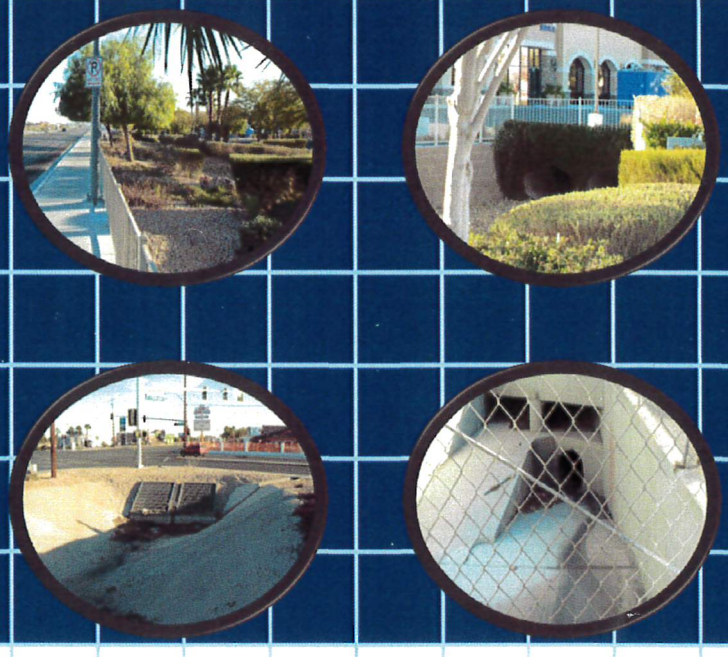
April 2014

Technical Drainage Report



Rancho Drive Capacity Improvements Rainbow Boulevard to Decatur Boulevard and Gowan Outfall - Alexander Road Facilities

Prepared For:

City of Las Vegas (Public Works)
333 N. Rancho Drive
Las Vegas, NV 89106
Phone: (702) 229-6276

Prepared By:

Stanley Consultants INC.
A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

Stanley Consultants, Inc.
5820 South Eastern Avenue,
Suite 200
Las Vegas, Nevada 89119
Phone: (702) 369-9396

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Rancho Dr Capacity Improvements (Rainbow to Decatur) Date: 4/6/2014

Location of Development: a) Descriptive (Cross Streets) North/South: Rancho Drive

East/West: Rainbow Blvd to Decatur Blvd

b) Section: varies Township: Range:

c) APN : See Next Page

Name of Owner: City of Las Vegas c/o Gina Venglass

Telephone No.: (702) 229-6790 Fax No.: 702-369-9793 E-Mail Address: gvenglass@lasvegasnevada.gov

Address: 333 N. Rancho Drive, Las Vegas, NV 89106

Contact Person-Name: Lant Leavitt **Telephone No.:** 702-369-9396

* **E-Mail Address:** LeavittLant@stanleygroup.com **Fax No.:** 702-369-9793

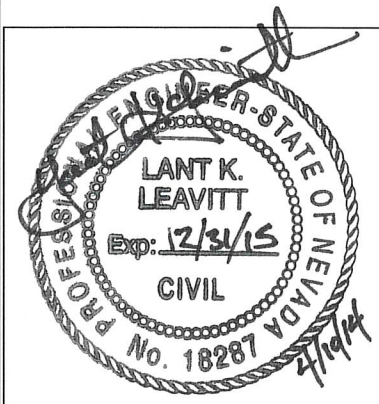
Firm: Stanley Consultants

Address: 5820 S. Eastern Ave, Suite 200, LV NV 89119

Type of Land Development/Land Disturbance Process:

☐	Rezoning	☐	Subdivision Map	☐	Clearing and Grading Only
☐	Parcel Map	☐	Planned Unit Development	☒	Other (Please specify below)
☐	Large Parcel Map	☐	Building Permit		Roadway and CCRFCD facility

1. Total Owned Land Area: At Site: right-of-way Being Developed/Disturbed: entire roadway
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☒ **Yes**** ☐ **No**
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ **Yes**** ☐ **No**
4. Proposed type of development (Residential, Commercial, Etc.): Roadway improvements and CCRFCD Flood Control Facilities
5. Approximate upstream land area which drains to the subject site:
6. Has the site drainage been evaluated in the past? ☒ **YES** ☐ **NO** If yes, please identify documentation: Rancho LOMR
   Refer to Draft Technical Drainage Study section 1.__ for a complete list of referenced studies.
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: varies along roadway
8. Briefly describe your proposed schedule for the subject project:
   Construction to be determined as project is not yet funded for construction.



Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

*New Required Field

****Review and concurrence of the Clark County Regional Flood Control District is required.**

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

Standard Form 1 – supplemental sheet with project APN's for the Rancho Drive Capacity Improvements – Rainbow Blvd to Decatur Blvd – and Gowan Outfall – Alexander Road Facilities

125-34-799-004
125-34-899-003
125-35-499-005
138-01-499-002
138-01-499-003
138-01-499-007
138-01-499-015
138-01-499-016
138-01-499-017
138-01-499-019
138-01-899-001
138-01-899-003
138-01-899-012
138-01-899-013
138-01-899-014
138-01-899-017
138-01-899-018
138-01-899-019
138-02-199-002
138-02-299-003
138-02-699-003
138-02-699-005
138-02-699-006
138-02-799-001
138-02-799-002
138-02-899-003
138-02-899-010
138-02-899-011
138-12-199-002
138-12-199-003
138-12-199-004
138-12-199-005
138-12-199-007
138-12-299-003
138-12-399-004
138-12-799-010
138-12-899-024
138-13-599-003
138-13-699-002
138-02-799-004
138-02-899-003
138-07-199-001
138-12-199-004
138-12-199-005
138-12-199-006
138-12-199-007
138-12-199-008
138-12-199-009
138-12-199-033
138-12-599-001
138-12-599-003
138-12-599-010
138-12-599-015
139-07-199-002
139-07-199-015

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name:	Rancho Drive	Map ID:	See form 1 supplemental
Firm Name:	Stanley Consultants	Engineer:	Lant Leavitt, PE
Address:	5820 S. Eastern Ave., Suite 200		
City:	Las Vegas	State: NV	Zip: 89119
Phone Number:	(702)369-9396	Fax Number:	(702) 369-9793
Property Owner:	City of Las Vegas		
Address:	333 N. Rancho Drive		
City:	Las Vegas	State: NV	Zip: 89106
Reviewed By:		Date Received:	Date Accepted for Review:

The following checklist is intended as a guide for the engineer preparing a Technical Drainage Study to submit to the local entity and Clark County Regional Flood Control District (if necessary). The listed items are the minimum information required prior to the entity performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (MANUAL).

This document is intended as an aid in preparing Technical Drainage Studies. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

If items are not applicable for the subject site, provide N/A.

I. GENERAL REQUIREMENT

YES	NO	
X		Design manual **Standard Form 1** with the engineer's seal and signature.
X		Design manual Standard Form 4.
X		2 copies of the 24" x 36" drainage Plan.
n/a		A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

REFERENCE:	**STANDARD FORM 2**

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS

Yes	No	
X		A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
x		a copy of current CCRFCD Master Plan Update Figure for Flood Control Facilities and Environmental areas with the site delineated.
X		Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.
x		On-site drainage basin maps for existing and proposed conditions showing the existing topography, basin boundaries, concentration points, and on-site and off-site flows in cfs.
X		Vicinity Map with local and major cross streets identified and a north arrow.

III. DRAINAGE PLANS

Yes	No	
n/a		Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada.
X		Minimum scale: 1" = 60'. (Frontage Channel Plan)
X		Project name.
X		Vicinity Map with local and major cross streets.
X		Revision box.
X		North arrow and bar scale.
X		Engineer's/consultant's address and phone number.
X		Elevation datum and benchmark.
X		Legend for symbols and abbreviations.
X		cut/fill scarps, where applicable.
X		Street names, grades widths.
n/a		Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street.

REFERENCE: | **STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
X	___	Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.
X	___	Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
x	___	Proposed typical street sections.
NA	___	Streets with off-set crowns.
n/a	___	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X	___	Property lines.
X	___	right-of-way lines and widths, existing and proposed.
X	___	Existing improvements and their elevations.
X	___	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
x	___	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X	___	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
x	___	Location and cross-section of street capacity calculations.
x	___	Cross-sectional detail for channels, including cutoff wall locations.
X	___	Existing and proposed drainage facilities, appurtenances, and connections (I.e., sidewalk, ditches, swales, storm drain systems, unimproved channels, and improved channels, and culverts, etc.) starting size, material, shape, and slope eighth plan and profile an HGL calculations.
N/A	___	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
NA	___	Location and detail of existing, proposed, and future block wall openings. Minimum size is 16" x 48 ". Wrought iron gate is required for flows > 10 cfs.
NA	___	Locations and detail of flood walls illustrating depth of flow, proposed grouting height, etc.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
n/s	____	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit.
n/a	____	Building and/or lot numbers.
x	____	alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
x	____	limits of existing floodplain based on current FIRM of best available information; limits of proposed floodplains based on best available information.
n/a	____	For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, of in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
n/a	____	Approximately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
X	____	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.

IV. HYDROLOGIC ANALYSIS

Yes	No	
mpu/lomr		Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
X	____	Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
X	____	Use of correct precipitation values in and around the McCarran Airport rainfall area.
X	____	A discussion on the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
X	____	a summary table of stormwater flows showing basin area, Q10 and Q100 for both individual basins and combined basin flows, where applicable.
X	____	copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
X	____	On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
x		Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
x		Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. Q_{100} d x v < < 8. Q_{10} d x v < 6 and 12 foot dry lane for rights-. of-way > 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
x		A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
NA		Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged).
NA		Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.
n/a		Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provide with 18 inches of freeboard above the Q100 weir height or flow depth, which ever is greater.
n/a		A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones.

Field survey data.
Input and output information.
Plotted cross-sections based on survey with proper encroachments.
A map showing the location of the cross-sections.
Analysis of both sub and super-critical flow segments.
A summary table and a discussion of the results in the text of the report.

25 / NDOT		Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
X		hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation.
NA		The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.

REFERENCE: **STANDARD FORM 2**

Technical Drainage Report for the Rancho Drive Capacity Improvements - Rainbow Boulevard to Decatur Boulevard - and Gowan Outfall - Alexander Road Facilities

April 2014
CLV Project # 110220
SCI Project # 23629

Prepared for:
City of Las Vegas (Public Works)
333 N. Rancho Drive
Las Vegas, NV 89106
Phone: (702) 229-6276

Prepared By:
Stanley Consultants, Inc.
5820 South Eastern Avenue, Suite 200
Las Vegas, Nevada 89119

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EXECUTIVE SUMMARY

This Technical Drainage Report for the Rancho Drive Capacity Improvements - Rainbow Boulevard to Decatur Boulevard - and Gowan Outfall - Alexander Road Facilities presents the hydrologic and hydraulic analyses performed for the Rancho Drive Capacity Improvement project. It also describes the drainage facilities that are recommended for construction with the project, including the Clark County Regional Flood Control District's (CCRFCD), 2008 Las Vegas Valley Master Plan Update (MPU) flood control facility, Gowan Outfall – Alexander Road Facilities. This study is submitted with the 70 percent improvement plan package for the Rancho Capacity Improvements. The recommended alignment for the Gowan Outfall – Alexander Road Facilities, recommended drop inlet locations, and the alignment of four minor storm drain systems are shown on those plans.

Storm runoff conveyed to Rancho Drive is substantial, more than 200 cfs during the 100-year event. The extent of flooding is exacerbated by the low slopes of Rancho Drive, typically less than 1 percent to as low as 0.1 percent. Existing swales located in the properties west of Rancho Drive are typically set at elevations below the roadway and convey much of the offsite flow south parallel to the road. This condition will exist until the upstream flood control facilities are constructed. Therefore, the proposed improvements were designed so that the interim condition perpetuates these existing conditions: the capacity of existing swales is maintained; drop inlets are proposed to discharge into existing swales; and the Gowan Outfall - Alexander Road Facilities are proposed to be capped at the upstream ends. While offsite flow rates in the interim condition are too high for Nevada Department of Transportation (NDOT) spread criteria to be met; drop inlets are spaced such that these criteria are met for the onsite flows. The design improves flood protection of adjacent properties in the ultimate condition through the installation of the storm drain facilities and preservation of existing swale capacity.

Analyses and design for the flood control facilities proposed as part of the Rancho Capacity Improvements meet criteria set forth by the City of Las Vegas, NDOT, Regional Transportation Commission (RTC), and CCRFCD. With the exception of the Gowan Outfall – Alexander Road Facilities, storm drain and drop inlets are sized for onsite 25-year storm event flow rates. The Gowan Outfall – Alexander Road Facilities are sized for the offsite 100-year storm flow rates, which are currently conveyed as surface flow to the project site. The drop inlets proposed with this facility are designed to capture the 100-year onsite flows. The analysis and design of this MPU facility extends from Craig Road, roughly 100 feet west of the Craig Road/Rancho Drive intersection, south in Rancho Drive to Alexander Road, and then east in Alexander Road to the intersection of Alexander Road and Decatur Boulevard.

The specific MPU facilities that are recommended for inclusion in the Rancho Drive Capacity Improvement project are the following: 2700 lf of 10' X 8' reinforced concrete box culvert in Rancho Drive from Jones Boulevard to Craig Road (GOAL 0111); 1100 lf of 12' X 8' reinforced concrete box culvert in Rancho Drive from Alexander Road to Jones Boulevard (GOAL 0100 and GOAL 0111); 160 lf of 12' X 8' reinforced concrete box culvert in Rancho Drive turning east on Alexander Road (GOAL 0000); 150 lf of 8' X 5' reinforced concrete box culvert in Alexander Road, west of Rancho Drive, as part of facility GOA2 0000; and 301 lf of 10' X 8' reinforced concrete box culvert in Craig Road, west of Rancho Drive, as part of facility GOAL 0168. Recommended facilities also include the following: inlets in Rancho Drive between Craig Road and Alexander Road, which are proposed to capture all of the onsite 100-year flow to take full advantage of the regional facility being constructed; inlets in Rancho Drive between Rainbow Boulevard and Craig Road and between Alexander Road and Decatur Boulevard to meet NDOT spread criteria for the 25-year storm event; a 24-inch RCP system on the west side of Rancho north of Cheyenne; an 18-inch RCP system on the east side of Rancho north of Cheyenne; and an 18-inch system on the east side of Rancho north of Gowan.

Upstream of the Rancho Drive/Alexander Road intersection, at the northwest corner of the intersection, an outlet structure is recommended to discharge the interim flow collected by the facility. An 18-inch orifice plate is proposed downstream of the outlet structure so that large flows are not conveyed into the 12' X 8' RCB in Alexander Road. A 24-inch RCP is proposed to drain low flows to the 96-inch RCP located at the intersection of Alexander Road and Decatur Boulevard.

Flow released by the outlet structure will split, with the majority of the flow continuing south in Rancho Drive and a portion conveyed east in Alexander Road. This pattern is consistent with the surface flow patterns described in the Rancho/US95 LOMR Floodplain Delineation study by Louis Berger Group (*Rancho LOMR*). In order to limit additional flow being conveyed to this location, the upstream portion of the Gowan Outfall – Alexander Road Facilities in Craig Road and in Jones Boulevard are proposed to be capped and should not be constructed until the downstream, Gowan Outfall facilities are complete.

In the future, the 12' X 8' reinforced concrete box culvert in Alexander Road (GOAL 0000) will continue east for approximately 4080 lf. Then, it will transition into two parallel 9' X 6' RCB's in order to resolve a sewer conflict located west of Decatur Boulevard. At the intersection of Alexander Road and Decatur Boulevard, these boxes will join with the existing, northbound 96-inch RCP, Gowan Outfall Facility (GOOF 0427) and continue east in Alexander Road as regional facility Gowan Outfall Facilities (GOOF 0375).

Construction costs for the Rancho Capacity Improvement project is estimated at $41.5 million. Of this cost, the costs associated with the Gowan Outfall – Alexander Road Facilities are estimated at $9.1 million.

1. INTRODUCTION

On July 25, 2011, Stanley Consultants, Inc. received a Notice-to-Proceed from the City of Las Vegas (CLV) to begin preliminary design services for the Rancho Drive Capacity Improvements – Decatur Boulevard to Rainbow Boulevard Project. The 30 percent design package for this roadway project was submitted January 2012. The drainage study submitted as part of the package identified the need for the future Clark County Regional Flood Control District (CCRFCD) 2008 Las Vegas Valley Master Plan Update (MPU) facility that is planned within Rancho Drive between Craig Road and Alexander Road, referred to as the Gowan Outfall – Alexander Road Facilities (Facility numbers GOAL 0100 and GOAL 0111). Thus, on June 26, 2012 the City of Las Vegas approved an additional service request to complete the 30 percent Design Phase package for the Gowan Outfall – Alexander Road Facilities. The Preliminary Design Report for these facilities was submitted December 5, 2012 and included 30 percent plan and profile for the storm drain facility, construction cost estimates, and additional survey. The analysis and recommendations from that study are incorporated into this final report, the Technical Drainage Report for the Rancho Drive Capacity Improvements – Rainbow Boulevard to Decatur Boulevard - and the Gowan Outfall - Alexander Road Facilities.

The purpose of this report is to compile the 30 percent findings for the Rancho Drive Capacity Improvements with those from the Preliminary Report for the Gowan Outfall – Alexander Road Facilities, present the final hydrologic and hydraulic analyses, and recommend drainage facilities necessary to meet criteria set forth by the City of Las Vegas, the Nevada Department of Transportation (NDOT), Regional Transportation Commission (RTC), and the Clark County Regional Flood Control District (CCRFCD). The report includes hydrologic and hydraulic descriptions and calculations for the existing roadway conditions and recommended drainage facilities as well as a summary of costs, utility conflicts, and geotechnical considerations. It is submitted with the 70% construction documents, which include cost estimates for the recommended flood control facilities and a utility conflict matrix, improvement plans and specifications.

The design for the project will be completed and bid together at such a time as construction funds become available.

2. RANCHO DRIVE CAPACITY IMPROVEMENTS PROJECT DESCRIPTION

2.1. Project Scope

The Rancho Drive Capacity Improvements Project includes the design of roadway and drainage facilities along Rancho Dr. between Decatur Blvd. and Rainbow Boulevard Two design alternatives were prepared to a 30% level for consideration by the City of Las Vegas:

- Option A: Construction of incomplete improvements (i.e. sawtooths, sidewalk, curb and gutter); 10-ft wide sidewalks where right-of-way is available (5-ft wide sidewalks where it is not); ADA sidewalk ramps; bus turnouts; turn lanes at major intersections, new streetlights, traffic signals and striping; preservation of existing sidewalk; median modifications, which include beautification elements within the 14-ft wide median and reduced median widths at intersections; mill and overlay and removal/replacement of existing asphalt where necessary.

- Option B: Construction of a complete street with a fourth outside travel lane in both directions (for local transit services); reconstruction of curb, gutter and sidewalks (curb line moves in); ADA sidewalk ramps; turn lanes at major intersections; new streetlights, traffic signals and striping; 10-ft wide sidewalks with an included amenity zone; median modifications, which include beautification elements within the 14-ft wide median and reduced median widths at intersections; mill and overlay and removal/replacement of existing AC where necessary.

The City of Las Vegas selected Option B. This final technical drainage report describes the hydrologic and hydraulic analyses performed for this option as well as recommended drainage facilities for this option. This report also includes the analysis for the Gowan Outfall – Alexander Road Facilities, which Stanley Consultants recommends be constructed as part of the Rancho Capacity Improvements. This storm drain facility is a CCRFCD Master Plan facility that will convey flow from the intersection of Rancho Drive and Craig Road south to the intersection of Rancho Drive and Alexander Road (where Alexander Road continues east past Rancho Drive).

The Gowan Outfall – Alexander Road Facilities will convey flow from the intersection of Rancho Drive and Craig Road south to the intersection of Rancho Drive and Alexander Road (where Alexander Road continues east past Rancho Drive). Ultimately, the downstream continuation of this facility will convey the flow east in Alexander Road. For the interim condition an outlet structure is proposed at the northwest corner of Rancho Drive and Jones Boulevard. Flow released by this structure will split, with the majority of the flow continuing south in Rancho Drive and a portion conveyed east in Alexander Road. This flow

pattern is consistent with the surface flow patterns described in the *Rancho LOMR*. The outlet structure has a 24-inch RCP bleeder line that terminates at the intersection of Alexander Road and Decatur Boulevard and discharges into the existing CCRFCD facility GOOF 0375. This pipe allows the box to drain. To minimize pressure in the RCP, an 18-inch orifice plate is proposed at the upstream end of the bleeder line. The design for the Gowan Outfall – Alexander Road Facilities extends from Craig Road roughly 100 feet west of Rancho Drive to the intersection of Alexander Road and Decatur Boulevard. The general location and alignment of the proposed flood control facilities and the Rancho Capacity Improvement Project are shown on Figure 1.

Rancho Drive is a Nevada Department of Transportation right-of-way. Therefore, the analyses and design for the Gowan Outfall – Alexander Road Facilities and additional storm drain facilities recommended as part of the Rancho Drive Capacity Improvements meet criteria set forth by the City of Las Vegas, the Nevada Department of Transportation (NDOT), Regional Transportation Commission (RTC), and the Clark County Regional Flood Control District (CCRFCD). Copies of this report were submitted to CCRFCD and NDOT for their review and approval.

Sewer improvements within the project limits are part of a separate project, City of Las Vegas Sewer Rehabilitation Group F, which was designed by Stanley Consultants. These improvements include both rehabilitation and relocation. The design of the Gowan Outfall – Alexander Road Facilities and other storm drain facilities was coordinated with the Group F project to avoid conflicts between the storm drain and sanitary sewer.

2.2. Project Location

The location of the Rancho Drive Capacity Improvement Project is the 3 miles of Rancho Drive between the northernmost intersection of Decatur Boulevard and Rancho Drive and the southernmost intersection of Rainbow Boulevard and Rancho Drive, in the City of Las Vegas, Nevada (Figure 1). The majority of the proposed improvements are located within Nevada Department of Transportation jurisdiction. Therefore, this study will require NDOT approval. Specifically, the property is identified by the Assessor's Parcel Numbers (APNs) 125-34-799-004, 125-34-899-003, 125-35-499-005, 138-02-199-002, 138-02-299-003, 138-02-699-003, 138-02-799-002, 138-02-899-003, 138-01-499-015, 138-12-199-003, 138-12-299-003, 138-12-399-004, 138-12-799-010, 138-12-899-024, 138-13-599-003, and 138-13-699-002.

3. PROJECT BACKGROUND INFORMATION

3.1. Referenced Drainage Studies

As part of the engineering services, Stanley Consultants obtained and reviewed hydrologic and hydraulic reports and studies performed for areas surrounding, tributary to and adjacent to the project site. The following studies were reviewed in the preparation of this report:

- *2008 Las Vegas Valley Flood Control Master Plan Update* (*MPU*), prepared for Clark County Regional Flood Control District, prepared by PBS&J, September 2008.
- *Rancho Drive/US 95 LOMR (Rancho LOMR)*, prepared for City of Las Vegas, prepared by The Louis Berger Group, Inc., November 13, 2006.
- *Final Design Report for Gowan Outfall Lone Mountain Branch Rancho to Decatur* (Gowan Outfall), prepared for City of Las Vegas, prepared by G.C. Wallace, Inc., January 2009.

3.2. FEMA Floodplain Information

The project site is located on Flood Insurance Rate Maps (FIRM) panel 1765 (Map Number 32003C1765 F, revised November 16, 2011) and panel 2155 (Map Number 32003C2155 F, revised to reflect LOMR dated November 16, 2011 and also revised to reflect LOMR dated November 17, 2011). The project site is primarily located within flood zones AE, with portions of the project in zones A and X.

FIRM panels showing the limits of the project are included in this study as Figures 2A and 2B. Flood zones are defined by FEMA as follows:

- Zone A is a Special Flood Hazard Area subject to inundation by the 1% annual chance flood with no base flood elevations determined.
- Zone AE is a Special Flood Hazard Area subject to inundation by the 1% annual chance flood with base flood elevations determined.
- Zone X is an area determined to be outside the 0.2% annual chance floodplain.

3.3. Clark County Regional Flood Control District Facilities

The CCRFCD facilities analyzed in this technical drainage study are the Gowan Outfall – Alexander Road Facilities in Rancho Drive from Craig Road to Alexander Road (GOAL 0111 and GOAL 0100) and the Gowan Outfall – Alexander Road facility in Alexander Road from Rancho Drive to Decatur

Boulevard (GOAL 0000). Other CCRFCD facilities within or adjacent to this project include the following: the Gowan Outfall – Lone Mountain Road Branch (GOLO 0275) within Rancho from Rainbow Boulevard to Lone Mountain; the Gowan Outfall Facilities (GOOF 0486 and 0511) at the intersection of Gowan and Rancho Drive; the Gowan Outfall Facilities (GOOF 0375 and 0427) at the intersection of Decatur Boulevard and Alexander Road; the Gowan Outfall Facilities (GOA2 0000) at Rancho Drive and Jones Boulevard; and Rancho Drive and the North Las Vegas Air Terminal (LAAT 0201 and 0204) at the intersection of Rancho Drive and Decatur Boulevard.

Figure 3A shows the project site with respect to CCRFCD facilities in the area. It also shows the additional section of the Gowan Outfall – Alexander Road Facilities studied in this report. This figure is reproduced from Figures F-19, F-20 and F-26 of the CCRFCD MPU. An annotated facility inventory is included in this study as figures 3B through 3C.

The facilities in the project area and those being constructed with the project, their corresponding identification number (ID), and types and sizes are listed in Table 1. Due to the detailed hydraulic analysis performed for this report, there are minor differences between the sizes recommended in this report with those presented in the MPU. For comparison purposes, the table includes both sizes.

Table 1 – CCRFCD Facilities

FACILITY	ID	Size and Type: Recommended	Size and Type: MPU	Location and construction status
Gowan Outfall Facilities	GOLO 0275	N/A - Existing	8' X 6' RCB	In Rancho Dr. between Rainbow Blvd. and Lone Mountain Rd
Gowan Outfall – Alexander Road facilities	GOAL 0000	Dual 9' X 6' RCB	10' X 9' RCB	In Alexander Rd from Decatur Blvd to just west of Tuffer Ln Sta. 146+82.30; future construction
		12' X 8' RCB	10' X 9' RCB	In Alexander Rd from west of Tuffer Ln to Rancho Dr; future construction
Gowan Outfall – Alexander Road facilities	GOAL 0100	12' X 8' RCB	10' X 8' RCB	In Rancho Dr from Alexander Rd to Jones Blvd; construct with Rancho Dr
Gowan Outfall – Alexander Road facilities	GOAL 0111	12' X 8' RCB	10' X 8' RCB	In Rancho Dr from Jones Blvd to Sta. 96+37.61; construct with Rancho Dr
		10' X 8' RCB	10' X 8' RCB	In Rancho Dr from station 96+37.61 to Craig Rd; construct with Rancho Dr
Gowan Outfall – Alexander Road facilities	GOAL 0168	10' X 8' RCB	10' X 8' RCB	At Rancho Dr and Craig Rd, stub west into Craig Rd; construct with Rancho Dr

FACILITY	ID	Size and Type: Recommended	Size and Type: MPU	Location and construction status
Gowan Outfall – Alexander Branch	GOA2 0000	8' X 5' RCB	8' X 5' RCB	At Rancho Dr and Jones Blvd, stub west into Jones Blvd; construct with Rancho Dr
Gowan Outfall Facilities	GOOF 0375	Not part of this project	2 ea. 12' X 8' RCB	In Alexander Rd, continues east past Decatur Blvd to Simmons; construct in future
Gowan Outfall Facilities	GOOF 0427	N/A - Existing	Existing 96" RCP	In Decatur Blvd, from Alexander Rd to Gilmore
Gowan Outfall Facilities	GOOF 0486	N/A - Existing	Existing 8' X 5' RCB	In Gowan Rd east of Rancho Dr
Gowan Outfall Facilities	GOOF 0511	N/A - Existing	Existing 8' X 5' RCB	In Gowan Rd west of Rancho Dr
Gowan Outfall Facilities	LAAT 0204	N/A - Existing	Existing 76 inch X 48 inch RCP	In Decatur Blvd. at Rancho Dr /Decatur Blvd intersection

The specific facilities that will be constructed with Rancho Drive are the following:

- 2700 lf of 10' X 8' reinforced concrete box culvert in Rancho Drive from Jones Boulevard to Craig Road (GOAL 0111)
- 1100 lf of 12' X 8' reinforced concrete box culvert in Rancho Drive from Alexander Road to Jones Boulevard (GOAL 0100 and GOAL 0111)
- 160 lf of 12' X 8' reinforced concrete box culvert in Rancho Drive turning east on Alexander Road (GOAL 0000)
- 150 lf of 8' X 5' reinforced concrete box culvert in Alexander Road, west of Rancho Drive, as part of facility GOA2 0000; and 301 lf of 10' X 8' reinforced concrete box culvert in Craig Road west of Rancho Drive, as part of facility GOAL 0168.

For the interim condition, a 24-inch RCP storm drain system is proposed to drain this portion of the Gowan Outfall facility to the existing Gowan Outfall facility at Alexander Road and Decatur Boulevard (GOOF 0325); an outlet structure is proposed at the northwest corner of the Rancho Drive and Alexander Road intersection for storm events that exceed the capacity of the 24-inch RCP storm drain system. Stanley Consultants was recently selected to design the downstream portion of the Gowan Outfall – Alexander Road Facilities. If this facility's design and construction are completed prior to those of the Rancho Capacity Improvements, the outlet structure and bleeder line will no longer be required.

In the future, the 12' X 8' reinforced concrete box culvert in Alexander Road (GOAL 0000) will continue east for approximately 4080 lf. Then, it will transition into two, parallel 9' X 6' RCB's in order to resolve a sewer conflict located west of Decatur Boulevard; the two boxes will continue east for 1066 lf. At the intersection of Alexander Road and Decatur Boulevard, these boxes and the northbound Gowan Outfall Facility (GOOF 0427), a 96-inch RCP, will join and continue east in Alexander Road as regional facility Gowan Outfall Facilities (GOOF 0375).

4. SURVEY AND EASEMENT INFORMATION

4.1. Survey Summary

Aerial mapping and topographic information at a contour interval of 1 foot was acquired for Rancho Drive between Rainbow Boulevard and Decatur Blvd and for Alexander Road from Rancho Drive to Decatur Blvd. An extensive ground survey was also completed to gather horizontal and vertical data at key locations along the project corridor and in order to acquire invert elevations of existing storm drain and sanitary sewer facilities and locate to other utilities. Additional survey for utilities was performed once potholing of these facilities was complete.

The project control survey was performed using RTK GPS survey techniques. City Benchmarks along the corridor were collected and checked for additional quality assurance. Measurements were gathered for drainage features such as sidewalk under drains, channels, storm sewer manholes (including depth measurements), culverts, headwalls, valley gutters and drop inlets (including depth measurements). Points were gathered for above ground utility appurtenances including water, sewer, electrical, cable, TV, telephone, fiber optic and natural gas facilities such as pull boxes, vaults, poles, meters, valves and manholes. Points were gathered for street cross sections at intervals between 50 and 100 feet. Street cross sections include shots at back of sidewalk, top of curb, gutter flow line, edge of pavement, street crown, edges of driveways, curb returns and pothole locations.

Rancho Drive is an NDOT right-of-way. The NDOT stationing established for Rancho Drive is referred to as the "LM" line in NDOT record drawings. The stationing is in metric units and is based on the alignment or centerline of the right-of-way. Because the construction documents for Rancho Drive are in English units, the stationing for the Rancho Drive project is also in English units. This stationing is based on the Record of Survey the City of Las Vegas performed for the Rancho Corridor to establish centerline monumentation and identifies all of the NDOT monuments for Rancho Drive that were found during the survey. The monumentation placed and referenced for the City's Record of Survey was based on what the survey referred to as the "O" line. The "O" line is the same centerline of the right-of-way as NDOT's

"LM" line. The angle point just north of Cheyenne was used to establish a station equation to convert the Record of Survey stationing to NDOT stationing (note, this angle point is the only angle point on the project). The NDOT, or "LM", station at this location is 56+04.561 meters; the Record of Survey, or "O", station is 138+92.58 feet. Thus, any station along the "O" line can be converted to the "LM" station by dividing by 3.2808333333 and adding 1370.094 meters.

Multiple benchmarks were used to vertically constrain the project to the City of Las Vegas Vertical Control published values. All elevation data are based on 1988 North American Vertical Datum (NAVD 88). Horizontal control is constrained to NAD83/1994 Nevada East Zone (2701) State Plane Coordinates based on the Las Vegas Valley Water District CORS stations Carlton Square and Tropicana. A project ground coordinate system was established for design purposes.

4.2. Rights-of-Way and Easements

Right-of-way plans for the Rancho Drive Capacity Improvement are included in the 70 percent construction document submittal for the project. These plans identify the additional right-of-way, temporary construction easements, and permanent easements that are required for the Rancho Drive project between Rainbow Boulevard and Decatur Boulevard. The plans also include the temporary construction easements and permanent easement that are required for the Gowan Outfall – Alexander Road Facilities.

5. GEOTECHNICAL CONDITIONS AND RECOMMENDATIONS

Preliminary pavement evaluation was performed for the Rancho Drive Capacity Improvements project by GeoTek, January 31, 2012. The report was provided as part of the 30 percent construction documents. The purpose of the study was to determine the asphalt concrete and aggregate base thicknesses along the existing roadway, to evaluate the earth materials underlying the project alignment and to determine the condition of the existing pavement section. The results of the study were used to determine locations where new pavement was required versus mill and overlay. These locations are shown on the improvement plans.

Further investigation was performed to evaluate the subsurface conditions related to the storm drain system. The updated report by GeoTek, May 31, 2013, is provided with the 70 percent construction documents. The report describes subsurface conditions that include hard to very hard soil in some areas as well as loose and soft soils. The hard to very hard soils may require the contractor to utilize special construction methods for the handling and removal of the material. The loose and soft soils may prove to be unstable during trenching operations for the deep drainage facilities excavation and, thus, require the

contractor to utilize shoring. Discussion of these issues and other geotechnical issues and recommendations are included in the project specifications.

6. UTILITY IMPACTS

The storm drain facilities proposed with the Rancho Drive and Gowan Outfall – Alexander Branch improvements affect existing utilities in the area. To document conflicts and proposed resolutions with these utilities, a Utility Conflict Matrix has been prepared with the 70 percent construction documents (Appendix E.) The Utility Conflict Matrix lists the existing utility, the proposed feature that is in conflict and whether the existing utility can be protected-in-place, concrete encased, or relocated. In addition to utilities in Rancho Drive, it lists utilities that may be in conflict with the portion of the Gowan Outfall – Alexander Road Facilities that are in Alexander Road. Potholes were performed for utilities that cross proposed drop inlet laterals and storm drains, and also at major intersections for utilities that will be located in the proposed sidewalk. Additional potholes will be required for these and other utilities prior to completion of the 90 percent construction documents.

Utility impacts of the Gowan Outfall – Alexander Road Facilities and other storm drain facilities are summarized in this study. They include selection of drop inlet types, sanitary sewer conflicts, water conflicts and dry utility conflicts.

6.1. Drop Inlet Types:

The majority of existing utilities in the Rancho Drive alignment are within or near the sidewalk area. To minimize conflicts and relocations of these existing utilities, the proposed drop inlet for the project is type DM2 from detail 412.1 of the Uniform Standard Drawings Clark County Area. This inlet is narrower than the type CM2 drop inlet, with less cross sectional area located behind the curb (see detail included in Appendix G). At locations where extremely minimal cover is available, a custom curb opening is proposed. It is essentially a modified sidewalk underdrain that intercepts flow and conveys it away from the street (see Plan Sheet SD-56.)

6.2. Water Conflicts:

Conflicts with water utilities are resolved in conformance with the Las Vegas Valley Water District Uniform Design and Construction Standards for Potable Water Systems, 2003 Edition (UDACS). The proposed improvement plans show a minimum of 10 feet of horizontal clearance between the proposed RCB mainline and adjacent parallel water facilities, which meets the requirements of UDACS Section 2.19. Asbestos concrete pipe (ACP) waterlines crossing trenches greater than 4 feet in width during

construction are proposed to be replaced with ductile iron pipe (DIP) across the spanning section. Special instructions for the removal and disposal of ACP will be provided in the project special provisions. In most locations of the proposed vertical alignment of the storm drain facility, a minimum of 1.5 feet of clearance is maintained with existing waterlines. Concrete encasements will be provided per Design and Construction Standards for Wastewater Collection Systems (DCSWCS) Standard Drawing SD-11 for locations that do not meet the minimum vertical clearance requirements. Major water-storm drain conflicts include the following (conflict number corresponds to the conflict listed in the Utility Conflict Matrix):

- CONFLICT NO. 155 (Station 70+00): Existing 8-inch ACP water line is in conflict with proposed storm drain area drain. It is proposed to relocate the existing water line.
- CONFLICT NO. 157 (Station 71+75): Existing 8-inch ACP water line is in conflict with proposed storm drain area drain. It is proposed to relocate the existing water line.
- CONFLICT NO. 252 (Station 103+75): Existing 12-inch ACP water line is in conflict with proposed storm drain bubbler structure. It is proposed to relocate the existing water line.
- CONFLICT NO. 258 (Station 105+40): Existing 24-inch ACP water line is in conflict with the 12' X 8' RCB and a proposed drop inlet. It is proposed to relocate the water line.
- CONFLICT NO. 301 (Station 128+75): Existing 6-inch PVC water line is in conflict with proposed storm drain drop inlet. It is proposed to relocate the water line.
- CONFLICT NO. 308 (Station 131+80): Existing 6-inch PVC water line is in conflict with proposed storm drain lateral. It is proposed to relocate the water line.
- CONFLICT NO. 451 (Station 108+50 - Alexander Alignment): Existing 8-inch PVC water line is in conflict with future storm drain. It is proposed to relocate the water line.
- CONFLICT NO. 452 (Station 112+00 - Alexander Alignment): Existing 8-inch PVC water line is in conflict with future storm drain. It is proposed to relocate the water line.
- CONFLICT NO. 453 (Station 113+50 - Alexander Alignment): Existing 8-inch PVC water line is in conflict with future storm drain. It is proposed to relocate the water line.
- CONFLICT NO. 454 (Station 116+50 - Alexander Alignment): Existing 8-inch PVC water line is in conflict with future storm drain. It is proposed to relocate the water line.

- CONFLICT NO. 455 (Station 122+50 - Alexander Alignment): Existing 6-inch ACP water line is in conflict with future storm drain. It is proposed to relocate the water line.

- CONFLICT NO. 456 (Station 122+50 - Alexander Alignment): Existing 6-inch ACP water line is in conflict with future storm drain. It is proposed to relocate the water line.

- CONFLICT NO. 457 (Station 132+50 - Alexander Alignment): Existing 8-inch PVC water line is in conflict with future storm drain. It is proposed to relocate the water line.

- CONFLICT NO. 458 (Station 156+75 - Alexander Alignment): Existing 16-inch ACP water line crosses proposed 24-inch RCP and future dual 9' X 6' RCB's in the Decatur Boulevard/Alexander Road intersection. It is proposed to relocate the 16-inch water line.

6.3. Sanitary Sewer Conflicts:

Conflicts with sanitary sewer facilities are resolved in conformance with the Clark County Water Reclamation District Design and Construction Standards for Wastewater Collection Systems, 1997 Edition (DCSWCS). In most locations, the proposed storm drain meets the minimum required one foot vertical clearance with existing sanitary sewer lines. In locations that don't meet the minimum vertical clearance requirements, concrete encasement has been provided (DCSWCS SD-11). The design for the Gowan Outfall – Alexander Road Facilities and other storm drain facilities were coordinated with the design for the City of Las Vegas Sewer Rehab Group F Project. The mainline sanitary sewer and storm drain systems are not in conflict. Sewer laterals are not in conflict with the Gowan Outfall – Alexander Road Facilities. Additional potholes may be required to confirm no conflicts exist with the minor storm drain systems. Major sanitary sewer-storm drain conflicts include the following:

- CONFLICT NO. 327 (Station 138+55): Conflict with a 24-inch sewer line and a proposed drop inlet. The 24-inch sewer will be CIPP lined with the City of Las Vegas Sewer Rehabilitation Group F Project, and protected in place with this project.

6.4. Dry Utility Conflicts:

Design adjustments were made to avoid conflicts with gas, power, telephone, cable and other dry utilities. Because the existing dry utilities are located either within the existing sidewalk or outside the existing roadway, most of the dry utility conflicts with proposed drainage facilities occur near the proposed curb line. Significant dry utility conflicts are with existing gas lines:

- CONFLICT NO. 115 (Station 65+00 RT 262 ft): Conflict with existing 10-inch steel gas line and the beginning of proposed 48-inch RCP connection from existing 48-inch RCP to proposed 10' X 8' RCB. It is proposed to relocate the 10-inch gas line.

- CONFLICT NO. 116 (Station 65+35 RT 212 ft): Conflict with existing 10-inch steel gas line and proposed 10' X 8' RCB connection from existing dual 7' X 3' RCB. It is proposed to relocate the 10-inch gas line.

- CONFLICT NO. 146 (Station 68+06 RT 13.5 ft): Conflict with proposed 10' X 8' RCB storm drain crossing an existing 10-inch steel gas line (16-inch steel sleeve). It is proposed to relocate the 10-inch gas line.

7. OFFSITE HYDROLOGY

The *Rancho Drive/US 95 LOMR* by The Louis Berger Group (*Rancho LOMR*) modeled the 100-year floodplain for the extents of this project. The existing and interim condition, offsite hydrology models were based primarily on the *Rancho LOMR*. For the existing condition, the *Rancho LOMR* analysis was revised to incorporate the Gown Outfall - Lone Mountain Branch (8' X 6' RCB CCRFCD facility GOLO 0275). This storm drain facility was constructed after the analysis for the *Rancho LOMR* was performed. Additionally, attributes for some of the sub-basins were updated to reflect development that occurred after the *Rancho LOMR* was completed. For the interim condition, the hydrologic model parameters were revised to include the portion of the Gowan Outfall – Alexander Road Facilities that are proposed with the Rancho Capacity Improvement Project. Specifically, inlet capture by the portion of the Gowan Outfall – Alexander Road Facilities that is located between Craig Road and Alexander Road is included in the model.

The developed condition, offsite hydrology models were based primarily on the MPU, specifically models for the Gowan and Central watersheds. Basins adjacent to Rancho Drive were referenced from the *Rancho LOMR* and revised to developed conditions where required. The models also include the basins east of Rancho Drive that contribute flow to the Gowan Outfall – Alexander Road Facilities.

7.1. Criteria and Modeling

The offsite flows impacting the project were determined in accordance with CCRFCD's *Hydrologic Criteria and Drainage Design Manual* (HCDDM) and NDOT Drainage Manual 2006 (DM06). The *HEC-1 Flood Hydrograph Computer Model* was used to estimate runoff. This program was developed by the U.S. Army Corps of Engineers Hydrologic Engineering Center in the late 1970's and adopted in 1988 by

the CCRFCD's HCDDM for rainfall and runoff predictions. The model is used to simulate the surface runoff response of a watershed to a design rainfall event by representing the watershed as an interconnected system of hydrologic and hydraulic components. Each component models an aspect of the rainfall-runoff process within a portion of the whole watershed. This basin portion is referred to as a sub-basin. The runoff hydrographs of each sub-basin are then combined and a final discharge hydrograph is obtained.

HEC-1 parameters are those drainage shed attributes that are input into the HEC-1 model in order to estimate peak runoff values. The parameters include the design storm, sub-basin delineation, hydrologic abstractions lag time and flow routing. These parameters were either based on the referenced studies or determined as described below.

Sub-basin Delineations: Offsite sub-basin areas were either referenced from the *Rancho LOMR* or the *2008 MPU*, or determined using AutoCAD.

Design Storm: The design storm events for the Rancho Capacity Improvements are the 6-hour, 10-, 25- and 100-year frequency rainfall events. CCRFCD requires streets to meet specific 10- and 100-year dry lane criteria, and NDOT requires Rancho Dr to meet specific 25- and 100-year criteria. The design storm event for the Gowan Outfall – Alexander Road Facilities is the 6-hour, 100-year frequency rainfall event. The rainfall pattern is based on Table 503 of HCDDM, 6-hour Design Storm Distributions. For the existing and interim conditions, storm distribution model SDN3 was used for this area because the *Rancho LOMR* showed that this storm provides the most conservative estimate for runoff to the project area. The *Rancho LOMR* split the analysis into an upper and lower HEC-1 models. For convenience, the analysis performed for this study is combined in a single HEC-1 model. In the developed condition, the area conveyed to the Rancho Drive site is less than 8 sq mi, therefore SDN3 distribution was used. The design storm events used for the analysis meet the criteria specified in DM06 and HCDDM.

The depth-duration-frequency data for the 100-year storm event were referenced from the *Rancho LOMR* and the MPU models. Most of the project site and contributing areas are located within the McCarran Rainfall Area (HCDDM Figure 513). Depth-duration-frequency values for this area were referenced from HCDDM Table 505. The adjustment ratios used in the HEC-1 models for the precipitation for the 10- and 25- year events were calculated from these values.

Depth-area reduction factors (DARF; Table 502 of HCDDM) were applied to the point rainfall depths based on the tributary area of the concentration point as specified in HCDDM. The DARFs for the 100-

year event were referenced from the MPU. Calculations for the 10- and 25-year event DARFs including their ratio to the 100-year event were performed. They are included in Appendix A.

Curve Number: Hydrologic Abstraction is the reduction of total rainfall to effective rainfall through runoff interception, infiltration, surface storage, evaporation, and/or evapotranspiration. These factors are influenced by surface cover and soil characteristics and input into the model as a "Curve Number" as defined in the *HCDDM*. Most of the curve numbers were referenced from the *Rancho LOMR* and MPU. For the few basins that were revised, soils groups were referenced from the MPU. Land use for sub-basins upstream of the site was based on existing development in the basin and assuming the basin would continue to develop in a similar manner. Calculations are included in Appendix A.

Lag Time: Lag time is described as the time between the center of mass of rainfall excess and the time of peak discharge from a basin. The time of concentration is defined as the time required for runoff to flow from the most hydraulically distant point of the sub-basin to the outlet of the sub-basin. Lag times were referenced from the *Rancho LOMR* and MPU as noted or calculated using Standard Form 4 (Appendix A).

Flow Routing: Most of the flow routing used in the HEC-1 model is referenced from the *Rancho LOMR* and MPU. New routing lengths were determined using AutoCAD.

Flow Split: Flow split calculations used in the model were performed in accordance with the *Standards Manual for Drainage Design and Floodplain Management in Tucson, Arizona, December, 1989* (Revised July, 1998). The equation calculates lateral flow conveyed into the side street from the total flow approaching the intersection, the width of the main and side streets, and the slope of the main street. Calculations were performed for four flow rates to develop a table of four upstream flow rates versus their downstream split flows. The tables were entered into the HEC-1 model so that each split is calculated from the actual HEC-1-modeled flow rate at the intersection. A detailed description of the calculation method and the calculations are included in Appendix D.

7.2. Offsite Existing Conditions

The majority of the offsite flow conveyed to Rancho Drive is from the west side of the Las Vegas Valley. The roadside properties located along the west side of Rancho Drive are typically at a lower elevation than the roadway. As a result, landscaped swales, parking areas and concrete and riprap channels convey the majority of the offsite flows south. East of Rancho Drive, topographic elevations decrease, so only small, local areas east of the road convey flow to the road. Existing conditions, drainage sub-basin boundaries and flow patterns are shown on Figure 4. The HEC-1 model results for offsite existing sub-

basins impacting the project site are included in Appendix A. The hydrology and hydraulics for the entrance driveways, etc., that convey flow to Rancho Drive are described in Section 8, Onsite Hydrology and Inlet Capture.

Both the existing condition model and the *Rancho LOMR* show that storm runoff conveyed to the site at major intersections is substantial (200 cfs or more during the 100-year event). In other words, the existing flooding in Rancho Drive is controlled by the offsite flows rather than onsite flows. The workmaps referenced from the *Rancho LOMR* are included in Appendix F. The existing condition model also shows the impact of the recently constructed Gowan Outfall – Lone Mountain Branch (GOLO 0275); capture of the surface runoff at intersection of Lone Mountain and Rancho Drive. South of Lone Mountain Road, along the alignment of the Gowan Outfall – Alexander Road Facilities, and continuing south to Decatur Blvd, the floodplain delineation shows that 100-year flows encroach into the roadway. While the completion of the Gowan Outfall – Lone Mountain Branch reduces the amount of flow conveyed south in Rancho Drive, flow rates are still too high for NDOT spread criteria to be met. The extent of flooding is exacerbated by the low slopes of Rancho Drive, typically less than 1 percent to as low as 0.1 percent.

Key locations where offsite flow impacts the design of Rancho Drive and their 100-year design storm flow rates are summarized below:

A. From Rainbow Boulevard to Lone Mountain Rd., the surface runoff is contained in the landscape swale located on the west side of Rancho Drive This flow is conveyed south to Lone Mountain Rd. where it and the westbound flow in Lone Mountain Rd. are captured by the Gowan Outfall storm drain, Lone Mountain Branch (concentration point C3AB2).

B. South of Lone Mountain Rd. to about 200 ft north of Craig Rd. (station 63+80; concentration point C2B3), normal depth calculations indicate that the 100-year storm, 91 cfs, will be conveyed south in the parking lot swales. For the 25-year storm, the energy gradeline at the south end of the parking lot swale is 1 ft, the depth of the swale. Therefore, all of the 25-year storm flows are expected to be diverted west into a concrete-lined channel west of Rancho Dr to an existing 48-inch culvert. The 100-year is expected to split as follows: 1) Most of the 100-year flow is expected to be diverted west in the concrete channel to the 48-inch culvert, which is situated below two, parallel 7' x3' RCB's; 2) Flow rates greater than the capacity of the 48-inch RCP, 88 cfs, will overtop this culvert and enter the 7' x3' RCB's; and 3) Flow that is not diverted west in the concrete channel will continue south in Rancho Dr to Craig Road. This flow will be captured

by an existing drop inlet, combine with the flow captured by the 48 in culvert, and continue east in an existing 60-inch storm drain.

C. Eastbound flow in Craig Road is conveyed to Rancho Drive then continues south. It combines with flow from the existing 7' x 3' RCB's, which is discharged into existing landscaped channels located south of Craig Road along the west side of Rancho Drive. The combined flow rate continues south, 135 cfs (2C2B3).

D. At the northern intersection of Rancho Drive with Alexander Road and Jones Boulevard, 514 cfs is conveyed south within the existing properties along the west side of Rancho Drive (concentration point 2CPT51).

E. At the southern intersection of Rancho Drive and Jones Boulevard-Alexander Road, flow splits: 103 cfs is conveyed east in Alexander Road (D6RCHO); 408 cfs continues south in Rancho Drive (6REMAIN).

F. As flow continues south toward Gowan Road, a portion of the total flow is captured by storm drain culverts and conveyed west and away from the project. At Gowan Road, 40 cfs of the 25-year storm is captured by the existing CCRFCD MPU facility Gowan Outfall (Facility number GOOF 0511; concentration point GOOF5A). This storm drain facility is full during the 100-year storm, so none of the 100-year storm is captured.

G. At the intersection of Gowan Road and Rancho Drive, flow splits: 690 cfs continues south in Rancho Drive (LWRRNCH). The remaining 229 cfs is conveyed east in Gowan Rd (DEASTGOW) to Decatur Boulevard, then north to the intersection of Alexander Road and Decatur Boulevard. There, it combines with the eastbound flow from the flow split described above at Alexander Road and with flows conveyed through offsite subbasin PT586-C for a total of 918 cfs at concentration point CCCPT56B.

H. South of Gowan Road to Cheyenne Avenue, the HEC-RAS performed for the *Rancho LOMR* shows flows being conveyed south both in Rancho Drive and through neighborhoods west of Rancho Drive The flow at the intersection of Rancho Drive and Gowan Road splits, with 693 cfs continuing south (LWRRNCH). Roughly 18 percent of this total flow is conveyed south in Rancho Drive; 71 cfs and 124 cfs in the 25- and 100-year events, respectively. See Appendix D for calculation from HEC-RAS section.

I. South of Cheyenne Avenue, this pattern continues, with flow from Cheyenne Avenue splitting off the roadway approximately 600 ft west of Rancho Drive. Then being conveyed south through the parking lot area just east of Hazelnut Lane. Roughly 3 percent of the total 531 cfs is conveyed south in Rancho Drive; 10 cfs and 16 cfs in the 25- and 100-year events, respectively.

J. At Station 173+55, the total flow south of Cheyenne Avenue converges in a riprap channel west of the roadway: 338 cfs and 531 cfs during the 25- and 100-year events, respectively (concentration point CX4X3). The channel capacity is more than 1400 cfs; As a result, the HECRAS from the Rancho LOMR shows flows that cross the northern property entering the channel. These flows continue to the south end of the project (DVBOX).

Table 2 provides a comparison at key locations of the peak flow rates calculated for *the Rancho LOMR* and the HEC-1 models for the offsite existing and offsite interim conditions. A detailed summary of all sub-basins, concentration points, etc., for the 10-, 25- and 100-year storm events is included in Appendix A.

Table 2 – Summary of Offsite Developed and Interim Condition Peak Flow Rates

BASIN/ HEC-1 STATION [2]	AREA, mi2	Offsite Existing Condition			Offsite Interim Condition		*Rancho LOMR* [1]
		Q10, CFS	Q25, CFS	Q100, CFS	Q25, CFS	Q100, CFS	Q100, CFS
CNW1C2	0.6	84	172	320	172	320	
CGCC4	0.74	18	60	233	60	233	
CPDGCD	0.26	29	65	131	65	131	
CGCB11	1.47	84	229	565	229	565	
CLONE	0.46	106	188	322	188	322	
C17BJ	5.61	205	430	1256	430	1256	
C14CG	0.19	17	30	94	30	94	
2CPT6B	6.31	222	478	1175	478	1175	
C3AB1	1.52	45	95	196	95	196	191
C3AB2	1.57	64	103	202	103	202	215
CPT2B2	1.65	30	49	77	49	77	216
C2B3	1.67	38	60	91	60	91	198
C2A2	4.9	43	83	205	83	205	207
C2B1	4.97	21	36	138	36	138	
2C2B3	5.17	21	37	136	35	135	199
CPT51	5.24	34	51	81	N/A	N/A	122
CPT52	6.15	140	254	453	254	453	458
2CPT51	6.62	163	292	514	270	478	541
D6RCHO	6.62	53	65	103	65	118	474

BASIN/ HEC-1 STATION [2]	AREA, mi2	Offsite Existing Condition			Offsite Interim Condition		*Rancho LOMR* [1]
		Q10, CFS	Q25, CFS	Q100, CFS	Q25, CFS	Q100, CFS	Q100, CFS
6REMAIN	6.62	108	224	408	228	450	428
C5A6	6.88	157	324	582	328	614	588
C5A7	7.81	57	155	280	159	285	279
C5A9	7.85	34	129	202	131	203	200
LWRRNCH	7.98	171	393	690	392	693	761 [1]
DEASTGOW	7.98	13	39	229	39	232	319 [1]
CCY08C	8.08	32	52	270	52	271	
CCPT56B	8.19	239	369	842	388	875	
CCCPT56B	8.46	244	384	918	402	945	
CBDVMORB	7.98	170	360	694	360	696	
RTCHY	7.98	57	213	514	213	515	617 [1]
CX4X3	2.01	207	338	531	338	531	533 [1]
DVBOX	2.01	N/A	210	210	210	210	233 [1]
DVBOX	2.01	N/A	128	321	128	321	533 [1]

[1] Flow rate referenced from work map, sheet C9R to C12R, Appendix F
[2] See summary tables in Appendix A for complete list of sub-basins, concentration points, diversions, etc., and their peak flow rates.

7.3. Offsite Interim Conditions

The interim condition assumes that all of the recommended storm drain systems and drop inlets proposed for the Rancho Capacity Improvement project are constructed, including the Gowan Outfall – Alexander Road Facilities. The proposed improvements were designed so that the ultimate condition improves flood protection of adjacent properties while the interim condition perpetuates the existing conditions. The offsite basins are identical to those for the existing condition (Figure 4); therefore, the flows conveyed to the project site are also the same as for the existing condition. Because the quantity of flow conveyed to the site during the interim condition is substantial, the proposed improvements preserve the capacity of existing landscape swales that are adjacent to Rancho Drive. The HEC-1 model results for offsite interim sub-basins are included in Appendix A. The offsite interim flow that is captured between Craig Road and Alexander Road is detailed on Figure 6A through 6K; flow in the Gowan Outfall – Alexander Road Facility is also shown. Normal depth calculations for existing swales are included in Appendix D.

From Rainbow Boulevard to Lone Mountain Road, the interim condition for offsite flows is identical to the existing condition. The flow is conveyed south within existing landscape swales. Proposed grading within the existing swales preserves their existing capacity. Drop inlets are proposed to meet NDOT

spread criteria; these calculations are described in Section 8, Onsite Hydrology and Inlet Capture, of this study. As with the existing condition, all of the offsite flow at the intersection of Gowan Road and Lone Mountain Road will be captured by the Gowan Outfall Lone Mountain Branch.

For the major intersections south of Lone Mountain Road, inlets are proposed that meet spread criteria in the developed condition. As with the existing condition and due to the high flow rates conveyed to the site, NDOT spread criteria for Rancho Drive are not met south of Lone Mountain Road during the interim condition. However, these criteria will be met once the planned CCRFCD facilities are constructed. These facilities include the upstream portion of the Gowan Outfall – Alexander Road Facilities (west of Rancho Drive in Craig Road) and the facilities that will cut off flow west of Buffalo Drive (see Figure 5, Developed Offsite Conditions).

In the interim condition, the Gowan Outfall – Alexander Road Facilities will be capped at the upstream end. The system, however, will capture a portion of the offsite flow between Craig Road and Alexander Road. Because of the high rates of flow conveyed to Rancho Drive during the interim condition, inlet capture rates will be higher for the offsite flow than for the onsite flow. Therefore, inlet capture calculations were performed to determine the amount of offsite runoff that will be captured by the proposed inlets and then diverted to the facility. The calculations are the same as those performed for the onsite capture, described in Section 8, Onsite Hydrology and Inlet Capture. Based on the *Rancho LOMR* offsite flow is assumed to be contained in the west side of the roadway. Additionally, the proposed cross section has a median island with a finished grade that is higher than the water surface calculated for the half street at Craig Road. Inlet capture calculations are included in Appendix B; normal depth and other hydraulic calculations are included in Appendix D.

The system was revised from that proposed in the preliminary study for the Gowan Outfall – Alexander Road Facilities: the 48-inch culvert north of Craig Road will not be connected to the proposed system during the interim condition.

The calculated inlet-capture flow rates are included as diversions in the interim condition HEC-1 models. The combined flows, 284 cfs during the 100-year storm, will be conveyed to the outlet structure located upstream of an existing flow split at the southern intersection of Rancho Drive and Alexander Road. The energy gradeline of the 284 cfs in the storm drain is below the grate elevation of the outlet structure. Therefore, flow will pond in the storm drain before being discharged through the grate. The ponding depth at the upstream end of the bleeder line and the amount of runoff that continues through the bleeder line were estimated using HY-8. The weir length of the grate on the outlet structure was assumed to be the

crest length. The culvert size used was the diameter orifice plate, 18 inches. A weir calculation was also performed to verify the required size of the grate. The hydraulic calculations are included in Appendix D.

Flow continuing in the facility through the bleeder line is 24 cfs during the 100-year storm (HY-8 calculation in Appendix D). The remaining 260 cfs discharges to the street through the outlet structure to combine with surface runoff. The total surface flow at the outlet structure is 568 cfs (see Appendix A, HEC-1 model for offsite interim condition). This flow will pond on the property at the northwest corner before continuing south to split at the Rancho Drive/Alexander Road intersection. Referring to the *Rancho LOMR* work map C8R, ponding currently occurs at this location. In addition, flow rates proposed are similar to existing and less than historic conditions on this property. The historic flow rate at this location reported in the Flood Insurance Study updated by the *Rancho* LOMR was 1229 cfs. The flow rate reported by the *Rancho LOMR* is 541 cfs. The location of the outlet structure was selected to perpetuate the existing flow split; 118 cfs continues east in Alexander Road; 450 cfs continues south in Rancho Drive.

South of the Rancho Drive and Jones Boulevard-Alexander Road intersection flow patterns for the interim offsite condition are the same as those for the existing condition. A comparison of the offsite interim flow rates with those reported in the *Rancho LOMR* are shown at key locations along Rancho Drive on Figure 6A through 6K, Onsite Interim and Developed Subbasin Map.

The storm drain systems north of Cheyenne Avenue and north of Gowan Road are designed to capture onsite flows to meet NODT spread criteria for the 25-year storm event. They tie into existing storm drain systems, which based on the *Rancho LOMR* and existing condition analysis are full and unable to accept additional flow from the offsite sub-basins during the interim condition. Therefore, the interim condition HEC-1 models do not include any inlet capture for these systems.

The 25- and 100-year storm events for the offsite interim condition are compared to the offsite existing and *Rancho LOMR* flow rates in Table 2 (Section 7.2). A detailed summary of all sub-basins, concentration points, etc., for the 10-, 25- and 100-year storm events is included in Appendix A.

7.4. Offsite Developed Conditions

Developed condition analysis assumes full build-out of all CCRFCD facilities and that the properties located upstream of the site are fully developed in accordance with current zoning requirements. The offsite, developed conditions drainage sub-basins and flow patterns are shown on Figure 5. Developed conditions are based primarily on the *MPU*. Basins adjacent to Rancho Drive were referenced from the *Rancho LOMR* and revised as necessary to update locations that have been developed since the LOMR

was performed. The developed condition HEC-1 models are included in Appendix A. Table 3 provides a summary of the peak flows at key locations for the developed conditions HEC-1 models. Where available, the table also lists the MPU estimate for flow in MPU facilities. A detailed summary of all sub-basins, concentration points, etc., for the 10-, 25- and 100-year storm events is included in Appendix A.

In general, offsite flow in the developed condition is captured and conveyed within the storm drain facilities described in the MPU. The developed flow rates calculated in this study are slightly less than those reported in the MPU. The difference is attributed to changes in the sub-basin areas that were made for site specific modeling of this project. The difference between the peak flow rates for this study and the MPU is within the error expected for these calculations. Because the MPU flow rates were higher, they were used to design the Gowan Outfall – Alexander Road Facilities.

Local areas on east and west sides of the street that convey flow to the roadway are discussed in the onsite section of this study. Drop inlets along Rancho Drive were sized for the onsite flow rates and are described in Section 8, Onsite Hydrology and Inlet Capture.

Key locations where offsite flow impacts the design of Rancho Dr and the Gowan Outfall – Alexander Road Facilities and their 100-year design storm flow rates are summarized below. These locations and their associated flow rates from the 25- and 100-year storm event are noted on the Interim and Developed Onsite Subbasin maps (6A to 6K):

A. From Rainbow Boulevard to Lone Mountain Road, offsite flows will be contained in the landscape swale on the west side of Rancho Drive. At concentration point C3AB2, both the southbound flow in the swale and the eastbound flow in Lone Mountain Road are captured by the Gowan Outfall - Lone Mountain Branch. This storm drain was designed to capture and convey flows from the entire 100-year storm event (HEC-1 node 3REMAIN).

B. Between Lone Mountain Road and Craig Road, the peak 100-year developed flow, 111 cfs at concentration point C2B3, is more than the existing flow rate, 91 cfs, but less than the rate reported in the Rancho LOMR, 198 cfs. These flows are expected to be conveyed south within the parking area swales west of the roadway. They will then be diverted to the concrete channel northwest of Craig. In the developed condition, the total 100-year flow within the channel will be diverted to the Gowan Outfall – Alexander Road Facilities.

C. At the intersection of Craig Road and Rancho Drive, eastbound flow in Craig Road will be captured and conveyed south in the Gowan Outfall – Alexander Road Facilities. In total, 862 cfs

are conveyed east within the GOAL 0168 to Rancho Drive, then south in GOAL0111 (concentration point 2C2B3).

D. At the northern intersection of Rancho Drive and Alexander Road, eastbound flow is captured by the Gowan Outfall – Alexander Road Facilities (GOA2 0000). These flows, 489 cfs, combine with the southbound flow in GOAL 0111. A total 1244 cfs continues south in GOAL 0100 (CCPT41-C).

E. At Rancho Drive and Alexander Road (southern intersection), offsite flow from concentration point CPT5A2-C are captured by local storm drain systems and diverted to the Gowan Outfall – Alexander Road Facilities. These flows combine with the southbound flow in GOAL 0100; the total flow, 1423 cfs during the 100-year storm, continues east in GOAL 0000.

F. From Jones Boulevard to Duncan Drive, flow rates in the developed condition, 36 cfs and 59 cfs for the 25- and 100-year events, respectively, are substantially less than the existing condition, 155 cfs and 280 cfs (see developed sub-basin PT5A7 and existing condition concentration point C5A7). At Culvert 32, 23 cfs will be diverted east, the remaining developed flow will be conveyed south within roadside swales.

G. At Gowan Road, southbound flow in Rancho Drive and eastbound flow in Gowan Road are captured and conveyed west in the existing Gowan Outfall (GOOF 0511). This facility exists, and once future upstream facilities are in place, it will have the capacity to convey the 100-year flows at this location (HEC-1 node CCPT6B-C).

H. At Rancho Drive and Michael Way, flow that was diverted from Gowan Road and conveyed through the Trilogy channel (DTRILGY) and flow conveyed behind the True Value store (DTRUV) return to Rancho Drive. These flows combine with the southbound flow in Rancho Drive and eastbound flow from sub-basin CY07B at concentration point CCY07B. Then, two existing 6-ft by 2-ft RCB's convey 72 cfs of this flow east under Rancho Drive. This eastbound flow continues to Decatur Boulevard, and then is diverted north to the intersection of Decatur Boulevard and Alexander Road. At concentration point C427, this flow combines with offsite sub-basins located east of Rancho Drive, flow in the Gowan Outfall from Gowan Road, and the flows in the Gowan Outfall – Alexander Road Facilities. The combined flows, 2331 cfs, continue east in the Gowan Outfall (GOOF 0375).

I. South of Michael Way, the remaining flow of 136 cfs continues south to Decatur Blvd, HEC-1 node 9REMAIN.

J. West of Rancho Drive between Michael Way and Decatur Boulevard, 521 cfs is conveyed south through residential neighborhoods to concentration point CCY06B-C. Ultimately, these flows will converge in the existing riprap channel located west of Rancho Drive, south of the Savers Parking Lot.

K. At the northern intersection of Rancho Driveand Decatur Boulevard, flow splits with 211 cfs continuing east and 480 cfs continuing south (HEC-1 nodes DA1-C and DCPD05A, respectively). This pattern is similar to the existing condition (see HEC-1 node DVBOX in the existing model).

Table 3 Summary of Offsite Developed Conditions HEC-1 Model

BASIN / HEC-1 STATION	LOMR Ref.	AREA, mi^2	Q10, CFS	Q25, CFS	Q100, CFS	MPU, CFS
CNW1C2		0.46	118	201	334	
CPDGCB10		0.77	187	321	538	
C3AB1	C3AB1	0.82	31	136	206	
C3AB2	C3AB2	0.87	57	126	210	
C3AA1		0.96	211	275	357	
C2B2	CPT2B2	1.09	50	72	102	
C2B3	C2B3	1.11	55	78	111	
2C2B3		2.52	296	473	862	880
CPT51C		2.56	308	489	875	880
CPT41-C		0.57	199	315	489	523
CCPT41-C	2CPT51	3.13	488	772	1244	1297
CPT5A2-C		3.4	557	889	1420	1461
CCPT5B6C		3.78	647	1036	1665	
CPT6B-C		1.08	289	459	699	
CPT6BC2	C5A9	1.15	2	11	67	
CCPT6B-C	DEASTGOWAN	1.15	288	455	627	699
CCY07B	CBDVMORB	1.28	69	108	208	
CCCY08-C		1.45	378	568	745	
C427		5.23	948	1496	2331	2375
CRGOWAN	CX4X3	2.33	201	337	610	
CPD05A-C		2.47	228	387	691	
DA1-C	DVBOX	1.19	211	211	211	
DCPD05A	DVBOX	2.47	17	176	480	

8. ONSITE HYDROLOGY AND INLET CAPTURE

Detailed calculations for the onsite hydrology and inlet capture for the existing and developed conditions are included in Appendix B. These calculations are divided into four parts: Part 1 details the runoff calculations; Part 2, the allowable spread calculations; and Part 3 is the inlet capture calculation; and Part 4 includes the calculation for the required lateral size for each drop inlet and depth times velocity for the 10- and 100-year developed condition. Note: Part 4 is included at the end of the 100-year calculations.

Inlet capture calculations for the offsite interim flows are also included in Appendix B.

8.1. Onsite Hydrologic/Hydraulic Criteria and Methods

Rancho Drive is located within NDOT right-of-way; therefore design criteria for the onsite hydrologic and hydraulic analysis of the Rancho Drive project is based on both the NDOT Drainage Manual 2006 (DM06) and the CCRFCD Hydrologic Criteria and Drainage Design Manual (HCDDM). The minimum design return frequency used for the hydrologic analysis was the 10-year event to verify the design meets the RTC's 12-ft dry lane criteria during this storm and to provide the City of Las Vegas with an estimate for the difference in costs between the infrastructure (drop inlets and storm drain pipe) required to meet the CCRFCD/RTC criteria versus the infrastructure required to meet NDOT criteria. Rancho Drive is defined by NDOT as "other principal arterial", which requires the design return frequency of both the 25- and 100-year events be used for the hydraulic and hydrologic analyses. The Gowan Outfall – Alexander Road Facilities is a CCRFCD Master Plan facility and was designed to convey the 100-year storm event (developed condition flows).

The onsite analysis was limited to the onsite (roadway) basins and those local areas on the east and west sides of Rancho Drive that drain onto the roadway. The assumption being that the size of the onsite basins is small compared to that of the offsite basins, and that onsite flow will attenuate before the offsite flow is conveyed to the site.

Onsite sub-basins were analyzed using the Rational Formula Method in accordance with the DM06 and HCDDM. The Rational Formula Method estimates the peak rate of runoff at any location in a watershed as a function of the drainage area, runoff coefficient and mean rainfall intensity for duration equal to the time of concentration (the time required for water to flow from the most remote point of the basin to the location being analyzed). It is an appropriate method for estimating peak discharges for small drainage areas up to about 200 acres, in which, there is no significant flood storage.

The sub-basin areas were determined using AutoCAD. Runoff coefficients for the 10- and 100-year events were referenced from Table 601 of HCDDM (C10 and C100). The runoff coefficient for the 25-year event was determined by interpolating between the values of C10 and C100 for Streets and Roads (paved) obtained from Table 601 of the HCDDM. Intensity was selected from Table 506 HCDDM for the calculated time of concentration for the sub-basin. A minimum time of concentration (t_c) of 5 minutes is used for directly connected impervious drainage basins.

The flow rates obtained from the Rational Formula Method were used to determine the spread of stormwater on the pavement surface and to determine the location and size of inlets needed. Per DM06, allowable spread of stormwater on the surface pavement during a 25-year storm is ½ the adjacent travel lane. The City of Las Vegas met with NDOT to discuss criteria to be used on Rancho Dr; the City of Las Vegas understands that NDOT has agreed to allow the spread width to inundate the bus lane and half of the outside travel lane. The discussion is summarized in the email to Stanley Consultants from the City in Appendix G. In proposed conditions for Rancho Drive, allowable spread to meet NDOT criteria is a constant 19.25 ft. Roadway surface flow spread calculations used a Manning's "n" value of 0.015. Additional design criteria specified in HCDDM requires that the 10-and 100-year events meet a depth times velocity of less than 6 and 8, respectively. Additionally, the design must provide a 12-ft dry lane on either side of the median during the 10-year event, or an allowable spread of 35 ft.

Design for the Gowan Outfall-Alexander Road facility includes additional inlets in Rancho Drive between Craig Road and Alexander Road, which are proposed to capture most of the onsite 100-year flow to take full advantage of the regional facility being constructed. An analysis for the spread width during the 100-year storm is provided in Appendix B.

Additional NDOT criteria for design of inlets include requiring inlets at roadway low points to prevent ponding. Flanking inlets are required above the sag inlet elevation at a minimum of 0.037 times the allowable ponding depth to provide for sag inlet clogging; however, flanking inlets should not be closer than 10 ft and not further than 50 ft from the sag inlet. While NDOT criteria also require inlets upstream of super-elevation transitions and where flow reaches the capacity of roadside ditches, this project does not propose either of those items. Roadway ditches are not utilized because of the street improvements include curb and gutter; however, the capacity of existing offsite swales is proposed to be maintained.

The calculation of the spread of stormwater on the pavement surface and of the inlet sizing follows the recommendations from the FHWA Hydraulic Engineering Circular No. 22 (HEC-22). Inlets are sized

with a 25 percent clogging factor per Table 3 of DM06. Laterals for all inlets were calculated with the derivation of Manning's formula within the spreadsheet for the relating intercepted flow.

Inlet capture for inlets located in drainage easements and normal depth calculation for swales were performed using Bentley FlowMaster, 2008. Manning's coefficients were referenced from *HCDDM*. Channel slopes were referenced from existing slopes. Depths of the channels were referenced from the existing topography. Output from FlowMaster for the Offsite Hydraulic calculations is included in Appendix D.

8.2. Onsite Existing Condition Analysis

The onsite existing condition analysis was performed to determine which, if any, of the existing drop inlets should be maintained. It also provided a basis to start design for the two options (A and B) originally considered for the Rancho Improvement Project. For existing conditions, sub-basin boundaries were generally placed at the downstream end of existing drop inlets or where runoff drained away from the site (Figure B-1 to B-11). Onsite sub-basins include small areas that are adjacent to Rancho Drive that drain into the roadway, such as entrance driveways and landscaping. Existing basins in the southbound travel lanes (west side) of Rancho Drive are labeled SBE## and basins in the northbound travel lanes (east side) are NBE##.

Runoff generated by each sub-basin during the 25-year storm was calculated (Appendix B). Spread at the end of each sub-basin boundary was also calculated; it is noted whether or not the existing basin meets spread criteria. When applicable, inlet capacity and bypass quantities were also determined.

In general, where there is existing curb and gutter that prevents flow from leaving the roadway, NDOT spread criteria are not met in the existing condition. This condition is due to the low slopes of Rancho Drive, 1 percent or less. Once flow contained in the road reaches a location where is can discharge to the adjacent property, criteria are met. Note that for offsite flows and as discussed in Section 7, NDOT criteria are not met for Rancho Drive.

8.3. Onsite Interim and Developed Drainage Conditions

Inlet spacing and sizing for Rancho Drive were designed to meet NDOT spread criteria for the 25-year storm event, which also satisfies CCRFCD/RTC drylane criteria for the 10-year storm event. Between Craig Road and Alexander Road, the project includes the CCRFCD MPU facility Gowan Outfall – Alexander Road Facilities. Therefore, drop inlets located within this portion of the project were sized and located to capture most of the 100-year storm event (sub-basins SBB16 to SBB20 and NBB13 through

NBB15). These locations also meet both NDOT spread criteria and CCRFCD dry lane criteria. Wherever possible new curb and gutter grades of 0.3 percent or greater are proposed; however, due to the existing conditions at the site, locations of very flat gutters exist. A minimum 2 percent typical cross slope is proposed wherever possible.

Runoff calculations, spread width calculations, and inlet capture calculations are provided for the 10-, 25-, and 100-year storm events. Fewer inlets are required to satisfy the 10-year 12-ft drylane criteria than the 25-ft spread criteria. The cost of the additional inlets is required to be tracked separately. Therefore, the 10-year inlet capture calculations include only existing inlet locations and the new inlets required to meet 12-ft drylane.

Sub-basin boundaries were initially placed to match the existing condition boundaries. Spread was then calculated. If the spread criteria were not met, adjustments were made to: basin boundaries, inlet locations, and inlet sizes. For properties located adjacent to Rancho Drive that do not currently discharge flow to the roadway, it was assumed that they will not discharge flow to the roadway in the developed condition. Therefore, the onsite interim and onsite developed conditions are identical, and separate calculations for *onsite* interim conditions were not performed (see Section 7.3, Offsite Interim Conditions, for discussion of inlet capture of *offsite* flows by Gowan Outfall – Alexander Road Facilities). Runoff, spread width, and inlet capture calculations are included in Appendix B. Sub-basin boundaries, inlet capture and bypass flow rates are shown on Figure 6A to 6K. The results for the spread calculations performed for the developed condition during the 25- year storm event are summarized in Table 4

Sub-basins SBB16D and SBB16E, located on the west side of Rancho Drive south of Craig Road, discharge directly into existing offsite swales. NDOT Type 2 inlets are proposed within these swales to capture 100 percent of the 100-year flow generated by these basins. The drop inlet sizes were designed with FlowMaster (Appendix D). These two inlets are considered to be sump conditions, where a 50% clogging factor was applied.

Table 4 - 25-year Onsite Developed Flow Spread Calculation Summary

Southbound Rancho Drive				Northbound Rancho Drive			
Subbasin I.D.	Drop Inlet Station	25-yr Spread, ft	< 19.25 ft max. allowable	Subbasin I.D.	Drop Inlet Station	25-yr Spread, ft	< 19.25 ft max. allowable
SBB01	14+80.00	8.53	yes	NBB01		9.19	yes
SBB01A	15+54.00	10.79	yes	NBB02A1	19+04	11.35	yes
SBB02	16+58.00	11.51	yes	NBB02A2	21+68	10.90	yes
SBB03	22+30	9.72	yes	NBB02B1	24+30	11.43	yes
SBB04A	25+42	12.11	yes	NBB02B2	26+92	13.87	yes

Southbound Rancho Drive				Northbound Rancho Drive			
Subbasin I.D.	Drop Inlet Station	25-yr Spread, ft	< 19.25 ft max. allowable	Subbasin I.D.	Drop Inlet Station	25-yr Spread, ft	< 19.25 ft max. allowable
SBB04B		13.70	yes	NBB02C	29+50	13.27	yes
SBB05		10.55	yes	NBB03		15.53	yes
SBB06A	34+40	10.35	yes	NBB04	36+60	13.26	yes
SBB06B		11.84	yes	NBB05A	42+50	10.64	yes
SBB07A	39+85	13.46	yes	NBB05B	44+35	11.44	yes
SBB07B	42+50	13.31	yes	NBB06		6.97	yes
SBB08		10.16	yes	NBB07		12.88	yes
SBB08A		10.61	yes	NBB08		6.80	yes
SBB09		10.02	yes	NBB09		7.21	yes
SBB10		13.60	yes	NBB10		8.57	yes
SBB11		10.04	yes	NBB11	67+10	11.68	yes
SBB12		4.93	yes	NBB12		15.19	yes
SBB13		6.19	yes	NBB13A	75+75	13.57	yes
SBB14		9.76	yes	NBB13B	82+52	11.11	yes
SBB15	65+28, 120' RT	13.53	yes	NBB14A	87+60	11.17	yes
SBB16		14.75	yes	NBB14B	92+52	11.18	yes
SBB16A	68+71	16.50	yes	NBB15	95+90	13.47	yes
SBB16B	73+20	13.93	yes	NBB16		13.45	yes
SBB16C	82+45	12.20	yes	NBB17A	99+40	10.21	yes
SBB16D	68+78	N/A	N/A	NBB17B	101+90	8.48	yes
SBB16E	73+30	N/A	N/A	NBB17C	104+25	8.80	yes
SBB17	87+10	15.24	yes	NBB17D		6.58	yes
SBB18	94+34	13.83	yes	NBB18	112+80	9.77	yes
SBB19A	96+18	10.49	yes	NBB19		9.46	yes
SBB19B		7.38	yes	NBB20		11.76	yes
SBB20A	99+50	9.69	yes	NBB21		5.99	yes
SBB20B	102+00	8.57	yes	NBB22	126+68	10.00	yes
SBB20C	104+60	8.84	yes	NBB23A	130+60	13.17	yes
SBB21	106+65	14.13	yes	NBB23B	133+32	19.14	yes
SBB22A		13.63	yes	NBB23C	135+37	16.57	yes
SBB22B	111+30	13.25	yes	NBB24		12.14	yes
SBB22C	113+56	10.35	yes	NBB25		6.76	yes
SBB23		15.12	yes	NBB26	145+13	8.91	yes
SBB24A	128+90	11.20	yes	NBB27		12.58	yes
SBB24B	131+78	12.95	yes	NBB28		11.09	yes
SBB24C		17.53	yes	NBB2930		8.56	yes
SBB25	138+56	6.93	yes	NBB31		9.41	yes
SBB26		11.74	yes	NBB32		6.26	yes
SBB27		8.12	yes	NBB33	166+52	11.86	yes
SBB28		8.38	yes	NBB33A	167+05	10.45	yes
SBB29		10.01	yes	NBB34A		12.66	yes
SBB30	150+72	12.14	yes	NBB34	168+35	12.31	yes
SBB3132	160+22	15.34	yes	NBB35		5.70	yes

Southbound Rancho Drive				Northbound Rancho Drive			
Subbasin I.D.	Drop Inlet Station	25-yr Spread, ft	< 19.25 ft max. allowable	Subbasin I.D.	Drop Inlet Station	25-yr Spread, ft	< 19.25 ft max. allowable
SBB33	163+00	9.35	yes	NBB36		17.27	yes
SBB34A	164+70	10.01	yes	NBB37	186+00	11.77	yes
SBB34B	165+60	5.67	yes				
SBB34C	167+06	7.71	yes				
SBB35	170+46	7.60	yes				
SBB36A		11.51	yes				
SBB36	178+00	13.52	yes				
SBB37A	182+04	12.12	yes				
SBB37B		7.11	yes				
SBB38		17.38	yes				
SBB39	188+53	10.18	yes				

9. GOWAN OUTFALL – ALEXANDER ROAD FACILITY DESIGN AND MINOR STORM DRAIN DESIGN

9.1. Storm drain Criteria and Methods

The Gowan Outfall – Alexander Road Facilities were designed to accommodate the major storm event (100-year design storm), while the minor storm drain systems and associated drop inlets were designed to accommodate the 25-year design storm. Both systems were designed in accordance with criteria listed in CCRFCD's HCDDM and NDOT's DM06 drainage manual. These criteria include the following:

- Maintain the hydraulic grade line (HGL) at 1 ft below the final grade above the storm drain at all locations; utilize a locking manhole lids for HGL less than 1.5 ft below the final grade.
- Limit the maximum velocity in the system to 25 ft/sec and the minimum velocity in the system to 3 ft/sec at half or full conduit flow conditions (minimum 0.3 percent slope of the storm drain).
- Increase conduit cross section area in the downstream direction.
- Locate manholes a maximum of 300 ft apart for storm drains with diameters less than 24 inches and 400 ft apart otherwise and outside of the normal vehicle wheel path.
- Provide minimum 18-inch diameter RCP for new storm drain laterals.
- Manning's roughness used for design is 0.015.

Additional criteria for the outlet structure that is proposed at the northwest corner of the southern intersection of Rancho Drive with Jones Boulevard and Alexander Road:

- Locate the outlet structure such that flows discharged through this outlet system will split and continue south in Rancho Drive and east in Alexander Road in a manner that is consistent with the existing conditions.
- Limit the headwater elevation as flow discharges from the outlet structure to a maximum of 1.5 ft above the adjacent sidewalk.
- Provide a 50 percent clogging factor for the grate; grate size to be determined using orifice equation; weir calculation to be used to estimate spread width as flow is conveyed over street.
- Design outlet structure lateral for use as a future inlet and maintenance access point (i.e. provide minimum 10′ X 6′ RCB for the lateral that slopes down into the main)

The Water Surface Pressure Gradient Hydraulic Model (WSPG) 2010 software, updated by XP Software, was used to estimate hydraulic losses, including friction, expansion, construction, bend, and junction losses, and to calculate the energy grade line (EGL) and HGL for the storm drain systems. These hydraulic calculations are included in Appendix C. For the Gowan Outfall – Alexander Road Facilities, flow rates entering the storm drain system at the intersections of Alexander Road and Decatur Boulevard, Rancho Drive and Jones Boulevard, and Rancho Drive and Craig Road were referenced from the MPU. For the minor storm drain systems, flow rates entering the system were referenced from the inlet capacity calculations included with this study.

9.2. Gowan Outfall – Alexander Road Facilities Design Summary

The Gowan Outfall – Alexander Road Facilities were analyzed from the intersection of Rancho Drive and Craig Road south to the intersection of Rancho Drive and Alexander Road and then west to the intersection of Alexander Road and Decatur Blvd. Because the flow rates calculated by this study for the developed condition were slightly less than those published in the MPU, the flow rates incorporated into the WSPG model were referenced from the MPU. The interim flow rates conveyed in the system are also less than the MPU flow rates. Inlet capture for the interim condition is described in Section 7.3, Offsite Interim Conditions. The drop inlet capture and bypass for both the interim and developed condition are shown on Figure 6A through 6K, Onsite Interim and Developed Condition Subbasin Map. The concentration points with the flow rates from the interim condition, the developed condition, and the *Rancho LOMR* are also shown. The flow rates shown on the Gowan Outfall – Alexander Road Facilities indicate the flows in this system for the developed condition.

The upstream end of the facility is located in Craig Road, east of the intersection of Rancho Drive and Craig Road. Ultimately, the storm drain will connect to the existing 42-inch RCP that is eastbound in

Craig Road. In the interim condition, this storm drain pipe is proposed to remain in place, with its existing connection to the 60-inch RCP that continues east in Craig Road. Near the upstream end of the proposed Gowan Outfall – Alexander Road Facilities, an existing 48-inch RCP and two existing 7′ X 3′ RCB's, capture flow in the concrete channel, located north of Craig Road. In the interim condition, only the 7′ X 3′ RCB's will connect to the system, while the 48-inch RCP will connect with the 60-inch RCP that continues east in Craig. In future, the 48-inch RCP will also connect to the system.

South of this intersection and continuing south in Rancho Drive, existing culverts that currently convey flow east under Rancho Drive will be connected into the new facility. Drop inlets are proposed at regular intervals to capture the 100-year flows generated in Rancho Drive. On the west side of Rancho Drive, within Alexander Road, a stub for the future connection to an 8′ X 5′ RCB that is proposed as Gowan Outfall – Alexander Branch (GOA2 0000) will be provided. South of this location, also on the west side of Rancho Drive, a connection for a future storm drain system will be provided within Jones Boulevard.

Currently, an outlet structure is proposed at the northwest corner of Rancho and Jones Boulevard. The lateral for this structure is proposed to slope toward the storm drain system so that the structure could function as an inlet once the downstream facilities are complete. By locating the outlet structure at the northwest corner of the intersection and limiting the discharged flow to the same rate as the existing condition, flows discharged from the outlet structure will split in a manner similar to the existing flow split at this location. Additionally, concrete curbing at the west side of the structure will guide discharged flow toward the street and away from the private property west of the outlet structure. The grate for the outlet structure was sized to limit the 100-year discharge elevation to 1.5 feet over the top of the sidewalk, headwater elevation of 2269 feet for sidewalk elevation of 2267.5 feet. A 50 percent clogging factor was applied to the grate to determine the size of grate required. The area used in the calculation did not include the bars across the grate but only considered the "open" area of the grate. Additional hydraulic calculations performed for the structure were described in Section 7, Offsite Interim Conditions, and are included in Appendix C.

As previously discussed, the downstream portion of the Gowan Outfall – Alexander Road Facilities is expected to starting next month. If this facility's design and construction are completed prior to those of the Rancho Capacity Improvements, the outlet structure will no longer be required.

In the future, when the storm drain is connected to the upstream 10' X 8' RCB facility in Craig Road (GOAL 0168) and the 8' X 5' lateral RCB facility in Alexander Road (GOA2 0000), the total flow rate at the Rancho Drive/Alexander Road intersection will be 1244 cfs (MPU flow rate). This rate exceeds the

existing 538 cfs reported in the Rancho LOMR as surface flow at the proposed location of the outlet structure. Therefore, the upstream connections should not be constructed prior to completion of the downstream facilities.

For the analyzed system, the maximum velocity in all storm sewers is less than the maximum allowable 25 ft/sec. The minimum slope of the storm drain is 0.4 percent, greater than the minimum allowable. In all cases, the HGL is 1.5-ft below the finished grade of the roadway. The recommended facilities for the entire length of the analyzed system are summarized in Table 1, CCRFCD Facilities (Section 3.2). A summary of the WSPG analysis and plot of the results is included in Appendix C.

9.3. Minor Storm drain Facility Design Summary

Three other storm drain facilities are proposed as part of the Rancho Drive improvements: a 24-inch RCP system on the west side of Rancho north of Cheyenne; an 18-inch RCP system on the east side of Rancho north of Cheyenne; and an 18-inch system on the east side of Rancho north of Gowan. Flow rates used to calculate the HGL and EGL for these systems are referenced from the inlet capture calculations described in Section 8 and performed for the 25-year storm event.

For these storm drain systems, the maximum velocity in all storm sewers is less than the maximum allowable 25 ft/sec. The minimum slope of the storm drain is 0.4 percent, greater than the minimum allowable. In all cases, the HGL is 1-ft below the finished grade of the roadway.

10. ESTIMATED PROJECT CONSTRUCTION COSTS

Project costs for the Rancho Drive Capacity Improvement Project, including the Gowan Outfall – Alexander Road Facilities, were estimated and are included with the 70 percent construction document submittal. The estimated total is subdivided by the type of improvement and possible funding source. For example, items associated with the Gowan Outfall are included as one subtotal (note the bleeder line is not included as part of the MPU facility costs).

Construction costs for the Rancho Capacity Improvement project, including acquisition of permanent easement and authorization to enter properties during construction are estimated at $41.5 million. Of this cost, the costs associated with the Gowan Outfall – Alexander Road Facilities are estimated at $9.1 million, which does not include the cost for the outlet structure and bleeder. The cost of authorization to enter property and permanent easements is estimated to be $3.1 million. Costs for additional inlets required to meet NDOT spread criteria are estimated to be $250 thousand.

The Preliminary Design Report for the Gowan Outfall – Alexander Road Facilities reported that by incorporating the facility into construction documents for the Rancho Drive Capacity Improvement project, the City will save approximately $1 million in construction costs. This savings is generally realized in mobilization/demobilization, asphalt pavement removal/replacement, traffic control/maintenance, dust control and discharge permits.

11. CONCLUSIONS AND RECOMMENDATIONS

1. Methodology in this report is in compliance with Nevada Department of Transportation (NDOT) and Clark County Regional Flood Control District (CCRFCD) criteria.

2. The project site has areas within FEMA Special Flood Hazard Area Zone A and AE; flooding is expected. The floodplain from the Rancho LOMR is shown on the onsite basin maps. Specifically, the portions of the Gowan Outfall – Alexander Road Facilities in Craig Road, Rancho Drive, and Alexander Road are located in FEMA designated Special Flood Hazard Area AE and X. The stub out in Jones Boulevard, west of Rancho Drive, is also located in FEMA Flood Zone AE. In the future when the upstream and downstream master plan facilities are constructed, the portion of the flood zone along Rancho Drive between Craig Road and Alexander Road can be removed by a CLOMR and LOMR.

3. The portion of the Gowan Outfall – Alexander Road Facilities in Rancho Drive was incorporated in the construction documents for the Rancho Drive Capacity Improvements; the portion of the Gowan Outfall facilities in Alexander Road was analyzed to verify functionality of the system and to determine appropriate invert elevations and sizes of the storm drain system.

4. The proposed alignment and function of the Gowan Outfall – Alexander Road Facilities are in conformance with the CCRFCD Las Vegas Flood Control Master Plan as outlined in the 2008 MPU. The proposed improvements will intercept flows currently impacting Rancho Drive. Construction of the proposed facility and regional facilities upstream of this project will ultimately reduce surface flows in Rancho Drive so that Rancho Drive will meet CCRFCD 10-year and 100-year street flow criteria as outlined in HCDDM.

5. Because the MPU peak flow rate is slightly higher than flow rates estimated by this study, the MPU flow rates were used for the design of the mainline alignment in Rancho Drive between Craig Road and Jones Boulevard and continuing east in Alexander Road to Decatur Boulevard: 880 cfs at the upstream end of the system; flow is added to the mainline from facility GOA2 0000 in Jones

Boulevard west of Rancho Drive so that 1297 cfs is in GOAL 0100; 1461 cfs at Rancho Drive/Alexander Road; and 2375 cfs at Alexander Road/Decatur Boulevard.

6. The recommended facilities for the Gowan Outfall – Alexander Road Facilities consist of 2700 feet of 10′ X 8′ reinforced concrete box culvert in Rancho Drive from Jones Boulevard to Craig Road (GOAL 0111); 1100 lf of 12′ X 8′ reinforced concrete box culvert in Rancho Drive from Alexander Road to Jones Boulevard (GOAL 0100 and GOAL 0111); 160 lf of 12′ X 8′ reinforced concrete box culvert in Rancho Drive turning east on Alexander Road (GOAL 0000); 230 lf of 8′ X 5′ reinforced concrete box culvert in Alexander Road, west of Rancho Drive, as part of facility GOA2 0000; and 301 lf of 10′ X 8′ reinforced concrete box culvert in Craig Road, west of Rancho Drive, as part of facility GOAL 0168. Design for the Gowan Outfall-Alexander Road Facilities includes inlets in Rancho Drive between Craig Road and Alexander Road, which are proposed to capture all of the onsite 100-year flow to take full advantage of the regional facility being constructed. An outlet structure is recommended on the northwest corner of Rancho Drive/Alexander Road to discharge flow from major storm events. A 24-in RCP is recommended as a bleeder line from the end of the storm drain system to the Alexander Road/Decatur Boulevard intersection. An 18-in orifice plate is recommended immediately downstream of the lateral for the outlet structure.

7. The future facilities recommended in Alexander Road to the Alexander Road/Decatur Boulevard intersection consist of 4080 lf of 12′ X 8′ reinforced concrete box culvert in Alexander Road (GOAL 0000) that transition into two, parallel 9′ X 6′ RCB's. These boxes continue for 1066 lf to the Alexander Road/Decatur Boulevard intersection. The dual boxes are recommended in order to resolve a sewer conflict located at Stations 94+04.96 and 96+74.61.

8. The upstream end of the Gowan Outfall – Alexander Road Facilities should be capped and the upstream facilities in Craig Road and Jones Boulevard should not be constructed until the Gown Outfall facilities downstream of the Gowan Outfall – Alexander Road facilities are complete and in place.

9. Drop inlets and storm drain laterals are recommended in Rancho Drive as part of this project to capture and convey onsite flows to the mainline storm drain facilities or to offsite drainage swales located on private property on either side of the roadway. Proposed inlet spacing perpetuates the existing flow paths, which should be maintained. To meet NDOT spread criteria and 10- and 100-year CCRFCD and RTC criteria, inlets and storm drain shown on construction documents should be installed.

10. Improvements proposed to existing offsite channels were designed to maintain existing capacity where required and should be constructed as shown on the construction documents.

11. Conflicts between the proposed storm drain systems and existing utilities are identified; several were potholed to identify vertical conflicts and to incorporate into design to minimize conflicts. Additional potholing of dry utilities that are not already located should be performed prior to completion of the 90 percent plans. Additional coordination for necessary relocations of existing utilities should be performed at the 90 percent plan stage.

12. REFERENCES

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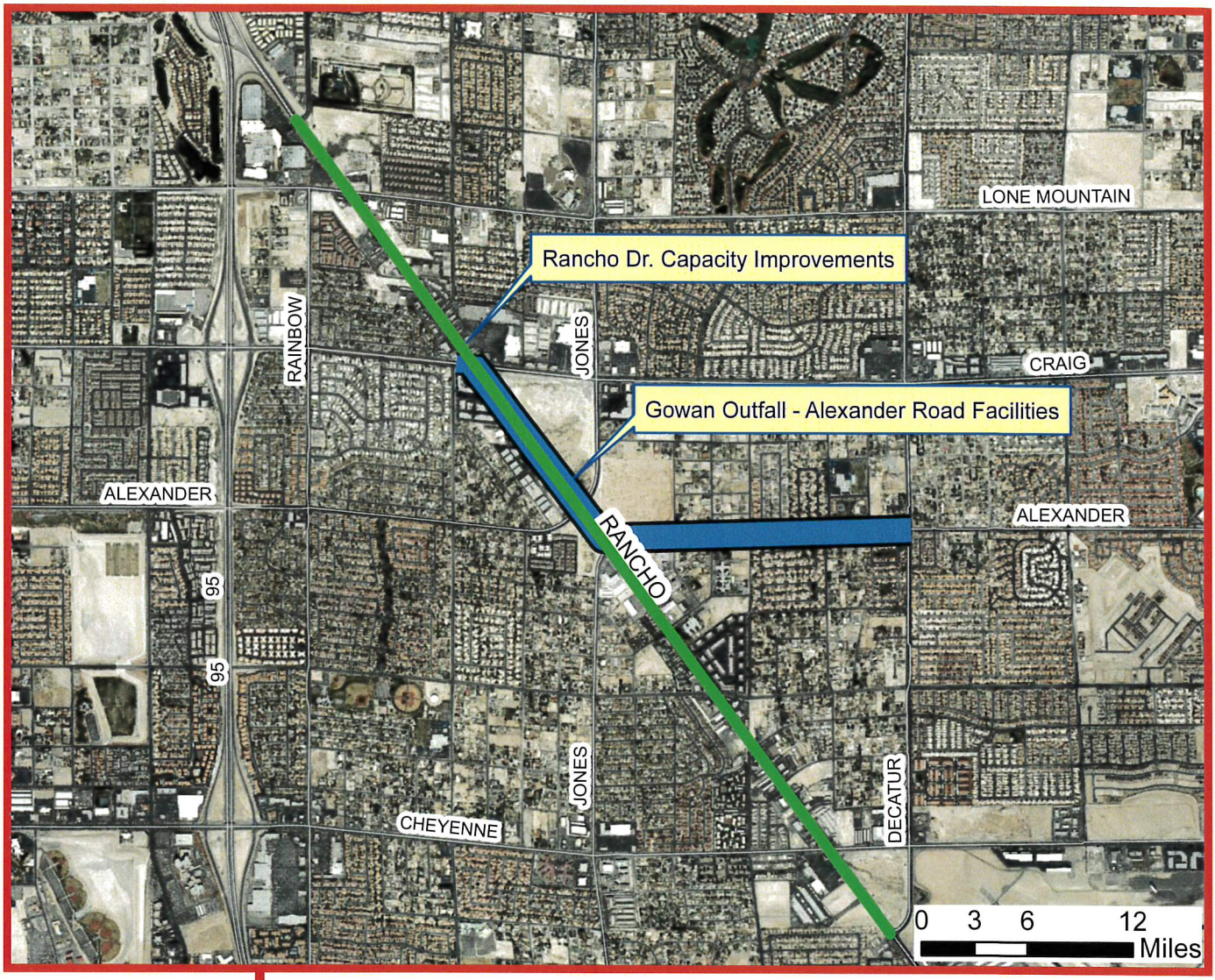
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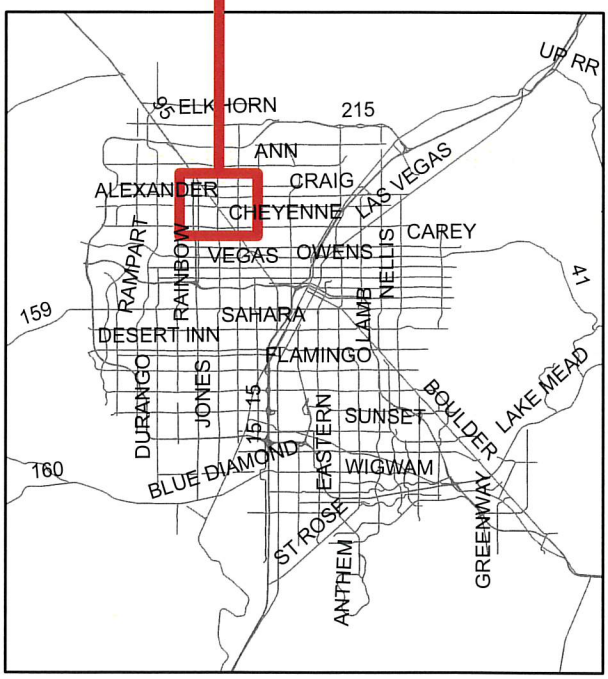
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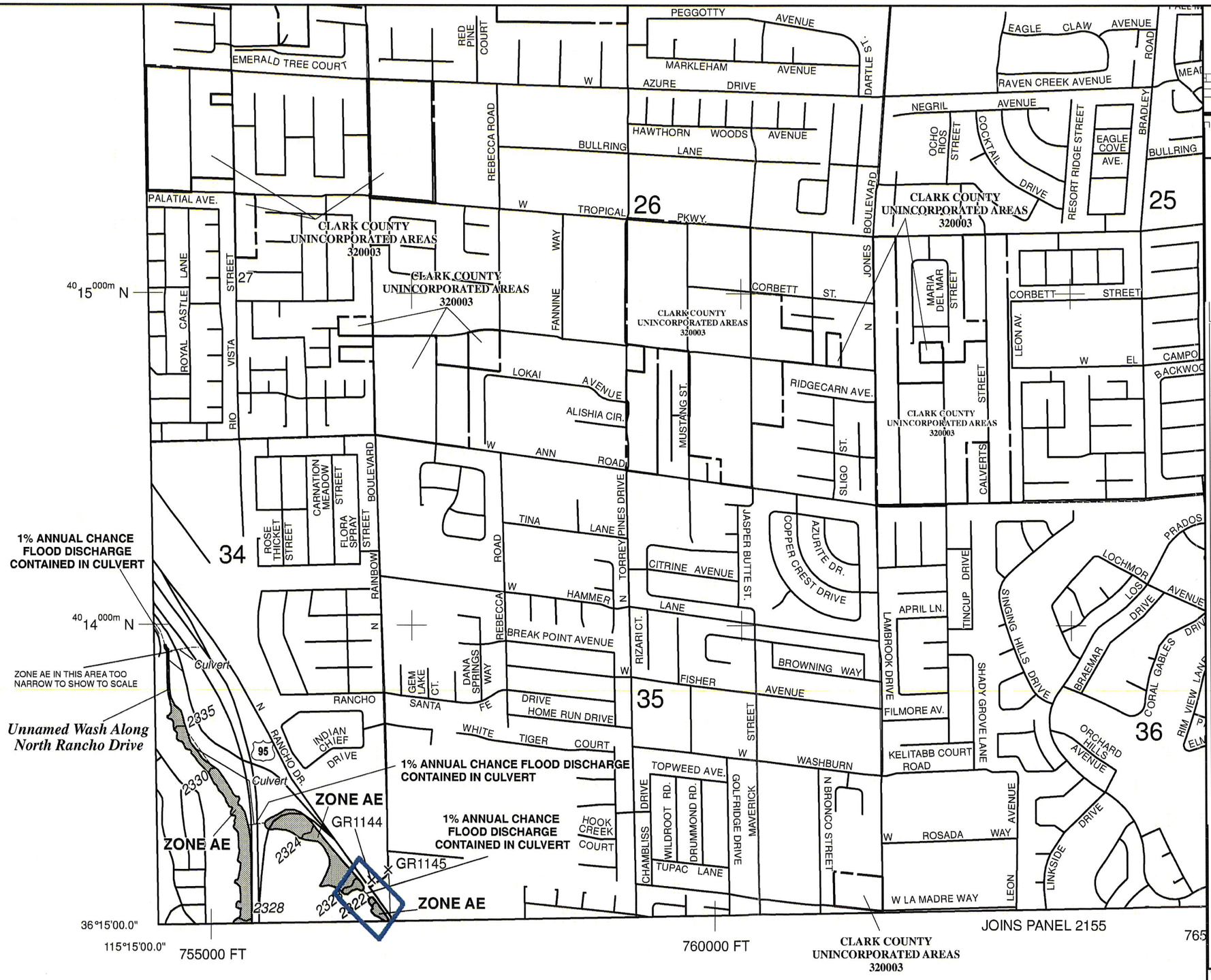
Rancho Drive Capacity Improvements
Rainbow to N. Decatur
and
Gowan Outfall - Alexander Road Flood Control Facility

Figure 1 - Vicinity Map

N

Stanley Consultants INC.
5820 S. Eastern Ave., Suite 200
Las Vegas, NV 89119
(702) 369-9396

SCI# 23629



MAP SCALE 1" = 1000'
0 1000 2000 FEET
0 300 600 METERS

PANEL 1765F

FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY, NEVADA
AND INCORPORATED AREAS

PANEL 1765 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY	320003	1765	F
LAS VEGAS, CITY OF	325276	1765	F
NORTH LAS VEGAS, CITY OF	320007	1765	F

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MAP NUMBER
32003C1765F

MAP REVISED
NOVEMBER 16, 2011

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

FIGURE 2A

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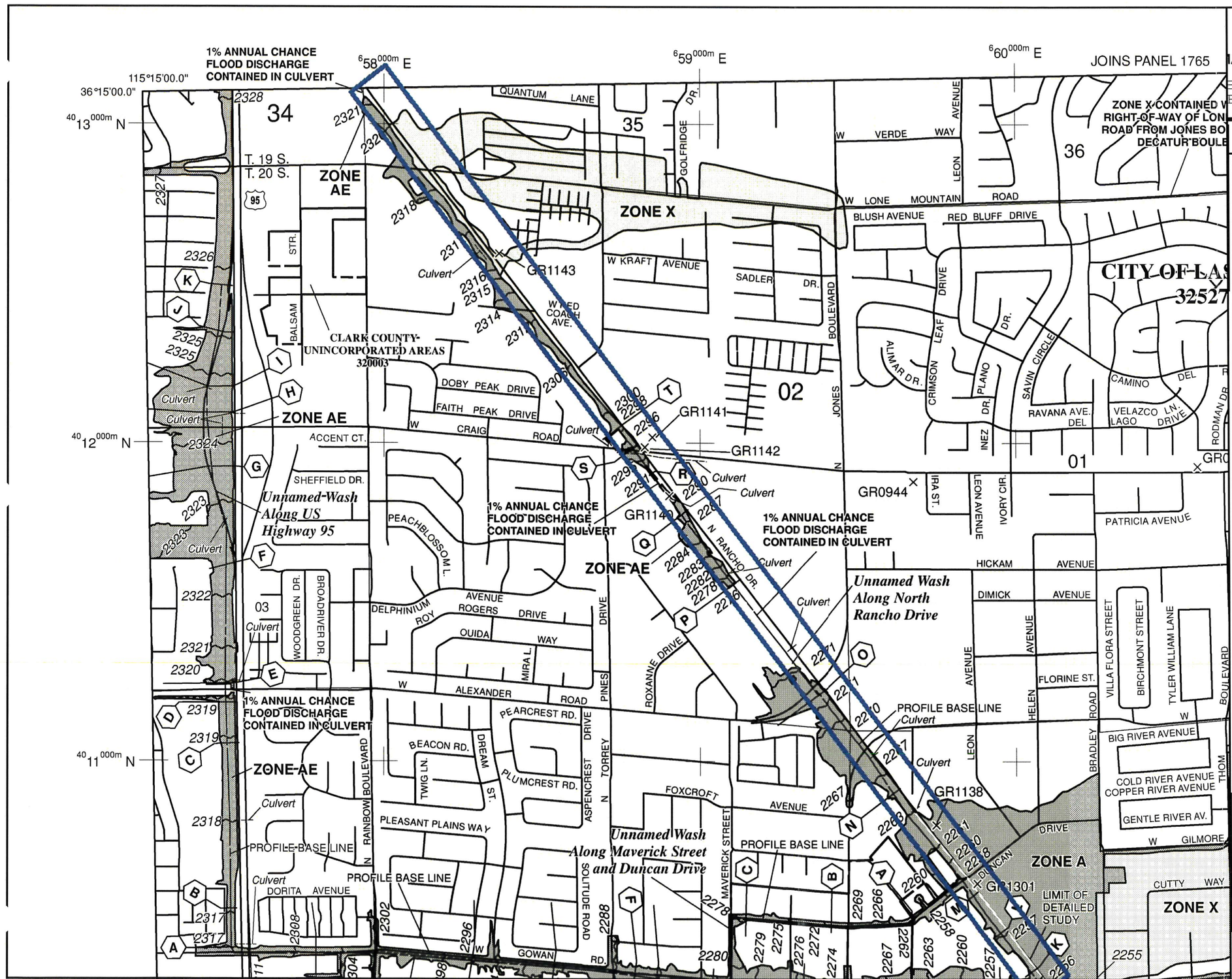

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CULVERT
115°15'00.0"
36°15'00.0"
6 58 000m E
6 59 000m E
6 60 000m E
JOINS PANEL 1765
40 13 000m N
40 12 000m N
40 11 000m N
T. 19 S.
T. 20 S.
ZONE AE
ZONE X
ZONE A
ZONE-AE
CLARK COUNTY-UNINCORPORATED AREAS 320003
CITY OF LAS 32527
QUANTUM LANE
GOLFRIDGE DR.
W VERDE WAY
LEON AVENUE
W LONE MOUNTAIN ROAD
BLUSH AVENUE
RED BLUFF DRIVE
W KRAFT AVENUE
SADLER DR.
BOULEVARD
JONES
ALIMAR DR.
CRIMSON LEAF DRIVE
PLANO DR.
SAVIN CIRCLE
RAVANA AVE.
CAMINO DEL
VELAZCO LN.
LAGO DRIVE
RODMAN DR.
DOBY PEAK DRIVE
FAITH PEAK DRIVE
W CRAIG ROAD
ACCENT CT.
SHEFFIELD DR.
Unnamed-Wash Along US Highway 95
PEACHBLOSSOM L.
DELPHINIUM AVENUE
ROY ROGERS DRIVE
OUIDA WAY
MIRA L.
WOODGREEN DR.
BROADRIVER DR.
W ALEXANDER ROAD
PEARCREST RD.
BEACON RD.
DREAM ST.
TWIG LN.
PLUMCREST RD.
ASPENCREST DRIVE
TORREY PINES
ROXANNE DRIVE
BOULEVARD
RAINBOW
PLEASANT PLAINS WAY
PROFILE BASE LINE
DORITA AVENUE
GOWAN RD.
SOLITUDE ROAD
MAVERICK STREET
FOXCROFT AVENUE
Unnamed Wash Along Maverick Street and Duncan Drive
N RANCHO DR.
Unnamed Wash Along North Rancho Drive
HICKAM AVENUE
DIMICK AVENUE
FLORINE ST.
HELEN
LEON
BRADLEY ROAD
VILLA FLORA STREET
BIRCHMONT STREET
TYLER WILLIAM LANE
BIG RIVER AVENUE
COLD RIVER AVENUE
COPPER RIVER AVENUE
GENTLE RIVER AV.
W GILMORE
CUTTY WAY
PATRICIA AVENUE
IVORY CIR.
IRA ST.
LIMIT OF DETAILED STUDY
GR1143
GR1141
GR1142
GR1140
GR0944
GR1138
GR1301
Culvert
PROFILE BASE LINE
1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CULVERT
ZONE X CONTAINED W RIGHT-OF-WAY OF LON ROAD FROM JONES BO DECATUR BOULE
MAP SCALE 1" = 1000'
1000 2000 FEET
0 300 600 METERS
PANEL 2155F
FIRM
FLOOD INSURANCE RATE MAP
CLARK COUNTY, NEVADA
AND INCORPORATED AREAS
PANEL 2155 OF 4090
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
CLARK COUNTY 320003 2155 F
LAS VEGAS, CITY OF 325276 2155 F
NORTH LAS VEGAS, CITY OF 320007 2155 F
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER 32003C2155F
MAP REVISED NOVEMBER 16, 2011
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM
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FIGURE 2B

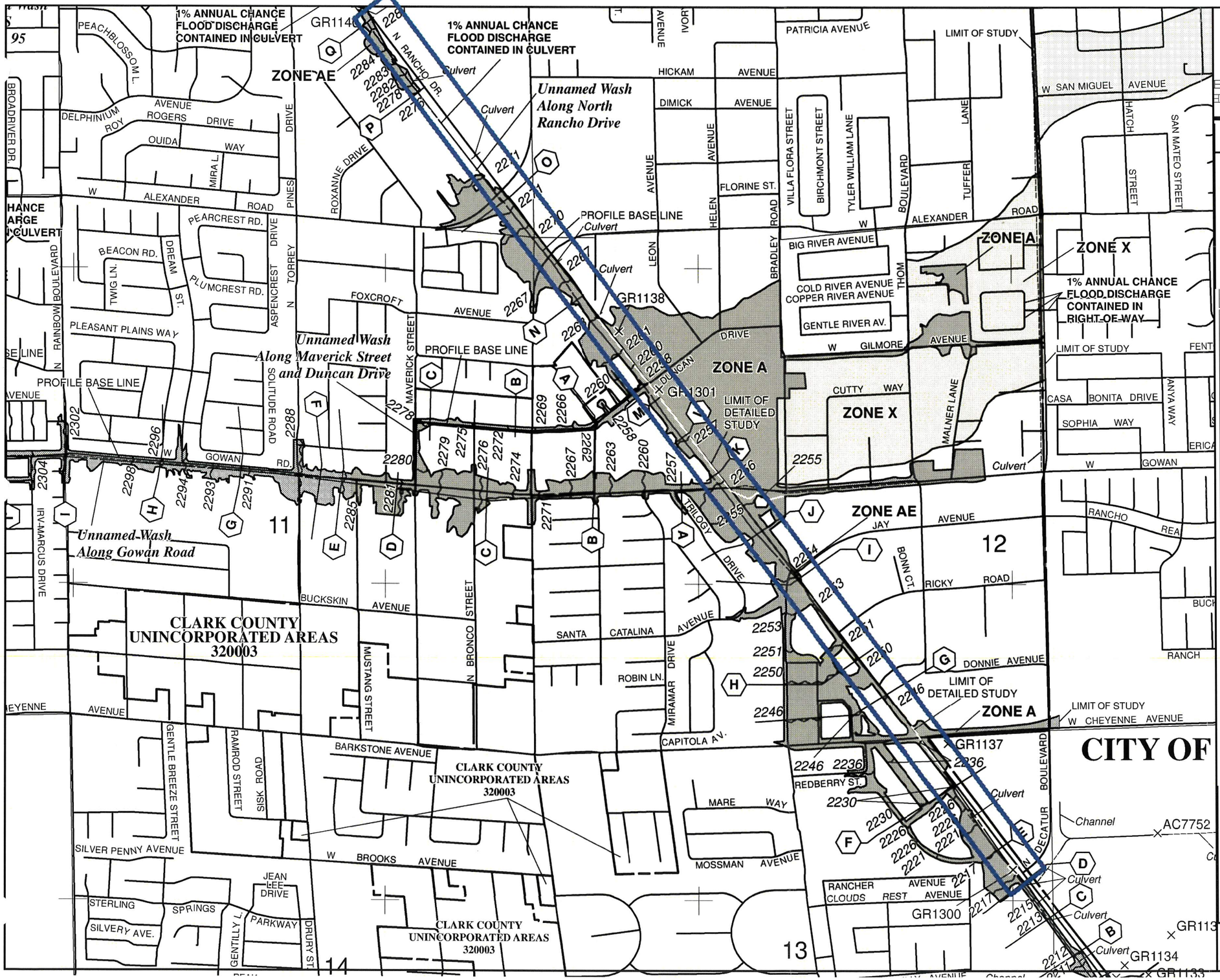

1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CULVERT
1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CULVERT
ZONE AE
Unnamed Wash Along North Rancho Drive
Culvert
PROFILE BASE LINE
ZONE A
ZONE X
1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN RIGHT-OF-WAY
LIMIT OF DETAILED STUDY
LIMIT OF STUDY
Unnamed Wash Along Maverick Street and Duncan Drive
Unnamed-Wash Along Gowan Road
CLARK COUNTY UNINCORPORATED AREAS 320003
CITY OF
PATRICIA AVENUE
HICKAM AVENUE
DIMICK AVENUE
FLORINE ST.
W ALEXANDER ROAD
FOXCROFT AVENUE
PLEASANT PLAINS WAY
W GILMORE AVENUE
CUTTY WAY
W GOWAN RD.
JAY AVENUE
RICKY ROAD
DONNIE AVENUE
W CHEYENNE AVENUE
BARKSTONE AVENUE
REDBERRY ST.
MARE WAY
MOSSMAN AVENUE
RANCHER AVENUE
CLOUDS REST AVENUE
BUCKSKIN AVENUE
SANTA CATALINA AVENUE
ROBIN LN.
CAPITOLA AV.
SILVER PENNY AVENUE
W BROOKS AVENUE
GR1138
GR1301
GR1300
GR1137
GR1134
GR1133
AC7752
Channel
Culvert
11
12
13
14
MAP SCALE 1" = 1000'
0 1000 2000 FEET
0 300 600 METERS
PANEL 2155F
FIRM
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FIGURE 2C

RANCHO CAPACITY IMPROVEMENT PROJECT SITE

ADDITIONAL SECTION OF CCRFCD FACILITY "GOAL" STUDIED

REPRODUCED FROM FIGURES F-19, F-20, AND F-26 FLOOD CONTROL FACILITIES

REGIONAL FLOOD CONTROL DISTRICT

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Detention Basin
- Culvert or Bridge Crossing
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

Category A	Category B
Channel	Channel
Stormdrain	Stormdrain
Crossing	Crossing

N

0 500 1,000 2,000 3,000
Feet
Scale: 1 inch = 2,000 feet
Refer to Figure G-2 for Aerial Source(s)

PBSJ
PB

FIGURE 3A

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
ANRB		**ANN ROAD CHANNEL WEST - RAINBOW**						
0000	P1	10' X 7' RCB	1320	721	CNW2B5-C	WEST3	0.99	0.40
ANWE		**ANN ROAD CHANNEL WEST**						
0245	E	10' X 9' RCB	1721	993	CNW2D1-C	WEST3	6.84	0.80
0279	E	10' X 9' RCB	553	743	2CNW2B5C	WEST3	6.37	0.80
0290	E	8' X 8' RCB	2050	743	2CNW2B5C	WEST3	6.37	0.70
0327	E	6' X 6' RCB	2360	161	RCHOOT	WEST3	5.38	0.87
0371	E	6' X 6' RCB	760	161	RCHOOT	WEST3	5.38	0.34
0385	E	54" RCP	1950	161	RCHOOT	WEST3	5.38	1.17
CNWE		**CENTENNIAL PKWY CHANNEL WEST**						
0150	P2	Conc Chnl 42'W 10'D 0:1 SS	720	4233	CNW3B3-C	WEST3	5.64	0.40
0173	P2	42' X 10' RCBC @ Torrey Pines	190	4233	CNW3B3-C	WEST3	5.64	0.40
0176	P2	Conc Chnl 32'W 12'D 0:1 SS	795	4233	CNW3B3-C	WEST3	5.64	0.40
0189	P2	Conc Chnl 32'W 10'D 0:1 SS	1845	4067	CNW2D4-C	WEST3	5.15	0.54
0226	P2	Conc Chnl 12'W 12'D 2:1 SS	1165	4067	CNW2D4-C	WEST3	5.15	1.00
0251	P2	Conc Chnl 12'W 12'D 2:1 SS	1135	3951	CNW2D3-C	WEST3	4.65	0.59
0271	P2	Conc Chnl 32'W 10'D 0:1 SS	185	3951	CNW2D3-C	WEST3	4.65	0.59
0274	E	32' X 10' RCBC @ Tenaya	130	3951	CNW2D3-C	WEST3	4.65	0.45
0277	P2	Conc Chnl 13'W 10'D 2:1 SS	590	3951	CNW2D3-C	WEST3	4.65	0.45
0287	P2	Conc Chnl 13'W 10'D 2:1 SS	605	3593	CNW2B2-C	WEST3	3.84	1.19
0301	P2	Conc Chnl 32'W 10'D 0:1 SS	235	3593	CNW2B2-C	WEST3	3.84	1.19
0304	P2	32' X 10' RCB	6510	3593	CNW2B2-C	WEST3	3.84	1.75
GO95		**GOWAN OUTFALL - U.S. 95 CHANNEL**						
0000	P1	Conc Chnl 12'W 4'D 2:1 SS	2640	299	GD17BG-C	ALLGOW3	0.36	0.30
0050	P1	Conc Chnl 12'W 4'D 2:1 SS	2450	299	GD17BG-C	ALLGOW3	0.36	0.30
GOA2		**GOWAN OUTFALL - ALEXANDER BRANCH**						
0000	P1	8' X 5' RCB	2281	523	CPT41-C	ALLGOW3	0.61	0.90
GOAL		**GOWAN OUTFALL - ALEXANDER ROAD FACILITIES**						
0111	P1	10' X 8' RCB	3000	880	CPT2B2	ALLGOW3	2.28	0.83
0168	P1	10' X 8' RCB	4200	880	CPT2B2	ALLGOW3	2.28	0.50
0247	P1	Conc Chnl 12'W 5.5'D 2:1 SS	2640	757	CGD20BMC	ALLGOW3	1.98	0.30
GOBU		**GOWAN NORTH - BUFFALO BRANCH**						
0000	E	2: 12' X 6' RCB	1705	961	CGD14CBC	ALLGOW3	2.53	0.20
0032	E	2: 12' X 5' RCB	1248	850	CGD14AAC	ALLGOW3	2.30	0.25
0058	E	2: 11' X 4' RCB	1398	745	CGD17AAC	ALLGOW3	1.90	0.25
0085	E	11' X 5' RCB	1266	614	CGD17ABC	ALLGOW3	1.52	0.25
0112	P1	8' X 6' RCB	1535	484	CGD20ABC	ALLGOW3	1.15	0.54
0136	P1	7' X 6' RCB	1400	344	CGD20AAC	ALLGOW3	0.76	0.36
GOBW		**GOWAN BELTWAY WEST**						
0000	E	48" RCP	2527	116	LMBWDB	ALLGOW4	10.68	4.37
0048	E	72" RCP	131	116	LMBWDB	ALLGOW4	10.68	2.21
0051	P2	72" RCP Outlet	1508	116	LMBWDB	ALLGOW4	10.68	0.30
0052	P2	589 ac-ft Lone Mountain-Beltway Detention Basin		5140	CLMBW1	GW3SC	3.50	
0082	P2	51,400 cfs PMF Spillway		51400	CLMBW1	GW3SC	3.50	
0096	P1	8' X 8' RCB Connector Pipe Under Beltway	839	5140	CLMBW1	GW3SC	3.50	0.30
0097	P2	54" RCP	394	525	UVB1-2	ALLGOW3	0.34	8.09
0106	P2	8' X 8' RCB Connector Pipe Under Lone Mountain	697	5140	CLMBW1	GW3SC	3.50	0.30
0128	P2	Conc Chnl 20'W 10'D 0:1 SS	190	3429	CWRBW1	ALLGOW3	6.06	25.00
0132	P2	Conc Chnl 14'W 10'D 0:1 SS	1286	2869	CHLBW1-C	GW3SC	1.84	5.00
0156	P2	Conc Chnl 16'W 10'D 0:1 SS	221	2869	CHLBW1-C	GW3SC	1.84	1.05
0160	P2	16' X 8' RCB	1230	2869	CHLBW1-C	GW3SC	1.84	1.05
GOBX		**GOWAN BOX CANYON**						
0000	P2	66" RCP	794	753	LWBW1	ALLGOW3	0.48	9.45
GODU		**GOWAN NORTH - DURANGO BRANCH**						
0000	E	12' X 6' RCB	2629	1150	CLV14-C	ALLGOW3	1.40	0.91
0050	E	9' X 6' RCB	865	835	CLV20-C	ALLGOW3	0.97	1.50
GOEC		**GOWAN NORTH - EL CAPITAN BRANCH**						
0000	P1	10' X 7' RCB	1445	1233	CLWFR-C	ALLGOW3	2.20	1.36
0026	P1	10' X 8' RCB	1320	1162	CWRJS-C	ALLGOW3	1.95	0.91
0051	P1	10' X 7' RCB	1320	1027	CHLFR-C	ALLGOW3	1.69	1.06
0076	P1	10' X 6' RCB	1320	894	CARFR-C	ALLGOW3	1.45	1.06

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
GOEC		**GOWAN NORTH - EL CAPITAN BRANCH**						
0100	P1	10' X 6' RCB	1320	745	CEAFR-C	ALLGOW3	1.21	0.76
0126	P1	10' X 7' RCB	1320	635	CTRFR-C	ALLGOW3	0.96	0.38
0152	P1	7' X 6' RCB	1320	485	CARFP-C	ALLGOW3	0.70	0.77
0176	P1	78" RCP	1320	363	CCPFR-C	ALLGOW3	0.46	1.15
GOL2		**GOWAN LONE MOUNTAIN SYSTEM-BRANCH 2**						
0000	E	5' X 4' RCB	150	461	CRBW	ALLGOW3	0.44	14.60
0003	E	66" RCP	607	461	CRBW	ALLGOW3	0.44	1.97
0014	E	84" RCPC @ Alexander	125	461	CRBW	ALLGOW3	0.44	4.00
GOLM		**GOWAN LONE MOUNTAIN SYSTEM**						
0000	E	78" RCP	2590	345	CLV15-C	ALLGOW4	11.88	1.80
0049	E	6' X 5' RCB	585	345	CLV15-C	ALLGOW4	11.88	1.87
0060	E	66" RCP	817	345	CLV15-C	ALLGOW4	11.88	2.40
0075	E	60" RCP	1385	345	CLV15-C	ALLGOW4	11.88	2.55
0101	E	54" RCP	701	190	LMTNDB	ALLGOW4	11.52	1.74
0115	E	48" RCP	1799	190	LMTNDB	ALLGOW4	11.52	3.08
0140	E	42" RCP	439	190	LMTNDB	ALLGOW4	11.52	1.60
0142	E	48" RCP	348	190	LMTNDB	ALLGOW4	11.52	2.14
0144	E	66" RCP	196	190	LMTNDB	ALLGOW4	11.52	5.44
0145	E	66" RCP Outlet	378	190	LMTNDB	ALLGOW4	11.52	0.90
0146	E	888 ac-ft Lone Mountain Detention Basin		7252	LMTNIN	GW3SC	6.13	
0147	E	36,000 cfs PMF Spillway		36000	LMTNIN	GW3SC	6.13	
0150	E	Drop Structure	481	6323	CGABW	GW3SC	5.12	
0162	E	28' X 8' RCBC @ Hualapai	625	6323	CGABW	GW3SC	5.12	1.86
0174	E	Conc Chnl 28'W 8'D 0:1 SS	2715	6173	CCLMT5	GW3SC	4.92	3.20
GOLO		**GOWAN OUTFALL - LONE MTN. ROAD BRANCH**						
0275	P1	8' X 6' RCB	3000	590	CPT3AA2	ALLGOW3	1.16	0.77
GONO		**GOWAN NORTH SYSTEM**						
0000	E	8' X 8' RCB Outlet	184	558	GWNNDB	ALLGOW5	68.49	0.51
0001	E	8' X 8' RCB Outlet	156	558	GWNNDB	ALLGOW5	68.49	0.63
0006	E	30,780 cfs PMF Spillway		30780	GWNNDB	ALLGOW5	68.49	
0008	E	921 ac-ft Gowan North Detention Basin		4937	CCLV43-C*	GW4SC	11.93	
0009	E	3: 13' X 8' RCB	1662	4937	CCLV43-C	GW4SC	11.93	0.62
0012	E	Conc Chnl 30'W 8'-9.5'D 0:1 SS	2665	4117	CCLV36-C	GW4SC	8.54	1.18
0062	E	Bridge 30'W 8.5'D @ Cimarron	80	3844	CCLV15-C	GW4SC	8.03	0.30
0063	E	Conc Chnl 30'W 8.5'-10'D 0:1 SS	2302	3844	CCLV15-C	GW4SC	8.03	1.00
0110	E	2: 12' X 8' RCAC @ Alexander	547	3352	CCRSFR-C*	GW3SC	6.10	1.00
0117	E	2: 12' X 8' RCAP	424	3352	CCRSFR-C*	GW3SC	6.10	1.10
0124	E	Conc Chnl 24'W 9'D 0:1 SS	887	3352	CCRSFR-C*	GW3SC	6.10	1.36
0141	E	Conc Chnl 24'W 9'-10.5'D 0:1 SS	2064	3352	CCRSFR-C	GW3SC	6.10	0.59
0181	E	Bridge 30'W 7'D @ Craig	142	2846	CRSFR-C	GW3SC	5.20	0.65
0183	E	Conc Chnl 22'W 8'-10.6'D 0:1 SS	2193	2846	CRSFR-C	GW3SC	5.20	0.72
0225	E	Conc Chnl Width Varies Depth Varies 0:1 SS	508	2605	CCLWFR-C	GW3SC	4.54	1.05
0230	E	13' X 5' RCB	256	1486	CCWRHW-C	GW3SC	2.34	2.78
0234	E	12' X 6' RCB	2010	1486	CCWRHW-C	GW3SC	2.34	1.67
0272	E	10' X 6' RCB	2797	1486	CCWRHW-C	GW3SC	2.34	3.15
0325	E	15' X 7' RCB	291	1486	CCWRHW-C	GW3SC	2.34	1.79
0335	E	15' X 7' RCB	529	1486	CWRHW-C	ALLGOW3	2.34	1.79
0350	P1	10' X 9' RCB	3473	1486	CWRHW-C	ALLGOW3	2.34	0.88
0411	P1	10' X 9' RCB	1320	1404	CARHW-C	ALLGOW3	1.89	0.76
0436	P1	10' X 7' RCB	1320	1173	CEAHW-C	ALLGOW3	1.53	1.14
0461	P1	10' X 9' RCB	1320	959	CTRHW-C	ALLGOW3	1.22	0.38
0486	P1	8' X 7' RCB	1320	747	CADHW-C	ALLGOW3	0.90	0.76
0511	P1	7' X 6' RCB	1320	546	CCPHW-C	ALLGOW3	0.60	1.14
GOOF		**GOWAN OUTFALL FACILITIES**						
0511	E	8' X 5' RCB	8390	699	CPT6B-C	GW3SC	1.08	0.50
0531	E	8' X 5' RCB	1300	558	GWNNDB	ALLGOW5	68.49	0.50
0551	E	72" RCP	524	558	GWNNDB	ALLGOW5	68.49	0.62
0773	E	60" RCP	803	286	LV30-C	ALLGOW3	0.42	1.40
0775	E	60" RCP	1300	286	LV30-C	ALLGOW3	0.42	1.00

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
RCHB		**RANCHO ROAD SYSTEM - BELTWAY**						
0000	E	2: 12' X 8.5' RCAP	1700	2631	CNW1C-W	WEST3	4.68	0.63
0034	E	Conc Chnl 21'W 8'D 0:1 SS	1000	2631	CNW1C-W	WEST3	4.68	1.19
0053	E	2: 12' X 8' RCBC @ South Ramp Connector	85	2304	CDW1C1	WEST3	4.31	1.40
0054	E	Conc Chnl 21'W 8'D 0:1 SS	432	2304	CDW1C1	WEST3	4.31	1.51
0062	E	Transition Structure	130	2304	CDW1C1	WEST3	4.31	1.51
0065	E	24' X 7' RCB	480	2304	CDW1C1	WEST3	4.31	0.30
0074	E	24' X 6' RCB	50	2226	CNWBC6-C	WEST3	4.17	0.30
0075	E	20' X 6' RCBC @ Beltway	428	2226	CNWBC6-C	WEST3	4.17	2.81
0083	P2	20' X 6' RCB	950	2226	CNWBC6-C	WEST3	4.17	2.49
0101	P2	Conc Chnl 20'W 7'D 0:1 SS	980	2226	CNWBC6-C	WEST3	4.17	2.38
0120	E	20' X 6' RCBC @ Grand Montecito	120	2226	CNWBC6-C	WEST3	4.17	1.00
0122	P2	Conc Chnl 16'-20'W 6'D 0:1 SS	350	2226	CNWBC6-C	WEST3	4.17	1.84
0130	P2	Conc Chnl 16'W 6'D 0:1 SS	1012	2226	CNWBC6-C	WEST3	4.17	2.67
RCHO		**RANCHO ROAD SYSTEM**						
0000	E	60" RCP with 36" Orifice Plate	1183	161	RCHODB	WEST3	5.38	0.74
0025	E	321 ac-ft Rancho Road Detention Basin		3115	RCHOIN	WEST3	5.38	
0027	E	18,000 cfs PMF Spillway		18000	RCHOIN	WEST3	5.38	
0050	E	Energy Dissipator	90	402	CNW1A4-C	WEST3	0.51	
0052	E	Conc Chnl 10'W 10'D 0:1 SS	115	402	CNW1A4-C	WEST3	0.51	11.43
0054	E	10' X 5' RCB	128	402	CNW1A4-C	WEST3	0.51	0.50
0056	E	10' X 5' RCB	815	402	CNW1A4-C	WEST3	0.51	0.47
0071	E	72" RCP	3140	402	CNW1A4-C	WEST3	0.51	1.80

** The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.*

*** As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.*

^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e., HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).

REGIONAL FLOOD CONTROL DISTRICT

2008 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F - 19

LEGEND

ID (Facility Identifier) AABB
- Parent Stream Name
- Stream Name

River Mile 0000
- Distance Above Confluence with Parent Stream (Miles)
- Miles in Hundredths

Existing Facility..... E
Proposed or Modified Facility..... P
Contingency Level
- Category B..... P0
- Master Plan..... P1
- Preliminary Design..... P2
- Design..... P3

Bottom Width..... W
Depth..... D
Side Slope, H:V..... SS

Construction Features

Cast in Place Concrete Pipe	CIPCP	Reinforced Concrete Arch Culvert	RCAC
Corrugated Metal Arch Pipe Culvert	CMAP	Reinforced Concrete Box	RCB
Corrugated Metal Pipe Culvert	CMPC	Reinforced Concrete Box Culvert	RCBC
High Density Polyethylene	HDPE	Reinforced Concrete Pipe	RCP
Horizontal Elliptical Reinforced Concrete Pipe	HERCP	Reinforced Concrete Pipe Culvert	RCPC
Reinforced Concrete Arch Pipe	RCAP	Storm Sewer Pipe	SSP

FIGURE 3B

PBS&J PB

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
ANWE		**ANN ROAD CHANNEL WEST**						
0000	E	12' X 12' RCB	1400	2214	CNN043-C	CWEST3	3.41	0.66
0027	E	14' X 9' RCB	203	2214	CNN043-C	CWEST3	3.41	0.77
0031	E	12' X 10' RCB	2362	2214	CNN043-C	CWEST3	3.41	1.40
0076	E	16' X 8' RCB	350	2214	CNN043-C	CWEST3	3.41	0.93
0082	E	12' X 11' RCB	2217	1947	CNW3B2-C	CWEST3	2.99	0.71
0122	E	12' X 10' RCB	260	1947	CNW3B2-C	CWEST3	2.99	0.71
0127	E	10' X 8' RCB	1450	1947	CNW3B2-C	CWEST3	2.99	2.55
0157	E	10' X 9' RCB	1112	1257	CNW2D2-C	CWEST3	1.95	1.13
0177	E	12' X 10' RCB	2797	1257	CNW2D2-C	CWEST3	1.95	0.39
0232	E	12 'X 8' RCB	714	1257	CNW2D2-C	CWEST3	1.95	0.43
0245	E	10' X 9' RCB	1721	993	CNW2D1-C	WEST3	6.84	0.80
0279	E	10' X 9' RCB	553	743	2CNW2B5C	WEST3	6.37	0.80
0290	E	8' X 8' RCB	2050	743	2CNW2B5C	WEST3	6.37	0.70
CNEA		**CENTENNIAL PKWY CHANNEL EAST**						
0123	E	14' X 6' RCB	1585	1457	CNN093-C	WEST3	1.67	0.92
0153	E	14' X 6' RCB	1125	1457	CNN093-C	WEST3	1.67	1.34
0175	E	15' X 6' RCB	125	1174	CNN078-C	WEST3	1.35	5.66
0176	E	Conc Chnl 15'W 6.5'D 0:1 SS	540	1174	CNN078-C	WEST3	1.35	0.70
CNWE		**CENTENNIAL PKWY CHANNEL WEST**						
0000	E	2: 27' X 10' RCBC @ Bellway	235	4465	CNW3D3-C	WEST3	6.41	1.51
0005	P2	2: 27' X 10' RCB	764	4465	CNW3D3-C	WEST3	6.41	1.10
0020	E	2: 27' X 10' RCBC @ Decatur	310	4465	CNW3D3-C	WEST3	6.41	2.58
0026	P2	2: 27' X 10' RCB	1006	4465	CNW3D3-C	WEST3	6.41	0.59
0045	P2	Conc Chnl 56'W 10'D 0:1 SS	1404	4465	CNW3D3-C	WEST3	6.41	0.59
0070	E	27' X 10' RCBC @ Bradley	155	2233^	CNW3D3-C^	WEST3	6.41	0.40
0071	P2	Add 1: 27' X 10' RCBC @ Bradley	155	2233^	CNW3D3-C^	WEST3	6.41	0.40
0075	P2	Conc Chnl 56'W 10'D 0:1 SS	1915	4465	CNW3D3-C	WEST3	6.41	0.40
0110	P2	2: 27' X 10' RCB	650	4382	2CW3B4-C	WEST3	6.15	0.40
0122	E	27' X 10' RCBC @ Jones	122	2191^	2CW3B4-C^	WEST3	6.15	0.40
0123	P2	Add 1: 27' X 10' RCBC @ Jones	122	2191^	2CW3B4-C^	WEST3	6.15	0.40
0129	P2	2: 27' X 10' RCB	1695	4382	2CW3B4-C	WEST3	6.15	0.40
0150	P2	Conc Chnl 42'W 10'D 0:1 SS	720	4233	CNW3B3-C	WEST3	5.64	0.40
0173	P2	42' X 10' RCBC @ Torrey Pines	190	4233	CNW3B3-C	WEST3	5.64	0.40
0176	P2	Conc Chnl 32'W 12'D 0:1 SS	795	4233	CNW3B3-C	WEST3	5.64	0.40
0189	P2	Conc Chnl 32'W 10'D 0:1 SS	1845	4067	CNW2D4-C	WEST3	5.15	0.54
GOA2		**GOWAN OUTFALL - ALEXANDER BRANCH**						
0000	P1	8' X 5' RCB	2281	523	CPT41-C	ALLGOW3	0.61	0.90
GOAL		**GOWAN OUTFALL - ALEXANDER ROAD FACILITIES**						
0000	P1	10' X 9' RCB	5280	1461	CPT5A2-C	ALLGOW3	3.23	1.00
0100	P1	10' X 8' RCB	540	1297	CCPT41-C	ALLGOW3	2.89	1.00
0111	P1	10' X 8' RCB	3000	880	CPT2B2	ALLGOW3	2.28	0.83
0168	P1	10' X 8' RCB	4200	880	CPT2B2	ALLGOW3	2.28	0.50
GOCL		**GOWAN OUTFALL - CLAYTON BRANCH**						
0000	P1	9' X 8' RCB	6785	814	CPT2B-1	ALLGOW3	1.11	0.61
GOCR		**GOWAN OUTFALL - CRAIG ROAD**						
0000	E	Conc Chnl 20'W 6'D 2:1 SS	1380	3101	CPT3D-3	ALLGOW3	5.78	1.30
0022	E	2: 8' X 8' RCB	3000	1120	CPT4C-2	ALLGOW3	1.75	0.50
0080	E	120" RCP	5850	995	CPT4C-1	ALLGOW3	1.50	0.50
0180	E	114" RCP	350	238	PT4B3-C	ALLGOW3	0.28	0.30
0201	E	96" RCP	1090	238	PT4B3-C	ALLGOW3	0.28	0.35
GOLO		**GOWAN OUTFALL - LONE MTN. ROAD BRANCH**						
0000	E	72" RCP	1370	308^	CPT2AD-1^	ALLGOW3	3.28	0.53
0001	E	13' X 8' RCB	1370	1433^	CPT2AD-1^	ALLGOW3	3.28	0.45
0025	E	16' X 8' RCB	1464	1741	CPT2AD-1	ALLGOW3	3.28	0.39
0052	E	16' X 8' RCB	2564	1741	CPT2AD-1	ALLGOW3	3.28	0.42
0100	E	16' X 8' RCB	2732	1605	C2AC2-C	ALLGOW3	2.96	0.37
0152	P1	10' X 10' RCB	700	1605	C2AC2-C	ALLGOW3	2.96	0.71
0165	P1	10' X 8' RCB	3300	1415	CPT2AB2	ALLGOW3	2.59	1.21
0228	P1	10' X 8' RCB	1300	1244	C2AB1C	ALLGOW3	2.31	1.00
0253	P1	10' X 6' RCB	1200	986	CPT3AC1	ALLGOW3	2.10	1.25

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
GOLO		**GOWAN OUTFALL - LONE MTN. ROAD BRANCH**						
0275	P1	8' X 6' RCB	3000	590	CPT3AA2	ALLGOW3	1.16	0.77
GOOF		**GOWAN OUTFALL FACILITIES**						
0000	E	Conc Chnl 20'W 7'D 2:1 SS	2500	5233	CPT-2B-3	GW5SC	14.66	1.25
0040	E	Conc Chnl 20'W 7'D 2:1 SS	1900	5058	CCPT2C1*	GW4SC	11.84	0.60
0074	E	2: 16' X 7' RCBC @ Camino Al Norte	131	5058	CCPT2C1*	GW4SC	11.84	1.30
0077	E	Conc Chnl 20'W 7'D 2:1 SS	3157	5058	CCPT2C1*	GW4SC	11.84	1.40
0146	E	3: 12' X 5' RCBC @ Clayton	150	4014^	CCPT2C1*^	GW4SC	11.84	1.33
0147	P1	Add 1: 12' X 7' RCBC @ Clayton	150	1044^	CCPT2C1*^	GW4SC	11.84	1.33
0149	E	Conc Chnl 20'W 7'D 2:1 SS	1228	5058	CCPT2C1	GW4SC	11.84	1.13
0150	E	Conc Chnl 20'W 7'D 2:1 SS	612	4772	CCPT3D-3	GW4SC	10.86	1.13
0161	E	Conc Chnl 20'W 7'D 2:1 SS (Replace w/ GOOF0162)	625	4772	CCPT3D-3	GW4SC	10.86	0.90
0162	P3	Confluence Structure (Replaces GOOF0161)	625	4772	CCPT3D-3	GW4SC	10.86	0.90
0196	P3	37.66' X 5.66' Bridge @ Simmons (Replaces GOOF0197)	120	3101	CPT3D-3	ALLGOW3	5.78	0.90
0197	E	3: 12' X 5' RCBC @ Simmons (Replace w/ GOOF0196)	120	3101	CPT3D-3	ALLGOW3	5.78	0.90
0198	E	14' X 6' RCB	1344	1164^	CPT4C-3^	GW3SC	5.85	0.41
0199	P3	Add 1: 24' X 6' RCB	1344	1581^	CPT4C-3^	GW3SC	5.85	0.40
0224	P3	1: 20' X 6' RCB and 1: 14' X 6' RCB	2700	2745	CPT4C-3	GW3SC	5.85	0.40
0275	P3	1: 16' X 8' RCB and 1: 14' X 6' RCB	515	2582	CPT5C-3	GW3SC	5.59	0.40
0285	P1	2: 14' X 8' RCB	2650	2582	CPT5C-3	GW3SC	5.59	0.45
0325	P1	2: 14' X 8' RCB	2650	2458	CPT5C-2	GW3SC	5.36	0.37
0375	P1	2: 12' X 8' RCB	2700	2375	CPT5C-1	GW3SC	5.17	0.56
0427	E	96" RCP	1510	630	DGOW2A	GW3SC	1.38	0.47
0485	E	90" RCP	1160	630	DGOW2A	GW3SC	1.38	0.47
0486	E	8' X 5' RCB	3300	630	DGOW2A	GW3SC	1.38	0.60
0511	E	8' X 5' RCB	8390	699	CPT6B-C	GW3SC	1.08	0.50
LV03		**CLAYTON STREET CHANNEL**						
0000	E	33' X 16' RCBC @ Hammer	400	1044	CNN057-C	WEST3	1.22	0.42
0006	E	Conc Chnl 9'W 9.4'D 1.5:1 SS	1300	1044	CNN057-C	WEST3	1.22	0.42
0030	E	2: 9' X 7' RCBC @ Ann	120	1044	CNN057-C	WEST3	1.22	0.42
0031	E	Conc Chnl 8'W 8.1'D 1.5:1 SS	2600	757	CNN054-C	WEST3	0.81	0.40
0081	E	2: 10' X 7' RCBC @ Tropical	100	757	CNN054-C	WEST3	0.81	0.42
0082	E	Conc Chnl 7'W 7.1'D 1.5:1 SS	2444	757	CNN054-C	WEST3	0.81	2.80
0128	E	Conc Chnl 7'W 7.1'D 1.5:1 SS	167	257	1/2NN052-C	WEST3	0.55	2.80
0129	E	2: 10' X 6' RCB	801	257	1/2NN052-C	WEST3	0.55	1.60
0131	E	10' X 6' RCB	665	257	1/2NN052-C	WEST3	0.55	1.28
LV05		**WESTERN TRIBUTARY AT ALEXANDER RD**						
0131	E	Conc Chnl 28'W 3'D 3:1 SS	1300	567	CLV99B-3	WEST3	0.64	0.76
LV06		**WESTERN TRIBUTARY AT CRAIG RD**						
0053	E	16' X 6' RCAP	782	1080	CLV99A-3	WEST3	1.31	1.56
0063	E	14' X 6' RCAP	526	1080	CLV99A-3	WEST3	1.31	1.88
0075	E	12' X 6' RCB	1608	1080	CLV99A-3	WEST3	1.31	0.72
0105	E	2: 8' X 6' RCBC @ Revere	158	1080	CLV99A-3	WEST3	1.31	1.71
0107	E	Conc Chnl 17.3'W 6'D 0:1 SS	140	1080	CLV99A-3	WEST3	1.31	3.79
0110	E	Conc Chnl 12'W 5.5'D 2:1 SS	2451	1080	CLV99A-3	WEST3	1.31	0.87
0147	E	12' X 6' RCBC @ Alexander	150	629	CLV99A-2	WEST3	0.74	1.16
LVMD		**LAS VEGAS WASH - MIDDLE**						
1877	E	Conc Chnl 30'W 10'D 1:1 SS	1570	6423	CNN104-C	WEST5	44.33	1.10
1905	E	Conc Chnl 12'W 10'D 1.65:1 SS	2440	3245	CNN086-C	WEST5	29.30	1.00
1953	E	2: 24' X 10' RCBC @ Camino Al Norte	145	3245	CNN086-C	WEST5	29.30	0.94
1954	E	Conc Chnl 32'W 7'D 2:1 SS	1587	3245	CNN086-C	WEST5	29.30	0.99
1984	E	Transition Structure	550	3221	LOWERDB	CWEST5	19.67	0.99
2048	E	68,000 cfs PMF Spillway		68000	LOWERIN	CWEST5	19.67	
2049	E	4: 7' X 7' RCB Outlet	200	3221	LOWERDB	CWEST5	19.67	
2050	E	700 ac-ft Lower Las Vegas Wash Detention Basin		6729	LOWERIN	CWEST5	19.67	
2052	P1	Conc Chnl 50'W 6'D 0:1 SS	240	6636	2C057-C	CWEST5	19.28	3.11
2053	P1	Conc Chnl 60'W 12'D 0:1 SS	690	6636	2C057-C	CWEST5	19.28	0.15
2054	P1	Conc Chnl 60'W 12'D 0:1 SS	260	6636	2C057-C	CWEST5	19.28	11.97
2055	P1	Conc Chnl 60'W 12'D 0:1 SS	165	6636	2C057-C	CWEST5	19.28	0.15
2060	E	4: 12.75' X 16' RCBC @ Clayton	144	6171	2C044-C	CWEST5	18.06	0.15
2061	E	Conc Chnl 54'W 16'D 0:1 SS	425	6171	2C044-C	CWEST5	18.06	0.15

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LVMD		**LAS VEGAS WASH - MIDDLE**						
2062	E	Conc Chnl 54'W 9'D 0:1 SS	1200	6171	2C044-C	CWEST5	18.06	1.35
2089	E	Conc Chnl 54'W 9'-9.5'D 0:1 SS	908	6171	2C044-C	CWEST5	18.06	0.50
2124	E	2: 26.5' X 10' RCBC @ Simmons	110	6046	2C043-C	CLVMD5	15.94	0.50
2125	E	Conc Chnl 54'W 9'D 0:1 SS	1571	6046	2C043-C	CLVMD5	15.94	0.77
2170	E	4: 12' X 10' RCBC @ Ann Road	500	6046	2C043-C	CLVMD5	15.94	1.42
2172	E	Conc Chnl 50'W 10'D 0:1 SS	1289	5734	2C3D4-C*	CLVMD4	11.98	1.15
2192	E	2: 24.5' X 10' RCBC @ Allen	110	5734	2C3D4-C*	CLVMD4	11.98	1.15
2197	E	Conc Chnl 50'W 10'D 0:1 SS	1385	5734	2C3D4-C*	CLVMD4	11.98	1.37
2223	E	50' X 10' RCBC @ El Campo Grande	275	5734	2C3D4-C*	CLVMD4	11.98	1.60
2228	E	Conc Chnl 50'W 10'D 0:1 SS	1600	5734	2C3D4-C*	CLVMD4	11.98	1.83
2266	E	2: 24.5' X 10' RCBC @ Tropical	575	5734	2C3D4-C*	CLVMD4	11.98	1.04
2276	E	Conc Chnl 50'D 10'D 0:1 SS	985	5734	2C3D4-C*	CLVMD4	11.98	0.80
2294	E	2: 24.5' X 10' RCBC @ Ranchhouse	292	5734	2C3D4-C	CLVMD4	11.98	1.04
2300	E	Transition Structure	200	5734	2C3D4-C	CLVMD4	11.98	1.50
2304	E	Conc Chnl 70'W 10'D 0:1 SS	220	5734	2C3D4-C	CLVMD4	11.98	1.50
2308	E	Confluence Structure	480	5734	2C3D4-C	CLVMD4	11.98	1.50
2322	P2	2: 24.5' X 10' RCB	1200	3317	CNW3D4-C	CWEST3	6.88	1.50
2324	P2	2:14' X 8' RCB	5485	3317	CNW3D4-C	CWEST3	6.88	0.40
LVSM		**LAS VEGAS WASH-SIMMONS**						
0000	E	12' X 8' RCB	195	790	CNN044-C	WEST3	0.81	0.63
0006	E	11' X 6' RCB	1005	790	CNN044-C	WEST3	0.81	0.30
0025	E	10' X 6' RCB	1310	790	CNN044-C	WEST3	0.81	0.44
0050	E	9' X 6' RCB	387	530	CNN040-C	WEST3	0.53	0.50
0057	E	8' X 6' RCB	1113	530	CNN040-C	WEST3	0.53	0.54
0084	E	72" RCP	252	530	CNN040-C	WEST3	0.53	1.49
0089	E	60" RCP	1068	235	NN038-C	WEST3	0.24	2.04
0109	E	48" RCP	2003	235	NN038-C	WEST3	0.24	1.91
TREA		**TROPICAL ROAD CHANNEL EAST**						
0134	E	66" RCP	2700	447	CNN095-C	WEST3	0.57	2.10

** The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.*

*** As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.*

^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e., HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).

FIGURE 3C

REGIONAL FLOOD CONTROL DISTRICT

2008 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY
FIGURE F - 20

LEGEND

ID (Facility Identifier) AABB
- Parent Stream Name
- Stream Name

River Mile 0000
- Distance Above Confluence with Parent Stream (Miles)
- Miles in Hundredths

Existing Facility..... E
Proposed or Modified Facility..... P
Contingency Level
- Category B..... P0
- Master Plan..... P1
- Preliminary Design..... P2
- Design..... P3

Bottom Width..... W
Depth..... D
Side Slope, H:V..... SS

Construction Features

Cast in Place Concrete Pipe	CIPCP	Reinforced Concrete Arch Culvert	RCAC
Corrugated Metal Arch Pipe Culvert	CMAP	Reinforced Concrete Box	RCB
Corrugated Metal Pipe Culvert	CMPC	Reinforced Concrete Box Culvert	RCBC
High Density Polyethylene	HDPE	Reinforced Concrete Pipe	RCP
Horizontal Elliptical Reinforced Concrete Pipe	HERCP	Reinforced Concrete Pipe Culvert	RCPC
Reinforced Concrete Arch Pipe	RCAP	Storm Sewer Pipe	SSP

PBS&J PB

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
FW15		**FREEWAY CHANNEL FROM DESERT INN TO EXPRESSWAY**						
0000	E	3: 12' X 10' RCB	2170	3728	CAL93	SW4	10.63	0.17
GOOF		**GOWAN OUTFALL FACILITIES**						
0485	E	90" RCP	1160	630	DGOW2A	GW3SC	1.38	0.47
0486	E	8' X 5' RCB	3300	630	DGOW2A	GW3SC	1.38	0.60
0511	E	8' X 5' RCB	8390	699	CPT6B-C	GW3SC	1.08	0.50
LAAS		**NORTH LAS VEGAS AIR TERMINAL - SIMMONS**						
0000	P3	14' X 6' RCB	760	698	CR2-CA	NW3	2.57	0.80
0014	P3	12' X 6' RCB	1350	698	CR2-CA	NW3	2.57	1.12
0040	P3	10' X 6' RCB	2105	698	CR2-CA	NW3	2.57	1.50
0080	P3	66" RCP	157	285	R-C	NW3	0.27	1.10
0083	P3	60" RCP	620	285	R-C	NW3	0.27	1.40
0095	P3	54" RCP	400	285	R-C	NW3	0.27	1.44
0103	P3	48" RCP	405	285	R-C	NW3	0.27	1.75
LAAT		**NORTH LAS VEGAS AIR TERMINAL**						
0000	E	RCBC - Unknown Characteristics	345	1331	CB3-1	NW3	4.17	0.50
0006	E	Conc Chnl - Unknown Characteristics	375	1331	CB3-1	NW3	4.17	0.50
0013	E	Earth Chnl 27'W 5'-6.5'D 1.5:1 SS (Replace w/ LAAT0014)	934	1331	CB3-1	NW3	4.17	0.50
0014	P3	10' X 6' RCB (Replaces LAAT0013)	934	1331	CB3-1	NW3	4.17	1.84
0030	E	Earth Chnl 27'W 5'-6.5'D 1.5:1 SS (Replace w/ LAAT0031)	1618	1079	CB3-2	NW3	3.87	0.50
0031	P3	10' X 6' RCB (Replaces LAAT0030)	1618	1079	CB3-2	NW3	3.87	1.05
0061	E	Earth Chnl 27'W 5'-6.5'D 1.5:1 SS (Replace w/ LAAT0062)	887	1079	CB3-2	NW3	3.87	0.50
0062	P1	12' X 8' RCB (Replaces LAAT0061)	887	1079	CB3-2	NW3	3.87	0.50
0078	E	10' X 6' RCB	1055	1079	CB3-2	NW3	3.87	0.58
0098	E	10' X 4' RCB	2207	677	CCA1-C	NW3	3.08	0.60
0140	E	Conc Chnl 6'W 4'D 1.5:1 SS	338	677	CCA1-C	NW3	3.08	0.64
0146	E	Conc Chnl 6'W 3'D 1.5:1 SS	1388	677	CCA1-C	NW3	3.08	0.68
0172	E	76" X 48" HERCP	536	480	CA1-C	NW3	2.87	0.75
0182	E	Conc Chnl 6'W 3'D 1.5:1 SS	997	480	CA1-C	NW3	2.87	0.83
0201	E	Conc Chnl 6'W 3'D 1.5:1 SS	184	294	A1-C1	NW3	0.31	0.37
0204	E	76" X 48" RCP	425	294	A1-C1	NW3	0.31	0.37
LANO		**NORTH LAS VEGAS AIR TERMINAL NORTH**						
0000	E	Conc Chnl 0'W 3'D 1.5:1 SS	470	294	A1-C1	NW3	0.31	0.30
LCCH		**LAS VEGAS CREEK CHANNEL**						
0000	E	2: 12' X 7' RCB	730	2894	CLC20-C	MEADOWS4	9.68	1.28
0013	E	2: 12' X 6' RCB	2035	2894	CLC20-C	MEADOWS4	9.68	0.82
0051	E	2:14' X 7' RCB	3113	2894	CLC20-C	MEADOWS4	9.68	0.60
0110	E	Transition Structure	220	2798	CCLC16-C	MEADOWS4	9.51	
0114	E	2: 14' X 7' RCB	670	2329	CRMEDET	MEADOWS4	8.25	0.80
0127	E	Transition Structure	110	2329	CRMEDET	MEADOWS4	8.25	
0129	E	2: 14' X 7' RCB	1130	2329	CRMEDET	MEADOWS4	8.25	0.50
0150	E	2: 13' X 7' RCB	200	2329	CRMEDET	MEADOWS4	8.25	0.95
0154	E	Transition Structure	190	2329	CRMEDET	MEADOWS4	8.25	
0157	E	2: 12' X 6' RCB	1650	1631	CCLC14-C	SW3	2.99	1.06
0188	E	2: 12' X 6' RCB	2225	1631	CCLC14-C	SW3	2.99	1.36
0230	E	12' X 6' RCB	2140	1381	CLC14-C	SW3	2.54	1.74
0270	E	12' X 6' RCB	1705	774	CCWA02-C	SW3	1.84	0.54
0302	E	8' X 6' RCB	3940	774	CCWA02-C	SW3	1.84	2.49
0377	E	10' X 7' RCB	1226	774	CCWA02-C	SW3	1.84	0.74
0400	E	Transition Structure	110	437	CWA02-C	SW3	1.47	0.49
0402	E	8' X 6' RCB @ Jones	535	437	CWA02-C	SW3	1.47	0.49
0412	E	60" RCP	1370	437	CWA02-C	SW3	1.47	1.08
0438	E	60" RCP	1090	162	CLC01-C	SW3	1.20	1.60
0458	E	60" RCP	1060	162	CLC01-C	SW3	1.20	1.60
0478	E	60" RCP	1110	162	CLC01-C	SW3	1.20	0.55
LCDE		**LAS VEGAS CREEK - DECATUR**						
0000	E	6' X 5' RCB	1800	404	LC11-C	SW3	0.38	1.26
0034	E	72" RCP	700	404	LC11-C	SW3	0.38	0.50
LCJO		**LAS VEGAS CREEK - JONES**						
0000	E	6' X 6' RCB	380	358	AL01B-C	SW3	0.37	0.50
0007	E	6' X 5' RCB	675	358	AL01B-C	SW3	0.37	0.62

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LCLT		**LAS VEGAS CREEK - LATERAL**						
0000	E	6' X 6' RCB	490	250	WA10D	SW3	0.45	0.50
0006	E	Conc Chnl 10'W 4'D 0:1 SS	1364	250	WA10D	SW3	0.45	0.50
0033	E	10' X 4' RCBC @ Washington	96	405	WA10-C	NW3	0.45	0.50
0034	E	Grass Chnl 12'W 5'D 1:1 SS	1750	405	WA10-C	SW3	0.45	0.20
LCME		**LAS VEGAS CREEK - MEADOWS**						
0000	E	14' X 8' RCB	895	1423	MEADOWDB	SW3SC	5.67	0.72
0016	E	Stilling Basin	140	1423	MEADOWDB	SW3SC	5.67	0.21
0017	E	3,300 cfs Spillway (Replace w/ LCME0018)		3300	MEADOWIN	SW3SC	5.67	
0018	P1	Modify Spillway, raise height by 1' (Replaces LCME0017)		3300	MEADOWIN	SW3SC	5.67	
0019	E	1: 11' X 5' RCB and 1: 11.5' X 5' RCB	110	1423	MEADOWDB	SW3SC	5.67	0.81
0020	E	213 ac-ft Meadows Detention Basin		4713	MEADOWIN	SW3SC	5.67	
0021	P1	Upgrade to 235 ac-ft Meadows Detention Basin		4713	MEADOWIN	SW3SC	5.67	
LCRA		**LAS VEGAS CREEK - RANCHO**						
0000	E	12' X 8' RCB	380	783	CLC16-C	SW3	1.71	0.60
0004	E	12' X 6' RCB	2367	783	CLC16-C	SW3	1.71	0.77
0050	E	8' X 6' RCB	355	526	WA13D	SW3	1.40	0.50
LMDE		**LAKE MEAD BOULEVARD - DECATUR BRANCH**						
0000	P1	10' X 5' RCB	2640	665	DCVG04-C	NW3	1.26	0.90
LV15		**FREEWAY CHANNEL**						
0316	E	11' X 6' RCB	3010	985	CWA20-C	NW3	4.46	0.59
0372	E	9' X 6' RCB	1970	985	CWA20-C	NW3	4.46	0.66
0409	E	7' X 6' RCB	815	542	CWA15A-C	NW3	3.67	0.91
0424	P1	8' X 6' RCB	2500	542	CWA15A-C	NW3	3.67	0.73
0472	P1	2: 66" RCP	1200	265	WA15A-C	NW3	0.37	0.42
0474	P1	8' X 6' RCB	2880	322	CCWA13-C	NW3	3.29	0.73
0528	P1	8' X 7' RCB	4420	869	CWA13-C	NW3	1.39	1.19
0602	P1	2: 66" RCP	5980	504	CWA09-C	NW3	0.61	1.59
LVLM		**LAS VEGAS WASH - LAKE MEAD**						
0033	E	60" RCP (Replace w/ LVLM0034)	1186	994	CLM20-C	NW3SC	1.36	1.62
0034	P0	12' X 5' RCB (Replaces LVLM0033)	1186	994	CLM20-C	NW3SC	1.36	1.62
0059	E	72" RCP (Replace w/ LVLM0060)	5952	994	CLM20-C	NW3SC	1.36	0.66
0060	P0	12' X 6' RCB (Replaces LVLM0059)	5952	994	CLM20-C	NW3SC	1.36	0.66
0170	E	78" RCP	2421	378	CLM16A-C	NW3SC	0.38	1.17
0221	E	48" RCP Outlet	270	168	DR2	NW4	11.78	
0222	E	48" RCP Outlet	500	208	DCAREY	NW4	11.78	
0224	E	36" RCP	2429					0.53
0225	E	90" RCP (Replace w/ LVLM0226)	641	1933	CLM10-C	NW3	3.02	1.35
0226	P0	2: 10' X 8' RCB (Replaces LVLM0225)	641	1933	CLM10-C	NW3	3.02	0.50
0227	E	10,000 cfs PMF Spillway		10000	CARYLMIN	NW4	11.78	
0228	E	607 ac-ft Carey-Lake Mead Detention Basin		5184	CARYLMIN	NW4	11.78	
0270	E	90" RCP (Replace w/ LVLM0271)	3473	1933	CLM10-C	NW3	3.02	1.35
0271	P0	12' X 8' RCB (Replaces LVLM0270)	3473	1933	CLM10-C	NW3	3.02	1.35
0336	E	84" RCP (Replace w/ LVLM0337)	1050	1652	CLM06-C	NW3	2.61	1.16
0337	P0	12' X 8' RCB (Replaces LVLM0336)	1050	1652	CLM06-C	NW3	2.61	1.16
0355	E	90" RCP (Replace w/ LVLM0356)	1840	1652	CLM06-C	NW3	2.61	0.40
0356	P0	12' X 11' RCB (Replaces LVLM0355)	1840	1652	CLM06-C	NW3	2.61	0.40
0388	E	84" RCP	520	852	CLM05-C	NW3	1.00	1.40
0399	E	78" RCP	803	852	CLM05-C	NW3	1.00	1.07
0416	E	72" RCP	1320	852	CLM05-C	NW3	1.00	1.00
0442	E	60" RCP	725	565	CLM03-C	NW3	0.63	1.28
0453	E	54" RCP	589	565	CLM03-C	NW3	0.63	2.37
0460	E	54" RCP	1464	235	LM02-C	NW3	0.29	2.05
0475	E	48" RCP	2632	235	LM02-C	NW3	0.29	1.24
0525	E	48" RCP	2600	542	CLM01-C	NW3	0.64	1.24
LVOE		**OWENS AVENUE - EAST**						
0345	P1	13' X 11' RCB	1685	2369	DLVOE	SW5	22.79	0.60
LVOW		**OWENS AVENUE SYSTEM**						
0003	E	96" RCP	7500	1089	CLM16B-C	NW3	2.40	0.70
0146	E	84" RCP	4800	570	DCVG20-C	NW3	2.02	0.90
0241	P3	66" RCP	5800	381	CVG20-C	NW3	1.57	1.40

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LVOW		**OWENS AVENUE SYSTEM**						
0351	P3	8' X 6' RCB	3000	829	CVG04-C	NW3	1.26	1.44
0360	P1	8' X 6' RCB	2300	829	CVG04-C	NW3	1.26	1.48
0460	P1	7' X 6' RCB	2700	616	CVG03-C	NW3	0.95	1.48
LVPK		**PEAK DRIVE SYSTEM**						
0000	E	Conc Chnl 15'W 6'D 0:1 SS	606	1024	CPD04B-C	NW3	1.59	1.22
0019	E	Conc Chnl 20'W 5.5'D 0:1 SS	2190	1024	CPD04B-C	NW3	1.59	0.57
0056	E	10' X 5' RCB	103	703	CCY04A-C	NW3	1.12	0.40
0058	E	9' X 6' RCB	2542	703	CCY04A-C	NW3	1.12	0.95
0104	E	10' X 6' RCB	76	703	CCY04A-C	NW3	1.12	1.26
0106	E	8' X 6' RCB	1235	703	CCY04A-C	NW3	1.12	0.54
0130	E	7' X 5' RCB	1435	400	CPD01-C	NW3	0.67	0.61
LVRA		**LAS VEGAS WASH - RANCHO**						
0000	E	12' X 8' RCB	612	1317	CCPD04BC	NW3	3.87	1.56
0012	E	12' X 8' RCB	2838	1317	CCPD04BC	NW3	3.87	0.78
0066	E	14' X 5' RCB	65	1317	CCPD04BC	NW3	3.87	1.22
LVSR		**LAS VEGAS WASH - SMOKE RANCH**						
0045	E	54" RCP (Replace w/ LVSR0046)	1180	1244	CS1-C	NW3SC	1.42	3.41
0046	P1	10' X 5' RCB (Replaces LVSR0045)	1180	1244	CS1-C	NW3SC	1.42	3.41
0070	E	66" RCP (Replace w/ LVSR0071)	4118	1244	CS1-C	NW3SC	1.42	0.73
0071	P1	10' X 9' RCB (Replaces LVSR0070)	4118	1244	CS1-C	NW3SC	1.42	0.73
0148	E	54" RCP (Replace w/ LVSR0149)	2587	951	CS	NW3SC	0.95	0.58
0149	P1	11' X 7' RCB (Replaces LVSR0148)	2587	951	CS	NW3SC	0.95	0.58
0197	E	30" RCP (Replace w/ LVSR0198)	581	445	CR2-C	NW3SC	0.38	0.86
0198	P1	8' x 5' RCB (Replaces LVSR0197)	581	445	CR2-C	NW3SC	0.38	0.86
0208	E	54" RCP (Replace w/ LVSR0209)	2060	445	CR2-C	NW3SC	0.38	1.41
0209	P1	7' X 5' RCB (Replaces LVSR0208)	2060	445	CR2-C	NW3SC	0.38	1.41
0210	E	14' X 8' RCB	800	2889	CB1-C	NW3	6.44	1.73
0221	E	Transition Structure	100	2889	CB1-C	NW3	6.44	7.08
0223	E	Conc Chnl 14'W 8'D 1.5:1 SS	2150	2889	CB1-C	NW3	6.44	0.96
0263	E	14' X 8' RCB	707	2889	CB1-C	NW3	6.44	0.63
0273	E	11' X 11' RCB	1140	2889	CB1-C	NW3	6.44	0.92
0295	E	11' X 11' RCB	510	2683	CCSR05B	NW3	6.16	2.85
0312	E	8' X 8' RCB	460	1607	CSR05B	NW3	2.30	1.63
0359	E	66" RCP (Replace w/ LVSR0360)	1690	1607	CSR05B	NW3	2.30	0.67
0360	P1	10' X 10' RCB (Replaces LVSR0359)	1690	1607	CSR05B	NW3	2.30	0.75
0396	E	60" RCP (Replace w/ LVSR0397)	2640	1461	CSR05D	NW3	1.94	1.14
0397	P1	10' X 9' RCB (Replaces LVSR0396)	2640	1461	CSR05D	NW3	1.94	0.87
0446	E	54" RCP (Replace w/ LVSR0447)	2530	1461	CSR05D	NW3	1.94	1.14
0447	P1	10' X 8' RCB (Replaces LVSR0446)	2530	1461	CSR05D	NW3	1.94	1.25
0496	P1	10' X 7' RCB	2855	1245	CSR02E	NW3	1.64	1.27
0500	E	60" RCP	1290					1.97
0525	E	54" RCP	1340					0.30
0546	P1	8' X 8' RCB	2640	758	CSR00A	NW3	1.01	0.57
LVWH		**WASHINGTON AVENUE CHANNEL**						
0431	E	3: 14.33' X 10' RCB	665	2870	DCLC21	SW5	22.79	0.15
0446	E	Junction Structure	69	2870	DCLC21	SW5	22.79	0.15
0447	E	3: 14.33' X 10' RCB	1955	4978	CCAL93	SW5	22.19	0.15
0484	E	Confluence Structure	455	4978	CCAL93	SW5	22.19	0.15
WAGC		**WASHINGTON AVENUE CHANNEL - GRAND CENTRAL**						
0000	E	2: 12' X 4' RCB	700	557	LC21	SW3	0.60	0.20
0014	E	1: 12' X 4' RCB and 1: 11' X 4' RCB	2440	557	LC21	SW3	0.60	0.20

** The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.*

*** As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.*

^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e., HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).

REGIONAL FLOOD CONTROL DISTRICT

2008 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY
FIGURE F - 26

LEGEND

ID (Facility Identifier) AABB
- Parent Stream Name
- Stream Name

River Mile 0000
- Distance Above Confluence with Parent Stream (Miles)
- Miles in Hundredths

Existing Facility..... E
Proposed or Modified Facility..... P
Contingency Level
- Category B..... P0
- Master Plan..... P1
- Preliminary Design..... P2
- Design..... P3

Bottom Width..... W
Depth..... D
Side Slope, H:V..... SS

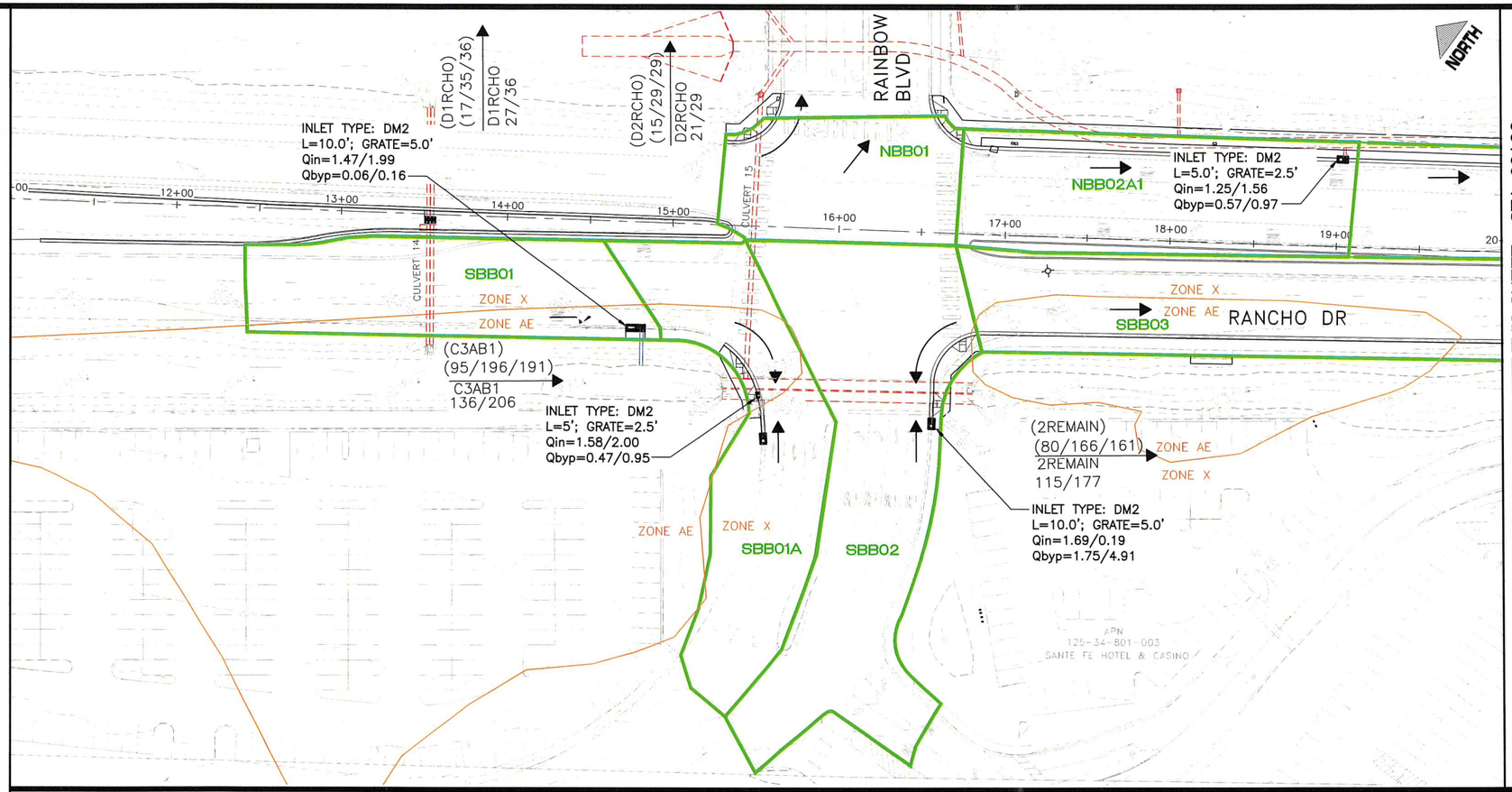
Construction Features

Cast in Place Concrete Pipe..... CIPCP	Reinforced Concrete Arch Culvert..... RCAC
Corrugated Metal Arch Pipe Culvert..... CMAP	Reinforced Concrete Box..... RCB
Corrugated Metal Pipe Culvert..... CMPC	Reinforced Concrete Box Culvert..... RCBC
High Density Polyethylene..... HDPE	Reinforced Concrete Pipe..... RCP
Horizontal Elliptical Reinforced Concrete Pipe..... HERCP	Reinforced Concrete Pipe Culvert..... RCPC
Reinforced Concrete Arch Pipe..... RCAP	Storm Sewer Pipe..... SSP

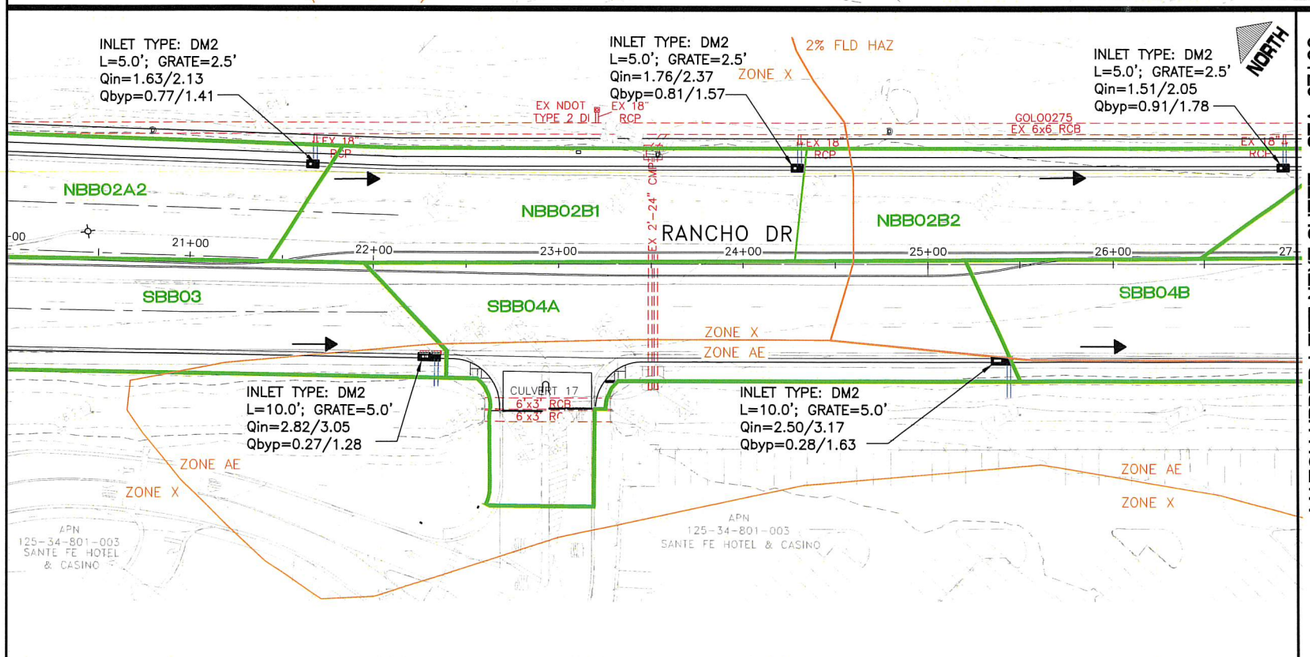
FIGURE 3D

PBS&J

PB



MATCH LOWER LEFT THIS SHEET - STA: 20+00



MATCH UPPER RIGHT THIS SHEET - STA: 20+00

MATCH UPPER LEFT NEXT SHEET - STA: 27+00

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL

(HEC-1 NODE)
(INTERIM 25YR FLOW/INTERIM 100YR FLOW/LOMR)

HEC-1 NODE
ULT 25YR FLOW/ULT 100YR FLOW

GOAL FLOW LABEL

HEC-1 NODE (INT 100 YR FLOW)
HEC-1 NODE ULT 25 YR/ULT 100 YR FLOW

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INLET TYPE: TYPE OF INLET
L=LENGTH OF OPENING; GRATE=LENGTH OF GRATE
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BASIS OF BEARING

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BENCHMARK

CITY OF LAS VEGAS BENCHMARK NUMBER 5LV002SES BEING A RIVET AND PLATE IN THE TOP OF CURB AT THE SOUTHEAST CORNER OF RANCHO DRIVE AND JONES BOULEVARD (NORTH)

ELEVATION (NAVD88) = 691.9676 METERS = 2270.23 FEET

70% DESIGN
NOT FOR
CONSTRUCTION

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER:DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER:KRISTINA SWALLOW, P.E.

DATE: APRIL 2014

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM

Stanley Consultants INC.
3820 S Eastern Ave.
Suite 200
Las Vegas, NV 89119
(702) 369-9396

CITY OF LAS VEGAS NEVADA

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
DECATUR TO RAINBOW

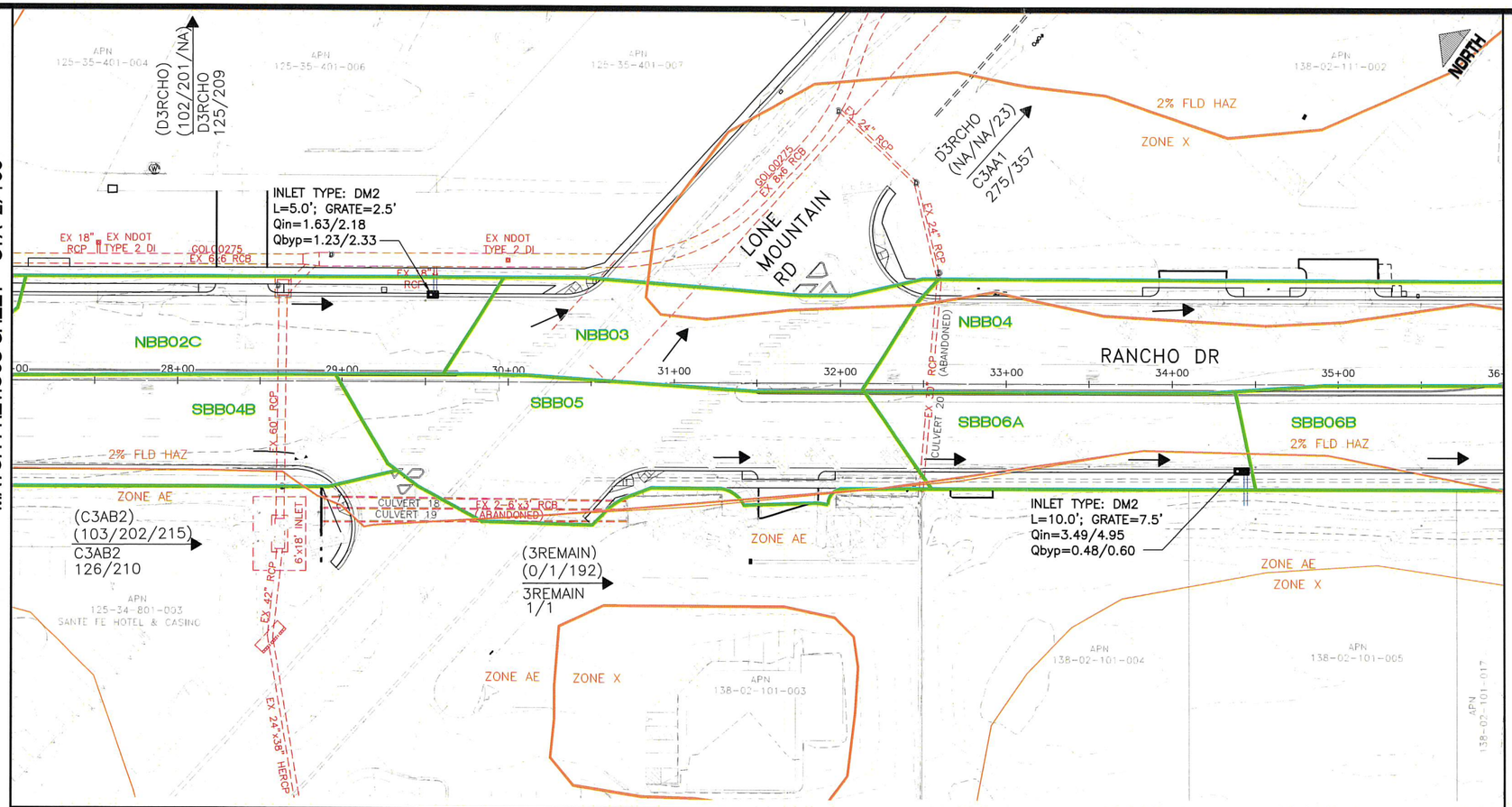
SHEET: ONSITE INTERIM AND DEVELOPED
SUBBASIN MAP

PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

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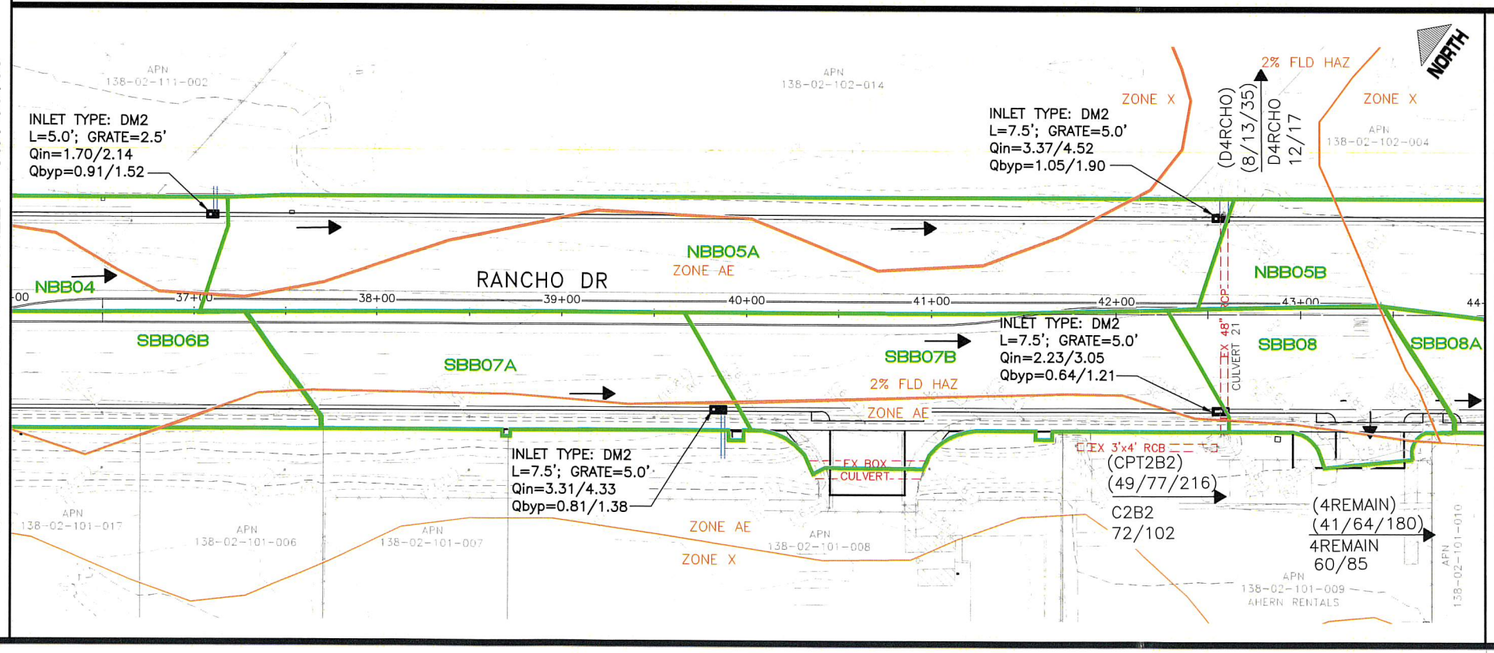
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MATCH PREVIOUS SHEET - STA: 27+00



MATCH LOWER LEFT THIS SHEET - STA: 36+00

MATCH UPPER RIGHT THIS SHEET - STA: 36+00



MATCH UPPER LEFT NEXT SHEET - STA: 44+00

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL

(HEC-1 NODE)
(INTERIM 25YR FLOW/INTERIM 100YR FLOW/LOMR)

HEC-1 NODE
ULT 25YR FLOW/ULT 100YR FLOW

GOAL FLOW LABEL

HEC-1 NODE (INT 100 YR FLOW)
HEC-1 NODE ULT 25 YR/ULT 100 YR FLOW

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70% DESIGN
NOT FOR
CONSTRUCTION

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: KRISTINA SWALLOW, P.E.

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM

DATE: APRIL 2014

Stanley Consultants inc.
5820 S. Eastern Ave.
Suite 200
Las Vegas, NV 89119
(702) 369-8396

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
DECATUR TO RAINBOW

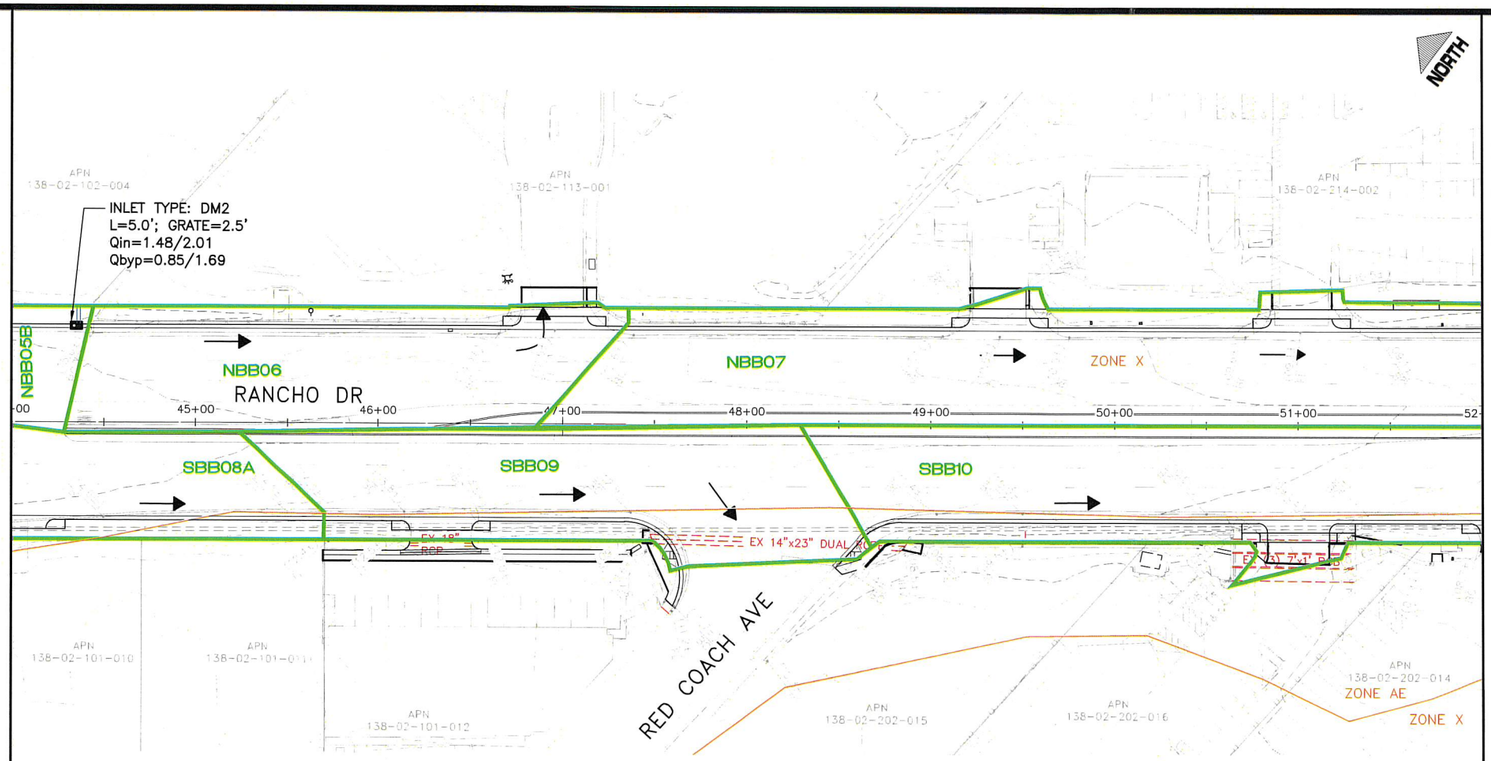
SHEET: ONSITE INTERIM AND DEVELOPED
SUBBASIN MAP

PROFESSIONAL ENGINEER - STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
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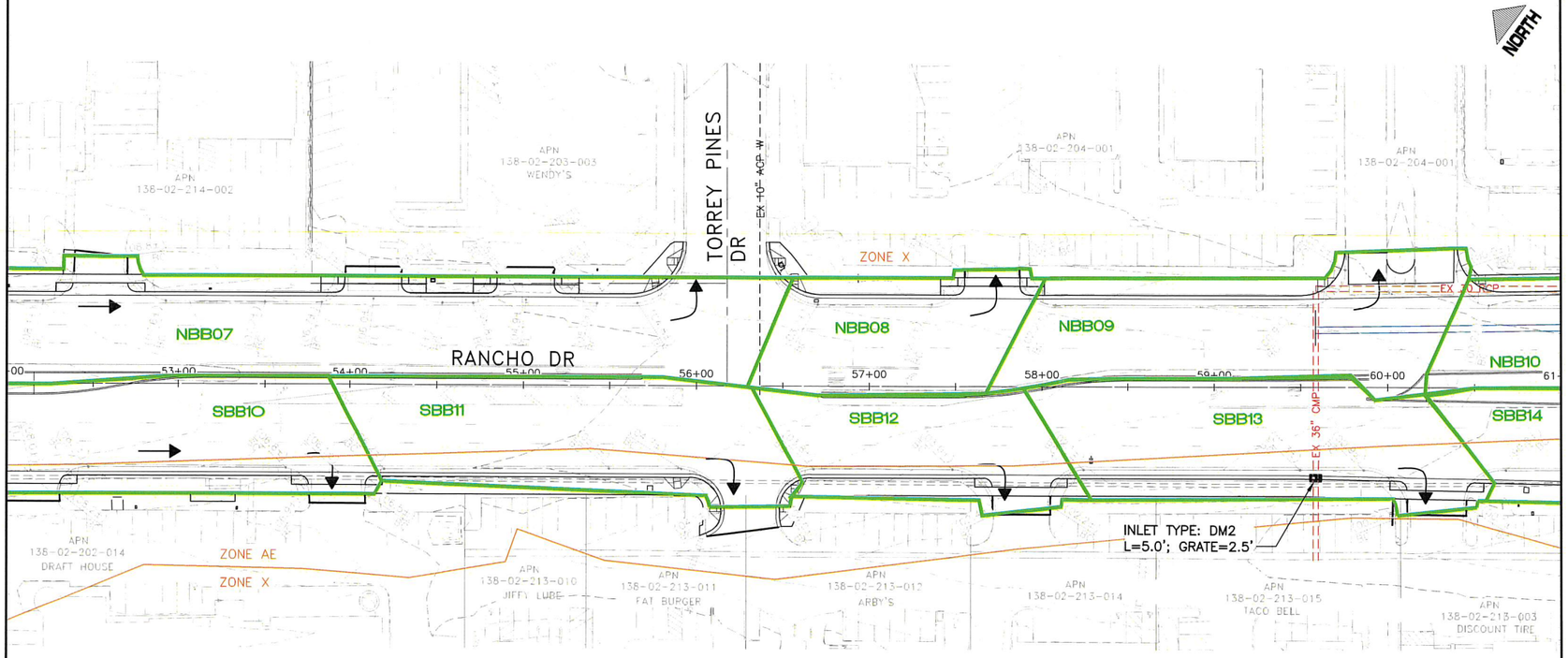
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MATCH PREVIOUS SHEET - STA: 44+00



MATCH LOWER LEFT THIS SHEET - STA: 52+00



MATCH UPPER RIGHT THIS SHEET - STA: 52+00

MATCH UPPER LEFT NEXT SHEET - STA: 61+00

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL

(HEC-1 NODE)
(INTERIM 25YR FLOW/INTERIM 100YR FLOW/LOMR)

HEC-1 NODE
ULT 25YR FLOW/ULT 100YR FLOW

GOAL FLOW LABEL

HEC-1 NODE (INT 100 YR FLOW)
HEC-1 NODE ULT 25 YR/ULT 100 YR FLOW

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INLET TYPE: TYPE OF INLET
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DATE: APRIL 2014

DESIGNED BY: DB
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DECATUR TO RAINBOW

SHEET: ONSITE INTERIM AND DEVELOPED SUBBASIN MAP

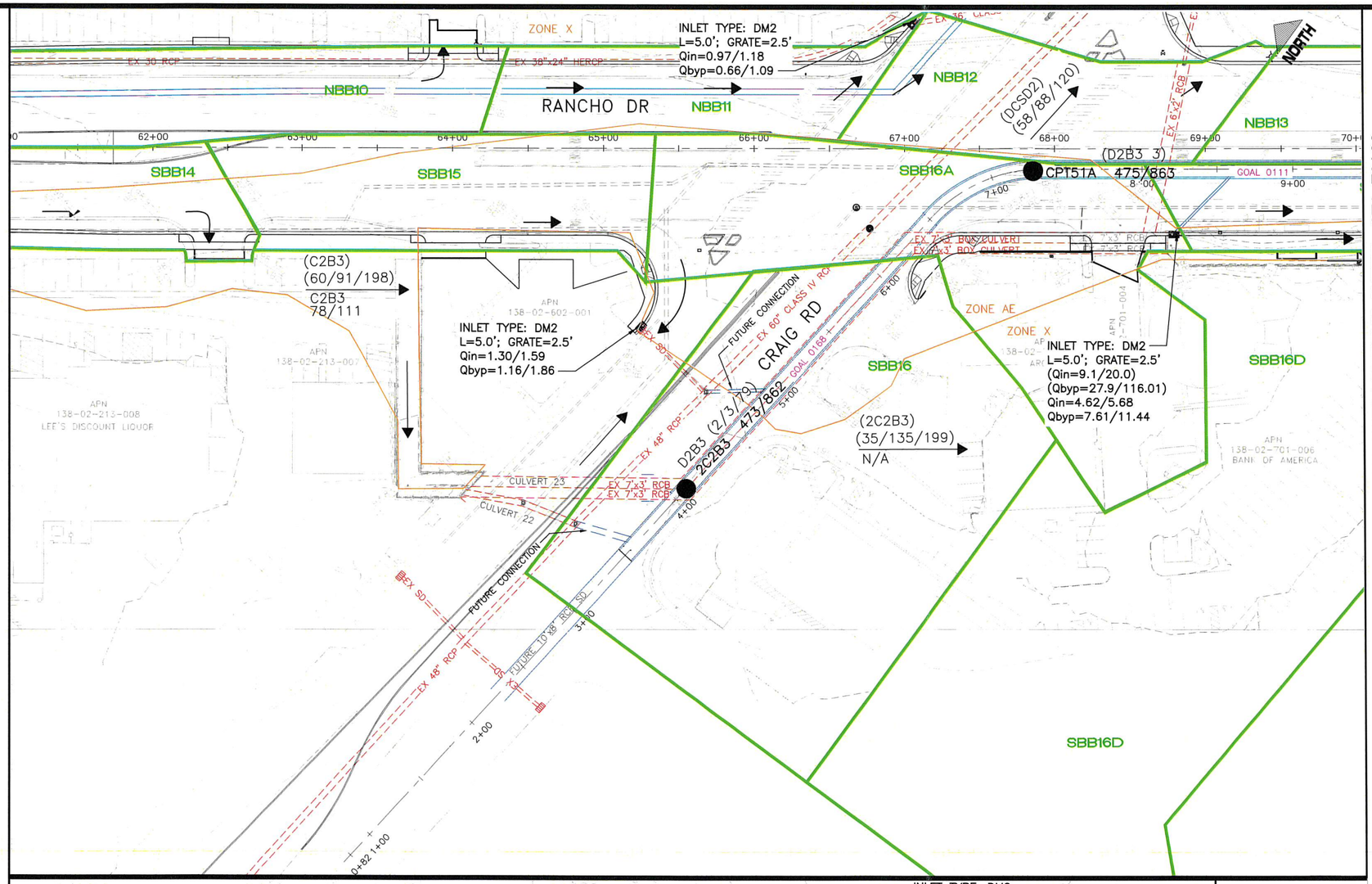
PROFESSIONAL ENGINEER - STATE OF NEVADA
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CIVIL
No. 18287

Sheet 6C of

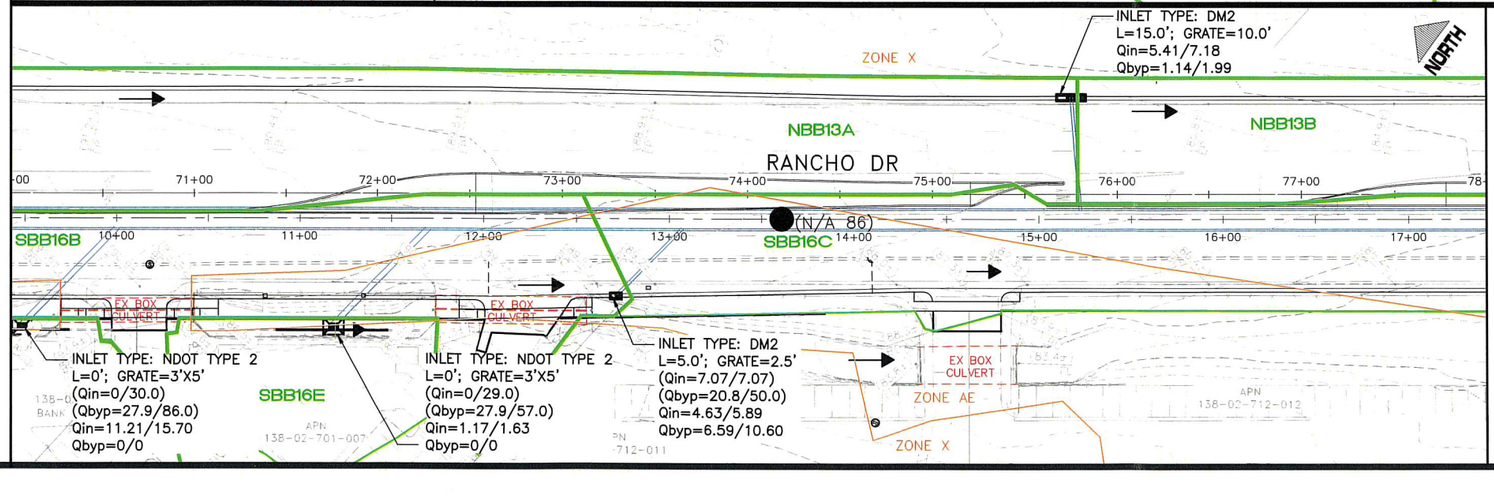
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MATCH PREVIOUS SHEET - STA: 61+00



MATCH LOWER LEFT THIS SHEET - STA: 70+00



MATCH UPPER RIGHT THIS SHEET - STA: 70+00

MATCH UPPER LEFT NEXT SHEET - STA: 78+00

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL

(HEC-1 NODE)
(INTERIM 25YR FLOW/INTERIM 100YR FLOW/LOMR)
HEC-1 NODE
ULT 25YR FLOW/ULT 100YR FLOW

GOAL FLOW LABEL

HEC-1 NODE (INT 100 YR FLOW)
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CITY OF LAS VEGAS BENCHMARK NUMBER 5LV002SES BEING A RIVET AND PLATE IN THE TOP OF CURB AT THE SOUTHEAST CORNER OF RANCHO DRIVE AND JONES BOULEVARD (NORTH)

ELEVATION (NAVD88) = 691.9676 METERS = 2270.23 FEET

70% DESIGN NOT FOR CONSTRUCTION

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER:DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER:KRISTINA SWALLOW, P.E.

DATE: APRIL 2014

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM

Stanley Consultants INC.
5820 S. Eastern Ave.
Suite 200
Las Vegas, NV 89119
(702) 369-3396

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS DECATUR TO RAINBOW

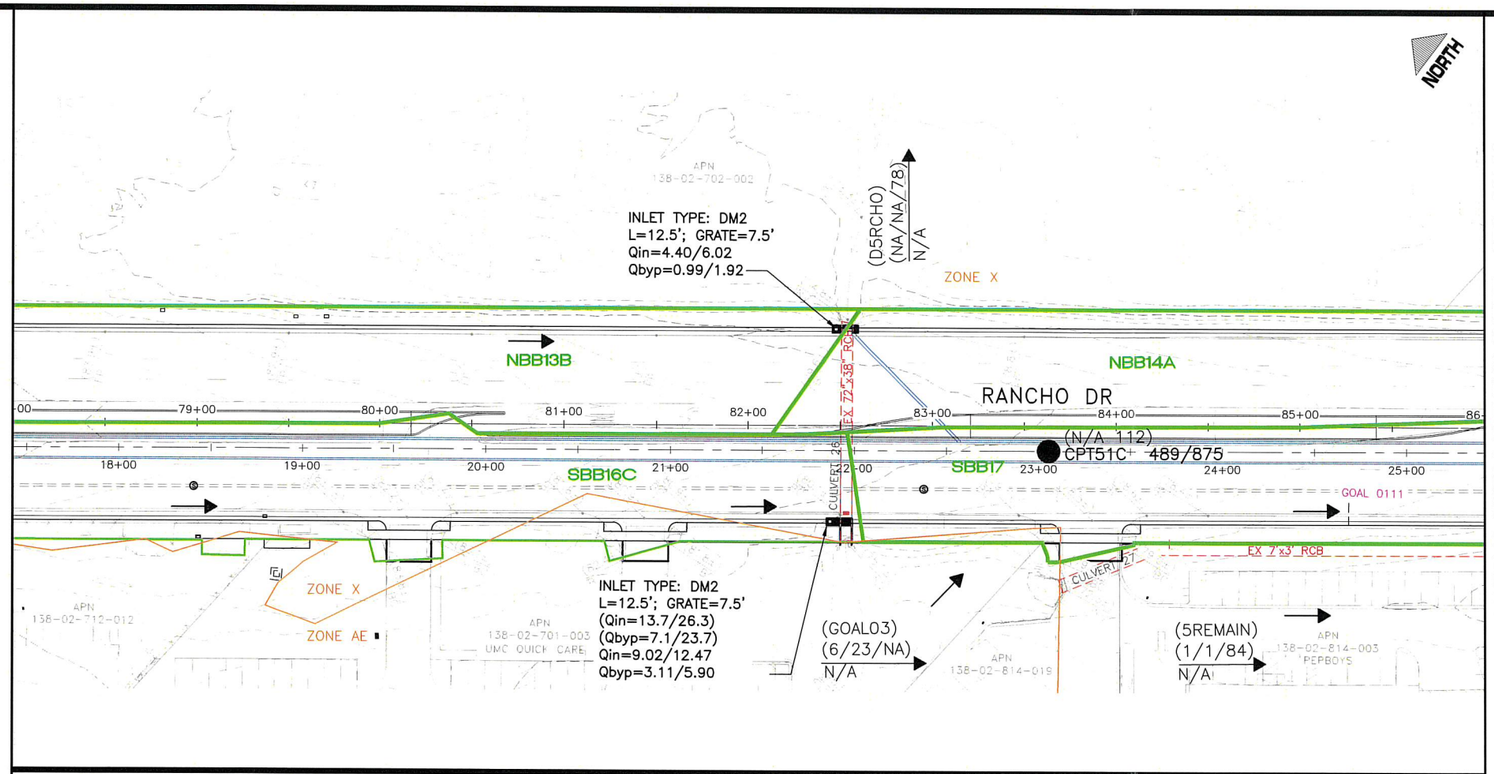
SHEET: ONSITE INTERIM AND DEVELOPED SUBBASIN MAP

PROFESSIONAL ENGINEER–STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet 6D of DRAWING NO.

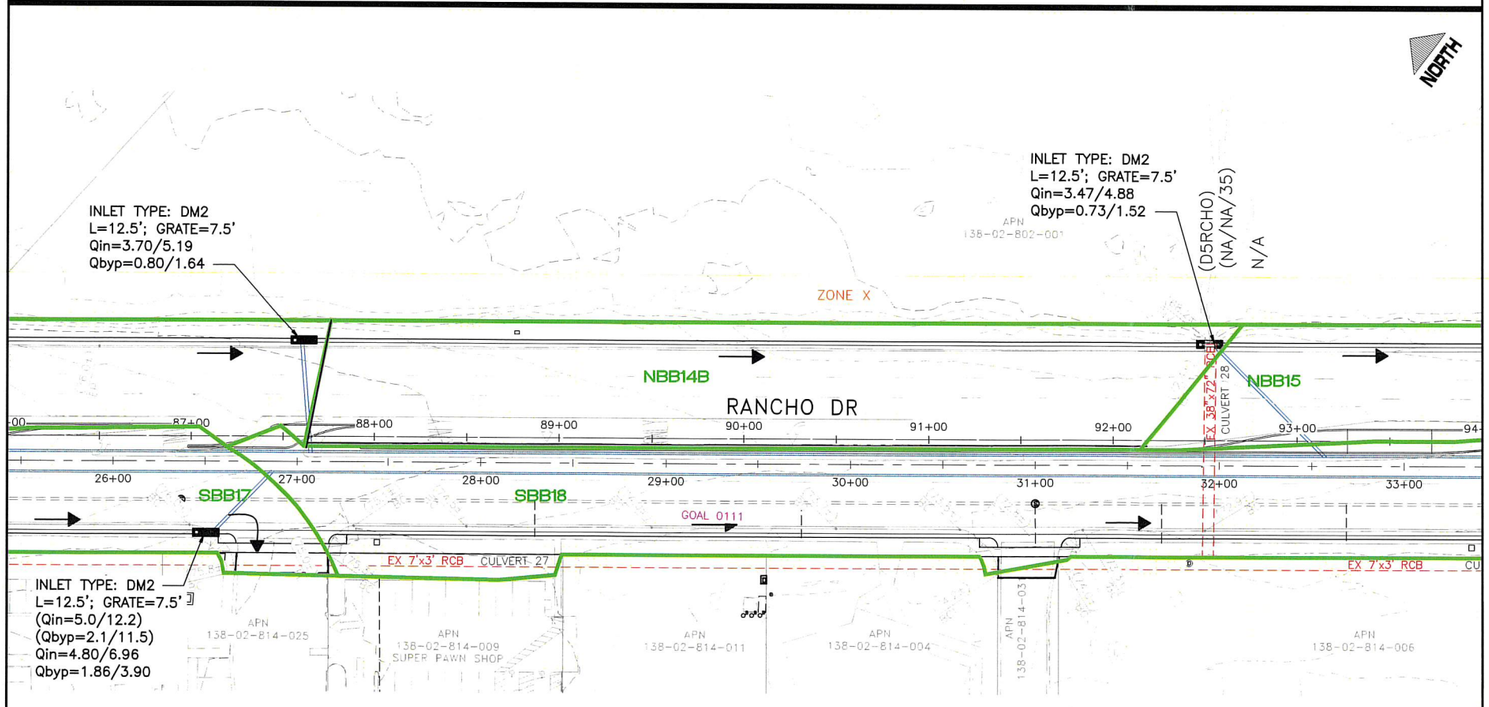
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MATCH PREVIOUS SHEET - STA: 78+00



MATCH LOWER LEFT THIS SHEET - STA: 86+00

MATCH UPPER RIGHT THIS SHEET - STA: 86+00



MATCH UPPER LEFT NEXT SHEET - STA: 94+00

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL

(HEC-1 NODE)
(INTERIM 25YR FLOW/INTERIM 100YR FLOW/LOMR)

HEC-1 NODE
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70% DESIGN
NOT FOR
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PROGRAM MANAGER: KRISTINA SWALLOW, P.E.

DATE: APRIL 2014

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM

Stanley Consultants INC.
5820 S. Eastern Ave.
Suite 200
Las Vegas, NV 89119
(702) 369-5396

CITY OF LAS VEGAS NEVADA

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
DECATUR TO RAINBOW

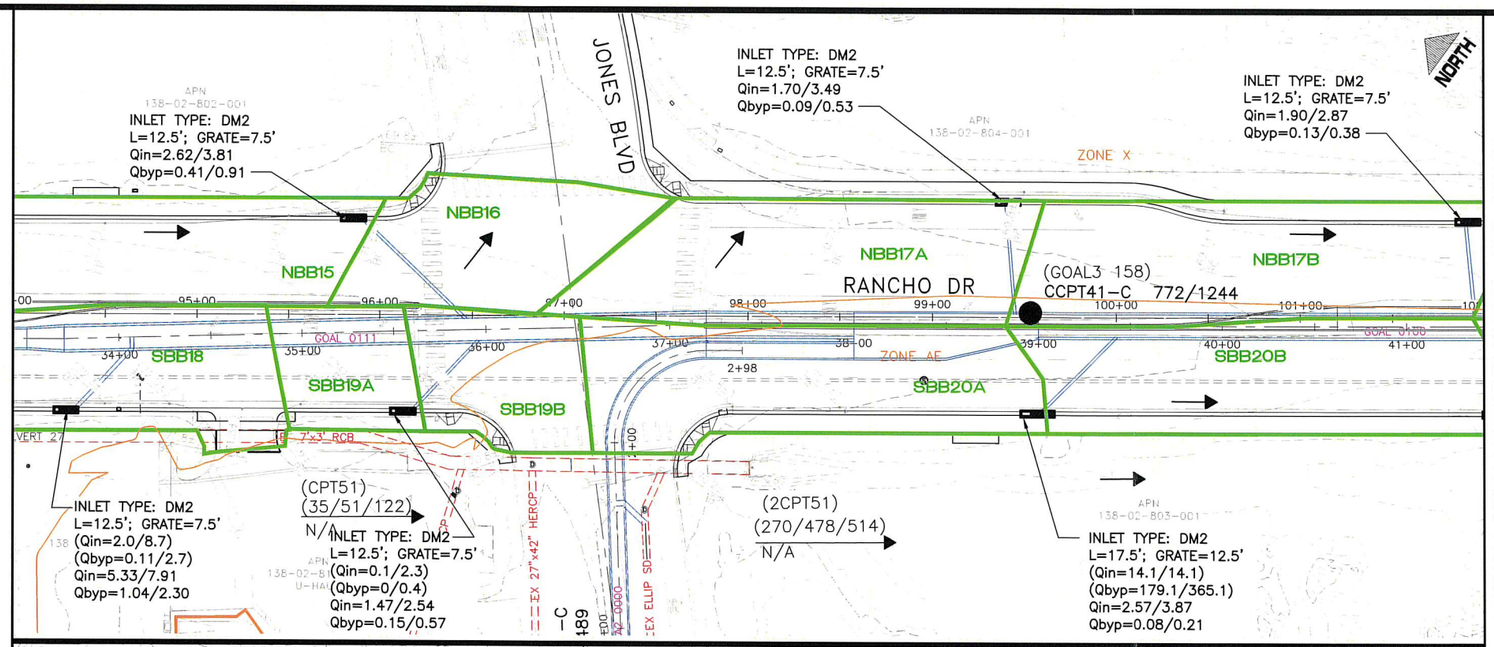
SHEET: ONSITE INTERIM AND DEVELOPED
SUBBASIN MAP

PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

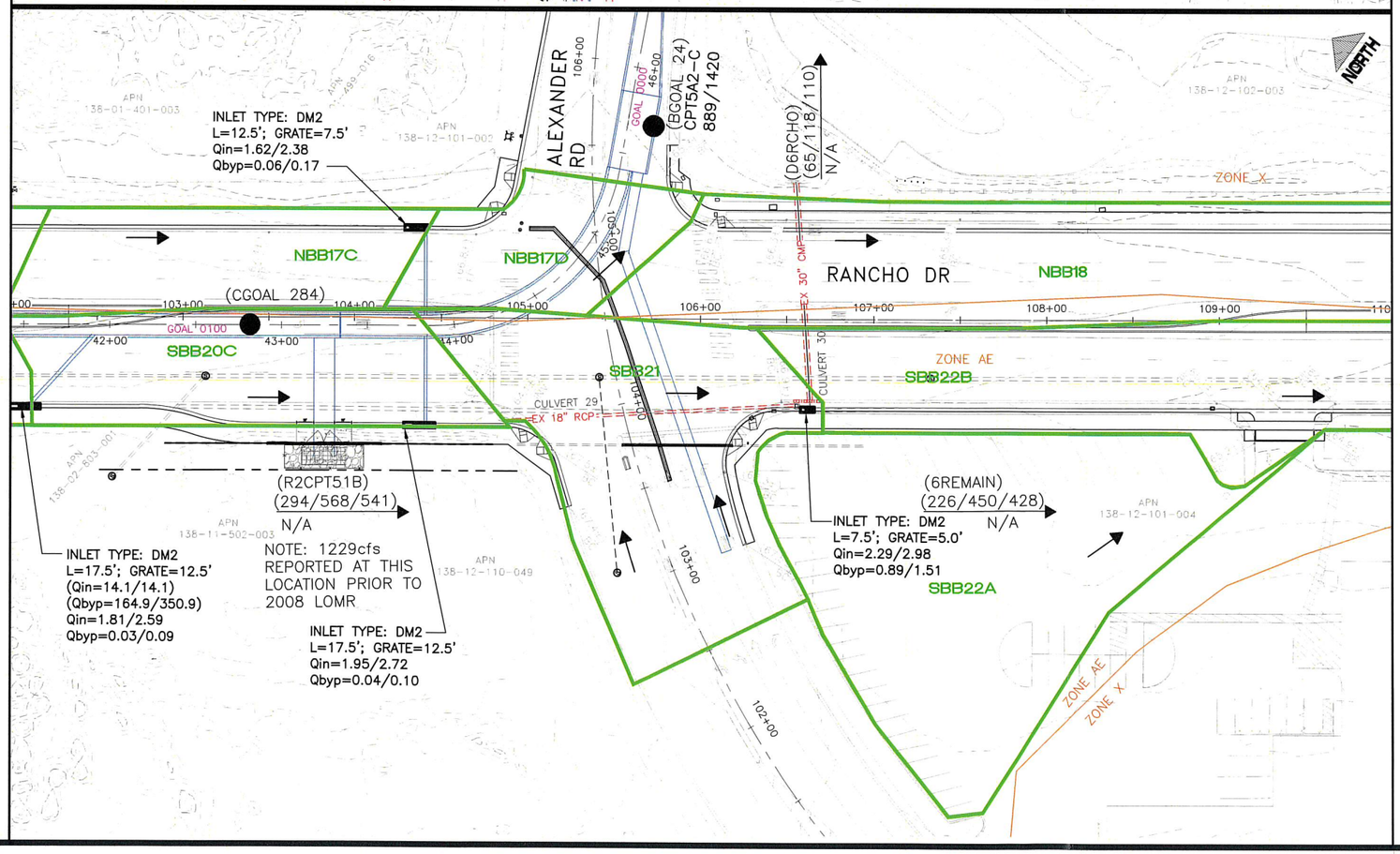
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Apr 08, 2014 - 11:52am - R:\2629-Rancho\08-Studies\01-705 Rancho Rd and Gowan Outfall Combined\Exhibits\22629 Inlet Exhibit 03-31-14.dwg

MATCH PREVIOUS SHEET - STA: 94+00



MATCH LOWER LEFT THIS SHEET - STA: 102+00



MATCH UPPER LEFT NEXT SHEET - STA: 110+00

MATCH UPPER RIGHT THIS SHEET - STA: 102+00

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)
1 inch = 40 ft.

LEGEND

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- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL

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DATE: APRIL 2014

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM

Stanley Consultants INC
5820 S Eastern Ave.
Suite 300
Las Vegas, NV 89119
(702) 369-9396

CITY OF LAS VEGAS NEVADA

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
DECATUR TO RAINBOW

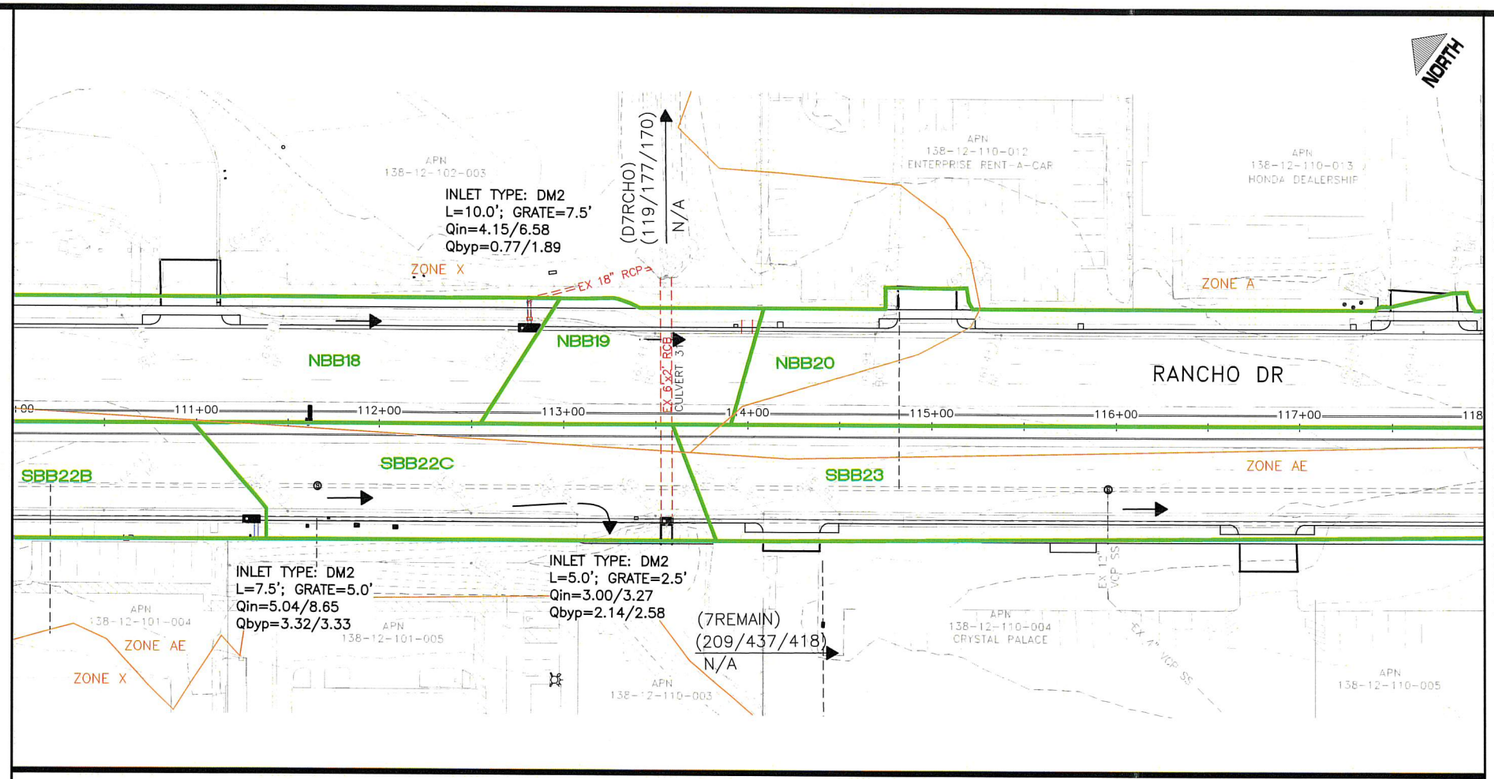
SHEET: ONSITE INTERIM AND DEVELOPED SUBBASIN MAP

PROFESSIONAL ENGINEER - STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

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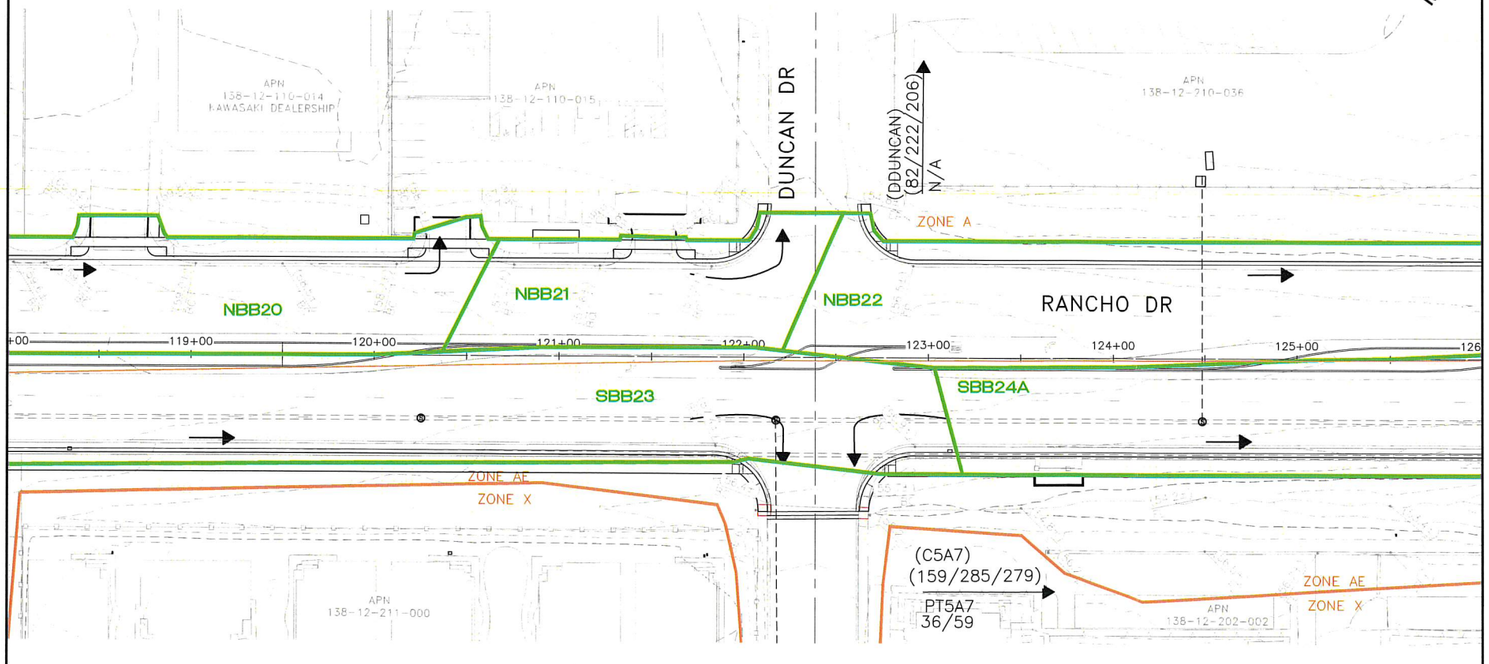
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MATCH PREVIOUS SHEET – STA: 110+00



MATCH LOWER LEFT THIS SHEET – STA: 118+00

MATCH UPPER RIGHT THIS SHEET – STA: 118+00



MATCH UPPER LEFT NEXT SHEET – STA: 126+00

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

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- FLOOD ZONE BOUNDARY
- FLOWLINE

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PROGRAM MANAGER: KRISTINA SWALLOW, P.E.

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM

DATE: APRIL 2014

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Suite 200
Las Vegas, NV 89119
(702) 369-9396

CITY OF LAS VEGAS NEVADA

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
DECATUR TO RAINBOW

SHEET: ONSITE INTERIM AND DEVELOPED SUBBASIN MAP

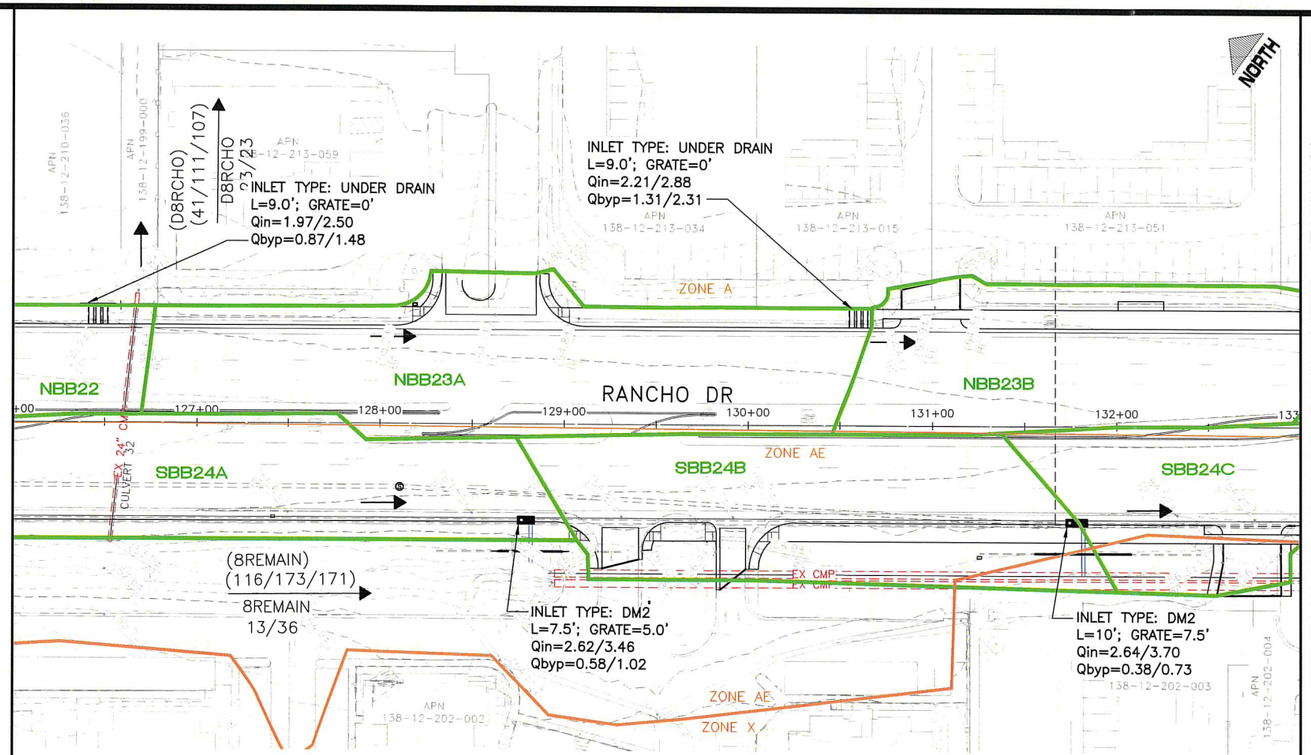
PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet 6G of

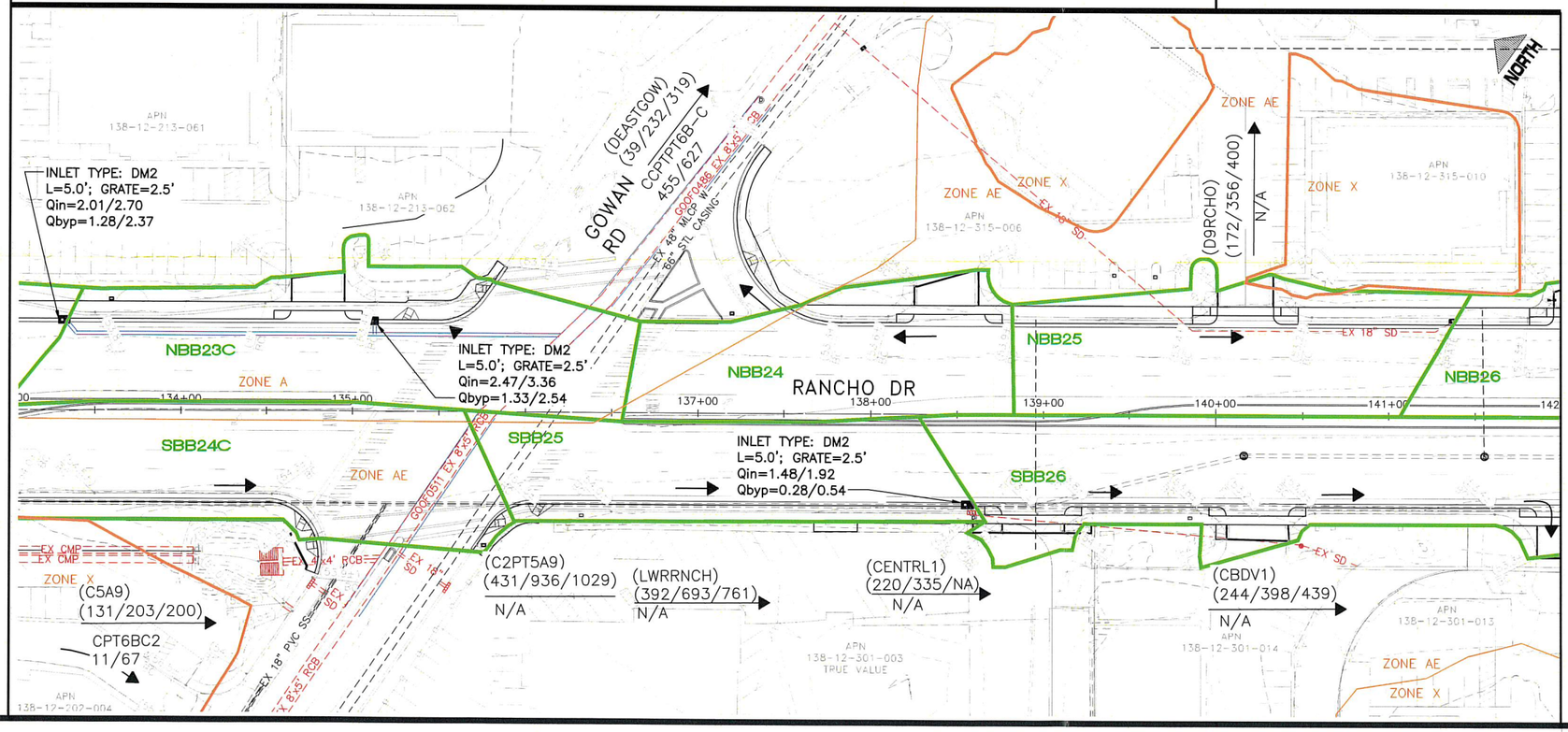
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Apr 08, 2014 – 11:56am – R:\13629-Rancho\08-Studies\01-705 Rancho Rd and Gowan Outfall Combined\Exhibits\13629 Intel Exhibit 03-31-14.dwg

MATCH PREVIOUS SHEET – STA: 126+00



MATCH LOWER LEFT THIS SHEET – STA: 133+00



MATCH UPPER LEFT NEXT SHEET – STA: 142+00

MATCH UPPER RIGHT THIS SHEET – STA: 133+00

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

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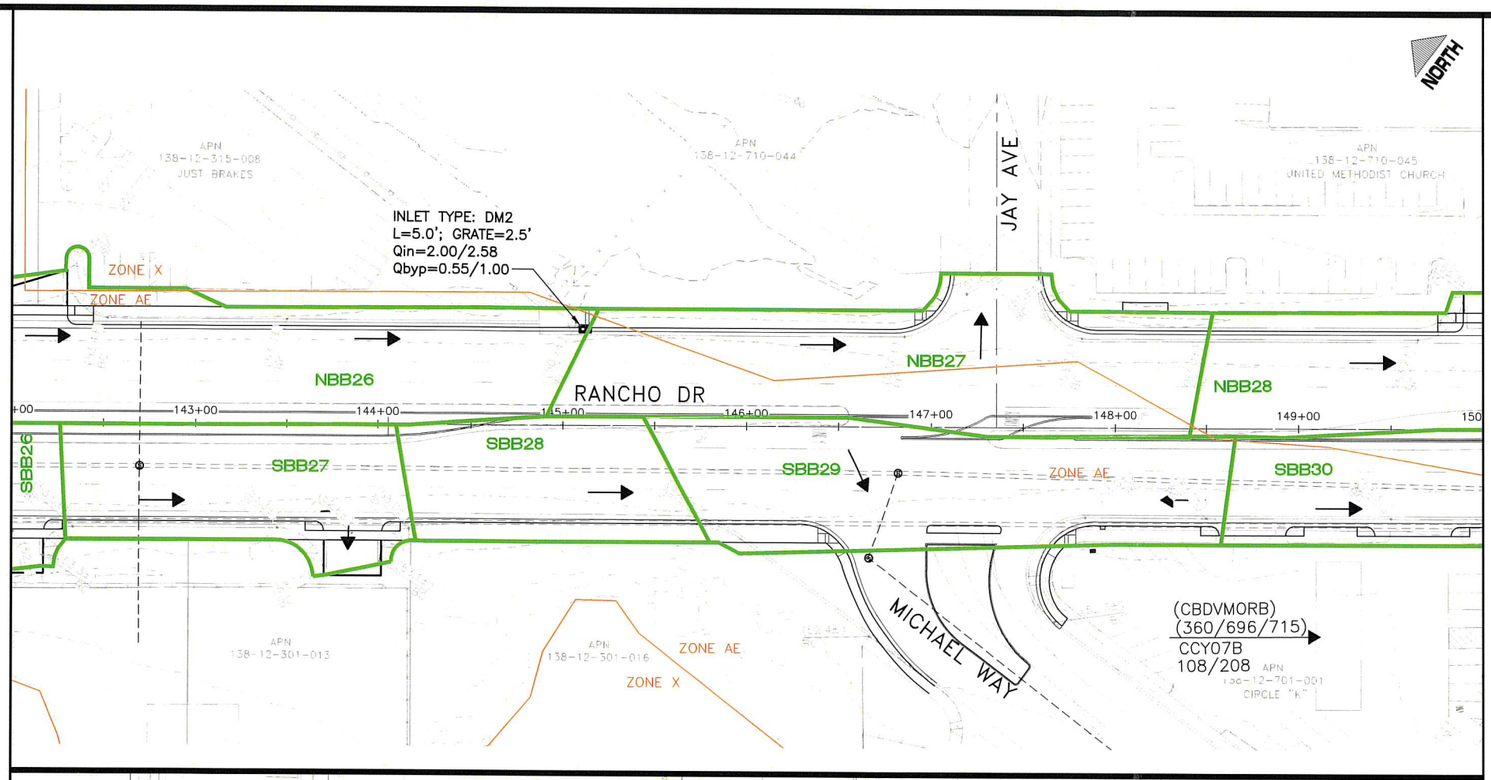
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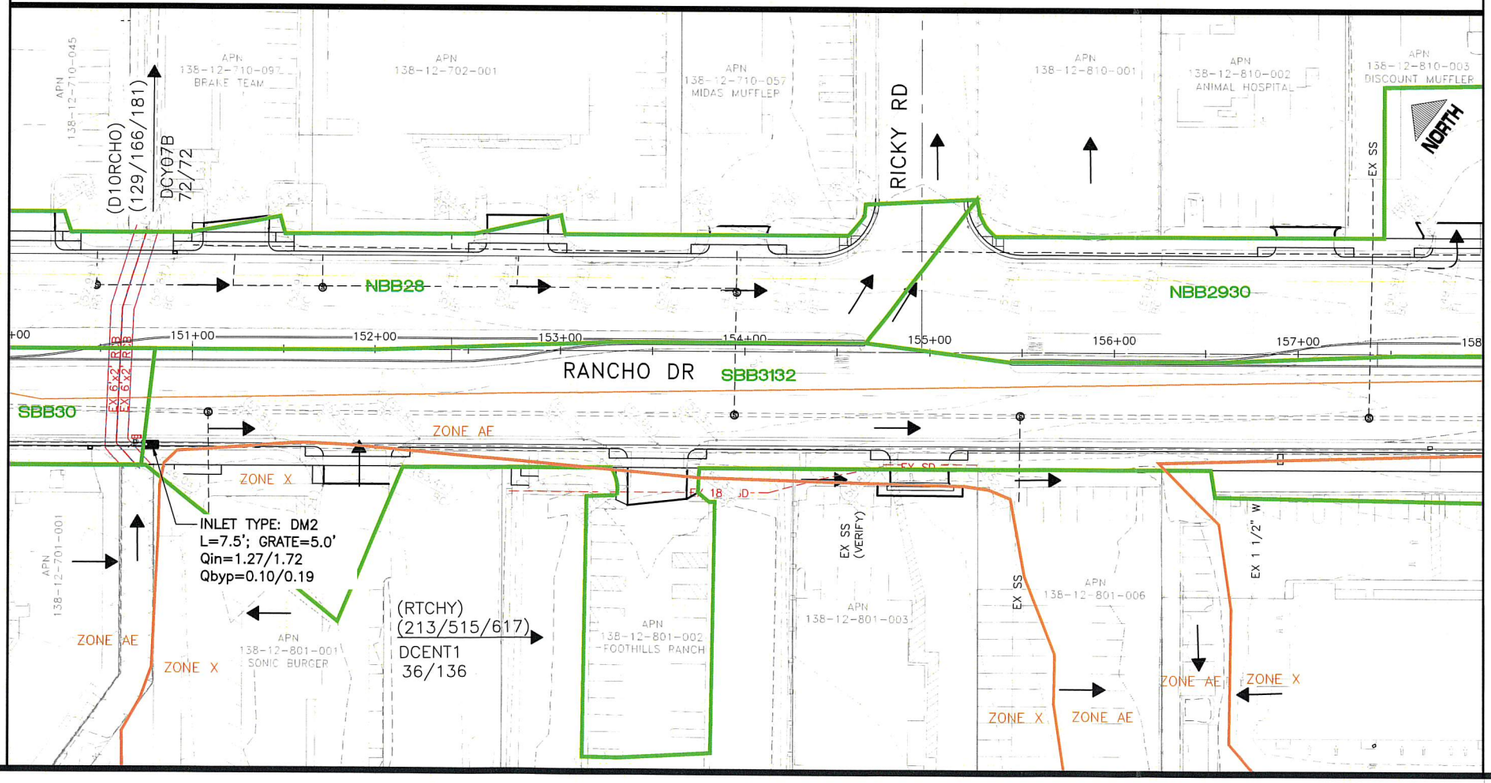
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Apr 08, 2014 - 11:54am - R:\12629-Rancho\WE-Studies\01-70% Rancho Rd and Gowan Outfall Combined\Exhibit\12629 Inlet Exhibit 03-31-14.dwg

MATCH PREVIOUS SHEET – STA: 142+00



MATCH LOWER LEFT THIS SHEET – STA: 150+00



MATCH UPPER LEFT NEXT SHEET – STA: 158+00

MATCH UPPER RIGHT THIS SHEET – STA: 150+00

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40 0 20 40 80

(IN FEET)

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TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
DECATUR TO RAINBOW

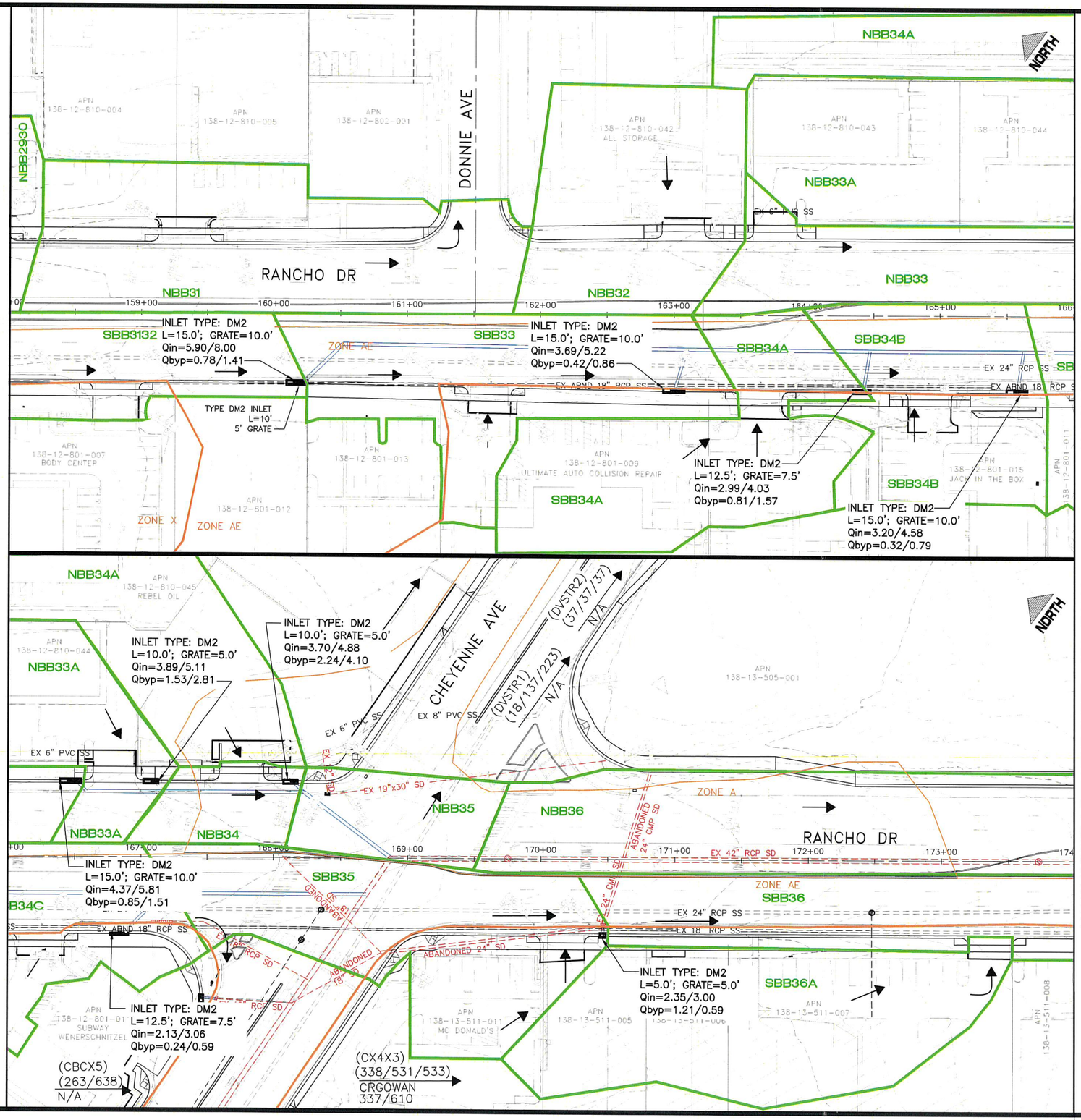
SHEET: ONSITE INTERIM AND DEVELOPED SUBBASIN MAP

PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet 61 of ___ DRAWING NO.

Apr 08, 2014 - 11:56am - R:\23629-Rancho\05-Studies\01-70% Rancho Rd and Gowan Outfall Combined\Exhibit\23629 Inlet Exhibit 03-31-14.dwg

MATCH PREVIOUS SHEET – STA: 158+00



MATCH LOWER LEFT THIS SHEET – STA: 166+00

MATCH UPPER RIGHT THIS SHEET – STA: 166+00

MATCH UPPER LEFT NEXT SHEET – STA: 174+00

Apr 08, 2014 – 11:57am – R:\23629-Rancho\06-Studies\01-70% Rancho Rd and Cowan Outfall Combined\Exhibits\23629 Rebl Exhibit 03-31-14.dwg

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL

(HEC–1 NODE)
(INTERIM 25YR FLOW/INTERIM 100YR FLOW/LOMR)

HEC–1 NODE
ULT 25YR FLOW/ULT 100YR FLOW

GOAL FLOW LABEL

HEC–1 NODE (INT 100 YR FLOW)
HEC–1 NODE ULT 25 YR/ULT 100 YR FLOW

INLET INTERCEPTION LABEL

INLET TYPE: TYPE OF INLET
L=LENGTH OF OPENING; GRATE=LENGTH OF GRATE
(Qin=INTERCEPT INTERIM 25YR/INTERIM 100YR)
(Qbyp=BYPASS INTERIM 25YR / INTERIM 100YR)
Qin=INTERCEPT ULT 25YR /ULT 100YR
Qbyp=BYPASS ULT 25YR /ULT 100YR

NOTE: ALL FLOW UNITS ARE CUBIC FEET PER SECOND

FEMA FIRM PANEL INFORMATION

THE PROJECT IS PRIMARILY LOCATED IN FLOOD ZONES "A", "AE" AND "X", REFERENCED BY FIRM, FLOOD INSURANCE RATE MAPS, CLARK COUNTY, NEVADA AND INCORPORATED AREAS, PANEL 1765 OF 4090, MAP NUMBER 32003C1765F, DATED NOVEMBER 16, 2011 AND PANEL 2155 OF 4090, MAP NUMBER 32003C2155F, DATED NOVEMBER 16, 2011. ZONE A IS LOCATED FROM NORTH OF THE RANCHO/ALEXANDER INTERSECTION EXTENDING TO THE SOUTH OF THE GOWAN/RANCHO INTERSECTION AND OCCURRING AGAIN AT THE CHEYENNE/RANCHO INTERSECTION. ZONE AE IS LOCATED NORTH AND SOUTH OF THE CRAIG/RANCHO INTERSECTION AND AT THE JAY/RANCHO INTERSECTION. ZONE X IS LOCATED AT THE NORTHERN AND SOUTHERN ENDS OF THE PROJECT.

(ZONE X – AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN. ZONE A – SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD WITH NO BASE FLOOD ELEVATIONS DETERMINED. ZONE AE – SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD WITH BASE FLOOD ELEVATIONS DETERMINED.)

BASIS OF BEARING

NORTH 36°41'41" WEST, BEING THE BEARING OF THE CENTERLINE OF RANCHO DRIVE SOUTH OF CHEYENNE AVENUE AS SHOWN BY THAT CERTAIN RECORD OF SURVEY PREPARED BY THE CITY OF LAS VEGAS, AS SHOWN IN FILE 151, PAGE 1 OF SURVEYS, ON FILE IN THE COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK NUMBER 5LV002SES BEING A RIVET AND PLATE IN THE TOP OF CURB AT THE SOUTHEAST CORNER OF RANCHO DRIVE AND JONES BOULEVARD (NORTH)

ELEVATION (NAVD88) = 691.9676 METERS = 2270.23 FEET

70% DESIGN
NOT FOR
CONSTRUCTION

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: KRISTINA SWALLOW, P.E.

DATE: APRIL 2014

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM

Stanley Consultants INC.
5820 S. Eastern Ave.
Suite 200
Las Vegas, NV 89119
(702) 369-9396

CITY OF LAS VEGAS NEVADA

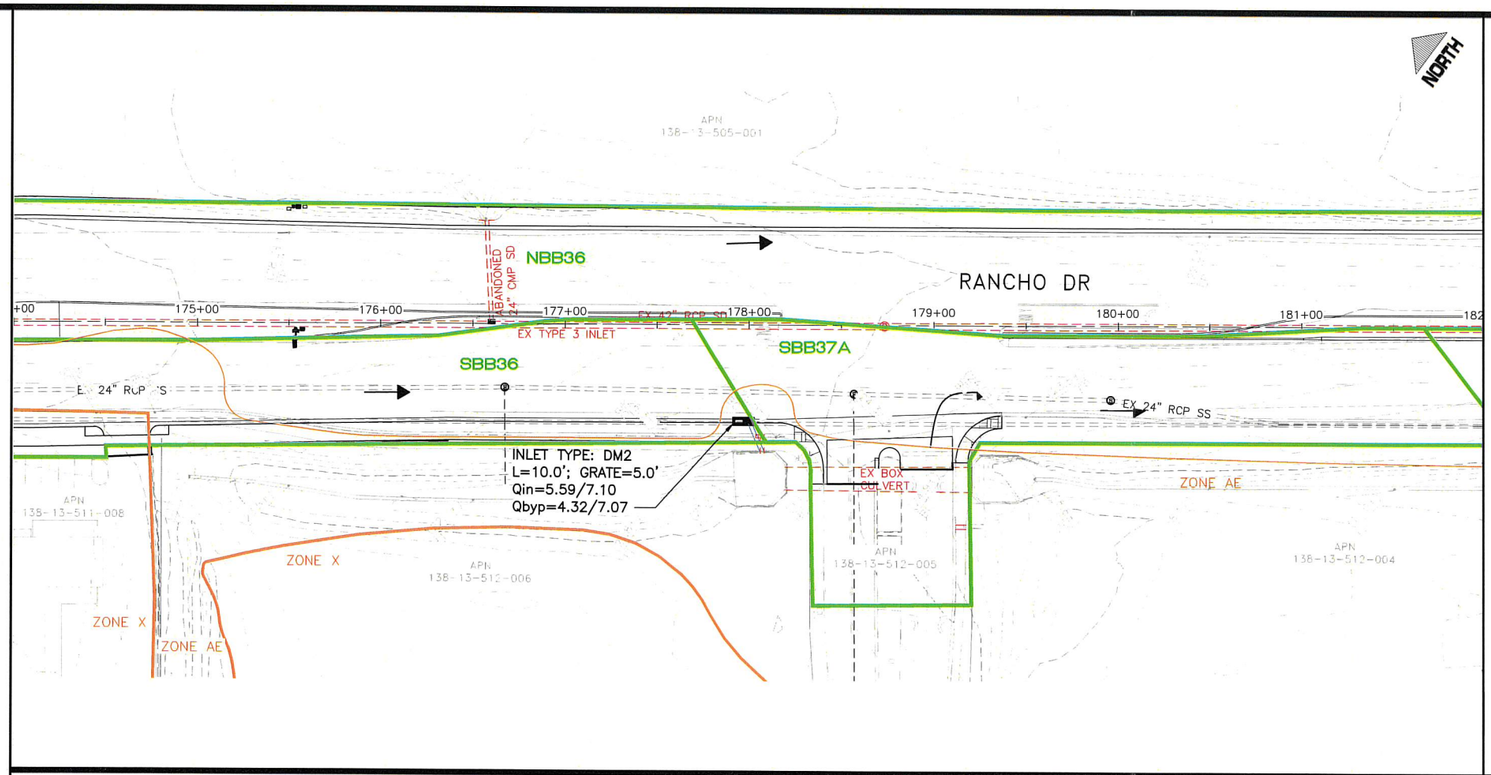
TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
DECATUR TO RAINBOW

SHEET: ONSITE INTERIM AND DEVELOPED SUBBASIN MAP

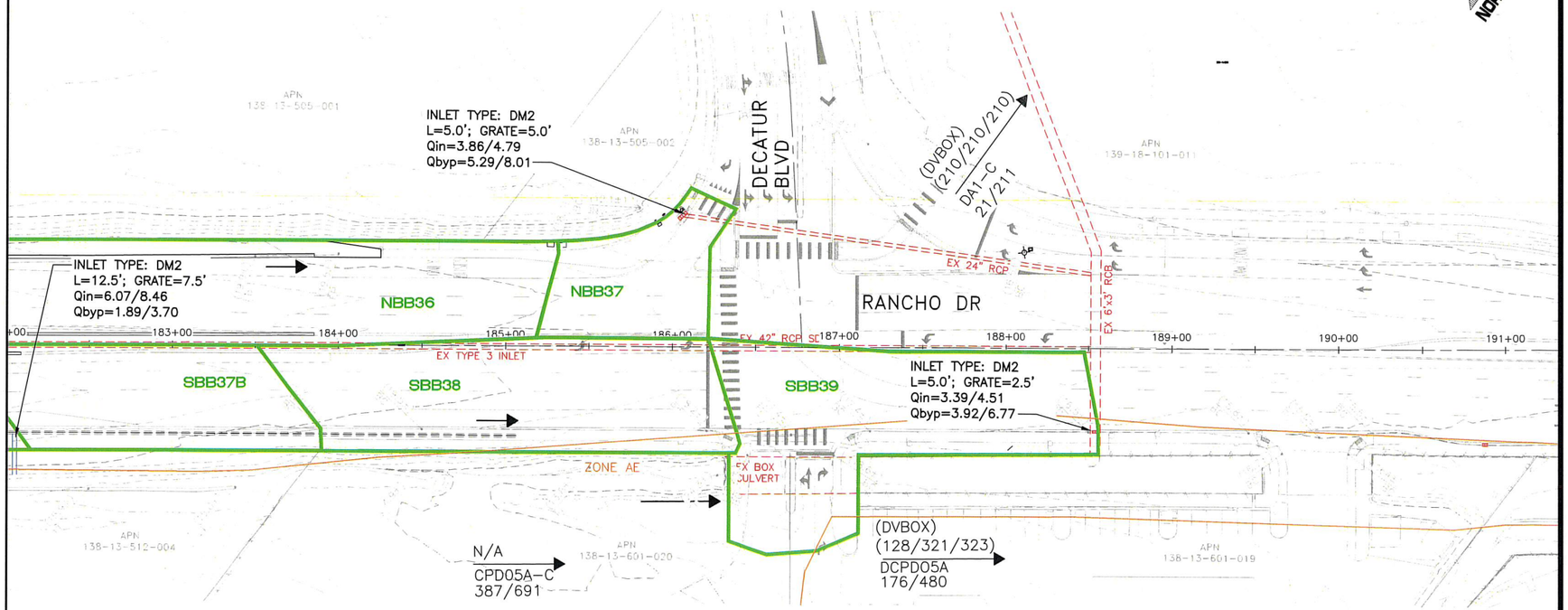
PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet
6J
of
DRAWING NO.

MATCH PREVIOUS SHEET - STA: 174+00



MATCH LOWER LEFT THIS SHEET - STA: 182+00



MATCH UPPER RIGHT THIS SHEET - STA: 182+00

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL

(HEC-1 NODE)
(INTERIM 25YR FLOW/INTERIM 100YR FLOW/LOMR)
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ULT 25YR FLOW/ULT 100YR FLOW

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HEC-1 NODE (INT 100 YR FLOW)
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CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: KRISTINA SWALLOW, P.E.

DATE: APRIL 2014

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM

5820 S Eastern Ave. Suite 200
Las Vegas, NV 89119
Stanley Consultants INC (702) 369-9396

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS DECATUR TO RAINBOW

SHEET: ONSITE INTERIM AND DEVELOPED SUBBASIN MAP

PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet 6K of

DRAWING NO.

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Appendix A

OFFSITE HYDROLOGY

- Depth Reduction Calculations
- Standard Form 4
- Existing Offsite Conditions
  - Summary Table
  - HEC-1, 10-YR Existing
  - HEC-1, 25-YR Existing
  - HEC-1, 100-YR Existing
- Interim Offsite Conditions
  - Summary Table
  - HEC-1, 25-YR Existing
  - HEC-1, 100-YR Existing
- Developed Offsite Conditions
  - Summary Table
  - HEC-1, 10-YR Developed
  - HEC-1, 25-YR Developed
  - HEC-1, 100-YR Developed

Project: Rancho Rd Improvements: Rainbow to N. Decatur
Job no.: 23629
Prepared by (last name, first initials): Murvosh, H Date: 12/20/2011
Subject 1: precipitaion and depth area reduction factors

6 hr storm event	100 yr	25 yr	10 yr
CCRFCD HC&DDM Reference Table:	505	505	505
D=depth, in.=	2.77	2.05	1.580

SQ MI.	100-YR DARF [1]	25-YR DARF [2]	10-YR DARF [2]
0	1	0.74	0.57
0.5	0.98	0.73	0.56
1	0.97	0.72	0.55
2	0.93	0.69	0.53
4	0.91	0.67	0.52
6	0.9	0.67	0.51
8	0.88	0.65	0.50
10	0.86	0.64	0.49
20	0.79	0.58	0.45
30	0.74	0.55	0.42

[1] referenced from HC&DDM Table 502
[2] (D/100yr D) * 100yr DARF

Project: Rancho Dr Capacity Improvements

Job No.: 23629
Date: 1/10/12
Calculated by: HM

Stanley Consultants INC.
5820 S. Eastern Ave. Suite 200
Las Vegas, Nevada 89119
702.369.9396

6-Hour Design Storm Distribution

Drainage Basin Name	Drainage Area (Acres)	Drainage Area (Sq. Mi.)	100-Year Adj. Pt. Rainfall (inches) Tbl. 505 x1.0 (Default) or Fig. 506 x1.43	Depth-Area Reduction Factor	100-Year Rainfall (inches)	10-Year Adj. Pt. Rainfall (inches) =100-year 0.57 Same as Tbl. 505 or Fig. 503 x 1.24	10-Year Rainfall (inches)	SDN # Tbl. 503	SCS Curve Numbers: Soils — Percent of Drainage Area in Each Hydrologic Soils Group (Sum Must=100%) A	B	C	D	Sum	Curve Numbers: Tbl. 602 Paragraph No.	Cover Type and Hydrologic Condition	Curve # for Hydrologic Soils Group A	B	C	D	Composite CN
NEW SUB-BASINS																				
PT2B2CR	127.36	0.199	referenced from MPU						see MPU						referenced from MPU					92.1
PT41-C	233.60	0.365	referenced from MPU						see MPU						referenced from MPU					88.6
PT5A2-C	170.88	0.267	referenced from MPU						see MPU						referenced from MPU					86.9
PT2B2	49.92	0.078	referenced from LOMR						0	0	100	0	100		commercial business C soil w/ 10% open space					93.2
PT51	44.80	0.070	referenced from LOMR						0	0	100	0	100		commercial business C soil w/ 10% open space					93.2
PT51A	22.28	0.035	referenced from LOMR						0	0	100	0	100		commercial business C soil w/ 10% open space					93.2
PT51B	22.52	0.035	referenced from LOMR						0	0	100	0	100		commercial business C soil w/ 10% open space					93.2
FOR DEVELOPED CONDITION; PT51 SUBDIVIDED INTO 4 SUBBASINS																				
PT51A	2.41	0.004	referenced from LOMR						0	0	100	0	100		commercial business C soil w/ 10% open space					93.2
PT51B	4.47	0.007	referenced from LOMR						0	0	100	0	100		commercial business C soil w/ 10% open space					93.2
PT51C	17.02	0.027	referenced from LOMR						0	0	100	0	100		commercial business C soil w/ 10% open space					93.2
PT51D	20.89	0.033	referenced from LOMR						0	0	100	0	100		commercial business C soil w/ 10% open space					93.2

Notes:

Project: Rancho Dr Capacity Improvements

Job No.: 23629
Date: 1/10/12
Calculated by: HM

Modified STANDARD FORM 4 from the Clark County Regional Flood Control District's Hydrologic Criteria and Drainage Design Manual

Stanley Consultants INC.
5820 S. Eastern Ave. Suite 200
Las Vegas, Nevada 89119
702.369.9396

Sub-Basin Data			Initial/Overland Time (Ti)			Travel Time (Tt)					Tc Check (Urbanized Basins)		Final Tc	TLAG	HEC-INPUT		Remarks
Designation	K (Default by CN)	Area (Acres)	Length (feet)	Slope (%)	Ti (Min)	Length (feet)	Slope (%)	V1 (FPS) (Manning)	V2 (FPS) (Manning)	Tt (Min)	Total Length (feet)	Tc= (L/180)+10 (Min)	Tc = Ti +Tt (Min)	(Tc*0.6)	Composite CN	Drainage Area (Sq. Mi.)	Tc>=10 for Non Urban Tc>=5 for Urban
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(Hr)			
NEW SUB-BASINS																	
PT2B2CR	0.83	127.36	200	1.00	6.98	5484	0.46	1.36	2.07	46.32	5684	41.6	41.6	0.417	92	0.1990	rev. mpu basin
PT41-C	0.78	233.60	120	1.00	6.32	5544	0.81	1.82	2.76	35.07	5664	41.5	41.4	0.415	89	0.3650	rev. mpu basin
PT5A2-C	0.76	170.88	100	1.00	6.17	5530	0.72	1.72	2.60	37.06	5630	41.3	41.3	0.414	87	0.2670	rev. mpu basin
PT2B2	0.84	49.92	170	1.00	6.10	2324	0.52	1.45	2.20	19.57	2494	23.9	23.9	0.239	93	0.0780	rev. LOMR basin
PT51	0.84	44.80	110	1.00	4.90	3124	0.90	1.91	2.90	19.45	3234	28.0	24.4	0.244	93	0.0700	rev. LOMR basin
PT51A	0.84	22.28	66	1.85	3.09	1582	1.07	2.09	3.17	9.69	1648	19.2	12.8	0.128	93	0.0348	rev. LOMR basin
PT51B	0.84	22.52	56	3.29	2.35	1726	0.77	1.77	2.69	12.31	1782	19.9	14.7	0.147	93	0.0352	rev. LOMR basin
FOR DEVELOPED CONDITION; PT51 SUBDIVIDED INTO 4 SUBBASINS																	
PT51A	0.84	2.41	72	1.29	3.64	117	0.16	0.81	1.22	5.10	189	11.1	8.7	0.088	93	0.0038	rev. LOMR basin
PT51B	0.84	4.47	35	0.51	3.46	300	0.64	1.62	2.45	3.80	335	11.9	7.3	0.073	93	0.0070	rev. LOMR basin
PT51C	0.84	17.02	66	1.85	3.09	1582	0.19	0.88	1.33	22.98	1648	19.2	19.2	0.192	93	0.0266	rev. LOMR basin
PT51D	0.84	20.89	56	0.13	6.90	1756	0.20	0.90	1.37	24.52	1812	20.1	20.1	0.201	93	0.0326	rev. LOMR basin

K = 0.0132*Cn-0.39 Ti = 1.8*(1.1-K)*L^(1/2)/(S^(1/3))

Generalized Manning's Equations

Existing Conditions	Developed Conditions
V1 = 14.8*(S/100)^0.5	V1 = 20.2*(S/100)^0.5
V2 = 29.4*(S/100)^0.5	V2 = 30.6*(S/100)^0.5

Tt = L/(60*V)

* V1 is used for the first 500 feet of length in column (7). V2 is used for the remainder.

HEC1 MODEL EXISTING OFFSITE RESULTS (SDN 3 STORM)					
BASIN/HEC STATION	AREA, mi^2	Q10, CFS	Q25, CFS	Q100, CFS	Notes/Location
ANN	0.26	30	62	120	
RANN	0.26	30	62	119	
GD29B	0.14	14	32	68	
CGD29B	0.4	39	85	170	
RGD29B	0.4	39	84	168	
NW1C2-C	0.21	82	126	192	
CNW1C2	0.6	84	172	320	
RNW1C2	0.6	83	172	318	
PDGCC3	0.05	21	34	54	
CGCC3	0.65	93	182	337	
RGCC3	0.65	92	182	336	
D95A	0.65	91	139	139	
REMAIN1	0.65	1	43	197	
RLBG1	0.65	1	42	197	
PDGCC2	0.04	4	9	20	
RGCC2	0.04	3	9	19	
PDGCC4	0.05	18	30	50	
CGCC4	0.74	18	60	233	
RLBG2	0.74	18	60	233	
HAMMER	0.13	17	37	71	
RHAMMER	0.13	17	37	71	
PDGCD	0.13	13	30	64	
CPDGCD	0.26	29	65	131	
RGCD	0.26	28	63	130	
PDGCB1	0.03	14	23	37	
RGCB1	0.03	13	22	36	
PDGCB2	0.03	8	15	26	
CGCB2	0.06	21	37	63	
RCGB2	0.06	21	36	61	
PDGCB3	0.07	6	15	33	
CGCB3	0.13	27	51	94	
RGCB3	0.13	26	50	92	
PDGCB4	0.02	8	13	21	
RGCB4	0.02	8	13	21	
CGCB4	0.41	52	113	226	
PDGCC1	0.05	6	15	29	
PDGCB5	0.11	12	27	54	
CGCB5	0.57	65	146	298	
RGCB5	0.57	62	145	294	
C2GCB5	1.31	65	189	486	
PDGCB6	0.02	9	15	23	
RGCB6	0.02	9	14	22	
PDGCB10	0.07	23	39	66	
PDGCB9	0.03	6	12	24	
CGCB9	1.43	82	226	554	
RGCB9	1.43	82	223	552	
PDGCB11	0.03	7	14	26	
CGCB11	1.47	84	229	565	
RLBG3	1.47	84	228	563	
D95B	1.47	33	90	188	
REMAIN2	1.47	51	138	375	
RMAIN2	1.47	51	137	369	
LONEMT	0.41	100	174	297	
GD20BH	0.05	7	15	29	
CLONE	0.46	106	188	322	
RLONE	0.46	105	185	319	
GD20BG	0.11	28	51	89	
C20BG	2.04	139	288	659	
R20BG	2.04	139	284	653	
CRAIG1	2.44	425	751	1293	
DGNBB	2.44	249	249	249	

HEC1 MODEL EXISTING OFFSITE RESULTS (SDN 3 STORM)					
BASIN/HEC STATION	AREA, mi^2	Q10, CFS	Q25, CFS	Q100, CFS	Notes/Location
DBUF1	2.44	176	502	1044	
RBUF1	2.44	175	500	1039	
DGNBB1	2.44	109	109	109	
DBUF2	2.44	66	391	930	
DBUFLO2	2.44	46	275	655	
DRED	2.44	19	116	275	
RDRED	2.44	19	115	274	
GD20BI	0.12	25	47	83	
C20BI	2.56	25	129	300	
R20BI	2.56	24	128	300	
GD20BL	0.08	39	60	92	
C20BL	4.67	161	368	898	
R20BL	4.67	159	366	898	
RTBUFAL2	2.44	46	275	655	
RBUF2	2.44	44	275	651	
DBUFLO3	2.44	32	196	465	
DCOBAL	2.44	13	78	186	
RCOBAL1	2.44	13	78	186	
GD20BJ	0.05	17	29	48	
C20BJ1	2.49	16	84	198	
R20BJ1	2.49	16	84	197	
C20BJ2	4.72	167	430	1067	
R20BJ2	4.72	167	430	1065	
GD20BM	0.05	26	40	62	
C20BM	4.77	174	436	1080	
D95E	4.77	15	55	152	
REMAIN5	4.77	159	381	928	
RREMAINS	4.77	159	380	923	
RTBUFAL3	2.44	32	196	465	
RBUF3	2.44	31	195	465	
DGNBB2	2.44	31	194	198	
DBUF3	2.44	0	1	267	
RCRAIG2	2.44	0	1	264	
GD20BK	0.05	11	21	37	
1C20BK	2.49	9	18	274	
R1C20BK	2.49	9	18	273	
2C20BK	4.82	165	388	1110	
R2C20BK	4.82	163	387	1102	
HICKAM1	0.48	87	160	285	
DGNBB3	0.48	86	125	125	
BUF3	0.48	1	35	160	
RHICKAM	0.48	1	34	158	
GD17BH	0.03	8	14	25	
C17BH	0.5	8	34	159	
R17BH	0.5	8	33	158	
GD17BG	0.12	34	58	98	
C17BG	0.62	39	70	217	
R17BG	0.62	39	69	216	
GD17BI	0.07	26	43	70	
C17BI	5.51	195	420	1241	
R17BI	5.51	193	417	1234	
GD14CH	0.04	13	23	40	
R14CH	0.04	13	23	39	
GD17BJ	0.06	31	47	73	
C17BJ	5.61	205	430	1256	
D95F	5.61	27	61	157	
REMAIN6	5.61	179	368	1099	
R17BJ	5.61	178	368	1098	
GD14CF	0.13	21	43	82	
DGNBB4	0.13	20	30	30	
BUF4	0.13	1	13	52	

HEC1 MODEL EXISTING OFFSITE RESULTS (SDN 3 STORM)					
BASIN/HEC STATION	AREA, mi^2	Q10, CFS	Q25, CFS	Q100, CFS	Notes/Location
R14CF	0.13	1	12	51	
GD14CG	0.06	17	30	51	
C14CG	0.19	17	30	94	
R14CG	0.19	16	30	92	
GD14CI	0.05	13	24	43	
C14C1	0.24	28	51	123	
R14CI	0.24	27	51	123	
CMAIN6	5.85	190	385	1135	
RMAIN6	5.85	188	383	1126	
D95G	5.85	65	76	98	
REMAIN7	5.85	123	308	1028	
GD11C	0.13	47	77	123	
C11C	5.98	140	330	1065	
R11C	5.98	139	329	1052	
GD11B	0.2	82	129	203	
C11B	6.18	150	382	1066	
GOOF1	6.18	2	3	3	
GOWAN1	6.18	148	379	1063	
R11B	6.18	147	378	1056	
CY05A	0.03	10	17	28	
D95G	5.85	65	76	98	
RD95G	5.85	65	75	97	
PT6B	0.11	59	91	139	
CPT6B	5.96	79	112	178	
2CPT6B	6.31	222	478	1175	
GOOF2	6.31	2	2	2	
GOWAN2	6.31	220	476	1173	
RPT6B	6.31	219	474	1169	
CY05D	0.06	11	22	40	
PT5A3	0.09	35	56	88	
C5A3	6.46	235	507	1197	
GOOF3	6.46	2	2	2	
GOWAN3	6.46	233	505	1195	
R5A3	6.46	231	503	1195	
MAVERICK	6.46	9	20	70	
MAV	6.46	222	484	1116	
R5A3B	6.46	222	482	1116	
CY06A	0.08	25	43	71	
PT5A8	0.03	7	12	20	
C5A8	6.56	231	503	1132	
R5A3C	6.56	230	501	1132	
GOOF4	6.56	2	2	2	
GOWAN4	6.56	228	499	1130	
DCY07B	6.56	37	116	297	
DPT5A8	6.56	191	383	810	
R5A8	6.56	191	381	833	
R5A82	6.56	190	381	832	
CY07A	0.03	11	18	28	
CCY07A	6.59	192	386	836	
TRUVAL	6.59	8	24	64	
TRUV	6.59	184	362	773	Eastbound flow in Gowan
D95B	1.47	33	90	188	
RD95B	1.47	33	89	186	
D1RCHO	1.47	6	17	35	
1REMAIN	1.47	27	72	151	
PT3AB1	0.05	31	44	63	
C3AB1	1.52	45	95	196	Santa Fee Entrance at Rainbow
D2RCHO	1.52	7	15	29	
2REMAIN	1.52	38	80	167	
R2MAIN	1.52	37	80	166	
PT3AB2	0.05	39	54	76	

HEC1 MODEL EXISTING OFFSITE RESULTS (SDN 3 STORM)					
BASIN/HEC STATION	AREA, mi^2	Q10, CFS	Q25, CFS	Q100, CFS	Notes/Location
C3AB2	1.57	64	103	202	Lone Mountain
D3RCHO	1.57	64	102	201	Diverted to stormdrain
3REMAIN	1.57	0	0	1	Remaining southbound flow
R3MAIN	1.57	0	0	1	
PT2B2	0.08	32	51	82	
CPT2B2	1.65	30	49	77	Ahern Rental property
D4RCHO	1.65	5	8	13	
4REMAIN	1.65	25	41	64	
R4MAIN	1.65	25	41	63	
PT2B3	0.02	15	22	31	
C2B3	1.67	38	60	91	Channel north of Craig
DCSD2	1.67	37	58	88	Diverted to 60-in. stormdrain
D2B3	1.67	1	2	3	Remaining southbound flow conveyed in RCB's
PT2A2	0.06	22	37	62	
R2A2	0.06	22	37	60	
PT2A1	0.06	24	39	62	
D95E	4.77	15	55	152	
RD95E	4.77	15	55	151	
C2A2	4.9	43	83	205	
DCSD1	4.9	42	82	90	
DPT2A1	4.9	1	1	115	
R2A2	4.9	1	1	115	
PT2B1	0.07	26	43	71	
C2B1	4.97	21	36	138	Eastbound flow in Craig
R2B1	4.97	20	35	138	
2C2B3	5.17	21	37	136	Rancho, south of Craig
RC2B3	5.17	21	36	136	
PT51A	0.04	29	40	58	
C2628	5.2	33	56	145	
D5RCHO	5.2	20	34	89	
5REMAIN	5.2	13	22	57	
R5REMN	5.2	13	22	56	
PT51B	0.04	28	40	57	
CPT51	5.24	34	51	81	Southbound at Alexander (north)
D95F	5.61	27	61	157	
RD95F	5.61	27	61	156	
PT3	0.15	65	104	164	
PT6A	0.02	13	20	30	
CPT6A	5.78	67	108	218	
RPT6A	5.78	66	108	217	
PT41	0.14	39	69	120	
RPT41	0.14	38	67	117	
PT42	0.08	19	35	60	
CPT42	0.22	57	102	174	
PT5A1	0.05	24	38	58	
C5A1	6.05	124	221	395	
R5A1	6.05	122	217	388	
PT5A4	0.03	9	15	27	
PT52	0.06	17	30	51	
CPT52	6.15	140	254	453	
RPT52	6.15	139	250	448	
2CPT51	6.62	163	292	514	Rancho south of Alexander-Jones (north)
R2CPT51	6.62	161	288	511	
D6RCHO	6.62	53	65	103	Eastbound in Alexander
6REMAIN	6.62	108	224	408	Remaining southbound at Jones-Alexander (south)
R6MAIN	6.62	105	222	406	
PT5A2	0.08	29	49	79	
R5A2	0.08	29	48	77	

HEC1 MODEL EXISTING OFFSITE RESULTS (SDN 3 STORM)					
BASIN/HEC STATION	AREA, mi^2	Q10, CFS	Q25, CFS	Q100, CFS	Notes/Location
PT5A6	0.19	61	105	177	
C5A6	6.88	157	324	582	Channel west of Rancho (Sta. 113+50)
D7RCHO	6.88	103	119	168	Diverted to channel
7REMAIN	6.88	54	205	414	Remaining southbound flow
R7MAIN	6.88	54	201	411	
DMAV	6.46	9	20	79	
RMAV	6.46	9	19	79	
CMAV	7.73	54	204	433	
DDUNCAN	7.73	13	79	203	Diverted to Duncan
DPT5A7	7.73	41	125	230	
PT5A7	0.07	21	36	59	
C5A7	7.81	57	155	280	Southbound flow at Duncan Dr.
R5A7	7.81	54	152	279	
D8RCHO	7.81	23	39	108	Diverted west over road
8REMAIN	7.81	31	113	171	Remaining southbound flow
R8MAIN	7.81	28	113	171	
PT5A9	0.05	17	28	45	
C5A9	7.85	34	129	202	Southbound at Gowan
GOOF5A	7.85	34	40	1	Diverted to GOOF0511
GWAN5A	7.85	0	89	201	Remaining southbound flow
C2PT5A9	7.98	184	433	930	Rancho/Gowan
GOOF5	7.98	1	1	1	Diverted to GOOF0511
GOWAN5	7.98	183	432	929	
LWRRNCH	7.98	171	393	690	Southbound in Rancho
DEASTGOW	7.98	13	39	229	Eastbound in Gowan
RDEASTGO	7.98	13	39	239	
CY08-C	0.09	40	62	96	
CCY08C	8.08	32	52	270	Northbound in Decatur at Gowan
GOOF6	8.08	1	1	1	
DGWN6	8.08	31	51	269	
DEGWN6	8.08	22	36	191	
DALEX	8.08	9	15	75	
CUL30	6.62	53	65	103	
RCUL30	6.62	53	64	102	
CUL31	6.88	103	119	168	
RCUL31	6.88	114	119	171	
DUNCAN	7.73	13	79	203	
RDUNCAN	7.73	17	113	223	
CUL32	7.81	23	39	108	
RCUL32	7.81	36	40	118	
CPT56B	7.81	182	330	612	
PT5B6-C	0.38	125	202	324	
CCPT56B	8.19	239	369	842	Eastbound in Alexander w. of Decatur
CCCPT56B	8.46	244	384	918	Alexander/Decatur
0511-1	6.18	2	3	3	
0511-2	6.31	2	2	2	
0511-3	6.46	2	2	2	
0511-4	6.56	2	2	2	
GOOF1-4	6.56	8	9	9	
0511-5A	7.85	34	40	1	
GOOF1-5A	7.85	42	49	10	
0511-5	7.98	1	1	1	
0486-1	8.08	1	1	1	
486	8.08	38	51	12	
RDGOW2A	8.08	36	51	12	
CCCPT5B6	8.46	278	434	910	
GOWAN	7.98	171	393	690	Southbound flow retrieved at Gowan
D9RCHO	7.98	45	172	356	Over Rancho and away from site

HEC1 MODEL EXISTING OFFSITE RESULTS (SDN 3 STORM)					
BASIN/HEC STATION	AREA, mi^2	Q10, CFS	Q25, CFS	Q100, CFS	Notes/Location
CENTRL1	7.98	125	221	334	
TRUVAL	6.59	8	24	64	Retrieve flow from Gowan
CBDV1	6.59	133	244	397	Rancho, south of True Value
MORBAY	6.56	37	116	297	Eastbound at Michael Wy
CBDVMORB	7.98	170	360	694	Rancho/Michael Way
D10RCHO	7.98	108	129	166	Divert to channel south of Michael
CENTRL2	7.98	62	231	528	Remaining southbound flow
RTCHY	7.98	57	213	514	Rancho/Cheyenne
DVSTR1	7.98	0	18	137	Diverted to Cheyenne
DVWR1	7.98	57	196	377	
DVSTR2	7.98	37	37	37	Diverted to Cheyenne
DVWR2	7.98	20	159	340	Remaining southbound flow
RX5	7.98	20	157	338	
X4	0.81	129	193	288	
X3B	0.16	49	76	119	
CUL4	0.16	48	64	79	
X3A	0.12	38	60	94	
CUL8	0.12	17	23	65	
CX3AB	0.28	63	86	143	
RK3AB	0.28	57	83	128	
CX	1.09	174	265	396	
DEVX4	1.09	87	100	100	
DEVX4	1.09	87	165	296	
RK4	1.09	87	164	295	
X3C	0.48	41	73	128	
SD1A	0.48	4	9	14	
SD1A	0.48	37	64	113	
RK3C	0.48	37	64	113	
X3	0.34	117	170	250	
CX3	1.91	164	284	474	
DTX4	1.09	87	100	100	
RDEX	1.09	87	100	100	
BSX5	0.1	47	68	101	
CX5	1.19	96	119	131	
DVSTR1	1.19	0	0	0	Diverted to Cheyenne
DVWR1	1.19	96	119	131	
DVSTR2	1.19	37	37	37	Diverted to Cheyenne
DVWR2	1.19	59	82	94	Remaining southbound flow
RX5	1.19	59	82	92	
CX4X3	2.01	207	338	531	Rancho north of Decatur (project end)
DVBOX	2.01	N/A	210	210	
DVBOX	2.01	N/A	128	321	

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   31MAR14  TIME  21:48:08   *
*                                       *
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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1                                        HEC-1 INPUT                                        PAGE  1

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                        *DIAGRAM
*** FREE ***
             1          ID   RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
             2          ID   GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
             3          ID   OFFSITE BASINS, EXISTING CONDITIONS
             4          ID   PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
             5          ID   PREPARED BY STANLEY CONSULTANTS INC. (HM/VF)
             6          ID   INPUT FILE: 10S3X.DAT
             7          ID   DESIGN STORM: 10-YEAR 6-HR
             8          ID   STORM DISTRIBUTION: SDN3
             9          ID   STORM CENTERING: FULL WATERSHED
            10          ID   THIS MODEL DIFFERS FROM 100 YEAR: FLOW DIVERTED TO STORM DRAIN
            11          ID   AT GOWAN/CRAIG
            12          ID
            13          ID
            14          ID   BASED ON:
            15          ID   CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
            16          ID   2008 MASTER PLAN UPDATE (MPU) BY PBS&J
            17          ID   GOWAN WATERSHED (INPUT FILE = ALLGOW3.DAT) AND
            18          ID   CENTRAL WATERSHED (NORTHWESTERN PORTION)
            19          ID
            20          ID   RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009
            21          ID   UPPRSDN3 AND LWRSDN3 HEC-1 MODELS
            22          ID   FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
            23          ID   CONTROL FACILITIES REFERENCED FROM LOMR UNLESS OTHERWISE NOTED
            24          ID
            25          ID   GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
            26          ID   BY G.C. WALLACE (GCW) 2007
            27          ID
            28          ID   PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
            29          ID   IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
            30          ID   HEC-1 ANALYSIS FOR EXISTING CONDITIONS FILE R00S3X.OUT
            31          ID   BY STANLEY CONSULTANTS, 1/2012
            32          ID
            33          ID   LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
            34          ID   ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
            35          ID   MPU SHOWS THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
            36          ID   (GOEC)
            37          ID
            38          ID
            39          ID   THIS EXISTING CONDITION MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL DRAINAGE
            40          ID   STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
            41          ID   EXISTING CONDITION MODEL AS FOLLOWS:
            42          ID   1. BASIN PT51 OF THE RANCHO STUDY WAS SPLIT INTO PT51A AND PT51B IN ORDER
            43          ID   TO SHOW WHERE FLOW WILL BE COLLECTED BY THE GOWAN OUTFALL - ALEXANDER
            44          ID   ROAD FACILITIES AT ALEXANDER-JONES/RANCHO DRIVE INTERSECTION.
            45          ID   2. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
            46          ID   TO THE EXISTING CONDITION MODEL
            47          ID   3. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE
            48          ID   DARF'S USED IN 2008 MPU HEC-1 ALLGOW3.OUT
            49          ID
            50          ID
            51          ID   JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
            52          ID   DARF RATIOS FOR AREAS OF 0, 0.5, 1.0, 2.0, 4.0, 6.0, 8.0 AND 10 SQUARE MILES
            53          ID   FOR THE 100-YEAR EVENT.
1                                        HEC-1 INPUT                                        PAGE  2

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            54          IT       5       0       0     300
            55          IO       5       0       0
            56          IN       5
            57          JR    PREC    0.57    0.56    0.55    0.53    0.52    0.51    0.50    0.49
                        *
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58          KK     ANN
59          KM  BASIN REFERENCED FROM LOMR
60          PB    2.85
61          BA   0.259
62          PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
63          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
64          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
65          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
66          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
67          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
68          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
69          PC   0.998   0.999   1.000
70          LS       0    76.8
71          UD   0.499
            *

72          KK    RANN
73          KM  ROUTE TO GD29B
74          RK    2600   0.015   0.015       0    TRAP     100       2
            *

75          KK   GD29B
76          KM  BASIN REFERENCED FROM LOMR
77          PB    2.77
78          BA   0.138
79          LS       0    74.3
80          UD   0.298
            *

81          KK  CGD29B
82          HC       2
            *

83          KK  RGD29B
84          KM  ROUTE GD29B TO CNW1C2
85          KM  ROUTING REVISED FROM LOMR BY STANLEY CONSULTANTS
86          KM  ANN ROAD
87          RD    4500  0.0122   0.016       0    TRAP       0      50
            * PREVIUOS ROUTING
            * KMROUTE TO ANN1B
            * RK2700      0.015   0.015       0   TRAP      100       2
            *

88          KK NW1C2-C
89          KM  BASIN REFERENCED FROM 2008 MPU
90          KM  TAKES PLACE OF ANN1B AND ANN1C (LOMR) WHICH ARE NOW DEVELOPED
91          KM  REVISED BY STANLEY CONSULTANTS
92          BA   0.207
93          PB    2.77
1                                       HEC-1 INPUT                                    PAGE   3

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

94          LS       0    89.5
95          UD   0.409
            *

96          KK  CNW1C2
97          KM  COMBINE RGD29B AND NW1C2-C
98          KM  ANN ROAD AND RANCHO
99          HC       2
            *

100         KK  RNW1C2
101         KM  ROUTE TO PDGCC3
102         RK    1250  0.0074   0.013       0    TRAP      12       2
            *

103         KK  PDGCC3
104         KM  CN UPDATED BY STANLEY CONSULTANTS FOR DEVELOPMENT
105         KM  REFERENCED FROM GOWAN SD, LONE MTN BRANCH BY GCW
106         PB    2.77
107         BA   0.047
108         LS       0    86.7
109         UD   0.188
            *

110         KK   CGCC3
111         HC       2
            *

112         KK   RGCC3
113         KM  ROUTE TO PDGCC4
114         RK    1550   0.005   0.013       0    TRAP       8       0
            *

115         KK REMAIN1
116         KM  DIVERT 139 CFS UNDER U.S. 95 BETWEEN ANN ROAD AND THE U.S. 95/RANCHO
117         KM  INTERSECTION IN A 10' X 3' RCB (CULVERT 3). FLOWS IN EXCESS OF 139 CFS
118         KM  REMAIN ON THE WEST SIDE OF U.S. 95.
119         KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
120         DT    D95A
121         DI       0      51     101     118     140     318   10000
122         DQ       0      50     100     117     139     139     139
            *

123         KK   RLBG1
124         KM  ROUTE TO CGCC4 (HECRAS CROSS SECTION 116+49)
125         KM  ADDED BY LBG
126         RK     278   0.005   0.013       0    TRAP       8       0
            *
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 127          KK  PDGCC2
 128          KM  BASIN REFERENCED FROM LOMR
 129          PB    2.77
 130          BA   0.042
 131          LS       0    73.2
 132          UD   0.286
              *
1                                        HEC-1 INPUT                                        PAGE  4

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 133          KK   RGCC2
 134          KM  ROUTE TO PDGCC4
 135          RK    2900  0.0055   0.015       0    TRAP      60       2
              *

 136          KK  PDGCC4
 137          KM  BASIN REFERENCED FROM LOMR
 138          PB    2.77
 139          BA   0.049
 140          LS       0    84.3
 141          UD   0.189
              *

 142          KK   CGCC4
 143          KM  THE FLOW AT THIS NODE CORRESPONDS TO HECRAS CROSS SECTION 116+49
 144          KM  OF THE US-95 EFFECTIVE HECRAS.
 145          KM  THIS IS THE MOST UPSTREAM NODE IN THE EFFECTIVE MODEL.
 146          HC       3
              *

 147          KK   RLBG2
 148          KM  ROUTE TO CGCB9 (HECRAS CROSS SECTION 112+87)
 149          KM  ADDED BY LBG
 150          RK     362   0.005   0.013       0    TRAP       8       0
              *

 151          KK  HAMMER
 152          KM  BASIN REFERENCED FROM LOMR
 153          PB    2.82
 154          BA   0.128
 155          LS       0    76.6
 156          UD   0.333
              *

 157          KK RHAMMER
 158          KM  ROUTE TO PDGCD
 159          RK    2700   0.015   0.015       0    TRAP      60       2
              *

 160          KK   PDGCD
 161          KM  BASIN REFERENCED FROM LOMR
 162          PB    2.77
 163          BA   0.129
 164          LS       0    74.0
 165          UD   0.284
              *

 166          KK  CPDGCD
 167          HC       2
              *
1                                        HEC-1 INPUT                                        PAGE  5

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 168          KK    RGCD
 169          KM  ROUTE TO PDGCB5
 170          RK    4060  0.0086   0.015       0    TRAP      40       2
              *

 171          KK  PDGCB1
 172          KM  BASIN REFERENCED FROM LOMR
 173          PB    2.77
 174          BA   0.033
 175          LS       0    84.9
 176          UD   0.166
              *

 177          KK   RGCB1
 178          KM  ROUTE TO PDGCB3
 179          RK    2100  0.0086   0.015       0    TRAP      40       2
              *

 180          KK  PDGCB2
 181          KM  BASIN REFERENCED FROM LOMR
 182          PB    2.77
 183          BA   0.030
 184          LS       0    81.3
 185          UD   0.190
              *

 186          KK   CGCB2
 187          HC       2
              *

 188          KK   RCGB2
 189          KM  ROUTE TO PDGCB3
 190          RK     700  0.0029    0.03       0    TRAP      20       2
              *
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```
 191          KK  PDGCB3
 192          KM  BASIN REFERENCED FROM LOMR
 193          PB    2.77
 194          BA   0.066
 195          LS       0    73.1
 196          UD   0.236
              *

 197          KK   CGCB3
 198          HC       2
              *

 199          KK   RGCB3
 200          KM  ROUTE TO PDGCB5
 201          RK    1400    0.01   0.025       0    TRAP      20       2
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 202          KK  PDGCB4
 203          KM  BASIN REFERENCED FROM LOMR
 204          PB    2.77
 205          BA   0.020
 206          LS       0    85.7
 207          UD   0.204
              *

 208          KK   RGCB4
 209          KM  ROUTE TO PDGCB5
 210          RK     800    0.01    0.03       0    TRAP      20       2
              *

 211          KK   CGCB4
 212          HC       3
              *

 213          KK  PDGCC1
 214          KM  BASIN REFERENCED FROM LOMR
 215          PB    2.77
 216          BA   0.053
 217          LS       0    75.4
 218          UD   0.263
              *

 219          KK  PDGCB5
 220          KM  BASIN REFERENCED FROM LOMR
 221          PB    2.77
 222          BA   0.110
 223          LS       0    76.0
 224          UD   0.375
              *

 225          KK   CGCB5
 226          HC       3
              *

 227          KK   RGCB5
 228          KM  ROUTE TO PDGCB9
 229          RK    3080  0.0065    0.03       0    TRAP      30       2
              *

 230          KK  C2GCB5
 231          HC       2
              *

 232          KK  PDGCB6
 233          KM  BASIN REFERENCED FROM LOMR
 234          PB    2.77
 235          BA   0.018
 236          LS       0    88.2
 237          UD   0.177
              *
```



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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 238          KK   RGCB6
 239          KM  ROUTE TO PDGCB9
 240          RK    2880  0.0065    0.03       0    TRAP      30       2
              *

 241          KK PDGCB10
 242          KM  BASIN REFERENCED FROM LOMR
 243          PB    2.77
 244          BA   0.074
 245          LS       0    83.7
 246          UD   0.260
              *

 247          KK  PDGCB9
 248          KM  BASIN REFERENCED FROM LOMR
 249          PB    2.77
 250          BA   0.031
 251          LS       0    76.5
 252          UD   0.137
              *

 253          KK   CGCB9
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```
254          HC       4
             *

255          KK   RGCB9
256          KM  ROUTE TO GCB11 (HECRAS CROSS SECTION 105+04)
257          KM  CHANGED FROM 1950 FT TO 783 FEET BY LBG
258          RK     783  0.0036   0.013       0    TRAP       8       2
             *

259          KK PDGCB11
260          KM  BASIN REFERENCED FROM LOMR
261          PB    2.77
262          BA   0.033
263          LS       0    79.3
264          UD   0.195
             *

265          KK  CGCB11
266          HC       2
             *

267          KK   RLBG3
268          KM  ROUTE TO REMAIN2 (HECRAS CROSS SECTION 99+93)
269          KM  ADDED BY LBG
270          RK     511  0.0036   0.013       0    TRAP       8       2
             *
1                                        HEC-1 INPUT                                                    PAGE  8

         LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

271          KK REMAIN2
272          KM  DIVERT 192 CFS UNDER U.S. 95 JUST SOUTH OF THE U.S. 95/RANCHO INTERSECTION
273          KM  IN 2, 6' X 2' RCB'S (CULVERT 5). REMAINING FLOW CONTINUES SOUTH ALONG U.S.
274          KM  95 TO LONE MOUNTAIN ROAD.
275          KM   REVISED TO 168 BY LBG
276          DT    D95B
277          DI       0     426     591   10000
278          DQ       0     168     192     192
             *

279          KK  RMAIN2
280          KM  ROUTE TO 20BG
281          KM  HECRAS CROSS SECTION 82+37
282          RK    1756  0.0029    0.03       0    TRAP      20       2
             *

283          KK  LONEMT
284          KM  BASIN REFERENCED FROM LOMR
285          PB    2.77
286          BA   0.411
287          LS       0    83.1
288          UD   0.380
             *

289          KK  GD20BH
290          KM  BASIN REFERENCED FROM LOMR
291          PB    2.77
292          BA   0.047
293          LS       0    76.6
294          UD   0.250
             *

295          KK   CLONE
296          KM  TENAYA/LONE MOUNTAIN
297          HC       2
             *

298          KK   RLONE
299          KM  ROUTE TO 20BG
300          KM  HECRAS CROSS SECTION 82+37
301          RK    1100  0.0015   0.015       0    TRAP      44       2
             *

302          KK  GD20BG
303          KM  BASIN REFERENCED FROM LOMR
304          PB    2.77
305          BA   0.113
306          LS       0    81.4
307          UD   0.261
             *
1                                        HEC-1 INPUT                                                    PAGE  9

         LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

308          KK   C20BG
309          HC       3
             *

310          KK   R20BG
311          KM  ROUTE TO 20BL
312          KM  HECRAS X-SECTION 65+10
313          RK    1680  0.0016    0.03       0    TRAP     150       2
             *

314          KK  CRAIG1
315          KM  ADDED FROM LOMR
316          KM  BASIN CRAIG1 (SDN3)
317          PB    3.16
318          BA    2.44
319          LS       0    82.0
```

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320          UD   0.700
             *

321          KK   DBUF1
322          KM  DIVERT 249 CFS (447 CAPACITY - 198 FUTURE INTERCEPTED) TO
323          KM  GOWAN NORTH BUFFALO BRANCH SD BETWEEN LONE MT AND RED COACH
324          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
325          KM  FACILITY ID: GOBU 0085
326          DT   DGNBB
327          DI       0     250    2807   10000
328          DQ       0     249     249     249
             *

329          KK   RBUF1
330          KM  ROUTE TO RED COACH
331          RK    1295   0.004   0.015       0    TRAP      80       2
             *

332          KK   DBUF2
333          KM  DIVERT 109 CFS TO GOWAN NORTH BUFFALO BRANCH SD AT RED COACH
334          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
335          KM  FACILITY ID: GOBU 0058
336          DT  DGNBB1
337          DI       0     110    1121   10000
338          DQ       0     109     109     109
             *

339          KK    DRED
340          KM  DIVERT 70.40% FLOW DOWN BUFFALO TOWARDS COBAL CANYON.
341          KM  TAKE FLOW DOWN RED COACH TO US95
342          DT DBUFLO2
343          DI       0     100    1000   10000
344          DQ       0    70.4    704.    7040
             *
1                                        HEC-1 INPUT                                        PAGE 10

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

345          KK   RDRED
346          KM  ROUTE TO 20BI
347          RK    2700   0.007   0.015       0    TRAP      80       2
             *

348          KK  GD20BI
349          KM  BASIN REFERENCED FROM LOMR
350          PB    2.77
351          BA   0.115
352          LS       0    80.5
353          UD   0.286
             *

354          KK   C20BI
355          HC       2
             *

356          KK   R20BI
357          KM  ROUTE TO 20BL
358          KM  HECRAS CROSS SECTION 65+10
359          RK     910  0.0055   0.015       0    TRAP      40       2
             *

360          KK  GD20BL
361          KM  BASIN REFERENCED FROM LOMR
362          PB    2.77
363          BA   0.079
364          LS       0    88.7
365          UD   0.230
             *

366          KK   C20BL
367          HC       3
             *

368          KK   R20BL
369          KM  ROUTE TO C20BJ2
370          KM  HECRAS CROSS SECTION 61+09
371          RK     401  0.0016    0.03       0    TRAP     150       2
             *

372          KKRTBUFAL2
373          KM  RETRIEVE FLOW DIVERTED TO BUFFALO PAST RED COACH
374          DR DBUFLO2
             *

375          KK   RBUF2
376          KM  ROUTE TO COBAL CANYON
377          RK     652   0.004   0.015       0    TRAP      80       2
             *
1                                        HEC-1 INPUT                                        PAGE 11

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

378          KK  DCOBAL
379          KM  DIVERT 71.46% OF FLOW AT COBAL CANYON/BUFFALO INTERSECTION SOUTH ON BUFFALO
380          KM  REMAINING FLOW CONTINUES TO US95
381          DT DBUFLO3
382          DI       0    100.    1000   10000
383          DQ       0   71.46   714.6    7146
             *
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```
384          KK RCOBAL1
385          KM  ROUTE TO C20BJ1
386          RK    2700   0.007   0.015       0    TRAP      60       2
             *

387          KK  GD20BJ
388          KM  BASIN REFERENCED FROM LOMR
389          PB    2.77
390          BA   0.052
391          LS       0    84.3
392          UD   0.257
             *

393          KK  C20BJ1
394          HC       2
             *

395          KK  R20BJ1
396          KM  ROUTE TO C20BJ2
397          RK     900   0.006   0.015       0    TRAP      40       2
             *

398          KK  C20BJ2
399          KM  US95 HECRAS CROSS SECTION 59+51
400          HC       2
             *

401          KK  R20BJ2
402          KM  ROUTE TO C20BM
403          RK     362   0.006   0.015       0    TRAP      40       2
             *

404          KK  GD20BM
405          KM  BASIN REFERENCED FROM LOMR
406          PB    2.77
407          BA   0.048
408          LS       0    89.2
409          UD   0.189
             *

410          KK   C20BM
411          KM  HECRAS CROSS SECTION 55+89
412          KM  GD20BM IS ADDED TO US95 FLOW FROM C20BJ2
413          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE 12

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


414          KK REMAIN5
415          KM  DIVERSION PER EXISTING INTERCHANGE AT CRAIG ROAD
416          KM  DIVERT FLOW THROUGH 2, 6' x 2' RCB'S (CULVERT 7) UNDER U.S. 95
417          KM  JUST NORTH OF THE CRAIG ROAD BRIDGE.
418          KM  REMAINING FLOW CONTINUES SOUTH ALONG U.S. 95
419          KM  THIS DIVERSION HAS TWO SEPARATE FLOW QUANTITIES, 82 CFS FOR THE SDN3
420          KM  MODEL AND 180 CFS FOR THE SDN5 MODEL
421          KM  REVISED BY LBG 6-28-05 (RATING CURVE DEVELOPED)
422          DT    D95E
423          DI       0     200     600    1000    1250    2006
424          DQ       0    16.8      82   144.0     170     264
             *

425          KKRREMAINS5
426          KM  ROUTE TO 2C20BK
427          RK     853   0.006   0.015       0    TRAP      40       2
             *

428          KKRTBUFAL3
429          KM  RETRIEVE FLOW DIVERTED TO BUFFALO PAST COBAL CANYON
430          DR DBUFLO3
             *

431          KK   RBUF3
432          KM  ROUTE TO CRAIG ROAD
433          RK     661   0.003   0.015       0    TRAP      80       2
             *

434          KK   DBUF3
435          KM  DIVERT 198 CFS TO GOWAN NORTH BUFFALO BRANCH SD AT CRAIG
436          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
437          KM  FACILITY ID: GOBU 0032
438          DT  DGNBB2
439          DI       0     199    1121   10000
440          DQ       0     198     198     198
             *

441          KK RCRAIG2
442          KM  ROUTE TO GD20BK
443          RK    3400  0.0067   0.015       0    TRAP      80       2
             *

444          KK  GD20BK
445          KM  BASIN REFERENCED FROM LOMR
446          PB    2.77
447          BA   0.050
448          LS       0    80.5
449          UD   0.264
             *
1                                        HEC-1 INPUT                                        PAGE 13

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
450          KK  1C20BK
451          HC       2
             *

452          KK R1C20BK
453          KM  ROUTE TO 2C20BK
454          KM  HECRAS CROSS SECTION 47+36 IN US-95 HECRAS MODEL
455          RK    1150  0.0039   0.015       0    TRAP      80       2
             *

456          KK  2C20BK
457          HC       2
             *

458          KK R2C20BK
459          KM  ROUTE TO C17BI
460          KM  HECRAS CROSS SECTION 42+41
461          KM  CHANGE FROM 600 FT TO 495 FT
462          RK     495  0.0039    0.03       0    TRAP      80       2
             *

463          KK HICKAM1
464          KM  BASIN REFERENCED FROM LOMR
465          PB    2.89
466          BA   0.477
467          LS       0    80.3
468          UD   0.472
             *

469          KK    BUF3
470          KM  DIVERT 125 CFS TO GOWAN NORTH BUFFALO BRANCH SD FROM HICKAM1
471          KM  SUBBASIN. REMAINING FLOW CONTINUES EAST ALONG HICKAM AVENUE
472          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
473          KM  FACILITY ID: GOBU 0000
474          DT  DGNBB3
475          DI       0     126     211   10000
476          DQ       0     125     125     125
             *

477          KK RHICKAM
478          KM  ROUTE TO C17BH
479          RK    1300   0.008   0.025       0    TRAP      80       2
             *

480          KK  GD17BH
481          KM  BASIN REFERENCED FROM LOMR
482          PB    2.77
483          BA   0.025
484          LS       0    82.8
485          UD   0.178
             *
```



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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

486          KK   C17BH
487          HC       2
             *

488          KK   R17BH
489          KM  ROUTE TO GD17BG
490          RK    1330   0.006   0.025       0    TRAP      80       2
             *

491          KK  GD17BG
492          KM  BASIN REFERENCED FROM LOMR
493          PB    2.77
494          BA   0.116
495          LS       0    83.3
496          UD   0.275
             *

497          KK   C17BG
498          HC       2
             *

499          KK   R17BG
500          KM  ROUTE TO C17BI
501          KM  HECRAS CROSS SECTION 42+41
502          RK    1200   0.005   0.025       0    TRAP      80       2
             *

503          KK  GD17BI
504          KM  BASIN REFERENCED FROM LOMR
505          PB    2.77
506          BA   0.066
507          LS       0    85.2
508          UD   0.193
             *

509          KK   C17BI
510          HC       3
             *

511          KK   R17BI
512          KM  ROUTE TO C17BJ
513          KM  HECRAS CROSS SECTION 27+40
514          RK    1501  0.0023    0.03       0    TRAP     200       2
             *
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```
          515          KK  GD14CH
          516          KM  BASIN REFERENCED FROM LOMR
          517          PB    2.77
          518          BA   0.040
          519          LS       0    83.0
          520          UD   0.181
                       *
1                                                  HEC-1 INPUT                                                  PAGE 15

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          521          KK   R14CH
          522          KM  ROUTE TO C17BJ
          523          KM  HECRAS CROSS SECTION 27+40
          524          RK    1900   0.005   0.015       0    TRAP      40       2
                       *

          525          KK  GD17BJ
          526          KM  BASIN REFERENCED FROM LOMR
          527          PB    2.77
          528          BA   0.063
          529          LS       0    88.3
          530          UD   0.222
                       *

          531          KK   C17BJ
          532          HC       3
                       *

          533          KK REMAIN6
          534          KM  DIVERT FLOW THROUGH DUAL 6' X 2' RCB'S (CULVERT 10) AT ALEXANDER ROAD
          535          KM  BETWEEN CROSS-SECTIONS 28+10 AND 26+94 IN THE HEC-RAS MODEL.
          536          KM  WEIR FLOW ELIMINATED DUE TO SOUND WALL AND BARRIER RAILS
          537          DT    D95F
          538          DI       0     100     500    1000    1937    2725
          539          DQ       0    10.8      72     144     192     264
                       *

          540          KK   R17BJ
          541          KM  ROUTE TO C6MAIN
          542          KM  HECRAS CROSS SECTION 25+14
          543          RK     226   0.005   0.015       0    TRAP      40       2
                       *

          544          KK  GD14CF
          545          KM  BASIN REFERENCED FROM LOMR
          546          KM  SUBBASIN AT NW OF GOWAN & BUFFALO INTERSECTION
          547          PB    2.78
          548          BA   0.130
          549          LS       0    77.9
          550          UD   0.288
                       *

          551          KK    BUF4
          552          KM  DIVERT 30 CFS TO GOWAN NORTH BUFFALO BRANCH SD FROM BUFFALO AND
          553          KM  EXCALIBUR INTERSECTION.REMAINING FLOW CONTINUES EAST ALONG ALEXANDER
          554          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
          555          KM  FACILITY ID: GOBU 0000
          556          DT  DGNBB4
          557          DI       0      31      60   10000
          558          DQ       0      30      30      30
                       *
1                                                  HEC-1 INPUT                                                  PAGE 16

        LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          559          KK   R14CF
          560          KM  ROUTE TO GD14CG
          561          RK    1450   0.006   0.015       0    TRAP     100       2
                       *

          562          KK  GD14CG
          563          KM  BASIN REFERENCED FROM LOMR
          564          PB    2.77
          565          BA   0.057
          566          LS       0    82.2
          567          UD   0.208
                       *

          568          KK   C14CG
          569          HC       2
                       *

          570          KK   R14CG
          571          KM  ROUTE TO GD14CI
          572          RK    1650   0.006   0.015       0    TRAP     100       2
                       *

          573          KK  GD14CI
          574          KM  BASIN REFERENCED FROM LOMR
          575          PB    2.77
          576          BA   0.054
          577          LS       0    79.7
          578          UD   0.196
                       *

          579          KK   C14C1
          580          HC       2
                       *
```

```
581          KK   R14CI
582          KM  ROUTE TO CMAIN6
583          RK     945  0.0106   0.015       0    TRAP     100       2
             *

584          KK  CMAIN6
585          KM  HECRAS US95 CROSS SECTION 25+14
586          HC       2
             *

587          KK  RMAIN6
588          KM   ROUTE SOUTH TO US95 HECRAS CROSS SECTION 13+00
589          RK    1214  0.0026    0.03       0    TRAP      80       3
             *
1                                        HEC-1 INPUT                                                    PAGE 17

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

590          KK REMAIN7
591          KM  DIVERT FLOW THROUGH 2-30" RCP's (CULVERT 12) EAST ACROSS
592          KM  US95 BETWEEN ALEXANDER ROAD AND GOWAN ROAD.
593          KM  FLOW OVER US95 ELIMINATED BETWEEN CROSS SECTIONS 14+20 AND 10+27
594          KM  DUE TO SOUNDWALLS.REVISED BY LBG 6-28-2005
595          DT    D95G
596          DI       0     100     500    1000    1500    1656    2000
597          DQ       0      60      82      96     102     101     104
             *

598          KK   GD11C
599          KM  BASIN REFERENCED FROM LOMR
600          PB    2.77
601          BA   0.132
602          LS       0    86.0
603          UD   0.296
             *

604          KK    C11C
605          HC       2
             *

606          KK    R11C
607          KM  ROUTE SOUTH TO CULVERT 13 UPSTREAM OF GOWAN UNDERPASS
608          KM  HECRAS CROSS SECTION 0+17
609          RK    1283  0.0026    0.03       0    TRAP      80       3
             *

610          KK   GD11B
611          KM  BASIN REFERENCED FROM LOMR
612          PB    2.77
613          BA   0.196
614          LS       0    87.6
615          UD   0.272
             *

616          KK    C11B
617          HC       2
             *

618          KK  GOWAN1
619          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
620          KM  BY POGGEMEYER DESIGN GROUP, INC
621          KM  DIVERT MAXIMUM OF 422 CFS INTO GOWAN OUTFALL AT US95
622          KM  REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
623          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
624          KM  DIVERT 0 CFS, GOWAN OUTFALL IS FULL AT THIS LOCATION, LBG
625          KM  FACILITY: GOWAN OUTFALL FACILITIES
626          KM  FACILITY ID: G00F 0511
627          DT   G00F1
628          DI       0      51     101     423    5000
629          DQ       0       1       2       3       4
             *
1                                        HEC-1 INPUT                                                    PAGE 18

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

630          KK    R11B
631          KM  ROUTE TO CPT6B
632          RK    1400  0.0057   0.015       0    TRAP      80       2
             *

633          KK   CY05A
634          KM  BASIN REFERENCED FROM LOMR
635          PB    2.77
636          BA   0.025
637          LS       0    85.6
638          UD   0.179
             *

639          KK    D95G
640          KM  RETRIEVE FLOW DIVERTED THROUGH CULVERT 13
641          DR    D95G
             *

642          KK   RD95G
643          KM  ROUTE TO PT6B
644          RK    2300   0.004   0.015       0    TRAP      60       2
             *

645          KK    PT6B
```

```
646          KM  BASIN REFERENCED FROM LOMR
647          PB    2.77
648          BA   0.107
649          LS       0    89.1
650          UD   0.182
             *

651          KK   CPT6B
652          HC       2
             *

653          KK  2CPT6B
654          KM  RAINBOW & GOWAN
655          HC       3
             *

656          KK  GOWAN2
657          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
658          KM  BY POGGEMEYER DESIGN GROUP, INC
659          KM  DIVERT MAXIMUM OF 52 CFS INTO GOWAN OUTFALL AT RAINBOW FOR A
660          KM  TOTAL OF 474 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
661          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
662          KM  DIVERT 2 CFS THE GOWAN OUTFALL IS FULL AT THIS LOCATION, LBG
663          KM  FACILITY: GOWAN OUTFALL FACILITIES
664          KM  FACILITY ID: G00F 0511
665          DT   GOOF2
666          DI       0      53     101     423    5000
667          DQ       0       2       2       2       2
             *
1                                        HEC-1 INPUT                                        PAGE 19

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

668          KK   RPT6B
669          KM  ROUTE TO C5A3
670          RK    2480  0.0067   0.015       0    TRAP      80       2
             *

671          KK   CY05D
672          KM  BASIN REFERENCED FROM LOMR
673          PB    2.77
674          BA   0.059
675          LS       0    78.6
676          UD   0.254
             *

677          KK   PT5A3
678          KM  BASIN REFERENCED FROM LOMR
679          PB    2.77
680          BA   0.089
681          LS       0    87.1
682          UD   0.285
             *

683          KK    C5A3
684          KM  TORREY PINES & GOWAN
685          HC       3
             *

686          KK  GOWAN3
687          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
688          KM  BY POGGEMEYER DESIGN GROUP, INC
689          KM  DIVERT MAXIMUM OF 21 CFS INTO GOWAN OUTFALL AT TORREY PINES, FOR A
690          KM  TOTAL OF 495 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
691          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
692          KM  DIVERT 2 CFS AT THIS LOCATION, LBG
693          KM  FACILITY: GOWAN OUTFALL FACILITIES
694          KM  FACILITY ID: G00F 0511
695          DT   GOOF3
696          DI       0      22    5000
697          DQ       0       2       2
             *

698          KK    R5A3
699          KM  ROUTE TO C5A8 GOWAN & BRONCO
700          RK    1236  0.0088   0.015       0    TRAP      80       2
             *

701          KK     MAV
702          KM  DIVERSION TO MAVERICK THEN DUNCAN THEN RANCHO.
703          KM  DIVERSIONS DETERMINED USING HECRAS
704          DTMAVERICK
705          DI       0     200     400    1050    1300    1550    1800
706          DQ       0       8      14      50     100     150     200
             *
1                                        HEC-1 INPUT                                        PAGE 20

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

707          KK   R5A3B
708          KM  ROUTE TO C5A8 GOWAN & BRONCO
709          RK     600  0.0088   0.015       0    TRAP      80       2
             *

710          KK   CY06A
711          KM  BASIN REFERENCED FROM LOMR
712          PB    2.77
713          BA   0.077
714          LS       0    84.0
715          UD   0.246
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                *

          716   KK   PT5A8
          717   KM  BASIN REFERENCED FROM LOMR
          718   PB    2.77
          719   BA   0.025
          720   LS       0    82.0
          721   UD   0.265
                *

          722   KK    C5A8
          723   KM  GOWAN & BRONCO
          724   HC       3
                *

          725   KK   R5A3C
          726   KM  ROUTE C5A8 TO GOWAN & JONES
          727   RK     620  0.0088   0.015       0    TRAP      80       2
                *

          728   KK  GOWAN4
          729   KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
          730   KM  BY POGGEMEYER DESIGN GROUP, INC
          731   KM  DIVERT MAXIMUM OF 44 CFS INTO GOWAN OUTFALL AT JONES FOR A
          732   KM  TOTAL OF 539 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
          733   KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
          734   KM  DIVERT 2 CFS AT THIS LOCATION, LBG
          735   KM  FACILITY: GOWAN OUTFALL FACILITIES
          736   KM  FACILITY ID: G00F 0511
          737   DT   GOOF4
          738   DI       0      45    5000
          739   DQ       0       2       2
                *

          740   KK  DPT5A8
          741   KM  DIVERT FLOW TO JONES
          742   KM  FROM VTN NEVADA SILVER MESA STUDY (1989) AND CVL FISR
          743   KM  DIVERTED FLOW DRAINS SOUTH THEN EAST TO SANTA CATALINA. IT THEN
          744   KM  FLOWS UNDER MICHAEL TO RANCHO. MOST GOES UNDER RANCHO IN A RCB JUST SOUTH
          745   KM   OF THE MICHAEL WAY INTERSECTION. REMAINING FLOW CONTINUES SOUTH ON RANCHO.
          746   DT  DCY07B
          747   DI       0     100     500    1000    2000    3000    4000    5500
          748   DQ       0       0     116     253     592     948    1308    1859
                *
1                                        HEC-1 INPUT                                                PAGE 21

        LINE    ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          749   KK    R5A8
          750   KM  ROUTE TO TRUE VALUE
          751   RK    1659  0.0097   0.015       0    TRAP      80       2
                *

          752   KK   R5A82
          753   KM  ROUTE TO CCY07A
          754   RK    1220  0.0097   0.015       0    TRAP      80       2
                *

          755   KK   CY07A
          756   KM  BASIN REFERENCED FROM LOMR
          757   PB    2.77
          758   BA   0.027
          759   LS       0    86.2
          760   UD   0.237
                *

          761   KK  CCY07A
          762   HC       2
                *

          763   KK    TRUV
          764   KM  DIVERSION BEHIND TRUE VALUE HARDWARE REVISED BY LBG. DIVERSIONS
          765   KM  DETERMINED USING HECRAS LATERAL WEIR. L = 25 FT
          766   DT  TRUVAL
          767   DI       0     200     400     600    1000    1400    1800
          768   DQ       0       8      25      43      78     114     149
                *
                * ************************************************************
                * ************************************************************
                * ****START OF FLOW CONVEYED IN SWALE ON WEST SIDE OF RANCHO****
                * ****AND ULTIMATELY TO THE GOWAN SD, LONE MTN BRANCH  *********
                * ****NONE OF THIS FLOW IS CONVEYED IN STREET PER LOMR HECRAS***
                * ************************************************************
                * ************************************************************
                *

          769   KK    D95B
          770   KM  RETRIEVE FLOW FROM BOX DIVERSION (CULVERT 3) JUST SOUTH OF US95/RANCHO INTERSE
          771   KM  ***NOTE: THIS FLOW CARRIES A DRAINAGE AREA OF 1.47 SQUARE MILES***
          772   KM  ***THIS TOTAL ADJUSTED BY STANLEY CONSULTANTS FROM 1.49 IN LBG HEC-1
          773   DR    D95B
                *

          774   KK   RD95B
          775   KM  ROUTE TO 1REMAIN ON RANCHO DRIVE
          776   RK    1200   0.004   0.025       0    TRAP      30       2
                *
1                                        HEC-1 INPUT                                                PAGE 22

        LINE    ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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777          KK 1REMAIN
778          KM  DIVERT 36 CFS EAST THROUGH 2, 24" CMP'S (CULVERT 14) UNDER RANCHO DR
779          KM  NORTHWEST (UPSTREAM) OF THE RANCHO DR AND RAINBOW BLVD INTERSECTION.
780          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
781          KM  UPPER RANCHO HECRAS CROSS SECTION 122+75.
782          DT  D1RCHO
783          DI       0     191    1000   10000
784          DQ       0      36      36      36
             *

785          KK  PT3AB1
786          KM  BASIN REFERENCED FROM LOMR
787          PB    2.77
788          BA   0.049
789          LS      0    93.7
790          UD   0.283
             *

791          KK   C3AB1
792          HC       2
             *

793          KK 2REMAIN
794          KM  DIVERT 29 CFS EAST THROUGH A 30" CMP (CULVERT 15) UNDER RANCHO DR
795          KM  AT THE RANCHO DR AND RAINBOW BLVD INTERSECTION.
796          KM  UPPER RANCHO HECRAS STA. 121+00
797          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
798          DT  D2RCHO
799          DI       0     189    1000   10000
800          DQ       0      29      29      29
             *

801          KK  R2MAIN
802          KM  ROUTE TO PT3AB2
803          RK    1365  0.0022   0.025       0    TRAP      30       2
             *

804          KK  PT3AB2
805          KM  BASIN REFERENCED FROM LOMR
806          PB    2.77
807          BA   0.050
808          LS      0    94.5
809          UD   0.197
             *

810          KK   C3AB2
811          HC       2
             *
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

812          KK 3REMAIN
813          KM  ALL FLOW UP TO STORMDRAIN DESIGN FLOW RATE, 240 CFS
814          KM  DIVERTED UNDER RANCHO RD AT LONE MT RD TO THE GOWAN SD FACILITY
815          KM  IN LONE MT(NDESIGN BY GCW)AT RANCHO HECRAS STA. 103+99 (LOMR BY LBG)
816          KM  REVISED BY STANLEY CONSULTANTS
817          KM  1 CFS REMAINS TO AVOID A ZERO FLOW
818          KM  FACILITY: GOWAN OUTFALL-LONE MTN ROAD BRANCH
819          KM  FACILITY ID: GOLO 0275
820          DT  D3RCHO
821          DI       0     241    1000   10000
822          DQ       0     240     240     240
             *
             * ************************************************************
             * ************************************************************
             * ****END OF FLOW CONVEYED TO GOWAN OUTFALL-LONE MTN ROAD SD****
             * *START OF SURFACE FLOW CONVEYED SOUTH IN SWALE EAST OF RANCHO*
             * *RUNOFF FROM TOTAL AREA CONVEYED TO STORMDRAIN ***************
             * *DECREASE CALCULATED AREA AT HC'S BY 0.1 SQ MI.***************
             * ************************************************************
             * ************************************************************
             *

823          KK  R3MAIN
824          KM  ROUTE TO CPT2B2
825          KM  RANCHO HECRAS CROSS SECTION 93+76
826          RK    1023   0.005    0.03       0    TRAP      40       2
             *

827          KK   PT2B2
828          KM  BASIN REFERENCED FROM LOMR
829          PB    2.77
830          BA   0.078
831          LS      0    87.0
832          UD   0.254
             *

833          KK  CPT2B2
834          HC       2
             *

835          KK 4REMAIN
836          KM  DIVERT 35 CFS EAST THROUGH A 36" CMP (CULVERT 21)
837          KM  UNDER RANCHO DR HALF WAY BETWEEN LONE MTN RD AND CRAIG RD
838          KM  UPPER RANCHO HECRAS CROSS SECTION 93+76.
839          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
840          DT  D4RCHO
841          DI       0     214    1000   10000
842          DQ       0      35      35      35
```

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  843         KK  R4MAIN
  844         KM  ROUTE TO C2B3
  845         RK    2323   0.011    0.02       0    TRAP      40       2
              *

  846         KK   PT2B3
  847         KM  BASIN REFERENCED FROM LOMR
  848         PB    2.77
  849         BA   0.023
  850         LS      0    93.2
  851         UD   0.236
              *

  852         KK    C2B3
  853         KM  UPPER RANCHO HECRAS CROSS SECTION 70+16
  854         KM   FLOW ALONG RANCHO, NO. OF RANCHO/CRAIG INTERSECTION
  855         HC       2
              *

  856         KK    D2B3
  857         KM  DIVERT FLOW TO CRAIG RD STORM DRAIN AT RANCHO.
  858         KM  CRAIG RD STORM DRAIN IS A 42" TO 48" TO 60" RCP.
  859         KM  A 48" LATERAL (CULVERT 22) INTO THE SD HAS A CAPACITY OF 120 CFS
  860         KM  HY-8 CALCULATIONS INDICATE OF THE 91 CFS 100 YEAR STORM; 88 CFS IS CAPTURED BY
  861         KM  THE INLET TO THE 48"LATERAL IS AT THE DOWNSTREAM END OF THE DRAINAGE EASEMENT
  862         KM  BEHIND THE 7-11 CONVENIENCE STORE. IMMEDIATELY ABOVE THE 48" INLET ARE
  863         KM  2, 3'X7' RCB'S (CULVERT 23) THAT CROSS UNDER CRAIG ROAD AND DISCHARGE ON THE
  864         KM  SOUTHWEST SIDE OF THE CRAIG/RANCHO INTERSECTION.
  865         KM  DIVERT 120 CFS TO THE CRAIG RD STORM DRAIN SINCE 90 CFS (HEC-1 DIVERSION DCSD1
  866         KM  ALREADY EXISTS IN THE PIPE. REMAINING FLOW TRAVELS UNDER CRAIG ROAD IN THE
  867         KM  2: 3'X7' RCB'S AND DISCHARGES AT THE SOUTHWEST CORNER OF THE CRAIG/RANCHO
  868         KM  INTERSECTION AND IS JOINED BY THE STREET FLOW IN CRAIG. ALL STREET FLOW
  869         KM  IN CRAIG IS CONTAINED IN THE NORTH HALF OF THE STREET BY THE MEDIAN CURB SO
  870         KM  THERE IS NO DIVERSION TO TORREY PINES.
  871         KM  UPPER RANCHO HECRAS STA. 70+00.
  872         DT   DCSD2
  873         DI       0      91    1000   10000
  874         DQ       0      88     120     120
              *

  875         KK   PT2A2
  876         KM  BASIN REFERENCED FROM LOMR
  877         PB    2.77
  878         BA   0.062
  879         LS      0    84.7
  880         UD   0.222
              *

  881         KK    R2A2
  882         KM  ROUTE TO C2A1
  883         RK    1200   0.004   0.015       0    TRAP     100       2
              *
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  884         KK   PT2A1
  885         KM  BASIN REFERENCED FROM LOMR
  886         PB    2.77
  887         BA   0.065
  888         LS      0    86.8
  889         UD   0.308
              *

  890         KK    D95E
  891         KM  RETRIEVE FLOW FROM BOX DIVERSION AT US95 AND CRAIG (CULVERT 7)
  892         KM  ***NOTE: THIS FLOW CARRIES A TOTAL TRIBUTARY AREA****
  893         KM  ***OF 4.77/18.58 SQUARE MILES SDN3/SDN5**************
  894         KM  THIS IS NOT IN ADDITION TO THE 1.47 SQUARE MILES BROUGHT IN BY D95B, SO
  895         KM  THE TOTAL TRIBUTARY AREA TO THE CRAIG/RANCHO INTERSECTION IS
  896         KM  MILES 4.77 + AREA AT C2B3 - AREA CAPTURED IN GOWAN SD LN MTN BRANCH
  897         DR    D95E
              *

  898         KK   RD95E
  899         KM  ROUTE TO PT2A2
  900         RK    1500   0.004   0.015       0    TRAP      80       2
              *

  901         KK    C2A2
  902         HC       3
              *

  903         KK  DPT2A1
  904         KM  DIVERT FLOW TO CRAIG RD. STORM DRAIN
  905         KM  42" RCP, CAPACITY = 90 CFS
  906         KM  REMAINING FLOW CONTINUES EAST IN CRAIG RD.
  907         KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
  908         DT   DCSD1
  909         DI       0      21      51      76      91     200     500    1000
  910         DQ       0      20      50      75      90      90      90      90
              *

  911         KK    R2A2
  912         KM  ROUTE TO C2B1
```

```
 913          RK    2100   0.007   0.015       0    TRAP      80       2
              *

 914          KK   PT2B1
 915          KM  BASIN REFERENCED FROM LOMR
 916          PB    2.77
 917          BA   0.072
 918          LS      0    84.5
 919          UD   0.222
              *
1                                        HEC-1 INPUT                                                PAGE 26

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 920          KK    C2B1
 921          HC       2
              *

 922          KK    R2B1
 923          KM  ROUTE TO 2C2B3
 924          KM  STREET FLOW IN CRAIG RD GOING EAST TO RANCHO DR
 925          RK     300   0.007   0.015       0    TRAP      80       2
              *

 926          KK   2C2B3
 927          HC       2
              *

 928          KK   RC2B3
 929          KM  ROUTE TO 5REMAIN
 930          KM  UPPER RANCHO HECRAS CROSS SECTION 53+82
 931          RK    1600  0.0076    0.03       0    TRAP      80       2
              *

 932          KK   PT51A
 933          KM  BASIN ADDED BY STANLEY CONSULTANTS, ORIGINALLY THE NORTHERN HALF
 934          KM  OF LOMR BASIN PT51, ALSO NORTHEAST PORTION OF MPU BASIN PT41-C
 935          KM  FLOW DISCHARGES INTO CHANNEL ON WEST SIDE OF RANCHO
 936          KM  CONTINUES SOUTH
 937          PB    2.77
 938          BA   0.035
 939          LS      0    93.2
 940          UD   0.128
              *

 941          KK   C2628
 942          HC       2
              *

 943          KK 5REMAIN
 944          KM  DIVERT FLOW EAST ACROSS RANCHO IN TWO 6' X 3' RCB's (CULVERT 26 AND 28).
 945          KM  THE FIRST RCB (CULVERT 26) IS JUST UPSTREAM OF A 7' X 3' RCB (CULVERT 27)
 946          KM  THAT PARALLELS RANCHO ON THE WEST SIDE.
 947          KM  DIVERT 78 CFS OF 185 CFS EAST IN (CULVERT 26).
 948          KM  THE REMAINING 107 CFS ENTERS CULVERT 27 AND CONTINUES SOUTH UNTIL IT SPLITS
 949          KM  AT THE CONNECTION WITH CULVERT 28.
 950          KM  DIVERT 35 CFS OF THE 107 CFS EAST IN CULVERT 28.
 951          KM  THE REMAINING 72 CFS CONTINUES TO THE SOUTH SIDE OF ALEXANDER IN CULVERT 27
 952          KM  UPPER RANCHO HECRAS HAS CULVERT 27 IN IT BETWEEN STA 52+64 AND 38+36.
 953          KM  IN INTERIM AND DEVELOPED CONDITIONS THESE FLOWS WILL ENTER THE CCRFCD
 954          KM  STORM DRAIN FACILITY (GOAL 0111) AT THESE LOCATIONS.
 955          DT  D5RCHO
 956          DI       0     185    1000   10000
 957          DQ       0     113     113     113
              *
1                                        HEC-1 INPUT                                                PAGE 27

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 958          KK  R5REMN
 959          KM  ROUTE TO CPT51
 960          KM  UPPER RANCHO HECRAS CROSS SECTION 38+36
 961          RK    1428   0.006    0.03       0    TRAP       7       0
              *

 962          KK   PT51B
 963          KM  BASIN ADDED BY STANLEY CONSULTANTS, ORIGINALLY THE SOUTHERN HALF
 964          KM  OF LOMR BASIN PT51, ALSO SOUTHEAST PART OF MPU BASIN PT41-C
 965          PB    2.77
 966          BA   0.035
 967          LS      0    93.2
 968          UD   0.147
              *
              * KKPT51
              * THIS BASIN WAS DIVIDED INTO SMALLER SUBBASINS BY STANLEY CONSULTANTS, SEE
              * ABOVE (PT51A AND PT51B) TO PROVIDE MORE DETAIL ON WHERE FLOWS WILL ENTER THE
              * PROPOSED CCRFCD STORM DRAIN SYSTEM IN CRAIG ROAD, RANCHO
              * DRIVE, AND ALEXANDER/JONES BOULEVARD IN INTERIM AND DEVELOPED CONDITIONS
              * PB2.77
              * BA0.070
              * LS0         90.4
              * UD0.262
              *

 969          KK   CPT51
 970          KM  WEST SIDE RANCHO, NORTH OF ALEXANDER (JONES NORTH)
 971          HC       2
              *
              * KKD95Fa
              * KMRETRIEVE FLOW FROM WEIR DIVERSION AT US95 AND ALEXANDER
```

```
                * DRD95Fa
                *
                * THESE TWO DIVERSIONS CARRY A TOTAL TRIBUTARY AREA OF 18.68.
                * THIS IS NOT IN ADDITION TO THE 1.49 SQUARE MILES AND 2.35
                * SQUARE MILES BROUGHT IN BY D95B AND D95E RESPECTIVELY, SO THE TOTAL
                * TRIBUTARY AREA AT THE ALEXANDER/RANCHO INTERSECTION IS 19.69 SQUARE MILES.
                * (18.68 + 1.01)
                * AREA ADJ TO SND3 RESULTS, 5.61 SQ MI, BY STANLEY CONSULTANTS
                *
 972            KK    D95F
 973            KM  RETRIEVE FLOW FROM CULVERT 10 AND WEIR DIVERSION AT US95 AND ALEXANDER
 974            DR    D95F
                *
 975            KK   RD95F
 976            KM  ROUTE TO CPT6A
 977            RK    1500   0.004   0.015       0    TRAP     100       2
                *
1                                        HEC-1 INPUT                                        PAGE 28

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 978            KK     PT3
 979            KM  BASIN REFERENCED FROM LOMR
 980            PB    2.77
 981            BA   0.148
 982            LS       0    86.9
 983            UD   0.211
                *

 984            KK    PT6A
 985            KM  BASIN REFERENCED FROM LOMR
 986            PB    2.77
 987            BA   0.024
 988            LS       0    90.3
 989            UD   0.231
                *

 990            KK   CPT6A
 991            HC       3
                *

 992            KK   RPT6A
 993            KM  ROUTE TO PT42
 994            RK    2450   0.007   0.015       0    TRAP     100       2
                *

 995            KK    PT41
 996            KM  BASIN REFERENCED FROM LOMR
 997            PB    2.77
 998            BA   0.137
 999            LS       0    82.0
1000            UD   0.220
                *

1001            KK   RPT41
1002            KM  ROUTE TO CPT42
1003            RK    1050  0.0038   0.015       0    TRAP      80       2
                *

1004            KK    PT42
1005            KM  BASIN REFERENCED FROM LOMR
1006            PB    2.77
1007            BA   0.079
1008            LS       0    82.0
1009            UD   0.303
                *

1010            KK   CPT42
1011            HC       2
                *
1                                        HEC-1 INPUT                                        PAGE 29

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1012            KK   PT5A1
1013            KM  BASIN REFERENCED FROM LOMR
1014            PB    2.77
1015            BA   0.051
1016            LS       0    88.3
1017            UD   0.237
                *

1018            KK    C5A1
1019            HC       3
                *

1020            KK    R5A1
1021            KM  ROUTE TO CPT52
1022            RK    1680  0.0089   0.015       0    TRAP     100       2
                *

1023            KK   PT5A4
1024            KM  BASIN REFERENCED FROM LOMR
1025            PB    2.77
1026            BA   0.034
1027            LS       0    82.0
1028            UD   0.284
                *
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1029          KK    PT52
1030          KM  BASIN REFERENCED FROM LOMR
1031          PB    2.77
1032          BA   0.065
1033          LS       0    82.0
1034          UD   0.273
              *

1035          KK   CPT52
1036          KM  ALEXANDER WEST OF RANCHO
1037          HC       3
              *

1038          KK   RPT52
1039          KM  ROUTE TO 2CPT51
1040          KM  UPPER RANCHO HECRAS CROSS SECTION 38+36, SAME AS CPT51
1041          RK     560  0.0036   0.015       0    TRAP     100       2
              *

1042          KK  2CPT51
1043          KM  RANCHO ALEXANDER INTERSECTION (JONES SOUTH)
1044          HC       2
              *
1                                        HEC-1 INPUT                                        PAGE 30

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1045          KK R2CPT51
1046          KM  ROUTE TO 2CPT51
1047          KM  UPPER RANCHO HECRAS CROSS SECTION 29+79
1048          RK     857  0.0036   0.015       0    TRAP     100       2
              *

1049          KK 6REMAIN
1050          KM  DIVERT 14 CFS TO AN 18" CMP (CULVERT 29) AT NORTHWEST CORNER OF THE JONES
1051          KM  AND RANCHO INTERSECTION.  CULVERT 29 DISCHARGES TO THE CATCH BASIN OF A DROP
1052          KM  INLET ON THE SOUTHEAST SIDE OF JONES AND THE WEST SIDE OF RANCHO.
1053          KM  DIVERT 48 CFS TO THE DROP INLET (13' CURB OPENING W/2.5' GRATE) FOR A TOTAL
1054          KM  OF 52 CFS. THE CATCH BASIN DISCHARGES TO A 36" CMP (CULVERT 30) THAT CROSSES
1055          KM  RANCHO AND DISCHARGES TO THE EAST SIDE. DIVERT ADDITONAL FLOW ACROSS RANCHO
1056          KM  AS WEIR FLOW BETWEEN CROSS SECTIONS 38+36 AND 28+01. RATING CURVE DEVELOPED
1057          KM  USING HECRAS LATERAL WEIR BY LGB 7-13-2005. REMAINING FLOW CONTINUES SOUTH
1058          KM  ON THE WEST SIDE OF RANCHO.
1059          DT  D6RCHO
1060          DI       0      53     146     400     600     700
1061          DQ       0      40      52      75     126     163
              *

1062          KK  R6MAIN
1063          KM  ROUTE TO C5A6
1064          RK     699  0.0025    0.03       0    TRAP      80       2
              *

1065          KK   PT5A2
1066          KM  BASIN REFERENCED FROM LOMR
1067          PB    2.77
1068          BA   0.080
1069          LS       0    85.8
1070          UD   0.257
              *

1071          KK    R5A2
1072          KM  ROUTE TO C5A6
1073          RK    3920  0.0064   0.015       0    TRAP      60       2
              *

1074          KK   PT5A6
1075          KM  BASIN REFERENCED FROM LOMR
1076          PB    2.77
1077          BA   0.188
1078          LS       0    82.9
1079          UD   0.195
              *

1080          KK    C5A6
1081          KM  UPPER RANCHO HECRAS CROSS SECTION 22+80
1082          HC       3
              *
1                                        HEC-1 INPUT                                        PAGE 31

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1083          KK 7REMAIN
1084          KM  DIVERT FLOW EAST ACROSS RANCHO IN A 6' X 2' RCB (CULVERT 31).
1085          KM  REMAINING FLOW CONTINUES SOUTH ON THE WEST SIDE OF RANCHO
1086          KM  REVISED BY LBG (CULVERT 31=102 to 107 cfs) WEIR FLOW RATING
1087          KM  CURVE DEVELOPED WITH HECRAS LATERAL WEIR #1 FROM 28+01 TO 22+80
1088          DT  D7RCHO
1089          DI       0     108     146     400     500     600     650
1090          DQ       0      99     102     126     140     174     185
              *

1091          KK  R7MAIN
1092          KM  ROUTE TO C5A7
1093          KM  UPPER RANCHO HECRAS CROSS SECTION 14+56
1094          RK     824   0.004    0.03       0    TRAP      80       2
              *

1095          KK    DMAV
```

```
1096          KM  RETRIEVE FLOW FROM MAVERICK
1097          DRMAVERICK
              *

1098          KK    RMAV
1099          KM  ROUTE TO CPT5A6
1100          RK    3180  0.0064   0.015       0    TRAP      60
              *

1101          KK    CMAV
1102          HC       2
              *

1103          KK  DPT5A7
1104          KM  DIVERT FLOW ACROSS RANCHO AS WEIR FLOW NEAR DUNCAN ROAD, BETWEEN
1105          KM  CROSS SECTIONS 19+32 AND 14+56. RATING CURVE BY LBG 7-13-2005
1106          KM   USING LATERAL WEIR IN HECRAS.
1107          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG THE WEST SIDE OF RANCHO
1108          DT DDUNCAN
1109          DI       0     146     200     352     552     800
1110          DQ       0      35      77     139     297     460
              *

1111          KK   PT5A7
1112          KM  BASIN REFERENCED FROM LOMR
1113          PB    2.77
1114          BA   0.074
1115          LS       0    84.4
1116          UD   0.351
              *

1117          KK    C5A7
1118          KM  DUNCAN/RANCHO INTERSECTION
1119          HC       2
              *
1                                        HEC-1 INPUT                                        PAGE 32

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1120          KK    R5A7
1121          KM  ROUTE TO 8REMAIN
1122          KM  UPPER RANCHO HECRAS CROSS SECTION 9+83
1123          RK     473   0.004    0.03       0    TRAP      80       2
              *

1124          KK 8REMAIN
1125          KM  DIVERT 24 CFS EAST ACROSS RANCHO IN A 24" CMP (CULVERT 32).
1126          KM  REMAINING FLOW CONTINUES SOUTH ON THE WEST SIDE OF RANCHO
1127          KM  REVISED TO 23 CFS BY LBG. WEIR FLOW ACROSS RANCHO CALCULATED
1128          KM  USING HECRAS LATERAL WEIR #3 BETWEEN CROSS SECTION 9+83 AND 7+43.
1129          DT  D8RCHO
1130          DI       0      24     100     200     300     400     500     600
1131          DQ       0      23      23      54     122     200     273     346
              *

1132          KK  R8MAIN
1133          KM  ROUTE TO C5A9
1134          KM  UPPER RANCHO HECRAS CROSS SECTION 0+00
1135          RK     983   0.003   0.025       0    TRAP      20       2
              *

1136          KK   PT5A9
1137          KM  BASIN REFERENCED FROM LOMR
1138          PB    2.77
1139          BA   0.045
1140          LS       0    85.7
1141          UD   0.246
              *

1142          KK    C5A9
1143          KM  GOWAN & RANCHO
1144          HC       2
              *

1145          KK  GWAN5A
1146          KM  10 AND 25 YEAR EVENT ONLY - FULL IN 100 YEAR EVENT
1147          KM  DIVERT MAXIMUM OF 40 CFS (DESIGN FLOW RATE) OF SOUTHBOUND FLOW
1148          KM  IN RANCHO INTO GOWAN OUTFALL SD AT RANCHO/GOWAN INTERSECTION,
1149          KM  REMAINING FLOW TRAVELS SOUTH. ADDED BY STANLEY CONSULTANTS
1150          KM  FACILITY: GOWAN OUTFALL FACILITIES
1151          KM  FACILITY ID: G00F 0511
1152          DT  GOOF5A
1153          DI       0       0      40   10000
1154          DQ       0       0      40      40
              *

1155          KK C2PT5A9
1156          KM
1157          HC       2
              *
1                                        HEC-1 INPUT                                        PAGE 33

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1158          KK  GOWAN5
1159          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I [SIC]
1160          KM  BY POGGEMEYER DESIGN GROUP, INC
1161          KM  DIVERT MAXIMUM OF 1 CFS INTO GOWAN OUTFALL (FACILITY G00F 0486)
1162          KM  AT RANCHO REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
1163          KM  REVISED BY LBG. GOOF IS FULL.
```

```
1164          DT   GOOF5
1165          DI       0      49    5000
1166          DQ       0       1       1
              *

1167          KKDEASTGOW
1168          KM  FLOW SPLIT AT GOWAN AND RANCHO INTERSECTION. DIVERT MAJORITY OF FLOW
1169          KM  TO RANCHO SOUTH OF GOWAN RD BETWEEN CROSS-SECTIONS 983 AND 0.
1170          KM  THE REMAINING FLOW TRAVELS EAST ON GOWAN.
1171          KM  (THIS IS A LITTLE STRANGE.  THE DIVERTED FLOW IS
1172          KM  WHAT ACTUALLY CONTINUES ON RANCHO SOUTH!)
1173          KM  DIVERSION RENAMED FROM "GOWAN" TO LWRRNCH
1174          KM  NODE RENAMED FROM "DRANCHO" TO "DEASTGOW"
1175          DT LWRRNCH
1176          DI       0     400     600    1000    1200    1400    1600    2000    2400
1177          DQ       0     372     502     730     842     955    1068    1305    1553
              *
              * ***************************************************************
              * *************END OF PBS&J MODEL, REFERENCED BY LOMR***********
              * **START MODEL OF EASTBOUND FLOW IN GOWAN ADDED BY STANLEY*****
              * ***************************************************************
              * ***************************************************************
              *

1178          KKRDEASTGOW
1179          KM  ROUTE FLOW TO GOWAN/DECATUR INTERSECTION AND COMBINE WITH BASIN CY08-C
1180          RK    3250   0.006   0.016       0    TRAP      80       2
              *

1181          KK  CY08-C
1182          KM  BASIN REFERENCED FROM 2008 MPU ALLGOW3.DAT
1183          BA   0.094
1184          PB    2.77
1185          LS       0    88.5
1186          UD   0.306
              *
1187          KM  KKCCCY08-C
1188          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1189          KM  COMBINE CY08-C, CCY08-C, AND RDCY07B
1190          KM  GOWAN AND DECATUR
1191          KM  HC3
              *
1192          KM  KKDGOW2A
1193          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1194          KM  DIVERT FLOW TO GOWAN OUTFALL
1195          KM  DIVERSION BASED ON GOWAN ROAD DRAINAGE STUDY BY POGGEMEYER
1196          KM  8'X 5' RCB, CAPACITY = 630 CFS (GOOF 0486)
1197          KM  REMAINING FLOW CONTINUES EAST IN GOWAN RD. AND ENTERS THE CENTRAL BASIN
1                                        HEC-1 INPUT                                    PAGE 34

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1198          KM  OPPOSITE OF DGOW2A IN CWH
1199          KM  DTDCENTRAL
1200          KM  DIO       31      51      71     101     301     601     631    3000    5000
1201          KM  DQO        1       1       1       1       1       1       1    2370    4370
              *
1202          KM  KKRDGOW2A
1203          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1204          KM  ROUTE DGOW2A TO CPT5B6-C
1205          KM  FACILITY = GOWAN NORTH SYSTEM
1206          KM  FACILITY # = GOOF 0427, 0485
1207          KM  LINING = RCP
1208          KM  RD2370    0.005   0.013   0       CIRC    8       0
              *

1209          KK  CCY08C
1210          KM  COMBINE RDEASTGOW AND CY08-C AT DECATUR GOWAN INTERSECTION
1211          KM  IN EXISTING CONDITION THIS FLOW WILL CONTINUE EAST IN GOWAN
1212          HC       2
              *

1213          KK   DGWN6
1214          KM  GOWAN OUTFALL FULL
1215          KM  DIVERT 1 CFS TO GOWAN OUTFALL AT GOWAN/DECATUR INTERSECTION
1216          DT   GOOF6
1217          DI       0      31      51      71     101     301    1001    2001    3001    5001
1218          DQ       0       1       1       1       1       1       1       1       1       1
              *

1219          KK   DALEX
1220          KM  DIVERT EASTBOUND SURFACE FLOW AT GOWAN/DECATUR INTERSECTION
1221          KM  THE REMAINING FLOW TRAVELS NORTH IN ALEXANDER
1222          KM  RATING TABLE FROM FLOW SPLIT CALCULATION BY STANLEY CONSULTANTS
1223          DT  DEGWN6
1224          DI       0     100     200     260     360
1225          DQ       0      71     143     185     257
              *
1226          KM  KKRDALEX
1227          KM  ROUTE SURFACE FLOW IN DECATUR TO DECATUR/ALEXANDER INTERSECTION
1228          KM  RD  2640   0.005    .016            TRAP     100       2
              *

1229          KK   CUL30
1230          KM  RETRIEVE FLOW FROM CULVERT 30
1231          DR  D6RCHO
              *

1232          KK  RCUL30
1233          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1234          RK    5000    0.01   0.016       0    TRAP      80       2
              *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1235      KK   CUL31
1236      KM  RETRIEVE FLOW FROM CULVERT 31
1237      DR  D7RCHO
          *

1238      KK  RCUL31
1239      KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1240      RD    4750    0.01   0.016       0    TRAP      80       2
          *

1241      KK  DUNCAN
1242      KM  RETRIEVE FLOW FROM DUNCAN
1243      DR DDUNCAN
          *

1244      KK RDUNCAN
1245      KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1246      RD    5450    0.01   0.016       0    TRAP      80       2
          *

1247      KK   CUL32
1248      KM  RETRIEVE FLOW FROM CULVERT 32
1249      DR  D8RCHO
          *

1250      KK  RCUL32
1251      KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1252      RD    5100    0.01   0.016       0    TRAP      80       2
          *

1253      KK  CPT56B
1254      KM  COMBINE ROUTES IN BASIN PT5B6-C AT ALEXANDER/DECATUR
1255      HC       4
          *

1256      KK PT5B6-C
1257      KM  BASIN REFERENCED FROM 2008 MPU ALLGOW3.DAT
1258      BA   0.381
1259      PB    2.77
1260      LS       0    86.3
1261      UD   0.368
          *

1262      KK CCPT56B
1263      KM  COMBINE PT5B6-C AND CPT56B AT ALEXANDER/DECATUR
1264      HC       2
          *

1265      KKCCCPT56B
1266      KM  COMBINE SURFACE FLOW IN ALEXANDER/DECATUR INTERSECTION
1267      HC       2
          *
1268      KM  KKCCPT5B6C
1269      KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
```



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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1270      KM  KMCOMBINE PT5B6-C AND CPT5B6-C
1271      KM  KMDECATUR AND ALEXANDER
1272      KM  HC2
          *
1273      KM  KKRCCPT5B6
1274      KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1275      KM  KMROUTE CCPT5B6C TO CPT5C-1
1276      KM  KMFACILITY = GOWAN OUTFALL FACILITIES
1277      KM  KMFACILITY # = GOOF 0375
1278      KM  KMLINING = RCB
1279      KM  RD2700    0.0056  0.015   0       TRAP    24      0
          *

1280      KK  0511-1
1281      KM  RETRIEVE FLOW IN GOOF 0511 AT US95/GOWAN
1282      DR   GOOF1
          *

1283      KK  0511-2
1284      KM  RETRIEVE FLOW IN GOOF 0511 AT RAINBOW/GOWAN
1285      DR   GOOF2
          *

1286      KK  0511-3
1287      KM  RETRIEVE FLOW IN GOOF 0511 AT TORREY PINES/GOWAN
1288      DR   GOOF3
          *

1289      KK  0511-4
1290      KM  RETRIEVE FLOW IN GOOF 0511 AT JONES/GOWAN
1291      DR   GOOF4
          *

1292      KK GOOF1-4
1293      KM  THIS REPRESENTS THE FLOW IN GOOF 0511 AT JONES/GOWAN
1294      HC       4
          *

1295      KK 0511-5A
```

```
1296          KM  RETRIEVE FLOW IN GOOF 0511 AT RANCHO/GOWAN
1297          DR  GOOF5A
              *

1298          KKGOOF1-5A
1299          KM  THIS REPRESENTS THE FLOW IN GOOF 0511 AT RANCHO/GOWAN
1300          HC       2
              *

1301          KK  0511-5
1302          KM  RETRIEVE FLOW IN GOOF EAST OF RANCHO
1303          DR   GOOF5
              *
1                                        HEC-1 INPUT                                        PAGE 37

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1304          KK  0486-1
1305          KM  RETRIEVE FLOW IN GOOF EAST OF RANCHO AT GOWAN
1306          DR   GOOF6
              *

1307          KK    0486
1308          KM  THIS REPRESENTS THE FLOW IN GOOF 0486 AT ALEXANDER/GOWAN
1309          HC       3
              *

1310          KK RDGOW2A
1311          KM  REFERENCED FROM 2008 MPU ALLGOW3.DAT
1312          KM  ROUTE DGOW2A TO CPT5B6-C
1313          KM  FACILITY = GOWAN NORTH SYSTEM
1314          KM  FACILITY # = GOOF 0427, 0485
1315          KM  LINING = RCP
1316          RD    2370   0.005   0.013       0    CIRC       8       0
              *

1317          KKCCCPT5B6C
1318          KM  COMBINE FACILITY FLOW AND SURFACE FLOW AT THE
1319          KM  ALEXANDER/DECATUR INTERSECTION
1320          HC       2
              *
              * ************************************************************
              * ********END GOWAN EASTBOUND FLOW MODEL BY STANLEY*************
              * **********BEGIN CVL MODEL REFERENCED BY LOMR******************
              * ************************************************************
              * ************************************************************
              *

1321          KK   GOWAN
1322          KM  RETRIEVE DIVERSION GOWAN
1323          KM  THE FLOW DIVERTED SOUTH IN RANCHO FROM GOWAN INTERSECTION
1324          DR LWRRNCH
              *

1325          KK CENTRL1
1326          KM  ADDED BY LBG
1327          KM  FLOW OVER RANCHO AT GOWAN RD BETWEEN 0+00 OF UPPER RANCHO HECRAS
1328          KM  MODEL AND 174+98 OF THE LOWER RANCHO MODEL.
1329          KM  (0+00 OF UPPER RANCHO MODEL = 177+03.33 OF LOWER RANCHO MODEL)
1330          KM  STATIONING OF UPPER RANCHO MODEL CORRESOPONDS TO ORIGNAL FIS.
1331          KM  MOST CROSS SECTIONS ARE IDENTICAL TO ORIGINAL EFFECTIVE MODEL.
1332          DT  D9RCHO
1333          DI       0     100     200     300     400     800    1000    1478
1334          DQ       0       8      61     121     176     424     522     811
              *
1                                        HEC-1 INPUT                                        PAGE 38

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1335          KK  TRUVAL
1336          KM  RETRIEVE TRUE VALUE DIVERSION DETERMINED WITH HECRAS LATERAL WEIR
1337          DR  TRUVAL
              *

1338          KK   CBDV1
1339          KM  COMBINE TRUVAL AND GOWAN
1340          KM  HECRAS STATION 17173.04 OF LOWER RANCHO MODEL
1341          HC       2
              *

1342          KK  MORBAY
1343          KM  RETRIEVE DIVERSION MORBAY (DCY07B FROM JONES/GOWAN)
1344          KM  MORBAY FROM CVL STUDY, DCY07B IN PBS&J STUDY
1345          DR  DCY07B
              *

1346          KKCBDVMORBAY
1347          KM  COMBINE GOWAN & MORBAY
1348          KM  HECRAS STATION 171+73.04 OF LOWER RANCHO MODEL
1349          HC       2
              *

1350          KK CENTRL2
1351          KM  ADDED BY LBG
1352          KM  2: 6'X2' RCBC UNDER RANCHO JUST SOUTH OF MICHAEL WAY
1353          KM  ID RAN 190 FROM NORTHWEST NEIGHBORHOOD STUDY
1354          DT D10RCHO
1355          DI       0      21      73     100    1000    2000
1356          DQ       0      20      72     100     200     200
              *
```

```
1357          KK   RTCHY
1358          KM  ROUTE TO CHEYENNE/RANCHO
1359          RM       3    0.32    0.15
              *
              * KKCBCX5
              * KMCOMBINE WITH CX5 AT CHEYENNE/RANCHO INTERSECTION
              * HC      2
              *

1360          KK   DVWR1
1361          KM  OVERFLOW CHEYENNE/RANCHO INTERSECTION HECRAS STATION 144+11.04
1362          KM  OF LOWER RANCHO MODEL
1363          DT  DVSTR1
1364          DI       0     167     261     622    1272
1365          DQ       0       0      36     180     455
              *
1                                        HEC-1 INPUT                                                    PAGE 39

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1366          KK   DVWR2
1367          KM  24" PIPE RANCHO
1368          DT  DVSTR2
1369          DI       0      10      20      30      37     100     500
1370          DQ       0      10      20      30      37      37      37
              *

1371          KK     RX5
1372          KM  ROUTE TO 6 X 3 RCB
1373          RM       1     0.1     0.3
              *
              *
              * ************************************************************
              * ********END SDN 3 ANALYSIS FOR UPPER HEC-1 MODEL *************
              * ******** NORTH OF CHEYENNE ***********************************
              * ********BEGIN HEC-1 FOR SDN3 ANALYSIS FOR LOWER HEC-1 MODEL***
              * ****SEE RANCHO LOMR FOR SEPARATE ANALYSIS AND CHECK OF sDN5***
              * ************************************************************
              *

1374          KK      X4
1375          KM  BASIN REFERENCED FROM LOMR
1376          KM  BASIN AREA USED IS REFERENCED FROM LBG SND3 MODEL
1377          KM  LBG LOMR REFERENCES THE SND5 MODEL, WHICH HAD AREA OF 0.698
1378          KM  PER LBG - THIS BASIN AREA REDUCED IN SIZE (FROM 0.810 TO 0.698)
1379          KM  TO TIE INTO BASINS FROM PBS&J MODEL
1380          PB    2.77
1381          BA   0.810
1382          LS       0      91
1383          UD     1.9
              *

1384          KK     X3B
1385          KM  BASIN REFERENCED FROM LOMR
1386          BA     .16
1387          LS       0      88
1388          UD    0.54
              *

1389          KK    CUL4
1390          KM  ROUTE THRU 2-6 X 4 689+30
1391          RS       1    ELEV    13.5
1392          SV       0     .32      18
1393          SE    13.5      15      18
1394          SQ       0      60     245
              *

1395          KK     X3A
1396          KM  BASIN REFERENCED FROM LOMR
1397          BA     .12
1398          LS       0      88
1399          UD    0.49
              *
1                                        HEC-1 INPUT                                                    PAGE 40

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1400          KK    CUL8
1401          KM  MAXIMUM Q INCREASED TO 50 CFS BY LBG TO ACCOMMODATE HIGHER FLOWS
1402          KM  STANLEY CONSULTANTS REFERENCED THE SDN3 MODEL
1403          KM  TO OBTAIN THE LAST COLUMN
1404          KM  24"  674+06
1405          RS       1    ELEV    18.5
1406          SV       0     1.1     3.6     3.7     3.9
1407          SE    18.5    20.5    22.5    22.6      23
1408          SQ       0      15      28      50      75
              *

1409          KK   CX3AB
1410          KM  COMBINE X3A &  X3B
1411          HC       2
              *

1412          KK   RK3AB
1413          KM  ROUTE TO JONES
1414          RM      10     1.0      .3
              *

1415          KK      CX
```

```
1416          HC       2
              *

1417          KK   DEVX4
1418          KM  DIVERT 100 CFS TO CHEYENNE
1419          DT   DEVX4
1420          DI       0      50     100     200     500    1000    5000
1421          DQ       0      25      50     100     100     100     100
              *

1422          KK     RK4
1423          KM  ROUTE X4 SOUTH ON MICHAEL WAY TO LOW POINT
1424          KM  THEN TO RANCHO
1425          RM       2     0.2     0.4
              *

1426          KK     X3C
1427          KM  BASIN REFERENCED FROM LOMR
1428          BA     .48
1429          LS       0      81
1430          UD    1.52
              *

1431          KK    SD1A
1432          KM  DROP   INLET  AT  BROOKS/JONES INTERSECTION
1433          DT    SD1A
1434          DI       0      50      93     285     500
1435          DQ       0       5      13      21      21
              *
1                                        HEC-1 INPUT                                        PAGE 41

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1436          KK    RK3C
1437          KM  ROUTE TO RANCHO
1438          KM  MUSKINGUM X COEFFICENT (COL 3) ADJUSTED BY LBG TO 0.40
1439          KM  TO PREVENT INSTABILITY
1440          RM       2     0.2    0.40
              *

1441          KK      X3
1442          KM  BASIN REFERENCED FROM LOMR
1443          BA    0.34
1444          LS       0      92
1445          UD    0.71
              *

1446          KK     CX3
1447          KM  COMBINE X3 X4 TO X3C
1448          HC       3
              *

1449          KK    DTX4
1450          KM  RETRIEVE DIVERT FLOW X4
1451          DR    DEVX4
              *

1452          KK    RDEX
1453          KM  ROUTE TO CHEYENNE
1454          KM  MUSKINGUM X COEFFICENT (COL 3) SND5 MODEL BY LBG USED 0.40 TO PREVENT
1455          KM  INSTABILITY
1456          KM  MUSKINGUM X COEFFICENT (COL 3) SND3 MODEL BY STANLEY CONSULTANTS ALSO
1457          KM  USED 0.40 TO PREVENT INSTABILITY
1458          RM       1     0.1    0.40
              *

1459          KK    BSX5
1460          KM  BASIN REFERENCED FROM LOMR
1461          KM  THE SDN5 MODEL BY LBG USED BA = 0.047 AND US = 0.122
1462          KM  THE SDN3 MODEL BY LBG USED BA = 0.100 AND US = 0.420
1463          BA   0.100
1464          LS       0      92
1465          UD   0.420
              *

1466          KK     CX5
1467          KM  COMBINE BSX5 & DEVX4
1468          HC       2
              *

1469          KK   DVWR1
1470          KM  REPEATED FROM UPPER MODEL
1471          KM  OVERFLOW CHEYENNE/RANCHO INTERSECTION HECRAS STATION 144+11.04
1472          KM  OF LOWER RANCHO MODEL
1473          DT  DVSTR1
1474          DI       0     167     261     622    1272
1475          DQ       0       0      36     180     455
              *
1                                        HEC-1 INPUT                                        PAGE 42

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

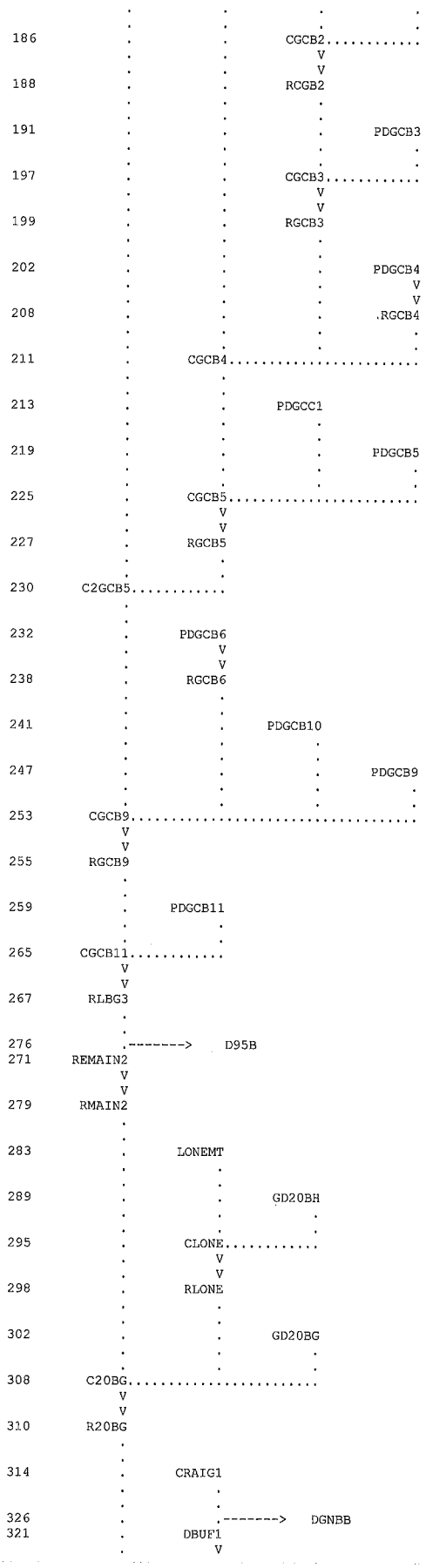

1476          KK   DVWR2
1477          KM  REPEATED FROM UPPER MODEL
1478          KM  24" PIPE RANCHO
1479          DT  DVSTR2
1480          DI       0      10      20      30      37     100     500
1481          DQ       0      10      20      30      37      37      37
              *
```

```
1482          KK     RX5
1483          KM  ROUTE TO 6 X 3 RCB
1484          RM       1     0.1     0.3
              *

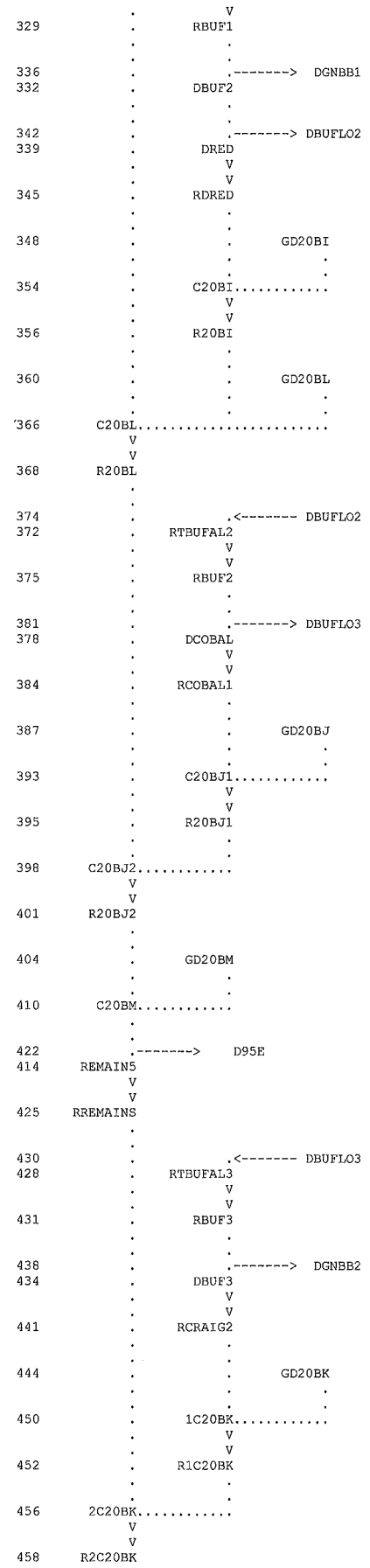
1485          KK   CX4X3
1486          KM  COMBINE X4 TO X3
1487          HC       2
              *
              * KKDVBOX
              * NOT EXPECTED TO SPLIT IN 10 YEAR STORM
              * KMROUTE FLOW THRU 6 X 3 BOX (MEA)  HECRAS STATION 126+38
              * KMLOCATED AT RANCHO NO. DECATUR (END OF PROJECT)
              * DT DVBOX
              * DI     0      50     100     170     210     700    5000
              * DQ     0      50     100     170     210     210     210
              *
1488          ZZ
1
      SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

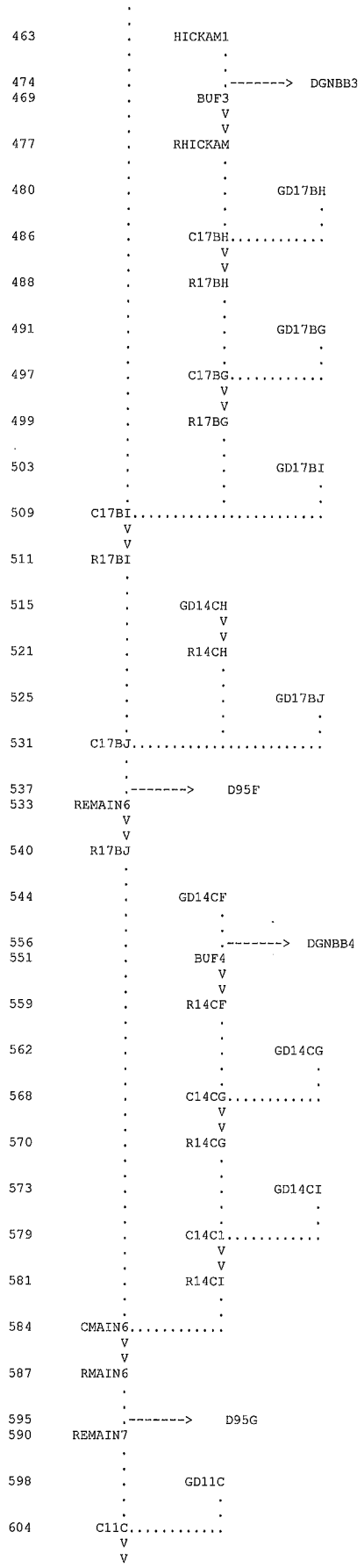
    58         ANN
                 V
                 V
    72         RANN
                 .
                 .
    75           .       GD29B
                 .          .
                 .          .
    81       CGD29B.............
                 V
                 V
    83       RGD29B
                 .
                 .
    88           .     NW1C2-C
                 .          .
                 .          .
    96       CNW1C2.............
                 V
                 V
   100       RNW1C2
                 .
                 .
   103           .      PDGCC3
                 .          .
                 .          .
   110        CGCC3.............
                 V
                 V
   112        RGCC3
                 .
                 .
   120           .-------->    D95A
   115      REMAIN1
                 V
                 V
   123        RLBG1
                 .
                 .
   127           .      PDGCC2
                 .          V
                 .          V
   133           .       RGCC2
                 .          .
                 .          .
   136           .          .      PDGCC4
                 .          .          .
                 .          .          .
   142       CGCC4.........................
                 V
                 V
   147       RLBG2
                 .
                 .
   151           .      HAMMER
                 .          V
                 .          V
   157           .     RHAMMER
                 .          .
                 .          .
   160           .          .       PDGCD
                 .          .          .
                 .          .          .
   166           .      CPDGCD.............
                 .          V
                 .          V
   168           .        RGCD
                 .          .
                 .          .
   171           .          .      PDGCB1
                 .          .          V
                 .          .          V
   177           .          .       RGCB1
                 .          .          .
                 .          .          .
   180           .          .          .      PDGCB2
```



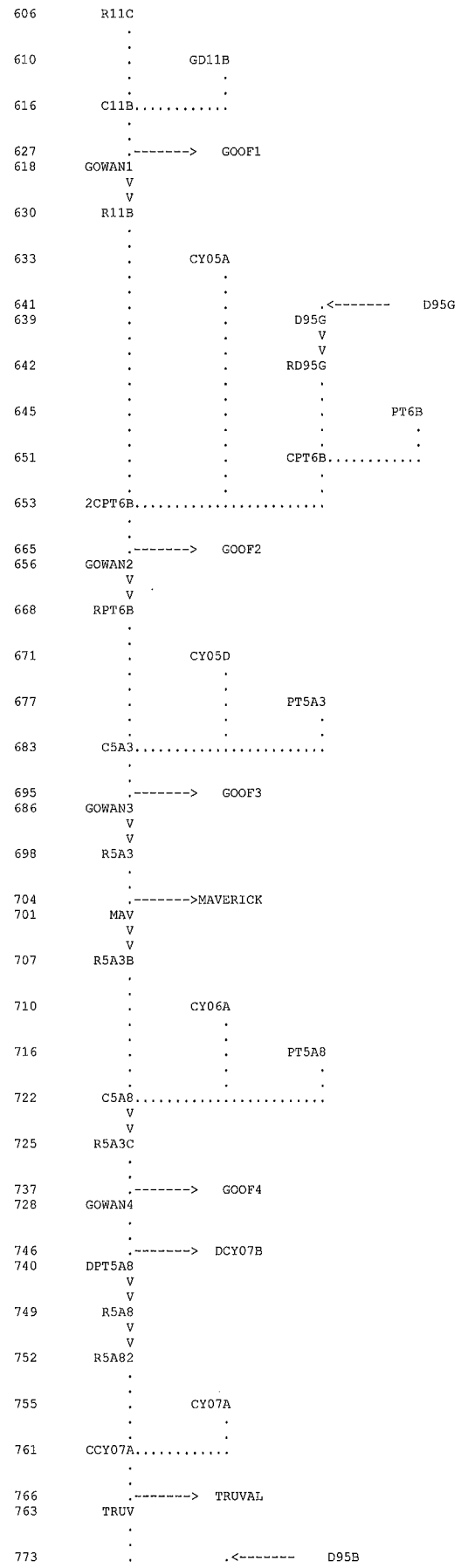
10S3X.OUT, 10-year existing condition, refer to Figure 4

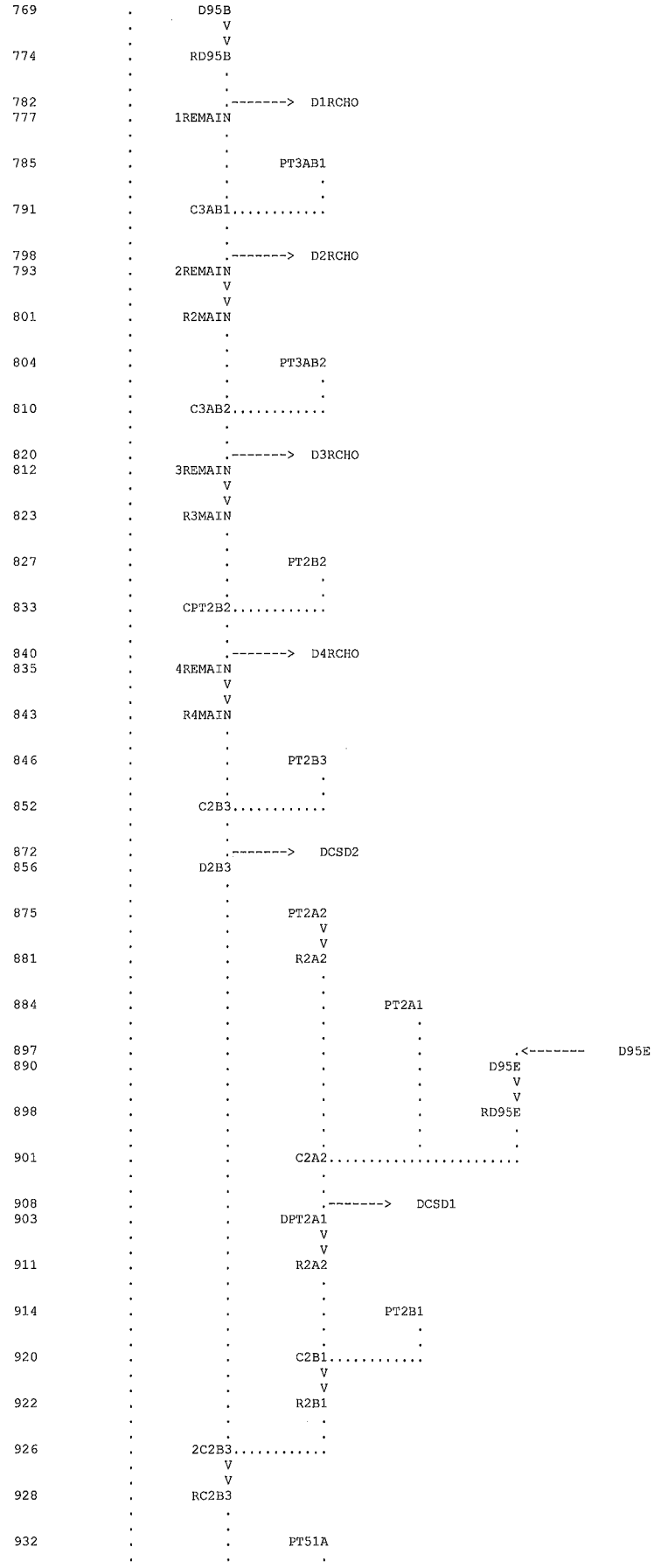


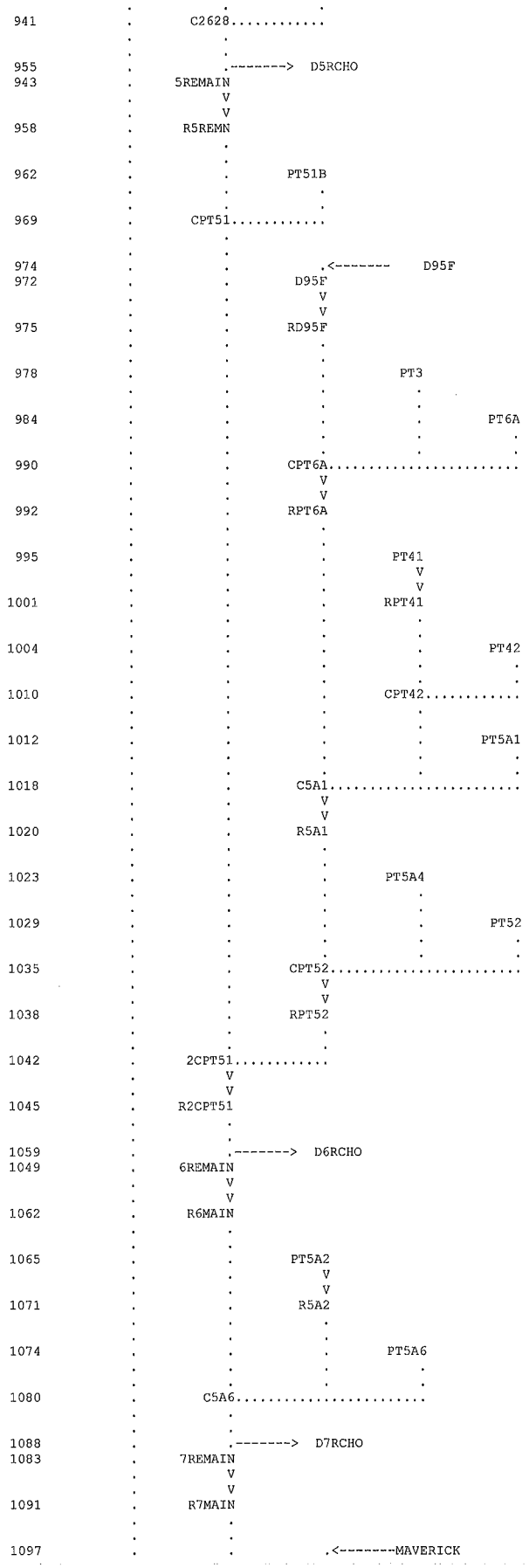
10S3X.OUT, 10-year existing condition, refer to Figure 4

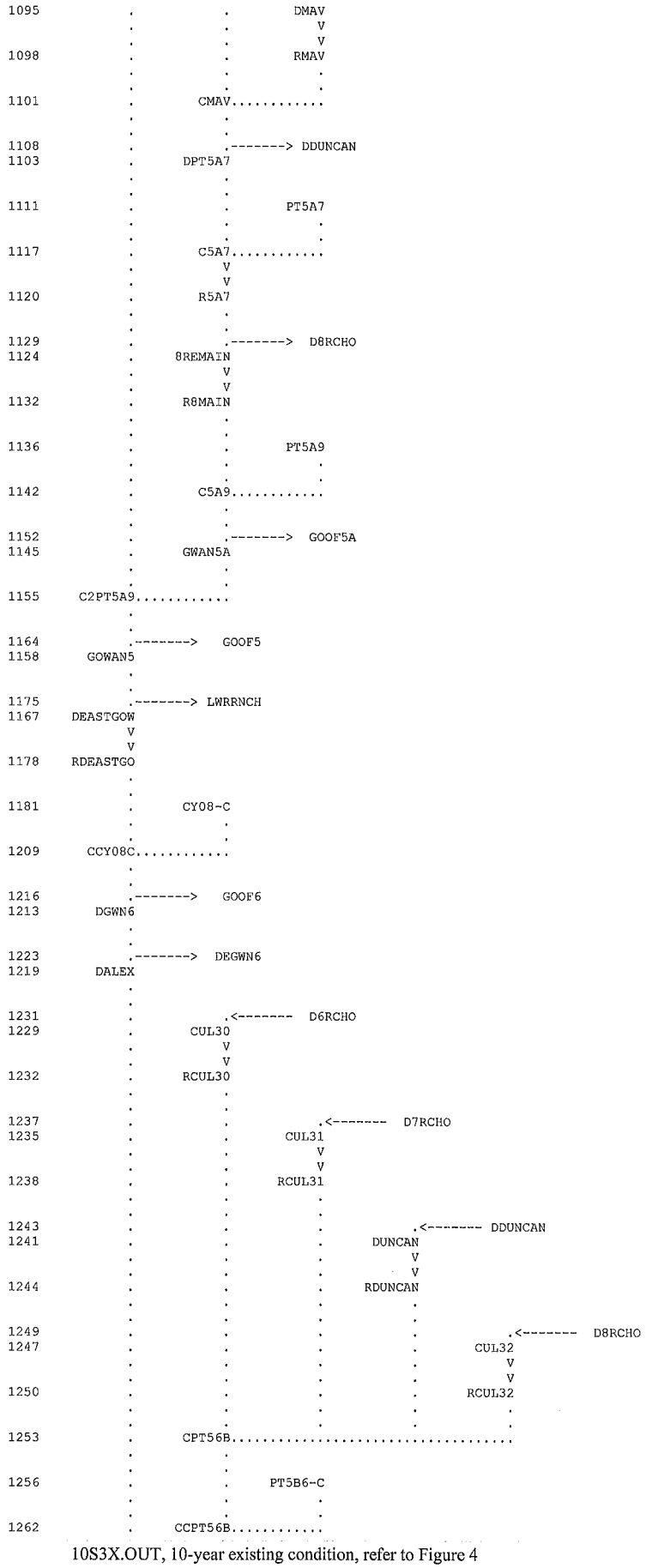


10S3X.OUT, 10-year existing condition, refer to Figure 4

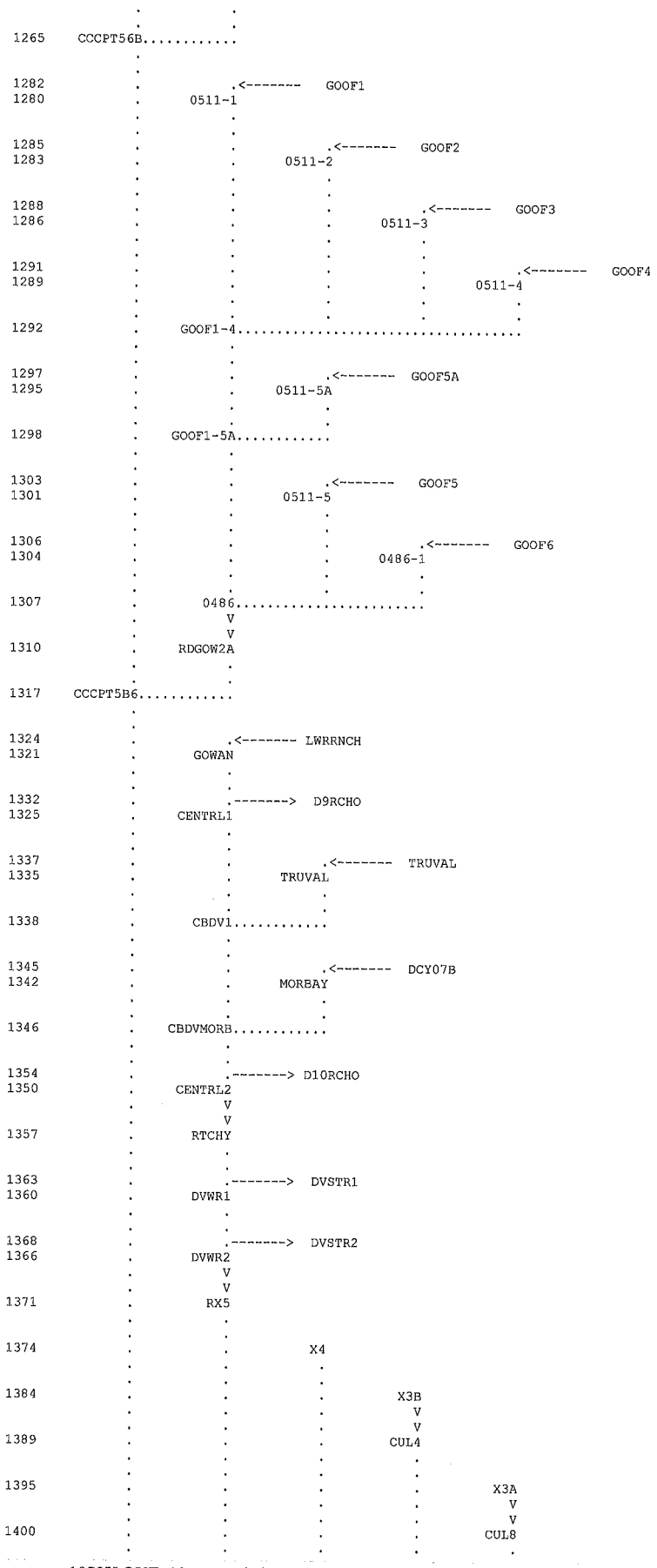

606 R11C
610 GD11B
616 C11B
627 GOOF1
618 GOWAN1
630 R11B
633 CY05A
641 D95G
639 D95G
642 RD95G
645 PT6B
651 CPT6B
653 2CPT6B
665 GOOF2
656 GOWAN2
668 RPT6B
671 CY05D
677 PT5A3
683 C5A3
695 GOOF3
686 GOWAN3
698 R5A3
704 MAVERICK
701 MAV
707 R5A3B
710 CY06A
716 PT5A8
722 C5A8
725 R5A3C
737 GOOF4
728 GOWAN4
746 DCY07B
740 DPT5A8
749 R5A8
752 R5A82
755 CY07A
761 CCY07A
766 TRUVAL
763 TRUV
773 D95B


769 D95B
774 RD95B
782 D1RCHO
777 1REMAIN
785 PT3AB1
791 C3AB1
798 D2RCHO
793 2REMAIN
801 R2MAIN
804 PT3AB2
810 C3AB2
820 D3RCHO
812 3REMAIN
823 R3MAIN
827 PT2B2
833 CPT2B2
840 D4RCHO
835 4REMAIN
843 R4MAIN
846 PT2B3
852 C2B3
872 DCSD2
856 D2B3
875 PT2A2
881 R2A2
884 PT2A1
897 D95E
890 D95E
898 RD95E
901 C2A2
908 DCSD1
903 DPT2A1
911 R2A2
914 PT2B1
920 C2B1
922 R2B1
926 2C2B3
928 RC2B3
932 PT51A

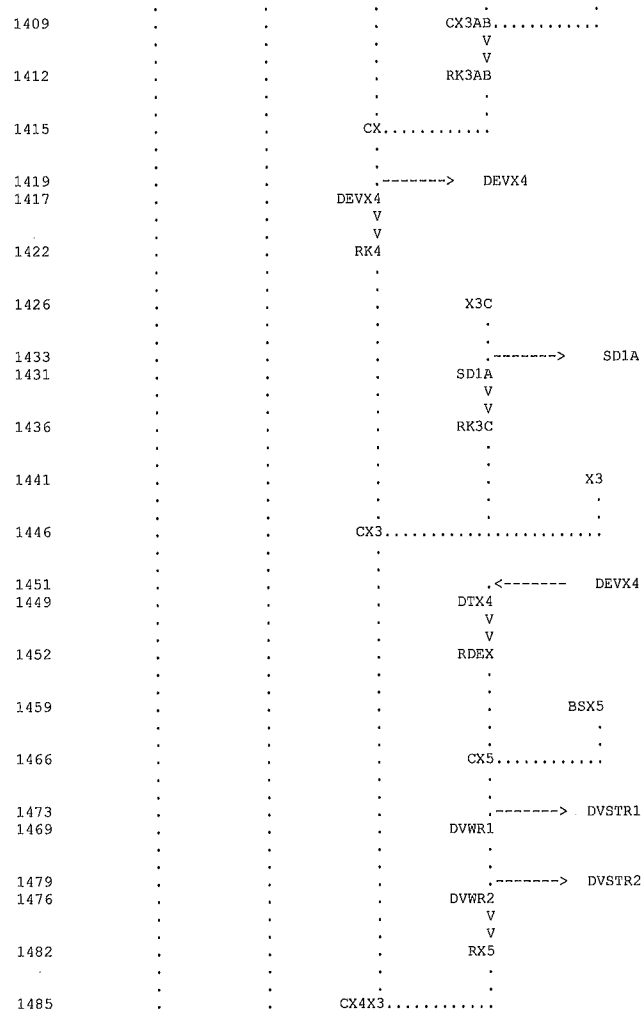

941 C2628
955 D5RCHO
943 5REMAIN
958 R5REMN
962 PT51B
969 CPT51
974 D95F
972 D95F
975 RD95F
978 PT3
984 PT6A
990 CPT6A
992 RPT6A
995 PT41
1001 RPT41
1004 PT42
1010 CPT42
1012 PT5A1
1018 C5A1
1020 R5A1
1023 PT5A4
1029 PT52
1035 CPT52
1038 RPT52
1042 2CPT51
1045 R2CPT51
1059 D6RCHO
1049 6REMAIN
1062 R6MAIN
1065 PT5A2
1071 R5A2
1074 PT5A6
1080 C5A6
1088 D7RCHO
1083 7REMAIN
1091 R7MAIN
1097 MAVERICK



10S3X.OUT, 10-year existing condition, refer to Figure 4



10S3X.OUT, 10-year existing condition, refer to Figure 4



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *              JUN   1998              *
 *           VERSION 4.1                *
 *                                      *
 *  RUN DATE   31MAR14  TIME  21:48:08  *
 *                                      *
 ****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
OFFSITE BASINS, EXISTING CONDITIONS
PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
PREPARED BY STANLEY CONSULTANTS INC. (HM/VF)
INPUT FILE: 10S3X.DAT
DESIGN STORM: 10-YEAR 6-HR
STORM DISTRIBUTION: SDN3
STORM CENTERING: FULL WATERSHED
THIS MODEL DIFFERS FROM 100 YEAR: FLOW DIVERTED TO STORM DRAIN
AT GOWAN/CRAIG

BASED ON:
CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
2008 MASTER PLAN UPDATE (MPU) BY PBS&J
GOWAN WATERSHED (INPUT FILE = ALLGOW3.DAT) AND
CENTRAL WATERSHED (NORTHWESTERN PORTION)

RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009
UPPRSDN3 AND LWRSDN3 HEC-1 MODELS
FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
CONTROL FACILITIES REFERENCED FROM LOMR UNLESS OTHERWISE NOTED

GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
BY G.C. WALLACE (GCW) 2007

PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY

IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
HEC-1 ANALYSIS FOR EXISTING CONDITIONS FILE R00S3X.OUT
BY STANLEY CONSULTANTS, 1/2012

LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
MPU SHOWS THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
(GOEC)

THIS EXISTING CONDITION MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL DRAINAGE
STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
EXISTING CONDITION MODEL AS FOLLOWS:
1. BASIN PT51 OF THE RANCHO STUDY WAS SPLIT INTO PT51A AND PT51B IN ORDER
TO SHOW WHERE FLOW WILL BE COLLECTED BY THE GOWAN OUTFALL - ALEXANDER
ROAD FACILITIES AT ALEXANDER-JONES/RANCHO DRIVE INTERSECTION.
2. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
TO THE EXISTING CONDITION MODEL
3. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE
DARF'S USED IN 2008 MPU HEC-1 ALLGOW3.OUT

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
DARF RATIOS FOR AREAS OF 0, 0.5, 1.0, 2.0, 4.0, 6.0, 8.0 AND 10 SQUARE MILES
FOR THE 100-YEAR EVENT.

```
 55 IO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN           5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME         0000  STARTING TIME
                        NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2    0  ENDING DATE
                    NDTIME         0055  ENDING TIME
                     ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                     NPLAN           1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                RATIOS OF PRECIPITATION
                .57       .56       .55       .53       .52       .51       .50       .49
```

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION							
OPERATION	STATION	AREA	PLAN		RATIO 1 .57	RATIO 2 .56	RATIO 3 .55	RATIO 4 .53	RATIO 5 .52	RATIO 6 .51	RATIO 7 .50	RATIO 8 .49
HYDROGRAPH AT												
+	ANN	.26	1	FLOW	30.	28.	27.	24.	22.	21.	19.	18.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RANN	.26	1	FLOW	30.	28.	27.	23.	22.	20.	19.	18.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.25	4.25
HYDROGRAPH AT												
+	GD29B	.14	1	FLOW	14.	13.	12.	10.	9.	9.	8.	7.
				TIME	3.83	3.83	3.83	3.83	3.83	3.92	3.92	3.92
2 COMBINED AT												
+	CGD29B	.40	1	FLOW	39.	37.	35.	30.	28.	27.	25.	23.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	RGD29B	.40	1	FLOW	39.	37.	35.	30.	28.	26.	25.	23.
				TIME	4.33	4.33	4.33	4.42	4.42	4.42	4.42	4.42
HYDROGRAPH AT												
+	NW1C2-C	.21	1	FLOW	82.	80.	77.	73.	70.	68.	65.	63.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CNW1C2	.60	1	FLOW	89.	84.	80.	73.	70.	68.	65.	63.
				TIME	4.17	4.17	4.17	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RNW1C2	.60	1	FLOW	88.	83.	79.	72.	70.	67.	65.	63.

				TIME	4.17	4.17	4.17	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	PDGCC3	.05	1	FLOW	21.	20.	20.	18.	18.	17.	16.	16.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	CGCC3	.65	1	FLOW	96.	93.	90.	84.	81.	78.	75.	73.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RGCC3	.65	1	FLOW	95.	92.	89.	83.	80.	77.	75.	72.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO												
+	D95A	.65	1	FLOW	94.	91.	88.	82.	79.	76.	74.	71.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	REMAIN1	.65	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.58	3.58	3.58	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	RLBG1	.65	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PDGCC2	.04	1	FLOW	4.	3.	3.	3.	2.	2.	2.	2.
				TIME	3.83	3.83	3.83	3.83	3.92	3.92	3.92	3.92
ROUTED TO												
+	RGCC2	.04	1	FLOW	3.	3.	3.	3.	2.	2.	2.	2.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.42
HYDROGRAPH AT												
+	PDGCC4	.05	1	FLOW	18.	17.	17.	15.	15.	14.	13.	13.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	CGCC4	.74	1	FLOW	19.	18.	18.	16.	16.	15.	14.	14.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	RLBG2	.74	1	FLOW	19.	18.	18.	16.	16.	15.	14.	14.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	HAMMER	.13	1	FLOW	17.	16.	15.	14.	13.	12.	11.	10.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	RHAMMER	.13	1	FLOW	17.	16.	15.	14.	13.	12.	11.	10.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PDGCD	.13	1	FLOW	13.	12.	11.	9.	9.	8.	7.	6.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
2 COMBINED AT												
+	CPDGCD	.26	1	FLOW	29.	27.	25.	22.	20.	19.	17.	16.
				TIME	3.92	3.92	3.92	3.92	4.00	4.00	4.00	4.00
ROUTED TO												
+	RGCD	.26	1	FLOW	28.	27.	25.	21.	20.	19.	17.	16.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	PDGCB1	.03	1	FLOW	14.	13.	13.	12.	11.	11.	10.	10.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO												
+	RGCB1	.03	1	FLOW	13.	13.	12.	11.	11.	10.	10.	9.
				TIME	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PDGCB2	.03	1	FLOW	8.	8.	8.	7.	7.	6.	6.	6.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	CGCB2	.06	1	FLOW	21.	20.	20.	18.	17.	16.	15.	15.
				TIME	3.67	3.67	3.67	3.67	3.67	3.75	3.75	3.75
ROUTED TO												
+	RCGB2	.06	1	FLOW	21.	20.	19.	18.	17.	16.	15.	14.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PDGCB3	.07	1	FLOW	6.	6.	5.	4.	4.	4.	3.	3.
				TIME	3.75	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CGCB3	.13	1	FLOW	27.	26.	24.	22.	21.	19.	18.	17.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	RGCB3	.13	1	FLOW	26.	25.	24.	22.	20.	19.	18.	17.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PDGCB4	.02	1	FLOW	8.	8.	8.	7.	7.	6.	6.	6.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67

ROUTED TO												
+	RGCB4	.02	1	FLOW	8.	8.	7.	7.	7.	6.	6.	6.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	CGCB4	.41	1	FLOW	52.	49.	45.	38.	35.	33.	30.	28.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.17	4.17
HYDROGRAPH AT												
+	PDGCC1	.05	1	FLOW	6.	6.	6.	5.	5.	4.	4.	4.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PDGCB5	.11	1	FLOW	12.	12.	11.	10.	9.	8.	8.	7.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
3 COMBINED AT												
+	CGCB5	.57	1	FLOW	69.	65.	60.	50.	46.	43.	39.	36.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.17
ROUTED TO												
+	RGCB5	.57	1	FLOW	66.	62.	59.	49.	45.	42.	39.	36.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.33
2 COMBINED AT												
+	C2GCB5	1.31	1	FLOW	73.	71.	65.	54.	52.	48.	44.	40.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.33
HYDROGRAPH AT												
+	PDGCB6	.02	1	FLOW	9.	9.	9.	8.	8.	8.	7.	7.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO												
+	RGCB6	.02	1	FLOW	9.	9.	9.	8.	8.	7.	7.	7.
				TIME	3.83	3.92	3.92	3.92	3.92	3.92	4.00	3.92
HYDROGRAPH AT												
+	PDGCB10	.07	1	FLOW	23.	22.	21.	19.	18.	18.	17.	16.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PDGCB9	.03	1	FLOW	6.	5.	5.	4.	4.	4.	3.	3.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.67	3.67
4 COMBINED AT												
+	CGCB9	1.43	1	FLOW	93.	87.	82.	72.	67.	63.	61.	55.
				TIME	4.08	4.08	4.08	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RGCB9	1.43	1	FLOW	93.	87.	82.	71.	66.	62.	59.	54.
				TIME	4.08	4.08	4.08	4.00	4.08	4.00	4.00	4.08
HYDROGRAPH AT												
+	PDGCB11	.03	1	FLOW	7.	7.	7.	6.	6.	5.	5.	5.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	CGCB11	1.47	1	FLOW	96.	90.	84.	74.	69.	65.	62.	56.
				TIME	4.08	4.08	4.08	4.00	4.00	4.00	4.00	4.08
ROUTED TO												
+	RLBG3	1.47	1	FLOW	95.	90.	84.	74.	68.	64.	61.	56.
				TIME	4.08	4.08	4.08	4.00	4.08	4.08	4.08	4.08
DIVERSION TO												
+	D95B	1.47	1	FLOW	38.	35.	33.	29.	27.	25.	24.	22.
				TIME	4.08	4.08	4.08	4.00	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	REMAIN2	1.47	1	FLOW	58.	54.	51.	45.	41.	39.	37.	34.
				TIME	4.08	4.08	4.08	4.00	4.08	4.08	4.08	4.08
ROUTED TO												
+	RMAIN2	1.47	1	FLOW	58.	54.	51.	44.	41.	39.	37.	34.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	LONEMT	.41	1	FLOW	100.	96.	92.	84.	80.	76.	72.	69.
				TIME	3.83	3.83	3.83	3.83	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	GD20BH	.05	1	FLOW	7.	6.	6.	5.	5.	5.	4.	4.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.83	3.83
2 COMBINED AT												
+	CLONE	.46	1	FLOW	106.	102.	97.	89.	85.	80.	76.	72.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
ROUTED TO												
+	RLONE	.46	1	FLOW	105.	101.	97.	88.	84.	80.	76.	72.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	GD20BG	.11	1	FLOW	28.	27.	26.	23.	22.	21.	20.	19.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	C20BG	2.04	1	FLOW	172.	163.	156.	139.	132.	124.	117.	110.
				TIME	3.92	4.00	4.00	4.00	3.92	3.92	3.92	3.92
ROUTED TO												
+	R20BG	2.04	1	FLOW	172.	163.	155.	139.	131.	123.	116.	110.

				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	CRAIG1	2.44	1	FLOW	502.	482.	463.	425.	406.	388.	370.	352.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO												
+	DGNBB	2.44	1	FLOW	249.	249.	249.	249.	249.	249.	249.	249.
				TIME	3.83	3.83	3.83	3.83	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	DBUF1	2.44	1	FLOW	253.	233.	214.	176.	157.	139.	121.	103.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RBUF1	2.44	1	FLOW	252.	232.	213.	175.	156.	137.	119.	100.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO												
+	DGNBB1	2.44	1	FLOW	109.	109.	109.	109.	109.	109.	109.	99.
				TIME	4.00	4.00	4.00	4.08	4.08	4.17	4.25	4.25
HYDROGRAPH AT												
+	DBUF2	2.44	1	FLOW	143.	123.	104.	66.	47.	28.	10.	1.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO												
+	DBUFLO2	2.44	1	FLOW	101.	87.	73.	46.	33.	20.	7.	1.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	DRED	2.44	1	FLOW	42.	37.	31.	19.	14.	8.	3.	0.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RDRED	2.44	1	FLOW	41.	35.	30.	19.	13.	8.	3.	0.
				TIME	4.33	4.33	4.42	4.42	4.50	4.58	4.67	5.33
HYDROGRAPH AT												
+	GD20BI	.12	1	FLOW	25.	24.	23.	20.	19.	18.	17.	16.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.83	3.83
2 COMBINED AT												
+	C20BI	2.56	1	FLOW	50.	43.	36.	25.	19.	18.	17.	16.
				TIME	4.33	4.33	4.42	4.42	3.75	3.75	3.83	3.83
ROUTED TO												
+	R20BI	2.56	1	FLOW	49.	43.	36.	24.	19.	18.	17.	16.
				TIME	4.42	4.42	4.42	4.50	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	GD20BL	.08	1	FLOW	39.	38.	37.	34.	33.	32.	31.	30.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C20BL	4.67	1	FLOW	207.	197.	188.	169.	161.	153.	144.	134.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	R20BL	4.67	1	FLOW	205.	195.	187.	168.	159.	151.	142.	134.
				TIME	4.08	4.08	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	RTBUFAL2	.00	1	FLOW	101.	87.	73.	46.	33.	20.	7.	1.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RBUF2	.00	1	FLOW	99.	85.	71.	44.	31.	19.	7.	1.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.50
DIVERSION TO												
+	DBUFLO3	.00	1	FLOW	71.	61.	51.	32.	23.	13.	5.	0.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.50
HYDROGRAPH AT												
+	DCOBAL	.00	1	FLOW	28.	24.	20.	13.	9.	5.	2.	0.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.50
ROUTED TO												
+	RCOBAL1	.00	1	FLOW	28.	24.	20.	13.	9.	5.	1.	0.
				TIME	4.42	4.42	4.42	4.50	4.50	4.67	4.83	5.58
HYDROGRAPH AT												
+	GD20BJ	.05	1	FLOW	17.	16.	16.	14.	14.	13.	13.	12.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	C20BJ1	.05	1	FLOW	32.	28.	24.	16.	14.	13.	13.	12.
				TIME	4.42	4.42	4.42	4.50	3.75	3.75	3.75	3.75
ROUTED TO												
+	R20BJ1	.05	1	FLOW	31.	27.	23.	16.	14.	13.	12.	12.
				TIME	4.42	4.50	4.50	4.58	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	C20BJ2	4.72	1	FLOW	223.	205.	198.	176.	167.	158.	149.	141.
				TIME	4.33	4.00	4.00	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R20BJ2	4.72	1	FLOW	222.	204.	196.	176.	167.	158.	149.	140.
				TIME	4.33	4.08	4.00	4.08	4.08	4.08	4.08	4.08

HYDROGRAPH AT												
+	GD20BM	.05	1	FLOW	26.	25.	25.	23.	22.	21.	21.	20.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	C20BM	4.77	1	FLOW	226.	214.	205.	183.	174.	165.	156.	147.
				TIME	4.33	4.00	4.00	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	D95E	4.77	1	FLOW	21.	19.	18.	15.	15.	14.	13.	12.
				TIME	4.33	4.00	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	REMAIN5	4.77	1	FLOW	205.	195.	188.	168.	159.	151.	143.	134.
				TIME	4.33	4.00	4.00	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RREMAINS	4.77	1	FLOW	203.	194.	186.	167.	159.	150.	141.	133.
				TIME	4.33	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	RTBUFAL3	.00	1	FLOW	71.	61.	51.	32.	23.	13.	5.	0.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.50
ROUTED TO												
+	RBUF3	.00	1	FLOW	70.	60.	50.	31.	22.	12.	4.	0.
				TIME	4.33	4.33	4.33	4.33	4.33	4.42	4.42	4.75
DIVERSION TO												
+	DGNBB2	.00	1	FLOW	69.	60.	50.	31.	22.	12.	4.	0.
				TIME	4.33	4.33	4.33	4.33	4.33	4.42	4.42	4.75
HYDROGRAPH AT												
+	DBUF3	.00	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	4.33	4.33	4.33	4.33	4.33	4.42	4.42	4.75
ROUTED TO												
+	RCRAIG2	.00	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	5.58	5.67	5.75	6.08	6.42	7.00	8.42	13.50
HYDROGRAPH AT												
+	GD20BK	.05	1	FLOW	11.	11.	10.	9.	9.	8.	8.	7.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	1C20BK	.05	1	FLOW	11.	11.	10.	9.	9.	8.	8.	7.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R1C20BK	.05	1	FLOW	11.	11.	10.	9.	9.	8.	8.	7.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.92	3.92
2 COMBINED AT												
+	2C20BK	4.82	1	FLOW	211.	201.	193.	174.	165.	156.	147.	138.
				TIME	4.00	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R2C20BK	4.82	1	FLOW	211.	201.	193.	173.	163.	154.	145.	136.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.17
HYDROGRAPH AT												
+	HICKAM1	.48	1	FLOW	87.	83.	79.	72.	68.	65.	61.	57.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO												
+	DGNBB3	.48	1	FLOW	86.	83.	79.	71.	68.	64.	60.	57.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	BUF3	.48	1	FLOW	1.	1.	1.	1.	1.	1.	0.	0.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RHICKAM	.48	1	FLOW	1.	1.	1.	1.	1.	1.	0.	0.
				TIME	4.42	4.42	4.42	4.42	4.50	4.50	4.50	4.50
HYDROGRAPH AT												
+	GD17BH	.03	1	FLOW	8.	8.	7.	7.	7.	6.	6.	6.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C17BH	.50	1	FLOW	8.	8.	7.	7.	7.	6.	6.	6.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R17BH	.50	1	FLOW	8.	8.	7.	7.	6.	6.	6.	6.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	GD17BG	.12	1	FLOW	34.	32.	31.	28.	27.	26.	25.	23.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	C17BG	.62	1	FLOW	42.	39.	37.	35.	33.	31.	30.	28.
				TIME	3.75	3.75	3.75	3.75	3.75	3.83	3.75	3.83
ROUTED TO												
+	R17BG	.62	1	FLOW	41.	39.	37.	34.	32.	31.	29.	28.
				TIME	3.83	3.83	3.83	3.83	3.83	3.92	3.92	3.92
HYDROGRAPH AT												
+	GD17BI	.07	1	FLOW	26.	25.	24.	22.	21.	21.	20.	19.

				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C17BI	5.51	1	FLOW	251.	238.	229.	205.	195.	184.	174.	163.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R17BI	5.51	1	FLOW	248.	237.	228.	204.	193.	181.	171.	161.
				TIME	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.25
HYDROGRAPH AT												
+	GD14CH	.04	1	FLOW	13.	13.	12.	11.	11.	10.	10.	9.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R14CH	.04	1	FLOW	13.	13.	12.	11.	10.	10.	10.	9.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	GD17BJ	.06	1	FLOW	31.	30.	29.	27.	26.	25.	24.	23.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C17BJ	5.61	1	FLOW	266.	252.	243.	217.	205.	193.	183.	170.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
DIVERSION TO												
+	D95F	5.61	1	FLOW	36.	34.	33.	29.	27.	25.	23.	22.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	REMAIN6	5.61	1	FLOW	230.	218.	210.	188.	179.	168.	159.	149.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	R17BJ	5.61	1	FLOW	229.	217.	209.	188.	178.	168.	159.	148.
				TIME	4.08	4.17	4.08	4.17	4.17	4.17	4.17	4.25
HYDROGRAPH AT												
+	GD14CF	.13	1	FLOW	21.	20.	19.	17.	16.	15.	14.	13.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO												
+	DGNBB4	.13	1	FLOW	20.	19.	18.	16.	15.	14.	13.	13.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	BUF4	.13	1	FLOW	1.	1.	1.	1.	1.	0.	0.	0.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	R14CF	.13	1	FLOW	1.	1.	1.	1.	1.	0.	0.	0.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33
HYDROGRAPH AT												
+	GD14CG	.06	1	FLOW	17.	16.	15.	14.	13.	13.	12.	11.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C14CG	.19	1	FLOW	17.	16.	15.	14.	13.	13.	12.	11.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R14CG	.19	1	FLOW	16.	15.	15.	14.	13.	12.	12.	11.
				TIME	3.75	3.83	3.75	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	GD14CI	.05	1	FLOW	13.	12.	11.	10.	10.	9.	9.	8.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C14C1	.24	1	FLOW	28.	27.	26.	23.	21.	20.	19.	18.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R14CI	.24	1	FLOW	27.	26.	25.	23.	21.	20.	19.	18.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CMAIN6	5.85	1	FLOW	246.	233.	225.	200.	190.	179.	170.	158.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	RMAIN6	5.85	1	FLOW	244.	233.	224.	198.	188.	178.	168.	158.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
DIVERSION TO												
+	D95G	5.85	1	FLOW	68.	67.	67.	65.	65.	64.	64.	63.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	REMAIN7	5.85	1	FLOW	176.	165.	157.	133.	123.	114.	105.	95.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	GD11C	.13	1	FLOW	47.	45.	44.	41.	39.	37.	36.	34.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	C11C	5.98	1	FLOW	198.	187.	178.	152.	140.	128.	119.	108.
				TIME	4.08	4.17	4.17	4.17	4.17	4.17	4.25	4.25

ROUTED TO												
+	R11C	5.98	1	FLOW	198.	184.	176.	151.	139.	128.	117.	107.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.33	4.33
HYDROGRAPH AT												
+	GD11B	.20	1	FLOW	82.	79.	77.	71.	69.	66.	64.	61.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	C11B	6.18	1	FLOW	231.	217.	205.	175.	162.	150.	138.	126.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
DIVERSION TO												
+	GOOF1	6.18	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	GOWAN1	6.18	1	FLOW	229.	214.	202.	173.	159.	148.	136.	124.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
ROUTED TO												
+	R11B	6.18	1	FLOW	228.	213.	200.	172.	159.	147.	135.	123.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	CY05A	.03	1	FLOW	10.	10.	10.	9.	9.	8.	8.	8.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.67
HYDROGRAPH AT												
+	D95G	.00	1	FLOW	68.	67.	67.	65.	65.	64.	64.	63.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
ROUTED TO												
+	RD95G	.00	1	FLOW	68.	67.	67.	65.	65.	64.	64.	63.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT												
+	PT6B	.11	1	FLOW	59.	57.	55.	52.	50.	48.	47.	45.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	CPT6B	.11	1	FLOW	88.	88.	84.	81.	79.	78.	76.	75.
				TIME	3.92	3.92	4.00	4.00	4.00	4.00	4.08	4.08
3 COMBINED AT												
+	2CPT6B	6.31	1	FLOW	311.	295.	282.	250.	235.	222.	209.	196.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO												
+	GOOF2	6.31	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT												
+	GOWAN2	6.31	1	FLOW	309.	293.	280.	248.	233.	220.	207.	194.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	RPT6B	6.31	1	FLOW	308.	291.	278.	247.	233.	219.	206.	194.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	CY05D	.06	1	FLOW	11.	10.	10.	9.	8.	8.	7.	7.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT5A3	.09	1	FLOW	35.	34.	33.	31.	30.	28.	27.	26.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	C5A3	6.46	1	FLOW	328.	311.	296.	263.	248.	235.	220.	206.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO												
+	GOOF3	6.46	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.42	3.42	3.42	3.42	3.50	3.50	3.50	3.50
HYDROGRAPH AT												
+	GOWAN3	6.46	1	FLOW	326.	309.	294.	261.	246.	233.	218.	204.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	R5A3	6.46	1	FLOW	325.	308.	293.	260.	245.	231.	217.	204.
				TIME	4.17	4.17	4.17	4.25	4.25	4.17	4.25	4.25
DIVERSION TO												
+	MAVERICK	6.46	1	FLOW	12.	11.	11.	10.	9.	9.	9.	8.
				TIME	4.17	4.17	4.17	4.25	4.25	4.17	4.25	4.25
HYDROGRAPH AT												
+	MAV	6.46	1	FLOW	313.	296.	282.	250.	236.	222.	209.	196.
				TIME	4.17	4.17	4.17	4.25	4.25	4.17	4.25	4.25
ROUTED TO												
+	R5A3B	6.46	1	FLOW	312.	295.	281.	250.	235.	222.	209.	196.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	CY06A	.08	1	FLOW	25.	24.	23.	21.	20.	19.	18.	17.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT5A8	.03	1	FLOW	7.	6.	6.	5.	5.	5.	5.	4.

				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	C5A8	6.56	1	FLOW	324.	307.	292.	259.	244.	231.	216.	203.
				TIME	4.17	4.17	4.17	4.17	4.25	4.17	4.25	4.25
ROUTED TO												
+	R5A3C	6.56	1	FLOW	323.	306.	291.	259.	244.	230.	216.	203.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
DIVERSION TO												
+	GOOF4	6.56	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	GOWAN4	6.56	1	FLOW	321.	304.	289.	257.	242.	228.	214.	201.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
DIVERSION TO												
+	DCY07B	6.56	1	FLOW	64.	59.	55.	45.	41.	37.	33.	29.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	DPT5A8	6.56	1	FLOW	257.	245.	234.	211.	201.	191.	181.	172.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	R5A8	6.56	1	FLOW	256.	244.	234.	211.	200.	191.	180.	171.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	R5A82	6.56	1	FLOW	256.	244.	233.	210.	199.	190.	180.	171.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33
HYDROGRAPH AT												
+	CY07A	.03	1	FLOW	11.	10.	10.	9.	9.	9.	8.	8.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	CCY07A	6.59	1	FLOW	258.	247.	236.	213.	201.	192.	182.	172.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
DIVERSION TO												
+	TRUVAL	6.59	1	FLOW	13.	12.	11.	9.	8.	8.	7.	7.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
HYDROGRAPH AT												
+	TRUV	6.59	1	FLOW	245.	235.	225.	204.	193.	184.	174.	166.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
HYDROGRAPH AT												
+	D95B	.00	1	FLOW	38.	35.	33.	29.	27.	25.	24.	22.
				TIME	4.08	4.08	4.08	4.00	4.08	4.08	4.08	4.08
ROUTED TO												
+	RD95B	.00	1	FLOW	37.	35.	33.	29.	27.	25.	24.	22.
				TIME	4.17	4.17	4.17	4.08	4.17	4.08	4.17	4.17
DIVERSION TO												
+	D1RCHO	.00	1	FLOW	7.	7.	6.	5.	5.	5.	4.	4.
				TIME	4.17	4.17	4.17	4.08	4.17	4.08	4.17	4.17
HYDROGRAPH AT												
+	1REMAIN	.00	1	FLOW	30.	29.	27.	24.	22.	20.	19.	18.
				TIME	4.17	4.17	4.17	4.08	4.17	4.08	4.17	4.17
HYDROGRAPH AT												
+	PT3AB1	.05	1	FLOW	31.	30.	29.	28.	27.	26.	26.	25.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
2 COMBINED AT												
+	C3AB1	.05	1	FLOW	48.	46.	45.	42.	40.	39.	37.	36.
				TIME	3.92	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	D2RCHO	.05	1	FLOW	7.	7.	7.	6.	6.	6.	6.	5.
				TIME	3.92	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	2REMAIN	.05	1	FLOW	41.	39.	38.	35.	34.	33.	31.	30.
				TIME	3.92	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R2MAIN	.05	1	FLOW	41.	39.	37.	35.	34.	32.	31.	29.
				TIME	4.00	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PT3AB2	.05	1	FLOW	39.	38.	37.	35.	34.	33.	32.	31.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	C3AB2	.10	1	FLOW	68.	67.	64.	60.	58.	55.	54.	51.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	D3RCHO	.10	1	FLOW	68.	66.	64.	60.	58.	55.	54.	51.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	3REMAIN	.10	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75

ROUTED TO												
+	R3MAIN	.10	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	PT2B2	.08	1	FLOW	32.	31.	30.	28.	27.	26.	25.	24.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	CPT2B2	.18	1	FLOW	32.	31.	30.	28.	27.	26.	25.	24.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO												
+	D4RCHO	.18	1	FLOW	5.	5.	5.	5.	4.	4.	4.	4.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	4REMAIN	.18	1	FLOW	27.	26.	25.	23.	22.	21.	21.	20.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R4MAIN	.18	1	FLOW	26.	25.	25.	23.	22.	21.	21.	20.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PT2B3	.02	1	FLOW	15.	15.	15.	14.	14.	13.	13.	12.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C2B3	.20	1	FLOW	40.	39.	38.	35.	34.	33.	31.	30.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	DCSD2	.20	1	FLOW	39.	38.	37.	34.	33.	32.	30.	29.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	D2B3	.20	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT2A2	.06	1	FLOW	22.	22.	21.	19.	18.	18.	17.	16.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R2A2	.06	1	FLOW	22.	21.	20.	19.	18.	17.	16.	15.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT2A1	.06	1	FLOW	24.	23.	23.	21.	20.	19.	19.	18.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	D95E	.00	1	FLOW	21.	19.	18.	15.	15.	14.	13.	12.
				TIME	4.33	4.00	4.00	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RD95E	.00	1	FLOW	21.	19.	17.	15.	15.	14.	13.	12.
				TIME	4.42	4.17	4.17	4.17	4.17	4.17	4.17	4.25
3 COMBINED AT												
+	C2A2	.13	1	FLOW	53.	51.	49.	45.	43.	41.	39.	38.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO												
+	DCSD1	.13	1	FLOW	52.	50.	48.	44.	42.	40.	38.	37.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	DPT2A1	.13	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.67	3.67
ROUTED TO												
+	R2A2	.13	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	4.17	4.17	4.08	4.08	4.08	4.17	4.17	4.25
HYDROGRAPH AT												
+	PT2B1	.07	1	FLOW	26.	25.	24.	22.	21.	20.	19.	18.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C2B1	.20	1	FLOW	26.	25.	24.	22.	21.	20.	19.	18.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R2B1	.20	1	FLOW	25.	24.	23.	21.	20.	19.	19.	18.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	2C2B3	.40	1	FLOW	26.	25.	24.	22.	21.	20.	19.	19.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
ROUTED TO												
+	RC2B3	.40	1	FLOW	26.	25.	24.	22.	21.	20.	19.	18.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PT51A	.04	1	FLOW	29.	28.	27.	26.	25.	24.	24.	23.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	C2628	.43	1	FLOW	41.	39.	38.	35.	33.	31.	30.	29.

				TIME	3.75	3.75	3.75	3.75	3.75	3.83	3.83	3.83
DIVERSION TO												
+	D5RCHO	.43	1	FLOW	25.	24.	23.	21.	20.	19.	18.	17.
				TIME	3.75	3.75	3.75	3.75	3.75	3.83	3.83	3.83
HYDROGRAPH AT												
+	5REMAIN	.43	1	FLOW	16.	15.	15.	14.	13.	12.	12.	11.
				TIME	3.75	3.75	3.75	3.75	3.75	3.83	3.83	3.83
ROUTED TO												
+	R5REMN	.43	1	FLOW	16.	15.	14.	13.	13.	12.	11.	11.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PT51B	.04	1	FLOW	28.	27.	27.	25.	25.	24.	23.	22.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	CPT51	.47	1	FLOW	39.	38.	37.	35.	34.	33.	32.	31.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	D95F	.00	1	FLOW	36.	34.	33.	29.	27.	25.	23.	22.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	RD95F	.00	1	FLOW	36.	34.	32.	28.	27.	25.	23.	21.
				TIME	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.33
HYDROGRAPH AT												
+	PT3	.15	1	FLOW	65.	63.	61.	57.	55.	53.	51.	48.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	PT6A	.02	1	FLOW	13.	13.	13.	12.	11.	11.	11.	10.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	CPT6A	.17	1	FLOW	80.	77.	74.	69.	67.	64.	62.	59.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	RPT6A	.17	1	FLOW	78.	76.	73.	68.	66.	63.	61.	58.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT41	.14	1	FLOW	39.	37.	35.	32.	31.	29.	27.	26.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	RPT41	.14	1	FLOW	38.	37.	35.	32.	30.	29.	27.	26.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT42	.08	1	FLOW	19.	18.	18.	16.	15.	14.	14.	13.
				TIME	3.75	3.75	3.75	3.75	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CPT42	.22	1	FLOW	57.	55.	53.	48.	45.	43.	41.	39.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT5A1	.05	1	FLOW	24.	23.	23.	21.	20.	20.	19.	18.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C5A1	.44	1	FLOW	158.	153.	147.	136.	131.	124.	120.	114.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R5A1	.44	1	FLOW	154.	148.	143.	132.	127.	122.	117.	111.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PT5A4	.03	1	FLOW	9.	8.	8.	7.	7.	6.	6.	6.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT52	.06	1	FLOW	17.	16.	15.	14.	13.	13.	12.	11.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	CPT52	.54	1	FLOW	178.	172.	165.	152.	146.	140.	134.	128.
				TIME	3.75	3.75	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RPT52	.54	1	FLOW	178.	171.	165.	152.	146.	139.	133.	127.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	2CPT51	1.01	1	FLOW	207.	200.	192.	178.	171.	163.	156.	149.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	R2CPT51	1.01	1	FLOW	207.	199.	191.	176.	169.	161.	154.	146.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO												
+	D6RCHO	1.01	1	FLOW	57.	57.	56.	55.	54.	53.	53.	52.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83

HYDROGRAPH AT												
+	6REMAIN	1.01	1	FLOW	149.	142.	135.	121.	115.	108.	101.	94.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	R6MAIN	1.01	1	FLOW	144.	137.	130.	118.	112.	105.	99.	93.
				TIME	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	PT5A2	.08	1	FLOW	29.	28.	27.	25.	24.	23.	22.	22.
				TIME	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R5A2	.08	1	FLOW	29.	28.	27.	25.	24.	23.	22.	21.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	PT5A6	.19	1	FLOW	61.	58.	56.	51.	49.	46.	44.	42.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C5A6	1.27	1	FLOW	217.	208.	196.	174.	168.	157.	148.	139.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.92	3.92
DIVERSION TO												
+	D7RCHO	1.27	1	FLOW	109.	108.	107.	105.	104.	103.	102.	101.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.92	3.92
HYDROGRAPH AT												
+	7REMAIN	1.27	1	FLOW	109.	100.	89.	70.	64.	54.	46.	38.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.92	3.92
ROUTED TO												
+	R7MAIN	1.27	1	FLOW	104.	96.	87.	69.	63.	54.	44.	35.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
HYDROGRAPH AT												
+	DMAV	.00	1	FLOW	12.	11.	11.	10.	9.	9.	9.	8.
				TIME	4.17	4.17	4.17	4.25	4.25	4.17	4.25	4.25
ROUTED TO												
+	RMAV	.00	1	FLOW	12.	11.	11.	10.	9.	9.	8.	8.
				TIME	4.42	4.42	4.42	4.42	4.50	4.50	4.50	4.50
2 COMBINED AT												
+	CMAV	1.27	1	FLOW	105.	97.	87.	69.	63.	54.	44.	35.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
DIVERSION TO												
+	DDUNCAN	1.27	1	FLOW	25.	23.	21.	17.	15.	13.	11.	8.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
HYDROGRAPH AT												
+	DPT5A7	1.27	1	FLOW	80.	74.	66.	53.	48.	41.	34.	27.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
HYDROGRAPH AT												
+	PT5A7	.07	1	FLOW	21.	20.	20.	18.	17.	16.	16.	15.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	C5A7	1.35	1	FLOW	100.	93.	85.	70.	64.	57.	49.	40.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
ROUTED TO												
+	R5A7	1.35	1	FLOW	98.	91.	82.	66.	60.	54.	47.	39.
				TIME	3.92	3.92	3.92	4.00	4.00	4.00	4.00	4.00
DIVERSION TO												
+	D8RCHO	1.35	1	FLOW	23.	23.	23.	23.	23.	23.	23.	23.
				TIME	3.75	3.75	3.83	3.83	3.83	3.83	3.92	3.92
HYDROGRAPH AT												
+	8REMAIN	1.35	1	FLOW	75.	68.	59.	43.	37.	31.	24.	16.
				TIME	3.92	3.92	3.92	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	R8MAIN	1.35	1	FLOW	72.	65.	58.	43.	36.	28.	22.	16.
				TIME	4.00	4.00	4.00	4.00	4.00	4.08	4.08	4.08
HYDROGRAPH AT												
+	PT5A9	.05	1	FLOW	17.	16.	16.	14.	14.	13.	13.	12.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C5A9	1.39	1	FLOW	82.	75.	67.	51.	44.	34.	28.	21.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
DIVERSION TO												
+	GOOF5A	1.39	1	FLOW	40.	40.	40.	40.	40.	34.	28.	21.
				TIME	3.83	3.92	3.92	4.00	4.00	4.00	4.08	4.08
HYDROGRAPH AT												
+	GWAN5A	1.39	1	FLOW	42.	35.	27.	11.	4.	0.	0.	0.
				TIME	4.00	4.00	4.00	4.00	4.00	.00	.00	.00
2 COMBINED AT												
+	C2PT5A9	7.98	1	FLOW	262.	246.	229.	204.	193.	184.	174.	166.
				TIME	4.08	4.08	4.08	4.25	4.25	4.25	4.33	4.33
DIVERSION TO												
+	GOOF5	7.98	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.

10S3X.OUT, 10-year existing condition, refer to Figure 4

				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.75	3.75
HYDROGRAPH AT												
+	GOWAN5	7.98	1	FLOW	261.	245.	228.	203.	192.	183.	173.	165.
				TIME	4.08	4.08	4.08	4.25	4.25	4.25	4.33	4.33
DIVERSION TO												
+	LWRRNCH	7.98	1	FLOW	243.	228.	212.	188.	179.	171.	161.	153.
				TIME	4.08	4.08	4.08	4.25	4.25	4.25	4.33	4.33
HYDROGRAPH AT												
+	DEASTGOW	7.98	1	FLOW	18.	17.	16.	14.	13.	13.	12.	12.
				TIME	4.08	4.08	4.08	4.25	4.25	4.25	4.33	4.33
ROUTED TO												
+	RDEASTGO	7.98	1	FLOW	18.	17.	16.	14.	13.	13.	12.	11.
				TIME	4.33	4.33	4.33	4.50	4.58	4.58	4.58	4.58
HYDROGRAPH AT												
+	CY08-C	.09	1	FLOW	40.	39.	38.	35.	34.	33.	32.	30.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	CCY08C	8.08	1	FLOW	40.	39.	38.	35.	34.	33.	32.	30.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	GOOF6	8.08	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.67	3.67	3.67	3.67	3.67	3.75	3.75	3.75
HYDROGRAPH AT												
+	DGWN6	8.08	1	FLOW	39.	38.	37.	34.	33.	32.	31.	29.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	DEGWN6	8.08	1	FLOW	28.	27.	26.	24.	23.	23.	22.	21.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	DALEX	8.08	1	FLOW	11.	11.	11.	10.	10.	9.	9.	9.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	CUL30	.00	1	FLOW	57.	57.	56.	55.	54.	53.	53.	52.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RCUL30	.00	1	FLOW	57.	57.	56.	54.	54.	53.	52.	51.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
HYDROGRAPH AT												
+	CUL31	.00	1	FLOW	109.	108.	107.	105.	104.	103.	102.	101.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.92	3.92
ROUTED TO												
+	RCUL31	.00	1	FLOW	113.	112.	112.	109.	112.	114.	115.	113.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	DUNCAN	.00	1	FLOW	25.	23.	21.	17.	15.	13.	11.	8.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
ROUTED TO												
+	RDUNCAN	.00	1	FLOW	32.	31.	22.	22.	13.	17.	15.	13.
				TIME	4.42	4.42	4.42	4.50	4.58	4.58	4.67	4.75
HYDROGRAPH AT												
+	CUL32	.00	1	FLOW	23.	23.	23.	23.	23.	23.	23.	23.
				TIME	3.75	3.75	3.83	3.83	3.83	3.83	3.92	3.92
ROUTED TO												
+	RCUL32	.00	1	FLOW	27.	26.	27.	29.	36.	36.	28.	26.
				TIME	4.33	4.50	4.50	4.25	4.25	4.25	4.50	4.50
4 COMBINED AT												
+	CPT56B	.00	1	FLOW	202.	198.	187.	183.	186.	182.	170.	164.
				TIME	4.42	4.42	4.42	4.25	4.25	4.25	4.25	4.08
HYDROGRAPH AT												
+	PT5B6-C	.38	1	FLOW	125.	121.	117.	108.	104.	100.	96.	91.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CCPT56B	.38	1	FLOW	287.	282.	276.	255.	247.	241.	239.	233.
				TIME	3.92	3.92	3.92	4.00	4.00	4.08	4.08	4.08
2 COMBINED AT												
+	CCCPT56B	8.46	1	FLOW	296.	292.	285.	262.	254.	247.	244.	238.
				TIME	3.92	3.92	3.92	4.00	4.00	4.08	4.08	4.08
HYDROGRAPH AT												
+	0511-1	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	0511-2	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT												
+	0511-3	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.42	3.42	3.42	3.42	3.50	3.50	3.50	3.50

HYDROGRAPH AT												
+	0511-4	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
4 COMBINED AT												
+	GOOF1-4	.00	1	FLOW	8.	8.	8.	8.	8.	8.	8.	8.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	0511-5A	.00	1	FLOW	40.	40.	40.	40.	40.	34.	28.	21.
				TIME	3.83	3.92	3.92	4.00	4.00	4.00	4.08	4.08
2 COMBINED AT												
+	GOOF1-5A	.00	1	FLOW	48.	48.	48.	48.	48.	42.	36.	30.
				TIME	4.17	4.17	4.17	4.08	4.08	4.00	4.08	4.08
HYDROGRAPH AT												
+	0511-5	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.75	3.75
HYDROGRAPH AT												
+	0486-1	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.67	3.67	3.67	3.67	3.67	3.75	3.75	3.75
3 COMBINED AT												
+	0486	.00	1	FLOW	50.	50.	50.	50.	50.	44.	38.	31.
				TIME	4.17	4.17	4.17	4.00	4.00	4.00	4.08	4.08
ROUTED TO												
+	RDGOW2A	.00	1	FLOW	51.	51.	51.	50.	49.	43.	36.	29.
				TIME	4.00	4.08	4.08	4.08	4.08	4.08	4.17	4.17
2 COMBINED AT												
+	CCCPT5B6	8.46	1	FLOW	346.	332.	326.	308.	299.	290.	278.	262.
				TIME	3.92	3.92	4.00	4.00	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	GOWAN	.00	1	FLOW	243.	228.	212.	188.	179.	171.	161.	153.
				TIME	4.08	4.08	4.08	4.25	4.25	4.25	4.33	4.33
DIVERSION TO												
+	D9RCHO	.00	1	FLOW	87.	78.	68.	55.	50.	45.	41.	36.
				TIME	4.08	4.08	4.08	4.25	4.25	4.25	4.33	4.33
HYDROGRAPH AT												
+	CENTRL1	.00	1	FLOW	156.	150.	144.	134.	129.	125.	121.	117.
				TIME	4.08	4.08	4.08	4.25	4.25	4.25	4.33	4.33
HYDROGRAPH AT												
+	TRUVAL	.00	1	FLOW	13.	12.	11.	9.	8.	8.	7.	7.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
2 COMBINED AT												
+	CBDV1	.00	1	FLOW	168.	161.	153.	143.	137.	133.	128.	124.
				TIME	4.08	4.08	4.08	4.25	4.25	4.25	4.33	4.33
HYDROGRAPH AT												
+	MORBAY	.00	1	FLOW	64.	59.	55.	45.	41.	37.	33.	29.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT												
+	CBDVMORB	.00	1	FLOW	231.	219.	208.	188.	178.	170.	161.	153.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO												
+	D10RCHO	.00	1	FLOW	115.	113.	112.	110.	109.	108.	107.	106.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	CENTRL2	.00	1	FLOW	116.	106.	96.	78.	70.	62.	54.	47.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RTCHY	.00	1	FLOW	108.	99.	90.	73.	64.	57.	50.	43.
				TIME	4.50	4.50	4.58	4.58	4.58	4.58	4.67	4.67
DIVERSION TO												
+	DVSTR1	.00	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT												
+	DVWR1	.00	1	FLOW	108.	99.	90.	73.	64.	57.	50.	43.
				TIME	4.50	4.50	4.58	4.58	4.58	4.58	4.67	4.67
DIVERSION TO												
+	DVSTR2	.00	1	FLOW	37.	37.	37.	37.	37.	37.	37.	37.
				TIME	4.08	4.08	4.17	4.17	4.25	4.33	4.33	4.50
HYDROGRAPH AT												
+	DVWR2	.00	1	FLOW	71.	62.	53.	36.	27.	20.	13.	6.
				TIME	4.50	4.50	4.58	4.58	4.58	4.58	4.67	4.67
ROUTED TO												
+	RX5	.00	1	FLOW	69.	60.	53.	35.	27.	20.	13.	6.
				TIME	4.58	4.67	4.67	4.67	4.75	4.75	4.75	4.75
HYDROGRAPH AT												
+	X4	.81	1	FLOW	133.	129.	126.	118.	115.	111.	107.	104.
				TIME	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58
HYDROGRAPH AT												
+	X3B	.16	1	FLOW	49.	47.	45.	42.	41.	39.	38.	36.

				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	CUL4	.16	1	FLOW	48.	46.	45.	42.	40.	39.	37.	36.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
			**	PEAK STAGES IN FEET **								
			1	STAGE	14.70	14.66	14.62	14.54	14.51	14.47	14.43	14.40
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	X3A	.12	1	FLOW	38.	37.	36.	34.	32.	31.	30.	29.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	CUL8	.12	1	FLOW	17.	17.	17.	16.	16.	16.	15.	15.
				TIME	4.58	4.58	4.50	4.50	4.50	4.50	4.50	4.50
			**	PEAK STAGES IN FEET **								
			1	STAGE	20.87	20.82	20.77	20.67	20.63	20.58	20.54	20.50
				TIME	4.58	4.58	4.50	4.50	4.50	4.50	4.50	4.50
2 COMBINED AT												
+	CX3AB	.28	1	FLOW	63.	62.	60.	56.	54.	52.	50.	48.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	RK3AB	.28	1	FLOW	57.	55.	54.	51.	49.	47.	46.	44.
				TIME	5.17	5.17	5.17	5.17	5.17	5.17	5.17	5.17
2 COMBINED AT												
+	CX	1.09	1	FLOW	184.	179.	174.	163.	158.	153.	148.	143.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
DIVERSION TO												
+	DEVX4	1.09	1	FLOW	92.	89.	87.	82.	79.	77.	74.	72.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
HYDROGRAPH AT												
+	DEVX4	1.09	1	FLOW	92.	89.	87.	82.	79.	77.	74.	72.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
ROUTED TO												
+	RK4	1.09	1	FLOW	92.	89.	87.	82.	79.	76.	74.	71.
				TIME	5.50	5.50	5.50	5.50	5.50	5.50	5.58	5.58
HYDROGRAPH AT												
+	X3C	.48	1	FLOW	41.	39.	37.	34.	32.	31.	29.	28.
				TIME	5.42	5.42	5.42	5.50	5.50	5.50	5.50	5.50
DIVERSION TO												
+	SD1A	.48	1	FLOW	4.	4.	4.	3.	3.	3.	3.	3.
				TIME	5.42	5.42	5.42	5.50	5.50	5.50	5.50	5.50
HYDROGRAPH AT												
+	SD1A	.48	1	FLOW	37.	35.	34.	31.	29.	28.	26.	25.
				TIME	5.42	5.42	5.42	5.50	5.50	5.50	5.50	5.50
ROUTED TO												
+	RK3C	.48	1	FLOW	37.	35.	34.	31.	29.	28.	26.	25.
				TIME	5.58	5.67	5.67	5.67	5.67	5.67	5.67	5.67
HYDROGRAPH AT												
+	X3	.34	1	FLOW	117.	113.	110.	104.	101.	98.	95.	92.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
3 COMBINED AT												
+	CX3	1.91	1	FLOW	174.	169.	164.	154.	148.	143.	138.	133.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
HYDROGRAPH AT												
+	DTX4	.00	1	FLOW	92.	89.	87.	82.	79.	77.	74.	72.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
ROUTED TO												
+	RDEX	.00	1	FLOW	92.	89.	87.	82.	79.	77.	74.	72.
				TIME	5.42	5.42	5.42	5.42	5.42	5.42	5.42	5.42
HYDROGRAPH AT												
+	BSX5	.10	1	FLOW	47.	46.	44.	42.	41.	40.	38.	37.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CX5	.10	1	FLOW	102.	99.	96.	91.	88.	85.	82.	79.
				TIME	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
DIVERSION TO												
+	DVSTR1	.10	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT												
+	DVWR1	.10	1	FLOW	102.	99.	96.	91.	88.	85.	82.	79.
				TIME	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
DIVERSION TO												
+	DVSTR2	.10	1	FLOW	37.	37.	37.	37.	37.	37.	37.	37.
				TIME	3.67	3.67	3.67	3.67	3.67	3.75	3.75	3.75
HYDROGRAPH AT												
+	DVWR2	.10	1	FLOW	65.	62.	59.	54.	51.	48.	45.	42.
				TIME	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25

ROUTED TO

+	RX5	.10	1	FLOW	65.	62.	59.	53.	51.	48.	45.	42.
				TIME	5.33	5.33	5.33	5.42	5.42	5.42	5.42	5.42

2 COMBINED AT

+	CX4X3	2.01	1	FLOW	239.	231.	223.	207.	199.	191.	183.	175.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	INTERPOLATED TO COMPUTATION INTERVAL PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .57									
RANN	MANE	3.17	29.76	249.97	.26	5.00	29.76	250.00	.26
FOR PLAN = 1 RATIO= .00									
RCUL32	MANE	3.00	37.87	252.00	-1.00	5.00	25.76	270.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCUL32	MANE	3.00	36.42	252.00	-1.00	5.00	26.84	270.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCUL32	MANE	2.75	30.82	253.00	-1.00	5.00	28.59	255.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCUL32	MANE	2.50	35.97	255.00	-1.00	5.00	35.97	255.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCUL32	MANE	2.50	35.77	255.00	-1.00	5.00	35.77	255.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCUL32	MANE	2.50	28.84	262.50	-1.00	5.00	28.09	270.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCUL32	MANE	2.25	31.71	256.50	-1.00	5.00	25.97	270.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDGOW2A	MANE	3.86	51.29	235.33	-1.00	5.00	50.74	240.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDGOW2A	MANE	3.86	51.73	243.09	-1.00	5.00	50.51	245.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDGOW2A	MANE	3.86	52.96	243.18	-1.00	5.00	50.79	245.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDGOW2A	MANE	3.86	51.45	243.44	-1.00	5.00	50.32	245.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDGOW2A	MANE	3.87	50.72	247.38	-1.00	5.00	49.28	245.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDGOW2A	MANE	3.96	44.85	245.59	-1.00	5.00	43.16	245.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDGOW2A	MANE	4.08	37.72	249.10	-1.00	5.00	36.34	250.00	-1.00
FOR PLAN = 1 RATIO= .00									
RDGOW2A	MANE	4.25	29.29	250.60	-1.00	5.00	28.62	250.00	-1.00

*** NORMAL END OF HEC-1 ***

10S3X.OUT, 10-year existing condition, refer to Figure 4

```
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *             JUN  1998                *
 *          VERSION 4.1                 *
 *                                      *
 *  RUN DATE   31MAR14  TIME  21:49:32  *
 *                                      *
 ****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*        DAVIS, CALIFORNIA 95616       *
*           (916) 756-1104             *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX           XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
                    *DIAGRAM
*** FREE ***
             1      ID   RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
             2      ID   GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
             3      ID   OFFSITE BASINS, EXISTING CONDITIONS
             4      ID   PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
             5      ID   PREPARED BY STANLEY CONSULTANTS INC. (HM/VF)
             6      ID   INPUT FILE: 25S3X.DAT
             7      ID   DESIGN STORM: 25-YEAR 6-HR
             8      ID   STORM DISTRIBUTION: SDN3
             9      ID   STORM CENTERING: FULL WATERSHED
            10      ID   THIS MODEL DIFFERS FROM 100 YEAR: FLOW DIVERTED TO STORM DRAIN
            11      ID   AT GOWAN/CRAIG
            12      ID
            13      ID
            14      ID   BASED ON:
            15      ID   CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
            16      ID   2008 MASTER PLAN UPDATE (MPU) BY PBS&J
            17      ID   GOWAN WATERSHED (INPUT FILE = ALLGOW3.DAT) AND
            18      ID   CENTRAL WATERSHED (NORTHWESTERN PORTION)
            19      ID
            20      ID   RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009
            21      ID   UPPRSDN3 AND LWRSDN3 HEC-1 MODELS
            22      ID   FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
            23      ID   CONTROL FACILITIES REFERENCED FROM LOMR UNLESS OTHERWISE NOTED
            24      ID
            25      ID   GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
            26      ID   BY G.C. WALLACE (GCW) 2007
            27      ID
            28      ID   PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
            29      ID   IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
            30      ID   HEC-1 ANALYSIS FOR EXISTING CONDITIONS FILE R00S3X.OUT
            31      ID   BY STANLEY CONSULTANTS, 1/2012
            32      ID
            33      ID   LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
            34      ID   ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
            35      ID   MPU SHOWS THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
            36      ID   (GOEC)
            37      ID
            38      ID
            39      ID   THIS EXISTING CONDITION MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL DRAINAGE
            40      ID   STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
            41      ID   EXISTING CONDITION MODEL AS FOLLOWS:
            42      ID   1. BASIN PT51 OF THE RANCHO STUDY WAS SPLIT INTO PT51A AND PT51B IN ORDER
            43      ID   TO SHOW WHERE FLOW WILL BE COLLECTED BY THE GOWAN OUTFALL - ALEXANDER
            44      ID   ROAD FACILITIES AT ALEXANDER-JONES/RANCHO DRIVE INTERSECTION.
            45      ID   2. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
            46      ID   TO THE EXISTING CONDITION MODEL
            47      ID   3. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE
            48      ID   DARF'S USED IN 2008 MPU HEC-1 ALLGOW3.OUT
            49      ID
            50      ID
            51      ID   JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
            52      ID   DARF RATIOS FOR AREAS OF 0, 0.5, 1.0, 2.0, 4.0, 6.0, 8.0 AND 10 SQUARE MILES
            53      ID   FOR THE 100-YEAR EVENT.
```

1 HEC-1 INPUT PAGE 2

```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
            54      IT       5       0       0     300
            55      IO       5       0       0
            56      IN       5
            57      JR    PREC    0.74    0.73    0.72    0.69    0.67    0.67    0.65    0.64
                    *
```

```
 58          KK     ANN
 59          KM  BASIN REFERENCED FROM LOMR
 60          PB    2.85
 61          BA   0.259
 62          PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
 63          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
 64          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
 65          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
 66          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
 67          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
 68          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
 69          PC   0.998   0.999   1.000
 70          LS       0    76.8
 71          UD   0.499
             *

 72          KK    RANN
 73          KM  ROUTE TO GD29B
 74          RK    2600   0.015   0.015       0    TRAP     100       2
             *

 75          KK   GD29B
 76          KM  BASIN REFERENCED FROM LOMR
 77          PB    2.77
 78          BA   0.138
 79          LS       0    74.3
 80          UD   0.298
             *

 81          KK  CGD29B
 82          HC       2
             *

 83          KK  RGD29B
 84          KM  ROUTE GD29B TO CNW1C2
 85          KM  ROUTING REVISED FROM LOMR BY STANLEY CONSULTANTS
 86          KM  ANN ROAD
 87          RD    4500  0.0122   0.016       0    TRAP       0      50
             * PREVIUOS ROUTING
             * KMROUTE TO ANN1B
             * RK2700     0.015   0.015       0   TRAP      100       2
             *

 88          KK NW1C2-C
 89          KM  BASIN REFERENCED FROM 2008 MPU
 90          KM  TAKES PLACE OF ANN1B AND ANN1C (LOMR) WHICH ARE NOW DEVELOPED
 91          KM  REVISED BY STANLEY CONSULTANTS
 92          BA   0.207
 93          PB    2.77
1                                        HEC-1 INPUT                                        PAGE  3

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 94          LS       0    89.5
 95          UD   0.409
             *

 96          KK  CNW1C2
 97          KM  COMBINE RGD29B AND NW1C2-C
 98          KM  ANN ROAD AND RANCHO
 99          HC       2
             *

100          KK  RNW1C2
101          KM  ROUTE TO PDGCC3
102          RK    1250  0.0074   0.013       0    TRAP      12       2
             *

103          KK  PDGCC3
104          KM  CN UPDATED BY STANLEY CONSULTANTS FOR DEVELOPMENT
105          KM  REFERENCED FROM GOWAN SD, LONE MTN BRANCH BY GCW
106          PB    2.77
107          BA   0.047
108          LS       0    86.7
109          UD   0.188
             *

110          KK   CGCC3
111          HC       2
             *

112          KK   RGCC3
113          KM  ROUTE TO PDGCC4
114          RK    1550   0.005   0.013       0    TRAP       8       0
             *

115          KK REMAIN1
116          KM  DIVERT 139 CFS UNDER U.S. 95 BETWEEN ANN ROAD AND THE U.S. 95/RANCHO
117          KM  INTERSECTION IN A 10' X 3' RCB (CULVERT 3). FLOWS IN EXCESS OF 139 CFS
118          KM  REMAIN ON THE WEST SIDE OF U.S. 95.
119          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
120          DT    D95A
121          DI       0      51     101     118     140     318   10000
122          DQ       0      50     100     117     139     139     139
             *

123          KK   RLBG1
124          KM  ROUTE TO CGCC4 (HECRAS CROSS SECTION 116+49)
125          KM  ADDED BY LBG
126          RK     278   0.005   0.013       0    TRAP       8       0
             *
```

```
127          KK  PDGCC2
128          KM  BASIN REFERENCED FROM LOMR
129          PB    2.77
130          BA   0.042
131          LS       0    73.2
132          UD   0.286
             *
1                                        HEC-1 INPUT                                                    PAGE  4
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

133          KK   RGCC2
134          KM  ROUTE TO PDGCC4
135          RK    2900  0.0055   0.015       0    TRAP       60       2
             *

136          KK  PDGCC4
137          KM  BASIN REFERENCED FROM LOMR
138          PB    2.77
139          BA   0.049
140          LS       0    84.3
141          UD   0.189
             *

142          KK   CGCC4
143          KM  THE FLOW AT THIS NODE CORRESPONDS TO HECRAS CROSS SECTION 116+49
144          KM  OF THE US-95 EFFECTIVE HECRAS.
145          KM  THIS IS THE MOST UPSTREAM NODE IN THE EFFECTIVE MODEL.
146          HC       3
             *

147          KK   RLBG2
148          KM  ROUTE TO CGCB9 (HECRAS CROSS SECTION 112+87)
149          KM  ADDED BY LBG
150          RK     362   0.005   0.013       0    TRAP       8        0
             *

151          KK  HAMMER
152          KM  BASIN REFERENCED FROM LOMR
153          PB    2.82
154          BA   0.128
155          LS       0    76.6
156          UD   0.333
             *

157          KK RHAMMER
158          KM  ROUTE TO PDGCD
159          RK    2700   0.015   0.015       0    TRAP       60       2
             *

160          KK   PDGCD
161          KM  BASIN REFERENCED FROM LOMR
162          PB    2.77
163          BA   0.129
164          LS       0    74.0
165          UD   0.284
             *

166          KK  CPDGCD
167          HC       2
             *
1                                        HEC-1 INPUT                                                    PAGE  5
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

168          KK    RGCD
169          KM  ROUTE TO PDGCB5
170          RK    4060  0.0086   0.015       0    TRAP       40       2
             *

171          KK  PDGCB1
172          KM  BASIN REFERENCED FROM LOMR
173          PB    2.77
174          BA   0.033
175          LS       0    84.9
176          UD   0.166
             *

177          KK   RGCB1
178          KM  ROUTE TO PDGCB3
179          RK    2100  0.0086   0.015       0    TRAP       40       2
             *

180          KK  PDGCB2
181          KM  BASIN REFERENCED FROM LOMR
182          PB    2.77
183          BA   0.030
184          LS       0    81.3
185          UD   0.190
             *

186          KK   CGCB2
187          HC       2
             *

188          KK   RCGB2
189          KM  ROUTE TO PDGCB3
190          RK     700  0.0029    0.03       0    TRAP       20       2
             *
```

```
 191          KK  PDGCB3
 192          KM  BASIN REFERENCED FROM LOMR
 193          PB    2.77
 194          BA   0.066
 195          LS       0    73.1
 196          UD   0.236
              *

 197          KK   CGCB3
 198          HC       2
              *

 199          KK   RGCB3
 200          KM  ROUTE TO PDGCB5
 201          RK    1400    0.01   0.025       0    TRAP      20       2
              *
1                                        HEC-1 INPUT                                        PAGE  6

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 202          KK  PDGCB4
 203          KM  BASIN REFERENCED FROM LOMR
 204          PB    2.77
 205          BA   0.020
 206          LS       0    85.7
 207          UD   0.204
              *

 208          KK   RGCB4
 209          KM  ROUTE TO PDGCB5
 210          RK     800    0.01    0.03       0    TRAP      20       2
              *

 211          KK   CGCB4
 212          HC       3
              *

 213          KK  PDGCC1
 214          KM  BASIN REFERENCED FROM LOMR
 215          PB    2.77
 216          BA   0.053
 217          LS       0    75.4
 218          UD   0.263
              *

 219          KK  PDGCB5
 220          KM  BASIN REFERENCED FROM LOMR
 221          PB    2.77
 222          BA   0.110
 223          LS       0    76.0
 224          UD   0.375
              *

 225          KK   CGCB5
 226          HC       3
              *

 227          KK   RGCB5
 228          KM  ROUTE TO PDGCB9
 229          RK    3080  0.0065    0.03       0    TRAP      30       2
              *

 230          KK  C2GCB5
 231          HC       2
              *

 232          KK  PDGCB6
 233          KM  BASIN REFERENCED FROM LOMR
 234          PB    2.77
 235          BA   0.018
 236          LS       0    88.2
 237          UD   0.177
              *
1                                        HEC-1 INPUT                                        PAGE  7

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 238          KK   RGCB6
 239          KM  ROUTE TO PDGCB9
 240          RK    2880  0.0065    0.03       0    TRAP      30       2
              *

 241          KK PDGCB10
 242          KM  BASIN REFERENCED FROM LOMR
 243          PB    2.77
 244          BA   0.074
 245          LS       0    83.7
 246          UD   0.260
              *

 247          KK  PDGCB9
 248          KM  BASIN REFERENCED FROM LOMR
 249          PB    2.77
 250          BA   0.031
 251          LS       0    76.5
 252          UD   0.137
              *

 253          KK   CGCB9
```

```
254          HC       4
             *

255          KK   RGCB9
256          KM  ROUTE TO GCB11 (HECRAS CROSS SECTION 105+04)
257          KM  CHANGED FROM 1950 FT TO 783 FEET BY LBG
258          RK     783  0.0036   0.013       0    TRAP       8       2
             *

259          KK PDGCB11
260          KM  BASIN REFERENCED FROM LOMR
261          PB    2.77
262          BA   0.033
263          LS       0    79.3
264          UD   0.195
             *

265          KK  CGCB11
266          HC       2
             *

267          KK   RLBG3
268          KM  ROUTE TO REMAIN2 (HECRAS CROSS SECTION 99+93)
269          KM  ADDED BY LBG
270          RK     511  0.0036   0.013       0    TRAP       8       2
             *
1                                        HEC-1 INPUT                                                    PAGE  8

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

271          KK REMAIN2
272          KM  DIVERT 192 CFS UNDER U.S. 95 JUST SOUTH OF THE U.S. 95/RANCHO INTERSECTION
273          KM  IN 2, 6' X 2' RCB'S (CULVERT 5). REMAINING FLOW CONTINUES SOUTH ALONG U.S.
274          KM  95 TO LONE MOUNTAIN ROAD.
275          KM   REVISED TO 168 BY LBG
276          DT    D95B
277          DI       0     426     591   10000
278          DQ       0     168     192     192
             *

279          KK  RMAIN2
280          KM  ROUTE TO 20BG
281          KM  HECRAS CROSS SECTION 82+37
282          RK    1756  0.0029    0.03       0    TRAP      20       2
             *

283          KK  LONEMT
284          KM  BASIN REFERENCED FROM LOMR
285          PB    2.77
286          BA   0.411
287          LS       0    83.1
288          UD   0.380
             *

289          KK  GD20BH
290          KM  BASIN REFERENCED FROM LOMR
291          PB    2.77
292          BA   0.047
293          LS       0    76.6
294          UD   0.250
             *

295          KK   CLONE
296          KM  TENAYA/LONE MOUNTAIN
297          HC       2
             *

298          KK   RLONE
299          KM  ROUTE TO 20BG
300          KM  HECRAS CROSS SECTION 82+37
301          RK    1100  0.0015   0.015       0    TRAP      44       2
             *

302          KK  GD20BG
303          KM  BASIN REFERENCED FROM LOMR
304          PB    2.77
305          BA   0.113
306          LS       0    81.4
307          UD   0.261
             *
1                                        HEC-1 INPUT                                                    PAGE  9

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

308          KK   C20BG
309          HC       3
             *

310          KK   R20BG
311          KM  ROUTE TO 20BL
312          KM  HECRAS X-SECTION 65+10
313          RK    1680  0.0016    0.03       0    TRAP     150       2
             *

314          KK  CRAIG1
315          KM  ADDED FROM LOMR
316          KM  BASIN CRAIG1 (SDN3)
317          PB    3.16
318          BA    2.44
319          LS       0    82.0
```

```
320          UD   0.700
             *

321          KK   DBUF1
322          KM  DIVERT 249 CFS (447 CAPACITY - 198 FUTURE INTERCEPTED) TO
323          KM  GOWAN NORTH BUFFALO BRANCH SD BETWEEN LONE MT AND RED COACH
324          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
325          KM  FACILITY ID: GOBU 0085
326          DT   DGNBB
327          DI       0     250    2807   10000
328          DQ       0     249     249     249
             *

329          KK   RBUF1
330          KM  ROUTE TO RED COACH
331          RK    1295   0.004   0.015       0    TRAP      80       2
             *

332          KK   DBUF2
333          KM  DIVERT 109 CFS TO GOWAN NORTH BUFFALO BRANCH SD AT RED COACH
334          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
335          KM  FACILITY ID: GOBU 0058
336          DT  DGNBB1
337          DI       0     110    1121   10000
338          DQ       0     109     109     109
             *

339          KK    DRED
340          KM  DIVERT 70.40% FLOW DOWN BUFFALO TOWARDS COBAL CANYON.
341          KM  TAKE FLOW DOWN RED COACH TO US95
342          DT DBUFLO2
343          DI       0     100    1000   10000
344          DQ       0    70.4    704.    7040
             *

1                                        HEC-1 INPUT                                    PAGE 10

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

345          KK   RDRED
346          KM  ROUTE TO 20BI
347          RK    2700   0.007   0.015       0    TRAP      80       2
             *

348          KK  GD20BI
349          KM  BASIN REFERENCED FROM LOMR
350          PB    2.77
351          BA   0.115
352          LS      0    80.5
353          UD   0.286
             *

354          KK   C20BI
355          HC       2
             *

356          KK   R20BI
357          KM  ROUTE TO 20BL
358          KM  HECRAS CROSS SECTION 65+10
359          RK     910  0.0055   0.015       0    TRAP      40       2
             *

360          KK  GD20BL
361          KM  BASIN REFERENCED FROM LOMR
362          PB    2.77
363          BA   0.079
364          LS      0    88.7
365          UD   0.230
             *

366          KK   C20BL
367          HC       3
             *

368          KK   R20BL
369          KM  ROUTE TO C20BJ2
370          KM  HECRAS CROSS SECTION 61+09
371          RK     401  0.0016    0.03       0    TRAP     150       2
             *

372          KKRTBUFAL2
373          KM  RETRIEVE FLOW DIVERTED TO BUFFALO PAST RED COACH
374          DR DBUFLO2
             *

375          KK   RBUF2
376          KM  ROUTE TO COBAL CANYON
377          RK     652   0.004   0.015       0    TRAP      80       2
             *

1                                        HEC-1 INPUT                                    PAGE 11

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

378          KK  DCOBAL
379          KM  DIVERT 71.46% OF FLOW AT COBAL CANYON/BUFFALO INTERSECTION SOUTH ON BUFFALO
380          KM  REMAINING FLOW CONTINUES TO US95
381          DT DBUFLO3
382          DI       0    100.    1000   10000
383          DQ       0   71.46   714.6    7146
             *
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```
384          KK RCOBAL1
385          KM  ROUTE TO C20BJ1
386          RK    2700   0.007   0.015       0    TRAP      60       2
             *

387          KK  GD20BJ
388          KM  BASIN REFERENCED FROM LOMR
389          PB    2.77
390          BA   0.052
391          LS       0    84.3
392          UD   0.257
             *

393          KK  C20BJ1
394          HC       2
             *

395          KK  R20BJ1
396          KM  ROUTE TO C20BJ2
397          RK     900   0.006   0.015       0    TRAP      40       2
             *

398          KK  C20BJ2
399          KM  US95 HECRAS CROSS SECTION 59+51
400          HC       2
             *

401          KK  R20BJ2
402          KM  ROUTE TO C20BM
403          RK     362   0.006   0.015       0    TRAP      40       2
             *

404          KK  GD20BM
405          KM  BASIN REFERENCED FROM LOMR
406          PB    2.77
407          BA   0.048
408          LS       0    89.2
409          UD   0.189
             *

410          KK   C20BM
411          KM  HECRAS CROSS SECTION 55+89
412          KM  GD20BM IS ADDED TO US95 FLOW FROM C20BJ2
413          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE 12

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

414          KK REMAIN5
415          KM  DIVERSION PER EXISTING INTERCHANGE AT CRAIG ROAD
416          KM  DIVERT FLOW THROUGH 2, 6' x 2' RCB'S (CULVERT 7) UNDER U.S. 95
417          KM  JUST NORTH OF THE CRAIG ROAD BRIDGE.
418          KM  REMAINING FLOW CONTINUES SOUTH ALONG U.S. 95
419          KM  THIS DIVERSION HAS TWO SEPARATE FLOW QUANTITIES, 82 CFS FOR THE SDN3
420          KM  MODEL AND 180 CFS FOR THE SDN5 MODEL
421          KM  REVISED BY LBG 6-28-05 (RATING CURVE DEVELOPED)
422          DT    D95E
423          DI       0     200     600    1000    1250    2006
424          DQ       0    16.8      82   144.0     170     264
             *

425          KKRREMAINS5
426          KM  ROUTE TO 2C20BK
427          RK     853   0.006   0.015       0    TRAP      40       2
             *

428          KKRTBUFAL3
429          KM  RETRIEVE FLOW DIVERTED TO BUFFALO PAST COBAL CANYON
430          DR DBUFLO3
             *

431          KK   RBUF3
432          KM  ROUTE TO CRAIG ROAD
433          RK     661   0.003   0.015       0    TRAP      80       2
             *

434          KK   DBUF3
435          KM  DIVERT 198 CFS TO GOWAN NORTH BUFFALO BRANCH SD AT CRAIG
436          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
437          KM  FACILITY ID: GOBU 0032
438          DT  DGNBB2
439          DI       0     199    1121   10000
440          DQ       0     198     198     198
             *

441          KK RCRAIG2
442          KM  ROUTE TO GD20BK
443          RK    3400  0.0067   0.015       0    TRAP      80       2
             *

444          KK  GD20BK
445          KM  BASIN REFERENCED FROM LOMR
446          PB    2.77
447          BA   0.050
448          LS       0    80.5
449          UD   0.264
             *
1                                        HEC-1 INPUT                                        PAGE 13

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
450          KK  1C20BK
451          HC       2
             *

452          KK R1C20BK
453          KM  ROUTE TO 2C20BK
454          KM  HECRAS CROSS SECTION 47+36 IN US-95 HECRAS MODEL
455          RK    1150  0.0039    0.015       0    TRAP      80       2
             *

456          KK  2C20BK
457          HC       2
             *

458          KK R2C20BK
459          KM  ROUTE TO C17BI
460          KM  HECRAS CROSS SECTION 42+41
461          KM  CHANGE FROM 600 FT TO 495 FT
462          RK     495  0.0039    0.03       0    TRAP      80       2
             *

463          KK HICKAM1
464          KM  BASIN REFERENCED FROM LOMR
465          PB    2.89
466          BA   0.477
467          LS       0    80.3
468          UD   0.472
             *

469          KK    BUF3
470          KM  DIVERT 125 CFS TO GOWAN NORTH BUFFALO BRANCH SD FROM HICKAM1
471          KM  SUBBASIN. REMAINING FLOW CONTINUES EAST ALONG HICKAM AVENUE
472          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
473          KM  FACILITY ID: GOBU 0000
474          DT  DGNBB3
475          DI       0     126     211   10000
476          DQ       0     125     125     125
             *

477          KK RHICKAM
478          KM  ROUTE TO C17BH
479          RK    1300   0.008   0.025       0    TRAP      80       2
             *

480          KK  GD17BH
481          KM  BASIN REFERENCED FROM LOMR
482          PB    2.77
483          BA   0.025
484          LS       0    82.8
485          UD   0.178
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

486          KK   C17BH
487          HC       2
             *

488          KK   R17BH
489          KM  ROUTE TO GD17BG
490          RK    1330   0.006   0.025       0    TRAP      80       2
             *

491          KK  GD17BG
492          KM  BASIN REFERENCED FROM LOMR
493          PB    2.77
494          BA   0.116
495          LS       0    83.3
496          UD   0.275
             *

497          KK   C17BG
498          HC       2
             *

499          KK   R17BG
500          KM  ROUTE TO C17BI
501          KM  HECRAS CROSS SECTION 42+41
502          RK    1200   0.005   0.025       0    TRAP      80       2
             *

503          KK  GD17BI
504          KM  BASIN REFERENCED FROM LOMR
505          PB    2.77
506          BA   0.066
507          LS       0    85.2
508          UD   0.193
             *

509          KK   C17BI
510          HC       3
             *

511          KK   R17BI
512          KM  ROUTE TO C17BJ
513          KM  HECRAS CROSS SECTION 27+40
514          RK    1501  0.0023    0.03       0    TRAP     200       2
             *
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```
515          KK  GD14CH
516          KM  BASIN REFERENCED FROM LOMR
517          PB    2.77
518          BA   0.040
519          LS       0    83.0
520          UD   0.181
             *
1                                        HEC-1 INPUT                                        PAGE 15

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

521          KK   R14CH
522          KM  ROUTE TO C17BJ
523          KM  HECRAS CROSS SECTION 27+40
524          RK    1900   0.005   0.015       0    TRAP      40       2
             *

525          KK  GD17BJ
526          KM  BASIN REFERENCED FROM LOMR
527          PB    2.77
528          BA   0.063
529          LS       0    88.3
530          UD   0.222
             *

531          KK   C17BJ
532          HC       3
             *

533          KK REMAIN6
534          KM  DIVERT FLOW THROUGH DUAL 6' X 2' RCB'S (CULVERT 10) AT ALEXANDER ROAD
535          KM  BETWEEN CROSS-SECTIONS 28+10 AND 26+94 IN THE HEC-RAS MODEL.
536          KM  WEIR FLOW ELIMINATED DUE TO SOUND WALL AND BARRIER RAILS
537          DT    D95F
538          DI       0     100     500    1000    1937    2725
539          DQ       0    10.8      72     144     192     264
             *

540          KK   R17BJ
541          KM  ROUTE TO C6MAIN
542          KM  HECRAS CROSS SECTION 25+14
543          RK     226   0.005   0.015       0    TRAP      40       2
             *

544          KK  GD14CF
545          KM  BASIN REFERENCED FROM LOMR
546          KM  SUBBASIN AT NW OF GOWAN & BUFFALO INTERSECTION
547          PB    2.78
548          BA   0.130
549          LS       0    77.9
550          UD   0.288
             *

551          KK    BUF4
552          KM  DIVERT 30 CFS TO GOWAN NORTH BUFFALO BRANCH SD FROM BUFFALO AND
553          KM  EXCALIBUR INTERSECTION.REMAINING FLOW CONTINUES EAST ALONG ALEXANDER
554          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
555          KM  FACILITY ID: GOBU 0000
556          DT  DGNBB4
557          DI       0      31      60   10000
558          DQ       0      30      30      30
             *
1                                        HEC-1 INPUT                                        PAGE 16

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

559          KK   R14CF
560          KM  ROUTE TO GD14CG
561          RK    1450   0.006   0.015       0    TRAP     100       2
             *

562          KK  GD14CG
563          KM  BASIN REFERENCED FROM LOMR
564          PB    2.77
565          BA   0.057
566          LS       0    82.2
567          UD   0.208
             *

568          KK   C14CG
569          HC       2
             *

570          KK   R14CG
571          KM  ROUTE TO GD14CI
572          RK    1650   0.006   0.015       0    TRAP     100       2
             *

573          KK  GD14CI
574          KM  BASIN REFERENCED FROM LOMR
575          PB    2.77
576          BA   0.054
577          LS       0    79.7
578          UD   0.196
             *

579          KK   C14C1
580          HC       2
             *
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```
 581          KK   R14CI
 582          KM  ROUTE TO CMAIN6
 583          RK     945  0.0106   0.015       0    TRAP     100       2
              *

 584          KK  CMAIN6
 585          KM  HECRAS US95 CROSS SECTION 25+14
 586          HC       2
              *

 587          KK  RMAIN6
 588          KM   ROUTE SOUTH TO US95 HECRAS CROSS SECTION 13+00
 589          RK    1214  0.0026    0.03       0    TRAP      80       3
              *
1                                        HEC-1 INPUT                                                    PAGE 17

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 590          KK REMAIN7
 591          KM  DIVERT FLOW THROUGH 2-30" RCP's (CULVERT 12) EAST ACROSS
 592          KM  US95 BETWEEN ALEXANDER ROAD AND GOWAN ROAD.
 593          KM  FLOW OVER US95 ELIMINATED BETWEEN CROSS SECTIONS 14+20 AND 10+27
 594          KM  DUE TO SOUNDWALLS.REVISED BY LBG 6-28-2005
 595          DT    D95G
 596          DI       0     100     500    1000    1500    1656    2000
 597          DQ       0      60      82      96     102     101     104
              *

 598          KK   GD11C
 599          KM  BASIN REFERENCED FROM LOMR
 600          PB    2.77
 601          BA   0.132
 602          LS       0    86.0
 603          UD   0.296
              *

 604          KK    C11C
 605          HC       2
              *

 606          KK    R11C
 607          KM  ROUTE SOUTH TO CULVERT 13 UPSTREAM OF GOWAN UNDERPASS
 608          KM  HECRAS CROSS SECTION 0+17
 609          RK    1283  0.0026    0.03       0    TRAP      80       3
              *

 610          KK   GD11B
 611          KM  BASIN REFERENCED FROM LOMR
 612          PB    2.77
 613          BA   0.196
 614          LS       0    87.6
 615          UD   0.272
              *

 616          KK    C11B
 617          HC       2
              *

 618          KK  GOWAN1
 619          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
 620          KM  BY POGGEMEYER DESIGN GROUP, INC
 621          KM  DIVERT MAXIMUM OF 422 CFS INTO GOWAN OUTFALL AT US95
 622          KM  REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
 623          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
 624          KM  DIVERT 0 CFS, GOWAN OUTFALL IS FULL AT THIS LOCATION, LBG
 625          KM  FACILITY: GOWAN OUTFALL FACILITIES
 626          KM  FACILITY ID: G00F 0511
 627          DT   GOOF1
 628          DI       0      51     101     423    5000
 629          DQ       0       1       2       3       4
              *
1                                        HEC-1 INPUT                                                    PAGE 18

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 630          KK    R11B
 631          KM  ROUTE TO CPT6B
 632          RK    1400  0.0057   0.015       0    TRAP      80       2
              *

 633          KK   CY05A
 634          KM  BASIN REFERENCED FROM LOMR
 635          PB    2.77
 636          BA   0.025
 637          LS       0    85.6
 638          UD   0.179
              *

 639          KK    D95G
 640          KM  RETRIEVE FLOW DIVERTED THROUGH CULVERT 13
 641          DR    D95G
              *

 642          KK   RD95G
 643          KM  ROUTE TO PT6B
 644          RK    2300   0.004   0.015       0    TRAP      60       2
              *

 645          KK    PT6B
```

```
646          KM  BASIN REFERENCED FROM LOMR
647          PB    2.77
648          BA   0.107
649          LS       0    89.1
650          UD   0.182
             *

651          KK   CPT6B
652          HC       2
             *

653          KK  2CPT6B
654          KM  RAINBOW & GOWAN
655          HC       3
             *

656          KK  GOWAN2
657          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
658          KM  BY POGGEMEYER DESIGN GROUP, INC
659          KM  DIVERT MAXIMUM OF 52 CFS INTO GOWAN OUTFALL AT RAINBOW FOR A
660          KM  TOTAL OF 474 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
661          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
662          KM  DIVERT 2 CFS THE GOWAN OUTFALL IS FULL AT THIS LOCATION, LBG
663          KM  FACILITY: GOWAN OUTFALL FACILITIES
664          KM  FACILITY ID: G00F 0511
665          DT   GOOF2
666          DI       0      53     101     423    5000
667          DQ       0       2       2       2       2
             *

1                                        HEC-1 INPUT                                    PAGE 19

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

668          KK   RPT6B
669          KM  ROUTE TO C5A3
670          RK    2480  0.0067   0.015       0    TRAP      80       2
             *

671          KK   CY05D
672          KM  BASIN REFERENCED FROM LOMR
673          PB    2.77
674          BA   0.059
675          LS       0    78.6
676          UD   0.254
             *

677          KK   PT5A3
678          KM  BASIN REFERENCED FROM LOMR
679          PB    2.77
680          BA   0.089
681          LS       0    87.1
682          UD   0.285
             *

683          KK    C5A3
684          KM  TORREY PINES & GOWAN
685          HC       3
             *

686          KK  GOWAN3
687          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
688          KM  BY POGGEMEYER DESIGN GROUP, INC
689          KM  DIVERT MAXIMUM OF 21 CFS INTO GOWAN OUTFALL AT TORREY PINES, FOR A
690          KM  TOTAL OF 495 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
691          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
692          KM  DIVERT 2 CFS AT THIS LOCATION, LBG
693          KM  FACILITY: GOWAN OUTFALL FACILITIES
694          KM  FACILITY ID: G00F 0511
695          DT   GOOF3
696          DI       0      22    5000
697          DQ       0       2       2
             *

698          KK    R5A3
699          KM  ROUTE TO C5A8 GOWAN & BRONCO
700          RK    1236  0.0088   0.015       0    TRAP      80       2
             *

701          KK     MAV
702          KM  DIVERSION TO MAVERICK THEN DUNCAN THEN RANCHO.
703          KM  DIVERSIONS DETERMINED USING HECRAS
704          DTMAVERICK
705          DI       0     200     400    1050    1300    1550    1800
706          DQ       0       8      14      50     100     150     200
             *

1                                        HEC-1 INPUT                                    PAGE 20

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

707          KK   R5A3B
708          KM  ROUTE TO C5A8 GOWAN & BRONCO
709          RK     600  0.0088   0.015       0    TRAP      80       2
             *

710          KK   CY06A
711          KM  BASIN REFERENCED FROM LOMR
712          PB    2.77
713          BA   0.077
714          LS       0    84.0
715          UD   0.246
```

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                *
716             KK   PT5A8
717             KM  BASIN REFERENCED FROM LOMR
718             PB    2.77
719             BA   0.025
720             LS       0    82.0
721             UD   0.265
                *

722             KK    C5A8
723             KM  GOWAN & BRONCO
724             HC       3
                *

725             KK   R5A3C
726             KM  ROUTE C5A8 TO GOWAN & JONES
727             RK     620  0.0088   0.015       0    TRAP      80       2
                *

728             KK  GOWAN4
729             KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
730             KM  BY POGGEMEYER DESIGN GROUP, INC
731             KM  DIVERT MAXIMUM OF 44 CFS INTO GOWAN OUTFALL AT JONES FOR A
732             KM  TOTAL OF 539 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
733             KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
734             KM  DIVERT 2 CFS AT THIS LOCATION, LBG
735             KM  FACILITY: GOWAN OUTFALL FACILITIES
736             KM  FACILITY ID: G00F 0511
737             DT   GOOF4
738             DI       0      45    5000
739             DQ       0       2       2
                *

740             KK  DPT5A8
741             KM  DIVERT FLOW TO JONES
742             KM  FROM VTN NEVADA SILVER MESA STUDY (1989) AND CVL FISR
743             KM  DIVERTED FLOW DRAINS SOUTH THEN EAST TO SANTA CATALINA. IT THEN
744             KM  FLOWS UNDER MICHAEL TO RANCHO. MOST GOES UNDER RANCHO IN A RCB JUST SOUTH
745             KM   OF THE MICHAEL WAY INTERSECTION. REMAINING FLOW CONTINUES SOUTH ON RANCHO.
746             DT  DCY07B
747             DI       0     100     500    1000    2000    3000    4000    5500
748             DQ       0       0     116     253     592     948    1308    1859
                *
1                                        HEC-1 INPUT                                    PAGE 21
LINE            ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

749             KK    R5A8
750             KM  ROUTE TO TRUE VALUE
751             RK    1659  0.0097   0.015       0    TRAP      80       2
                *

752             KK   R5A82
753             KM  ROUTE TO CCY07A
754             RK    1220  0.0097   0.015       0    TRAP      80       2
                *

755             KK   CY07A
756             KM  BASIN REFERENCED FROM LOMR
757             PB    2.77
758             BA   0.027
759             LS       0    86.2
760             UD   0.237
                *

761             KK  CCY07A
762             HC       2
                *

763             KK    TRUV
764             KM  DIVERSION BEHIND TRUE VALUE HARDWARE REVISED BY LBG. DIVERSIONS
765             KM  DETERMINED USING HECRAS LATERAL WEIR. L = 25 FT
766             DT  TRUVAL
767             DI       0     200     400     600    1000    1400    1800
768             DQ       0       8      25      43      78     114     149
                *
                * ***************************************************************
                * ***************************************************************
                * ****START OF FLOW CONVEYED IN SWALE ON WEST SIDE OF RANCHO****
                * ****AND ULTIMATELY TO THE GOWAN SD, LONE MTN BRANCH  *********
                * ****NONE OF THIS FLOW IS CONVEYED IN STREET PER LOMR HECRAS***
                * ***************************************************************
                * ***************************************************************
                *

769             KK    D95B
770             KM  RETRIEVE FLOW FROM BOX DIVERSION (CULVERT 3) JUST SOUTH OF US95/RANCHO INTERSE
771             KM  ***NOTE: THIS FLOW CARRIES A DRAINAGE AREA OF 1.47 SQUARE MILES***
772             KM  ***THIS TOTAL ADJUSTED BY STANLEY CONSULTANTS FROM 1.49 IN LBG HEC-1
773             DR    D95B
                *

774             KK   RD95B
775             KM  ROUTE TO 1REMAIN ON RANCHO DRIVE
776             RK    1200   0.004   0.025       0    TRAP      30       2
                *
1                                        HEC-1 INPUT                                    PAGE 22
LINE            ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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```
777          KK 1REMAIN
778          KM  DIVERT 36 CFS EAST THROUGH 2, 24" CMP'S (CULVERT 14) UNDER RANCHO DR
779          KM  NORTHWEST (UPSTREAM) OF THE RANCHO DR AND RAINBOW BLVD INTERSECTION.
780          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
781          KM  UPPER RANCHO HECRAS CROSS SECTION 122+75.
782          DT  D1RCHO
783          DI       0     191    1000   10000
784          DQ       0      36      36      36
             *

785          KK  PT3AB1
786          KM  BASIN REFERENCED FROM LOMR
787          PB    2.77
788          BA   0.049
789          LS       0    93.7
790          UD   0.283
             *

791          KK   C3AB1
792          HC       2
             *

793          KK 2REMAIN
794          KM  DIVERT 29 CFS EAST THROUGH A 30" CMP (CULVERT 15) UNDER RANCHO DR
795          KM  AT THE RANCHO DR AND RAINBOW BLVD INTERSECTION.
796          KM  UPPER RANCHO HECRAS STA. 121+00
797          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
798          DT  D2RCHO
799          DI       0     189    1000   10000
800          DQ       0      29      29      29
             *

801          KK  R2MAIN
802          KM  ROUTE TO PT3AB2
803          RK    1365  0.0022   0.025       0    TRAP      30       2
             *

804          KK  PT3AB2
805          KM  BASIN REFERENCED FROM LOMR
806          PB    2.77
807          BA   0.050
808          LS       0    94.5
809          UD   0.197
             *

810          KK   C3AB2
811          HC       2
             *
1                                        HEC-1 INPUT                                                    PAGE 23

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

812          KK 3REMAIN
813          KM  ALL FLOW UP TO STORMDRAIN DESIGN FLOW RATE, 240 CFS
814          KM  DIVERTED UNDER RANCHO RD AT LONE MT RD TO THE GOWAN SD FACILITY
815          KM  IN LONE MT(NDESIGN BY GCW)AT RANCHO HECRAS STA. 103+99 (LOMR BY LBG)
816          KM  REVISED BY STANLEY CONSULTANTS
817          KM  1 CFS REMAINS TO AVOID A ZERO FLOW
818          KM  FACILITY: GOWAN OUTFALL-LONE MTN ROAD BRANCH
819          KM  FACILITY ID: GOLO 0275
820          DT  D3RCHO
821          DI       0     241    1000   10000
822          DQ       0     240     240     240
             *
             * ***************************************************************
             * ***************************************************************
             * ****END OF FLOW CONVEYED TO GOWAN OUTFALL-LONE MTN ROAD SD****
             * *START OF SURFACE FLOW CONVEYED SOUTH IN SWALE EAST OF RANCHO*
             * *RUNOFF FROM TOTAL AREA CONVEYED TO STORMDRAIN ***************
             * *DECREASE CALCULATED AREA AT HC'S BY 0.1 SQ MI.***************
             * ***************************************************************
             * ***************************************************************
             *

823          KK  R3MAIN
824          KM  ROUTE TO CPT2B2
825          KM  RANCHO HECRAS CROSS SECTION 93+76
826          RK    1023   0.005    0.03       0    TRAP      40       2
             *

827          KK   PT2B2
828          KM  BASIN REFERENCED FROM LOMR
829          PB    2.77
830          BA   0.078
831          LS       0    87.0
832          UD   0.254
             *

833          KK  CPT2B2
834          HC       2
             *

835          KK 4REMAIN
836          KM  DIVERT 35 CFS EAST THROUGH A 36" CMP (CULVERT 21)
837          KM  UNDER RANCHO DR HALF WAY BETWEEN LONE MTN RD AND CRAIG RD
838          KM  UPPER RANCHO HECRAS CROSS SECTION 93+76.
839          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
840          DT  D4RCHO
841          DI       0     214    1000   10000
842          DQ       0      35      35      35
```

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1                                                                                                    PAGE 24
                                                HEC-1 INPUT

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  843     KK  R4MAIN
  844     KM  ROUTE TO C2B3
  845     RK    2323   0.011    0.02       0    TRAP      40       2
          *

  846     KK   PT2B3
  847     KM  BASIN REFERENCED FROM LOMR
  848     PB    2.77
  849     BA   0.023
  850     LS      0    93.2
  851     UD   0.236
          *

  852     KK    C2B3
  853     KM  UPPER RANCHO HECRAS CROSS SECTION 70+16
  854     KM   FLOW ALONG RANCHO, NO. OF RANCHO/CRAIG INTERSECTION
  855     HC       2
          *

  856     KK    D2B3
  857     KM  DIVERT FLOW TO CRAIG RD STORM DRAIN AT RANCHO.
  858     KM  CRAIG RD STORM DRAIN IS A 42" TO 48" TO 60" RCP.
  859     KM  A 48" LATERAL (CULVERT 22) INTO THE SD HAS A CAPACITY OF 120 CFS
  860     KM  HY-8 CALCULATIONS INDICATE OF THE 91 CFS 100 YEAR STORM; 88 CFS IS CAPTURED BY
  861     KM  THE INLET TO THE 48"LATERAL IS AT THE DOWNSTREAM END OF THE DRAINAGE EASEMENT
  862     KM  BEHIND THE 7-11 CONVENIENCE STORE. IMMEDIATELY ABOVE THE 48" INLET ARE
  863     KM  2, 3'X7' RCB'S (CULVERT 23) THAT CROSS UNDER CRAIG ROAD AND DISCHARGE ON THE
  864     KM  SOUTHWEST SIDE OF THE CRAIG/RANCHO INTERSECTION.
  865     KM  DIVERT 120 CFS TO THE CRAIG RD STORM DRAIN SINCE 90 CFS (HEC-1 DIVERSION DCSD1
  866     KM  ALREADY EXISTS IN THE PIPE. REMAINING FLOW TRAVELS UNDER CRAIG ROAD IN THE
  867     KM  2: 3'X7' RCB'S AND DISCHARGES AT THE SOUTHWEST CORNER OF THE CRAIG/RANCHO
  868     KM  INTERSECTION AND IS JOINED BY THE STREET FLOW IN CRAIG. ALL STREET FLOW
  869     KM  IN CRAIG IS CONTAINED IN THE NORTH HALF OF THE STREET BY THE MEDIAN CURB SO
  870     KM  THERE IS NO DIVERSION TO TORREY PINES.
  871     KM  UPPER RANCHO HECRAS STA. 70+00.
  872     DT   DCSD2
  873     DI       0      91    1000   10000
  874     DQ       0      88     120     120
          *

  875     KK   PT2A2
  876     KM  BASIN REFERENCED FROM LOMR
  877     PB    2.77
  878     BA   0.062
  879     LS      0    84.7
  880     UD   0.222
          *

  881     KK    R2A2
  882     KM  ROUTE TO C2A1
  883     RK    1200   0.004   0.015       0    TRAP     100       2
          *
1                                               HEC-1 INPUT                                          PAGE 25

LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  884     KK   PT2A1
  885     KM  BASIN REFERENCED FROM LOMR
  886     PB    2.77
  887     BA   0.065
  888     LS      0    86.8
  889     UD   0.308
          *

  890     KK    D95E
  891     KM  RETRIEVE FLOW FROM BOX DIVERSION AT US95 AND CRAIG (CULVERT 7)
  892     KM  ***NOTE: THIS FLOW CARRIES A TOTAL TRIBUTARY AREA****
  893     KM  ***OF 4.77/18.58 SQUARE MILES SDN3/SDN5**************
  894     KM  THIS IS NOT IN ADDITION TO THE 1.47 SQUARE MILES BROUGHT IN BY D95B, SO
  895     KM  THE TOTAL TRIBUTARY AREA TO THE CRAIG/RANCHO INTERSECTION IS
  896     KM  MILES 4.77 + AREA AT C2B3 - AREA CAPTURED IN GOWAN SD LN MTN BRANCH
  897     DR    D95E
          *

  898     KK   RD95E
  899     KM  ROUTE TO PT2A2
  900     RK    1500   0.004   0.015       0    TRAP      80       2
          *

  901     KK    C2A2
  902     HC       3
          *

  903     KK  DPT2A1
  904     KM  DIVERT FLOW TO CRAIG RD. STORM DRAIN
  905     KM  42" RCP, CAPACITY = 90 CFS
  906     KM  REMAINING FLOW CONTINUES EAST IN CRAIG RD.
  907     KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
  908     DT   DCSD1
  909     DI       0      21      51      76      91     200     500    1000
  910     DQ       0      20      50      75      90      90      90      90
          *

  911     KK    R2A2
  912     KM  ROUTE TO C2B1
```

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 913          RK    2100   0.007   0.015       0    TRAP      80       2
              *

 914          KK   PT2B1
 915          KM  BASIN REFERENCED FROM LOMR
 916          PB    2.77
 917          BA   0.072
 918          LS      0    84.5
 919          UD   0.222
              *
1                                        HEC-1 INPUT                                                    PAGE 26
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 920          KK    C2B1
 921          HC       2
              *

 922          KK    R2B1
 923          KM  ROUTE TO 2C2B3
 924          KM  STREET FLOW IN CRAIG RD GOING EAST TO RANCHO DR
 925          RK     300   0.007   0.015       0    TRAP      80       2
              *

 926          KK   2C2B3
 927          HC       2
              *

 928          KK   RC2B3
 929          KM  ROUTE TO 5REMAIN
 930          KM  UPPER RANCHO HECRAS CROSS SECTION 53+82
 931          RK    1600  0.0076    0.03       0    TRAP      80       2
              *

 932          KK   PT51A
 933          KM  BASIN ADDED BY STANLEY CONSULTANTS, ORIGINALLY THE NORTHERN HALF
 934          KM  OF LOMR BASIN PT51, ALSO NORTHEAST PORTION OF MPU BASIN PT41-C
 935          KM  FLOW DISCHARGES INTO CHANNEL ON WEST SIDE OF RANCHO
 936          KM  CONTINUES SOUTH
 937          PB    2.77
 938          BA   0.035
 939          LS      0    93.2
 940          UD   0.128
              *

 941          KK   C2628
 942          HC       2
              *

 943          KK 5REMAIN
 944          KM  DIVERT FLOW EAST ACROSS RANCHO IN TWO 6' X 3' RCB's (CULVERT 26 AND 28).
 945          KM  THE FIRST RCB (CULVERT 26) IS JUST UPSTREAM OF A 7' X 3' RCB (CULVERT 27)
 946          KM  THAT PARALLELS RANCHO ON THE WEST SIDE.
 947          KM  DIVERT 78 CFS OF 185 CFS EAST IN (CULVERT 26).
 948          KM  THE REMAINING 107 CFS ENTERS CULVERT 27 AND CONTINUES SOUTH UNTIL IT SPLITS
 949          KM  AT THE CONNECTION WITH CULVERT 28.
 950          KM  DIVERT 35 CFS OF THE 107 CFS EAST IN CULVERT 28.
 951          KM  THE REMAINING 72 CFS CONTINUES TO THE SOUTH SIDE OF ALEXANDER IN CULVERT 27
 952          KM  UPPER RANCHO HECRAS HAS CULVERT 27 IN IT BETWEEN STA 52+64 AND 38+36.
 953          KM  IN INTERIM AND DEVELOPED CONDITIONS THESE FLOWS WILL ENTER THE CCRFCD
 954          KM  STORM DRAIN FACILITY (GOAL 0111) AT THESE LOCATIONS.
 955          DT  D5RCHO
 956          DI       0     185    1000   10000
 957          DQ       0     113     113     113
              *
1                                        HEC-1 INPUT                                                    PAGE 27
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 958          KK  R5REMN
 959          KM  ROUTE TO CPT51
 960          KM  UPPER RANCHO HECRAS CROSS SECTION 38+36
 961          RK    1428   0.006    0.03       0    TRAP       7       0
              *

 962          KK   PT51B
 963          KM  BASIN ADDED BY STANLEY CONSULTANTS, ORIGINALLY THE SOUTHERN HALF
 964          KM  OF LOMR BASIN PT51, ALSO SOUTHEAST PART OF MPU BASIN PT41-C
 965          PB    2.77
 966          BA   0.035
 967          LS      0    93.2
 968          UD   0.147
              *
              * KKPT51
              * THIS BASIN WAS DIVIDED INTO SMALLER SUBBASINS BY STANLEY CONSULTANTS, SEE
              * ABOVE (PT51A AND PT51B) TO PROVIDE MORE DETAIL ON WHERE FLOWS WILL ENTER THE
              * PROPOSED CCRFCD STORM DRAIN SYSTEM IN CRAIG ROAD, RANCHO
              * DRIVE, AND ALEXANDER/JONES BOULEVARD IN INTERIM AND DEVELOPED CONDITIONS
              * PB2.77
              * BA0.070
              * LS0         90.4
              * UD0.262
              *

 969          KK   CPT51
 970          KM  WEST SIDE RANCHO, NORTH OF ALEXANDER (JONES NORTH)
 971          HC       2
              *
              * KKD95Fa
              * KMRETRIEVE FLOW FROM WEIR DIVERSION AT US95 AND ALEXANDER
```

```
                * DRD95Fa
                *
                * THESE TWO DIVERSIONS CARRY A TOTAL TRIBUTARY AREA OF 18.68.
                * THIS IS NOT IN ADDITION TO THE 1.49 SQUARE MILES AND 2.35
                * SQUARE MILES BROUGHT IN BY D95B AND D95E RESPECTIVELY, SO THE TOTAL
                * TRIBUTARY AREA AT THE ALEXANDER/RANCHO INTERSECTION IS 19.69 SQUARE MILES.
                * (18.68 + 1.01)
                * AREA ADJ TO SND3 RESULTS, 5.61 SQ MI, BY STANLEY CONSULTANTS
                *
 972            KK    D95F
 973            KM  RETRIEVE FLOW FROM CULVERT 10 AND WEIR DIVERSION AT US95 AND ALEXANDER
 974            DR    D95F
                *
 975            KK   RD95F
 976            KM  ROUTE TO CPT6A
 977            RK    1500   0.004   0.015       0    TRAP     100       2
                *
1                                          HEC-1 INPUT                                          PAGE 28
LINE            ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 978            KK     PT3
 979            KM  BASIN REFERENCED FROM LOMR
 980            PB    2.77
 981            BA   0.148
 982            LS       0    86.9
 983            UD   0.211
                *
 984            KK    PT6A
 985            KM  BASIN REFERENCED FROM LOMR
 986            PB    2.77
 987            BA   0.024
 988            LS       0    90.3
 989            UD   0.231
                *
 990            KK   CPT6A
 991            HC       3
                *
 992            KK   RPT6A
 993            KM  ROUTE TO PT42
 994            RK    2450   0.007   0.015       0    TRAP     100       2
                *
 995            KK    PT41
 996            KM  BASIN REFERENCED FROM LOMR
 997            PB    2.77
 998            BA   0.137
 999            LS       0    82.0
1000            UD   0.220
                *
1001            KK   RPT41
1002            KM  ROUTE TO CPT42
1003            RK    1050  0.0038   0.015       0    TRAP      80       2
                *
1004            KK    PT42
1005            KM  BASIN REFERENCED FROM LOMR
1006            PB    2.77
1007            BA   0.079
1008            LS       0    82.0
1009            UD   0.303
                *
1010            KK   CPT42
1011            HC       2
                *
1                                          HEC-1 INPUT                                          PAGE 29
LINE            ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1012            KK   PT5A1
1013            KM  BASIN REFERENCED FROM LOMR
1014            PB    2.77
1015            BA   0.051
1016            LS       0    88.3
1017            UD   0.237
                *
1018            KK    C5A1
1019            HC       3
                *
1020            KK    R5A1
1021            KM  ROUTE TO CPT52
1022            RK    1680  0.0089   0.015       0    TRAP     100       2
                *
1023            KK   PT5A4
1024            KM  BASIN REFERENCED FROM LOMR
1025            PB    2.77
1026            BA   0.034
1027            LS       0    82.0
1028            UD   0.284
                *
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1029          KK    PT52
1030          KM  BASIN REFERENCED FROM LOMR
1031          PB    2.77
1032          BA   0.065
1033          LS       0    82.0
1034          UD   0.273
              *

1035          KK   CPT52
1036          KM  ALEXANDER WEST OF RANCHO
1037          HC       3
              *

1038          KK   RPT52
1039          KM  ROUTE TO 2CPT51
1040          KM  UPPER RANCHO HECRAS CROSS SECTION 38+36, SAME AS CPT51
1041          RK     560  0.0036   0.015       0    TRAP     100       2
              *

1042          KK  2CPT51
1043          KM  RANCHO ALEXANDER INTERSECTION (JONES SOUTH)
1044          HC       2
              *
1                                        HEC-1 INPUT                                        PAGE 30

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1045          KK R2CPT51
1046          KM  ROUTE TO 2CPT51
1047          KM  UPPER RANCHO HECRAS CROSS SECTION 29+79
1048          RK     857  0.0036   0.015       0    TRAP     100       2
              *

1049          KK 6REMAIN
1050          KM  DIVERT 14 CFS TO AN 18" CMP (CULVERT 29) AT NORTHWEST CORNER OF THE JONES
1051          KM  AND RANCHO INTERSECTION.  CULVERT 29 DISCHARGES TO THE CATCH BASIN OF A DROP
1052          KM  INLET ON THE SOUTHEAST SIDE OF JONES AND THE WEST SIDE OF RANCHO.
1053          KM  DIVERT 48 CFS TO THE DROP INLET (13' CURB OPENING W/2.5' GRATE) FOR A TOTAL
1054          KM  OF 52 CFS. THE CATCH BASIN DISCHARGES TO A 36" CMP (CULVERT 30) THAT CROSSES
1055          KM  RANCHO AND DISCHARGES TO THE EAST SIDE. DIVERT ADDITONAL FLOW ACROSS RANCHO
1056          KM  AS WEIR FLOW BETWEEN CROSS SECTIONS 38+36 AND 28+01. RATING CURVE DEVELOPED
1057          KM  USING HECRAS LATERAL WEIR BY LGB 7-13-2005. REMAINING FLOW CONTINUES SOUTH
1058          KM  ON THE WEST SIDE OF RANCHO.
1059          DT  D6RCHO
1060          DI       0      53     146     400     600     700
1061          DQ       0      40      52      75     126     163
              *

1062          KK  R6MAIN
1063          KM  ROUTE TO C5A6
1064          RK     699  0.0025    0.03       0    TRAP      80       2
              *

1065          KK   PT5A2
1066          KM  BASIN REFERENCED FROM LOMR
1067          PB    2.77
1068          BA   0.080
1069          LS       0    85.8
1070          UD   0.257
              *

1071          KK    R5A2
1072          KM  ROUTE TO C5A6
1073          RK    3920  0.0064   0.015       0    TRAP      60       2
              *

1074          KK   PT5A6
1075          KM  BASIN REFERENCED FROM LOMR
1076          PB    2.77
1077          BA   0.188
1078          LS       0    82.9
1079          UD   0.195
              *

1080          KK    C5A6
1081          KM  UPPER RANCHO HECRAS CROSS SECTION 22+80
1082          HC       3
              *
1                                        HEC-1 INPUT                                        PAGE 31

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1083          KK 7REMAIN
1084          KM  DIVERT FLOW EAST ACROSS RANCHO IN A 6' X 2' RCB (CULVERT 31).
1085          KM  REMAINING FLOW CONTINUES SOUTH ON THE WEST SIDE OF RANCHO
1086          KM  REVISED BY LBG (CULVERT 31=102 to 107 cfs) WEIR FLOW RATING
1087          KM  CURVE DEVELOPED WITH HECRAS LATERAL WEIR #1 FROM 28+01 TO 22+80
1088          DT  D7RCHO
1089          DI       0     108     146     400     500     600     650
1090          DQ       0      99     102     126     140     174     185
              *

1091          KK  R7MAIN
1092          KM  ROUTE TO C5A7
1093          KM  UPPER RANCHO HECRAS CROSS SECTION 14+56
1094          RK     824   0.004    0.03       0    TRAP      80       2
              *

1095          KK    DMAV
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```
1096          KM  RETRIEVE FLOW FROM MAVERICK
1097          DRMAVERICK
              *

1098          KK    RMAV
1099          KM  ROUTE TO CPT5A6
1100          RK    3180  0.0064   0.015       0    TRAP      60
              *

1101          KK    CMAV
1102          HC       2
              *

1103          KK  DPT5A7
1104          KM  DIVERT FLOW ACROSS RANCHO AS WEIR FLOW NEAR DUNCAN ROAD, BETWEEN
1105          KM  CROSS SECTIONS 19+32 AND 14+56. RATING CURVE BY LBG 7-13-2005
1106          KM   USING LATERAL WEIR IN HECRAS.
1107          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG THE WEST SIDE OF RANCHO
1108          DT DDUNCAN
1109          DI       0     146     200     352     552     800
1110          DQ       0      35      77     139     297     460
              *

1111          KK   PT5A7
1112          KM  BASIN REFERENCED FROM LOMR
1113          PB    2.77
1114          BA   0.074
1115          LS       0    84.4
1116          UD   0.351
              *

1117          KK    C5A7
1118          KM  DUNCAN/RANCHO INTERSECTION
1119          HC       2
              *
```

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HEC-1 INPUT PAGE 32

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1120          KK    R5A7
1121          KM  ROUTE TO 8REMAIN
1122          KM  UPPER RANCHO HECRAS CROSS SECTION 9+83
1123          RK     473   0.004    0.03       0    TRAP      80       2
              *

1124          KK 8REMAIN
1125          KM  DIVERT 24 CFS EAST ACROSS RANCHO IN A 24" CMP (CULVERT 32).
1126          KM  REMAINING FLOW CONTINUES SOUTH ON THE WEST SIDE OF RANCHO
1127          KM  REVISED TO 23 CFS BY LBG. WEIR FLOW ACROSS RANCHO CALCULATED
1128          KM  USING HECRAS LATERAL WEIR #3 BETWEEN CROSS SECTION 9+83 AND 7+43.
1129          DT  D8RCHO
1130          DI       0      24     100     200     300     400     500     600
1131          DQ       0      23      23      54     122     200     273     346
              *

1132          KK  R8MAIN
1133          KM  ROUTE TO C5A9
1134          KM  UPPER RANCHO HECRAS CROSS SECTION 0+00
1135          RK     983   0.003   0.025       0    TRAP      20       2
              *

1136          KK   PT5A9
1137          KM  BASIN REFERENCED FROM LOMR
1138          PB    2.77
1139          BA   0.045
1140          LS       0    85.7
1141          UD   0.246
              *

1142          KK    C5A9
1143          KM  GOWAN & RANCHO
1144          HC       2
              *

1145          KK  GWAN5A
1146          KM  10 AND 25 YEAR EVENT ONLY - FULL IN 100 YEAR EVENT
1147          KM  DIVERT MAXIMUM OF 40 CFS (DESIGN FLOW RATE) OF SOUTHBOUND FLOW
1148          KM  IN RANCHO INTO GOWAN OUTFALL SD AT RANCHO/GOWAN INTERSECTION,
1149          KM  REMAINING FLOW TRAVELS SOUTH. ADDED BY STANLEY CONSULTANTS
1150          KM  FACILITY: GOWAN OUTFALL FACILITIES
1151          KM  FACILITY ID: G00F 0511
1152          DT  GOOF5A
1153          DI       0       0      40   10000
1154          DQ       0       0      40      40
              *

1155          KK C2PT5A9
1156          KM
1157          HC       2
              *
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1

HEC-1 INPUT PAGE 33

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1158          KK  GOWAN5
1159          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I [SIC]
1160          KM  BY POGGEMEYER DESIGN GROUP, INC
1161          KM  DIVERT MAXIMUM OF 1 CFS INTO GOWAN OUTFALL (FACILITY G00F 0486)
1162          KM  AT RANCHO REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
1163          KM  REVISED BY LBG. GOOF IS FULL.
```

```
1164          DT   GOOF5
1165          DI       0      49    5000
1166          DQ       0       1       1
              *

1167          KKDEASTGOW
1168          KM  FLOW SPLIT AT GOWAN AND RANCHO INTERSECTION. DIVERT MAJORITY OF FLOW
1169          KM  TO RANCHO SOUTH OF GOWAN RD BETWEEN CROSS-SECTIONS 983 AND 0.
1170          KM  THE REMAINING FLOW TRAVELS EAST ON GOWAN.
1171          KM  (THIS IS A LITTLE STRANGE.  THE DIVERTED FLOW IS
1172          KM  WHAT ACTUALLY CONTINUES ON RANCHO SOUTH!)
1173          KM  DIVERSION RENAMED FROM "GOWAN" TO LWRRNCH
1174          KM  NODE RENAMED FROM "DRANCHO" TO "DEASTGOW"
1175          DT LWRRNCH
1176          DI       0     400     600    1000    1200    1400    1600    2000    2400
1177          DQ       0     372     502     730     842     955    1068    1305    1553
              *
              * ************************************************************
              * ************END OF PBS&J MODEL, REFERENCED BY LOMR***********
              * **START MODEL OF EASTBOUND FLOW IN GOWAN ADDED BY STANLEY*****
              * ************************************************************
              * ************************************************************
              *

1178          KKRDEASTGOW
1179          KM  ROUTE FLOW TO GOWAN/DECATUR INTERSECTION AND COMBINE WITH BASIN CY08-C
1180          RK    3250   0.006   0.016       0    TRAP      80       2
              *

1181          KK  CY08-C
1182          KM  BASIN REFERENCED FROM 2008 MPU ALLGOW3.DAT
1183          BA   0.094
1184          PB    2.77
1185          LS       0    88.5
1186          UD   0.306
              *
1187          KM  KKCCCY08-C
1188          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1189          KM  COMBINE CY08-C, CCY08-C, AND RDCY07B
1190          KM  GOWAN AND DECATUR
1191          KM  HC3
              *
1192          KM  KKDGOW2A
1193          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1194          KM  DIVERT FLOW TO GOWAN OUTFALL
1195          KM  DIVERSION BASED ON GOWAN ROAD DRAINAGE STUDY BY POGGEMEYER
1196          KM  8'X 5' RCB, CAPACITY = 630 CFS (GOOF 0486)
1197          KM  REMAINING FLOW CONTINUES EAST IN GOWAN RD. AND ENTERS THE CENTRAL BASIN
1
                                      HEC-1 INPUT                                    PAGE 34

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

1198          KM  OPPOSITE OF DGOW2A IN CWH
1199          KM  DTDCENTRAL
1200          KM  DIO       31      51      71     101     301     601     631    3000    5000
1201          KM  DQO        1       1       1       1       1       1       1    2370    4370
              *
1202          KM  KKRDGOW2A
1203          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1204          KM  ROUTE DGOW2A TO CPT5B6-C
1205          KM  FACILITY = GOWAN NORTH SYSTEM
1206          KM  FACILITY # = GOOF 0427, 0485
1207          KM  LINING = RCP
1208          KM  RD2370    0.005   0.013   0       CIRC    8       0
              *

1209          KK  CCY08C
1210          KM  COMBINE RDEASTGOW AND CY08-C AT DECATUR GOWAN INTERSECTION
1211          KM  IN EXISTING CONDITION THIS FLOW WILL CONTINUE EAST IN GOWAN
1212          HC       2
              *

1213          KK   DGWN6
1214          KM  GOWAN OUTFALL FULL
1215          KM  DIVERT 1 CFS TO GOWAN OUTFALL AT GOWAN/DECATUR INTERSECTION
1216          DT   GOOF6
1217          DI       0      31      51      71     101     301    1001    2001    3001    5001
1218          DQ       0       1       1       1       1       1       1       1       1       1
              *

1219          KK   DALEX
1220          KM  DIVERT EASTBOUND SURFACE FLOW AT GOWAN/DECATUR INTERSECTION
1221          KM  THE REMAINING FLOW TRAVELS NORTH IN ALEXANDER
1222          KM  RATING TABLE FROM FLOW SPLIT CALCULATION BY STANLEY CONSULTANTS
1223          DT  DEGWN6
1224          DI       0     100     200     260     360
1225          DQ       0      71     143     185     257
              *
1226          KM  KKRDALEX
1227          KM  ROUTE SURFACE FLOW IN DECATUR TO DECATUR/ALEXANDER INTERSECTION
1228          KM  RD  2640   0.005    .016            TRAP     100       2
              *

1229          KK   CUL30
1230          KM  RETRIEVE FLOW FROM CULVERT 30
1231          DR  D6RCHO
              *

1232          KK  RCUL30
1233          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1234          RK    5000    0.01   0.016       0    TRAP      80       2
              *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1235      KK   CUL31
1236      KM  RETRIEVE FLOW FROM CULVERT 31
1237      DR  D7RCHO
          *

1238      KK  RCUL31
1239      KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1240      RD    4750    0.01   0.016       0    TRAP      80       2
          *

1241      KK  DUNCAN
1242      KM  RETRIEVE FLOW FROM DUNCAN
1243      DR DDUNCAN
          *

1244      KK RDUNCAN
1245      KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1246      RD    5450    0.01   0.016       0    TRAP      80       2
          *

1247      KK   CUL32
1248      KM  RETRIEVE FLOW FROM CULVERT 32
1249      DR  D8RCHO
          *

1250      KK  RCUL32
1251      KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1252      RD    5100    0.01   0.016       0    TRAP      80       2
          *

1253      KK  CPT56B
1254      KM  COMBINE ROUTES IN BASIN PT5B6-C AT ALEXANDER/DECATUR
1255      HC       4
          *

1256      KK PT5B6-C
1257      KM  BASIN REFERENCED FROM 2008 MPU ALLGOW3.DAT
1258      BA   0.381
1259      PB    2.77
1260      LS       0    86.3
1261      UD   0.368
          *

1262      KK CCPT56B
1263      KM  COMBINE PT5B6-C AND CPT56B AT ALEXANDER/DECATUR
1264      HC       2
          *

1265      KKCCCPT56B
1266      KM  COMBINE SURFACE FLOW IN ALEXANDER/DECATUR INTERSECTION
1267      HC       2
          *
1268      KM  KKCCPT5B6C
1269      KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
```



```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1270      KM  KMCOMBINE PT5B6-C AND CPT5B6-C
1271      KM  KMDECATUR AND ALEXANDER
1272      KM  HC2
          *
1273      KM  KKRCCPT5B6
1274      KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1275      KM  KMROUTE CCPT5B6C TO CPT5C-1
1276      KM  KMFACILITY = GOWAN OUTFALL FACILITIES
1277      KM  KMFACILITY # = GOOF 0375
1278      KM  KMLINING = RCB
1279      KM  RD2700    0.0056  0.015   0       TRAP    24      0
          *

1280      KK  0511-1
1281      KM  RETRIEVE FLOW IN GOOF 0511 AT US95/GOWAN
1282      DR   GOOF1
          *

1283      KK  0511-2
1284      KM  RETRIEVE FLOW IN GOOF 0511 AT RAINBOW/GOWAN
1285      DR   GOOF2
          *

1286      KK  0511-3
1287      KM  RETRIEVE FLOW IN GOOF 0511 AT TORREY PINES/GOWAN
1288      DR   GOOF3
          *

1289      KK  0511-4
1290      KM  RETRIEVE FLOW IN GOOF 0511 AT JONES/GOWAN
1291      DR   GOOF4
          *

1292      KK GOOF1-4
1293      KM  THIS REPRESENTS THE FLOW IN GOOF 0511 AT JONES/GOWAN
1294      HC       4
          *

1295      KK 0511-5A
```

```
1296          KM  RETRIEVE FLOW IN GOOF 0511 AT RANCHO/GOWAN
1297          DR  GOOF5A
              *

1298          KKGOOF1-5A
1299          KM  THIS REPRESENTS THE FLOW IN GOOF 0511 AT RANCHO/GOWAN
1300          HC       2
              *

1301          KK  0511-5
1302          KM  RETRIEVE FLOW IN GOOF EAST OF RANCHO
1303          DR   GOOF5
              *
1                                        HEC-1 INPUT                                        PAGE 37

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1304          KK  0486-1
1305          KM  RETRIEVE FLOW IN GOOF EAST OF RANCHO AT GOWAN
1306          DR   GOOF6
              *

1307          KK    0486
1308          KM  THIS REPRESENTS THE FLOW IN GOOF 0486 AT ALEXANDER/GOWAN
1309          HC       3
              *

1310          KK RDGOW2A
1311          KM  REFERENCED FROM 2008 MPU ALLGOW3.DAT
1312          KM  ROUTE DGOW2A TO CPT5B6-C
1313          KM  FACILITY = GOWAN NORTH SYSTEM
1314          KM  FACILITY # = GOOF 0427, 0485
1315          KM  LINING = RCP
1316          RD    2370   0.005   0.013       0    CIRC       8       0
              *

1317          KKCCCPT5B6C
1318          KM  COMBINE FACILITY FLOW AND SURFACE FLOW AT THE
1319          KM  ALEXANDER/DECATUR INTERSECTION
1320          HC       2
              *
              * ***************************************************************
              * ********END GOWAN EASTBOUND FLOW MODEL BY STANLEY*************
              * **********BEGIN CVL MODEL REFERENCED BY LOMR******************
              * ***************************************************************
              * ***************************************************************
              *

1321          KK   GOWAN
1322          KM  RETRIEVE DIVERSION GOWAN
1323          KM  THE FLOW DIVERTED SOUTH IN RANCHO FROM GOWAN INTERSECTION
1324          DR LWRRNCH
              *

1325          KK CENTRL1
1326          KM  ADDED BY LBG
1327          KM  FLOW OVER RANCHO AT GOWAN RD BETWEEN 0+00 OF UPPER RANCHO HECRAS
1328          KM  MODEL AND 174+98 OF THE LOWER RANCHO MODEL.
1329          KM  (0+00 OF UPPER RANCHO MODEL = 177+03.33 OF LOWER RANCHO MODEL)
1330          KM  STATIONING OF UPPER RANCHO MODEL CORRESOPONDS TO ORIGNAL FIS.
1331          KM  MOST CROSS SECTIONS ARE IDENTICAL TO ORIGINAL EFFECTIVE MODEL.
1332          DT  D9RCHO
1333          DI       0     100     200     300     400     800    1000    1478
1334          DQ       0       8      61     121     176     424     522     811
              *
1                                        HEC-1 INPUT                                        PAGE 38

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1335          KK  TRUVAL
1336          KM  RETRIEVE TRUE VALUE DIVERSION DETERMINED WITH HECRAS LATERAL WEIR
1337          DR  TRUVAL
              *

1338          KK   CBDV1
1339          KM  COMBINE TRUVAL AND GOWAN
1340          KM  HECRAS STATION 17173.04 OF LOWER RANCHO MODEL
1341          HC       2
              *

1342          KK  MORBAY
1343          KM  RETRIEVE DIVERSION MORBAY (DCY07B FROM JONES/GOWAN)
1344          KM  MORBAY FROM CVL STUDY, DCY07B IN PBS&J STUDY
1345          DR  DCY07B
              *

1346          KKCBDVMORBAY
1347          KM  COMBINE GOWAN & MORBAY
1348          KM  HECRAS STATION 171+73.04 OF LOWER RANCHO MODEL
1349          HC       2
              *

1350          KK CENTRL2
1351          KM  ADDED BY LBG
1352          KM  2: 6'X2' RCBC UNDER RANCHO JUST SOUTH OF MICHAEL WAY
1353          KM  ID RAN 190 FROM NORTHWEST NEIGHBORHOOD STUDY
1354          DT D10RCHO
1355          DI       0      21      73     100    1000    2000
1356          DQ       0      20      72     100     200     200
              *
```

```
1357          KK   RTCHY
1358          KM  ROUTE TO CHEYENNE/RANCHO
1359          RM       3    0.32    0.15
              *
              * KKCBCX5
              * KMCOMBINE WITH CX5 AT CHEYENNE/RANCHO INTERSECTION
              * HC      2
              *

1360          KK   DVWR1
1361          KM  OVERFLOW CHEYENNE/RANCHO INTERSECTION HECRAS STATION 144+11.04
1362          KM  OF LOWER RANCHO MODEL
1363          DT  DVSTR1
1364          DI       0     167     261     622    1272
1365          DQ       0       0      36     180     455
              *
1
                                        HEC-1 INPUT                                    PAGE 39
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

1366          KK   DVWR2
1367          KM  24" PIPE RANCHO
1368          DT  DVSTR2
1369          DI       0      10      20      30      37     100     500
1370          DQ       0      10      20      30      37      37      37
              *

1371          KK     RX5
1372          KM  ROUTE TO 6 X 3 RCB
1373          RM       1     0.1     0.3
              *
              *
              * ************************************************************
              * ********END SDN 3 ANALYSIS FOR UPPER HEC-1 MODEL *************
              * ******** NORTH OF CHEYENNE *********************************
              * ********BEGIN HEC-1 FOR SDN3 ANALYSIS FOR LOWER HEC-1 MODEL***
              * ****SEE RANCHO LOMR FOR SEPARATE ANALYSIS AND CHECK OF sDN5***
              * ************************************************************
              *

1374          KK      X4
1375          KM  BASIN REFERENCED FROM LOMR
1376          KM  BASIN AREA USED IS REFERENCED FROM LBG SND3 MODEL
1377          KM  LBG LOMR REFERENCES THE SND5 MODEL, WHICH HAD AREA OF 0.698
1378          KM  PER LBG - THIS BASIN AREA REDUCED IN SIZE [FROM 0.810 TO 0.698)
1379          KM  TO TIE INTO BASINS FROM PBS&J MODEL
1380          PB    2.77
1381          BA   0.810
1382          LS       0      91
1383          UD     1.9
              *

1384          KK     X3B
1385          KM  BASIN REFERENCED FROM LOMR
1386          BA     .16
1387          LS       0      88
1388          UD    0.54
              *

1389          KK    CUL4
1390          KM  ROUTE THRU 2-6 X 4 689+30
1391          RS       1    ELEV    13.5
1392          SV       0     .32      18
1393          SE    13.5      15      18
1394          SQ       0      60     245
              *

1395          KK     X3A
1396          KM  BASIN REFERENCED FROM LOMR
1397          BA     .12
1398          LS       0      88
1399          UD    0.49
              *
1
                                        HEC-1 INPUT                                    PAGE 40
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

1400          KK    CUL8
1401          KM  MAXIMUM Q INCREASED TO 50 CFS BY LBG TO ACCOMMODATE HIGHER FLOWS
1402          KM  STANLEY CONSULTANTS REFERENCED THE SDN3 MODEL
1403          KM  TO OBTAIN THE LAST COLUMN
1404          KM  24"  674+06
1405          RS       1    ELEV    18.5
1406          SV       0     1.1     3.6     3.7     3.9
1407          SE    18.5    20.5    22.5    22.6      23
1408          SQ       0      15      28      50      75
              *

1409          KK   CX3AB
1410          KM  COMBINE X3A &  X3B
1411          HC       2
              *

1412          KK   RK3AB
1413          KM  ROUTE TO JONES
1414          RM      10     1.0      .3
              *

1415          KK      CX
```

```
1416          HC       2
              *

1417          KK   DEVX4
1418          KM  DIVERT 100 CFS TO CHEYENNE
1419          DT   DEVX4
1420          DI       0      50     100     200     500    1000    5000
1421          DQ       0      25      50     100     100     100     100
              *

1422          KK     RK4
1423          KM  ROUTE X4 SOUTH ON MICHAEL WAY TO LOW POINT
1424          KM  THEN TO RANCHO
1425          RM       2     0.2     0.4
              *

1426          KK     X3C
1427          KM  BASIN REFERENCED FROM LOMR
1428          BA     .48
1429          LS       0      81
1430          UD    1.52
              *

1431          KK    SD1A
1432          KM  DROP   INLET  AT  BROOKS/JONES INTERSECTION
1433          DT    SD1A
1434          DI       0      50      93     285     500
1435          DQ       0       5      13      21      21
              *
1                                        HEC-1 INPUT                                    PAGE 41

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1436          KK    RK3C
1437          KM  ROUTE TO RANCHO
1438          KM  MUSKINGUM X COEFFICENT (COL 3) ADJUSTED BY LBG TO 0.40
1439          KM  TO PREVENT INSTABILITY
1440          RM       2     0.2    0.40
              *

1441          KK      X3
1442          KM  BASIN REFERENCED FROM LOMR
1443          BA    0.34
1444          LS       0      92
1445          UD    0.71
              *

1446          KK     CX3
1447          KM  COMBINE X3 X4 TO X3C
1448          HC       3
              *

1449          KK    DTX4
1450          KM  RETRIEVE DIVERT FLOW X4
1451          DR   DEVX4
              *

1452          KK    RDEX
1453          KM  ROUTE TO CHEYENNE
1454          KM  MUSKINGUM X COEFFICENT (COL 3) SND5 MODEL BY LBG USED 0.40 TO PREVENT
1455          KM  INSTABILITY
1456          KM  MUSKINGUM X COEFFICENT (COL 3) SND3 MODEL BY STANLEY CONSULTANTS ALSO
1457          KM  USED 0.40 TO PREVENT INSTABILITY
1458          RM       1     0.1    0.40
              *

1459          KK    BSX5
1460          KM  BASIN REFERENCED FROM LOMR
1461          KM  THE SDN5 MODEL BY LBG USED BA = 0.047 AND US = 0.122
1462          KM  THE SDN3 MODEL BY LBG USED BA = 0.100 AND US = 0.420
1463          BA   0.100
1464          LS       0      92
1465          UD   0.420
              *

1466          KK     CX5
1467          KM  COMBINE BSX5 & DEVX4
1468          HC       2
              *

1469          KK   DVWR1
1470          KM  REPEATED FROM UPPER MODEL
1471          KM  OVERFLOW CHEYENNE/RANCHO INTERSECTION HECRAS STATION 144+11.04
1472          KM  OF LOWER RANCHO MODEL
1473          DT  DVSTR1
1474          DI       0     167     261     622    1272
1475          DQ       0       0      36     180     455
              *
1                                        HEC-1 INPUT                                    PAGE 42

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1476          KK   DVWR2
1477          KM  REPEATED FROM UPPER MODEL
1478          KM  24" PIPE RANCHO
1479          DT  DVSTR2
1480          DI       0      10      20      30      37     100     500
1481          DQ       0      10      20      30      37      37      37
              *
```

```
1482            KK     RX5
1483            KM  ROUTE TO 6 X 3 RCB
1484            RM       1     0.1     0.3
                *

1485            KK   CX4X3
1486            KM  COMBINE X4 TO X3
1487            HC       2
                *

1488            KK   DVBOX
1489            KM  ROUTE FLOW THRU 6 X 3 BOX (MEA)  HECRAS STATION 126+38
1490            KM  LOCATED AT RANCHO NO. DECATUR (END OF PROJECT)
1491            DT   DVBOX
1492            DI       0      50     100     170     210     700    5000
1493            DQ       0      50     100     170     210     210     210
                *
1494            ZZ
1
```

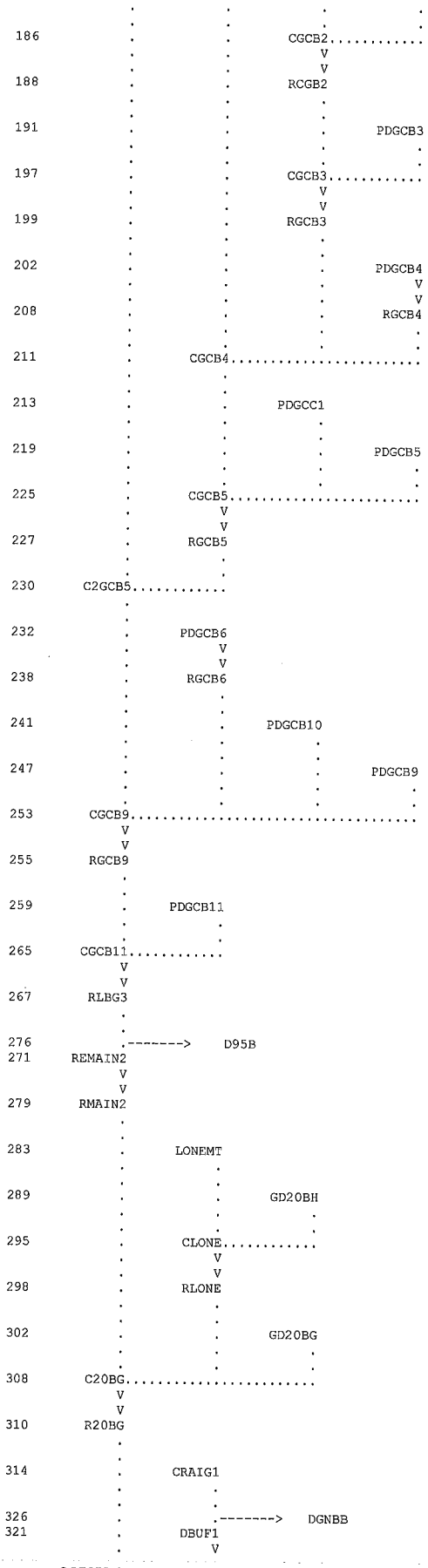
SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

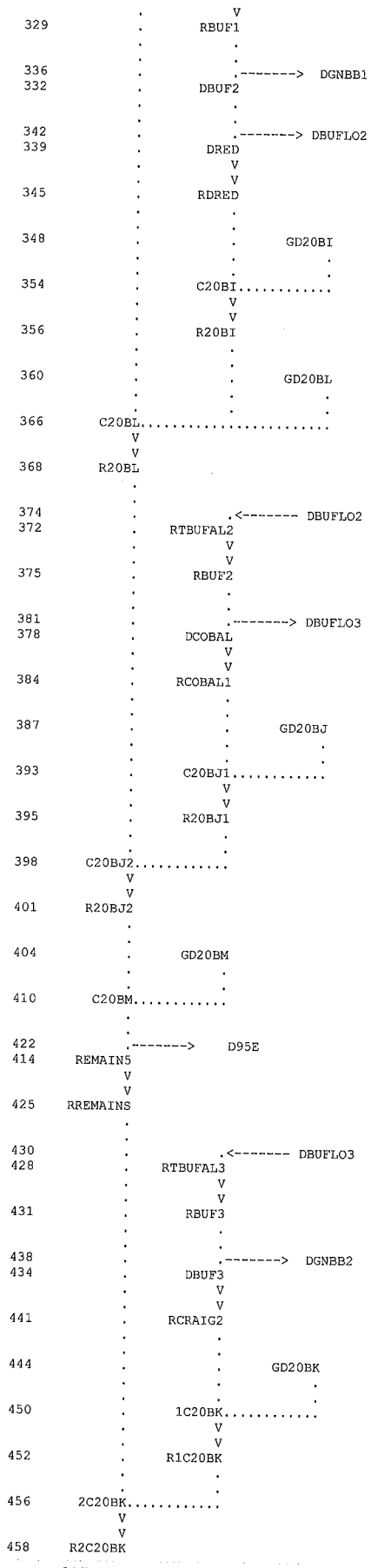
  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   58         ANN
               V
               V
   72         RANN
               .
               .
   75          .       GD29B
               .          .
               .          .
   81       CGD29B.........
               V
               V
   83       RGD29B
               .
               .
   88          .     NW1C2-C
               .          .
               .          .
   96       CNW1C2.........
               V
               V
  100       RNW1C2
               .
               .
  103          .      PDGCC3
               .          .
               .          .
  110       CGCC3..........
               V
               V
  112       RGCC3
               .
               .
  120          .-------->    D95A
  115    REMAIN1
               V
               V
  123       RLBG1
               .
               .
  127          .      PDGCC2
               .          V
               .          V
  133          .       RGCC2
               .          .
               .          .
  136          .          .      PDGCC4
               .          .          .
               .          .          .
  142       CGCC4.....................
               V
               V
  147       RLBG2
               .
               .
  151          .      HAMMER
               .          V
               .          V
  157          .     RHAMMER
               .          .
               .          .
  160          .          .       PDGCD
               .          .          .
               .          .          .
  166          .      CPDGCD..........
               .          V
               .          V
  168          .       RGCD
               .          .
               .          .
  171          .          .      PDGCB1
               .          .          V
               .          .          V
  177          .          .       RGCB1
               .          .          .
               .          .          .
  180          .          .          .     PDGCB2
```

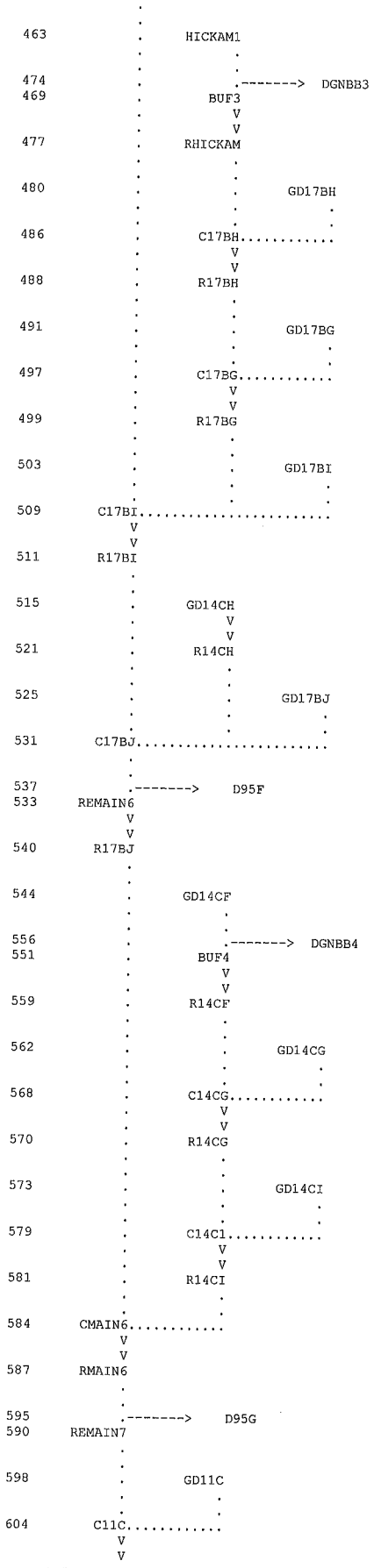
25S3X.OUT, 25-year existing condition, refer to Figure 4



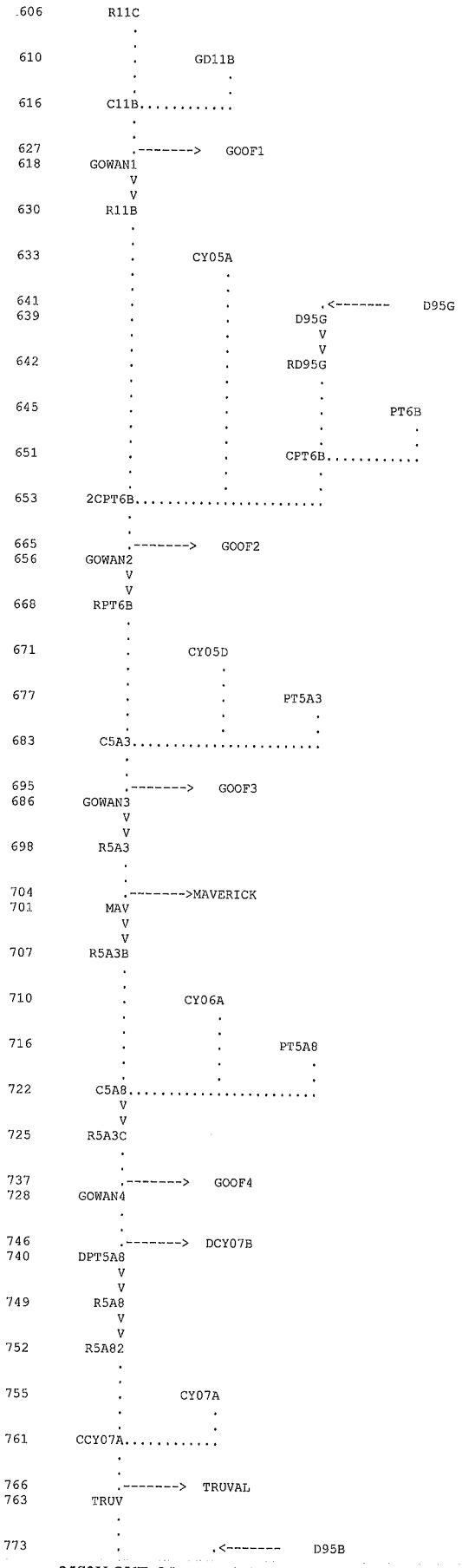
25S3X.OUT, 25-year existing condition, refer to Figure 4



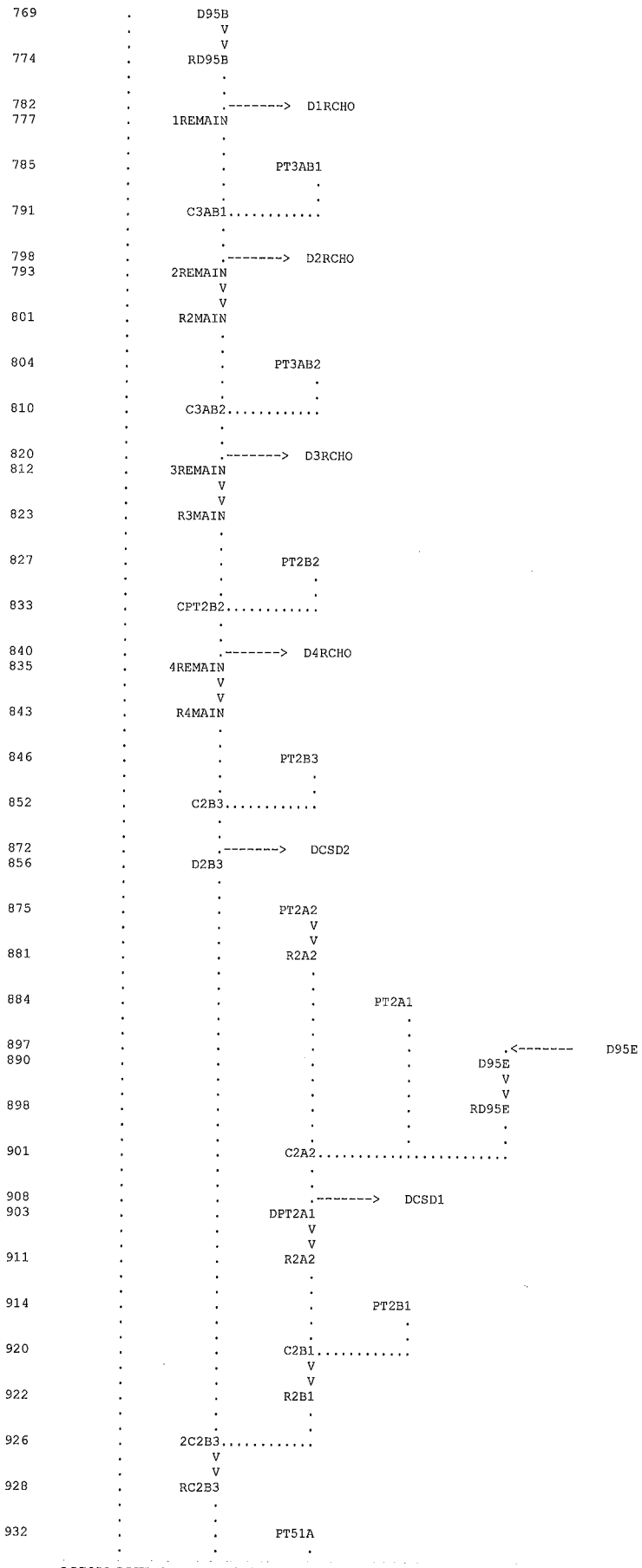
25S3X.OUT, 25-year existing condition, refer to Figure 4

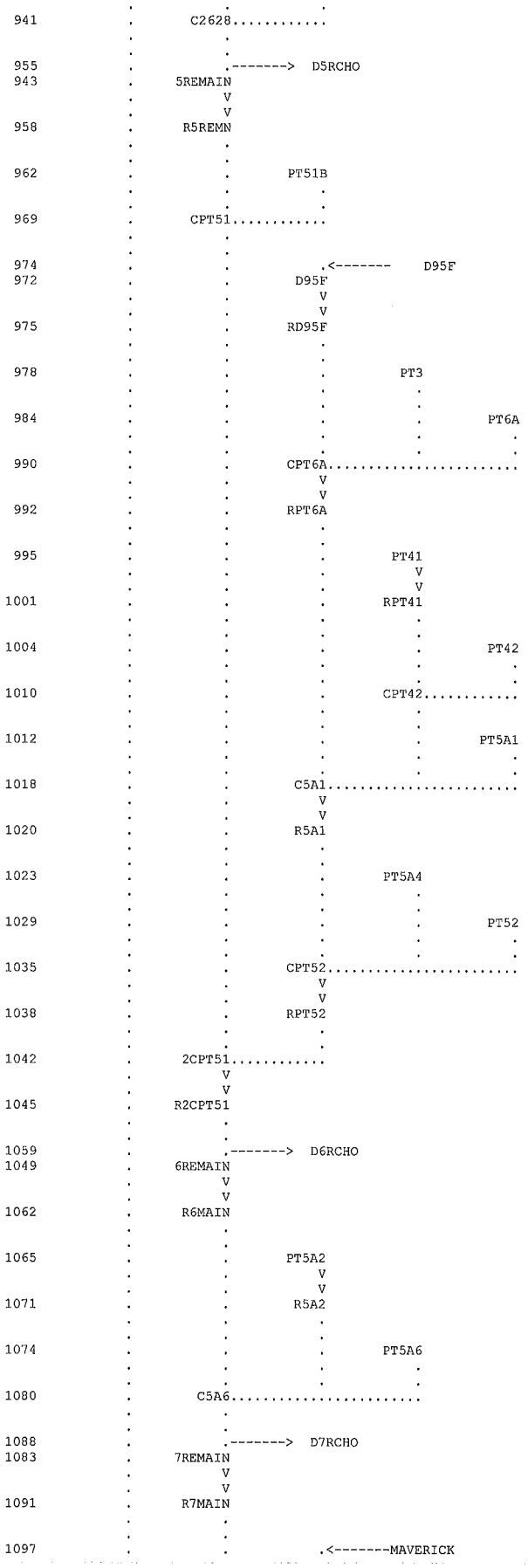


25S3X.OUT, 25-year existing condition, refer to Figure 4

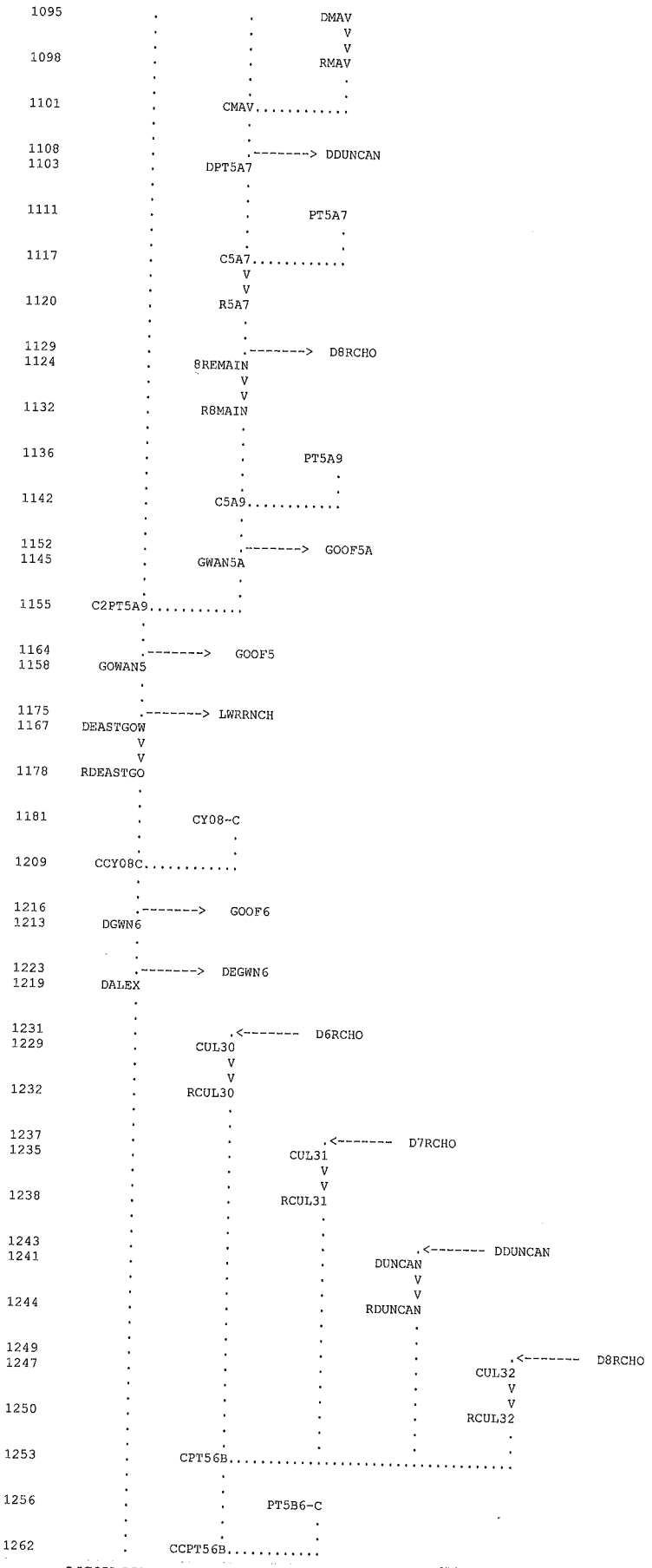


25S3X.OUT, 25-year existing condition, refer to Figure 4

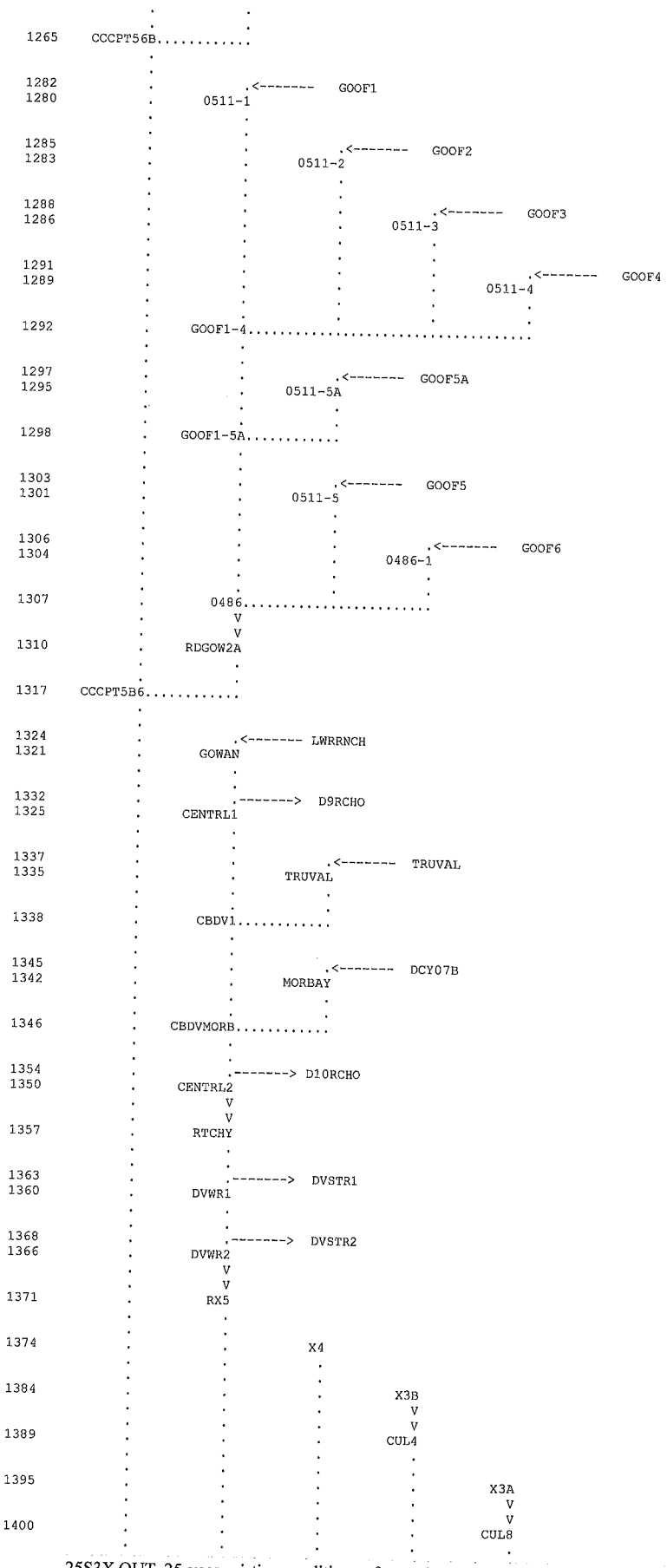

769 D95B
774 RD95B
782 .-------> D1RCHO
777 1REMAIN
785 PT3AB1
791 C3AB1.....
798 .-------> D2RCHO
793 2REMAIN
801 R2MAIN
804 PT3AB2
810 C3AB2.....
820 .-------> D3RCHO
812 3REMAIN
823 R3MAIN
827 PT2B2
833 CPT2B2.....
840 .-------> D4RCHO
835 4REMAIN
843 R4MAIN
846 PT2B3
852 C2B3.....
872 .-------> DCSD2
856 D2B3
875 PT2A2
881 R2A2
884 PT2A1
897 .<------- D95E
890 D95E
898 RD95E
901 C2A2.....
908 .-------> DCSD1
903 DPT2A1
911 R2A2
914 PT2B1
920 C2B1.....
922 R2B1
926 2C2B3.....
928 RC2B3
932 PT51A



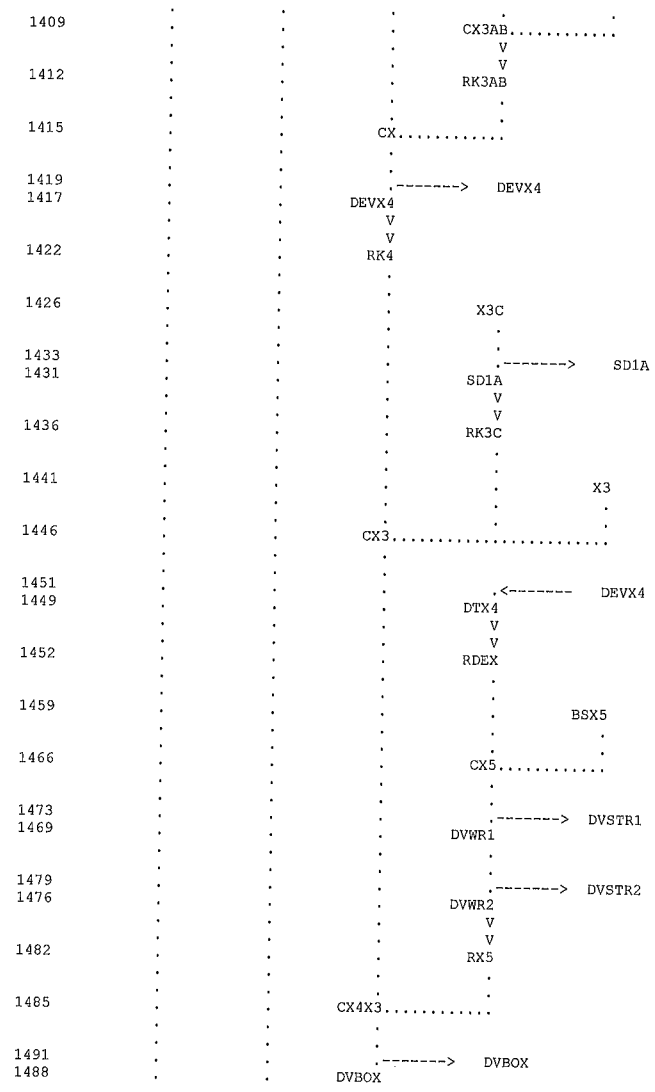
25S3X.OUT, 25-year existing condition, refer to Figure 4



25S3X.OUT, 25-year existing condition, refer to Figure 4



25S3X.OUT, 25-year existing condition, refer to Figure 4




```
 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *              JUN  1998               *
 *           VERSION 4.1                *
 *                                      *
 *  RUN DATE   31MAR14  TIME  21:49:32  *
 *                                      *
 ****************************************
```

```
 ************************************
 *                                  *
 *    U.S. ARMY CORPS OF ENGINEERS  *
 *    HYDROLOGIC ENGINEERING CENTER *
 *          609 SECOND STREET       *
 *       DAVIS, CALIFORNIA 95616    *
 *           (916) 756-1104         *
 *                                  *
 ************************************
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RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
OFFSITE BASINS, EXISTING CONDITIONS
PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
PREPARED BY STANLEY CONSULTANTS INC. (HM/VF)
INPUT FILE: 25S3X.DAT
DESIGN STORM: 25-YEAR 6-HR
STORM DISTRIBUTION: SDN3
STORM CENTERING: FULL WATERSHED
THIS MODEL DIFFERS FROM 100 YEAR: FLOW DIVERTED TO STORM DRAIN
AT GOWAN/CRAIG

BASED ON:
CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
2008 MASTER PLAN UPDATE (MPU) BY PBS&J
GOWAN WATERSHED (INPUT FILE = ALLGOW3.DAT) AND
CENTRAL WATERSHED (NORTHWESTERN PORTION)

RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009
UPPRSDN3 AND LWRSDN3 HEC-1 MODELS
FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
CONTROL FACILITIES REFERENCED FROM LOMR UNLESS OTHERWISE NOTED

25S3X.OUT, 25-year existing condition, refer to Figure 4

GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
BY G.C. WALLACE (GCW) 2007

PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
HEC-1 ANALYSIS FOR EXISTING CONDITIONS FILE R00S3X.OUT
BY STANLEY CONSULTANTS, 1/2012

LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
MPU SHOWS THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
(GOEC)

THIS EXISTING CONDITION MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL DRAINAGE
STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
EXISTING CONDITION MODEL AS FOLLOWS:
1. BASIN PT51 OF THE RANCHO STUDY WAS SPLIT INTO PT51A AND PT51B IN ORDER
TO SHOW WHERE FLOW WILL BE COLLECTED BY THE GOWAN OUTFALL - ALEXANDER
ROAD FACILITIES AT ALEXANDER-JONES/RANCHO DRIVE INTERSECTION.
2. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
TO THE EXISTING CONDITION MODEL
3. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE
DARF'S USED IN 2008 MPU HEC-1 ALLGOW3.OUT

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
DARF RATIOS FOR AREAS OF 0, 0.5, 1.0, 2.0, 4.0, 6.0, 8.0 AND 10 SQUARE MILES
FOR THE 100-YEAR EVENT.

```
 55 IO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN           5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME         0000  STARTING TIME
                        NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2    0  ENDING DATE
                    NDTIME         0055  ENDING TIME
                     ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE    24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                     NPLAN           1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                    .74       .73       .72       .69       .67       .67       .65       .64


        *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

1

                PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                            FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                        TIME TO PEAK IN HOURS

                                                                    RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN                RATIO 1   RATIO 2   RATIO 3   RATIO 4   RATIO 5   RATIO 6   RATIO 7   RATIO 8
                                                             .74       .73       .72       .69       .67       .67       .65       .64
 HYDROGRAPH AT
+                  ANN        .26     1    FLOW             62.       60.       58.       52.       48.       48.       44.       42.
                                          TIME           4.00      4.00      4.00      4.00      4.00      4.00      4.00      4.00
 ROUTED TO
+                  RANN       .26     1    FLOW             62.       60.       58.       52.       48.       48.       44.       42.
                                          TIME           4.08      4.08      4.08      4.08      4.08      4.08      4.08      4.17
 HYDROGRAPH AT
+                  GD29B      .14     1    FLOW             32.       31.       30.       26.       24.       24.       22.       21.
                                          TIME           3.83      3.83      3.83      3.83      3.83      3.83      3.83      3.83
   2 COMBINED AT
+                  CGD29B     .40     1    FLOW             85.       82.       79.       70.       64.       64.       59.       56.
                                          TIME           4.00      4.00      4.00      4.00      4.00      4.00      4.08      4.08
 ROUTED TO
+                  RGD29B     .40     1    FLOW             84.       81.       78.       70.       64.       64.       59.       56.
                                          TIME           4.17      4.25      4.25      4.25      4.25      4.25      4.25      4.25
 HYDROGRAPH AT
+                  NW1C2-C    .21     1    FLOW            126.      123.      121.      113.      108.      108.      103.      100.
```

25S3X.OUT, 25-year existing condition, refer to Figure 4

				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CNW1C2	.60	1	FLOW	177.	172.	167.	151.	140.	140.	130.	124.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RNW1C2	.60	1	FLOW	177.	172.	166.	150.	139.	139.	128.	123.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	PDGCC3	.05	1	FLOW	34.	33.	32.	30.	28.	28.	27.	26.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CGCC3	.65	1	FLOW	188.	182.	176.	159.	148.	148.	137.	131.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RGCC3	.65	1	FLOW	187.	182.	176.	159.	147.	147.	135.	130.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO													
+	D95A	.65	1	FLOW	139.	139.	139.	139.	139.	139.	134.	129.
				TIME	3.75	3.83	3.83	3.92	4.00	4.00	4.08	4.08
HYDROGRAPH AT													
+	REMAIN1	.65	1	FLOW	48.	43.	37.	20.	8.	8.	1.	1.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	3.50	3.58
ROUTED TO													
+	RLBG1	.65	1	FLOW	48.	42.	37.	19.	7.	7.	1.	1.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	3.58	3.67
HYDROGRAPH AT													
+	PDGCC2	.04	1	FLOW	9.	9.	8.	7.	7.	7.	6.	6.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RGCC2	.04	1	FLOW	9.	8.	8.	7.	6.	6.	6.	5.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	PDGCC4	.05	1	FLOW	30.	29.	29.	26.	25.	25.	24.	23.
				TIME	3.58	3.58	3.58	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	CGCC4	.74	1	FLOW	66.	60.	54.	35.	26.	26.	25.	24.
				TIME	4.08	4.08	4.08	4.08	3.67	3.67	3.67	3.67
ROUTED TO													
+	RLBG2	.74	1	FLOW	66.	60.	54.	34.	26.	26.	24.	24.
				TIME	4.08	4.08	4.08	4.08	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	HAMMER	.13	1	FLOW	37.	36.	34.	31.	28.	28.	26.	25.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RHAMMER	.13	1	FLOW	37.	35.	34.	30.	28.	28.	26.	25.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PDGCD	.13	1	FLOW	30.	28.	27.	24.	22.	22.	20.	19.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CPDGCD	.26	1	FLOW	65.	62.	60.	52.	48.	48.	44.	42.
				TIME	3.83	3.83	3.83	3.83	3.92	3.92	3.92	3.92
ROUTED TO													
+	RGCD	.26	1	FLOW	63.	61.	59.	52.	48.	48.	44.	42.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PDGCB1	.03	1	FLOW	23.	22.	22.	20.	19.	19.	18.	17.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RGCB1	.03	1	FLOW	22.	22.	22.	19.	18.	18.	17.	17.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PDGCB2	.03	1	FLOW	15.	15.	14.	13.	12.	12.	11.	11.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CGCB2	.06	1	FLOW	37.	36.	36.	32.	31.	31.	29.	28.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RCGB2	.06	1	FLOW	36.	35.	34.	31.	30.	30.	28.	27.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	PDGCB3	.07	1	FLOW	15.	15.	14.	12.	11.	11.	10.	9.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CGCB3	.13	1	FLOW	51.	49.	48.	43.	41.	41.	38.	36.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75

ROUTED TO												
+	RGCB3	.13	1	FLOW	50.	48.	47.	42.	39.	39.	36.	35.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.83
HYDROGRAPH AT												
+	PDGCB4	.02	1	FLOW	13.	13.	13.	12.	11.	11.	10.	10.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	RGCB4	.02	1	FLOW	13.	13.	12.	11.	11.	11.	10.	10.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	CGCB4	.41	1	FLOW	113.	108.	105.	94.	86.	86.	78.	73.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	PDGCC1	.05	1	FLOW	15.	14.	14.	12.	11.	11.	10.	10.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PDGCB5	.11	1	FLOW	27.	26.	25.	22.	20.	20.	19.	18.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
3 COMBINED AT												
+	CGCB5	.57	1	FLOW	152.	146.	141.	126.	116.	116.	105.	99.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	RGCB5	.57	1	FLOW	150.	145.	139.	123.	113.	113.	102.	97.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
2 COMBINED AT												
+	C2GCB5	1.31	1	FLOW	215.	202.	189.	153.	131.	131.	117.	111.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	PDGCB6	.02	1	FLOW	15.	14.	14.	13.	12.	12.	12.	12.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO												
+	RGCB6	.02	1	FLOW	14.	14.	13.	12.	12.	12.	11.	11.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.92	3.92
HYDROGRAPH AT												
+	PDGCB10	.07	1	FLOW	39.	38.	37.	34.	32.	32.	30.	29.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PDGCB9	.03	1	FLOW	12.	12.	11.	10.	9.	9.	9.	8.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
4 COMBINED AT												
+	CGCB9	1.43	1	FLOW	253.	239.	226.	185.	160.	160.	147.	139.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RGCB9	1.43	1	FLOW	251.	237.	223.	183.	159.	159.	146.	137.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PDGCB11	.03	1	FLOW	14.	14.	13.	12.	11.	11.	10.	10.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	CGCB11	1.47	1	FLOW	257.	244.	229.	188.	165.	165.	150.	142.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RLBG3	1.47	1	FLOW	256.	242.	228.	187.	164.	164.	150.	141.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO												
+	D95B	1.47	1	FLOW	101.	95.	90.	74.	65.	65.	59.	56.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	REMAIN2	1.47	1	FLOW	155.	147.	138.	113.	99.	99.	91.	86.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RMAIN2	1.47	1	FLOW	153.	146.	137.	113.	99.	99.	90.	85.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	LONEMT	.41	1	FLOW	174.	170.	165.	152.	143.	143.	134.	129.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	GD20BH	.05	1	FLOW	15.	14.	14.	12.	11.	11.	10.	10.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	CLONE	.46	1	FLOW	188.	183.	178.	163.	153.	153.	143.	139.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RLONE	.46	1	FLOW	185.	180.	175.	160.	150.	150.	141.	137.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	GD20BG	.11	1	FLOW	51.	49.	48.	44.	41.	41.	38.	37.

				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	C20BG	2.04	1	FLOW	349.	335.	321.	288.	267.	267.	246.	236.
				TIME	4.00	4.00	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	R20BG	2.04	1	FLOW	348.	333.	320.	284.	263.	263.	243.	233.
				TIME	4.08	4.08	4.08	4.00	4.00	4.00	4.08	4.08
HYDROGRAPH AT												
+	CRAIG1	2.44	1	FLOW	862.	840.	817.	751.	708.	708.	665.	644.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO												
+	DGNBB	2.44	1	FLOW	249.	249.	249.	249.	249.	249.	249.	249.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.75	3.75
HYDROGRAPH AT												
+	DBUF1	2.44	1	FLOW	613.	591.	568.	502.	459.	459.	416.	395.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	RBUF1	2.44	1	FLOW	609.	587.	565.	500.	457.	457.	415.	394.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO												
+	DGNBB1	2.44	1	FLOW	109.	109.	109.	109.	109.	109.	109.	109.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	DBUF2	2.44	1	FLOW	500.	478.	456.	391.	348.	348.	306.	285.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO												
+	DBUFLO2	2.44	1	FLOW	352.	336.	321.	275.	245.	245.	215.	201.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	DRED	2.44	1	FLOW	148.	141.	135.	116.	103.	103.	91.	84.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RDRED	2.44	1	FLOW	147.	141.	134.	115.	102.	102.	90.	84.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT												
+	GD20BI	.12	1	FLOW	47.	45.	44.	40.	37.	37.	35.	33.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	C20BI	2.56	1	FLOW	164.	158.	150.	129.	115.	115.	102.	95.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	R20BI	2.56	1	FLOW	164.	157.	149.	128.	114.	114.	101.	94.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33
HYDROGRAPH AT												
+	GD20BL	.08	1	FLOW	60.	59.	57.	54.	51.	51.	49.	47.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C20BL	4.67	1	FLOW	508.	486.	467.	406.	368.	368.	335.	316.
				TIME	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	R20BL	4.67	1	FLOW	507.	486.	466.	404.	366.	366.	330.	311.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25
HYDROGRAPH AT												
+	RTBUFAL2	.00	1	FLOW	352.	336.	321.	275.	245.	245.	215.	201.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RBUF2	.00	1	FLOW	352.	336.	321.	275.	245.	245.	215.	200.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO												
+	DBUFLO3	.00	1	FLOW	251.	240.	229.	196.	175.	175.	153.	143.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	DCOBAL	.00	1	FLOW	100.	96.	92.	78.	70.	70.	61.	57.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RCOBAL1	.00	1	FLOW	100.	95.	91.	78.	69.	69.	61.	56.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT												
+	GD20BJ	.05	1	FLOW	29.	28.	27.	25.	24.	24.	22.	21.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C20BJ1	.05	1	FLOW	107.	103.	98.	84.	75.	75.	67.	62.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33
ROUTED TO												
+	R20BJ1	.05	1	FLOW	107.	102.	98.	84.	75.	75.	66.	61.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33

2 COMBINED AT												
+	C20BJ2	4.72	1	FLOW	606.	580.	554.	478.	430.	430.	390.	369.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
ROUTED TO												
+	R20BJ2	4.72	1	FLOW	605.	578.	552.	476.	430.	430.	389.	367.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	GD20BM	.05	1	FLOW	40.	39.	38.	36.	34.	34.	33.	32.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	C20BM	4.77	1	FLOW	614.	587.	561.	483.	436.	436.	395.	373.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
DIVERSION TO												
+	D95E	4.77	1	FLOW	84.	80.	76.	63.	55.	55.	49.	45.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	REMAIN5	4.77	1	FLOW	530.	507.	486.	420.	381.	381.	346.	328.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
ROUTED TO												
+	RREMAINS	4.77	1	FLOW	527.	504.	482.	419.	380.	380.	345.	326.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	RTBUFAL3	.00	1	FLOW	251.	240.	229.	196.	175.	175.	153.	143.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RBUF3	.00	1	FLOW	251.	239.	228.	195.	174.	174.	152.	141.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO												
+	DGNBB2	.00	1	FLOW	198.	198.	198.	194.	173.	173.	151.	141.
				TIME	4.08	4.08	4.17	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	DBUF3	.00	1	FLOW	53.	41.	30.	1.	1.	1.	1.	1.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RCRAIG2	.00	1	FLOW	52.	40.	28.	1.	1.	1.	1.	1.
				TIME	4.42	4.42	4.50	5.08	5.08	5.08	5.17	5.25
HYDROGRAPH AT												
+	GD20BK	.05	1	FLOW	21.	20.	20.	18.	17.	17.	16.	15.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	1C20BK	.05	1	FLOW	56.	45.	33.	18.	17.	17.	16.	15.
				TIME	4.42	4.42	4.50	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R1C20BK	.05	1	FLOW	54.	43.	31.	18.	17.	17.	16.	15.
				TIME	4.50	4.50	4.58	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	2C20BK	4.82	1	FLOW	538.	514.	492.	427.	388.	388.	352.	333.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	R2C20BK	4.82	1	FLOW	533.	509.	488.	427.	387.	387.	350.	330.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	HICKAM1	.48	1	FLOW	160.	155.	151.	137.	129.	129.	120.	116.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO												
+	DGNBB3	.48	1	FLOW	125.	125.	125.	125.	125.	125.	119.	115.
				TIME	3.75	3.83	3.83	3.83	3.92	3.92	4.00	4.00
HYDROGRAPH AT												
+	BUF3	.48	1	FLOW	35.	30.	26.	12.	4.	4.	1.	1.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RHICKAM	.48	1	FLOW	34.	29.	25.	12.	4.	4.	1.	1.
				TIME	4.00	4.08	4.08	4.08	4.17	4.17	4.33	4.33
HYDROGRAPH AT												
+	GD17BH	.03	1	FLOW	14.	14.	14.	12.	12.	12.	11.	11.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	C17BH	.50	1	FLOW	40.	34.	30.	15.	12.	12.	11.	11.
				TIME	4.00	4.00	4.08	4.08	3.58	3.58	3.58	3.58
ROUTED TO												
+	R17BH	.50	1	FLOW	38.	33.	28.	13.	12.	12.	11.	10.
				TIME	4.17	4.17	4.17	4.25	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	GD17BG	.12	1	FLOW	58.	57.	55.	51.	48.	48.	45.	43.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	C17BG	.62	1	FLOW	72.	70.	68.	63.	59.	59.	56.	54.

				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R17BG	.62	1	FLOW	71.	69.	67.	62.	58.	58.	55.	53.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	GD17BI	.07	1	FLOW	43.	42.	41.	38.	36.	36.	34.	33.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C17BI	5.51	1	FLOW	610.	580.	549.	467.	420.	420.	381.	360.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	R17BI	5.51	1	FLOW	605.	578.	548.	465.	417.	417.	379.	360.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT												
+	GD14CH	.04	1	FLOW	23.	22.	22.	20.	19.	19.	18.	17.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO												
+	R14CH	.04	1	FLOW	23.	22.	21.	20.	19.	19.	17.	17.
				TIME	3.67	3.75	3.67	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	GD17BJ	.06	1	FLOW	47.	46.	45.	42.	40.	40.	38.	37.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C17BJ	5.61	1	FLOW	622.	595.	564.	478.	430.	430.	390.	371.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
DIVERSION TO												
+	D95F	5.61	1	FLOW	90.	86.	81.	69.	61.	61.	55.	52.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
HYDROGRAPH AT												
+	REMAIN6	5.61	1	FLOW	532.	509.	483.	409.	368.	368.	335.	319.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
ROUTED TO												
+	R17BJ	5.61	1	FLOW	532.	508.	482.	409.	368.	368.	334.	318.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
HYDROGRAPH AT												
+	GD14CF	.13	1	FLOW	43.	42.	40.	36.	33.	33.	31.	29.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	DGNBB4	.13	1	FLOW	30.	30.	30.	30.	30.	30.	30.	29.
				TIME	3.67	3.67	3.67	3.67	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	BUF4	.13	1	FLOW	13.	12.	10.	6.	3.	3.	1.	1.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R14CF	.13	1	FLOW	12.	11.	10.	5.	2.	2.	1.	1.
				TIME	3.92	3.92	3.92	3.92	4.00	4.00	4.17	4.17
HYDROGRAPH AT												
+	GD14CG	.06	1	FLOW	30.	29.	28.	26.	24.	24.	23.	22.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C14CG	.19	1	FLOW	30.	29.	29.	26.	24.	24.	23.	22.
				TIME	3.92	3.67	3.83	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R14CG	.19	1	FLOW	30.	29.	28.	25.	24.	24.	22.	22.
				TIME	4.00	3.75	3.92	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	GD14CI	.05	1	FLOW	24.	23.	23.	20.	19.	19.	18.	17.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C14C1	.24	1	FLOW	51.	50.	48.	44.	41.	41.	38.	37.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R14CI	.24	1	FLOW	51.	50.	48.	44.	41.	41.	38.	36.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	CMAIN6	5.85	1	FLOW	555.	530.	503.	427.	385.	385.	347.	330.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
ROUTED TO												
+	RMAIN6	5.85	1	FLOW	549.	522.	496.	426.	383.	383.	346.	329.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.08
DIVERSION TO												
+	D95G	5.85	1	FLOW	83.	83.	82.	78.	76.	76.	74.	73.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.08
HYDROGRAPH AT												
+	REMAIN7	5.85	1	FLOW	466.	439.	415.	348.	308.	308.	273.	256.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.08

25S3X.OUT, 25-year existing condition, refer to Figure 4

HYDROGRAPH AT												
+	GD11C	.13	1	FLOW	77.	75.	73.	68.	64.	64.	61.	59.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	C11C	5.98	1	FLOW	493.	466.	439.	368.	330.	330.	301.	289.
				TIME	4.25	4.25	4.25	4.25	4.08	4.08	4.08	4.08
ROUTED TO												
+	R11C	5.98	1	FLOW	488.	463.	437.	368.	329.	329.	299.	286.
				TIME	4.33	4.33	4.33	4.33	4.17	4.17	4.08	4.17
HYDROGRAPH AT												
+	GD11B	.20	1	FLOW	129.	126.	123.	114.	109.	109.	103.	101.
				TIME	3.67	3.67	3.67	3.67	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	C11B	6.18	1	FLOW	523.	495.	471.	417.	382.	382.	350.	335.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	GOOF1	6.18	1	FLOW	3.	3.	3.	3.	3.	3.	3.	3.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	GOWAN1	6.18	1	FLOW	520.	492.	468.	414.	379.	379.	348.	333.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R11B	6.18	1	FLOW	518.	491.	468.	414.	378.	378.	346.	330.
				TIME	4.25	4.33	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	CY05A	.03	1	FLOW	17.	17.	16.	15.	14.	14.	14.	13.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	D95G	.00	1	FLOW	83.	83.	82.	78.	76.	76.	74.	73.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.08
ROUTED TO												
+	RD95G	.00	1	FLOW	83.	83.	82.	78.	75.	75.	74.	73.
				TIME	4.33	4.33	4.42	4.42	4.42	4.42	4.42	4.17
HYDROGRAPH AT												
+	PT6B	.11	1	FLOW	91.	89.	87.	81.	78.	78.	74.	72.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	CPT6B	.11	1	FLOW	132.	130.	124.	116.	112.	112.	107.	105.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83
3 COMBINED AT												
+	2CPT6B	6.31	1	FLOW	617.	594.	575.	517.	478.	478.	444.	427.
				TIME	4.25	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	GOOF2	6.31	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.33	3.33	3.33	3.42	3.42	3.42	3.42	3.42
HYDROGRAPH AT												
+	GOWAN2	6.31	1	FLOW	615.	592.	573.	515.	476.	476.	442.	425.
				TIME	4.25	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RPT6B	6.31	1	FLOW	614.	591.	573.	513.	474.	474.	438.	420.
				TIME	4.25	4.08	4.08	4.08	4.08	4.08	4.08	4.17
HYDROGRAPH AT												
+	CY05D	.06	1	FLOW	22.	21.	20.	18.	17.	17.	16.	15.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT5A3	.09	1	FLOW	56.	55.	53.	50.	47.	47.	45.	44.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	C5A3	6.46	1	FLOW	653.	630.	611.	549.	507.	507.	470.	451.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	GOOF3	6.46	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.25	3.25	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT												
+	GOWAN3	6.46	1	FLOW	651.	628.	609.	547.	505.	505.	468.	449.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R5A3	6.46	1	FLOW	651.	627.	608.	545.	503.	503.	465.	445.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	MAVERICK	6.46	1	FLOW	28.	27.	26.	22.	20.	20.	18.	17.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	MAV	6.46	1	FLOW	623.	601.	582.	523.	484.	484.	448.	429.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R5A3B	6.46	1	FLOW	622.	600.	581.	521.	482.	482.	446.	428.

25S3X.OUT, 25-year existing condition, refer to Figure 4

				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.17
HYDROGRAPH AT												
+	CY06A	.08	1	FLOW	43.	41.	40.	37.	35.	35.	33.	32.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	PT5A8	.03	1	FLOW	12.	11.	11.	10.	9.	9.	9.	9.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	C5A8	6.56	1	FLOW	646.	624.	605.	543.	503.	503.	465.	446.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R5A3C	6.56	1	FLOW	646.	623.	604.	542.	501.	501.	463.	444.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	GOOF4	6.56	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.42	3.42	3.42	3.42	3.50	3.50	3.50	3.50
HYDROGRAPH AT												
+	GOWAN4	6.56	1	FLOW	644.	621.	602.	540.	499.	499.	461.	442.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	DCY07B	6.56	1	FLOW	155.	149.	144.	127.	116.	116.	105.	99.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	DPT5A8	6.56	1	FLOW	488.	472.	458.	413.	383.	383.	357.	343.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R5A8	6.56	1	FLOW	487.	470.	456.	410.	381.	381.	356.	343.
				TIME	4.08	4.08	4.08	4.08	4.17	4.17	4.17	4.17
ROUTED TO												
+	R5A82	6.56	1	FLOW	485.	468.	454.	410.	381.	381.	355.	342.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	CY07A	.03	1	FLOW	18.	17.	17.	15.	15.	15.	14.	13.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	CCY07A	6.59	1	FLOW	491.	474.	460.	415.	386.	386.	359.	346.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
DIVERSION TO												
+	TRUVAL	6.59	1	FLOW	33.	32.	30.	26.	24.	24.	22.	20.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	TRUV	6.59	1	FLOW	458.	442.	429.	388.	362.	362.	338.	326.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	D95B	.00	1	FLOW	101.	95.	90.	74.	65.	65.	59.	56.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RD95B	.00	1	FLOW	99.	94.	89.	74.	64.	64.	59.	56.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	D1RCHO	.00	1	FLOW	19.	18.	17.	14.	12.	12.	11.	10.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	1REMAIN	.00	1	FLOW	80.	76.	72.	60.	52.	52.	48.	45.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	PT3AB1	.05	1	FLOW	44.	43.	42.	40.	39.	39.	37.	36.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C3AB1	.05	1	FLOW	105.	100.	95.	82.	75.	75.	69.	66.
				TIME	4.00	4.00	4.00	3.92	3.92	3.92	3.92	3.92
DIVERSION TO												
+	D2RCHO	.05	1	FLOW	16.	15.	15.	13.	12.	12.	11.	10.
				TIME	4.00	4.00	4.00	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	2REMAIN	.05	1	FLOW	89.	85.	80.	69.	64.	64.	59.	56.
				TIME	4.00	4.00	4.00	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	R2MAIN	.05	1	FLOW	88.	84.	80.	69.	63.	63.	58.	56.
				TIME	4.08	4.08	4.08	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PT3AB2	.05	1	FLOW	54.	53.	52.	49.	48.	48.	46.	45.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	C3AB2	.10	1	FLOW	108.	105.	103.	95.	91.	91.	86.	84.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75

DIVERSION TO												
+	D3RCHO	.10	1	FLOW	107.	105.	102.	95.	90.	90.	86.	83.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	3REMAIN	.10	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R3MAIN	.10	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	PT2B2	.08	1	FLOW	51.	50.	49.	46.	43.	43.	41.	40.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	CPT2B2	.18	1	FLOW	51.	50.	49.	46.	43.	43.	41.	40.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO												
+	D4RCHO	.18	1	FLOW	8.	8.	8.	7.	7.	7.	7.	7.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	4REMAIN	.18	1	FLOW	43.	42.	41.	38.	36.	36.	34.	33.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R4MAIN	.18	1	FLOW	43.	42.	41.	38.	36.	36.	34.	33.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT2B3	.02	1	FLOW	22.	22.	21.	20.	19.	19.	18.	18.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C2B3	.20	1	FLOW	63.	61.	60.	56.	53.	53.	50.	50.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	DCSD2	.20	1	FLOW	60.	59.	58.	54.	51.	51.	49.	48.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	D2B3	.20	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT2A2	.06	1	FLOW	37.	37.	36.	33.	31.	31.	29.	28.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R2A2	.06	1	FLOW	37.	36.	35.	33.	31.	31.	29.	28.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT2A1	.06	1	FLOW	39.	38.	37.	35.	33.	33.	31.	30.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	D95E	.00	1	FLOW	84.	80.	76.	63.	55.	55.	49.	45.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
ROUTED TO												
+	RD95E	.00	1	FLOW	83.	79.	75.	63.	55.	55.	48.	45.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33
3 COMBINED AT												
+	C2A2	.13	1	FLOW	114.	109.	103.	92.	83.	83.	76.	72.
				TIME	4.17	4.17	4.17	3.92	3.92	3.92	3.92	3.92
DIVERSION TO												
+	DCSD1	.13	1	FLOW	90.	90.	90.	90.	82.	82.	75.	71.
				TIME	3.75	3.83	3.83	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	DPT2A1	.13	1	FLOW	24.	19.	13.	2.	1.	1.	1.	1.
				TIME	4.17	4.17	4.17	3.92	3.50	3.50	3.50	3.50
ROUTED TO												
+	R2A2	.13	1	FLOW	23.	17.	13.	1.	1.	1.	1.	1.
				TIME	4.25	4.25	4.33	4.33	4.00	4.00	5.75	4.08
HYDROGRAPH AT												
+	PT2B1	.07	1	FLOW	43.	42.	41.	38.	36.	36.	34.	33.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C2B1	.20	1	FLOW	43.	42.	41.	38.	36.	36.	34.	33.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R2B1	.20	1	FLOW	43.	42.	41.	37.	35.	35.	33.	32.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	2C2B3	.40	1	FLOW	45.	44.	42.	39.	37.	37.	35.	34.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	RC2B3	.40	1	FLOW	44.	42.	41.	38.	36.	36.	34.	33.

				TIME	3.75	3.75	3.75	3.75	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PT51A	.04	1	FLOW	40.	40.	39.	37.	35.	35.	34.	33.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	C2628	.43	1	FLOW	68.	66.	64.	59.	56.	56.	53.	51.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	D5RCHO	.43	1	FLOW	41.	40.	39.	36.	34.	34.	32.	31.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	5REMAIN	.43	1	FLOW	26.	26.	25.	23.	22.	22.	21.	20.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R5REMN	.43	1	FLOW	26.	25.	25.	23.	22.	22.	20.	20.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT51B	.04	1	FLOW	40.	39.	38.	36.	35.	35.	33.	33.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	CPT51	.47	1	FLOW	60.	59.	57.	54.	51.	51.	49.	48.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	D95F	.00	1	FLOW	90.	86.	81.	69.	61.	61.	55.	52.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
ROUTED TO												
+	RD95F	.00	1	FLOW	89.	85.	81.	69.	61.	61.	55.	52.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.42	4.42
HYDROGRAPH AT												
+	PT3	.15	1	FLOW	104.	102.	99.	92.	88.	88.	83.	81.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	PT6A	.02	1	FLOW	20.	19.	19.	18.	17.	17.	16.	16.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	CPT6A	.17	1	FLOW	139.	134.	130.	115.	108.	108.	102.	99.
				TIME	3.83	3.83	3.83	3.83	3.67	3.67	3.67	3.67
ROUTED TO												
+	RPT6A	.17	1	FLOW	138.	133.	129.	115.	108.	108.	101.	98.
				TIME	3.92	3.92	3.92	3.92	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT41	.14	1	FLOW	69.	67.	66.	60.	56.	56.	53.	51.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	RPT41	.14	1	FLOW	67.	65.	64.	58.	55.	55.	51.	50.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT42	.08	1	FLOW	35.	34.	33.	30.	28.	28.	26.	25.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	CPT42	.22	1	FLOW	102.	99.	96.	88.	83.	83.	78.	75.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT5A1	.05	1	FLOW	38.	37.	36.	33.	32.	32.	30.	30.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C5A1	.44	1	FLOW	269.	261.	255.	234.	221.	221.	207.	201.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R5A1	.44	1	FLOW	264.	257.	250.	230.	217.	217.	203.	196.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT5A4	.03	1	FLOW	15.	15.	15.	13.	13.	13.	12.	11.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT52	.06	1	FLOW	30.	29.	28.	26.	24.	24.	23.	22.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	CPT52	.54	1	FLOW	310.	301.	293.	269.	254.	254.	237.	230.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	RPT52	.54	1	FLOW	306.	297.	290.	265.	250.	250.	234.	227.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	2CPT51	1.01	1	FLOW	355.	346.	336.	310.	292.	292.	273.	264.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75

ROUTED TO												
+	R2CPT51	1.01	1	FLOW	351.	341.	333.	306.	288.	288.	271.	262.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO												
+	D6RCHO	1.01	1	FLOW	71.	70.	69.	66.	65.	65.	63.	63.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	6REMAIN	1.01	1	FLOW	281.	272.	264.	239.	224.	224.	207.	200.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	R6MAIN	1.01	1	FLOW	279.	271.	262.	238.	222.	222.	205.	197.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PT5A2	.08	1	FLOW	49.	47.	46.	43.	40.	40.	38.	37.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R5A2	.08	1	FLOW	48.	47.	46.	42.	40.	40.	37.	36.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PT5A6	.19	1	FLOW	105.	102.	99.	91.	86.	86.	81.	78.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C5A6	1.27	1	FLOW	401.	390.	379.	345.	324.	324.	301.	290.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO												
+	D7RCHO	1.27	1	FLOW	126.	125.	124.	121.	119.	119.	117.	116.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	7REMAIN	1.27	1	FLOW	275.	265.	255.	224.	205.	205.	184.	175.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	R7MAIN	1.27	1	FLOW	273.	262.	252.	221.	201.	201.	179.	168.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	DMAV	.00	1	FLOW	28.	27.	26.	22.	20.	20.	18.	17.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RMAV	.00	1	FLOW	28.	26.	25.	22.	19.	19.	18.	16.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.33
2 COMBINED AT												
+	CMAV	1.27	1	FLOW	280.	269.	258.	225.	204.	204.	181.	171.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
DIVERSION TO												
+	DDUNCAN	1.27	1	FLOW	110.	105.	101.	87.	79.	79.	62.	54.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT												
+	DPT5A7	1.27	1	FLOW	170.	164.	157.	138.	125.	125.	119.	116.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT												
+	PT5A7	.07	1	FLOW	36.	35.	34.	31.	29.	29.	28.	27.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	C5A7	1.35	1	FLOW	206.	198.	191.	169.	155.	155.	147.	143.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	R5A7	1.35	1	FLOW	202.	194.	187.	165.	152.	152.	145.	142.
				TIME	3.83	3.83	3.83	3.92	3.83	3.83	3.92	3.92
DIVERSION TO												
+	D8RCHO	1.35	1	FLOW	55.	52.	50.	43.	39.	39.	37.	36.
				TIME	3.83	3.83	3.83	3.92	3.83	3.83	3.92	3.92
HYDROGRAPH AT												
+	8REMAIN	1.35	1	FLOW	147.	142.	137.	122.	113.	113.	108.	106.
				TIME	3.83	3.83	3.83	3.92	3.83	3.83	3.92	3.92
ROUTED TO												
+	R8MAIN	1.35	1	FLOW	146.	141.	137.	122.	113.	113.	108.	105.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	PT5A9	.05	1	FLOW	28.	27.	26.	24.	23.	23.	22.	21.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C5A9	1.39	1	FLOW	165.	160.	154.	138.	129.	129.	123.	120.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO												
+	GOOF5A	1.39	1	FLOW	40.	40.	40.	40.	40.	40.	40.	40.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	GWAN5A	1.39	1	FLOW	125.	120.	114.	98.	89.	89.	83.	80.

				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT													
+	C2PT5A9	7.98	1	FLOW	557.	536.	518.	465.	433.	433.	401.	385.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO													
+	GOOF5	7.98	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	GOWAN5	7.98	1	FLOW	556.	535.	517.	464.	432.	432.	400.	384.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO													
+	LWRRNCH	7.98	1	FLOW	474.	460.	448.	414.	393.	393.	372.	357.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	DEASTGOW	7.98	1	FLOW	83.	75.	69.	50.	39.	39.	28.	27.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RDEASTGO	7.98	1	FLOW	82.	75.	69.	49.	39.	39.	28.	27.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	CY08-C	.09	1	FLOW	62.	61.	60.	56.	53.	53.	51.	49.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CCY08C	8.08	1	FLOW	114.	105.	98.	74.	61.	61.	52.	50.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.08	4.08
DIVERSION TO													
+	GOOF6	8.08	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	DGWN6	8.08	1	FLOW	113.	104.	97.	73.	60.	60.	51.	49.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.08	4.08
DIVERSION TO													
+	DEGWN6	8.08	1	FLOW	80.	74.	69.	52.	42.	42.	36.	35.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.08	4.08
HYDROGRAPH AT													
+	DALEX	8.08	1	FLOW	33.	30.	28.	21.	17.	17.	15.	14.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.08	4.08
HYDROGRAPH AT													
+	CUL30	.00	1	FLOW	71.	70.	69.	66.	65.	65.	63.	63.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RCUL30	.00	1	FLOW	70.	69.	69.	66.	64.	64.	63.	62.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	CUL31	.00	1	FLOW	126.	125.	124.	121.	119.	119.	117.	116.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RCUL31	.00	1	FLOW	128.	126.	125.	121.	119.	119.	118.	118.
				TIME	4.08	4.08	4.08	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	DUNCAN	.00	1	FLOW	110.	105.	101.	87.	79.	79.	62.	54.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
ROUTED TO													
+	RDUNCAN	.00	1	FLOW	158.	148.	132.	120.	113.	113.	65.	63.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.25	4.25
HYDROGRAPH AT													
+	CUL32	.00	1	FLOW	55.	52.	50.	43.	39.	39.	37.	36.
				TIME	3.83	3.83	3.83	3.92	3.83	3.83	3.92	3.92
ROUTED TO													
+	RCUL32	.00	1	FLOW	60.	57.	55.	46.	40.	40.	39.	37.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.33
4 COMBINED AT													
+	CPT56B	.00	1	FLOW	415.	399.	378.	345.	330.	330.	272.	258.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.25
HYDROGRAPH AT													
+	PT5B6-C	.38	1	FLOW	202.	198.	193.	179.	170.	170.	161.	156.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CCPT56B	.38	1	FLOW	559.	539.	516.	453.	433.	433.	369.	345.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT													
+	CCCPT56B	8.46	1	FLOW	591.	570.	544.	474.	450.	450.	384.	359.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	0511-1	.00	1	FLOW	3.	3.	3.	3.	3.	3.	3.	3.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08

HYDROGRAPH AT												
+	0511-2	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.33	3.33	3.33	3.42	3.42	3.42	3.42	3.42
HYDROGRAPH AT												
+	0511-3	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.25	3.25	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT												
+	0511-4	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.42	3.42	3.42	3.42	3.50	3.50	3.50	3.50
4 COMBINED AT												
+	GOOF1-4	.00	1	FLOW	9.	9.	9.	9.	9.	9.	9.	9.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	0511-5A	.00	1	FLOW	40.	40.	40.	40.	40.	40.	40.	40.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	GOOF1-5A	.00	1	FLOW	49.	49.	49.	49.	49.	49.	49.	49.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	0511-5	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	0486-1	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT												
+	0486	.00	1	FLOW	51.	51.	51.	51.	51.	51.	51.	51.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RDGOW2A	.00	1	FLOW	51.	51.	51.	51.	51.	51.	51.	51.
				TIME	3.92	3.92	3.92	4.17	4.17	4.17	4.17	4.00
2 COMBINED AT												
+	CCCPT5B6	8.46	1	FLOW	642.	621.	595.	525.	501.	501.	434.	409.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	GOWAN	.00	1	FLOW	474.	460.	448.	414.	393.	393.	372.	357.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	D9RCHO	.00	1	FLOW	222.	213.	206.	184.	172.	172.	161.	152.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	CENTRL1	.00	1	FLOW	252.	247.	242.	229.	221.	221.	211.	205.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	TRUVAL	.00	1	FLOW	33.	32.	30.	26.	24.	24.	22.	20.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT												
+	CBDV1	.00	1	FLOW	285.	278.	273.	255.	244.	244.	232.	224.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	MORBAY	.00	1	FLOW	155.	149.	144.	127.	116.	116.	105.	99.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
2 COMBINED AT												
+	CBDVMORB	.00	1	FLOW	440.	427.	417.	382.	360.	360.	337.	324.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	D10RCHO	.00	1	FLOW	138.	136.	135.	131.	129.	129.	126.	125.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	CENTRL2	.00	1	FLOW	302.	291.	282.	251.	231.	231.	211.	199.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RTCHY	.00	1	FLOW	287.	276.	265.	234.	213.	213.	192.	181.
				TIME	4.50	4.50	4.50	4.42	4.42	4.42	4.42	4.42
DIVERSION TO												
+	DVSTR1	.00	1	FLOW	46.	42.	38.	26.	18.	18.	10.	5.
				TIME	4.50	4.50	4.50	4.42	4.42	4.42	4.42	4.42
HYDROGRAPH AT												
+	DVWR1	.00	1	FLOW	241.	234.	228.	208.	196.	196.	183.	176.
				TIME	4.50	4.50	4.50	4.42	4.42	4.42	4.42	4.42
DIVERSION TO												
+	DVSTR2	.00	1	FLOW	37.	37.	37.	37.	37.	37.	37.	37.
				TIME	3.83	3.83	3.92	3.92	3.92	3.92	3.92	4.00
HYDROGRAPH AT												
+	DVWR2	.00	1	FLOW	204.	197.	191.	171.	159.	159.	146.	139.
				TIME	4.50	4.50	4.50	4.42	4.42	4.42	4.42	4.42
ROUTED TO												
+	RX5	.00	1	FLOW	203.	196.	190.	170.	157.	157.	144.	137.

				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
HYDROGRAPH AT												
+	X4	.81	1	FLOW	197.	193.	189.	178.	170.	170.	163.	159.
				TIME	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58
HYDROGRAPH AT												
+	X3B	.16	1	FLOW	76.	74.	73.	68.	65.	65.	61.	60.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	CUL4	.16	1	FLOW	64.	63.	63.	61.	61.	61.	60.	59.
				TIME	4.25	4.25	4.25	4.17	4.17	4.17	4.08	4.08
			**	PEAK STAGES IN FEET **								
			1	STAGE	15.06	15.05	15.04	15.02	15.01	15.01	15.00	14.97
				TIME	4.25	4.25	4.25	4.17	4.17	4.17	4.08	4.08
HYDROGRAPH AT												
+	X3A	.12	1	FLOW	60.	59.	58.	54.	51.	51.	48.	47.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	CUL8	.12	1	FLOW	23.	23.	23.	22.	21.	21.	20.	20.
				TIME	4.67	4.67	4.67	4.67	4.58	4.58	4.58	4.58
			**	PEAK STAGES IN FEET **								
			1	STAGE	21.79	21.74	21.68	21.51	21.40	21.40	21.29	21.23
				TIME	4.67	4.67	4.67	4.67	4.58	4.58	4.58	4.58
2 COMBINED AT												
+	CX3AB	.28	1	FLOW	86.	85.	84.	81.	80.	80.	77.	76.
				TIME	4.33	4.33	4.33	4.25	4.25	4.25	4.08	4.08
ROUTED TO												
+	RK3AB	.28	1	FLOW	83.	82.	81.	77.	74.	74.	70.	69.
				TIME	5.25	5.25	5.25	5.17	5.17	5.17	5.17	5.17
2 COMBINED AT												
+	CX	1.09	1	FLOW	276.	271.	265.	248.	237.	237.	226.	220.
				TIME	5.33	5.33	5.33	5.33	5.25	5.25	5.25	5.25
DIVERSION TO												
+	DEVX4	1.09	1	FLOW	100.	100.	100.	100.	100.	100.	100.	100.
				TIME	4.75	4.75	4.75	4.83	4.92	4.92	4.92	5.00
HYDROGRAPH AT												
+	DEVX4	1.09	1	FLOW	176.	171.	165.	148.	137.	137.	126.	120.
				TIME	5.33	5.33	5.33	5.33	5.25	5.25	5.25	5.25
ROUTED TO												
+	RK4	1.09	1	FLOW	176.	170.	164.	148.	136.	136.	125.	120.
				TIME	5.58	5.58	5.58	5.50	5.50	5.50	5.50	5.50
HYDROGRAPH AT												
+	X3C	.48	1	FLOW	73.	71.	69.	63.	59.	59.	55.	53.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
DIVERSION TO												
+	SD1A	.48	1	FLOW	9.	9.	9.	7.	7.	7.	6.	6.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
HYDROGRAPH AT												
+	SD1A	.48	1	FLOW	64.	62.	60.	55.	52.	52.	49.	48.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
ROUTED TO												
+	RK3C	.48	1	FLOW	64.	62.	60.	55.	52.	52.	49.	48.
				TIME	5.50	5.50	5.50	5.50	5.58	5.58	5.58	5.58
HYDROGRAPH AT												
+	X3	.34	1	FLOW	170.	167.	164.	154.	148.	148.	142.	138.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
3 COMBINED AT												
+	CX3	1.91	1	FLOW	299.	291.	284.	260.	244.	244.	228.	221.
				TIME	5.42	5.42	5.42	5.42	5.33	5.33	5.33	5.33
HYDROGRAPH AT												
+	DTX4	.00	1	FLOW	100.	100.	100.	100.	100.	100.	100.	100.
				TIME	4.75	4.75	4.75	4.83	4.92	4.92	4.92	5.00
ROUTED TO												
+	RDEX	.00	1	FLOW	100.	100.	100.	100.	100.	100.	100.	100.
				TIME	5.25	5.25	5.25	5.33	5.33	5.33	5.42	5.42
HYDROGRAPH AT												
+	BSX5	.10	1	FLOW	68.	67.	66.	62.	60.	60.	57.	56.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CX5	.10	1	FLOW	120.	120.	119.	118.	117.	117.	116.	116.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.08	5.08
DIVERSION TO												
+	DVSTR1	.10	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT												
+	DVWR1	.10	1	FLOW	120.	120.	119.	118.	117.	117.	116.	116.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.08	5.08

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 DIVERSION TO
+                DVSTR2       .10     1   FLOW          37.     37.     37.     37.     37.     37.     37.     37.
                                          TIME          3.50    3.50    3.50    3.58    3.58    3.58    3.58    3.58

 HYDROGRAPH AT
+                DVWR2        .10     1   FLOW          83.     83.     82.     81.     80.     80.     79.     79.
                                          TIME          5.00    5.00    5.00    5.00    5.00    5.00    5.08    5.08

 ROUTED TO
+                  RX5        .10     1   FLOW          83.     82.     82.     81.     80.     80.     79.     78.
                                          TIME          5.08    5.08    5.08    5.17    5.17    5.17    5.17    5.25

  2 COMBINED AT
+                CX4X3        2.01    1   FLOW         377.    369.    362.    338.    322.    322.    305.    297.
                                          TIME          5.33    5.33    5.33    5.33    5.33    5.33    5.33    5.33

 DIVERSION TO
+                DVBOX        2.01    1   FLOW         210.    210.    210.    210.    210.    210.    210.    210.
                                          TIME          3.92    3.92    4.00    4.00    4.08    4.08    4.58    4.67

 HYDROGRAPH AT
+                DVBOX        2.01    1   FLOW         167.    159.    152.    128.    112.    112.     95.     87.
                                          TIME          5.33    5.33    5.33    5.33    5.33    5.33    5.33    5.33
1
                                  SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                      (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                  INTERPOLATED TO
                                                                                  COMPUTATION INTERVAL
          ISTAQ    ELEMENT        DT        PEAK     TIME TO      VOLUME        DT        PEAK     TIME TO      VOLUME
                                                                    PEAK                              PEAK

                                  (MIN)      (CFS)      (MIN)       (IN)      (MIN)       (CFS)      (MIN)        (IN)

        FOR PLAN = 1  RATIO=  .74
            RANN  MANE          2.49      61.90     246.24        .50       5.00       61.81     245.00         .50

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .6912E+01 EXCESS= .0000E+00 OUTFLOW= .6909E+01 BASIN STORAGE= .1459E-03 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .73
            RANN  MANE          2.52      59.84     244.37        .48       5.00       59.80     245.00         .48

*** NORMAL END OF HEC-1 ***
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1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN   1998               *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   31MAR14  TIME  21:51:31   *
 *                                       *
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*                                    *
*    U.S. ARMY CORPS OF ENGINEERS    *
*    HYDROLOGIC ENGINEERING CENTER   *
*          609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616      *
*           (916) 756-1104           *
*                                    *
**************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX  XXXXX            XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
      LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
                *DIAGRAM
*** FREE ***
         1  ID   RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
         2  ID   GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
         3  ID   OFFSITE BASINS, EXISTING CONDITIONS
         4  ID   PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
         5  ID   PREPARED BY STANLEY CONSULTANTS INC. (HM/VF)
         6  ID   INPUT FILE: 100S3X.DAT
         7  ID   DESIGN STORM: 100-YEAR 6-HR
         8  ID   STORM DISTRIBUTION: SDN3
         9  ID   STORM CENTERING: FULL WATERSHED
        10  ID   THIS MODEL DIFFERS FROM 10 AND 25 YEAR: NO FLOW DIVERTED TO STORM DRAIN
        11  ID   AT GOWAN/CRAIG
        12  ID
        13  ID
        14  ID   BASED ON:
        15  ID   CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
        16  ID   2008 MASTER PLAN UPDATE (MPU) BY PBS&J
        17  ID   GOWAN WATERSHED (INPUT FILE = ALLGOW3.DAT) AND
        18  ID   CENTRAL WATERSHED (NORTHWESTERN PORTION)
        19  ID
        20  ID   RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009
        21  ID   UPPRSDN3 AND LWRSDN3 HEC-1 MODELS
        22  ID   FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
        23  ID   CONTROL FACILITIES REFERENCED FROM LOMR UNLESS OTHERWISE NOTED
        24  ID
        25  ID   GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
        26  ID   BY G.C. WALLACE (GCW) 2007
        27  ID
        28  ID   PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
        29  ID   IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
        30  ID   HEC-1 ANALYSIS FOR EXISTING CONDITIONS FILE R00S3X.OUT
        31  ID   BY STANLEY CONSULTANTS, 1/2012
        32  ID
        33  ID   LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
        34  ID   ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
        35  ID   MPU SHOWS THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
        36  ID   (GOEC)
        37  ID
        38  ID
        39  ID   THIS EXISTING CONDITION MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL DRAINAGE
        40  ID   STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
        41  ID   EXISTING CONDITION MODEL AS FOLLOWS:
        42  ID   1. BASIN PT51 OF THE RANCHO STUDY WAS SPLIT INTO PT51A AND PT51B IN ORDER
        43  ID   TO SHOW WHERE FLOW WILL BE COLLECTED BY THE GOWAN OUTFALL - ALEXANDER
        44  ID   ROAD FACILITIES AT ALEXANDER-JONES/RANCHO DRIVE INTERSECTION.
        45  ID   2. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
        46  ID   TO THE EXISTING CONDITION MODEL
        47  ID   3. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE
        48  ID   DARF'S USED IN 2008 MPU HEC-1 ALLGOW3.OUT
        49  ID
        50  ID
        51  ID   JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
        52  ID   JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
        53  ID
```

1 HEC-1 INPUT PAGE 2

```
      LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
        54  ID                        AREA    DARF
        55  ID                        SQ. MI.
        56  ID                        0-0.5   0.99
        57  ID                        0.5-1   0.975
        58  ID                        1-2     0.95
```

100S3X.OUT, 100-year existing condition, refer to Figure 4

```
59          ID                          2-3     0.925
60          ID                          3-4     0.915
61          ID                          4-5     0.908
62          ID                          5-6     0.903
63          ID                          6-7     0.895
64          ID                          7-8     0.885
65          ID
66          ID
67          ID
68          IT       5       0       0     300
69          IO       5       0       0
70          IN       5
71          JR    PREC    0.99   0.975    0.95   0.925   0.915   0.908   0.903   0.895   0.885
            *

72          KK     ANN
73          KM  BASIN REFERENCED FROM LOMR
74          PB    2.85
75          BA   0.259
76          PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
77          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
78          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
79          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
80          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
81          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
82          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
83          PC   0.998   0.999   1.000
84          LS       0    76.8
85          UD   0.499
            *

86          KK    RANN
87          KM  ROUTE TO GD29B
88          RK    2600   0.015   0.015       0    TRAP     100       2
            *

89          KK   GD29B
90          KM  BASIN REFERENCED FROM LOMR
91          PB    2.77
92          BA   0.138
93          LS       0    74.3
94          UD   0.298
            *

95          KK  CGD29B
96          HC       2
            *
```

1

HEC-1 INPUT PAGE 3

```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

97          KK  RGD29B
98          KM  ROUTE GD29B TO CNW1C2
99          KM  ROUTING REVISED FROM LOMR BY STANLEY CONSULTANTS
100         KM  ANN ROAD
101         RD    4500  0.0122   0.016       0    TRAP       0      50
            * PREVIUOS ROUTING
            * KMROUTE TO ANN1B
            * RK2700      0.015   0.015       0   TRAP      100       2
            *

102         KK NW1C2-C
103         KM  BASIN REFERENCED FROM 2008 MPU
104         KM  TAKES PLACE OF ANN1B AND ANN1C (LOMR) WHICH ARE NOW DEVELOPED
105         KM  REVISED BY STANLEY CONSULTANTS
106         BA   0.207
107         PB    2.77
108         LS       0    89.5
109         UD   0.409
            *

110         KK  CNW1C2
111         KM  COMBINE RGD29B AND NW1C2-C
112         KM  ANN ROAD AND RANCHO
113         HC       2
            *

114         KK  RNW1C2
115         KM  ROUTE TO PDGCC3
116         RK    1250  0.0074   0.013       0    TRAP      12       2
            *

117         KK  PDGCC3
118         KM  CN UPDATED BY STANLEY CONSULTANTS FOR DEVELOPMENT
119         KM  REFERENCED FROM GOWAN SD, LONE MTN BRANCH BY GCW
120         PB    2.77
121         BA   0.047
122         LS       0    86.7
123         UD   0.188
            *

124         KK   CGCC3
125         HC       2
            *

126         KK   RGCC3
127         KM  ROUTE TO PDGCC4
128         RK    1550   0.005   0.013       0    TRAP       8       0
            *
```

1

HEC-1 INPUT PAGE 4

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  129         KK REMAIN1
  130         KM  DIVERT 139 CFS UNDER U.S. 95 BETWEEN ANN ROAD AND THE U.S. 95/RANCHO
  131         KM  INTERSECTION IN A 10' X 3' RCB (CULVERT 3). FLOWS IN EXCESS OF 139 CFS
  132         KM  REMAIN ON THE WEST SIDE OF U.S. 95.
  133         KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
  134         DT    D95A
  135         DI       0      51     101     118     140     318   10000
  136         DQ       0      50     100     117     139     139     139
              *

  137         KK   RLBG1
  138         KM  ROUTE TO CGCC4 (HECRAS CROSS SECTION 116+49)
  139         KM  ADDED BY LBG
  140         RK     278   0.005   0.013       0    TRAP       8       0
              *

  141         KK  PDGCC2
  142         KM  BASIN REFERENCED FROM LOMR
  143         PB    2.77
  144         BA   0.042
  145         LS       0    73.2
  146         UD   0.286
              *

  147         KK   RGCC2
  148         KM  ROUTE TO PDGCC4
  149         RK    2900  0.0055   0.015       0    TRAP      60       2
              *

  150         KK  PDGCC4
  151         KM  BASIN REFERENCED FROM LOMR
  152         PB    2.77
  153         BA   0.049
  154         LS       0    84.3
  155         UD   0.189
              *

  156         KK   CGCC4
  157         KM  THE FLOW AT THIS NODE CORRESPONDS TO HECRAS CROSS SECTION 116+49
  158         KM  OF THE US-95 EFFECTIVE HECRAS.
  159         KM  THIS IS THE MOST UPSTREAM NODE IN THE EFFECTIVE MODEL.
  160         HC       3
              *

  161         KK   RLBG2
  162         KM  ROUTE TO CGCB9 (HECRAS CROSS SECTION 112+87)
  163         KM  ADDED BY LBG
  164         RK     362   0.005   0.013       0    TRAP       8       0
              *
1                                        HEC-1 INPUT                                        PAGE  5
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  165         KK  HAMMER
  166         KM  BASIN REFERENCED FROM LOMR
  167         PB    2.82
  168         BA   0.128
  169         LS       0    76.6
  170         UD   0.333
              *

  171         KK RHAMMER
  172         KM  ROUTE TO PDGCD
  173         RK    2700   0.015   0.015       0    TRAP      60       2
              *

  174         KK   PDGCD
  175         KM  BASIN REFERENCED FROM LOMR
  176         PB    2.77
  177         BA   0.129
  178         LS       0    74.0
  179         UD   0.284
              *

  180         KK  CPDGCD
  181         HC       2
              *

  182         KK    RGCD
  183         KM  ROUTE TO PDGCB5
  184         RK    4060  0.0086   0.015       0    TRAP      40       2
              *

  185         KK  PDGCB1
  186         KM  BASIN REFERENCED FROM LOMR
  187         PB    2.77
  188         BA   0.033
  189         LS       0    84.9
  190         UD   0.166
              *

  191         KK   RGCB1
  192         KM  ROUTE TO PDGCB3
  193         RK    2100  0.0086   0.015       0    TRAP      40       2
              *

  194         KK  PDGCB2
  195         KM  BASIN REFERENCED FROM LOMR
```

```
196          PB    2.77
197          BA   0.030
198          LS       0    81.3
199          UD   0.190
             *
1                                        HEC-1 INPUT                                                    PAGE  6
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

200          KK   CGCB2
201          HC       2
             *

202          KK   RCGB2
203          KM  ROUTE TO PDGCB3
204          RK     700  0.0029    0.03       0    TRAP      20       2
             *

205          KK  PDGCB3
206          KM  BASIN REFERENCED FROM LOMR
207          PB    2.77
208          BA   0.066
209          LS       0    73.1
210          UD   0.236
             *

211          KK   CGCB3
212          HC       2
             *

213          KK   RGCB3
214          KM  ROUTE TO PDGCB5
215          RK    1400    0.01   0.025       0    TRAP      20       2
             *

216          KK  PDGCB4
217          KM  BASIN REFERENCED FROM LOMR
218          PB    2.77
219          BA   0.020
220          LS       0    85.7
221          UD   0.204
             *

222          KK   RGCB4
223          KM  ROUTE TO PDGCB5
224          RK     800    0.01    0.03       0    TRAP      20       2
             *

225          KK   CGCB4
226          HC       3
             *

227          KK  PDGCC1
228          KM  BASIN REFERENCED FROM LOMR
229          PB    2.77
230          BA   0.053
231          LS       0    75.4
232          UD   0.263
             *
1                                        HEC-1 INPUT                                                    PAGE  7
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

233          KK  PDGCB5
234          KM  BASIN REFERENCED FROM LOMR
235          PB    2.77
236          BA   0.110
237          LS       0    76.0
238          UD   0.375
             *

239          KK   CGCB5
240          HC       3
             *

241          KK   RGCB5
242          KM  ROUTE TO PDGCB9
243          RK    3080  0.0065    0.03       0    TRAP      30       2
             *

244          KK  C2GCB5
245          HC       2
             *

246          KK  PDGCB6
247          KM  BASIN REFERENCED FROM LOMR
248          PB    2.77
249          BA   0.018
250          LS       0    88.2
251          UD   0.177
             *

252          KK   RGCB6
253          KM  ROUTE TO PDGCB9
254          RK    2880  0.0065    0.03       0    TRAP      30       2
             *

255          KK PDGCB10
256          KM  BASIN REFERENCED FROM LOMR
257          PB    2.77
```

```
258          BA   0.074
259          LS      0    83.7
260          UD   0.260
             *

261          KK  PDGCB9
262          KM  BASIN REFERENCED FROM LOMR
263          PB    2.77
264          BA   0.031
265          LS      0    76.5
266          UD   0.137
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

267          KK   CGCB9
268          HC       4
             *

269          KK   RGCB9
270          KM  ROUTE TO GCB11 (HECRAS CROSS SECTION 105+04)
271          KM  CHANGED FROM 1950 FT TO 783 FEET BY LBG
272          RK     783  0.0036   0.013       0    TRAP       8       2
             *

273          KK PDGCB11
274          KM  BASIN REFERENCED FROM LOMR
275          PB    2.77
276          BA   0.033
277          LS      0    79.3
278          UD   0.195
             *

279          KK  CGCB11
280          HC       2
             *

281          KK   RLBG3
282          KM  ROUTE TO REMAIN2 (HECRAS CROSS SECTION 99+93)
283          KM  ADDED BY LBG
284          RK     511  0.0036   0.013       0    TRAP       8       2
             *

285          KK REMAIN2
286          KM  DIVERT 192 CFS UNDER U.S. 95 JUST SOUTH OF THE U.S. 95/RANCHO INTERSECTION
287          KM  IN 2, 6' X 2' RCB'S (CULVERT 5). REMAINING FLOW CONTINUES SOUTH ALONG U.S.
288          KM  95 TO LONE MOUNTAIN ROAD.
289          KM   REVISED TO 168 BY LBG
290          DT    D95B
291          DI       0     426     591   10000
292          DQ       0     168     192     192
             *

293          KK  RMAIN2
294          KM  ROUTE TO 20BG
295          KM  HECRAS CROSS SECTION 82+37
296          RK    1756  0.0029    0.03       0    TRAP      20       2
             *

297          KK  LONEMT
298          KM  BASIN REFERENCED FROM LOMR
299          PB    2.77
300          BA   0.411
301          LS      0    83.1
302          UD   0.380
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

303          KK  GD20BH
304          KM  BASIN REFERENCED FROM LOMR
305          PB    2.77
306          BA   0.047
307          LS      0    76.6
308          UD   0.250
             *

309          KK   CLONE
310          KM  TENAYA/LONE MOUNTAIN
311          HC       2
             *

312          KK   RLONE
313          KM  ROUTE TO 20BG
314          KM  HECRAS CROSS SECTION 82+37
315          RK    1100  0.0015   0.015       0    TRAP      44       2
             *

316          KK  GD20BG
317          KM  BASIN REFERENCED FROM LOMR
318          PB    2.77
319          BA   0.113
320          LS      0    81.4
321          UD   0.261
             *

322          KK   C20BG
323          HC       3
```

```
                *
  324           KK   R20BG
  325           KM  ROUTE TO 20BL
  326           KM  HECRAS X-SECTION 65+10
  327           RK    1680  0.0016    0.03       0    TRAP     150       2
                *
  328           KK  CRAIG1
  329           KM  ADDED FROM LOMR
  330           KM  BASIN CRAIG1 (SDN3)
  331           PB    3.16
  332           BA    2.44
  333           LS       0    82.0
  334           UD   0.700
                *
  335           KK   DBUF1
  336           KM  DIVERT 249 CFS (447 CAPACITY - 198 FUTURE INTERCEPTED) TO
  337           KM  GOWAN NORTH BUFFALO BRANCH SD BETWEEN LONE MT AND RED COACH
  338           KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
  339           KM  FACILITY ID: GOBU 0085
  340           DT   DGNBB
  341           DI       0     250    2807   10000
  342           DQ       0     249     249     249
                *
1                                       HEC-1 INPUT                                                    PAGE 10
LINE            ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  343           KK   RBUF1
  344           KM  ROUTE TO RED COACH
  345           RK    1295   0.004   0.015       0    TRAP      80       2
                *
  346           KK   DBUF2
  347           KM  DIVERT 109 CFS TO GOWAN NORTH BUFFALO BRANCH SD AT RED COACH
  348           KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
  349           KM  FACILITY ID: GOBU 0058
  350           DT  DGNBB1
  351           DI       0     110    1121   10000
  352           DQ       0     109     109     109
                *
  353           KK    DRED
  354           KM  DIVERT 70.40% FLOW DOWN BUFFALO TOWARDS COBAL CANYON.
  355           KM  TAKE FLOW DOWN RED COACH TO US95
  356           DT DBUFLO2
  357           DI       0     100    1000   10000
  358           DQ       0    70.4    704.    7040
                *
  359           KK   RDRED
  360           KM  ROUTE TO 20BI
  361           RK    2700   0.007   0.015       0    TRAP      80       2
                *
  362           KK  GD20BI
  363           KM  BASIN REFERENCED FROM LOMR
  364           PB    2.77
  365           BA   0.115
  366           LS       0    80.5
  367           UD   0.286
                *
  368           KK   C20BI
  369           HC       2
                *
  370           KK   R20BI
  371           KM  ROUTE TO 20BL
  372           KM  HECRAS CROSS SECTION 65+10
  373           RK     910  0.0055   0.015       0    TRAP      40       2
                *
  374           KK  GD20BL
  375           KM  BASIN REFERENCED FROM LOMR
  376           PB    2.77
  377           BA   0.079
  378           LS       0    88.7
  379           UD   0.230
                *
1                                       HEC-1 INPUT                                                    PAGE 11
LINE            ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  380           KK   C20BL
  381           HC       3
                *
  382           KK   R20BL
  383           KM  ROUTE TO C20BJ2
  384           KM  HECRAS CROSS SECTION 61+09
  385           RK     401  0.0016    0.03       0    TRAP     150       2
                *
  386           KKRTBUFAL2
  387           KM  RETRIEVE FLOW DIVERTED TO BUFFALO PAST RED COACH
  388           DR DBUFLO2
                *
```

100S3X.OUT, 100-year existing condition, refer to Figure 4

```
389          KK   RBUF2
390          KM  ROUTE TO COBAL CANYON
391          RK      652   0.004   0.015       0    TRAP      80       2
             *

392          KK  DCOBAL
393          KM  DIVERT 71.46% OF FLOW AT COBAL CANYON/BUFFALO INTERSECTION SOUTH ON BUFFALO
394          KM  REMAINING FLOW CONTINUES TO US95
395          DT DBUFLO3
396          DI       0    100.    1000   10000
397          DQ       0   71.46   714.6    7146
             *

398          KK RCOBAL1
399          KM  ROUTE TO C20BJ1
400          RK     2700   0.007   0.015       0    TRAP      60       2
             *

401          KK  GD20BJ
402          KM  BASIN REFERENCED FROM LOMR
403          PB    2.77
404          BA   0.052
405          LS       0    84.3
406          UD   0.257
             *

407          KK  C20BJ1
408          HC       2
             *

409          KK  R20BJ1
410          KM  ROUTE TO C20BJ2
411          RK      900   0.006   0.015       0    TRAP      40       2
             *
1                                        HEC-1 INPUT                                                    PAGE 12
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

412          KK  C20BJ2
413          KM  US95 HECRAS CROSS SECTION 59+51
414          HC       2
             *

415          KK  R20BJ2
416          KM  ROUTE TO C20BM
417          RK      362   0.006   0.015       0    TRAP      40       2
             *

418          KK  GD20BM
419          KM  BASIN REFERENCED FROM LOMR
420          PB    2.77
421          BA   0.048
422          LS       0    89.2
423          UD   0.189
             *

424          KK   C20BM
425          KM  HECRAS CROSS SECTION 55+89
426          KM  GD20BM IS ADDED TO US95 FLOW FROM C20BJ2
427          HC       2
             *

428          KK REMAIN5
429          KM  DIVERSION PER EXISTING INTERCHANGE AT CRAIG ROAD
430          KM  DIVERT FLOW THROUGH 2, 6' x 2' RCB'S (CULVERT 7) UNDER U.S. 95
431          KM  JUST NORTH OF THE CRAIG ROAD BRIDGE.
432          KM  REMAINING FLOW CONTINUES SOUTH ALONG U.S. 95
433          KM  THIS DIVERSION HAS TWO SEPARATE FLOW QUANTITIES, 82 CFS FOR THE SDN3
434          KM  MODEL AND 180 CFS FOR THE SDN5 MODEL
435          KM  REVISED BY LBG 6-28-05 (RATING CURVE DEVELOPED)
436          DT    D95E
437          DI       0     200     600    1000    1250    2006
438          DQ       0    16.8      82   144.0     170     264
             *

439          KKRREMAINS5
440          KM  ROUTE TO 2C20BK
441          RK      853   0.006   0.015       0    TRAP      40       2
             *

442          KKRTBUFAL3
443          KM  RETRIEVE FLOW DIVERTED TO BUFFALO PAST COBAL CANYON
444          DR DBUFLO3
             *

445          KK   RBUF3
446          KM  ROUTE TO CRAIG ROAD
447          RK      661   0.003   0.015       0    TRAP      80       2
             *
1                                        HEC-1 INPUT                                                    PAGE 13
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

448          KK   DBUF3
449          KM  DIVERT 198 CFS TO GOWAN NORTH BUFFALO BRANCH SD AT CRAIG
450          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
451          KM  FACILITY ID: GOBU 0032
452          DT  DGNBB2
453          DI       0     199    1121   10000
```

```
454          DQ       0     198     198     198
             *

455          KK RCRAIG2
456          KM  ROUTE TO GD20BK
457          RK    3400  0.0067   0.015       0    TRAP      80       2
             *

458          KK  GD20BK
459          KM  BASIN REFERENCED FROM LOMR
460          PB    2.77
461          BA   0.050
462          LS       0    80.5
463          UD   0.264
             *

464          KK  1C20BK
465          HC       2
             *

466          KK R1C20BK
467          KM  ROUTE TO 2C20BK
468          KM  HECRAS CROSS SECTION 47+36 IN US-95 HECRAS MODEL
469          RK    1150  0.0039   0.015       0    TRAP      80       2
             *

470          KK  2C20BK
471          HC       2
             *

472          KK R2C20BK
473          KM  ROUTE TO C17BI
474          KM  HECRAS CROSS SECTION 42+41
475          KM  CHANGE FROM 600 FT TO 495 FT
476          RK     495  0.0039    0.03       0    TRAP      80       2
             *

477          KK HICKAM1
478          KM  BASIN REFERENCED FROM LOMR
479          PB    2.89
480          BA   0.477
481          LS       0    80.3
482          UD   0.472
             *
1                                        HEC-1 INPUT                                        PAGE 14
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

483          KK    BUF3
484          KM  DIVERT 125 CFS TO GOWAN NORTH BUFFALO BRANCH SD FROM HICKAM1
485          KM  SUBBASIN. REMAINING FLOW CONTINUES EAST ALONG HICKAM AVENUE
486          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
487          KM  FACILITY ID: GOBU 0000
488          DT  DGNBB3
489          DI       0     126     211   10000
490          DQ       0     125     125     125
             *

491          KK RHICKAM
492          KM  ROUTE TO C17BH
493          RK    1300   0.008   0.025       0    TRAP      80       2
             *

494          KK  GD17BH
495          KM  BASIN REFERENCED FROM LOMR
496          PB    2.77
497          BA   0.025
498          LS       0    82.8
499          UD   0.178
             *

500          KK   C17BH
501          HC       2
             *

502          KK   R17BH
503          KM  ROUTE TO GD17BG
504          RK    1330   0.006   0.025       0    TRAP      80       2
             *

505          KK  GD17BG
506          KM  BASIN REFERENCED FROM LOMR
507          PB    2.77
508          BA   0.116
509          LS       0    83.3
510          UD   0.275
             *

511          KK   C17BG
512          HC       2
             *

513          KK   R17BG
514          KM  ROUTE TO C17BI
515          KM  HECRAS CROSS SECTION 42+41
516          RK    1200   0.005   0.025       0    TRAP      80       2
             *
1                                        HEC-1 INPUT                                        PAGE 15
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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517          KK  GD17BI
518          KM  BASIN REFERENCED FROM LOMR
519          PB    2.77
520          BA   0.066
521          LS       0    85.2
522          UD   0.193
             *

523          KK   C17BI
524          HC       3
             *

525          KK   R17BI
526          KM  ROUTE TO C17BJ
527          KM  HECRAS CROSS SECTION 27+40
528          RK    1501  0.0023    0.03       0    TRAP     200       2
             *

529          KK  GD14CH
530          KM  BASIN REFERENCED FROM LOMR
531          PB    2.77
532          BA   0.040
533          LS       0    83.0
534          UD   0.181
             *

535          KK   R14CH
536          KM  ROUTE TO C17BJ
537          KM  HECRAS CROSS SECTION 27+40
538          RK    1900   0.005   0.015       0    TRAP      40       2
             *

539          KK  GD17BJ
540          KM  BASIN REFERENCED FROM LOMR
541          PB    2.77
542          BA   0.063
543          LS       0    88.3
544          UD   0.222
             *

545          KK   C17BJ
546          HC       3
             *

547          KK REMAIN6
548          KM  DIVERT FLOW THROUGH DUAL 6' X 2' RCB'S (CULVERT 10) AT ALEXANDER ROAD
549          KM  BETWEEN CROSS-SECTIONS 28+10 AND 26+94 IN THE HEC-RAS MODEL.
550          KM  WEIR FLOW ELIMINATED DUE TO SOUND WALL AND BARRIER RAILS
551          DT    D95F
552          DI       0     100     500    1000    1937    2725
553          DQ       0    10.8      72     144     192     264
             *
```

1

HEC-1 INPUT PAGE 16

```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

554          KK   R17BJ
555          KM  ROUTE TO C6MAIN
556          KM  HECRAS CROSS SECTION 25+14
557          RK     226   0.005   0.015       0    TRAP      40       2
             *

558          KK  GD14CF
559          KM  BASIN REFERENCED FROM LOMR
560          KM  SUBBASIN AT NW OF GOWAN & BUFFALO INTERSECTION
561          PB    2.78
562          BA   0.130
563          LS       0    77.9
564          UD   0.288
             *

565          KK    BUF4
566          KM  DIVERT 30 CFS TO GOWAN NORTH BUFFALO BRANCH SD FROM BUFFALO AND
567          KM  EXCALIBUR INTERSECTION.REMAINING FLOW CONTINUES EAST ALONG ALEXANDER
568          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
569          KM  FACILITY ID: GOBU 0000
570          DT  DGNBB4
571          DI       0      31      60   10000
572          DQ       0      30      30      30
             *

573          KK   R14CF
574          KM  ROUTE TO GD14CG
575          RK    1450   0.006   0.015       0    TRAP     100       2
             *

576          KK  GD14CG
577          KM  BASIN REFERENCED FROM LOMR
578          PB    2.77
579          BA   0.057
580          LS       0    82.2
581          UD   0.208
             *

582          KK   C14CG
583          HC       2
             *

584          KK   R14CG
585          KM  ROUTE TO GD14CI
```

```
586          RK    1650   0.006   0.015       0    TRAP     100       2
             *

587          KK  GD14CI
588          KM  BASIN REFERENCED FROM LOMR
589          PB    2.77
590          BA   0.054
591          LS       0    79.7
592          UD   0.196
             *
1                                        HEC-1 INPUT                                                    PAGE 17
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

593          KK   C14C1
594          HC       2
             *

595          KK   R14CI
596          KM  ROUTE TO CMAIN6
597          RK     945  0.0106   0.015       0    TRAP     100       2
             *

598          KK  CMAIN6
599          KM  HECRAS US95 CROSS SECTION 25+14
600          HC       2
             *

601          KK  RMAIN6
602          KM   ROUTE SOUTH TO US95 HECRAS CROSS SECTION 13+00
603          RK    1214  0.0026    0.03       0    TRAP      80       3
             *

604          KK REMAIN7
605          KM  DIVERT FLOW THROUGH 2-30" RCP's (CULVERT 12) EAST ACROSS
606          KM  US95 BETWEEN ALEXANDER ROAD AND GOWAN ROAD.
607          KM  FLOW OVER US95 ELIMINATED BETWEEN CROSS SECTIONS 14+20 AND 10+27
608          KM  DUE TO SOUNDWALLS.REVISED BY LBG 6-28-2005
609          DT    D95G
610          DI       0     100     500    1000    1500    1656    2000
611          DQ       0      60      82      96     102     101     104
             *

612          KK   GD11C
613          KM  BASIN REFERENCED FROM LOMR
614          PB    2.77
615          BA   0.132
616          LS       0    86.0
617          UD   0.296
             *

618          KK    C11C
619          HC       2
             *

620          KK    R11C
621          KM  ROUTE SOUTH TO CULVERT 13 UPSTREAM OF GOWAN UNDERPASS
622          KM  HECRAS CROSS SECTION 0+17
623          RK    1283  0.0026    0.03       0    TRAP      80       3
             *

624          KK   GD11B
625          KM  BASIN REFERENCED FROM LOMR
626          PB    2.77
627          BA   0.196
628          LS       0    87.6
629          UD   0.272
             *
1                                        HEC-1 INPUT                                                    PAGE 18
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

630          KK    C11B
631          HC       2
             *

632          KK  GOWAN1
633          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
634          KM  BY POGGEMEYER DESIGN GROUP, INC
635          KM  DIVERT MAXIMUM OF 422 CFS INTO GOWAN OUTFALL AT US95
636          KM  REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
637          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
638          KM  DIVERT 0 CFS, GOWAN OUTFALL IS FULL AT THIS LOCATION, LBG
639          KM  FACILITY: GOWAN OUTFALL FACILITIES
640          KM  FACILITY ID: G00F 0511
641          DT   GOOF1
642          DI       0      51     101     423    5000
643          DQ       0       1       2       3       4
             *

644          KK    R11B
645          KM  ROUTE TO CPT6B
646          RK    1400  0.0057   0.015       0    TRAP      80       2
             *

647          KK   CY05A
648          KM  BASIN REFERENCED FROM LOMR
649          PB    2.77
650          BA   0.025
651          LS       0    85.6
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652          UD   0.179
             *

653          KK    D95G
654          KM  RETRIEVE FLOW DIVERTED THROUGH CULVERT 13
655          DR    D95G
             *

656          KK   RD95G
657          KM  ROUTE TO PT6B
658          RK    2300   0.004   0.015       0    TRAP      60       2
             *

659          KK    PT6B
660          KM  BASIN REFERENCED FROM LOMR
661          PB    2.77
662          BA   0.107
663          LS       0    89.1
664          UD   0.182
             *
1                                        HEC-1 INPUT                                        PAGE 19

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

665          KK   CPT6B
666          HC       2
             *

667          KK  2CPT6B
668          KM  RAINBOW & GOWAN
669          HC       3
             *

670          KK  GOWAN2
671          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
672          KM  BY POGGEMEYER DESIGN GROUP, INC
673          KM  DIVERT MAXIMUM OF 52 CFS INTO GOWAN OUTFALL AT RAINBOW FOR A
674          KM  TOTAL OF 474 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
675          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
676          KM  DIVERT 2 CFS THE GOWAN OUTFALL IS FULL AT THIS LOCATION, LBG
677          KM  FACILITY: GOWAN OUTFALL FACILITIES
678          KM  FACILITY ID: G00F 0511
679          DT   G00F2
680          DI       0      53     101     423    5000
681          DQ       0       2       2       2       2
             *

682          KK   RPT6B
683          KM  ROUTE TO C5A3
684          RK    2480  0.0067   0.015       0    TRAP      80       2
             *

685          KK   CY05D
686          KM  BASIN REFERENCED FROM LOMR
687          PB    2.77
688          BA   0.059
689          LS       0    78.6
690          UD   0.254
             *

691          KK   PT5A3
692          KM  BASIN REFERENCED FROM LOMR
693          PB    2.77
694          BA   0.089
695          LS       0    87.1
696          UD   0.285
             *

697          KK    C5A3
698          KM  TORREY PINES & GOWAN
699          HC       3
             *
1                                        HEC-1 INPUT                                        PAGE 20

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

700          KK  GOWAN3
701          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
702          KM  BY POGGEMEYER DESIGN GROUP, INC
703          KM  DIVERT MAXIMUM OF 21 CFS INTO GOWAN OUTFALL AT TORREY PINES, FOR A
704          KM  TOTAL OF 495 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
705          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
706          KM  DIVERT 2 CFS AT THIS LOCATION, LBG
707          KM  FACILITY: GOWAN OUTFALL FACILITIES
708          KM  FACILITY ID: G00F 0511
709          DT   G00F3
710          DI       0      22    5000
711          DQ       0       2       2
             *

712          KK    R5A3
713          KM  ROUTE TO C5A8 GOWAN & BRONCO
714          RK    1236  0.0088   0.015       0    TRAP      80       2
             *

715          KK     MAV
716          KM  DIVERSION TO MAVERICK THEN DUNCAN THEN RANCHO.
717          KM  DIVERSIONS DETERMINED USING HECRAS
718          DTMAVERICK
719          DI       0     200     400    1050    1300    1550    1800
```

```
720          DQ       0       8      14      50     100     150     200
             *

721          KK   R5A3B
722          KM  ROUTE TO C5A8 GOWAN & BRONCO
723          RK     600  0.0088   0.015       0    TRAP      80       2
             *

724          KK   CY06A
725          KM  BASIN REFERENCED FROM LOMR
726          PB    2.77
727          BA   0.077
728          LS       0    84.0
729          UD   0.246
             *

730          KK   PT5A8
731          KM  BASIN REFERENCED FROM LOMR
732          PB    2.77
733          BA   0.025
734          LS       0    82.0
735          UD   0.265
             *

736          KK    C5A8
737          KM  GOWAN & BRONCO
738          HC       3
             *
1                                        HEC-1 INPUT                                                    PAGE 21

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

739          KK   R5A3C
740          KM  ROUTE C5A8 TO GOWAN & JONES
741          RK     620  0.0088   0.015       0    TRAP      80       2
             *

742          KK  GOWAN4
743          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
744          KM  BY POGGEMEYER DESIGN GROUP, INC
745          KM  DIVERT MAXIMUM OF 44 CFS INTO GOWAN OUTFALL AT JONES FOR A
746          KM  TOTAL OF 539 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
747          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
748          KM  DIVERT 2 CFS AT THIS LOCATION, LBG
749          KM  FACILITY: GOWAN OUTFALL FACILITIES
750          KM  FACILITY ID: G00F 0511
751          DT   G00F4
752          DI       0      45    5000
753          DQ       0       2       2
             *

754          KK  DPT5A8
755          KM  DIVERT FLOW TO JONES
756          KM  FROM VTN NEVADA SILVER MESA STUDY (1989) AND CVL FISR
757          KM  DIVERTED FLOW DRAINS SOUTH THEN EAST TO SANTA CATALINA. IT THEN
758          KM  FLOWS UNDER MICHAEL TO RANCHO. MOST GOES UNDER RANCHO IN A RCB JUST SOUTH
759          KM   OF THE MICHAEL WAY INTERSECTION. REMAINING FLOW CONTINUES SOUTH ON RANCHO.
760          DT  DCY07B
761          DI       0     100     500    1000    2000    3000    4000    5500
762          DQ       0       0     116     253     592     948    1308    1859
             *

763          KK    R5A8
764          KM  ROUTE TO TRUE VALUE
765          RK    1659  0.0097   0.015       0    TRAP      80       2
             *

766          KK   R5A82
767          KM  ROUTE TO CCY07A
768          RK    1220  0.0097   0.015       0    TRAP      80       2
             *

769          KK   CY07A
770          KM  BASIN REFERENCED FROM LOMR
771          PB    2.77
772          BA   0.027
773          LS       0    86.2
774          UD   0.237
             *

775          KK  CCY07A
776          HC       2
             *
1                                        HEC-1 INPUT                                                    PAGE 22

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

777          KK    TRUV
778          KM  DIVERSION BEHIND TRUE VALUE HARDWARE REVISED BY LBG. DIVERSIONS
779          KM  DETERMINED USING HECRAS LATERAL WEIR. L = 25 FT
780          DT  TRUVAL
781          DI       0     200     400     600    1000    1400    1800
782          DQ       0       8      25      43      78     114     149
             *
             * ************************************************************
             * ************************************************************
             * ****START OF FLOW CONVEYED IN SWALE ON WEST SIDE OF RANCHO****
             * ****AND ULTIMATELY TO THE GOWAN SD, LONE MTN BRANCH  *********
             * ****NONE OF THIS FLOW IS CONVEYED IN STREET PER LOMR HECRAS***
             * ************************************************************
```

```
                * ************************************************************
                *
783             KK    D95B
784             KM  RETRIEVE FLOW FROM BOX DIVERSION (CULVERT 3) JUST SOUTH OF US95/RANCHO INTERSE
785             KM  ***NOTE: THIS FLOW CARRIES A DRAINAGE AREA OF 1.47 SQUARE MILES***
786             KM  ***THIS TOTAL ADJUSTED BY STANLEY CONSULTANTS FROM 1.49 IN LBG HEC-1
787             DR    D95B
                *
788             KK   RD95B
789             KM  ROUTE TO 1REMAIN ON RANCHO DRIVE
790             RK    1200   0.004   0.025       0    TRAP      30       2
                *
791             KK 1REMAIN
792             KM  DIVERT 36 CFS EAST THROUGH 2, 24" CMP'S (CULVERT 14) UNDER RANCHO DR
793             KM  NORTHWEST (UPSTREAM) OF THE RANCHO DR AND RAINBOW BLVD INTERSECTION.
794             KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
795             KM  UPPER RANCHO HECRAS CROSS SECTION 122+75.
796             DT  D1RCHO
797             DI       0     191    1000   10000
798             DQ       0      36      36      36
                *
799             KK  PT3AB1
800             KM  BASIN REFERENCED FROM LOMR
801             PB    2.77
802             BA   0.049
803             LS       0    93.7
804             UD   0.283
                *
805             KK   C3AB1
806             HC       2
                *
1                                          HEC-1 INPUT                                          PAGE 23

LINE            ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

807             KK 2REMAIN
808             KM  DIVERT 29 CFS EAST THROUGH A 30" CMP (CULVERT 15) UNDER RANCHO DR
809             KM  AT THE RANCHO DR AND RAINBOW BLVD INTERSECTION.
810             KM  UPPER RANCHO HECRAS STA. 121+00
811             KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
812             DT  D2RCHO
813             DI       0     189    1000   10000
814             DQ       0      29      29      29
                *
815             KK  R2MAIN
816             KM  ROUTE TO PT3AB2
817             RK    1365  0.0022   0.025       0    TRAP      30       2
                *
818             KK  PT3AB2
819             KM  BASIN REFERENCED FROM LOMR
820             PB    2.77
821             BA   0.050
822             LS       0    94.5
823             UD   0.197
                *
824             KK   C3AB2
825             HC       2
                *
826             KK 3REMAIN
827             KM  ALL FLOW UP TO STORMDRAIN DESIGN FLOW RATE, 240 CFS
828             KM  DIVERTED UNDER RANCHO RD AT LONE MT RD TO THE GOWAN SD FACILITY
829             KM  IN LONE MT(NDESIGN BY GCW)AT RANCHO HECRAS STA. 103+99 (LOMR BY LBG)
830             KM  REVISED BY STANLEY CONSULTANTS
831             KM  1 CFS REMAINS TO AVOID A ZERO FLOW
832             KM  FACILITY: GOWAN OUTFALL-LONE MTN ROAD BRANCH
833             KM  FACILITY ID: GOLO 0275
834             DT  D3RCHO
835             DI       0     241    1000   10000
836             DQ       0     240     240     240
                *
                * ************************************************************
                * ************************************************************
                * ****END OF FLOW CONVEYED TO GOWAN OUTFALL-LONE MTN ROAD SD****
                * *START OF SURFACE FLOW CONVEYED SOUTH IN SWALE EAST OF RANCHO*
                * *RUNOFF FROM TOTAL AREA CONVEYED TO STORMDRAIN ***************
                * *DECREASE CALCULATED AREA AT HC'S BY 0.1 SQ MI.***************
                * ************************************************************
                * ************************************************************
                *
1                                          HEC-1 INPUT                                          PAGE 24

LINE            ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

837             KK  R3MAIN
838             KM  ROUTE TO CPT2B2
839             KM  RANCHO HECRAS CROSS SECTION 93+76
840             RK    1023   0.005    0.03       0    TRAP      40       2
                *
841             KK   PT2B2
842             KM  BASIN REFERENCED FROM LOMR
```

```
843          PB    2.77
844          BA   0.078
845          LS       0    87.0
846          UD   0.254
             *

847          KK  CPT2B2
848          HC       2
             *

849          KK 4REMAIN
850          KM  DIVERT 35 CFS EAST THROUGH A 36" CMP (CULVERT 21)
851          KM  UNDER RANCHO DR HALF WAY BETWEEN LONE MTN RD AND CRAIG RD
852          KM  UPPER RANCHO HECRAS CROSS SECTION 93+76.
853          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
854          DT  D4RCHO
855          DI       0     214    1000   10000
856          DQ       0      35      35      35
             *

857          KK  R4MAIN
858          KM  ROUTE TO C2B3
859          RK    2323   0.011    0.02       0    TRAP      40       2
             *

860          KK   PT2B3
861          KM  BASIN REFERENCED FROM LOMR
862          PB    2.77
863          BA   0.023
864          LS       0    93.2
865          UD   0.236
             *

866          KK    C2B3
867          KM  UPPER RANCHO HECRAS CROSS SECTION 70+16
868          KM   FLOW ALONG RANCHO, NO. OF RANCHO/CRAIG INTERSECTION
869          HC       2
             *

870          KK    D2B3
871          KM  DIVERT FLOW TO CRAIG RD STORM DRAIN AT RANCHO.
872          KM  CRAIG RD STORM DRAIN IS A 42" TO 48" TO 60" RCP.
873          KM  A 48" LATERAL (CULVERT 22) INTO THE SD HAS A CAPACITY OF 120 CFS
874          KM  HY-8 CALCULATIONS INDICATE OF THE 91 CFS 100 YEAR STORM; 88 CFS IS CAPTURED BY
875          KM  THE INLET TO THE 48"LATERAL IS AT THE DOWNSTREAM END OF THE DRAINAGE EASEMENT
876          KM  BEHIND THE 7-11 CONVENIENCE STORE. IMMEDIATELY ABOVE THE 48" INLET ARE
1                                        HEC-1 INPUT                                    PAGE 25

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

877          KM  2, 3'X7' RCB'S (CULVERT 23) THAT CROSS UNDER CRAIG ROAD AND DISCHARGE ON THE
878          KM  SOUTHWEST SIDE OF THE CRAIG/RANCHO INTERSECTION.
879          KM  DIVERT 120 CFS TO THE CRAIG RD STORM DRAIN SINCE 90 CFS (HEC-1 DIVERSION DCSD1
880          KM  ALREADY EXISTS IN THE PIPE. REMAINING FLOW TRAVELS UNDER CRAIG ROAD IN THE
881          KM  2: 3'X7' RCB'S AND DISCHARGES AT THE SOUTHWEST CORNER OF THE CRAIG/RANCHO
882          KM  INTERSECTION AND IS JOINED BY THE STREET FLOW IN CRAIG. ALL STREET FLOW
883          KM  IN CRAIG IS CONTAINED IN THE NORTH HALF OF THE STREET BY THE MEDIAN CURB SO
884          KM  THERE IS NO DIVERSION TO TORREY PINES.
885          KM  UPPER RANCHO HECRAS STA. 70+00.
886          DT   DCSD2
887          DI       0      91    1000   10000
888          DQ       0      88     120     120
             *

889          KK   PT2A2
890          KM  BASIN REFERENCED FROM LOMR
891          PB    2.77
892          BA   0.062
893          LS       0    84.7
894          UD   0.222
             *

895          KK    R2A2
896          KM  ROUTE TO C2A1
897          RK    1200   0.004   0.015       0    TRAP     100       2
             *

898          KK   PT2A1
899          KM  BASIN REFERENCED FROM LOMR
900          PB    2.77
901          BA   0.065
902          LS       0    86.8
903          UD   0.308
             *

904          KK    D95E
905          KM  RETRIEVE FLOW FROM BOX DIVERSION AT US95 AND CRAIG (CULVERT 7)
906          KM  ***NOTE: THIS FLOW CARRIES A TOTAL TRIBUTARY AREA****
907          KM  ***OF 4.77/18.58 SQUARE MILES SDN3/SDN5**************
908          KM  THIS IS NOT IN ADDITION TO THE 1.47 SQUARE MILES BROUGHT IN BY D95B, SO
909          KM  THE TOTAL TRIBUTARY AREA TO THE CRAIG/RANCHO INTERSECTION IS
910          KM  MILES 4.77 + AREA AT C2B3 - AREA CAPTURED IN GOWAN SD LN MTN BRANCH
911          DR    D95E
             *

912          KK   RD95E
913          KM  ROUTE TO PT2A2
914          RK    1500   0.004   0.015       0    TRAP      80       2
             *
1                                        HEC-1 INPUT                                    PAGE 26

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
915          KK    C2A2
916          HC       3
             *

917          KK  DPT2A1
918          KM  DIVERT FLOW TO CRAIG RD. STORM DRAIN
919          KM  42" RCP, CAPACITY = 90 CFS
920          KM  REMAINING FLOW CONTINUES EAST IN CRAIG RD.
921          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
922          DT   DCSD1
923          DI       0      21      51      76      91     200     500    1000
924          DQ       0      20      50      75      90      90      90      90
             *

925          KK    R2A2
926          KM  ROUTE TO C2B1
927          RK    2100   0.007   0.015       0    TRAP      80       2
             *

928          KK   PT2B1
929          KM  BASIN REFERENCED FROM LOMR
930          PB    2.77
931          BA   0.072
932          LS       0    84.5
933          UD   0.222
             *

934          KK    C2B1
935          HC       2
             *

936          KK    R2B1
937          KM  ROUTE TO 2C2B3
938          KM  STREET FLOW IN CRAIG RD GOING EAST TO RANCHO DR
939          RK     300   0.007   0.015       0    TRAP      80       2
             *

940          KK   2C2B3
941          HC       2
             *

942          KK   RC2B3
943          KM  ROUTE TO 5REMAIN
944          KM  UPPER RANCHO HECRAS CROSS SECTION 53+82
945          RK    1600  0.0076    0.03       0    TRAP      80       2
             *

946          KK   PT51A
947          KM  BASIN ADDED BY STANLEY CONSULTANTS, ORIGINALLY THE NORTHERN HALF
948          KM  OF LOMR BASIN PT51, ALSO NORTHEAST PORTION OF MPU BASIN PT41-C
949          KM  FLOW DISCHARGES INTO CHANNEL ON WEST SIDE OF RANCHO
950          KM  CONTINUES SOUTH
951          PB    2.77
952          BA   0.035
1                                        HEC-1 INPUT                                    PAGE 27
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
953          LS       0    93.2
954          UD   0.128
             *

955          KK   C2628
956          HC       2
             *

957          KK 5REMAIN
958          KM  DIVERT FLOW EAST ACROSS RANCHO IN TWO 6' X 3' RCB's (CULVERT 26 AND 28).
959          KM  THE FIRST RCB (CULVERT 26) IS JUST UPSTREAM OF A 7' X 3' RCB (CULVERT 27)
960          KM  THAT PARALLELS RANCHO ON THE WEST SIDE.
961          KM  DIVERT 78 CFS OF 185 CFS EAST IN (CULVERT 26).
962          KM  THE REMAINING 107 CFS ENTERS CULVERT 27 AND CONTINUES SOUTH UNTIL IT SPLITS
963          KM  AT THE CONNECTION WITH CULVERT 28.
964          KM  DIVERT 35 CFS OF THE 107 CFS EAST IN CULVERT 28.
965          KM  THE REMAINING 72 CFS CONTINUES TO THE SOUTH SIDE OF ALEXANDER IN CULVERT 27
966          KM  UPPER RANCHO HECRAS HAS CULVERT 27 IN IT BETWEEN STA 52+64 AND 38+36.
967          KM  IN INTERIM AND DEVELOPED CONDITIONS THESE FLOWS WILL ENTER THE CCRFCD
968          KM  STORM DRAIN FACILITY (GOAL 0111) AT THESE LOCATIONS.
969          DT  D5RCHO
970          DI       0     185    1000   10000
971          DQ       0     113     113     113
             *

972          KK  R5REMN
973          KM  ROUTE TO CPT51
974          KM  UPPER RANCHO HECRAS CROSS SECTION 38+36
975          RK    1428   0.006    0.03       0    TRAP       7       0
             *

976          KK   PT51B
977          KM  BASIN ADDED BY STANLEY CONSULTANTS, ORIGINALLY THE SOUTHERN HALF
978          KM  OF LOMR BASIN PT51, ALSO SOUTHEAST PART OF MPU BASIN PT41-C
979          PB    2.77
980          BA   0.035
981          LS       0    93.2
982          UD   0.147
             *
             * KKPT51
             * THIS BASIN WAS DIVIDED INTO SMALLER SUBBASINS BY STANLEY CONSULTANTS, SEE
             * ABOVE (PT51A AND PT51B) TO PROVIDE MORE DETAIL ON WHERE FLOWS WILL ENTER THE
```

```
                * PROPOSED CCRFCD STORM DRAIN SYSTEM IN CRAIG ROAD, RANCHO
                * DRIVE, AND ALEXANDER/JONES BOULEVARD IN INTERIM AND DEVELOPED CONDITIONS
                * PB2.77
                * BA0.070
                * LS0          90.4
                * UD0.262
                *
1
                                                HEC-1 INPUT                                                    PAGE 28
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 983            KK   CPT51
 984            KM  WEST SIDE RANCHO, NORTH OF ALEXANDER (JONES NORTH)
 985            HC       2
                *
                * KKD95Fa
                * KMRETRIEVE FLOW FROM WEIR DIVERSION AT US95 AND ALEXANDER
                * DRD95Fa
                *
                * THESE TWO DIVERSIONS CARRY A TOTAL TRIBUTARY AREA OF 18.68.
                * THIS IS NOT IN ADDITION TO THE 1.49 SQUARE MILES AND 2.35
                * SQUARE MILES BROUGHT IN BY D95B AND D95E RESPECTIVELY, SO THE TOTAL
                * TRIBUTARY AREA AT THE ALEXANDER/RANCHO INTERSECTION IS 19.69 SQUARE MILES.
                * (18.68 + 1.01)
                * AREA ADJ TO SND3 RESULTS, 5.61 SQ MI, BY STANLEY CONSULTANTS
                *
 986            KK    D95F
 987            KM  RETRIEVE FLOW FROM CULVERT 10 AND WEIR DIVERSION AT US95 AND ALEXANDER
 988            DR    D95F
                *
 989            KK   RD95F
 990            KM  ROUTE TO CPT6A
 991            RK    1500   0.004   0.015       0    TRAP     100       2
                *
 992            KK     PT3
 993            KM  BASIN REFERENCED FROM LOMR
 994            PB    2.77
 995            BA   0.148
 996            LS       0    86.9
 997            UD   0.211
                *
 998            KK    PT6A
 999            KM  BASIN REFERENCED FROM LOMR
1000            PB    2.77
1001            BA   0.024
1002            LS       0    90.3
1003            UD   0.231
                *
1004            KK   CPT6A
1005            HC       3
                *
1006            KK   RPT6A
1007            KM  ROUTE TO PT42
1008            RK    2450   0.007   0.015       0    TRAP     100       2
                *
1
                                                HEC-1 INPUT                                                    PAGE 29
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1009            KK    PT41
1010            KM  BASIN REFERENCED FROM LOMR
1011            PB    2.77
1012            BA   0.137
1013            LS       0    82.0
1014            UD   0.220
                *
1015            KK   RPT41
1016            KM  ROUTE TO CPT42
1017            RK    1050  0.0038   0.015       0    TRAP      80       2
                *
1018            KK    PT42
1019            KM  BASIN REFERENCED FROM LOMR
1020            PB    2.77
1021            BA   0.079
1022            LS       0    82.0
1023            UD   0.303
                *
1024            KK   CPT42
1025            HC       2
                *
1026            KK   PT5A1
1027            KM  BASIN REFERENCED FROM LOMR
1028            PB    2.77
1029            BA   0.051
1030            LS       0    88.3
1031            UD   0.237
                *
1032            KK    C5A1
1033            HC       3
```

```
                *
1034            KK    R5A1
1035            KM  ROUTE TO CPT52
1036            RK    1680  0.0089   0.015       0    TRAP     100       2
                *
1037            KK   PT5A4
1038            KM  BASIN REFERENCED FROM LOMR
1039            PB    2.77
1040            BA   0.034
1041            LS       0    82.0
1042            UD   0.284
                *
1                                        HEC-1 INPUT                                                    PAGE 30

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1043            KK    PT52
1044            KM  BASIN REFERENCED FROM LOMR
1045            PB    2.77
1046            BA   0.065
1047            LS       0    82.0
1048            UD   0.273
                *

1049            KK   CPT52
1050            KM  ALEXANDER WEST OF RANCHO
1051            HC       3
                *

1052            KK   RPT52
1053            KM  ROUTE TO 2CPT51
1054            KM  UPPER RANCHO HECRAS CROSS SECTION 38+36, SAME AS CPT51
1055            RK     560  0.0036   0.015       0    TRAP     100       2
                *

1056            KK  2CPT51
1057            KM  RANCHO ALEXANDER INTERSECTION (JONES SOUTH)
1058            HC       2
                *

1059            KK R2CPT51
1060            KM  ROUTE TO 2CPT51
1061            KM  UPPER RANCHO HECRAS CROSS SECTION 29+79
1062            RK     857  0.0036   0.015       0    TRAP     100       2
                *

1063            KK 6REMAIN
1064            KM  DIVERT 14 CFS TO AN 18" CMP (CULVERT 29) AT NORTHWEST CORNER OF THE JONES
1065            KM  AND RANCHO INTERSECTION.  CULVERT 29 DISCHARGES TO THE CATCH BASIN OF A DROP
1066            KM  INLET ON THE SOUTHEAST SIDE OF JONES AND THE WEST SIDE OF RANCHO.
1067            KM  DIVERT 48 CFS TO THE DROP INLET (13' CURB OPENING W/2.5' GRATE) FOR A TOTAL
1068            KM  OF 52 CFS. THE CATCH BASIN DISCHARGES TO A 36" CMP (CULVERT 30) THAT CROSSES
1069            KM  RANCHO AND DISCHARGES TO THE EAST SIDE. DIVERT ADDITONAL FLOW ACROSS RANCHO
1070            KM  AS WEIR FLOW BETWEEN CROSS SECTIONS 38+36 AND 28+01. RATING CURVE DEVELOPED
1071            KM  USING HECRAS LATERAL WEIR BY LGB 7-13-2005. REMAINING FLOW CONTINUES SOUTH
1072            KM  ON THE WEST SIDE OF RANCHO.
1073            DT  D6RCHO
1074            DI       0      53     146     400     600     700
1075            DQ       0      40      52      75     126     163
                *

1076            KK  R6MAIN
1077            KM  ROUTE TO C5A6
1078            RK     699  0.0025    0.03       0    TRAP      80       2
                *
1                                        HEC-1 INPUT                                                    PAGE 31

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1079            KK   PT5A2
1080            KM  BASIN REFERENCED FROM LOMR
1081            PB    2.77
1082            BA   0.080
1083            LS       0    85.8
1084            UD   0.257
                *

1085            KK    R5A2
1086            KM  ROUTE TO C5A6
1087            RK    3920  0.0064   0.015       0    TRAP      60       2
                *

1088            KK   PT5A6
1089            KM  BASIN REFERENCED FROM LOMR
1090            PB    2.77
1091            BA   0.188
1092            LS       0    82.9
1093            UD   0.195
                *

1094            KK    C5A6
1095            KM  UPPER RANCHO HECRAS CROSS SECTION 22+80
1096            HC       3
                *

1097            KK 7REMAIN
1098            KM  DIVERT FLOW EAST ACROSS RANCHO IN A 6' X 2' RCB (CULVERT 31).
1099            KM  REMAINING FLOW CONTINUES SOUTH ON THE WEST SIDE OF RANCHO
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```
1100          KM  REVISED BY LBG (CULVERT 31=102 to 107 cfs) WEIR FLOW RATING
1101          KM  CURVE DEVELOPED WITH HECRAS LATERAL WEIR #1 FROM 28+01 TO 22+80
1102          DT  D7RCHO
1103          DI       0     108     146     400     500     600     650
1104          DQ       0      99     102     126     140     174     185
              *

1105          KK  R7MAIN
1106          KM  ROUTE TO C5A7
1107          KM  UPPER RANCHO HECRAS CROSS SECTION 14+56
1108          RK     824   0.004    0.03       0    TRAP      80       2
              *

1109          KK    DMAV
1110          KM  RETRIEVE FLOW FROM MAVERICK
1111          DRMAVERICK
              *

1112          KK    RMAV
1113          KM  ROUTE TO CPT5A6
1114          RK    3180  0.0064   0.015       0    TRAP      60
              *
1                                        HEC-1 INPUT                                        PAGE 32

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1115          KK    CMAV
1116          HC       2
              *

1117          KK  DPT5A7
1118          KM  DIVERT FLOW ACROSS RANCHO AS WEIR FLOW NEAR DUNCAN ROAD, BETWEEN
1119          KM  CROSS SECTIONS 19+32 AND 14+56. RATING CURVE BY LBG 7-13-2005
1120          KM   USING LATERAL WEIR IN HECRAS.
1121          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG THE WEST SIDE OF RANCHO
1122          DT DDUNCAN
1123          DI       0     146     200     352     552     800
1124          DQ       0      35      77     139     297     460
              *

1125          KK   PT5A7
1126          KM  BASIN REFERENCED FROM LOMR
1127          PB    2.77
1128          BA   0.074
1129          LS       0    84.4
1130          UD   0.351
              *

1131          KK    C5A7
1132          KM  DUNCAN/RANCHO INTERSECTION
1133          HC       2
              *

1134          KK    R5A7
1135          KM  ROUTE TO 8REMAIN
1136          KM  UPPER RANCHO HECRAS CROSS SECTION 9+83
1137          RK     473   0.004    0.03       0    TRAP      80       2
              *

1138          KK 8REMAIN
1139          KM  DIVERT 24 CFS EAST ACROSS RANCHO IN A 24" CMP (CULVERT 32).
1140          KM  REMAINING FLOW CONTINUES SOUTH ON THE WEST SIDE OF RANCHO
1141          KM  REVISED TO 23 CFS BY LBG. WEIR FLOW ACROSS RANCHO CALCULATED
1142          KM  USING HECRAS LATERAL WEIR #3 BETWEEN CROSS SECTION 9+83 AND 7+43.
1143          DT  D8RCHO
1144          DI       0      24     100     200     300     400     500     600
1145          DQ       0      23      23      54     122     200     273     346
              *

1146          KK  R8MAIN
1147          KM  ROUTE TO C5A9
1148          KM  UPPER RANCHO HECRAS CROSS SECTION 0+00
1149          RK     983   0.003   0.025       0    TRAP      20       2
              *
1                                        HEC-1 INPUT                                        PAGE 33

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


1150          KK   PT5A9
1151          KM  BASIN REFERENCED FROM LOMR
1152          PB    2.77
1153          BA   0.045
1154          LS       0    85.7
1155          UD   0.246
              *

1156          KK    C5A9
1157          KM  GOWAN & RANCHO
1158          HC       2
              *

1159          KK  GWAN5A
1160          KM  10 AND 25 YEAR EVENT ONLY - FULL IN 100 YEAR EVENT
1161          KM  DIVERT MAXIMUM OF 40 CFS (DESIGN FLOW RATE) OF SOUTHBOUND FLOW
1162          KM  IN RANCHO INTO GOWAN OUTFALL SD AT RANCHO/GOWAN INTERSECTION,
1163          KM  REMAINING FLOW TRAVELS SOUTH. ADDED BY STANLEY CONSULTANTS
1164          KM  FACILITY: GOWAN OUTFALL FACILITIES
1165          KM  FACILITY ID: G00F 0511
1166          DT  G00F5A
1167          DI       0       0      40   10000
```

```
1168          DQ       0       0       1       1
              *

1169          KK C2PT5A9
1170          KM
1171          HC       2
              *

1172          KK  GOWAN5
1173          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I [SIC]
1174          KM  BY POGGEMEYER DESIGN GROUP, INC
1175          KM  DIVERT MAXIMUM OF 1 CFS INTO GOWAN OUTFALL (FACILITY G00F 0486)
1176          KM  AT RANCHO REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
1177          KM  REVISED BY LBG. GOOF IS FULL.
1178          DT   GOOF5
1179          DI       0      49    5000
1180          DQ       0       1       1
              *

1181          KKDEASTGOW
1182          KM  FLOW SPLIT AT GOWAN AND RANCHO INTERSECTION. DIVERT MAJORITY OF FLOW
1183          KM  TO RANCHO SOUTH OF GOWAN RD BETWEEN CROSS-SECTIONS 983 AND 0.
1184          KM  THE REMAINING FLOW TRAVELS EAST ON GOWAN.
1185          KM  (THIS IS A LITTLE STRANGE.  THE DIVERTED FLOW IS
1186          KM  WHAT ACTUALLY CONTINUES ON RANCHO SOUTH!)
1187          KM  DIVERSION RENAMED FROM "GOWAN" TO LWRRNCH
1188          KM  NODE RENAMED FROM "DRANCHO" TO "DEASTGOW"
1189          DT LWRRNCH
1190          DI       0     400     600    1000    1200    1400    1600    2000    2400
1191          DQ       0     372     502     730     842     955    1068    1305    1553
              *
              * ************************************************************
              * ************END OF PBS&J MODEL, REFERENCED BY LOMR***********
              * **START MODEL OF EASTBOUND FLOW IN GOWAN ADDED BY STANLEY*****
              * ************************************************************
              * ************************************************************
              *
1
                                          HEC-1 INPUT                                    PAGE 34
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1192          KKRDEASTGOW
1193          KM  ROUTE FLOW TO GOWAN/DECATUR INTERSECTION AND COMBINE WITH BASIN CY08-C
1194          RK    3250   0.006   0.016       0    TRAP      80       2
              *

1195          KK  CY08-C
1196          KM  BASIN REFERENCED FROM 2008 MPU ALLGOW3.DAT
1197          BA   0.094
1198          PB    2.77
1199          LS       0    88.5
1200          UD   0.306
              *
1201          KM  KKCCCY08-C
1202          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1203          KM  COMBINE CY08-C, CCY08-C, AND RDCY07B
1204          KM  GOWAN AND DECATUR
1205          KM  HC3
              *
1206          KM  KKDGOW2A
1207          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1208          KM  DIVERT FLOW TO GOWAN OUTFALL
1209          KM  DIVERSION BASED ON GOWAN ROAD DRAINAGE STUDY BY POGGEMEYER
1210          KM  8'X 5' RCB, CAPACITY = 630 CFS (GOOF 0486)
1211          KM  REMAINING FLOW CONTINUES EAST IN GOWAN RD. AND ENTERS THE CENTRAL BASIN
1212          KM  OPPOSITE OF DGOW2A IN CWH
1213          KM  DTDCENTRAL
1214          KM  DI0       31      51      71     101     301     601     631    3000    5000
1215          KM  DQ0        1       1       1       1       1       1       1    2370    4370
              *
1216          KM  KKRDGOW2A
1217          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1218          KM  ROUTE DGOW2A TO CPT5B6-C
1219          KM  FACILITY = GOWAN NORTH SYSTEM
1220          KM  FACILITY # = GOOF 0427, 0485
1221          KM  LINING = RCP
1222          KM  RD2370    0.005   0.013   0       CIRC    8       0
              *

1223          KK  CCY08C
1224          KM  COMBINE RDEASTGOW AND CY08-C AT DECATUR GOWAN INTERSECTION
1225          KM  IN EXISTING CONDITION THIS FLOW WILL CONTINUE EAST IN GOWAN
1226          HC       2
              *

1227          KK   DGWN6
1228          KM  GOWAN OUTFALL FULL
1229          KM  DIVERT 1 CFS TO GOWAN OUTFALL AT GOWAN/DECATUR INTERSECTION
1230          DT   GOOF6
1231          DI       0      31      51      71     101     301    1001    2001    3001    5001
1232          DQ       0       1       1       1       1       1       1       1       1       1
              *
1
                                          HEC-1 INPUT                                    PAGE 35
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1233          KK   DALEX
1234          KM  DIVERT EASTBOUND SURFACE FLOW AT GOWAN/DECATUR INTERSECTION
1235          KM  THE REMAINING FLOW TRAVELS NORTH IN ALEXANDER
1236          KM  RATING TABLE FROM FLOW SPLIT CALCULATION BY STANLEY CONSULTANTS
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1237          DT  DEGWN6
1238          DI        0      100      200      260      360
1239          DQ        0       71      143      185      257
              *
1240          KM  KKRDALEX
1241          KM  ROUTE SURFACE FLOW IN DECATUR TO DECATUR/ALEXANDER INTERSECTION
1242          KM  RD  2640   0.005    .016            TRAP     100       2
              *

1243          KK   CUL30
1244          KM  RETRIEVE FLOW FROM CULVERT 30
1245          DR  D6RCHO
              *

1246          KK  RCUL30
1247          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1248          RK    5000    0.01   0.016       0    TRAP      80       2
              *

1249          KK   CUL31
1250          KM  RETRIEVE FLOW FROM CULVERT 31
1251          DR  D7RCHO
              *

1252          KK  RCUL31
1253          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1254          RD    4750    0.01   0.016       0    TRAP      80       2
              *

1255          KK  DUNCAN
1256          KM  RETRIEVE FLOW FROM DUNCAN
1257          DR DDUNCAN
              *

1258          KK RDUNCAN
1259          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1260          RD    5450    0.01   0.016       0    TRAP      80       2
              *

1261          KK   CUL32
1262          KM  RETRIEVE FLOW FROM CULVERT 32
1263          DR  D8RCHO
              *

1264          KK  RCUL32
1265          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1266          RD    5100    0.01   0.016       0    TRAP      80       2
              *
1
                                        HEC-1 INPUT                                        PAGE 36
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1267          KK  CPT56B
1268          KM  COMBINE ROUTES IN BASIN PT5B6-C AT ALEXANDER/DECATUR
1269          HC       4
              *

1270          KK PT5B6-C
1271          KM  BASIN REFERENCED FROM 2008 MPU ALLGOW3.DAT
1272          BA   0.381
1273          PB    2.77
1274          LS       0    86.3
1275          UD   0.368
              *

1276          KK CCPT56B
1277          KM  COMBINE PT5B6-C AND CPT56B AT ALEXANDER/DECATUR
1278          HC       2
              *

1279          KKCCCPT56B
1280          KM  COMBINE SURFACE FLOW IN ALEXANDER/DECATUR INTERSECTION
1281          HC       2
              *
1282          KM  KKCCPT5B6C
1283          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1284          KM  KMCOMBINE PT5B6-C AND CPT5B6-C
1285          KM  KMDECATUR AND ALEXANDER
1286          KM  HC2
              *
1287          KM  KKRCCPT5B6
1288          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1289          KM  KMROUTE CCPT5B6C TO CPT5C-1
1290          KM  KMFACILITY = GOWAN OUTFALL FACILITIES
1291          KM  KMFACILITY # = GOOF 0375
1292          KM  KMLINING = RCB
1293          KM  RD2700    0.0056  0.015   0       TRAP    24      0
              *

1294          KK  0511-1
1295          KM  RETRIEVE FLOW IN GOOF 0511 AT US95/GOWAN
1296          DR   GOOF1
              *

1297          KK  0511-2
1298          KM  RETRIEVE FLOW IN GOOF 0511 AT RAINBOW/GOWAN
1299          DR   GOOF2
              *

1300          KK  0511-3
1301          KM  RETRIEVE FLOW IN GOOF 0511 AT TORREY PINES/GOWAN
```

```
1302          DR   GOOF3
              *
1                                        HEC-1 INPUT                                        PAGE 37
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1303          KK  0511-4
1304          KM  RETRIEVE FLOW IN GOOF 0511 AT JONES/GOWAN
1305          DR   GOOF4
              *

1306          KK GOOF1-4
1307          KM  THIS REPRESENTS THE FLOW IN GOOF 0511 AT JONES/GOWAN
1308          HC       4
              *

1309          KK 0511-5A
1310          KM  RETRIEVE FLOW IN GOOF 0511 AT RANCHO/GOWAN
1311          DR  GOOF5A
              *

1312          KKGOOF1-5A
1313          KM  THIS REPRESENTS THE FLOW IN GOOF 0511 AT RANCHO/GOWAN
1314          HC       2
              *

1315          KK  0511-5
1316          KM  RETRIEVE FLOW IN GOOF EAST OF RANCHO
1317          DR   GOOF5
              *

1318          KK  0486-1
1319          KM  RETRIEVE FLOW IN GOOF EAST OF RANCHO AT GOWAN
1320          DR   GOOF6
              *

1321          KK    0486
1322          KM  THIS REPRESENTS THE FLOW IN GOOF 0486 AT ALEXANDER/GOWAN
1323          HC       3
              *

1324          KK RDGOW2A
1325          KM  REFERENCED FROM 2008 MPU ALLGOW3.DAT
1326          KM  ROUTE DGOW2A TO CPT5B6-C
1327          KM  FACILITY = GOWAN NORTH SYSTEM
1328          KM  FACILITY # = GOOF 0427, 0485
1329          KM  LINING = RCP
1330          RD    2370   0.005   0.013       0    CIRC       8       0
              *

1331          KKCCCPT5B6C
1332          KM  COMBINE FACILITY FLOW AND SURFACE FLOW AT THE
1333          KM  ALEXANDER/DECATUR INTERSECTION
1334          HC       2
              *
              * ************************************************************
              * ********END GOWAN EASTBOUND FLOW MODEL BY STANLEY**************
              * **********BEGIN CVL MODEL REFERENCED BY LOMR******************
              * ************************************************************
              * ************************************************************
              *
1                                        HEC-1 INPUT                                        PAGE 38
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1335          KK   GOWAN
1336          KM  RETRIEVE DIVERSION GOWAN
1337          KM  THE FLOW DIVERTED SOUTH IN RANCHO FROM GOWAN INTERSECTION
1338          DR LWRRNCH
              *

1339          KK CENTRL1
1340          KM  ADDED BY LBG
1341          KM  FLOW OVER RANCHO AT GOWAN RD BETWEEN 0+00 OF UPPER RANCHO HECRAS
1342          KM  MODEL AND 174+98 OF THE LOWER RANCHO MODEL.
1343          KM  (0+00 OF UPPER RANCHO MODEL = 177+03.33 OF LOWER RANCHO MODEL)
1344          KM  STATIONING OF UPPER RANCHO MODEL CORRESOPONDS TO ORIGNAL FIS.
1345          KM  MOST CROSS SECTIONS ARE IDENTICAL TO ORIGINAL EFFECTIVE MODEL.
1346          DT  D9RCHO
1347          DI       0     100     200     300     400     800    1000    1478
1348          DQ       0       8      61     121     176     424     522     811
              *

1349          KK  TRUVAL
1350          KM  RETRIEVE TRUE VALUE DIVERSION DETERMINED WITH HECRAS LATERAL WEIR
1351          DR  TRUVAL
              *

1352          KK   CBDV1
1353          KM  COMBINE TRUVAL AND GOWAN
1354          KM  HECRAS STATION 17173.04 OF LOWER RANCHO MODEL
1355          HC       2
              *

1356          KK  MORBAY
1357          KM  RETRIEVE DIVERSION MORBAY (DCY07B FROM JONES/GOWAN)
1358          KM  MORBAY FROM CVL STUDY, DCY07B IN PBS&J STUDY
1359          DR  DCY07B
              *
```

```
1360          KKCBDVMORBAY
1361          KM  COMBINE GOWAN & MORBAY
1362          KM  HECRAS STATION 171+73.04 OF LOWER RANCHO MODEL
1363          HC       2
              *

1364          KK CENTRL2
1365          KM  ADDED BY LBG
1366          KM  2: 6'X2' RCBC UNDER RANCHO JUST SOUTH OF MICHAEL WAY
1367          KM  ID RAN 190 FROM NORTHWEST NEIGHBORHOOD STUDY
1368          DT D10RCHO
1369          DI       0      21      73     100    1000    2000
1370          DQ       0      20      72     100     200     200
              *
1
                                        HEC-1 INPUT                                                    PAGE 39
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1371          KK   RTCHY
1372          KM  ROUTE TO CHEYENNE/RANCHO
1373          RM       3    0.32    0.15
              *
              * KKCBCX5
              * KMCOMBINE WITH CX5 AT CHEYENNE/RANCHO INTERSECTION
              * HC      2
              *

1374          KK   DVWR1
1375          KM  OVERFLOW CHEYENNE/RANCHO INTERSECTION HECRAS STATION 144+11.04
1376          KM  OF LOWER RANCHO MODEL
1377          DT  DVSTR1
1378          DI       0     167     261     622    1272
1379          DQ       0       0      36     180     455
              *

1380          KK   DVWR2
1381          KM  24" PIPE RANCHO
1382          DT  DVSTR2
1383          DI       0      10      20      30      37     100     500
1384          DQ       0      10      20      30      37      37      37
              *

1385          KK     RX5
1386          KM  ROUTE TO 6 X 3 RCB
1387          RM       1     0.1     0.3
              *
              *
              * ************************************************************
              * ********END SDN 3 ANALYSIS FOR UPPER HEC-1 MODEL *************
              * ******** NORTH OF CHEYENNE ***********************************
              * ********BEGIN HEC-1 FOR SDN3 ANALYSIS FOR LOWER HEC-1 MODEL***
              * ****SEE RANCHO LOMR FOR SEPARATE ANALYSIS AND CHECK OF sDN5***
              * ************************************************************
              *

1388          KK      X4
1389          KM  BASIN REFERENCED FROM LOMR
1390          KM  BASIN AREA USED IS REFERENCED FROM LBG SND3 MODEL
1391          KM  LBG LOMR REFERENCES THE SND5 MODEL, WHICH HAD AREA OF 0.698
1392          KM  PER LBG - THIS BASIN AREA REDUCED IN SIZE [FROM 0.810 TO 0.698)
1393          KM  TO TIE INTO BASINS FROM PBS&J MODEL
1394          PB    2.77
1395          BA   0.810
1396          LS       0      91
1397          UD     1.9
              *
1
                                        HEC-1 INPUT                                                    PAGE 40
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1398          KK     X3B
1399          KM  BASIN REFERENCED FROM LOMR
1400          BA     .16
1401          LS       0      88
1402          UD    0.54
              *

1403          KK    CUL4
1404          KM  ROUTE THRU 2-6 X 4 689+30
1405          RS       1    ELEV    13.5
1406          SV       0     .32      18
1407          SE    13.5      15      18
1408          SQ       0      60     245
              *

1409          KK     X3A
1410          KM  BASIN REFERENCED FROM LOMR
1411          BA     .12
1412          LS       0      88
1413          UD    0.49
              *

1414          KK    CUL8
1415          KM  MAXIMUM Q INCREASED TO 50 CFS BY LBG TO ACCOMMODATE HIGHER FLOWS
1416          KM  STANLEY CONSULTANTS REFERENCED THE SDN3 MODEL
1417          KM  TO OBTAIN THE LAST COLUMN
1418          KM  24"  674+06
1419          RS       1    ELEV    18.5
1420          SV       0     1.1     3.6     3.7     3.9
1421          SE    18.5    20.5    22.5    22.6      23
```

100S3X.OUT, 100-year existing condition, refer to Figure 4

```
1422          SQ       0      15      28      50      75
              *

1423          KK   CX3AB
1424          KM  COMBINE X3A &  X3B
1425          HC       2
              *

1426          KK   RK3AB
1427          KM  ROUTE TO JONES
1428          RM      10     1.0      .3
              *

1429          KK      CX
1430          HC       2
              *

1431          KK   DEVX4
1432          KM  DIVERT 100 CFS TO CHEYENNE
1433          DT   DEVX4
1434          DI       0      50     100     200     500    1000    5000
1435          DQ       0      25      50     100     100     100     100
              *
1
                                        HEC-1 INPUT                                    PAGE 41
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1436          KK     RK4
1437          KM  ROUTE X4 SOUTH ON MICHAEL WAY TO LOW POINT
1438          KM  THEN TO RANCHO
1439          RM       2     0.2     0.4
              *

1440          KK     X3C
1441          KM  BASIN REFERENCED FROM LOMR
1442          BA     .48
1443          LS       0      81
1444          UD    1.52
              *

1445          KK    SD1A
1446          KM  DROP   INLET  AT  BROOKS/JONES INTERSECTION
1447          DT    SD1A
1448          DI       0      50      93     285     500
1449          DQ       0       5      13      21      21
              *

1450          KK    RK3C
1451          KM  ROUTE TO RANCHO
1452          KM  MUSKINGUM X COEFFICENT (COL 3) ADJUSTED BY LBG TO 0.40
1453          KM  TO PREVENT INSTABILITY
1454          RM       2     0.2    0.40
              *

1455          KK      X3
1456          KM  BASIN REFERENCED FROM LOMR
1457          BA    0.34
1458          LS       0      92
1459          UD    0.71
              *

1460          KK     CX3
1461          KM  COMBINE X3 X4 TO X3C
1462          HC       3
              *

1463          KK    DTX4
1464          KM  RETRIEVE DIVERT FLOW X4
1465          DR   DEVX4
              *

1466          KK    RDEX
1467          KM  ROUTE TO CHEYENNE
1468          KM  MUSKINGUM X COEFFICENT (COL 3) SND5 MODEL BY LBG USED 0.40 TO PREVENT
1469          KM  INSTABILITY
1470          KM  MUSKINGUM X COEFFICENT (COL 3) SND3 MODEL BY STANLEY CONSULTANTS ALSO
1471          KM  USED 0.40 TO PREVENT INSTABILITY
1472          RM       1     0.1    0.40
              *
1
                                        HEC-1 INPUT                                    PAGE 42
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1473          KK    BSX5
1474          KM  BASIN REFERENCED FROM LOMR
1475          KM  THE SDN5 MODEL BY LBG USED BA = 0.047 AND US = 0.122
1476          KM  THE SDN3 MODEL BY LBG USED BA = 0.100 AND US = 0.420
1477          BA   0.100
1478          LS       0      92
1479          UD   0.420
              *

1480          KK     CX5
1481          KM  COMBINE BSX5 & DEVX4
1482          HC       2
              *

1483          KK   DVWR1
1484          KM  REPEATED FROM UPPER MODEL
1485          KM  OVERFLOW CHEYENNE/RANCHO INTERSECTION HECRAS STATION 144+11.04
```

100S3X.OUT, 100-year existing condition, refer to Figure 4

```
1486           KM  OF LOWER RANCHO MODEL
1487           DT  DVSTR1
1488           DI       0     167     261     622    1272
1489           DQ       0       0      36     180     455
               *

1490           KK   DVWR2
1491           KM  REPEATED FROM UPPER MODEL
1492           KM  24" PIPE RANCHO
1493           DT  DVSTR2
1494           DI       0      10      20      30      37     100     500
1495           DQ       0      10      20      30      37      37      37
               *

1496           KK    RX5
1497           KM  ROUTE TO 6 X 3 RCB
1498           RM       1     0.1     0.3
               *

1499           KK   CX4X3
1500           KM  COMBINE X4 TO X3
1501           HC       2
               *

1502           KK   DVBOX
1503           KM  ROUTE FLOW THRU 6 X 3 BOX (MEA)  HECRAS STATION 126+38
1504           KM  LOCATED AT RANCHO NO. DECATUR (END OF PROJECT)
1505           DT   DVBOX
1506           DI       0      50     100     170     210     700    5000
1507           DQ       0      50     100     170     210     210     210
               *
1508           ZZ
1
```

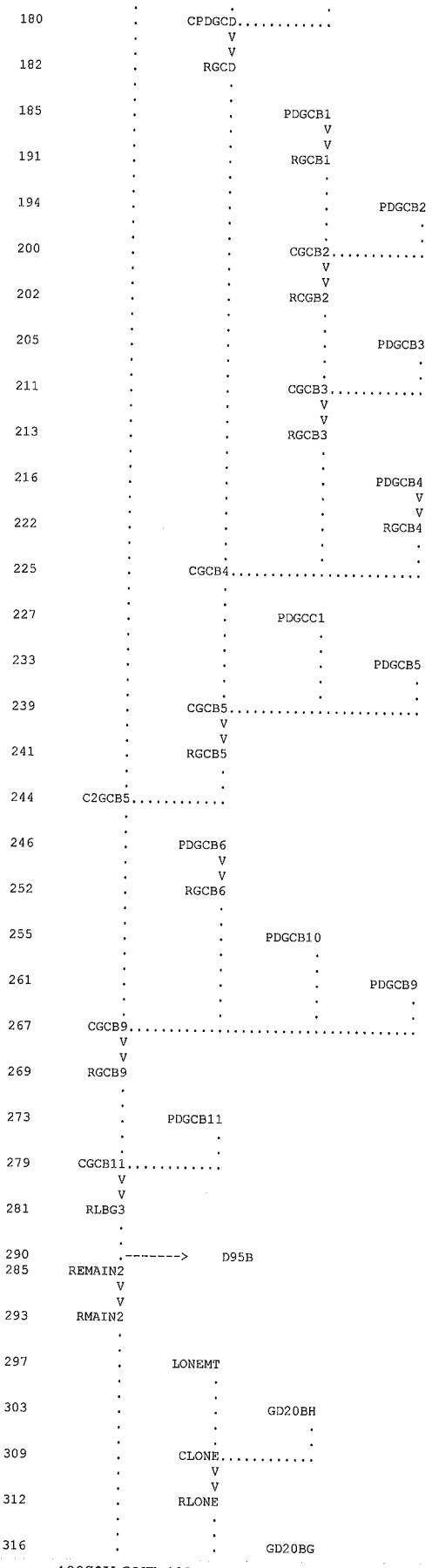
SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

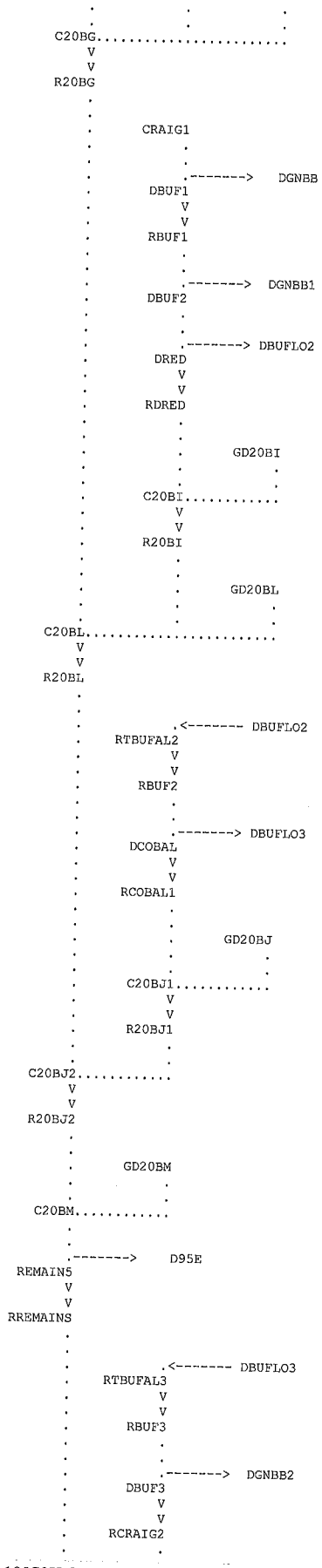
(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW

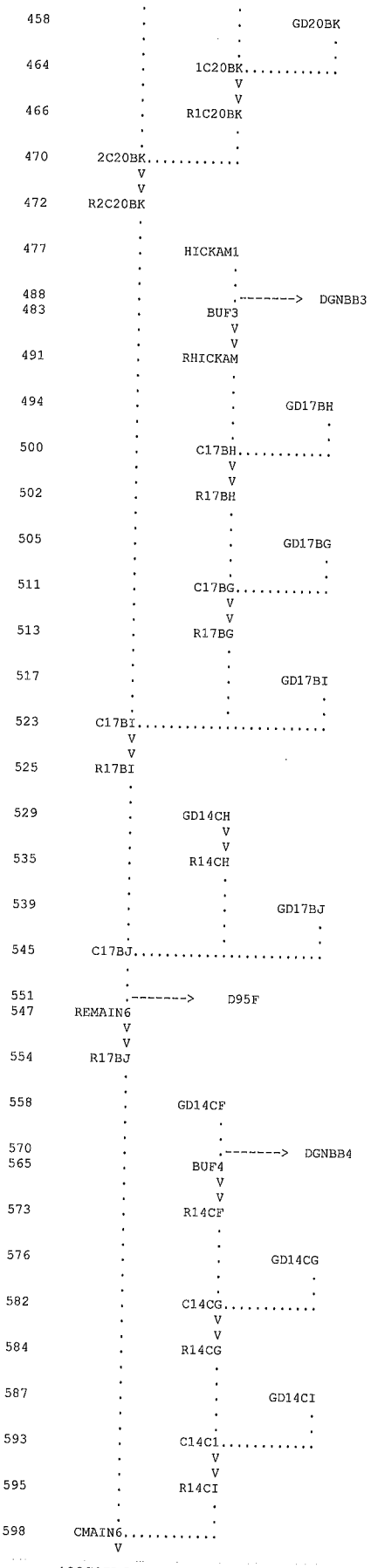
```
 72        ANN
             V
             V
 86        RANN
             .
             .
 89          .       GD29B
             .          .
             .          .
 95       CGD29B.............
             V
             V
 97       RGD29B
             .
             .
102          .     NW1C2-C
             .          .
             .          .
110       CNW1C2.............
             V
             V
114       RNW1C2
             .
             .
117          .      PDGCC3
             .          .
             .          .
124       CGCC3.............
             V
             V
126       RGCC3
             .
             .
134          .-------->    D95A
129      REMAIN1
             V
             V
137       RLBG1
             .
             .
141          .      PDGCC2
             .          V
             .          V
147          .      RGCC2
             .          .
             .          .
150          .             .      PDGCC4
             .             .          .
             .             .          .
156       CGCC4.........................
             V
             V
161       RLBG2
             .
             .
165          .      HAMMER
             .          V
             .          V
171          .     RHAMMER
             .          .
             .          .
174          .          .       PDGCD
             .          .          .
```



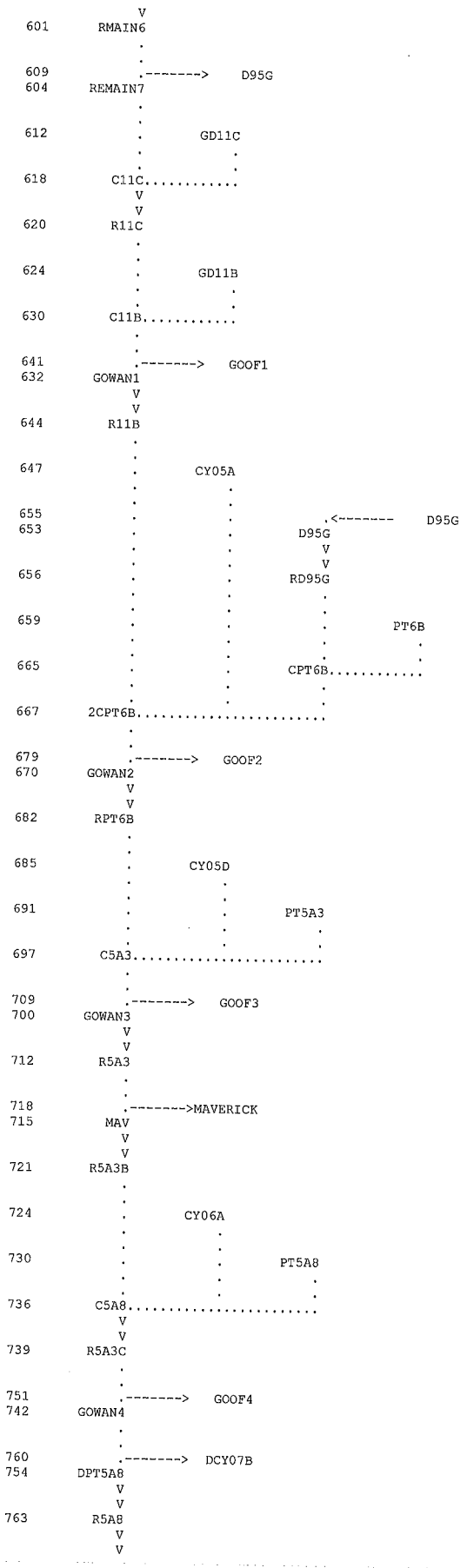
100S3X.OUT, 100-year existing condition, refer to Figure 4



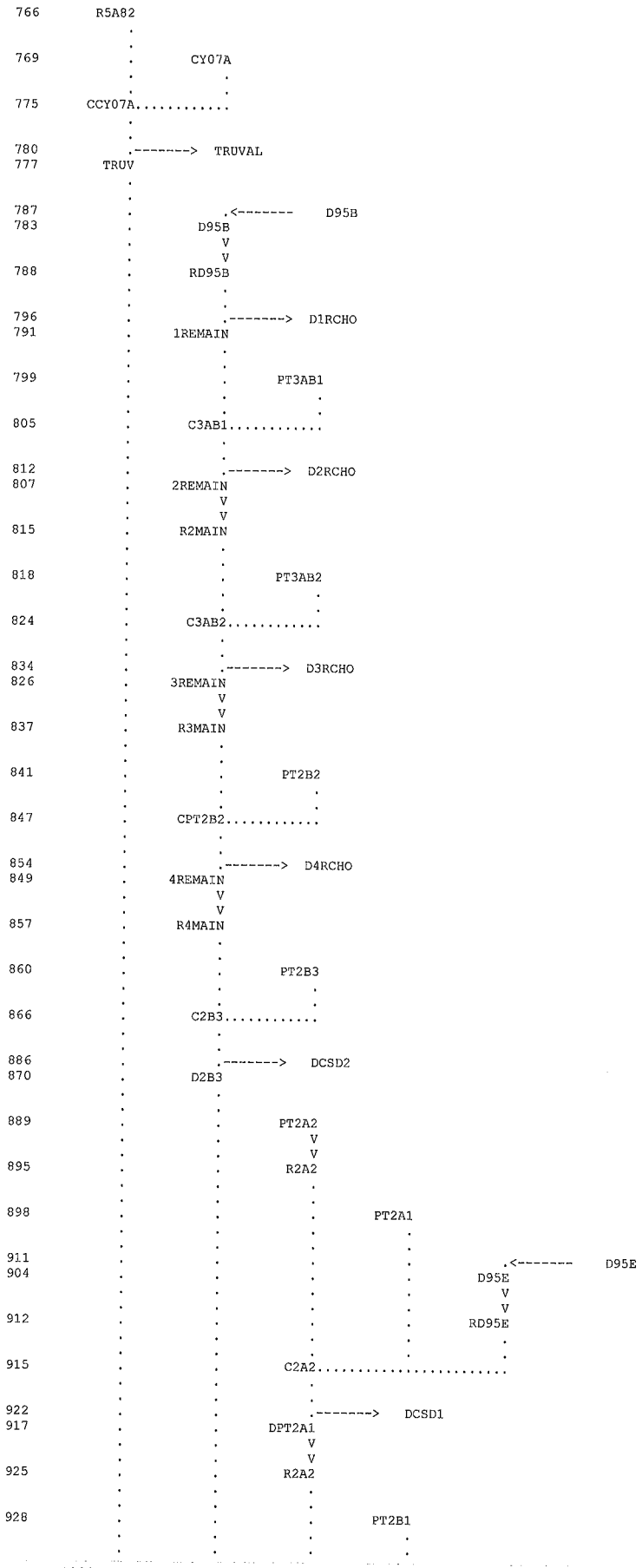
100S3X.OUT, 100-year existing condition, refer to Figure 4



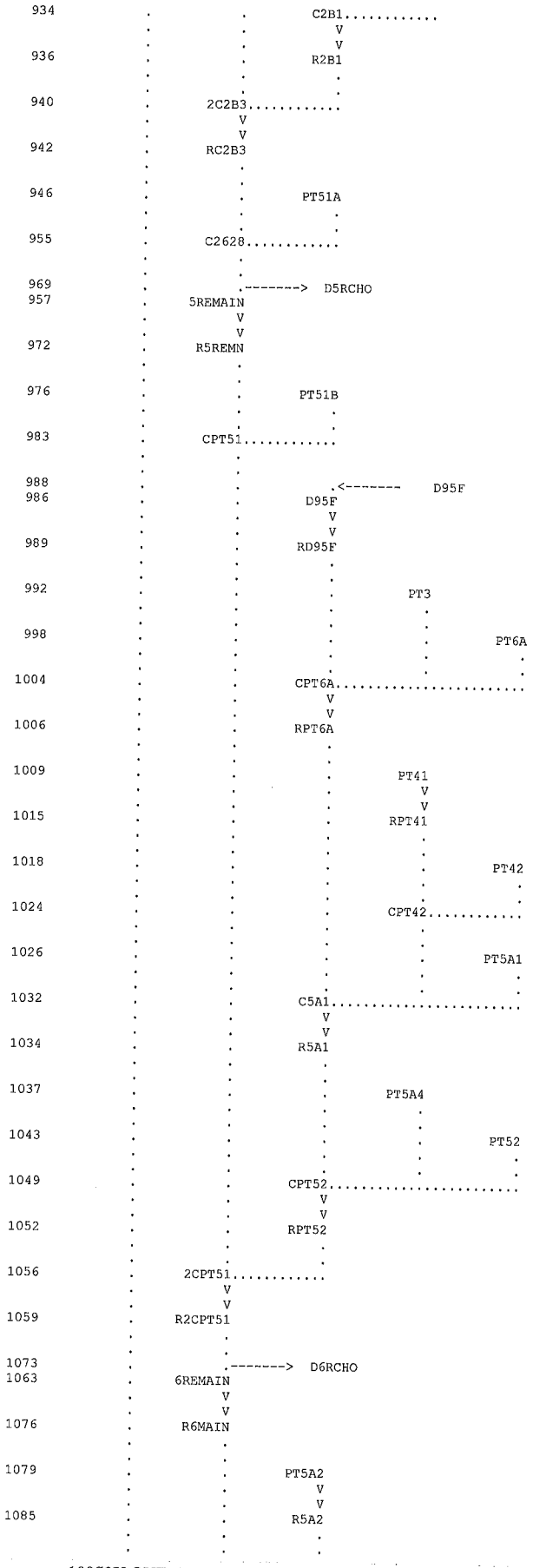
100S3X.OUT, 100-year existing condition, refer to Figure 4



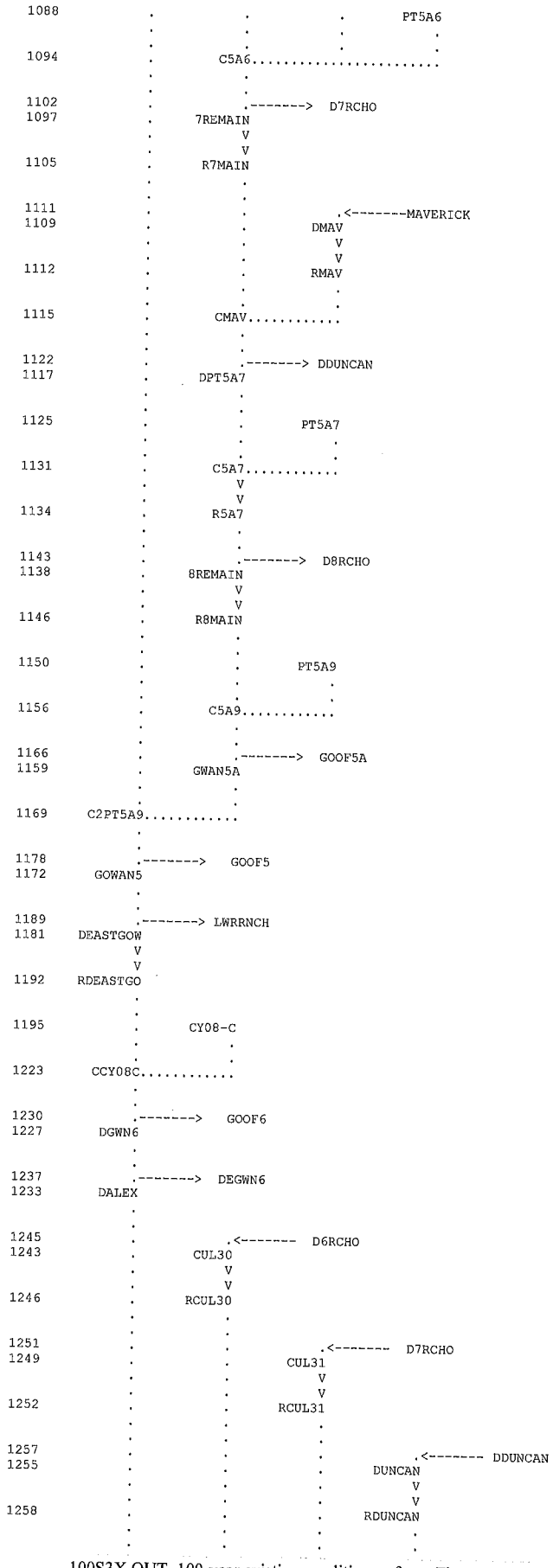
100S3X.OUT, 100-year existing condition, refer to Figure 4



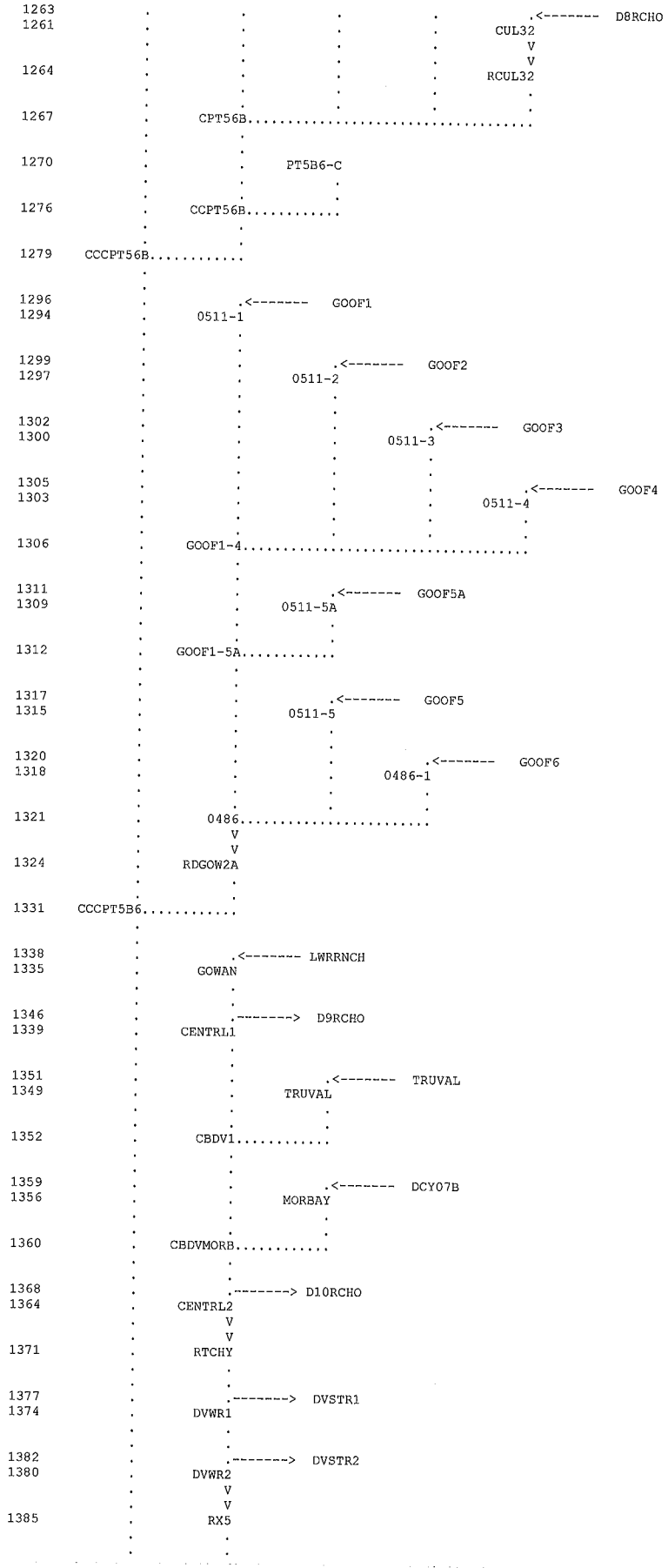
100S3X.OUT, 100-year existing condition, refer to Figure 4



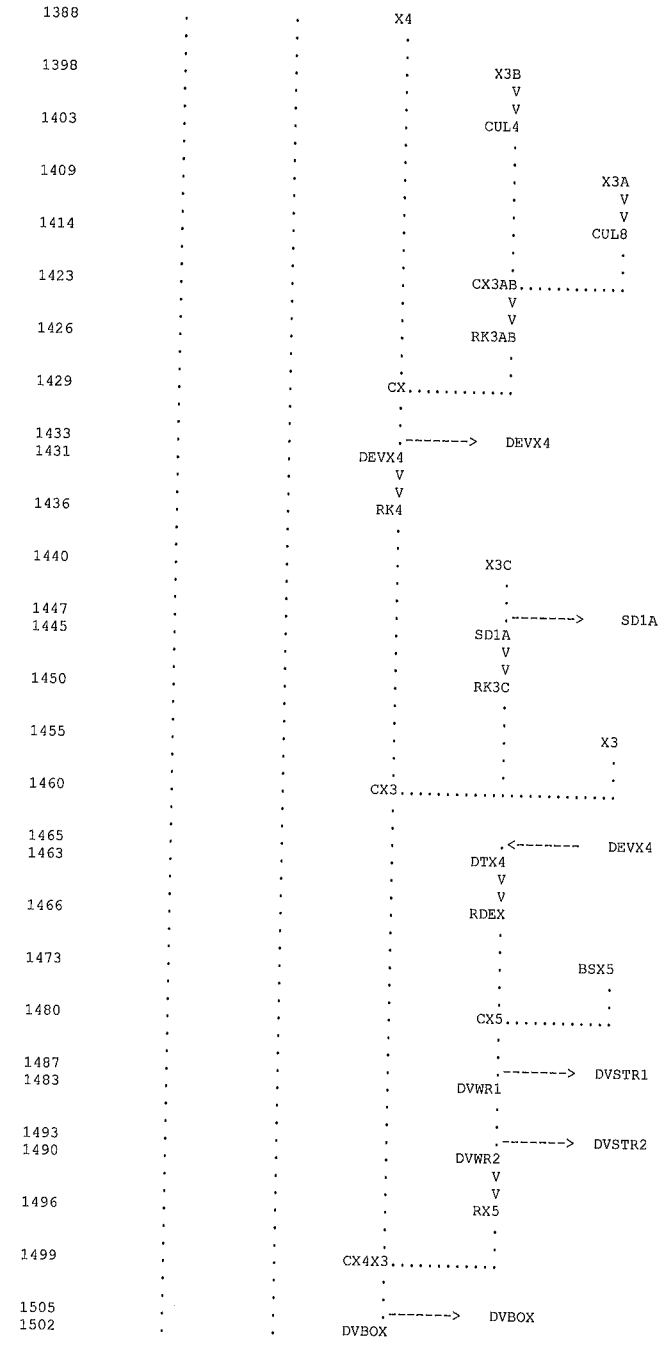
100S3X.OUT, 100-year existing condition, refer to Figure 4



100S3X.OUT, 100-year existing condition, refer to Figure 4



100S3X.OUT, 100-year existing condition, refer to Figure 4



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   31MAR14  TIME  21:51:31   *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
OFFSITE BASINS, EXISTING CONDITIONS
PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
PREPARED BY STANLEY CONSULTANTS INC. (HM/VF)
INPUT FILE: 100S3X.DAT
DESIGN STORM: 100-YEAR 6-HR
STORM DISTRIBUTION: SDN3
STORM CENTERING: FULL WATERSHED
THIS MODEL DIFFERS FROM 10 AND 25 YEAR: NO FLOW DIVERTED TO STORM DRAIN

100S3X.OUT, 100-year existing condition, refer to Figure 4

```
AT GOWAN/CRAIG


BASED ON:
CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
2008 MASTER PLAN UPDATE (MPU) BY PBS&J
GOWAN WATERSHED (INPUT FILE = ALLGOW3.DAT) AND
CENTRAL WATERSHED (NORTHWESTERN PORTION)

RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009
UPPRSDN3 AND LWRSDN3 HEC-1 MODELS
FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
CONTROL FACILITIES REFERENCED FROM LOMR UNLESS OTHERWISE NOTED

GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
BY G.C. WALLACE (GCW) 2007

PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
HEC-1 ANALYSIS FOR EXISTING CONDITIONS FILE R00S3X.OUT
BY STANLEY CONSULTANTS, 1/2012

LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
MPU SHOWS THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
(GOEC)


THIS EXISTING CONDITION MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL DRAINAGE
STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
EXISTING CONDITION MODEL AS FOLLOWS:
1. BASIN PT51 OF THE RANCHO STUDY WAS SPLIT INTO PT51A AND PT51B IN ORDER
TO SHOW WHERE FLOW WILL BE COLLECTED BY THE GOWAN OUTFALL - ALEXANDER
ROAD FACILITIES AT ALEXANDER-JONES/RANCHO DRIVE INTERSECTION.
2. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
TO THE EXISTING CONDITION MODEL
3. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE
DARF'S USED IN 2008 MPU HEC-1 ALLGOW3.OUT


JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

                        AREA    DARF
                        SQ. MI.
                        0-0.5   0.99
                        0.5-1   0.975
                        1-2     0.95
                        2-3     0.925
                        3-4     0.915
                        4-5     0.908
                        5-6     0.903
                        6-7     0.895
                        7-8     0.885



69 IO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                   NMIN          5  MINUTES IN COMPUTATION INTERVAL
                   IDATE      1  0  STARTING DATE
                   ITIME       0000  STARTING TIME
                      NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      2  0  ENDING DATE
                  NDTIME       0055  ENDING TIME
                  ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .08 HOURS
                    TOTAL TIME BASE   24.92 HOURS

      ENGLISH UNITS
           DRAINAGE AREA          SQUARE MILES
           PRECIPITATION DEPTH    INCHES
           LENGTH, ELEVATION      FEET
           FLOW                   CUBIC FEET PER SECOND
           STORAGE VOLUME         ACRE-FEET
           SURFACE AREA           ACRES
           TEMPERATURE            DEGREES FAHRENHEIT

   JP          MULTI-PLAN OPTION
                   NPLAN          1  NUMBER OF PLANS

   JR          MULTI-RATIO OPTION
                  RATIOS OF PRECIPITATION
                  .99       .98       .95       .93       .92       .91       .90       .89       .88

     *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT


     *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT
```

1

100S3X.OUT, 100-year existing condition, refer to Figure 4

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .99	RATIO 2 .98	RATIO 3 .95	RATIO 4 .93	RATIO 5 .92	RATIO 6 .91	RATIO 7 .90	RATIO 8 .89	RATIO 9 .88
HYDROGRAPH AT													
+	ANN	.26	1	FLOW	120.	117.	111.	105.	102.	100.	99.	97.	95.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RANN	.26	1	FLOW	119.	116.	110.	104.	101.	100.	98.	97.	94.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	GD29B	.14	1	FLOW	68.	65.	61.	58.	56.	55.	54.	53.	52.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CGD29B	.40	1	FLOW	170.	164.	155.	146.	143.	140.	138.	135.	131.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RGD29B	.40	1	FLOW	168.	163.	154.	145.	142.	139.	137.	135.	131.
				TIME	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	NW1C2-C	.21	1	FLOW	192.	188.	181.	175.	172.	170.	169.	167.	164.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CNW1C2	.60	1	FLOW	329.	320.	304.	289.	283.	278.	276.	270.	264.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RNW1C2	.60	1	FLOW	327.	318.	303.	287.	281.	277.	274.	268.	262.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PDGCC3	.05	1	FLOW	54.	53.	51.	49.	48.	47.	47.	46.	46.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CGCC3	.65	1	FLOW	347.	337.	321.	305.	299.	294.	291.	285.	279.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RGCC3	.65	1	FLOW	346.	336.	320.	304.	297.	293.	290.	284.	277.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO													
+	D95A	.65	1	FLOW	139.	139.	139.	139.	139.	139.	139.	139.	139.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.67	3.67	3.67
HYDROGRAPH AT													
+	REMAIN1	.65	1	FLOW	207.	197.	181.	165.	158.	154.	151.	145.	138.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RLBG1	.65	1	FLOW	207.	197.	181.	164.	158.	153.	150.	145.	138.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PDGCC2	.04	1	FLOW	20.	19.	18.	17.	16.	16.	16.	15.	15.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RGCC2	.04	1	FLOW	19.	18.	17.	16.	16.	15.	15.	15.	14.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PDGCC4	.05	1	FLOW	50.	49.	47.	45.	44.	44.	43.	43.	42.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT													
+	CGCC4	.74	1	FLOW	244.	233.	215.	197.	190.	185.	182.	175.	168.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RLBG2	.74	1	FLOW	244.	233.	215.	197.	190.	184.	181.	175.	168.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	HAMMER	.13	1	FLOW	71.	69.	65.	62.	60.	59.	59.	58.	56.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RHAMMER	.13	1	FLOW	71.	69.	65.	61.	60.	58.	58.	57.	55.
				TIME	3.83	3.83	3.83	3.83	3.83	3.92	3.83	3.92	3.92
HYDROGRAPH AT													
+	PDGCD	.13	1	FLOW	64.	61.	58.	54.	53.	52.	51.	50.	48.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CPDGCD	.26	1	FLOW	131.	127.	120.	113.	110.	108.	107.	105.	102.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83

ROUTED TO													
+	RGCD	.26	1	FLOW	130.	127.	119.	112.	109.	107.	106.	104.	100.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PDGCB1	.03	1	FLOW	37.	36.	35.	33.	33.	32.	32.	32.	31.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RGCB1	.03	1	FLOW	36.	35.	34.	33.	32.	32.	32.	31.	31.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PDGCB2	.03	1	FLOW	26.	26.	24.	23.	23.	22.	22.	22.	21.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.67	3.67	3.67
2 COMBINED AT													
+	CGCB2	.06	1	FLOW	63.	61.	58.	56.	55.	54.	54.	53.	52.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RCGB2	.06	1	FLOW	61.	59.	56.	54.	53.	52.	52.	51.	50.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PDGCB3	.07	1	FLOW	33.	32.	30.	28.	27.	26.	26.	25.	25.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75	3.75
2 COMBINED AT													
+	CGCB3	.13	1	FLOW	94.	91.	86.	82.	80.	79.	78.	76.	75.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RGCB3	.13	1	FLOW	92.	89.	85.	81.	79.	78.	77.	75.	74.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	PDGCB4	.02	1	FLOW	21.	21.	20.	19.	19.	19.	18.	18.	18.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RGCB4	.02	1	FLOW	21.	21.	20.	19.	19.	18.	18.	18.	18.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	CGCB4	.41	1	FLOW	226.	220.	207.	196.	190.	188.	185.	182.	176.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	PDGCC1	.05	1	FLOW	29.	29.	27.	25.	25.	24.	24.	24.	23.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	PDGCB5	.11	1	FLOW	54.	52.	49.	46.	45.	44.	44.	43.	42.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
3 COMBINED AT													
+	CGCB5	.57	1	FLOW	307.	298.	281.	266.	258.	255.	251.	247.	240.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RGCB5	.57	1	FLOW	303.	294.	277.	263.	257.	252.	248.	244.	238.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT													
+	C2GCB5	1.31	1	FLOW	543.	522.	486.	453.	438.	429.	420.	411.	397.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PDGCB6	.02	1	FLOW	23.	22.	22.	21.	20.	20.	20.	20.	19.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RGCB6	.02	1	FLOW	22.	21.	20.	20.	19.	19.	19.	18.	18.
				TIME	3.75	3.83	3.75	3.75	3.75	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	PDGCB10	.07	1	FLOW	66.	64.	61.	58.	57.	57.	56.	55.	54.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PDGCB9	.03	1	FLOW	24.	23.	22.	21.	20.	20.	20.	19.	19.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
4 COMBINED AT													
+	CGCB9	1.43	1	FLOW	616.	594.	554.	519.	503.	493.	484.	473.	459.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RGCB9	1.43	1	FLOW	614.	591.	552.	515.	500.	489.	480.	469.	455.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PDGCB11	.03	1	FLOW	26.	25.	24.	23.	22.	22.	22.	21.	21.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CGCB11	1.47	1	FLOW	628.	605.	565.	528.	512.	501.	492.	481.	466.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RLBG3	1.47	1	FLOW	626.	603.	563.	526.	510.	498.	489.	478.	464.

				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO													
+	D95B	1.47	1	FLOW	192.	192.	188.	182.	180.	179.	177.	176.	173.
				TIME	3.83	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	REMAIN2	1.47	1	FLOW	434.	411.	375.	343.	330.	320.	312.	303.	290.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RMAIN2	1.47	1	FLOW	423.	402.	369.	338.	326.	317.	309.	300.	288.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	LONEMT	.41	1	FLOW	297.	289.	276.	264.	259.	255.	253.	249.	244.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	GD20BH	.05	1	FLOW	29.	28.	26.	25.	24.	24.	23.	23.	22.
				TIME	3.67	3.67	3.67	3.67	3.67	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CLONE	.46	1	FLOW	322.	314.	300.	286.	281.	277.	274.	270.	264.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RLONE	.46	1	FLOW	319.	311.	297.	283.	278.	274.	271.	267.	261.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	GD20BG	.11	1	FLOW	89.	86.	82.	78.	77.	76.	75.	73.	72.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	C20BG	2.04	1	FLOW	793.	762.	709.	659.	640.	623.	612.	597.	578.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	R20BG	2.04	1	FLOW	786.	756.	702.	653.	637.	619.	607.	594.	577.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	CRAIG1	2.44	1	FLOW	1451.	1414.	1354.	1293.	1269.	1253.	1241.	1222.	1198.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO													
+	DGNBB	2.44	1	FLOW	249.	249.	249.	249.	249.	249.	249.	249.	249.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.58	3.58	3.58
HYDROGRAPH AT													
+	DBUF1	2.44	1	FLOW	1202.	1165.	1105.	1044.	1020.	1004.	992.	973.	949.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO													
+	RBUF1	2.44	1	FLOW	1197.	1160.	1099.	1039.	1015.	998.	986.	967.	943.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO													
+	DGNBB1	2.44	1	FLOW	109.	109.	109.	109.	109.	109.	109.	109.	109.
				TIME	3.58	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	DBUF2	2.44	1	FLOW	1088.	1051.	990.	930.	906.	889.	877.	858.	834.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO													
+	DBUFLO2	2.44	1	FLOW	766.	740.	697.	655.	638.	626.	617.	604.	587.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	DRED	2.44	1	FLOW	322.	311.	293.	275.	268.	263.	260.	254.	247.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO													
+	RDRED	2.44	1	FLOW	321.	310.	292.	274.	267.	263.	259.	253.	246.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	GD20BI	.12	1	FLOW	83.	81.	77.	73.	72.	71.	70.	69.	67.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	C20BI	2.56	1	FLOW	351.	339.	320.	300.	293.	287.	283.	278.	270.
				TIME	4.17	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
ROUTED TO													
+	R20BI	2.56	1	FLOW	350.	338.	319.	300.	292.	287.	283.	277.	270.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	GD20BL	.08	1	FLOW	92.	90.	87.	84.	83.	82.	81.	80.	79.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	C20BL	4.67	1	FLOW	1128.	1086.	1011.	942.	918.	898.	883.	863.	841.
				TIME	4.00	4.00	4.00	4.00	4.00	4.08	4.08	4.08	4.08
ROUTED TO													
+	R20BL	4.67	1	FLOW	1117.	1075.	1005.	941.	915.	898.	882.	862.	839.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08	4.08

HYDROGRAPH AT													
+	RTBUFAL2	.00	1	FLOW	766.	740.	697.	655.	638.	626.	617.	604.	587.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO													
+	RBUF2	.00	1	FLOW	762.	737.	694.	651.	634.	622.	614.	601.	584.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25
DIVERSION TO													
+	DBUFLO3	.00	1	FLOW	545.	526.	496.	465.	453.	445.	439.	429.	417.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25
HYDROGRAPH AT													
+	DCOBAL	.00	1	FLOW	218.	210.	198.	186.	181.	178.	175.	171.	167.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25
ROUTED TO													
+	RCOBAL1	.00	1	FLOW	217.	210.	198.	186.	181.	178.	175.	171.	167.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	GD20BJ	.05	1	FLOW	48.	47.	45.	43.	42.	41.	41.	40.	40.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C20BJ1	.05	1	FLOW	230.	223.	210.	198.	193.	189.	187.	183.	178.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	R20BJ1	.05	1	FLOW	230.	222.	210.	197.	192.	189.	186.	182.	177.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT													
+	C20BJ2	4.72	1	FLOW	1325.	1275.	1195.	1119.	1088.	1067.	1048.	1025.	997.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	R20BJ2	4.72	1	FLOW	1324.	1274.	1194.	1117.	1086.	1065.	1046.	1022.	994.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	GD20BM	.05	1	FLOW	62.	60.	58.	56.	55.	55.	54.	53.	53.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	C20BM	4.77	1	FLOW	1341.	1291.	1210.	1133.	1102.	1080.	1061.	1037.	1009.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO													
+	D95E	4.77	1	FLOW	181.	175.	166.	158.	155.	152.	150.	148.	145.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	REMAIN5	4.77	1	FLOW	1160.	1116.	1044.	975.	947.	928.	911.	889.	864.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RREMAINS	4.77	1	FLOW	1157.	1114.	1041.	971.	943.	923.	906.	885.	859.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	RTBUFAL3	.00	1	FLOW	545.	526.	496.	465.	453.	445.	439.	429.	417.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25
ROUTED TO													
+	RBUF3	.00	1	FLOW	543.	524.	494.	465.	453.	444.	438.	429.	417.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	DGNBB2	.00	1	FLOW	198.	198.	198.	198.	198.	198.	198.	198.	198.
				TIME	3.83	3.83	3.83	3.83	3.83	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	DBUF3	.00	1	FLOW	345.	326.	296.	267.	255.	246.	240.	231.	219.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	RCRAIG2	.00	1	FLOW	343.	325.	294.	264.	252.	244.	239.	229.	216.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	GD20BK	.05	1	FLOW	37.	36.	34.	33.	32.	32.	31.	31.	30.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	1C20BK	.05	1	FLOW	354.	336.	305.	274.	261.	252.	246.	236.	224.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33	4.33
ROUTED TO													
+	R1C20BK	.05	1	FLOW	351.	332.	303.	273.	260.	252.	246.	236.	224.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
2 COMBINED AT													
+	2C20BK	4.82	1	FLOW	1442.	1384.	1286.	1183.	1143.	1110.	1089.	1055.	1022.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25	4.25
ROUTED TO													
+	R2C20BK	4.82	1	FLOW	1437.	1377.	1278.	1173.	1131.	1102.	1085.	1055.	1021.
				TIME	4.17	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	HICKAM1	.48	1	FLOW	285.	277.	264.	251.	246.	242.	240.	236.	231.

				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO													
+	DGNBB3	.48	1	FLOW	125.	125.	125.	125.	125.	125.	125.	125.	125.
				TIME	3.58	3.58	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	BUF3	.48	1	FLOW	160.	152.	139.	126.	121.	117.	115.	111.	106.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RHICKAM	.48	1	FLOW	158.	150.	138.	125.	120.	116.	114.	110.	105.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	GD17BH	.03	1	FLOW	25.	24.	23.	22.	21.	21.	21.	21.	20.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	C17BH	.50	1	FLOW	167.	159.	146.	133.	128.	124.	121.	117.	112.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	R17BH	.50	1	FLOW	166.	158.	144.	131.	125.	122.	119.	115.	109.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	GD17BG	.12	1	FLOW	98.	95.	91.	87.	85.	84.	83.	82.	81.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	C17BG	.62	1	FLOW	227.	217.	200.	184.	178.	174.	170.	166.	159.
				TIME	3.92	3.92	3.92	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	R17BG	.62	1	FLOW	226.	216.	200.	184.	177.	173.	169.	164.	157.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	GD17BI	.07	1	FLOW	70.	68.	66.	63.	62.	61.	60.	59.	58.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT													
+	C17BI	5.51	1	FLOW	1650.	1582.	1469.	1350.	1303.	1266.	1241.	1202.	1157.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO													
+	R17BI	5.51	1	FLOW	1633.	1559.	1446.	1335.	1290.	1257.	1234.	1198.	1155.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	GD14CH	.04	1	FLOW	40.	38.	37.	35.	34.	34.	34.	33.	32.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	R14CH	.04	1	FLOW	39.	38.	36.	34.	34.	34.	33.	32.	32.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	GD17BJ	.06	1	FLOW	73.	72.	69.	66.	65.	65.	64.	63.	62.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	C17BJ	5.61	1	FLOW	1665.	1591.	1470.	1358.	1313.	1280.	1256.	1220.	1177.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	D95F	5.61	1	FLOW	178.	174.	168.	162.	160.	158.	157.	155.	153.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	REMAIN6	5.61	1	FLOW	1487.	1416.	1302.	1196.	1153.	1121.	1099.	1064.	1024.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	R17BJ	5.61	1	FLOW	1484.	1414.	1302.	1195.	1152.	1120.	1098.	1063.	1022.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	GD14CF	.13	1	FLOW	82.	79.	75.	71.	70.	69.	68.	66.	65.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO													
+	DGNBB4	.13	1	FLOW	30.	30.	30.	30.	30.	30.	30.	30.	30.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT													
+	BUF4	.13	1	FLOW	52.	49.	45.	41.	40.	39.	38.	36.	35.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	R14CF	.13	1	FLOW	51.	48.	44.	41.	39.	38.	37.	36.	35.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	GD14CG	.06	1	FLOW	51.	50.	48.	45.	45.	44.	44.	43.	42.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C14CG	.19	1	FLOW	94.	91.	84.	78.	76.	73.	72.	70.	68.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75

ROUTED TO													
+	R14CG	.19	1	FLOW	92.	89.	83.	77.	75.	72.	71.	69.	67.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	GD14CI	.05	1	FLOW	43.	42.	40.	38.	37.	37.	36.	36.	35.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C14C1	.24	1	FLOW	123.	118.	111.	104.	101.	99.	97.	94.	92.
				TIME	3.75	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	R14CI	.24	1	FLOW	123.	118.	110.	102.	99.	96.	95.	92.	89.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CMAIN6	5.85	1	FLOW	1544.	1472.	1352.	1235.	1191.	1158.	1135.	1100.	1058.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	RMAIN6	5.85	1	FLOW	1523.	1457.	1347.	1232.	1185.	1150.	1126.	1089.	1046.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	D95G	5.85	1	FLOW	102.	101.	100.	99.	98.	98.	98.	97.	97.
				TIME	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	REMAIN7	5.85	1	FLOW	1421.	1356.	1246.	1133.	1087.	1052.	1028.	992.	949.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	GD11C	.13	1	FLOW	123.	120.	116.	111.	109.	108.	107.	105.	103.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	C11C	5.98	1	FLOW	1469.	1397.	1286.	1171.	1124.	1089.	1065.	1028.	985.
				TIME	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	R11C	5.98	1	FLOW	1465.	1396.	1280.	1162.	1113.	1077.	1052.	1015.	974.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.33
HYDROGRAPH AT													
+	GD11B	.20	1	FLOW	203.	199.	191.	184.	181.	178.	177.	174.	171.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C11B	6.18	1	FLOW	1524.	1453.	1336.	1215.	1166.	1130.	1104.	1066.	1022.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	GOOF1	6.18	1	FLOW	3.	3.	3.	3.	3.	3.	3.	3.	3.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	GOWAN1	6.18	1	FLOW	1521.	1450.	1333.	1212.	1163.	1126.	1101.	1063.	1019.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	R11B	6.18	1	FLOW	1518.	1447.	1327.	1206.	1156.	1119.	1094.	1056.	1013.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.33
HYDROGRAPH AT													
+	CY05A	.03	1	FLOW	28.	28.	26.	25.	25.	25.	24.	24.	24.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	D95G	.00	1	FLOW	102.	101.	100.	99.	98.	98.	98.	97.	97.
				TIME	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	RD95G	.00	1	FLOW	102.	101.	100.	99.	98.	98.	97.	97.	97.
				TIME	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	PT6B	.11	1	FLOW	139.	136.	131.	127.	125.	123.	122.	121.	119.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CPT6B	.11	1	FLOW	200.	196.	191.	185.	182.	179.	178.	176.	173.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	2CPT6B	6.31	1	FLOW	1645.	1573.	1451.	1327.	1276.	1239.	1213.	1175.	1131.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	GOOF2	6.31	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.17	3.17	3.25	3.25	3.25	3.25	3.25	3.25	3.25
HYDROGRAPH AT													
+	GOWAN2	6.31	1	FLOW	1643.	1571.	1449.	1325.	1274.	1237.	1211.	1173.	1129.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	RPT6B	6.31	1	FLOW	1638.	1563.	1439.	1314.	1264.	1230.	1206.	1169.	1127.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	CY05D	.06	1	FLOW	40.	39.	37.	35.	34.	34.	33.	33.	32.

				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PT5A3	.09	1	FLOW	88.	86.	83.	80.	78.	77.	77.	76.	74.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT													
+	C5A3	6.46	1	FLOW	1677.	1602.	1476.	1350.	1298.	1261.	1235.	1197.	1153.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
DIVERSION TO													
+	GOOF3	6.46	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	2.50	2.58	2.58	2.67	2.67	2.67	2.67	2.75	2.83
HYDROGRAPH AT													
+	GOWAN3	6.46	1	FLOW	1675.	1600.	1474.	1348.	1296.	1259.	1233.	1195.	1151.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
ROUTED TO													
+	R5A3	6.46	1	FLOW	1671.	1595.	1468.	1342.	1292.	1256.	1232.	1195.	1151.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
DIVERSION TO													
+	MAVERICK	6.46	1	FLOW	174.	159.	134.	108.	98.	91.	86.	79.	70.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	MAV	6.46	1	FLOW	1497.	1436.	1335.	1233.	1193.	1165.	1146.	1116.	1081.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
ROUTED TO													
+	R5A3B	6.46	1	FLOW	1495.	1434.	1332.	1232.	1193.	1165.	1145.	1116.	1081.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	CY06A	.08	1	FLOW	71.	69.	67.	64.	62.	62.	61.	60.	59.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PT5A8	.03	1	FLOW	20.	20.	19.	18.	17.	17.	17.	17.	16.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
3 COMBINED AT													
+	C5A8	6.56	1	FLOW	1519.	1457.	1355.	1253.	1212.	1182.	1162.	1132.	1097.
				TIME	4.25	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33
ROUTED TO													
+	R5A3C	6.56	1	FLOW	1517.	1455.	1352.	1251.	1211.	1182.	1162.	1132.	1097.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
DIVERSION TO													
+	GOOF4	6.56	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.17	3.25	3.25	3.25	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT													
+	GOWAN4	6.56	1	FLOW	1515.	1453.	1350.	1249.	1209.	1180.	1160.	1130.	1095.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
DIVERSION TO													
+	DCY07B	6.56	1	FLOW	428.	407.	372.	337.	324.	314.	307.	297.	285.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	DPT5A8	6.56	1	FLOW	1087.	1047.	979.	911.	885.	866.	853.	833.	810.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
ROUTED TO													
+	R5A8	6.56	1	FLOW	1083.	1042.	975.	911.	885.	866.	852.	833.	809.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33
ROUTED TO													
+	R5A82	6.56	1	FLOW	1079.	1039.	975.	910.	884.	865.	851.	832.	808.
				TIME	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	CY07A	.03	1	FLOW	28.	27.	26.	25.	25.	25.	24.	24.	24.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CCY07A	6.59	1	FLOW	1085.	1044.	980.	915.	889.	869.	856.	836.	813.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33
DIVERSION TO													
+	TRUVAL	6.59	1	FLOW	86.	82.	76.	71.	68.	67.	65.	64.	62.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	TRUV	6.59	1	FLOW	1000.	962.	903.	844.	820.	803.	791.	773.	751.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	D95B	.00	1	FLOW	192.	192.	188.	182.	180.	179.	177.	176.	173.
				TIME	3.83	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RD95B	.00	1	FLOW	192.	191.	186.	181.	179.	178.	177.	175.	173.
				TIME	3.92	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO													
+	D1RCHO	.00	1	FLOW	36.	36.	35.	34.	34.	33.	33.	33.	33.
				TIME	3.92	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

HYDROGRAPH AT													
+	1REMAIN	.00	1	FLOW	156.	155.	151.	147.	145.	144.	143.	142.	140.
				TIME	3.92	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PT3AB1	.05	1	FLOW	63.	62.	60.	58.	57.	57.	56.	56.	55.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C3AB1	.05	1	FLOW	206.	203.	196.	189.	186.	184.	183.	181.	179.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO													
+	D2RCHO	.05	1	FLOW	29.	29.	29.	29.	29.	28.	28.	28.	27.
				TIME	3.75	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	2REMAIN	.05	1	FLOW	177.	174.	167.	160.	158.	156.	155.	153.	151.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	R2MAIN	.05	1	FLOW	175.	173.	166.	159.	156.	154.	153.	151.	149.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	4.00	4.00	4.00
HYDROGRAPH AT													
+	PT3AB2	.05	1	FLOW	76.	75.	73.	70.	70.	69.	68.	68.	67.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	C3AB2	.10	1	FLOW	217.	211.	202.	192.	189.	186.	184.	182.	178.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO													
+	D3RCHO	.10	1	FLOW	216.	210.	201.	191.	188.	185.	183.	181.	177.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	3REMAIN	.10	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	R3MAIN	.10	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	PT2B2	.08	1	FLOW	82.	80.	77.	74.	72.	72.	71.	70.	69.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CPT2B2	.18	1	FLOW	82.	80.	77.	74.	73.	72.	71.	70.	69.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO													
+	D4RCHO	.18	1	FLOW	13.	13.	13.	12.	12.	12.	12.	11.	11.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	4REMAIN	.18	1	FLOW	68.	67.	64.	62.	61.	60.	59.	59.	58.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	R4MAIN	.18	1	FLOW	68.	66.	63.	61.	60.	59.	59.	58.	57.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	PT2B3	.02	1	FLOW	31.	31.	30.	29.	29.	28.	28.	28.	27.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C2B3	.20	1	FLOW	96.	94.	91.	87.	86.	85.	84.	84.	82.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO													
+	DCSD2	.20	1	FLOW	88.	88.	88.	85.	83.	82.	81.	81.	79.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	D2B3	.20	1	FLOW	8.	6.	3.	3.	3.	3.	3.	3.	3.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	PT2A2	.06	1	FLOW	62.	60.	58.	55.	54.	54.	53.	52.	51.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	R2A2	.06	1	FLOW	60.	58.	56.	54.	53.	52.	52.	51.	50.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	PT2A1	.06	1	FLOW	62.	60.	58.	56.	55.	54.	54.	53.	52.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	D95E	.00	1	FLOW	181.	175.	166.	158.	155.	152.	150.	148.	145.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RD95E	.00	1	FLOW	180.	174.	164.	156.	153.	151.	149.	147.	144.
				TIME	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17
3 COMBINED AT													
+	C2A2	.13	1	FLOW	248.	240.	228.	215.	210.	205.	203.	199.	194.

				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
DIVERSION TO													
+	DCSD1	.13	1	FLOW	90.	90.	90.	90.	90.	90.	90.	90.	90.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.67
HYDROGRAPH AT													
+	DPT2A1	.13	1	FLOW	158.	150.	138.	125.	120.	115.	113.	109.	104.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
ROUTED TO													
+	R2A2	.13	1	FLOW	156.	148.	136.	124.	119.	115.	113.	108.	102.
				TIME	4.00	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	PT2B1	.07	1	FLOW	71.	69.	66.	63.	62.	62.	61.	60.	59.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C2B1	.20	1	FLOW	189.	180.	165.	149.	142.	138.	135.	131.	124.
				TIME	4.00	4.00	4.00	4.00	4.00	4.08	4.08	4.08	4.08
ROUTED TO													
+	R2B1	.20	1	FLOW	189.	179.	164.	149.	142.	138.	135.	130.	124.
				TIME	4.00	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
2 COMBINED AT													
+	2C2B3	.40	1	FLOW	191.	181.	166.	151.	144.	139.	136.	132.	125.
				TIME	4.00	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RC2B3	.40	1	FLOW	188.	179.	165.	150.	144.	139.	136.	131.	124.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.17
HYDROGRAPH AT													
+	PT51A	.04	1	FLOW	58.	57.	55.	53.	52.	52.	52.	51.	50.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	C2628	.43	1	FLOW	201.	191.	175.	160.	153.	148.	145.	140.	133.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO													
+	D5RCHO	.43	1	FLOW	113.	113.	107.	98.	94.	91.	89.	85.	81.
				TIME	3.92	4.00	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	5REMAIN	.43	1	FLOW	88.	78.	68.	62.	60.	58.	57.	54.	52.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	R5REMN	.43	1	FLOW	86.	77.	68.	62.	59.	57.	56.	54.	52.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	PT51B	.04	1	FLOW	57.	56.	54.	52.	52.	51.	51.	50.	49.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CPT51	.47	1	FLOW	99.	91.	88.	84.	83.	82.	81.	80.	79.
				TIME	4.00	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	D95F	.00	1	FLOW	178.	174.	168.	162.	160.	158.	157.	155.	153.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	RD95F	.00	1	FLOW	178.	174.	168.	162.	159.	157.	156.	154.	152.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33	4.33
HYDROGRAPH AT													
+	PT3	.15	1	FLOW	164.	160.	154.	148.	146.	144.	143.	141.	138.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PT6A	.02	1	FLOW	30.	29.	28.	27.	27.	27.	26.	26.	26.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	CPT6A	.17	1	FLOW	260.	254.	242.	229.	223.	219.	218.	213.	207.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RPT6A	.17	1	FLOW	260.	253.	240.	227.	222.	218.	217.	212.	207.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	PT41	.14	1	FLOW	120.	117.	111.	106.	104.	103.	102.	100.	98.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RPT41	.14	1	FLOW	117.	113.	108.	103.	101.	100.	99.	97.	95.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PT42	.08	1	FLOW	60.	59.	56.	53.	52.	52.	51.	50.	49.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CPT42	.22	1	FLOW	174.	170.	162.	155.	152.	150.	148.	146.	143.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75

HYDROGRAPH AT													
+	PT5A1	.05	1	FLOW	58.	57.	55.	53.	52.	51.	51.	50.	49.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	C5A1	.44	1	FLOW	479.	466.	444.	422.	413.	407.	403.	395.	387.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	R5A1	.44	1	FLOW	470.	457.	436.	414.	405.	399.	395.	388.	379.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.83	3.83	3.83
HYDROGRAPH AT													
+	PT5A4	.03	1	FLOW	27.	26.	25.	24.	23.	23.	23.	22.	22.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	PT52	.06	1	FLOW	51.	50.	48.	46.	45.	44.	44.	43.	42.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT													
+	CPT52	.54	1	FLOW	548.	533.	509.	483.	473.	466.	461.	453.	443.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RPT52	.54	1	FLOW	542.	527.	502.	477.	468.	461.	457.	448.	439.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	2CPT51	1.01	1	FLOW	627.	609.	577.	548.	537.	529.	524.	514.	503.
				TIME	3.83	3.83	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	R2CPT51	1.01	1	FLOW	626.	608.	577.	546.	534.	525.	520.	511.	499.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO													
+	D6RCHO	1.01	1	FLOW	136.	129.	120.	112.	109.	107.	106.	103.	100.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	6REMAIN	1.01	1	FLOW	490.	479.	457.	434.	425.	418.	415.	408.	399.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	R6MAIN	1.01	1	FLOW	488.	477.	455.	432.	423.	417.	413.	406.	398.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	PT5A2	.08	1	FLOW	79.	77.	74.	71.	70.	69.	68.	67.	66.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	R5A2	.08	1	FLOW	77.	76.	72.	70.	68.	68.	67.	66.	65.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	PT5A6	.19	1	FLOW	177.	172.	165.	157.	154.	152.	151.	149.	146.
				TIME	3.58	3.58	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	C5A6	1.27	1	FLOW	697.	680.	649.	617.	607.	598.	592.	582.	570.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO													
+	D7RCHO	1.27	1	FLOW	195.	192.	185.	178.	175.	173.	171.	168.	164.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	7REMAIN	1.27	1	FLOW	502.	488.	464.	440.	431.	425.	421.	414.	407.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	R7MAIN	1.27	1	FLOW	496.	483.	460.	436.	427.	421.	418.	411.	404.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	DMAV	.00	1	FLOW	174.	159.	134.	108.	98.	91.	86.	79.	70.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
ROUTED TO													
+	RMAV	.00	1	FLOW	172.	158.	133.	108.	97.	91.	85.	79.	69.
				TIME	4.33	4.33	4.33	4.33	4.42	4.42	4.42	4.42	4.42
2 COMBINED AT													
+	CMAV	1.27	1	FLOW	533.	517.	490.	461.	451.	444.	440.	433.	424.
				TIME	3.92	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO													
+	DDUNCAN	1.27	1	FLOW	282.	269.	248.	225.	217.	212.	209.	203.	196.
				TIME	3.92	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	DPT5A7	1.27	1	FLOW	251.	248.	242.	236.	234.	232.	232.	230.	228.
				TIME	3.92	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	PT5A7	.07	1	FLOW	59.	57.	55.	53.	52.	51.	50.	50.	49.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	C5A7	1.35	1	FLOW	310.	305.	297.	288.	285.	283.	282.	280.	277.

				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	R5A7	1.35	1	FLOW	309.	304.	296.	287.	284.	282.	281.	279.	276.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO													
+	D8RCHO	1.35	1	FLOW	129.	125.	119.	113.	111.	110.	109.	108.	106.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	8REMAIN	1.35	1	FLOW	180.	179.	177.	174.	173.	172.	172.	171.	170.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	R8MAIN	1.35	1	FLOW	180.	178.	176.	173.	172.	172.	171.	171.	170.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PT5A9	.05	1	FLOW	45.	44.	42.	41.	40.	39.	39.	38.	38.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C5A9	1.39	1	FLOW	217.	215.	210.	206.	203.	204.	203.	202.	200.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO													
+	GOOF5A	1.39	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	GWAN5A	1.39	1	FLOW	216.	214.	209.	205.	202.	203.	202.	201.	199.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	C2PT5A9	7.98	1	FLOW	1179.	1139.	1073.	1009.	982.	963.	950.	930.	906.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	GOOF5	7.98	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.25	3.25	3.33	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT													
+	GOWAN5	7.98	1	FLOW	1178.	1138.	1072.	1008.	981.	962.	949.	929.	905.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	LWRRNCH	7.98	1	FLOW	830.	807.	770.	734.	719.	709.	701.	690.	676.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	DEASTGOW	7.98	1	FLOW	348.	331.	302.	273.	262.	254.	248.	240.	229.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	RDEASTGO	7.98	1	FLOW	347.	330.	301.	273.	262.	253.	248.	239.	229.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	CY08-C	.09	1	FLOW	96.	94.	91.	87.	86.	85.	84.	83.	82.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CCY08C	8.08	1	FLOW	375.	356.	327.	298.	288.	281.	278.	270.	260.
				TIME	4.25	4.25	4.25	4.25	4.17	4.08	4.08	4.08	4.08
DIVERSION TO													
+	GOOF6	8.08	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42
HYDROGRAPH AT													
+	DGWN6	8.08	1	FLOW	374.	355.	326.	297.	287.	280.	277.	269.	259.
				TIME	4.25	4.25	4.25	4.25	4.17	4.08	4.08	4.08	4.08
DIVERSION TO													
+	DEGWN6	8.08	1	FLOW	267.	254.	232.	212.	204.	200.	197.	191.	184.
				TIME	4.25	4.25	4.25	4.25	4.17	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	DALEX	8.08	1	FLOW	107.	102.	93.	85.	82.	81.	80.	77.	75.
				TIME	4.25	4.25	4.25	4.25	4.17	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	CUL30	.00	1	FLOW	136.	129.	120.	112.	109.	107.	106.	103.	100.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RCUL30	.00	1	FLOW	133.	127.	119.	111.	108.	106.	105.	102.	99.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	CUL31	.00	1	FLOW	195.	192.	185.	178.	175.	173.	171.	168.	164.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RCUL31	.00	1	FLOW	206.	202.	193.	183.	179.	176.	174.	171.	167.
				TIME	3.92	3.92	3.92	3.92	3.92	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	DUNCAN	.00	1	FLOW	282.	269.	248.	225.	217.	212.	209.	203.	196.
				TIME	3.92	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83

ROUTED TO												
+	RDUNCAN	.00	1	FLOW	330.	317.	284.	244.	229.	222.	223.	223.	221.
				TIME	3.92	3.92	3.92	3.92	3.92	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	CUL32	.00	1	FLOW	129.	125.	119.	113.	111.	110.	109.	108.	106.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RCUL32	.00	1	FLOW	143.	140.	134.	128.	125.	123.	122.	118.	113.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
4 COMBINED AT													
+	CPT56B	.00	1	FLOW	784.	752.	689.	643.	633.	625.	622.	612.	599.
				TIME	3.92	3.92	3.92	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PT5B6-C	.38	1	FLOW	324.	316.	304.	292.	287.	283.	281.	277.	272.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CCPT56B	.38	1	FLOW	1087.	1049.	974.	891.	871.	860.	855.	842.	825.
				TIME	3.92	3.92	3.92	3.92	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT													
+	CCCPT56B	8.46	1	FLOW	1182.	1140.	1060.	969.	952.	939.	933.	918.	898.
				TIME	3.92	3.92	3.92	3.92	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	0511-1	.00	1	FLOW	3.	3.	3.	3.	3.	3.	3.	3.	3.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	0511-2	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.17	3.17	3.25	3.25	3.25	3.25	3.25	3.25	3.25
HYDROGRAPH AT													
+	0511-3	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	2.50	2.58	2.58	2.67	2.67	2.67	2.67	2.75	2.83
HYDROGRAPH AT													
+	0511-4	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.17	3.25	3.25	3.25	3.33	3.33	3.33	3.33	3.33
4 COMBINED AT													
+	GOOF1-4	.00	1	FLOW	9.	9.	9.	9.	9.	9.	9.	9.	9.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	0511-5A	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	GOOF1-5A	.00	1	FLOW	10.	10.	10.	10.	10.	10.	10.	10.	10.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	0511-5	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.25	3.25	3.33	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT													
+	0486-1	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42
3 COMBINED AT													
+	0486	.00	1	FLOW	12.	12.	12.	12.	12.	12.	12.	12.	12.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	RDGOW2A	.00	1	FLOW	12.	12.	12.	12.	12.	12.	12.	12.	12.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
2 COMBINED AT													
+	CCCPT5B6	8.46	1	FLOW	1194.	1152.	1072.	981.	964.	952.	945.	930.	910.
				TIME	3.92	3.92	3.92	3.92	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	GOWAN	.00	1	FLOW	830.	807.	770.	734.	719.	709.	701.	690.	676.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	D9RCHO	.00	1	FLOW	438.	428.	406.	383.	374.	367.	363.	356.	347.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	CENTRL1	.00	1	FLOW	391.	380.	365.	351.	345.	341.	338.	334.	329.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	TRUVAL	.00	1	FLOW	86.	82.	76.	71.	68.	67.	65.	64.	62.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33
2 COMBINED AT													
+	CBDV1	.00	1	FLOW	477.	462.	441.	421.	413.	407.	403.	397.	390.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.25	4.25	4.25
HYDROGRAPH AT													
+	MORBAY	.00	1	FLOW	428.	407.	372.	337.	324.	314.	307.	297.	285.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
2 COMBINED AT													
+	CBDVMORB	.00	1	FLOW	904.	868.	812.	758.	737.	721.	710.	694.	674.

				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
DIVERSION TO													
+	D10RCHO	.00	1	FLOW	189.	185.	179.	173.	171.	169.	168.	166.	164.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	CENTRL2	.00	1	FLOW	715.	683.	633.	585.	566.	552.	543.	528.	510.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
ROUTED TO													
+	RTCHY	.00	1	FLOW	682.	654.	610.	566.	549.	536.	527.	514.	497.
				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
DIVERSION TO													
+	DVSTR1	.00	1	FLOW	205.	193.	175.	158.	151.	146.	142.	137.	130.
				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
HYDROGRAPH AT													
+	DVWR1	.00	1	FLOW	476.	460.	435.	408.	398.	390.	385.	377.	367.
				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
DIVERSION TO													
+	DVSTR2	.00	1	FLOW	37.	37.	37.	37.	37.	37.	37.	37.	37.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	DVWR2	.00	1	FLOW	439.	423.	398.	371.	361.	353.	348.	340.	330.
				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
ROUTED TO													
+	RX5	.00	1	FLOW	437.	421.	395.	369.	359.	351.	346.	338.	329.
				TIME	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67
HYDROGRAPH AT													
+	X4	.81	1	FLOW	294.	288.	279.	269.	265.	262.	260.	257.	253.
				TIME	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
HYDROGRAPH AT													
+	X3B	.16	1	FLOW	119.	116.	112.	108.	106.	105.	104.	102.	101.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	CUL4	.16	1	FLOW	79.	78.	77.	75.	74.	74.	74.	73.	72.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
			**	PEAK STAGES IN FEET **									
			1	STAGE	15.32	15.30	15.27	15.24	15.23	15.23	15.22	15.21	15.20
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	X3A	.12	1	FLOW	94.	92.	89.	85.	84.	83.	82.	81.	80.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	CUL8	.12	1	FLOW	65.	62.	57.	53.	50.	47.	46.	44.	39.
				TIME	4.25	4.25	4.33	4.33	4.33	4.42	4.42	4.42	4.50
			**	PEAK STAGES IN FEET **									
			1	STAGE	22.83	22.79	22.71	22.64	22.60	22.59	22.58	22.57	22.55
				TIME	4.25	4.25	4.33	4.33	4.33	4.42	4.42	4.42	4.50
2 COMBINED AT													
+	CX3AB	.28	1	FLOW	143.	140.	134.	128.	124.	120.	119.	117.	110.
				TIME	4.25	4.33	4.33	4.33	4.33	4.42	4.42	4.42	4.50
ROUTED TO													
+	RK3AB	.28	1	FLOW	128.	124.	119.	113.	110.	109.	107.	105.	102.
				TIME	5.33	5.33	5.42	5.42	5.42	5.42	5.42	5.42	5.42
2 COMBINED AT													
+	CX	1.09	1	FLOW	420.	411.	396.	381.	374.	370.	367.	362.	355.
				TIME	5.42	5.42	5.42	5.42	5.42	5.50	5.50	5.50	5.50
DIVERSION TO													
+	DEVX4	1.09	1	FLOW	100.	100.	100.	100.	100.	100.	100.	100.	100.
				TIME	4.42	4.42	4.50	4.50	4.50	4.50	4.50	4.50	4.58
HYDROGRAPH AT													
+	DEVX4	1.09	1	FLOW	320.	311.	296.	281.	274.	270.	267.	262.	255.
				TIME	5.42	5.42	5.42	5.42	5.42	5.50	5.50	5.50	5.50
ROUTED TO													
+	RK4	1.09	1	FLOW	319.	310.	295.	280.	274.	269.	266.	261.	255.
				TIME	5.58	5.58	5.67	5.67	5.67	5.67	5.67	5.67	5.67
HYDROGRAPH AT													
+	X3C	.48	1	FLOW	128.	124.	119.	113.	111.	109.	108.	106.	104.
				TIME	5.17	5.17	5.25	5.25	5.25	5.25	5.25	5.25	5.25
DIVERSION TO													
+	SD1A	.48	1	FLOW	14.	14.	14.	14.	14.	14.	14.	14.	13.
				TIME	5.17	5.17	5.25	5.25	5.25	5.25	5.25	5.25	5.25
HYDROGRAPH AT													
+	SD1A	.48	1	FLOW	113.	110.	105.	99.	97.	95.	94.	93.	90.
				TIME	5.17	5.17	5.25	5.25	5.25	5.25	5.25	5.25	5.25
ROUTED TO													
+	RK3C	.48	1	FLOW	113.	110.	104.	99.	97.	95.	94.	92.	90.
				TIME	5.42	5.42	5.42	5.42	5.42	5.42	5.42	5.42	5.42

HYDROGRAPH AT													
+	X3	.34	1	FLOW	250.	245.	237.	229.	226.	224.	222.	219.	216.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
3 COMBINED AT													
+	CX3	1.91	1	FLOW	512.	498.	474.	450.	441.	434.	429.	421.	412.
				TIME	5.42	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
HYDROGRAPH AT													
+	DTX4	.00	1	FLOW	100.	100.	100.	100.	100.	100.	100.	100.	100.
				TIME	4.42	4.42	4.50	4.50	4.50	4.50	4.50	4.50	4.58
ROUTED TO													
+	RDEX	.00	1	FLOW	100.	100.	100.	100.	100.	100.	100.	100.	100.
				TIME	4.92	4.92	5.08	5.00	5.00	5.00	5.00	5.00	5.00
HYDROGRAPH AT													
+	BSX5	.10	1	FLOW	101.	99.	95.	92.	91.	90.	89.	88.	87.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CX5	.10	1	FLOW	139.	136.	131.	126.	126.	126.	125.	125.	125.
				TIME	3.92	3.92	3.92	4.92	4.92	4.92	4.92	4.92	4.92
DIVERSION TO													
+	DVSTR1	.10	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT													
+	DVWR1	.10	1	FLOW	139.	136.	131.	126.	126.	126.	125.	125.	125.
				TIME	3.92	3.92	3.92	4.92	4.92	4.92	4.92	4.92	4.92
DIVERSION TO													
+	DVSTR2	.10	1	FLOW	37.	37.	37.	37.	37.	37.	37.	37.	37.
				TIME	3.33	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42
HYDROGRAPH AT													
+	DVWR2	.10	1	FLOW	102.	99.	94.	89.	89.	89.	88.	88.	88.
				TIME	3.92	3.92	3.92	4.92	4.92	4.92	4.92	4.92	4.92
ROUTED TO													
+	RX5	.10	1	FLOW	100.	97.	92.	89.	89.	89.	88.	88.	88.
				TIME	4.00	4.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00
2 COMBINED AT													
+	CX4X3	2.01	1	FLOW	595.	580.	556.	531.	521.	514.	509.	502.	492.
				TIME	5.42	5.42	5.42	5.42	5.42	5.42	5.42	5.42	5.42
DIVERSION TO													
+	DVBOX	2.01	1	FLOW	210.	210.	210.	210.	210.	210.	210.	210.	210.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	DVBOX	2.01	1	FLOW	385.	370.	346.	321.	311.	304.	299.	292.	282.
				TIME	5.42	5.42	5.42	5.42	5.42	5.42	5.42	5.42	5.42

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SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .99									
	RANN MANE	1.94	120.17	243.71	.94	5.00	119.09	245.00	.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1297E+02 EXCESS= .0000E+00 OUTFLOW= .1297E+02 BASIN STORAGE= .1480E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .98									
	RANN MANE	1.95	116.18	242.71	.91	5.00	115.54	245.00	.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1074E+02 EXCESS= .0000E+00 OUTFLOW= .1073E+02 BASIN STORAGE= .1952E-03 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .89									
	RANN MANE	2.06	96.80	243.02	.76	5.00	96.60	245.00	.76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1054E+02 EXCESS= .0000E+00 OUTFLOW= .1054E+02 BASIN STORAGE= .1845E-03 PERCENT ERROR= .0

*** NORMAL END OF HEC-1 ***

HEC1 MODEL INTERIM OFFSITE RESULTS (SDN 3 STORM)				
BASIN/HEC STATION	AREA, mi^2	Q25, CFS	Q100, CFS	Notes/Location
ANN	0.26	62	120	
RANN	0.26	62	119	
GD29B	0.14	32	68	
CGD29B	0.4	85	170	
RGD29B	0.4	84	168	
NW1C2-C	0.21	126	192	
CNW1C2	0.6	172	320	
RNW1C2	0.6	172	318	
PDGCC3	0.05	34	54	
CGCC3	0.65	182	337	
RGCC3	0.65	182	336	
D95A	0.65	139	139	
REMAIN1	0.65	43	197	
RLBG1	0.65	42	197	
PDGCC2	0.04	9	20	
RGCC2	0.04	9	19	
PDGCC4	0.05	30	50	
CGCC4	0.74	60	233	
RLBG2	0.74	60	233	
HAMMER	0.13	37	71	
RHAMMER	0.13	37	71	
PDGCD	0.13	30	64	
CPDGCD	0.26	65	131	
RGCD	0.26	63	130	
PDGCB1	0.03	23	37	
RGCB1	0.03	22	36	
PDGCB2	0.03	15	26	
CGCB2	0.06	37	63	
RCGB2	0.06	36	61	
PDGCB3	0.07	15	33	
CGCB3	0.13	51	94	
RGCB3	0.13	50	92	
PDGCB4	0.02	13	21	
RGCB4	0.02	13	21	
CGCB4	0.41	113	226	
PDGCC1	0.05	15	29	
PDGCB5	0.11	27	54	
CGCB5	0.57	146	298	
RGCB5	0.57	145	294	
C2GCB5	1.31	189	486	
PDGCB6	0.02	15	23	
RGCB6	0.02	14	22	
PDGCB10	0.07	39	66	
PDGCB9	0.03	12	24	
CGCB9	1.43	226	554	
RGCB9	1.43	223	552	
PDGCB11	0.03	14	26	
CGCB11	1.47	229	565	
RLBG3	1.47	228	563	
D95B	1.47	90	188	
REMAIN2	1.47	138	375	
RMAIN2	1.47	137	369	
LONEMT	0.41	174	297	
GD20BH	0.05	15	29	

HEC1 MODEL INTERIM OFFSITE RESULTS (SDN 3 STORM)				
BASIN/HEC STATION	AREA, mi^2	Q25, CFS	Q100, CFS	Notes/Location
CLONE	0.46	188	322	
RLONE	0.46	185	319	
GD20BG	0.11	51	89	
C20BG	2.04	288	659	
R20BG	2.04	284	653	
CRAIG1	2.44	751	1293	
DGNBB	2.44	249	249	
DBUF1	2.44	502	1044	
RBUF1	2.44	500	1039	
DGNBB1	2.44	109	109	
DBUF2	2.44	391	930	
DBUFLO2	2.44	275	655	
DRED	2.44	116	275	
RDRED	2.44	115	274	
GD20BI	0.12	47	83	
C20BI	2.56	129	300	
R20BI	2.56	128	300	
GD20BL	0.08	60	92	
C20BL	4.67	368	898	
R20BL	4.67	366	898	
RTBUFAL2	2.44	275	655	
RBUF2	2.44	275	651	
DBUFLO3	2.44	196	465	
DCOBAL	2.44	78	186	
RCOBAL1	2.44	78	186	
GD20BJ	0.05	29	48	
C20BJ1	2.49	84	198	
R20BJ1	2.49	84	197	
C20BJ2	4.72	430	1067	
R20BJ2	4.72	430	1065	
GD20BM	0.05	40	62	
C20BM	4.77	436	1080	
D95E	4.77	55	152	
REMAIN5	4.77	381	928	
RREMAINS	4.77	380	923	
RTBUFAL3	2.44	196	465	
RBUF3	2.44	195	465	
DGNBB2	2.44	194	198	
DBUF3	2.44	1	267	
RCRAIG2	2.44	1	264	
GD20BK	0.05	21	37	
1C20BK	2.49	18	274	
R1C20BK	2.49	18	273	
2C20BK	4.82	388	1110	
R2C20BK	4.82	387	1102	
HICKAM1	0.48	160	285	
DGNBB3	0.48	125	125	
BUF3	0.48	35	160	
RHICKAM	0.48	34	158	
GD17BH	0.03	14	25	
C17BH	0.5	34	159	
R17BH	0.5	33	158	
GD17BG	0.12	58	98	
C17BG	0.62	70	217	

HEC1 MODEL INTERIM OFFSITE RESULTS (SDN 3 STORM)				
BASIN/HEC STATION	AREA, mi^2	Q25, CFS	Q100, CFS	Notes/Location
R17BG	0.62	69	216	
GD17BI	0.07	43	70	
C17BI	5.51	420	1241	
R17BI	5.51	417	1234	
GD14CH	0.04	23	40	
R14CH	0.04	23	39	
GD17BJ	0.06	47	73	
C17BJ	5.61	430	1256	
D95F	5.61	61	157	
REMAIN6	5.61	368	1099	
R17BJ	5.61	368	1098	
GD14CF	0.13	43	82	
DGNBB4	0.13	30	30	
BUF4	0.13	13	52	
R14CF	0.13	12	51	
GD14CG	0.06	30	51	
C14CG	0.19	30	94	
R14CG	0.19	30	92	
GD14CI	0.05	24	43	
C14C1	0.24	51	123	
R14CI	0.24	51	123	
CMAIN6	5.85	385	1135	
RMAIN6	5.85	383	1126	
D95G	5.85	76	98	
REMAIN7	5.85	308	1028	
GD11C	0.13	77	123	
C11C	5.98	330	1065	
R11C	5.98	329	1052	
GD11B	0.2	129	203	
C11B	6.18	382	1066	
GOOF1	6.18	3	3	
GOWAN1	6.18	379	1063	
R11B	6.18	378	1057	
CY05A	0.03	17	28	
D95G	5.85	76	98	
RD95G	5.85	75	97	
PT6B	0.11	91	139	
CPT6B	5.96	112	178	
2CPT6B	6.31	478	1175	
GOOF2	6.31	2	2	
GOWAN2	6.31	476	1173	
RPT6B	6.31	474	1170	
CY05D	0.06	22	40	
PT5A3	0.09	56	88	
C5A3	6.46	507	1197	
GOOF3	6.46	2	2	
GOWAN3	6.46	505	1195	
R5A3	6.46	503	1195	
MAVERICK	6.46	20	70	
MAV	6.46	484	1116	
R5A3B	6.46	482	1116	
CY06A	0.08	43	71	
PT5A8	0.03	12	20	
C5A8	6.56	503	1132	

HEC1 MODEL INTERIM OFFSITE RESULTS (SDN 3 STORM)				
BASIN/HEC STATION	AREA, mi^2	Q25, CFS	Q100, CFS	Notes/Location
R5A3C	6.56	501	1132	
GOOF4	6.56	2	2	
GOWAN4	6.56	499	1130	
DCY07B	6.56	116	297	
DPT5A8	6.56	383	810	
R5A8	6.56	381	833	
R5A82	6.56	381	832	
CY07A	0.03	18	28	
CCY07A	6.59	386	836	
TRUVAL	6.59	24	64	
TRUV	6.59	362	773	Eastbound flow in Gowan
D95B	1.47	90	188	
RD95B	1.47	89	186	
D1RCHO	1.47	17	35	
1REMAIN	1.47	72	151	
PT3AB1	0.05	44	63	
C3AB1	1.52	95	196	Santa Fee Entrance at Rainbow
D2RCHO	1.52	15	29	
2REMAIN	1.52	80	167	
R2MAIN	1.52	80	166	
PT3AB2	0.05	54	76	
C3AB2	1.57	103	202	Lone Mountain
D3RCHO	1.57	102	201	Diverted to stormdrain
3REMAIN	1.57	0	1	Remaining southbound flow
R3MAIN	1.57	0	1	
PT2B2	0.08	51	82	
CPT2B2	1.65	49	77	Ahern Rental property
D4RCHO	1.65	8	13	
4REMAIN	1.65	41	64	
R4MAIN	1.65	41	63	
PT2B3	0.02	22	31	
C2B3	1.67	60	91	Channel north of Craig
DCSD2	1.67	58	88	Diverted to 60-in. stormdrain
D2B3	1.67	2	3	Remaining southbound flow conveyed in RCB's
GOAL01	1.67	2	3	Flow diverted to GOAL
D2B3B	1.67	0	0	Remaining southbound flow
PT2A2	0.06	37	62	
R2A2	0.06	37	60	
PT2A1	0.06	39	62	
D95E	4.77	55	152	
RD95E	4.77	55	151	
C2A2	4.9	83	205	
DCSD1	4.9	82	90	
DPT2A1	4.9	1	115	
R2A2	4.9	1	115	
PT2B1	0.07	43	71	
C2B1	4.97	36	138	Eastbound flow in Craig
R2B1	4.97	35	138	
2C2B3	5.17	35	135	Rancho, south of Craig
GOAL02	5.17	28	111	Flow captured by inlets, conveyed to GOAL
D2CB3	5.17	7	24	
RC2B3	5.17	6	24	

HEC1 MODEL INTERIM OFFSITE RESULTS (SDN 3 STORM)				
BASIN/HEC STATION	AREA, mi^2	Q25, CFS	Q100, CFS	Notes/Location
GOAL03	5.17	6	23	Flow captured by inlets, conveyed to GOAL
DC2628	5.17	1	1	
R5REMN	5.17	1	1	
PT51B	0.04	40	57	
CPT51	5.2	35	51	Southbound at Alexander (north)
D95F	5.61	61	157	
RD95F	5.61	61	156	
PT3	0.15	104	164	
PT6A	0.02	20	30	
CPT6A	5.78	108	218	
RPT6A	5.78	108	217	
PT41	0.14	69	120	
RPT41	0.14	67	117	
PT42	0.08	35	60	
CPT42	0.22	102	174	
PT5A1	0.05	38	58	
C5A1	6.05	221	395	
R5A1	6.05	217	388	
PT5A4	0.03	15	27	
PT52	0.06	30	51	
CPT52	6.15	254	453	
RPT52	6.15	250	448	
2CPT51	6.58	270	478	Rancho south of Alexander-Jones (north)
GOAL04	6.58	118	127	Flow captured by existing culverts and new inlets; conveyed to GOAL
DC2CPT51	6.58	153	351	
R2CPT51	6.58	151	347	
PT51A	0.04	40	58	Flow captured by culvert 27 and conveyed to GOAL
RGOAL1	0	2	3	
RGOAL2	0	35	112	
RGOAL3	0	7	23	
GOAL3	0.04	73	158	
RGOAL3	0.04	71	157	
RGOAL4	0	127	127	
CGOAL	0.04	198	284	Flow in GOAL at outlet structure
BGOAL	0.04	24	24	Flow in GOAL that continues in bleeder line
DGOAL	0.04	174	260	Flow existing GOAL at outlet structure NW intersection Rancho and Jones/Alexander
R2CPT51B	6.62	294	568	Surface flow at southern intersection of Rancho and Jones/Alexander
D6RCHO	6.62	65	118	Eastbound in Alexander
6REMAIN	6.62	228	450	Remaining southbound at Jones-Alexander (south)
R6MAIN	6.62	226	444	
PT5A2	0.08	49	79	
R5A2	0.08	48	77	
PT5A6	0.19	105	177	

HEC1 MODEL INTERIM OFFSITE RESULTS (SDN 3 STORM)				
BASIN/HEC STATION	AREA, mi^2	Q25, CFS	Q100, CFS	Notes/Location
C5A6	6.88	328	614	Channel west of Rancho (Sta. 113+50)
D7RCHO	6.88	119	177	Diverted to channel
7REMAIN	6.88	209	437	Remaining southbound flow
R7MAIN	6.88	208	436	
DMAV	6.46	20	79	
RMAV	6.46	19	79	
CMAV	7.73	212	457	
DDUNCAN	7.73	82	222	Diverted to Duncan
DPT5A7	7.73	130	235	
PT5A7	0.07	36	59	
C5A7	7.81	159	285	Southbound flow at Duncan Dr.
R5A7	7.81	157	284	
D8RCHO	7.81	41	111	Diverted west over road
8REMAIN	7.81	116	173	Remaining southbound flow
R8MAIN	7.81	115	172	
PT5A9	0.05	28	45	
C5A9	7.85	131	203	Southbound at Gowan
GOOF5A	7.85	40	1	Diverted to GOOF0511
GWAN5A	7.85	91	202	Remaining southbound flow
C2PT5A9	7.98	431	936	Rancho/Gowan
GOOF5	7.98	1	1	Diverted to GOOF0511
GOWAN5	7.98	430	935	
LWRRNCH	7.98	392	693	Southbound in Rancho
DEASTGOW	7.98	39	232	Eastbound in Gowan
RDEASTGO	7.98	38	242	
CY08-C	0.09	62	96	
CCY08C	8.08	52	271	Northbound in Decatur at Gowan
GOOF6	8.08	1	1	
DGWN6	8.08	51	270	
DEGWN6	8.08	36	192	
DALEX	8.08	15	75	
CUL30	6.62	65	118	
RCUL30	6.62	65	115	
CUL31	6.88	119	177	
RCUL31	6.88	124	181	
DUNCAN	7.73	82	222	
RDUNCAN	7.73	89	243	
CUL32	7.81	41	111	
RCUL32	7.81	42	126	
CPT56B	7.81	307	639	
PT5B6-C	0.38	202	324	
CCPT56B	8.19	388	875	Eastbound in Alexander w. of Decatur
CCCPT56B	8.46	402	945	Alexander/Decatur
0511-1	6.18	3	3	
0511-2	6.31	2	2	
0511-3	6.46	2	2	
0511-4	6.56	2	2	
GOOF1-4	6.56	9	9	
0511-5A	7.85	40	1	
GOOF1-5A	7.85	49	10	
0511-5	7.98	1	1	
0486-1	8.08	1	1	

HEC1 MODEL INTERIM OFFSITE RESULTS (SDN 3 STORM)				
BASIN/HEC STATION	AREA, mi^2	Q25, CFS	Q100, CFS	Notes/Location
486	8.08	51	12	
RDGOW2A	8.08	51	12	
CCCPT5B6	8.46	453	939	
GOWAN	7.98	392	693	Southbound flow retrieved at Gowan
D9RCHO	7.98	171	358	Over Rancho and away from site
CENTRL1	7.98	220	335	
TRUVAL	6.59	24	64	Retrieve flow from Gowan
CBDV1	6.59	244	398	Rancho, south of True Value
MORBAY	6.56	116	297	Eastbound at Michael Wy
CBDVMORB	7.98	360	696	Rancho/Michael Way
D10RCHO	7.98	129	166	Divert to channel south of Michael
CENTRL2	7.98	231	529	Remaining southbound flow
RTCHY	7.98	213	515	Rancho/Cheyenne
DVSTR1	7.98	18	137	Diverted to Cheyenne
DVWR1	7.98	195	378	
DVSTR2	7.98	37	37	Diverted to Cheyenne
DVWR2	7.98	158	341	Remaining southbound flow
RX5	7.98	156	339	
X4	0.81	193	288	
X3B	0.16	76	119	
CUL4	0.16	64	79	
X3A	0.12	60	94	
CUL8	0.12	23	65	
CX3AB	0.28	86	143	
RK3AB	0.28	83	128	
CX	1.09	265	396	
DEVX4	1.09	100	100	
DEVX4	1.09	165	296	
RK4	1.09	164	295	
X3C	0.48	73	128	
SD1A	0.48	9	14	
SD1A	0.48	64	113	
RK3C	0.48	64	113	
X3	0.34	170	250	
CX3	1.91	284	474	
DTX4	1.09	100	100	
RDEX	1.09	100	100	
BSX5	0.1	68	101	
CX5	1.19	119	131	
DVSTR1	1.19	0	0	Diverted to Cheyenne
DVWR1	1.19	119	131	
DVSTR2	1.19	37	37	Diverted to Cheyenne
DVWR2	1.19	82	94	Remaining southbound flow

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   31MAR14  TIME  21:53:34   *
*                                       *
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*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


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          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

                        *DIAGRAM
*** FREE ***
             1          ID   RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
             2          ID   GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
             3          ID   OFFSITE BASINS, INTERIM CONDITIONS
             4          ID   PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
             5          ID   PREPARED BY STANLEY CONSULTANTS INC. (HM)
             6          ID   INPUT FILE: 25S3I.DAT
             7          ID   DESIGN STORM: 25-YEAR 6-HR
             8          ID   STORM DISTRIBUTION: SDN3
             9          ID   STORM CENTERING: FULL WATERSHED
            10          ID   MODEL INCLUDES DIVERSIONS FOR THE INTERIM OFFSITE FLOW TO THE
            11          ID   REGIONAL FACILITY GOWAN OUTFALL - ALEXANDER BRANCH FROM
            12          ID   THE INTERSECTION OF CRAIG AND RANCHO TO THE SOUTHERN INTERSECTION OF
            13          ID   JONES/ALEXANDER AND RANCHO
            14          ID
            15          ID   THIS MODEL DIFFERS FROM 100 YEAR: FLOW DIVERTED TO STORM DRAIN
            16          ID   AT GOWAN/CRAIG
            17          ID
            18          ID
            19          ID   BASED ON:
            20          ID   CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
            21          ID   2008 MASTER PLAN UPDATE (MPU) BY PBS&J
            22          ID   GOWAN WATERSHED (INPUT FILE = ALLGOW3.DAT) AND
            23          ID   CENTRAL WATERSHED (NORTHWESTERN PORTION)
            24          ID
            25          ID   RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009
            26          ID   UPPRSDN3 AND LWRSDN3 HEC-1 MODELS
            27          ID   FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
            28          ID   CONTROL FACILITIES REFERENCED FROM LOMR UNLESS OTHERWISE NOTED
            29          ID
            30          ID   GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
            31          ID   BY G.C. WALLACE (GCW) 2007
            32          ID
            33          ID   PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
            34          ID   IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
            35          ID   HEC-1 ANALYSIS FOR EXISTING CONDITIONS FILE R00S3X.OUT
            36          ID   BY STANLEY CONSULTANTS, 1/2012
            37          ID
            38          ID   LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
            39          ID   ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
            40          ID   MPU SHOWS THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
            41          ID   (GOEC)
            42          ID
            43          ID
            44          ID   THIS MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL DRAINAGE
            45          ID   STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
            46          ID   EXISTING CONDITION MODEL AS FOLLOWS:
            47          ID   1. BASIN PT51 OF THE RANCHO STUDY WAS SPLIT INTO PT51A AND PT51B IN ORDER
            48          ID   TO SHOW WHERE FLOW WILL BE COLLECTED BY THE GOWAN OUTFALL - ALEXANDER
            49          ID   ROAD FACILITIES AT ALEXANDER-JONES/RANCHO DRIVE INTERSECTION.
            50          ID   2. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
            51          ID   TO THE EXISTING CONDITION MODEL
            52          ID   3. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE
            53          ID   DARF'S USED IN 2008 MPU HEC-1 ALLGOW3.OUT
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          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

            54          ID
            55          ID
            56          ID   JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
            57          ID   DARF RATIOS FOR AREAS OF 0, 0.5, 1.0, 2.0, 4.0, 6.0, 8.0 AND 10 SQUARE MILES
            58          ID   FOR THE 100-YEAR EVENT.
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 59          IT       5       0       0     300
 60          IO       5       0       0
 61          IN       5
 62          JR    PREC    0.74    0.73    0.72    0.69    0.67    0.67    0.65    0.64
             *

 63          KK     ANN
 64          KM  BASIN REFERENCED FROM LOMR
 65          PB    2.85
 66          BA   0.259
 67          PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
 68          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
 69          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
 70          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
 71          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
 72          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
 73          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
 74          PC   0.998   0.999   1.000
 75          LS       0    76.8
 76          UD   0.499
             *

 77          KK    RANN
 78          KM  ROUTE TO GD29B
 79          RK    2600   0.015   0.015       0    TRAP     100       2
             *

 80          KK   GD29B
 81          KM  BASIN REFERENCED FROM LOMR
 82          PB    2.77
 83          BA   0.138
 84          LS       0    74.3
 85          UD   0.298
             *

 86          KK  CGD29B
 87          HC       2
             *

 88          KK  RGD29B
 89          KM  ROUTE GD29B TO CNW1C2
 90          KM  ROUTING REVISED FROM LOMR BY STANLEY CONSULTANTS
 91          KM  ANN ROAD
 92          RD    4500  0.0122   0.016       0    TRAP       0      50
             * PREVIUOS ROUTING
             * KMROUTE TO ANN1B
             * RK2700      0.015   0.015       0   TRAP      100       2
             *
1                                        HEC-1 INPUT                                    PAGE  3
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 93          KK NW1C2-C
 94          KM  BASIN REFERENCED FROM 2008 MPU
 95          KM  TAKES PLACE OF ANN1B AND ANN1C (LOMR) WHICH ARE NOW DEVELOPED
 96          KM  REVISED BY STANLEY CONSULTANTS
 97          BA   0.207
 98          PB    2.77
 99          LS       0    89.5
100          UD   0.409
             *

101          KK  CNW1C2
102          KM  COMBINE RGD29B AND NW1C2-C
103          KM  ANN ROAD AND RANCHO
104          HC       2
             *

105          KK  RNW1C2
106          KM  ROUTE TO PDGCC3
107          RK    1250  0.0074   0.013       0    TRAP      12       2
             *

108          KK  PDGCC3
109          KM  CN UPDATED BY STANLEY CONSULTANTS FOR DEVELOPMENT
110          KM  REFERENCED FROM GOWAN SD, LONE MTN BRANCH BY GCW
111          PB    2.77
112          BA   0.047
113          LS       0    86.7
114          UD   0.188
             *

115          KK   CGCC3
116          HC       2
             *

117          KK   RGCC3
118          KM  ROUTE TO PDGCC4
119          RK    1550   0.005   0.013       0    TRAP       8       0
             *

120          KK REMAIN1
121          KM  DIVERT 139 CFS UNDER U.S. 95 BETWEEN ANN ROAD AND THE U.S. 95/RANCHO
122          KM  INTERSECTION IN A 10' X 3' RCB (CULVERT 3). FLOWS IN EXCESS OF 139 CFS
123          KM  REMAIN ON THE WEST SIDE OF U.S. 95.
124          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
125          DT    D95A
126          DI       0      51     101     118     140     318   10000
127          DQ       0      50     100     117     139     139     139
             *
1                                        HEC-1 INPUT                                    PAGE  4
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25S3I.OUT, 25-year interim condition, refer to Figure 4

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 128      KK   RLBG1
 129      KM  ROUTE TO CGCC4 (HECRAS CROSS SECTION 116+49)
 130      KM  ADDED BY LBG
 131      RK      278   0.005   0.013       0    TRAP       8       0
          *

 132      KK  PDGCC2
 133      KM  BASIN REFERENCED FROM LOMR
 134      PB    2.77
 135      BA   0.042
 136      LS       0    73.2
 137      UD   0.286
          *

 138      KK   RGCC2
 139      KM  ROUTE TO PDGCC4
 140      RK    2900  0.0055   0.015       0    TRAP      60       2
          *

 141      KK  PDGCC4
 142      KM  BASIN REFERENCED FROM LOMR
 143      PB    2.77
 144      BA   0.049
 145      LS       0    84.3
 146      UD   0.189
          *

 147      KK   CGCC4
 148      KM  THE FLOW AT THIS NODE CORRESPONDS TO HECRAS CROSS SECTION 116+49
 149      KM  OF THE US-95 EFFECTIVE HECRAS.
 150      KM  THIS IS THE MOST UPSTREAM NODE IN THE EFFECTIVE MODEL.
 151      HC       3
          *

 152      KK   RLBG2
 153      KM  ROUTE TO CGCB9 (HECRAS CROSS SECTION 112+87)
 154      KM  ADDED BY LBG
 155      RK     362   0.005   0.013       0    TRAP       8       0
          *

 156      KK  HAMMER
 157      KM  BASIN REFERENCED FROM LOMR
 158      PB    2.82
 159      BA   0.128
 160      LS       0    76.6
 161      UD   0.333
          *

 162      KK RHAMMER
 163      KM  ROUTE TO PDGCD
 164      RK    2700   0.015   0.015       0    TRAP      60       2
          *
```



```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 165      KK   PDGCD
 166      KM  BASIN REFERENCED FROM LOMR
 167      PB    2.77
 168      BA   0.129
 169      LS       0    74.0
 170      UD   0.284
          *

 171      KK  CPDGCD
 172      HC       2
          *

 173      KK    RGCD
 174      KM  ROUTE TO PDGCB5
 175      RK    4060  0.0086   0.015       0    TRAP      40       2
          *

 176      KK  PDGCB1
 177      KM  BASIN REFERENCED FROM LOMR
 178      PB    2.77
 179      BA   0.033
 180      LS       0    84.9
 181      UD   0.166
          *

 182      KK   RGCB1
 183      KM  ROUTE TO PDGCB3
 184      RK    2100  0.0086   0.015       0    TRAP      40       2
          *

 185      KK  PDGCB2
 186      KM  BASIN REFERENCED FROM LOMR
 187      PB    2.77
 188      BA   0.030
 189      LS       0    81.3
 190      UD   0.190
          *

 191      KK   CGCB2
 192      HC       2
          *
```

```
 193          KK   RCGB2
 194          KM  ROUTE TO PDGCB3
 195          RK     700  0.0029    0.03       0    TRAP      20       2
              *

 196          KK  PDGCB3
 197          KM  BASIN REFERENCED FROM LOMR
 198          PB    2.77
 199          BA   0.066
 200          LS       0    73.1
 201          UD   0.236
              *
1                                        HEC-1 INPUT                                        PAGE  6

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 202          KK   CGCB3
 203          HC       2
              *

 204          KK   RGCB3
 205          KM  ROUTE TO PDGCB5
 206          RK    1400    0.01   0.025       0    TRAP      20       2
              *

 207          KK  PDGCB4
 208          KM  BASIN REFERENCED FROM LOMR
 209          PB    2.77
 210          BA   0.020
 211          LS       0    85.7
 212          UD   0.204
              *

 213          KK   RGCB4
 214          KM  ROUTE TO PDGCB5
 215          RK     800    0.01    0.03       0    TRAP      20       2
              *

 216          KK   CGCB4
 217          HC       3
              *

 218          KK  PDGCC1
 219          KM  BASIN REFERENCED FROM LOMR
 220          PB    2.77
 221          BA   0.053
 222          LS       0    75.4
 223          UD   0.263
              *

 224          KK  PDGCB5
 225          KM  BASIN REFERENCED FROM LOMR
 226          PB    2.77
 227          BA   0.110
 228          LS       0    76.0
 229          UD   0.375
              *

 230          KK   CGCB5
 231          HC       3
              *

 232          KK   RGCB5
 233          KM  ROUTE TO PDGCB9
 234          RK    3080  0.0065    0.03       0    TRAP      30       2
              *
1                                        HEC-1 INPUT                                        PAGE  7

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 235          KK  C2GCB5
 236          HC       2
              *

 237          KK  PDGCB6
 238          KM  BASIN REFERENCED FROM LOMR
 239          PB    2.77
 240          BA   0.018
 241          LS       0    88.2
 242          UD   0.177
              *

 243          KK   RGCB6
 244          KM  ROUTE TO PDGCB9
 245          RK    2880  0.0065    0.03       0    TRAP      30       2
              *

 246          KK PDGCB10
 247          KM  BASIN REFERENCED FROM LOMR
 248          PB    2.77
 249          BA   0.074
 250          LS       0    83.7
 251          UD   0.260
              *

 252          KK  PDGCB9
 253          KM  BASIN REFERENCED FROM LOMR
 254          PB    2.77
 255          BA   0.031
```

```
256          LS       0    76.5
257          UD   0.137
             *

258          KK   CGCB9
259          HC       4
             *

260          KK   RGCB9
261          KM  ROUTE TO GCB11 (HECRAS CROSS SECTION 105+04)
262          KM  CHANGED FROM 1950 FT TO 783 FEET BY LBG
263          RK     783  0.0036   0.013       0    TRAP       8       2
             *

264          KK PDGCB11
265          KM  BASIN REFERENCED FROM LOMR
266          PB    2.77
267          BA   0.033
268          LS       0    79.3
269          UD   0.195
             *
1                                        HEC-1 INPUT                                                    PAGE  8
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

270          KK  CGCB11
271          HC       2
             *

272          KK   RLBG3
273          KM  ROUTE TO REMAIN2 (HECRAS CROSS SECTION 99+93)
274          KM  ADDED BY LBG
275          RK     511  0.0036   0.013       0    TRAP       8       2
             *

276          KK REMAIN2
277          KM  DIVERT 192 CFS UNDER U.S. 95 JUST SOUTH OF THE U.S. 95/RANCHO INTERSECTION
278          KM  IN 2, 6' X 2' RCB'S (CULVERT 5). REMAINING FLOW CONTINUES SOUTH ALONG U.S.
279          KM  95 TO LONE MOUNTAIN ROAD.
280          KM   REVISED TO 168 BY LBG
281          DT    D95B
282          DI       0     426     591   10000
283          DQ       0     168     192     192
             *

284          KK  RMAIN2
285          KM  ROUTE TO 20BG
286          KM  HECRAS CROSS SECTION 82+37
287          RK    1756  0.0029    0.03       0    TRAP      20       2
             *

288          KK  LONEMT
289          KM  BASIN REFERENCED FROM LOMR
290          PB    2.77
291          BA   0.411
292          LS       0    83.1
293          UD   0.380
             *

294          KK  GD20BH
295          KM  BASIN REFERENCED FROM LOMR
296          PB    2.77
297          BA   0.047
298          LS       0    76.6
299          UD   0.250
             *

300          KK   CLONE
301          KM  TENAYA/LONE MOUNTAIN
302          HC       2
             *

303          KK   RLONE
304          KM  ROUTE TO 20BG
305          KM  HECRAS CROSS SECTION 82+37
306          RK    1100  0.0015   0.015       0    TRAP      44       2
             *
1                                        HEC-1 INPUT                                                    PAGE  9
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

307          KK  GD20BG
308          KM  BASIN REFERENCED FROM LOMR
309          PB    2.77
310          BA   0.113
311          LS       0    81.4
312          UD   0.261
             *

313          KK   C20BG
314          HC       3
             *

315          KK   R20BG
316          KM  ROUTE TO 20BL
317          KM  HECRAS X-SECTION 65+10
318          RK    1680  0.0016    0.03       0    TRAP     150       2
             *

319          KK  CRAIG1
```

```
320          KM  ADDED FROM LOMR
321          KM  BASIN CRAIG1 (SDN3)
322          PB    3.16
323          BA    2.44
324          LS       0    82.0
325          UD   0.700
             *

326          KK   DBUF1
327          KM  DIVERT 249 CFS (447 CAPACITY - 198 FUTURE INTERCEPTED) TO
328          KM  GOWAN NORTH BUFFALO BRANCH SD BETWEEN LONE MT AND RED COACH
329          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
330          KM  FACILITY ID: GOBU 0085
331          DT   DGNBB
332          DI       0     250    2807   10000
333          DQ       0     249     249     249
             *

334          KK   RBUF1
335          KM  ROUTE TO RED COACH
336          RK    1295   0.004   0.015       0    TRAP      80       2
             *

337          KK   DBUF2
338          KM  DIVERT 109 CFS TO GOWAN NORTH BUFFALO BRANCH SD AT RED COACH
339          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
340          KM  FACILITY ID: GOBU 0058
341          DT  DGNBB1
342          DI       0     110    1121   10000
343          DQ       0     109     109     109
             *

1                                        HEC-1 INPUT                                        PAGE 10

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

344          KK    DRED
345          KM  DIVERT 70.40% FLOW DOWN BUFFALO TOWARDS COBAL CANYON.
346          KM  TAKE FLOW DOWN RED COACH TO US95
347          DT DBUFLO2
348          DI       0     100    1000   10000
349          DQ       0    70.4    704.    7040
             *

350          KK   RDRED
351          KM  ROUTE TO 20BI
352          RK    2700   0.007   0.015       0    TRAP      80       2
             *

353          KK  GD20BI
354          KM  BASIN REFERENCED FROM LOMR
355          PB    2.77
356          BA   0.115
357          LS       0    80.5
358          UD   0.286
             *

359          KK   C20BI
360          HC       2
             *

361          KK   R20BI
362          KM  ROUTE TO 20BL
363          KM  HECRAS CROSS SECTION 65+10
364          RK     910  0.0055   0.015       0    TRAP      40       2
             *

365          KK  GD20BL
366          KM  BASIN REFERENCED FROM LOMR
367          PB    2.77
368          BA   0.079
369          LS       0    88.7
370          UD   0.230
             *

371          KK   C20BL
372          HC       3
             *

373          KK   R20BL
374          KM  ROUTE TO C20BJ2
375          KM  HECRAS CROSS SECTION 61+09
376          RK     401  0.0016    0.03       0    TRAP     150       2
             *

1                                        HEC-1 INPUT                                        PAGE 11

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

377          KKRTBUFAL2
378          KM  RETRIEVE FLOW DIVERTED TO BUFFALO PAST RED COACH
379          DR DBUFLO2
             *

380          KK   RBUF2
381          KM  ROUTE TO COBAL CANYON
382          RK     652   0.004   0.015       0    TRAP      80       2
             *

383          KK  DCOBAL
384          KM  DIVERT 71.46% OF FLOW AT COBAL CANYON/BUFFALO INTERSECTION SOUTH ON BUFFALO
385          KM  REMAINING FLOW CONTINUES TO US95
```

```
386          DT DBUFLO3
387          DI        0    100.    1000   10000
388          DQ        0   71.46   714.6    7146
             *

389          KK RCOBAL1
390          KM  ROUTE TO C20BJ1
391          RK     2700   0.007   0.015       0    TRAP      60       2
             *

392          KK  GD20BJ
393          KM  BASIN REFERENCED FROM LOMR
394          PB    2.77
395          BA   0.052
396          LS       0    84.3
397          UD   0.257
             *

398          KK  C20BJ1
399          HC       2
             *

400          KK  R20BJ1
401          KM  ROUTE TO C20BJ2
402          RK     900   0.006   0.015       0    TRAP      40       2
             *

403          KK  C20BJ2
404          KM  US95 HECRAS CROSS SECTION 59+51
405          HC       2
             *

406          KK  R20BJ2
407          KM  ROUTE TO C20BM
408          RK     362   0.006   0.015       0    TRAP      40       2
             *
1                                        HEC-1 INPUT                                                    PAGE 12
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

409          KK  GD20BM
410          KM  BASIN REFERENCED FROM LOMR
411          PB    2.77
412          BA   0.048
413          LS       0    89.2
414          UD   0.189
             *

415          KK   C20BM
416          KM  HECRAS CROSS SECTION 55+89
417          KM  GD20BM IS ADDED TO US95 FLOW FROM C20BJ2
418          HC       2
             *

419          KK REMAIN5
420          KM  DIVERSION PER EXISTING INTERCHANGE AT CRAIG ROAD
421          KM  DIVERT FLOW THROUGH 2, 6' x 2' RCB'S (CULVERT 7) UNDER U.S. 95
422          KM  JUST NORTH OF THE CRAIG ROAD BRIDGE.
423          KM  REMAINING FLOW CONTINUES SOUTH ALONG U.S. 95
424          KM  THIS DIVERSION HAS TWO SEPARATE FLOW QUANTITIES, 82 CFS FOR THE SDN3
425          KM  MODEL AND 180 CFS FOR THE SDN5 MODEL
426          KM  REVISED BY LBG 6-28-05 (RATING CURVE DEVELOPED)
427          DT    D95E
428          DI        0     200     600    1000    1250    2006
429          DQ        0    16.8      82   144.0     170     264
             *

430          KKRREMAINS5
431          KM  ROUTE TO 2C20BK
432          RK      853   0.006   0.015       0    TRAP      40       2
             *

433          KKRTBUFAL3
434          KM  RETRIEVE FLOW DIVERTED TO BUFFALO PAST COBAL CANYON
435          DR DBUFLO3
             *

436          KK   RBUF3
437          KM  ROUTE TO CRAIG ROAD
438          RK      661   0.003   0.015       0    TRAP      80       2
             *

439          KK   DBUF3
440          KM  DIVERT 198 CFS TO GOWAN NORTH BUFFALO BRANCH SD AT CRAIG
441          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
442          KM  FACILITY ID: GOBU 0032
443          DT  DGNBB2
444          DI        0     199    1121   10000
445          DQ        0     198     198     198
             *
1                                        HEC-1 INPUT                                                    PAGE 13
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

446          KK RCRAIG2
447          KM  ROUTE TO GD20BK
448          RK     3400  0.0067   0.015       0    TRAP      80       2
             *

449          KK  GD20BK
```

```
 450          KM  BASIN REFERENCED FROM LOMR
 451          PB    2.77
 452          BA   0.050
 453          LS       0    80.5
 454          UD   0.264
              *

 455          KK  1C20BK
 456          HC       2
              *

 457          KK R1C20BK
 458          KM  ROUTE TO 2C20BK
 459          KM  HECRAS CROSS SECTION 47+36 IN US-95 HECRAS MODEL
 460          RK    1150  0.0039   0.015       0    TRAP      80       2
              *

 461          KK  2C20BK
 462          HC       2
              *

 463          KK R2C20BK
 464          KM  ROUTE TO C17BI
 465          KM  HECRAS CROSS SECTION 42+41
 466          KM  CHANGE FROM 600 FT TO 495 FT
 467          RK     495  0.0039    0.03       0    TRAP      80       2
              *

 468          KK HICKAM1
 469          KM  BASIN REFERENCED FROM LOMR
 470          PB    2.89
 471          BA   0.477
 472          LS       0    80.3
 473          UD   0.472
              *

 474          KK    BUF3
 475          KM  DIVERT 125 CFS TO GOWAN NORTH BUFFALO BRANCH SD FROM HICKAM1
 476          KM  SUBBASIN. REMAINING FLOW CONTINUES EAST ALONG HICKAM AVENUE
 477          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
 478          KM  FACILITY ID: GOBU 0000
 479          DT  DGNBB3
 480          DI       0     126     211   10000
 481          DQ       0     125     125     125
              *
1                                      HEC-1 INPUT                                      PAGE 14

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 482          KK RHICKAM
 483          KM  ROUTE TO C17BH
 484          RK    1300   0.008   0.025       0    TRAP      80       2
              *

 485          KK  GD17BH
 486          KM  BASIN REFERENCED FROM LOMR
 487          PB    2.77
 488          BA   0.025
 489          LS       0    82.8
 490          UD   0.178
              *

 491          KK   C17BH
 492          HC       2
              *

 493          KK   R17BH
 494          KM  ROUTE TO GD17BG
 495          RK    1330   0.006   0.025       0    TRAP      80       2
              *

 496          KK  GD17BG
 497          KM  BASIN REFERENCED FROM LOMR
 498          PB    2.77
 499          BA   0.116
 500          LS       0    83.3
 501          UD   0.275
              *

 502          KK   C17BG
 503          HC       2
              *

 504          KK   R17BG
 505          KM  ROUTE TO C17BI
 506          KM  HECRAS CROSS SECTION 42+41
 507          RK    1200   0.005   0.025       0    TRAP      80       2
              *

 508          KK  GD17BI
 509          KM  BASIN REFERENCED FROM LOMR
 510          PB    2.77
 511          BA   0.066
 512          LS       0    85.2
 513          UD   0.193
              *

 514          KK   C17BI
 515          HC       3
              *
1                                      HEC-1 INPUT                                      PAGE 15
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  516         KK   R17BI
  517         KM  ROUTE TO C17BJ
  518         KM  HECRAS CROSS SECTION 27+40
  519         RK    1501  0.0023    0.03       0    TRAP     200       2
              *

  520         KK  GD14CH
  521         KM  BASIN REFERENCED FROM LOMR
  522         PB    2.77
  523         BA   0.040
  524         LS       0    83.0
  525         UD   0.181
              *

  526         KK   R14CH
  527         KM  ROUTE TO C17BJ
  528         KM  HECRAS CROSS SECTION 27+40
  529         RK    1900   0.005   0.015       0    TRAP      40       2
              *

  530         KK  GD17BJ
  531         KM  BASIN REFERENCED FROM LOMR
  532         PB    2.77
  533         BA   0.063
  534         LS       0    88.3
  535         UD   0.222
              *

  536         KK   C17BJ
  537         HC       3
              *

  538         KK REMAIN6
  539         KM  DIVERT FLOW THROUGH DUAL 6' X 2' RCB'S (CULVERT 10) AT ALEXANDER ROAD
  540         KM  BETWEEN CROSS-SECTIONS 28+10 AND 26+94 IN THE HEC-RAS MODEL.
  541         KM  WEIR FLOW ELIMINATED DUE TO SOUND WALL AND BARRIER RAILS
  542         DT    D95F
  543         DI       0     100     500    1000    1937    2725
  544         DQ       0    10.8      72     144     192     264
              *

  545         KK   R17BJ
  546         KM  ROUTE TO C6MAIN
  547         KM  HECRAS CROSS SECTION 25+14
  548         RK     226   0.005   0.015       0    TRAP      40       2
              *

  549         KK  GD14CF
  550         KM  BASIN REFERENCED FROM LOMR
  551         KM  SUBBASIN AT NW OF GOWAN & BUFFALO INTERSECTION
  552         PB    2.78
  553         BA   0.130
  554         LS       0    77.9
  555         UD   0.288
              *
1                                        HEC-1 INPUT                                        PAGE 16
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  556         KK    BUF4
  557         KM  DIVERT 30 CFS TO GOWAN NORTH BUFFALO BRANCH SD FROM BUFFALO AND
  558         KM  EXCALIBUR INTERSECTION.REMAINING FLOW CONTINUES EAST ALONG ALEXANDER
  559         KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
  560         KM  FACILITY ID: GOBU 0000
  561         DT  DGNBB4
  562         DI       0      31      60   10000
  563         DQ       0      30      30      30
              *

  564         KK   R14CF
  565         KM  ROUTE TO GD14CG
  566         RK    1450   0.006   0.015       0    TRAP     100       2
              *

  567         KK  GD14CG
  568         KM  BASIN REFERENCED FROM LOMR
  569         PB    2.77
  570         BA   0.057
  571         LS       0    82.2
  572         UD   0.208
              *

  573         KK   C14CG
  574         HC       2
              *

  575         KK   R14CG
  576         KM  ROUTE TO GD14CI
  577         RK    1650   0.006   0.015       0    TRAP     100       2
              *

  578         KK  GD14CI
  579         KM  BASIN REFERENCED FROM LOMR
  580         PB    2.77
  581         BA   0.054
  582         LS       0    79.7
  583         UD   0.196
```

```
                *
  584           KK   C14C1
  585           HC       2
                *

  586           KK   R14CI
  587           KM  ROUTE TO CMAIN6
  588           RK     945  0.0106   0.015       0    TRAP     100       2
                *
1                                        HEC-1 INPUT                                                    PAGE 17

 LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

  589           KK  CMAIN6
  590           KM  HECRAS US95 CROSS SECTION 25+14
  591           HC       2
                *

  592           KK  RMAIN6
  593           KM   ROUTE SOUTH TO US95 HECRAS CROSS SECTION 13+00
  594           RK    1214  0.0026    0.03       0    TRAP      80       3
                *

  595           KK REMAIN7
  596           KM  DIVERT FLOW THROUGH 2-30" RCP's (CULVERT 12) EAST ACROSS
  597           KM  US95 BETWEEN ALEXANDER ROAD AND GOWAN ROAD.
  598           KM  FLOW OVER US95 ELIMINATED BETWEEN CROSS SECTIONS 14+20 AND 10+27
  599           KM  DUE TO SOUNDWALLS.REVISED BY LBG 6-28-2005
  600           DT    D95G
  601           DI       0     100     500    1000    1500    1656    2000
  602           DQ       0      60      82      96     102     101     104
                *

  603           KK   GD11C
  604           KM  BASIN REFERENCED FROM LOMR
  605           PB    2.77
  606           BA   0.132
  607           LS       0    86.0
  608           UD   0.296
                *

  609           KK    C11C
  610           HC       2
                *

  611           KK    R11C
  612           KM  ROUTE SOUTH TO CULVERT 13 UPSTREAM OF GOWAN UNDERPASS
  613           KM  HECRAS CROSS SECTION 0+17
  614           RK    1283  0.0026    0.03       0    TRAP      80       3
                *

  615           KK   GD11B
  616           KM  BASIN REFERENCED FROM LOMR
  617           PB    2.77
  618           BA   0.196
  619           LS       0    87.6
  620           UD   0.272
                *

  621           KK    C11B
  622           HC       2
                *
1                                        HEC-1 INPUT                                                    PAGE 18

 LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

  623           KK  GOWAN1
  624           KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
  625           KM  BY POGGEMEYER DESIGN GROUP, INC
  626           KM  DIVERT MAXIMUM OF 422 CFS INTO GOWAN OUTFALL AT US95
  627           KM  REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
  628           KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
  629           KM  DIVERT 0 CFS, GOWAN OUTFALL IS FULL AT THIS LOCATION, LBG
  630           KM  FACILITY: GOWAN OUTFALL FACILITIES
  631           KM  FACILITY ID: G00F 0511
  632           DT   G00F1
  633           DI       0      51     101     423    5000
  634           DQ       0       1       2       3       4
                *

  635           KK    R11B
  636           KM  ROUTE TO CPT6B
  637           RK    1400  0.0057   0.015       0    TRAP      80       2
                *

  638           KK   CY05A
  639           KM  BASIN REFERENCED FROM LOMR
  640           PB    2.77
  641           BA   0.025
  642           LS       0    85.6
  643           UD   0.179
                *

  644           KK    D95G
  645           KM  RETRIEVE FLOW DIVERTED THROUGH CULVERT 13
  646           DR    D95G
                *

  647           KK   RD95G
```

```
 648          KM  ROUTE TO PT6B
 649          RK    2300   0.004   0.015       0    TRAP      60       2
              *

 650          KK    PT6B
 651          KM  BASIN REFERENCED FROM LOMR
 652          PB    2.77
 653          BA   0.107
 654          LS       0    89.1
 655          UD   0.182
              *

 656          KK   CPT6B
 657          HC       2
              *
1                                        HEC-1 INPUT                                                    PAGE 19

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 658          KK  2CPT6B
 659          KM  RAINBOW & GOWAN
 660          HC       3
              *

 661          KK  GOWAN2
 662          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
 663          KM  BY POGGEMEYER DESIGN GROUP, INC
 664          KM  DIVERT MAXIMUM OF 52 CFS INTO GOWAN OUTFALL AT RAINBOW FOR A
 665          KM  TOTAL OF 474 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
 666          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
 667          KM  DIVERT 2 CFS THE GOWAN OUTFALL IS FULL AT THIS LOCATION, LBG
 668          KM  FACILITY: GOWAN OUTFALL FACILITIES
 669          KM  FACILITY ID: G00F 0511
 670          DT   GOOF2
 671          DI       0      53     101     423    5000
 672          DQ       0       2       2       2       2
              *

 673          KK   RPT6B
 674          KM  ROUTE TO C5A3
 675          RK    2480  0.0067   0.015       0    TRAP      80       2
              *

 676          KK   CY05D
 677          KM  BASIN REFERENCED FROM LOMR
 678          PB    2.77
 679          BA   0.059
 680          LS       0    78.6
 681          UD   0.254
              *

 682          KK   PT5A3
 683          KM  BASIN REFERENCED FROM LOMR
 684          PB    2.77
 685          BA   0.089
 686          LS       0    87.1
 687          UD   0.285
              *

 688          KK    C5A3
 689          KM  TORREY PINES & GOWAN
 690          HC       3
              *

 691          KK  GOWAN3
 692          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
 693          KM  BY POGGEMEYER DESIGN GROUP, INC
 694          KM  DIVERT MAXIMUM OF 21 CFS INTO GOWAN OUTFALL AT TORREY PINES, FOR A
 695          KM  TOTAL OF 495 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
 696          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
 697          KM  DIVERT 2 CFS AT THIS LOCATION, LBG
 698          KM  FACILITY: GOWAN OUTFALL FACILITIES
 699          KM  FACILITY ID: G00F 0511
1                                        HEC-1 INPUT                                                    PAGE 20

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 700          DT   GOOF3
 701          DI       0      22    5000
 702          DQ       0       2       2
              *

 703          KK    R5A3
 704          KM  ROUTE TO C5A8 GOWAN & BRONCO
 705          RK    1236  0.0088   0.015       0    TRAP      80       2
              *

 706          KK     MAV
 707          KM  DIVERSION TO MAVERICK THEN DUNCAN THEN RANCHO.
 708          KM  DIVERSIONS DETERMINED USING HECRAS
 709          DTMAVERICK
 710          DI       0     200     400    1050    1300    1550    1800
 711          DQ       0       8      14      50     100     150     200
              *

 712          KK   R5A3B
 713          KM  ROUTE TO C5A8 GOWAN & BRONCO
 714          RK     600  0.0088   0.015       0    TRAP      80       2
              *

 715          KK   CY06A
```

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716          KM  BASIN REFERENCED FROM LOMR
717          PB    2.77
718          BA   0.077
719          LS       0    84.0
720          UD   0.246
             *

721          KK   PT5A8
722          KM  BASIN REFERENCED FROM LOMR
723          PB    2.77
724          BA   0.025
725          LS       0    82.0
726          UD   0.265
             *

727          KK    C5A8
728          KM  GOWAN & BRONCO
729          HC       3
             *

730          KK   R5A3C
731          KM  ROUTE C5A8 TO GOWAN & JONES
732          RK     620  0.0088   0.015       0    TRAP      80       2
             *

733          KK  GOWAN4
734          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
735          KM  BY POGGEMEYER DESIGN GROUP, INC
736          KM  DIVERT MAXIMUM OF 44 CFS INTO GOWAN OUTFALL AT JONES FOR A
737          KM  TOTAL OF 539 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
738          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
1                                        HEC-1 INPUT                                    PAGE 21
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
739          KM  DIVERT 2 CFS AT THIS LOCATION, LBG
740          KM  FACILITY: GOWAN OUTFALL FACILITIES
741          KM  FACILITY ID: G00F 0511
742          DT   GOOF4
743          DI       0      45    5000
744          DQ       0       2       2
             *

745          KK  DPT5A8
746          KM  DIVERT FLOW TO JONES
747          KM  FROM VTN NEVADA SILVER MESA STUDY (1989) AND CVL FISR
748          KM  DIVERTED FLOW DRAINS SOUTH THEN EAST TO SANTA CATALINA. IT THEN
749          KM  FLOWS UNDER MICHAEL TO RANCHO. MOST GOES UNDER RANCHO IN A RCB JUST SOUTH
750          KM   OF THE MICHAEL WAY INTERSECTION. REMAINING FLOW CONTINUES SOUTH ON RANCHO.
751          DT  DCY07B
752          DI       0     100     500    1000    2000    3000    4000    5500
753          DQ       0       0     116     253     592     948    1308    1859
             *

754          KK    R5A8
755          KM  ROUTE TO TRUE VALUE
756          RK    1659  0.0097   0.015       0    TRAP      80       2
             *

757          KK   R5A82
758          KM  ROUTE TO CCY07A
759          RK    1220  0.0097   0.015       0    TRAP      80       2
             *

760          KK   CY07A
761          KM  BASIN REFERENCED FROM LOMR
762          PB    2.77
763          BA   0.027
764          LS       0    86.2
765          UD   0.237
             *

766          KK  CCY07A
767          HC       2
             *

768          KK    TRUV
769          KM  DIVERSION BEHIND TRUE VALUE HARDWARE REVISED BY LBG. DIVERSIONS
770          KM  DETERMINED USING HECRAS LATERAL WEIR, L = 25 FT
771          DT  TRUVAL
772          DI       0     200     400     600    1000    1400    1800
773          DQ       0       8      25      43      78     114     149
             *
             * ***************************************************************
             * ***************************************************************
             * ****START OF FLOW CONVEYED IN SWALE ON WEST SIDE OF RANCHO*****
             * ****AND ULTIMATELY TO THE GOWAN SD, LONE MTN BRANCH  *********
             * ****NONE OF THIS FLOW IS CONVEYED IN STREET PER LOMR HECRAS****
             * ***************************************************************
             * ***************************************************************
             *
1                                        HEC-1 INPUT                                    PAGE 22
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

774          KK    D95B
775          KM  RETRIEVE FLOW FROM BOX DIVERSION (CULVERT 3) JUST SOUTH OF US95/RANCHO INTERSE
776          KM  ***NOTE: THIS FLOW CARRIES A DRAINAGE AREA OF 1.47 SQUARE MILES***
777          KM  ***THIS TOTAL ADJUSTED BY STANLEY CONSULTANTS FROM 1.49 IN LBG HEC-1
778          DR    D95B
             *
```

```
840          KK 4REMAIN
841          KM  DIVERT 35 CFS EAST THROUGH A 36" CMP (CULVERT 21)
842          KM  UNDER RANCHO DR HALF WAY BETWEEN LONE MTN RD AND CRAIG RD
843          KM  UPPER RANCHO HECRAS CROSS SECTION 93+76.
844          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
845          DT  D4RCHO
846          DI       0     214    1000   10000
847          DQ       0      35      35      35
             *

848          KK  R4MAIN
849          KM  ROUTE TO C2B3
850          RK    2323   0.011    0.02       0    TRAP      40       2
             *

851          KK   PT2B3
852          KM  BASIN REFERENCED FROM LOMR
853          PB    2.77
854          BA   0.023
855          LS       0    93.2
856          UD   0.236
             *

857          KK    C2B3
858          KM  UPPER RANCHO HECRAS CROSS SECTION 70+16
859          KM   FLOW ALONG RANCHO, NO. OF RANCHO/CRAIG INTERSECTION
860          HC       2
             *

861          KK    D2B3
862          KM  DIVERT FLOW TO CRAIG RD STORM DRAIN AT RANCHO.
863          KM  CRAIG RD STORM DRAIN IS A 42" TO 48" TO 60" RCP.
864          KM  A 48" LATERAL (CULVERT 22) INTO THE SD HAS A CAPACITY OF 120 CFS
865          KM  HY-8 CALCULATIONS INDICATE OF THE 91 CFS 100 YEAR STORM; 88 CFS IS CAPTURED BY
866          KM  THE INLET TO THE 48"LATERAL IS AT THE DOWNSTREAM END OF THE DRAINAGE EASEMENT
867          KM  BEHIND THE 7-11 CONVENIENCE STORE. IMMEDIATELY ABOVE THE 48" INLET ARE
868          KM  2, 3'X7' RCB'S (CULVERT 23) THAT CROSS UNDER CRAIG ROAD AND DISCHARGE ON THE
869          KM  SOUTHWEST SIDE OF THE CRAIG/RANCHO INTERSECTION.
870          KM  DIVERT 120 CFS TO THE CRAIG RD STORM DRAIN SINCE 90 CFS (HEC-1 DIVERSION DCSD1
871          KM  ALREADY EXISTS IN THE PIPE. REMAINING FLOW TRAVELS UNDER CRAIG ROAD IN THE
872          KM  2: 3'X7' RCB'S AND DISCHARGES AT THE SOUTHWEST CORNER OF THE CRAIG/RANCHO
873          KM  INTERSECTION AND IS JOINED BY THE STREET FLOW IN CRAIG. ALL STREET FLOW
874          KM  IN CRAIG IS CONTAINED IN THE NORTH HALF OF THE STREET BY THE MEDIAN CURB SO
875          KM  THERE IS NO DIVERSION TO TORREY PINES.
876          KM  UPPER RANCHO HECRAS STA. 70+00.
877          DT   DCSD2
878          DI       0      91    1000   10000
879          DQ       0      88     120     120
             *
1                                        HEC-1 INPUT                                                    PAGE 25
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

880          KK   D2B3B
881          KM  DIVERT FLOW CAPTURED BY 7'X3' RCB'S TO GOWAN OUTFALL - ALEXANDER BRANCH SYSTEM
882          DT  GOAL01
883          DI       0       3     100     272
884          DQ       0       3       3       3
             *

885          KK   PT2A2
886          KM  BASIN REFERENCED FROM LOMR
887          PB    2.77
888          BA   0.062
889          LS       0    84.7
890          UD   0.222
             *

891          KK    R2A2
892          KM  ROUTE TO C2A1
893          RK    1200   0.004   0.015       0    TRAP     100       2
             *

894          KK   PT2A1
895          KM  BASIN REFERENCED FROM LOMR
896          PB    2.77
897          BA   0.065
898          LS       0    86.8
899          UD   0.308
             *

900          KK    D95E
901          KM  RETRIEVE FLOW FROM BOX DIVERSION AT US95 AND CRAIG (CULVERT 7)
902          KM  ***NOTE: THIS FLOW CARRIES A TOTAL TRIBUTARY AREA****
903          KM  ***OF 4.77/18.58 SQUARE MILES SDN3/SDN5**************
904          KM  THIS IS NOT IN ADDITION TO THE 1.47 SQUARE MILES BROUGHT IN BY D95B, SO
905          KM  THE TOTAL TRIBUTARY AREA TO THE CRAIG/RANCHO INTERSECTION IS
906          KM  MILES 4.77 + AREA AT C2B3 - AREA CAPTURED IN GOWAN SD LN MTN BRANCH
907          DR    D95E
             *

908          KK   RD95E
909          KM  ROUTE TO PT2A2
910          RK    1500   0.004   0.015       0    TRAP      80       2
             *

911          KK    C2A2
912          HC       3
             *
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```
913          KK  DPT2A1
914          KM  DIVERT FLOW TO CRAIG RD. STORM DRAIN
915          KM  42" RCP, CAPACITY = 90 CFS
916          KM  REMAINING FLOW CONTINUES EAST IN CRAIG RD.
917          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
918          DT   DCSD1
919          DI       0      21      51      76      91     200     500    1000
1                                        HEC-1 INPUT                                    PAGE 26

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

920          DQ       0      20      50      75      90      90      90      90
             *

921          KK    R2A2
922          KM  ROUTE TO C2B1
923          RK    2100   0.007   0.015       0    TRAP      80       2
             *

924          KK   PT2B1
925          KM  BASIN REFERENCED FROM LOMR
926          PB    2.77
927          BA   0.072
928          LS       0    84.5
929          UD   0.222
             *

930          KK    C2B1
931          HC       2
             *

932          KK    R2B1
933          KM  ROUTE TO 2C2B3
934          KM  STREET FLOW IN CRAIG RD GOING EAST TO RANCHO DR
935          RK     300   0.007   0.015       0    TRAP      80       2
             *

936          KK   2C2B3
937          HC       2
             *

938          KK   D2CB3
939          KM  DIVERT FLOW CAPTURED BY INLETS ON RANCHO TO GOWAN OUTFALL - ALEXANDER BRANCH:
940          KM  DM2 AT 68+71, NDOT TYPE 2 AT 70+00, KMNDOT TYPE 2 AT 71+60, DM2 AT 43+20
941          KM  AND DM2 AT 82+45
942          DT  GOAL02
943          DI       0      37     136     150
944          DQ       0      30     112     112
             *

945          KK   RC2B3
946          KM  ROUTE TO 5REMAIN
947          KM  UPPER RANCHO HECRAS CROSS SECTION 53+82
948          RK    1600  0.0076    0.03       0    TRAP      80       2
             *
             * * IN INTERIM CONDITION, FLOW FROM PT51A CONVEYED INTO CULVERT 27 AND
             * * THEN TO GOAL AT NORTHERN INTERSECTION OF RANCHO W/ JONES/ALEXANDER
             * * BASIN PT51A LOCATED HERE IN EXISTING CONDITION HEC-1 MODEL
             * * MOVED TO END OF THIS MODEL WITH RETRIEVED FLOW IN GOAL
             *
             * KKPT51A
             * KMBASIN ADDED BY STANLEY CONSULTANTS, ORIGINALLY THE NORTHERN HALF
             * KMOF LOMR BASIN PT51, ALSO NORTHEAST PORTION OF MPU BASIN PT41-C
             * KMFLOW DISCHARGES INTO CHANNEL ON WEST SIDE OF RANCHO
             * KMCONTINUES SOUTH
             * PB2.77
             * BA0.035
             * LS0         93.2
             * UD   0.128
             *
             * KKC2628
             * HC2
             *
1                                        HEC-1 INPUT                                    PAGE 27

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

949          KK  DC2628
950          KM  DIVERT FLOW CAPTURED BY CULVERT 27 TO GOWAN OUTFALL - ALEXANDER BRANCH:
951          KM  AT STA 82+45 AND INLETS AT STA. 87.10, 94+34, 96+18
952          KM  THIS DIVERSION AND ONE ABOVE TAKE PLACE OF 5REMAIN
953          DT  GOAL03
954          DI       0       8      24     100
955          DQ       0       7      23      23
             *
             *
             * KK5REMAIN
             * KMDIVERT FLOW EAST ACROSS RANCHO IN TWO 6' X 3' RCB's (CULVERT 26 AND 28).
             * KMTHE FIRST RCB (CULVERT 26) IS JUST UPSTREAM OF A 7' X 3' RCB (CULVERT 27)
             * KMTHAT PARALLELS RANCHO ON THE WEST SIDE.
             * KMDIVERT 78 CFS OF 185 CFS EAST IN (CULVERT 26).
             * KMTHE REMAINING 107 CFS ENTERS CULVERT 27 AND CONTINUES SOUTH UNTIL IT SPLITS
             * KMAT THE CONNECTION WITH CULVERT 28.
             * KMDIVERT 35 CFS OF THE 107 CFS EAST IN CULVERT 28.
             * KMTHE REMAINING 72 CFS CONTINUES TO THE SOUTH SIDE OF ALEXANDER IN CULVERT 27
             * KMUPPER RANCHO HECRAS HAS CULVERT 27 IN IT BETWEEN STA 52+64 AND 38+36.
             * KMIN INTERIM AND DEVELOPED CONDITIONS THESE FLOWS WILL ENTER THE CCRFCD
             * KMSTORM DRAIN FACILITY (GOAL 0111) AT THESE LOCATIONS.
             * DTD5RCHO
             * DI0         185   1000  10000
             * DQ0         113    113    113
```

```
                *
     956        KK  R5REMN
     957        KM  ROUTE TO CPT51
     958        KM  UPPER RANCHO HECRAS CROSS SECTION 38+36
     959        RK    1428   0.006    0.03       0    TRAP       7       0
                *
     960        KK   PT51B
     961        KM  BASIN ADDED BY STANLEY CONSULTANTS, ORIGINALLY THE SOUTHERN HALF
     962        KM  OF LOMR BASIN PT51, ALSO SOUTHEAST PART OF MPU BASIN PT41-C
     963        PB    2.77
     964        BA   0.035
     965        LS       0    93.2
     966        UD   0.147
                *
                * KKPT51
                * THIS BASIN WAS DIVIDED INTO SMALLER SUBBASINS BY STANLEY CONSULTANTS, SEE
                * ABOVE (PT51A AND PT51B) TO PROVIDE MORE DETAIL ON WHERE FLOWS WILL ENTER THE
                * PROPOSED CCRFCD STORM DRAIN SYSTEM IN CRAIG ROAD, RANCHO
                * DRIVE, AND ALEXANDER/JONES BOULEVARD IN INTERIM AND DEVELOPED CONDITIONS
                * PB2.77
                * BA0.070
                * LS0         90.4
                * UD0.262
                *
1                                          HEC-1 INPUT                                                    PAGE 28
     LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

     967        KK   CPT51
     968        KM  WEST SIDE RANCHO, NORTH OF ALEXANDER (JONES NORTH)
     969        HC       2
                *
                * KKD95Fa
                * KMRETRIEVE FLOW FROM WEIR DIVERSION AT US95 AND ALEXANDER
                * DRD95Fa
                *
                * THESE TWO DIVERSIONS CARRY A TOTAL TRIBUTARY AREA OF 18.68.
                * THIS IS NOT IN ADDITION TO THE 1.49 SQUARE MILES AND 2.35
                * SQUARE MILES BROUGHT IN BY D95B AND D95E RESPECTIVELY, SO THE TOTAL
                * TRIBUTARY AREA AT THE ALEXANDER/RANCHO INTERSECTION IS 19.69 SQUARE MILES.
                * (18.68 + 1.01)
                * AREA ADJ TO SND3 RESULTS, 5.61 SQ MI, BY STANLEY CONSULTANTS
                *
     970        KK    D95F
     971        KM  RETRIEVE FLOW FROM CULVERT 10 AND WEIR DIVERSION AT US95 AND ALEXANDER
     972        DR    D95F
                *
     973        KK   RD95F
     974        KM  ROUTE TO CPT6A
     975        RK    1500   0.004   0.015       0    TRAP     100       2
                *
     976        KK     PT3
     977        KM  BASIN REFERENCED FROM LOMR
     978        PB    2.77
     979        BA   0.148
     980        LS       0    86.9
     981        UD   0.211
                *
     982        KK    PT6A
     983        KM  BASIN REFERENCED FROM LOMR
     984        PB    2.77
     985        BA   0.024
     986        LS       0    90.3
     987        UD   0.231
                *
     988        KK   CPT6A
     989        HC       3
                *
     990        KK   RPT6A
     991        KM  ROUTE TO PT42
     992        RK    2450   0.007   0.015       0    TRAP     100       2
                *
1                                          HEC-1 INPUT                                                    PAGE 29
     LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

     993        KK    PT41
     994        KM  BASIN REFERENCED FROM LOMR
     995        PB    2.77
     996        BA   0.137
     997        LS       0    82.0
     998        UD   0.220
                *
     999        KK   RPT41
    1000        KM  ROUTE TO CPT42
    1001        RK    1050  0.0038   0.015       0    TRAP      80       2
                *
    1002        KK    PT42
    1003        KM  BASIN REFERENCED FROM LOMR
    1004        PB    2.77
```

```
1005          BA   0.079
1006          LS      0    82.0
1007          UD   0.303
              *

1008          KK   CPT42
1009          HC      2
              *

1010          KK   PT5A1
1011          KM  BASIN REFERENCED FROM LOMR
1012          PB    2.77
1013          BA   0.051
1014          LS      0    88.3
1015          UD   0.237
              *

1016          KK    C5A1
1017          HC      3
              *

1018          KK    R5A1
1019          KM  ROUTE TO CPT52
1020          RK    1680  0.0089   0.015       0    TRAP     100       2
              *

1021          KK   PT5A4
1022          KM  BASIN REFERENCED FROM LOMR
1023          PB    2.77
1024          BA   0.034
1025          LS      0    82.0
1026          UD   0.284
              *
1                                        HEC-1 INPUT                                                    PAGE 30

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1027          KK    PT52
1028          KM  BASIN REFERENCED FROM LOMR
1029          PB    2.77
1030          BA   0.065
1031          LS      0    82.0
1032          UD   0.273
              *

1033          KK   CPT52
1034          KM  ALEXANDER WEST OF RANCHO
1035          HC      3
              *

1036          KK   RPT52
1037          KM  ROUTE TO 2CPT51
1038          KM  UPPER RANCHO HECRAS CROSS SECTION 38+36, SAME AS CPT51
1039          RK     560  0.0036   0.015       0    TRAP     100       2
              *

1040          KK  2CPT51
1041          KM  RANCHO ALEXANDER INTERSECTION (JONES SOUTH)
1042          HC      2
              *

1043          KKDC2CPT51
1044          KM  DIVERT FLOW IN CULVERTS AT RANCHO/JONES INTERSECTION
1045          KM   TO GOWAN OUTFALL - ALEXANDER BRANCH:
1046          KM   STA 96+45, 96+80, 97+45
1047          KM   AND DIVERT FLOW CAPTURED BY INLETS TO GOWAN OUTFALL - ALEXANDER BRANCH:
1048          KM  AT STA 99+50 AND 102+00
1049          DT  GOAL04
1050          DI      0     292     478    5000
1051          DQ      0     127     127     127
              *

1052          KK R2CPT51
1053          KM  ROUTE TO 2CPT51
1054          KM  UPPER RANCHO HECRAS CROSS SECTION 29+79
1055          RK     857  0.0036   0.015       0    TRAP     100       2
              *
              * START FOR DETERMINING INTERIM FLOW AT NORTHERN INTERSECTION
              * OF RANCHO AND JONES/ALEXANDER IN GOWAN OUTFALL - ALEXANDER BRANCH

1056          KK   PT51A
1057          KM   BASIN ADDED BY STANLEY CONSULTANTS, ORIGINALLY THE NORTHERN HALF
1058          KM   OF LOMR BASIN PT51, ALSO NORTHEAST PORTION OF MPU BASIN PT41-C
1059          KM   100-YEAR AND LESS RUNOFF DISCHARGES INTO CULVERT 27, AN RCB ON
1060          KM   WEST SIDE OF RANCHO THEN CONVEYED TO GOAL, CONTINUES SOUTH IN GOAL
1061          PB    2.77
1062          BA   0.035
1063          LS      0    93.2
1064          UD   0.128
              *
              *
              * RETRIEVE FLOW DIVERTED TO GOWAN OUTFALL-ALEXANDER BRANCH **
              *
1                                        HEC-1 INPUT                                                    PAGE 31

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1065          KK  RGOAL1
1066          DR  GOAL01
              *
```

```
1067          KK  RGOAL2
1068          DR  GOAL02
              *

1069          KK  RGOAL3
1070          DR  GOAL03
              *

1071          KK   GOAL3
1072          HC       4
              *

1073          KK  RGOAL3
1074          KM   ROUTE FLOW UPSTREAM OF THE NORTHERN INTERSECTIN OF RANCHO AND
1075          KM   ALEXANDER/JONES TO OUTLET IN GOWAN OUTFALL - ALEXANDER BRANCH
1076          RD    1000   0.005   0.015       0    TRAP      12       0
              *

1077          KK  RGOAL4
1078          KM   FLOW CAPTURED BY GOAL BETWEEN JONES/ALEXANDER AND ALEXANDER/JONES
1079          DR  GOAL04
              *

1080          KK   CGOAL
1081          KM   COMBINE FLOWS IN GOWAN OUTFALL - ALEXANDER FACILITIES
1082          KM   UPSTREAM OF OUTLET STRUCTURE
1083          HC       2
              *

1084          KK   DGOAL
1085          KM  DIVERT THE 24 CFS THAT CONTINUES THROUGH THE BLEEDER LINE
1086          DT   BGOAL
1087          DI       0      24     100     198     284
1088          DQ       0      23      24      24      24
              *
              * * REMAINING STORMDRAIN FLOW SURFACES THROUGH OUTLET STRUCTURE
              * * COMBINES WITH SURFACE FLOW AND SPLITS AT
              * * INTERSECTION OF RANCHO AND JONES/ALEXANDER
              * * SEE DIVERSION CARD 6 REMAINN

1089          KKR2CPT51B
1090          HC       2
              *

1091          KK 6REMAIN
1092          KM   FLOWSPLIT AT RANCHO AND JONES/ALEXANDER INTERSECTION
1093          KM   REMAINS SAME AS EXISTING CONDITION SPLIT
1094          KM   THE 14 CFS DIVERTED TO AN 18" CMP (CULVERT 29) IN EXISTING CONDITION IS
1095          KM   NOW DIVERTED INTO THE GOAL, DOWNSTREAM OF THE ORIFICE PLATE, SO IT CONTINUES
1096          KM   EAST IN THE BLEEDER LINE.
1
                                    HEC-1 INPUT                                          PAGE 32

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1097          KM   THE CATCH BASIN OF A DROP INLET ON THE SOUTHEAST SIDE OF JONES AND
1098          KM   THE WEST SIDE OF RANCHO WILL REMAIN. FLOW CAPTURED BY THIS INLET CROSSES
1099          KM  RANCHO (CULVERT 30) AND DISCHARGES TO THE EAST SIDE.
1100          KM   DIVERT ADDITONAL FLOW ACROSS RANCHO THAT IS WEIR FLOW BETWEEN CROSS
1101          KM   SECTIONS 38+36 AND 28+01. RATING CURVE DEVELOPED
1102          KM   USING HECRAS LATERAL WEIR BY LGB 7-13-2005. REMAINING FLOW CONTINUES SOUTH
1103          KM   ON THE WEST SIDE OF RANCHO.
1104          DT  D6RCHO
1105          DI       0      53     146     400     600     700
1106          DQ       0      40      52      75     126     163
              *

1107          KK  R6MAIN
1108          KM  ROUTE TO C5A6
1109          RK     699  0.0025    0.03       0    TRAP      80       2
              *

1110          KK   PT5A2
1111          KM  BASIN REFERENCED FROM LOMR
1112          PB    2.77
1113          BA   0.080
1114          LS       0    85.8
1115          UD   0.257
              *

1116          KK    R5A2
1117          KM  ROUTE TO C5A6
1118          RK    3920  0.0064   0.015       0    TRAP      60       2
              *

1119          KK   PT5A6
1120          KM  BASIN REFERENCED FROM LOMR
1121          PB    2.77
1122          BA   0.188
1123          LS       0    82.9
1124          UD   0.195
              *

1125          KK    C5A6
1126          KM  UPPER RANCHO HECRAS CROSS SECTION 22+80
1127          HC       3
              *

1128          KK 7REMAIN
1129          KM  DIVERT FLOW EAST ACROSS RANCHO IN A 6' X 2' RCB (CULVERT 31).
1130          KM  REMAINING FLOW CONTINUES SOUTH ON THE WEST SIDE OF RANCHO
1131          KM  REVISED BY LBG (CULVERT 31=102 to 107 cfs) WEIR FLOW RATING
```

```
1132          KM  CURVE DEVELOPED WITH HECRAS LATERAL WEIR #1 FROM 28+01 TO 22+80
1133          DT  D7RCHO
1134          DI       0     108     146     400     500     600     650
1135          DQ       0      99     102     126     140     174     185
              *
1
                                        HEC-1 INPUT                                    PAGE 33
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1136          KK  R7MAIN
1137          KM  ROUTE TO C5A7
1138          KM  UPPER RANCHO HECRAS CROSS SECTION 14+56
1139          RK     824   0.004    0.03       0    TRAP      80       2
              *

1140          KK    DMAV
1141          KM  RETRIEVE FLOW FROM MAVERICK
1142          DRMAVERICK
              *

1143          KK    RMAV
1144          KM  ROUTE TO CPT5A6
1145          RK    3180  0.0064   0.015       0    TRAP      60
              *

1146          KK    CMAV
1147          HC       2
              *

1148          KK  DPT5A7
1149          KM  DIVERT FLOW ACROSS RANCHO AS WEIR FLOW NEAR DUNCAN ROAD, BETWEEN
1150          KM  CROSS SECTIONS 19+32 AND 14+56. RATING CURVE BY LBG 7-13-2005
1151          KM   USING LATERAL WEIR IN HECRAS.
1152          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG THE WEST SIDE OF RANCHO
1153          DT DDUNCAN
1154          DI       0     146     200     352     552     800
1155          DQ       0      35      77     139     297     460
              *

1156          KK   PT5A7
1157          KM  BASIN REFERENCED FROM LOMR
1158          PB    2.77
1159          BA   0.074
1160          LS       0    84.4
1161          UD   0.351
              *

1162          KK    C5A7
1163          KM  DUNCAN/RANCHO INTERSECTION
1164          HC       2
              *

1165          KK    R5A7
1166          KM  ROUTE TO 8REMAIN
1167          KM  UPPER RANCHO HECRAS CROSS SECTION 9+83
1168          RK     473   0.004    0.03       0    TRAP      80       2
              *
1
                                        HEC-1 INPUT                                    PAGE 34
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1169          KK 8REMAIN
1170          KM  DIVERT 24 CFS EAST ACROSS RANCHO IN A 24" CMP (CULVERT 32).
1171          KM  REMAINING FLOW CONTINUES SOUTH ON THE WEST SIDE OF RANCHO
1172          KM  REVISED TO 23 CFS BY LBG. WEIR FLOW ACROSS RANCHO CALCULATED
1173          KM  USING HECRAS LATERAL WEIR #3 BETWEEN CROSS SECTION 9+83 AND 7+43.
1174          DT  D8RCHO
1175          DI       0      24     100     200     300     400     500     600
1176          DQ       0      23      23      54     122     200     273     346
              *

1177          KK  R8MAIN
1178          KM  ROUTE TO C5A9
1179          KM  UPPER RANCHO HECRAS CROSS SECTION 0+00
1180          RK     983   0.003   0.025       0    TRAP      20       2
              *

1181          KK   PT5A9
1182          KM  BASIN REFERENCED FROM LOMR
1183          PB    2.77
1184          BA   0.045
1185          LS       0    85.7
1186          UD   0.246
              *

1187          KK    C5A9
1188          KM  GOWAN & RANCHO
1189          HC       2
              *

1190          KK  GWAN5A
1191          KM  10 AND 25 YEAR EVENT ONLY - FULL IN 100 YEAR EVENT
1192          KM  DIVERT MAXIMUM OF 40 CFS (DESIGN FLOW RATE) OF SOUTHBOUND FLOW
1193          KM  IN RANCHO INTO GOWAN OUTFALL SD AT RANCHO/GOWAN INTERSECTION,
1194          KM  REMAINING FLOW TRAVELS SOUTH. ADDED BY STANLEY CONSULTANTS
1195          KM  FACILITY: GOWAN OUTFALL FACILITIES
1196          KM  FACILITY ID: G00F 0511
1197          DT  GOOF5A
1198          DI       0       0      40   10000
1199          DQ       0       0      40      40
```

```
                *

1200            KK C2PT5A9
1201            KM
1202            HC       2
                *

1203            KK  GOWAN5
1204            KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I [SIC]
1205            KM  BY POGGEMEYER DESIGN GROUP, INC
1206            KM  DIVERT MAXIMUM OF 1 CFS INTO GOWAN OUTFALL (FACILITY G00F 0486)
1207            KM  AT RANCHO REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
1208            KM  REVISED BY LBG. GOOF IS FULL.
1209            DT   GOOF5
1210            DI       0      49    5000
1                                      HEC-1 INPUT                                                    PAGE 35
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10
1211            DQ       0       1       1
                *

1212            KKDEASTGOW
1213            KM  FLOW SPLIT AT GOWAN AND RANCHO INTERSECTION. DIVERT MAJORITY OF FLOW
1214            KM  TO RANCHO SOUTH OF GOWAN RD BETWEEN CROSS-SECTIONS 983 AND 0.
1215            KM  THE REMAINING FLOW TRAVELS EAST ON GOWAN.
1216            KM  (THIS IS A LITTLE STRANGE.  THE DIVERTED FLOW IS
1217            KM  WHAT ACTUALLY CONTINUES ON RANCHO SOUTH!)
1218            KM  DIVERSION RENAMED FROM "GOWAN" TO LWRRNCH
1219            KM  NODE RENAMED FROM "DRANCHO" TO "DEASTGOW"
1220            DT LWRRNCH
1221            DI       0     400     600    1000    1200    1400    1600    2000    2400
1222            DQ       0     372     502     730     842     955    1068    1305    1553
                *
                * ***************************************************************
                * ************END OF PBS&J MODEL, REFERENCED BY LOMR***********
                * **START MODEL OF EASTBOUND FLOW IN GOWAN ADDED BY STANLEY*****
                * ***************************************************************
                * ***************************************************************
                *

1223            KKRDEASTGOW
1224            KM  ROUTE FLOW TO GOWAN/DECATUR INTERSECTION AND COMBINE WITH BASIN CY08-C
1225            RK    3250   0.006   0.016       0    TRAP      80       2
                *

1226            KK  CY08-C
1227            KM  BASIN REFERENCED FROM 2008 MPU ALLGOW3.DAT
1228            BA   0.094
1229            PB    2.77
1230            LS       0    88.5
1231            UD   0.306
                *
1232            KM  KKCCCY08-C
1233            KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1234            KM  COMBINE CY08-C, CCY08-C, AND RDCY07B
1235            KM  GOWAN AND DECATUR
1236            KM  HC3
                *
1237            KM  KKDGOW2A
1238            KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1239            KM  DIVERT FLOW TO GOWAN OUTFALL
1240            KM  DIVERSION BASED ON GOWAN ROAD DRAINAGE STUDY BY POGGEMEYER
1241            KM  8'X 5' RCB, CAPACITY = 630 CFS (GOOF 0486)
1242            KM  REMAINING FLOW CONTINUES EAST IN GOWAN RD. AND ENTERS THE CENTRAL BASIN
1243            KM  OPPOSITE OF DGOW2A IN CWH
1244            KM  DTDCENTRAL
1245            KM  DI0       31      51      71     101     301     601     631    3000    5000
1246            KM  DQ0        1       1       1       1       1       1       1    2370    4370
                *
1247            KM  KKRDGOW2A
1248            KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1249            KM  ROUTE DGOW2A TO CPT5B6-C
1250            KM  FACILITY = GOWAN NORTH SYSTEM
1                                      HEC-1 INPUT                                                    PAGE 36
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10
1251            KM  FACILITY # = GOOF 0427, 0485
1252            KM  LINING = RCP
1253            KM  RD2370    0.005   0.013   0       CIRC    8       0
                *

1254            KK  CCY08C
1255            KM  COMBINE RDEASTGOW AND CY08-C AT DECATUR GOWAN INTERSECTION
1256            KM  IN EXISTING CONDITION THIS FLOW WILL CONTINUE EAST IN GOWAN
1257            HC       2
                *

1258            KK   DGWN6
1259            KM  GOWAN OUTFALL FULL
1260            KM  DIVERT 1 CFS TO GOWAN OUTFALL AT GOWAN/DECATUR INTERSECTION
1261            DT   GOOF6
1262            DI       0      31      51      71     101     301    1001    2001    3001    5001
1263            DQ       0       1       1       1       1       1       1       1       1       1
                *

1264            KK   DALEX
1265            KM  DIVERT EASTBOUND SURFACE FLOW AT GOWAN/DECATUR INTERSECTION
1266            KM  THE REMAINING FLOW TRAVELS NORTH IN ALEXANDER
1267            KM  RATING TABLE FROM FLOW SPLIT CALCULATION BY STANLEY CONSULTANTS
1268            DT  DEGWN6
```

25S3I.OUT, 25-year interim condition, refer to Figure 4

```
1269          DI       0     100     200     260     360
1270          DQ       0      71     143     185     257
              *
1271          KM  KKRDALEX
1272          KM  ROUTE SURFACE FLOW IN DECATUR TO DECATUR/ALEXANDER INTERSECTION
1273          KM  RD  2640   0.005    .016            TRAP     100       2
              *

1274          KK   CUL30
1275          KM  RETRIEVE FLOW FROM CULVERT 30
1276          DR  D6RCHO
              *

1277          KK  RCUL30
1278          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1279          RK    5000    0.01   0.016       0    TRAP      80       2
              *

1280          KK   CUL31
1281          KM  RETRIEVE FLOW FROM CULVERT 31
1282          DR  D7RCHO
              *

1283          KK  RCUL31
1284          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1285          RD    4750    0.01   0.016       0    TRAP      80       2
              *
1                                        HEC-1 INPUT                                                    PAGE 37

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1286          KK  DUNCAN
1287          KM  RETRIEVE FLOW FROM DUNCAN
1288          DR DDUNCAN
              *

1289          KK RDUNCAN
1290          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1291          RD    5450    0.01   0.016       0    TRAP      80       2
              *

1292          KK   CUL32
1293          KM  RETRIEVE FLOW FROM CULVERT 32
1294          DR  D8RCHO
              *

1295          KK  RCUL32
1296          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1297          RD    5100    0.01   0.016       0    TRAP      80       2
              *

1298          KK  CPT56B
1299          KM  COMBINE ROUTES IN BASIN PT5B6-C AT ALEXANDER/DECATUR
1300          HC       4
              *

1301          KK PT5B6-C
1302          KM  BASIN REFERENCED FROM 2008 MPU ALLGOW3.DAT
1303          BA   0.381
1304          PB    2.77
1305          LS       0    86.3
1306          UD   0.368
              *

1307          KK CCPT56B
1308          KM  COMBINE PT5B6-C AND CPT56B AT ALEXANDER/DECATUR
1309          HC       2
              *

1310          KKCCCPT56B
1311          KM  COMBINE SURFACE FLOW IN ALEXANDER/DECATUR INTERSECTION
1312          HC       2
              *
1313          KM  KKCCPT5B6C
1314          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1315          KM  KMCOMBINE PT5B6-C AND CPT5B6-C
1316          KM  KMDECATUR AND ALEXANDER
1317          KM  HC2
              *
1318          KM  KKRCCPT5B6
1319          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1320          KM  KMROUTE CCPT5B6C TO CPT5C-1
1321          KM  KMFACILITY = GOWAN OUTFALL FACILITIES
1322          KM  KMFACILITY # = GOOF 0375
1323          KM  KMLINING = RCB
1                                        HEC-1 INPUT                                                    PAGE 38

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1324          KM  RD2700    0.0056  0.015   0       TRAP    24      0
              *

1325          KK  0511-1
1326          KM  RETRIEVE FLOW IN GOOF 0511 AT US95/GOWAN
1327          DR   GOOF1
              *

1328          KK  0511-2
1329          KM  RETRIEVE FLOW IN GOOF 0511 AT RAINBOW/GOWAN
1330          DR   GOOF2
              *
```

```
1331          KK  0511-3
1332          KM  RETRIEVE FLOW IN GOOF 0511 AT TORREY PINES/GOWAN
1333          DR   GOOF3
              *

1334          KK  0511-4
1335          KM  RETRIEVE FLOW IN GOOF 0511 AT JONES/GOWAN
1336          DR   GOOF4
              *

1337          KK GOOF1-4
1338          KM  THIS REPRESENTS THE FLOW IN GOOF 0511 AT JONES/GOWAN
1339          HC       4
              *

1340          KK 0511-5A
1341          KM  RETRIEVE FLOW IN GOOF 0511 AT RANCHO/GOWAN
1342          DR  GOOF5A
              *

1343          KKGOOF1-5A
1344          KM  THIS REPRESENTS THE FLOW IN GOOF 0511 AT RANCHO/GOWAN
1345          HC       2
              *

1346          KK  0511-5
1347          KM  RETRIEVE FLOW IN GOOF EAST OF RANCHO
1348          DR   GOOF5
              *

1349          KK  0486-1
1350          KM  RETRIEVE FLOW IN GOOF EAST OF RANCHO AT GOWAN
1351          DR   GOOF6
              *

1352          KK    0486
1353          KM  THIS REPRESENTS THE FLOW IN GOOF 0486 AT ALEXANDER/GOWAN
1354          HC       3
              *
1

                                        HEC-1 INPUT                                    PAGE 39

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1355          KK RDGOW2A
1356          KM  REFERENCED FROM 2008 MPU ALLGOW3.DAT
1357          KM  ROUTE DGOW2A TO CPT5B6-C
1358          KM  FACILITY = GOWAN NORTH SYSTEM
1359          KM  FACILITY # = GOOF 0427, 0485
1360          KM  LINING = RCP
1361          RD    2370   0.005   0.013       0    CIRC       8       0
              *

1362          KKCCCPT5B6C
1363          KM  COMBINE FACILITY FLOW AND SURFACE FLOW AT THE
1364          KM  ALEXANDER/DECATUR INTERSECTION
1365          HC       2
              *
              * ************************************************************
              * ********END GOWAN EASTBOUND FLOW MODEL BY STANLEY*************
              * **********BEGIN CVL MODEL REFERENCED BY LOMR******************
              * ************************************************************
              * ************************************************************
              *

1366          KK   GOWAN
1367          KM  RETRIEVE DIVERSION GOWAN
1368          KM  THE FLOW DIVERTED SOUTH IN RANCHO FROM GOWAN INTERSECTION
1369          DR LWRRNCH
              *

1370          KK CENTRL1
1371          KM  ADDED BY LBG
1372          KM  FLOW OVER RANCHO AT GOWAN RD BETWEEN 0+00 OF UPPER RANCHO HECRAS
1373          KM  MODEL AND 174+98 OF THE LOWER RANCHO MODEL.
1374          KM  (0+00 OF UPPER RANCHO MODEL = 177+03.33 OF LOWER RANCHO MODEL)
1375          KM  STATIONING OF UPPER RANCHO MODEL CORRESOPONDS TO ORIGNAL FIS.
1376          KM  MOST CROSS SECTIONS ARE IDENTICAL TO ORIGINAL EFFECTIVE MODEL.
1377          DT  D9RCHO
1378          DI       0     100     200     300     400     800    1000    1478
1379          DQ       0       8      61     121     176     424     522     811
              *

1380          KK  TRUVAL
1381          KM  RETRIEVE TRUE VALUE DIVERSION DETERMINED WITH HECRAS LATERAL WEIR
1382          DR  TRUVAL
              *

1383          KK   CBDV1
1384          KM  COMBINE TRUVAL AND GOWAN
1385          KM  HECRAS STATION 17173.04 OF LOWER RANCHO MODEL
1386          HC       2
              *
1

                                        HEC-1 INPUT                                    PAGE 40

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1387          KK  MORBAY
1388          KM  RETRIEVE DIVERSION MORBAY (DCY07B FROM JONES/GOWAN)
1389          KM  MORBAY FROM CVL STUDY, DCY07B IN PBS&J STUDY
```

```
1390          DR  DCY07B
              *

1391          KKCBDVMORBAY
1392          KM  COMBINE GOWAN & MORBAY
1393          KM  HECRAS STATION 171+73.04 OF LOWER RANCHO MODEL
1394          HC       2
              *

1395          KK CENTRL2
1396          KM  ADDED BY LBG
1397          KM  2: 6'X2' RCBC UNDER RANCHO JUST SOUTH OF MICHAEL WAY
1398          KM  ID RAN 190 FROM NORTHWEST NEIGHBORHOOD STUDY
1399          DT D10RCHO
1400          DI       0      21      73     100    1000    2000
1401          DQ       0      20      72     100     200     200
              *

1402          KK   RTCHY
1403          KM  ROUTE TO CHEYENNE/RANCHO
1404          RM       3    0.32    0.15
              *
              * KKCBCX5
              * KMCOMBINE WITH CX5 AT CHEYENNE/RANCHO INTERSECTION
              * HC     2
              *

1405          KK   DVWR1
1406          KM  OVERFLOW CHEYENNE/RANCHO INTERSECTION HECRAS STATION 144+11.04
1407          KM  OF LOWER RANCHO MODEL
1408          DT  DVSTR1
1409          DI       0     167     261     622    1272
1410          DQ       0       0      36     180     455
              *

1411          KK   DVWR2
1412          KM  24" PIPE RANCHO
1413          DT  DVSTR2
1414          DI       0      10      20      30      37     100     500
1415          DQ       0      10      20      30      37      37      37
              *

1416          KK     RX5
1417          KM  ROUTE TO 6 X 3 RCB
1418          RM       1     0.1     0.3
              *
              *
              * ************************************************************
              * ********END SDN 3 ANALYSIS FOR UPPER HEC-1 MODEL *************
              * ******** NORTH OF CHEYENNE ***********************************
              * ********BEGIN HEC-1 FOR SDN3 ANALYSIS FOR LOWER HEC-1 MODEL***
              * ****SEE RANCHO LOMR FOR SEPARATE ANALYSIS AND CHECK OF sDN5***
              * ************************************************************
              *
1
                                        HEC-1 INPUT                                    PAGE 41
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1419          KK      X4
1420          KM  BASIN REFERENCED FROM LOMR
1421          KM  BASIN AREA USED IS REFERENCED FROM LBG SND3 MODEL
1422          KM  LBG LOMR REFERENCES THE SND5 MODEL, WHICH HAD AREA OF 0.698
1423          KM  PER LBG - THIS BASIN AREA REDUCED IN SIZE [FROM 0.810 TO 0.698)
1424          KM  TO TIE INTO BASINS FROM PBS&J MODEL
1425          PB    2.77
1426          BA   0.810
1427          LS       0      91
1428          UD     1.9
              *

1429          KK     X3B
1430          KM  BASIN REFERENCED FROM LOMR
1431          BA     .16
1432          LS       0      88
1433          UD    0.54
              *

1434          KK    CUL4
1435          KM  ROUTE THRU 2-6 X 4 689+30
1436          RS       1    ELEV    13.5
1437          SV       0     .32      18
1438          SE    13.5      15      18
1439          SQ       0      60     245
              *

1440          KK     X3A
1441          KM  BASIN REFERENCED FROM LOMR
1442          BA     .12
1443          LS       0      88
1444          UD    0.49
              *

1445          KK    CUL8
1446          KM  MAXIMUM Q INCREASED TO 50 CFS BY LBG TO ACCOMMODATE HIGHER FLOWS
1447          KM  STANLEY CONSULTANTS REFERENCED THE SDN3 MODEL
1448          KM  TO OBTAIN THE LAST COLUMN
1449          KM  24"  674+06
1450          RS       1    ELEV    18.5
1451          SV       0     1.1     3.6     3.7     3.9
1452          SE    18.5    20.5    22.5    22.6      23
1453          SQ       0      15      28      50      75
```

25S3I.OUT, 25-year interim condition, refer to Figure 4

```
                *
1454            KK   CX3AB
1455            KM  COMBINE X3A &  X3B
1456            HC       2
                *
1
                                                HEC-1 INPUT                                                    PAGE 42
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1457            KK   RK3AB
1458            KM  ROUTE TO JONES
1459            RM      10     1.0      .3
                *

1460            KK      CX
1461            HC       2
                *

1462            KK   DEVX4
1463            KM  DIVERT 100 CFS TO CHEYENNE
1464            DT   DEVX4
1465            DI       0      50     100     200     500    1000    5000
1466            DQ       0      25      50     100     100     100     100
                *

1467            KK     RK4
1468            KM  ROUTE X4 SOUTH ON MICHAEL WAY TO LOW POINT
1469            KM  THEN TO RANCHO
1470            RM       2     0.2     0.4
                *

1471            KK     X3C
1472            KM  BASIN REFERENCED FROM LOMR
1473            BA     .48
1474            LS       0      81
1475            UD    1.52
                *

1476            KK    SD1A
1477            KM  DROP   INLET  AT  BROOKS/JONES INTERSECTION
1478            DT    SD1A
1479            DI       0      50      93     285     500
1480            DQ       0       5      13      21      21
                *

1481            KK    RK3C
1482            KM  ROUTE TO RANCHO
1483            KM  MUSKINGUM X COEFFICENT (COL 3) ADJUSTED BY LBG TO 0.40
1484            KM  TO PREVENT INSTABILITY
1485            RM       2     0.2    0.40
                *

1486            KK      X3
1487            KM  BASIN REFERENCED FROM LOMR
1488            BA    0.34
1489            LS       0      92
1490            UD    0.71
                *
1
                                                HEC-1 INPUT                                                    PAGE 43
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1491            KK     CX3
1492            KM  COMBINE X3 X4 TO X3C
1493            HC       3
                *

1494            KK    DTX4
1495            KM  RETRIEVE DIVERT FLOW X4
1496            DR   DEVX4
                *

1497            KK    RDEX
1498            KM  ROUTE TO CHEYENNE
1499            KM  MUSKINGUM X COEFFICENT (COL 3) SND5 MODEL BY LBG USED 0.40 TO PREVENT
1500            KM  INSTABILITY
1501            KM  MUSKINGUM X COEFFICENT (COL 3) SND3 MODEL BY STANLEY CONSULTANTS ALSO
1502            KM  USED 0.40 TO PREVENT INSTABILITY
1503            RM       1     0.1    0.40
                *

1504            KK    BSX5
1505            KM  BASIN REFERENCED FROM LOMR
1506            KM  THE SDN5 MODEL BY LBG USED BA = 0.047 AND US = 0.122
1507            KM  THE SDN3 MODEL BY LBG USED BA = 0.100 AND US = 0.420
1508            BA   0.100
1509            LS       0      92
1510            UD   0.420
                *

1511            KK     CX5
1512            KM  COMBINE BSX5 & DEVX4
1513            HC       2
                *

1514            KK   DVWR1
1515            KM  REPEATED FROM UPPER MODEL
1516            KM  OVERFLOW CHEYENNE/RANCHO INTERSECTION HECRAS STATION 144+11.04
1517            KM  OF LOWER RANCHO MODEL
```

```
1518          DT  DVSTR1
1519          DI       0     167     261     622    1272
1520          DQ       0       0      36     180     455
              *

1521          KK   DVWR2
1522          KM  REPEATED FROM UPPER MODEL
1523          KM  24" PIPE RANCHO
1524          DT  DVSTR2
1525          DI       0      10      20      30      37     100     500
1526          DQ       0      10      20      30      37      37      37
              *
1                                        HEC-1 INPUT                                        PAGE 44

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

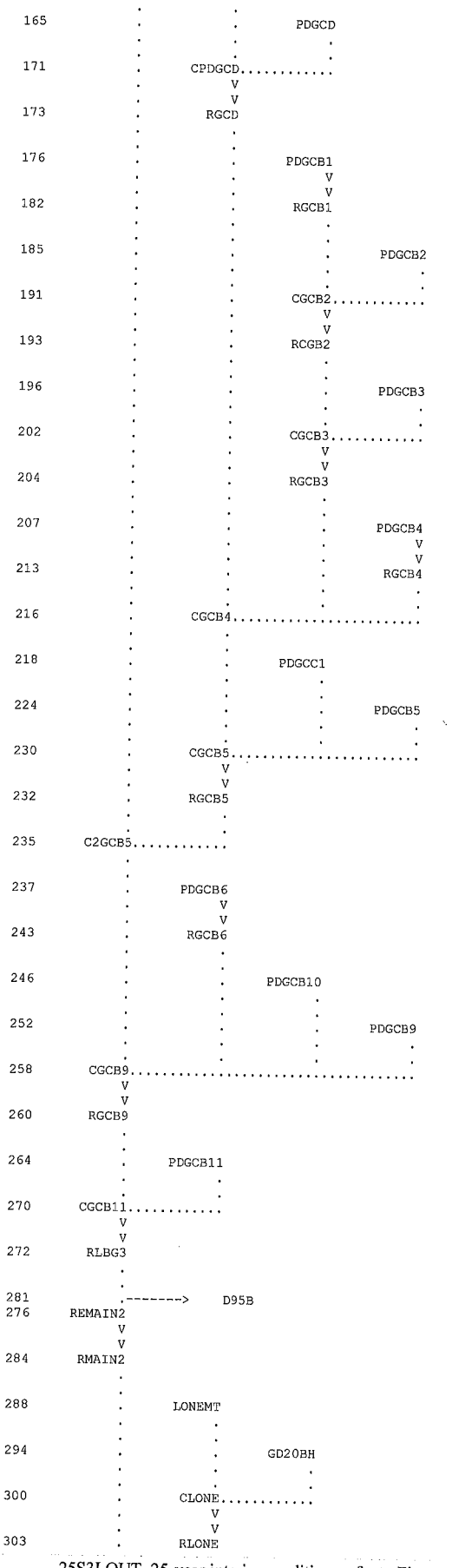
1527          KK     RX5
1528          KM  ROUTE TO 6 X 3 RCB
1529          RM       1     0.1     0.3
              *

1530          KK   CX4X3
1531          KM  COMBINE X4 TO X3
1532          HC       2
              *

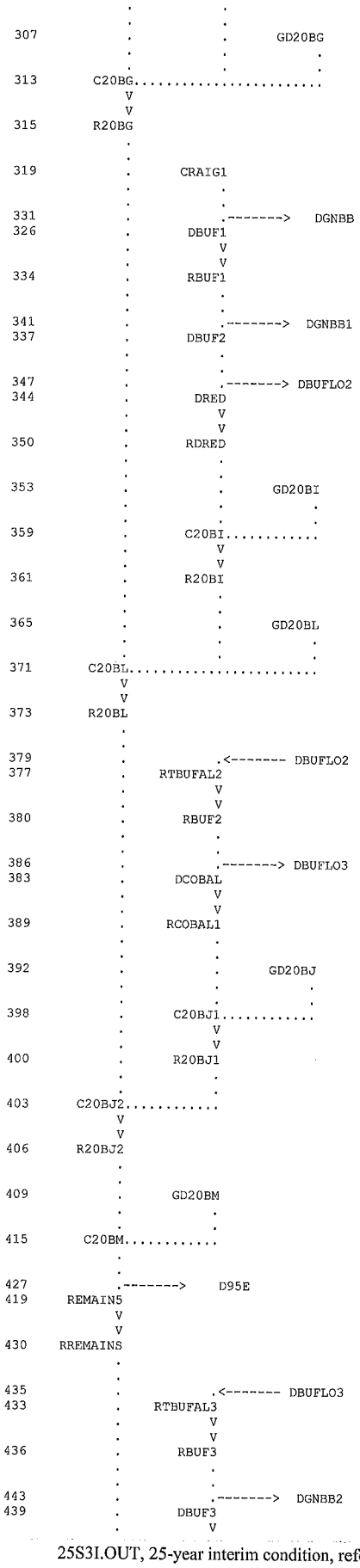
1533          KK   DVBOX
1534          KM  ROUTE FLOW THRU 6 X 3 BOX (MEA)  HECRAS STATION 126+38
1535          KM  LOCATED AT RANCHO NO. DECATUR (END OF PROJECT)
1536          DT   DVBOX
1537          DI       0      50     100     170     210     700    5000
1538          DQ       0      50     100     170     210     210     210
              *
1539          ZZ
1
          SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

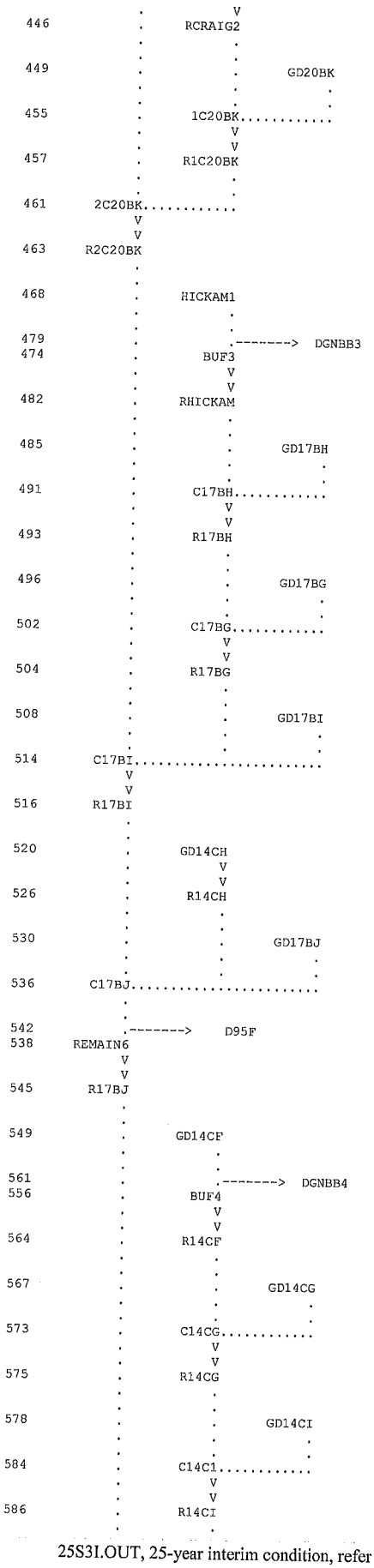
   63        ANN
             V
             V
   77       RANN
             .
             .
   80        .       GD29B
             .           .
             .           .
   86     CGD29B.....
             V
             V
   88     RGD29B
             .
             .
   93        .     NW1C2-C
             .           .
             .           .
  101     CNW1C2.....
             V
             V
  105     RNW1C2
             .
             .
  108        .      PDGCC3
             .           .
             .           .
  115      CGCC3.....
             V
             V
  117      RGCC3
             .
             .
  125        .-------->    D95A
  120    REMAIN1
             V
             V
  128      RLBG1
             .
             .
  132        .      PDGCC2
             .           V
             .           V
  138        .       RGCC2
             .           .
             .           .
  141        .           .      PDGCC4
             .           .           .
             .           .           .
  147     CGCC4.....
             V
             V
  152     RLBG2
             .
             .
  156        .      HAMMER
             .           V
             .           V
  162        .     RHAMMER
             .           .
```



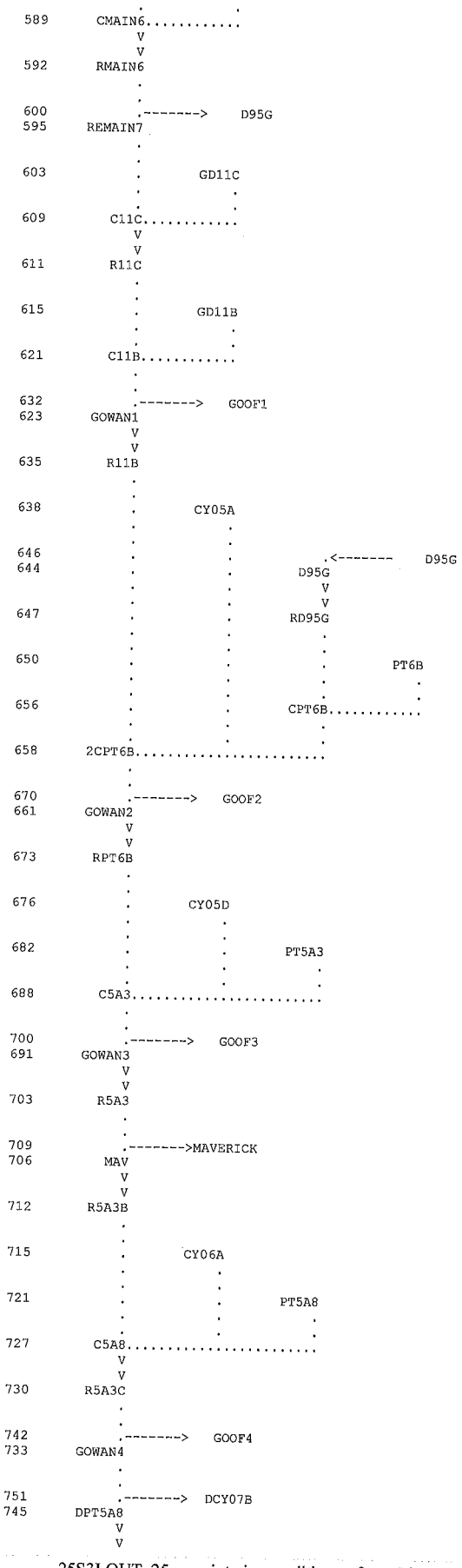
25S3I.OUT, 25-year interim condition, refer to Figure 4



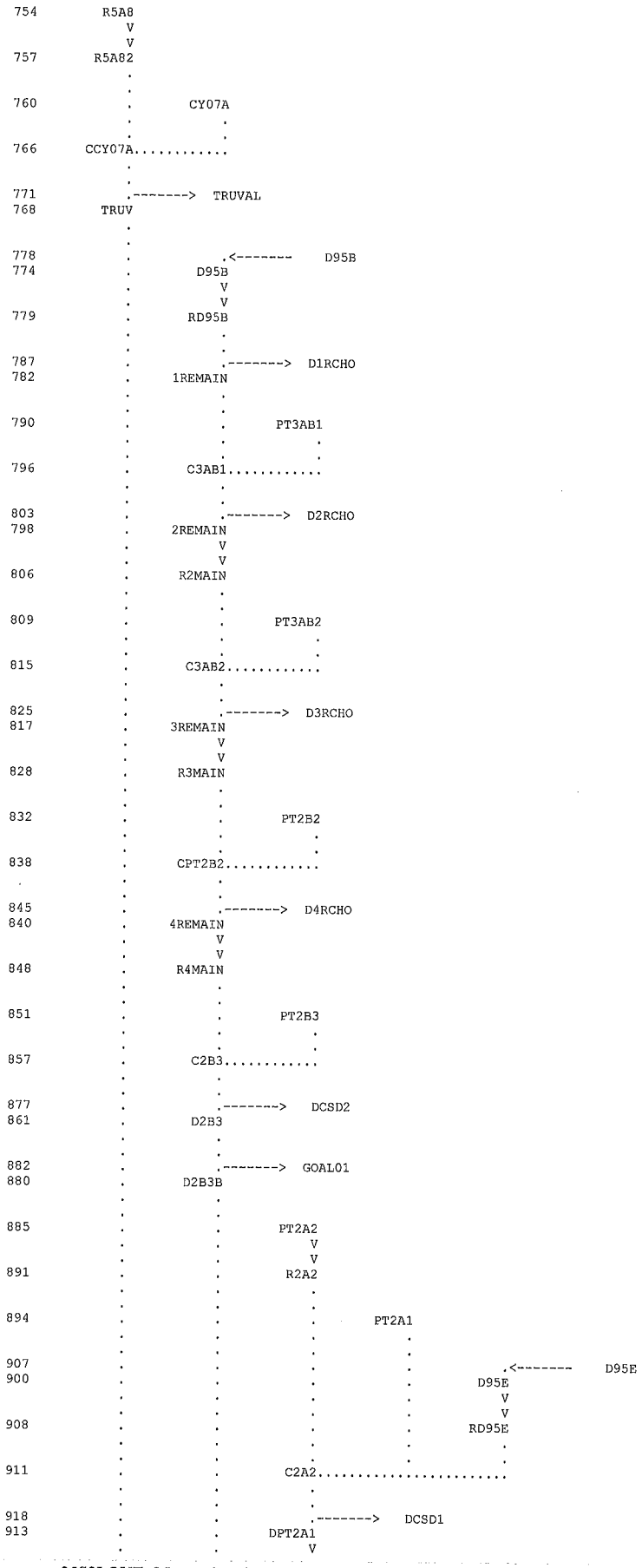
25S3I.OUT, 25-year interim condition, refer to Figure 4



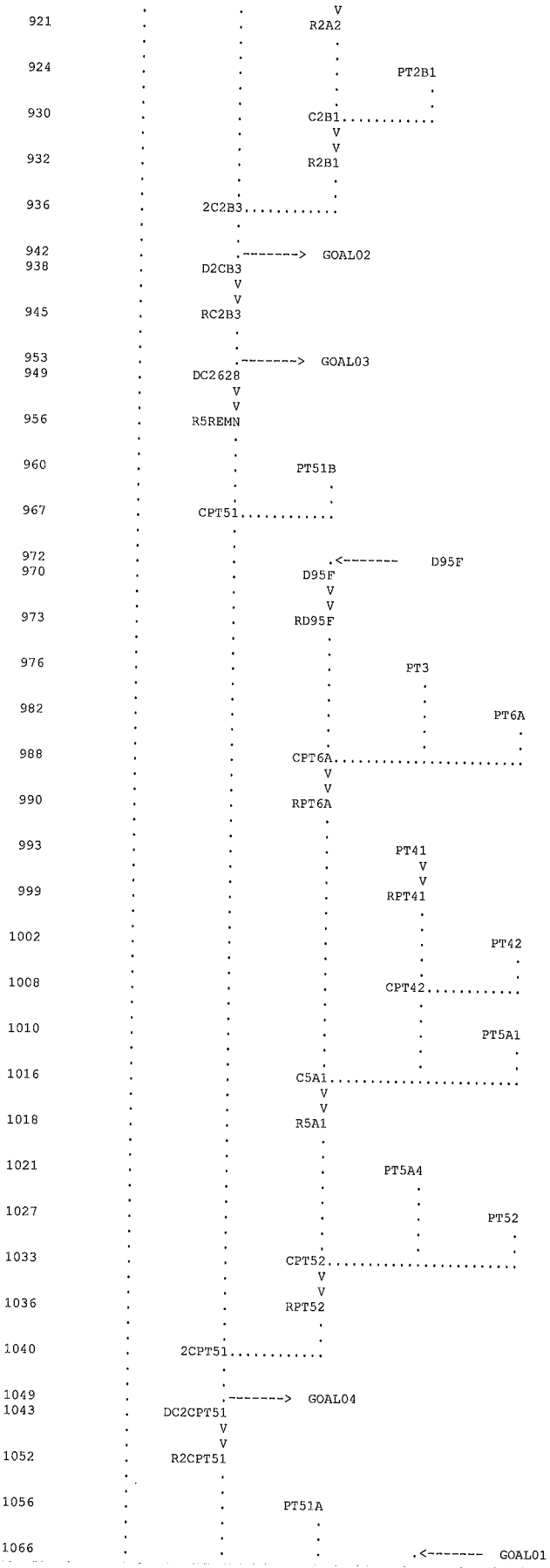
25S31.OUT, 25-year interim condition, refer to Figure 4



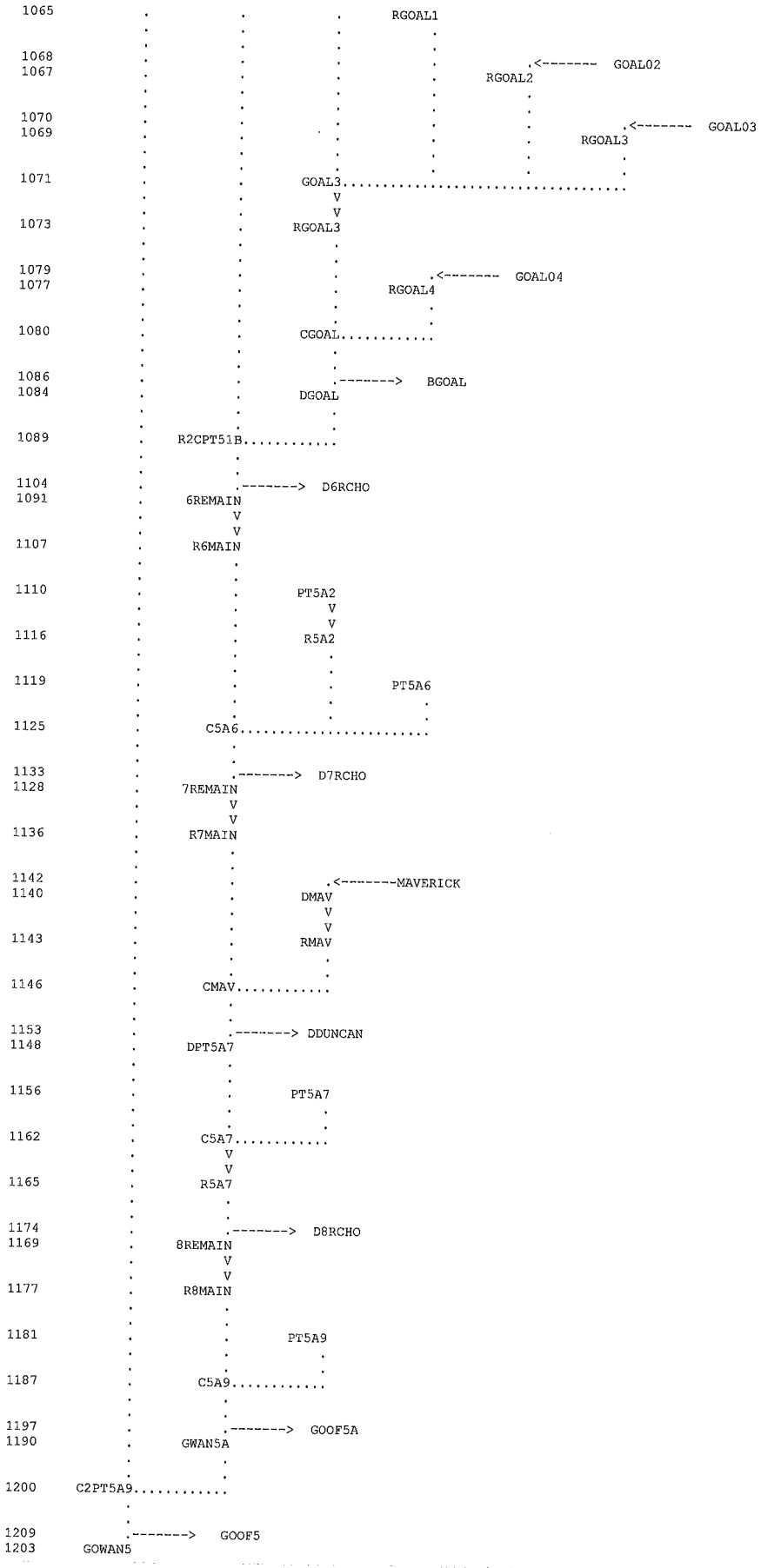
25S3I.OUT, 25-year interim condition, refer to Figure 4



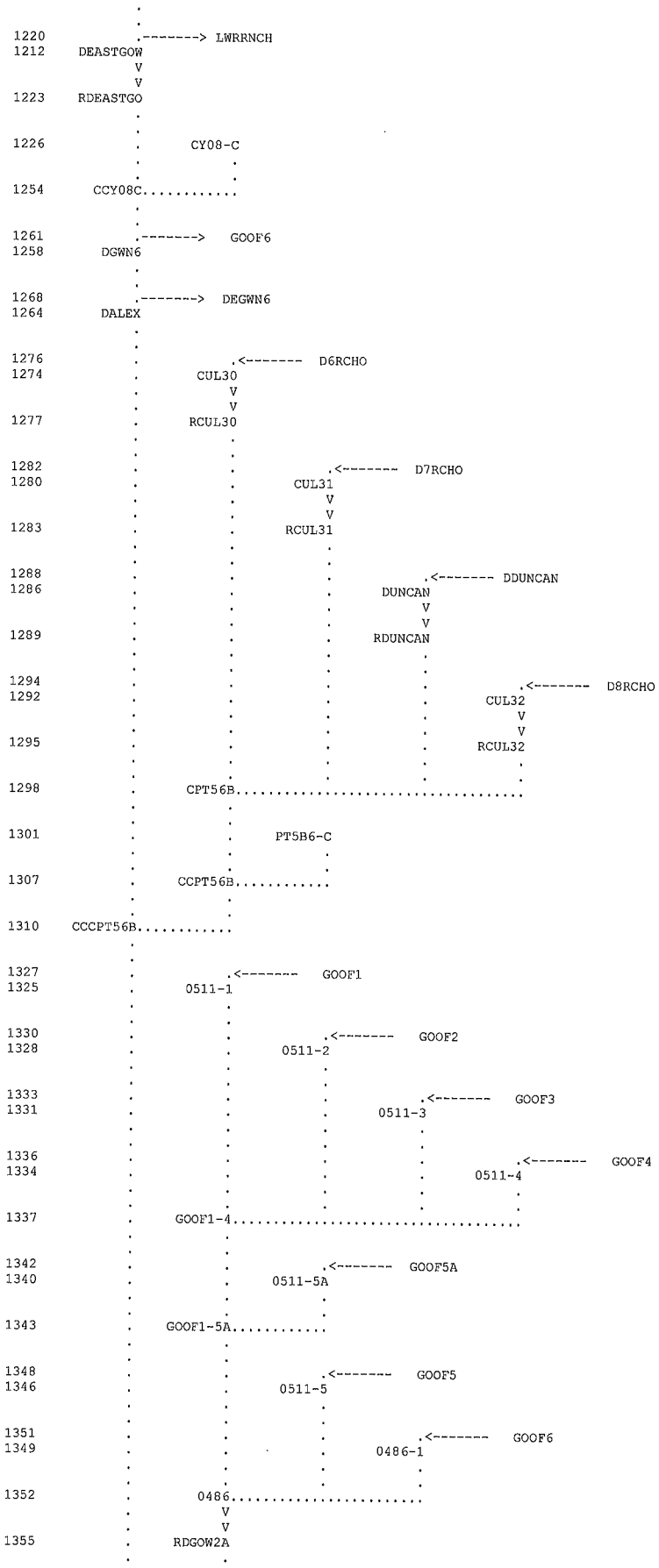
25S3I.OUT, 25-year interim condition, refer to Figure 4



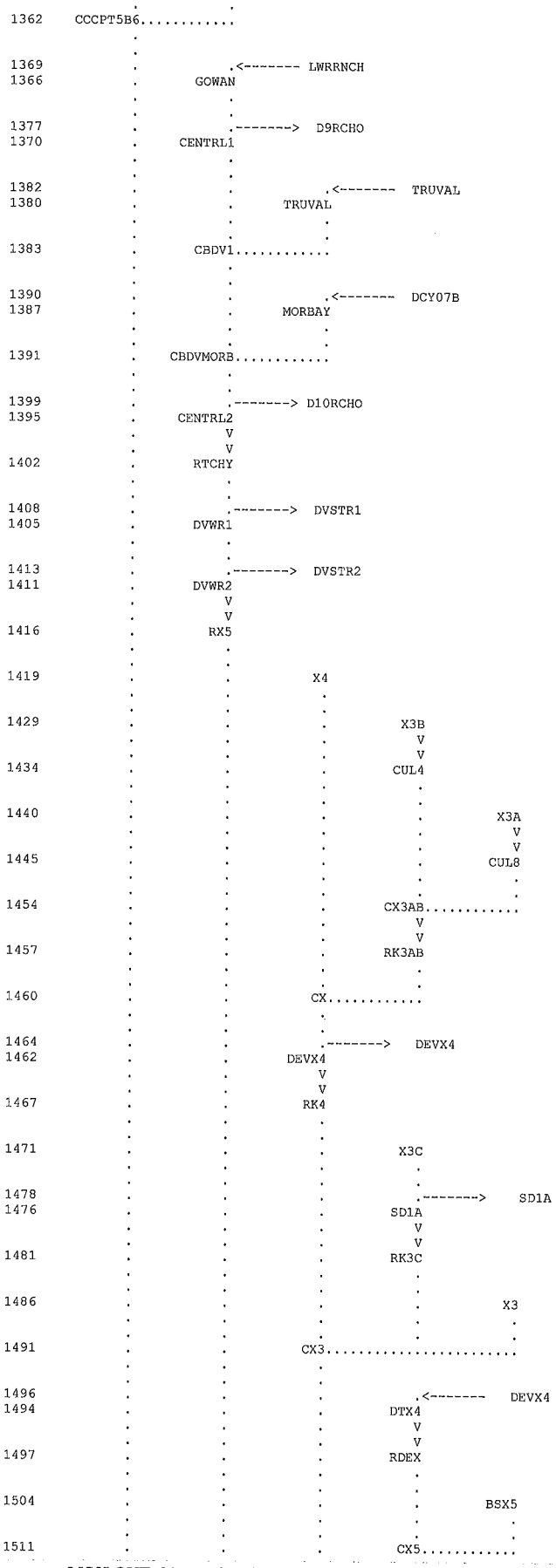
25S3I.OUT, 25-year interim condition, refer to Figure 4



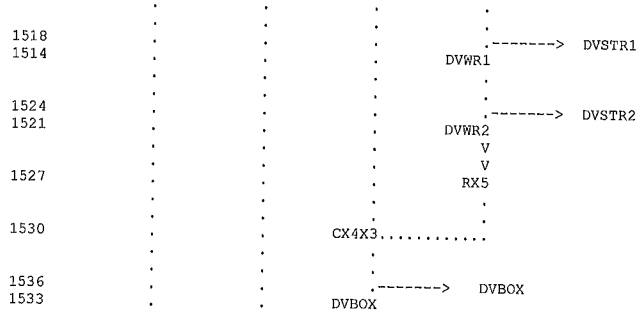
25S31.OUT, 25-year interim condition, refer to Figure 4



25S3I.OUT, 25-year interim condition, refer to Figure 4



25S3I.OUT, 25-year interim condition, refer to Figure 4



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*                JUN  1998              *
*             VERSION 4.1               *
*                                       *
*  RUN DATE   31MAR14  TIME  21:53:34   *
*                                       *
*****************************************
```

```
**************************************
*                                    *
*    U.S. ARMY CORPS OF ENGINEERS    *
*    HYDROLOGIC ENGINEERING CENTER   *
*          609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616      *
*           (916) 756-1104           *
*                                    *
**************************************
```

RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
OFFSITE BASINS, INTERIM CONDITIONS
PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
PREPARED BY STANLEY CONSULTANTS INC. (HM)
INPUT FILE: 25S3I.DAT
DESIGN STORM: 25-YEAR 6-HR
STORM DISTRIBUTION: SDN3
STORM CENTERING: FULL WATERSHED
MODEL INCLUDES DIVERSIONS FOR THE INTERIM OFFSITE FLOW TO THE
REGIONAL FACILITY GOWAN OUTFALL - ALEXANDER BRANCH FROM
THE INTERSECTION OF CRAIG AND RANCHO TO THE SOUTHERN INTERSECTION OF
JONES/ALEXANDER AND RANCHO

THIS MODEL DIFFERS FROM 100 YEAR: FLOW DIVERTED TO STORM DRAIN
AT GOWAN/CRAIG

BASED ON:
CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
2008 MASTER PLAN UPDATE (MPU) BY PBS&J
GOWAN WATERSHED (INPUT FILE = ALLGOW3.DAT) AND
CENTRAL WATERSHED (NORTHWESTERN PORTION)

RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009
UPPRSDN3 AND LWRSDN3 HEC-1 MODELS
FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
CONTROL FACILITIES REFERENCED FROM LOMR UNLESS OTHERWISE NOTED

GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
BY G.C. WALLACE (GCW) 2007

PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
HEC-1 ANALYSIS FOR EXISTING CONDITIONS FILE R00S3X.OUT
BY STANLEY CONSULTANTS, 1/2012

LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
MPU SHOWS THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
(GOEC)

THIS MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL DRAINAGE
STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
EXISTING CONDITION MODEL AS FOLLOWS:
1. BASIN PT51 OF THE RANCHO STUDY WAS SPLIT INTO PT51A AND PT51B IN ORDER
TO SHOW WHERE FLOW WILL BE COLLECTED BY THE GOWAN OUTFALL - ALEXANDER
ROAD FACILITIES AT ALEXANDER-JONES/RANCHO DRIVE INTERSECTION.
2. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
TO THE EXISTING CONDITION MODEL
3. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE
DARF'S USED IN 2008 MPU HEC-1 ALLGOW3.OUT

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
DARF RATIOS FOR AREAS OF 0, 0.5, 1.0, 2.0, 4.0, 6.0, 8.0 AND 10 SQUARE MILES
FOR THE 100-YEAR EVENT.

```
 60 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN          5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1   0  STARTING DATE
                      ITIME         0000  STARTING TIME
```

25S3I.OUT, 25-year interim condition, refer to Figure 4

```
                    NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE        2    0  ENDING DATE
                 NDTIME          0055  ENDING TIME
                 ICENT            19  CENTURY MARK

              COMPUTATION INTERVAL      .08 HOURS
                 TOTAL TIME BASE    24.92 HOURS

     ENGLISH UNITS
          DRAINAGE AREA          SQUARE MILES
          PRECIPITATION DEPTH    INCHES
          LENGTH, ELEVATION      FEET
          FLOW                   CUBIC FEET PER SECOND
          STORAGE VOLUME         ACRE-FEET
          SURFACE AREA           ACRES
          TEMPERATURE            DEGREES FAHRENHEIT

JP        MULTI-PLAN OPTION
               NPLAN           1  NUMBER OF PLANS

JR        MULTI-RATIO OPTION
             RATIOS OF PRECIPITATION
             .74       .73       .72       .69       .67       .67       .65       .64

    *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT


    *** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

1

          PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                        FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                  TIME TO PEAK IN HOURS

                                                                  RATIOS APPLIED TO PRECIPITATION
 OPERATION        STATION     AREA    PLAN              RATIO 1   RATIO 2   RATIO 3   RATIO 4   RATIO 5   RATIO 6   RATIO 7   RATIO 8
                                                           .74       .73       .72       .69       .67       .67       .65       .64
 HYDROGRAPH AT
+                   ANN       .26     1   FLOW            62.       60.       58.       52.       48.       48.       44.       42.
                                           TIME          4.00      4.00      4.00      4.00      4.00      4.00      4.00      4.00
 ROUTED TO
+                  RANN       .26     1   FLOW            62.       60.       58.       52.       48.       48.       44.       42.
                                           TIME          4.08      4.08      4.08      4.08      4.08      4.08      4.08      4.17
 HYDROGRAPH AT
+                  GD29B       .14     1   FLOW            32.       31.       30.       26.       24.       24.       22.       21.
                                           TIME          3.83      3.83      3.83      3.83      3.83      3.83      3.83      3.83
   2 COMBINED AT
+                 CGD29B       .40     1   FLOW            85.       82.       79.       70.       64.       64.       59.       56.
                                           TIME          4.00      4.00      4.00      4.00      4.00      4.00      4.08      4.08
 ROUTED TO
+                 RGD29B       .40     1   FLOW            84.       81.       78.       70.       64.       64.       59.       56.
                                           TIME          4.17      4.25      4.25      4.25      4.25      4.25      4.25      4.25
 HYDROGRAPH AT
+                NW1C2-C       .21     1   FLOW           126.      123.      121.      113.      108.      108.      103.      100.
                                           TIME          3.83      3.83      3.83      3.83      3.83      3.83      3.83      3.83
   2 COMBINED AT
+                 CNW1C2       .60     1   FLOW           177.      172.      167.      151.      140.      140.      130.      124.
                                           TIME          4.08      4.08      4.08      4.08      4.08      4.08      4.08      4.08
 ROUTED TO
+                 RNW1C2       .60     1   FLOW           177.      172.      166.      150.      139.      139.      128.      123.
                                           TIME          4.08      4.08      4.08      4.08      4.08      4.08      4.08      4.08
 HYDROGRAPH AT
+                 PDGCC3       .05     1   FLOW            34.       33.       32.       30.       28.       28.       27.       26.
                                           TIME          3.58      3.58      3.58      3.58      3.58      3.58      3.58      3.58
   2 COMBINED AT
+                  CGCC3       .65     1   FLOW           188.      182.      176.      159.      148.      148.      137.      131.
                                           TIME          4.08      4.08      4.08      4.08      4.08      4.08      4.08      4.08
 ROUTED TO
+                  RGCC3       .65     1   FLOW           187.      182.      176.      159.      147.      147.      135.      130.
                                           TIME          4.08      4.08      4.08      4.08      4.08      4.08      4.08      4.08
 DIVERSION TO
+                   D95A       .65     1   FLOW           139.      139.      139.      139.      139.      139.      134.      129.
                                           TIME          3.75      3.83      3.83      3.92      4.00      4.00      4.08      4.08
 HYDROGRAPH AT
+                REMAIN1       .65     1   FLOW            48.       43.       37.       20.        8.        8.        1.        1.
                                           TIME          4.08      4.08      4.08      4.08      4.08      4.08      3.50      3.58
 ROUTED TO
+                  RLBG1       .65     1   FLOW            48.       42.       37.       19.        7.        7.        1.        1.
                                           TIME          4.08      4.08      4.08      4.08      4.08      4.08      3.58      3.67
 HYDROGRAPH AT
+                 PDGCC2       .04     1   FLOW             9.        9.        8.        7.        7.        7.        6.        6.
```

				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RGCC2	.04	1	FLOW	9.	8.	8.	7.	6.	6.	6.	5.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	PDGCC4	.05	1	FLOW	30.	29.	29.	26.	25.	25.	24.	23.
				TIME	3.58	3.58	3.58	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	CGCC4	.74	1	FLOW	66.	60.	54.	35.	26.	26.	25.	24.
				TIME	4.08	4.08	4.08	4.08	3.67	3.67	3.67	3.67
ROUTED TO												
+	RLBG2	.74	1	FLOW	66.	60.	54.	34.	26.	26.	24.	24.
				TIME	4.08	4.08	4.08	4.08	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	HAMMER	.13	1	FLOW	37.	36.	34.	31.	28.	28.	26.	25.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RHAMMER	.13	1	FLOW	37.	35.	34.	30.	28.	28.	26.	25.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	PDGCD	.13	1	FLOW	30.	28.	27.	24.	22.	22.	20.	19.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CPDGCD	.26	1	FLOW	65.	62.	60.	52.	48.	48.	44.	42.
				TIME	3.83	3.83	3.83	3.83	3.92	3.92	3.92	3.92
ROUTED TO												
+	RGCD	.26	1	FLOW	63.	61.	59.	52.	48.	48.	44.	42.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PDGCB1	.03	1	FLOW	23.	22.	22.	20.	19.	19.	18.	17.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO												
+	RGCB1	.03	1	FLOW	22.	22.	22.	19.	18.	18.	17.	17.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	PDGCB2	.03	1	FLOW	15.	15.	14.	13.	12.	12.	11.	11.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	CGCB2	.06	1	FLOW	37.	36.	36.	32.	31.	31.	29.	28.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	RCGB2	.06	1	FLOW	36.	35.	34.	31.	30.	30.	28.	27.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PDGCB3	.07	1	FLOW	15.	15.	14.	12.	11.	11.	10.	9.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	CGCB3	.13	1	FLOW	51.	49.	48.	43.	41.	41.	38.	36.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	RGCB3	.13	1	FLOW	50.	48.	47.	42.	39.	39.	36.	35.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.83
HYDROGRAPH AT												
+	PDGCB4	.02	1	FLOW	13.	13.	13.	12.	11.	11.	10.	10.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	RGCB4	.02	1	FLOW	13.	13.	12.	11.	11.	11.	10.	10.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	CGCB4	.41	1	FLOW	113.	108.	105.	94.	86.	86.	78.	73.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	PDGCC1	.05	1	FLOW	15.	14.	14.	12.	11.	11.	10.	10.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PDGCB5	.11	1	FLOW	27.	26.	25.	22.	20.	20.	19.	18.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
3 COMBINED AT												
+	CGCB5	.57	1	FLOW	152.	146.	141.	126.	116.	116.	105.	99.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	RGCB5	.57	1	FLOW	150.	145.	139.	123.	113.	113.	102.	97.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
2 COMBINED AT												
+	C2GCB5	1.31	1	FLOW	215.	202.	189.	153.	131.	131.	117.	111.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08

25S3I.OUT, 25-year interim condition, refer to Figure 4

HYDROGRAPH AT												
+	PDGCB6	.02	1	FLOW	15.	14.	14.	13.	12.	12.	12.	12.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO												
+	RGCB6	.02	1	FLOW	14.	14.	13.	12.	12.	12.	11.	11.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.92	3.92
HYDROGRAPH AT												
+	PDGCB10	.07	1	FLOW	39.	38.	37.	34.	32.	32.	30.	29.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PDGCB9	.03	1	FLOW	12.	12.	11.	10.	9.	9.	9.	8.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
4 COMBINED AT												
+	CGCB9	1.43	1	FLOW	253.	239.	226.	185.	160.	160.	147.	139.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RGCB9	1.43	1	FLOW	251.	237.	223.	183.	159.	159.	146.	137.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PDGCB11	.03	1	FLOW	14.	14.	13.	12.	11.	11.	10.	10.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	CGCB11	1.47	1	FLOW	257.	244.	229.	188.	165.	165.	150.	142.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RLBG3	1.47	1	FLOW	256.	242.	228.	187.	164.	164.	150.	141.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO												
+	D95B	1.47	1	FLOW	101.	95.	90.	74.	65.	65.	59.	56.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	REMAIN2	1.47	1	FLOW	155.	147.	138.	113.	99.	99.	91.	86.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RMAIN2	1.47	1	FLOW	153.	146.	137.	113.	99.	99.	90.	85.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	LONEMT	.41	1	FLOW	174.	170.	165.	152.	143.	143.	134.	129.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	GD20BH	.05	1	FLOW	15.	14.	14.	12.	11.	11.	10.	10.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	CLONE	.46	1	FLOW	188.	183.	178.	163.	153.	153.	143.	139.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RLONE	.46	1	FLOW	185.	180.	175.	160.	150.	150.	141.	137.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	GD20BG	.11	1	FLOW	51.	49.	48.	44.	41.	41.	38.	37.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	C20BG	2.04	1	FLOW	349.	335.	321.	288.	267.	267.	246.	236.
				TIME	4.00	4.00	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	R20BG	2.04	1	FLOW	348.	333.	320.	284.	263.	263.	243.	233.
				TIME	4.08	4.08	4.08	4.00	4.00	4.00	4.08	4.08
HYDROGRAPH AT												
+	CRAIG1	2.44	1	FLOW	862.	840.	817.	751.	708.	708.	665.	644.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO												
+	DGNBB	2.44	1	FLOW	249.	249.	249.	249.	249.	249.	249.	249.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.75	3.75
HYDROGRAPH AT												
+	DBUF1	2.44	1	FLOW	613.	591.	568.	502.	459.	459.	416.	395.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	RBUF1	2.44	1	FLOW	609.	587.	565.	500.	457.	457.	415.	394.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO												
+	DGNBB1	2.44	1	FLOW	109.	109.	109.	109.	109.	109.	109.	109.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	DBUF2	2.44	1	FLOW	500.	478.	456.	391.	348.	348.	306.	285.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO												
+	DBUFLO2	2.44	1	FLOW	352.	336.	321.	275.	245.	245.	215.	201.

				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	DRED	2.44	1	FLOW	148.	141.	135.	116.	103.	103.	91.	84.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RDRED	2.44	1	FLOW	147.	141.	134.	115.	102.	102.	90.	84.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT												
+	GD20BI	.12	1	FLOW	47.	45.	44.	40.	37.	37.	35.	33.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	C20BI	2.56	1	FLOW	164.	158.	150.	129.	115.	115.	102.	95.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	R20BI	2.56	1	FLOW	164.	157.	149.	128.	114.	114.	101.	94.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33
HYDROGRAPH AT												
+	GD20BL	.08	1	FLOW	60.	59.	57.	54.	51.	51.	49.	47.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C20BL	4.67	1	FLOW	508.	486.	467.	406.	368.	368.	335.	316.
				TIME	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	R20BL	4.67	1	FLOW	507.	486.	466.	404.	366.	366.	330.	311.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25
HYDROGRAPH AT												
+	RTBUFAL2	.00	1	FLOW	352.	336.	321.	275.	245.	245.	215.	201.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RBUF2	.00	1	FLOW	352.	336.	321.	275.	245.	245.	215.	200.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO												
+	DBUFLO3	.00	1	FLOW	251.	240.	229.	196.	175.	175.	153.	143.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	DCOBAL	.00	1	FLOW	100.	96.	92.	78.	70.	70.	61.	57.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RCOBAL1	.00	1	FLOW	100.	95.	91.	78.	69.	69.	61.	56.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT												
+	GD20BJ	.05	1	FLOW	29.	28.	27.	25.	24.	24.	22.	21.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C20BJ1	.05	1	FLOW	107.	103.	98.	84.	75.	75.	67.	62.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33
ROUTED TO												
+	R20BJ1	.05	1	FLOW	107.	102.	98.	84.	75.	75.	66.	61.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
2 COMBINED AT												
+	C20BJ2	4.72	1	FLOW	606.	580.	554.	478.	430.	430.	390.	369.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
ROUTED TO												
+	R20BJ2	4.72	1	FLOW	605.	578.	552.	476.	430.	430.	389.	367.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	GD20BM	.05	1	FLOW	40.	39.	38.	36.	34.	34.	33.	32.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	C20BM	4.77	1	FLOW	614.	587.	561.	483.	436.	436.	395.	373.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
DIVERSION TO												
+	D95E	4.77	1	FLOW	84.	80.	76.	63.	55.	55.	49.	45.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	REMAIN5	4.77	1	FLOW	530.	507.	486.	420.	381.	381.	346.	328.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
ROUTED TO												
+	RREMAINS	4.77	1	FLOW	527.	504.	482.	419.	380.	380.	345.	326.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	RTBUFAL3	.00	1	FLOW	251.	240.	229.	196.	175.	175.	153.	143.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RBUF3	.00	1	FLOW	251.	239.	228.	195.	174.	174.	152.	141.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25

DIVERSION TO												
+	DGNBB2	.00	1	FLOW	198.	198.	198.	194.	173.	173.	151.	141.
				TIME	4.08	4.08	4.17	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	DBUF3	.00	1	FLOW	53.	41.	30.	1.	1.	1.	1.	1.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RCRAIG2	.00	1	FLOW	52.	40.	28.	1.	1.	1.	1.	1.
				TIME	4.42	4.42	4.50	5.08	5.08	5.08	5.17	5.25
HYDROGRAPH AT												
+	GD20BK	.05	1	FLOW	21.	20.	20.	18.	17.	17.	16.	15.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	1C20BK	.05	1	FLOW	56.	45.	33.	18.	17.	17.	16.	15.
				TIME	4.42	4.42	4.50	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R1C20BK	.05	1	FLOW	54.	43.	31.	18.	17.	17.	16.	15.
				TIME	4.50	4.50	4.58	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	2C20BK	4.82	1	FLOW	538.	514.	492.	427.	388.	388.	352.	333.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	R2C20BK	4.82	1	FLOW	533.	509.	488.	427.	387.	387.	350.	330.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	HICKAM1	.48	1	FLOW	160.	155.	151.	137.	129.	129.	120.	116.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO												
+	DGNBB3	.48	1	FLOW	125.	125.	125.	125.	125.	125.	119.	115.
				TIME	3.75	3.83	3.83	3.83	3.92	3.92	4.00	4.00
HYDROGRAPH AT												
+	BUF3	.48	1	FLOW	35.	30.	26.	12.	4.	4.	1.	1.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RHICKAM	.48	1	FLOW	34.	29.	25.	12.	4.	4.	1.	1.
				TIME	4.00	4.08	4.08	4.08	4.17	4.17	4.33	4.33
HYDROGRAPH AT												
+	GD17BH	.03	1	FLOW	14.	14.	14.	12.	12.	12.	11.	11.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	C17BH	.50	1	FLOW	40.	34.	30.	15.	12.	12.	11.	11.
				TIME	4.00	4.00	4.08	4.08	3.58	3.58	3.58	3.58
ROUTED TO												
+	R17BH	.50	1	FLOW	38.	33.	28.	13.	12.	12.	11.	10.
				TIME	4.17	4.17	4.17	4.25	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	GD17BG	.12	1	FLOW	58.	57.	55.	51.	48.	48.	45.	43.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	C17BG	.62	1	FLOW	72.	70.	68.	63.	59.	59.	56.	54.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R17BG	.62	1	FLOW	71.	69.	67.	62.	58.	58.	55.	53.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	GD17BI	.07	1	FLOW	43.	42.	41.	38.	36.	36.	34.	33.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C17BI	5.51	1	FLOW	610.	580.	549.	467.	420.	420.	381.	360.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	R17BI	5.51	1	FLOW	605.	578.	548.	465.	417.	417.	379.	360.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT												
+	GD14CH	.04	1	FLOW	23.	22.	22.	20.	19.	19.	18.	17.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO												
+	R14CH	.04	1	FLOW	23.	22.	21.	20.	19.	19.	17.	17.
				TIME	3.67	3.75	3.67	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	GD17BJ	.06	1	FLOW	47.	46.	45.	42.	40.	40.	38.	37.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C17BJ	5.61	1	FLOW	622.	595.	564.	478.	430.	430.	390.	371.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
DIVERSION TO												
+	D95F	5.61	1	FLOW	90.	86.	81.	69.	61.	61.	55.	52.

				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
HYDROGRAPH AT												
+	REMAIN6	5.61	1	FLOW	532.	509.	483.	409.	368.	368.	335.	319.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
ROUTED TO												
+	R17BJ	5.61	1	FLOW	532.	508.	482.	409.	368.	368.	334.	318.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
HYDROGRAPH AT												
+	GD14CF	.13	1	FLOW	43.	42.	40.	36.	33.	33.	31.	29.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	DGNBB4	.13	1	FLOW	30.	30.	30.	30.	30.	30.	30.	29.
				TIME	3.67	3.67	3.67	3.67	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	BUF4	.13	1	FLOW	13.	12.	10.	6.	3.	3.	1.	1.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R14CF	.13	1	FLOW	12.	11.	10.	5.	2.	2.	1.	1.
				TIME	3.92	3.92	3.92	3.92	4.00	4.00	4.17	4.17
HYDROGRAPH AT												
+	GD14CG	.06	1	FLOW	30.	29.	28.	26.	24.	24.	23.	22.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C14CG	.19	1	FLOW	30.	29.	29.	26.	24.	24.	23.	22.
				TIME	3.92	3.67	3.83	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R14CG	.19	1	FLOW	30.	29.	28.	25.	24.	24.	22.	22.
				TIME	4.00	3.75	3.92	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	GD14CI	.05	1	FLOW	24.	23.	23.	20.	19.	19.	18.	17.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C14CI	.24	1	FLOW	51.	50.	48.	44.	41.	41.	38.	37.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R14CI	.24	1	FLOW	51.	50.	48.	44.	41.	41.	38.	36.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	CMAIN6	5.85	1	FLOW	555.	530.	503.	427.	385.	385.	347.	330.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
ROUTED TO												
+	RMAIN6	5.85	1	FLOW	549.	522.	496.	426.	383.	383.	346.	329.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.08
DIVERSION TO												
+	D95G	5.85	1	FLOW	83.	83.	82.	78.	76.	76.	74.	73.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.08
HYDROGRAPH AT												
+	REMAIN7	5.85	1	FLOW	466.	439.	415.	348.	308.	308.	273.	256.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.08
HYDROGRAPH AT												
+	GD11C	.13	1	FLOW	77.	75.	73.	68.	64.	64.	61.	59.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	C11C	5.98	1	FLOW	493.	466.	439.	368.	330.	330.	301.	289.
				TIME	4.25	4.25	4.25	4.25	4.08	4.08	4.08	4.08
ROUTED TO												
+	R11C	5.98	1	FLOW	488.	463.	437.	368.	329.	329.	299.	286.
				TIME	4.33	4.33	4.33	4.33	4.17	4.17	4.08	4.17
HYDROGRAPH AT												
+	GD11B	.20	1	FLOW	129.	126.	123.	114.	109.	109.	103.	101.
				TIME	3.67	3.67	3.67	3.67	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	C11B	6.18	1	FLOW	523.	495.	471.	417.	382.	382.	350.	335.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	GOOF1	6.18	1	FLOW	3.	3.	3.	3.	3.	3.	3.	3.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	GOWAN1	6.18	1	FLOW	520.	492.	468.	414.	379.	379.	348.	333.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R11B	6.18	1	FLOW	518.	491.	468.	414.	378.	378.	346.	330.
				TIME	4.25	4.33	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	CY05A	.03	1	FLOW	17.	17.	16.	15.	14.	14.	14.	13.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58

HYDROGRAPH AT												
+	D95G	.00	1	FLOW	83.	83.	82.	78.	76.	76.	74.	73.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.08
ROUTED TO												
+	RD95G	.00	1	FLOW	83.	83.	82.	78.	75.	75.	74.	73.
				TIME	4.33	4.33	4.42	4.42	4.42	4.42	4.42	4.17
HYDROGRAPH AT												
+	PT6B	.11	1	FLOW	91.	89.	87.	81.	78.	78.	74.	72.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	CPT6B	.11	1	FLOW	132.	130.	124.	116.	112.	112.	107.	105.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83
3 COMBINED AT												
+	2CPT6B	6.31	1	FLOW	617.	594.	575.	517.	478.	478.	444.	427.
				TIME	4.25	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	GOOF2	6.31	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.33	3.33	3.33	3.42	3.42	3.42	3.42	3.42
HYDROGRAPH AT												
+	GOWAN2	6.31	1	FLOW	615.	592.	573.	515.	476.	476.	442.	425.
				TIME	4.25	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RPT6B	6.31	1	FLOW	614.	591.	573.	513.	474.	474.	438.	420.
				TIME	4.25	4.08	4.08	4.08	4.08	4.08	4.08	4.17
HYDROGRAPH AT												
+	CY05D	.06	1	FLOW	22.	21.	20.	18.	17.	17.	16.	15.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT5A3	.09	1	FLOW	56.	55.	53.	50.	47.	47.	45.	44.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	C5A3	6.46	1	FLOW	653.	630.	611.	549.	507.	507.	470.	451.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	GOOF3	6.46	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.25	3.25	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT												
+	GOWAN3	6.46	1	FLOW	651.	628.	609.	547.	505.	505.	468.	449.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R5A3	6.46	1	FLOW	651.	627.	608.	545.	503.	503.	465.	445.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	MAVERICK	6.46	1	FLOW	28.	27.	26.	22.	20.	20.	18.	17.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	MAV	6.46	1	FLOW	623.	601.	582.	523.	484.	484.	448.	429.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R5A3B	6.46	1	FLOW	622.	600.	581.	521.	482.	482.	446.	428.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.17
HYDROGRAPH AT												
+	CY06A	.08	1	FLOW	43.	41.	40.	37.	35.	35.	33.	32.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	PT5A8	.03	1	FLOW	12.	11.	11.	10.	9.	9.	9.	9.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	C5A8	6.56	1	FLOW	646.	624.	605.	543.	503.	503.	465.	446.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R5A3C	6.56	1	FLOW	646.	623.	604.	542.	501.	501.	463.	444.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	GOOF4	6.56	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.42	3.42	3.42	3.42	3.50	3.50	3.50	3.50
HYDROGRAPH AT												
+	GOWAN4	6.56	1	FLOW	644.	621.	602.	540.	499.	499.	461.	442.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	DCY07B	6.56	1	FLOW	155.	149.	144.	127.	116.	116.	105.	99.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	DPT5A8	6.56	1	FLOW	488.	472.	458.	413.	383.	383.	357.	343.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R5A8	6.56	1	FLOW	487.	470.	456.	410.	381.	381.	356.	343.

				TIME	4.08	4.08	4.08	4.08	4.17	4.17	4.17	4.17
ROUTED TO												
+	R5A82	6.56	1	FLOW	485.	468.	454.	410.	381.	381.	355.	342.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	CY07A	.03	1	FLOW	18.	17.	17.	15.	15.	15.	14.	13.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	CCY07A	6.59	1	FLOW	491.	474.	460.	415.	386.	386.	359.	346.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
DIVERSION TO												
+	TRUVAL	6.59	1	FLOW	33.	32.	30.	26.	24.	24.	22.	20.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	TRUV	6.59	1	FLOW	458.	442.	429.	388.	362.	362.	338.	326.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	D95B	.00	1	FLOW	101.	95.	90.	74.	65.	65.	59.	56.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RD95B	.00	1	FLOW	99.	94.	89.	74.	64.	64.	59.	56.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	D1RCHO	.00	1	FLOW	19.	18.	17.	14.	12.	12.	11.	10.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	1REMAIN	.00	1	FLOW	80.	76.	72.	60.	52.	52.	48.	45.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	PT3AB1	.05	1	FLOW	44.	43.	42.	40.	39.	39.	37.	36.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C3AB1	.05	1	FLOW	105.	100.	95.	82.	75.	75.	69.	66.
				TIME	4.00	4.00	4.00	3.92	3.92	3.92	3.92	3.92
DIVERSION TO												
+	D2RCHO	.05	1	FLOW	16.	15.	15.	13.	12.	12.	11.	10.
				TIME	4.00	4.00	4.00	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	2REMAIN	.05	1	FLOW	89.	85.	80.	69.	64.	64.	59.	56.
				TIME	4.00	4.00	4.00	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	R2MAIN	.05	1	FLOW	88.	84.	80.	69.	63.	63.	58.	56.
				TIME	4.08	4.08	4.08	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PT3AB2	.05	1	FLOW	54.	53.	52.	49.	48.	48.	46.	45.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	C3AB2	.10	1	FLOW	108.	105.	103.	95.	91.	91.	86.	84.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	D3RCHO	.10	1	FLOW	107.	105.	102.	95.	90.	90.	86.	83.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	3REMAIN	.10	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R3MAIN	.10	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	PT2B2	.08	1	FLOW	51.	50.	49.	46.	43.	43.	41.	40.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	CPT2B2	.18	1	FLOW	51.	50.	49.	46.	43.	43.	41.	40.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO												
+	D4RCHO	.18	1	FLOW	8.	8.	8.	7.	7.	7.	7.	7.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	4REMAIN	.18	1	FLOW	43.	42.	41.	38.	36.	36.	34.	33.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R4MAIN	.18	1	FLOW	43.	42.	41.	38.	36.	36.	34.	33.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT2B3	.02	1	FLOW	22.	22.	21.	20.	19.	19.	18.	18.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67

2 COMBINED AT												
+	C2B3	.20	1	FLOW	63.	61.	60.	56.	53.	53.	50.	50.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	DCSD2	.20	1	FLOW	60.	59.	58.	54.	51.	51.	49.	48.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	D2B3	.20	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	GOAL01	.20	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	D2B3B	.20	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT												
+	PT2A2	.06	1	FLOW	37.	37.	36.	33.	31.	31.	29.	28.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R2A2	.06	1	FLOW	37.	36.	35.	33.	31.	31.	29.	28.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT2A1	.06	1	FLOW	39.	38.	37.	35.	33.	33.	31.	30.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	D95E	.00	1	FLOW	84.	80.	76.	63.	55.	55.	49.	45.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
ROUTED TO												
+	RD95E	.00	1	FLOW	83.	79.	75.	63.	55.	55.	48.	45.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33
3 COMBINED AT												
+	C2A2	.13	1	FLOW	114.	109.	103.	92.	83.	83.	76.	72.
				TIME	4.17	4.17	4.17	3.92	3.92	3.92	3.92	3.92
DIVERSION TO												
+	DCSD1	.13	1	FLOW	90.	90.	90.	90.	82.	82.	75.	71.
				TIME	3.75	3.83	3.83	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	DPT2A1	.13	1	FLOW	24.	19.	13.	2.	1.	1.	1.	1.
				TIME	4.17	4.17	4.17	3.92	3.50	3.50	3.50	3.50
ROUTED TO												
+	R2A2	.13	1	FLOW	23.	17.	13.	1.	1.	1.	1.	1.
				TIME	4.25	4.25	4.33	4.33	4.00	4.00	5.75	4.08
HYDROGRAPH AT												
+	PT2B1	.07	1	FLOW	43.	42.	41.	38.	36.	36.	34.	33.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C2B1	.20	1	FLOW	43.	42.	41.	38.	36.	36.	34.	33.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R2B1	.20	1	FLOW	43.	42.	41.	37.	35.	35.	33.	32.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	2C2B3	.40	1	FLOW	43.	42.	41.	37.	35.	35.	33.	32.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO												
+	GOAL02	.40	1	FLOW	35.	34.	33.	30.	28.	28.	27.	26.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	D2CB3	.40	1	FLOW	8.	8.	8.	7.	7.	7.	6.	6.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	RC2B3	.40	1	FLOW	8.	7.	7.	7.	6.	6.	6.	6.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO												
+	GOAL03	.40	1	FLOW	7.	7.	6.	6.	6.	6.	5.	5.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	DC2628	.40	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	R5REMN	.40	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	4.08	4.08	4.08	4.08	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	PT51B	.04	1	FLOW	40.	39.	38.	36.	35.	35.	33.	33.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	CPT51	.43	1	FLOW	40.	39.	38.	36.	35.	35.	33.	33.

				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	D95F	.00	1	FLOW	90.	86.	81.	69.	61.	61.	55.	52.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
ROUTED TO												
+	RD95F	.00	1	FLOW	89.	85.	81.	69.	61.	61.	55.	52.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.42	4.42
HYDROGRAPH AT												
+	PT3	.15	1	FLOW	104.	102.	99.	92.	88.	88.	83.	81.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	PT6A	.02	1	FLOW	20.	19.	19.	18.	17.	17.	16.	16.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	CPT6A	.17	1	FLOW	139.	134.	130.	115.	108.	108.	102.	99.
				TIME	3.83	3.83	3.83	3.83	3.67	3.67	3.67	3.67
ROUTED TO												
+	RPT6A	.17	1	FLOW	138.	133.	129.	115.	108.	108.	101.	98.
				TIME	3.92	3.92	3.92	3.92	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT41	.14	1	FLOW	69.	67.	66.	60.	56.	56.	53.	51.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	RPT41	.14	1	FLOW	67.	65.	64.	58.	55.	55.	51.	50.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT42	.08	1	FLOW	35.	34.	33.	30.	28.	28.	26.	25.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	CPT42	.22	1	FLOW	102.	99.	96.	88.	83.	83.	78.	75.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT5A1	.05	1	FLOW	38.	37.	36.	33.	32.	32.	30.	30.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C5A1	.44	1	FLOW	269.	261.	255.	234.	221.	221.	207.	201.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R5A1	.44	1	FLOW	264.	257.	250.	230.	217.	217.	203.	196.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT5A4	.03	1	FLOW	15.	15.	15.	13.	13.	13.	12.	11.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT52	.06	1	FLOW	30.	29.	28.	26.	24.	24.	23.	22.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	CPT52	.54	1	FLOW	310.	301.	293.	269.	254.	254.	237.	230.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	RPT52	.54	1	FLOW	306.	297.	290.	265.	250.	250.	234.	227.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	2CPT51	.97	1	FLOW	329.	320.	312.	287.	270.	270.	253.	245.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	GOAL04	.97	1	FLOW	127.	127.	127.	125.	118.	118.	110.	106.
				TIME	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	DC2CPT51	.97	1	FLOW	202.	193.	185.	162.	153.	153.	143.	138.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R2CPT51	.97	1	FLOW	199.	190.	182.	160.	151.	151.	142.	137.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PT51A	.04	1	FLOW	40.	40.	39.	37.	35.	35.	34.	33.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	RGOAL1	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	RGOAL2	.00	1	FLOW	35.	34.	33.	30.	28.	28.	27.	26.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	RGOAL3	.00	1	FLOW	7.	7.	6.	6.	6.	6.	5.	5.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92

4 COMBINED AT												
+	GOAL3	.04	1	FLOW	73.	72.	70.	65.	62.	62.	59.	57.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO												
+	RGOAL3	.04	1	FLOW	71.	69.	68.	63.	59.	59.	56.	55.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	RGOAL4	.00	1	FLOW	127.	127.	127.	125.	118.	118.	110.	106.
				TIME	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	CGOAL	.04	1	FLOW	198.	195.	190.	182.	171.	171.	161.	156.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	BGOAL	.04	1	FLOW	24.	24.	24.	24.	24.	24.	24.	24.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	DGOAL	.04	1	FLOW	174.	171.	166.	158.	147.	147.	137.	132.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	R2CPT51B	1.01	1	FLOW	360.	350.	341.	314.	294.	294.	273.	264.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	D6RCHO	1.01	1	FLOW	71.	71.	70.	67.	65.	65.	64.	63.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	6REMAIN	1.01	1	FLOW	289.	280.	272.	247.	228.	228.	210.	201.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	R6MAIN	1.01	1	FLOW	288.	279.	270.	244.	226.	226.	208.	200.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PT5A2	.08	1	FLOW	49.	47.	46.	43.	40.	40.	38.	37.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R5A2	.08	1	FLOW	48.	47.	46.	42.	40.	40.	37.	36.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PT5A6	.19	1	FLOW	105.	102.	99.	91.	86.	86.	81.	78.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	C5A6	1.27	1	FLOW	412.	400.	388.	352.	328.	328.	304.	293.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83
DIVERSION TO												
+	D7RCHO	1.27	1	FLOW	128.	126.	125.	121.	119.	119.	117.	116.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	7REMAIN	1.27	1	FLOW	285.	274.	263.	230.	209.	209.	187.	177.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	R7MAIN	1.27	1	FLOW	283.	273.	262.	230.	208.	208.	185.	175.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	DMAV	.00	1	FLOW	28.	27.	26.	22.	20.	20.	18.	17.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RMAV	.00	1	FLOW	28.	26.	25.	22.	19.	19.	18.	16.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.33
2 COMBINED AT												
+	CMAV	1.27	1	FLOW	290.	279.	268.	234.	212.	212.	188.	177.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO												
+	DDUNCAN	1.27	1	FLOW	114.	109.	105.	91.	82.	82.	68.	59.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	DPT5A7	1.27	1	FLOW	176.	170.	163.	143.	130.	130.	120.	118.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PT5A7	.07	1	FLOW	36.	35.	34.	31.	29.	29.	28.	27.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	C5A7	1.35	1	FLOW	212.	205.	197.	174.	159.	159.	148.	145.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	R5A7	1.35	1	FLOW	209.	202.	194.	171.	157.	157.	146.	143.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO												
+	D8RCHO	1.35	1	FLOW	60.	55.	52.	45.	41.	41.	37.	36.

				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	8REMAIN	1.35	1	FLOW	149.	147.	142.	126.	116.	116.	109.	107.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	R8MAIN	1.35	1	FLOW	148.	145.	140.	124.	115.	115.	109.	106.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	PT5A9	.05	1	FLOW	28.	27.	26.	24.	23.	23.	22.	21.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C5A9	1.39	1	FLOW	168.	164.	159.	142.	131.	131.	124.	121.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.92	3.92
DIVERSION TO												
+	GOOF5A	1.39	1	FLOW	40.	40.	40.	40.	40.	40.	40.	40.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	GWAN5A	1.39	1	FLOW	128.	124.	119.	102.	91.	91.	84.	81.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.92	3.92
2 COMBINED AT												
+	C2PT5A9	7.98	1	FLOW	559.	538.	519.	464.	431.	431.	399.	383.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	GOOF5	7.98	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	GOWAN5	7.98	1	FLOW	558.	537.	518.	463.	430.	430.	398.	382.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	LWRRNCH	7.98	1	FLOW	474.	461.	449.	413.	392.	392.	370.	355.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	DEASTGOW	7.98	1	FLOW	83.	76.	69.	50.	39.	39.	28.	27.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RDEASTGO	7.98	1	FLOW	82.	75.	69.	49.	38.	38.	28.	27.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	CY08-C	.09	1	FLOW	62.	61.	60.	56.	53.	53.	51.	49.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	CCY08C	8.08	1	FLOW	114.	106.	99.	74.	61.	61.	52.	50.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.08	4.08
DIVERSION TO												
+	GOOF6	8.08	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	DGWN6	8.08	1	FLOW	113.	105.	98.	73.	60.	60.	51.	49.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.08	4.08
DIVERSION TO												
+	DEGWN6	8.08	1	FLOW	81.	75.	69.	52.	42.	42.	36.	35.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.08	4.08
HYDROGRAPH AT												
+	DALEX	8.08	1	FLOW	33.	30.	28.	21.	17.	17.	15.	14.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.08	4.08
HYDROGRAPH AT												
+	CUL30	.00	1	FLOW	71.	71.	70.	67.	65.	65.	64.	63.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	RCUL30	.00	1	FLOW	71.	70.	69.	66.	65.	65.	63.	62.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
HYDROGRAPH AT												
+	CUL31	.00	1	FLOW	128.	126.	125.	121.	119.	119.	117.	116.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RCUL31	.00	1	FLOW	130.	130.	129.	126.	124.	124.	123.	122.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	DUNCAN	.00	1	FLOW	114.	109.	105.	91.	82.	82.	68.	59.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RDUNCAN	.00	1	FLOW	160.	125.	121.	96.	89.	89.	77.	66.
				TIME	4.08	4.08	4.08	4.08	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	CUL32	.00	1	FLOW	60.	55.	52.	45.	41.	41.	37.	36.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83

ROUTED TO												
+	RCUL32	.00	1	FLOW	67.	63.	60.	44.	42.	42.	40.	40.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
4 COMBINED AT												
+	CPT56B	.00	1	FLOW	425.	384.	374.	323.	307.	307.	290.	279.
				TIME	4.08	4.08	4.08	4.08	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	PT5B6-C	.38	1	FLOW	202.	198.	193.	179.	170.	170.	161.	156.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CCPT56B	.38	1	FLOW	569.	524.	512.	451.	411.	411.	388.	374.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.17	4.17
2 COMBINED AT												
+	CCCPT56B	8.46	1	FLOW	601.	555.	540.	472.	427.	427.	402.	387.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.17	4.17
HYDROGRAPH AT												
+	0511-1	.00	1	FLOW	3.	3.	3.	3.	3.	3.	3.	3.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	0511-2	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.33	3.33	3.33	3.42	3.42	3.42	3.42	3.42
HYDROGRAPH AT												
+	0511-3	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.25	3.25	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT												
+	0511-4	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.42	3.42	3.42	3.42	3.50	3.50	3.50	3.50
4 COMBINED AT												
+	GOOF1-4	.00	1	FLOW	9.	9.	9.	9.	9.	9.	9.	9.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	0511-5A	.00	1	FLOW	40.	40.	40.	40.	40.	40.	40.	40.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	GOOF1-5A	.00	1	FLOW	49.	49.	49.	49.	49.	49.	49.	49.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	0511-5	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	0486-1	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT												
+	0486	.00	1	FLOW	51.	51.	51.	51.	51.	51.	51.	51.
				TIME	4.25	4.25	4.00	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RDGOW2A	.00	1	FLOW	51.	51.	51.	51.	51.	51.	51.	51.
				TIME	3.92	3.92	3.92	3.92	4.17	4.17	4.17	4.00
2 COMBINED AT												
+	CCCPT5B6	8.46	1	FLOW	652.	606.	591.	523.	478.	478.	453.	438.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.17	4.17
HYDROGRAPH AT												
+	GOWAN	.00	1	FLOW	474.	461.	449.	413.	392.	392.	370.	355.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	D9RCHO	.00	1	FLOW	222.	214.	206.	184.	171.	171.	160.	151.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	CENTRL1	.00	1	FLOW	252.	247.	243.	229.	220.	220.	211.	204.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	TRUVAL	.00	1	FLOW	33.	32.	30.	26.	24.	24.	22.	20.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT												
+	CBDV1	.00	1	FLOW	285.	278.	273.	255.	244.	244.	232.	224.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	MORBAY	.00	1	FLOW	155.	149.	144.	127.	116.	116.	105.	99.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
2 COMBINED AT												
+	CBDVMORB	.00	1	FLOW	440.	427.	417.	382.	360.	360.	337.	323.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	D10RCHO	.00	1	FLOW	138.	136.	135.	131.	129.	129.	126.	125.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	CENTRL2	.00	1	FLOW	302.	291.	281.	251.	231.	231.	210.	198.

				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RTCHY	.00	1	FLOW	287.	276.	265.	234.	213.	213.	191.	180.
				TIME	4.50	4.50	4.50	4.42	4.42	4.42	4.42	4.42
DIVERSION TO												
+	DVSTR1	.00	1	FLOW	47.	42.	38.	26.	18.	18.	9.	5.
				TIME	4.50	4.50	4.42	4.42	4.42	4.42	4.42	4.42
HYDROGRAPH AT												
+	DVWR1	.00	1	FLOW	241.	234.	227.	208.	195.	195.	182.	175.
				TIME	4.50	4.50	4.42	4.42	4.42	4.42	4.42	4.42
DIVERSION TO												
+	DVSTR2	.00	1	FLOW	37.	37.	37.	37.	37.	37.	37.	37.
				TIME	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	DVWR2	.00	1	FLOW	204.	197.	190.	171.	158.	158.	145.	138.
				TIME	4.50	4.50	4.42	4.42	4.42	4.42	4.42	4.42
ROUTED TO												
+	RX5	.00	1	FLOW	203.	196.	190.	170.	156.	156.	143.	136.
				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
HYDROGRAPH AT												
+	X4	.81	1	FLOW	197.	193.	189.	178.	170.	170.	163.	159.
				TIME	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58
HYDROGRAPH AT												
+	X3B	.16	1	FLOW	76.	74.	73.	68.	65.	65.	61.	60.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	CUL4	.16	1	FLOW	64.	63.	63.	61.	61.	61.	60.	59.
				TIME	4.25	4.25	4.25	4.17	4.17	4.17	4.08	4.08
				** PEAK STAGES IN FEET **								
			1	STAGE	15.06	15.05	15.04	15.02	15.01	15.01	15.00	14.97
				TIME	4.25	4.25	4.25	4.17	4.17	4.17	4.08	4.08
HYDROGRAPH AT												
+	X3A	.12	1	FLOW	60.	59.	58.	54.	51.	51.	48.	47.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	CUL8	.12	1	FLOW	23.	23.	23.	22.	21.	21.	20.	20.
				TIME	4.67	4.67	4.67	4.67	4.58	4.58	4.58	4.58
				** PEAK STAGES IN FEET **								
			1	STAGE	21.79	21.74	21.68	21.51	21.40	21.40	21.29	21.23
				TIME	4.67	4.67	4.67	4.67	4.58	4.58	4.58	4.58
2 COMBINED AT												
+	CX3AB	.28	1	FLOW	86.	85.	84.	81.	80.	80.	77.	76.
				TIME	4.33	4.33	4.33	4.25	4.25	4.25	4.08	4.08
ROUTED TO												
+	RK3AB	.28	1	FLOW	83.	82.	81.	77.	74.	74.	70.	69.
				TIME	5.25	5.25	5.25	5.17	5.17	5.17	5.17	5.17
2 COMBINED AT												
+	CX	1.09	1	FLOW	276.	271.	265.	248.	237.	237.	226.	220.
				TIME	5.33	5.33	5.33	5.33	5.25	5.25	5.25	5.25
DIVERSION TO												
+	DEVX4	1.09	1	FLOW	100.	100.	100.	100.	100.	100.	100.	100.
				TIME	4.75	4.75	4.75	4.83	4.92	4.92	4.92	5.00
HYDROGRAPH AT												
+	DEVX4	1.09	1	FLOW	176.	171.	165.	148.	137.	137.	126.	120.
				TIME	5.33	5.33	5.33	5.33	5.25	5.25	5.25	5.25
ROUTED TO												
+	RK4	1.09	1	FLOW	176.	170.	164.	148.	136.	136.	125.	120.
				TIME	5.58	5.58	5.58	5.50	5.50	5.50	5.50	5.50
HYDROGRAPH AT												
+	X3C	.48	1	FLOW	73.	71.	69.	63.	59.	59.	55.	53.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
DIVERSION TO												
+	SD1A	.48	1	FLOW	9.	9.	9.	7.	7.	7.	6.	6.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
HYDROGRAPH AT												
+	SD1A	.48	1	FLOW	64.	62.	60.	55.	52.	52.	49.	48.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
ROUTED TO												
+	RK3C	.48	1	FLOW	64.	62.	60.	55.	52.	52.	49.	48.
				TIME	5.50	5.50	5.50	5.50	5.58	5.58	5.58	5.58
HYDROGRAPH AT												
+	X3	.34	1	FLOW	170.	167.	164.	154.	148.	148.	142.	138.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
3 COMBINED AT												
+	CX3	1.91	1	FLOW	299.	291.	284.	260.	244.	244.	228.	221.
				TIME	5.42	5.42	5.42	5.42	5.33	5.33	5.33	5.33

HYDROGRAPH AT												
+	DTX4	.00	1	FLOW	100.	100.	100.	100.	100.	100.	100.	100.
				TIME	4.75	4.75	4.75	4.83	4.92	4.92	4.92	5.00
ROUTED TO												
+	RDEX	.00	1	FLOW	100.	100.	100.	100.	100.	100.	100.	100.
				TIME	5.25	5.25	5.25	5.33	5.33	5.33	5.42	5.42
HYDROGRAPH AT												
+	BSX5	.10	1	FLOW	68.	67.	66.	62.	60.	60.	57.	56.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CX5	.10	1	FLOW	120.	120.	119.	118.	117.	117.	116.	116.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.08	5.08
DIVERSION TO												
+	DVSTR1	.10	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT												
+	DVWR1	.10	1	FLOW	120.	120.	119.	118.	117.	117.	116.	116.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.08	5.08
DIVERSION TO												
+	DVSTR2	.10	1	FLOW	37.	37.	37.	37.	37.	37.	37.	37.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	DVWR2	.10	1	FLOW	83.	83.	82.	81.	80.	80.	79.	79.
				TIME	5.00	5.00	5.00	5.00	5.00	5.00	5.08	5.08
ROUTED TO												
+	RX5	.10	1	FLOW	83.	82.	82.	81.	80.	80.	79.	78.
				TIME	5.08	5.08	5.08	5.17	5.17	5.17	5.17	5.25
2 COMBINED AT												
+	CX4X3	2.01	1	FLOW	377.	369.	362.	338.	322.	322.	305.	297.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
DIVERSION TO												
+	DVBOX	2.01	1	FLOW	210.	210.	210.	210.	210.	210.	210.	210.
				TIME	3.92	3.92	4.00	4.00	4.08	4.08	4.58	4.67
HYDROGRAPH AT												
+	DVBOX	2.01	1	FLOW	167.	159.	152.	128.	112.	112.	95.	87.
				TIME	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .74									
RANN	MANE	2.49	61.90	246.24	.50	5.00	61.81	245.00	.50

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6912E+01 EXCESS= .0000E+00 OUTFLOW= .6909E+01 BASIN STORAGE= .1459E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .73									
RANN	MANE	2.52	59.84	244.37	.48	5.00	59.80	245.00	.48

*** NORMAL END OF HEC-1 ***

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   31MAR14  TIME  20:42:24   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*            (916) 756-1104             *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


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         LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                       *DIAGRAM
*** FREE ***
              1        ID   RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
              2        ID   GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
              3        ID   OFFSITE BASINS, INTERIM CONDITIONS
              4        ID   PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
              5        ID   PREPARED BY STANLEY CONSULTANTS INC. (HM)
              6        ID   INPUT FILE: 100S3I.DAT
              7        ID   DESIGN STORM: 100-YEAR 6-HR
              8        ID   STORM DISTRIBUTION: SDN3
              9        ID   STORM CENTERING: FULL WATERSHED
             10        ID   MODEL INCLUDES DIVERSIONS FOR THE INTERIM OFFSITE FLOW TO THE
             11        ID   REGIONAL FACILITY GOWAN OUTFALL - ALEXANDER BRANCH FROM
             12        ID   THE INTERSECTION OF CRAIG AND RANCHO TO THE SOUTHERN INTERSECTION OF
             13        ID   JONES/ALEXANDER AND RANCHO
             14        ID
             15        ID   THIS MODEL DIFFERS FROM 25 YEAR: NO FLOW DIVERTED TO STORM DRAIN
             16        ID   AT GOWAN/CRAIG
             17        ID   FROM CRAIG RD TO ALEXANDER
             18        ID
             19        ID
             20        ID
             21        ID
             22        ID   BASED ON:
             23        ID   CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
             24        ID   2008 MASTER PLAN UPDATE (MPU) BY PBS&J
             25        ID   GOWAN WATERSHED (INPUT FILE = ALLGOW3.DAT) AND
             26        ID   CENTRAL WATERSHED (NORTHWESTERN PORTION)
             27        ID
             28        ID   RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009
             29        ID   UPPRSDN3 AND LWRSDN3 HEC-1 MODELS
             30        ID   FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
             31        ID   CONTROL FACILITIES REFERENCED FROM LOMR UNLESS OTHERWISE NOTED
             32        ID
             33        ID   GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
             34        ID   BY G.C. WALLACE (GCW) 2007
             35        ID
             36        ID   PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
             37        ID   IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
             38        ID   HEC-1 ANALYSIS FOR EXISTING CONDITIONS FILE R00S3X.OUT
             39        ID   BY STANLEY CONSULTANTS, 1/2012
             40        ID
             41        ID   LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
             42        ID   ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
             43        ID   MPU SHOWS THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
             44        ID   (GOEC)
             45        ID
             46        ID
             47        ID   THIS MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL DRAINAGE
             48        ID   STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
             49        ID   EXISTING CONDITION MODEL AS FOLLOWS:
             50        ID   1. BASIN PT51 OF THE RANCHO STUDY WAS SPLIT INTO PT51A AND PT51B IN ORDER
             51        ID   TO SHOW WHERE FLOW WILL BE COLLECTED BY THE GOWAN OUTFALL - ALEXANDER
             52        ID   ROAD FACILITIES AT ALEXANDER-JONES/RANCHO DRIVE INTERSECTION.
             53        ID   2. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
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         LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

             54        ID   TO THE EXISTING CONDITION MODEL
             55        ID   3. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE
             56        ID   DARF'S USED IN 2008 MPU HEC-1 ALLGOW3.OUT
             57        ID
             58        ID
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 59          ID   JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
 60          ID   JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
 61          ID
 62          ID                          AREA    DARF
 63          ID                          SQ. MI.
 64          ID                          0-0.5   0.99
 65          ID                          0.5-1   0.975
 66          ID                          1-2     0.95
 67          ID                          2-3     0.925
 68          ID                          3-4     0.915
 69          ID                          4-5     0.908
 70          ID                          5-6     0.903
 71          ID                          6-7     0.895
 72          ID                          7-8     0.885
 73          ID
 74          ID
 75          ID
 76          IT       5       0       0     300
 77          IO       5       0       0
 78          IN       5
 79          JR    PREC    0.99   0.975    0.95   0.925   0.915   0.908   0.903   0.895   0.885
             *

 80          KK     ANN
 81          KM  BASIN REFERENCED FROM LOMR
 82          PB    2.85
 83          BA   0.259
 84          PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
 85          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
 86          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
 87          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
 88          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
 89          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
 90          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
 91          PC   0.998   0.999   1.000
 92          LS       0    76.8
 93          UD   0.499
             *

 94          KK    RANN
 95          KM  ROUTE TO GD29B
 96          RK    2600   0.015   0.015       0    TRAP     100       2
             *

 97          KK   GD29B
 98          KM  BASIN REFERENCED FROM LOMR
 99          PB    2.77
100          BA   0.138
101          LS       0    74.3
102          UD   0.298
             *
1                                        HEC-1 INPUT                                        PAGE  3

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

103          KK  CGD29B
104          HC       2
             *

105          KK  RGD29B
106          KM  ROUTE GD29B TO CNW1C2
107          KM  ROUTING REVISED FROM LOMR BY STANLEY CONSULTANTS
108          KM  ANN ROAD
109          RD    4500  0.0122   0.016       0    TRAP       0      50
             * PREVIUOS ROUTING
             * KMROUTE TO ANN1B
             * RK2700     0.015   0.015       0   TRAP      100       2
             *

110          KK NW1C2-C
111          KM  BASIN REFERENCED FROM 2008 MPU
112          KM  TAKES PLACE OF ANN1B AND ANN1C (LOMR) WHICH ARE NOW DEVELOPED
113          KM  REVISED BY STANLEY CONSULTANTS
114          BA   0.207
115          PB    2.77
116          LS       0    89.5
117          UD   0.409
             *

118          KK  CNW1C2
119          KM  COMBINE RGD29B AND NW1C2-C
120          KM  ANN ROAD AND RANCHO
121          HC       2
             *

122          KK  RNW1C2
123          KM  ROUTE TO PDGCC3
124          RK    1250  0.0074   0.013       0    TRAP      12       2
             *

125          KK  PDGCC3
126          KM  CN UPDATED BY STANLEY CONSULTANTS FOR DEVELOPMENT
127          KM  REFERENCED FROM GOWAN SD, LONE MTN BRANCH BY GCW
128          PB    2.77
129          BA   0.047
130          LS       0    86.7
131          UD   0.188
             *

132          KK   CGCC3
133          HC       2
```

```
                *
  134           KK   RGCC3
  135           KM  ROUTE TO PDGCC4
  136           RK    1550   0.005   0.013       0    TRAP       8       0
                *
1                                        HEC-1 INPUT                                                    PAGE  4
 LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  137           KK REMAIN1
  138           KM  DIVERT 139 CFS UNDER U.S. 95 BETWEEN ANN ROAD AND THE U.S. 95/RANCHO
  139           KM  INTERSECTION IN A 10' X 3' RCB (CULVERT 3). FLOWS IN EXCESS OF 139 CFS
  140           KM  REMAIN ON THE WEST SIDE OF U.S. 95.
  141           KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
  142           DT    D95A
  143           DI       0      51     101     118     140     318   10000
  144           DQ       0      50     100     117     139     139     139
                *
  145           KK   RLBG1
  146           KM  ROUTE TO CGCC4 (HECRAS CROSS SECTION 116+49)
  147           KM  ADDED BY LBG
  148           RK     278   0.005   0.013       0    TRAP       8       0
                *
  149           KK  PDGCC2
  150           KM  BASIN REFERENCED FROM LOMR
  151           PB    2.77
  152           BA   0.042
  153           LS       0    73.2
  154           UD   0.286
                *
  155           KK   RGCC2
  156           KM  ROUTE TO PDGCC4
  157           RK    2900  0.0055   0.015       0    TRAP      60       2
                *
  158           KK  PDGCC4
  159           KM  BASIN REFERENCED FROM LOMR
  160           PB    2.77
  161           BA   0.049
  162           LS       0    84.3
  163           UD   0.189
                *
  164           KK   CGCC4
  165           KM  THE FLOW AT THIS NODE CORRESPONDS TO HECRAS CROSS SECTION 116+49
  166           KM  OF THE US-95 EFFECTIVE HECRAS.
  167           KM  THIS IS THE MOST UPSTREAM NODE IN THE EFFECTIVE MODEL.
  168           HC       3
                *
  169           KK   RLBG2
  170           KM  ROUTE TO CGCB9 (HECRAS CROSS SECTION 112+87)
  171           KM  ADDED BY LBG
  172           RK     362   0.005   0.013       0    TRAP       8       0
                *
1                                        HEC-1 INPUT                                                    PAGE  5
 LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  173           KK  HAMMER
  174           KM  BASIN REFERENCED FROM LOMR
  175           PB    2.82
  176           BA   0.128
  177           LS       0    76.6
  178           UD   0.333
                *
  179           KK RHAMMER
  180           KM  ROUTE TO PDGCD
  181           RK    2700   0.015   0.015       0    TRAP      60       2
                *
  182           KK   PDGCD
  183           KM  BASIN REFERENCED FROM LOMR
  184           PB    2.77
  185           BA   0.129
  186           LS       0    74.0
  187           UD   0.284
                *
  188           KK  CPDGCD
  189           HC       2
                *
  190           KK    RGCD
  191           KM  ROUTE TO PDGCB5
  192           RK    4060  0.0086   0.015       0    TRAP      40       2
                *
  193           KK  PDGCB1
  194           KM  BASIN REFERENCED FROM LOMR
  195           PB    2.77
  196           BA   0.033
  197           LS       0    84.9
  198           UD   0.166
                *
```

```
 199          KK   RGCB1
 200          KM  ROUTE TO PDGCB3
 201          RK    2100  0.0086   0.015       0    TRAP      40       2
              *

 202          KK  PDGCB2
 203          KM  BASIN REFERENCED FROM LOMR
 204          PB    2.77
 205          BA   0.030
 206          LS       0    81.3
 207          UD   0.190
              *
1                                        HEC-1 INPUT                                        PAGE  6

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 208          KK   CGCB2
 209          HC       2
              *

 210          KK   RCGB2
 211          KM  ROUTE TO PDGCB3
 212          RK     700  0.0029    0.03       0    TRAP      20       2
              *

 213          KK  PDGCB3
 214          KM  BASIN REFERENCED FROM LOMR
 215          PB    2.77
 216          BA   0.066
 217          LS       0    73.1
 218          UD   0.236
              *

 219          KK   CGCB3
 220          HC       2
              *

 221          KK   RGCB3
 222          KM  ROUTE TO PDGCB5
 223          RK    1400    0.01   0.025       0    TRAP      20       2
              *

 224          KK  PDGCB4
 225          KM  BASIN REFERENCED FROM LOMR
 226          PB    2.77
 227          BA   0.020
 228          LS       0    85.7
 229          UD   0.204
              *

 230          KK   RGCB4
 231          KM  ROUTE TO PDGCB5
 232          RK     800    0.01    0.03       0    TRAP      20       2
              *

 233          KK   CGCB4
 234          HC       3
              *

 235          KK  PDGCC1
 236          KM  BASIN REFERENCED FROM LOMR
 237          PB    2.77
 238          BA   0.053
 239          LS       0    75.4
 240          UD   0.263
              *
1                                        HEC-1 INPUT                                        PAGE  7

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 241          KK  PDGCB5
 242          KM  BASIN REFERENCED FROM LOMR
 243          PB    2.77
 244          BA   0.110
 245          LS       0    76.0
 246          UD   0.375
              *

 247          KK   CGCB5
 248          HC       3
              *

 249          KK   RGCB5
 250          KM  ROUTE TO PDGCB9
 251          RK    3080  0.0065    0.03       0    TRAP      30       2
              *

 252          KK  C2GCB5
 253          HC       2
              *

 254          KK  PDGCB6
 255          KM  BASIN REFERENCED FROM LOMR
 256          PB    2.77
 257          BA   0.018
 258          LS       0    88.2
 259          UD   0.177
              *
```

100S3I.OUT, 100-year interim condition, refer to Figure 4

```
260          KK   RGCB6
261          KM  ROUTE TO PDGCB9
262          RK    2880  0.0065    0.03       0    TRAP      30       2
             *

263          KK PDGCB10
264          KM  BASIN REFERENCED FROM LOMR
265          PB    2.77
266          BA   0.074
267          LS       0    83.7
268          UD   0.260
             *

269          KK  PDGCB9
270          KM  BASIN REFERENCED FROM LOMR
271          PB    2.77
272          BA   0.031
273          LS       0    76.5
274          UD   0.137
             *
1                                        HEC-1 INPUT                                                    PAGE  8

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

275          KK   CGCB9
276          HC       4
             *

277          KK   RGCB9
278          KM  ROUTE TO GCB11 (HECRAS CROSS SECTION 105+04)
279          KM  CHANGED FROM 1950 FT TO 783 FEET BY LBG
280          RK     783  0.0036   0.013       0    TRAP       8       2
             *

281          KK PDGCB11
282          KM  BASIN REFERENCED FROM LOMR
283          PB    2.77
284          BA   0.033
285          LS       0    79.3
286          UD   0.195
             *

287          KK  CGCB11
288          HC       2
             *

289          KK   RLBG3
290          KM  ROUTE TO REMAIN2 (HECRAS CROSS SECTION 99+93)
291          KM  ADDED BY LBG
292          RK     511  0.0036   0.013       0    TRAP       8       2
             *

293          KK REMAIN2
294          KM  DIVERT 192 CFS UNDER U.S. 95 JUST SOUTH OF THE U.S. 95/RANCHO INTERSECTION
295          KM  IN 2, 6' X 2' RCB'S (CULVERT 5). REMAINING FLOW CONTINUES SOUTH ALONG U.S.
296          KM  95 TO LONE MOUNTAIN ROAD.
297          KM   REVISED TO 168 BY LBG
298          DT    D95B
299          DI       0     426     591   10000
300          DQ       0     168     192     192
             *

301          KK  RMAIN2
302          KM  ROUTE TO 20BG
303          KM  HECRAS CROSS SECTION 82+37
304          RK    1756  0.0029    0.03       0    TRAP      20       2
             *

305          KK  LONEMT
306          KM  BASIN REFERENCED FROM LOMR
307          PB    2.77
308          BA   0.411
309          LS       0    83.1
310          UD   0.380
             *
1                                        HEC-1 INPUT                                                    PAGE  9

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

311          KK  GD20BH
312          KM  BASIN REFERENCED FROM LOMR
313          PB    2.77
314          BA   0.047
315          LS       0    76.6
316          UD   0.250
             *

317          KK   CLONE
318          KM  TENAYA/LONE MOUNTAIN
319          HC       2
             *

320          KK   RLONE
321          KM  ROUTE TO 20BG
322          KM  HECRAS CROSS SECTION 82+37
323          RK    1100  0.0015   0.015       0    TRAP      44       2
             *

324          KK  GD20BG
325          KM  BASIN REFERENCED FROM LOMR
```

```
326          PB    2.77
327          BA   0.113
328          LS       0    81.4
329          UD   0.261
             *

330          KK   C20BG
331          HC       3
             *

332          KK   R20BG
333          KM  ROUTE TO 20BL
334          KM  HECRAS X-SECTION 65+10
335          RK    1680  0.0016    0.03       0    TRAP     150       2
             *

336          KK  CRAIG1
337          KM  ADDED FROM LOMR
338          KM  BASIN CRAIG1 (SDN3)
339          PB    3.16
340          BA    2.44
341          LS       0    82.0
342          UD   0.700
             *

343          KK   DBUF1
344          KM  DIVERT 249 CFS (447 CAPACITY - 198 FUTURE INTERCEPTED) TO
345          KM  GOWAN NORTH BUFFALO BRANCH SD BETWEEN LONE MT AND RED COACH
346          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
347          KM  FACILITY ID: GOBU 0085
348          DT   DGNBB
349          DI       0     250    2807   10000
350          DQ       0     249     249     249
             *
1                                        HEC-1 INPUT                                        PAGE 10

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

351          KK   RBUF1
352          KM  ROUTE TO RED COACH
353          RK    1295   0.004   0.015       0    TRAP      80       2
             *

354          KK   DBUF2
355          KM  DIVERT 109 CFS TO GOWAN NORTH BUFFALO BRANCH SD AT RED COACH
356          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
357          KM  FACILITY ID: GOBU 0058
358          DT  DGNBB1
359          DI       0     110    1121   10000
360          DQ       0     109     109     109
             *

361          KK    DRED
362          KM  DIVERT 70.40% FLOW DOWN BUFFALO TOWARDS COBAL CANYON.
363          KM  TAKE FLOW DOWN RED COACH TO US95
364          DT DBUFLO2
365          DI       0     100    1000   10000
366          DQ       0    70.4    704.    7040
             *

367          KK   RDRED
368          KM  ROUTE TO 20BI
369          RK    2700   0.007   0.015       0    TRAP      80       2
             *

370          KK  GD20BI
371          KM  BASIN REFERENCED FROM LOMR
372          PB    2.77
373          BA   0.115
374          LS       0    80.5
375          UD   0.286
             *

376          KK   C20BI
377          HC       2
             *

378          KK   R20BI
379          KM  ROUTE TO 20BL
380          KM  HECRAS CROSS SECTION 65+10
381          RK     910  0.0055   0.015       0    TRAP      40       2
             *

382          KK  GD20BL
383          KM  BASIN REFERENCED FROM LOMR
384          PB    2.77
385          BA   0.079
386          LS       0    88.7
387          UD   0.230
             *
1                                        HEC-1 INPUT                                        PAGE 11

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

388          KK   C20BL
389          HC       3
             *

390          KK   R20BL
391          KM  ROUTE TO C20BJ2
```

```
392          KM  HECRAS CROSS SECTION 61+09
393          RK      401  0.0016    0.03       0    TRAP     150       2
             *

394          KKRTBUFAL2
395          KM  RETRIEVE FLOW DIVERTED TO BUFFALO PAST RED COACH
396          DR DBUFLO2
             *

397          KK   RBUF2
398          KM  ROUTE TO COBAL CANYON
399          RK      652   0.004   0.015       0    TRAP      80       2
             *

400          KK  DCOBAL
401          KM  DIVERT 71.46% OF FLOW AT COBAL CANYON/BUFFALO INTERSECTION SOUTH ON BUFFALO
402          KM  REMAINING FLOW CONTINUES TO US95
403          DT DBUFLO3
404          DI       0    100.    1000   10000
405          DQ       0   71.46   714.6    7146
             *

406          KK RCOBAL1
407          KM  ROUTE TO C20BJ1
408          RK    2700   0.007   0.015       0    TRAP      60       2
             *

409          KK  GD20BJ
410          KM  BASIN REFERENCED FROM LOMR
411          PB    2.77
412          BA   0.052
413          LS       0    84.3
414          UD   0.257
             *

415          KK  C20BJ1
416          HC       2
             *

417          KK  R20BJ1
418          KM  ROUTE TO C20BJ2
419          RK     900   0.006   0.015       0    TRAP      40       2
             *
1                                        HEC-1 INPUT                                        PAGE 12
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

420          KK  C20BJ2
421          KM  US95 HECRAS CROSS SECTION 59+51
422          HC       2
             *

423          KK  R20BJ2
424          KM  ROUTE TO C20BM
425          RK     362   0.006   0.015       0    TRAP      40       2
             *

426          KK  GD20BM
427          KM  BASIN REFERENCED FROM LOMR
428          PB    2.77
429          BA   0.048
430          LS       0    89.2
431          UD   0.189
             *

432          KK   C20BM
433          KM  HECRAS CROSS SECTION 55+89
434          KM  GD20BM IS ADDED TO US95 FLOW FROM C20BJ2
435          HC       2
             *

436          KK REMAIN5
437          KM  DIVERSION PER EXISTING INTERCHANGE AT CRAIG ROAD
438          KM  DIVERT FLOW THROUGH 2, 6' x 2' RCB'S (CULVERT 7) UNDER U.S. 95
439          KM  JUST NORTH OF THE CRAIG ROAD BRIDGE.
440          KM  REMAINING FLOW CONTINUES SOUTH ALONG U.S. 95
441          KM  THIS DIVERSION HAS TWO SEPARATE FLOW QUANTITIES, 82 CFS FOR THE SDN3
442          KM  MODEL AND 180 CFS FOR THE SDN5 MODEL
443          KM  REVISED BY LBG 6-28-05 (RATING CURVE DEVELOPED)
444          DT    D95E
445          DI       0     200     600    1000    1250    2006
446          DQ       0    16.8      82   144.0     170     264
             *

447          KKRREMAINS5
448          KM  ROUTE TO 2C20BK
449          RK     853   0.006   0.015       0    TRAP      40       2
             *

450          KKRTBUFAL3
451          KM  RETRIEVE FLOW DIVERTED TO BUFFALO PAST COBAL CANYON
452          DR DBUFLO3
             *

453          KK   RBUF3
454          KM  ROUTE TO CRAIG ROAD
455          RK     661   0.003   0.015       0    TRAP      80       2
             *
1                                        HEC-1 INPUT                                        PAGE 13
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
456          KK   DBUF3
457          KM  DIVERT 198 CFS TO GOWAN NORTH BUFFALO BRANCH SD AT CRAIG
458          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
459          KM  FACILITY ID: GOBU 0032
460          DT  DGNBB2
461          DI       0     199    1121   10000
462          DQ       0     198     198     198
             *

463          KK RCRAIG2
464          KM  ROUTE TO GD20BK
465          RK    3400  0.0067   0.015       0    TRAP      80       2
             *

466          KK  GD20BK
467          KM  BASIN REFERENCED FROM LOMR
468          PB    2.77
469          BA   0.050
470          LS       0    80.5
471          UD   0.264
             *

472          KK  1C20BK
473          HC       2
             *

474          KK R1C20BK
475          KM  ROUTE TO 2C20BK
476          KM  HECRAS CROSS SECTION 47+36 IN US-95 HECRAS MODEL
477          RK    1150  0.0039   0.015       0    TRAP      80       2
             *

478          KK  2C20BK
479          HC       2
             *

480          KK R2C20BK
481          KM  ROUTE TO C17BI
482          KM  HECRAS CROSS SECTION 42+41
483          KM  CHANGE FROM 600 FT TO 495 FT
484          RK     495  0.0039    0.03       0    TRAP      80       2
             *

485          KK HICKAM1
486          KM  BASIN REFERENCED FROM LOMR
487          PB    2.89
488          BA   0.477
489          LS       0    80.3
490          UD   0.472
             *
1
                                        HEC-1 INPUT                                                    PAGE 14
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

491          KK    BUF3
492          KM  DIVERT 125 CFS TO GOWAN NORTH BUFFALO BRANCH SD FROM HICKAM1
493          KM  SUBBASIN. REMAINING FLOW CONTINUES EAST ALONG HICKAM AVENUE
494          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
495          KM  FACILITY ID: GOBU 0000
496          DT  DGNBB3
497          DI       0     126     211   10000
498          DQ       0     125     125     125
             *

499          KK RHICKAM
500          KM  ROUTE TO C17BH
501          RK    1300   0.008   0.025       0    TRAP      80       2
             *

502          KK  GD17BH
503          KM  BASIN REFERENCED FROM LOMR
504          PB    2.77
505          BA   0.025
506          LS       0    82.8
507          UD   0.178
             *

508          KK   C17BH
509          HC       2
             *

510          KK   R17BH
511          KM  ROUTE TO GD17BG
512          RK    1330   0.006   0.025       0    TRAP      80       2
             *

513          KK  GD17BG
514          KM  BASIN REFERENCED FROM LOMR
515          PB    2.77
516          BA   0.116
517          LS       0    83.3
518          UD   0.275
             *

519          KK   C17BG
520          HC       2
             *

521          KK   R17BG
```

100S3I.OUT, 100-year interim condition, refer to Figure 4

```
 522          KM  ROUTE TO C17BI
 523          KM  HECRAS CROSS SECTION 42+41
 524          RK    1200   0.005   0.025       0    TRAP      80       2
              *
1                                        HEC-1 INPUT                                                    PAGE 15

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 525          KK  GD17BI
 526          KM  BASIN REFERENCED FROM LOMR
 527          PB    2.77
 528          BA   0.066
 529          LS       0    85.2
 530          UD   0.193
              *

 531          KK   C17BI
 532          HC       3
              *

 533          KK   R17BI
 534          KM  ROUTE TO C17BJ
 535          KM  HECRAS CROSS SECTION 27+40
 536          RK    1501  0.0023    0.03       0    TRAP     200       2
              *

 537          KK  GD14CH
 538          KM  BASIN REFERENCED FROM LOMR
 539          PB    2.77
 540          BA   0.040
 541          LS       0    83.0
 542          UD   0.181
              *

 543          KK   R14CH
 544          KM  ROUTE TO C17BJ
 545          KM  HECRAS CROSS SECTION 27+40
 546          RK    1900   0.005   0.015       0    TRAP      40       2
              *

 547          KK  GD17BJ
 548          KM  BASIN REFERENCED FROM LOMR
 549          PB    2.77
 550          BA   0.063
 551          LS       0    88.3
 552          UD   0.222
              *

 553          KK   C17BJ
 554          HC       3
              *

 555          KK REMAIN6
 556          KM  DIVERT FLOW THROUGH DUAL 6' X 2' RCB'S (CULVERT 10) AT ALEXANDER ROAD
 557          KM  BETWEEN CROSS-SECTIONS 28+10 AND 26+94 IN THE HEC-RAS MODEL.
 558          KM  WEIR FLOW ELIMINATED DUE TO SOUND WALL AND BARRIER RAILS
 559          DT    D95F
 560          DI       0     100     500    1000    1937    2725
 561          DQ       0    10.8      72     144     192     264
              *
1                                        HEC-1 INPUT                                                    PAGE 16

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 562          KK   R17BJ
 563          KM  ROUTE TO C6MAIN
 564          KM  HECRAS CROSS SECTION 25+14
 565          RK     226   0.005   0.015       0    TRAP      40       2
              *

 566          KK  GD14CF
 567          KM  BASIN REFERENCED FROM LOMR
 568          KM  SUBBASIN AT NW OF GOWAN & BUFFALO INTERSECTION
 569          PB    2.78
 570          BA   0.130
 571          LS       0    77.9
 572          UD   0.288
              *

 573          KK    BUF4
 574          KM  DIVERT 30 CFS TO GOWAN NORTH BUFFALO BRANCH SD FROM BUFFALO AND
 575          KM  EXCALIBUR INTERSECTION.REMAINING FLOW CONTINUES EAST ALONG ALEXANDER
 576          KM  FACILITY: GOWAN NORTH-BUFFALO BRANCH
 577          KM  FACILITY ID: GOBU 0000
 578          DT  DGNBB4
 579          DI       0      31      60   10000
 580          DQ       0      30      30      30
              *

 581          KK   R14CF
 582          KM  ROUTE TO GD14CG
 583          RK    1450   0.006   0.015       0    TRAP     100       2
              *

 584          KK  GD14CG
 585          KM  BASIN REFERENCED FROM LOMR
 586          PB    2.77
 587          BA   0.057
 588          LS       0    82.2
 589          UD   0.208
```

```
                *
590             KK   C14CG
591             HC       2
                *
592             KK   R14CG
593             KM  ROUTE TO GD14CI
594             RK    1650   0.006   0.015       0    TRAP     100       2
                *
595             KK  GD14CI
596             KM  BASIN REFERENCED FROM LOMR
597             PB    2.77
598             BA   0.054
599             LS       0    79.7
600             UD   0.196
                *
1                                          HEC-1 INPUT                                                    PAGE 17
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

601             KK   C14C1
602             HC       2
                *
603             KK   R14CI
604             KM  ROUTE TO CMAIN6
605             RK     945  0.0106   0.015       0    TRAP     100       2
                *
606             KK  CMAIN6
607             KM  HECRAS US95 CROSS SECTION 25+14
608             HC       2
                *
609             KK  RMAIN6
610             KM   ROUTE SOUTH TO US95 HECRAS CROSS SECTION 13+00
611             RK    1214  0.0026    0.03       0    TRAP      80       3
                *
612             KK REMAIN7
613             KM  DIVERT FLOW THROUGH 2-30" RCP's (CULVERT 12) EAST ACROSS
614             KM  US95 BETWEEN ALEXANDER ROAD AND GOWAN ROAD.
615             KM  FLOW OVER US95 ELIMINATED BETWEEN CROSS SECTIONS 14+20 AND 10+27
616             KM  DUE TO SOUNDWALLS.REVISED BY LBG 6-28-2005
617             DT    D95G
618             DI       0     100     500    1000    1500    1656    2000
619             DQ       0      60      82      96     102     101     104
                *
620             KK   GD11C
621             KM  BASIN REFERENCED FROM LOMR
622             PB    2.77
623             BA   0.132
624             LS       0    86.0
625             UD   0.296
                *
626             KK    C11C
627             HC       2
                *
628             KK    R11C
629             KM  ROUTE SOUTH TO CULVERT 13 UPSTREAM OF GOWAN UNDERPASS
630             KM  HECRAS CROSS SECTION 0+17
631             RK    1283  0.0026    0.03       0    TRAP      80       3
                *
632             KK   GD11B
633             KM  BASIN REFERENCED FROM LOMR
634             PB    2.77
635             BA   0.196
636             LS       0    87.6
637             UD   0.272
                *
1                                          HEC-1 INPUT                                                    PAGE 18
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

638             KK    C11B
639             HC       2
                *
640             KK  GOWAN1
641             KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
642             KM  BY POGGEMEYER DESIGN GROUP, INC
643             KM  DIVERT MAXIMUM OF 422 CFS INTO GOWAN OUTFALL AT US95
644             KM  REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
645             KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
646             KM  DIVERT 0 CFS, GOWAN OUTFALL IS FULL AT THIS LOCATION, LBG
647             KM  FACILITY: GOWAN OUTFALL FACILITIES
648             KM  FACILITY ID: G00F 0511
649             DT   GOOF1
650             DI       0      51     101     423    5000
651             DQ       0       3       3       3       3
                *
652             KK    R11B
653             KM  ROUTE TO CPT6B
```

```
654          RK    1400  0.0057   0.015       0    TRAP      80       2
             *

655          KK   CY05A
656          KM  BASIN REFERENCED FROM LOMR
657          PB    2.77
658          BA   0.025
659          LS      0    85.6
660          UD   0.179
             *

661          KK    D95G
662          KM  RETRIEVE FLOW DIVERTED THROUGH CULVERT 13
663          DR    D95G
             *

664          KK   RD95G
665          KM  ROUTE TO PT6B
666          RK    2300   0.004   0.015       0    TRAP      60       2
             *

667          KK    PT6B
668          KM  BASIN REFERENCED FROM LOMR
669          PB    2.77
670          BA   0.107
671          LS      0    89.1
672          UD   0.182
             *
1                                        HEC-1 INPUT                                        PAGE 19

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

673          KK   CPT6B
674          HC       2
             *

675          KK  2CPT6B
676          KM  RAINBOW & GOWAN
677          HC       3
             *

678          KK  GOWAN2
679          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
680          KM  BY POGGEMEYER DESIGN GROUP, INC
681          KM  DIVERT MAXIMUM OF 52 CFS INTO GOWAN OUTFALL AT RAINBOW FOR A
682          KM  TOTAL OF 474 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
683          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
684          KM  DIVERT 2 CFS THE GOWAN OUTFALL IS FULL AT THIS LOCATION, LBG
685          KM  FACILITY: GOWAN OUTFALL FACILITIES
686          KM  FACILITY ID: G00F 0511
687          DT   GOOF2
688          DI       0      53     101     423    5000
689          DQ       0       2       2       2       2
             *

690          KK   RPT6B
691          KM  ROUTE TO C5A3
692          RK    2480  0.0067   0.015       0    TRAP      80       2
             *

693          KK   CY05D
694          KM  BASIN REFERENCED FROM LOMR
695          PB    2.77
696          BA   0.059
697          LS      0    78.6
698          UD   0.254
             *

699          KK   PT5A3
700          KM  BASIN REFERENCED FROM LOMR
701          PB    2.77
702          BA   0.089
703          LS      0    87.1
704          UD   0.285
             *

705          KK    C5A3
706          KM  TORREY PINES & GOWAN
707          HC       3
             *
1                                        HEC-1 INPUT                                        PAGE 20

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

708          KK  GOWAN3
709          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
710          KM  BY POGGEMEYER DESIGN GROUP, INC
711          KM  DIVERT MAXIMUM OF 21 CFS INTO GOWAN OUTFALL AT TORREY PINES, FOR A
712          KM  TOTAL OF 495 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
713          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
714          KM  DIVERT 2 CFS AT THIS LOCATION, LBG
715          KM  FACILITY: GOWAN OUTFALL FACILITIES
716          KM  FACILITY ID: G00F 0511
717          DT   GOOF3
718          DI       0      22    5000
719          DQ       0       2       2
             *

720          KK    R5A3
721          KM  ROUTE TO C5A8 GOWAN & BRONCO
```

```
 722          RK    1236  0.0088   0.015       0    TRAP      80       2
              *

 723          KK     MAV
 724          KM  DIVERSION TO MAVERICK THEN DUNCAN THEN RANCHO.
 725          KM  DIVERSIONS DETERMINED USING HECRAS
 726          DTMAVERICK
 727          DI       0     200     400    1050    1300    1550    1800
 728          DQ       0       8      14      50     100     150     200
              *

 729          KK   R5A3B
 730          KM  ROUTE TO C5A8 GOWAN & BRONCO
 731          RK     600  0.0088   0.015       0    TRAP      80       2
              *

 732          KK   CY06A
 733          KM  BASIN REFERENCED FROM LOMR
 734          PB    2.77
 735          BA   0.077
 736          LS       0    84.0
 737          UD   0.246
              *

 738          KK   PT5A8
 739          KM  BASIN REFERENCED FROM LOMR
 740          PB    2.77
 741          BA   0.025
 742          LS       0    82.0
 743          UD   0.265
              *

 744          KK    C5A8
 745          KM  GOWAN & BRONCO
 746          HC       3
              *
1                                        HEC-1 INPUT                                        PAGE 21

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 747          KK   R5A3C
 748          KM  ROUTE C5A8 TO GOWAN & JONES
 749          RK     620  0.0088   0.015       0    TRAP      80       2
              *

 750          KK  GOWAN4
 751          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I
 752          KM  BY POGGEMEYER DESIGN GROUP, INC
 753          KM  DIVERT MAXIMUM OF 44 CFS INTO GOWAN OUTFALL AT JONES FOR A
 754          KM  TOTAL OF 539 CFS.REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
 755          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
 756          KM  DIVERT 2 CFS AT THIS LOCATION, LBG
 757          KM  FACILITY: GOWAN OUTFALL FACILITIES
 758          KM  FACILITY ID: G00F 0511
 759          DT   GOOF4
 760          DI       0      45    5000
 761          DQ       0       2       2
              *

 762          KK  DPT5A8
 763          KM  DIVERT FLOW TO JONES
 764          KM  FROM VTN NEVADA SILVER MESA STUDY (1989) AND CVL FISR
 765          KM  DIVERTED FLOW DRAINS SOUTH THEN EAST TO SANTA CATALINA. IT THEN
 766          KM  FLOWS UNDER MICHAEL TO RANCHO. MOST GOES UNDER RANCHO IN A RCB JUST SOUTH
 767          KM   OF THE MICHAEL WAY INTERSECTION. REMAINING FLOW CONTINUES SOUTH ON RANCHO.
 768          DT  DCY07B
 769          DI       0     100     500    1000    2000    3000    4000    5500
 770          DQ       0       0     116     253     592     948    1308    1859
              *

 771          KK    R5A8
 772          KM  ROUTE TO TRUE VALUE
 773          RK     1659  0.0097   0.015       0    TRAP      80       2
              *

 774          KK   R5A82
 775          KM  ROUTE TO CCY07A
 776          RK     1220  0.0097   0.015       0    TRAP      80       2
              *

 777          KK   CY07A
 778          KM  BASIN REFERENCED FROM LOMR
 779          PB    2.77
 780          BA   0.027
 781          LS       0    86.2
 782          UD   0.237
              *

 783          KK  CCY07A
 784          HC       2
              *
1                                        HEC-1 INPUT                                        PAGE 22

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 785          KK    TRUV
 786          KM  DIVERSION BEHIND TRUE VALUE HARDWARE REVISED BY LBG. DIVERSIONS
 787          KM  DETERMINED USING HECRAS LATERAL WEIR. L = 25 FT
 788          DT  TRUVAL
 789          DI       0     200     400     600    1000    1400    1800
```

```
790          DQ       0       8      25      43      78     114     149
             *
             * ***************************************************************
             * ***************************************************************
             * ****START OF FLOW CONVEYED IN SWALE ON WEST SIDE OF RANCHO****
             * ****AND ULTIMATELY TO THE GOWAN SD, LONE MTN BRANCH  *********
             * ****NONE OF THIS FLOW IS CONVEYED IN STREET PER LOMR HECRAS***
             * ***************************************************************
             * ***************************************************************
             *
791          KK    D95B
792          KM  RETRIEVE FLOW FROM BOX DIVERSION (CULVERT 3) JUST SOUTH OF US95/RANCHO INTERSE
793          KM  ***NOTE: THIS FLOW CARRIES A DRAINAGE AREA OF 1.47 SQUARE MILES***
794          KM  ***THIS TOTAL ADJUSTED BY STANLEY CONSULTANTS FROM 1.49 IN LBG HEC-1
795          DR    D95B
             *
796          KK   RD95B
797          KM  ROUTE TO 1REMAIN ON RANCHO DRIVE
798          RK    1200   0.004   0.025       0    TRAP      30       2
             *
799          KK 1REMAIN
800          KM  DIVERT 36 CFS EAST THROUGH 2, 24" CMP'S (CULVERT 14) UNDER RANCHO DR
801          KM  NORTHWEST (UPSTREAM) OF THE RANCHO DR AND RAINBOW BLVD INTERSECTION.
802          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
803          KM  UPPER RANCHO HECRAS CROSS SECTION 122+75.
804          DT  D1RCHO
805          DI       0     191    1000   10000
806          DQ       0      36      36      36
             *
807          KK  PT3AB1
808          KM  BASIN REFERENCED FROM LOMR
809          PB    2.77
810          BA   0.049
811          LS       0    93.7
812          UD   0.283
             *
813          KK   C3AB1
814          HC       2
             *
1                                        HEC-1 INPUT                                    PAGE 23
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
815          KK 2REMAIN
816          KM  DIVERT 29 CFS EAST THROUGH A 30" CMP (CULVERT 15) UNDER RANCHO DR
817          KM  AT THE RANCHO DR AND RAINBOW BLVD INTERSECTION.
818          KM  UPPER RANCHO HECRAS STA. 121+00
819          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
820          DT  D2RCHO
821          DI       0     189    1000   10000
822          DQ       0      29      29      29
             *
823          KK  R2MAIN
824          KM  ROUTE TO PT3AB2
825          RK    1365  0.0022   0.025       0    TRAP      30       2
             *
826          KK  PT3AB2
827          KM  BASIN REFERENCED FROM LOMR
828          PB    2.77
829          BA   0.050
830          LS       0    94.5
831          UD   0.197
             *
832          KK   C3AB2
833          HC       2
             *
834          KK 3REMAIN
835          KM  ALL FLOW UP TO STORMDRAIN DESIGN FLOW RATE, 240 CFS
836          KM  DIVERTED UNDER RANCHO RD AT LONE MT RD TO THE GOWAN SD FACILITY
837          KM  IN LONE MT(NDESIGN BY GCW)AT RANCHO HECRAS STA. 103+99 (LOMR BY LBG)
838          KM  REVISED BY STANLEY CONSULTANTS
839          KM  1 CFS REMAINS TO AVOID A ZERO FLOW
840          KM  FACILITY: GOWAN OUTFALL-LONE MTN ROAD BRANCH
841          KM  FACILITY ID: GOLO 0275
842          DT  D3RCHO
843          DI       0     241    1000   10000
844          DQ       0     240     240     240
             *
             * ***************************************************************
             * ***************************************************************
             * ****END OF FLOW CONVEYED TO GOWAN OUTFALL-LONE MTN ROAD SD****
             * *START OF SURFACE FLOW CONVEYED SOUTH IN SWALE EAST OF RANCHO*
             * *RUNOFF FROM TOTAL AREA CONVEYED TO STORMDRAIN ***************
             * *DECREASE CALCULATED AREA AT HC'S BY 0.1 SQ MI.***************
             * ***************************************************************
             * ***************************************************************
             *
1                                        HEC-1 INPUT                                    PAGE 24
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

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845          KK  R3MAIN
846          KM  ROUTE TO CPT2B2
847          KM  RANCHO HECRAS CROSS SECTION 93+76
848          RK    1023   0.005    0.03       0    TRAP      40       2
             *

849          KK   PT2B2
850          KM  BASIN REFERENCED FROM LOMR
851          PB    2.77
852          BA   0.078
853          LS       0    87.0
854          UD   0.254
             *

855          KK  CPT2B2
856          HC       2
             *

857          KK 4REMAIN
858          KM  DIVERT 35 CFS EAST THROUGH A 36" CMP (CULVERT 21)
859          KM  UNDER RANCHO DR HALF WAY BETWEEN LONE MTN RD AND CRAIG RD
860          KM  UPPER RANCHO HECRAS CROSS SECTION 93+76.
861          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
862          DT  D4RCHO
863          DI       0     214    1000   10000
864          DQ       0      35      35      35
             *

865          KK  R4MAIN
866          KM  ROUTE TO C2B3
867          RK    2323   0.011    0.02       0    TRAP      40       2
             *

868          KK   PT2B3
869          KM  BASIN REFERENCED FROM LOMR
870          PB    2.77
871          BA   0.023
872          LS       0    93.2
873          UD   0.236
             *

874          KK    C2B3
875          KM  UPPER RANCHO HECRAS CROSS SECTION 70+16
876          KM   FLOW ALONG RANCHO, NO. OF RANCHO/CRAIG INTERSECTION
877          HC       2
             *

878          KK    D2B3
879          KM  DIVERT FLOW TO CRAIG RD STORM DRAIN AT RANCHO.
880          KM  CRAIG RD STORM DRAIN IS A 42" TO 48" TO 60" RCP.
881          KM  A 48" LATERAL (CULVERT 22) INTO THE SD HAS A CAPACITY OF 120 CFS
882          KM  HY-8 CALCULATIONS INDICATE OF THE 91 CFS 100 YEAR STORM; 88 CFS IS CAPTURED BY
883          KM  THE INLET TO THE 48"LATERAL IS AT THE DOWNSTREAM END OF THE DRAINAGE EASEMENT
884          KM  BEHIND THE 7-11 CONVENIENCE STORE. IMMEDIATELY ABOVE THE 48" INLET ARE
1                                          HEC-1 INPUT                                    PAGE 25
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

885          KM  2, 3'X7' RCB'S (CULVERT 23) THAT CROSS UNDER CRAIG ROAD AND DISCHARGE ON THE
886          KM  SOUTHWEST SIDE OF THE CRAIG/RANCHO INTERSECTION.
887          KM  DIVERT 120 CFS TO THE CRAIG RD STORM DRAIN SINCE 90 CFS (HEC-1 DIVERSION DCSD1
888          KM  ALREADY EXISTS IN THE PIPE. REMAINING FLOW TRAVELS UNDER CRAIG ROAD IN THE
889          KM  2: 3'X7' RCB'S AND DISCHARGES AT THE SOUTHWEST CORNER OF THE CRAIG/RANCHO
890          KM  INTERSECTION AND IS JOINED BY THE STREET FLOW IN CRAIG. ALL STREET FLOW
891          KM  IN CRAIG IS CONTAINED IN THE NORTH HALF OF THE STREET BY THE MEDIAN CURB SO
892          KM  THERE IS NO DIVERSION TO TORREY PINES.
893          KM  UPPER RANCHO HECRAS STA. 70+00.
894          DT   DCSD2
895          DI       0      91    1000   10000
896          DQ       0      88     120     120
             *

897          KK   D2B3B
898          KM  DIVERT FLOW CAPTURED BY 7'X3' RCB'S TO GOWAN OUTFALL - ALEXANDER BRANCH SYSTEM
899          DT  GOAL01
900          DI       0       3     100     272
901          DQ       0       3       3       3
             *

902          KK   PT2A2
903          KM  BASIN REFERENCED FROM LOMR
904          PB    2.77
905          BA   0.062
906          LS       0    84.7
907          UD   0.222
             *

908          KK    R2A2
909          KM  ROUTE TO C2A1
910          RK    1200   0.004   0.015       0    TRAP     100       2
             *

911          KK   PT2A1
912          KM  BASIN REFERENCED FROM LOMR
913          PB    2.77
914          BA   0.065
915          LS       0    86.8
916          UD   0.308
             *

917          KK    D95E
918          KM  RETRIEVE FLOW FROM BOX DIVERSION AT US95 AND CRAIG (CULVERT 7)
```

```
919          KM  ***NOTE: THIS FLOW CARRIES A TOTAL TRIBUTARY AREA****
920          KM  ***OF 4.77/18.58 SQUARE MILES SDN3/SDN5**************
921          KM  THIS IS NOT IN ADDITION TO THE 1.47 SQUARE MILES BROUGHT IN BY D95B, SO
922          KM  THE TOTAL TRIBUTARY AREA TO THE CRAIG/RANCHO INTERSECTION IS
923          KM  MILES 4.77 + AREA AT C2B3 - AREA CAPTURED IN GOWAN SD LN MTN BRANCH
924          DR    D95E
             *
1                                        HEC-1 INPUT                                    PAGE 26
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

925          KK   RD95E
926          KM  ROUTE TO PT2A2
927          RK    1500   0.004   0.015       0    TRAP      80       2
             *

928          KK    C2A2
929          HC       3
             *

930          KK  DPT2A1
931          KM  DIVERT FLOW TO CRAIG RD. STORM DRAIN
932          KM  42" RCP, CAPACITY = 90 CFS
933          KM  REMAINING FLOW CONTINUES EAST IN CRAIG RD.
934          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
935          DT   DCSD1
936          DI       0      21      51      76      91     200     500    1000
937          DQ       0      20      50      75      90      90      90      90
             *

938          KK    R2A2
939          KM  ROUTE TO C2B1
940          RK    2100   0.007   0.015       0    TRAP      80       2
             *

941          KK   PT2B1
942          KM  BASIN REFERENCED FROM LOMR
943          PB    2.77
944          BA   0.072
945          LS       0    84.5
946          UD   0.222
             *

947          KK    C2B1
948          HC       2
             *

949          KK    R2B1
950          KM  ROUTE TO 2C2B3
951          KM  STREET FLOW IN CRAIG RD GOING EAST TO RANCHO DR
952          RK     300   0.007   0.015       0    TRAP      80       2
             *

953          KK   2C2B3
954          HC       2
             *

955          KK   D2CB3
956          KM  DIVERT FLOW CAPTURED BY INLETS ON RANCHO TO GOWAN OUTFALL - ALEXANDER BRANCH:
957          KM  DM2 AT 68+71, NDOT TYPE 2 AT 70+00, KMNDOT TYPE 2 AT 71+60, DM2 AT 43+20
958          KM  AND DM2 AT 82+45
959          DT  GOAL02
960          DI       0      37     136     150
961          DQ       0      30     112     112
             *
1                                        HEC-1 INPUT                                    PAGE 27
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

962          KK   RC2B3
963          KM  ROUTE TO 5REMAIN
964          KM  UPPER RANCHO HECRAS CROSS SECTION 53+82
965          RK    1600  0.0076    0.03       0    TRAP      80       2
             *
             * * IN INTERIM CONDITION, FLOW FROM PT51A CONVEYED INTO CULVERT 27 AND
             * * THEN TO GOAL AT NORTHERN INTERSECTION OF RANCHO W/ JONES/ALEXANDER
             * * BASIN PT51A LOCATED HERE IN EXISTING CONDITION HEC-1 MODEL
             * * MOVED TO END OF THIS MODEL WITH RETRIEVED FLOW IN GOAL
             *
             * KKPT51A
             * KMBASIN ADDED BY STANLEY CONSULTANTS, ORIGINALLY THE NORTHERN HALF
             * KMOF LOMR BASIN PT51, ALSO NORTHEAST PORTION OF MPU BASIN PT41-C
             * KMFLOW DISCHARGES INTO CHANNEL ON WEST SIDE OF RANCHO
             * KMCONTINUES SOUTH
             * PB2.77
             * BA0.035
             * LS0         93.2
             * UD   0.128
             *
             * KKC2628
             * HC2
             *

966          KK  DC2628
967          KM  DIVERT FLOW CAPTURED BY CULVERT 27 TO GOWAN OUTFALL - ALEXANDER BRANCH:
968          KM  AT STA 82+45 AND INLETS AT STA. 87.10, 94+34, 96+18
969          KM  THIS DIVERSION AND ONE ABOVE TAKE PLACE OF 5REMAIN
970          DT  GOAL03
971          DI       0       8      24     100
972          DQ       0       7      23      23
```

```
                *
                *
                * KK5REMAIN
                * KMDIVERT FLOW EAST ACROSS RANCHO IN TWO 6' X 3' RCB's (CULVERT 26 AND 28).
                * KMTHE FIRST RCB (CULVERT 26) IS JUST UPSTREAM OF A 7' X 3' RCB (CULVERT 27)
                * KMTHAT PARALLELS RANCHO ON THE WEST SIDE.
                * KMDIVERT 78 CFS OF 185 CFS EAST IN (CULVERT 26).
                * KMTHE REMAINING 107 CFS ENTERS CULVERT 27 AND CONTINUES SOUTH UNTIL IT SPLITS
                * KMAT THE CONNECTION WITH CULVERT 28.
                * KMDIVERT 35 CFS OF THE 107 CFS EAST IN CULVERT 28.
                * KMTHE REMAINING 72 CFS CONTINUES TO THE SOUTH SIDE OF ALEXANDER IN CULVERT 27
                * KMUPPER RANCHO HECRAS HAS CULVERT 27 IN IT BETWEEN STA 52+64 AND 38+36.
                * KMIN INTERIM AND DEVELOPED CONDITIONS THESE FLOWS WILL ENTER THE CCRFCD
                * KMSTORM DRAIN FACILITY (GOAL 0111) AT THESE LOCATIONS.
                * DTD5RCHO
                * DI0          185   1000  10000
                * DQ0          113    113    113
                *
1                                                  HEC-1 INPUT                                                    PAGE 28

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

 973            KK  R5REMN
 974            KM  ROUTE TO CPT51
 975            KM  UPPER RANCHO HECRAS CROSS SECTION 38+36
 976            RK    1428   0.006    0.03       0    TRAP       7       0
                *

 977            KK   PT51B
 978            KM  BASIN ADDED BY STANLEY CONSULTANTS, ORIGINALLY THE SOUTHERN HALF
 979            KM  OF LOMR BASIN PT51, ALSO SOUTHEAST PART OF MPU BASIN PT41-C
 980            PB    2.77
 981            BA   0.035
 982            LS       0    93.2
 983            UD   0.147
                *
                * KKPT51
                * THIS BASIN WAS DIVIDED INTO SMALLER SUBBASINS BY STANLEY CONSULTANTS, SEE
                * ABOVE (PT51A AND PT51B) TO PROVIDE MORE DETAIL ON WHERE FLOWS WILL ENTER THE
                * PROPOSED CCRFCD STORM DRAIN SYSTEM IN CRAIG ROAD, RANCHO
                * DRIVE, AND ALEXANDER/JONES BOULEVARD IN INTERIM AND DEVELOPED CONDITIONS
                * PB2.77
                * BA0.070
                * LS0          90.4
                * UD0.262
                *

 984            KK   CPT51
 985            KM  WEST SIDE RANCHO, NORTH OF ALEXANDER (JONES NORTH)
 986            HC       2
                *
                * KKD95Fa
                * KMRETRIEVE FLOW FROM WEIR DIVERSION AT US95 AND ALEXANDER
                * DRD95Fa
                *
                * THESE TWO DIVERSIONS CARRY A TOTAL TRIBUTARY AREA OF 18.68.
                * THIS IS NOT IN ADDITION TO THE 1.49 SQUARE MILES AND 2.35
                * SQUARE MILES BROUGHT IN BY D95B AND D95E RESPECTIVELY, SO THE TOTAL
                * TRIBUTARY AREA AT THE ALEXANDER/RANCHO INTERSECTION IS 19.69 SQUARE MILES.
                * (18.68 + 1.01)
                * AREA ADJ TO SND3 RESULTS, 5.61 SQ MI, BY STANLEY CONSULTANTS
                *

 987            KK    D95F
 988            KM  RETRIEVE FLOW FROM CULVERT 10 AND WEIR DIVERSION AT US95 AND ALEXANDER
 989            DR    D95F
                *

 990            KK   RD95F
 991            KM  ROUTE TO CPT6A
 992            RK    1500   0.004   0.015       0    TRAP     100       2
                *
1                                                  HEC-1 INPUT                                                    PAGE 29

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

 993            KK     PT3
 994            KM  BASIN REFERENCED FROM LOMR
 995            PB    2.77
 996            BA   0.148
 997            LS       0    86.9
 998            UD   0.211
                *

 999            KK    PT6A
1000            KM  BASIN REFERENCED FROM LOMR
1001            PB    2.77
1002            BA   0.024
1003            LS       0    90.3
1004            UD   0.231
                *

1005            KK   CPT6A
1006            HC       3
                *

1007            KK   RPT6A
1008            KM  ROUTE TO PT42
1009            RK    2450   0.007   0.015       0    TRAP     100       2
                *
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```
1010          KK    PT41
1011          KM  BASIN REFERENCED FROM LOMR
1012          PB    2.77
1013          BA   0.137
1014          LS       0    82.0
1015          UD   0.220
              *

1016          KK   RPT41
1017          KM  ROUTE TO CPT42
1018          RK    1050  0.0038   0.015       0    TRAP      80       2
              *

1019          KK    PT42
1020          KM  BASIN REFERENCED FROM LOMR
1021          PB    2.77
1022          BA   0.079
1023          LS       0    82.0
1024          UD   0.303
              *

1025          KK   CPT42
1026          HC       2
              *
1                                        HEC-1 INPUT                                          PAGE 30

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1027          KK   PT5A1
1028          KM  BASIN REFERENCED FROM LOMR
1029          PB    2.77
1030          BA   0.051
1031          LS       0    88.3
1032          UD   0.237
              *

1033          KK    C5A1
1034          HC       3
              *

1035          KK    R5A1
1036          KM  ROUTE TO CPT52
1037          RK    1680  0.0089   0.015       0    TRAP     100       2
              *

1038          KK   PT5A4
1039          KM  BASIN REFERENCED FROM LOMR
1040          PB    2.77
1041          BA   0.034
1042          LS       0    82.0
1043          UD   0.284
              *

1044          KK    PT52
1045          KM  BASIN REFERENCED FROM LOMR
1046          PB    2.77
1047          BA   0.065
1048          LS       0    82.0
1049          UD   0.273
              *

1050          KK   CPT52
1051          KM  ALEXANDER WEST OF RANCHO
1052          HC       3
              *

1053          KK   RPT52
1054          KM  ROUTE TO 2CPT51
1055          KM  UPPER RANCHO HECRAS CROSS SECTION 38+36, SAME AS CPT51
1056          RK     560  0.0036   0.015       0    TRAP     100       2
              *

1057          KK  2CPT51
1058          KM  RANCHO ALEXANDER INTERSECTION (JONES SOUTH)
1059          HC       2
              *
1                                        HEC-1 INPUT                                          PAGE 31

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1060          KKDC2CPT51
1061          KM  DIVERT FLOW IN CULVERTS AT RANCHO/JONES INTERSECTION
1062          KM   TO GOWAN OUTFALL - ALEXANDER BRANCH:
1063          KM   STA 96+45, 96+80, 97+45
1064          KM   AND DIVERT FLOW CAPTURED BY INLETS TO GOWAN OUTFALL - ALEXANDER BRANCH:
1065          KM  AT STA 99+50 AND 102+00
1066          DT  GOAL04
1067          DI       0     292     478    5000
1068          DQ       0     127     127     127
              *

1069          KK R2CPT51
1070          KM  ROUTE TO 2CPT51
1071          KM  UPPER RANCHO HECRAS CROSS SECTION 29+79
1072          RK     857  0.0036   0.015       0    TRAP     100       2
              *
              *
              * START FOR DETERMINING INTERIM FLOW AT NORTHERN INTERSECTION
              * OF RANCHO AND JONES/ALEXANDER IN GOWAN OUTFALL - ALEXANDER BRANCH
```

```
1073          KK   PT51A
1074          KM   BASIN ADDED BY STANLEY CONSULTANTS, ORIGINALLY THE NORTHERN HALF
1075          KM   OF LOMR BASIN PT51, ALSO NORTHEAST PORTION OF MPU BASIN PT41-C
1076          KM   100-YEAR AND LESS RUNOFF DISCHARGES INTO CULVERT 27, AN RCB ON
1077          KM   WEST SIDE OF RANCHO THEN CONVEYED TO GOAL, CONTINUES SOUTH IN GOAL
1078          PB    2.77
1079          BA   0.035
1080          LS      0    93.2
1081          UD   0.128
              *
              *
              * RETRIEVE FLOW DIVERTED TO GOWAN OUTFALL-ALEXANDER BRANCH **
              *

1082          KK  RGOAL1
1083          DR  GOAL01
              *

1084          KK  RGOAL2
1085          DR  GOAL02
              *

1086          KK  RGOAL3
1087          DR  GOAL03
              *

1088          KK   GOAL3
1089          HC       4
              *
              *
1
                                                  HEC-1 INPUT                                                    PAGE 32
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1090          KK  RGOAL3
1091          KM   ROUTE FLOW UPSTREAM OF THE NORTHERN INTERSECTIN OF RANCHO AND
1092          KM   ALEXANDER/JONES TO OUTLET IN GOWAN OUTFALL - ALEXANDER BRANCH
1093          RD    1000   0.005   0.015       0    TRAP      12       0
              *

1094          KK  RGOAL4
1095          KM   FLOW CAPTURED BY GOAL BETWEEN JONES/ALEXANDER AND ALEXANDER/JONES
1096          DR  GOAL04
              *

1097          KK   CGOAL
1098          KM   COMBINE FLOWS IN GOWAN OUTFALL - ALEXANDER FACILITIES
1099          KM   UPSTREAM OF OUTLET STRUCTURE
1100          HC       2
              *

1101          KK   DGOAL
1102          KM  DIVERT THE 24 CFS THAT CONTINUES THROUGH THE BLEEDER LINE
1103          DT   BGOAL
1104          DI       0      24     100     198     284
1105          DQ       0      23      24      24      24
              *
              * * REMAINING STORMDRAIN FLOW SURFACES THROUGH OUTLET STRUCTURE
              * * COMBINES WITH SURFACE FLOW AND SPLITS AT
              * * INTERSECTION OF RANCHO AND JONES/ALEXANDER
              * * SEE DIVERSION CARD 6 REMAIN

1106          KKR2CPT51B
1107          HC       2
              *

1108          KK 6REMAIN
1109          KM   FLOWSPLIT AT RANCHO AND JONES/ALEXANDER INTERSECTION
1110          KM   REMAINS SAME AS EXISTING CONDITION SPLIT
1111          KM   THE 14 CFS DIVERTED TO AN 18" CMP (CULVERT 29) IN EXISTING CONDITION IS
1112          KM   NOW DIVERTED INTO THE GOAL, DOWNSTREAM OF THE ORIFICE PLATE, SO IT CONTINUES
1113          KM   EAST IN THE BLEEDER LINE.
1114          KM   THE CATCH BASIN OF A DROP INLET ON THE SOUTHEAST SIDE OF JONES AND
1115          KM   THE WEST SIDE OF RANCHO WILL REMAIN. FLOW CAPTURED BY THIS INLET CROSSES
1116          KM  RANCHO (CULVERT 30) AND DISCHARGES TO THE EAST SIDE.
1117          KM   DIVERT ADDITONAL FLOW ACROSS RANCHO THAT IS WEIR FLOW BETWEEN CROSS
1118          KM   SECTIONS 38+36 AND 28+01. RATING CURVE DEVELOPED
1119          KM   USING HECRAS LATERAL WEIR BY LGB 7-13-2005. REMAINING FLOW CONTINUES SOUTH
1120          KM   ON THE WEST SIDE OF RANCHO.
1121          DT  D6RCHO
1122          DI       0      53     146     400     600     700
1123          DQ       0      40      52      75     126     163
              *
1
                                                  HEC-1 INPUT                                                    PAGE 33
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1124          KK  R6MAIN
1125          KM  ROUTE TO C5A6
1126          RK     699  0.0025    0.03       0    TRAP      80       2
              *

1127          KK   PT5A2
1128          KM  BASIN REFERENCED FROM LOMR
1129          PB    2.77
1130          BA   0.080
1131          LS      0    85.8
1132          UD   0.257
              *
```

```
1133          KK    R5A2
1134          KM  ROUTE TO C5A6
1135          RK    3920  0.0064   0.015       0    TRAP      60       2
              *

1136          KK   PT5A6
1137          KM  BASIN REFERENCED FROM LOMR
1138          PB    2.77
1139          BA   0.188
1140          LS      0    82.9
1141          UD   0.195
              *

1142          KK    C5A6
1143          KM  UPPER RANCHO HECRAS CROSS SECTION 22+80
1144          HC       3
              *

1145          KK 7REMAIN
1146          KM  DIVERT FLOW EAST ACROSS RANCHO IN A 6' X 2' RCB (CULVERT 31).
1147          KM  REMAINING FLOW CONTINUES SOUTH ON THE WEST SIDE OF RANCHO
1148          KM  REVISED BY LBG (CULVERT 31=102 to 107 cfs) WEIR FLOW RATING
1149          KM  CURVE DEVELOPED WITH HECRAS LATERAL WEIR #1 FROM 28+01 TO 22+80
1150          DT  D7RCHO
1151          DI       0     108     146     400     500     600     650
1152          DQ       0      99     102     126     140     174     185
              *

1153          KK  R7MAIN
1154          KM  ROUTE TO C5A7
1155          KM  UPPER RANCHO HECRAS CROSS SECTION 14+56
1156          RK     824   0.004    0.03       0    TRAP      80       2
              *

1157          KK    DMAV
1158          KM  RETRIEVE FLOW FROM MAVERICK
1159          DRMAVERICK
              *
1                                        HEC-1 INPUT                                        PAGE 34

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1160          KK    RMAV
1161          KM  ROUTE TO CPT5A6
1162          RK    3180  0.0064   0.015       0    TRAP      60
              *

1163          KK    CMAV
1164          HC       2
              *

1165          KK  DPT5A7
1166          KM  DIVERT FLOW ACROSS RANCHO AS WEIR FLOW NEAR DUNCAN ROAD, BETWEEN
1167          KM  CROSS SECTIONS 19+32 AND 14+56. RATING CURVE BY LBG 7-13-2005
1168          KM   USING LATERAL WEIR IN HECRAS.
1169          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG THE WEST SIDE OF RANCHO
1170          DT DDUNCAN
1171          DI       0     146     200     352     552     800
1172          DQ       0      35      77     139     297     460
              *

1173          KK   PT5A7
1174          KM  BASIN REFERENCED FROM LOMR
1175          PB    2.77
1176          BA   0.074
1177          LS      0    84.4
1178          UD   0.351
              *

1179          KK    C5A7
1180          KM  DUNCAN/RANCHO INTERSECTION
1181          HC       2
              *

1182          KK    R5A7
1183          KM  ROUTE TO 8REMAIN
1184          KM  UPPER RANCHO HECRAS CROSS SECTION 9+83
1185          RK     473   0.004    0.03       0    TRAP      80       2
              *

1186          KK 8REMAIN
1187          KM  DIVERT 24 CFS EAST ACROSS RANCHO IN A 24" CMP (CULVERT 32).
1188          KM  REMAINING FLOW CONTINUES SOUTH ON THE WEST SIDE OF RANCHO
1189          KM  REVISED TO 23 CFS BY LBG. WEIR FLOW ACROSS RANCHO CALCULATED
1190          KM  USING HECRAS LATERAL WEIR #3 BETWEEN CROSS SECTION 9+83 AND 7+43.
1191          DT  D8RCHO
1192          DI       0      24     100     200     300     400     500     600
1193          DQ       0      23      23      54     122     200     273     346
              *

1194          KK  R8MAIN
1195          KM  ROUTE TO C5A9
1196          KM  UPPER RANCHO HECRAS CROSS SECTION 0+00
1197          RK     983   0.003   0.025       0    TRAP      20       2
              *
1                                        HEC-1 INPUT                                        PAGE 35

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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```
1198          KK   PT5A9
1199          KM  BASIN REFERENCED FROM LOMR
1200          PB    2.77
1201          BA   0.045
1202          LS       0    85.7
1203          UD   0.246
              *

1204          KK    C5A9
1205          KM  GOWAN & RANCHO
1206          HC       2
              *

1207          KK  GWAN5A
1208          KM  10 AND 25 YEAR EVENT ONLY - FULL IN 100 YEAR EVENT
1209          KM  DIVERT MAXIMUM OF 40 CFS (DESIGN FLOW RATE) OF SOUTHBOUND FLOW
1210          KM  IN RANCHO INTO GOWAN OUTFALL SD AT RANCHO/GOWAN INTERSECTION,
1211          KM  REMAINING FLOW TRAVELS SOUTH. ADDED BY STANLEY CONSULTANTS
1212          KM  FACILITY: GOWAN OUTFALL FACILITIES
1213          KM  FACILITY ID: G00F 0511
1214          DT  GOOF5A
1215          DI       0       0      40   10000
1216          DQ       0       0       1       1
              *

1217          KK C2PT5A9
1218          KM
1219          HC       2
              *

1220          KK  GOWAN5
1221          KM  FROM 90% SUBMITTAL DRAINAGE STUDY ADDENDA I [SIC]
1222          KM  BY POGGEMEYER DESIGN GROUP, INC
1223          KM  DIVERT MAXIMUM OF 1 CFS INTO GOWAN OUTFALL (FACILITY G00F 0486)
1224          KM  AT RANCHO REMAINING FLOW TRAVELS EASTWARD ON GOWAN ROAD
1225          KM  REVISED BY LBG. GOOF IS FULL.
1226          DT   GOOF5
1227          DI       0      49    5000
1228          DQ       0       1       1
              *

1229          KKDEASTGOW
1230          KM  FLOW SPLIT AT GOWAN AND RANCHO INTERSECTION. DIVERT MAJORITY OF FLOW
1231          KM  TO RANCHO SOUTH OF GOWAN RD BETWEEN CROSS-SECTIONS 983 AND 0.
1232          KM  THE REMAINING FLOW TRAVELS EAST ON GOWAN.
1233          KM  (THIS IS A LITTLE STRANGE.  THE DIVERTED FLOW IS
1234          KM  WHAT ACTUALLY CONTINUES ON RANCHO SOUTH!)
1235          KM  DIVERSION RENAMED FROM "GOWAN" TO LWRRNCH
1236          KM  NODE RENAMED FROM "DRANCHO" TO "DEASTGOW"
1237          DT LWRRNCH
1238          DI       0     400     600    1000    1200    1400    1600    2000    2400
1239          DQ       0     372     502     730     842     955    1068    1305    1553
              *
              * ************************************************************
              * *************END OF PBS&J MODEL, REFERENCED BY LOMR***********
              * **START MODEL OF EASTBOUND FLOW IN GOWAN ADDED BY STANLEY*****
              * ************************************************************
              * ************************************************************
              *
1                                        HEC-1 INPUT                                        PAGE 36

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1240          KKRDEASTGOW
1241          KM  ROUTE FLOW TO GOWAN/DECATUR INTERSECTION AND COMBINE WITH BASIN CY08-C
1242          RK    3250   0.006   0.016       0    TRAP      80       2
              *

1243          KK  CY08-C
1244          KM  BASIN REFERENCED FROM 2008 MPU ALLGOW3.DAT
1245          BA   0.094
1246          PB    2.77
1247          LS       0    88.5
1248          UD   0.306
              *
1249          KM  KKCCCY08-C
1250          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1251          KM  COMBINE CY08-C, CCY08-C, AND RDCY07B
1252          KM  GOWAN AND DECATUR
1253          KM  HC3
              *
1254          KM  KKDGOW2A
1255          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1256          KM  DIVERT FLOW TO GOWAN OUTFALL
1257          KM  DIVERSION BASED ON GOWAN ROAD DRAINAGE STUDY BY POGGEMEYER
1258          KM  8'X 5' RCB, CAPACITY = 630 CFS (GOOF 0486)
1259          KM  REMAINING FLOW CONTINUES EAST IN GOWAN RD. AND ENTERS THE CENTRAL BASIN
1260          KM  OPPOSITE OF DGOW2A IN CWH
1261          KM  DTDCENTRAL
1262          KM  DI0       31      51      71     101     301     601     631    3000    5000
1263          KM  DQ0        1       1       1       1       1       1       1    2370    4370
              *
1264          KM  KKRDGOW2A
1265          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1266          KM  ROUTE DGOW2A TO CPT5B6-C
1267          KM  FACILITY = GOWAN NORTH SYSTEM
1268          KM  FACILITY # = GOOF 0427, 0485
1269          KM  LINING = RCP
1270          KM  RD2370    0.005   0.013   0       CIRC    8       0
              *
```

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1271          KK  CCY08C
1272          KM  COMBINE RDEASTGOW AND CY08-C AT DECATUR GOWAN INTERSECTION
1273          KM  IN EXISTING CONDITION THIS FLOW WILL CONTINUE EAST IN GOWAN
1274          HC       2
              *

1275          KK   DGWN6
1276          KM  GOWAN OUTFALL FULL
1277          KM  DIVERT 1 CFS TO GOWAN OUTFALL AT GOWAN/DECATUR INTERSECTION
1278          DT   GOOF6
1279          DI       0      31      51      71     101     301    1001    2001    3001    5001
1280          DQ       0       1       1       1       1       1       1       1       1       1
              *
1                                        HEC-1 INPUT                                          PAGE 37

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1281          KK   DALEX
1282          KM  DIVERT EASTBOUND SURFACE FLOW AT GOWAN/DECATUR INTERSECTION
1283          KM  THE REMAINING FLOW TRAVELS NORTH IN ALEXANDER
1284          KM  RATING TABLE FROM FLOW SPLIT CALCULATION BY STANLEY CONSULTANTS
1285          DT  DEGWN6
1286          DI       0     100     200     260     360
1287          DQ       0      71     143     185     257
              *
1288          KM  KKRDALEX
1289          KM  ROUTE SURFACE FLOW IN DECATUR TO DECATUR/ALEXANDER INTERSECTION
1290          KM  RD  2640   0.005    .016            TRAP     100       2
              *

1291          KK   CUL30
1292          KM  RETRIEVE FLOW FROM CULVERT 30
1293          DR  D6RCHO
              *

1294          KK  RCUL30
1295          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1296          RK    5000    0.01   0.016       0    TRAP      80       2
              *

1297          KK   CUL31
1298          KM  RETRIEVE FLOW FROM CULVERT 31
1299          DR  D7RCHO
              *

1300          KK  RCUL31
1301          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1302          RD    4750    0.01   0.016       0    TRAP      80       2
              *

1303          KK  DUNCAN
1304          KM  RETRIEVE FLOW FROM DUNCAN
1305          DR DDUNCAN
              *

1306          KK RDUNCAN
1307          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1308          RD    5450    0.01   0.016       0    TRAP      80       2
              *

1309          KK   CUL32
1310          KM  RETRIEVE FLOW FROM CULVERT 32
1311          DR  D8RCHO
              *

1312          KK  RCUL32
1313          KM  ROUTE RETRIEVED FLOW THROUGH BASIN PT5B6-C
1314          RD    5100    0.01   0.016       0    TRAP      80       2
              *
1                                        HEC-1 INPUT                                          PAGE 38

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1315          KK  CPT56B
1316          KM  COMBINE ROUTES IN BASIN PT5B6-C AT ALEXANDER/DECATUR
1317          HC       4
              *

1318          KK PT5B6-C
1319          KM  BASIN REFERENCED FROM 2008 MPU ALLGOW3.DAT
1320          BA   0.381
1321          PB    2.77
1322          LS       0    86.3
1323          UD   0.368
              *

1324          KK CCPT56B
1325          KM  COMBINE PT5B6-C AND CPT56B AT ALEXANDER/DECATUR
1326          HC       2
              *

1327          KKCCCPT56B
1328          KM  COMBINE SURFACE FLOW IN ALEXANDER/DECATUR INTERSECTION
1329          HC       2
              *
1330          KM  KKCCPT5B6C
1331          KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1332          KM  KMCOMBINE PT5B6-C AND CPT5B6-C
1333          KM  KMDECATUR AND ALEXANDER
1334          KM  HC2
```

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                *
1335            KM  KKRCCPT5B6
1336            KM  KMREFERENCED FROM 2008 MPU ALLGOW3.DAT
1337            KM  KMROUTE CCPT5B6C TO CPT5C-1
1338            KM  KMFACILITY = GOWAN OUTFALL FACILITIES
1339            KM  KMFACILITY # = GOOF 0375
1340            KM  KMLINING = RCB
1341            KM  RD2700    0.0056  0.015   0       TRAP    24      0
                *

1342            KK  0511-1
1343            KM  RETRIEVE FLOW IN GOOF 0511 AT US95/GOWAN
1344            DR   GOOF1
                *

1345            KK  0511-2
1346            KM  RETRIEVE FLOW IN GOOF 0511 AT RAINBOW/GOWAN
1347            DR   GOOF2
                *

1348            KK  0511-3
1349            KM  RETRIEVE FLOW IN GOOF 0511 AT TORREY PINES/GOWAN
1350            DR   GOOF3
                *
1                                       HEC-1 INPUT                                                    PAGE 39
LINE            ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1351            KK  0511-4
1352            KM  RETRIEVE FLOW IN GOOF 0511 AT JONES/GOWAN
1353            DR   GOOF4
                *

1354            KK GOOF1-4
1355            KM  THIS REPRESENTS THE FLOW IN GOOF 0511 AT JONES/GOWAN
1356            HC       4
                *

1357            KK 0511-5A
1358            KM  RETRIEVE FLOW IN GOOF 0511 AT RANCHO/GOWAN
1359            DR  GOOF5A
                *

1360            KKGOOF1-5A
1361            KM  THIS REPRESENTS THE FLOW IN GOOF 0511 AT RANCHO/GOWAN
1362            HC       2
                *

1363            KK  0511-5
1364            KM  RETRIEVE FLOW IN GOOF EAST OF RANCHO
1365            DR   GOOF5
                *

1366            KK  0486-1
1367            KM  RETRIEVE FLOW IN GOOF EAST OF RANCHO AT GOWAN
1368            DR   GOOF6
                *

1369            KK    0486
1370            KM  THIS REPRESENTS THE FLOW IN GOOF 0486 AT ALEXANDER/GOWAN
1371            HC       3
                *

1372            KK RDGOW2A
1373            KM  REFERENCED FROM 2008 MPU ALLGOW3.DAT
1374            KM  ROUTE DGOW2A TO CPT5B6-C
1375            KM  FACILITY = GOWAN NORTH SYSTEM
1376            KM  FACILITY # = GOOF 0427, 0485
1377            KM  LINING = RCP
1378            RD    2370   0.005   0.013       0    CIRC       8       0
                *

1379            KKCCCPT5B6C
1380            KM  COMBINE FACILITY FLOW AND SURFACE FLOW AT THE
1381            KM  ALEXANDER/DECATUR INTERSECTION
1382            HC       2
                *
                * ***************************************************************
                * ********END GOWAN EASTBOUND FLOW MODEL BY STANLEY*************
                * **********BEGIN CVL MODEL REFERENCED BY LOMR*******************
                * ***************************************************************
                * ***************************************************************
                *
1                                       HEC-1 INPUT                                                    PAGE 40
LINE            ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1383            KK   GOWAN
1384            KM  RETRIEVE DIVERSION GOWAN
1385            KM  THE FLOW DIVERTED SOUTH IN RANCHO FROM GOWAN INTERSECTION
1386            DR LWRRNCH
                *

1387            KK CENTRL1
1388            KM  ADDED BY LBG
1389            KM  FLOW OVER RANCHO AT GOWAN RD BETWEEN 0+00 OF UPPER RANCHO HECRAS
1390            KM  MODEL AND 174+98 OF THE LOWER RANCHO MODEL.
1391            KM  (0+00 OF UPPER RANCHO MODEL = 177+03.33 OF LOWER RANCHO MODEL)
1392            KM  STATIONING OF UPPER RANCHO MODEL CORRESOPONDS TO ORIGNAL FIS.
1393            KM  MOST CROSS SECTIONS ARE IDENTICAL TO ORIGINAL EFFECTIVE MODEL.
```

```
1394          DT  D9RCHO
1395          DI        0     100     200     300     400     800    1000    1478
1396          DQ        0       8      61     121     176     424     522     811
              *

1397          KK  TRUVAL
1398          KM  RETRIEVE TRUE VALUE DIVERSION DETERMINED WITH HECRAS LATERAL WEIR
1399          DR  TRUVAL
              *

1400          KK   CBDV1
1401          KM  COMBINE TRUVAL AND GOWAN
1402          KM  HECRAS STATION 17173.04 OF LOWER RANCHO MODEL
1403          HC        2
              *

1404          KK  MORBAY
1405          KM  RETRIEVE DIVERSION MORBAY (DCY07B FROM JONES/GOWAN)
1406          KM  MORBAY FROM CVL STUDY, DCY07B IN PBS&J STUDY
1407          DR  DCY07B
              *

1408          KKCBDVMORBAY
1409          KM  COMBINE GOWAN & MORBAY
1410          KM  HECRAS STATION 171+73.04 OF LOWER RANCHO MODEL
1411          HC        2
              *

1412          KK CENTRL2
1413          KM  ADDED BY LBG
1414          KM  2: 6'X2' RCBC UNDER RANCHO JUST SOUTH OF MICHAEL WAY
1415          KM  ID RAN 190 FROM NORTHWEST NEIGHBORHOOD STUDY
1416          DT D10RCHO
1417          DI        0       21       73      100     1000     2000
1418          DQ        0       20       72      100      200      200
              *
1                                        HEC-1 INPUT                                        PAGE 41

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1419          KK   RTCHY
1420          KM  ROUTE TO CHEYENNE/RANCHO
1421          RM        3    0.32    0.15
              *
              * KKCBCX5
              * KMCOMBINE WITH CX5 AT CHEYENNE/RANCHO INTERSECTION
              * HC      2
              *

1422          KK   DVWR1
1423          KM  OVERFLOW CHEYENNE/RANCHO INTERSECTION HECRAS STATION 144+11.04
1424          KM  OF LOWER RANCHO MODEL
1425          DT  DVSTR1
1426          DI        0     167     261     622    1272
1427          DQ        0       0      36     180     455
              *

1428          KK   DVWR2
1429          KM  24" PIPE RANCHO
1430          DT  DVSTR2
1431          DI        0      10      20      30      37     100     500
1432          DQ        0      10      20      30      37      37      37
              *

1433          KK     RX5
1434          KM  ROUTE TO 6 X 3 RCB
1435          RM        1     0.1     0.3
              *
              *
              * ************************************************************
              * ********END SDN 3 ANALYSIS FOR UPPER HEC-1 MODEL *************
              * ******** NORTH OF CHEYENNE *********************************
              * ********BEGIN HEC-1 FOR SDN3 ANALYSIS FOR LOWER HEC-1 MODEL***
              * ****SEE RANCHO LOMR FOR SEPARATE ANALYSIS AND CHECK OF sDN5***
              * ************************************************************
              *

1436          KK      X4
1437          KM  BASIN REFERENCED FROM LOMR
1438          KM  BASIN AREA USED IS REFERENCED FROM LBG SND3 MODEL
1439          KM  LBG LOMR REFERENCES THE SND5 MODEL, WHICH HAD AREA OF 0.698
1440          KM  PER LBG - THIS BASIN AREA REDUCED IN SIZE [FROM 0.810 TO 0.698)
1441          KM  TO TIE INTO BASINS FROM PBS&J MODEL
1442          PB    2.77
1443          BA   0.810
1444          LS        0      91
1445          UD     1.9
              *
1                                        HEC-1 INPUT                                        PAGE 42

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1446          KK     X3B
1447          KM  BASIN REFERENCED FROM LOMR
1448          BA     .16
1449          LS        0      88
1450          UD    0.54
              *

1451          KK    CUL4
```

```
1452          KM  ROUTE THRU 2-6 X 4 689+30
1453          RS       1    ELEV    13.5
1454          SV       0     .32      18
1455          SE    13.5      15      18
1456          SQ       0      60     245
              *

1457          KK     X3A
1458          KM  BASIN REFERENCED FROM LOMR
1459          BA     .12
1460          LS       0      88
1461          UD    0.49
              *

1462          KK    CUL8
1463          KM  MAXIMUM Q INCREASED TO 50 CFS BY LBG TO ACCOMMODATE HIGHER FLOWS
1464          KM  STANLEY CONSULTANTS REFERENCED THE SDN3 MODEL
1465          KM  TO OBTAIN THE LAST COLUMN
1466          KM  24"  674+06
1467          RS       1    ELEV    18.5
1468          SV       0     1.1     3.6     3.7     3.9
1469          SE    18.5    20.5    22.5    22.6      23
1470          SQ       0      15      28      50      75
              *

1471          KK   CX3AB
1472          KM  COMBINE X3A &  X3B
1473          HC       2
              *

1474          KK   RK3AB
1475          KM  ROUTE TO JONES
1476          RM      10     1.0      .3
              *

1477          KK      CX
1478          HC       2
              *

1479          KK   DEVX4
1480          KM  DIVERT 100 CFS TO CHEYENNE
1481          DT   DEVX4
1482          DI       0      50     100     200     500    1000    5000
1483          DQ       0      25      50     100     100     100     100
              *
1                                        HEC-1 INPUT                                    PAGE 43

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1484          KK     RK4
1485          KM  ROUTE X4 SOUTH ON MICHAEL WAY TO LOW POINT
1486          KM  THEN TO RANCHO
1487          RM       2     0.2     0.4
              *

1488          KK     X3C
1489          KM  BASIN REFERENCED FROM LOMR
1490          BA     .48
1491          LS       0      81
1492          UD    1.52
              *

1493          KK    SD1A
1494          KM  DROP   INLET  AT  BROOKS/JONES INTERSECTION
1495          DT    SD1A
1496          DI       0      50      93     285     500
1497          DQ       0       5      13      21      21
              *

1498          KK    RK3C
1499          KM  ROUTE TO RANCHO
1500          KM  MUSKINGUM X COEFFICENT (COL 3) ADJUSTED BY LBG TO 0.40
1501          KM  TO PREVENT INSTABILITY
1502          RM       2     0.2    0.40
              *

1503          KK      X3
1504          KM  BASIN REFERENCED FROM LOMR
1505          BA    0.34
1506          LS       0      92
1507          UD    0.71
              *

1508          KK     CX3
1509          KM  COMBINE X3 X4 TO X3C
1510          HC       3
              *

1511          KK    DTX4
1512          KM  RETRIEVE DIVERT FLOW X4
1513          DR   DEVX4
              *

1514          KK    RDEX
1515          KM  ROUTE TO CHEYENNE
1516          KM  MUSKINGUM X COEFFICENT (COL 3) SND5 MODEL BY LBG USED 0.40 TO PREVENT
1517          KM  INSTABILITY
1518          KM  MUSKINGUM X COEFFICENT (COL 3) SND3 MODEL BY STANLEY CONSULTANTS ALSO
1519          KM  USED 0.40 TO PREVENT INSTABILITY
1520          RM       1     0.1    0.40
              *
```

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1521          KK    BSX5
1522          KM  BASIN REFERENCED FROM LOMR
1523          KM  THE SDN5 MODEL BY LBG USED BA = 0.047 AND US = 0.122
1524          KM  THE SDN3 MODEL BY LBG USED BA = 0.100 AND US = 0.420
1525          BA   0.100
1526          LS       0      92
1527          UD   0.420
              *

1528          KK     CX5
1529          KM  COMBINE BSX5 & DEVX4
1530          HC       2
              *

1531          KK   DVWR1
1532          KM  REPEATED FROM UPPER MODEL
1533          KM  OVERFLOW CHEYENNE/RANCHO INTERSECTION HECRAS STATION 144+11.04
1534          KM  OF LOWER RANCHO MODEL
1535          DT  DVSTR1
1536          DI       0     167     261     622    1272
1537          DQ       0       0      36     180     455
              *

1538          KK   DVWR2
1539          KM  REPEATED FROM UPPER MODEL
1540          KM  24" PIPE RANCHO
1541          DT  DVSTR2
1542          DI       0      10      20      30      37     100     500
1543          DQ       0      10      20      30      37      37      37
              *

1544          KK     RX5
1545          KM  ROUTE TO 6 X 3 RCB
1546          RM       1     0.1     0.3
              *

1547          KK   CX4X3
1548          KM  COMBINE X4 TO X3
1549          HC       2
              *

1550          KK   DVBOX
1551          KM  ROUTE FLOW THRU 6 X 3 BOX (MEA)  HECRAS STATION 126+38
1552          KM  LOCATED AT RANCHO NO. DECATUR (END OF PROJECT)
1553          DT   DVBOX
1554          DI       0      50     100     170     210     700    5000
1555          DQ       0      50     100     170     210     210     210
              *
1556          ZZ
```

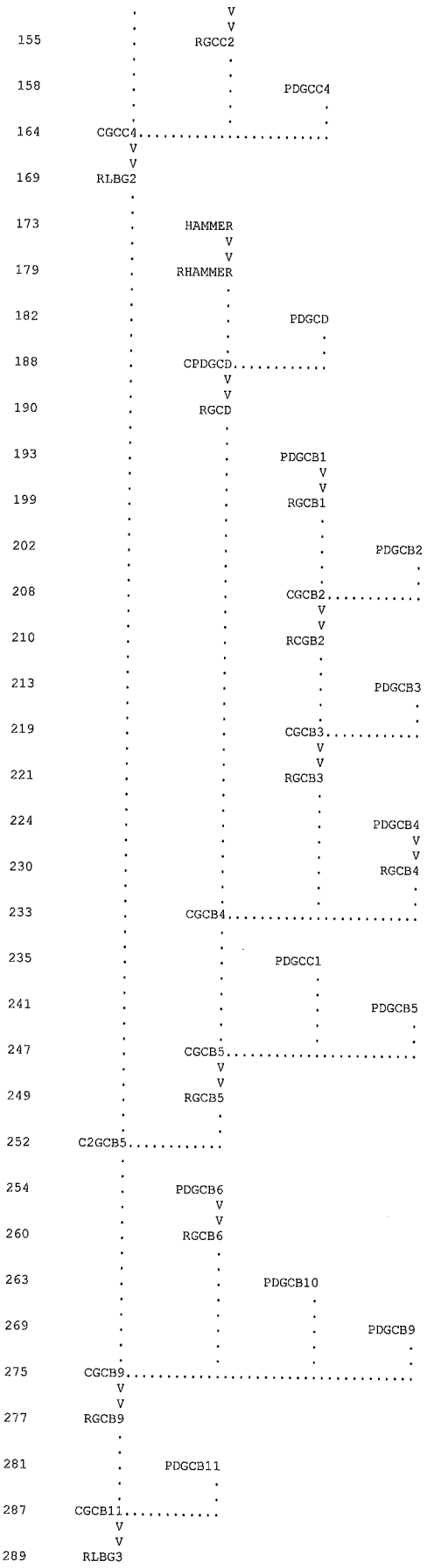
1

SCHEMATIC DIAGRAM OF STREAM NETWORK

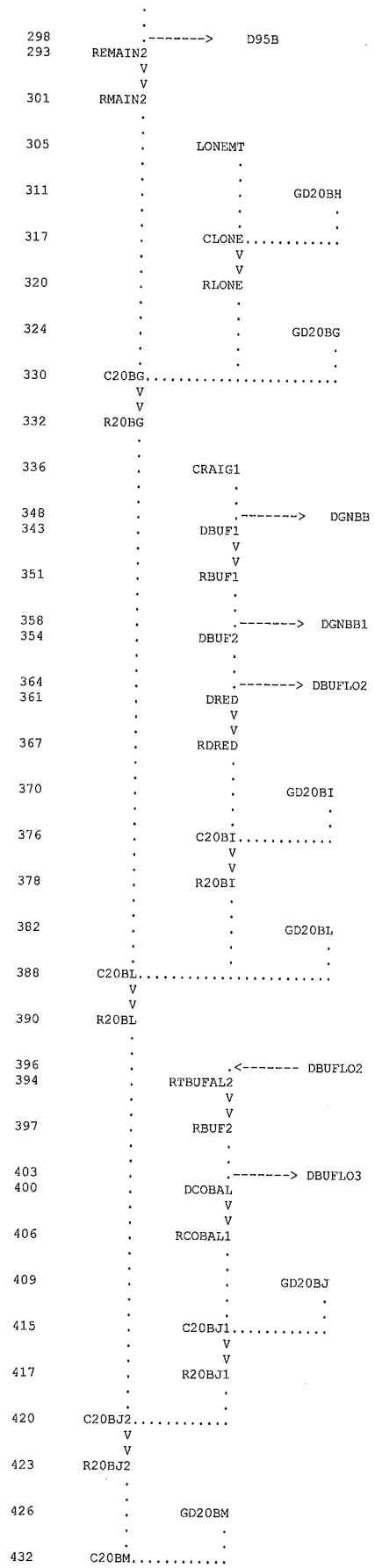
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INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

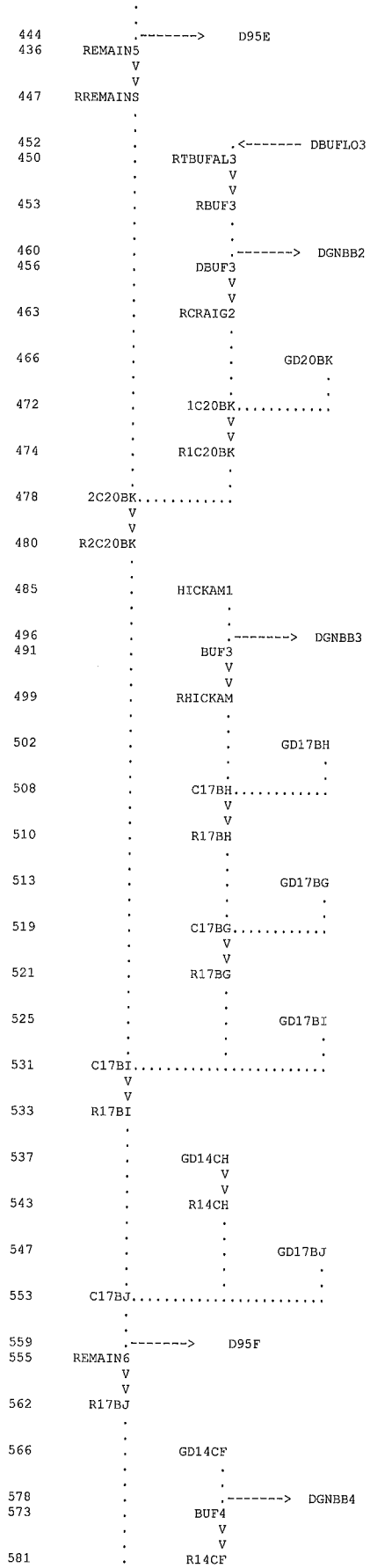
   80         ANN
               V
               V
   94          RANN
               .
               .
   97          .       GD29B
               .          .
               .          .
  103       CGD29B.............
               V
               V
  105       RGD29B
               .
               .
  110          .     NW1C2-C
               .          .
               .          .
  118       CNW1C2.............
               V
               V
  122       RNW1C2
               .
               .
  125          .       PDGCC3
               .          .
               .          .
  132        CGCC3.............
               V
               V
  134         RGCC3
               .
               .
  142          .-------->    D95A
  137      REMAIN1
               V
               V
  145         RLBG1
               .
               .
  149          .       PDGCC2
```



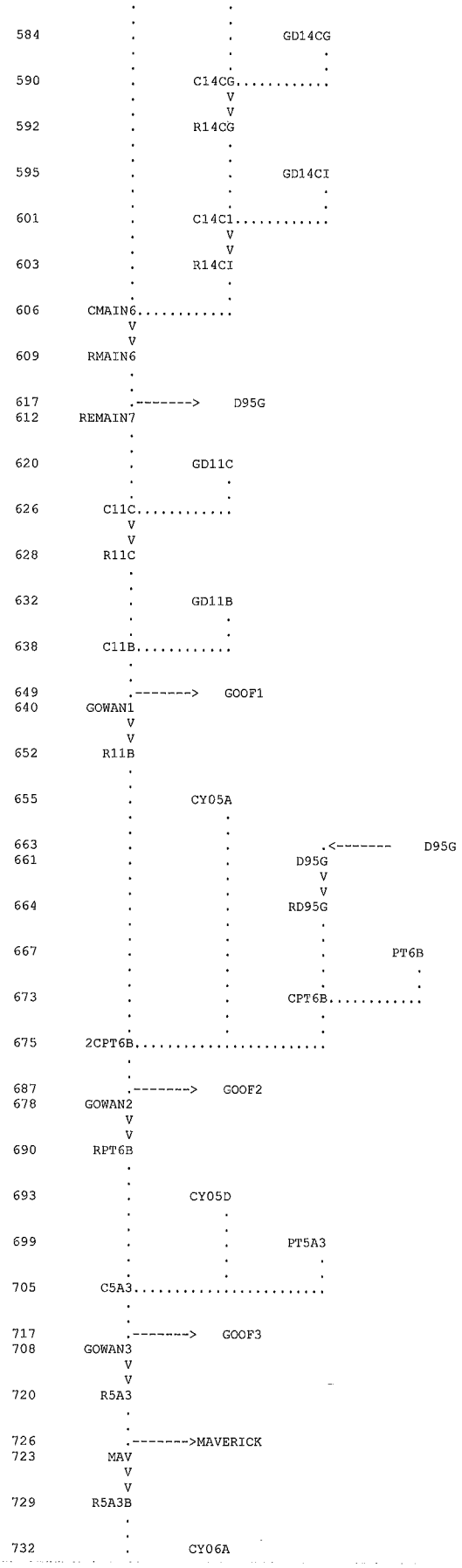
100S3I.OUT, 100-year interim condition, refer to Figure 4



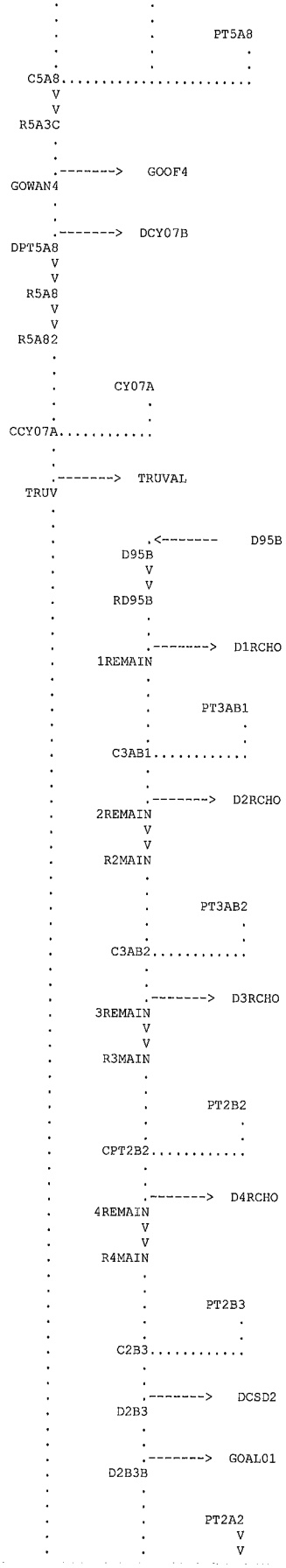
100S3I.OUT, 100-year interim condition, refer to Figure 4



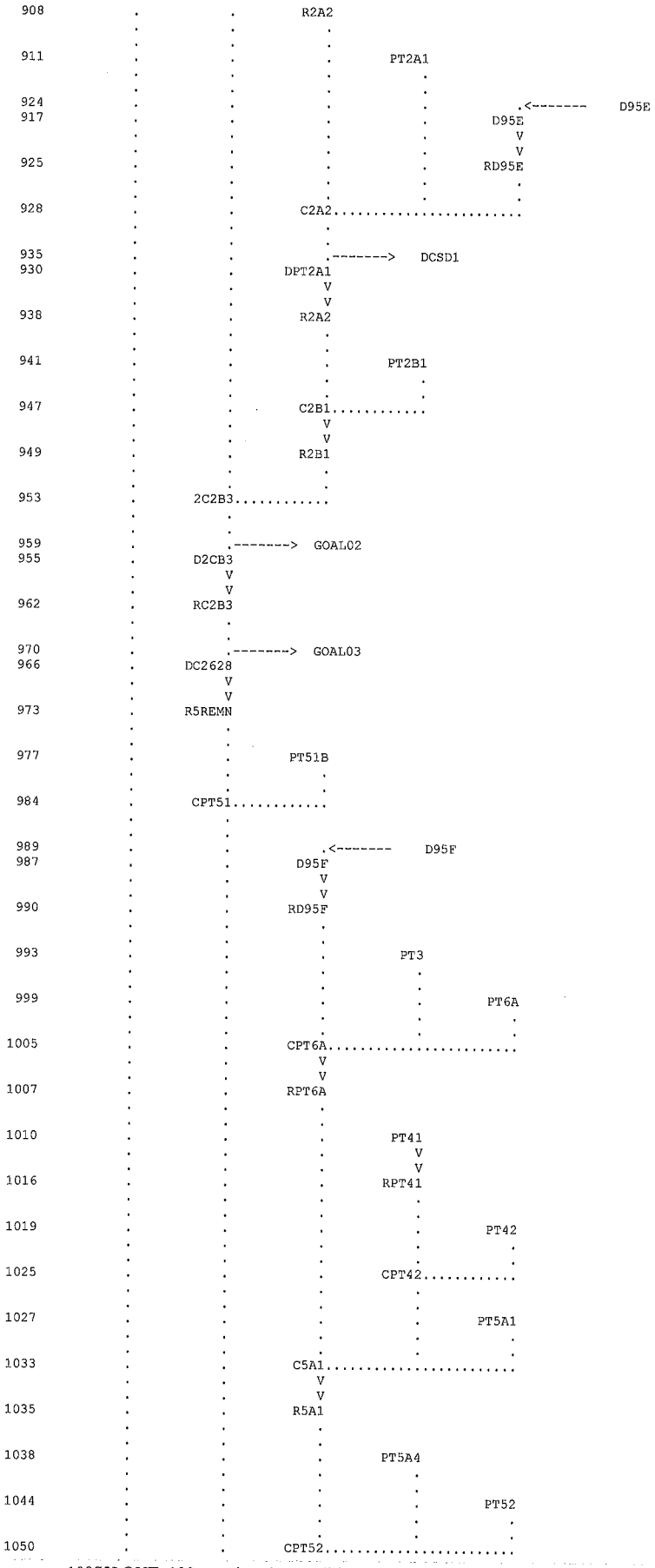
100S3I.OUT, 100-year interim condition, refer to Figure 4



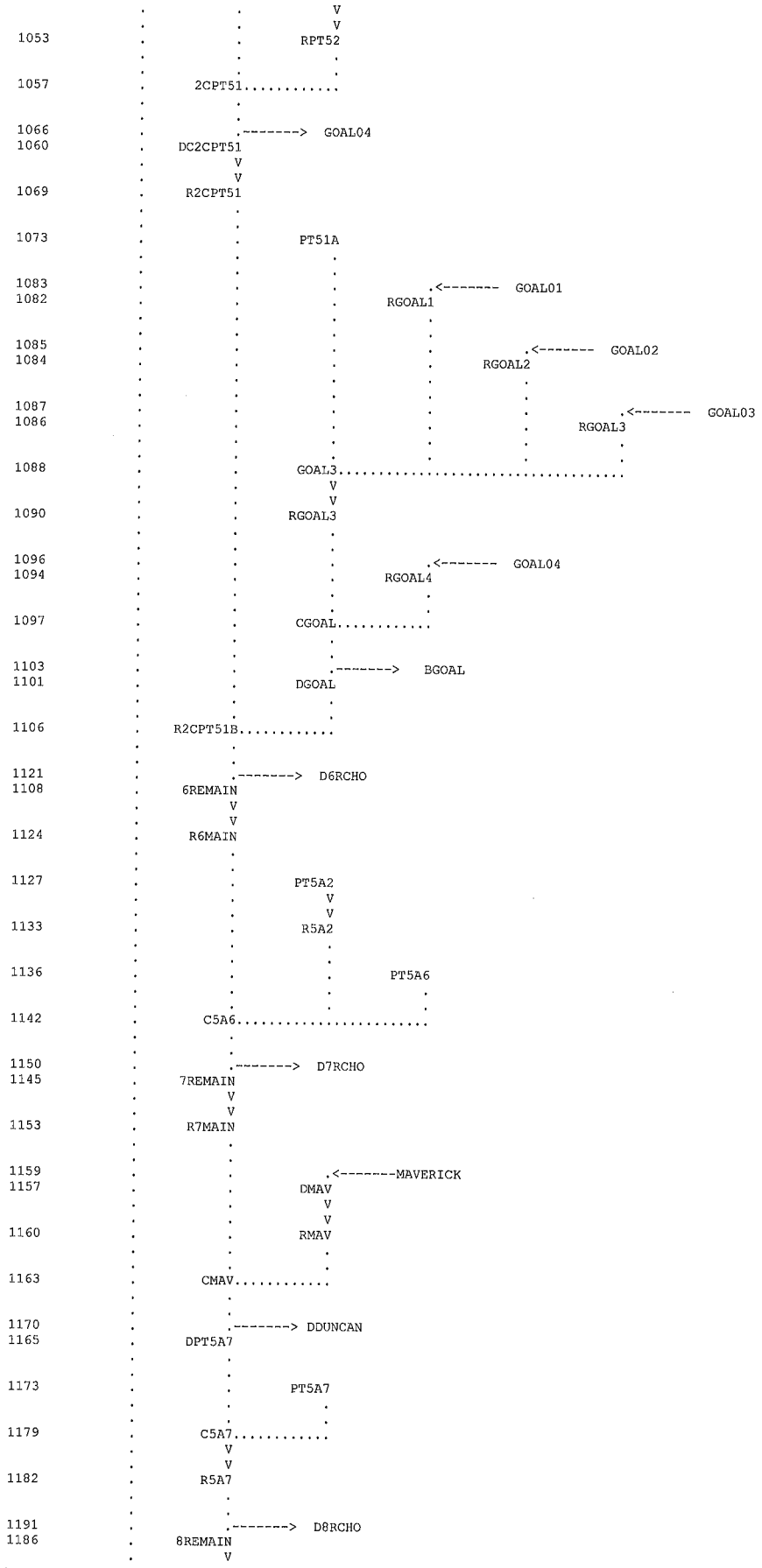
100S3I.OUT, 100-year interim condition, refer to Figure 4



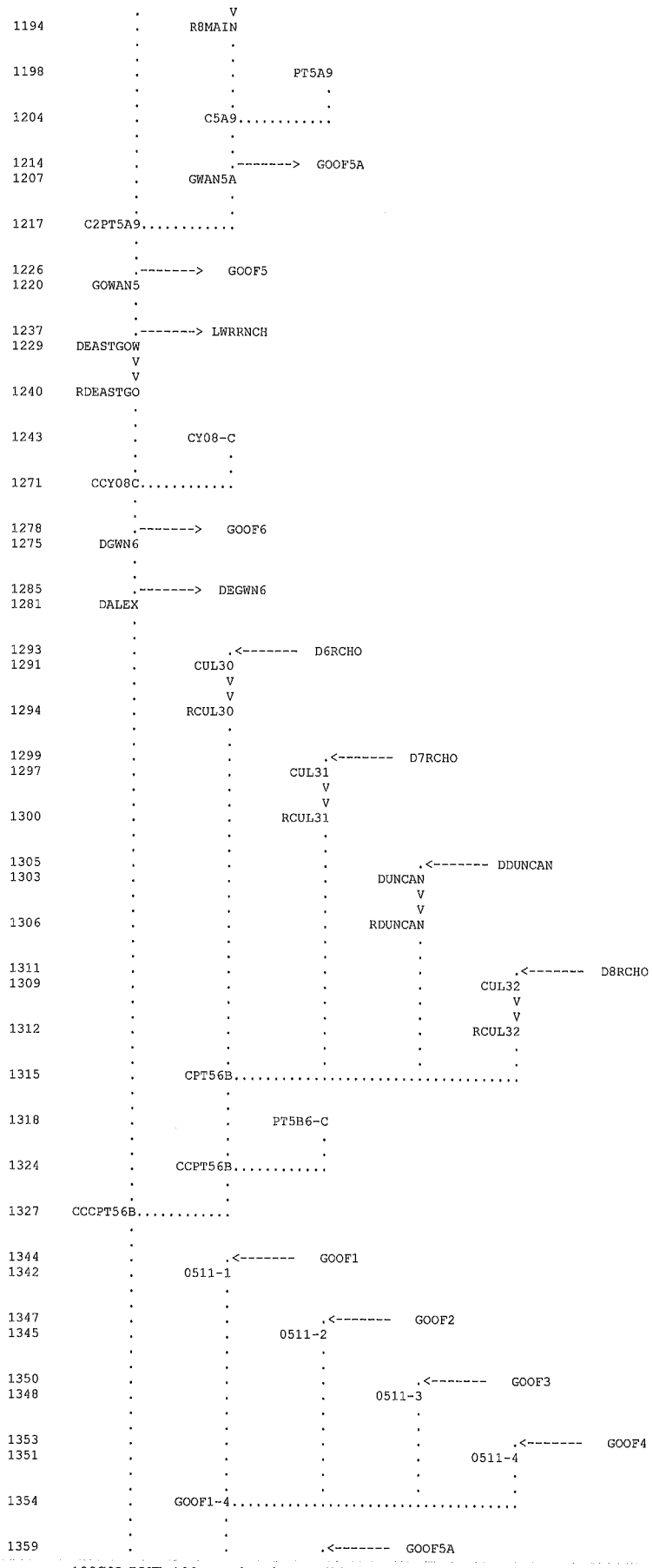
100S3I.OUT, 100-year interim condition, refer to Figure 4



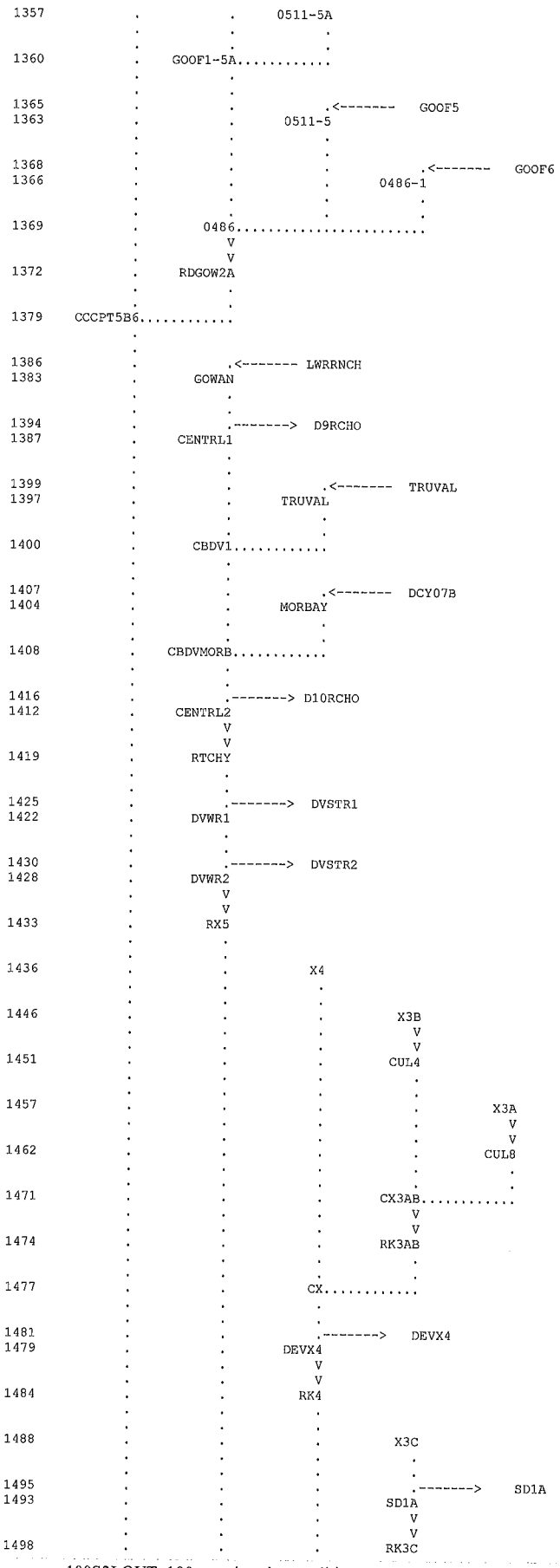
100S3I.OUT, 100-year interim condition, refer to Figure 4



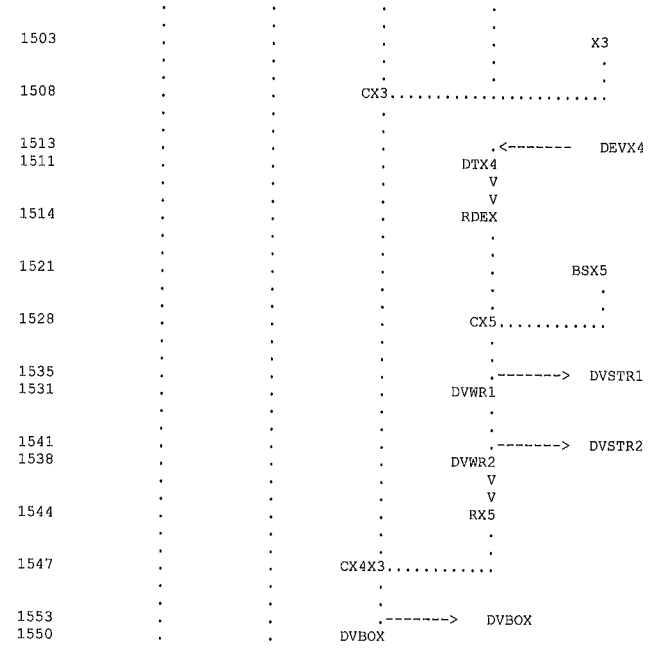
100S3I.OUT, 100-year interim condition, refer to Figure 4



100S3I.OUT, 100-year interim condition, refer to Figure 4



100S3I.OUT, 100-year interim condition, refer to Figure 4



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *               JUN   1998              *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   31MAR14  TIME  20:42:24   *
 *                                       *
 *****************************************
```

```
***************************************
*                                     *
*    U.S. ARMY CORPS OF ENGINEERS     *
*    HYDROLOGIC ENGINEERING CENTER    *
*          609 SECOND STREET          *
*       DAVIS, CALIFORNIA 95616       *
*            (916) 756-1104           *
*                                     *
***************************************
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RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
OFFSITE BASINS, INTERIM CONDITIONS
PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
PREPARED BY STANLEY CONSULTANTS INC. (HM)
INPUT FILE: 100S3I.DAT
DESIGN STORM: 100-YEAR 6-HR
STORM DISTRIBUTION: SDN3
STORM CENTERING: FULL WATERSHED
MODEL INCLUDES DIVERSIONS FOR THE INTERIM OFFSITE FLOW TO THE
REGIONAL FACILITY GOWAN OUTFALL - ALEXANDER BRANCH FROM
THE INTERSECTION OF CRAIG AND RANCHO TO THE SOUTHERN INTERSECTION OF
JONES/ALEXANDER AND RANCHO

THIS MODEL DIFFERS FROM 25 YEAR: NO FLOW DIVERTED TO STORM DRAIN
AT GOWAN/CRAIG
FROM CRAIG RD TO ALEXANDER

BASED ON:
CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
2008 MASTER PLAN UPDATE (MPU) BY PBS&J
GOWAN WATERSHED (INPUT FILE = ALLGOW3.DAT) AND
CENTRAL WATERSHED (NORTHWESTERN PORTION)

RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009
UPPRSDN3 AND LWRSDN3 HEC-1 MODELS
FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
CONTROL FACILITIES REFERENCED FROM LOMR UNLESS OTHERWISE NOTED

GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
BY G.C. WALLACE (GCW) 2007

PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
HEC-1 ANALYSIS FOR EXISTING CONDITIONS FILE R00S3X.OUT
BY STANLEY CONSULTANTS, 1/2012

LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
MPU SHOWS THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
(GOEC)

THIS MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL DRAINAGE
STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
EXISTING CONDITION MODEL AS FOLLOWS:

1. BASIN PT51 OF THE RANCHO STUDY WAS SPLIT INTO PT51A AND PT51B IN ORDER TO SHOW WHERE FLOW WILL BE COLLECTED BY THE GOWAN OUTFALL - ALEXANDER ROAD FACILITIES AT ALEXANDER-JONES/RANCHO DRIVE INTERSECTION.
2. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED TO THE EXISTING CONDITION MODEL
3. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE DARF'S USED IN 2008 MPU HEC-1 ALLGOW3.OUT

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

AREA SQ. MI.	DARF
0-0.5	0.99
0.5-1	0.975
1-2	0.95
2-3	0.925
3-4	0.915
4-5	0.908
5-6	0.903
6-7	0.895
7-8	0.885

77 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN		5	MINUTES IN COMPUTATION INTERVAL
IDATE	1	0	STARTING DATE
ITIME		0000	STARTING TIME
NQ		300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2	0	ENDING DATE
NDTIME		0055	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
.99 .98 .95 .93 .92 .91 .90 .89 .88

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .99	RATIO 2 .98	RATIO 3 .95	RATIO 4 .93	RATIO 5 .92	RATIO 6 .91	RATIO 7 .90	RATIO 8 .89	RATIO 9 .88
HYDROGRAPH AT													
+	ANN	.26	1	FLOW	120.	117.	111.	105.	102.	100.	99.	97.	95.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RANN	.26	1	FLOW	119.	116.	110.	104.	101.	100.	98.	97.	94.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	GD29B	.14	1	FLOW	68.	65.	61.	58.	56.	55.	54.	53.	52.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CGD29B	.40	1	FLOW	170.	164.	155.	146.	143.	140.	138.	135.	131.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RGD29B	.40	1	FLOW	168.	163.	154.	145.	142.	139.	137.	135.	131.
				TIME	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	NW1C2-C	.21	1	FLOW	192.	188.	181.	175.	172.	170.	169.	167.	164.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CNW1C2	.60	1	FLOW	329.	320.	304.	289.	283.	278.	276.	270.	264.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

100S3I.OUT, 100-year interim condition, refer to Figure 4

ROUTED TO													
+	RNW1C2	.60	1	FLOW	327.	318.	303.	287.	281.	277.	274.	268.	262.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PDGCC3	.05	1	FLOW	54.	53.	51.	49.	48.	47.	47.	46.	46.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CGCC3	.65	1	FLOW	347.	337.	321.	305.	299.	294.	291.	285.	279.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RGCC3	.65	1	FLOW	346.	336.	320.	304.	297.	293.	290.	284.	277.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO													
+	D95A	.65	1	FLOW	139.	139.	139.	139.	139.	139.	139.	139.	139.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.67	3.67	3.67
HYDROGRAPH AT													
+	REMAIN1	.65	1	FLOW	207.	197.	181.	165.	158.	154.	151.	145.	138.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RLBG1	.65	1	FLOW	207.	197.	181.	164.	158.	153.	150.	145.	138.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PDGCC2	.04	1	FLOW	20.	19.	18.	17.	16.	16.	16.	15.	15.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RGCC2	.04	1	FLOW	19.	18.	17.	16.	16.	15.	15.	15.	14.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PDGCC4	.05	1	FLOW	50.	49.	47.	45.	44.	44.	43.	43.	42.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT													
+	CGCC4	.74	1	FLOW	244.	233.	215.	197.	190.	185.	182.	175.	168.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RLBG2	.74	1	FLOW	244.	233.	215.	197.	190.	184.	181.	175.	168.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	HAMMER	.13	1	FLOW	71.	69.	65.	62.	60.	59.	59.	58.	56.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RHAMMER	.13	1	FLOW	71.	69.	65.	61.	60.	58.	58.	57.	55.
				TIME	3.83	3.83	3.83	3.83	3.83	3.92	3.83	3.92	3.92
HYDROGRAPH AT													
+	PDGCD	.13	1	FLOW	64.	61.	58.	54.	53.	52.	51.	50.	48.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CPDGCD	.26	1	FLOW	131.	127.	120.	113.	110.	108.	107.	105.	102.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RGCD	.26	1	FLOW	130.	127.	119.	112.	109.	107.	106.	104.	100.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PDGCB1	.03	1	FLOW	37.	36.	35.	33.	33.	32.	32.	32.	31.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RGCB1	.03	1	FLOW	36.	35.	34.	33.	32.	32.	32.	31.	31.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PDGCB2	.03	1	FLOW	26.	26.	24.	23.	23.	22.	22.	22.	21.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.67	3.67	3.67
2 COMBINED AT													
+	CGCB2	.06	1	FLOW	63.	61.	58.	56.	55.	54.	54.	53.	52.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RCGB2	.06	1	FLOW	61.	59.	56.	54.	53.	52.	52.	51.	50.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PDGCB3	.07	1	FLOW	33.	32.	30.	28.	27.	26.	26.	25.	25.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75	3.75
2 COMBINED AT													
+	CGCB3	.13	1	FLOW	94.	91.	86.	82.	80.	79.	78.	76.	75.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RGCB3	.13	1	FLOW	92.	89.	85.	81.	79.	78.	77.	75.	74.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													

+	PDGCB4	.02	1	FLOW	21.	21.	20.	19.	19.	19.	18.	18.	18.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RGCB4	.02	1	FLOW	21.	21.	20.	19.	19.	18.	18.	18.	18.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	CGCB4	.41	1	FLOW	226.	220.	207.	196.	190.	188.	185.	182.	176.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	PDGCC1	.05	1	FLOW	29.	29.	27.	25.	25.	24.	24.	24.	23.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	PDGCB5	.11	1	FLOW	54.	52.	49.	46.	45.	44.	44.	43.	42.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
3 COMBINED AT													
+	CGCB5	.57	1	FLOW	307.	298.	281.	266.	258.	255.	251.	247.	240.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RGCB5	.57	1	FLOW	303.	294.	277.	263.	257.	252.	248.	244.	238.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT													
+	C2GCB5	1.31	1	FLOW	543.	522.	486.	453.	438.	429.	420.	411.	397.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PDGCB6	.02	1	FLOW	23.	22.	22.	21.	20.	20.	20.	20.	19.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RGCB6	.02	1	FLOW	22.	21.	20.	20.	19.	19.	19.	18.	18.
				TIME	3.75	3.83	3.75	3.75	3.75	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	PDGCB10	.07	1	FLOW	66.	64.	61.	58.	57.	57.	56.	55.	54.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PDGCB9	.03	1	FLOW	24.	23.	22.	21.	20.	20.	20.	19.	19.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
4 COMBINED AT													
+	CGCB9	1.43	1	FLOW	616.	594.	554.	519.	503.	493.	484.	473.	459.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RGCB9	1.43	1	FLOW	614.	591.	552.	515.	500.	489.	480.	469.	455.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PDGCB11	.03	1	FLOW	26.	25.	24.	23.	22.	22.	22.	21.	21.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CGCB11	1.47	1	FLOW	628.	605.	565.	528.	512.	501.	492.	481.	466.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RLBG3	1.47	1	FLOW	626.	603.	563.	526.	510.	498.	489.	478.	464.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO													
+	D95B	1.47	1	FLOW	192.	192.	188.	182.	180.	179.	177.	176.	173.
				TIME	3.83	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	REMAIN2	1.47	1	FLOW	434.	411.	375.	343.	330.	320.	312.	303.	290.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RMAIN2	1.47	1	FLOW	423.	402.	369.	338.	326.	317.	309.	300.	288.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	LONEMT	.41	1	FLOW	297.	289.	276.	264.	259.	255.	253.	249.	244.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	GD20BH	.05	1	FLOW	29.	28.	26.	25.	24.	24.	23.	23.	22.
				TIME	3.67	3.67	3.67	3.67	3.67	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CLONE	.46	1	FLOW	322.	314.	300.	286.	281.	277.	274.	270.	264.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RLONE	.46	1	FLOW	319.	311.	297.	283.	278.	274.	271.	267.	261.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	GD20BG	.11	1	FLOW	89.	86.	82.	78.	77.	76.	75.	73.	72.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	C20BG	2.04	1	FLOW	793.	762.	709.	659.	640.	623.	612.	597.	578.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92

ROUTED TO													
+	R20BG	2.04	1	FLOW	786.	756.	702.	653.	637.	619.	607.	594.	577.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	CRAIG1	2.44	1	FLOW	1451.	1414.	1354.	1293.	1269.	1253.	1241.	1222.	1198.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO													
+	DGNBB	2.44	1	FLOW	249.	249.	249.	249.	249.	249.	249.	249.	249.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.58	3.58	3.58
HYDROGRAPH AT													
+	DBUF1	2.44	1	FLOW	1202.	1165.	1105.	1044.	1020.	1004.	992.	973.	949.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO													
+	RBUF1	2.44	1	FLOW	1197.	1160.	1099.	1039.	1015.	998.	986.	967.	943.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO													
+	DGNBB1	2.44	1	FLOW	109.	109.	109.	109.	109.	109.	109.	109.	109.
				TIME	3.58	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	DBUF2	2.44	1	FLOW	1088.	1051.	990.	930.	906.	889.	877.	858.	834.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO													
+	DBUFLO2	2.44	1	FLOW	766.	740.	697.	655.	638.	626.	617.	604.	587.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	DRED	2.44	1	FLOW	322.	311.	293.	275.	268.	263.	260.	254.	247.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO													
+	RDRED	2.44	1	FLOW	321.	310.	292.	274.	267.	263.	259.	253.	246.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	GD20BI	.12	1	FLOW	83.	81.	77.	73.	72.	71.	70.	69.	67.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	C20BI	2.56	1	FLOW	351.	339.	320.	300.	293.	287.	283.	278.	270.
				TIME	4.17	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
ROUTED TO													
+	R20BI	2.56	1	FLOW	350.	338.	319.	300.	292.	287.	283.	277.	270.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	GD20BL	.08	1	FLOW	92.	90.	87.	84.	83.	82.	81.	80.	79.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	C20BL	4.67	1	FLOW	1128.	1086.	1011.	942.	918.	898.	883.	863.	841.
				TIME	4.00	4.00	4.00	4.00	4.00	4.08	4.08	4.08	4.08
ROUTED TO													
+	R20BL	4.67	1	FLOW	1117.	1075.	1005.	941.	915.	898.	882.	862.	839.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	RTBUFAL2	.00	1	FLOW	766.	740.	697.	655.	638.	626.	617.	604.	587.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO													
+	RBUF2	.00	1	FLOW	762.	737.	694.	651.	634.	622.	614.	601.	584.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25
DIVERSION TO													
+	DBUFLO3	.00	1	FLOW	545.	526.	496.	465.	453.	445.	439.	429.	417.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25
HYDROGRAPH AT													
+	DCOBAL	.00	1	FLOW	218.	210.	198.	186.	181.	178.	175.	171.	167.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25
ROUTED TO													
+	RCOBAL1	.00	1	FLOW	217.	210.	198.	186.	181.	178.	175.	171.	167.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	GD20BJ	.05	1	FLOW	48.	47.	45.	43.	42.	41.	41.	40.	40.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C20BJ1	.05	1	FLOW	230.	223.	210.	198.	193.	189.	187.	183.	178.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	R20BJ1	.05	1	FLOW	230.	222.	210.	197.	192.	189.	186.	182.	177.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT													
+	C20BJ2	4.72	1	FLOW	1325.	1275.	1195.	1119.	1088.	1067.	1048.	1025.	997.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													

+	R20BJ2	4.72	1	FLOW	1324.	1274.	1194.	1117.	1086.	1065.	1046.	1022.	994.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	GD20BM	.05	1	FLOW	62.	60.	58.	56.	55.	55.	54.	53.	53.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	C20BM	4.77	1	FLOW	1341.	1291.	1210.	1133.	1102.	1080.	1061.	1037.	1009.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO													
+	D95E	4.77	1	FLOW	181.	175.	166.	158.	155.	152.	150.	148.	145.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	REMAIN5	4.77	1	FLOW	1160.	1116.	1044.	975.	947.	928.	911.	889.	864.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RREMAIN5	4.77	1	FLOW	1157.	1114.	1041.	971.	943.	923.	906.	885.	859.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	RTBUFAL3	.00	1	FLOW	545.	526.	496.	465.	453.	445.	439.	429.	417.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25
ROUTED TO													
+	RBUF3	.00	1	FLOW	543.	524.	494.	465.	453.	444.	438.	429.	417.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	DGNBB2	.00	1	FLOW	198.	198.	198.	198.	198.	198.	198.	198.	198.
				TIME	3.83	3.83	3.83	3.83	3.83	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	DBUF3	.00	1	FLOW	345.	326.	296.	267.	255.	246.	240.	231.	219.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	RCRAIG2	.00	1	FLOW	343.	325.	294.	264.	252.	244.	239.	229.	216.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	GD20BK	.05	1	FLOW	37.	36.	34.	33.	32.	32.	31.	31.	30.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	1C20BK	.05	1	FLOW	354.	336.	305.	274.	261.	252.	246.	236.	224.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33	4.33
ROUTED TO													
+	R1C20BK	.05	1	FLOW	351.	332.	303.	273.	260.	252.	246.	236.	224.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
2 COMBINED AT													
+	2C20BK	4.82	1	FLOW	1442.	1384.	1286.	1183.	1143.	1110.	1089.	1055.	1022.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25	4.25
ROUTED TO													
+	R2C20BK	4.82	1	FLOW	1437.	1377.	1278.	1173.	1131.	1102.	1085.	1055.	1021.
				TIME	4.17	4.17	4.17	4.17	4.17	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	HICKAM1	.48	1	FLOW	285.	277.	264.	251.	246.	242.	240.	236.	231.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO													
+	DGNBB3	.48	1	FLOW	125.	125.	125.	125.	125.	125.	125.	125.	125.
				TIME	3.58	3.58	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	BUF3	.48	1	FLOW	160.	152.	139.	126.	121.	117.	115.	111.	106.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RHICKAM	.48	1	FLOW	158.	150.	138.	125.	120.	116.	114.	110.	105.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	GD17BH	.03	1	FLOW	25.	24.	23.	22.	21.	21.	21.	21.	20.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	C17BH	.50	1	FLOW	167.	159.	146.	133.	128.	124.	121.	117.	112.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	R17BH	.50	1	FLOW	166.	158.	144.	131.	125.	122.	119.	115.	109.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	GD17BG	.12	1	FLOW	98.	95.	91.	87.	85.	84.	83.	82.	81.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	C17BG	.62	1	FLOW	227.	217.	200.	184.	178.	174.	170.	166.	159.
				TIME	3.92	3.92	3.92	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	R17BG	.62	1	FLOW	226.	216.	200.	184.	177.	173.	169.	164.	157.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

HYDROGRAPH AT													
+	GD17BI	.07	1	FLOW	70.	68.	66.	63.	62.	61.	60.	59.	58.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT													
+	C17BI	5.51	1	FLOW	1650.	1582.	1469.	1350.	1303.	1266.	1241.	1202.	1157.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO													
+	R17BI	5.51	1	FLOW	1633.	1559.	1446.	1335.	1290.	1257.	1234.	1198.	1155.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	GD14CH	.04	1	FLOW	40.	38.	37.	35.	34.	34.	34.	33.	32.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	R14CH	.04	1	FLOW	39.	38.	36.	34.	34.	34.	33.	32.	32.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	GD17BJ	.06	1	FLOW	73.	72.	69.	66.	65.	65.	64.	63.	62.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	C17BJ	5.61	1	FLOW	1665.	1591.	1470.	1358.	1313.	1280.	1256.	1220.	1177.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	D95F	5.61	1	FLOW	178.	174.	168.	162.	160.	158.	157.	155.	153.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	REMAIN6	5.61	1	FLOW	1487.	1416.	1302.	1196.	1153.	1121.	1099.	1064.	1024.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	R17BJ	5.61	1	FLOW	1484.	1414.	1302.	1195.	1152.	1120.	1098.	1063.	1022.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	GD14CF	.13	1	FLOW	82.	79.	75.	71.	70.	69.	68.	66.	65.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO													
+	DGNBB4	.13	1	FLOW	30.	30.	30.	30.	30.	30.	30.	30.	30.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT													
+	BUF4	.13	1	FLOW	52.	49.	45.	41.	40.	39.	38.	36.	35.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	R14CF	.13	1	FLOW	51.	48.	44.	41.	39.	38.	37.	36.	35.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	GD14CG	.06	1	FLOW	51.	50.	48.	45.	45.	44.	44.	43.	42.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C14CG	.19	1	FLOW	94.	91.	84.	78.	76.	73.	72.	70.	68.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	R14CG	.19	1	FLOW	92.	89.	83.	77.	75.	72.	71.	69.	67.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	GD14CI	.05	1	FLOW	43.	42.	40.	38.	37.	37.	36.	36.	35.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C14C1	.24	1	FLOW	123.	118.	111.	104.	101.	99.	97.	94.	92.
				TIME	3.75	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	R14CI	.24	1	FLOW	123.	118.	110.	102.	99.	96.	95.	92.	89.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CMAIN6	5.85	1	FLOW	1544.	1472.	1352.	1235.	1191.	1158.	1135.	1100.	1058.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	RMAIN6	5.85	1	FLOW	1523.	1457.	1347.	1232.	1185.	1150.	1126.	1089.	1046.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	D95G	5.85	1	FLOW	102.	101.	100.	99.	98.	98.	98.	97.	97.
				TIME	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	REMAIN7	5.85	1	FLOW	1421.	1356.	1246.	1133.	1087.	1052.	1028.	992.	949.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	GD11C	.13	1	FLOW	123.	120.	116.	111.	109.	108.	107.	105.	103.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													

+	C11C	5.98	1	FLOW	1469.	1397.	1286.	1171.	1124.	1089.	1065.	1028.	985.
				TIME	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	R11C	5.98	1	FLOW	1465.	1396.	1280.	1162.	1113.	1077.	1052.	1015.	974.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.33
HYDROGRAPH AT													
+	GD11B	.20	1	FLOW	203.	199.	191.	184.	181.	178.	177.	174.	171.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C11B	6.18	1	FLOW	1524.	1453.	1336.	1215.	1166.	1130.	1104.	1066.	1022.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	GOOF1	6.18	1	FLOW	3.	3.	3.	3.	3.	3.	3.	3.	3.
				TIME	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT													
+	GOWAN1	6.18	1	FLOW	1521.	1450.	1333.	1212.	1163.	1127.	1101.	1063.	1019.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	R11B	6.18	1	FLOW	1519.	1447.	1327.	1206.	1156.	1120.	1094.	1057.	1013.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.33
HYDROGRAPH AT													
+	CY05A	.03	1	FLOW	28.	28.	26.	25.	25.	25.	24.	24.	24.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	D95G	.00	1	FLOW	102.	101.	100.	99.	98.	98.	98.	97.	97.
				TIME	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	RD95G	.00	1	FLOW	102.	101.	100.	99.	98.	98.	97.	97.	97.
				TIME	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	PT6B	.11	1	FLOW	139.	136.	131.	127.	125.	123.	122.	121.	119.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CPT6B	.11	1	FLOW	200.	196.	191.	185.	182.	179.	178.	176.	173.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	2CPT6B	6.31	1	FLOW	1646.	1573.	1451.	1327.	1277.	1239.	1213.	1175.	1131.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	GOOF2	6.31	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.17	3.17	3.25	3.25	3.25	3.25	3.25	3.25	3.25
HYDROGRAPH AT													
+	GOWAN2	6.31	1	FLOW	1644.	1571.	1449.	1325.	1275.	1237.	1211.	1173.	1129.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	RPT6B	6.31	1	FLOW	1638.	1563.	1439.	1314.	1265.	1230.	1206.	1170.	1127.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	CY05D	.06	1	FLOW	40.	39.	37.	35.	34.	34.	33.	33.	32.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PT5A3	.09	1	FLOW	88.	86.	83.	80.	78.	77.	77.	76.	74.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT													
+	C5A3	6.46	1	FLOW	1678.	1602.	1476.	1350.	1299.	1261.	1235.	1197.	1154.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
DIVERSION TO													
+	GOOF3	6.46	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	2.50	2.58	2.58	2.67	2.67	2.67	2.75	2.83	2.83
HYDROGRAPH AT													
+	GOWAN3	6.46	1	FLOW	1676.	1600.	1474.	1348.	1297.	1259.	1233.	1195.	1152.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
ROUTED TO													
+	R5A3	6.46	1	FLOW	1671.	1595.	1468.	1342.	1292.	1257.	1232.	1195.	1151.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
DIVERSION TO													
+	MAVERICK	6.46	1	FLOW	174.	159.	134.	108.	98.	91.	86.	79.	70.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	MAV	6.46	1	FLOW	1497.	1436.	1335.	1234.	1193.	1165.	1146.	1116.	1081.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
ROUTED TO													
+	R5A3B	6.46	1	FLOW	1495.	1434.	1332.	1232.	1193.	1165.	1145.	1116.	1081.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	CY06A	.08	1	FLOW	71.	69.	67.	64.	62.	62.	61.	60.	59.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67

HYDROGRAPH AT													
+	PT5A8	.03	1	FLOW	20.	20.	19.	18.	17.	17.	17.	17.	16.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
3 COMBINED AT													
+	C5A8	6.56	1	FLOW	1519.	1458.	1355.	1253.	1212.	1182.	1162.	1132.	1097.
				TIME	4.25	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33
ROUTED TO													
+	R5A3C	6.56	1	FLOW	1517.	1455.	1353.	1251.	1211.	1182.	1162.	1132.	1097.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
DIVERSION TO													
+	GOOF4	6.56	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	3.17	3.25	3.25	3.25	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT													
+	GOWAN4	6.56	1	FLOW	1515.	1453.	1351.	1249.	1209.	1180.	1160.	1130.	1095.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
DIVERSION TO													
+	DCY07B	6.56	1	FLOW	428.	407.	372.	337.	324.	314.	307.	297.	285.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	DPT5A8	6.56	1	FLOW	1088.	1047.	979.	911.	885.	866.	853.	833.	810.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
ROUTED TO													
+	R5A8	6.56	1	FLOW	1083.	1042.	975.	911.	885.	866.	852.	833.	809.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33
ROUTED TO													
+	R5A82	6.56	1	FLOW	1079.	1039.	975.	910.	884.	865.	851.	832.	808.
				TIME	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	CY07A	.03	1	FLOW	28.	27.	26.	25.	25.	25.	24.	24.	24.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CCY07A	6.59	1	FLOW	1085.	1044.	980.	915.	889.	869.	856.	836.	813.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33
DIVERSION TO													
+	TRUVAL	6.59	1	FLOW	86.	82.	76.	71.	68.	67.	65.	64.	62.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	TRUV	6.59	1	FLOW	1000.	962.	903.	844.	820.	803.	791.	773.	751.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	D95B	.00	1	FLOW	192.	192.	188.	182.	180.	179.	177.	176.	173.
				TIME	3.83	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RD95B	.00	1	FLOW	192.	191.	186.	181.	179.	178.	177.	175.	173.
				TIME	3.92	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO													
+	D1RCHO	.00	1	FLOW	36.	36.	35.	34.	34.	33.	33.	33.	33.
				TIME	3.92	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	1REMAIN	.00	1	FLOW	156.	155.	151.	147.	145.	144.	143.	142.	140.
				TIME	3.92	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PT3AB1	.05	1	FLOW	63.	62.	60.	58.	57.	57.	56.	56.	55.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C3AB1	.05	1	FLOW	206.	203.	196.	189.	186.	184.	183.	181.	179.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO													
+	D2RCHO	.05	1	FLOW	29.	29.	29.	29.	29.	28.	28.	28.	27.
				TIME	3.75	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	2REMAIN	.05	1	FLOW	177.	174.	167.	160.	158.	156.	155.	153.	151.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	R2MAIN	.05	1	FLOW	175.	173.	166.	159.	156.	154.	153.	151.	149.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	4.00	4.00	4.00
HYDROGRAPH AT													
+	PT3AB2	.05	1	FLOW	76.	75.	73.	70.	70.	69.	68.	68.	67.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	C3AB2	.10	1	FLOW	217.	211.	202.	192.	189.	186.	184.	182.	178.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO													
+	D3RCHO	.10	1	FLOW	216.	210.	201.	191.	188.	185.	183.	181.	177.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													

+	3REMAIN	.10	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	R3MAIN	.10	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	PT2B2	.08	1	FLOW	82.	80.	77.	74.	72.	72.	71.	70.	69.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CPT2B2	.18	1	FLOW	82.	80.	77.	74.	73.	72.	71.	70.	69.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO													
+	D4RCHO	.18	1	FLOW	13.	13.	13.	12.	12.	12.	12.	11.	11.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	4REMAIN	.18	1	FLOW	68.	67.	64.	62.	61.	60.	59.	59.	58.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	R4MAIN	.18	1	FLOW	68.	66.	63.	61.	60.	59.	59.	58.	57.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	PT2B3	.02	1	FLOW	31.	31.	30.	29.	29.	28.	28.	28.	27.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C2B3	.20	1	FLOW	96.	94.	91.	87.	86.	85.	84.	84.	82.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO													
+	DCSD2	.20	1	FLOW	88.	88.	88.	85.	83.	82.	81.	81.	79.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	D2B3	.20	1	FLOW	8.	6.	3.	3.	3.	3.	3.	3.	3.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO													
+	GOAL01	.20	1	FLOW	3.	3.	3.	3.	3.	3.	3.	3.	3.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	D2B3B	.20	1	FLOW	5.	3.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.75	3.75	.00	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT													
+	PT2A2	.06	1	FLOW	62.	60.	58.	55.	54.	54.	53.	52.	51.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	R2A2	.06	1	FLOW	60.	58.	56.	54.	53.	52.	52.	51.	50.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	PT2A1	.06	1	FLOW	62.	60.	58.	56.	55.	54.	54.	53.	52.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	D95E	.00	1	FLOW	181.	175.	166.	158.	155.	152.	150.	148.	145.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RD95E	.00	1	FLOW	180.	174.	164.	156.	153.	151.	149.	147.	144.
				TIME	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17
3 COMBINED AT													
+	C2A2	.13	1	FLOW	248.	240.	228.	215.	210.	205.	203.	199.	194.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
DIVERSION TO													
+	DCSD1	.13	1	FLOW	90.	90.	90.	90.	90.	90.	90.	90.	90.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.67
HYDROGRAPH AT													
+	DPT2A1	.13	1	FLOW	158.	150.	138.	125.	120.	115.	113.	109.	104.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
ROUTED TO													
+	R2A2	.13	1	FLOW	156.	148.	136.	124.	119.	115.	113.	108.	102.
				TIME	4.00	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	PT2B1	.07	1	FLOW	71.	69.	66.	63.	62.	62.	61.	60.	59.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C2B1	.20	1	FLOW	189.	180.	165.	149.	142.	138.	135.	131.	124.
				TIME	4.00	4.00	4.00	4.00	4.00	4.08	4.08	4.08	4.08
ROUTED TO													
+	R2B1	.20	1	FLOW	189.	179.	164.	149.	142.	138.	135.	130.	124.
				TIME	4.00	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
2 COMBINED AT													
+	2C2B3	.40	1	FLOW	189.	179.	164.	149.	142.	138.	135.	130.	124.
				TIME	4.00	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08

DIVERSION TO													
+	GOAL02	.40	1	FLOW	112.	112.	112.	112.	112.	112.	111.	107.	102.
				TIME	3.75	3.83	3.83	3.92	4.00	4.00	4.08	4.08	4.08
HYDROGRAPH AT													
+	D2CB3	.40	1	FLOW	77.	67.	52.	37.	30.	26.	24.	23.	22.
				TIME	4.00	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RC2B3	.40	1	FLOW	76.	66.	50.	36.	30.	25.	24.	23.	22.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO													
+	GOAL03	.40	1	FLOW	23.	23.	23.	23.	23.	23.	23.	22.	21.
				TIME	3.92	3.92	3.92	4.00	4.08	4.08	4.17	4.17	4.17
HYDROGRAPH AT													
+	DC2628	.40	1	FLOW	53.	43.	27.	13.	7.	2.	1.	1.	1.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	3.75	3.75	3.75
ROUTED TO													
+	R5REMN	.40	1	FLOW	51.	41.	27.	12.	6.	2.	1.	1.	1.
				TIME	4.08	4.08	4.17	4.17	4.25	4.33	4.00	4.00	4.00
HYDROGRAPH AT													
+	PT51B	.04	1	FLOW	57.	56.	54.	52.	52.	51.	51.	50.	49.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CPT51	.43	1	FLOW	63.	56.	54.	52.	52.	51.	51.	50.	49.
				TIME	4.08	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	D95F	.00	1	FLOW	178.	174.	168.	162.	160.	158.	157.	155.	153.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	RD95F	.00	1	FLOW	178.	174.	168.	162.	159.	157.	156.	154.	152.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33	4.33
HYDROGRAPH AT													
+	PT3	.15	1	FLOW	164.	160.	154.	148.	146.	144.	143.	141.	138.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PT6A	.02	1	FLOW	30.	29.	28.	27.	27.	27.	26.	26.	26.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	CPT6A	.17	1	FLOW	260.	254.	242.	229.	223.	219.	218.	213.	207.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RPT6A	.17	1	FLOW	260.	253.	240.	227.	222.	218.	217.	212.	207.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	PT41	.14	1	FLOW	120.	117.	111.	106.	104.	103.	102.	100.	98.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RPT41	.14	1	FLOW	117.	113.	108.	103.	101.	100.	99.	97.	95.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	PT42	.08	1	FLOW	60.	59.	56.	53.	52.	52.	51.	50.	49.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CPT42	.22	1	FLOW	174.	170.	162.	155.	152.	150.	148.	146.	143.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	PT5A1	.05	1	FLOW	58.	57.	55.	53.	52.	51.	51.	50.	49.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	C5A1	.44	1	FLOW	479.	466.	444.	422.	413.	407.	403.	395.	387.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	R5A1	.44	1	FLOW	470.	457.	436.	414.	405.	399.	395.	388.	379.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.83	3.83	3.83
HYDROGRAPH AT													
+	PT5A4	.03	1	FLOW	27.	26.	25.	24.	23.	23.	23.	22.	22.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	PT52	.06	1	FLOW	51.	50.	48.	46.	45.	44.	44.	43.	42.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT													
+	CPT52	.54	1	FLOW	548.	533.	509.	483.	473.	466.	461.	453.	443.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RPT52	.54	1	FLOW	542.	527.	502.	477.	468.	461.	457.	448.	439.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													

+	2CPT51	.97	1	FLOW	577.	562.	536.	509.	499.	491.	487.	478.	468.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO													
+	GOAL04	.97	1	FLOW	127.	127.	127.	127.	127.	127.	127.	127.	127.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	DC2CPT51	.97	1	FLOW	450.	435.	409.	382.	372.	364.	360.	351.	341.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	R2CPT51	.97	1	FLOW	442.	428.	403.	377.	367.	360.	355.	347.	337.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	PT51A	.04	1	FLOW	58.	57.	55.	53.	52.	52.	52.	51.	50.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	RGOAL1	.00	1	FLOW	3.	3.	3.	3.	3.	3.	3.	3.	3.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	RGOAL2	.00	1	FLOW	112.	112.	112.	112.	112.	112.	111.	107.	102.
				TIME	3.75	3.83	3.83	3.92	4.00	4.00	4.08	4.08	4.08
HYDROGRAPH AT													
+	RGOAL3	.00	1	FLOW	23.	23.	23.	23.	23.	23.	23.	22.	21.
				TIME	3.92	3.92	3.92	4.00	4.08	4.08	4.17	4.17	4.17
4 COMBINED AT													
+	GOAL3	.04	1	FLOW	158.	155.	153.	149.	147.	146.	144.	139.	133.
				TIME	3.75	3.83	3.92	4.00	4.00	4.00	4.08	4.08	4.08
ROUTED TO													
+	RGOAL3	.04	1	FLOW	157.	153.	152.	148.	146.	146.	144.	139.	132.
				TIME	3.83	3.92	3.92	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	RGOAL4	.00	1	FLOW	127.	127.	127.	127.	127.	127.	127.	127.	127.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CGOAL	.04	1	FLOW	284.	280.	279.	275.	273.	273.	271.	266.	259.
				TIME	3.83	3.92	3.92	4.00	4.08	4.08	4.08	4.08	4.08
DIVERSION TO													
+	BGOAL	.04	1	FLOW	24.	24.	24.	24.	24.	24.	24.	24.	24.
				TIME	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.50
HYDROGRAPH AT													
+	DGOAL	.04	1	FLOW	260.	256.	255.	251.	249.	249.	247.	242.	235.
				TIME	3.83	3.92	3.92	4.00	4.08	4.08	4.08	4.08	4.08
2 COMBINED AT													
+	R2CPT51B	1.01	1	FLOW	702.	684.	651.	615.	598.	587.	581.	568.	551.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO													
+	D6RCHO	1.01	1	FLOW	164.	157.	145.	132.	126.	123.	121.	118.	114.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	6REMAIN	1.01	1	FLOW	538.	527.	506.	484.	473.	465.	460.	450.	438.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	R6MAIN	1.01	1	FLOW	537.	524.	502.	478.	466.	459.	454.	444.	432.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	PT5A2	.08	1	FLOW	79.	77.	74.	71.	70.	69.	68.	67.	66.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	R5A2	.08	1	FLOW	77.	76.	72.	70.	68.	68.	67.	66.	65.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	PT5A6	.19	1	FLOW	177.	172.	165.	157.	154.	152.	151.	149.	146.
				TIME	3.58	3.58	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	C5A6	1.27	1	FLOW	744.	723.	688.	656.	642.	632.	626.	614.	598.
				TIME	3.75	3.75	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO													
+	D7RCHO	1.27	1	FLOW	206.	201.	193.	186.	183.	181.	180.	177.	173.
				TIME	3.75	3.75	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	7REMAIN	1.27	1	FLOW	538.	522.	494.	470.	459.	451.	446.	437.	425.
				TIME	3.75	3.75	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	R7MAIN	1.27	1	FLOW	533.	519.	494.	469.	457.	450.	445.	436.	424.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	DMAV	.00	1	FLOW	174.	159.	134.	108.	98.	91.	86.	79.	70.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33

ROUTED TO												
+	RMAV	.00	1	FLOW	172.	158.	133.	108.	97.	91.	86.	79.	70.
				TIME	4.33	4.33	4.33	4.33	4.42	4.42	4.42	4.42	4.42
2 COMBINED AT													
+	CMAV	1.27	1	FLOW	570.	553.	524.	494.	482.	473.	467.	457.	445.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
DIVERSION TO													
+	DDUNCAN	1.27	1	FLOW	309.	298.	275.	251.	241.	235.	230.	222.	212.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT													
+	DPT5A7	1.27	1	FLOW	261.	255.	249.	243.	240.	238.	237.	235.	232.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT													
+	PT5A7	.07	1	FLOW	59.	57.	55.	53.	52.	51.	50.	50.	49.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	C5A7	1.35	1	FLOW	320.	313.	304.	295.	292.	289.	288.	285.	281.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	R5A7	1.35	1	FLOW	318.	311.	303.	294.	291.	288.	286.	284.	280.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO													
+	D8RCHO	1.35	1	FLOW	136.	131.	124.	118.	116.	114.	113.	111.	108.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	8REMAIN	1.35	1	FLOW	182.	180.	179.	176.	175.	174.	174.	173.	172.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	R8MAIN	1.35	1	FLOW	182.	180.	178.	176.	174.	174.	173.	172.	171.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PT5A9	.05	1	FLOW	45.	44.	42.	41.	40.	39.	39.	38.	38.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C5A9	1.39	1	FLOW	219.	217.	213.	208.	206.	205.	205.	203.	202.
				TIME	3.75	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83
DIVERSION TO													
+	GOOF5A	1.39	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	GWAN5A	1.39	1	FLOW	218.	216.	212.	207.	205.	204.	204.	202.	201.
				TIME	3.75	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	C2PT5A9	7.98	1	FLOW	1182.	1142.	1076.	1012.	986.	967.	955.	936.	912.
				TIME	4.25	4.25	4.25	4.33	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	GOOF5	7.98	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.25	3.25	3.33	3.33	3.33	3.33	3.33	3.33	3.42
HYDROGRAPH AT													
+	GOWAN5	7.98	1	FLOW	1181.	1141.	1075.	1011.	985.	966.	954.	935.	911.
				TIME	4.25	4.25	4.25	4.33	4.25	4.25	4.25	4.25	4.25
DIVERSION TO													
+	LWRRNCH	7.98	1	FLOW	832.	809.	772.	736.	721.	711.	704.	693.	679.
				TIME	4.25	4.25	4.25	4.33	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	DEASTGOW	7.98	1	FLOW	350.	332.	303.	275.	263.	256.	250.	242.	232.
				TIME	4.25	4.25	4.25	4.33	4.25	4.25	4.25	4.25	4.25
ROUTED TO													
+	RDEASTGO	7.98	1	FLOW	349.	332.	303.	274.	263.	255.	250.	242.	231.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	CY08-C	.09	1	FLOW	96.	94.	91.	87.	86.	85.	84.	83.	82.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CCY08C	8.08	1	FLOW	376.	358.	328.	299.	289.	282.	279.	271.	261.
				TIME	4.25	4.33	4.33	4.25	4.17	4.08	4.08	4.08	4.08
DIVERSION TO													
+	GOOF6	8.08	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42
HYDROGRAPH AT													
+	DGWN6	8.08	1	FLOW	375.	357.	327.	298.	288.	281.	278.	270.	260.
				TIME	4.25	4.33	4.33	4.25	4.17	4.08	4.08	4.08	4.08
DIVERSION TO													
+	DEGWN6	8.08	1	FLOW	268.	255.	233.	213.	205.	200.	198.	192.	185.
				TIME	4.25	4.33	4.33	4.25	4.17	4.08	4.08	4.08	4.08
HYDROGRAPH AT													

+ DALEX	8.08	1	FLOW	107.	102.	94.	86.	83.	81.	80.	78.	75.
			TIME	4.25	4.33	4.33	4.25	4.17	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+ CUL30	.00	1	FLOW	164.	157.	145.	132.	126.	123.	121.	118.	114.
			TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+ RCUL30	.00	1	FLOW	162.	155.	140.	128.	123.	121.	119.	115.	112.
			TIME	3.92	3.92	3.92	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+ CUL31	.00	1	FLOW	206.	201.	193.	186.	183.	181.	180.	177.	173.
			TIME	3.75	3.75	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+ RCUL31	.00	1	FLOW	216.	211.	204.	194.	190.	187.	185.	181.	177.
			TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00	4.00
HYDROGRAPH AT												
+ DUNCAN	.00	1	FLOW	309.	298.	275.	251.	241.	235.	230.	222.	212.
			TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
ROUTED TO												
+ RDUNCAN	.00	1	FLOW	361.	346.	321.	289.	275.	264.	256.	243.	223.
			TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+ CUL32	.00	1	FLOW	136.	131.	124.	118.	116.	114.	113.	111.	108.
			TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+ RCUL32	.00	1	FLOW	142.	141.	138.	133.	131.	129.	128.	126.	123.
			TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
4 COMBINED AT												
+ CPT56B	.00	1	FLOW	874.	839.	775.	705.	676.	657.	653.	639.	628.
			TIME	3.92	3.92	3.92	3.92	3.92	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+ PT5B6-C	.38	1	FLOW	324.	316.	304.	292.	287.	283.	281.	277.	272.
			TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+ CCPT56B	.38	1	FLOW	1177.	1135.	1060.	979.	945.	921.	903.	875.	854.
			TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
2 COMBINED AT												
+ CCCPT56B	8.46	1	FLOW	1272.	1227.	1145.	1058.	1021.	994.	975.	945.	927.
			TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
HYDROGRAPH AT												
+ 0511-1	.00	1	FLOW	3.	3.	3.	3.	3.	3.	3.	3.	3.
			TIME	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT												
+ 0511-2	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.	2.
			TIME	3.17	3.17	3.25	3.25	3.25	3.25	3.25	3.25	3.25
HYDROGRAPH AT												
+ 0511-3	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.	2.
			TIME	2.50	2.58	2.58	2.67	2.67	2.67	2.75	2.83	2.83
HYDROGRAPH AT												
+ 0511-4	.00	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.	2.
			TIME	3.17	3.25	3.25	3.25	3.33	3.33	3.33	3.33	3.33
4 COMBINED AT												
+ GOOF1-4	.00	1	FLOW	9.	9.	9.	9.	9.	9.	9.	9.	9.
			TIME	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33
HYDROGRAPH AT												
+ 0511-5A	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
			TIME	3.50	3.50	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+ GOOF1-5A	.00	1	FLOW	10.	10.	10.	10.	10.	10.	10.	10.	10.
			TIME	3.50	3.50	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+ 0511-5	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
			TIME	3.25	3.25	3.33	3.33	3.33	3.33	3.33	3.33	3.42
HYDROGRAPH AT												
+ 0486-1	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
			TIME	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42
3 COMBINED AT												
+ 0486	.00	1	FLOW	12.	12.	12.	12.	12.	12.	12.	12.	12.
			TIME	3.50	3.50	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO												
+ RDGOW2A	.00	1	FLOW	12.	12.	12.	12.	12.	12.	12.	12.	12.
			TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+ CCCPT5B6	8.46	1	FLOW	1284.	1239.	1157.	1070.	1033.	1006.	987.	957.	939.
			TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
HYDROGRAPH AT												
+ GOWAN	.00	1	FLOW	832.	809.	772.	736.	721.	711.	704.	693.	679.
			TIME	4.25	4.25	4.25	4.33	4.25	4.25	4.25	4.25	4.25

DIVERSION TO													
+	D9RCHO	.00	1	FLOW	439.	429.	407.	384.	375.	369.	364.	358.	349.
				TIME	4.25	4.25	4.25	4.33	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	CENTRL1	.00	1	FLOW	392.	381.	365.	352.	346.	342.	339.	335.	330.
				TIME	4.25	4.25	4.25	4.33	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT													
+	TRUVAL	.00	1	FLOW	86.	82.	76.	71.	68.	67.	65.	64.	62.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33
2 COMBINED AT													
+	CBDV1	.00	1	FLOW	478.	463.	441.	422.	414.	409.	405.	398.	391.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.25
HYDROGRAPH AT													
+	MORBAY	.00	1	FLOW	428.	407.	372.	337.	324.	314.	307.	297.	285.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
2 COMBINED AT													
+	CBDVMORB	.00	1	FLOW	905.	869.	813.	759.	738.	723.	712.	696.	676.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33
DIVERSION TO													
+	D10RCHO	.00	1	FLOW	189.	185.	179.	173.	171.	169.	168.	166.	164.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	CENTRL2	.00	1	FLOW	716.	684.	634.	586.	567.	554.	544.	529.	512.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33
ROUTED TO													
+	RTCHY	.00	1	FLOW	683.	655.	610.	567.	550.	537.	528.	515.	499.
				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
DIVERSION TO													
+	DVSTR1	.00	1	FLOW	206.	194.	175.	158.	151.	146.	143.	137.	131.
				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
HYDROGRAPH AT													
+	DVWR1	.00	1	FLOW	477.	461.	435.	409.	398.	391.	386.	378.	368.
				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
DIVERSION TO													
+	DVSTR2	.00	1	FLOW	37.	37.	37.	37.	37.	37.	37.	37.	37.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	DVWR2	.00	1	FLOW	440.	424.	398.	372.	361.	354.	349.	341.	331.
				TIME	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
ROUTED TO													
+	RX5	.00	1	FLOW	437.	421.	396.	370.	359.	352.	347.	339.	329.
				TIME	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67
HYDROGRAPH AT													
+	X4	.81	1	FLOW	294.	288.	279.	269.	265.	262.	260.	257.	253.
				TIME	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
HYDROGRAPH AT													
+	X3B	.16	1	FLOW	119.	116.	112.	108.	106.	105.	104.	102.	101.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	CUL4	.16	1	FLOW	79.	78.	77.	75.	74.	74.	74.	73.	72.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
			**	PEAK STAGES IN FEET **									
			1	STAGE	15.32	15.30	15.27	15.24	15.23	15.23	15.22	15.21	15.20
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	X3A	.12	1	FLOW	94.	92.	89.	85.	84.	83.	82.	81.	80.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	CUL8	.12	1	FLOW	65.	62.	57.	53.	50.	47.	46.	44.	39.
				TIME	4.25	4.25	4.33	4.33	4.33	4.42	4.42	4.42	4.50
			**	PEAK STAGES IN FEET **									
			1	STAGE	22.83	22.79	22.71	22.64	22.60	22.59	22.58	22.57	22.55
				TIME	4.25	4.25	4.33	4.33	4.33	4.42	4.42	4.42	4.50
2 COMBINED AT													
+	CX3AB	.28	1	FLOW	143.	140.	134.	128.	124.	120.	119.	117.	110.
				TIME	4.25	4.33	4.33	4.33	4.33	4.42	4.42	4.42	4.50
ROUTED TO													
+	RK3AB	.28	1	FLOW	128.	124.	119.	113.	110.	109.	107.	105.	102.
				TIME	5.33	5.33	5.42	5.42	5.42	5.42	5.42	5.42	5.42
2 COMBINED AT													
+	CX	1.09	1	FLOW	420.	411.	396.	381.	374.	370.	367.	362.	355.
				TIME	5.42	5.42	5.42	5.42	5.42	5.50	5.50	5.50	5.50
DIVERSION TO													
+	DEVX4	1.09	1	FLOW	100.	100.	100.	100.	100.	100.	100.	100.	100.
				TIME	4.42	4.42	4.50	4.50	4.50	4.50	4.50	4.50	4.58
HYDROGRAPH AT													

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+                DEVX4      1.09     1   FLOW        320.     311.     296.     281.     274.     270.     267.     262.     255.
                                        TIME        5.42     5.42     5.42     5.42     5.42     5.50     5.50     5.50     5.50

 ROUTED TO
+                 RK4       1.09     1   FLOW        319.     310.     295.     280.     274.     269.     266.     261.     255.
                                        TIME        5.58     5.58     5.67     5.67     5.67     5.67     5.67     5.67     5.67

 HYDROGRAPH AT
+                 X3C        .48     1   FLOW        128.     124.     119.     113.     111.     109.     108.     106.     104.
                                        TIME        5.17     5.17     5.25     5.25     5.25     5.25     5.25     5.25     5.25

 DIVERSION TO
+                 SD1A       .48     1   FLOW         14.      14.      14.      14.      14.      14.      14.      14.      13.
                                        TIME        5.17     5.17     5.25     5.25     5.25     5.25     5.25     5.25     5.25

 HYDROGRAPH AT
+                 SD1A       .48     1   FLOW        113.     110.     105.      99.      97.      95.      94.      93.      90.
                                        TIME        5.17     5.17     5.25     5.25     5.25     5.25     5.25     5.25     5.25

 ROUTED TO
+                 RK3C       .48     1   FLOW        113.     110.     104.      99.      97.      95.      94.      92.      90.
                                        TIME        5.42     5.42     5.42     5.42     5.42     5.42     5.42     5.42     5.42

 HYDROGRAPH AT
+                 X3         .34     1   FLOW        250.     245.     237.     229.     226.     224.     222.     219.     216.
                                        TIME        4.17     4.17     4.17     4.17     4.17     4.17     4.17     4.17     4.17

   3 COMBINED AT
+                 CX3       1.91     1   FLOW        512.     498.     474.     450.     441.     434.     429.     421.     412.
                                        TIME        5.42     5.50     5.50     5.50     5.50     5.50     5.50     5.50     5.50

 HYDROGRAPH AT
+                 DTX4       .00     1   FLOW        100.     100.     100.     100.     100.     100.     100.     100.     100.
                                        TIME        4.42     4.42     4.50     4.50     4.50     4.50     4.50     4.50     4.58

 ROUTED TO
+                 RDEX       .00     1   FLOW        100.     100.     100.     100.     100.     100.     100.     100.     100.
                                        TIME        4.92     4.92     5.08     5.00     5.00     5.00     5.00     5.00     5.00

 HYDROGRAPH AT
+                 BSX5       .10     1   FLOW        101.      99.      95.      92.      91.      90.      89.      88.      87.
                                        TIME        3.83     3.83     3.83     3.83     3.83     3.83     3.83     3.83     3.83

   2 COMBINED AT
+                 CX5        .10     1   FLOW        139.     136.     131.     126.     126.     126.     125.     125.     125.
                                        TIME        3.92     3.92     3.92     4.92     4.92     4.92     4.92     4.92     4.92

 DIVERSION TO
+                 DVSTR1     .10     1   FLOW          0.       0.       0.       0.       0.       0.       0.       0.       0.
                                        TIME         .00      .00      .00      .00      .00      .00      .00      .00      .00

 HYDROGRAPH AT
+                 DVWR1      .10     1   FLOW        139.     136.     131.     126.     126.     126.     125.     125.     125.
                                        TIME        3.92     3.92     3.92     4.92     4.92     4.92     4.92     4.92     4.92

 DIVERSION TO
+                 DVSTR2     .10     1   FLOW         37.      37.      37.      37.      37.      37.      37.      37.      37.
                                        TIME        3.33     3.42     3.42     3.42     3.42     3.42     3.42     3.42     3.42

 HYDROGRAPH AT
+                 DVWR2      .10     1   FLOW        102.      99.      94.      89.      89.      89.      88.      88.      88.
                                        TIME        3.92     3.92     3.92     4.92     4.92     4.92     4.92     4.92     4.92

 ROUTED TO
+                 RX5        .10     1   FLOW        100.      97.      92.      89.      89.      89.      88.      88.      88.
                                        TIME        4.00     4.00     4.00     5.00     5.00     5.00     5.00     5.00     5.00

   2 COMBINED AT
+                 CX4X3     2.01     1   FLOW        595.     580.     556.     531.     521.     514.     509.     502.     492.
                                        TIME        5.42     5.42     5.42     5.42     5.42     5.42     5.42     5.42     5.42

 DIVERSION TO
+                 DVBOX     2.01     1   FLOW        210.     210.     210.     210.     210.     210.     210.     210.     210.
                                        TIME        3.75     3.75     3.75     3.75     3.75     3.75     3.75     3.75     3.75

 HYDROGRAPH AT
+                 DVBOX     2.01     1   FLOW        385.     370.     346.     321.     311.     304.     299.     292.     282.
                                        TIME        5.42     5.42     5.42     5.42     5.42     5.42     5.42     5.42     5.42
1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                    (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                                INTERPOLATED TO
                                                                                            COMPUTATION INTERVAL
          ISTAQ    ELEMENT        DT        PEAK      TIME TO      VOLUME        DT          PEAK      TIME TO      VOLUME
                                                                    PEAK                                   PEAK

                                  (MIN)      (CFS)      (MIN)       (IN)       (MIN)        (CFS)      (MIN)        (IN)

        FOR PLAN = 1  RATIO=  .99
            RANN  MANE          1.94     120.17     243.71        .94        5.00       119.09     245.00         .94

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1297E+02 EXCESS= .0000E+00 OUTFLOW= .1297E+02 BASIN STORAGE= .1480E-03 PERCENT ERROR=     .0

        FOR PLAN = 1  RATIO=  .98
            RANN  MANE          1.95     116.18     242.71        .91        5.00       115.54     245.00         .91

 *** NORMAL END OF HEC-1 ***
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HEC1 MODEL DEVELOPED OFFSITE RESULTS (SDN 3 STORM)						
BASIN/HEC STATION	LOMR ref	AREA, mi^2	Q10, CFS	Q25, CFS	Q100, CFS	Notes/Location
PDGCD-C		0.44	68	127	228	
RPDGCD-C		0.44	68	127	228	
RRPDGCD		0.44	67	127	227	
NW29B-C		0.25	50	91	161	
RNW29B-C		0.25	49	92	161	
NW1C2-C		0.21	82	126	192	
CNW1C2		0.46	118	201	334	
RCNW1C2		0.46	116	201	332	
PDGCB10C		0.31	82	138	229	
CPDGCB10		0.77	187	321	538	
DPT3AA11		0.77	139	139	139	
DPDGCB10		0.77	48	182	399	
RDPDGCB1		0.77	26	146	343	
DPT3AB1C		0.77	26	146	192	
DDPDGCB1		0.77	0	0	151	
CDPDGCB1		1.21	61	119	329	
RCDPDGCB		1.21	60	119	326	
GD20BE-C		0.43	95	165	279	
CGD20BEC		1.64	114	233	549	
RCGD20BE		1.64	115	235	546	
GD20BM-C		0.34	127	194	296	
CGD20BMC		1.98	202	364	757	
RCGD20BM		1.98	201	360	758	
PT2B2CR		0.2	95	138	202	
CPT2B2		2.18	260	422	819	Craig west of Rancho
RCPT2B2		2.18	257	420	814	
DPT3AB1C		0.77	26	146	192	
RDPT3AB1		0.77	25	143	192	
D1RCHO		0.77	5	27	36	
1REMAIN		0.77	21	116	156	
PT3AB1		0.05	31	44	63	
C3AB1	C3AB1	0.82	31	136	206	Rainbow/Santa Fee Entrance
D2RCHO	D2RCHO	0.82	5	21	29	
2REMAIN	2REMAIN	0.82	26	115	177	
R2MAIN	R2MAIN	0.82	25	114	175	
PT3AB2		0.05	39	54	76	
C3AB2	C3AB2	0.87	57	126	210	Lone Mountain (west side of Rancho)
D3RCHO	D3RCHO	0.87	57	125	209	Diverted to stormdrain
3REMAIN	3REMAIN	0.87	0	1	1	Remaining southbound flow
DPT3AA11		0.77	139	139	139	
RDPT3AA1		0.77	143	148	146	
DPT3AA1A		0.77	5	27	36	
DPT3AA1B		0.82	5	21	29	

HEC1 MODEL DEVELOPED OFFSITE RESULTS (SDN 3 STORM)						
BASIN/HEC STATION	LOMR ref	AREA, mi^2	Q10, CFS	Q25, CFS	Q100, CFS	Notes/Location
PT3AA1-C		0.14	77	110	158	
C3AA1		0.96	211	275	357	Lone Mountain (east side of Rancho)
D3RCHO		0.96	211	275	357	
GOLO		0.96	0	0	0	
C3AA1		1.01	0	0	1	
PT2B2		0.08	52	74	106	
C2B2	CPT2B2	1.09	50	72	102	Ahern Rental property
D4RCHO		1.09	8	12	17	
4REMAIN	4REMAIN	1.09	42	60	85	
R4MAIN		1.09	41	59	83	
PT2B3		0.02	15	22	31	
C2B3	C2B3	1.11	55	78	111	Channel north of Craig
RC2B3	RC2B3	1.11	54	76	111	
2C2B3		2.52	296	473	862	Eastbound in GOAL0168 (Craig/Rancho)
PT51A	PT51A	0	3	5	7	
RPT51A		0	3	4	7	
CPT51A		2.53	297	475	863	
PT51B		0.01	7	9	13	
RPT51B		0.01	6	8	12	
PT51C	PT51C	0.03	19	28	40	
RPT51C	RPT51C	0.03	19	27	39	
CPT51C		2.56	308	489	875	Southbound GOAL0111 north of Jones
PT51D		0.03	23	33	48	
PT3-C		0.17	74	112	169	
RCPT3-C		0.17	75	112	171	
PT41-C		0.37	134	209	323	
CPT41-C		0.57	199	315	489	Eastbound GOA20000
CCPT41-C	2CPT51	3.13	488	772	1244	Southbound GOAL0100 south of Jones
RCPT41-C		3.13	487	770	1243	
PT5A2-C		0.27	86	138	220	
CPT5A2-C		3.4	557	889	1420	Eastbound GOAL0000
RCPT5A2	6REMAIN	3.4	554	885	1423	
PT5B6-C		0.38	125	202	324	
CCPT5B6C		3.78	647	1036	1665	Alexander west of Decatur
GD17BG-C		0.36	125	194	299	
RGD17BG		0.36	125	193	298	
GD11B-C		0.26	143	211	313	
CGD11B-C		0.63	223	345	528	

HEC1 MODEL DEVELOPED OFFSITE RESULTS (SDN 3 STORM)						
BASIN/HEC STATION	LOMR ref	AREA, mi^2	Q10, CFS	Q25, CFS	Q100, CFS	Notes/Location
RCGD11B		0.63	222	345	527	
PT6B-C		0.45	95	155	250	
CPT6B-C		1.08	289	459	699	
DGOW1A		1.08	288	458	560	Eastbound GOOF0511
DPT6B-C1		1.08	1	1	139	
DTRILGY		1.08	0	0	43	
DPT6B-C2		1.08	1	1	97	
TRUVAL		1.08	0	0	4	
TRUV		1.08	1	1	93	
DGOW		1.08	0	0	54	
DGOWAN		1.08	1	1	39	
PT5A7	C5A7	0.07	21	36	59	
D8RCHO	D8RCHO	0.07	20	23	23	Eastbound in culvert 32
8REMAIN	8REMAIN	0.07	1	13	36	
R8MAIN	R8MAIN	0.07	1	12	36	
CPT6BC2	C5A9	1.15	2	11	67	
RCPT6B-C		1.15	2	13	67	
DGOW1A		1.08	288	458	560	
RDGOW1A		1.08	287	454	563	
CCPT6B-C	DEASTGOWAN	1.15	288	455	627	Gowan/Decatur in GOOF0486
DTRUV		1.08	0	0	4	
DTRILGY		1.08	0	0	43	
CY07B		0.2	74	113	173	
CCY07B	CBDVMORB	1.28	69	108	208	Rancho/Michael
DCENT1		1.28	1	36	136	
DCY07B	D10RCHO	1.28	68	72	72	
RDCY07B		1.28	68	76	76	
CY08-C		0.09	40	62	96	
CCCY08-C		1.45	378	568	745	Northbound GOOF0485/ GOOF0427
RDGOW2A		1.45	377	566	741	
C427		5.23	948	1496	2331	Decatur/Alexander: Northbound combines with eastbound and continues east GOOF0375
9REMAIN		1.28	1	36	136	
R9REMAIN		1.28	1	39	139	
OG04-C		0.29	137	206	311	
DPD01		0.29	124	124	124	
DOG04-C		0.29	13	82	187	
RDOG04-C		0.29	3	42	121	
OG05-C		0.27	118	176	264	

HEC1 MODEL DEVELOPED OFFSITE RESULTS (SDN 3 STORM)						
BASIN/HEC STATION	LOMR ref	AREA, mi^2	Q10, CFS	Q25, CFS	Q100, CFS	Notes/Location
COG05-C		0.55	115	173	259	
RCOG05-C		0.55	116	174	261	
CY06B-C		0.5	107	176	284	
CCY06B-C		1.05	215	342	521	
RCCY06B		1.05	213	339	521	
CRGOWAN	CX4X3	2.33	201	337	610	Rancho/Cheyenne
RCRGOWAN		2.33	199	334	607	
PD05A-C		0.14	72	102	146	
CPD05A-C		2.47	228	387	691	Rancho/Decatur
DA1-C	DVBOX	1.19	211	211	211	
DCPD05A	DVBOX	2.47	17	176	480	

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   09OCT12  TIME  16:31:09   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


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         LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                       *DIAGRAM
*** FREE ***
            1          ID   RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
            2          ID   GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
            3          ID   OFFSITE BASINS, DEVELOPED CONDITIONS
            4          ID   PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
            5          ID   PREPARED BY STANLEY CONSULTANTS INC. (HM/VF)
            6          ID   INPUT FILE: 10S3D.DAT
            7          ID   DESIGN STORM: 10-YEAR 6-HR
            8          ID   STORM DISTRIBUTION: SDN3
            9          ID   STORM CENTERING: FULL WATERSHED
           10          ID   REFER TO FIGURE 5
           11          ID
           12          ID   BASED ON:
           13          ID   CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
           14          ID   2008 MASTER PLAN UPDATE (MPU) BY PBS&J
           15          ID   GOWAN WATERSHED (ALL) AND
           16          ID   CENTRAL WATERSHED (NORTHWESTERN PORTION)
           17          ID   FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
           18          ID   CONTROL FACILITIES REFERENCED FROM MPU UNLESS OTHERWISE NOTED
           19          ID
           20          ID   RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009
           21          ID
           22          ID   GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
           23          ID   BY G.C. WALLACE (GCW) 2007
           24          ID
           25          ID   PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
           26          ID   IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
           27          ID   HEC-1 ANALYSIS FOR DEVELOPED CONDITIONS FILE R00S3D.OUT
           28          ID   BY STANLEY CONSULTANTS, 1/2012
           29          ID
           30          ID   LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
           31          ID   ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
           32          ID   MPU HAD THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
           33          ID   (GOEC)
           34          ID
           35          ID
           36          ID   THIS DEVELOPED CONDITION MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL
           37          ID   DRAINAGE STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
           38          ID   DEVELOPED CONDITION MODEL AS FOLLOWS:
           39          ID   1. ROUTES THE 100-YEAR STORM IN THE GOAL STORM DRAIN SYSTEM.
           40          ID   2. BASIN PT51 IS PART OF THE 2008 MPU BASIN PT41-C. IT WAS DELINEATED
           41          ID   AS PART OF THE RANCHO LOMR BY LBG AND INCORPORATED INTO THE DRAINAGE
           42          ID   ANALYSIS FOR THE RANCHO IMPROVEMENTS. ACCORDING TO THE RANCHO LOMR
           43          ID   AND RANCHO IMPROVEMENTS ALL OF THE FLOW GENERATED BY PT51 IS COLLECTED
           44          ID   INTO THE GOWAN OUTFALL - ALEXANDER ROAD FACILITY AT
           45          ID   ALEXANDER-JONES/RANCHO DRIVE INTERSECTION. THEREFORE THIS SUBBASIN WAS
           46          ID   FURTHER DELINEATED (PT51A THROUGH PT51D) INTO SMALL SUBBASINS TO SHOW
           47          ID   LOCATIONS ALONG RANCHO DRIVE AND ALEXANDER ROAD (WEST OF RANCHO DRIVE)
           48          ID   WHERE FLOWS ARE COLLECTED IN THE PROPOSED FLOOD CONTROL FACILITY.
           49          ID   3. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
           50          ID   TO THE EXISTING CONDITION MODEL
           51          ID   4. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE DARF'S
           52          ID   USED IN THE 2008 MPU HEC-1 ALLGOW3.OUT
           53          ID
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         LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

           54          ID
           55          ID
           56          ID   JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
           57          ID   DARF RATIOS FOR AREAS OF 0, 0.5, 1.0, 2.0, 4.0, 6.0, 8.0 AND 10 SQUARE MILES
           58          ID   FOR THE 100-YEAR EVENT.
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  59          IT       5       0       0     300
  60          IO       5       0       0
  61          IN       5
  62          JR    PREC    0.57    0.56    0.55    0.53    0.52    0.51    0.50    0.49
              *

  63          KK PDGCD-C
  64          KM   2008 MPU BASIN
  65          BA   0.441
  66          PB    2.77
  67          PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
  68          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
  69          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
  70          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
  71          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
  72          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
  73          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
  74          PC   0.998   0.999   1.000
  75          LS       0    80.6
  76          UD   0.543
              *

  77          KKRPDGCD-C
  78          KM  ROUTE PDGCD-C TO RRPDGCD
  79          KM  FROM CWH
  80          RD    3080  0.0065    0.03       0    TRAP      30       2
              *

  81          KK RRPDGCD
  82          KM  ROUTE RPDGCD-C TO CDPDGCB1
  83          KM  LINING = CONCRETE
  84          KM  FROM CWH
  85          RD    1610  0.0062   0.015       0    TRAP       8       2
              *

  86          KK NW29B-C
  87          KM   2008 MPU BASIN
  88          BA   0.254
  89          PB    2.80
  90          LS       0    80.9
  91          UD   0.404
              *

  92          KKRNW29B-C
  93          KM  ROUTE NW29B-C TO CNW1C2
  94          KM  ANN ROAD
  95          RD    4500  0.0122   0.016       0    TRAP       0      50
              *
1                                      HEC-1 INPUT                                      PAGE  3

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  96          KK NW1C2-C
  97          KM   2008 MPU BASIN
  98          BA   0.207
  99          PB    2.77
 100          LS       0    89.5
 101          UD   0.409
              *

 102          KK  CNW1C2
 103          KM  COMBINE RNW29B-C AND NW1C2-C
 104          KM  ANN ROAD AND RANCHO
 105          HC       2
              *

 106          KK RCNW1C2
 107          KM  ROUTE CNW1C2 TO CPDGCB10
 108          KM  ALONG RANCHO
 109          KM  LINING = CONCRETE
 110          RD    2300  0.0087   0.015       0    TRAP      12       0
              *

 111          KKPDGCB10C
 112          KM   2008 MPU BASIN
 113          BA   0.309
 114          PB    2.77
 115          LS       0    84.6
 116          UD   0.414
              *

 117          KKCPDGCB10
 118          KM  COMBINE PDGCB10C AND RCNW1C2
 119          KM  NEAR US95 AND RANCHO INTERSECTION
 120          HC       2
              *

 121          KKDPDGCB10
 122          KM  FLOW SPLIT ACROSS RANCHO TO PT3AA1
 123          KM  10'X 3' RCB (139 CFS)   CULVERT 3
 124          KM  FROM 2008 MPU BASIN; U.S. 95 / RANCHO FIS
 125          KM  D95A
 126          DTDPT3AA11
 127          DI       0      51     101     118     140     318   10000
 128          DQ       0      50     100     117     139     139     139
              *

 129          KKRDPDGCB1
 130          KM  ROUTE DPDGCB10 TO DDPDGCB1
 131          KM  ALONG US95
 132          KM  LINING = CONCRETE
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 133          RD    2000  0.0004   0.015       0    TRAP       8       2
              *
1                                        HEC-1 INPUT                                        PAGE  4

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

 134          KKDDPDGCB1
 135          KM  FLOW SPLIT ACROSS US95 TO PT3AB1 (LOMR BASIN)
 136          KM  (2) 6'X 2' RCB (CULVERT 5). 192 CFS - BASED ON INLET CONTROL NOMOGRAPH WITH 4'
 137          KM  HEADWATER; HEADWATER BASED ON DEPTH OF CONCRETE CHANNEL
 138          KM  2008 MPU BASIN
 139          DTDPT3AB1C
 140          DI       0     192   10000
 141          DQ       0     192     192
              *

 142          KKCDPDGCB1
 143          KM  COMBINE RRPDGCD AND DDPDGCB1
 144          KM  NEAR US95 AND RANCHO INTERSECTION
 145          HC       2
              *

 146          KKRCDPDGCB
 147          KM  ROUTE CDPDGCB1 TO CGD20BEC
 148          KM  LOCAL FACILITY ALONG U.S. 95
 149          RD    1750  0.0029   0.025       0    TRAP      20       3
              *

 150          KKGD20BE-C
 151          KM   2008 MPU BASIN
 152          BA   0.427
 153          PB    2.77
 154          LS       0    83.4
 155          UD   0.467
              *

 156          KKCGD20BEC
 157          KM  COMBINE GD20BE-C AND RCDPDGCB
 158          KM  COMBINATION OF US 95 AND LONE MOUNTAIN
 159          HC       2
              *

 160          KKRCGD20BE
 161          KM  ROUTE CGD20BEC TO CGD20BMC
 162          KM  NEWLY PROPOSED REGIONAL FACILITY
 163          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
 164          KM  FACILITY # = GOAL 0247
 165          KM  LINING = CONCRETE
 166          RD    2640   0.003   0.015       0    TRAP      12       2
              *

 167          KKGD20BM-C
 168          KM   2008 MPU BASIN
 169          BA   0.343
 170          PB    2.77
 171          LS       0    89.3
 172          UD   0.456
              *
1                                        HEC-1 INPUT                                        PAGE  5

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

 173          KKCGD20BMC
 174          KM  COMBINE GD20BM-C AND RCGD20BE
 175          KM  US 95 AND CRAIG ROAD
 176          HC       2
              *

 177          KKRCGD20BM
 178          KM  ROUTE CGD20BMC TO CPT2B2
 179          KM  NEWLY PROPOSED REGIONAL FACILITY
 180          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
 181          KM  FACILITY # = GOAL 0168
 182          KM  LINING = RCB
 183          RD    4200   0.005   0.015       0    TRAP      10       0
              *

 184          KK PT2B2CR
 185          KM   REVISED FROM 2008 MPU BASIN  BY STANLEY
 186          KM   AREA DECREASED FOR LOMR BASINS PT2B3 AND PT2A2 ALONG RANCHO
 187          BA   0.199
 188          PB    2.77
 189          LS       0    92.1
 190          UD   0.417
              *

 191          KK  CPT2B2
 192          KM  CRAIG AND RANCHO
 193          HC       2
              *

 194          KK RCPT2B2
 195          KM  ROUTE CPT2B2 TO CPT41-C
 196          KM  NEWLY PROPOSED REGIONAL FACILITY
 197          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
 198          KM  FACILITY # = GOAL 0111
 199          KM  LINING = RCB
 200          RD    3000  0.0083   0.015       0    TRAP      10       0
              *
              *
```

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                * ************************************************************
                * ************************************************************
                * ************************************************************
                * ****START OF FLOW CONVEYED IN SWALE ON WEST SIDE OF RANCHO****
                * ****AND ULTIMATELY TO THE GOWAN SD, LONE MTN BRANCH  *********
                * ****NONE OF THIS FLOW IS CONVEYED IN STREET PER LOMR HECRAS***
                * ************************************************************

          201   KKDPT3AB1C
          202   KM  RETRIEVE FLOW FROM BOX DIVERSION JUST SOUTH OF 95/RANCHO INT.
          203   KM  IN EXISTING (LOMR) RETRIEVING D95B
          204   KM  NOTE: DRAINAGE AREA OF 0.77 SQUARE MILES
          205   KM  RETRIEVE DPT3AB1C
          206   DRDPT3AB1C
                *
1                                        HEC-1 INPUT                                                PAGE  6

        LINE    ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          207   KKRDPT3AB1
          208   KM  ROUTE TO CULVERT RANCHO/RAINBOW INTERSECTION
          209   RK    1200   0.004   0.025       0    TRAP      30       2
                *

          210   KK 1REMAIN
          211   KM  DIVERT 36 CFS EAST THROUGH 2, 24" CMP'S (CULVERT 14) UNDER RANCHO ROAD JUST
          212   KM  NORTHWEST (UPSTREAM) OF THE RANCHO ROAD AND RAINBOW BLVD. INTERSECTION.
          213   KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO. UPPER RANCHO HECRAS STA. 122+
          214   KM  REFERENCED FROM LOMR
          215   DT  D1RCHO
          216   DI       0     191    1000   10000
          217   DQ       0      36      36      36
                *

          218   KK  PT3AB1
          219   KM   REFERENCED FROM LOMR
          220   PB    2.77
          221   BA   0.049
          222   LS       0    93.7
          223   UD   0.283
                *

          224   KK   C3AB1
          225   HC       2
                *

          226   KK 2REMAIN
          227   KM  DIVERT 29 CFS EAST THROUGH A 30" CMP (CULVERT 15) UNDER RANCHO ROAD AT THE
          228   KM  RANCHO ROAD AND RAINBOW BLVD. INTERSECTION. (UPPER RANCHO HECRAS STA. 121+00)
          229   KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
          230   KM  REFERENCED FROM LOMR
          231   DT  D2RCHO
          232   DI       0     189    1000   10000
          233   DQ       0      29      29      29
                *

          234   KK  R2MAIN
          235   KM  ROUTE TO PT3AB2
          236   RK    1365  0.0022   0.025       0    TRAP      30       2
                *

          237   KK  PT3AB2
          238   KM   REFERENCED FROM LOMR
          239   PB    2.77
          240   BA   0.050
          241   LS       0    94.5
          242   UD   0.197
                *
1                                        HEC-1 INPUT                                                PAGE  7

        LINE    ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          243   KK   C3AB2
          244   KM   COMBINE FLOW WEST SIDE RANCHO AT LONE MTN
          245   HC       2
                *

          246   KK 3REMAIN
          247   KM  ALL FLOW UP TO STORMDRAIN LATERAL DESIGN FLOW RATE, 240 CFS
          248   KM  DIVERTED UNDER RANCHO RD AT LONE MT RD
          249   KM  TO THE GOWAN SD, LONE MTN BRANCH (DESIGN BY GCW)
          250   KM  AT RANCHO HECRAS STA. 103+99 (LOMR BY LBG)
          251   KM  REVISED BY STANLEY FROM LBG HEC-1 MODEL
          252   KM  1 CFS REMAINS TO AVOID A ZERO FLOW
          253   KM  FACILITY = GOWAN OUTFALL - LONE MTN ROAD BRANCH
          254   KM  FACILITY # = GOLO 0275
          255   KM  LINING = 8X6 RCB
          256   DT  D3RCHO
          257   DI       0     241    1000   10000
          258   DQ       0     240     240     240
                *

          259   KKDPT3AA11
          260   KM  RETRIEVE DPT3AA11
          261   DRDPT3AA11
                *

          262   KKRDPT3AA1
          263   KM  ROUTE DPT3AA11 TO C3AA1
          264   KM  ALONGE RANCHO - EAST SIDE
```

```
265          KM  LINING = UNLINED
266          RD    3400  0.0048   0.025       0    TRAP      20       3
             *

267          KKDPT3AA1A
268          KM  RETRIEVE D1RCHO EAST SIDE RANCHO
269          KM  PART OF DIVERSION DPT3AA13 IN MPU
270          DR  D1RCHO
             *

271          KKDPT3AA1B
272          KM  RETRIEVE D2RCHO EAST SIDE RANCHO
273          KM  PART OF DIVERSION DPT3AA13 IN MPU
274          DR  D2RCHO
             *

275          KKPT3AA1-C
276          KM   2008 MPU BASIN
277          BA   0.144
278          PB    2.77
279          LS       0    93.3
280          UD   0.383
             *
1                                        HEC-1 INPUT                                                    PAGE  8

         LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

281          KK   C3AA1
282          KM  COMBINE ALL FLOW EAST SIDE RANCHO AT LONE MTN
283          HC       4
             *

284          KK    GOLO
285          KM  ALL FLOW UP TO STORMDRAIN DESIGN FLOW RATE, 503 CFS
286          KM  DIVERTED TO THE GOWAN SD, LONE MTN BRANCH (DESIGN BY GCW)
287          KM  AT RANCHO HECRAS STA. 103+99 (LOMR BY LBG)
288          KM  204 CFS ALREADY CONTAINED FROM WEST SIDE OF ROAD
289          KM  REMAINING 100-YR FLOW CONVEYED WEST IN MPU
290          KM  REVISED BY STANLEY FROM LBG HEC-1 MODEL
291          KM  FACILITY = GOWAN OUTFALL - LONE MTN ROAD BRANCH
292          KM  FACILITY # = GOLO 0275
293          KM  LINING = 8X6 RCB
294          DT  D3RCHO
295          DI       0     263     500   10000
296          DQ       0     263     500     500
             *

297          KK   C3AA1
298          KM  REMAINING SOUTHBOUND FLOW IN RANCHO
299          HC       2
             *
             * ************************************************************
             * ****END OF FLOW CONVEYED TO GOWAN SD; AT LONE MTN************
             * *START OF SURFACE FLOW CONVEYED SOUTH IN SWALE EAST OF RANCHO*
             * *RUNOFF FROM TOTAL AREA CONVEYED TO STORMDRAIN ***************
             * *DECREASE CALCULATED AREA AT HC'S BY 0.1 SQ MI.***************
             * ************************************************************
             *

300          KK   PT2B2
301          KM  BASIN FROM LOMR; PART OF PT2B2-C IN 2008 MPU
302          KM  UPDATED TO DEVELOPED CONDITION BY STANLEY
303          PB    2.77
304          BA   0.078
305          LS       0    93.2
306          UD   0.239
             *

307          KK    C2B2
308          KM  REMAINING SOUTHBOUND FLOW IN RANCHO
309          HC       2
             *

310          KK 4REMAIN
311          KM  DIVERT 35 CFS EAST THROUGH A 36" CMP (CULVERT 21) UNDER RANCHO ROAD HALF WAY
312          KM  BETWEEN LONE MT. RD. AND CRAIG ROAD. UPPER RANCHO HECRAS STA. 93+76.
313          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
314          KM   REFERENCED FROM LOMR
315          DT  D4RCHO
316          DI       0     214    1000   10000
317          DQ       0      35      35      35
             *
1                                        HEC-1 INPUT                                                    PAGE  9

         LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

318          KK  R4MAIN
319          KM  ROUTE TO C2B3
320          RK    2323   0.011    0.02       0    TRAP      40       2
             *

321          KK   PT2B3
322          KM  LOMR BASIN; PART OF PT2B2-C IN MPU
323          PB    2.77
324          BA   0.023
325          LS       0    93.2
326          UD   0.236
             *

327          KK    C2B3(UPPER RANCHO HECRAS STA. 70+16.)
```

```
328          KM  FLOW ALONG RANCHO, NO. OF RANCHO/CRAIG INTERSECTION
329          HC       2
             *

330          KK   RC2B3
331          KM  ROUTE C2B3 IN GOAL 0111
332          KM  FLOW FROM 48-INCH LATERAL AT DOWNSTREAM END OF DRAINAGE EASEMENT BEHIND
333          KM  CONVENIENCE STORE ON NW CORNER OF CRAIG/RANCHO.
334          KM  EXISTING CONDITION:
335          KM  120 CFS DIVERTED TO 60-INCH STORM DRAIN IN CRAIG ROAD REMAINING CROSSED
336          KM  CRAIG ROAD IN TWO 7'X 3' RCB'S.
337          KM  DEVELOPED:
338          KM  MAINTAIN 48-INCH LATERAL BUT CONNECT IT TO PROPOSED FACILITY GOAL 0168,
339          KM  ABANDON EASTBOUND 60-INCH RCP IN CRAIG ROAD.
340          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
341          KM  FACILITY # = GOAL 0111
342          KM  LINING = RCB
343          RD    3000  0.0083   0.015       0    TRAP      10       0
             *

344          KK   2C2B3
345          KM  COMBINE SOUTHBOUND RANCHO FLOW WITH
346          KM  EASTBOUND CRAIG FLOW IN GOAL 0111
347          HC       2
             *

348          KK   PT51A
349          KM  STREET FLOW IN CRAIG RD, WEST OF RANCHO DRIVE
350          PB    2.77
351          BA  0.0038
352          LS       0    93.2
353          UD   0.087
             *

354          KK  RPT51A
355          KM  ROUTE PT51A IN GOAL 0111
356          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
357          KM  FACILITY # = GOAL 0111
358          KM  LINING = RCB
359          RD    3000  0.0083   0.015       0    TRAP      10       0
             *
1                                        HEC-1 INPUT                                        PAGE 10

           LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

360          KK  CPT51A
361          HC       2
             *

362          KK   PT51B
363          PB    2.77
364          BA   0.007
365          LS       0    93.2
366          UD   0.073
             *

367          KK  RPT51B
368          KM  ROUTE PT51B IN GOAL 0111
369          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
370          KM  FACILITY # = GOAL 0111
371          KM  LINING = RCB
372          RD    2500  0.0083   0.015       0    TRAP      10       0
             *

373          KK   PT51C
374          PB    2.77
375          BA   0.027
376          LS       0    93.2
377          UD   0.192
             *

378          KK  RPT51C
379          KM  ROUTE PT51C IN GOAL 0111
380          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
381          KM  FACILITY # = GOAL 0111
382          KM  LINING = RCB
383          RD    1500  0.0083   0.015       0    TRAP      10       0
             *

384          KK  CPT51C
385          KM  KM WEST SIDE RANCHO, NORTH OF ALEXANDER (JONES NORTH)
386          HC       3
             *

387          KK   PT51D
388          KM  FLOW FROM THIS SUBBASIN CAPTURED IN FUTURE FACILITY GOA2 0000
389          KM  THROUGH TWO DROP INLETS WITHIN SUBBASIN THAT DISCHARGE TO CULVERT 27
390          KM  (7X3 RCB) OR TO PROPOSED DROP INLETS IN ALEXANDER ROAD AT LOW POINT
391          PB    2.77
392          BA   0.033
393          LS       0    93.2
394          UD   0.201
             *
1                                        HEC-1 INPUT                                        PAGE 11

           LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

395          KK   PT3-C
396          KM   2008 MPU BASIN
397          BA   0.172
```

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398          PB    2.77
399          LS       0    89.9
400          UD   0.372
             *

401          KK RCPT3-C
402          KM  ROUTE PT3-C TO CPT41-C
403          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
404          KM  FACILITY # = GOA2 0000
405          KM  LINING = 8X5 RCB
406          RD    4700  0.0081   0.016       0    TRAP       0      50
             *

407          KK  PT41-C
408          KM  2008 MPU BASIN REVISED BY STANLEY
409          KM  AREA REDUCED TO ACCOMMODATE LOMR BASIN PT51 ALONG RANCHO
410          BA   0.365
411          PB    2.77
412          LS       0    88.6
413          UD   0.415
             *

414          KK CPT41-C
415          KM  COMBINE RCPT3-C, PT41-C AND PT51D
416          KM  EASTBOUND FLOW IN ALEXANDER AT RANCHO
417          KM  REVISED BY STANLEY TO INCLUDE PT51D
418          HC       3
             *

419          KKCCPT41-C
420          KM  COMBINE EASTBOUND FLOW IN ALEXANDER (GOA2 0000) WITH
421          KM  SOUTHBOUND FLOW IN RANCHO (GOAL 0111)
422          KM  AT ALEXANDER AND RANCHO
423          HC       2
             *

424          KKRCPT41-C
425          KM  ROUTE CCPT41-C TO CPT5A2-C
426          KM  NEWLY PROPOSED REGIONAL FACILITY
427          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
428          KM  FACILITY # = GOAL 0100
429          KM  LINING = RCB
430          RD     540   0.003   0.015       0    TRAP      10       0
             *

431          KK PT5A2-C
432          KM   2008 MPU BASIN
433          KM   REVISED BY STANLEY; AREAREDUCED FROM LOMR BASIN PT5A7
434          BA  0.2670
435          PB    2.77
436          LS       0    86.9
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

437          UD   0.414
             *

438          KKCPT5A2-C
439          KM  COMBINE PT5A2-C AND CPT41-C
440          KM  ALEXANDER AND RANCHO
441          HC       2
             *

442          KK RCPT5A2
443          KM  ROUTE CPT5A2-C TO CPT5B6-C
444          KM  FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
445          KM  FACILITY # = GOAL 0000
446          KM  LINING = RCB
447          RD    5280    0.01   0.015       0    TRAP      10       0
             *

448          KK PT5B6-C
449          BA   0.381
450          PB    2.77
451          LS       0    86.3
452          UD   0.368
             *

453          KKCCPT5B6C
454          KM  COMBINE PT5B6-C AND CPT5B6-C
455          KM  DECATUR AND ALEXANDER
456          HC       2
             *
             *
             * ****************************************************
             * BEGIN FLOW SPLIT FROM GOWAN WATERSHED; MPU NW BASIN MODEL
             * ****************************************************
             *

457          KKGD17BG-C
458          KM   2008 MPU BASIN
459          BA   0.364
460          PB    2.77
461          LS       0    88.7
462          UD   0.478
             *

463          KK RGD17BG
464          KM  ROUTE RGD17BG TO CGD11B-C
465          KM  FACILITY = GOWAN OUTFALL - U.S. 95 CHANNEL
466          KM  FACILITY # = GO95 0000
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467          KM  LINING = CONCRETE
468          RD    2640   0.003   0.015       0    TRAP      12       2
             *
1                                        HEC-1 INPUT                                        PAGE 13

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10


469          KK GD11B-C
470          KM   2008 MPU BASIN
471          BA   0.262
472          PB    2.77
473          LS       0    91.4
474          UD   0.278
             *

475          KKCGD11B-C
476          KM  COMBINE GD11B-C AND RGD17BG
477          KM  GOWAN AND US 95
478          HC       2
             *

479          KK RCGD11B
480          KM  ROUTE CGD11B-C TO CPT6B-C
481          KM  FACILITY = GOWAN OUTFALL FACILITIES
482          KM  FACILITY # = GOOF 0511
483          KM  LINING = RCB
484          RD    8390   0.005   0.015       0    TRAP       8       0
             *

485          KK  PT6B-C
486          KM   2008 MPU BASIN
487          BA   0.454
488          PB    2.77
489          LS       0    86.1
490          UD   0.756
             *

491          KK CPT6B-C
492          KM  COMBINE PT6B-C AND RCGD11B
493          KM  GOWAN AND RANCHO
494          HC       2
             *

495          KKDPT6B-C1
496          KM  FLOW SPLIT TO GOWAN OUTFALL
497          KM  DGOW1A
498          KM  FROM 2008 MPU / CWH
499          DT  DGOW1A
500          DI       0      31      51      71     101     301     561     600    3000    5000
501          DQ       0      30      50      70     100     300     560     560     560     560
             *

502          KKDPT6B-C2
503          KM  FLOW SPLIT TO TRILOGY CHANNEL
504          KM  DTRILGY
505          KM  FROM 2008 MPU; CWH
506          DT DTRILGY
507          DI       0      31      91     202     349     625    1214    1944    2801
508          DQ       0       3      33      55      95     173     267     374     491
             *
1                                        HEC-1 INPUT                                        PAGE 14

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10


509          KK    TRUV
510          KM   DIVERSION BEHIND TRUE VALUE HARDWARE REVISED BY LBG.  DIVERSIONS
511          KM   FROM LOMR; DETERMINED USING HECRAS LATERAL WEIR. L = 25 FT
512          KM   USED IN PLACE OF TRILOGY CHANNEL DIVERSION OF MPU (STANLEY)
513          DT  TRUVAL
514          DI       0     200     400     600    1000    1400    1800
515          DQ       0       8      25      43      78     114     149
             *

516          KK  DGOWAN
517          KM   FLOWSPLIT AT GOWAN FOR EASTBOUND SURFACE FLOW IN GOWAN
518          KM   ADDED BY STANLEY; SEE FLOWSPLIT CALCS
519          KM  REMAINING FLOW CONTINUES SOUTH IN RANCHO RD.
520          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
521          DT    DGOW
522          DI       0       1      50      70     100     200
523          DQ       0       0      33      40      58     120
             *

524          KK   PT5A7
525          KM   BASIN REFERENCED FROM LOMR; PART OF PT5A2-C MPU BASIN
526          PB    2.77
527          BA   0.074
528          LS       0    84.4
529          UD   0.351
             *

530          KK 8REMAIN
531          KM  DIVERT 24 CFS EAST ACROSS RANCHO IN A 24" CMP (CULVERT 32).
532          KM  REMAINING FLOW CONTINUES SOUTH ON THE WEST SIDE OF RANCHO
533          KM   REVISED TO 23 CFS BY LBG.  WEIR FLOW ACROSS RANCHO CALCULATED
534          KM   USING HECRAS LATERAL WEIR #3 BETWEEN X-983 AND X-743.
535          DT  D8RCHO
536          DI       0      24     100     200     300     400     500     600
537          DQ       0      23      23      54     122     200     273     346
             *
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```
538          KK  R8MAIN
539          KM  ROUTE TO C5A9 (UPPER RANCHO HECRAS STA 0+00)
540          RK     983   0.003   0.025       0    TRAP      20       2
             *

541          KK CPT6BC2
542          KM  COMBINE WITH SOUTHBOUND FLOW IN RANCHO
543          KM  GOWAN AND RANCHO
544          HC       2
             *

545          KKRCPT6B-C
546          KM  ROUTE DPT6B-C2 TO CCPT6B-C
547          KM  DECATUR AND GOWAN
548          RD    3300   0.007   0.016       0    TRAP       0      50
             *
1                                        HEC-1 INPUT                                                    PAGE 15

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

549          KK  DGOW1A
550          KM  RETRIEVE DGOW1A
551          DR  DGOW1A
             *

552          KK RDGOW1A
553          KM  ROUTE PT6B-C TO CCPT6B-C
554          KM  FACILITY = GOWAN OUTFALL FACILITIES
555          KM  FACILITY # = GOOF 0486
556          KM  LINING = RCB
557          RD    3300   0.006   0.015       0    TRAP       8       0
             *

558          KKCCPT6B-C
559          KM  COMBINE RCPT6B-C AND RDGOW1A
560          KM  GOWAN AND DECATUR
561          HC       2
             *

562          KK   DTRUV
563          KM   REFERENCED FROM LOMR
564          KM   DEVERSION DETERMINED WITH HECRAS LATERAL WEIR BY LBG
565          KM   RETURNS TO RANCHO SOUTH OF TRUE VALUE
566          KM  RETRIEVE DTRUV
567          DR  TRUVAL
             *

568          KK DTRILGY
569          KM  RETRIEVE DTRILGY
570          DR DTRILGY
             *

571          KK   CY07B
572          KM   2008 MPU BASIN
573          KM   SOUTH OF GOWAN, WEST OF RANCHO
574          BA   0.203
575          PB    2.77
576          LS       0    89.1
577          UD   0.461
             *

578          KK  CCY07B
579          KM  COMBINE DTRILGY AND CY07B
580          KM  NEAR RANCHO AND MICHAEL
581          HC       3
             *

582          KK  DCY07B
583          KM  FLOW SPLIT TO CENTRAL BASIN
584          KM  DIVERT FLOW EAST IN RAN 190
585          KM  OPPOSITE OF D9RCHO
586          KM  FROM CWH
587          DT  DCENT1
588          DI       0      19      73     100    1000    2000
1                                        HEC-1 INPUT                                                    PAGE 16

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

589          DQ       0       1       1      28     928    1928
             *

590          KK RDCY07B
591          KM  ROUTE DCY07B TO CCCY08-C
592          KM  DECATUR AND GOWAN
593          RD    3150   0.007   0.016       0    TRAP       0      50
             *

594          KK  CY08-C
595          BA   0.094
596          PB    2.77
597          LS       0    88.5
598          UD   0.306
             *

599          KKCCCY08-C
600          KM  COMBINE CY08-C, CCY08-C, AND RDCY07B
601          KM  GOWAN AND DECATUR
602          HC       3
             *
```

```
603          KK RDGOW2A
604          KM  ROUTE DGOW2A TO CPT5B6-C
605          KM  FACILITY = GOWAN NORTH SYSTEM
606          KM  FACILITY # = GOOF 0427, 0485
607          KM  LINING = RCP
608          RD    2370   0.005   0.013       0    CIRC       8       0
             *

609          KK    C427
610          HC       2
             *

611          KK 9REMAIN
612          KM  RETRIEVE DCENT1
613          DR  DCENT1
             *

614          KKR9REMAIN
615          KM  ROUTE 9REMAIN SOUTH IN RANCHO
616          RD    2100  0.0076   0.016       0    TRAP       0      50
             *

617          KK  OG04-C
618          KM  START OF NW HEC-1 MODEL BASINS
619          BA   0.288
620          LS       0    90.2
621          UD   0.320
             *
1                                        HEC-1 INPUT                                                    PAGE 17

        LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

622          KK DOG04-C
623          KM  FLOW SPLIT TO PD01-C
624          KM  COMBINED CAPACITY = 124 CFS
625          DT   DPD01
626          DI       0      51     125     500    1000
627          DQ       0      50     124     124     124
             *

628          KKRDOG04-C
629          KM  ROUTE DOG04-C TO COG05-C
630          KM  US95 TO CHEYENNE
631          RD    4100  0.0007   0.016       0    TRAP       0      50
             *

632          KK  OG05-C
633          BA   0.266
634          PB    2.77
635          LS       0    90.7
636          UD   0.392
             *

637          KK COG05-C
638          KM  COMBINE RDOG04-C AND OG05-C
639          KM  RAINBOW AND CHEYENNE
640          HC       2
             *

641          KKRCOG05-C
642          KM  ROUTE RCOG05-C TO CCY06B-C
643          KM  CHEYENNE
644          RD    7500  0.0097   0.016       0    TRAP       0      50
             *

645          KK CY06B-C
646          BA   0.498
647          PB    2.77
648          LS       0    86.2
649          UD   0.697
             *

650          KKCCY06B-C
651          KM  COMBINE RCOG05-C AND CY06B-C
652          KM  MICHAEL AND CHEYENNE
653          HC       2
             *

654          KK RCCY06B
655          KM  ROUTE CCY06B TO CRGOWAN
656          KM  CHEYENNE
657          RD    1400    0.01   0.016       0    TRAP       0      50
             *
1                                        HEC-1 INPUT                                                    PAGE 18

        LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

658          KK CRGOWAN
659          KM  COMBINE R9REMAIN AND RCCY06B
660          KM  RANCHO AND CHEYENNE
661          HC       2
             *

662          KKRCRGOWAN
663          KM  ROUTE CRGOWAN TO CPD05A-C
664          KM  RANCHO
665          RD    1700  0.0088   0.016       0    TRAP       0      50
             *

666          KK PD05A-C
```

```
667           BA   0.135
668           PB    2.77
669           LS       0    93.5
670           UD   0.406
              *

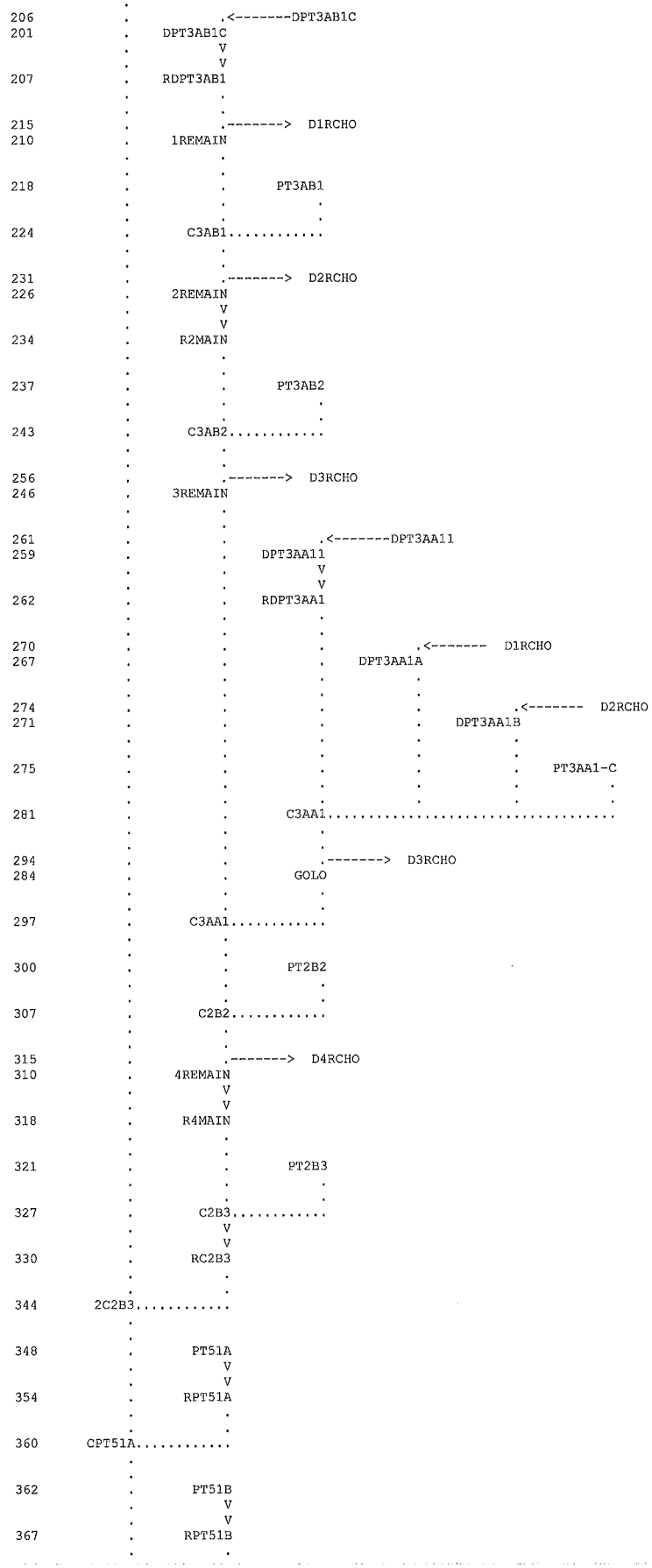
671           KKCPD05A-C
672           KM  COMBINE PD05A-C AND RCRGOWAN
673           KM  RANCHO AND DECATUR
674           HC       2
              *

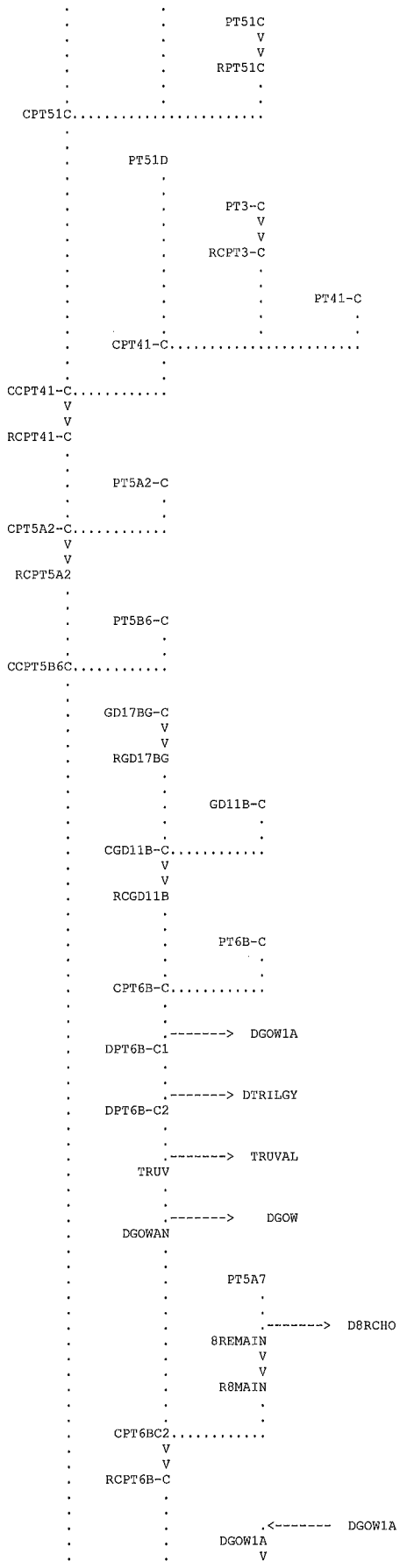
675           KK DCPD05A
676           KM  FLOW SPLIT TO A1-C1
677           KM  OPPOSITE OF DA2 FLOW SPLIT IN CWH
678           KM  CAPACITY RAN 170 = 210 CFS
679           KM  REMAINING FLOW GOES DOWN WEST SIDE OF RANCHO
680           DT   DA1-C
681           DI       0      51     101     211     500    1000    5000
682           DQ       0      51     101     211     211     211     211
              *
683           ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK

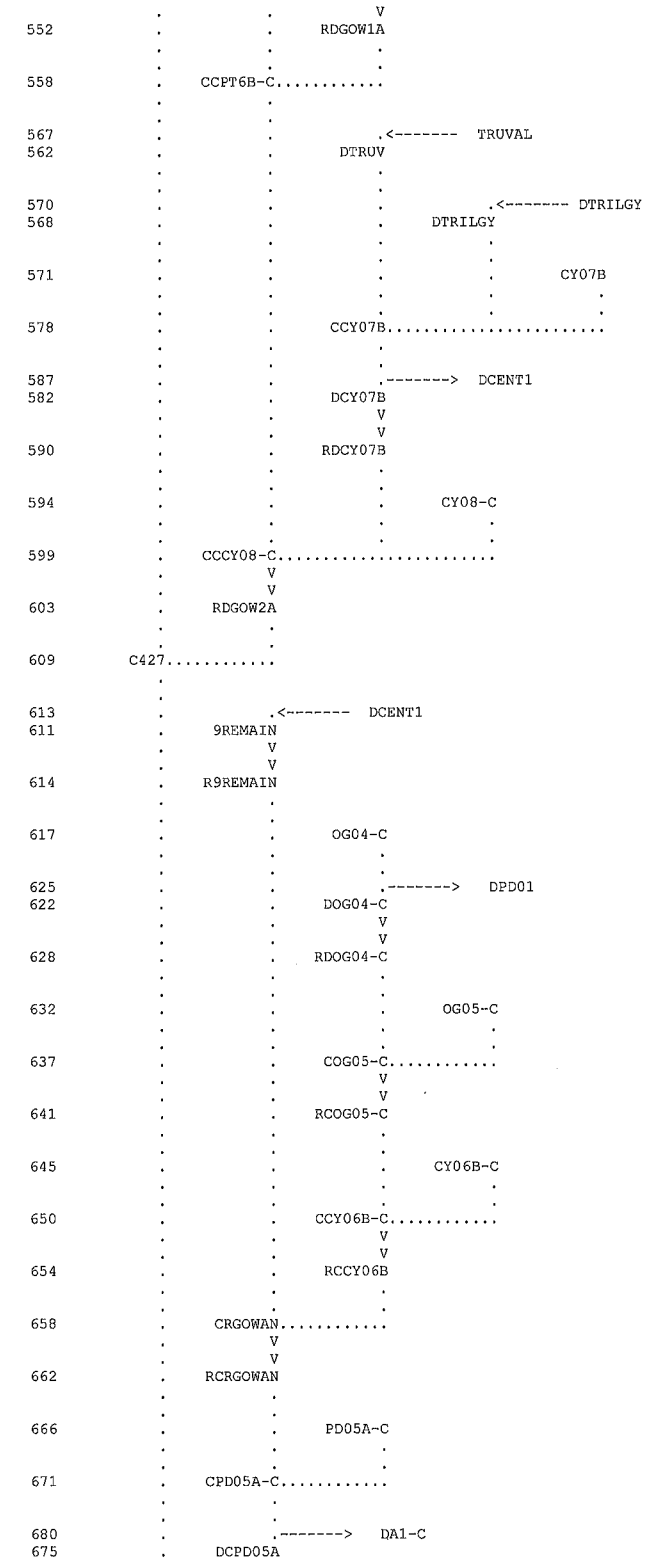
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   63     PDGCD-C
             V
             V
   77    RPDGCD-C
             V
             V
   81     RRPDGCD
             .
             .
   86           .     NW29B-C
                .          V
                .          V
   92           .    RNW29B-C
                .          .
                .          .
   96           .          .     NW1C2-C
                .          .          .
                .          .          .
  102           .      CNW1C2.....     .
                .          V          .
                .          V          .
  106           .     RCNW1C2         .
                .          .          .
                .          .          .
  111           .          .    PDGCB10C
                .          .          .
                .          .          .
  117           .    CPDGCB10.....    .
                .          .          .
                .          .          .
  126           .          .-------->DPT3AA11
  121           .    DPDGCB10
                .          V
                .          V
  129           .    RDPDGCB1
                .          .
                .          .
  139           .          .-------->DPT3AB1C
  134           .    DDPDGCB1
                .          .
                .          .
  142    CDPDGCB1.....     .
             V             .
             V             .
  146    RCDPDGCB          .
             .             .
             .             .
  150           .    GD20BE-C
                .          .
                .          .
  156    CGD20BEC.....     .
             V             .
             V             .
  160    RCGD20BE          .
             .             .
             .             .
  167           .    GD20BM-C
                .          .
                .          .
  173    CGD20BMC.....     .
             V             .
             V             .
  177    RCGD20BM          .
             .             .
             .             .
  184           .     PT2B2CR
                .          .
                .          .
  191     CPT2B2.....      .
             V             .
             V             .
  194     RCPT2B2          .
             .             .
```


206
.<-------DPT3AB1C
201
DPT3AB1C
V
V
207
RDPT3AB1
215
.-------> D1RCHO
210
1REMAIN
218
PT3AB1
224
C3AB1.....
231
.-------> D2RCHO
226
2REMAIN
234
R2MAIN
237
PT3AB2
243
C3AB2.....
256
.-------> D3RCHO
246
3REMAIN
261
.<-------DPT3AA11
259
DPT3AA11
262
RDPT3AA1
270
.<------- D1RCHO
267
DPT3AA1A
274
.<------- D2RCHO
271
DPT3AA1B
275
PT3AA1-C
281
C3AA1.....
294
.-------> D3RCHO
284
GOLO
297
C3AA1.....
300
PT2B2
307
C2B2.....
315
.-------> D4RCHO
310
4REMAIN
318
R4MAIN
321
PT2B3
327
C2B3.....
330
RC2B3
344
2C2B3.....
348
PT51A
354
RPT51A
360
CPT51A.....
362
PT51B
367
RPT51B


373 PT51C
378 RPT51C
384 CPT51C
387 PT51D
395 PT3-C
401 RCPT3-C
407 PT41-C
414 CPT41-C
419 CCPT41-C
424 RCPT41-C
431 PT5A2-C
438 CPT5A2-C
442 RCPT5A2
448 PT5B6-C
453 CCPT5B6C
457 GD17BG-C
463 RGD17BG
469 GD11B-C
475 CGD11B-C
479 RCGD11B
485 PT6B-C
491 CPT6B-C
499 DGOW1A
495 DPT6B-C1
506 DTRILGY
502 DPT6B-C2
513 TRUVAL
509 TRUV
521 DGOW
516 DGOWAN
524 PT5A7
535 D8RCHO
530 8REMAIN
538 R8MAIN
541 CPT6BC2
545 RCPT6B-C
551 DGOW1A
549 DGOW1A



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*               JUN   1998              *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   09OCT12  TIME  16:31:09   *
*                                       *
*****************************************
```

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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
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                    RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
                    GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
                    OFFSITE BASINS, DEVELOPED CONDITIONS
                    PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
                    PREPARED BY STANLEY CONSULTANTS INC. (HM/VF)
                    INPUT FILE: 10S3D.DAT
                    DESIGN STORM: 10-YEAR 6-HR
                    STORM DISTRIBUTION: SDN3
                    STORM CENTERING: FULL WATERSHED
                    REFER TO FIGURE 5

                    BASED ON:
                    CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
                    2008 MASTER PLAN UPDATE (MPU) BY PBS&J
                    GOWAN WATERSHED (ALL) AND
                    CENTRAL WATERSHED (NORTHWESTERN PORTION)
                    FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
                    CONTROL FACILITIES REFERENCED FROM MPU UNLESS OTHERWISE NOTED

                    RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009

                    GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
                    BY G.C. WALLACE (GCW) 2007

                    PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
                    IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
                    HEC-1 ANALYSIS FOR DEVELOPED CONDITIONS FILE R00S3D.OUT
                    BY STANLEY CONSULTANTS, 1/2012

                    LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
                    ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
                    MPU HAD THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
                    (GOEC)


                    THIS DEVELOPED CONDITION MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL
                    DRAINAGE STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
                    DEVELOPED CONDITION MODEL AS FOLLOWS:
                    1. ROUTES THE 100-YEAR STORM IN THE GOAL STORM DRAIN SYSTEM.
                    2. BASIN PT51 IS PART OF THE 2008 MPU BASIN PT41-C. IT WAS DELINEATED
                    AS PART OF THE RANCHO LOMR BY LBG AND INCORPORATED INTO THE DRAINAGE
                    ANALYSIS FOR THE RANCHO IMPROVEMENTS. ACCORDING TO THE RANCHO LOMR
                    AND RANCHO IMPROVEMENTS ALL OF THE FLOW GENERATED BY PT51 IS COLLECTED
                    INTO THE GOWAN OUTFALL - ALEXANDER ROAD FACILITY AT
                    ALEXANDER-JONES/RANCHO DRIVE INTERSECTION. THEREFORE THIS SUBBASIN WAS
                    FURTHER DELINEATED (PT51A THROUGH PT51D) INTO SMALL SUBBASINS TO SHOW
                    LOCATIONS ALONG RANCHO DRIVE AND ALEXANDER ROAD (WEST OF RANCHO DRIVE)
                    WHERE FLOWS ARE COLLECTED IN THE PROPOSED FLOOD CONTROL FACILITY.
                    3. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
                    TO THE EXISTING CONDITION MODEL
                    4. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE DARF'S
                    USED IN THE 2008 MPU HEC-1 ALLGOW3.OUT


                    JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
                    DARF RATIOS FOR AREAS OF 0, 0.5, 1.0, 2.0, 4.0, 6.0, 8.0 AND 10 SQUARE MILES
                    FOR THE 100-YEAR EVENT.

60 IO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                     NMIN          5  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1   0  STARTING DATE
                    ITIME       0000  STARTING TIME
                       NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2   0  ENDING DATE
                   NDTIME       0055  ENDING TIME
                   ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL     .08 HOURS
                      TOTAL TIME BASE   24.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

   JP          MULTI-PLAN OPTION
                    NPLAN          1  NUMBER OF PLANS

   JR          MULTI-RATIO OPTION
                   RATIOS OF PRECIPITATION
                   .57       .56       .55       .53       .52       .51       .50       .49
```

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .57	RATIO 2 .56	RATIO 3 .55	RATIO 4 .53	RATIO 5 .52	RATIO 6 .51	RATIO 7 .50	RATIO 8 .49
HYDROGRAPH AT												
+	PDGCD-C	.44	1	FLOW	68.	65.	62.	56.	53.	50.	47.	45.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RPDGCD-C	.44	1	FLOW	68.	65.	61.	56.	52.	50.	47.	44.
				TIME	4.25	4.25	4.25	4.25	4.25	4.33	4.33	4.33
ROUTED TO												
+	RRPDGCD	.44	1	FLOW	67.	64.	61.	55.	52.	49.	46.	44.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT												
+	NW29B-C	.25	1	FLOW	50.	47.	45.	41.	39.	37.	35.	33.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	RNW29B-C	.25	1	FLOW	49.	47.	45.	41.	38.	36.	34.	33.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	NW1C2-C	.21	1	FLOW	82.	80.	77.	73.	70.	68.	65.	63.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CNW1C2	.46	1	FLOW	118.	114.	109.	100.	96.	90.	85.	82.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.08
ROUTED TO												
+	RCNW1C2	.46	1	FLOW	116.	112.	107.	98.	96.	89.	85.	81.
				TIME	4.08	4.08	4.08	4.08	4.00	4.00	4.08	4.08
HYDROGRAPH AT												
+	PDGCB10C	.31	1	FLOW	82.	79.	76.	70.	67.	64.	62.	59.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT												
+	CPDGCB10	.77	1	FLOW	194.	187.	179.	165.	160.	150.	142.	133.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO												
+	DPT3AA11	.77	1	FLOW	139.	139.	139.	139.	139.	139.	139.	132.
				TIME	3.75	3.83	3.83	3.92	3.92	4.00	4.00	4.00
HYDROGRAPH AT												
+	DPDGCB10	.77	1	FLOW	55.	48.	40.	26.	21.	11.	3.	1.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.58
ROUTED TO												
+	RDPDGCB1	.77	1	FLOW	32.	26.	20.	10.	6.	3.	1.	1.
				TIME	4.17	4.17	4.17	4.25	4.25	4.33	4.50	5.00
DIVERSION TO												
+	DPT3AB1C	.77	1	FLOW	32.	26.	20.	10.	6.	3.	1.	1.
				TIME	4.17	4.17	4.17	4.25	4.25	4.33	4.50	5.00
HYDROGRAPH AT												
+	DDPDGCB1	.77	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00
2 COMBINED AT												
+	CDPDGCB1	1.21	1	FLOW	67.	64.	61.	55.	52.	49.	46.	44.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
ROUTED TO												
+	RCDPDGCB	1.21	1	FLOW	66.	63.	60.	55.	52.	49.	47.	43.
				TIME	4.42	4.42	4.42	4.50	4.50	4.50	4.50	4.50
HYDROGRAPH AT												
+	GD20BE-C	.43	1	FLOW	95.	91.	88.	80.	77.	73.	70.	66.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT												
+	CGD20BEC	1.64	1	FLOW	126.	119.	114.	103.	99.	92.	87.	82.
				TIME	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33
ROUTED TO												
+	RCGD20BE	1.64	1	FLOW	126.	121.	115.	102.	98.	93.	88.	84.
				TIME	4.42	4.42	4.42	4.42	4.50	4.50	4.50	4.50
HYDROGRAPH AT												
+	GD20BM-C	.34	1	FLOW	127.	123.	119.	112.	108.	104.	101.	97.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT												
+	CGD20BMC	1.98	1	FLOW	216.	209.	202.	186.	180.	172.	165.	158.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RCGD20BM	1.98	1	FLOW	216.	208.	201.	185.	179.	172.	165.	158.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08

HYDROGRAPH AT												
+	PT2B2CR	.20	1	FLOW	95.	92.	90.	85.	82.	80.	77.	75.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CPT2B2	2.18	1	FLOW	301.	291.	281.	260.	251.	241.	232.	222.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RCPT2B2	2.18	1	FLOW	297.	287.	277.	257.	247.	239.	230.	220.
				TIME	4.00	4.00	4.00	4.00	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	DPT3AB1C	.00	1	FLOW	32.	26.	20.	10.	6.	3.	1.	1.
				TIME	4.17	4.17	4.17	4.25	4.25	4.33	4.50	5.00
ROUTED TO												
+	RDPT3AB1	.00	1	FLOW	32.	25.	20.	10.	6.	3.	1.	1.
				TIME	4.25	4.25	4.25	4.33	4.42	4.50	4.75	5.17
DIVERSION TO												
+	D1RCHO	.00	1	FLOW	6.	5.	4.	2.	1.	1.	0.	0.
				TIME	4.25	4.25	4.25	4.33	4.42	4.50	4.75	5.00
HYDROGRAPH AT												
+	1REMAIN	.00	1	FLOW	26.	21.	16.	8.	5.	2.	1.	1.
				TIME	4.25	4.25	4.25	4.33	4.42	4.50	4.75	5.25
HYDROGRAPH AT												
+	PT3AB1	.05	1	FLOW	31.	30.	29.	28.	27.	26.	26.	25.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
2 COMBINED AT												
+	C3AB1	.05	1	FLOW	37.	31.	29.	28.	27.	26.	26.	25.
				TIME	4.17	4.17	3.67	3.67	3.67	3.67	3.67	3.75
DIVERSION TO												
+	D2RCHO	.05	1	FLOW	6.	5.	5.	4.	4.	4.	4.	4.
				TIME	4.17	4.17	3.67	3.67	3.67	3.67	3.67	3.75
HYDROGRAPH AT												
+	2REMAIN	.05	1	FLOW	31.	26.	25.	24.	23.	22.	22.	21.
				TIME	4.17	4.17	3.67	3.67	3.67	3.67	3.67	3.75
ROUTED TO												
+	R2MAIN	.05	1	FLOW	31.	25.	25.	24.	23.	22.	22.	21.
				TIME	4.25	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	PT3AB2	.05	1	FLOW	39.	38.	37.	35.	34.	33.	32.	31.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	C3AB2	.10	1	FLOW	58.	57.	55.	52.	51.	50.	48.	47.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO												
+	D3RCHO	.10	1	FLOW	58.	57.	55.	52.	51.	49.	48.	47.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	3REMAIN	.10	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	DPT3AA11	.00	1	FLOW	139.	139.	139.	139.	139.	139.	139.	132.
				TIME	3.75	3.83	3.83	3.92	3.92	4.00	4.00	4.00
ROUTED TO												
+	RDPT3AA1	.00	1	FLOW	143.	143.	142.	141.	140.	140.	138.	131.
				TIME	4.00	4.00	4.00	4.08	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	DPT3AA1A	.00	1	FLOW	6.	5.	4.	2.	1.	1.	0.	0.
				TIME	4.25	4.25	4.25	4.33	4.42	4.50	4.75	5.00
HYDROGRAPH AT												
+	DPT3AA1B	.00	1	FLOW	6.	5.	5.	4.	4.	4.	4.	4.
				TIME	4.17	4.17	3.67	3.67	3.67	3.67	3.67	3.75
HYDROGRAPH AT												
+	PT3AA1-C	.14	1	FLOW	77.	76.	74.	70.	68.	66.	64.	62.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
4 COMBINED AT												
+	C3AA1	.14	1	FLOW	215.	211.	206.	200.	194.	188.	181.	173.
				TIME	3.92	3.92	4.00	4.00	4.00	4.00	4.08	4.08
DIVERSION TO												
+	D3RCHO	.14	1	FLOW	215.	211.	206.	200.	194.	188.	181.	173.
				TIME	3.92	3.92	4.00	4.00	4.00	4.00	4.08	4.08
HYDROGRAPH AT												
+	GOLO	.14	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00
2 COMBINED AT												
+	C3AA1	.24	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												

+	PT2B2	.08	1	FLOW	52.	51.	49.	47.	46.	44.	43.	42.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C2B2	.32	1	FLOW	52.	51.	50.	47.	46.	45.	43.	42.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO												
+	D4RCHO	.32	1	FLOW	9.	8.	8.	8.	7.	7.	7.	7.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	4REMAIN	.32	1	FLOW	44.	43.	42.	39.	38.	37.	36.	35.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R4MAIN	.32	1	FLOW	43.	42.	41.	39.	38.	37.	36.	35.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT2B3	.02	1	FLOW	15.	15.	15.	14.	14.	13.	13.	12.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C2B3	.34	1	FLOW	57.	56.	55.	52.	50.	49.	48.	46.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	RC2B3	.34	1	FLOW	57.	55.	54.	52.	50.	49.	48.	46.
				TIME	3.75	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	2C2B3	2.52	1	FLOW	340.	328.	317.	296.	285.	274.	264.	254.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PT51A	.00	1	FLOW	3.	3.	3.	3.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO												
+	RPT51A	.00	1	FLOW	3.	3.	3.	3.	3.	3.	3.	3.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	CPT51A	2.53	1	FLOW	341.	330.	319.	297.	286.	276.	266.	255.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PT51B	.01	1	FLOW	7.	6.	6.	6.	6.	6.	6.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO												
+	RPT51B	.01	1	FLOW	6.	6.	6.	6.	5.	5.	5.	5.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	PT51C	.03	1	FLOW	19.	19.	18.	17.	17.	17.	16.	16.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO												
+	RPT51C	.03	1	FLOW	19.	19.	18.	17.	17.	16.	16.	15.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	CPT51C	2.56	1	FLOW	352.	341.	330.	308.	296.	285.	275.	264.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PT51D	.03	1	FLOW	23.	23.	22.	21.	20.	20.	19.	19.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	PT3-C	.17	1	FLOW	74.	72.	70.	66.	64.	61.	59.	57.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RCPT3-C	.17	1	FLOW	75.	73.	71.	66.	64.	62.	60.	58.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	PT41-C	.37	1	FLOW	134.	130.	126.	118.	114.	110.	106.	102.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92
3 COMBINED AT												
+	CPT41-C	.57	1	FLOW	206.	199.	193.	181.	174.	168.	162.	156.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT												
+	CCPT41-C	3.13	1	FLOW	558.	540.	523.	488.	471.	454.	438.	421.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RCPT41-C	3.13	1	FLOW	557.	539.	522.	487.	470.	453.	436.	419.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PT5A2-C	.27	1	FLOW	86.	83.	80.	75.	72.	69.	66.	64.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT												
+	CPT5A2-C	3.40	1	FLOW	638.	617.	597.	557.	537.	518.	499.	479.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

ROUTED TO												
+	RCPT5A2	3.40	1	FLOW	635.	614.	594.	554.	533.	512.	493.	472.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PT5B6-C	.38	1	FLOW	125.	121.	117.	108.	104.	100.	96.	91.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CCPT5B6C	3.78	1	FLOW	743.	718.	694.	647.	623.	599.	576.	553.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	GD17BG-C	.36	1	FLOW	125.	121.	117.	110.	106.	102.	98.	95.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	RGD17BG	.36	1	FLOW	125.	121.	117.	109.	105.	101.	98.	94.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
HYDROGRAPH AT												
+	GD11B-C	.26	1	FLOW	143.	139.	135.	128.	124.	120.	116.	113.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	CGD11B-C	.63	1	FLOW	230.	223.	216.	202.	196.	189.	182.	175.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RCGD11B	.63	1	FLOW	228.	222.	215.	202.	195.	188.	182.	175.
				TIME	3.92	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PT6B-C	.45	1	FLOW	95.	91.	88.	82.	78.	75.	72.	69.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT												
+	CPT6B-C	1.08	1	FLOW	309.	299.	289.	270.	261.	251.	242.	233.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
DIVERSION TO												
+	DGOW1A	1.08	1	FLOW	308.	298.	288.	269.	260.	250.	241.	232.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
HYDROGRAPH AT												
+	DPT6B-C1	1.08	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO												
+	DTRILGY	1.08	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	DPT6B-C2	1.08	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO												
+	TRUVAL	1.08	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	TRUV	1.08	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.58	3.58	3.58	3.58	3.58	3.58
DIVERSION TO												
+	DGOW	1.08	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT												
+	DGOWAN	1.08	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	PT5A7	.07	1	FLOW	21.	20.	20.	18.	17.	16.	16.	15.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO												
+	D8RCHO	.07	1	FLOW	20.	20.	19.	17.	17.	16.	15.	14.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT												
+	8REMAIN	.07	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	R8MAIN	.07	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	4.00	4.00	4.00	4.00	4.08	4.00	4.08	4.08
2 COMBINED AT												
+	CPT6BC2	1.15	1	FLOW	2.	2.	2.	2.	2.	2.	2.	1.
				TIME	4.00	4.00	4.00	4.00	4.08	4.00	4.08	4.08
ROUTED TO												
+	RCPT6B-C	1.15	1	FLOW	2.	2.	2.	2.	2.	2.	2.	2.
				TIME	4.50	4.50	4.50	4.58	4.58	4.58	4.58	4.58
HYDROGRAPH AT												
+	DGOW1A	.00	1	FLOW	308.	298.	288.	269.	260.	250.	241.	232.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
ROUTED TO												

+	RDGOW1A	.00	1	FLOW	306.	297.	287.	268.	259.	250.	240.	232.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
2 COMBINED AT												
+	CCPT6B-C	1.15	1	FLOW	307.	297.	288.	269.	259.	250.	241.	232.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	DTRUV	.00	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	DTRILGY	.00	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.50	3.50	3.50	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	CY07B	.20	1	FLOW	74.	71.	69.	65.	62.	60.	58.	56.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
3 COMBINED AT												
+	CCY07B	.20	1	FLOW	74.	71.	69.	65.	63.	60.	58.	56.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO												
+	DCENT1	.20	1	FLOW	2.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.92	3.50	3.50	3.50	3.50	3.50	3.58	3.58
HYDROGRAPH AT												
+	DCY07B	.20	1	FLOW	72.	70.	68.	64.	62.	59.	57.	55.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	RDCY07B	.20	1	FLOW	73.	71.	68.	64.	62.	59.	57.	55.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	CY08-C	.09	1	FLOW	40.	39.	38.	35.	34.	33.	32.	30.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	CCCY08-C	1.45	1	FLOW	402.	390.	378.	353.	341.	328.	316.	305.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RDGOW2A	1.45	1	FLOW	402.	389.	377.	351.	339.	326.	314.	302.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
2 COMBINED AT												
+	C427	5.23	1	FLOW	1133.	1095.	1059.	985.	948.	911.	876.	841.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.08
HYDROGRAPH AT												
+	9REMAIN	.00	1	FLOW	2.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.92	3.50	3.50	3.50	3.50	3.50	3.58	3.58
ROUTED TO												
+	R9REMAIN	.00	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	4.33	3.92	3.92	3.92	3.92	4.00	4.00	4.00
HYDROGRAPH AT												
+	OG04-C	.29	1	FLOW	137.	133.	129.	121.	118.	114.	110.	106.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	DPD01	.29	1	FLOW	124.	124.	124.	120.	117.	113.	109.	105.
				TIME	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	DOG04-C	.29	1	FLOW	13.	9.	5.	1.	1.	1.	1.	1.
				TIME	3.75	3.75	3.75	3.50	3.50	3.50	3.50	3.50
ROUTED TO												
+	RDOG04-C	.29	1	FLOW	3.	2.	1.	1.	1.	1.	1.	1.
				TIME	5.00	5.17	5.33	5.67	5.67	5.67	5.67	5.67
HYDROGRAPH AT												
+	OG05-C	.27	1	FLOW	118.	115.	112.	105.	102.	99.	95.	92.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	COG05-C	.55	1	FLOW	119.	115.	112.	105.	102.	99.	95.	92.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RCOG05-C	.55	1	FLOW	119.	116.	112.	105.	102.	99.	95.	92.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	CY06B-C	.50	1	FLOW	111.	107.	103.	95.	91.	88.	84.	80.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25
2 COMBINED AT												
+	CCY06B-C	1.05	1	FLOW	230.	222.	215.	201.	194.	186.	179.	172.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.25
ROUTED TO												
+	RCCY06B	1.05	1	FLOW	227.	222.	213.	200.	193.	187.	178.	173.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT												
+	CRGOWAN	1.05	1	FLOW	229.	223.	214.	201.	194.	188.	179.	174.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25

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 ROUTED TO
+                RCRGOWAN      1.05     1   FLOW          228.     220.     213.     199.     193.     188.     180.     174.
                                           TIME          4.25     4.33     4.33     4.33     4.33     4.33     4.33     4.33

 HYDROGRAPH AT
+                 PD05A-C       .14     1   FLOW           72.      70.      68.      65.      63.      61.      59.      58.
                                           TIME          3.83     3.83     3.83     3.83     3.83     3.83     3.83     3.83

  2 COMBINED AT
+                CPD05A-C      1.19     1   FLOW          266.     253.     247.     228.     225.     217.     209.     200.
                                           TIME          4.25     4.25     4.25     4.25     4.25     4.25     4.25     4.33

 DIVERSION TO
+                  DA1-C       1.19     1   FLOW          211.     211.     211.     211.     211.     211.     209.     200.
                                           TIME          4.17     4.17     4.17     4.25     4.25     4.25     4.25     4.33

 HYDROGRAPH AT
+                DCPD05A       1.19     1   FLOW           55.      42.      36.      17.      14.       6.       0.       0.
                                           TIME          4.25     4.25     4.25     4.25     4.25     4.25      .00      .00
1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                    (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                 INTERPOLATED TO
                                                                                 COMPUTATION INTERVAL
          ISTAQ     ELEMENT       DT        PEAK     TIME TO      VOLUME       DT        PEAK     TIME TO      VOLUME
                                                                    PEAK                            PEAK

                                 (MIN)      (CFS)      (MIN)      (IN)      (MIN)      (CFS)      (MIN)       (IN)

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          3.25      67.82     256.75       .34       5.00      67.70     255.00         .34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8084E+01 EXCESS= .0000E+00 OUTFLOW= .8092E+01 BASIN STORAGE= .6222E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          3.25      64.76     256.75       .33       5.00      64.56     255.00         .33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7742E+01 EXCESS= .0000E+00 OUTFLOW= .7752E+01 BASIN STORAGE= .6111E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          3.25      61.72     256.75       .32       5.00      61.45     255.00         .32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7406E+01 EXCESS= .0000E+00 OUTFLOW= .7417E+01 BASIN STORAGE= .5999E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          3.00      55.68     258.00       .29       5.00      55.50     255.00         .29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6748E+01 EXCESS= .0000E+00 OUTFLOW= .6756E+01 BASIN STORAGE= .5417E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          3.00      52.78     258.00       .27       5.00      52.50     255.00         .27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6427E+01 EXCESS= .0000E+00 OUTFLOW= .6436E+01 BASIN STORAGE= .5653E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          3.00      49.93     258.00       .26       5.00      49.60     260.00         .26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6111E+01 EXCESS= .0000E+00 OUTFLOW= .6121E+01 BASIN STORAGE= .5381E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          3.00      47.09     258.00       .25       5.00      46.90     260.00         .25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5801E+01 EXCESS= .0000E+00 OUTFLOW= .5811E+01 BASIN STORAGE= .5219E-02 PERCENT ERROR=   -.3

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          2.75      44.41     258.50       .23       5.00      44.26     260.00         .23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5497E+01 EXCESS= .0000E+00 OUTFLOW= .5504E+01 BASIN STORAGE= .5344E-02 PERCENT ERROR=   -.2



*** NORMAL END OF HEC-1 ***
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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   09OCT12  TIME  16:31:42   *
*                                       *
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*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*         609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616     *
*         (916) 756-1104            *
*                                   *
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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X .       XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


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          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                        *DIAGRAM
*** FREE ***
             1          ID   RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
             2          ID   GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
             3          ID   OFFSITE BASINS, DEVELOPED CONDITIONS
             4          ID   PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
             5          ID   PREPARED BY STANLEY CONSULTANTS INC. (HM/VF)
             6          ID   INPUT FILE: 25S3D.DAT
             7          ID   DESIGN STORM: 25-YEAR 6-HR
             8          ID   STORM DISTRIBUTION: SDN3
             9          ID   STORM CENTERING: FULL WATERSHED
            10          ID   REFER TO FIGURE 5
            11          ID
            12          ID   BASED ON:
            13          ID   CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
            14          ID   2008 MASTER PLAN UPDATE (MPU) BY PBS&J
            15          ID   GOWAN WATERSHED (ALL) AND
            16          ID   CENTRAL WATERSHED (NORTHWESTERN PORTION)
            17          ID   FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
            18          ID   CONTROL FACILITIES REFERENCED FROM MPU UNLESS OTHERWISE NOTED
            19          ID
            20          ID   RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009
            21          ID
            22          ID   GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
            23          ID   BY G.C. WALLACE (GCW) 2007
            24          ID
            25          ID   PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
            26          ID   IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
            27          ID   HEC-1 ANALYSIS FOR DEVELOPED CONDITIONS FILE R00S3D.OUT
            28          ID   BY STANLEY CONSULTANTS, 1/2012
            29          ID
            30          ID   LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
            31          ID   ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
            32          ID   MPU HAD THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
            33          ID   (GOEC)
            34          ID
            35          ID
            36          ID   THIS DEVELOPED CONDITION MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL
            37          ID   DRAINAGE STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
            38          ID   DEVELOPED CONDITION MODEL AS FOLLOWS:
            39          ID   1. ROUTES THE 100-YEAR STORM IN THE GOAL STORM DRAIN SYSTEM.
            40          ID   2. BASIN PT51 IS PART OF THE 2008 MPU BASIN PT41-C. IT WAS DELINEATED
            41          ID   AS PART OF THE RANCHO LOMR BY LBG AND INCORPORATED INTO THE DRAINAGE
            42          ID   ANALYSIS FOR THE RANCHO IMPROVEMENTS. ACCORDING TO THE RANCHO LOMR
            43          ID   AND RANCHO IMPROVEMENTS ALL OF THE FLOW GENERATED BY PT51 IS COLLECTED
            44          ID   INTO THE GOWAN OUTFALL - ALEXANDER ROAD FACILITY AT
            45          ID   ALEXANDER-JONES/RANCHO DRIVE INTERSECTION. THEREFORE THIS SUBBASIN WAS
            46          ID   FURTHER DELINEATED (PT51A THROUGH PT51D) INTO SMALL SUBBASINS TO SHOW
            47          ID   LOCATIONS ALONG RANCHO DRIVE AND ALEXANDER ROAD (WEST OF RANCHO DRIVE)
            48          ID   WHERE FLOWS ARE COLLECTED IN THE PROPOSED FLOOD CONTROL FACILITY.
            49          ID   3. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
            50          ID   TO THE EXISTING CONDITION MODEL
            51          ID   4. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE DARF'S
            52          ID   USED IN THE 2008 MPU HEC-1 ALLGOW3.OUT
            53          ID
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          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            54          ID
            55          ID
            56          ID   JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
            57          ID   DARF RATIOS FOR AREAS OF 0, 0.5, 1.0, 2.0, 4.0, 6.0, 8.0 AND 10 SQUARE MILES
            58          ID   FOR THE 100-YEAR EVENT.
```

```
 59          IT       5       0       0     300
 60          IO       5       0       0
 61          IN       5
 62          JR    PREC    0.74    0.73    0.72    0.69    0.67    0.67    0.65    0.64
             *

 63          KK PDGCD-C
 64          KM   2008 MPU BASIN
 65          BA   0.441
 66          PB    2.77
 67          PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
 68          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
 69          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
 70          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
 71          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
 72          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
 73          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
 74          PC   0.998   0.999   1.000
 75          LS       0    80.6
 76          UD   0.543
             *

 77          KKRPDGCD-C
 78          KM  ROUTE PDGCD-C TO RRPDGCD
 79          KM  FROM CWH
 80          RD    3080  0.0065    0.03       0    TRAP      30       2
             *

 81          KK RRPDGCD
 82          KM  ROUTE RPDGCD-C TO CDPDGCB1
 83          KM  LINING = CONCRETE
 84          KM  FROM CWH
 85          RD    1610  0.0062   0.015       0    TRAP       8       2
             *

 86          KK NW29B-C
 87          KM   2008 MPU BASIN
 88          BA   0.254
 89          PB    2.80
 90          LS       0    80.9
 91          UD   0.404
             *

 92          KKRNW29B-C
 93          KM  ROUTE NW29B-C TO CNW1C2
 94          KM  ANN ROAD
 95          RD    4500  0.0122   0.016       0    TRAP       0      50
             *
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 96          KK NW1C2-C
 97          KM   2008 MPU BASIN
 98          BA   0.207
 99          PB    2.77
100          LS       0    89.5
101          UD   0.409
             *

102          KK  CNW1C2
103          KM  COMBINE RNW29B-C AND NW1C2-C
104          KM  ANN ROAD AND RANCHO
105          HC       2
             *

106          KK RCNW1C2
107          KM  ROUTE CNW1C2 TO CPDGCB10
108          KM  ALONG RANCHO
109          KM  LINING = CONCRETE
110          RD    2300  0.0087   0.015       0    TRAP      12       0
             *

111          KKPDGCB10C
112          KM   2008 MPU BASIN
113          BA   0.309
114          PB    2.77
115          LS       0    84.6
116          UD   0.414
             *

117          KKCPDGCB10
118          KM  COMBINE PDGCB10C AND RCNW1C2
119          KM  NEAR US95 AND RANCHO INTERSECTION
120          HC       2
             *

121          KKDPDGCB10
122          KM  FLOW SPLIT ACROSS RANCHO TO PT3AA1
123          KM  10'X 3' RCB (139 CFS)   CULVERT 3
124          KM  FROM 2008 MPU BASIN; U.S. 95 / RANCHO FIS
125          KM  D95A
126          DTDPT3AA11
127          DI       0      51     101     118     140     318   10000
128          DQ       0      50     100     117     139     139     139
             *

129          KKRDPDGCB1
130          KM  ROUTE DPDGCB10 TO DDPDGCB1
131          KM  ALONG US95
132          KM  LINING = CONCRETE
```

```
 133          RD    2000  0.0004   0.015       0    TRAP       8       2
              *
1                                        HEC-1 INPUT                                                PAGE  4

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 134          KKDDPDGCB1
 135          KM  FLOW SPLIT ACROSS US95 TO PT3AB1 (LOMR BASIN)
 136          KM  (2) 6'X 2' RCB (CULVERT 5). 192 CFS - BASED ON INLET CONTROL NOMOGRAPH WITH 4'
 137          KM  HEADWATER; HEADWATER BASED ON DEPTH OF CONCRETE CHANNEL
 138          KM  2008 MPU BASIN
 139          DTDPT3AB1C
 140          DI       0     192   10000
 141          DQ       0     192     192
              *

 142          KKCDPDGCB1
 143          KM  COMBINE RRPDGCD AND DDPDGCB1
 144          KM  NEAR US95 AND RANCHO INTERSECTION
 145          HC       2
              *

 146          KKRCDPDGCB
 147          KM  ROUTE CDPDGCB1 TO CGD20BEC
 148          KM  LOCAL FACILITY ALONG U.S. 95
 149          RD    1750  0.0029   0.025       0    TRAP      20       3
              *

 150          KKGD20BE-C
 151          KM   2008 MPU BASIN
 152          BA   0.427
 153          PB    2.77
 154          LS       0    83.4
 155          UD   0.467
              *

 156          KKCGD20BEC
 157          KM  COMBINE GD20BE-C AND RCDPDGCB
 158          KM  COMBINATION OF US 95 AND LONE MOUNTAIN
 159          HC       2
              *

 160          KKRCGD20BE
 161          KM  ROUTE CGD20BEC TO CGD20BMC
 162          KM  NEWLY PROPOSED REGIONAL FACILITY
 163          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
 164          KM  FACILITY # = GOAL 0247
 165          KM  LINING = CONCRETE
 166          RD    2640   0.003   0.015       0    TRAP      12       2
              *

 167          KKGD20BM-C
 168          KM   2008 MPU BASIN
 169          BA   0.343
 170          PB    2.77
 171          LS       0    89.3
 172          UD   0.456
              *
1                                        HEC-1 INPUT                                                PAGE  5

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 173          KKCGD20BMC
 174          KM  COMBINE GD20BM-C AND RCGD20BE
 175          KM  US 95 AND CRAIG ROAD
 176          HC       2
              *

 177          KKRCGD20BM
 178          KM  ROUTE CGD20BMC TO CPT2B2
 179          KM  NEWLY PROPOSED REGIONAL FACILITY
 180          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
 181          KM  FACILITY # = GOAL 0168
 182          KM  LINING = RCB
 183          RD    4200   0.005   0.015       0    TRAP      10       0
              *

 184          KK PT2B2CR
 185          KM   REVISED FROM 2008 MPU BASIN  BY STANLEY
 186          KM   AREA DECREASED FOR LOMR BASINS PT2B3 AND PT2A2 ALONG RANCHO
 187          BA   0.199
 188          PB    2.77
 189          LS       0    92.1
 190          UD   0.417
              *

 191          KK  CPT2B2
 192          KM  CRAIG AND RANCHO
 193          HC       2
              *

 194          KK RCPT2B2
 195          KM  ROUTE CPT2B2 TO CPT41-C
 196          KM  NEWLY PROPOSED REGIONAL FACILITY
 197          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
 198          KM  FACILITY # = GOAL 0111
 199          KM  LINING = RCB
 200          RD    3000  0.0083   0.015       0    TRAP      10       0
              *
              *
```

```
                * ************************************************************
                * ************************************************************
                * ************************************************************
                * ****START OF FLOW CONVEYED IN SWALE ON WEST SIDE OF RANCHO****
                * ****AND ULTIMATELY TO THE GOWAN SD, LONE MTN BRANCH  *********
                * ****NONE OF THIS FLOW IS CONVEYED IN STREET PER LOMR HECRAS***
                * ************************************************************

          201   KKDPT3AB1C
          202   KM  RETRIEVE FLOW FROM BOX DIVERSION JUST SOUTH OF 95/RANCHO INT.
          203   KM  IN EXISTING (LOMR) RETRIEVING D95B
          204   KM  NOTE: DRAINAGE AREA OF 0.77 SQUARE MILES
          205   KM  RETRIEVE DPT3AB1C
          206   DRDPT3AB1C
                *
1                                        HEC-1 INPUT                                                    PAGE  6

        LINE    ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          207   KKRDPT3AB1
          208   KM  ROUTE TO CULVERT RANCHO/RAINBOW INTERSECTION
          209   RK    1200   0.004   0.025       0    TRAP      30       2
                *

          210   KK 1REMAIN
          211   KM  DIVERT 36 CFS EAST THROUGH 2, 24" CMP'S (CULVERT 14) UNDER RANCHO ROAD JUST
          212   KM  NORTHWEST (UPSTREAM) OF THE RANCHO ROAD AND RAINBOW BLVD. INTERSECTION.
          213   KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO. UPPER RANCHO HECRAS STA. 122+
          214   KM  REFERENCED FROM LOMR
          215   DT  D1RCHO
          216   DI       0     191    1000   10000
          217   DQ       0      36      36      36
                *

          218   KK  PT3AB1
          219   KM   REFERENCED FROM LOMR
          220   PB    2.77
          221   BA   0.049
          222   LS       0    93.7
          223   UD   0.283
                *

          224   KK   C3AB1
          225   HC       2
                *

          226   KK 2REMAIN
          227   KM  DIVERT 29 CFS EAST THROUGH A 30" CMP (CULVERT 15) UNDER RANCHO ROAD AT THE
          228   KM  RANCHO ROAD AND RAINBOW BLVD. INTERSECTION. (UPPER RANCHO HECRAS STA. 121+00)
          229   KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
          230   KM  REFERENCED FROM LOMR
          231   DT  D2RCHO
          232   DI       0     189    1000   10000
          233   DQ       0      29      29      29
                *

          234   KK  R2MAIN
          235   KM  ROUTE TO PT3AB2
          236   RK    1365  0.0022   0.025       0    TRAP      30       2
                *

          237   KK  PT3AB2
          238   KM   REFERENCED FROM LOMR
          239   PB    2.77
          240   BA   0.050
          241   LS       0    94.5
          242   UD   0.197
                *
1                                        HEC-1 INPUT                                                    PAGE  7

        LINE    ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          243   KK   C3AB2
          244   KM   COMBINE FLOW WEST SIDE RANCHO AT LONE MTN
          245   HC       2
                *

          246   KK 3REMAIN
          247   KM  ALL FLOW UP TO STORMDRAIN LATERAL DESIGN FLOW RATE, 240 CFS
          248   KM  DIVERTED UNDER RANCHO RD AT LONE MT RD
          249   KM  TO THE GOWAN SD, LONE MTN BRANCH (DESIGN BY GCW)
          250   KM  AT RANCHO HECRAS STA. 103+99 (LOMR BY LBG)
          251   KM  REVISED BY STANLEY FROM LBG HEC-1 MODEL
          252   KM  1 CFS REMAINS TO AVOID A ZERO FLOW
          253   KM  FACILITY = GOWAN OUTFALL - LONE MTN ROAD BRANCH
          254   KM  FACILITY # = GOLO 0275
          255   KM  LINING = 8X6 RCB
          256   DT  D3RCHO
          257   DI       0     241    1000   10000
          258   DQ       0     240     240     240
                *

          259   KKDPT3AA11
          260   KM  RETRIEVE DPT3AA11
          261   DRDPT3AA11
                *

          262   KKRDPT3AA1
          263   KM  ROUTE DPT3AA11 TO C3AA1
          264   KM  ALONGE RANCHO - EAST SIDE
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```
265          KM  LINING = UNLINED
266          RD    3400  0.0048   0.025       0    TRAP      20       3
             *

267          KKDPT3AA1A
268          KM  RETRIEVE D1RCHO EAST SIDE RANCHO
269          KM  PART OF DIVERSION DPT3AA13 IN MPU
270          DR  D1RCHO
             *

271          KKDPT3AA1B
272          KM  RETRIEVE D2RCHO EAST SIDE RANCHO
273          KM  PART OF DIVERSION DPT3AA13 IN MPU
274          DR  D2RCHO
             *

275          KKPT3AA1-C
276          KM   2008 MPU BASIN
277          BA   0.144
278          PB    2.77
279          LS       0    93.3
280          UD   0.383
             *
1                                        HEC-1 INPUT                                                    PAGE  8

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

281          KK   C3AA1
282          KM  COMBINE ALL FLOW EAST SIDE RANCHO AT LONE MTN
283          HC       4
             *

284          KK    GOLO
285          KM  ALL FLOW UP TO STORMDRAIN DESIGN FLOW RATE, 503 CFS
286          KM  DIVERTED TO THE GOWAN SD, LONE MTN BRANCH (DESIGN BY GCW)
287          KM  AT RANCHO HECRAS STA. 103+99 (LOMR BY LBG)
288          KM  204 CFS ALREADY CONTAINED FROM WEST SIDE OF ROAD
289          KM  REMAINING 100-YR FLOW CONVEYED WEST IN MPU
290          KM  REVISED BY STANLEY FROM LBG HEC-1 MODEL
291          KM  FACILITY = GOWAN OUTFALL - LONE MTN ROAD BRANCH
292          KM  FACILITY # = GOLO 0275
293          KM  LINING = 8X6 RCB
294          DT  D3RCHO
295          DI       0     263     500   10000
296          DQ       0     263     500     500
             *

297          KK   C3AA1
298          KM  REMAINING SOUTHBOUND FLOW IN RANCHO
299          HC       2
             *
             * ************************************************************
             * ****END OF FLOW CONVEYED TO GOWAN SD; AT LONE MTN*************
             * *START OF SURFACE FLOW CONVEYED SOUTH IN SWALE EAST OF RANCHO*
             * *RUNOFF FROM TOTAL AREA CONVEYED TO STORMDRAIN ***************
             * *DECREASE CALCULATED AREA AT HC'S BY 0.1 SQ MI.***************
             * ************************************************************
             *

300          KK   PT2B2
301          KM  BASIN FROM LOMR; PART OF PT2B2-C IN 2008 MPU
302          KM  UPDATED TO DEVELOPED CONDITION BY STANLEY
303          PB    2.77
304          BA   0.078
305          LS       0    93.2
306          UD   0.239
             *

307          KK    C2B2
308          KM  REMAINING SOUTHBOUND FLOW IN RANCHO
309          HC       2
             *

310          KK 4REMAIN
311          KM  DIVERT 35 CFS EAST THROUGH A 36" CMP (CULVERT 21) UNDER RANCHO ROAD HALF WAY
312          KM  BETWEEN LONE MT. RD. AND CRAIG ROAD. UPPER RANCHO HECRAS STA. 93+76.
313          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
314          KM   REFERENCED FROM LOMR
315          DT  D4RCHO
316          DI       0     214    1000   10000
317          DQ       0      35      35      35
             *
1                                        HEC-1 INPUT                                                    PAGE  9

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

318          KK  R4MAIN
319          KM  ROUTE TO C2B3
320          RK    2323   0.011    0.02       0    TRAP      40       2
             *

321          KK   PT2B3
322          KM  LOMR BASIN; PART OF PT2B2-C IN MPU
323          PB    2.77
324          BA   0.023
325          LS       0    93.2
326          UD   0.236
             *

327          KK    C2B3(UPPER RANCHO HECRAS STA. 70+16.)
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```
328          KM  FLOW ALONG RANCHO, NO. OF RANCHO/CRAIG INTERSECTION
329          HC       2
             *

330          KK   RC2B3
331          KM  ROUTE C2B3 IN GOAL 0111
332          KM  FLOW FROM 48-INCH LATERAL AT DOWNSTREAM END OF DRAINAGE EASEMENT BEHIND
333          KM  CONVENIENCE STORE ON NW CORNER OF CRAIG/RANCHO.
334          KM  EXISTING CONDITION:
335          KM  120 CFS DIVERTED TO 60-INCH STORM DRAIN IN CRAIG ROAD REMAINING CROSSED
336          KM  CRAIG ROAD IN TWO 7'X 3' RCB'S.
337          KM  DEVELOPED:
338          KM  MAINTAIN 48-INCH LATERAL BUT CONNECT IT TO PROPOSED FACILITY GOAL 0168,
339          KM  ABANDON EASTBOUND 60-INCH RCP IN CRAIG ROAD.
340          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
341          KM  FACILITY # = GOAL 0111
342          KM  LINING = RCB
343          RD    3000  0.0083   0.015       0    TRAP      10       0
             *

344          KK   2C2B3
345          KM  COMBINE SOUTHBOUND RANCHO FLOW WITH
346          KM  EASTBOUND CRAIG FLOW IN GOAL 0111
347          HC       2
             *

348          KK   PT51A
349          KM  STREET FLOW IN CRAIG RD, WEST OF RANCHO DRIVE
350          PB    2.77
351          BA  0.0038
352          LS       0    93.2
353          UD   0.087
             *

354          KK  RPT51A
355          KM  ROUTE PT51A IN GOAL 0111
356          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
357          KM  FACILITY # = GOAL 0111
358          KM  LINING = RCB
359          RD    3000  0.0083   0.015       0    TRAP      10       0
             *
1                                          HEC-1 INPUT                                          PAGE 10

           LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

360          KK  CPT51A
361          HC       2
             *

362          KK   PT51B
363          PB    2.77
364          BA   0.007
365          LS       0    93.2
366          UD   0.073
             *

367          KK  RPT51B
368          KM  ROUTE PT51B IN GOAL 0111
369          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
370          KM  FACILITY # = GOAL 0111
371          KM  LINING = RCB
372          RD    2500  0.0083   0.015       0    TRAP      10       0
             *

373          KK   PT51C
374          PB    2.77
375          BA   0.027
376          LS       0    93.2
377          UD   0.192
             *

378          KK  RPT51C
379          KM  ROUTE PT51C IN GOAL 0111
380          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
381          KM  FACILITY # = GOAL 0111
382          KM  LINING = RCB
383          RD    1500  0.0083   0.015       0    TRAP      10       0
             *

384          KK  CPT51C
385          KM  KM WEST SIDE RANCHO, NORTH OF ALEXANDER (JONES NORTH)
386          HC       3
             *

387          KK   PT51D
388          KM  FLOW FROM THIS SUBBASIN CAPTURED IN FUTURE FACILITY GOA2 0000
389          KM  THROUGH TWO DROP INLETS WITHIN SUBBASIN THAT DISCHARGE TO CULVERT 27
390          KM  (7X3 RCB) OR TO PROPOSED DROP INLETS IN ALEXANDER ROAD AT LOW POINT
391          PB    2.77
392          BA   0.033
393          LS       0    93.2
394          UD   0.201
             *
1                                          HEC-1 INPUT                                          PAGE 11

           LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

395          KK   PT3-C
396          KM   2008 MPU BASIN
397          BA   0.172
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```
398          PB    2.77
399          LS       0    89.9
400          UD   0.372
             *

401          KK RCPT3-C
402          KM  ROUTE PT3-C TO CPT41-C
403          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
404          KM  FACILITY # = GOA2 0000
405          KM  LINING = 8X5 RCB
406          RD    4700  0.0081   0.016       0    TRAP       0      50
             *

407          KK  PT41-C
408          KM  2008 MPU BASIN REVISED BY STANLEY
409          KM  AREA REDUCED TO ACCOMMODATE LOMR BASIN PT51 ALONG RANCHO
410          BA   0.365
411          PB    2.77
412          LS       0    88.6
413          UD   0.415
             *

414          KK CPT41-C
415          KM  COMBINE RCPT3-C, PT41-C AND PT51D
416          KM  EASTBOUND FLOW IN ALEXANDER AT RANCHO
417          KM  REVISED BY STANLEY TO INCLUDE PT51D
418          HC       3
             *

419          KKCCPT41-C
420          KM  COMBINE EASTBOUND FLOW IN ALEXANDER (GOA2 0000) WITH
421          KM  SOUTHBOUND FLOW IN RANCHO (GOAL 0111)
422          KM  AT ALEXANDER AND RANCHO
423          HC       2
             *

424          KKRCPT41-C
425          KM  ROUTE CCPT41-C TO CPT5A2-C
426          KM  NEWLY PROPOSED REGIONAL FACILITY
427          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
428          KM  FACILITY # = GOAL 0100
429          KM  LINING = RCB
430          RD     540   0.003   0.015       0    TRAP      10       0
             *

431          KK PT5A2-C
432          KM   2008 MPU BASIN
433          KM   REVISED BY STANLEY; AREAREDUCED FROM LOMR BASIN PT5A7
434          BA  0.2670
435          PB    2.77
436          LS       0    86.9
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

437          UD   0.414
             *

438          KKCPT5A2-C
439          KM  COMBINE PT5A2-C AND CPT41-C
440          KM  ALEXANDER AND RANCHO
441          HC       2
             *

442          KK RCPT5A2
443          KM  ROUTE CPT5A2-C TO CPT5B6-C
444          KM  FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
445          KM  FACILITY # = GOAL 0000
446          KM  LINING = RCB
447          RD    5280    0.01   0.015       0    TRAP      10       0
             *

448          KK PT5B6-C
449          BA   0.381
450          PB    2.77
451          LS       0    86.3
452          UD   0.368
             *

453          KKCCPT5B6C
454          KM  COMBINE PT5B6-C AND CPT5B6-C
455          KM  DECATUR AND ALEXANDER
456          HC       2
             *
             *
             * ******************************************************
             * BEGIN FLOW SPLIT FROM GOWAN WATERSHED; MPU NW BASIN MODEL
             * ******************************************************
             *

457          KKGD17BG-C
458          KM   2008 MPU BASIN
459          BA   0.364
460          PB    2.77
461          LS       0    88.7
462          UD   0.478
             *

463          KK RGD17BG
464          KM  ROUTE RGD17BG TO CGD11B-C
465          KM  FACILITY = GOWAN OUTFALL - U.S. 95 CHANNEL
466          KM  FACILITY # = GO95 0000
```

```
 467          KM  LINING = CONCRETE
 468          RD    2640   0.003   0.015       0    TRAP      12       2
              *
1                                        HEC-1 INPUT                                                PAGE 13

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 469          KK GD11B-C
 470          KM   2008 MPU BASIN
 471          BA   0.262
 472          PB    2.77
 473          LS       0    91.4
 474          UD   0.278
              *

 475          KKCGD11B-C
 476          KM  COMBINE GD11B-C AND RGD17BG
 477          KM  GOWAN AND US 95
 478          HC       2
              *

 479          KK RCGD11B
 480          KM  ROUTE CGD11B-C TO CPT6B-C
 481          KM  FACILITY = GOWAN OUTFALL FACILITIES
 482          KM  FACILITY # = GOOF 0511
 483          KM  LINING = RCB
 484          RD    8390   0.005   0.015       0    TRAP       8       0
              *

 485          KK  PT6B-C
 486          KM   2008 MPU BASIN
 487          BA   0.454
 488          PB    2.77
 489          LS       0    86.1
 490          UD   0.756
              *

 491          KK CPT6B-C
 492          KM  COMBINE PT6B-C AND RCGD11B
 493          KM  GOWAN AND RANCHO
 494          HC       2
              *

 495          KKDPT6B-C1
 496          KM  FLOW SPLIT TO GOWAN OUTFALL
 497          KM  DGOW1A
 498          KM  FROM 2008 MPU / CWH
 499          DT  DGOW1A
 500          DI       0      31      51      71     101     301     561     600    3000    5000
 501          DQ       0      30      50      70     100     300     560     560     560     560
              *

 502          KKDPT6B-C2
 503          KM  FLOW SPLIT TO TRILOGY CHANNEL
 504          KM  DTRILGY
 505          KM  FROM 2008 MPU; CWH
 506          DT DTRILGY
 507          DI       0      31      91     202     349     625    1214    1944    2801
 508          DQ       0       3      33      55      95     173     267     374     491
              *
1                                        HEC-1 INPUT                                                PAGE 14

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 509          KK    TRUV
 510          KM   DIVERSION BEHIND TRUE VALUE HARDWARE REVISED BY LBG.  DIVERSIONS
 511          KM   FROM LOMR; DETERMINED USING HECRAS LATERAL WEIR. L = 25 FT
 512          KM   USED IN PLACE OF TRILOGY CHANNEL DIVERSION OF MPU (STANLEY)
 513          DT  TRUVAL
 514          DI       0     200     400     600    1000    1400    1800
 515          DQ       0       8      25      43      78     114     149
              *

 516          KK  DGOWAN
 517          KM   FLOWSPLIT AT GOWAN FOR EASTBOUND SURFACE FLOW IN GOWAN
 518          KM   ADDED BY STANLEY; SEE FLOWSPLIT CALCS
 519          KM  REMAINING FLOW CONTINUES SOUTH IN RANCHO RD.
 520          KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
 521          DT    DGOW
 522          DI       0       1      50      70     100     200
 523          DQ       0       0      33      40      58     120
              *

 524          KK   PT5A7
 525          KM   BASIN REFERENCED FROM LOMR; PART OF PT5A2-C MPU BASIN
 526          PB    2.77
 527          BA   0.074
 528          LS       0    84.4
 529          UD   0.351
              *

 530          KK 8REMAIN
 531          KM  DIVERT 24 CFS EAST ACROSS RANCHO IN A 24" CMP (CULVERT 32).
 532          KM  REMAINING FLOW CONTINUES SOUTH ON THE WEST SIDE OF RANCHO
 533          KM   REVISED TO 23 CFS BY LBG.  WEIR FLOW ACROSS RANCHO CALCULATED
 534          KM   USING HECRAS LATERAL WEIR #3 BETWEEN X-983 AND X-743.
 535          DT  D8RCHO
 536          DI       0      24     100     200     300     400     500     600
 537          DQ       0      23      23      54     122     200     273     346
              *
```

```
538          KK  R8MAIN
539          KM  ROUTE TO C5A9 (UPPER RANCHO HECRAS STA 0+00)
540          RK     983   0.003   0.025       0    TRAP      20       2
             *

541          KK CPT6BC2
542          KM  COMBINE WITH SOUTHBOUND FLOW IN RANCHO
543          KM  GOWAN AND RANCHO
544          HC       2
             *

545          KKRCPT6B-C
546          KM  ROUTE DPT6B-C2 TO CCPT6B-C
547          KM  DECATUR AND GOWAN
548          RD    3300   0.007   0.016       0    TRAP       0      50
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

549          KK  DGOW1A
550          KM  RETRIEVE DGOW1A
551          DR  DGOW1A
             *

552          KK RDGOW1A
553          KM  ROUTE PT6B-C TO CCPT6B-C
554          KM  FACILITY = GOWAN OUTFALL FACILITIES
555          KM  FACILITY # = GOOF 0486
556          KM  LINING = RCB
557          RD    3300   0.006   0.015       0    TRAP       8       0
             *

558          KKCCPT6B-C
559          KM  COMBINE RCPT6B-C AND RDGOW1A
560          KM  GOWAN AND DECATUR
561          HC       2
             *

562          KK   DTRUV
563          KM   REFERENCED FROM LOMR
564          KM   DEVERSION DETERMINED WITH HECRAS LATERAL WEIR BY LBG
565          KM   RETURNS TO RANCHO SOUTH OF TRUE VALUE
566          KM  RETRIEVE DTRUV
567          DR  TRUVAL
             *

568          KK DTRILGY
569          KM  RETRIEVE DTRILGY
570          DR DTRILGY
             *

571          KK   CY07B
572          KM   2008 MPU BASIN
573          KM   SOUTH OF GOWAN, WEST OF RANCHO
574          BA   0.203
575          PB    2.77
576          LS       0    89.1
577          UD   0.461
             *

578          KK  CCY07B
579          KM  COMBINE DTRILGY AND CY07B
580          KM  NEAR RANCHO AND MICHAEL
581          HC       3
             *

582          KK  DCY07B
583          KM  FLOW SPLIT TO CENTRAL BASIN
584          KM  DIVERT FLOW EAST IN RAN 190
585          KM  OPPOSITE OF D9RCHO
586          KM  FROM CWH
587          DT  DCENT1
588          DI       0      19      73     100    1000    2000
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

589          DQ       0       1       1      28     928    1928
             *

590          KK RDCY07B
591          KM  ROUTE DCY07B TO CCCY08-C
592          KM  DECATUR AND GOWAN
593          RD    3150   0.007   0.016       0    TRAP       0      50
             *

594          KK  CY08-C
595          BA   0.094
596          PB    2.77
597          LS       0    88.5
598          UD   0.306
             *

599          KKCCCY08-C
600          KM  COMBINE CY08-C, CCY08-C, AND RDCY07B
601          KM  GOWAN AND DECATUR
602          HC       3
             *
```

```
603          KK RDGOW2A
604          KM  ROUTE DGOW2A TO CPT5B6-C
605          KM  FACILITY = GOWAN NORTH SYSTEM
606          KM  FACILITY # = GOOF 0427, 0485
607          KM  LINING = RCP
608          RD    2370   0.005   0.013       0    CIRC       8       0
             *

609          KK    C427
610          HC       2
             *

611          KK 9REMAIN
612          KM  RETRIEVE DCENT1
613          DR  DCENT1
             *

614          KKR9REMAIN
615          KM  ROUTE 9REMAIN SOUTH IN RANCHO
616          RD    2100  0.0076   0.016       0    TRAP       0      50
             *

617          KK  OG04-C
618          KM  START OF NW HEC-1 MODEL BASINS
619          BA   0.288
620          LS       0    90.2
621          UD   0.320
             *
1                                        HEC-1 INPUT                                        PAGE 17

          LINE       ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

622          KK DOG04-C
623          KM  FLOW SPLIT TO PD01-C
624          KM  COMBINED CAPACITY = 124 CFS
625          DT   DPD01
626          DI       0      51     125     500    1000
627          DQ       0      50     124     124     124
             *

628          KKRDOG04-C
629          KM  ROUTE DOG04-C TO COG05-C
630          KM  US95 TO CHEYENNE
631          RD    4100  0.0007   0.016       0    TRAP       0      50
             *

632          KK  OG05-C
633          BA   0.266
634          PB    2.77
635          LS       0    90.7
636          UD   0.392
             *

637          KK COG05-C
638          KM  COMBINE RDOG04-C AND OG05-C
639          KM  RAINBOW AND CHEYENNE
640          HC       2
             *

641          KKRCOG05-C
642          KM  ROUTE RCOG05-C TO CCY06B-C
643          KM  CHEYENNE
644          RD    7500  0.0097   0.016       0    TRAP       0      50
             *

645          KK CY06B-C
646          BA   0.498
647          PB    2.77
648          LS       0    86.2
649          UD   0.697
             *

650          KKCCY06B-C
651          KM  COMBINE RCOG05-C AND CY06B-C
652          KM  MICHAEL AND CHEYENNE
653          HC       2
             *

654          KK RCCY06B
655          KM  ROUTE CCY06B TO CRGOWAN
656          KM  CHEYENNE
657          RD    1400    0.01   0.016       0    TRAP       0      50
             *
1                                        HEC-1 INPUT                                        PAGE 18

          LINE       ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

658          KK CRGOWAN
659          KM  COMBINE R9REMAIN AND RCCY06B
660          KM  RANCHO AND CHEYENNE
661          HC       2
             *

662          KKRCRGOWAN
663          KM  ROUTE CRGOWAN TO CPD05A-C
664          KM  RANCHO
665          RD    1700  0.0088   0.016       0    TRAP       0      50
             *

666          KK PD05A-C
```

```
          667           BA   0.135
          668           PB    2.77
          669           LS       0    93.5
          670           UD   0.406
                        *

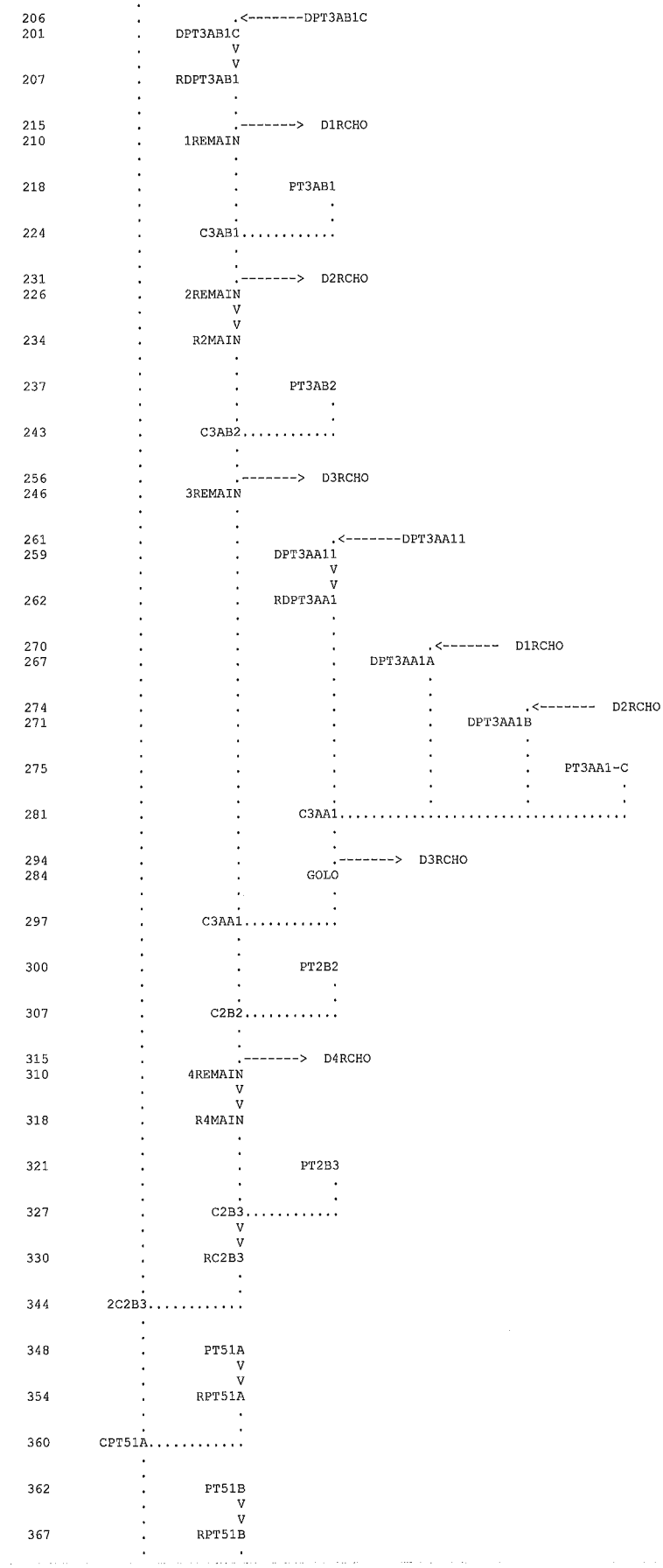
          671           KKCPD05A-C
          672           KM  COMBINE PD05A-C AND RCRGOWAN
          673           KM  RANCHO AND DECATUR
          674           HC       2
                        *

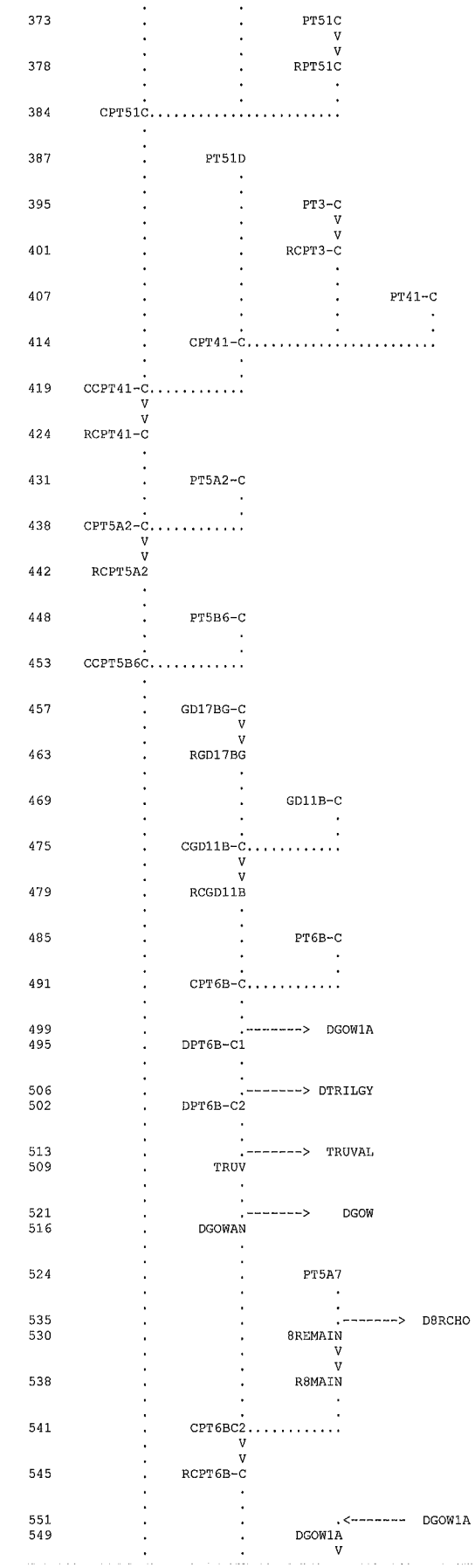
          675           KK DCPD05A
          676           KM  FLOW SPLIT TO A1-C1
          677           KM  OPPOSITE OF DA2 FLOW SPLIT IN CWH
          678           KM  CAPACITY RAN 170 = 210 CFS
          679           KM  REMAINING FLOW GOES DOWN WEST SIDE OF RANCHO
          680           DT   DA1-C
          681           DI       0      51     101     211     500    1000    5000
          682           DQ       0      51     101     211     211     211     211
                        *
          683           ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

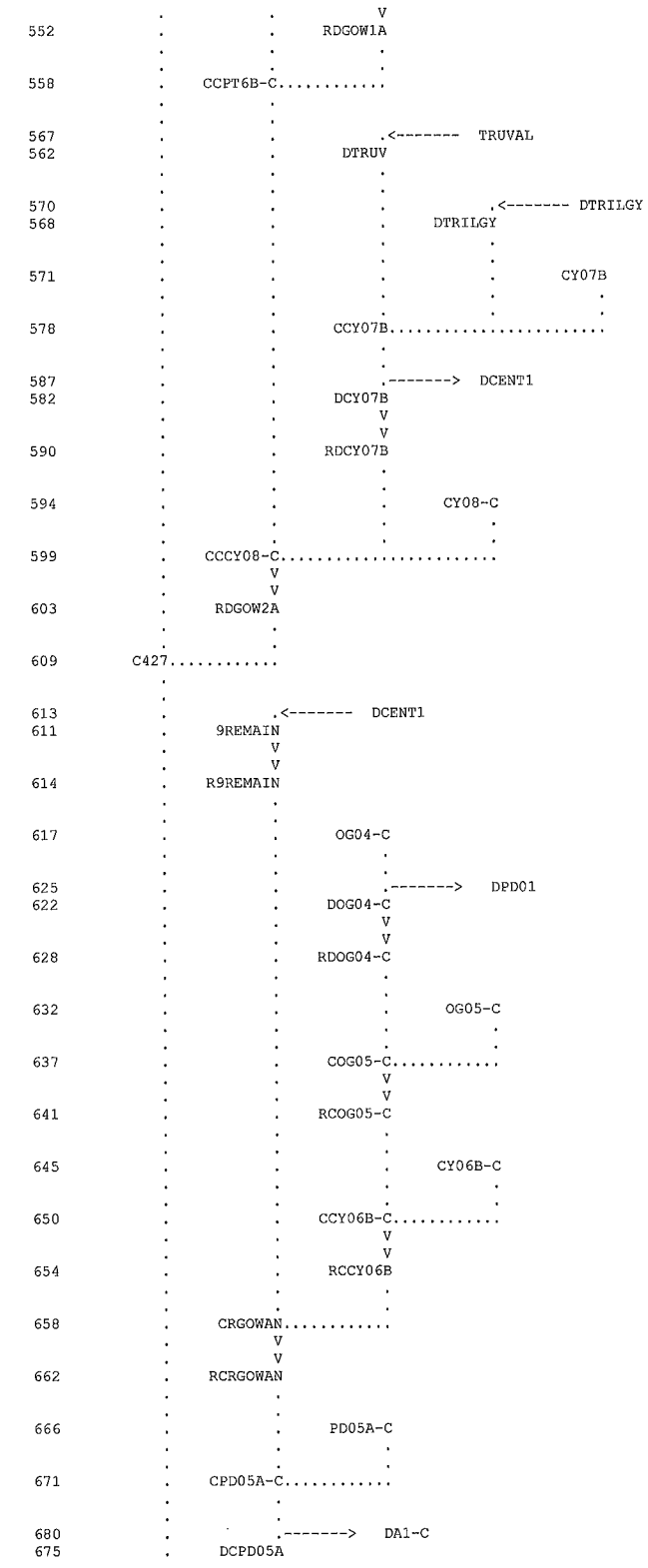
 INPUT
  LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    63     PDGCD-C
                V
                V
    77    RPDGCD-C
                V
                V
    81     RRPDGCD
                .
                .
    86           .     NW29B-C
                 .           V
                 .           V
    92           .    RNW29B-C
                 .           .
                 .           .
    96           .           .     NW1C2-C
                 .           .           .
                 .           .           .
   102           .      CNW1C2.............
                 .           V
                 .           V
   106           .     RCNW1C2
                 .           .
                 .           .
   111           .           .    PDGCB10C
                 .           .           .
                 .           .           .
   117           .    CPDGCB10.............
                 .           .
                 .           .
   126           .           .--------->DPT3AA11
   121           .    DPDGCB10
                 .           V
                 .           V
   129           .    RDPDGCB1
                 .           .
                 .           .
   139           .           .-------->DPT3AB1C
   134           .    DDPDGCB1
                 .           .
                 .           .
   142    CDPDGCB1.............
                V
                V
   146    RCDPDGCB
                .
                .
   150          .    GD20BE-C
                .           .
                .           .
   156    CGD20BEC.............
                V
                V
   160    RCGD20BE
                .
                .
   167          .    GD20BM-C
                .           .
                .           .
   173    CGD20BMC.............
                V
                V
   177    RCGD20BM
                .
                .
   184          .     PT2B2CR
                .           .
                .           .
   191     CPT2B2.............
                V
                V
   194     RCPT2B2
                .
```


206
DPT3AB1C
201
DPT3AB1C
207
RDPT3AB1
215
D1RCHO
210
1REMAIN
218
PT3AB1
224
C3AB1
231
D2RCHO
226
2REMAIN
234
R2MAIN
237
PT3AB2
243
C3AB2
256
D3RCHO
246
3REMAIN
261
DPT3AA11
259
DPT3AA11
262
RDPT3AA1
270
D1RCHO
267
DPT3AA1A
274
D2RCHO
271
DPT3AA1B
275
PT3AA1-C
281
C3AA1
294
D3RCHO
284
GOLO
297
C3AA1
300
PT2B2
307
C2B2
315
D4RCHO
310
4REMAIN
318
R4MAIN
321
PT2B3
327
C2B3
330
RC2B3
344
2C2B3
348
PT51A
354
RPT51A
360
CPT51A
362
PT51B
367
RPT51B


373 PT51C
378 RPT51C
384 CPT51C
387 PT51D
395 PT3-C
401 RCPT3-C
407 PT41-C
414 CPT41-C
419 CCPT41-C
424 RCPT41-C
431 PT5A2-C
438 CPT5A2-C
442 RCPT5A2
448 PT5B6-C
453 CCPT5B6C
457 GD17BG-C
463 RGD17BG
469 GD11B-C
475 CGD11B-C
479 RCGD11B
485 PT6B-C
491 CPT6B-C
499 DGOW1A
495 DPT6B-C1
506 DTRILGY
502 DPT6B-C2
513 TRUVAL
509 TRUV
521 DGOW
516 DGOWAN
524 PT5A7
535 D8RCHO
530 8REMAIN
538 R8MAIN
541 CPT6BC2
545 RCPT6B-C
551 DGOW1A
549 DGOW1A



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   09OCT12  TIME  16:31:42   *
*                                       *
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
                    RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
                    GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
                    OFFSITE BASINS, DEVELOPED CONDITIONS
                    PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
                    PREPARED BY STANLEY CONSULTANTS INC. (HM/VF)
                    INPUT FILE: 25S3D.DAT
                    DESIGN STORM: 25-YEAR 6-HR
                    STORM DISTRIBUTION: SDN3
                    STORM CENTERING: FULL WATERSHED
                    REFER TO FIGURE 5

                    BASED ON:
                    CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
                    2008 MASTER PLAN UPDATE (MPU) BY PBS&J
                    GOWAN WATERSHED (ALL) AND
                    CENTRAL WATERSHED (NORTHWESTERN PORTION)
                    FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
                    CONTROL FACILITIES REFERENCED FROM MPU UNLESS OTHERWISE NOTED

                    RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009

                    GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
                    BY G.C. WALLACE (GCW) 2007

                    PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
                    IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
                    HEC-1 ANALYSIS FOR DEVELOPED CONDITIONS FILE R00S3D.OUT
                    BY STANLEY CONSULTANTS, 1/2012

                    LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
                    ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
                    MPU HAD THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
                    (GOEC)


                    THIS DEVELOPED CONDITION MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL
                    DRAINAGE STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
                    DEVELOPED CONDITION MODEL AS FOLLOWS:
                    1. ROUTES THE 100-YEAR STORM IN THE GOAL STORM DRAIN SYSTEM.
                    2. BASIN PT51 IS PART OF THE 2008 MPU BASIN PT41-C. IT WAS DELINEATED
                    AS PART OF THE RANCHO LOMR BY LBG AND INCORPORATED INTO THE DRAINAGE
                    ANALYSIS FOR THE RANCHO IMPROVEMENTS. ACCORDING TO THE RANCHO LOMR
                    AND RANCHO IMPROVEMENTS ALL OF THE FLOW GENERATED BY PT51 IS COLLECTED
                    INTO THE GOWAN OUTFALL - ALEXANDER ROAD FACILITY AT
                    ALEXANDER-JONES/RANCHO DRIVE INTERSECTION. THEREFORE THIS SUBBASIN WAS
                    FURTHER DELINEATED (PT51A THROUGH PT51D) INTO SMALL SUBBASINS TO SHOW
                    LOCATIONS ALONG RANCHO DRIVE AND ALEXANDER ROAD (WEST OF RANCHO DRIVE)
                    WHERE FLOWS ARE COLLECTED IN THE PROPOSED FLOOD CONTROL FACILITY.
                    3. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
                    TO THE EXISTING CONDITION MODEL
                    4. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE DARF'S
                    USED IN THE 2008 MPU HEC-1 ALLGOW3.OUT


                    JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
                    DARF RATIOS FOR AREAS OF 0, 0.5, 1.0, 2.0, 4.0, 6.0, 8.0 AND 10 SQUARE MILES
                    FOR THE 100-YEAR EVENT.

  60 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2    0  ENDING DATE
                     NDTIME        0055  ENDING TIME
                     ICENT           19  CENTURY MARK

                   COMPUTATION INTERVAL     .08 HOURS
                        TOTAL TIME BASE   24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                       NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                     .74       .73       .72       .69       .67       .67       .65       .64
1

               PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                              FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                                TIME TO PEAK IN HOURS


                                                                    RATIOS APPLIED TO PRECIPITATION
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OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7	RATIO 8
					.74	.73	.72	.69	.67	.67	.65	.64
HYDROGRAPH AT												
+	PDGCD-C	.44	1	FLOW	127.	123.	119.	109.	102.	102.	95.	91.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RPDGCD-C	.44	1	FLOW	127.	123.	120.	107.	100.	100.	94.	91.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RRPDGCD	.44	1	FLOW	127.	123.	119.	107.	100.	100.	93.	90.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	NW29B-C	.25	1	FLOW	91.	88.	86.	78.	73.	73.	68.	66.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	RNW29B-C	.25	1	FLOW	92.	89.	87.	77.	73.	73.	68.	65.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	NW1C2-C	.21	1	FLOW	126.	123.	121.	113.	108.	108.	103.	100.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CNW1C2	.46	1	FLOW	201.	196.	191.	174.	165.	165.	156.	151.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RCNW1C2	.46	1	FLOW	201.	196.	191.	173.	164.	164.	154.	149.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PDGCB10C	.31	1	FLOW	138.	134.	131.	121.	114.	114.	108.	104.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT												
+	CPDGCB10	.77	1	FLOW	329.	321.	313.	286.	271.	271.	256.	248.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO												
+	DPT3AA11	.77	1	FLOW	139.	139.	139.	139.	139.	139.	139.	139.
				TIME	3.58	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	DPDGCB10	.77	1	FLOW	190.	182.	174.	147.	132.	132.	117.	109.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RDPDGCB1	.77	1	FLOW	153.	146.	138.	115.	100.	100.	86.	79.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	DPT3AB1C	.77	1	FLOW	153.	146.	138.	115.	100.	100.	86.	79.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	DDPDGCB1	.77	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00
2 COMBINED AT												
+	CDPDGCB1	1.21	1	FLOW	127.	123.	119.	107.	100.	100.	93.	90.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RCDPDGCB	1.21	1	FLOW	126.	122.	119.	107.	100.	100.	92.	89.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.42	4.42
HYDROGRAPH AT												
+	GD20BE-C	.43	1	FLOW	165.	160.	156.	143.	135.	135.	127.	122.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT												
+	CGD20BEC	1.64	1	FLOW	247.	240.	233.	210.	197.	197.	183.	176.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	RCGD20BE	1.64	1	FLOW	248.	241.	235.	213.	198.	198.	181.	176.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.33
HYDROGRAPH AT												
+	GD20BM-C	.34	1	FLOW	194.	190.	186.	174.	166.	166.	158.	154.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT												
+	CGD20BMC	1.98	1	FLOW	390.	377.	364.	327.	307.	307.	285.	273.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
ROUTED TO												
+	RCGD20BM	1.98	1	FLOW	384.	372.	360.	324.	300.	300.	278.	267.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.33	4.08
HYDROGRAPH AT												
+	PT2B2CR	.20	1	FLOW	138.	135.	132.	125.	120.	120.	115.	112.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CPT2B2	2.18	1	FLOW	480.	467.	455.	422.	401.	401.	379.	368.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

ROUTED TO												
+	RCPT2B2	2.18	1	FLOW	478.	465.	451.	420.	397.	397.	377.	366.
				TIME	4.08	4.08	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	DPT3AB1C	.00	1	FLOW	153.	146.	138.	115.	100.	100.	86.	79.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	RDPT3AB1	.00	1	FLOW	150.	143.	135.	112.	99.	99.	85.	78.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
DIVERSION TO												
+	D1RCHO	.00	1	FLOW	28.	27.	25.	21.	19.	19.	16.	15.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	1REMAIN	.00	1	FLOW	122.	116.	110.	91.	80.	80.	69.	63.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	PT3AB1	.05	1	FLOW	44.	43.	42.	40.	39.	39.	37.	36.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C3AB1	.05	1	FLOW	143.	136.	130.	109.	96.	96.	83.	77.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO												
+	D2RCHO	.05	1	FLOW	22.	21.	20.	17.	15.	15.	13.	12.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	2REMAIN	.05	1	FLOW	121.	115.	110.	92.	82.	82.	71.	65.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO												
+	R2MAIN	.05	1	FLOW	119.	114.	109.	92.	81.	81.	70.	65.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	PT3AB2	.05	1	FLOW	54.	53.	52.	49.	48.	48.	46.	45.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT												
+	C3AB2	.10	1	FLOW	132.	126.	120.	102.	92.	92.	80.	75.
				TIME	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO												
+	D3RCHO	.10	1	FLOW	131.	125.	119.	102.	91.	91.	80.	74.
				TIME	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	3REMAIN	.10	1	FLOW	1.	1.	0.	0.	0.	0.	0.	0.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	DPT3AA11	.00	1	FLOW	139.	139.	139.	139.	139.	139.	139.	139.
				TIME	3.58	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	RDPT3AA1	.00	1	FLOW	148.	148.	147.	143.	143.	143.	144.	145.
				TIME	3.83	3.83	3.83	3.83	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	DPT3AA1A	.00	1	FLOW	28.	27.	25.	21.	19.	19.	16.	15.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	DPT3AA1B	.00	1	FLOW	22.	21.	20.	17.	15.	15.	13.	12.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	PT3AA1-C	.14	1	FLOW	110.	108.	106.	100.	97.	97.	93.	91.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
4 COMBINED AT												
+	C3AA1	.14	1	FLOW	280.	275.	271.	260.	253.	253.	246.	242.
				TIME	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO												
+	D3RCHO	.14	1	FLOW	280.	275.	271.	260.	253.	253.	246.	242.
				TIME	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	GOLO	.14	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00
2 COMBINED AT												
+	C3AA1	.24	1	FLOW	1.	1.	0.	0.	0.	0.	0.	0.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	PT2B2	.08	1	FLOW	74.	73.	71.	67.	65.	65.	62.	61.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C2B2	.32	1	FLOW	74.	73.	72.	68.	65.	65.	63.	61.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO												

+	D4RCHO	.32	1	FLOW	12.	12.	12.	11.	11.	11.	10.	10.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	4REMAIN	.32	1	FLOW	62.	61.	60.	57.	55.	55.	52.	51.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO												
+	R4MAIN	.32	1	FLOW	61.	60.	59.	56.	54.	54.	51.	51.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT												
+	PT2B3	.02	1	FLOW	22.	22.	21.	20.	19.	19.	18.	18.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	C2B3	.34	1	FLOW	81.	80.	78.	74.	71.	71.	68.	67.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	RC2B3	.34	1	FLOW	81.	79.	76.	72.	70.	70.	68.	65.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.83
2 COMBINED AT												
+	2C2B3	2.52	1	FLOW	535.	521.	507.	473.	449.	449.	427.	415.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PT51A	.00	1	FLOW	5.	5.	5.	4.	4.	4.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO												
+	RPT51A	.00	1	FLOW	4.	4.	4.	4.	4.	4.	4.	4.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT												
+	CPT51A	2.53	1	FLOW	537.	523.	509.	475.	451.	451.	429.	417.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PT51B	.01	1	FLOW	9.	9.	9.	9.	8.	8.	8.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO												
+	RPT51B	.01	1	FLOW	8.	8.	8.	8.	8.	8.	7.	7.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT												
+	PT51C	.03	1	FLOW	28.	27.	27.	25.	24.	24.	23.	23.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO												
+	RPT51C	.03	1	FLOW	27.	27.	26.	25.	24.	24.	23.	23.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT												
+	CPT51C	2.56	1	FLOW	552.	538.	524.	489.	464.	464.	442.	430.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PT51D	.03	1	FLOW	33.	32.	32.	30.	29.	29.	28.	27.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	PT3-C	.17	1	FLOW	112.	110.	107.	101.	96.	96.	92.	90.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RCPT3-C	.17	1	FLOW	112.	109.	107.	101.	96.	96.	92.	90.
				TIME	4.00	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	PT41-C	.37	1	FLOW	209.	204.	200.	186.	177.	177.	169.	164.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
3 COMBINED AT												
+	CPT41-C	.57	1	FLOW	322.	315.	308.	287.	273.	273.	259.	253.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT												
+	CCPT41-C	3.13	1	FLOW	869.	849.	828.	772.	733.	733.	698.	679.
				TIME	3.92	3.92	3.92	3.92	4.00	4.00	4.00	4.00
ROUTED TO												
+	RCPT41-C	3.13	1	FLOW	866.	846.	825.	770.	733.	733.	697.	679.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PT5A2-C	.27	1	FLOW	138.	135.	132.	122.	116.	116.	110.	107.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	CPT5A2-C	3.40	1	FLOW	1001.	979.	955.	889.	844.	844.	803.	780.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	RCPT5A2	3.40	1	FLOW	996.	973.	951.	885.	842.	842.	801.	779.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	PT5B6-C	.38	1	FLOW	202.	198.	193.	179.	170.	170.	161.	156.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83

2 COMBINED AT												
+	CCPT5B6C	3.78	1	FLOW	1167.	1143.	1114.	1036.	986.	986.	938.	912.
				TIME	3.92	3.92	3.92	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	GD17BG-C	.36	1	FLOW	194.	189.	185.	173.	165.	165.	157.	153.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	RGD17BG	.36	1	FLOW	193.	189.	185.	173.	165.	165.	156.	152.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	GD11B-C	.26	1	FLOW	211.	207.	203.	191.	183.	183.	175.	171.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT												
+	CGD11B-C	.63	1	FLOW	352.	345.	338.	316.	301.	301.	287.	280.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RCGD11B	.63	1	FLOW	352.	345.	337.	315.	301.	301.	286.	279.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	PT6B-C	.45	1	FLOW	155.	151.	147.	136.	129.	129.	122.	119.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT												
+	CPT6B-C	1.08	1	FLOW	479.	469.	459.	428.	408.	408.	388.	378.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO												
+	DGOW1A	1.08	1	FLOW	478.	468.	458.	427.	407.	407.	387.	377.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	DPT6B-C1	1.08	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.08	3.17	3.25	3.33	3.42	3.42	3.42	3.42
DIVERSION TO												
+	DTRILGY	1.08	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.08	3.17	3.17	3.33	3.42	3.42	3.42	3.42
HYDROGRAPH AT												
+	DPT6B-C2	1.08	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.08	3.17	3.25	3.33	3.42	3.42	3.42	3.42
DIVERSION TO												
+	TRUVAL	1.08	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.08	3.17	3.17	3.33	3.33	3.33	3.42	3.42
HYDROGRAPH AT												
+	TRUV	1.08	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.08	3.17	3.25	3.33	3.42	3.42	3.42	3.42
DIVERSION TO												
+	DGOW	1.08	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT												
+	DGOWAN	1.08	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.08	3.17	3.25	3.33	3.42	3.42	3.42	3.42
HYDROGRAPH AT												
+	PT5A7	.07	1	FLOW	36.	35.	34.	31.	29.	29.	28.	27.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO												
+	D8RCHO	.07	1	FLOW	23.	23.	23.	23.	23.	23.	23.	23.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.75	3.75
HYDROGRAPH AT												
+	8REMAIN	.07	1	FLOW	13.	12.	11.	8.	6.	6.	5.	4.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	R8MAIN	.07	1	FLOW	12.	11.	10.	8.	6.	6.	5.	4.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT												
+	CPT6BC2	1.15	1	FLOW	13.	12.	11.	9.	7.	7.	5.	5.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	RCPT6B-C	1.15	1	FLOW	16.	15.	13.	10.	8.	8.	5.	5.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.42	4.42
HYDROGRAPH AT												
+	DGOW1A	.00	1	FLOW	478.	468.	458.	427.	407.	407.	387.	377.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RDGOW1A	.00	1	FLOW	475.	464.	454.	425.	403.	403.	383.	374.
				TIME	4.00	4.00	4.00	4.00	4.08	4.08	4.08	4.08
2 COMBINED AT												
+	CCPT6B-C	1.15	1	FLOW	476.	465.	455.	426.	404.	404.	384.	375.
				TIME	4.00	4.00	4.00	4.00	4.08	4.08	4.08	4.08
HYDROGRAPH AT												

+	DTRUV	.00	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.08	3.17	3.17	3.33	3.33	3.33	3.42	3.42
HYDROGRAPH AT												
+	DTRILGY	.00	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	3.08	3.17	3.17	3.33	3.42	3.42	3.42	3.42
HYDROGRAPH AT												
+	CY07B	.20	1	FLOW	113.	110.	108.	101.	96.	96.	92.	89.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
3 COMBINED AT												
+	CCY07B	.20	1	FLOW	113.	111.	108.	101.	97.	97.	92.	90.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO												
+	DCENT1	.20	1	FLOW	41.	39.	36.	29.	25.	25.	20.	18.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT												
+	DCY07B	.20	1	FLOW	72.	72.	72.	72.	72.	72.	72.	72.
				TIME	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	RDCY07B	.20	1	FLOW	75.	75.	76.	76.	74.	74.	74.	74.
				TIME	3.92	3.92	3.92	3.92	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	CY08-C	.09	1	FLOW	62.	61.	60.	56.	53.	53.	51.	49.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT												
+	CCCY08-C	1.45	1	FLOW	590.	579.	568.	537.	514.	514.	492.	481.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO												
+	RDGOW2A	1.45	1	FLOW	587.	576.	566.	533.	510.	510.	488.	477.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
2 COMBINED AT												
+	C427	5.23	1	FLOW	1754.	1715.	1679.	1570.	1496.	1496.	1424.	1386.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT												
+	9REMAIN	.00	1	FLOW	41.	39.	36.	29.	25.	25.	20.	18.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO												
+	R9REMAIN	.00	1	FLOW	44.	42.	39.	32.	28.	28.	23.	19.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT												
+	OG04-C	.29	1	FLOW	206.	202.	198.	186.	177.	177.	169.	165.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO												
+	DPD01	.29	1	FLOW	124.	124.	124.	124.	124.	124.	124.	124.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT												
+	DOG04-C	.29	1	FLOW	82.	78.	74.	62.	53.	53.	45.	41.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO												
+	RDOG04-C	.29	1	FLOW	42.	39.	36.	28.	22.	22.	18.	15.
				TIME	4.42	4.42	4.50	4.50	4.58	4.58	4.58	4.67
HYDROGRAPH AT												
+	OG05-C	.27	1	FLOW	176.	173.	170.	159.	152.	152.	145.	142.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT												
+	COG05-C	.55	1	FLOW	177.	173.	170.	159.	152.	152.	146.	142.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO												
+	RCOG05-C	.55	1	FLOW	177.	174.	170.	160.	153.	153.	147.	143.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT												
+	CY06B-C	.50	1	FLOW	180.	176.	172.	159.	151.	151.	143.	139.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT												
+	CCY06B-C	1.05	1	FLOW	357.	350.	342.	319.	304.	304.	289.	282.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	RCCY06B	1.05	1	FLOW	354.	346.	339.	315.	300.	300.	285.	279.
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT												
+	CRGOWAN	1.05	1	FLOW	389.	378.	369.	337.	319.	319.	302.	291.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO												
+	RCRGOWAN	1.05	1	FLOW	383.	376.	365.	334.	316.	316.	301.	289.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT												
+	PD05A-C	.14	1	FLOW	102.	100.	98.	93.	89.	89.	86.	84.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83

```
  2 COMBINED AT
+               CPD05A-C      1.19      1   FLOW          440.      432.      417.      387.      364.      364.      346.      334.
                                            TIME          4.17      4.17      4.25      4.17      4.25      4.25      4.25      4.25

 DIVERSION TO
+                  DA1-C      1.19      1   FLOW          211.      211.      211.      211.      211.      211.      211.      211.
                                            TIME          3.92      3.92      3.92      3.92      4.00      4.00      4.00      4.00

 HYDROGRAPH AT
+                DCPD05A      1.19      1   FLOW          229.      221.      206.      176.      153.      153.      135.      123.
                                            TIME          4.17      4.17      4.25      4.17      4.25      4.25      4.25      4.25
1
                                        SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                            (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                    INTERPOLATED TO
                                                                                  COMPUTATION INTERVAL
            ISTAQ     ELEMENT       DT        PEAK     TIME TO      VOLUME       DT        PEAK     TIME TO      VOLUME
                                                          PEAK                                          PEAK

                                   (MIN)      (CFS)      (MIN)      (IN)      (MIN)      (CFS)      (MIN)       (IN)

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          5.00     127.18     250.00       .62       5.00     127.18     250.00         .62

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1455E+02 EXCESS= .0000E+00 OUTFLOW= .1457E+02 BASIN STORAGE= .6066E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          5.00     123.38     250.00       .60       5.00     123.38     250.00         .60

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1414E+02 EXCESS= .0000E+00 OUTFLOW= .1416E+02 BASIN STORAGE= .5990E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          5.00     119.61     250.00       .58       5.00     119.61     250.00         .58

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1374E+02 EXCESS= .0000E+00 OUTFLOW= .1375E+02 BASIN STORAGE= .5914E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          4.75     108.34     251.75       .53       5.00     107.21     255.00         .53

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1252E+02 EXCESS= .0000E+00 OUTFLOW= .1254E+02 BASIN STORAGE= .6927E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          4.50     101.18     252.00       .50       5.00     100.38     255.00         .50

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1175E+02 EXCESS= .0000E+00 OUTFLOW= .1176E+02 BASIN STORAGE= .6570E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          4.50     101.18     252.00       .50       5.00     100.38     255.00         .50

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1175E+02 EXCESS= .0000E+00 OUTFLOW= .1176E+02 BASIN STORAGE= .6570E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          4.50      94.10     252.00       .47       5.00      93.60     255.00         .47

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1098E+02 EXCESS= .0000E+00 OUTFLOW= .1100E+02 BASIN STORAGE= .5988E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
          RPDGCD-C  MANE          4.25      90.65     255.00       .45       5.00      90.65     255.00         .45

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1061E+02 EXCESS= .0000E+00 OUTFLOW= .1062E+02 BASIN STORAGE= .5785E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
           RRPDGCD  MANE          2.97     126.73     252.06       .62       5.00     126.51     255.00         .62

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1457E+02 EXCESS= .0000E+00 OUTFLOW= .1457E+02 BASIN STORAGE= .8610E-03 PERCENT ERROR=    .0



 *** NORMAL END OF HEC-1 ***
```

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   09OCT12  TIME  16:32:06   *
*                                       *
*****************************************
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```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
          LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                    *DIAGRAM
*** FREE ***
             1      ID   RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
             2      ID   GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
             3      ID   OFFSITE BASINS, DEVELOPED CONDITIONS
             4      ID   PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
             5      ID   PREPARED BY STANLEY CONSULTANTS INC. (HM/VF)
             6      ID   INPUT FILE: 100S3D.DAT
             7      ID   DESIGN STORM: 100-YEAR 6-HR
             8      ID   STORM DISTRIBUTION: SDN3
             9      ID   STORM CENTERING: FULL WATERSHED
            10      ID   REFER TO FIGURE 5
            11      ID
            12      ID   BASED ON:
            13      ID   CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
            14      ID   2008 MASTER PLAN UPDATE (MPU) BY PBS&J
            15      ID   GOWAN WATERSHED (ALL) AND
            16      ID   CENTRAL WATERSHED (NORTHWESTERN PORTION)
            17      ID   FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
            18      ID   CONTROL FACILITIES REFERENCED FROM MPU UNLESS OTHERWISE NOTED
            19      ID
            20      ID   RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009
            21      ID
            22      ID   GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
            23      ID   BY G.C. WALLACE (GCW) 2007
            24      ID
            25      ID   PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
            26      ID   IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
            27      ID   HEC-1 ANALYSIS FOR DEVELOPED CONDITIONS FILE R00S3D.OUT
            28      ID   BY STANLEY CONSULTANTS, 1/2012
            29      ID
            30      ID   LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
            31      ID   ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
            32      ID   MPU HAD THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
            33      ID   (GOEC)
            34      ID
            35      ID
            36      ID   THIS DEVELOPED CONDITION MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL
            37      ID   DRAINAGE STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
            38      ID   DEVELOPED CONDITION MODEL AS FOLLOWS:
            39      ID   1. ROUTES THE 100-YEAR STORM IN THE GOAL STORM DRAIN SYSTEM
            40      ID   2. BASIN PT51 IS PART OF THE 2008 MPU BASIN PT41-C. IT WAS DELINEATED
            41      ID   AS PART OF THE RANCHO LOMR BY LBG AND INCORPORATED INTO THE DRAINAGE
            42      ID   ANALYSIS FOR THE RANCHO IMPROVEMENTS. ACCORDING TO THE RANCHO LOMR
            43      ID   AND RANCHO IMPROVEMENTS ALL OF THE FLOW GENERATED BY PT51 IS COLLECTED
            44      ID   INTO THE GOWAN OUTFALL - ALEXANDER ROAD FACILITY AT
            45      ID   ALEXANDER-JONES/RANCHO DRIVE INTERSECTION. THEREFORE THIS SUBBASIN WAS
            46      ID   FURTHER DELINEATED (PT51A THROUGH PT51D) INTO SMALL SUBBASINS TO SHOW
            47      ID   LOCATIONS ALONG RANCHO DRIVE AND ALEXANDER ROAD (WEST OF RANCHO DRIVE)
            48      ID   WHERE FLOWS ARE COLLECTED IN THE PROPOSED FLOOD CONTROL FACILITY.
            49      ID   3. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
            50      ID   TO THE EXISTING CONDITION MODEL
            51      ID   4. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE DARF'S
            52      ID   USED IN THE 2008 MPU HEC-1 ALLGOW3.OUT
            53      ID
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          LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            54      ID
            55      ID
            56      ID   JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
            57      ID   JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
            58      ID
```

```
 59          ID                          AREA    DARF
 60          ID                          SQ. MI.
 61          ID                          0-0.5   0.99
 62          ID                          0.5-1   0.975
 63          ID                          1-2     0.95
 64          ID                          2-3     0.925
 65          ID                          3-4     0.915
 66          ID                          4-5     0.908
 67          ID                          5-6     0.903
 68          ID                          6-7     0.895
 69          ID                          7-8     0.885
 70          ID
 71          ID
 72          ID
 73          IT       5       0       0     300
 74          IO       5       0       0
 75          IN       5
 76          JR    PREC    0.99   0.975    0.95   0.925   0.915   0.908   0.903   0.895   0.885
             *

 77          KK PDGCD-C
 78          KM   2008 MPU BASIN
 79          BA   0.441
 80          PB    2.77
 81          PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
 82          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
 83          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
 84          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
 85          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
 86          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
 87          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
 88          PC   0.998   0.999   1.000
 89          LS       0    80.6
 90          UD   0.543
             *

 91          KKRPDGCD-C
 92          KM  ROUTE PDGCD-C TO RRPDGCD
 93          KM  FROM CWH
 94          RD    3080  0.0065    0.03       0    TRAP      30       2
             *

 95          KK RRPDGCD
 96          KM  ROUTE RPDGCD-C TO CDPDGCB1
 97          KM  LINING = CONCRETE
 98          KM  FROM CWH
 99          RD    1610  0.0062   0.015       0    TRAP       8       2
             *
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

100          KK NW29B-C
101          KM   2008 MPU BASIN
102          BA   0.254
103          PB    2.80
104          LS       0    80.9
105          UD   0.404
             *

106          KKRNW29B-C
107          KM  ROUTE NW29B-C TO CNW1C2
108          KM  ANN ROAD
109          RD    4500  0.0122   0.016       0    TRAP       0      50
             *

110          KK NW1C2-C
111          KM   2008 MPU BASIN
112          BA   0.207
113          PB    2.77
114          LS       0    89.5
115          UD   0.409
             *

116          KK  CNW1C2
117          KM  COMBINE RNW29B-C AND NW1C2-C
118          KM  ANN ROAD AND RANCHO
119          HC       2
             *

120          KK RCNW1C2
121          KM  ROUTE CNW1C2 TO CPDGCB10
122          KM  ALONG RANCHO
123          KM  LINING = CONCRETE
124          RD    2300  0.0087   0.015       0    TRAP      12       0
             *

125          KKPDGCB10C
126          KM   2008 MPU BASIN
127          BA   0.309
128          PB    2.77
129          LS       0    84.6
130          UD   0.414
             *

131          KKCPDGCB10
132          KM  COMBINE PDGCB10C AND RCNW1C2
133          KM  NEAR US95 AND RANCHO INTERSECTION
134          HC       2
             *
```

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  135         KKDPDGCB10
  136         KM  FLOW SPLIT ACROSS RANCHO TO PT3AA1
  137         KM  10'X 3' RCB (139 CFS)   CULVERT 3
  138         KM  FROM 2008 MPU BASIN; U.S. 95 / RANCHO FIS
  139         KM  D95A
  140         DTDPT3AA11
  141         DI       0      51     101     118     140     318   10000
  142         DQ       0      50     100     117     139     139     139
              *

  143         KKRDPDGCB1
  144         KM  ROUTE DPDGCB10 TO DDPDGCB1
  145         KM  ALONG US95
  146         KM  LINING = CONCRETE
  147         RD    2000  0.0004   0.015       0    TRAP       8       2
              *

  148         KKDDPDGCB1
  149         KM  FLOW SPLIT ACROSS US95 TO PT3AB1 (LOMR BASIN)
  150         KM  (2) 6'X 2' RCB (CULVERT 5). 192 CFS - BASED ON INLET CONTROL NOMOGRAPH WITH 4'
  151         KM  HEADWATER; HEADWATER BASED ON DEPTH OF CONCRETE CHANNEL
  152         KM  2008 MPU BASIN
  153         DTDPT3AB1C
  154         DI       0     192   10000
  155         DQ       0     192     192
              *

  156         KKCDPDGCB1
  157         KM  COMBINE RRPDGCD AND DDPDGCB1
  158         KM  NEAR US95 AND RANCHO INTERSECTION
  159         HC       2
              *

  160         KKRCDPDGCB
  161         KM  ROUTE CDPDGCB1 TO CGD20BEC
  162         KM  LOCAL FACILITY ALONG U.S. 95
  163         RD    1750  0.0029   0.025       0    TRAP      20       3
              *

  164         KKGD20BE-C
  165         KM   2008 MPU BASIN
  166         BA   0.427
  167         PB    2.77
  168         LS       0    83.4
  169         UD   0.467
              *

  170         KKCGD20BEC
  171         KM  COMBINE GD20BE-C AND RCDPDGCB
  172         KM  COMBINATION OF US 95 AND LONE MOUNTAIN
  173         HC       2
              *
1                                        HEC-1 INPUT                                        PAGE  5

LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  174         KKRCGD20BE
  175         KM  ROUTE CGD20BEC TO CGD20BMC
  176         KM  NEWLY PROPOSED REGIONAL FACILITY
  177         KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
  178         KM  FACILITY # = GOAL 0247
  179         KM  LINING = CONCRETE
  180         RD    2640   0.003   0.015       0    TRAP      12       2
              *

  181         KKGD20BM-C
  182         KM   2008 MPU BASIN
  183         BA   0.343
  184         PB    2.77
  185         LS       0    89.3
  186         UD   0.456
              *

  187         KKCGD20BMC
  188         KM  COMBINE GD20BM-C AND RCGD20BE
  189         KM  US 95 AND CRAIG ROAD
  190         HC       2
              *

  191         KKRCGD20BM
  192         KM  ROUTE CGD20BMC TO CPT2B2
  193         KM  NEWLY PROPOSED REGIONAL FACILITY
  194         KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
  195         KM  FACILITY # = GOAL 0168
  196         KM  LINING = RCB
  197         RD    4200   0.005   0.015       0    TRAP      10       0
              *

  198         KK PT2B2CR
  199         KM   REVISED FROM 2008 MPU BASIN  BY STANLEY
  200         KM   AREA DECREASED FOR LOMR BASINS PT2B3 AND PT2A2 ALONG RANCHO
  201         BA   0.199
  202         PB    2.77
  203         LS       0    92.1
  204         UD   0.417
              *
```

```
205          KK  CPT2B2
206          KM  CRAIG AND RANCHO
207          HC       2
             *

208          KK RCPT2B2
209          KM  ROUTE CPT2B2 TO CPT41-C
210          KM  NEWLY PROPOSED REGIONAL FACILITY
211          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
212          KM  FACILITY # = GOAL 0111
213          KM  LINING = RCB
214          RD    3000  0.0083   0.015       0    TRAP      10       0
             *
             *
             * ************************************************************
             * ************************************************************
             * ************************************************************
             * ****START OF FLOW CONVEYED IN SWALE ON WEST SIDE OF RANCHO****
             * ****AND ULTIMATELY TO THE GOWAN SD, LONE MTN BRANCH  *********
             * ****NONE OF THIS FLOW IS CONVEYED IN STREET PER LOMR HECRAS***
             * ************************************************************
1                                        HEC-1 INPUT                                        PAGE  6

         LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

215          KKDPT3AB1C
216          KM  RETRIEVE FLOW FROM BOX DIVERSION JUST SOUTH OF 95/RANCHO INT.
217          KM  IN EXISTING (LOMR) RETRIEVING D95B
218          KM  NOTE: DRAINAGE AREA OF 0.77 SQUARE MILES
219          KM  RETRIEVE DPT3AB1C
220          DRDPT3AB1C
             *

221          KKRDPT3AB1
222          KM  ROUTE TO CULVERT RANCHO/RAINBOW INTERSECTION
223          RK    1200   0.004   0.025       0    TRAP      30       2
             *

224          KK 1REMAIN
225          KM  DIVERT 36 CFS EAST THROUGH 2, 24" CMP'S (CULVERT 14) UNDER RANCHO ROAD JUST
226          KM  NORTHWEST (UPSTREAM) OF THE RANCHO ROAD AND RAINBOW BLVD. INTERSECTION.
227          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO. UPPER RANCHO HECRAS STA. 122+
228          KM  REFERENCED FROM LOMR
229          DT  D1RCHO
230          DI       0     191    1000   10000
231          DQ       0      36      36      36
             *

232          KK  PT3AB1
233          KM   REFERENCED FROM LOMR
234          PB    2.77
235          BA   0.049
236          LS       0    93.7
237          UD   0.283
             *

238          KK   C3AB1
239          HC       2
             *

240          KK 2REMAIN
241          KM  DIVERT 29 CFS EAST THROUGH A 30" CMP (CULVERT 15) UNDER RANCHO ROAD AT THE
242          KM  RANCHO ROAD AND RAINBOW BLVD. INTERSECTION. (UPPER RANCHO HECRAS STA. 121+00)
243          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
244          KM  REFERENCED FROM LOMR
245          DT  D2RCHO
246          DI       0     189    1000   10000
247          DQ       0      29      29      29
             *

248          KK  R2MAIN
249          KM  ROUTE TO PT3AB2
250          RK    1365  0.0022   0.025       0    TRAP      30       2
             *
1                                        HEC-1 INPUT                                        PAGE  7

         LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

251          KK  PT3AB2
252          KM   REFERENCED FROM LOMR
253          PB    2.77
254          BA   0.050
255          LS       0    94.5
256          UD   0.197
             *

257          KK   C3AB2
258          KM   COMBINE FLOW WEST SIDE RANCHO AT LONE MTN
259          HC       2
             *

260          KK 3REMAIN
261          KM  ALL FLOW UP TO STORMDRAIN LATERAL DESIGN FLOW RATE, 240 CFS
262          KM  DIVERTED UNDER RANCHO RD AT LONE MT RD
263          KM  TO THE GOWAN SD, LONE MTN BRANCH (DESIGN BY GCW)
264          KM  AT RANCHO HECRAS STA. 103+99 (LOMR BY LBG)
265          KM  REVISED BY STANLEY FROM LBG HEC-1 MODEL
266          KM  1 CFS REMAINS TO AVOID A ZERO FLOW
267          KM  FACILITY = GOWAN OUTFALL - LONE MTN ROAD BRANCH
268          KM  FACILITY # = GOLO 0275
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269          KM  LINING = 8X6 RCB
270          DT  D3RCHO
271          DI       0     241    1000   10000
272          DQ       0     240     240     240
             *

273          KKDPT3AA11
274          KM  RETRIEVE DPT3AA11
275          DRDPT3AA11
             *

276          KKRDPT3AA1
277          KM  ROUTE DPT3AA11 TO C3AA1
278          KM  ALONGE RANCHO - EAST SIDE
279          KM  LINING = UNLINED
280          RD    3400  0.0048   0.025       0    TRAP      20       3
             *

281          KKDPT3AA1A
282          KM  RETRIEVE D1RCHO EAST SIDE RANCHO
283          KM  PART OF DIVERSION DPT3AA13 IN MPU
284          DR  D1RCHO
             *

285          KKDPT3AA1B
286          KM  RETRIEVE D2RCHO EAST SIDE RANCHO
287          KM  PART OF DIVERSION DPT3AA13 IN MPU
288          DR  D2RCHO
             *
1                                        HEC-1 INPUT                                        PAGE  8

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

289          KKPT3AA1-C
290          KM   2008 MPU BASIN
291          BA   0.144
292          PB    2.77
293          LS       0    93.3
294          UD   0.383
             *

295          KK   C3AA1
296          KM  COMBINE ALL FLOW EAST SIDE RANCHO AT LONE MTN
297          HC       4
             *

298          KK    GOLO
299          KM  ALL FLOW UP TO STORMDRAIN DESIGN FLOW RATE, 503 CFS
300          KM  DIVERTED TO THE GOWAN SD, LONE MTN BRANCH (DESIGN BY GCW)
301          KM  AT RANCHO HECRAS STA. 103+99 (LOMR BY LBG)
302          KM  204 CFS ALREADY CONTAINED FROM WEST SIDE OF ROAD
303          KM  REMAINING 100-YR FLOW CONVEYED WEST IN MPU
304          KM  REVISED BY STANLEY FROM LBG HEC-1 MODEL
305          KM  FACILITY = GOWAN OUTFALL - LONE MTN ROAD BRANCH
306          KM  FACILITY # = GOLO 0275
307          KM  LINING = 8X6 RCB
308          DT  D3RCHO
309          DI       0     263     504   10000
310          DQ       0     263     504     504
             *

311          KK   C3AA1
312          KM  REMAINING SOUTHBOUND FLOW IN RANCHO
313          HC       2
             *
             * ************************************************************
             * ****END OF FLOW CONVEYED TO GOWAN SD; AT LONE MTN*************
             * *START OF SURFACE FLOW CONVEYED SOUTH IN SWALE EAST OF RANCHO*
             * *RUNOFF FROM TOTAL AREA CONVEYED TO STORMDRAIN ***************
             * *DECREASE CALCULATED AREA AT HC'S BY 0.1 SQ MI.***************
             * ************************************************************
             *

314          KK   PT2B2
315          KM  BASIN FROM LOMR; PART OF PT2B2-C IN 2008 MPU
316          KM  UPDATED TO DEVELOPED CONDITION BY STANLEY
317          PB    2.77
318          BA   0.078
319          LS       0    93.2
320          UD   0.239
             *
1                                        HEC-1 INPUT                                        PAGE  9

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

321          KK    C2B2
322          KM  REMAINING SOUTHBOUND FLOW IN RANCHO
323          HC       2
             *

324          KK 4REMAIN
325          KM  DIVERT 35 CFS EAST THROUGH A 36" CMP (CULVERT 21) UNDER RANCHO ROAD HALF WAY
326          KM  BETWEEN LONE MT. RD. AND CRAIG ROAD. UPPER RANCHO HECRAS STA. 93+76.
327          KM  REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO.
328          KM   REFERENCED FROM LOMR
329          DT  D4RCHO
330          DI       0     214    1000   10000
331          DQ       0      35      35      35
             *
```

```
 332          KK  R4MAIN
 333          KM  ROUTE TO C2B3
 334          RK    2323   0.011    0.02       0    TRAP      40       2
              *

 335          KK   PT2B3
 336          KM  LOMR BASIN; PART OF PT2B2-C IN MPU
 337          PB    2.77
 338          BA   0.023
 339          LS      0    93.2
 340          UD   0.236
              *

 341          KK    C2B3(UPPER RANCHO HECRAS STA. 70+16.)
 342          KM  FLOW ALONG RANCHO, NO. OF RANCHO/CRAIG INTERSECTION
 343          HC      2
              *

 344          KK   RC2B3
 345          KM  ROUTE C2B3 IN GOAL 0111
 346          KM  FLOW FROM 48-INCH LATERAL AT DOWNSTREAM END OF DRAINAGE EASEMENT BEHIND
 347          KM  CONVENIENCE STORE ON NW CORNER OF CRAIG/RANCHO.
 348          KM  EXISTING CONDITION:
 349          KM  120 CFS DIVERTED TO 60-INCH STORM DRAIN IN CRAIG ROAD REMAINING CROSSED
 350          KM  CRAIG ROAD IN TWO 7'X 3' RCB'S.
 351          KM  DEVELOPED:
 352          KM  MAINTAIN 48-INCH LATERAL BUT CONNECT IT TO PROPOSED FACILITY GOAL 0168,
 353          KM  ABANDON EASTBOUND 60-INCH RCP IN CRAIG ROAD.
 354          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
 355          KM  FACILITY # = GOAL 0111
 356          KM  LINING = RCB
 357          RD    3000  0.0083   0.015       0    TRAP      10       0
              *
1                                        HEC-1 INPUT                                        PAGE 10

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 358          KK   2C2B3
 359          KM  COMBINE SOUTHBOUND RANCHO FLOW WITH
 360          KM  EASTBOUND CRAIG FLOW IN GOAL 0111
 361          HC      2
              *

 362          KK   PT51A
 363          KM  STREET FLOW IN CRAIG RD, WEST OF RANCHO DRIVE
 364          PB    2.77
 365          BA  0.0038
 366          LS      0    93.2
 367          UD   0.087
              *

 368          KK  RPT51A
 369          KM  ROUTE PT51A IN GOAL 0111
 370          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
 371          KM  FACILITY # = GOAL 0111
 372          KM  LINING = RCB
 373          RD    3000  0.0083   0.015       0    TRAP      10       0
              *

 374          KK  CPT51A
 375          HC      2
              *

 376          KK   PT51B
 377          PB    2.77
 378          BA   0.007
 379          LS      0    93.2
 380          UD   0.073
              *

 381          KK  RPT51B
 382          KM  ROUTE PT51B IN GOAL 0111
 383          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
 384          KM  FACILITY # = GOAL 0111
 385          KM  LINING = RCB
 386          RD    2500  0.0083   0.015       0    TRAP      10       0
              *

 387          KK   PT51C
 388          PB    2.77
 389          BA   0.027
 390          LS      0    93.2
 391          UD   0.192
              *

 392          KK  RPT51C
 393          KM  ROUTE PT51C IN GOAL 0111
 394          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
 395          KM  FACILITY # = GOAL 0111
 396          KM  LINING = RCB
 397          RD    1500  0.0083   0.015       0    TRAP      10       0
              *
1                                        HEC-1 INPUT                                        PAGE 11

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 398          KK  CPT51C
 399          KM  KM WEST SIDE RANCHO, NORTH OF ALEXANDER (JONES NORTH)
 400          HC      3
              *
```

```
401          KK   PT51D
402          KM  FLOW FROM THIS SUBBASIN CAPTURED IN FUTURE FACILITY GOA2 0000
403          KM  THROUGH TWO DROP INLETS WITHIN SUBBASIN THAT DISCHARGE TO CULVERT 27
404          KM  (7X3 RCB) OR TO PROPOSED DROP INLETS IN ALEXANDER ROAD AT LOW POINT
405          PB    2.77
406          BA   0.033
407          LS       0    93.2
408          UD   0.201
             *

409          KK   PT3-C
410          KM   2008 MPU BASIN
411          BA   0.172
412          PB    2.77
413          LS       0    89.9
414          UD   0.372
             *

415          KK RCPT3-C
416          KM  ROUTE PT3-C TO CPT41-C
417          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
418          KM  FACILITY # = GOA2 0000
419          KM  LINING = 8X5 RCB
420          RD    4700  0.0081   0.016       0    TRAP       0      50
             *

421          KK  PT41-C
422          KM  2008 MPU BASIN REVISED BY STANLEY
423          KM  AREA REDUCED TO ACCOMMODATE LOMR BASIN PT51 ALONG RANCHO
424          BA   0.365
425          PB    2.77
426          LS       0    88.6
427          UD   0.415
             *

428          KK CPT41-C
429          KM  COMBINE RCPT3-C, PT41-C AND PT51D
430          KM  EASTBOUND FLOW IN ALEXANDER AT RANCHO
431          KM  REVISED BY STANLEY TO INCLUDE PT51D
432          HC       3
             *

433          KKCCPT41-C
434          KM  COMBINE EASTBOUND FLOW IN ALEXANDER (GOA2 0000) WITH
435          KM  SOUTHBOUND FLOW IN RANCHO (GOAL 0111)
436          KM  AT ALEXANDER AND RANCHO
437          HC       2
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

438          KKRCPT41-C
439          KM  ROUTE CCPT41-C TO CPT5A2-C
440          KM  NEWLY PROPOSED REGIONAL FACILITY
441          KM  FACILITY = GOWAN OUTFALL - ALEXANDER BRANCH
442          KM  FACILITY # = GOAL 0100
443          KM  LINING = RCB
444          RD     540   0.003   0.015       0    TRAP      10       0
             *

445          KK PT5A2-C
446          KM   2008 MPU BASIN
447          KM   REVISED BY STANLEY; AREAREDUCED FROM LOMR BASIN PT5A7
448          BA  0.2670
449          PB    2.77
450          LS       0    86.9
451          UD   0.414
             *

452          KKCPT5A2-C
453          KM  COMBINE PT5A2-C AND CPT41-C
454          KM  ALEXANDER AND RANCHO
455          HC       2
             *

456          KK RCPT5A2
457          KM  ROUTE CPT5A2-C TO CPT5B6-C
458          KM  FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
459          KM  FACILITY # = GOAL 0000
460          KM  LINING = RCB
461          RD    5280    0.01   0.015       0    TRAP      10       0
             *

462          KK PT5B6-C
463          BA   0.381
464          PB    2.77
465          LS       0    86.3
466          UD   0.368
             *

467          KKCCPT5B6C
468          KM  COMBINE PT5B6-C AND CPT5B6-C
469          KM  DECATUR AND ALEXANDER
470          HC       2
             *
             * ****************************************************
             * BEGIN FLOW SPLIT FROM GOWAN WATERSHED; MPU NW BASIN MODEL
             * ****************************************************
             *
```

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  471     KKGD17BG-C
  472     KM   2008 MPU BASIN
  473     BA   0.364
  474     PB    2.77
  475     LS       0    88.7
  476     UD   0.478
          *

  477     KK RGD17BG
  478     KM  ROUTE RGD17BG TO CGD11B-C
  479     KM  FACILITY = GOWAN OUTFALL - U.S. 95 CHANNEL
  480     KM  FACILITY # = GO95 0000
  481     KM  LINING = CONCRETE
  482     RD    2640   0.003   0.015       0    TRAP      12       2
          *

  483     KK GD11B-C
  484     KM   2008 MPU BASIN
  485     BA   0.262
  486     PB    2.77
  487     LS       0    91.4
  488     UD   0.278
          *

  489     KKCGD11B-C
  490     KM  COMBINE GD11B-C AND RGD17BG
  491     KM  GOWAN AND US 95
  492     HC       2
          *

  493     KK RCGD11B
  494     KM  ROUTE CGD11B-C TO CPT6B-C
  495     KM  FACILITY = GOWAN OUTFALL FACILITIES
  496     KM  FACILITY # = GOOF 0511
  497     KM  LINING = RCB
  498     RD    8390   0.005   0.015       0    TRAP       8       0
          *

  499     KK  PT6B-C
  500     KM   2008 MPU BASIN
  501     BA   0.454
  502     PB    2.77
  503     LS       0    86.1
  504     UD   0.756
          *

  505     KK CPT6B-C
  506     KM  COMBINE PT6B-C AND RCGD11B
  507     KM  GOWAN AND RANCHO
  508     HC       2
          *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  509     KKDPT6B-C1
  510     KM  FLOW SPLIT TO GOWAN OUTFALL
  511     KM  DGOW1A
  512     KM  FROM 2008 MPU / CWH
  513     DT  DGOW1A
  514     DI       0      31      51      71     101     301     561     600    3000    5000
  515     DQ       0      30      50      70     100     300     560     560     560     560
          *

  516     KKDPT6B-C2
  517     KM  FLOW SPLIT TO TRILOGY CHANNEL
  518     KM  DTRILGY
  519     KM  FROM 2008 MPU; CWH
  520     DT DTRILGY
  521     DI       0      31      91     202     349     625    1214    1944    2801
  522     DQ       0       3      33      55      95     173     267     374     491
          *

  523     KK    TRUV
  524     KM   DIVERSION BEHIND TRUE VALUE HARDWARE REVISED BY LBG.  DIVERSIONS
  525     KM   FROM LOMR; DETERMINED USING HECRAS LATERAL WEIR. L = 25 FT
  526     KM   USED IN PLACE OF TRILOGY CHANNEL DIVERSION OF MPU (STANLEY)
  527     DT  TRUVAL
  528     DI       0     200     400     600    1000    1400    1800
  529     DQ       0       8      25      43      78     114     149
          *

  530     KK  DGOWAN
  531     KM   FLOWSPLIT AT GOWAN FOR EASTBOUND SURFACE FLOW IN GOWAN
  532     KM   ADDED BY STANLEY; SEE FLOWSPLIT CALCS
  533     KM  REMAINING FLOW CONTINUES SOUTH IN RANCHO RD.
  534     KM  MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
  535     DT    DGOW
  536     DI       0       1      50      70     100     200
  537     DQ       0       0      33      40      58     120
          *

  538     KK   PT5A7
  539     KM   BASIN REFERENCED FROM LOMR; PART OF PT5A2-C MPU BASIN
  540     PB    2.77
  541     BA   0.074
```

```
542          LS       0    84.4
543          UD   0.351
             *

544          KK 8REMAIN
545          KM  DIVERT 24 CFS EAST ACROSS RANCHO IN A 24" CMP (CULVERT 32).
546          KM  REMAINING FLOW CONTINUES SOUTH ON THE WEST SIDE OF RANCHO
547          KM   REVISED TO 23 CFS BY LBG.  WEIR FLOW ACROSS RANCHO CALCULATED
548          KM   USING HECRAS LATERAL WEIR #3 BETWEEN X-983 AND X-743.
549          DT  D8RCHO
550          DI       0      24     100     200     300     400     500     600
551          DQ       0      23      23      54     122     200     273     346
             *
1                                        HEC-1 INPUT                                    PAGE 15

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

552          KK  R8MAIN
553          KM  ROUTE TO C5A9 (UPPER RANCHO HECRAS STA 0+00)
554          RK     983   0.003   0.025       0    TRAP      20       2
             *

555          KK CPT6BC2
556          KM  COMBINE WITH SOUTHBOUND FLOW IN RANCHO
557          KM  GOWAN AND RANCHO
558          HC       2
             *

559          KKRCPT6B-C
560          KM  ROUTE DPT6B-C2 TO CCPT6B-C
561          KM  DECATUR AND GOWAN
562          RD    3300   0.007   0.016       0    TRAP       0      50
             *

563          KK  DGOW1A
564          KM  RETRIEVE DGOW1A
565          DR  DGOW1A
             *

566          KK RDGOW1A
567          KM  ROUTE PT6B-C TO CCPT6B-C
568          KM  FACILITY = GOWAN OUTFALL FACILITIES
569          KM  FACILITY # = GOOF 0486
570          KM  LINING = RCB
571          RD    3300   0.006   0.015       0    TRAP       8       0
             *

572          KKCCPT6B-C
573          KM  COMBINE RCPT6B-C AND RDGOW1A
574          KM  GOWAN AND DECATUR
575          HC       2
             *

576          KK   DTRUV
577          KM   REFERENCED FROM LOMR
578          KM   DEVERSION DETERMINED WITH HECRAS LATERAL WEIR BY LBG
579          KM   RETURNS TO RANCHO SOUTH OF TRUE VALUE
580          KM  RETRIEVE DTRUV
581          DR  TRUVAL
             *

582          KK DTRILGY
583          KM  RETRIEVE DTRILGY
584          DR DTRILGY
             *
1                                        HEC-1 INPUT                                    PAGE 16

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

585          KK   CY07B
586          KM   2008 MPU BASIN
587          KM   SOUTH OF GOWAN, WEST OF RANCHO
588          BA   0.203
589          PB    2.77
590          LS       0    89.1
591          UD   0.461
             *

592          KK  CCY07B
593          KM  COMBINE DTRILGY AND CY07B
594          KM  NEAR RANCHO AND MICHAEL
595          HC       3
             *

596          KK  DCY07B
597          KM  FLOW SPLIT TO CENTRAL BASIN
598          KM  DIVERT FLOW EAST IN RAN 190
599          KM  OPPOSITE OF D9RCHO
600          KM  FROM CWH
601          DT  DCENT1
602          DI       0      19      73     100    1000    2000
603          DQ       0       1       1      28     928    1928
             *

604          KK RDCY07B
605          KM  ROUTE DCY07B TO CCCY08-C
606          KM  DECATUR AND GOWAN
607          RD    3150   0.007   0.016       0    TRAP       0      50
             *
```

```
          608          KK  CY08-C
          609          BA   0.094
          610          PB    2.77
          611          LS       0    88.5
          612          UD   0.306
                       *

          613          KKCCCY08-C
          614          KM  COMBINE CY08-C, CCY08-C, AND RDCY07B
          615          KM  GOWAN AND DECATUR
          616          HC       3
                       *

          617          KK RDGOW2A
          618          KM  ROUTE DGOW2A TO CPT5B6-C
          619          KM  FACILITY = GOWAN NORTH SYSTEM
          620          KM  FACILITY # = GOOF 0427, 0485
          621          KM  LINING = RCP
          622          RD    2370   0.005   0.013       0    CIRC       8       0
                       *
1                                          HEC-1 INPUT                                                    PAGE 17

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          623          KK    C427
          624          HC       2
                       *

          625          KK 9REMAIN
          626          KM  RETRIEVE DCENT1
          627          DR  DCENT1
                       *

          628          KKR9REMAIN
          629          KM  ROUTE 9REMAIN SOUTH IN RANCHO
          630          RD    2100  0.0076   0.016       0    TRAP       0      50
                       *

          631          KK  OG04-C
          632          KM  START OF NW HEC-1 MODEL BASINS
          633          BA   0.288
          634          LS       0    90.2
          635          UD   0.320
                       *

          636          KK DOG04-C
          637          KM  FLOW SPLIT TO PD01-C
          638          KM  COMBINED CAPACITY = 124 CFS
          639          DT   DPD01
          640          DI       0      51     125     500    1000
          641          DQ       0      50     124     124     124
                       *

          642          KKRDOG04-C
          643          KM  ROUTE DOG04-C TO COG05-C
          644          KM  US95 TO CHEYENNE
          645          RD    4100  0.0007   0.016       0    TRAP       0      50
                       *

          646          KK  OG05-C
          647          BA   0.266
          648          PB    2.77
          649          LS       0    90.7
          650          UD   0.392
                       *

          651          KK COG05-C
          652          KM  COMBINE RDOG04-C AND OG05-C
          653          KM  RAINBOW AND CHEYENNE
          654          HC       2
                       *

          655          KKRCOG05-C
          656          KM  ROUTE RCOG05-C TO CCY06B-C
          657          KM  CHEYENNE
          658          RD    7500  0.0097   0.016       0    TRAP       0      50
                       *
1                                          HEC-1 INPUT                                                    PAGE 18

        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          659          KK CY06B-C
          660          BA   0.498
          661          PB    2.77
          662          LS       0    86.2
          663          UD   0.697
                       *

          664          KKCCY06B-C
          665          KM  COMBINE RCOG05-C AND CY06B-C
          666          KM  MICHAEL AND CHEYENNE
          667          HC       2
                       *

          668          KK RCCY06B
          669          KM  ROUTE CCY06B TO CRGOWAN
          670          KM  CHEYENNE
          671          RD    1400    0.01   0.016       0    TRAP       0      50
                       *
```

```
672           KK CRGOWAN
673           KM  COMBINE R9REMAIN AND RCCY06B
674           KM  RANCHO AND CHEYENNE
675           HC       2
              *

676           KKRCRGOWAN
677           KM  ROUTE CRGOWAN TO CPD05A-C
678           KM  RANCHO
679           RD    1700  0.0088   0.016       0    TRAP       0      50
              *

680           KK PD05A-C
681           BA   0.135
682           PB    2.77
683           LS       0    93.5
684           UD   0.406
              *

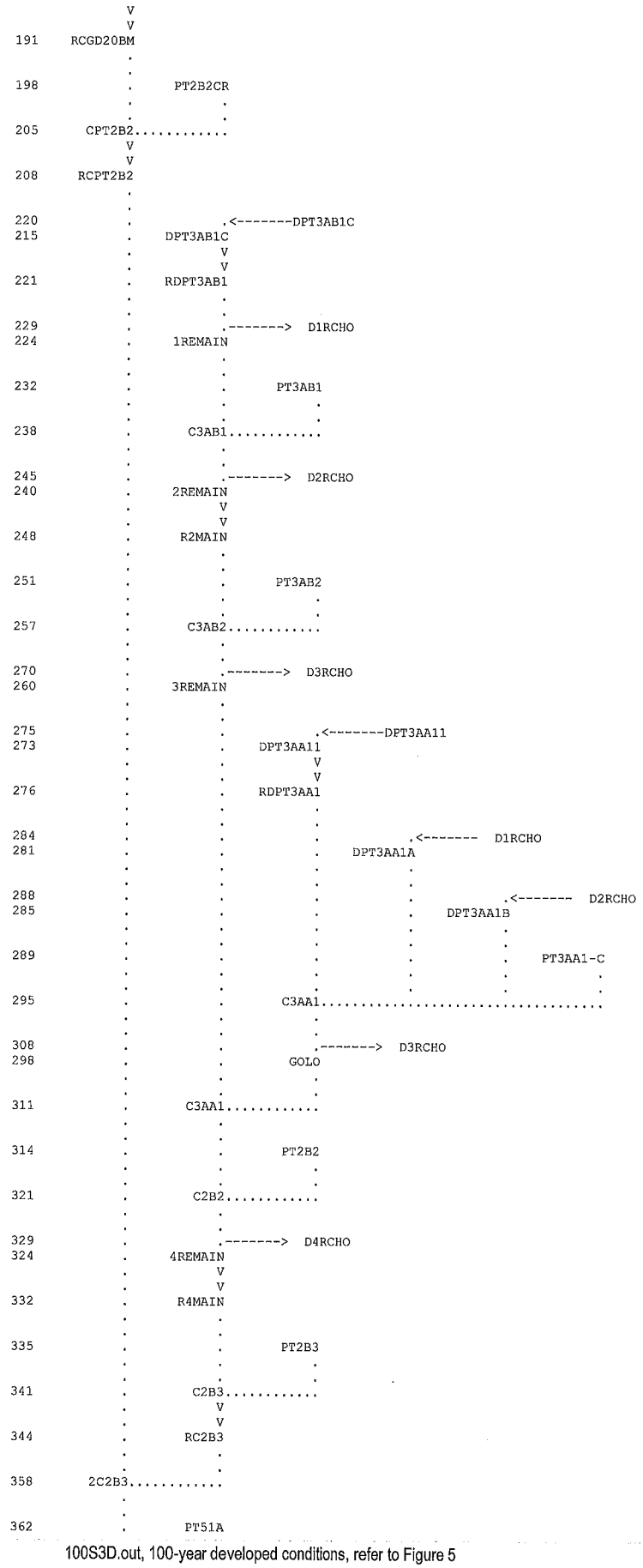
685           KKCPD05A-C
686           KM  COMBINE PD05A-C AND RCRGOWAN
687           KM  RANCHO AND DECATUR
688           HC       2
              *

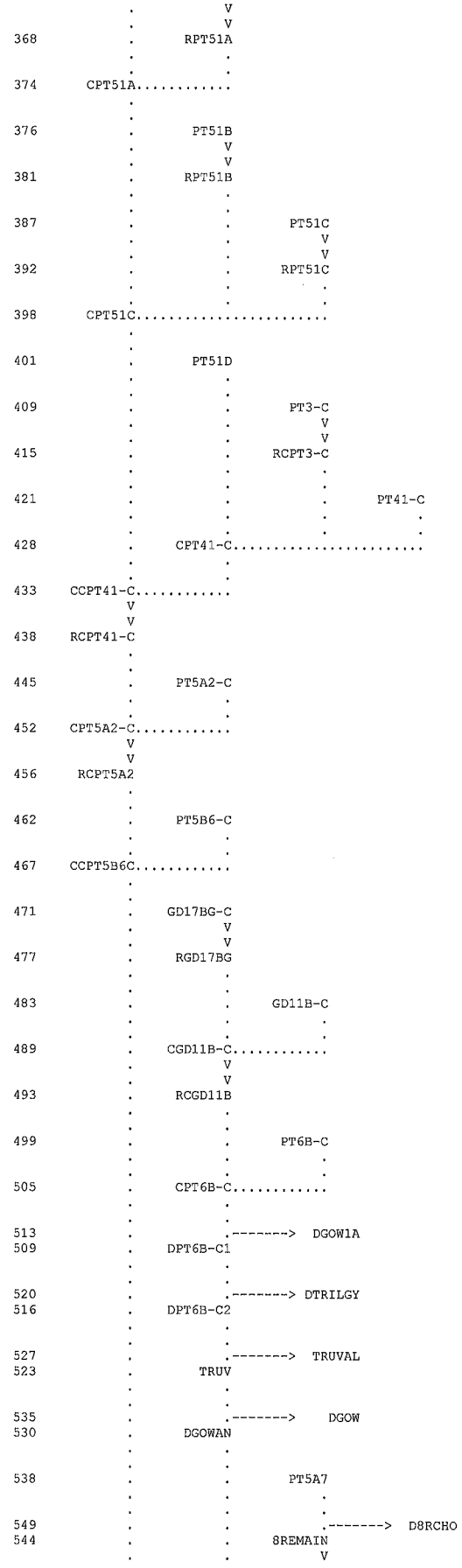
689           KK DCPD05A
690           KM  FLOW SPLIT TO A1-C1
691           KM  OPPOSITE OF DA2 FLOW SPLIT IN CWH
692           KM  CAPACITY RAN 170 = 210 CFS
693           KM  REMAINING FLOW GOES DOWN WEST SIDE OF RANCHO
694           DT   DA1-C
695           DI       0      51     101     211     500    1000    5000
696           DQ       0      51     101     211     211     211     211
              *
697           ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

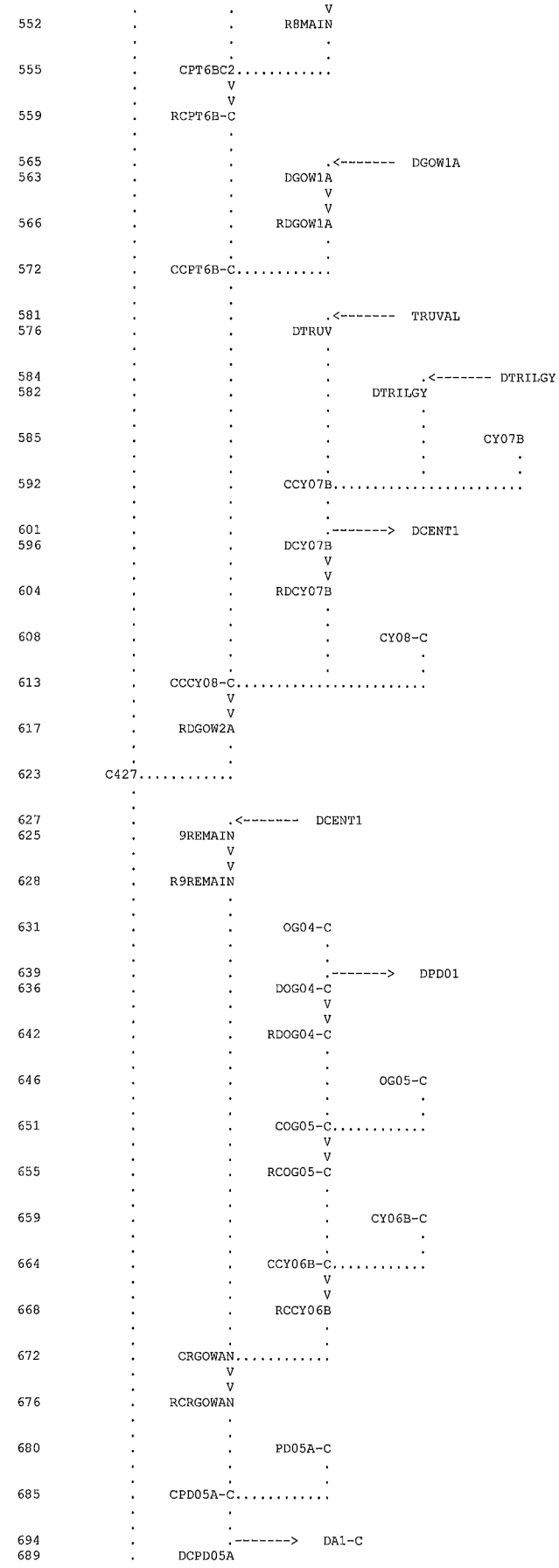
   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    77     PDGCD-C
                V
                V
    91    RPDGCD-C
                V
                V
    95     RRPDGCD
                .
                .
   100          .     NW29B-C
                .           V
                .           V
   106          .    RNW29B-C
                .           .
                .           .
   110          .           .     NW1C2-C
                .           .           .
                .           .           .
   116          .      CNW1C2............
                .           V
                .           V
   120          .     RCNW1C2
                .           .
                .           .
   125          .           .    PDGCB10C
                .           .           .
                .           .           .
   131          .    CPDGCB10............
                .           .
                .           .
   140          .           .-------->DPT3AA11
   135          .    DPDGCB10
                .           V
                .           V
   143          .    RDPDGCB1
                .           .
                .           .
   153          .           .-------->DPT3AB1C
   148          .    DDPDGCB1
                .           .
                .           .
   156    CDPDGCB1............
                V
                V
   160    RCDPDGCB
                .
                .
   164          .    GD20BE-C
                .           .
                .           .
   170    CGD20BEC............
                V
                V
   174    RCGD20BE
                .
                .
   181          .    GD20BM-C
                .           .
                .           .
   187    CGD20BMC............
```


191 RCGD20BM
198 PT2B2CR
205 CPT2B2
208 RCPT2B2
220 .<-------DPT3AB1C
215 DPT3AB1C
221 RDPT3AB1
229 .------> D1RCHO
224 1REMAIN
232 PT3AB1
238 C3AB1
245 .------> D2RCHO
240 2REMAIN
248 R2MAIN
251 PT3AB2
257 C3AB2
270 .------> D3RCHO
260 3REMAIN
275 .<-------DPT3AA11
273 DPT3AA11
276 RDPT3AA1
284 .<------- D1RCHO
281 DPT3AA1A
288 .<------- D2RCHO
285 DPT3AA1B
289 PT3AA1-C
295 C3AA1
308 .------> D3RCHO
298 GOLO
311 C3AA1
314 PT2B2
321 C2B2
329 .------> D4RCHO
324 4REMAIN
332 R4MAIN
335 PT2B3
341 C2B3
344 RC2B3
358 2C2B3
362 PT51A



100S3D.out, 100-year developed conditions, refer to Figure 5


552 R8MAIN
555 CPT6BC2
559 RCPT6B-C
565 DGOW1A
563 DGOW1A
566 RDGOW1A
572 CCPT6B-C
581 TRUVAL
576 DTRUV
584 DTRILGY
582 DTRILGY
585 CY07B
592 CCY07B
601 DCENT1
596 DCY07B
604 RDCY07B
608 CY08-C
613 CCCY08-C
617 RDGOW2A
623 C427
627 DCENT1
625 9REMAIN
628 R9REMAIN
631 OG04-C
639 DPD01
636 DOG04-C
642 RDOG04-C
646 OG05-C
651 COG05-C
655 RCOG05-C
659 CY06B-C
664 CCY06B-C
668 RCCY06B
672 CRGOWAN
676 RCRGOWAN
680 PD05A-C
685 CPD05A-C
694 DA1-C
689 DCPD05A

```
 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   09OCT12  TIME  16:32:06  *
*                                      *
****************************************
```

```
************************************
*                                  *
*    U.S. ARMY CORPS OF ENGINEERS  *
*    HYDROLOGIC ENGINEERING CENTER *
*          609 SECOND STREET       *
*       DAVIS, CALIFORNIA 95616    *
*           (916) 756-1104         *
*                                  *
************************************
```

RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR AND
GOWAN OUTFALL - ALEXANDER ROAD FACILITIES
OFFSITE BASINS, DEVELOPED CONDITIONS
PREPARED FOR CITY OF LAS VEGAS, NV, AND NDOT
PREPARED BY STANLEY CONSULTANTS INC. (HM/VF)
INPUT FILE: 100S3D.DAT
DESIGN STORM: 100-YEAR 6-HR
STORM DISTRIBUTION: SDN3
STORM CENTERING: FULL WATERSHED
REFER TO FIGURE 5

BASED ON:
CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
2008 MASTER PLAN UPDATE (MPU) BY PBS&J
GOWAN WATERSHED (ALL) AND
CENTRAL WATERSHED (NORTHWESTERN PORTION)
FLOW ROUTING AND DIVERSIONS FOR FLOW SPLITS AT INTERSECTIONS AND FLOOD
CONTROL FACILITIES REFERENCED FROM MPU UNLESS OTHERWISE NOTED

RANCHO/US95 LOMR (LOMR) MODIFIED BY THE LOUIS BERGER GROUP (LBG) 2009

GOWAN OUTFALL - LONE MOUNTAIN BRANCH PRELIMINARY DESIGN REPORT
BY G.C. WALLACE (GCW) 2007

PRELIMINARY TECHNICAL DRAINAGE REPORT FOR RANCHO DRIVE CAPACITY
IMPROVEMENTS RAINBOW TO DECATUR (RANCHO STUDY)
HEC-1 ANALYSIS FOR DEVELOPED CONDITIONS FILE R00S3D.OUT
BY STANLEY CONSULTANTS, 1/2012

LOMR BY LBG IDENTIFIED THE SDN3 AS CONTROLLING STORM NORTH OF GOWAN
ACCORDINGLY, LBG CREATED SDN3 MODEL BY CUTTING OFF FLOW WEST OF EL CAPITAN WY
MPU HAD THIS FLOW CUTOFF BY CCRFCD FACILITY GOWAN NORTH - EL CAPITAN BRANCH
(GOEC)

THIS DEVELOPED CONDITION MODEL DIFFERS FROM THE PRELIMINARY TECHNICAL
DRAINAGE STUDY FOR RANCHO DRIVE CAPACITY IMPROVEMENTS RAINBOW TO DECATUR
DEVELOPED CONDITION MODEL AS FOLLOWS:
1. ROUTES THE 100-YEAR STORM IN THE GOAL STORM DRAIN SYSTEM
1. BASIN PT51 IS PART OF THE 2008 MPU BASIN PT41-C. IT WAS DELINEATED
AS PART OF THE RANCHO LOMR BY LBG AND INCORPORATED INTO THE DRAINAGE
ANALYSIS FOR THE RANCHO IMPROVEMENTS. ACCORDING TO THE RANCHO LOMR
AND RANCHO IMPROVEMENTS ALL OF THE FLOW GENERATED BY PT51 IS COLLECTED
INTO THE GOWAN OUTFALL - ALEXANDER ROAD FACILITY AT
ALEXANDER-JONES/RANCHO DRIVE INTERSECTION. THEREFORE THIS SUBBASIN WAS
FURTHER DELINEATED (PT51A THROUGH PT51D) INTO SMALL SUBBASINS TO SHOW
LOCATIONS ALONG RANCHO DRIVE AND ALEXANDER ROAD (WEST OF RANCHO DRIVE)
WHERE FLOWS ARE COLLECTED IN THE PROPOSED FLOOD CONTROL FACILITY.
2. SUBBASINS PT5B6-C AND CY08-C(FROM 2008 MPU HEC-1 ALLGOW3.OUT) WERE ADDED
TO THE EXISTING CONDITION MODEL
3. THE DEPTH-AREA REDUCTION FACTORS (DARF)WERE REVISED TO MATCH THE DARF'S
USED IN THE 2008 MPU HEC-1 ALLGOW3.OUT

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

AREA SQ. MI.	DARF
0-0.5	0.99
0.5-1	0.975
1-2	0.95
2-3	0.925
3-4	0.915
4-5	0.908
5-6	0.903
6-7	0.895
7-8	0.885

```
 74 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME         0000  STARTING TIME
                        NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2    0  ENDING DATE
                    NDTIME         0055  ENDING TIME
                     ICENT           19  CENTURY MARK
```

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS
DRAINAGE AREA SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION FEET
FLOW CUBIC FEET PER SECOND
STORAGE VOLUME ACRE-FEET
SURFACE AREA ACRES
TEMPERATURE DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
.99 .98 .95 .93 .92 .91 .90 .89 .88

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

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*** FDKRUT WARNING TIME STEP CALCULATION FAILED TO CONVERGE. STABILITY PROBLEMS MAY RESULT

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .99	RATIO 2 .98	RATIO 3 .95	RATIO 4 .93	RATIO 5 .92	RATIO 6 .91	RATIO 7 .90	RATIO 8 .89	RATIO 9 .88
HYDROGRAPH AT													
+	PDGCD-C	.44	1	FLOW	228.	222.	211.	201.	197.	194.	192.	189.	184.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RPDGCD-C	.44	1	FLOW	228.	221.	211.	201.	196.	194.	192.	188.	184.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO													
+	RRPDGCD	.44	1	FLOW	227.	220.	211.	199.	196.	192.	190.	187.	183.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	NW29B-C	.25	1	FLOW	161.	157.	149.	142.	139.	137.	136.	133.	130.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RNW29B-C	.25	1	FLOW	161.	157.	149.	142.	139.	137.	136.	134.	131.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	NW1C2-C	.21	1	FLOW	192.	188.	181.	175.	172.	170.	169.	167.	164.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CNW1C2	.46	1	FLOW	334.	326.	312.	298.	292.	289.	286.	281.	276.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RCNW1C2	.46	1	FLOW	332.	324.	310.	297.	292.	288.	286.	282.	276.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PDGCB10C	.31	1	FLOW	229.	223.	214.	204.	201.	198.	196.	193.	190.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CPDGCB10	.77	1	FLOW	552.	538.	515.	492.	483.	477.	472.	466.	456.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO													
+	DPT3AA11	.77	1	FLOW	139.	139.	139.	139.	139.	139.	139.	139.	139.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.58	3.58
HYDROGRAPH AT													
+	DPDGCB10	.77	1	FLOW	413.	399.	376.	353.	344.	338.	333.	327.	317.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92

ROUTED TO													
+	RDPDGCB1	.77	1	FLOW	356.	343.	322.	300.	292.	286.	282.	276.	267.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO													
+	DPT3AB1C	.77	1	FLOW	192.	192.	192.	192.	192.	192.	192.	192.	192.
				TIME	3.75	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT													
+	DDPDGCB1	.77	1	FLOW	164.	151.	130.	108.	100.	94.	90.	84.	75.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT													
+	CDPDGCB1	1.21	1	FLOW	378.	359.	329.	298.	286.	277.	271.	262.	249.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RCDPDGCB	1.21	1	FLOW	374.	355.	326.	294.	283.	274.	268.	259.	246.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	GD20BE-C	.43	1	FLOW	279.	272.	260.	249.	244.	241.	238.	235.	230.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT													
+	CGD20BEC	1.64	1	FLOW	616.	590.	549.	506.	490.	478.	469.	457.	439.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RCGD20BE	1.64	1	FLOW	609.	581.	546.	495.	486.	467.	466.	446.	436.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	GD20BM-C	.34	1	FLOW	296.	290.	280.	269.	265.	262.	260.	257.	253.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT													
+	CGD20BMC	1.98	1	FLOW	850.	816.	757.	699.	686.	665.	663.	640.	628.
				TIME	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO													
+	RCGD20BM	1.98	1	FLOW	843.	807.	758.	697.	681.	662.	657.	633.	618.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	PT2B2CR	.20	1	FLOW	202.	198.	192.	185.	183.	181.	179.	177.	175.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CPT2B2	2.18	1	FLOW	975.	936.	884.	819.	800.	780.	775.	749.	733.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO													
+	RCPT2B2	2.18	1	FLOW	972.	934.	879.	814.	795.	775.	769.	745.	727.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	DPT3AB1C	.00	1	FLOW	192.	192.	192.	192.	192.	192.	192.	192.	192.
				TIME	3.75	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92
ROUTED TO													
+	RDPT3AB1	.00	1	FLOW	192.	192.	192.	192.	192.	192.	192.	192.	192.
				TIME	3.83	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
DIVERSION TO													
+	D1RCHO	.00	1	FLOW	36.	36.	36.	36.	36.	36.	36.	36.	36.
				TIME	3.83	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	1REMAIN	.00	1	FLOW	156.	156.	156.	156.	156.	156.	156.	156.	156.
				TIME	3.83	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00
HYDROGRAPH AT													
+	PT3AB1	.05	1	FLOW	63.	62.	60.	58.	57.	57.	56.	56.	55.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C3AB1	.05	1	FLOW	211.	206.	200.	198.	198.	197.	197.	197.	196.
				TIME	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO													
+	D2RCHO	.05	1	FLOW	29.	29.	29.	29.	29.	29.	29.	29.	29.
				TIME	3.83	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	2REMAIN	.05	1	FLOW	182.	177.	171.	169.	169.	168.	168.	168.	167.
				TIME	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	R2MAIN	.05	1	FLOW	178.	175.	170.	166.	165.	165.	165.	164.	164.
				TIME	3.92	3.92	3.92	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PT3AB2	.05	1	FLOW	76.	75.	73.	70.	70.	69.	68.	68.	67.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	C3AB2	.10	1	FLOW	214.	210.	204.	198.	195.	194.	193.	191.	188.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO													
+	D3RCHO	.10	1	FLOW	213.	209.	203.	197.	195.	193.	192.	190.	188.

				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	3REMAIN	.10	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	DPT3AA11	.00	1	FLOW	139.	139.	139.	139.	139.	139.	139.	139.	139.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.58	3.58
ROUTED TO													
+	RDPT3AA1	.00	1	FLOW	145.	146.	147.	148.	149.	149.	149.	148.	148.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	DPT3AA1A	.00	1	FLOW	36.	36.	36.	36.	36.	36.	36.	36.	36.
				TIME	3.83	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	DPT3AA1B	.00	1	FLOW	29.	29.	29.	29.	29.	29.	29.	29.	29.
				TIME	3.83	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PT3AA1-C	.14	1	FLOW	158.	155.	150.	146.	144.	142.	141.	140.	138.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
4 COMBINED AT													
+	C3AA1	.14	1	FLOW	360.	357.	351.	345.	342.	340.	338.	337.	334.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO													
+	D3RCHO	.14	1	FLOW	360.	357.	351.	345.	342.	340.	338.	337.	334.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	GOLO	.14	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00	.00	.00	.00
2 COMBINED AT													
+	C3AA1	.24	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PT2B2	.08	1	FLOW	106.	104.	101.	98.	97.	96.	95.	94.	93.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C2B2	.32	1	FLOW	107.	105.	102.	98.	97.	96.	96.	95.	93.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO													
+	D4RCHO	.32	1	FLOW	17.	17.	17.	16.	16.	16.	16.	15.	15.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	4REMAIN	.32	1	FLOW	89.	88.	85.	82.	81.	80.	80.	79.	78.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	R4MAIN	.32	1	FLOW	87.	86.	83.	80.	79.	78.	78.	77.	76.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	PT2B3	.02	1	FLOW	31.	31.	30.	29.	29.	28.	28.	28.	27.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	C2B3	.34	1	FLOW	117.	115.	111.	108.	106.	105.	105.	104.	102.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RC2B3	.34	1	FLOW	118.	113.	111.	108.	106.	104.	103.	103.	102.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	2C2B3	2.52	1	FLOW	1023.	985.	928.	862.	842.	822.	815.	791.	772.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	PT51A	.00	1	FLOW	7.	7.	7.	6.	6.	6.	6.	6.	6.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO													
+	RPT51A	.00	1	FLOW	7.	6.	6.	6.	6.	6.	6.	6.	6.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CPT51A	2.53	1	FLOW	1024.	986.	929.	863.	843.	823.	817.	792.	774.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	PT51B	.01	1	FLOW	13.	13.	13.	12.	12.	12.	12.	12.	12.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO													
+	RPT51B	.01	1	FLOW	12.	12.	12.	11.	11.	11.	11.	11.	11.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	PT51C	.03	1	FLOW	40.	39.	38.	37.	36.	36.	36.	35.	35.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58

ROUTED TO													
+	RPT51C	.03	1	FLOW	39.	38.	37.	36.	35.	35.	35.	35.	34.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT													
+	CPT51C	2.56	1	FLOW	1037.	998.	941.	875.	854.	835.	828.	804.	785.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	PT51D	.03	1	FLOW	48.	47.	45.	44.	43.	43.	43.	42.	42.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	PT3-C	.17	1	FLOW	169.	166.	160.	154.	152.	150.	149.	147.	145.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RCPT3-C	.17	1	FLOW	171.	167.	162.	156.	153.	152.	150.	149.	146.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PT41-C	.37	1	FLOW	323.	316.	305.	293.	289.	285.	283.	279.	275.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
3 COMBINED AT													
+	CPT41-C	.57	1	FLOW	500.	489.	471.	453.	446.	441.	438.	432.	425.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT													
+	CCPT41-C	3.13	1	FLOW	1464.	1418.	1339.	1265.	1244.	1221.	1212.	1192.	1167.
				TIME	4.08	4.08	4.08	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RCPT41-C	3.13	1	FLOW	1463.	1417.	1339.	1264.	1243.	1221.	1211.	1191.	1167.
				TIME	4.08	4.08	4.08	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PT5A2-C	.27	1	FLOW	220.	215.	207.	198.	195.	193.	191.	188.	185.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CPT5A2-C	3.40	1	FLOW	1646.	1599.	1522.	1444.	1420.	1396.	1384.	1365.	1340.
				TIME	4.00	4.00	4.00	4.00	4.00	3.92	3.92	3.92	3.92
ROUTED TO													
+	RCPT5A2	3.40	1	FLOW	1640.	1593.	1520.	1444.	1423.	1396.	1388.	1364.	1341.
				TIME	4.08	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PT5B6-C	.38	1	FLOW	324.	316.	304.	292.	287.	283.	281.	277.	272.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CCPT5B6C	3.78	1	FLOW	1905.	1854.	1771.	1688.	1665.	1637.	1628.	1600.	1575.
				TIME	4.00	4.00	4.00	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	GD17BG-C	.36	1	FLOW	299.	293.	282.	272.	267.	264.	262.	259.	254.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RGD17BG	.36	1	FLOW	298.	292.	281.	271.	267.	264.	261.	258.	254.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	GD11B-C	.26	1	FLOW	313.	307.	297.	287.	283.	280.	278.	274.	270.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT													
+	CGD11B-C	.63	1	FLOW	539.	528.	509.	490.	483.	478.	474.	468.	460.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RCGD11B	.63	1	FLOW	538.	527.	508.	490.	482.	477.	473.	467.	460.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	PT6B-C	.45	1	FLOW	250.	244.	234.	224.	220.	218.	216.	213.	209.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
2 COMBINED AT													
+	CPT6B-C	1.08	1	FLOW	742.	726.	699.	672.	662.	654.	649.	641.	630.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO													
+	DGOW1A	1.08	1	FLOW	560.	560.	560.	560.	560.	560.	560.	560.	560.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	DPT6B-C1	1.08	1	FLOW	182.	166.	139.	112.	102.	94.	89.	81.	70.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO													
+	DTRILGY	1.08	1	FLOW	51.	48.	43.	37.	35.	34.	32.	28.	23.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	DPT6B-C2	1.08	1	FLOW	131.	118.	97.	75.	67.	61.	57.	53.	48.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO													
+	TRUVAL	1.08	1	FLOW	5.	5.	4.	3.	3.	2.	2.	2.	2.

				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	TRUV	1.08	1	FLOW	125.	113.	93.	72.	64.	58.	55.	51.	46.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO													
+	DGOW	1.08	1	FLOW	74.	66.	54.	41.	38.	36.	35.	33.	30.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	DGOWAN	1.08	1	FLOW	52.	47.	39.	31.	26.	22.	20.	17.	16.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PT5A7	.07	1	FLOW	59.	57.	55.	53.	52.	51.	50.	50.	49.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO													
+	D8RCHO	.07	1	FLOW	23.	23.	23.	23.	23.	23.	23.	23.	23.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.58	3.58
HYDROGRAPH AT													
+	8REMAIN	.07	1	FLOW	36.	34.	32.	30.	29.	28.	27.	27.	26.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	R8MAIN	.07	1	FLOW	36.	34.	32.	29.	28.	28.	27.	27.	26.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CPT6BC2	1.15	1	FLOW	84.	78.	67.	56.	50.	46.	44.	42.	39.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RCPT6B-C	1.15	1	FLOW	85.	78.	67.	55.	50.	47.	45.	42.	40.
				TIME	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	DGOW1A	.00	1	FLOW	560.	560.	560.	560.	560.	560.	560.	560.	560.
				TIME	3.75	3.75	3.75	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RDGOW1A	.00	1	FLOW	562.	563.	563.	561.	561.	561.	561.	561.	561.
				TIME	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT													
+	CCPT6B-C	1.15	1	FLOW	645.	638.	627.	615.	610.	607.	605.	602.	599.
				TIME	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	DTRUV	.00	1	FLOW	5.	5.	4.	3.	3.	2.	2.	2.	2.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	DTRILGY	.00	1	FLOW	51.	48.	43.	37.	35.	34.	32.	28.	23.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	CY07B	.20	1	FLOW	173.	169.	163.	157.	155.	153.	152.	150.	147.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
3 COMBINED AT													
+	CCY07B	.20	1	FLOW	228.	220.	208.	196.	191.	187.	183.	176.	168.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO													
+	DCENT1	.20	1	FLOW	156.	148.	136.	124.	119.	115.	111.	104.	96.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	DCY07B	.20	1	FLOW	72.	72.	72.	72.	72.	72.	72.	72.	72.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO													
+	RDCY07B	.20	1	FLOW	75.	75.	76.	76.	76.	76.	76.	76.	76.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	CY08-C	.09	1	FLOW	96.	94.	91.	87.	86.	85.	84.	83.	82.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT													
+	CCCY08-C	1.45	1	FLOW	770.	762.	745.	733.	728.	725.	723.	719.	715.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RDGOW2A	1.45	1	FLOW	763.	755.	741.	728.	723.	719.	717.	714.	711.
				TIME	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT													
+	C427	5.23	1	FLOW	2645.	2587.	2491.	2398.	2372.	2342.	2331.	2301.	2273.
				TIME	4.00	4.00	4.00	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT													
+	9REMAIN	.00	1	FLOW	156.	148.	136.	124.	119.	115.	111.	104.	96.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	R9REMAIN	.00	1	FLOW	161.	153.	139.	126.	121.	117.	113.	107.	98.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08	4.08

HYDROGRAPH AT													
+	OG04-C	.29	1	FLOW	311.	304.	294.	283.	279.	276.	274.	271.	266.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO													
+	DPD01	.29	1	FLOW	124.	124.	124.	124.	124.	124.	124.	124.	124.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT													
+	DOG04-C	.29	1	FLOW	187.	180.	170.	159.	155.	152.	150.	147.	142.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RDOG04-C	.29	1	FLOW	121.	116.	108.	100.	97.	95.	93.	90.	87.
				TIME	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	OG05-C	.27	1	FLOW	264.	259.	250.	241.	237.	235.	233.	230.	227.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	COG05-C	.55	1	FLOW	266.	259.	250.	241.	238.	235.	234.	231.	227.
				TIME	4.17	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RCOG05-C	.55	1	FLOW	266.	261.	252.	243.	239.	236.	234.	232.	228.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	CY06B-C	.50	1	FLOW	291.	284.	273.	262.	257.	254.	252.	248.	244.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT													
+	CCY06B-C	1.05	1	FLOW	554.	542.	521.	501.	493.	487.	483.	477.	469.
				TIME	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO													
+	RCCY06B	1.05	1	FLOW	555.	540.	521.	502.	492.	486.	483.	477.	468.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT													
+	CRGOWAN	1.05	1	FLOW	690.	673.	642.	610.	597.	587.	578.	568.	553.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.17	4.17
ROUTED TO													
+	RCRGOWAN	1.05	1	FLOW	687.	671.	641.	607.	597.	584.	574.	567.	549.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT													
+	PD05A-C	.14	1	FLOW	146.	143.	139.	134.	132.	131.	130.	129.	127.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT													
+	CPD05A-C	1.19	1	FLOW	778.	760.	728.	691.	680.	666.	656.	648.	629.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO													
+	DA1-C	1.19	1	FLOW	211.	211.	211.	211.	211.	211.	211.	211.	211.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	DCPD05A	1.19	1	FLOW	567.	549.	517.	480.	469.	455.	445.	437.	418.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
RPDGCD-C	MANE	5.00	227.50	250.00	1.10	5.00	227.50	250.00	1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2576E+02 EXCESS= .0000E+00 OUTFLOW= .2577E+02 BASIN STORAGE= .5421E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RPDGCD-C	MANE	5.00	221.21	250.00	1.07	5.00	221.21	250.00	1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2504E+02 EXCESS= .0000E+00 OUTFLOW= .2505E+02 BASIN STORAGE= .6246E-02 PERCENT ERROR= -.1

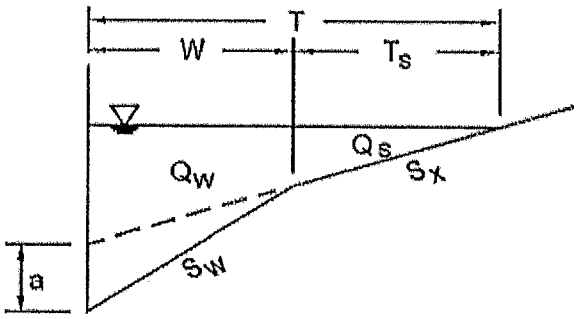
*** NORMAL END OF HEC-1 ***

Appendix B

ONSITE HYDROLOGY, INLET CAPTURE, AND HYDRAULICS

- Summary Table for Developed Onsite 25-year storm Spread Widths
- Rational Method, Spread Width and Drop Inlet Capture Calculations Formula Details
- Onsite Existing Condition: runoff, spread width and inlet capture calculations
  - 25-year storm
- Onsite Existing Condition Figure: C1 – C11
- Offsite Interim Conditions: inlet capture
  - 25-year storm event
  - 100-year storm event
- Onsite Developed Condition: runoff, spread width and inlet capture calculations
  - 25-year storm event
  - 100-year storm event
  - 10-year storm event (calculations to determine number of drop inlets required to satisfy 10-year storm event drylane criteria)

Spreadsheet formulas for Rational Method, flow-spread-width and inlet capture calculations for a composite roadway section of conventional curb and gutter (see Figure below) and a Type C modified drop inlet (grate with curb opening, including a "sweeper" opening upstream of grate).



Composite Section; Conventional Curb and Gutter
Reproduced from Figure 4-1, FHWA HEC-22

Part 1: Runoff Calculations			
COLUMN ID NO.	**COLUMN I.D.**	**DESCRIPTION/EQUATION**	**REFERENCE**
1	Subbasin I.D.	Name of subbasin, (using SB for south bound and NB for north bound.	
2	Area ft^2	Area of the subbasin in square feet. Determined from the subbasin map in AutoCAD	
3	Area acres	Area of the subbasin in acres, calculated: $$Area\ (acres) = \frac{Area\ ft^2}{43{,}560\ ft^2/acre}$$	
4	C_{XX}	Runoff Coefficient for Streets and Roads Paved XX-Year Storm Event (typically 10- or 25-)	HCDDM Table 601
5	C_{100}	Runoff Coefficient for Streets and Roads Paved 100-Year Storm Event	HCDDM Table 601
6	Length L_o (ft)	Length of overland flow, (500 ft. max), measured from subbasin figures.	
7	Slope S_o (%)	Average basin slope in percent, cross slope of street.	
8	K	Flow Resistance Coefficient. For Rational Method, K=C_{10} for all storm events C = 0.90 (paved streets)	HCDDM See discussion for K on pages 604-605 and Table 601
9	t_i min.	Initial, inlet or overland flow time: $$t_i = \frac{1.8(1.1-K){L_o}^{1/2}}{{S_o}^{1/3}}$$	HCDDM Equation 602
10	L ft.	Watershed length – length of swale, ditch, gutter or channel.	

Part 1: Runoff Calculations			
COLUMN ID NO.	**COLUMN I.D.**	**DESCRIPTION/EQUATION**	**REFERENCE**
11	Slope S (%)	Average slope of the swale, ditch, gutter or channel. Calculated from elevations on the plan and profile sheets.	
12	V fps	Average travel velocity. Determined from Figure 602 and regression using the average slope of the gutter.	HCDDM Figure 602 and regression
13	t_t min.	Travel time in ditch, channel, gutter, storm drain, etc.: $t_t = \frac{L}{(60 \cdot V)}$	HCDDM Section 611 Example Applications 611.1 Step 3
14	Conc. Time t_c (min.)	Time of Concentration: $t_c = t_i + t_t$	HCDDM Equation 601
15	Total Length L_T (ft)	Total Length, length of overland flow and watershed length: $L_T = L_o + L$	
16	Check Urban t_c (min.)	Time of Concentration: $t_c = \frac{L_T}{180} + 10$	HCDDM Equation 604
17	Calculated t_c min.	Calculated time of concentration, compare column 14 to 16. Smaller time of concentration controls. *Note minimum time of concentration for Clark County is 5 minutes. If t_c in column 17 is less than 5 minutes, Intensity (in column 18 and 19) is based on 5 minutes*	HCDDM Section 611 Example Applications 611.1 Step 4
18	Final t_c min.	Final time of concentration, the maximum value between column 17 and 5 minutes. *Note minimum time of concentration for Clark County is 5 minutes. If t_c in column 17 is less than 5 minutes, Intensity (in column 19 and 20) is based on 5 minutes*	HCDDM Section 611 Example Applications 611.1 Step 4
19	I_{XX} in./hr.	Intensity – based on the final time of concentration and the XX-Year Intensity Curve (typically 10 or 25).	Table 506 HCDDM and regression
20	I_{100} in./hr.	Intensity – based on the final time of concentration and the 100-Year Intensity Curve.	Table 506 HCDDM and regression
21	Q_{XX} cfs	XX-year maximum rate of runoff (typically 10 or 25): $Q_{10} = C_{10} \cdot I_{10} \cdot Area\ (acre)$	*Q = CIA*
22	Q_{100} cfs	100-year maximum rate of runoff: $Q_{100} = C_{100} \cdot I_{100} \cdot Area\ (acre)$	*Q = CIA*

Part 2: Allowable Spread Calculations			
COLUMN NO.	**COLUMN I.D.**	**DESCRIPTION/EQUATION**	**REFERENCE**
1	Subbasin I.D.	Name of subbasin, (using SB for south bound and NB for north bound.	
2	Inlet Type	Type of inlet used at the location given in column 3	
3	Location	Location of drop inlet by centerline stationing	
4	L_{grate} ft	Length of the proposed drop inlet grate	
5	$L_{curb\ opening}$ ft	Length of the proposed drop inlet curb opening	
6	Q_{XXX} cfs	The design-year flow rate calculated using the Rational Formula method (typically 10-, 25-, or 100-year storm).	
7	Bypass from upstream basin	Quantity of incoming flow from upstream basin	
8	$Q_{XXwlbypass}$ cfs	The XX-year flow rate (Q_{XX}) plus bypass flow from upstream subbasin (typically 10-, 25-, or 100-year storm).	
9	S_L ft/ft	Longitudinal slope in ft/ft.	
10	S_x ft/ft	Cross slope of street.	
11	Q_{S1} cfs	Side flow, flow capacity of the street section above the depressed (or gutter) section. Initial assumption is checked against the value, Q_{S2}, (column 25) then refined until $Q_{S1} \approx Q_{S2}$.	FHWA HEC-22 Example 4-9 Step 1
12	Q_{W1} cfs	Frontal flow, flow capacity in the gutter/depressed section: $Q_{W1} = Q_{XXw/bypass} - Q_{S1}$	FHWA HEC-22 Equation 4-5
13	E_{O1}	Ratio of flow in a chosen width (usually the width of the grate) to total gutter flow: $E_{O1} = \frac{Q_{W1}}{Q_{XXw/bypass}}$	As defined in FHWA HEC-22 Equation 4-6

Part 2: Allowable Spread Calculations			
COLUMN NO.	**COLUMN I.D.**	**DESCRIPTION/EQUATION**	**REFERENCE**
14	S_W	Cross slope of the gutter/depressed section: $$S_W = S_X + \frac{a}{W}$$	As defined in FHWA HEC-22 Equation 4-6
15	S_W/S_X	Ratio of cross slope of the gutter section (S_W) to the cross slope of the street section (S_X)	
16	W/T	Ratio of width of gutter section (W) to total spread (T): $$W/T = \frac{1}{1 + \left[\frac{S_W/S_X}{-1 + \frac{S_W/S_X}{\frac{1}{E_{O1}-1}+1}}\right]^{0.375}}$$	Derived from FHWA HEC-22 Equation 4-4 See Example 4-10
17	T_1 ft	Total spread of water: $$T_1 = \frac{W}{W/T}$$ $$W/T \; from \; column \; 20$$	FHWA HEC-22 Example 4-9 Step 1
18	T_{check}	Check that the calculated spread of water (T in column 21) is within the allowable spread.	For Rancho: Option B: $Tallowable$ $=< 19.25 \; ft \; for \; 25yr \; (NDOT)$ and $< 35 \; ft \; for \; 10yr \; (CCRFCD \; drylane)$
19	T_{S1} ft	Spread of water in street section: $$T_{S1} = T_1 - W$$	FHWA HEC-22 Example 4-9 Step 1 Figure 4-1
20	Q_{S2} cfs	Side flow, flow capacity of the street section above the depressed (or gutter) section: $$Q_{S2} = \left(\frac{K_U}{n}\right) S_X^{1.67} \cdot S_L^{0.5} \cdot T_{S1}^{2.67}$$ K_U=0.56 for English units n=Manning's coefficient Q_{S2} must be approximately equal to the assumed Q_{S1}, in order to continue.	FHWA HEC-22 Equation 4-2
21	Depth of Flow Q_{xx} D (ft)	Water surface depth within the gutter cross section for the XX-year storm event (10, 25, or 100)	FHWA HEC-22 FHWA HEC-12

Part 3: Inlet Capture Calculations			
COLUMN ID NO.	**COLUMN I.D.**	**DESCRIPTION/EQUATION**	**REFERENCE**
1	Subbasin I.D.	Name of subbasin, (using SB for south bound and NB for north bound.	
2	L_{grate} ft	Length of the proposed drop inlet grate	
3	$L_{curb\ opening}$ ft	Length of the proposed drop inlet curb opening	
4	Inlet Clogging Factor, %	Clogging factor for curb openings on grade = 25%	NDOT Drainage Manual December 2006 Section 3.3.2.2.1
5	L_{grate} ft	Length of the drop inlet grate / length with clogging factor applied	
6	$L_{curb\ opening}$ ft	Length of the drop inlet curb opening / length with clogging factor applied	
7	S_e ft/ft	Equivalent cross slope: $S_e = S_X + \frac{a}{W} E_o$ *a*=gutter depression, *w*=gutter width	Derived from FHWA HEC-22 Equation 4-24 Example 4-9, Step 2
8	L_T ft	The length of the curb opening inlet required for total interception of gutter flow: $L_T = \frac{K_T \cdot Q^{0.42} \cdot S_L^{0.3}}{(n \cdot S_e)^{0.6}}$ $Q = Q_{100w/bypass}$, $K_T = 0.6$ in English Units	FHWA HEC-22 Equation 4-25
9	L ft	Curb opening length upstream of grate: $L = L_{curb\ opening} - L_{grate}$	
10	E	Efficiency of curb-opening inlets shorter than the length required for total interception. $E = 1 - \left[1 - \left(\frac{L}{L_T}\right)\right]^{1.8}$	FHWA HEC-22 Equation 4-23
11	Q_{lc} cfs	Interception capacity of the curb opening: $Q_{lc} = E \cdot Q_{100w/bypass}$	FHWA HEC-22 Equation 4-14

12	Q_g cfs	Flow at grate: $Q_g = Q_{100w/bypass} - Q_{ic}$	FHWA HEC-22 Example 4-10 Step 1
13	Q_{S3} cfs	Flow capacity of the street section above the depressed (or gutter) section. Initial assumption is checked against the value, Q_{S4}, and then refined until $Q_{S3} \approx Q_{S4}$.	FHWA HEC-22 Example 4-10 Step 2
14	Q_{W3} cfs	Flow rate in the depressed (gutter) section: $Q_{W3} = Q_g - Q_{S3}$ Note: Q_g is total flow reaching the grate	FHWA HEC-22 Equation 4-5
15	E_{O3}	Ratio of flow in a chosen width (usually the width of the grate) to total gutter flow: $E_{O3} = \frac{Q_{W3}}{Q_g}$	Defined in FHWA HEC-22 Equation 4-6
16	W/T	Ratio of width of gutter section to total spread: $W/T = \frac{1}{1 + \left[\frac{S_W/S_X}{-1 + \frac{S_W/S_X}{\frac{1}{E_{O3}-1}+1}}\right]^{0.375}}$	Derived from FHWA HEC-22 Equation 4-4 Example 4-10
17	T_3 ft	Total spread of water: $T_3 = \frac{W}{W/T}$ Actual W divided by calculated W/T $(column\ 11)$	FHWA HEC-22 Example 4-9 Step 1
18	T_{S3} ft	Spread of water in street section (Total spread minus depressed section width): $T_{S3} = T_3 - W$	FHWA HEC-22 Examples 4-2 and 4-9 Step 1 and Figure 4.1, 2. Composite Section

19	Q_{S4} cfs	Side flow, flow capacity of the street section above the depressed (or gutter) section: $Q_{S4} = \left(\frac{K_U}{n}\right) S_X^{1.67} \cdot S_L^{0.5} \cdot T_{S3}^{2.67}$ $Q_{S3} \approx Q_{S4}$ K_U=0.56 for English Units. Q_{S4} must be approximately equal to assumed Q_{S3}, in order to continue.	FHWA HEC-22 Equation 4-2
20	V ft/s	Velocity of flow in the gutter (Q/A): $V = \frac{Q_g}{(0.5 \cdot T_3^2 \cdot S_X) + (0.5 \cdot a \cdot W)}$	FHWA HEC-22 Example 4-10 Step 2
21	V_O ft/s	Gutter velocity where splash-over first occurs.	FHWA HEC-22 Chart 5 and regression
22	R_f	The ratio of frontal flow intercepted to total frontal flow: $R_f = 1 - K_U(V - V_{O)}$ K_U=0.09 for English Units. Note: R_f cannot exceed 1.0 (100% capture). The equation in the spreadsheet defaults to 1 if the calculated value exceeds 1.	FHWA HEC-22 Equation 4-18
23	R_S	The ratio of side flow intercepted to total side flow (a.k.a. side flow interception efficiency): $R_S = \frac{1}{1 + \frac{K_U V^{1.8}}{S_x \cdot L_{grate}^{2.3}}}$ K_U=0.15 for English Units.	FHWA HEC-22 Equation 4-19
24	Q_{ig} cfs	The interception capacity of a grate inlet on grade: $Q_{ig} = Q_g[(R_f \cdot E_{O3}) + R_S(1 - E_{O3})]$	FHWA HEC-22 Equation 4-21
25	$Q_{XXIntercept}$ cfs	Total interception capacity (for XX-year storm): $Q_{XXintercept} = Q_{ic} + Q_{ig}$	
26	$Q_{XXbypass}$	Flow that is not intercepted by the inlet (for XX-year storm): $Q_{XXbypass} = Q_{XXw/bypass} - Q_{intercept}$	FHWA HEC-22 Equation 4-15

Part 4: Lateral Pipe Size and Depth Times Velocity Calculations			
1	Subbasin I.D.	Name of subbasin, (using SB for south bound and NB for north bound).	
2	Station	Centerline stationing	
3	Pipe Slope S (ft/ft)	Slope of lateral pipe.	
4	Required Minimum Pipe Size Diameter (inches)	Calculated pipe diameter size: $D = \{(4^{5/3}nQ)/(1.49\pi S^{1/2})\}^{3/8}$	Derived from Manning's Equation
5	Pipe size (inches)	Selected manufacturer's pipe size	
6	10-yr Depth x Velocity	10-year storm event depth multiplied by velocity	
7	10-yr check < 6	Verify 10 year storm event meets criteria, less than 6.	HCDDM 304.4
8	100 yr Depth x Velocity	100-year storm event depth multiplied by velocity.	
9	100 yr check < 8	Verify 100-year storm event meets criteria, less than 8	HCDDM 304.4

References: Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual, 1999; FHWA Hydraulic Engineering Circular 22, "Urban Drainage Design Manual, 3rd Edition"

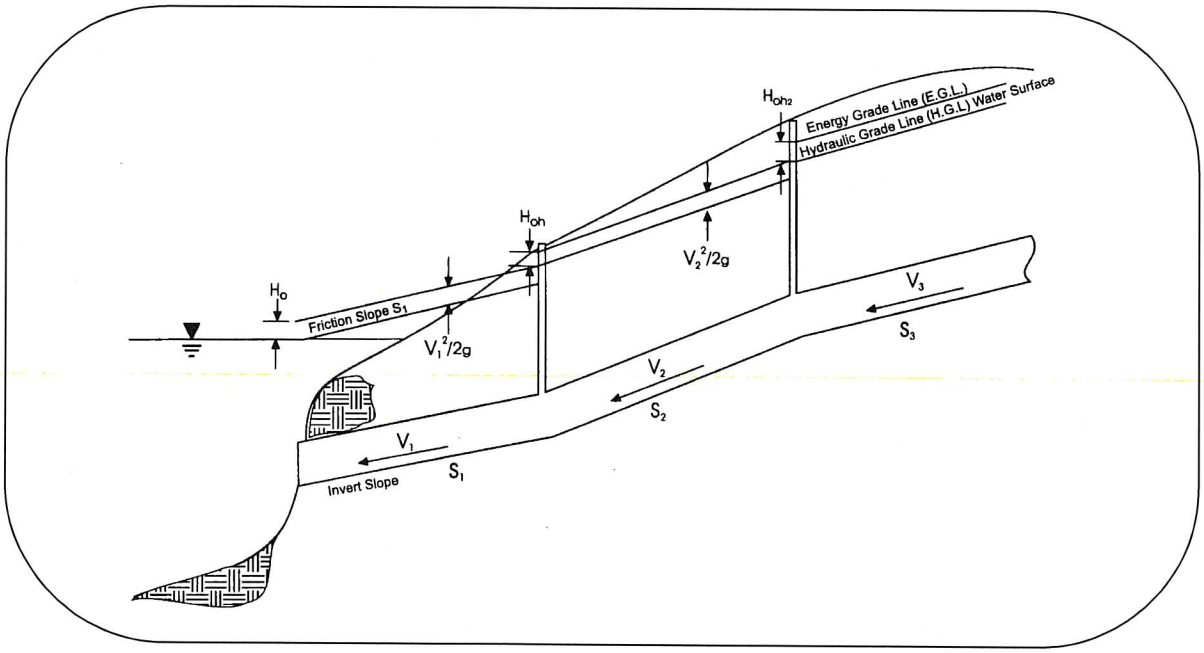
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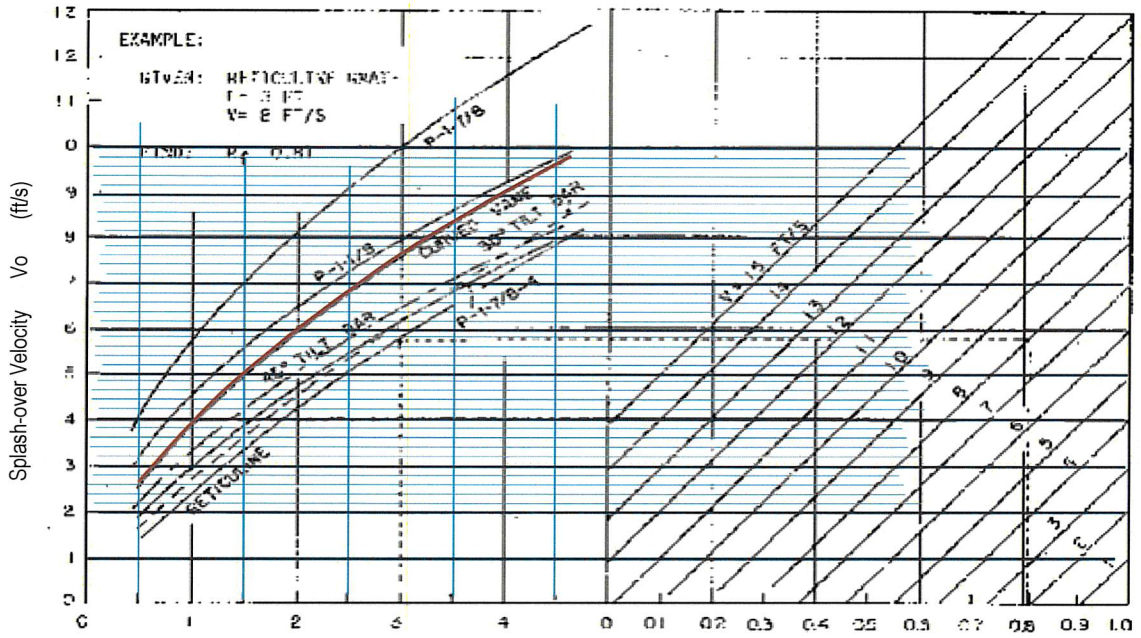
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CHART 5B

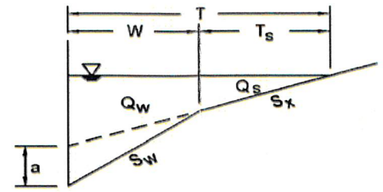


Length	V_o
0.5	2.6
1.0	3.8
1.5	5.0
2.0	5.9
2.5	6.7
3.0	7.6
3.5	8.3
4.0	9.0
4.5	9.6

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Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS - DECATUR TO RAINBOW PROJECT**
Job no.: 23629
Prepared by : VF Date: 1/17/2012
Checked by : HM/KR

Computation: **Existing onsite runoff and inlet capture**
References: Rational Method in accordance with CCRFCD's HC&DDM, 1996, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009
Curb opening and grate inlet capture for composite curb



Composite Section; Conventional Curb and Gutter
Reproduced from Figure 4-1, FHWA HEC-22

Part 1: Runoff calculations - Existing

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Subbasin I.D.	Paved Areas				Initial/Overland Time				Travel Time				Conc. Time tc (min.)	Total Length L_T (ft)	Check Urban t_c (min.)	Final t_c min.	I_{25} in./hr.	I_{100} in./hr.	Q_{25} cfs	Q_{100} cfs
	Area ft^2	Area acres	C_{25}	C_{100}	Length L_o (ft)	Slope S_o (%)	K	t_i min.	L ft	Slope S (%)	V fps	t_t min.								
SBE01	19,013.93	0.44	0.91	0.93	37	2.00	0.90	1.74	263	0.11	1.40	3.13	4.87	300.00	11.67	4.87	5.52	7.56	2.19	3.07
SBE01A	10,315.94	0.24	0.91	0.93	41	2.00	0.90	1.83	141	0.69	1.68	1.40	3.23	182.00	11.01	3.23	5.52	7.56	1.19	1.67
SBE02	26,794.00	0.62	0.91	0.93	52	2.00	0.90	2.06	150	0.25	1.40	1.79	3.85	202.00	11.12	3.85	5.52	7.56	3.09	4.32
SBE03	30,327.11	0.70	0.91	0.93	44	2.00	0.90	1.90	516	0.33	1.40	6.14	8.04	560.00	13.11	8.04	4.86	6.68	3.08	4.33
SBE04	43,397.02	1.00	0.91	0.93	39	2.00	0.90	1.78	482	0.17	1.40	5.74	7.52	521.00	12.89	7.52	4.98	6.83	4.51	6.33
SBE05	22,871.06	0.53	0.91	0.93	59	2.00	0.90	2.19	164	0.26	1.40	1.95	4.15	223.00	11.24	4.15	5.52	7.56	2.64	3.69
SBE06	25,892.55	0.59	0.91	0.93	40	2.00	0.90	1.81	258	0.26	1.40	3.07	4.88	298.00	11.66	4.88	5.52	7.56	2.99	4.18
SBE07	33,123.07	0.76	0.91	0.93	53	2.00	0.90	2.08	458	0.29	1.40	5.45	7.53	511.00	12.84	7.53	4.97	6.83	3.44	4.83
SBE08	8,879.12	0.20	0.91	0.93	63	2.00	0.90	2.27	48	0.73	1.73	0.46	2.73	111.00	10.62	2.73	5.52	7.56	1.02	1.43
SBE08A	8,660.02	0.20	0.91	0.93	55	2.00	0.90	2.12	86	0.41	1.40	1.02	3.14	141.00	10.78	3.14	5.52	7.56	1.00	1.40
SBE09	15,236.69	0.35	0.91	0.93	47	2.00	0.90	1.96	120	1.02	2.02	0.99	2.95	167.00	10.93	2.95	5.52	8.53	1.76	2.77
SBE10	32,363.58	0.74	0.91	0.93	41	2.00	0.90	1.83	461	0.99	1.99	3.86	5.69	502.00	12.79	5.69	5.37	7.36	3.63	5.09
SBE11	19,825.06	0.46	0.91	0.93	52	2.00	0.90	2.06	131	0.79	1.79	1.22	3.28	183.00	11.02	3.28	5.52	7.56	2.29	3.20
SBE12	10,809.94	0.25	0.91	0.93	38	2.00	0.90	1.76	48	0.56	1.51	0.53	2.29	86.00	10.48	2.29	5.52	7.56	1.25	1.74
SBE13	14,522.15	0.33	0.91	0.93	50	2.00	0.90	2.02	107	0.79	1.79	1.00	3.02	157.00	10.87	3.02	5.52	7.56	1.67	2.34
SBE14	12,727.37	0.29	0.91	0.93	38	2.00	0.90	1.76	105	0.63	1.58	1.11	2.87	143.00	10.79	2.87	5.52	7.56	1.47	2.05
SBE15	19,324.83	0.44	0.91	0.93	57	2.00	0.90	2.16	172	0.67	1.64	1.75	3.91	229.00	11.27	3.91	5.52	7.56	2.23	3.12
SBE16	120,181.91	2.76	0.91	0.93	44	2.00	0.90	1.90	1424	0.89	1.89	12.56	14.45	1468.00	18.16	14.45	3.94	5.37	9.89	13.78
SBE17	29,723.86	0.68	0.91	0.93	45	2.00	0.90	1.92	405	0.94	1.94	3.48	5.40	450.00	12.50	5.40	5.43	7.44	3.37	4.72
SBE18	42,951.35	0.99	0.91	0.93	45	2.00	0.90	1.92	675	0.38	1.40	8.04	9.95	720.00	14.00	9.95	4.45	6.13	3.99	5.62
SBE19	10,667.41	0.24	0.91	0.93	45	2.00	0.90	1.92	77	0.51	1.42	0.90	2.82	122.00	10.68	2.82	5.52	7.56	1.23	1.72
SBE20	35,465.64	0.81	0.91	0.93	45	2.00	0.90	1.92	71	0.51	1.42	0.83	2.75	116.00	10.64	2.75	5.52	7.56	4.09	5.72
SBE21	26,967.76	0.62	0.91	0.93	61	2.00	0.90	2.23	167	0.35	1.40	1.99	4.22	228.00	11.27	4.22	5.52	7.56	3.11	4.35
SBE22	79,873.90	1.83	0.91	0.93	41	2.00	0.90	1.83	607	0.64	1.59	6.36	8.19	648.00	13.60	8.19	4.83	6.64	8.06	11.32
SBE23	44,114.99	1.01	0.91	0.93	45	2.00	0.90	1.92	745	0.59	1.54	8.06	9.98	790.00	14.39	9.98	4.44	6.13	4.09	5.77
SBE24	82,322.58	1.89	0.91	0.93	45	2.00	0.90	1.92	1093	0.19	1.40	13.01	14.93	1138.00	16.32	14.93	3.38	4.7	5.81	8.26
SBE25	15,791.95	0.36	0.91	0.93	45	2.00	0.90	1.92	251	0.28	1.40	2.99	4.90	296.00	11.64	4.90	5.52	7.56	1.82	2.55
SBE26	25,201.05	0.58	0.91	0.93	45	2.00	0.90	1.92	294	0.01	1.40	3.50	5.42	339.00	11.88	5.42	5.43	7.44	2.86	4.00
SBE27	12,401.27	0.28	0.91	0.93	45	2.00	0.90	1.92	87	0.17	1.40	1.04	2.95	132.00	10.73	2.95	5.52	7.56	1.43	2.00
SBE28	8,551.33	0.20	0.91	0.93	45	2.00	0.90	1.92	42	1.45	2.45	0.29	2.20	87.00	10.48	2.20	5.52	7.56	0.99	1.38
SBE29	16,934.71	0.39	0.91	0.93	43	2.00	0.90	1.87	67	0.19	1.40	0.80	2.67	110.00	10.61	2.67	5.52	7.56	1.95	2.73
SBE30	11,160.41	0.26	0.91	0.93	45	2.00	0.90	1.92	158	0.01	1.40	1.88	3.80	203.00	11.13	3.80	5.52	7.56	1.29	1.80
SBE31	71,370.64	1.64	0.91	0.93	51	2.00	0.90	2.04	805	0.39	1.40	9.58	11.62	856.00	14.76	11.62	4.26	5.85	6.35	8.91
SBE32	5,235.92	0.12	0.91	0.93	58	2.00	0.90	2.18	50	1.98	2.79	0.30	2.47	108.00	10.60	2.47	5.52	7.56	0.60	0.85
SBE33	28,682.92	0.66	0.91	0.93	45	2.00	0.90	1.92	287	1.16	2.16	2.21	4.13	332.00	11.84	4.13	5.52	7.56	3.31	4.63
SBE34A	24,180.31	0.56	0.91	0.93	27	2.00	0.90	1.48	119	3.30	3.75	0.53	2.01	146.00	10.81	2.01	5.52	7.56	2.79	3.90
SBE34	45,758.78	1.05	0.91	0.93	45	2.00	0.90	1.92	355	1.19	2.19	2.70	4.62	400.00	12.22	4.62	5.52	7.56	5.28	7.39
SBE35	27,475.60	0.63	0.91	0.93	79	2.00	0.90	2.54	104	1.48	2.48	0.70	3.24	183.00	11.02	3.24	5.52	7.56	3.17	4.43
SBE36A	34,213.61	0.79	0.91	0.93	54	2.00	0.90	2.10	227	2.22	3.00	1.26	3.36	281.00	11.56	3.36	5.52	7.56	3.95	5.52
SBE36	43,297.86	0.99	0.91	0.93	45	2.00	0.90	1.92	750	1.36	2.36	5.30	7.21	795.00	14.42	7.21	5.04	7.21	4.56	6.66
SBE37	38,444.76	0.88	0.91	0.93	70	2.00	0.90	2.39	110	1.12	2.12	0.86	3.26	180.00	11.00	3.26	5.52	7.56	4.43	6.21
SBE38	15,937.13	0.37	0.91	0.93	66	2.00	0.90	2.32	177	0.81	1.81	1.63	3.95	243.00	11.35	3.95	5.52	7.56	1.84	2.57
SBE39	18,135.64	0.42	0.91	0.93	45	2.00	0.90	1.92	134	0.68	1.66	1.35	3.26	179.00	10.99	3.26	5.52	7.56	2.09	2.93

Part 1: Runoff calculations - Existing

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Subbasin I.D.	Paved Areas				Initial/Overland Time				Travel Time				Conc. Time tc (min.)	Total Length L_T (ft)	Check Urban t_c (min.)	Final t_c min.	I_{25} in./hr.	I_{100} in./hr.	Q_{25} cfs	Q_{100} cfs
	Area ft^2	Area acres	C_{25}	C_{100}	Length L_o (ft)	Slope S_o (%)	K	t_i min.	L ft	Slope S (%)	V fps	t_t min.								
NBE01	9,656.48	0.22	0.91	0.93	43	2.00	0.90	1.87	28	1.71	2.63	0.18	2.05	71.00	10.39	2.05	5.52	7.56	1.11	1.56
NBE02	66,616.53	1.53	0.91	0.93	52	2.00	0.90	2.06	644	0.25	1.40	7.67	9.73	696.00	13.87	9.73	4.50	6.20	6.26	8.82
NBE03	9,846.00	0.23	0.91	0.93	46	2.00	0.90	1.94	53	2.13	2.92	0.30	2.24	99.00	10.55	2.24	5.52	7.56	1.14	1.59
NBE04	24,391.23	0.56	0.91	0.93	56	2.00	0.90	2.14	397	0.12	1.40	4.73	6.86	453.00	12.52	6.86	5.12	7.02	2.61	3.66
NBE05	36,794.82	0.84	0.91	0.93	83	2.00	0.90	2.60	51	7.78	4.75	0.18	2.78	134.00	10.74	2.78	5.52	7.56	4.24	5.94
NBE06	16,713.48	0.38	0.91	0.93	51	2.00	0.90	2.04	219	0.86	1.86	1.96	4.00	270.00	11.50	4.00	5.52	7.56	1.93	2.70
NBE07	52,711.54	1.21	0.91	0.93	50	2.00	0.90	2.02	816	0.95	1.95	6.97	8.99	866.00	14.81	8.99	4.66	6.41	5.13	7.21
NBE08	7,158.80	0.16	0.91	0.93	35	2.00	0.90	1.69	66	0.94	1.94	0.57	2.26	101.00	10.56	2.26	5.52	7.56	0.83	1.16
NBE09	13,352.48	0.31	0.91	0.93	45	2.00	0.90	1.92	131	0.87	1.87	1.17	3.08	176.00	10.98	3.08	5.52	7.56	1.54	2.16
NBE10	23,948.93	0.55	0.91	0.93	49	2.00	0.90	2.00	294	0.81	1.81	2.71	4.71	343.00	11.91	4.71	5.52	7.56	2.76	3.87
NBE11	12,653.55	0.29	0.91	0.93	39	2.00	0.90	1.78	183	1.25	2.25	1.36	3.14	222.00	11.23	3.14	5.52	7.56	1.46	2.04
NBE12	14,955.62	0.34	0.91	0.93	20	2.00	0.90	1.28	76	1.46	2.46	0.51	1.79	96.00	10.53	1.79	5.52	7.56	1.72	2.41
NBE13	73,044.21	1.68	0.91	0.93	64	2.00	0.90	2.29	60	1.70	2.62	0.38	2.67	124.00	10.69	2.67	5.52	7.56	8.42	11.79
NBE14	51,999.24	1.19	0.91	0.93	55	2.00	0.90	2.12	53	9.09	6.00	0.15	2.27	108.00	10.60	2.27	5.52	7.56	6.00	8.39
NBE15	17,432.56	0.40	0.91	0.93	60	2.00	0.90	2.21	99	0.45	1.40	1.18	3.39	159.00	10.88	3.39	5.52	7.56	2.01	2.81
NBE16	15,842.66	0.36	0.91	0.93	61	2.00	0.90	2.23	37	0.54	1.48	0.42	2.65	98.00	10.54	2.65	5.52	7.56	1.83	2.56
NBE17	46,902.13	1.08	0.91	0.93	73	2.00	0.90	2.44	153	0.48	1.40	1.82	4.26	226.00	11.26	4.26	5.52	7.56	5.41	7.57
NBE18	43,493.85	1.00	0.91	0.93	59	2.00	0.90	2.19	565	0.61	1.56	6.04	8.23	624.00	13.47	8.23	4.82	6.63	4.38	6.16
NBE19	8,006.58	0.18	0.91	0.93	59	2.00	0.90	2.19	102	0.16	1.40	1.21	3.41	161.00	10.89	3.41	5.52	7.56	0.92	1.29
NBE20	44,806.93	1.03	0.91	0.93	56	2.00	0.90	2.14	576	0.68	1.66	5.78	7.92	632.00	13.51	7.92	4.89	6.72	4.58	6.43
NBE21	11,059.04	0.25	0.91	0.93	45	2.00	0.90	1.92	91	0.46	1.40	1.08	3.00	136.00	10.76	3.00	5.52	7.56	1.28	1.78
NBE22	22,813.86	0.52	0.91	0.93	50	2.00	0.90	2.02	84	3.55	3.80	0.37	2.39	134.00	10.74	2.39	5.52	7.56	2.63	3.68
NBE23	71,584.19	1.64	0.91	0.93	44	2.00	0.90	1.90	863	0.21	1.40	10.27	12.17	907.00	15.04	12.17	4.20	5.76	6.28	8.80
NBE24	15,102.61	0.35	0.91	0.93	50	2.00	0.90	2.02	77	0.48	1.40	0.92	2.94	127.00	10.71	2.94	5.52	7.56	1.74	2.44
NBE25	17,938.36	0.41	0.91	0.93	48	2.00	0.90	1.98	230	0.33	1.40	2.74	4.72	278.00	11.54	4.72	5.52	7.56	2.07	2.90
NBE26	23,789.64	0.55	0.91	0.93	58	2.00	0.90	2.18	318	0.08	1.40	3.79	5.96	376.00	12.09	5.96	5.31	7.28	2.64	3.70
NBE27	18,063.80	0.41	0.91	0.93	44	2.00	0.90	1.90	170	0.18	1.40	2.02	3.92	214.00	11.19	3.92	5.52	7.56	2.08	2.92
NBE28	39,748.76	0.91	0.91	0.93	50	2.00	0.90	2.02	579	0.16	1.40	6.89	8.91	629.00	13.49	8.91	4.68	6.43	3.89	5.46
NBE29	7,860.88	0.18	0.91	0.93	49	2.00	0.90	2.00	52	5.81	4.80	0.18	2.18	101.00	10.56	2.18	5.52	7.56	0.91	1.27
NBE30	18,804.91	0.43	0.91	0.93	53	2.00	0.90	2.08	115	0.52	1.44	1.33	3.41	168.00	10.93	3.41	5.52	7.56	2.17	3.04
NBE31	34,861.36	0.80	0.91	0.93	49	2.00	0.90	2.00	206	1.07	2.07	1.66	3.66	255.00	11.42	3.66	5.52	7.56	4.02	5.63
NBE32	25,766.32	0.59	0.91	0.93	48	2.00	0.90	1.98	127	1.10	2.10	1.01	2.99	175.00	10.97	2.99	5.52	7.56	2.97	4.16
NBE33A	38,785.72	0.89	0.91	0.93	60	2.00	0.90	2.21	238	1.18	2.18	1.82	4.03	298.00	11.66	4.03	5.52	7.56	4.47	6.26
NBE33	18,157.51	0.42	0.91	0.93	45	2.00	0.90	1.92	330	1.15	2.15	2.56	4.47	375.00	12.08	4.47	5.52	7.56	2.09	2.93
NBE34A	35,378.86	0.81	0.91	0.93	55	2.00	0.90	2.12	438	1.15	2.15	3.40	5.51	493.00	12.74	5.51	5.41	7.41	4.00	5.60
NBE34	7,306.19	0.17	0.91	0.93	36	2.00	0.90	1.71	134	1.35	2.35	0.95	2.66	170.00	10.94	2.66	5.52	7.56	0.84	1.18
NBE35	7,849.26	0.18	0.91	0.93	45	2.00	0.90	1.92	20	1.80	2.68	0.12	2.04	65.00	10.36	2.04	5.52	7.56	0.91	1.27
NBE36	82,676.67	1.90	0.91	0.93	69	2.00	0.90	2.37	96	1.31	2.31	0.69	3.07	165.00	10.92	3.07	5.52	7.56	9.53	13.34
NBE37	6,686.87	0.15	0.91	0.93	53	2.00	0.90	2.08	62	2.03	2.83	0.37	2.45	115.00	10.64	2.45	5.52	7.56	0.77	1.08
NBE38	10,922.17	0.25	0.91	0.93	58	2.00	0.90	2.18	49	1.90	2.74	0.30	2.47	107.00	10.59	2.47	5.52	7.56	1.26	1.76

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Phone: (702) 369-9396

Project:
Job no.: **23629**
Prepared by : **VF** Date: 1/17/2012
Checked by : **HM/KR**

Constant values		
Manning's coefficient	n =	0.015
Width of inlet	W =	1.5 ft
Gutter depression	a =	0.083 ft

Computation: **Existing onsite runoff and inlet capture**
References: Rational Method in accordance with CCRFCD's HC&DDM, 1996, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009
Curb opening and grate inlet capture for composite curb

Part 2: Allowable spread calculations - Existing

T allowable = 7 ft

1	2	3	4	5	10	11	12	10a	11a	13	14	15	16	17	18	19	20	21	23	24	25
Subbasins Contributing Flow	Inlet Type	Location	Q_{25} cfs	$Q_{25w/bypass}$ cfs	L_{grate} ft	$L_{curb\ opening}$ ft	INLET CLOGGING FACTOR %	With Clogging Factor L_{grate} ft	With Clogging Factor $L_{curb\ opening}$ ft	S_L ft/ft	S_x ft/ft	Spread Calculation Q_{S1} cfs	Q_{W1} cfs	E_{O1}	S_W	S_W/S_X	W/T	T_1 ft	T_{check}	T_{S1} ft	Q_{S2} cfs
SBE01		NA	2.19	2.19			25	0.0	0.0	0.001	0.020	1.51	0.68	0.31	0.075	3.8	0.11	14.02	no	12.52	1.51
SBE01A	Grate/Curb	NA	1.19	3.38	2	8	25	1.5	6.0	0.007	0.020	2.10	1.28	0.38	0.075	3.8	0.13	11.48	no	9.98	2.10
SBE02	Curb Opening	NA	3.09	4.13		8	25	0.0	6.0	0.003	0.020	2.94	1.18	0.29	0.075	3.8	0.10	15.16	no	13.66	2.94
SBE03	Curb Opening	NA	3.08	4.91		11	25	0.0	8.3	0.003	0.020	3.53	1.39	0.28	0.075	3.8	0.10	15.42	no	13.92	3.53
SBE04		NA	4.51	6.33			25	0.0	0.0	0.002	0.020	4.92	1.41	0.22	0.075	3.8	0.08	19.43	no	17.93	4.92
SBE05		NA	2.64	2.63			25	0.0	0.0	0.003	0.020	1.73	0.91	0.34	0.075	3.8	0.12	12.67	no	11.17	1.73
SBE06		NA	2.99	2.99			25	0.0	0.0	0.003	0.020	2.01	0.98	0.33	0.075	3.8	0.11	13.28	no	11.78	2.01
SBE07	Grate/Curb	NA	3.44	3.44	2	2	25	1.5	1.5	0.003	0.020	2.35	1.09	0.32	0.075	3.8	0.11	13.73	no	12.23	2.35
SBE08		NA	1.02	3.12			25	0.0	0.0	0.007	0.020	1.88	1.24	0.40	0.075	3.8	0.14	10.98	no	9.48	1.88
SBE08A		NA	1.00	1.00			25	0.0	0.0	0.004	0.020	0.45	0.55	0.55	0.075	3.8	0.20	7.67	no	6.17	0.45
SBE09		NA	1.76	1.76			25	0.0	0.0	0.010	0.020	0.82	0.93	0.53	0.075	3.8	0.19	8.04	no	6.54	0.82
SBE10		NA	3.63	3.63			25	0.0	0.0	0.010	0.020	2.19	1.44	0.40	0.075	3.8	0.14	10.97	no	9.47	2.19
SBE11		NA	2.29	2.29			25	0.0	0.0	0.008	0.020	1.25	1.04	0.46	0.075	3.8	0.16	9.51	no	8.01	1.25
SBE12		NA	1.25	1.25			25	0.0	0.0	0.006	0.020	0.57	0.67	0.54	0.075	3.8	0.19	7.88	no	6.38	0.57
SBE13		NA	1.67	1.67			25	0.0	0.0	0.008	0.020	0.81	0.86	0.52	0.075	3.8	0.18	8.30	no	6.80	0.81
SBE14		NA	1.47	1.47			25	0.0	0.0	0.006	0.020	0.71	0.76	0.52	0.075	3.8	0.18	8.26	no	6.76	0.71
SBE15		NA	2.23	2.23			25	0.0	0.0	0.007	0.020	1.23	0.99	0.45	0.075	3.8	0.15	9.73	no	8.23	1.23
SBE16	Grate/Curb	NA	9.89	9.89	2	2	25	1.5	1.5	0.009	0.020	7.32	2.57	0.26	0.075	3.8	0.09	16.70	no	15.20	7.32
SBE17		NA	3.37	10.44			25	0.0	0.0	0.009	0.020	7.75	2.69	0.26	0.075	3.8	0.09	16.86	no	15.36	7.75
SBE18		NA	3.99	3.99			25	0.0	0.0	0.004	0.020	2.73	1.26	0.32	0.075	3.8	0.11	13.79	no	12.29	2.73
SBE19		NA	1.23	1.23			25	0.0	0.0	0.005	0.020	0.57	0.65	0.53	0.075	3.8	0.19	8.01	no	6.51	0.57
SBE20		NA	4.09	4.09			25	0.0	0.0	0.005	0.020	2.73	1.35	0.33	0.075	3.8	0.11	13.17	no	11.67	2.73
SBE21	Curb Opening	NA	3.11	3.11		16	25	0.0	12.0	0.003	0.020	2.04	1.07	0.34	0.075	3.8	0.12	12.74	no	11.24	2.04
SBE22		NA	8.06	8.26			25	0.0	0.0	0.006	0.020	6.10	2.16	0.26	0.075	3.8	0.09	16.62	no	15.12	6.10
SBE23		NA	4.09	4.09			25	0.0	0.0	0.006	0.020	2.69	1.40	0.34	0.075	3.8	0.12	12.77	no	11.27	2.69
SBE24		NA	5.81	5.81			25	0.0	0.0	0.002	0.020	4.43	1.38	0.24	0.075	3.8	0.08	18.28	no	16.78	4.43
SBE25	Grate/Curb	NA	1.82	1.82	4	4	26	3.0	3.0	0.003	0.020	1.08	0.74	0.41	0.075	3.8	0.14	10.69	no	9.19	1.08
SBE26		NA	2.86	3.47			25	0.0	0.0	0.000	0.020	2.95	0.52	0.15	0.075	3.8	0.05	28.43	no	26.93	2.95
SBE27		NA	1.43	1.43			25	0.0	0.0	0.002	0.020	0.85	0.58	0.41	0.075	3.8	0.14	10.71	no	9.21	0.85
SBE28		NA	0.99	0.99			25	0.0	0.0	0.015	0.020	0.29	0.69	0.70	0.075	3.8	0.27	5.66	yes	4.16	0.29
SBE29	Grate/Curb	NA	1.95	1.95			25	0.0	0.0	0.002	0.020	1.24	0.72	0.37	0.075	3.8	0.13	11.88	no	10.38	1.24
SBE30		NA	1.29	1.29	4	4	25	3.0	3.0	0.000	0.020	0.97	0.32	0.25	0.075	3.8	0.09	17.28	no	15.78	0.97
SBE31		NA	6.35	6.46			25	0.0	0.0	0.004	0.020	4.77	1.69	0.26	0.075	3.8	0.09	16.64	no	15.14	4.77
SBE32		NA	0.60	0.60			25	0.0	0.0	0.020	0.020	0.09	0.52	0.86	0.075	3.8	0.38	3.97	yes	2.47	0.09
SBE33		NA	3.31	3.31			25	0.0	0.0	0.012	0.020	1.91	1.41	0.42	0.075	3.8	0.15	10.24	no	8.74	1.91
SBE34A		NA	2.79	2.79			25	0.0	0.0	0.033	0.020	1.23	1.55	0.56	0.075	3.8	0.20	7.60	no	6.10	1.23
SBE34	Curb Opening	NA	5.28	11.38		18	25	0.0	13.5	0.012	0.020	8.41	2.97	0.26	0.075	3.8	0.09	16.65	no	15.15	8.41
SBE35	Grate/Curb	NA	3.17	8.76	3	3	25	2.3	2.3	0.015	0.020	6.11	2.65	0.30	0.075	3.8	0.10	14.41	no	12.91	6.11
SBE36A		NA	3.95	3.95			25	0.0	0.0	0.022	0.020	2.17	1.78	0.45	0.075	3.8	0.16	9.62	no	8.12	2.17
SBE36	Grate/Curb	NA	4.56	14.44	3	3	25	2.3	2.3	0.014	0.020	10.93	3.51	0.24	0.075	3.8	0.08	17.80	no	16.30	10.93
SBE37		NA	4.43	14.76			25	0.0	0.0	0.011	0.020	11.34	3.42	0.23	0.075	3.8	0.08	18.65	no	17.15	11.34
SBE38		NA	1.84	1.84			25	0.0	0.0	0.008	0.020	0.92	0.92	0.50	0.075	3.8	0.17	8.61	no	7.11	0.92
SBE39	Grate/Curb	NA	2.09	2.09	3	3	25	2.3	2.3	0.007	0.020	1.13	0.96	0.46	0.075	3.8	0.16	9.44	no	7.94	1.13

Part 2: Allowable spread calculations - Existing

T allowable = 7 ft

1	2	3	4	5	10	11	12	10a	11a	13	14	15	16	17	18	19	20	21	23	24	25
Subbasins Contributing Flow	Inlet Type	Location	Q_{25} cfs	$Q_{25w/bypass}$ cfs	L_{grate} ft	$L_{curb\ opening}$ ft	INLET CLOGGING FACTOR %	With Clogging Factor		S_L ft/ft	S_x ft/ft	Spread Calculation									
								L_{grate} ft	$L_{curb\ opening}$ ft			Q_{S1} cfs	Q_{W1} cfs	E_{O1}	S_W	S_W/S_X	W/T	T_1 ft	T_{check}	T_{S1} ft	Q_{S2} cfs
NBE01		NA	1.11	1.11			25	0.0	0.0	0.017	0.020	0.34	0.77	0.69	0.075	3.8	0.26	5.77	yes	4.27	0.34
NBE02		NA	6.26	6.27			25	0.0	0.0	0.002	0.020	4.75	1.51	0.24	0.075	3.8	0.08	17.95	no	16.45	4.75
NBE03		NA	1.14	1.13			25	0.0	0.0	0.021	0.020	0.32	0.81	0.71	0.075	3.8	0.27	5.51	yes	4.01	0.32
NBE04		NA	2.61	2.61			25	0.0	0.0	0.001	0.020	1.83	0.78	0.30	0.075	3.8	0.10	14.59	no	13.09	1.83
NBE05		NA	4.24	6.85			25	0.0	0.0	0.078	0.020	3.67	3.18	0.46	0.075	3.8	0.16	9.32	no	7.82	3.67
NBE06		NA	1.93	1.93			25	0.0	0.0	0.009	0.020	0.97	0.96	0.50	0.075	3.8	0.17	8.68	no	7.18	0.97
NBE07		NA	5.13	5.13			25	0.0	0.0	0.010	0.020	3.37	1.76	0.34	0.075	3.8	0.12	12.72	no	11.22	3.37
NBE08		NA	0.83	0.83			25	0.0	0.0	0.009	0.020	0.26	0.57	0.69	0.075	3.8	0.26	5.78	yes	4.28	0.26
NBE09		NA	1.54	1.54			25	0.0	0.0	0.009	0.020	0.70	0.83	0.54	0.075	3.8	0.19	7.85	no	6.35	0.70
NBE10		NA	2.76	2.76			25	0.0	0.0	0.008	0.020	1.58	1.17	0.43	0.075	3.8	0.15	10.21	no	8.71	1.58
NBE11		NA	1.46	1.46			25	0.0	0.0	0.012	0.020	0.59	0.86	0.59	0.075	3.8	0.21	7.07	no	5.57	0.59
NBE12		NA	1.72	3.18			25	0.0	0.0	0.015	0.020	1.74	1.44	0.45	0.075	3.8	0.16	9.59	no	8.09	1.74
NBE13		NA	8.42	8.43			25	0.0	0.0	0.017	0.020	5.77	2.66	0.32	0.075	3.8	0.11	13.81	no	12.31	5.77
NBE14		NA	6.00	5.99			25	0.0	0.0	0.091	0.020	2.97	3.02	0.50	0.075	3.8	0.18	8.51	no	7.01	2.97
NBE15		NA	2.01	2.01			25	0.0	0.0	0.005	0.020	1.15	0.87	0.43	0.075	3.8	0.15	10.11	no	8.61	1.15
NBE16		NA	1.83	1.83			25	0.0	0.0	0.005	0.020	0.98	0.85	0.46	0.075	3.8	0.16	9.37	no	7.87	0.98
NBE17		NA	5.41	5.41			25	0.0	0.0	0.005	0.020	3.82	1.59	0.29	0.075	3.8	0.10	14.85	no	13.35	3.82
NBE18	Grate/Curb	NA	4.38	4.38	3	15	25	2.3	11.3	0.006	0.020	2.92	1.46	0.33	0.075	3.8	0.11	13.06	no	11.56	2.92
NBE19	Curb Opening	NA	0.92	1.57		4	25	0.0	3.0	0.002	0.020	0.97	0.60	0.38	0.075	3.8	0.13	11.37	no	9.87	0.97
NBE20		NA	4.58	5.32			25	0.0	0.0	0.007	0.020	3.64	1.68	0.32	0.075	3.8	0.11	13.82	no	12.32	3.64
NBE21		NA	1.28	1.32			25	0.0	0.0	0.005	0.020	0.65	0.67	0.51	0.075	3.8	0.18	8.42	no	6.92	0.65
NBE22		NA	2.63	2.68			25	0.0	0.0	0.035	0.020	1.14	1.54	0.57	0.075	3.8	0.20	7.35	no	5.85	1.14
NBE23		NA	6.28	6.33			25	0.0	0.0	0.002	0.020	4.86	1.47	0.23	0.075	3.8	0.08	18.60	no	17.10	4.86
NBE24		NA	1.74	1.79			25	0.0	0.0	0.005	0.020	0.97	0.81	0.46	0.075	3.8	0.16	9.51	no	8.01	0.97
NBE25	Grate/Curb	NA	2.07	2.12	3	3	25	2.3	2.3	0.003	0.020	1.28	0.84	0.40	0.075	3.8	0.14	11.02	no	9.52	1.28
NBE26		NA	2.64	3.59			25	0.0	0.0	0.001	0.020	2.73	0.86	0.24	0.075	3.8	0.08	18.04	no	16.54	2.73
NBE27		NA	2.08	2.12			25	0.0	0.0	0.002	0.020	1.38	0.74	0.35	0.075	3.8	0.12	12.44	no	10.94	1.38
NBE28		NA	3.89	3.92			25	0.0	0.0	0.002	0.020	2.87	1.05	0.27	0.075	3.8	0.09	16.21	no	14.71	2.87
NBE29		NA	0.91	0.95			25	0.0	0.0	0.058	0.020	0.11	0.83	0.88	0.075	3.8	0.40	3.75	yes	2.25	0.11
NBE30		NA	2.17	2.20			25	0.0	0.0	0.005	0.020	1.26	0.94	0.43	0.075	3.8	0.15	10.20	no	8.70	1.26
NBE31		NA	4.02	4.05			25	0.0	0.0	0.011	0.020	2.49	1.56	0.39	0.075	3.8	0.13	11.31	no	9.81	2.49
NBE32		NA	2.97	3.01			25	0.0	0.0	0.011	0.020	1.69	1.31	0.44	0.075	3.8	0.15	9.93	no	8.43	1.69
NBE33A		NA	4.47	4.47			25	0.0	0.0	0.012	0.020	2.78	1.69	0.38	0.075	3.8	0.13	11.52	no	10.02	2.78
NBE33		NA	2.09	6.57			25	0.0	0.0	0.011	0.020	4.45	2.12	0.32	0.075	3.8	0.11	13.53	no	12.03	4.45
NBE34A		NA	4.00	4.00			25	0.0	0.0	0.011	0.020	2.43	1.57	0.39	0.075	3.8	0.14	11.08	no	9.58	2.43
NBE34	Grate/Curb	NA	0.84	11.41	3	3	25	2.3	2.3	0.014	0.020	8.36	3.05	0.27	0.075	3.8	0.09	16.27	no	14.77	8.36
NBE35		NA	0.91	8.76			25	0.0	0.0	0.018	0.020	6.01	2.76	0.31	0.075	3.8	0.11	13.86	no	12.36	6.01
NBE36		NA	9.53	9.53			25	0.0	0.0	0.013	0.020	6.81	2.72	0.29	0.075	3.8	0.10	15.25	no	13.75	6.81
NBE37	Grate/Curb	NA	0.77	0.78	4	4	25	3.0	3.0	0.020	0.020	0.15	0.62	0.80	0.075	3.8	0.33	4.56	yes	3.06	0.15
NBE38		NA	1.26	1.38			25	0.0	0.0	0.019	0.020	0.48	0.90	0.65	0.075	3.8	0.24	6.25	yes	4.75	0.48

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Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS - DECATUR TO RAINBOW PROJECT**
Job no.: 23629
Prepared by : VF Date: 1/17/2012
Checked by : HM/KR

Constant values
Manning's coefficient n = 0.015
Width of inlet W = 1.5 ft
Gutter depression a = 0.083 ft

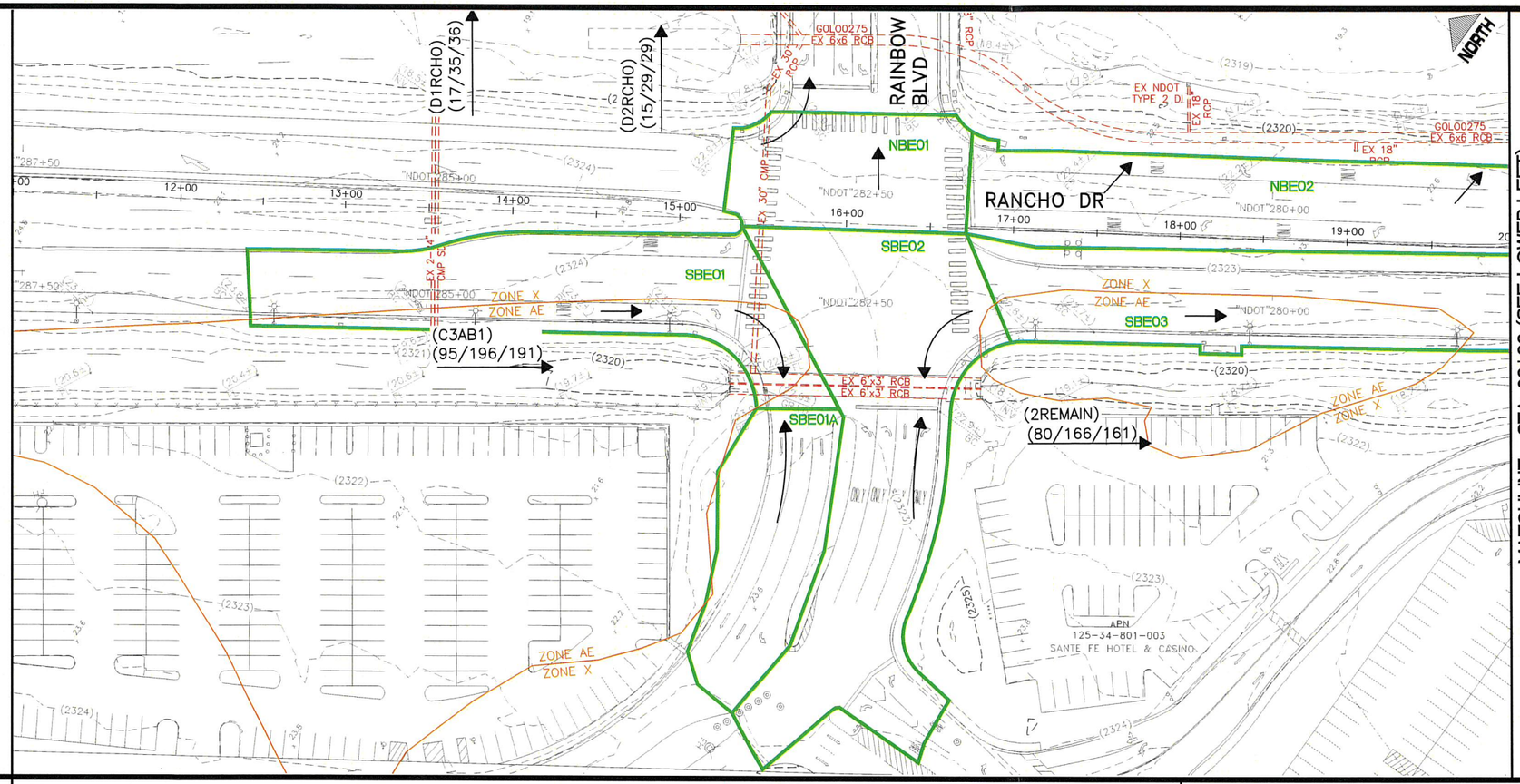
Computation: **Existing onsite runoff and inlet capture**
References: Rational Method in accordance with CCRFCD's HC&DDM, 1996, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009
Curb opening and grate inlet capture for composite curb

Part 3: Inlet capture calculations - Existing

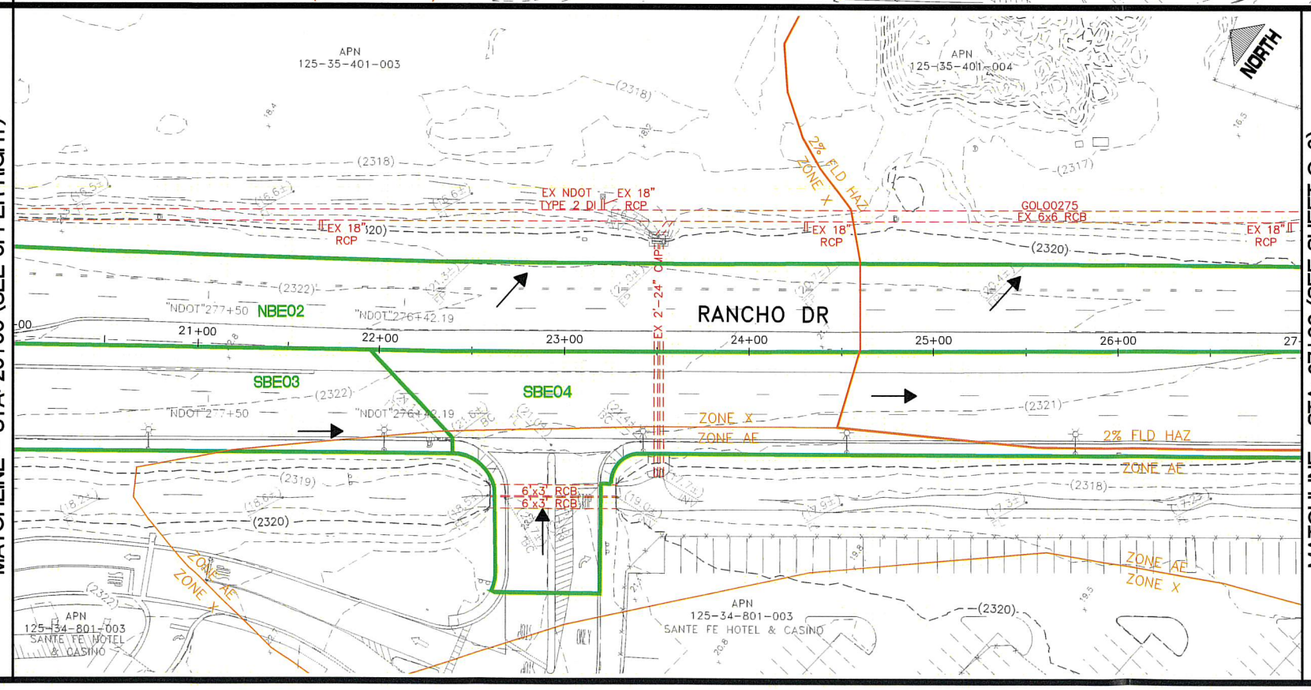
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
Subbasins Contributing Flow	Curb Opening Calculation					Grate Opening Calculation													$Q_{intercept}$ cfs	Q_{bypass} cfs	Comments
	Se ft/ft	L_T ft	L ft	E	Q_{ic} cfs	Q_g cfs	Q_{S3} cfs	Q_{W3} cfs	E_{O3}	W/T	T_3 ft	T_{S3} ft	Q_{S4} cfs	V ft/s	V_O ft/s	R_f	R_s	Q_{ig} cfs			
SBE01	0.037	9.6	0.0	0.00	0.00	2.19	1.51	0.68	0.31	0.11	14.0	12.5	1.51	1.08				0.00	0.00	2.19	total discharges into existing inlet at Santa Fe Casino entrance
SBE01A	0.041	19.0	4.5	0.39	1.30	2.08	1.12	0.96	0.46	0.16	9.4	7.9	1.12	2.20	5.90	1.00	0.08	1.04	2.35	1.04	total discharges into existing inlet at Santa Fe Casino entrance
SBE02	0.036	16.6	6.0	0.55	2.29	1.84	1.11	0.73	0.40	0.14	11.0	9.5	1.11	1.45				0.00	2.29	1.84	total discharges into existing inlet at Santa Fe Casino entrance
SBE03	0.036	19.4	8.3	0.63	3.10	1.81	1.05	0.76	0.42	0.15	10.3	8.8	1.05	1.60				0.00	3.10	1.81	11 feet of curb opening
SBE04	0.032	18.6	0.0	0.00	0.00	6.33	4.92	1.41	0.22	0.08	19.4	17.9	4.92	1.65				0.00	6.33	0.00	discharges west into Ln Mtn Rd
SBE05	0.039	13.1	0.0	0.00	0.00	2.63	1.73	0.91	0.34	0.12	12.7	11.2	1.73	1.58				0.00	2.64	0.00	discharges into undeveloped lots to the west, APN 13802101004
SBE06	0.038	14.0	0.0	0.00	0.00	2.99	2.01	0.98	0.33	0.11	13.3	11.8	2.01	1.64				0.00	2.98	0.01	discharges west to undevel. lots APN 13802101004,005,017,006
SBE07	0.038	15.6	0.0	0.00	0.00	3.44	2.35	1.09	0.32	0.11	13.7	12.2	2.35	1.77	5.90	1.00	0.11	1.35	1.35	2.10	2X2 curb opening and grate
SBE08	0.042	18.4	0.0	0.00	0.00	3.12	1.88	1.24	0.40	0.14	11.0	9.5	1.88	2.46				0.00	3.12	0.00	discharges into Ahern Rentals parking lot
SBE08A	0.051	8.6	0.0	0.00	0.00	1.00	0.45	0.55	0.55	0.20	7.7	6.2	0.45	1.54				0.00	1.00	0.00	discharges into undeveloped lots to the west, 13802101011
SBE09	0.049	14.5	0.0	0.00	0.00	1.76	0.82	0.93	0.53	0.19	8.0	6.5	0.82	2.48				0.00	1.75	0.00	discharges west in Red Coach Avenue
SBE10	0.042	21.5	0.0	0.00	0.00	3.63	2.19	1.44	0.40	0.14	11.0	9.5	2.19	2.87				0.00	3.63	0.00	discharges into Draft House parking lot
SBE11	0.045	15.8	0.0	0.00	0.00	2.29	1.25	1.04	0.46	0.16	9.5	8.0	1.25	2.37				0.00	2.29	0.00	discharges into Fat Burger parking lot
SBE12	0.050	10.4	0.0	0.00	0.00	1.25	0.57	0.67	0.54	0.19	7.9	6.4	0.57	1.83				0.00	1.25	0.00	discharges into Arby's parking lot
SBE13	0.049	13.3	0.0	0.00	0.00	1.67	0.81	0.86	0.52	0.18	8.3	6.8	0.81	2.22				0.00	1.67	0.00	discharges into Discount Tire parking lot
SBE14	0.049	11.7	0.0	0.00	0.00	1.47	0.71	0.76	0.52	0.18	8.3	6.8	0.71	1.97				0.00	1.47	0.00	discharges into Lee's Discount Liquor parking lot
SBE15	0.045	15.0	0.0	0.00	0.00	2.23	1.23	0.99	0.45	0.15	9.7	8.2	1.23	2.21				0.00	2.23	0.00	discharges west in Craig
SBE16	0.034	35.7	0.0	0.00	0.00	9.89	7.32	2.57	0.26	0.09	16.7	15.2	7.32	3.47	5.90	1.00	0.03	2.83	2.83	7.06	2X2 curb opening and grate
SBE17	0.034	37.3	0.0	0.00	0.00	10.44	7.75	2.69	0.26	0.09	16.9	15.4	7.75	3.59				0.00	10.44	0.00	discharges into Super Pawn Shop parking lot
SBE18	0.038	18.0	0.0	0.00	0.00	3.99	2.73	1.26	0.32	0.11	13.8	12.3	2.73	2.03				0.00	3.99	0.00	discharges into UHaul parking lot
SBE19	0.049	10.1	0.0	0.00	0.00	1.23	0.57	0.65	0.53	0.19	8.0	6.5	0.57	1.75				0.00	1.23	0.00	discharges west into Jones Boulevard
SBE20	0.038	19.5	0.0	0.00	0.00	4.09	2.73	1.35	0.33	0.11	13.2	11.7	2.73	2.27				0.00	4.09	0.00	discharges west to undevel. 13802803001, -11502003, 12110049
SBE21	0.039	15.4	12.0	0.93	2.90													0.00	2.90	0.20	16 feet of curb opening
SBE22	0.034	29.9	0.0	0.00	0.00	8.26	6.10	2.16	0.26	0.09	16.6	15.1	6.10	2.93				0.00	8.27	-0.01	discharges into undeveloped lots to the west, 13812110003
SBE23	0.039	20.3	0.0	0.00	0.00	4.09	2.69	1.40	0.34	0.12	12.8	11.3	2.69	2.41				0.00	4.09	0.00	discharges to sw underdrains in Duncan Dr, then channel
SBE24	0.033	18.5	0.0	0.00	0.00	5.81	4.43	1.38	0.24	0.08	18.3	16.8	4.43	1.71				0.00	5.81	0.00	discharges west into Gowan Road
SBE25	0.043	11.0	0.0	0.00	0.00	1.82	1.08	0.74	0.41	0.14	10.7	9.2	1.08	1.51	9.00	1.00	0.44	1.21	1.21	0.61	4X4 curb opening and grate
SBE26	0.028	6.0	0.0	0.00	0.00	3.47	2.95	0.52	0.15	0.05	28.4	26.9	2.95	0.43				0.00	3.47	0.00	discharges into first driveway of 13812301013
SBE27	0.042	8.5	0.0	0.00	0.00	1.43	0.85	0.58	0.41	0.14	10.7	9.2	0.85	1.18				0.00	1.43	0.00	discharges into second driveway of 13812301013
SBE28	0.059	11.4	0.0	0.00	0.00	0.99	0.29	0.69	0.70	0.27	5.7	4.2	0.29	2.58				0.00	0.99	0.00	discharges into undeveloped lot to the west, APN 13812301016
SBE29	0.040	10.4	0.0	0.00	0.00	1.95	1.24	0.72	0.37	0.13	11.9	10.4	1.24	1.33				0.00	1.95	0.00	discharges west into Michael Way
SBE30	0.034	4.3	0.0	0.00	0.00	1.29	0.97	0.32	0.25	0.09	17.3	15.8	0.97	0.42	9.00	1.00	0.89	1.18	1.18	0.11	4X4 curb opening and grate
SBE31	0.034	23.3	0.0	0.00	0.00	6.46	4.77	1.69	0.26	0.09	16.6	15.1	4.77	2.28				0.00	6.46	0.00	discharges into undeveloped lot to the west, APN 13812801012
SBE32	0.068	9.4	0.0	0.00	0.00	0.60	0.09	0.52	0.86	0.38	4.0	2.5	0.09	2.75				0.00	0.60	0.00	discharges into undeveloped lot to the west, APN 13812801012
SBE33	0.044	21.2	0.0	0.00	0.00	3.31	1.91	1.41	0.42	0.15	10.2	8.7	1.91	2.98				0.00	0.00	3.31	discharges into SBE34
SBE34A	0.051	24.6	0.0	0.00	0.00	2.79	1.23	1.55	0.56	0.20	7.6	6.1	1.23	4.36				0.00	0.00	2.79	discharges into SBE34
SBE34	0.034	41.4	13.5	0.51	5.79	5.59	3.65	1.94	0.35	0.12	12.6	11.1	3.65	3.40				0.00	5.79	5.59	18 feet of curb opening
SBE35	0.037	38.1	0.0	0.00	0.00	8.76	6.11	2.65	0.30	0.10	14.4	12.9	6.11	4.10	7.60	1.00	0.06	3.04	3.04	5.72	3X3 curb opening and grate
SBE36A	0.045	27.2	0.0	0.00	0.00	3.95	2.17	1.78	0.45	0.16	9.6	8.1	2.17	4.00				0.00	0.00	3.95	discharges into SBE36 with bypass from SBE35
SBE36	0.033	48.4	0.0	0.00	0.00	14.44	10.93	3.51	0.24	0.08	17.8	16.3	10.93	4.47	7.60	1.00	0.06	4.11	4.11	10.33	3X3 curb opening and grate
SBE37	0.033	46.6	0.0	0.00	0.00	14.76	11.34	3.42	0.23	0.08	18.6	17.1	11.34	4.17				0.00	14.76	0.00	discharges into undeveloped lots to the west, APN 13813512004
SBE38	0.048	14.1	0.0	0.00	0.00	1.84	0.92	0.92	0.50	0.17	8.6	7.1	0.92	2.28				0.00	1.84	0.00	discharges into undeveloped lots to the west, APN 13813601020
SBE39	0.045	14.5	0.0	0.00	0.00	2.09	1.13	0.96	0.46	0.16	9.4	7.9	1.13	2.19	7.60	1.00	0.17	1.15	1.15	0.93	3X3 curb opening and grate

Part 3: Inlet capture calculations - Existing

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
Subbasins Contributing Flow	Curb Opening Calculation					Grate Opening Calculation													$Q_{intercept}$ cfs	Q_{bypass} cfs	Comments
	Se ft/ft	L_T ft	L ft	E	Q_{ic} cfs	Q_g cfs	Q_{S3} cfs	Q_{W3} cfs	E_{O3}	W/T	T_3 ft	T_{S3} ft	Q_{S4} cfs	V ft/s	V_O ft/s	R_f	R_s	Q_{ig} cfs			
NBE01	0.058	12.7	0.0	0.00	0.00	1.11	0.34	0.77	0.69	0.26	5.8	4.3	0.34	2.82				0.00	1.11	0.00	discharges east into Rainbow Boulevard
NBE02	0.033	20.4	0.0	0.00	0.00	6.27	4.75	1.51	0.24	0.08	18.0	16.5	4.75	1.91				0.00	6.27	0.00	discharges east to undevel. lots APN 12535401003, 004, 006, 007
NBE03	0.060	13.5	0.0	0.00	0.00	1.13	0.32	0.81	0.71	0.27	5.5	4.0	0.32	3.10				0.00	1.13	0.00	discharges east into Ln Mtn Rd
NBE04	0.037	10.9	0.0	0.00	0.00	2.61	1.83	0.78	0.30	0.10	14.6	13.1	1.83	1.19				0.00	0.00	2.61	combines w/NBE05, discharges east to undevl. APN 13802102014
NBE05	0.046	49.5	0.0	0.00	0.00	6.85	3.67	3.18	0.46	0.16	9.3	7.8	3.67	7.37				0.00	6.85	0.00	discharges into undeveloped lots to the east, APN 13802102014
NBE06	0.047	14.7	0.0	0.00	0.00	1.93	0.97	0.96	0.50	0.17	8.7	7.2	0.97	2.37				0.00	1.93	0.00	discharges into APN 13802113001 parking lot
NBE07	0.039	25.7	0.0	0.00	0.00	5.13	3.37	1.76	0.34	0.12	12.7	11.2	3.37	3.05				0.00	5.13	0.00	discharges east into Torrey Pines Drive
NBE08	0.058	9.3	0.0	0.00	0.00	0.83	0.26	0.57	0.69	0.26	5.8	4.3	0.26	2.09				0.00	0.83	0.00	discharges east to parking lot,APN 13802204001 Checkr, BigO
NBE09	0.050	13.0	0.0	0.00	0.00	1.54	0.70	0.83	0.54	0.19	7.8	6.3	0.70	2.27				0.00	1.54	0.00	discharges east to pkng lot (13802204001) upstream of DelTaco
NBE10	0.044	17.7	0.0	0.00	0.00	2.76	1.58	1.17	0.43	0.15	10.2	8.7	1.58	2.50				0.00	2.76	0.00	discharges east into parking lot (APN 13802601001, Kmart)
NBE11	0.053	13.7	0.0	0.00	0.00	1.46	0.59	0.86	0.59	0.21	7.1	5.6	0.59	2.59				0.00	0.00	1.46	combines with NBE12 and discharges east into Craig Road
NBE12	0.045	21.9	0.0	0.00	0.00	3.18	1.74	1.44	0.45	0.16	9.6	8.1	1.74	3.24				0.00	3.18	0.00	discharges east into Craig Road
NBE13	0.037	38.6	0.0	0.00	0.00	8.43	5.77	2.66	0.32	0.11	13.8	12.3	5.77	4.28				0.00	8.43	0.00	discharges east to undevel lots APN 13802702001, 002
NBE14	0.048	47.7	0.0	0.00	0.00	5.99	2.97	3.02	0.50	0.18	8.5	7.0	2.97	7.62				0.00	5.99	0.00	discharges into undeveloped lots to the east, APN 13802802001
NBE15	0.044	13.0	0.0	0.00	0.00	2.01	1.15	0.87	0.43	0.15	10.1	8.6	1.15	1.86				0.00	2.01	0.00	discharges into undeveloped lots to the east, APN 13802802001
NBE16	0.046	12.8	0.0	0.00	0.00	1.83	0.98	0.85	0.46	0.16	9.4	7.9	0.98	1.95				0.00	1.83	0.00	discharges east into Jones Boulevard
NBE17	0.036	22.4	0.0	0.00	0.00	5.41	3.82	1.59	0.29	0.10	14.9	13.4	3.82	2.38				0.00	5.41	0.00	east undevel 13802804001, -01401003, -01499016,-12101002 and Al
NBE18	0.038	21.2	9.0	0.63	2.76	1.62	0.81	0.80	0.50	0.17	8.7	7.2	0.81	1.99	7.60	1.00	0.20	0.96	3.73	0.65	15 foot curb opening and 3 foot grate
NBE19	0.041	8.8	3.0	0.53	0.83	0.74	0.36	0.38	0.52	0.18	8.3	6.8	0.36	0.99				0.00	0.83	0.74	4 foot curb opening
NBE20	0.037	24.1	0.0	0.00	0.00	5.32	3.64	1.68	0.32	0.11	13.8	12.3	3.64	2.70				0.00	5.28	0.04	discharges east into parking lot (APN 13812110015)
NBE21	0.048	10.3	0.0	0.00	0.00	1.32	0.65	0.67	0.51	0.18	8.4	6.9	0.65	1.71				0.00	1.27	0.05	discharges east into Duncan Drive
NBE22	0.052	24.5	0.0	0.00	0.00	2.68	1.14	1.54	0.57	0.20	7.3	5.8	1.14	4.45				0.00	2.63	0.05	discharges east into undeveloped area within NDOT ROW
NBE23	0.033	19.7	0.0	0.00	0.00	6.33	4.86	1.47	0.23	0.08	18.6	17.1	4.86	1.80				0.00	6.28	0.05	discharges east into Gowan Road
NBE24	0.045	12.3	0.0	0.00	0.00	1.79	0.97	0.81	0.46	0.16	9.5	8.0	0.97	1.85				0.00	1.74	0.05	discharges east into Gowan Road
NBE25	0.042	12.4	0.0	0.00	0.00	2.12	1.28	0.84	0.40	0.14	11.0	9.5	1.28	1.66	7.60	1.00	0.26	1.17	1.17	0.95	3X3 curb opening and grate
NBE26	0.033	11.5	0.0	0.00	0.00	3.59	2.73	0.86	0.24	0.08	18.0	16.5	2.73	1.08				0.00	3.55	0.04	discharges east into APN 13812710044
NBE27	0.039	10.7	0.0	0.00	0.00	2.12	1.38	0.74	0.35	0.12	12.4	10.9	1.38	1.32				0.00	2.09	0.03	discharges east into Jay Avenue
NBE28	0.035	14.4	0.0	0.00	0.00	3.92	2.87	1.05	0.27	0.09	16.2	14.7	2.87	1.46				0.00	3.88	0.04	discharges east into Ricky Road
NBE29	0.069	15.5	0.0	0.00	0.00	0.95	0.11	0.83	0.88	0.40	3.7	2.2	0.11	4.66				0.00	0.91	0.04	discharges into undeveloped lot to the east, APN 13812810001
NBE30	0.044	14.1	0.0	0.00	0.00	2.20	1.26	0.94	0.43	0.15	10.2	8.7	1.27	2.00				0.00	2.17	0.03	discharges east into Disct Muffler parking lot, APN 13812810003
NBE31	0.041	23.3	0.0	0.00	0.00	4.05	2.49	1.56	0.39	0.13	11.3	9.8	2.49	3.02				0.00	4.02	0.03	discharges east into Donnie Avenue
NBE32	0.044	19.9	0.0	0.00	0.00	3.01	1.69	1.31	0.44	0.15	9.9	8.4	1.69	2.87				0.00	0.00	3.01	combines with NBE33A, NBE33 and discharges into NBE34
NBE33A	0.041	25.1	0.0	0.00	0.00	4.47	2.78	1.69	0.38	0.13	11.5	10.0	2.78	3.22				0.00	0.00	4.47	combines with NBE33 and discharges into NBE34
NBE33	0.038	30.7	0.0	0.00	0.00	6.57	4.45	2.12	0.32	0.11	13.5	12.0	4.45	3.47				0.00	0.00	6.57	discharges into NBE34
NBE34A	0.042	23.5	0.0	0.00	0.00	4.00	2.43	1.57	0.39	0.14	11.1	9.6	2.43	3.10				0.00	0.00	4.00	discharges into NBE34
NBE34	0.035	42.8	0.0	0.00	0.00	11.41	8.36	3.05	0.27	0.09	16.3	14.8	8.36	4.21	7.60	1.00	0.06	3.56	3.56	7.86	3X3 curb opening and grate
NBE35	0.037	39.9	0.0	0.00	0.00	8.76	6.01	2.76	0.31	0.11	13.9	12.4	6.01	4.41				0.00	8.79	0.00	discharges east into Cheyenne Avenue
NBE36	0.036	38.6	0.0	0.00	0.00	9.53	6.81	2.72	0.29	0.10	15.3	13.8	6.81	3.99				0.00	9.53	0.00	discharges east to undevel lots APN 13813505001, 002
NBE37	0.064	10.8	0.0	0.00	0.00	0.78	0.15	0.62	0.80	0.33	4.6	3.1	0.15	2.87	9.00	1.00	0.20	0.65	0.65	0.12	4X4 curb opening and grate
NBE38	0.056	14.6	0.0	0.00	0.00	1.38	0.48	0.90	0.65	0.24	6.3	4.8	0.48	3.05				0.00	1.40	0.00	discharges east into Decatur Boulevard



MATCHLINE - STA: 20+00 (SEE LOWER LEFT)



MATCHLINE - STA: 27+00 (SEE SHEET C-2)

MATCHLINE - STA: 20+00 (SEE UPPER RIGHT)

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL
(HEC-1 NODE)
(EX 25YR FLOW/EX 100YR FLOW/LOMR)

NOTE:
1. ALL FLOW UNITS ARE CUBIC FEET PER SECOND
2. OFFSITE EXISTING FLOW RATES SHOWN ARE SUBSTANTIAL AND WILL CONTROL STREET AND CHANNEL FLOW DEPTHS
3. EXISTING ONSITE FLOW RATES AND INLET CAPTURE FOR THE BASINS SHOWN SEE PART 1 AND PART 3 OF "EXISTING ONSITE RUNOFF AND INLET CAPTURE" CALCULATION IN APPENDIX B

FEMA FIRM PANEL INFORMATION

THE PROJECT IS PRIMARILY LOCATED IN FLOOD ZONES "A", "AE" AND "X", REFERENCED BY FIRM, FLOOD INSURANCE RATE MAPS, CLARK COUNTY, NEVADA AND INCORPORATED AREAS, PANEL 1765 OF 4090, MAP NUMBER 32003C1765F, DATED NOVEMBER 16, 2011 AND PANEL 2155 OF 4090, MAP NUMBER 32003C2155F, DATED NOVEMBER 16, 2011. ZONE A IS LOCATED FROM NORTH OF THE RANCHO/ALEXANDER INTERSECTION EXTENDING TO THE SOUTH OF THE GOWAN/RANCHO INTERSECTION AND OCCURRING AGAIN AT THE CHEYENNE/RANCHO INTERSECTION. ZONE AE IS LOCATED NORTH AND SOUTH OF THE CRAIG/RANCHO INTERSECTION AND AT THE JAY/RANCHO INTERSECTION. ZONE X IS LOCATED AT THE NORTHERN AND SOUTHERN ENDS OF THE PROJECT.

(ZONE X – AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN. ZONE A – SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD WITH NO BASE FLOOD ELEVATIONS DETERMINED. ZONE AE – SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD WITH BASE FLOOD ELEVATIONS DETERMINED.)

BASIS OF BEARING

NORTH 36°41'41" WEST, BEING THE BEARING OF THE CENTERLINE OF RANCHO DRIVE SOUTH OF CHEYENNE AVENUE AS SHOWN BY THAT CERTAIN RECORD OF SURVEY PREPARED BY THE CITY OF LAS VEGAS, AS SHOWN IN FILE 151, PAGE 1 OF SURVEYS, ON FILE IN THE COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK NUMBER 5LV002SES BEING A RIVET AND PLATE IN THE TOP OF CURB AT THE SOUTHEAST CORNER OF RANCHO DRIVE AND JONES BOULEVARD (NORTH)

ELEVATION (NAVD88) = 691.9676 METERS = 2270.23 FEET

REVISIONS

NO.	DATE:	DESCRIPTION	APP'D

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER:
PROGRAM MANAGER: DAVID N. BOWERS, P.E., P.T.O.E.
JEREMY LEAVITT

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM

DATE: JANUARY 2012

CITY OF LAS VEGAS NEVADA

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS DECATUR TO RAINBOW

SHEET: EXISTING BASIN LAYOUT

PROFESSIONAL ENGINEER - STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet
B-1
of
DRAWING NO.

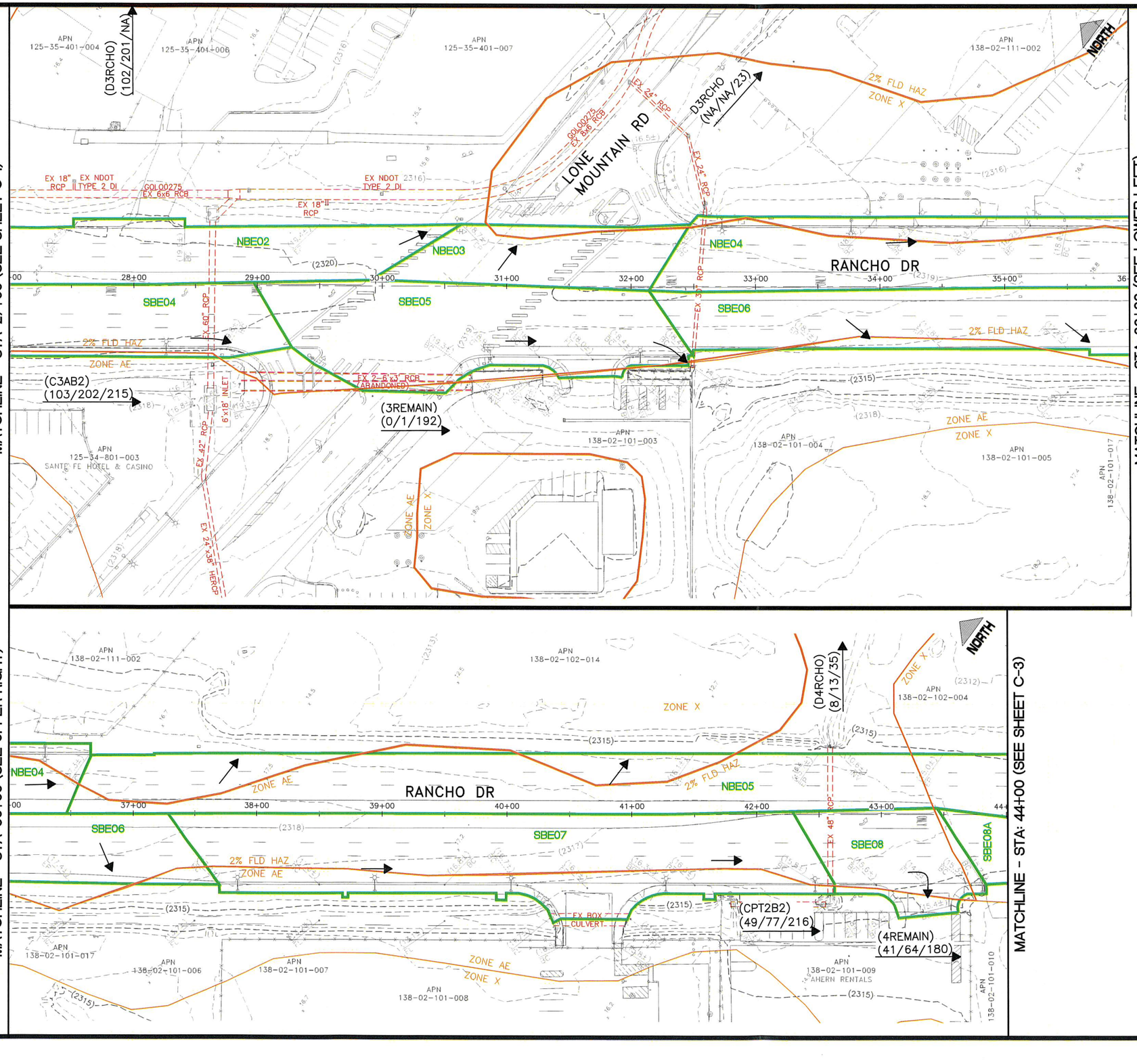
Apr 07, 2014 - 3:46pm - R:\24529-Rancho\06-Studies\01-70ft Rancho Rd and Gowan Outfall Combined\09-Working Drawings\70ft-Basin Layout_Existing_04-02-14.dwg

MATCHLINE - STA: 27+00 (SEE SHEET C-1)

MATCHLINE - STA: 36+00 (SEE LOWER LEFT)

MATCHLINE - STA: 36+00 (SEE UPPER RIGHT)

MATCHLINE - STA: 44+00 (SEE SHEET C-3)



GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL
(HEC-1 NODE)
(EX 25YR FLOW/EX 100YR FLOW/LOMR)

NOTE:
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3. EXISTING ONSITE FLOW RATES AND INLET CAPTURE FOR THE BASINS SHOWN SEE PART 1 AND PART 3 OF "EXISTING ONSITE RUNOFF AND INLET CAPTURE" CALCULATION IN APPENDIX B

FEMA FIRM PANEL INFORMATION

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(ZONE X – AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN. ZONE A – SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD WITH NO BASE FLOOD ELEVATIONS DETERMINED. ZONE AE – SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD WITH BASE FLOOD ELEVATIONS DETERMINED.)

BASIS OF BEARING

NORTH 36°41'41" WEST, BEING THE BEARING OF THE CENTERLINE OF RANCHO DRIVE SOUTH OF CHEYENNE AVENUE AS SHOWN BY THAT CERTAIN RECORD OF SURVEY PREPARED BY THE CITY OF LAS VEGAS, AS SHOWN IN FILE 151, PAGE 1 OF SURVEYS, ON FILE IN THE COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK NUMBER 5LV002SES BEING A RIVET AND PLATE IN THE TOP OF CURB AT THE SOUTHEAST CORNER OF RANCHO DRIVE AND JONES BOULEVARD (NORTH)

ELEVATION (NAVD88) = 691.9676 METERS = 2270.23 FEET

NO.	DATE:	DESCRIPTION	APP'D
		REVISIONS	

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: JEREMY LEAVITT

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM
DATE: JANUARY 2012

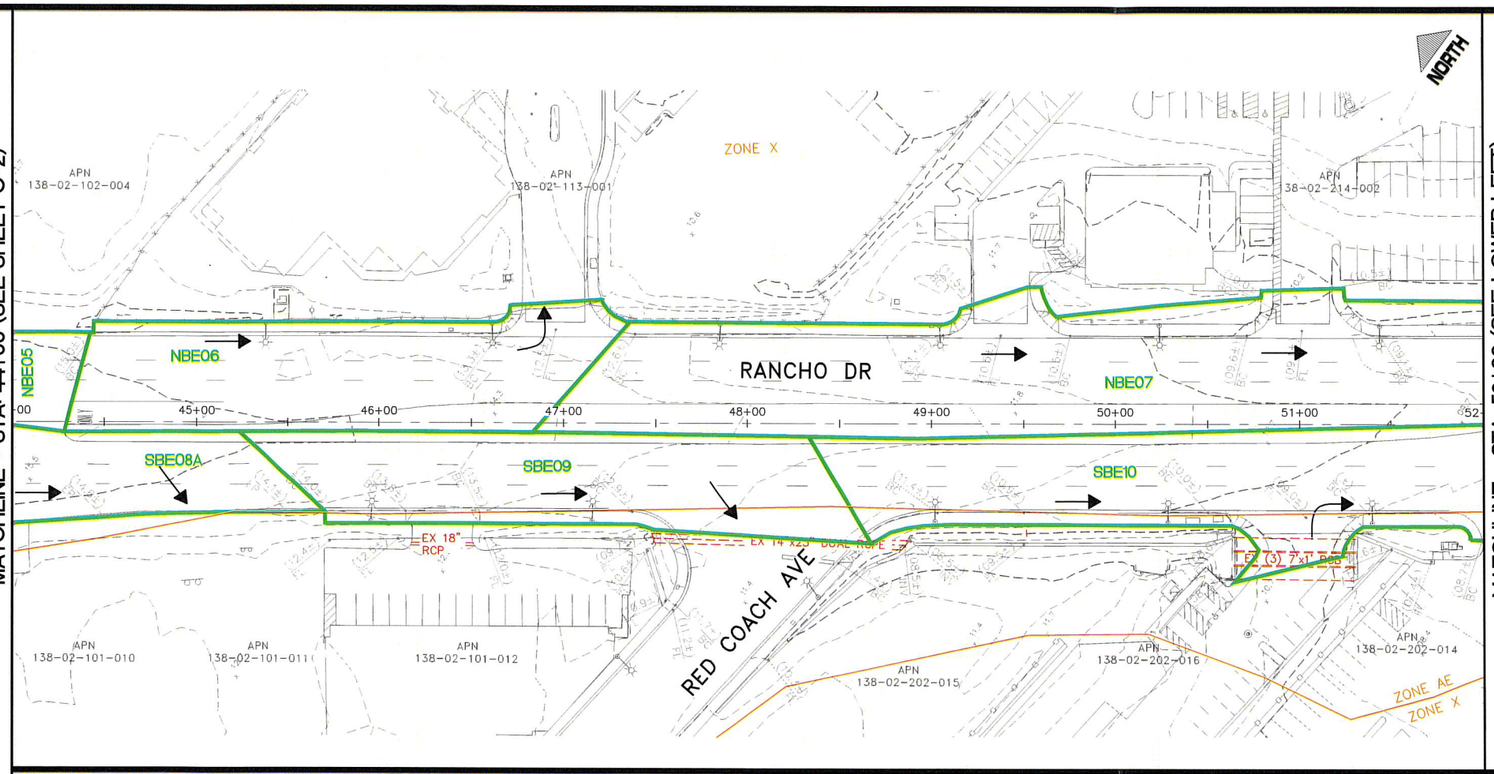
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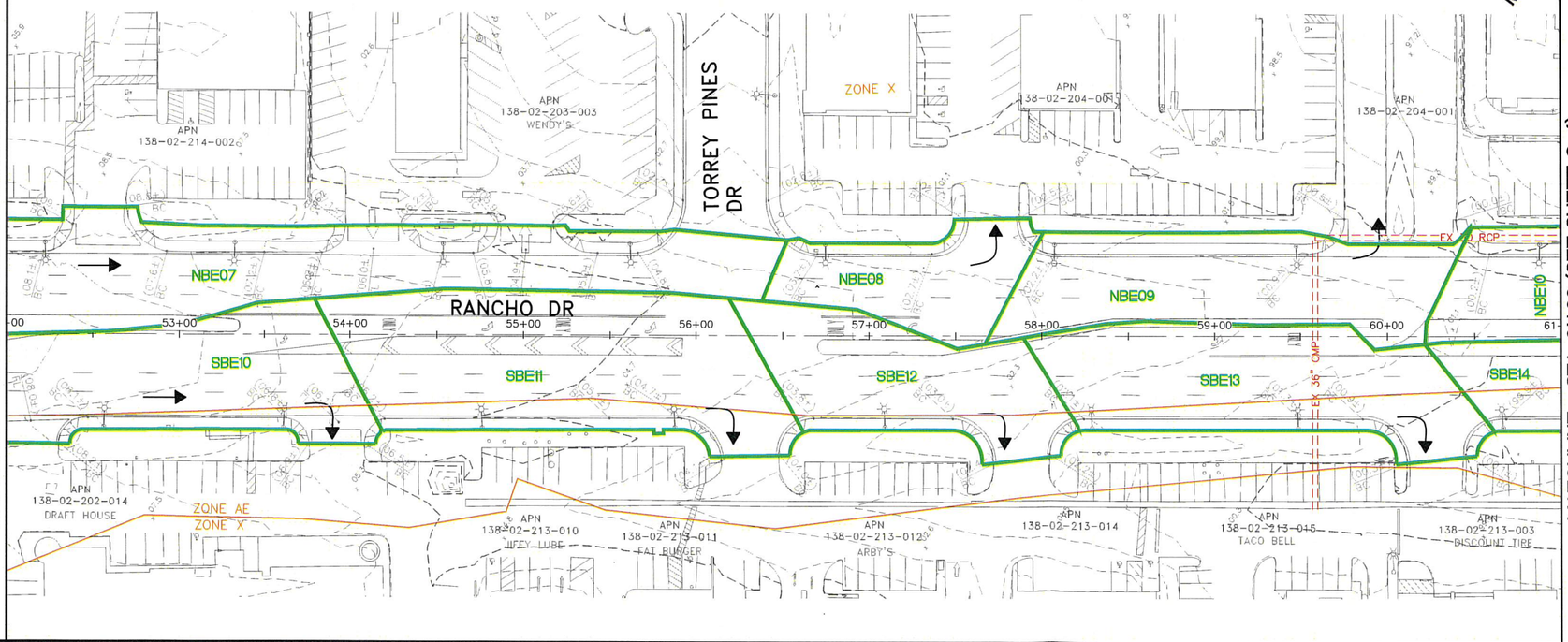
SHEET: EXISTING BASIN LAYOUT

PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet B-2 of DRAWING NO.

Apr 07, 2014 - 3:45pm - R:\23629-Rancho\06-Studies\01-702 Rancho Rd and Gowan Outfall Combined\09-Working Drawings\702-Basin Layout_Existing 04-02-14.dwg





GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL
(HEC-1 NODE)
(EX 25YR FLOW/EX 100YR FLOW/LOMR)

NOTE:
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BASIS OF BEARING

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BENCHMARK

CITY OF LAS VEGAS BENCHMARK NUMBER 5LV002SES BEING A RIVET AND PLATE IN THE TOP OF CURB AT THE SOUTHEAST CORNER OF RANCHO DRIVE AND JONES BOULEVARD (NORTH)

ELEVATION (NAVD88) = 691.9676 METERS = 2270.23 FEET

REVISIONS

NO.	DATE:	DESCRIPTION	APP'D

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: JEREMY LEAVITT

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM
DATE: JANUARY 2012

CITY OF LAS VEGAS NEVADA

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS DECATUR TO RAINBOW

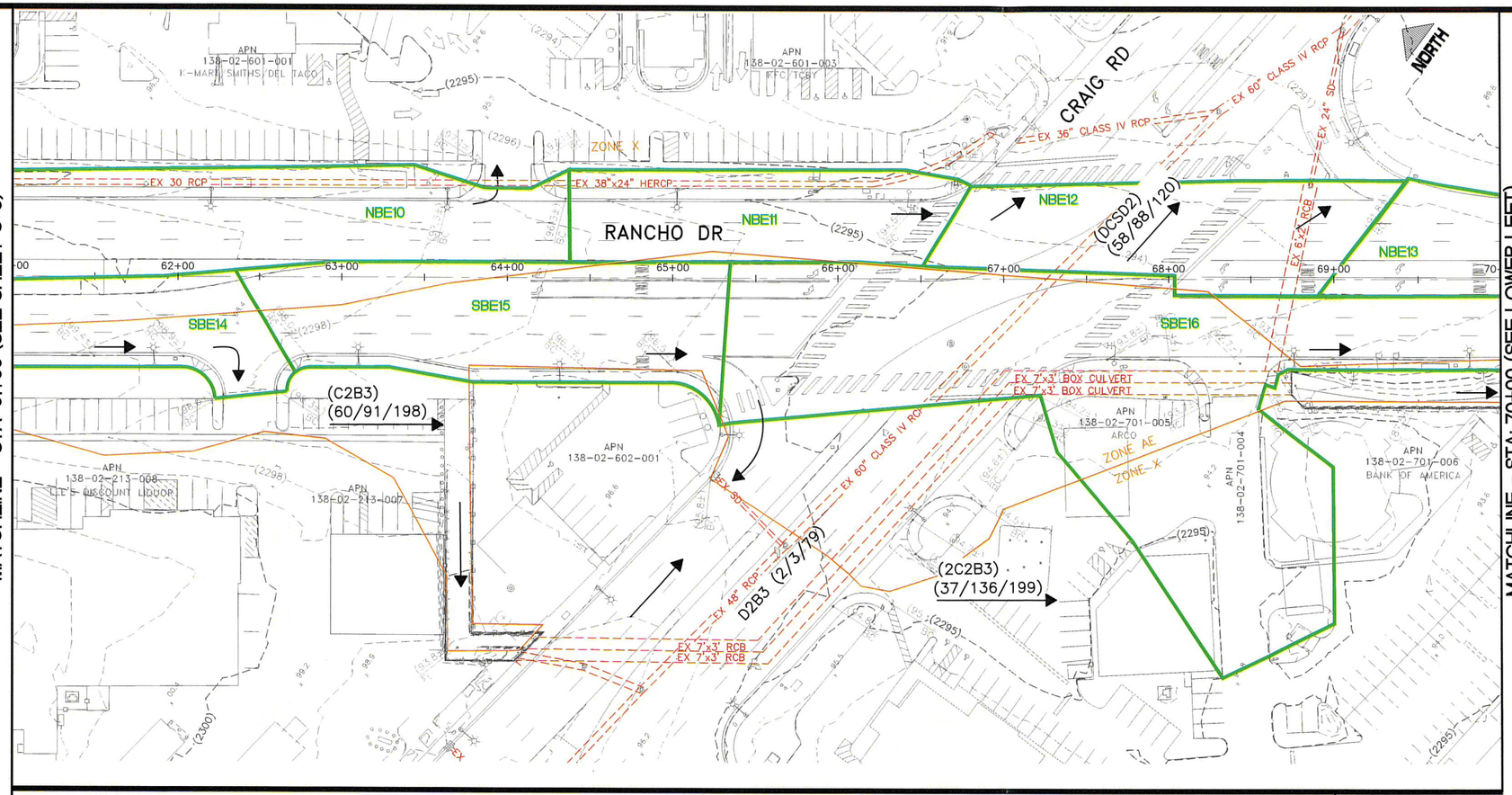
SHEET: EXISTING BASIN LAYOUT

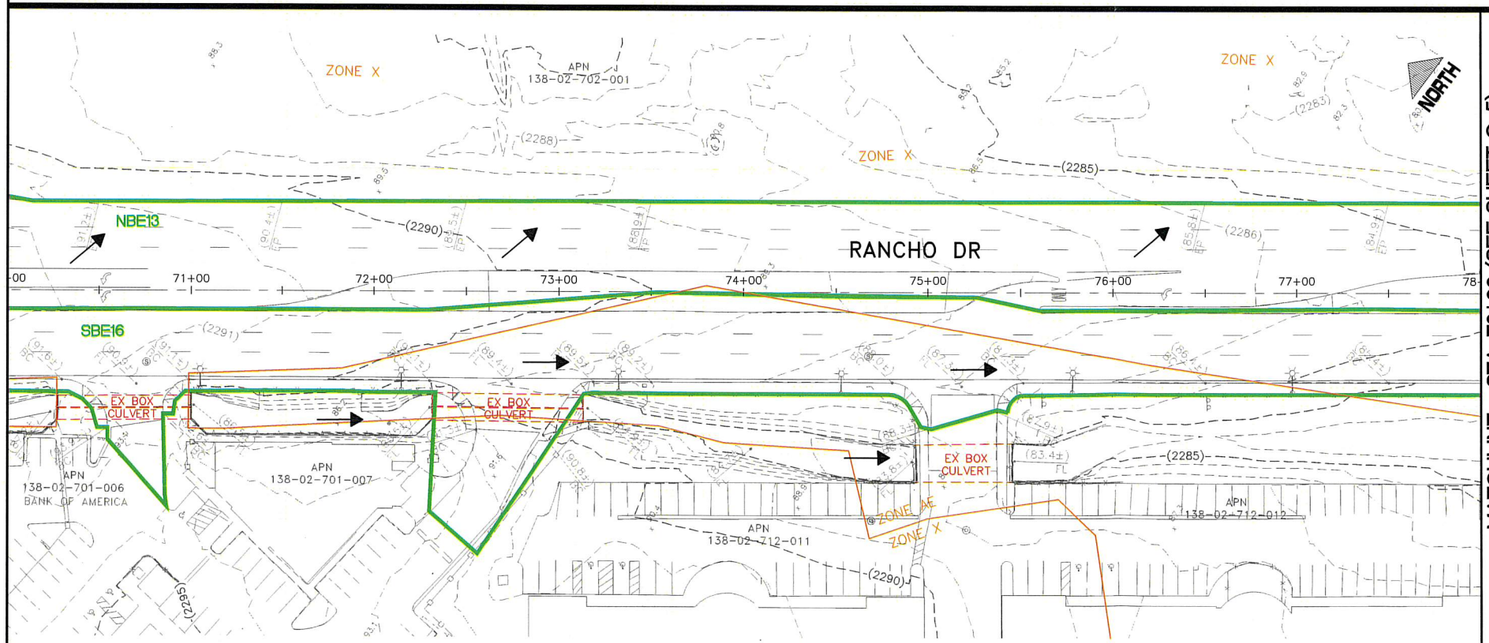
PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet B-3 of

DRAWING NO.

Apr 07, 2014 – 3:46pm – R:\2629-Rancho\06-Studies\01-70% Rancho Rd and Gowan Outfall Combined\09-Working Drawings\70%-Basin Layout_Existing 04-02-14.dwg





GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL
(HEC-1 NODE)
(EX 25YR FLOW/EX 100YR FLOW/LOMR)

NOTE:
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ELEVATION (NAVD88) = 691.9676 METERS = 2270.23 FEET

NO.	DATE:	DESCRIPTION	APP'D
		REVISIONS	

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: JEREMY LEAVITT

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM
DATE: JANUARY 2012

CITY OF LAS VEGAS NEVADA

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
DECATUR TO RAINBOW

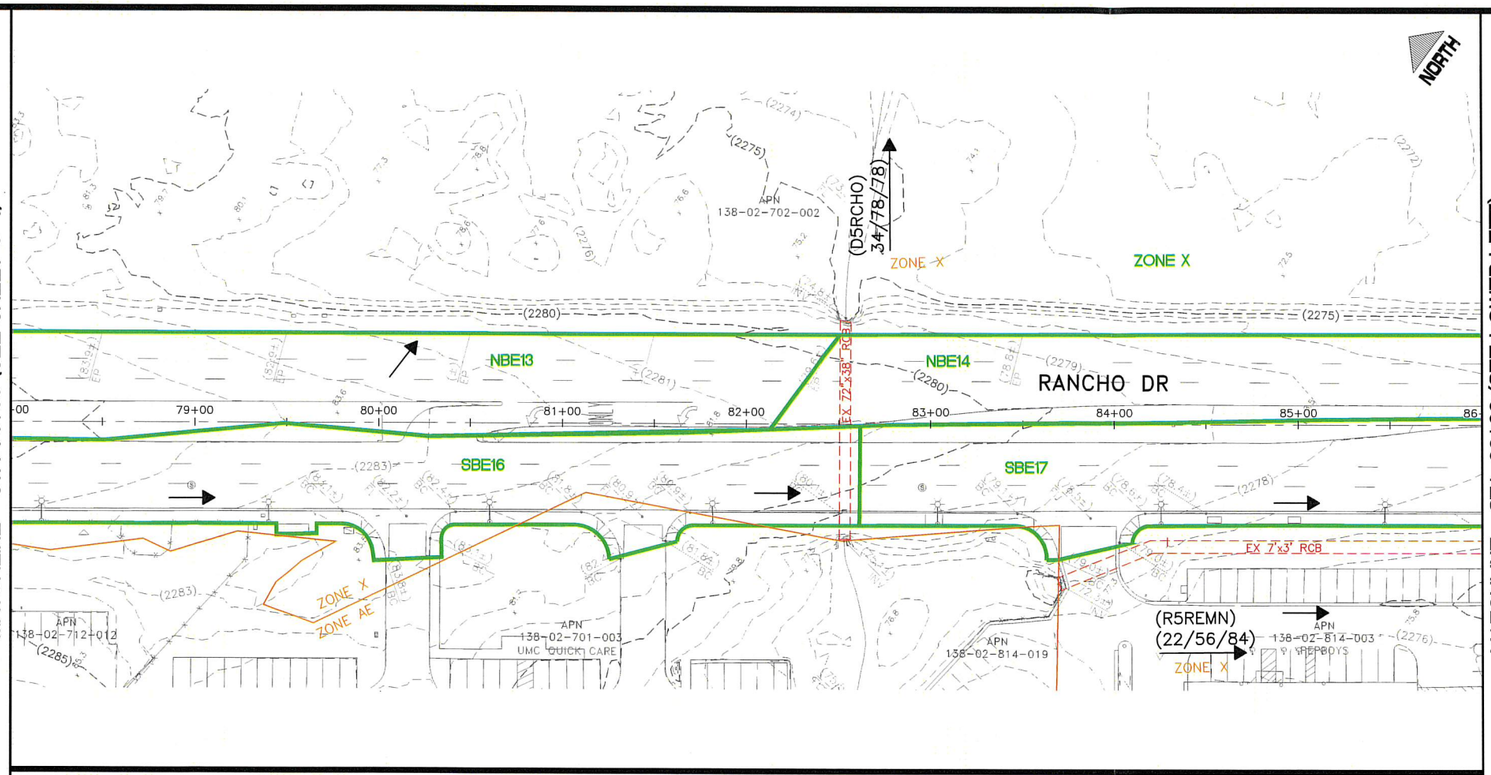
SHEET: EXISTING BASIN LAYOUT

PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet
B-4
__ of
DRAWING NO.

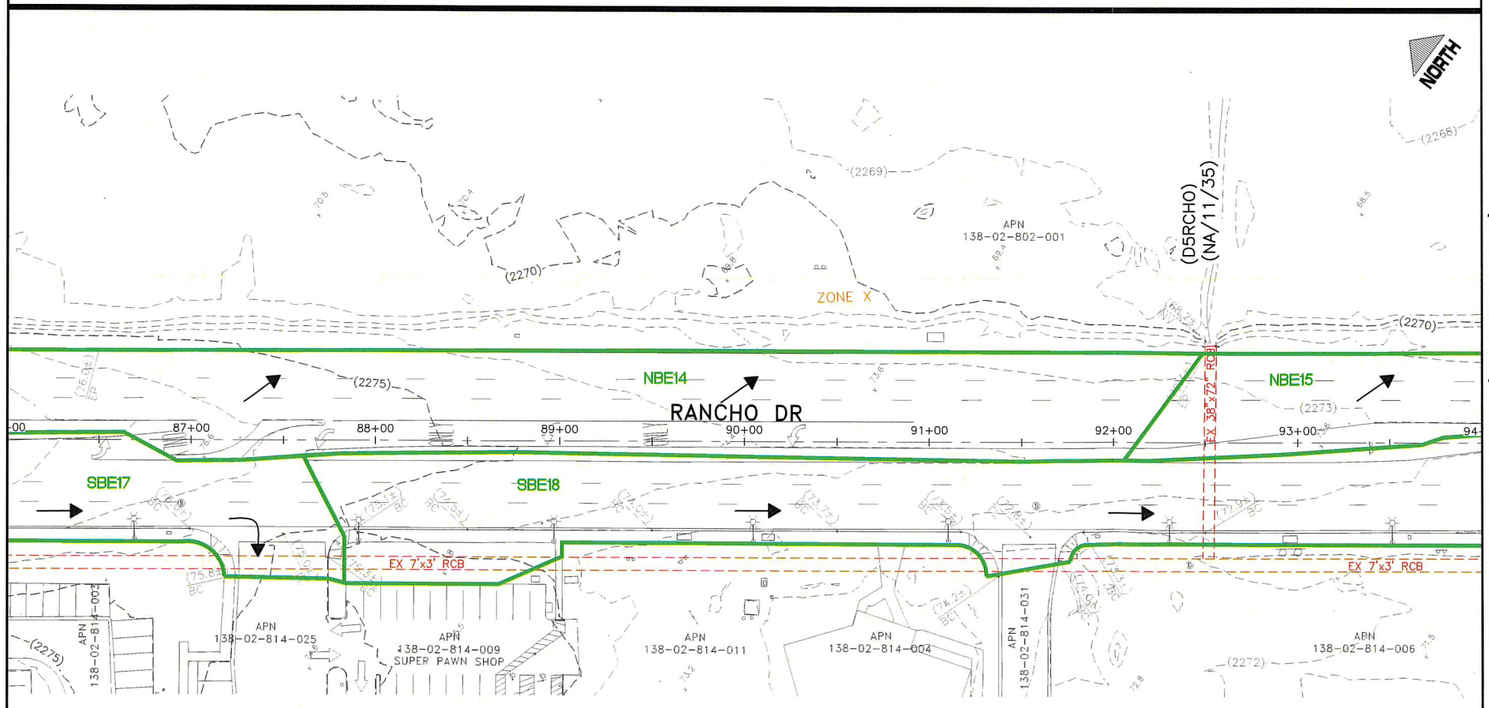
Apr 07, 2014 - 3:47pm - R:\23629-Rancho\06-Studies\01-70S Rancho Rd and Gowan Outfall Combined\09-Working Drawings\70S-Basin Layout_Existing 04-02-14.dwg

MATCHLINE – STA: 78+00 (SEE SHEET C-4)



MATCHLINE – STA: 86+00 (SEE LOWER LEFT)

MATCHLINE – STA: 86+00 (SEE UPPER RIGHT)



MATCHLINE – STA: 94+00 (SEE SHEET C-6)

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL
(HEC–1 NODE)
(EX 25YR FLOW/EX 100YR FLOW/LOMR)

NOTE:
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BENCHMARK

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ELEVATION (NAVD88) = 691.9676 METERS = 2270.23 FEET

NO.	DATE:	REVISIONS	APP'D

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: JEREMY LEAVITT

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM
DATE: JANUARY 2012

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS DECATUR TO RAINBOW

SHEET: EXISTING BASIN LAYOUT

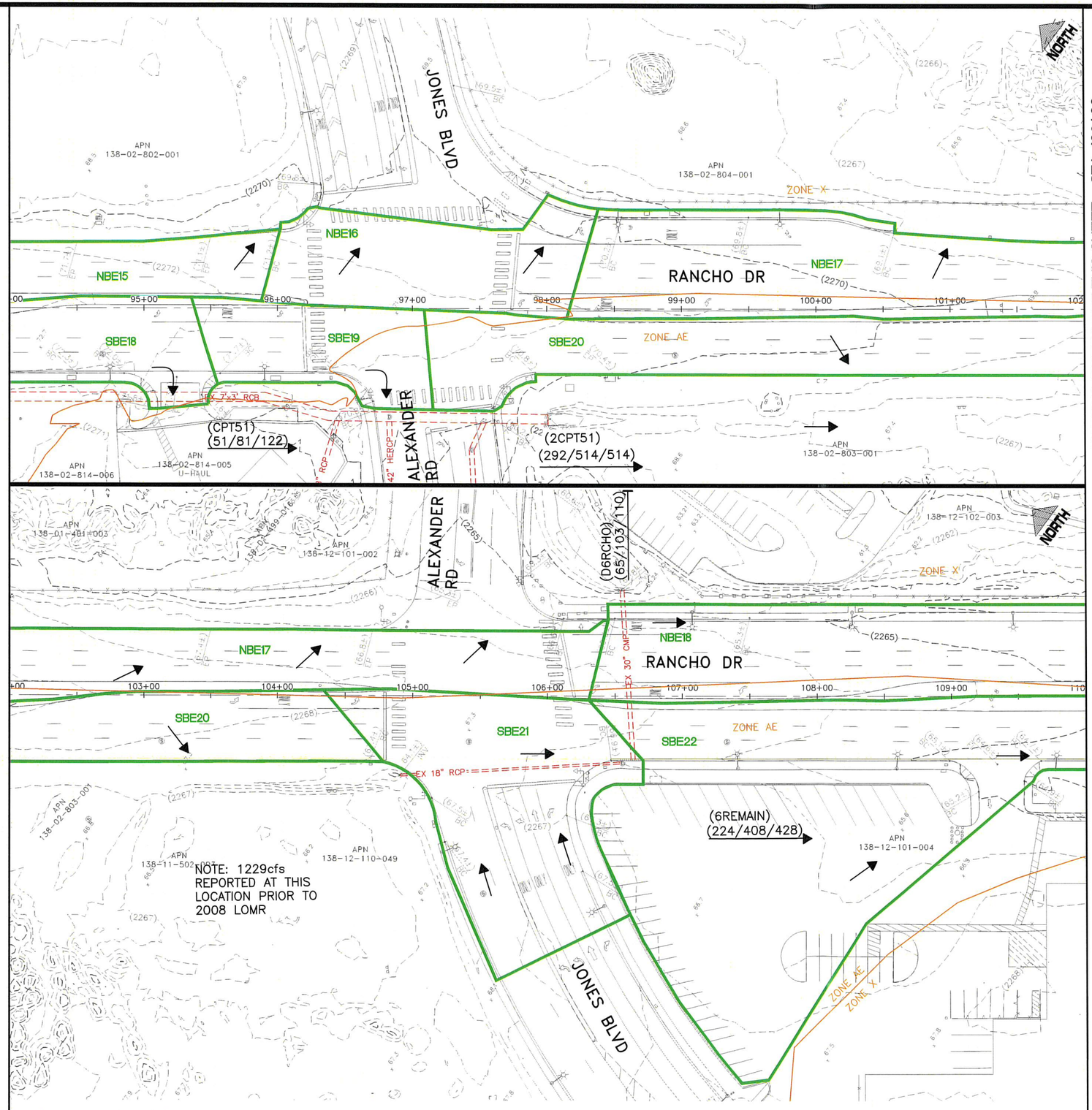
PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet
B-5
__ of
DRAWING NO.

Apr 07, 2014 – 3:48pm – R:\13529-Rancho\06-Studies\01-70ft Rancho Rd and Gowan Outfall Combined\95-Working Drawings\70ft-Basin Layout_Existing 04-02-14.dwg

MATCH PREVIOUS SHEET - STA: 94+00

MATCH UPPER RIGHT THIS SHEET - STA: 102+00



MATCH LOWER LEFT THIS SHEET - STA: 102+00

MATCH UPPER LEFT NEXT SHEET - STA: 110+00

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL
(HEC-1 NODE)
(EX 25YR FLOW/EX 100YR FLOW/LOMR)

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NO.	DATE:	DESCRIPTION	APP'D
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DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: JEREMY LEAVITT

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DATE: JANUARY 2012

CITY OF LAS VEGAS NEVADA

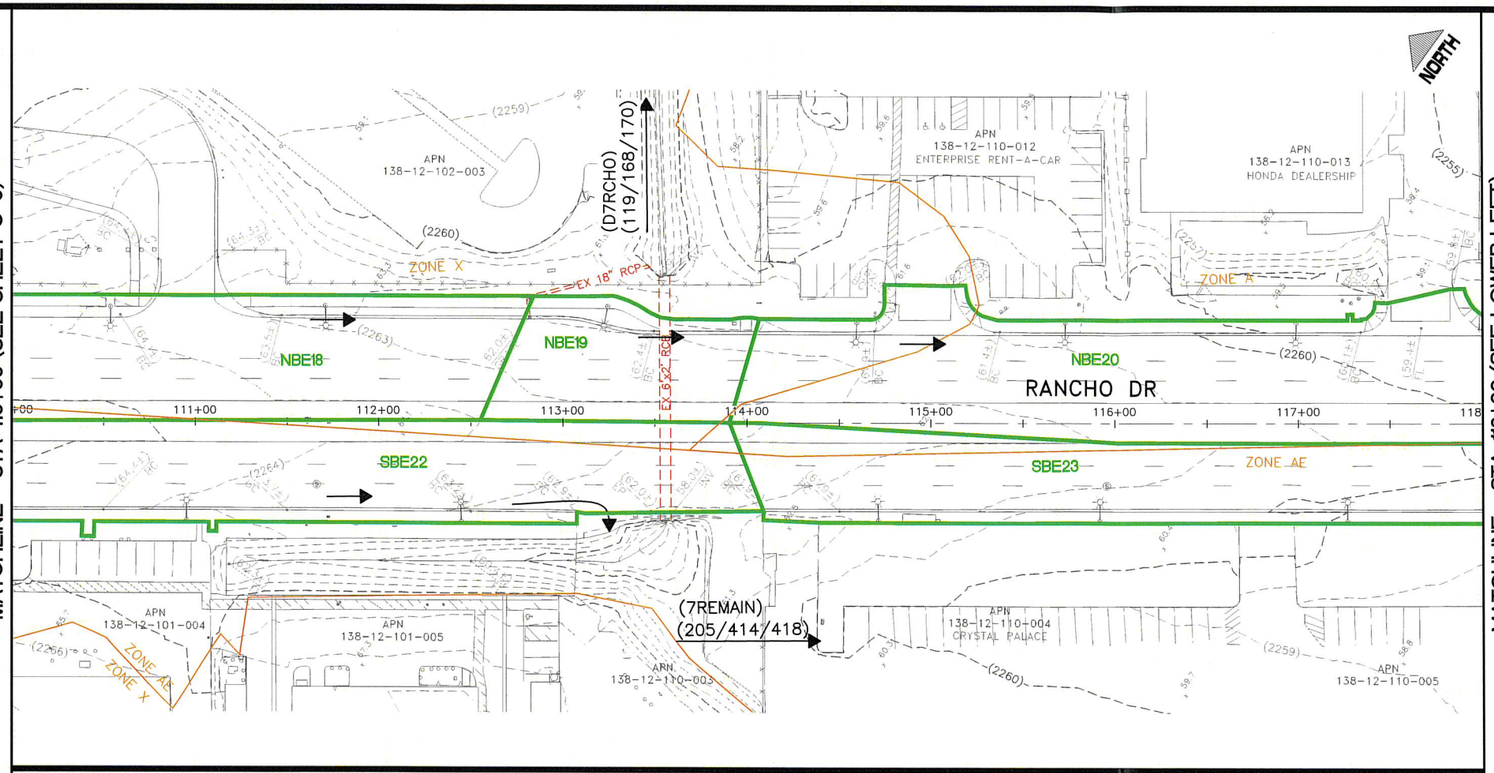
TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS DECATUR TO RAINBOW

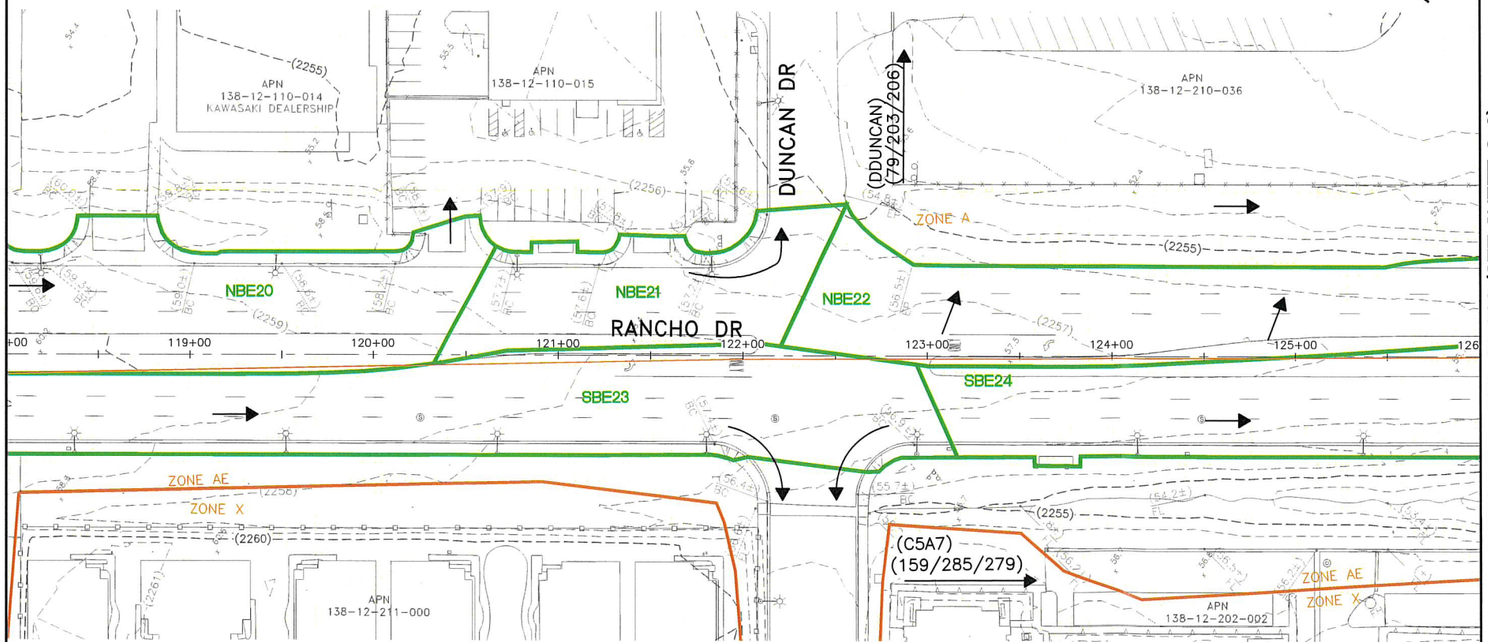
SHEET: EXISTING BASIN LAYOUT

PROFESSIONAL ENGINEER-STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet B-6 of DRAWING NO.

Apr 07, 2014 - 3:49pm - R:\23629-Rancho\06-Studies\01-70%_Rancho Rd and Gowan Outfall Combined\03-Working Drawings\70%-Basin Layout_Existing 04-02-14.dwg





GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL
(HEC-1 NODE)
(EX 25YR FLOW/EX 100YR FLOW/LOMR)

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NO.	DATE:	DESCRIPTION	APP'D
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DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: JEREMY LEAVITT

DESIGNED BY: DB
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DATE: JANUARY 2012

CITY OF LAS VEGAS NEVADA

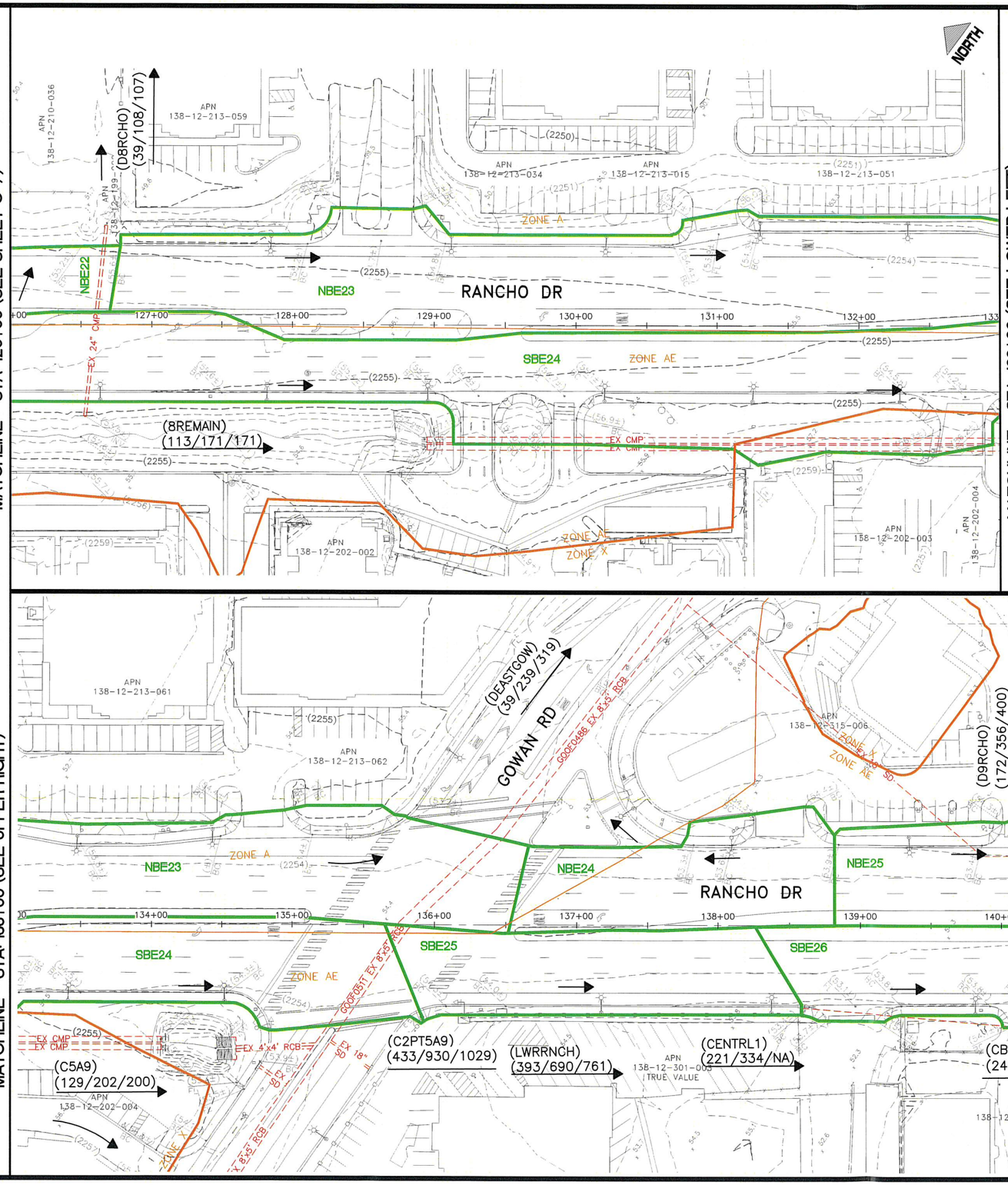
TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
DECATUR TO RAINBOW

SHEET: EXISTING BASIN LAYOUT

PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet
B-7
__ of
DRAWING NO.

Apr 07, 2014 - 3:50pm - R:\2629-Rancho\06-Studies\01-70'S Rancho Rd and Gowan Outfall Combined\09-Working Drawings\70'S-Basin Layout_Existing 04-02-14.dwg



GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

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REVISIONS

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DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM
DATE: JANUARY 2012

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS DECATUR TO RAINBOW

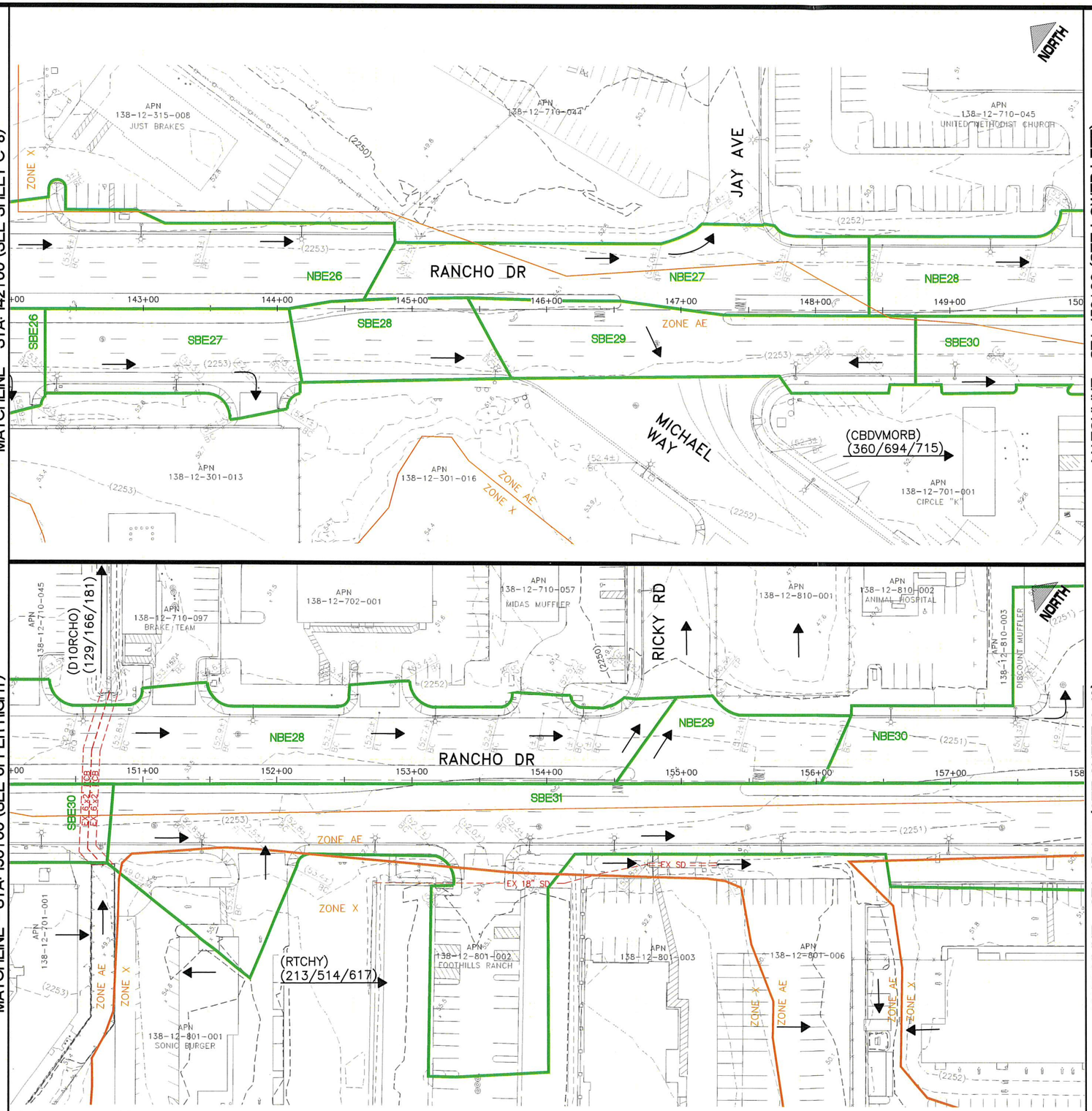
SHEET: EXISTING BASIN LAYOUT

PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18257

Sheet B-8 of

DRAWING NO.

Apr 07, 2014 - 3:51pm - R:\23629-Rancho\06-Studies\01-70%_Rancho Rd and Gowan Outfall Combined\99-Working Drawings\70%-Basin Layout_Existing 04-02-14.dwg



GRAPHIC SCALE

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(IN FEET)

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LEGEND

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3. EXISTING ONSITE FLOW RATES AND INLET CAPTURE FOR THE BASINS SHOWN SEE PART 1 AND PART 3 OF "EXISTING ONSITE RUNOFF AND INLET CAPTURE" CALCULATION IN APPENDIX B

FEMA FIRM PANEL INFORMATION

THE PROJECT IS PRIMARILY LOCATED IN FLOOD ZONES "A", "AE" AND "X", REFERENCED BY FIRM, FLOOD INSURANCE RATE MAPS, CLARK COUNTY, NEVADA AND INCORPORATED AREAS, PANEL 1765 OF 4090, MAP NUMBER 32003C1765F, DATED NOVEMBER 16, 2011 AND PANEL 2155 OF 4090, MAP NUMBER 32003C2155F, DATED NOVEMBER 16, 2011. ZONE A IS LOCATED FROM NORTH OF THE RANCHO/ALEXANDER INTERSECTION EXTENDING TO THE SOUTH OF THE GOWAN/RANCHO INTERSECTION AND OCCURRING AGAIN AT THE CHEYENNE/RANCHO INTERSECTION. ZONE AE IS LOCATED NORTH AND SOUTH OF THE CRAIG/RANCHO INTERSECTION AND AT THE JAY/RANCHO INTERSECTION. ZONE X IS LOCATED AT THE NORTHERN AND SOUTHERN ENDS OF THE PROJECT.

(ZONE X – AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN. ZONE A – SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD WITH NO BASE FLOOD ELEVATIONS DETERMINED. ZONE AE – SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD WITH BASE FLOOD ELEVATIONS DETERMINED.)

BASIS OF BEARING

NORTH 36°41'41" WEST, BEING THE BEARING OF THE CENTERLINE OF RANCHO DRIVE SOUTH OF CHEYENNE AVENUE AS SHOWN BY THAT CERTAIN RECORD OF SURVEY PREPARED BY THE CITY OF LAS VEGAS, AS SHOWN IN FILE 151, PAGE 1 OF SURVEYS, ON FILE IN THE COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK NUMBER 5LV002SES BEING A RIVET AND PLATE IN THE TOP OF CURB AT THE SOUTHEAST CORNER OF RANCHO DRIVE AND JONES BOULEVARD (NORTH)

ELEVATION (NAVD88) = 691.9676 METERS = 2270.23 FEET

NO.	DATE:	DESCRIPTION	APP'D
		REVISIONS	

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: JEREMY LEAVITT

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM
DATE: JANUARY 2012

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS DECATUR TO RAINBOW

SHEET: EXISTING BASIN LAYOUT

PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet B-9 of DRAWING NO.

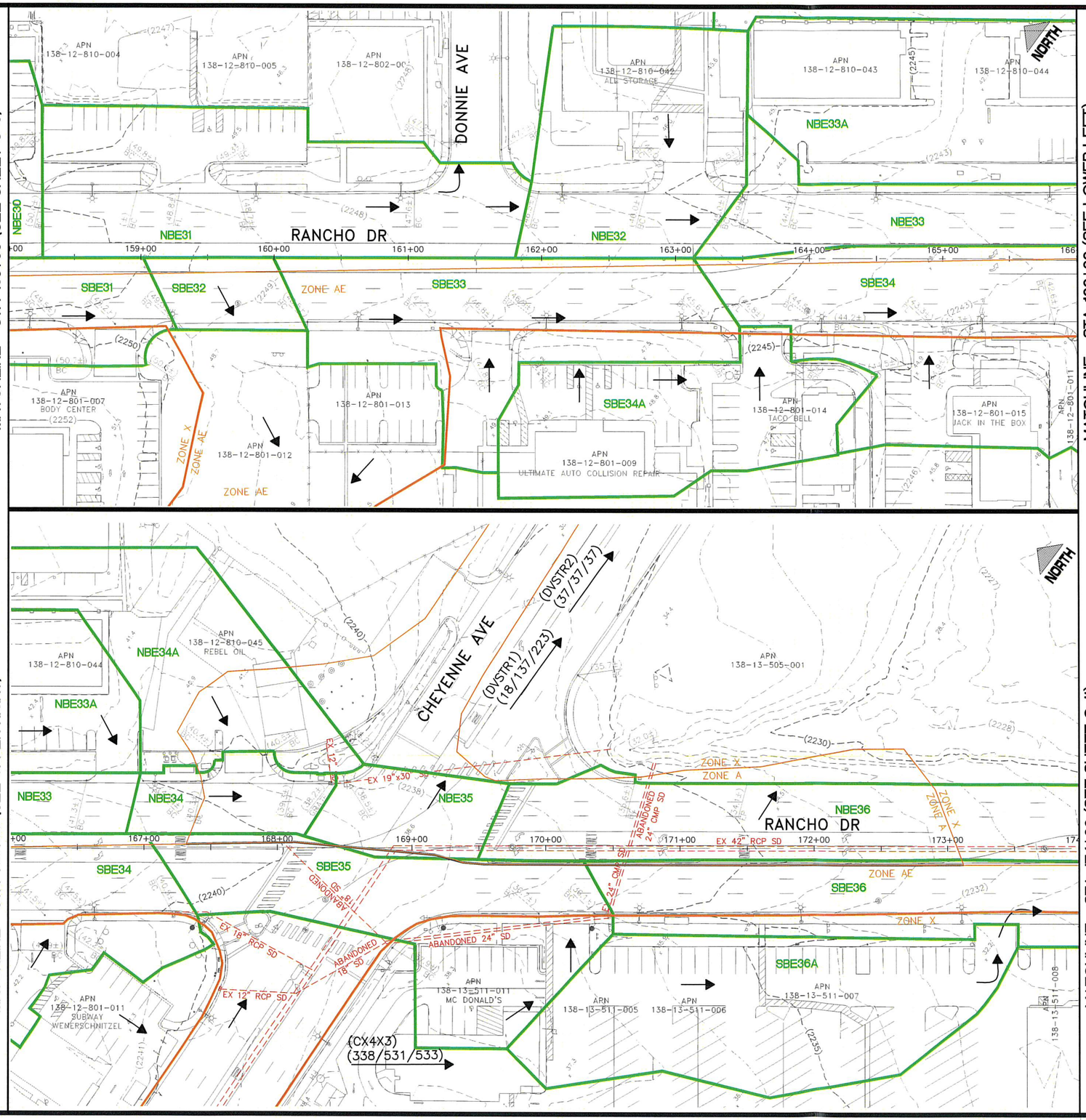
Apr 07, 2014 - 3:53pm - R:\23629-Rancho\05-Studies\01-705 Rancho Rd and Gowan Outfall Combined\03-Working Drawings\705-Basin Layout_Existing 04-02-14.dwg

MATCHLINE - STA: 158+00 (SEE SHEET C-9)

MATCHLINE - STA: 166+00 (SEE LOWER LEFT)

MATCHLINE - STA: 166+00 (SEE UPPER RIGHT)

MATCHLINE - STA: 174+00 (SEE SHEET C-11)



GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL
(HEC-1 NODE)
(EX 25YR FLOW/EX 100YR FLOW/LOMR)

NOTE:
1. ALL FLOW UNITS ARE CUBIC FEET PER SECOND
2. OFFSITE EXISTING FLOW RATES SHOWN ARE SUBSTANTIAL AND WILL CONTROL STREET AND CHANNEL FLOW DEPTHS
3. EXISTING ONSITE FLOW RATES AND INLET CAPTURE FOR THE BASINS SHOWN SEE PART 1 AND PART 3 OF "EXISTING ONSITE RUNOFF AND INLET CAPTURE" CALCULATION IN APPENDIX B

FEMA FIRM PANEL INFORMATION

THE PROJECT IS PRIMARILY LOCATED IN FLOOD ZONES "A", "AE" AND "X", REFERENCED BY FIRM, FLOOD INSURANCE RATE MAPS, CLARK COUNTY, NEVADA AND INCORPORATED AREAS, PANEL 1765 OF 4090, MAP NUMBER 32003C1765F, DATED NOVEMBER 16, 2011 AND PANEL 2155 OF 4090, MAP NUMBER 32003C2155F, DATED NOVEMBER 16, 2011. ZONE A IS LOCATED FROM NORTH OF THE RANCHO/ALEXANDER INTERSECTION EXTENDING TO THE SOUTH OF THE GOWAN/RANCHO INTERSECTION AND OCCURRING AGAIN AT THE CHEYENNE/RANCHO INTERSECTION. ZONE AE IS LOCATED NORTH AND SOUTH OF THE CRAIG/RANCHO INTERSECTION AND AT THE JAY/RANCHO INTERSECTION. ZONE X IS LOCATED AT THE NORTHERN AND SOUTHERN ENDS OF THE PROJECT.

(ZONE X – AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN. ZONE A – SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD WITH NO BASE FLOOD ELEVATIONS DETERMINED. ZONE AE – SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD WITH BASE FLOOD ELEVATIONS DETERMINED.)

BASIS OF BEARING

NORTH 36°41'41" WEST, BEING THE BEARING OF THE CENTERLINE OF RANCHO DRIVE SOUTH OF CHEYENNE AVENUE AS SHOWN BY THAT CERTAIN RECORD OF SURVEY PREPARED BY THE CITY OF LAS VEGAS, AS SHOWN IN FILE 151, PAGE 1 OF SURVEYS, ON FILE IN THE COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK NUMBER 5LV002SES BEING A RIVET AND PLATE IN THE TOP OF CURB AT THE SOUTHEAST CORNER OF RANCHO DRIVE AND JONES BOULEVARD (NORTH)

ELEVATION (NAVD88) = 691.9676 METERS = 2270.23 FEET

REVISIONS

NO.	DATE:	DESCRIPTION	APP'D

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: JEREMY LEAVITT

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM
DATE: JANUARY 2012

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS DECATUR TO RAINBOW

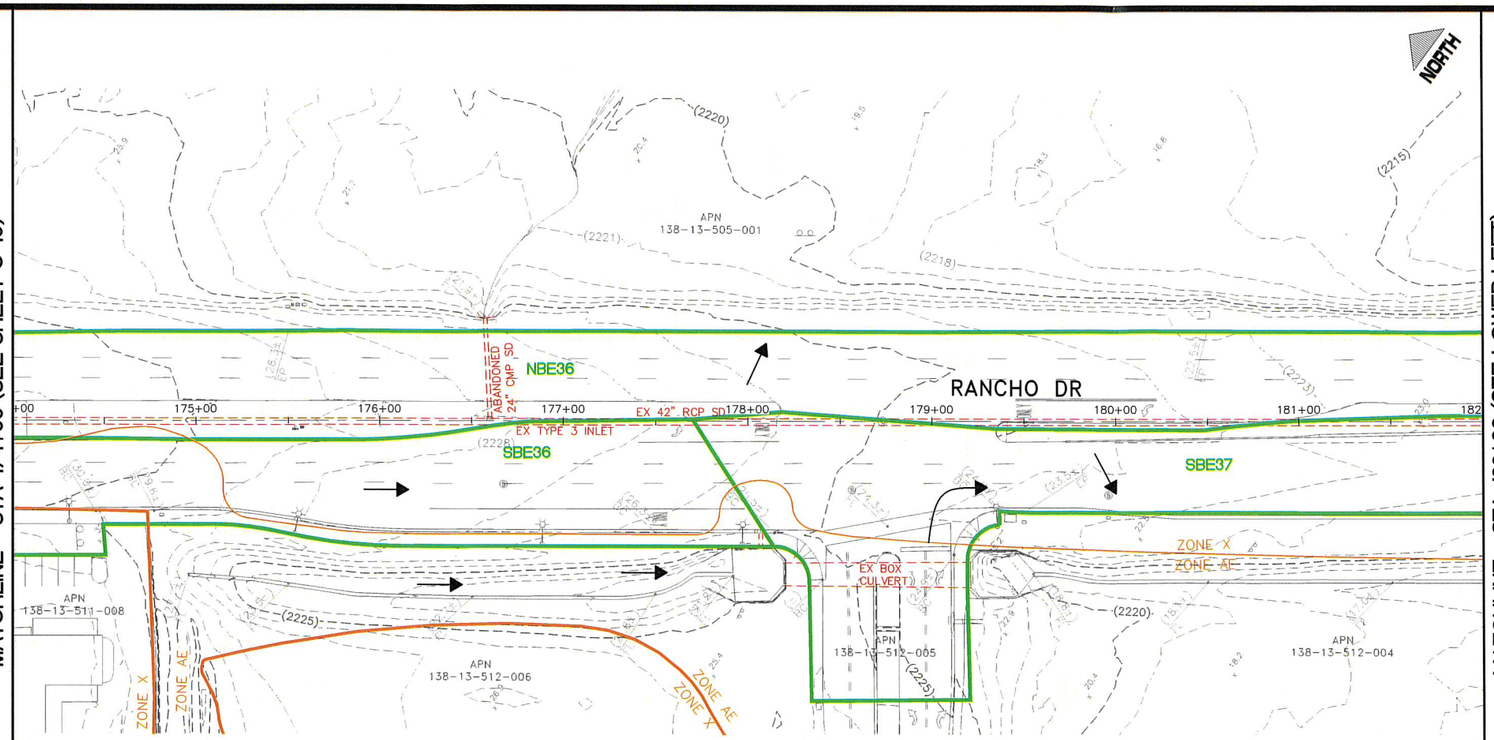
SHEET: EXISTING BASIN LAYOUT

PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

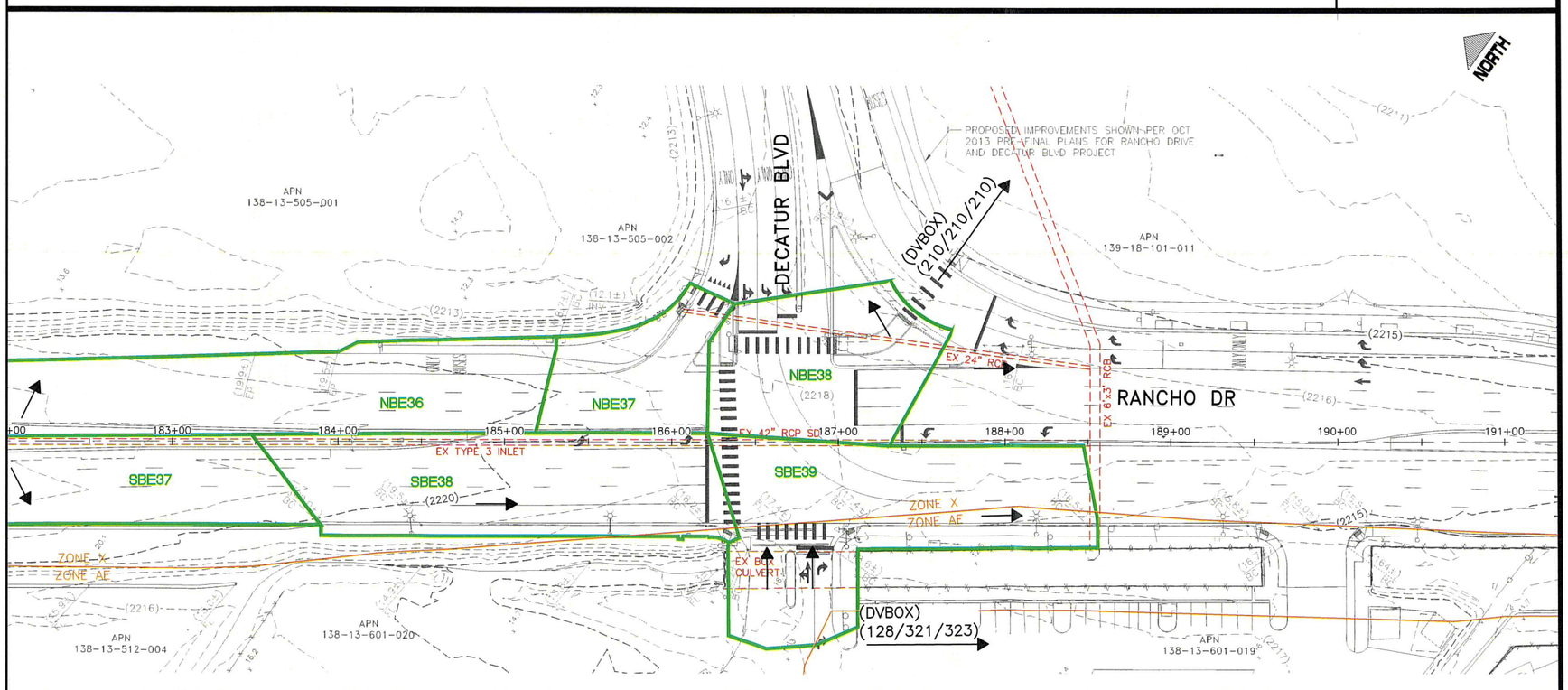
Sheet B-10 of DRAWING NO.

Apr 07, 2014 - 3:54pm - R:\12929-Rancho\06-Studies\01-70% Rancho Rd and Gowan Outfall Combined\99-Working Drawings\70%-Basin Layout_Existing 04-02-14.dwg

MATCHLINE – STA: 174+00 (SEE SHEET C-10)



MATCHLINE – STA: 182+00 (SEE LOWER LEFT)



MATCHLINE – STA: 182+00 (SEE UPPER RIGHT)

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 ft.

LEGEND

- EXISTING BASIN BOUNDARY
- FLOOD ZONE BOUNDARY
- FLOWLINE

OFFSITE FLOW LABEL
(HEC–1 NODE)
(EX 25YR FLOW/EX 100YR FLOW/LOMR)

NOTE:
1. ALL FLOW UNITS ARE CUBIC FEET PER SECOND
2. OFFSITE EXISTING FLOW RATES SHOWN ARE SUBSTANTIAL AND WILL CONTROL STREET AND CHANNEL FLOW DEPTHS
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BASIS OF BEARING

NORTH 36°41'41" WEST, BEING THE BEARING OF THE CENTERLINE OF RANCHO DRIVE SOUTH OF CHEYENNE AVENUE AS SHOWN BY THAT CERTAIN RECORD OF SURVEY PREPARED BY THE CITY OF LAS VEGAS, AS SHOWN IN FILE 151, PAGE 1 OF SURVEYS, ON FILE IN THE COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK NUMBER 5LV002SES BEING A RIVET AND PLATE IN THE TOP OF CURB AT THE SOUTHEAST CORNER OF RANCHO DRIVE AND JONES BOULEVARD (NORTH)

ELEVATION (NAVD88) = 691.9676 METERS = 2270.23 FEET

REVISIONS			
NO.	DATE:	DESCRIPTION	APP'D

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: JEREMY LEAVITT

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM
DATE: JANUARY 2012

CITY OF LAS VEGAS NEVADA

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS DECATUR TO RAINBOW

SHEET: EXISTING BASIN LAYOUT

PROFESSIONAL ENGINEER – STATE OF NEVADA
LANT K. LEAVITT
EXP. 12/31/15
CIVIL
No. 18287

Sheet B-11 of

DRAWING NO.

Apr 07, 2014 - 3:55pm - R:\2623-Rancho\06-Studies\01-70% Rancho Rd and Gowan Outfall Combined\99-Working Drawings\70%-Basin Layout_Existing 04-02-14.dwg

Stanley Consultants, Inc.
5820 S. Eastern Ave., Suite 200, Las Vegas, NV 89119
Phone: (702) 369-9396

Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS, DECATUR TO RAINBOW AND GOWAN OUTFALL - ALEXANDER ROAD FACILITIES**
Job no.: 23629.06
Prepared by : HM
Checked by :
Date: 4/5/2014 12:51
Computation: Interim Offsite Street flow and inlet/culvert capture
References: HEC-1, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009 Curb opening and grate inlet capture for composite curb

Constant values
Manning's coefficient n = 0.015
Width of inlet W = 1.5 ft
Gutter depression a = 0.083 ft

Determine amount of flow conveyed to Gowan Outfall: Minimum of the calculated inlet capture and the calculated capacity of the lateral pipe.

				Inlet sizes		With Clogging Factor			Curb Opening Calculation					Grate Opening Calculation												Inlet Capacity	Culvert/Lateral Capacity			Total Intercept			
Description / HEC-1 Node	Location	Q (cfs)	Q w/bypass (cfs)	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Inlet Clogging Factor (%)	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Se (ft/ft)	L_T (ft)	L (ft)	E	Q_{ic} (cfs)	Q_g (cfs)	Q_{S3} (cfs)	Q_{W3} (cfs)	E_{O3}	W/T	T_3 (ft)	T_{S3} (ft)	Q_{S4} (cfs)	V (ft/s)	V_O (ft/s)	R_f	R_s	Q_{ig} (cfs)	$Q_{intercept}$ (cfs)	Equiv. Diam. (in.)	Slope	Q Pipe (cfs)	$Q_{intercept}$ (cfs)	Q bypass (cfs)	HEC-1 Diversion Node	Comments
INTERIM CONDITION 25-YEAR STORM																																	
Culvert 23 (2) 7'x3' RCB / D2B3	63+60	2	2	Flow that overtops the 48" RCP and is captured by dual 7'x3' RCB's. Then is conveyed into GOAL at Craig, see HY-8 calculation																										3.0	3.0	0.0	D2B3B	discharges into **SBB16**
2C2B3	67+00	37	37	Flow conveyed to Rancho from Craig; assumed that flow remains on west side of Rancho																										0.0	37.0			discharges into **SBB16A**
DM2 Inlet	68+71	0	37	2.5	5.0	25	1.9	3.8	0.0	61.5	1.9	0.1	2.0	35.0	29.1	5.9	0.2	0.1	24.7	23.2	29.1	4.7	6.8	1.0	0.0	7.1	9.1	18	8.0%	20.0	9.1	27.9		new curb opening and inlet
NDOT TYPE 2	70+00	0	28	Flow does not overtop curb																							0.0	36	8.0%	127.0	0.0	27.9		new curb opening and inlet
NDOT TYPE 2	71+60	0	28	Flow does not overtop curb																							0.0	36	8.0%	127.0	0.0	27.9		new curb opening and inlet
DM2 Inlet	73+20	0	28	2.5	5.0	25	1.9	3.8	0.0	54.9	1.9	0.1	1.7	26.2	20.6	5.7	0.2	0.1	19.3	17.8	20.6	5.1	6.8	1.0	0.0	6.5	8.1	18	1.0%	7.1	7.1	20.8		new curb opening and inlet
DM2 Inlet	82+45	0	21	7.5	12.5	25	5.6	9.4	0.1	40.0	3.8	0.2	3.4	17.4	12.4	5.0	0.3	0.1	14.0	12.5	12.3	4.9	10.0	1.0	0.4	10.3	13.7	24	5.5%	35.7	13.7	7.1	Total 30 cfs at D2CB3	new curb opening and inlet to replace exisitng 2' inlet
Culvert 27 / PT51A	82+45	40	47	Offsite flow captured by culvert (see HY-8 calculation); street flow continues in roadway as bypass																										40.0	40.0	7.1	DPT51A	Culvert 26 HEC-1; all offsite goes into SD system; street flow remains in street
DM2 Inlet	87+10	0	7	7.5	12.5	25	5.6	9.4	0.0	31.7	3.8	0.2	1.4	5.7	3.9	1.8	0.3	0.1	14.2	12.7	3.8	3.0	10.0	1.0	0.5	3.6	5.0	18	5.2%	16.2	5.0	2.1		new curb opening and inlet
DM2 Inlet	94+34	0	2	7.5	12.5	25	5.6	9.4	0.1	12.1	3.8	0.5	1.0	1.1	0.4	0.7	0.6	0.2	6.3	4.8	0.4	1.9	10.0	1.0	0.7	1.0	2.0	24	5.1%	34.4	2.0	0.1		new curb opening and inlet
DM2 Inlet	96+18	0	0	Assumed 100% of 0.1 cfs bypass from upstream inlet is captured by this 12.5' inlet with 7.5' grate																							0.1	18	4.2%	14.5	0.1	0.0	Total of 7 cfs DC2628	new curb opening and inlet
PT51B	97+00	40	40	Flow conveyed to Rancho from Jones																											0.0	40.0			new curb opening and inlet
2CPT51	97+50	292	292	Flow conveyed to Rancho from Jones; based on LOMR, flow is within western property and west side of roadway																											0.0	292.0			new curb opening and inlet
38"x24" RCEP	96+45	0	292	Portion of flow from CPT52 conveyed to GOLO within existing stormdrain is assumed to be the pipe capacity																									30	1.0%	27.6	27.6	264.4		existing SD capture
42"x27" RCEP	96+80	0	264	Portion of flow from CPT52 conveyed to GOLO within existing stormdrain is assumed to be the pipe capacity																									33	1.0%	35.6	35.6	228.8		existing SD capture
42"x27" RCEP	97+45	0	229	Portion of flow from CPT52 conveyed to GOLO within existing stormdrain is assumed to be the pipe capacity																									33	1.0%	35.6	35.6	193.2		existing SD capture
DM2 Inlet	99+50	0	193	12.5	17.5	25	9.4	13.1	0.0	120.7	3.8	0.1	10.7	182.5	167.3	15.2	0.1	0.0	49.4	47.9	167.3	6.2	10.0	1.0	0.5	99.9	110.6	18	4.0%	14.1	14.1	179.1		new curb opening and inlet
DM2 Inlet	102+00	0	179	12.5	17.5	25	9.4	13.1	0.0	119.4	3.8	0.1	10.0	169.1	154.9	14.1	0.1	0.0	49.3	47.8	155.0	6.0	10.0	1.0	0.5	93.0	103.0	18	4.0%	14.1	14.1	164.9	Total of 127 cfs at DC2CPT51	new curb opening and inlet

Stanley Consultants, Inc.
5820 S. Eastern Ave., Suite 200, Las Vegas, NV 89119
Phone: (702) 369-9396

Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS, DECATUR TO RAINBOW AND GOWAN OUTFALL - ALEXANDER ROAD FACILITIES**
Job no.: 23629.06
Prepared by : HM
Checked by :
Date: 4/5/2014 12:51
Computation: Interim Offsite Street flow and inlet/culvert capture
References: HEC-1, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009 Curb opening and grate inlet capture for composite curb

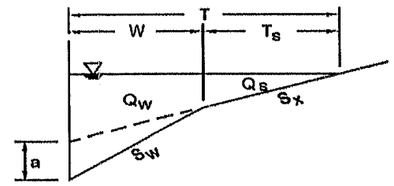
Constant values
Manning's coefficient n = 0.015
Width of inlet W = 1.5 ft
Gutter depression a = 0.083 ft

Determine amount of flow conveyed to Gowan Outfall: Minimum of the calculated inlet capture and the calculated capacity of the lateral pipe.

				Inlet sizes		With Clogging Factor			Curb Opening Calculation					Grate Opening Calculation												Inlet Capacity	Culvert/Lateral Capacity			Total Intercept			
Description / HEC-1 Node	Location	Q (cfs)	Q w/bypass (cfs)	L_{grate} (ft)	L_{curb} opening (ft)	Inlet Clogging Factor (%)	L_{grate} (ft)	L_{curb} opening (ft)	Se (ft/ft)	L_T (ft)	L (ft)	E	Q_{ic} (cfs)	Q_g (cfs)	Q_{S3} (cfs)	Q_{W3} (cfs)	E_{O3}	W/T	T_3 (ft)	T_{S3} (ft)	Q_{S4} (cfs)	V (ft/s)	V_O (ft/s)	R_f	R_s	Q_{ig} (cfs)	$Q_{intercept}$ (cfs)	Equiv. Diam. (in.)	Slope	Q Pipe (cfs)	$Q_{intercept}$ (cfs)	Q bypass (cfs)	HEC-1 Diversion Node	Comments
INTERIM CONDITION 100-YEAR STORM																																	
Culvert 23 (2) 7'x3' RCB / D2B3	63+60	3	3	Flow that overtops the 48" RCP and is captured by dual 7'x3' RCB's and conveyed into GOAL at Craig, see HY-8 calculation																										3.00	3.0	0.0	D2B3B	discharges into **SBB16**
2C2B3	67+00	136	136	Flow conveyed to Rancho from Craig; assumed that flow remains on west side of Rancho																											0.0	136.0		discharges into **SBB16A**
DM2 Inlet	68+71	0	136	2.5	5.0	25	1.9	3.8	0.0	114.0	1.9	0.0	4.0	132.0	118.6	13.4	0.1	0.0	40.7	39.2	118.6	6.6	6.8	1.0	0.0	16.0	20.0	18	8.00%	20.0	20.0	116.0		new curb opening and inlet
NDOT TYPE 2	70+00	0	116	See Flowmaster calculation for inlet capture																							30.0	36	8.00%	127.0	30.0	86.0		new curb opening and inlet
NDOT TYPE 2	71+60	0	86	See Flowmaster calculation for inlet capture																							29.0	36	8.00%	127.0	29.0	57.0		new curb opening and inlet
DM2 Inlet	73+20	0	57	2.5	5.0	25	1.9	3.8	0.0	77.5	1.9	0.0	2.5	54.5	45.7	8.9	0.2	0.1	25.5	24.0	45.8	6.1	6.8	1.0	0.0	10.1	12.6	18	1.00%	7.1	7.1	49.9		new curb opening and inlet
DM2 Inlet	82+45	0	50	7.5	12.5	25	5.6	9.4	0.0	60.8	3.8	0.1	5.4	44.5	35.6	9.0	0.2	0.1	20.2	18.7	35.8	6.0	10.0	1.0	0.3	20.8	26.2	24	5.50%	35.7	26.2	23.7	Total 112 cfs at D2CB3	new curb opening and inlet to replace exisitng 2' inlet
Culvert 27 / PT51A	82+45	58	82	Offsite flow captured by culvert (see HY-8 calculation); street flow continues in roadway as bypass																										58.0	58.0	23.7	DPT51A	Culvert 26 HEC-1; all offsite goes into SD system; street flow remains in street
DM2 Inlet	87+10	0	24	7.5	12.5	25	5.6	9.4	0.0	59.0	3.8	0.1	2.6	21.0	17.2	3.8	0.2	0.1	23.7	22.2	17.1	4.1	10.0	1.0	0.3	9.6	12.2	18	5.24%	16.2	12.2	11.4		new curb opening and inlet
DM2 Inlet	94+34	0	11	7.5	12.5	25	5.6	9.4	0.0	29.4	3.8	0.2	2.5	9.0	6.6	2.4	0.3	0.1	15.9	14.4	6.6	2.8	10.0	1.0	0.6	6.2	8.7	24	5.10%	34.4	8.7	2.7		new curb opening and inlet
DM2 Inlet	96+18	0	3	7.5	12.5	25	5.6	9.4	0.0	19.8	3.8	0.3	0.9	1.9	1.1	0.8	0.4	0.1	11.3	9.8	1.1	2.0	10.0	1.0	0.6	1.4	2.3	18	4.19%	14.5	2.3	0.4	Total of 23 cfs DC2628	new curb opening and inlet
PT51B	97+00	57	57	Flow conveyed to Rancho from Jones																											0.0	57.4		new curb opening and inlet
2CPT51	97+50	478	478	Flow conveyed to Rancho from Jones; based on LOMR, flow is within western property and west side of roadway																											0.0	478.0		new curb opening and inlet
38"x24" RCEP	96+45	0	478	Portion of flow from CPT52 conveyed to GOLO within existing stormdrain is assumed to be the pipe capacity																									30	1.00%	27.6	27.6	450.4		existing SD capture
42"x27" RCEP	96+80	0	450	Portion of flow from CPT52 conveyed to GOLO within existing stormdrain is assumed to be the pipe capacity																									33	1.00%	35.6	35.6	414.8		existing SD capture
42"x27" RCEP	97+45	0	415	Portion of flow from CPT52 conveyed to GOLO within existing stormdrain is assumed to be the pipe capacity																									33	1.00%	35.6	35.6	379.2		existing SD capture
DM2 Inlet	99+50	0	379	12.5	17.5	25	9.4	13.1	0.0	163.8	3.8	0.0	15.5	363.7	340.5	23.3	0.1	0.0	64.0	62.5	340.1	7.4	10.0	1.0	0.4	169.2	184.7	18	4.00%	14.1	14.1	365.1		new curb opening and inlet
DM2 Inlet	102+00	0	365	12.5	17.5	25	9.4	13.1	0.0	164.9	3.8	0.0	14.8	350.3	328.1	22.2	0.1	0.0	64.8	63.3	328.3	7.2	10.0	1.0	0.4	162.5	177.3	18	4.00%	14.1	14.1	350.9	Total of 127 cfs at DC2CPT51	new curb opening and inlet

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Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS, DECATUR TO RAINBOW AND GOWAN OUTFALL - ALEXANDER ROAD FACILITIES**
Job no.: 23629.06
Prepared by : MM
Checked by : KR
Date: 4/5/2014 12:51
Computation: Developed onsite: 25-year runoff and inlet capture
References: Rational Method in accordance with CCRFCD's HC&DDM, 1996, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009 Curb opening and grate inlet capture for composite curb



Composite Section; Conventional Curb and Gutter
Reproduced from Figure 4-1, FHWA HEC-22

Part 1: Runoff calculations; 25-year

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	Paved Areas				Initial/Overland Time				Travel Time												
Subbasin I.D.	Area ft^2	Area (acres)	C_{25}	C_{100}	Length Lo (ft)	Slope S_o (%)	K	t_i (minutes)	L (ft)	Slope S (%)	V (fps)	t_t (minutes)	Conc. Time t_c (minutes)	Total Length L_T (ft)	Check Urban t_c (minutes)	Calculated t_c (minutes)	Final t_c (minutes)	I_{25} (in./hr)	I_{100} (in./hr)	Q_{25} (cfs)	Q_{100} (cfs)
SBB01	13,430	0.31	0.91	0.93	37	2.50	0.90	1.61	244	0.30	1.09	3.72	5.33	281.00	11.56	5.33	5.33	5.46	7.49	1.53	2.15
SBB01A	17,162	0.39	0.91	0.93	41	1.60	0.90	1.97	141	0.69	1.66	1.41	3.39	182.00	11.01	3.39	5.00	5.57	7.63	2.00	2.80
SBB02	25,506	0.59	0.91	0.93	52	2.00	0.90	2.06	150	0.70	1.67	1.49	3.55	202.00	11.12	3.55	5.00	5.57	7.63	2.97	4.15
SBB03	32,775	0.75	0.91	0.93	47	3.20	0.90	1.67	516	0.30	1.09	7.87	9.54	563.00	13.13	9.54	9.54	4.52	6.19	3.09	4.33
SBB04A	23,979	0.55	0.91	0.93	47	2.30	0.90	1.87	294	0.23	0.96	5.12	6.99	341.00	11.89	6.99	6.99	5.02	6.88	2.52	3.52
SBB04B	24,986	0.57	0.91	0.93	49	2.00	0.90	2.00	298	0.20	0.89	5.57	7.57	347.00	11.93	7.57	7.57	4.89	6.70	2.55	3.58
SBB05	22,523	0.52	0.91	0.93	56	2.00	0.90	2.14	301	0.60	1.55	3.24	5.38	357.00	11.98	5.38	5.38	5.45	7.47	2.56	3.59
SBB06A	12,067	0.28	0.91	0.93	43	3.10	0.90	1.62	188	0.40	1.26	2.48	4.10	231.00	11.28	4.10	5.00	5.57	7.63	1.40	1.97
SBB06B	19,082	0.44	0.91	0.93	46	2.30	0.90	1.85	292	0.20	0.89	5.46	7.31	338.00	11.88	7.31	7.31	4.95	6.78	1.97	2.76
SBB07A	14,803	0.34	0.91	0.93	53	2.60	0.90	1.91	194	0.20	0.89	3.63	5.53	247.00	11.37	5.53	5.53	5.40	7.40	1.67	2.34
SBB07B	18,258	0.42	0.91	0.93	53	1.90	0.90	2.12	216	0.28	1.06	3.41	5.52	269.00	11.49	5.52	5.52	5.41	7.41	2.06	2.89
SBB08	8,879	0.20	0.91	0.93	53	2.30	0.90	1.99	72	0.20	0.89	1.35	3.33	125.00	10.69	3.33	5.00	5.57	7.63	1.03	1.45
SBB08A	10,954	0.25	0.91	0.93	62	2.30	0.90	2.15	165	0.50	1.41	1.95	4.09	227.00	11.26	4.09	5.00	5.57	7.63	1.27	1.78
SBB09	19,119	0.44	0.91	0.93	53	2.80	0.90	1.86	153	1.10	2.10	1.21	3.07	206.00	11.14	3.07	5.00	5.57	7.63	2.22	3.11
SBB10	36,267	0.83	0.91	0.93	53	1.50	0.90	2.29	471	1.00	2.00	3.92	6.21	524.00	12.91	6.21	6.21	5.22	7.15	3.95	5.53
SBB11	15,762	0.36	0.91	0.93	57	1.40	0.90	2.43	186	1.14	2.14	1.45	3.88	243.00	11.35	3.88	5.00	5.57	7.63	1.83	2.57
SBB12	9,893	0.23	0.91	0.93	53	2.90	0.90	1.84	119	1.29	2.28	0.87	2.71	172.00	10.96	2.71	5.00	5.57	7.63	1.15	1.61
SBB13	16,052	0.37	0.91	0.93	60	3.40	0.90	1.85	162	0.80	1.79	1.51	3.36	222.00	11.23	3.36	5.00	5.57	7.63	1.87	2.61
SBB14	14,533	0.33	0.91	0.93	47	1.50	0.90	2.16	157	0.90	1.90	1.38	3.53	204.00	11.13	3.53	5.00	5.57	7.63	1.69	2.37
SBB15	21,216	0.49	0.91	0.93	61	1.20	0.90	2.65	209	0.80	1.79	1.95	4.59	270.00	11.50	4.59	5.00	5.57	7.63	2.47	3.46
SBB16	67,985	1.56	0.91	0.93	296	1.90	0.90	5.00	273	1.00	2.00	2.27	7.27	569.00	13.16	7.27	7.27	4.96	6.79	7.04	9.86
SBB16A	44,600	1.02	0.91	0.93	72	2.40	0.90	2.28	291	0.80	1.79	2.71	4.99	363.00	12.02	4.99	5.00	5.57	7.63	5.19	7.26
SBB16B	31,641	0.73	0.91	0.93	57	2.70	0.90	1.95	428	1.10	2.10	3.40	5.35	485.00	12.69	5.35	5.35	5.46	7.48	3.61	5.05
SBB16C	58,217	1.34	0.91	0.93	59	3.60	0.90	1.80	900	1.00	2.00	7.49	9.30	959.00	15.33	9.30	9.30	4.56	6.24	5.54	7.76
SBB16D	105,882	2.43	0.91	0.93	60	2.00	0.90	2.21	522	0.90	1.90	4.58	6.79	582.00	13.23	6.79	6.79	5.07	6.94	11.21	15.70
SBB16E	10,028	0.23	0.91	0.93	95	2.00	0.90	2.78	112	0.20	0.89	2.09	4.88	207.00	11.15	4.88	5.00	5.57	7.63	1.17	1.63
SBB17	32,200	0.74	0.91	0.93	46	1.80	0.90	2.01	456	0.90	1.90	4.00	6.01	502.00	12.79	6.01	6.01	5.27	7.22	3.54	4.96
SBB18	49,951	1.15	0.91	0.93	50	2.50	0.90	1.88	730	0.47	1.37	8.88	10.76	780.00	14.33	10.76	10.76	4.32	5.92	4.51	6.31
SBB19A	4,940	0.11	0.91	0.93	53	1.40	0.90	2.34	50	0.72	1.70	0.49	2.83	103.00	10.57	2.83	5.00	5.57	7.63	0.57	0.80
SBB19B	6,633	0.15	0.91	0.93	54	1.40	0.90	2.36	65	1.10	2.10	0.52	2.88	119.00	10.66	2.88	5.00	5.57	7.63	0.77	1.08
SBB20A	14,873	0.34	0.91	0.93	50	2.40	0.90	1.90	250	0.55	1.48	2.81	4.71	300.00	11.67	4.71	5.00	5.57	7.63	1.73	2.42
SBB20B	15,183	0.35	0.91	0.93	50	2.30	0.90	1.93	250	0.55	1.48	2.81	4.74	300.00	11.67	4.74	5.00	5.57	7.63	1.77	2.47
SBB20C	16,792	0.39	0.91	0.93	50	2.30	0.90	1.93	250	0.55	1.48	2.81	4.74	300.00	11.67	4.74	5.00	5.57	7.63	1.95	2.74
SBB21	26,942	0.62	0.91	0.93	63	1.70	0.90	2.39	172	0.36	1.20	2.39	4.79	235.00	11.31	4.79	5.00	5.57	7.63	3.13	4.39
SBB22A	36,063	0.83	0.91	0.93	24	2.00	0.90	1.40	223	0.66	1.62	2.29	3.69	247.00	11.37	3.69	5.00	5.57	7.63	4.19	5.87
SBB22B	30,335	0.70	0.91	0.93	52	2.80	0.90	1.84	454	0.70	1.67	4.52	6.36	506.00	12.81	6.36	6.36	5.18	7.09	3.28	4.59
SBB22C	15,487	0.36	0.91	0.93	54	3.20	0.90	1.80	197	0.60	1.55	2.12	3.92	251.00	11.39	3.92	5.00	5.57	7.63	1.80	2.52
SBB23	56,676	1.30	0.91	0.93	53	2.20	0.90	2.02	840	0.57	1.51	9.29	11.31	893.00	14.96	11.31	11.31	4.24	5.81	5.02	7.03
SBB24A	35,480	0.81	0.91	0.93	44	2.70	0.90	1.71	566	0.27	1.04	9.10	10.81	610.00	13.39	10.81	10.81	4.31	5.91	3.20	4.47
SBB24B	22,051	0.51	0.91	0.93	48	2.00	0.90	1.98	260	0.30	1.09	3.96	5.94	308.00	11.71	5.94	5.94	5.29	7.24	2.44	3.41
SBB24C	31,541	0.72	0.91	0.93	47	1.60	0.90	2.11	253	0.20	0.89	4.73	6.84	300.00	11.67	6.84	6.84	5.06	6.93	3.33	4.67
SBB25	15,656	0.36	0.91	0.93	56	3.80	0.90	1.73	255	0.30	1.09	3.89	5.61	311.00	11.73	5.61	5.61	5.38	7.37	1.76	2.46
SBB26	26,565	0.61	0.91	0.93	51	3.10	0.90	1.76	315	0.10	0.63	8.34	10.10	366.00	12.03	10.10	10.10	4.42	6.06	2.45	3.44
SBB27	12,393	0.28	0.91	0.93	45	3.50	0.90	1.59	120	0.12	0.69	2.90	4.49	165.00	10.92	4.49	5.00	5.57	7.63	1.44	2.02
SBB28	9,696	0.22	0.91	0.93	47	2.10	0.90	1.93	128	0.30	1.09	1.95	3.88	175.00	10.97	3.88	5.00	5.57	7.63	1.13	1.58
SBB29	19,233	0.44	0.91	0.93	60	3.10	0.90	1.91	139	0.15	0.77	3.00	4.91	199.00	11.11	4.91	5.00	5.57	7.63	2.24	3.13

Part 1: Runoff calculations; 25-year

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	Paved Areas				Initial/Overland Time				Travel Time												
Subbasin I.D.	Area ft^2	Area (acres)	C_{25}	C_{100}	Length Lo (ft)	Slope S_o (%)	K	t_i (minutes)	L (ft)	Slope S (%)	V (fps)	t_t (minutes)	Conc. Time t_c (minutes)	Total Length L_T (ft)	Check Urban t_c (minutes)	Calculated t_c (minutes)	Final t_c (minutes)	I_{25} (in./hr)	I_{100} (in./hr)	Q_{25} (cfs)	Q_{100} (cfs)
SBB30	13,070	0.30	0.91	0.93	43	1.90	0.90	1.91	195	0.10	0.63	5.16	7.07	238.00	11.32	7.07	7.07	5.00	6.86	1.37	1.91
SBB3132	79,107	1.82	0.91	0.93	45	2.20	0.90	1.86	924	0.46	1.36	11.36	13.22	969.00	15.38	13.22	13.22	3.99	5.46	6.59	9.22
SBB33	28,649	0.66	0.91	0.93	56	2.70	0.90	1.93	278	1.10	2.10	2.21	4.14	334.00	11.86	4.14	5.00	5.57	7.63	3.33	4.67
SBB34A	29,061	0.67	0.91	0.93	27	2.00	0.90	1.48	119	1.70	2.61	0.76	2.24	146.00	10.81	2.24	5.00	5.57	7.63	3.38	4.73
SBB34B	23,340	0.54	0.91	0.93	28	3.60	0.90	1.24	65	3.60	3.81	0.28	1.53	93.00	10.52	1.53	5.00	5.57	7.63	2.71	3.80
SBB34C	17,543	0.40	0.91	0.93	57	2.40	0.90	2.03	351	1.30	2.28	2.56	4.59	408.00	12.27	4.59	5.00	5.57	7.63	2.04	2.86
SBB35	30,593	0.70	0.91	0.93	71	3.10	0.90	2.08	293	1.46	2.42	2.02	4.10	364.00	12.02	4.10	5.00	5.57	7.63	3.56	4.98
SBB36A	34,138	0.78	0.91	0.93	94	2.00	0.90	2.77	243	1.60	2.54	1.60	4.37	337.00	11.87	4.37	5.00	5.57	7.63	3.97	5.56
SBB36	44,738	1.03	0.91	0.93	50	2.40	0.90	1.90	714	1.46	2.42	4.91	6.82	764.00	14.24	6.82	6.82	5.06	6.94	4.73	6.63
SBB37A	31,977	0.73	0.91	0.93	94	2.80	0.90	2.48	353	1.00	2.00	2.94	5.41	447.00	12.48	5.41	5.41	5.44	7.45	3.63	5.09
SBB37B	11,467	0.26	0.91	0.93	59	3.70	0.90	1.79	169	0.96	1.96	1.44	3.22	228.00	11.27	3.22	5.00	5.57	7.63	1.33	1.87
SBB38	16,998	0.39	0.91	0.93	65	1.30	0.90	2.66	226	0.80	1.79	2.10	4.76	291.00	11.62	4.76	5.00	5.57	7.63	1.98	2.77
SBB39	18,119	0.42	0.91	0.93	57	3.50	0.90	1.79	200	1.00	2.00	1.66	3.46	257.00	11.43	3.46	5.00	5.57	7.63	2.11	2.95
NBB01	10,384	0.24	0.91	0.93	43	1.60	0.90	2.02	28	0.50	1.41	0.33	2.35	71.00	10.39	2.35	5.00	5.57	7.63	1.21	1.69
NBB02A1	16,632	0.38	0.91	0.93	62	1.80	0.90	2.33	250	0.29	1.07	3.88	6.21	312.00	11.73	6.21	6.21	5.22	7.15	1.81	2.54
NBB02A2	16,580	0.38	0.91	0.93	52	2.30	0.90	1.97	253	0.29	1.07	3.92	5.89	305.00	11.69	5.89	5.89	5.30	7.26	1.84	2.57
NBB02B1	16,797	0.39	0.91	0.93	62	2.40	0.90	2.12	250	0.23	0.96	4.36	6.47	312.00	11.73	6.47	6.47	5.15	7.05	1.81	2.53
NBB02B2	14,879	0.34	0.91	0.93	47	1.70	0.90	2.07	246	0.23	0.96	4.29	6.35	293.00	11.63	6.35	6.35	5.18	7.09	1.61	2.25
NBB02C	17,104	0.39	0.91	0.93	45	1.70	0.90	2.02	251	0.40	1.26	3.31	5.33	296.00	11.64	5.33	5.33	5.46	7.48	1.95	2.73
NBB03	15,075	0.35	0.91	0.93	46	2.10	0.90	1.91	53	0.10	0.63	1.40	3.31	99.00	10.55	3.31	5.00	5.57	7.63	1.75	2.46
NBB04	27,649	0.63	0.91	0.93	61	2.00	0.90	2.23	389	0.20	0.89	7.27	9.50	450.00	12.50	9.50	9.50	4.52	6.20	2.61	3.66
NBB05A	36,771	0.84	0.91	0.93	62	3.10	0.90	1.94	577	0.43	1.31	7.34	9.28	639.00	13.55	9.28	9.28	4.56	6.25	3.50	4.90
NBB05B	11,025	0.25	0.91	0.93	47	1.90	0.90	1.99	137	0.39	1.25	1.83	3.82	184.00	11.02	3.82	5.00	5.57	7.63	1.28	1.80
NBB06	18,457	0.42	0.91	0.93	57	3.50	0.90	1.79	215	1.08	2.08	1.72	3.51	272.00	11.51	3.51	5.00	5.57	7.63	2.15	3.01
NBB07	58,078	1.33	0.91	0.93	54	2.00	0.90	2.10	814	1.10	2.10	6.46	8.56	868.00	14.82	8.56	8.56	4.69	6.43	5.69	7.97
NBB08	9,759	0.22	0.91	0.93	55	1.90	0.90	2.16	76	1.03	2.03	0.62	2.78	131.00	10.73	2.78	5.00	5.57	7.63	1.14	1.59
NBB09	16,029	0.37	0.91	0.93	52	2.40	0.90	1.94	128	1.10	2.10	1.02	2.95	180.00	11.00	2.95	5.00	5.57	7.63	1.86	2.61
NBB10	23,978	0.55	0.91	0.93	49	2.40	0.90	1.88	302	1.10	2.10	2.40	4.28	351.00	11.95	4.28	5.00	5.57	7.63	2.79	3.91
NBB11	13,983	0.32	0.91	0.93	50	1.00	0.90	2.55	174	1.20	2.19	1.32	3.87	224.00	11.24	3.87	5.00	5.57	7.63	1.63	2.28
NBB12	18,064	0.41	0.91	0.93	69	1.20	0.90	2.81	200	0.30	1.09	3.05	5.86	269.00	11.49	5.86	5.86	5.31	7.27	2.00	2.81
NBB13A	45,736	1.05	0.91	0.93	95	2.10	0.90	2.74	644	0.96	1.96	5.47	8.21	739.00	14.11	8.21	8.21	4.76	6.52	4.55	6.37
NBB13B	42,663	0.98	0.91	0.93	95	2.60	0.90	2.55	644	0.90	1.90	5.65	8.20	739.00	14.11	8.20	8.20	4.76	6.52	4.24	5.94
NBB14A	32,846	0.75	0.91	0.93	73	2.30	0.90	2.33	489	0.90	1.90	4.29	6.62	562.00	13.12	6.62	6.62	5.11	7.00	3.51	4.91
NBB14B	31,952	0.73	0.91	0.93	73	2.20	0.90	2.36	489	0.90	1.90	4.29	6.66	562.00	13.12	6.66	6.66	5.10	6.99	3.41	4.77
NBB15	21,422	0.49	0.91	0.93	85	1.60	0.90	2.84	322	0.50	1.41	3.80	6.64	407.00	12.26	6.64	6.64	5.11	7.00	2.29	3.20
NBB16	9,315	0.21	0.91	0.93	61	1.20	0.90	2.65	133	0.30	1.09	2.03	4.67	194.00	11.08	4.67	5.00	5.57	7.63	1.08	1.52
NBB17A	15,390	0.35	0.91	0.93	60	1.90	0.90	2.25	189	0.40	1.26	2.49	4.74	249.00	11.38	4.74	5.00	5.57	7.63	1.79	2.51
NBB17B	16,679	0.38	0.91	0.93	60	2.30	0.90	2.11	246	0.70	1.67	2.45	4.56	306.00	11.70	4.56	5.00	5.57	7.63	1.94	2.72
NBB17C	13,250	0.30	0.91	0.93	60	2.30	0.90	2.11	210	0.40	1.26	2.77	4.88	270.00	11.50	4.88	5.00	5.57	7.63	1.54	2.16
NBB17D	9,700	0.22	0.91	0.93	60	2.50	0.90	2.05	136	0.60	1.55	1.46	3.52	196.00	11.09	3.52	5.00	5.57	7.63	1.13	1.58
NBB18	49,270	1.13	0.91	0.93	54	3.40	0.90	1.76	597	0.61	1.56	6.37	8.13	651.00	13.62	8.13	8.13	4.78	6.54	4.92	6.88
NBB19	8,470	0.19	0.91	0.93	53	2.30	0.90	1.99	103	0.31	1.11	1.54	3.53	156.00	10.87	3.53	5.00	5.57	7.63	0.99	1.38
NBB20	42,403	0.97	0.91	0.93	59	2.70	0.90	1.99	579	0.77	1.76	5.50	7.48	638.00	13.54	7.48	7.48	4.91	6.73	4.35	6.09
NBB21	11,253	0.26	0.91	0.93	47	2.80	0.90	1.75	100	0.80	1.79	0.93	2.68	147.00	10.82	2.68	5.00	5.57	7.63	1.31	1.83
NBB22	28,382	0.65	0.91	0.93	55	2.90	0.90	1.87	406	0.30	1.09	6.19	8.06	461.00	12.56	8.06	8.06	4.79	6.56	2.84	3.98
NBB23A	26,838	0.62	0.91	0.93	42	2.40	0.90	1.74	366	0.21	0.91	6.67	8.42	408.00	12.27	8.42	8.42	4.72	6.47	2.65	3.70
NBB23B	20,265	0.47	0.91	0.93	51	1.60	0.90	2.20	245	0.10	0.63	6.49	8.68	296.00	11.64	8.68	8.68	4.67	6.40	1.98	2.77
NBB23C	24,078	0.55	0.91	0.93	44	2.20	0.90	1.84	196	0.10	0.63	5.19	7.03	240.00	11.33	7.03	7.03	5.01	6.87	2.52	3.53
NBB24	15,267	0.35	0.91	0.93	49	3.10	0.90	1.73	178	0.10	0.63	4.71	6.44	227.00	11.26	6.44	6.44	5.16	7.06	1.64	2.30
NBB25	17,793	0.41	0.91	0.93	51	4.00	0.90	1.62	229	0.40	1.26	3.02	4.64	280.00	11.56	4.64	5.00	5.57	7.63	2.07	2.90
NBB26	25,703	0.59	0.91	0.93	50	3.70	0.90	1.65	352	0.20	0.89	6.58	8.22	402.00	12.23	8.22	8.22	4.76	6.52	2.55	3.58
NBB27	22,512	0.52	0.91	0.93	41	3.00	0.90	1.60	149	0.10	0.63	3.95	5.54	190.00	11.06	5.54	5.54	5.40	7.40	2.54	3.56
NBB28	41,417	0.95	0.91	0.93	55	3.20	0.90	1.81	578	0.20	0.89	10.80	12.61	633.00	13.52	12.61	12.61	4.06	5.56	3.51	4.92
NBB2930	28,089	0.64	0.91	0.93	57	3.70	0.90	1.76	238	0.40	1.26	3.14	4.90	295.00	11.64	4.90	5.00	5.57	7.63	3.27	4.58
NBB31	36,303	0.83	0.91	0.93	46	2.80	0.90	1.73	255	1.00	2.00	2.12	3.86	301.00	11.67	3.86	5.00	5.57	7.63	4.22	5.91
NBB32	25,743	0.59	0.91	0.93	55	3.50	0.90	1.76	128	1.80	2.69	0.79	2.55	183.00	11.02	2.55	5.00	5.57	7.63	2.99	4.19
NBB33	19,154	0.44	0.91	0.93	55	2.10	0.90	2.08	294	1.20	2.19	2.23	4.32	349.00	11.94	4.32	5.00	5.57	7.63	2.23	3.12
NBB33A	39,322	0.90	0.91	0.93	59	2.70	0.90	1.99	239	1.10	2.10	1.90	3.88	298.00	11.66	3.88	5.00	5.57	7.63	4.57	6.41
NBB34A	32,841	0.75	0.91	0.93	55	2.00	0.90	2.12	438	1.00	2.00	3.65	5.77	493.00	12.74	5.77	5.77	5.34	7.31	3.66	5.13
NBB34	6,405	0.15	0.91	0.93	44	2.00	0.90	1.90	106	1.50	2.45	0.72	2.62	150.00	10.83	2.62	5.00	5.57	7.63	0.75	1.04
NBB35	8,152	0.19	0.91	0.93	45	2.00	0.90	1.92	20	1.30	2.28	0.15	2.06	65.00	10.36	2.06	5.00	5.57	7.63	0.95	1.33
NBB36	105,840	2.43	0.91	0.93	81	1.60	0.90	2.77	1534	1.10	2.10	12.17	14.94	1615.00	18.97	14.94	14.94	3.79	5.18	8.37	11.71
NBB37	6,694	0.15	0.91	0.93	53	2.50	0.90	1.93	49	2.20	2.98	0.27	2.21	102.00	10.57	2.21	5.00	5.57	7.63	0.78	1.09

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Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS, DECATUR TO RAINBOW AND GOWAN OUTFALL - ALEXANDER ROAD FACILITIES**
Job no.: 23629.06
Prepared by : MM
Checked by : KR
Date: 4/5/2014 12:51
Computation: Developed onsite: 25-year runoff and inlet capture
References: Rational Method in accordance with CCRFCD's HC&DDM, 1996, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009 Curb opening and grate inlet capture for composite curb

Constant values		
Manning's coefficient	n =	0.015
Width of inlet	W =	1.5 ft
Gutter depression	a =	0.083 ft
	$T_{allowable}$ =	19.25 ft

Part 2: Allowable spread calculations; 25-year

1	2	3	4	5	6	7	8	9	10	Spread Calculation									
Subbasin I.D.	Inlet Type	Location	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Q_{25} (cfs)	Bypass from upstream basin (cfs)	$Q_{25\ w/bypass}$ (cfs)	S_L (ft/ft)	S_x (ft/ft)	Q_{S1} (cfs)	Q_{W1} (cfs)	E_{O1}	S_W	S_W/S_X	W/T	T_1 (ft)	T_{check}	T_{S1} (ft)	Q_{S2} (cfs)	Depth of flow for D (ft)
SBB01	Type DM2	14+80.00	5.00	10.00	1.53	0.00	1.53	0.003	0.025	0.79	0.74	0.48	0.081	3.2	0.18	8.53	yes	7.03	0.79	0.222
SBB01A	Existing inlet	15+54.00	2.00	8.00	2.00	0.06	2.06	0.007	0.016	1.19	0.87	0.42	0.072	4.5	0.14	10.79	yes	9.29	1.19	0.208
SBB02	Existing inlet	16+58.00	0.00	8.00	2.97	0.47	3.44	0.007	0.020	2.14	1.30	0.38	0.076	3.8	0.13	11.51	yes	10.01	2.13	0.254
SBB03	Type DM2	22+30.00	5.00	10.00	3.09	0	3.09	0.003	0.032	1.81	1.28	0.42	0.088	2.7	0.15	9.72	yes	8.22	1.81	0.298
SBB04A	Type DM2	25+42.00	5.00	10.00	2.52	0.27	2.78	0.002	0.023	1.80	0.98	0.35	0.079	3.4	0.12	12.11	yes	10.61	1.80	0.293
SBB04B					2.55	0.28	2.83	0.002	0.020	1.93	0.90	0.32	0.076	3.8	0.11	13.70	yes	12.20	1.93	0.297
SBB05					2.56	0	2.56	0.006	0.020	1.50	1.06	0.41	0.076	3.8	0.14	10.55	yes	9.05	1.50	0.234
SBB06A	Type DM2	34+40.00	7.50	10.00	1.40	2.56	3.97	0.004	0.031	2.41	1.56	0.39	0.087	2.8	0.14	10.35	yes	8.85	2.41	0.311
SBB06B					1.97	0.48	2.45	0.002	0.023	1.57	0.88	0.36	0.079	3.4	0.13	11.84	yes	10.34	1.57	0.287
SBB07A	Type DM2	39+85.00	5.00	7.50	1.67	2.45	4.12	0.002	0.026	2.84	1.29	0.31	0.082	3.1	0.11	13.46	yes	11.96	2.84	0.355
SBB07B	Type DM2	42+50.00	5.00	7.50	2.06	0.81	2.88	0.003	0.019	1.92	0.95	0.33	0.075	3.9	0.11	13.31	yes	11.81	1.92	0.279
SBB08					1.03	0.64	1.68	0.002	0.023	0.98	0.70	0.42	0.079	3.4	0.15	10.16	yes	8.66	0.98	0.248
SBB08A					1.27	1.68	2.95	0.005	0.023	1.77	1.18	0.40	0.079	3.4	0.14	10.61	yes	9.11	1.77	0.258
SBB09					2.22	2.95	5.17	0.011	0.028	3.05	2.13	0.41	0.084	3.0	0.15	10.02	yes	8.52	3.05	0.280
SBB10					3.95	0	3.95	0.010	0.015	2.61	1.34	0.34	0.071	4.7	0.11	13.60	yes	12.10	2.61	0.242
SBB11					1.83	0	1.83	0.011	0.014	0.98	0.85	0.47	0.070	5.0	0.15	10.04	yes	8.54	0.98	0.182
SBB12					1.15	0	1.15	0.013	0.029	0.31	0.84	0.73	0.085	2.9	0.30	4.93	yes	3.43	0.31	0.139
SBB13					1.87	0	1.87	0.008	0.034	0.73	1.14	0.61	0.090	2.6	0.24	6.19	yes	4.69	0.73	0.192
SBB14					1.69	0	1.69	0.009	0.015	0.89	0.80	0.47	0.071	4.7	0.15	9.76	yes	8.26	0.89	0.185
SBB15	Type DM2	65+28, 120' RT	2.50	5.00	2.47	0	2.47	0.008	0.012	1.59	0.88	0.36	0.068	5.6	0.11	13.53	yes	12.03	1.59	0.210
SBB16					7.04	0	7.04	0.010	0.019	4.94	2.10	0.30	0.075	3.9	0.10	14.75	yes	13.25	4.94	0.307
SBB16A	Type DM2	68+71	2.50	5.00	5.19	7.04	12.23	0.008	0.024	9.09	3.14	0.26	0.080	3.3	0.09	16.50	yes	15.00	9.09	0.407
SBB16B	Type DM2	73+20	2.50	5.00	3.61	7.61	11.22	0.011	0.027	7.85	3.37	0.30	0.083	3.1	0.11	13.93	yes	12.43	7.85	0.378
SBB16C	Type DM2	82+45	7.50	12.50	5.54	6.59	12.13	0.010	0.036	8.12	4.01	0.33	0.092	2.5	0.12	12.20	yes	10.70	8.12	0.415
SBB16D	Type 2 NDOT Grate	68+78.00																		
SBB16E	Type 2 NDOT Grate	73+30.00																		
SBB17	Type DM2	87+10.00	7.50	12.50	3.54	3.11	6.66	0.009	0.018	4.72	1.93	0.29	0.074	4.1	0.10	15.24	yes	13.74	4.72	0.304
SBB18	Type DM2	94+34.00	7.50	12.50	4.51	1.86	6.37	0.005	0.025	4.43	1.94	0.31	0.081	3.2	0.11	13.83	yes	12.33	4.43	0.354
SBB19A	Type DM2	96+18.00	7.50	12.50	0.57	1.04	1.62	0.007	0.014	0.89	0.72	0.45	0.070	5.0	0.14	10.49	yes	8.99	0.89	0.188
SBB19B	Type DM2				0.77	0.15	0.92	0.011	0.014	0.36	0.56	0.61	0.070	5.0	0.20	7.38	yes	5.88	0.36	0.145
SBB20A	Type DM2	99+50.00	12.50	17.50	1.73	0.92	2.65	0.006	0.024	1.50	1.15	0.43	0.080	3.3	0.15	9.69	yes	8.19	1.50	0.244
SBB20B	Type DM2	102+00.00	12.50	17.50	1.77	0.08	1.85	0.006	0.023	0.94	0.90	0.49	0.079	3.4	0.18	8.57	yes	7.07	0.94	0.211
SBB20C	Type DM2	104+60.00	12.50	17.50	1.95	0.03	1.99	0.006	0.023	1.04	0.95	0.48	0.079	3.4	0.17	8.84	yes	7.34	1.04	0.218
SBB21	Type DM2	106+65.00	5.00	7.50	3.13	0.04	3.18	0.004	0.017	2.17	1.01	0.32	0.073	4.3	0.11	14.13	yes	12.63	2.17	0.273
SBB22A					4.19	0.89	5.08	0.007	0.020	3.45	1.63	0.32	0.076	3.8	0.11	13.63	yes	12.13	3.45	0.296
SBB22B	Type DM2	111+30.00	5.00	7.50	3.28	5.08	8.36	0.007	0.028	5.74	2.62	0.31	0.084	3.0	0.11	13.25	yes	11.75	5.74	0.370
SBB22C	Type DM2	113+56.00	2.50	5.00	1.80	3.32	5.12	0.006	0.032	3.11	2.00	0.39	0.088	2.7	0.14	10.35	yes	8.85	3.11	0.319
SBB23					5.02	2.13	7.15	0.006	0.022	5.12	2.03	0.28	0.078	3.5	0.10	15.12	yes	13.62	5.12	0.350
SBB24A	Type DM2	128+90.00	5.00	7.50	3.20	0	3.20	0.003	0.027	2.01	1.19	0.37	0.083	3.1	0.13	11.20	yes	9.70	2.01	0.305
SBB24B	Type DM2	131+78.00	7.50	10.00	2.44	0.58	3.01	0.003	0.020	2.00	1.02	0.34	0.076	3.8	0.12	12.95	yes	11.45	2.00	0.282
SBB24C					3.33	0.38	3.71	0.002	0.016	2.76	0.95	0.26	0.072	4.5	0.09	17.53	yes	16.03	2.76	0.316
SBB25	Type DM2	138+56.00	2.50	5.00	1.76	0	1.76	0.003	0.038	0.79	0.97	0.55	0.094	2.5	0.22	6.93	yes	5.43	0.79	0.233
SBB26					2.45	0.28	2.73	0.001	0.031	1.78	0.95	0.35	0.087	2.8	0.13	11.74	yes	10.24	1.78	0.354
SBB27					1.44	0	1.44	0.001	0.035	0.74	0.70	0.48	0.091	2.6	0.18	8.12	yes	6.62	0.74	0.263
SBB28					1.13	0	1.13	0.003	0.021	0.56	0.57	0.51	0.077	3.6	0.18	8.38	yes	6.88	0.56	0.196
SBB29					2.24	0	2.24	0.002	0.031	1.33	0.91	0.41	0.087	2.8	0.15	10.01	yes	8.51	1.33	0.301

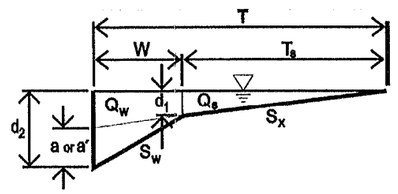
Part 2: Allowable spread calculations; 25-year

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
										Spread Calculation										
Subbasin I.D.	Inlet Type	Location	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Q_{25} (cfs)	Bypass from upstream basin (cfs)	$Q_{25\ w/bypass}$ (cfs)	S_L (ft/ft)	S_x (ft/ft)	Q_{S1} (cfs)	Q_{W1} (cfs)	E_{O1}	S_W	S_W/S_X	W/T	T_1 (ft)	T_{check}	T_{S1} (ft)	Q_{S2} (cfs)	Depth of flow for D (ft)
SBB30	Type DM2	150+72.00	5.00	7.50	1.37	0	1.37	0.001	0.019	0.87	0.50	0.36	0.075	3.9	0.12	12.14	yes	10.64	0.87	0.257
SBB3132	Type DM2	160+22.00	10.00	15.00	6.59	0.10	6.68	0.005	0.022	4.81	1.87	0.28	0.078	3.5	0.10	15.34	yes	13.84	4.81	0.355
SBB33	Type DM2	163+00.00	10.00	15.00	3.33	0.78	4.12	0.011	0.027	2.30	1.82	0.44	0.083	3.1	0.16	9.35	yes	7.85	2.30	0.255
SBB34A	Type DM2	164+70.00	7.50	12.50	3.38	0.42	3.80	0.017	0.020	2.15	1.65	0.43	0.076	3.8	0.15	10.01	yes	8.51	2.15	0.223
SBB34B	Type DM2	165+60.00	10.00	15.00	2.71	0.81	3.52	0.036	0.036	1.25	2.28	0.65	0.092	2.5	0.26	5.67	yes	4.17	1.25	0.179
SBB34C	Type DM2	167+06.00	7.50	12.50	2.04	0.32	2.36	0.013	0.024	1.10	1.26	0.53	0.080	3.3	0.19	7.71	yes	6.21	1.10	0.196
SBB35	Type DM2	170+46.00	5.00	5.00	3.56	0	3.56	0.015	0.031	1.71	1.85	0.52	0.087	2.8	0.20	7.60	yes	6.10	1.71	0.226
SBB36A					3.97	1.21	5.18	0.016	0.020	3.22	1.97	0.38	0.076	3.8	0.13	11.51	yes	10.01	3.22	0.253
SBB36	Type DM2	178+00.00	5.00	10.00	4.73	5.18	9.92	0.015	0.024	6.80	3.11	0.31	0.080	3.3	0.11	13.52	yes	12.02	6.80	0.336
SBB37A	Type DM2	182+04.00	7.50	12.50	3.63	4.32	7.96	0.010	0.028	5.23	2.73	0.34	0.084	3.0	0.12	12.12	yes	10.62	5.23	0.339
SBB37B					1.33	1.89	3.22	0.010	0.037	1.49	1.73	0.54	0.093	2.5	0.21	7.11	yes	5.61	1.49	0.236
SBB38					1.98	3.22	5.20	0.008	0.013	3.80	1.40	0.27	0.069	5.3	0.09	17.38	yes	15.88	3.80	0.270
SBB39	Existing inlet	188+53.00	3.00	3.00	2.11	5.20	7.31	0.010	0.035	4.43	2.88	0.39	0.091	2.6	0.15	10.18	yes	8.68	4.43	0.335
			0.00	0.00																
NBB01					1.21	0	1.21	0.005	0.016	0.61	0.59	0.49	0.072	4.5	0.16	9.19	yes	7.69	0.61	0.182
NBB02A1	Type DM2	19+04.00	2.50	5.00	1.81	0	1.81	0.003	0.018	1.10	0.71	0.39	0.074	4.1	0.13	11.35	yes	9.85	1.10	0.234
NBB02A2	Type DM2	21+68.00	2.50	5.00	1.84	0.57	2.40	0.003	0.023	1.46	0.94	0.39	0.079	3.4	0.14	10.90	yes	9.40	1.46	0.265
NBB02B1	Type DM2	24+30.00	2.50	5.00	1.81	0.77	2.58	0.002	0.024	1.62	0.95	0.37	0.080	3.3	0.13	11.43	yes	9.93	1.62	0.286
NBB02B2	Type DM2	26+92.00	2.50	5.00	1.61	0.81	2.42	0.002	0.017	1.64	0.78	0.32	0.073	4.3	0.11	13.87	yes	12.37	1.64	0.268
NBB02C	Type DM2	29+50.00	2.50	5.00	1.95	0.91	2.86	0.004	0.017	1.89	0.97	0.34	0.073	4.3	0.11	13.27	yes	11.77	1.89	0.258
NBB03					1.75	1.23	2.98	0.001	0.021	2.15	0.83	0.28	0.077	3.6	0.10	15.53	yes	14.03	2.15	0.347
NBB04	Type DM2	36+60.00	2.50	5.00	2.61	0	2.61	0.002	0.020	1.75	0.86	0.33	0.076	3.8	0.11	13.26	yes	11.76	1.75	0.289
NBB05A	Type DM2	42+50.00	5.00	7.50	3.50	0.91	4.42	0.004	0.031	2.72	1.69	0.38	0.087	2.8	0.14	10.64	yes	9.14	2.72	0.320
NBB05B	Type DM2	44+35.00	2.50	5.00	1.28	1.05	2.33	0.004	0.019	1.43	0.90	0.38	0.075	3.9	0.13	11.44	yes	9.94	1.43	0.244
NBB06					2.15	0.85	2.99	0.011	0.035	1.34	1.65	0.55	0.091	2.6	0.22	6.97	yes	5.47	1.34	0.222
NBB07					5.69	0	5.69	0.011	0.020	3.76	1.93	0.34	0.076	3.8	0.12	12.88	yes	11.38	3.76	0.281
NBB08					1.14	0	1.14	0.010	0.019	0.43	0.70	0.62	0.075	3.9	0.22	6.80	yes	5.30	0.43	0.156
NBB09					1.86	0	1.86	0.011	0.024	0.81	1.05	0.57	0.080	3.3	0.21	7.21	yes	5.71	0.81	0.184
NBB10					2.79	0	2.79	0.011	0.024	1.43	1.36	0.49	0.080	3.3	0.17	8.57	yes	7.07	1.43	0.217
NBB11	Existing inlet	67+10.00	2.50	5.00	1.63	0	1.63	0.012	0.010	0.92	0.71	0.44	0.066	6.6	0.13	11.68	yes	10.18	0.92	0.170
NBB12					2.00	0	2.00	0.003	0.012	1.37	0.63	0.32	0.068	5.6	0.10	15.19	yes	13.69	1.37	0.230
NBB13A	Type DM2	75+75.00	10.00	15.00	4.55	2.00	6.55	0.010	0.021	4.46	2.09	0.32	0.077	3.6	0.11	13.57	yes	12.07	4.46	0.305
NBB13B	Type DM2	82+52.00			4.24	1.14	5.39	0.009	0.026	3.36	2.03	0.38	0.082	3.1	0.14	11.11	yes	9.61	3.36	0.294
NBB14A	Type DM2	87+60.00	7.50	12.50	3.51	0.99	4.50	0.009	0.023	2.78	1.72	0.38	0.079	3.4	0.13	11.17	yes	9.67	2.78	0.271
NBB14B	Type DM2	92+52.00			3.41	0.80	4.20	0.009	0.022	2.59	1.61	0.38	0.078	3.5	0.13	11.18	yes	9.68	2.59	0.263
NBB15	Type DM2	95+90.00	7.50	12.50	2.29	0.73	3.02	0.005	0.016	2.00	1.02	0.34	0.072	4.5	0.11	13.47	yes	11.97	2.00	0.251
NBB16					1.08	0.41	1.49	0.003	0.012	0.95	0.54	0.36	0.068	5.6	0.11	13.45	yes	11.95	0.95	0.209
NBB17A	Type DM2	99+40.00	7.50	12.50	1.79	0	1.79	0.004	0.019	1.02	0.77	0.43	0.075	3.9	0.15	10.21	yes	8.71	1.02	0.220
NBB17B	Type DM2	101+90.00	7.50	12.50	1.94	0.09	2.03	0.007	0.023	1.03	1.00	0.49	0.079	3.4	0.18	8.48	yes	6.98	1.03	0.209
NBB17C	Type DM2	104+25.00	7.50	12.50	1.54	0.13	1.68	0.004	0.023	0.87	0.80	0.48	0.079	3.4	0.17	8.80	yes	7.30	0.87	0.217
NBB17D					1.13	0.06	1.19	0.006	0.025	0.47	0.72	0.61	0.081	3.2	0.23	6.58	yes	5.08	0.47	0.173
NBB18	Type DM2	112+80.00	7.50	10.00	4.92	0	4.92	0.006	0.034	2.90	2.02	0.41	0.090	2.6	0.15	9.77	yes	8.27	2.90	0.314
NBB19			0.00	0.00	0.99	0.77	1.76	0.003	0.023	0.97	0.79	0.45	0.079	3.4	0.16	9.46	yes	7.96	0.97	0.232
NBB20					4.35	1.76	6.11	0.008	0.027	3.94	2.16	0.35	0.083	3.1	0.13	11.76	yes	10.26	3.94	0.320
NBB21					1.31	0	1.31	0.008	0.028	0.47	0.84	0.64	0.084	3.0	0.25	5.99	yes	4.49	0.47	0.167
NBB22	Type DM2	126+68.00	2.50	5.00	2.84	0	2.84	0.003	0.029	1.68	1.16	0.41	0.085	2.9	0.15	10.00	yes	8.50	1.68	0.286
NBB23A	Type DM2	130+60.00	2.50	5.00	2.65	0.87	3.51	0.002	0.024	2.38	1.13	0.32	0.080	3.3	0.11	13.17	yes	11.67	2.38	0.327
NBB23B	Type DM2	133+32.00	2.50	5.00	1.98	1.31	3.28	0.001	0.016	2.52	0.77	0.23	0.072	4.5	0.08	19.14	yes	17.64	2.52	0.342
NBB23C	Type DM2	135+37.00	2.50	5.00	2.52	1.28	3.80	0.001	0.022	2.82	0.98	0.26	0.078	3.5	0.09	16.57	yes	15.07	2.82	0.382
NBB24					1.64	1.33	2.98	0.001	0.031	1.97	1.00	0.34	0.087	2.8	0.12	12.14	yes	10.64	1.97	0.367
NBB25					2.07	0	2.07	0.004	0.040	0.92	1.15	0.56	0.096	2.4	0.22	6.76	yes	5.26	0.92	0.234
NBB26	Type DM2	145+13.00	2.50	5.00	2.55	0	2.55	0.002	0.037	1.43	1.13	0.44	0.093	2.5	0.17	8.91	yes	7.41	1.43	0.302
NBB27					2.54	0.55	3.09	0.001	0.030	2.08	1.01	0.33	0.086	2.9	0.12	12.58	yes	11.08	2.08	0.371
NBB28					3.51	0	3.51	0.002	0.032	2.22	1.29	0.37	0.088	2.7	0.14	11.09	yes	9.59	2.22	0.342
NBB2930					3.27	0	3.27	0.004	0.037	1.77	1.50	0.46	0.093	2.5	0.18	8.56	yes	7.06	1.77	0.289
NBB31					4.22	0	4.22	0.010	0.028	2.38	1.84	0.44	0.084	3.0	0.16	9.41	yes	7.91	2.38	0.263
NBB32					2.99	0	2.99	0.018	0.035	1.19	1.80	0.60	0.091	2.6	0.24	6.26	yes	4.76	1.19	0.197
NBB33	Type DM2	166+52.00	10.00	15.00	2.23	2.99	5.22	0.012	0.021	3.32	1.91	0.37	0.077	3.6	0.13	11.86	yes	10.36	3.32	0.269
NBB33A	Type DM2	167+05.00	5.00	10.00	4.57	0.85	5.42	0.011	0.027	3.27	2.15	0.40	0.083	3.1	0.14	10.45	yes	8.95	3.27	0.284
NBB34A					3.66	1.53	5.19	0.010	0.020	3.40	1.79	0.35	0.076	3.8	0.12	12.66	yes	11.16	3.40	0.276
NBB34	Type DM2	168+35.00	5.00	10.00	0.75	5.19	5.94	0.015	0.020	3.83	2.11	0.35	0.076	3.8	0.12	12.31	yes	10.81	3.83	0.270
NBB35					0.95	0	0.95	0.013	0.020	0.29	0.66	0.70	0.076	3.8	0.26	5.70	yes	4.20	0.29	0.137
NBB36					8.37	0	8.37	0.011	0.016	6.19	2.18	0.26	0.072	4.5	0.09	17.27	yes	15.77	6.19	0.312
NBB37	Existing Inlet	186+00.00	4.00	4.00	0.78	8.37	9.15	0.022	0.025	5.87	3.27	0.36	0.081	3.2	0.13	11.77	yes	10.27	5.87	0.303

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Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS, DECATUR TO RAINBOW AND**
Job no.: 23629.06
Prepared by : MM
Checked by : KR
Date: 4/5/2014 12:51
Computation: Developed onsite: 25-year runoff and inlet capture
References: Rational Method in accordance with CCRFCD's HC&DDM, 1996, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009 Curb opening and grate inlet capture for composite curb

Constant values
Manning's coefficient n = 0.015
Width of inlet W = 1.5 ft
Gutter depression a = 0.083 ft



Part 3: Inlet capture calculations; 25-year

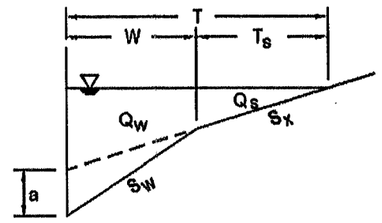
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	28
	Inlet sizes			With Clogging		Curb Opening Calculation					Grate Opening Calculation															
Subbasin I.D.	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Inlet Clogging Factor (%)	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Se (ft/ft)	L_T (ft)	L (ft)	E	Q_{ic} (cfs)	Q_g (cfs)	Q_{S3} (cfs)	Q_{W3} (cfs)	E_{O3}	W/T	T_3 (ft)	T_{S3} (ft)	Q_{S4} (cfs)	V (ft/s)	V_O (ft/s)	R_f	R_s	Q_{ig} (cfs)	$Q_{25\ intercept}$ (cfs)	$Q_{25\ bypass}$ (cfs)	Comments
SBB01	5.0	10.0	25	3.8	7.50	0.05	9.21	3.75	0.61	0.93	0.60	0.19	0.41	0.68	0.27	5.63	4.13	0.19	1.30	10.00	1.00	0.68	0.54	1.47	0.06	new curb opening and inlet; remaining bypass discharges into SBB01A
SBB01A	2.0	8.0	25	1.5	6.00	0.04	15.78	4.50	0.45	0.93	1.12	0.52	0.61	0.54	0.18	8.29	6.79	0.52	1.84	5.91	1.00	0.08	0.65	1.58	0.47	total discharges into existing inlet at Santa Fe Casino entrance
SBB02	0.0	8.0	25	0.0	6.00	0.04	19.20	6.00	0.49	1.69	1.75	0.89	0.87	0.49	0.17	8.71	7.21	0.89	2.14	0.00	0.81	0.00	0.00	1.69	1.75	total discharges into existing inlet at Santa Fe Casino entrance
SBB03	5.0	10.0	25	3.8	7.50	0.06	11.94	3.75	0.49	1.52	1.57	0.73	0.84	0.53	0.20	7.36	5.86	0.73	1.69	10.00	1.00	0.64	1.30	2.82	0.27	new curb opening and inlet; remaining bypass discharges into SBB04A
SBB04A	5.0	10.0	25	3.8	7.50	0.04	12.31	3.75	0.48	1.34	1.45	0.79	0.66	0.45	0.16	9.29	7.79	0.79	1.37	10.00	1.00	0.64	1.17	2.50	0.28	new curb opening and inlet; remaining bypass discharges into SBB04B
SBB04B																									2.83	discharges west into Lone Mountain Road
SBB05																									2.56	discharges into subbasin SBB06A
SBB06A	7.5	10.0	25	5.6	7.50	0.05	14.81	1.88	0.22	0.86	3.11	1.77	1.34	0.43	0.16	9.38	7.88	1.77	2.18	10.00	1.00	0.73	2.63	3.49	0.48	new curb opening and inlet; remaining bypass discharges into SBB06B
SBB06B																									2.45	discharges into SBB07A
SBB07A	5.0	7.5	25	3.8	5.63	0.04	13.77	1.88	0.23	0.95	3.17	2.07	1.09	0.35	0.12	12.13	10.63	2.07	1.60	10.00	1.00	0.61	2.35	3.31	0.81	new curb opening and inlet; remaining bypass discharges into SBB07B
SBB07B	5.0	7.5	25	3.8	5.63	0.04	14.31	1.88	0.22	0.64	2.23	1.41	0.82	0.37	0.12	12.03	10.53	1.41	1.55	10.00	1.00	0.54	1.59	2.23	0.64	new curb opening and inlet; remaining bypass discharges into SBB08
SBB08																									1.68	discharges into Ahern Rentals parking lot
SBB08A																									2.95	discharges into SBB09
SBB09																									5.17	discharges west into Red Coach Avenue
SBB10																									3.95	discharges into Draft House parking lot
SBB11																									1.83	discharges into Fat Burger/Arby's parking lot
SBB12																									1.15	discharges into Arby/APN 138-02-213-014 parking lot
SBB13																									1.87	discharges into Taco Bell/Discount Tire parking lot
SBB14																									1.69	discharges into Lee's Disct Liquor/APN13802213007 pkng lot
SBB15	2.5	5.0	25	1.9	3.75	0.03	20.25	1.88	0.16	0.40	2.07	1.27	0.80	0.39	0.12	12.58	11.08	1.27	2.05	6.76	1.00	0.09	0.91	1.30	1.16	discharges west into new curb opening and inlet in Craig Rd;
SBB16																									7.04	discharges into SBB16A
SBB16A	2.5	5.0	25	1.9	3.75	0.04	35.51	1.88	0.09	1.14	11.09	8.13	2.96	0.27	0.09	15.88	14.38	8.13	3.59	6.76	1.00	0.06	3.48	4.62	7.61	new curb opening and inlet; remaining bypass discharges into SBB16B
SBB16B	2.5	5.0	25	1.9	3.75	0.04	34.82	1.88	0.09	1.06	10.16	6.99	3.17	0.31	0.11	13.39	11.89	6.99	4.09	6.76	1.00	0.06	3.57	4.63	6.59	new curb opening and inlet; remaining bypass discharges into SBB01C
SBB16C	7.5	12.5	25	5.6	9.38	0.05	30.66	3.75	0.21	2.54	9.59	6.13	3.46	0.36	0.13	11.13	9.63	6.13	4.18	10.00	1.00	0.49	6.48	9.02	3.11	new curb opening and inlet to replace exisitng 2' inlet; remaining bypass discharges into SBB17
SBB16D						See Grate sump calculations performed with Flow Master																		11.21	0.00	Grate only area drain sump; sized for 100% capture
SBB16E						See Grate sump calculations performed with Flow Master																		1.17	0.00	Grate only area drain sump; sized for 100% capture
SBB17	7.5	12.5	25	5.6	9.38	0.03	30.52	3.75	0.21	1.40	5.26	3.58	1.68	0.32	0.11	13.88	12.38	3.58	2.93	10.00	1.00	0.48	3.40	4.80	1.86	new curb opening and inlet; remaining bypass discharges into SBB18
SBB18	7.5	12.5	25	5.6	9.38	0.04	21.79	3.75	0.29	1.84	4.53	2.95	1.58	0.35	0.12	12.10	10.60	2.95	2.39	10.00	1.00	0.65	3.49	5.33	1.04	new curb opening and inlet; remaining bypass discharges into SBB19A
SBB19A	7.5	12.5	25	5.6	9.38	0.04	14.59	3.75	0.41	0.67	0.95	0.42	0.53	0.56	0.18	8.27	6.77	0.42	1.75	10.00	1.00	0.64	0.80	1.47	0.15	new curb opening and inlet; remaining bypass discharges into SBB19B
SBB19B																									0.92	Discharges into SBB20A
SBB20A	12.5	17.5	25	9.4	13.13	0.05	14.56	3.75	0.42	1.10	1.55	0.73	0.83	0.53	0.19	7.74	6.24	0.73	1.98	10.00	1.00	0.89	1.47	2.57	0.08	new curb opening and inlet; remaining bypass discharges into SBB20B
SBB20B	12.5	17.5	25	9.4	13.13	0.05	12.19	3.75	0.48	0.89	0.95	0.36	0.60	0.63	0.23	6.41	4.91	0.36	1.78	10.00	1.00	0.90	0.92	1.81	0.03	new curb opening and inlet; remaining bypass discharges into SBB20C
SBB20C	12.5	17.5	25	9.4	13.13	0.05	12.69	3.75	0.47	0.93	1.06	0.42	0.64	0.60	0.22	6.72	5.22	0.42	1.82	10.00	1.00	0.90	1.02	1.95	0.04	new curb opening and inlet; remaining bypass discharges into SBB21
SBB21	5.0	7.5	25	3.8	5.63	0.03	16.85	1.88	0.19	0.61	2.57	1.68	0.89	0.35	0.12	12.98	11.48	1.68	1.72	10.00	1.00	0.47	1.68	2.29	0.89	new curb opening and inlet; remaining bypass discharges into SBB22A
SBB22A																									5.08	discharges into SBB22B
SBB22B	5.0	7.5	25	3.8	5.63	0.05	26.24	1.88	0.12	1.04	7.32	4.90	2.42	0.33	0.12	12.58	11.08	4.90	3.21	10.00	1.00	0.32	4.00	5.04	3.32	new curb opening and inlet; remaining bypass discharges into SBB22C
SBB22C	2.5	5.0	25	1.9	3.75	0.05	18.43	1.88	0.18	0.90	4.22	2.44	1.78	0.42	0.16	9.58	8.08	2.44	2.75	6.76	1.00	0.13	2.09	2.99	2.13	new curb opening and inlet; remaining bypass discharges into SBB23
SBB23																									7.15	discharges to sw underdrains in Duncan Dr, then channel
SBB24A	5.0	7.5	25	3.8	5.63	0.05	12.80	1.88	0.25	0.79	2.40	1.41	1.00	0.41	0.15	9.99	8.49	1.41	1.70	10.00	1.00	0.59	1.83	2.62	0.58	new curb opening and inlet; remaining bypass discharges into SBB24B
SBB24B	7.5	10.0	25	5.6	7.50	0.04	14.58	1.88	0.22	0.66	2.35	1.48	0.88	0.37	0.13	11.72	10.22	1.48	1.64	10.00	1.00	0.74	1.97	2.64	0.38	new curb opening and inlet; remaining bypass discharges into SBB24C
SBB24C																									3.71	discharges west into Gowan Road
SBB25	2.5	5.0	25	1.9	3.75	0.07	8.27	1.88	0.37	0.65	1.11	0.40	0.71	0.64	0.26	5.69	4.19	0.40	1.64	6.76	1.00	0.31	0.83	1.48	0.28	new curb opening and inlet; remaining bypass discharges into SBB26
SBB26																									2.73	discharges into first driveway of 13812301013
SBB27																									1.44	discharges into second driveway of 13812301013
SBB28																									1.13	discharges west into Michael Way
SBB29																									2.24	discharges west into Michael Way

Part 3: Inlet capture calculations; 25-year

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	28
	Inlet sizes			With Clogging		Curb Opening Calculation					Grate Opening Calculation															
Subbasin I.D.	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Inlet Clogging Factor (%)	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Se (ft/ft)	L_T (ft)	L (ft)	E	Q_{Ic} (cfs)	Q_g (cfs)	Q_{S3} (cfs)	Q_{W3} (cfs)	E_{O3}	W/T	T_3 (ft)	T_{S3} (ft)	Q_{S4} (cfs)	V (ft/s)	V_O (ft/s)	R_f	R_s	Q_{ig} (cfs)	$Q_{25\ intercept}$ (cfs)	$Q_{25\ bypass}$ (cfs)	Comments
SBB30	5.0	7.5	25	3.8	5.63	0.04	7.48	1.88	0.41	0.55	0.81	0.45	0.36	0.45	0.15	9.81	8.31	0.45	0.83	10.00	1.00	0.79	0.72	1.27	0.10	new curb opening and inlet; remaining bypass discharges into SBB3132
SBB3132	10.0	15.0	25	7.5	11.25	0.04	23.61	3.75	0.27	1.79	4.89	3.34	1.55	0.32	0.11	13.58	12.08	3.34	2.34	10.00	1.00	0.77	4.11	5.90	0.78	new curb opening and inlet; remaining bypass discharges into SBB33
SBB33	10.0	15.0	26	7.4	11.10	0.05	20.70	3.70	0.30	1.23	2.89	1.43	1.45	0.50	0.19	8.07	6.57	1.43	3.07	10.00	1.00	0.71	2.47	3.69	0.42	new curb opening and inlet; remaining bypass discharges into SBB34A
SBB34A	7.5	12.5	25	5.6	9.38	0.04	25.03	3.75	0.25	0.96	2.84	1.46	1.38	0.49	0.17	8.85	7.35	1.46	3.36	10.00	1.00	0.44	2.03	2.99	0.81	new curb opening and inlet; remaining bypass discharges into SBB34B
SBB34B	10.0	15.0	26	7.4	11.10	0.07	22.65	3.70	0.27	0.97	2.56	0.73	1.83	0.72	0.31	4.91	3.41	0.73	5.15	10.00	1.00	0.56	2.23	3.20	0.32	new curb opening and inlet; remaining bypass discharges into SBB34C
SBB34C	7.5	12.5	25	5.6	9.38	0.05	16.82	3.75	0.37	0.86	1.50	0.55	0.95	0.63	0.24	6.31	4.81	0.55	2.78	10.00	1.00	0.57	1.26	2.13	0.24	new curb opening and inlet; remaining discharge heads west around the corner on Cheyenne to an existing inlet
SBB35	5.0	5.0	25	3.8	3.75	0.06	19.36	0.00	0.00	0.00	3.56	1.71	1.85	0.52	0.20	7.60	6.10	1.71	3.71	10.00	1.00	0.29	2.35	2.35	1.21	new curb opening and inlet; remaining bypass discharges into SBB36A
SBB36A																									5.18	discharges into SBB36
SBB36	5.0	10.0	25	3.8	7.50	0.04	37.14	3.75	0.17	1.73	8.19	5.42	2.77	0.34	0.12	12.54	11.04	5.42	4.20	10.00	1.00	0.20	3.86	5.59	4.32	new curb opening and inlet; remaining bypass discharges into SBB37A
SBB37A	7.5	12.5	25	5.6	9.38	0.05	28.02	3.75	0.23	1.81	6.14	3.82	2.32	0.38	0.14	10.94	9.44	3.82	3.53	10.00	1.00	0.51	4.25	6.07	1.89	new curb opening and inlet; remaining bypass discharges into SBB37B
SBB37B																									3.22	discharges into SBB38
SBB38																									5.20	discharges into SBB39
SBB39	3.0	3.0	25	2.3	2.25	0.06	24.12	0.00	0.00	0.00	7.31	4.43	2.88	0.39	0.15	10.18	8.68	4.43	3.90	7.54	1.00	0.12	3.39	3.39	3.92	existing 3X3 curb opening and grate
NBB01																									1.21	discharges east into Rainbow Boulevard
NBB02A1	2.5	5.0	25	1.9	3.75	0.04	11.48	1.88	0.27	0.50	1.31	0.73	0.59	0.45	0.15	9.94	8.44	0.73	1.38	6.76	1.00	0.22	0.75	1.25	0.57	new curb opening and inlet; remaining bypass discharges into NBB02A2
NBB02A2	2.5	5.0	25	1.9	3.75	0.04	12.05	1.88	0.26	0.63	1.77	0.99	0.78	0.44	0.16	9.63	8.13	0.99	1.57	6.76	1.00	0.22	1.00	1.63	0.77	new curb opening and inlet; remaining bypass discharges into NBB02B1
NBB02B1	2.5	5.0	25	1.9	3.75	0.04	11.59	1.88	0.27	0.70	1.88	1.09	0.79	0.42	0.15	10.06	8.56	1.09	1.47	6.76	1.00	0.25	1.06	1.76	0.81	new curb opening and inlet; remaining bypass discharges into NBB02B2
NBB02B2	2.5	5.0	25	1.9	3.75	0.03	13.07	1.88	0.24	0.59	1.83	1.17	0.66	0.36	0.12	12.40	10.90	1.17	1.34	6.76	1.00	0.22	0.92	1.51	0.91	new curb opening and inlet; remaining bypass discharges into NBB02C
NBB02C	2.5	5.0	25	1.9	3.75	0.04	16.31	1.88	0.20	0.56	2.30	1.45	0.85	0.37	0.12	12.14	10.64	1.45	1.75	6.76	1.00	0.15	1.07	1.63	1.23	new curb opening and inlet; remaining bypass discharges into NBB03
NBB03			25																						2.98	discharges east into Ln Mtn Rd
NBB04	2.5	5.0	25	1.9	3.75	0.04	12.25	1.88	0.26	0.68	1.94	1.22	0.72	0.37	0.13	11.77	10.27	1.22	1.34	6.76	1.00	0.25	1.02	1.70	0.91	new curb opening and inlet; remaining bypass discharges into NBB05A
NBB05A	5.0	7.5	25	3.8	5.63	0.05	15.94	1.88	0.20	0.89	3.53	2.06	1.47	0.42	0.15	9.73	8.23	2.06	2.31	10.00	1.00	0.49	2.48	3.37	1.05	new curb opening and inlet; remaining bypass discharges into NBB05B
NBB05B	2.5	5.0	25	1.9	3.75	0.04	13.82	1.88	0.23	0.54	1.79	1.03	0.77	0.43	0.15	10.27	8.77	1.03	1.68	6.76	1.00	0.17	0.95	1.48	0.85	new curb opening and inlet; remaining bypass discharges into NBB06
NBB06																									2.99	discharges into APN 13802113001 parking lot
NBB07																									5.69	discharges east into Torrey Pines Drive
NBB08																									1.14	discharges east to parking lot,APN 13802204001 Checkr, BigO
NBB09																									1.86	discharges east to pkng lot (13802204001) upstream of DelTaco
NBB10																									2.79	discharges east into parking lot (APN 13802601001, Kmart)
NBB11	2.5	5.0	25	1.9	3.75	0.03	18.39	1.88	0.18	0.29	1.34	0.70	0.64	0.47	0.14	10.72	9.22	0.70	2.10	6.76	1.00	0.07	0.69	0.97	0.66	exisitng 2.5x5 discharges east into Craig Road
NBB12																									2.00	discharges east into Craig Road
NBB13A	10.0	15.0	25	7.5	11.25	0.04	28.66	3.75	0.22	1.46	5.09	3.29	1.80	0.35	0.12	12.27	10.77	3.29	3.10	10.00	1.00	0.65	3.95	5.41	1.14	new curb opening and inlet; remaining bypass discharges into NBB13B
NBB13B	7.5	12.5	25	5.6	9.38	0.05	23.07	3.75	0.27	1.47	3.91	2.25	1.67	0.43	0.15	9.77	8.27	2.25	3.00	10.00	1.00	0.56	2.92	4.40	0.99	new curb opening and inlet; remaining bypass discharges into NBB14A
NBB14A	7.5	12.5	25	5.6	9.38	0.04	22.17	3.75	0.28	1.28	3.22	1.82	1.40	0.43	0.15	9.75	8.25	1.82	2.79	10.00	1.00	0.56	2.42	3.70	0.80	new curb opening and inlet; remaining bypass discharges into NBB14B
NBB14B	7.5	12.5	25	5.6	9.38	0.04	21.80	3.75	0.29	1.21	2.99	1.68	1.31	0.44	0.15	9.73	8.23	1.68	2.71	10.00	1.00	0.56	2.26	3.47	0.73	new curb opening and inlet; remaining bypass discharges into NBB15
NBB15	7.5	12.5	25	5.6	9.38	0.03	18.16	3.75	0.34	1.03	1.99	1.19	0.80	0.40	0.13	11.36	9.86	1.19	1.82	10.00	1.00	0.66	1.58	2.61	0.41	new curb opening and inlet; remaining bypass discharges into NBB016
NBB16																									1.49	discharges east into Jones Blvd.
NBB17	7.5	12.5	25	5.6	9.38	0.04	12.02	3.75	0.49	0.88	0.91	0.40	0.51	0.56	0.20	7.64	6.14	0.40	1.48	10.00	1.00	0.77	0.82	1.70	0.09	new curb opening and inlet; remaining bypass discharges into NBB17B
NBB18	7.5	12.5	25	5.6	9.38	0.05	13.60	3.75	0.44	0.90	1.14	0.44	0.70	0.61	0.23	6.58	5.08	0.44	2.03	10.00	1.00	0.69	1.00	1.90	0.13	new curb opening and inlet; remaining bypass discharges into NBB17C
NBB19	7.5	12.5	25	5.6	9.38	0.05	10.72	3.75	0.54	0.90	0.77	0.28	0.49	0.64	0.24	6.26	4.76	0.28	1.50	10.00	1.00	0.80	0.71	1.62	0.06	new curb opening and inlet; remaining bypass discharges into NBB17D
NBB20																									1.19	discharges into Alexander Road
NBB21	7.5	10.0	25	5.6	7.50	0.06	17.62	1.88	0.18	0.90	4.02	2.24	1.78	0.44	0.17	9.01	7.51	2.24	2.78	10.00	1.00	0.66	3.24	4.15	0.77	new curb opening and inlet; remaining bypass discharges into NBB19
NBB19																									1.76	discharges into NBB20
NBB20																									6.11	discharges east into parking lot (APN 13812110015)
NBB21																									1.31	discharges east into Duncan Drive
NBB22	2.5	5.0	25	1.9	3.75	0.05	11.96	1.88	0.26	0.75	2.09	1.13	0.96	0.46	0.17	8.83	7.33	1.13	1.75	6.76	1.00	0.23	1.22	1.97	0.87	new curb opening and inlet; remaining bypass discharges into NBB23A
NBB23A	2.5	5.0	25	1.9	3.75	0.04	13.34	1.88	0.24	0.84	2.68	1.72	0.96	0.36	0.13	11.82	10.32	1.72	1.54	6.76	1.00	0.24	1.37	2.21	1.31	new curb opening and inlet; remaining bypass discharges into NBB23B
NBB23B	2.5	5.0	25	1.9	3.75	0.03	12.95	1.88	0.25	0.81	2.48	1.83	0.65	0.26	0.09	17.15	15.65	1.83	1.03	6.76	1.00	0.30	1.20	2.01	1.28	new curb opening and inlet; remaining bypass discharges into NBB23C
NBB23C	2.5	5.0	25	1.9	3.75	0.04	12.01	1.88	0.26	1.00	2.80	1.98	0.82	0.29	0.10	14.71	13.21	1.98	1.15	6.76	1.00	0.33	1.47	2.47	1.33	new curb opening and inlet, bypass goes east in Gowan
NBB24																									2.98	discharges east into Gowan Road
NBB25																									2.07	discharges into NBB26
NBB26	2.5	5.0	25	1.9	3.75	0.06	9.13	1.88	0.34	0.87	1.69	0.82	0.87	0.51	0.20	7.53	6.03	0.82	1.52	6.76	1.00	0.33	1.14	2.00	0.55	new curb opening and inlet; remaining bypass discharges into NBB27
NBB27																									3.09	discharges east into Jay Avenue
NBB28																									3.51	discharges east into Ricky Road
NBB2930																									3.27	discharges east into Disct Muffler parking lot, APN 13812810003
NBB31																									4.22	discharges east into Donnie Avenue
NBB32																									2.99	discharges into NBB33
NBB33	10.0	15.0	25	7.5	11.25	0.04	26.81	3.75	0.24	1.24	3.98	2.36	1.62	0.41	0.14	10.62	9.12	2.36	3.19	10.00	1.00	0.64	3.13	4.37	0.85	new curb opening and inlet; remaining bypass discharges into NBB33A
NBB33A	5.0	10.0	25	3.8	7.50	0.05	23.92	3.75	0.26	1.43	3.99	2.21	1.78	0.45	0.16	9.23	7.73	2.21	3.29	10.00	1.00	0.31	2.46	3.89	1.53	new curb opening and inlet; remaining bypass discharges into NBB34A
NBB34A																									5.19	discharges into NBB34
NBB34	5.0	10.0	25	3.8	7.50	0.04	30.97	3.75	0.21	1.23	4.71	2.88	1.83	0.39	0.13	11.21	9.71	2.88	3.57	10.00	1.00	0.22	2.47	3.70	2.24	new curb opening and inlet; remaining bypass discharges into NBB35
NBB35																									0.95	discharges east into Cheyenne Ave
NBB36																									8.37	discharges into NBB37
NBB37	4.0	4.0	25	3.0	3.00	0.04	38.70	0.00	0.00	0.00	9.15	5.87	3.27	0.36	0.13	11.77	10.27	5.87	5.10	8.96	1.00	0.10	3.86	3.86	5.29	existing 4X4 curb opening and grate

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Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS, DECATUR TO RAINBOW AND GOWAN OUTFALL - ALEXANDER ROAD FACILITIES**
Job no.: 23629.06
Prepared by : MM
Checked by : KR
Date: 4/5/2014 14:08
Computation: Developed onsite: 100-year runoff and inlet capture
References: Rational Method in accordance with CCRFCD's HC&DDM, 1996, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009
Curb opening and grate inlet capture for composite curb



Composite Section, Conventional Curb and Gutter
Reproduced from Figure 4-1, FHWA HEC-22

Part 1: Runoff calculations - 100-year

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	Paved Areas				Initial/Overland Time				Travel Time												
Subbasin I.D.	Area ft^2	Area (acres)	C_{25}	C_{100}	Length Lo (ft)	Slope S_o (%)	K	t_i (minutes)	L (ft)	Slope S (%)	V (fps)	t_t (minutes)	Conc. Time t_c (minutes)	Total Length L_T (ft)	Check Urban t_c (minutes)	Calculated t_c (minutes)	Final t_c (minutes)	I_{25} (in./hr)	I_{100} (in./hr)	Q_{25} (cfs)	Q_{100} (cfs)
SBB01	13,430	0.31	0.91	0.93	37	2.50	0.90	1.61	244	0.30	1.09	3.72	5.33	281.00	11.56	5.33	5.33	5.46	7.49	1.53	2.15
SBB01A	17,162	0.39	0.91	0.93	41	1.60	0.90	1.97	141	0.69	1.66	1.41	3.39	182.00	11.01	3.39	5.00	5.57	7.63	2.00	2.80
SBB02	25,506	0.59	0.91	0.93	52	2.00	0.90	2.06	150	0.70	1.67	1.49	3.55	202.00	11.12	3.55	5.00	5.57	7.63	2.97	4.15
SBB03	32,775	0.75	0.91	0.93	47	3.20	0.90	1.67	516	0.30	1.09	7.87	9.54	563.00	13.13	9.54	9.54	4.52	6.19	3.09	4.33
SBB04A	23,979	0.55	0.91	0.93	47	2.30	0.90	1.87	294	0.23	0.96	5.12	6.99	341.00	11.89	6.99	6.99	5.02	6.88	2.52	3.52
SBB04B	24,986	0.57	0.91	0.93	49	2.00	0.90	2.00	298	0.20	0.89	5.57	7.57	347.00	11.93	7.57	7.57	4.89	6.70	2.55	3.58
SBB05	22,523	0.52	0.91	0.93	56	2.00	0.90	2.14	301	0.60	1.55	3.24	5.38	357.00	11.98	5.38	5.38	5.45	7.47	2.56	3.59
SBB06A	12,067	0.28	0.91	0.93	43	3.10	0.90	1.62	188	0.40	1.26	2.48	4.10	231.00	11.28	4.10	5.00	5.57	7.63	1.40	1.97
SBB06B	19,082	0.44	0.91	0.93	46	2.30	0.90	1.85	292	0.20	0.89	5.46	7.31	338.00	11.88	7.31	7.31	4.95	6.78	1.97	2.76
SBB07A	14,803	0.34	0.91	0.93	53	2.60	0.90	1.91	194	0.20	0.89	3.63	5.53	247.00	11.37	5.53	5.53	5.40	7.40	1.67	2.34
SBB07B	18,258	0.42	0.91	0.93	53	1.90	0.90	2.12	216	0.28	1.06	3.41	5.52	269.00	11.49	5.52	5.52	5.41	7.41	2.06	2.89
SBB08	8,879	0.20	0.91	0.93	53	2.30	0.90	1.99	72	0.20	0.89	1.35	3.33	125.00	10.69	3.33	5.00	5.57	7.63	1.03	1.45
SBB08A	10,954	0.25	0.91	0.93	62	2.30	0.90	2.15	165	0.50	1.41	1.95	4.09	227.00	11.26	4.09	5.00	5.57	7.63	1.27	1.78
SBB09	19,119	0.44	0.91	0.93	53	2.80	0.90	1.86	153	1.10	2.10	1.21	3.07	206.00	11.14	3.07	5.00	5.57	7.63	2.22	3.11
SBB10	36,267	0.83	0.91	0.93	53	1.50	0.90	2.29	471	1.00	2.00	3.92	6.21	524.00	12.91	6.21	6.21	5.22	7.15	3.95	5.53
SBB11	15,762	0.36	0.91	0.93	57	1.40	0.90	2.43	186	1.14	2.14	1.45	3.88	243.00	11.35	3.88	5.00	5.57	7.63	1.83	2.57
SBB12	9,893	0.23	0.91	0.93	53	2.90	0.90	1.84	119	1.29	2.28	0.87	2.71	172.00	10.96	2.71	5.00	5.57	7.63	1.15	1.61
SBB13	16,052	0.37	0.91	0.93	60	3.40	0.90	1.85	162	0.80	1.79	1.51	3.36	222.00	11.23	3.36	5.00	5.57	7.63	1.87	2.61
SBB14	14,533	0.33	0.91	0.93	47	1.50	0.90	2.16	157	0.90	1.90	1.38	3.53	204.00	11.13	3.53	5.00	5.57	7.63	1.69	2.37
SBB15	21,216	0.49	0.91	0.93	61	1.20	0.90	2.65	209	0.80	1.79	1.95	4.59	270.00	11.50	4.59	5.00	5.57	7.63	2.47	3.46
SBB16	67,985	1.56	0.91	0.93	296	1.90	0.90	5.00	273	1.00	2.00	2.27	7.27	569.00	13.16	7.27	7.27	4.96	6.79	7.04	9.86
SBB16A	44,600	1.02	0.91	0.93	72	2.40	0.90	2.28	291	0.80	1.79	2.71	4.99	363.00	12.02	4.99	5.00	5.57	7.63	5.19	7.26
SBB16B	31,641	0.73	0.91	0.93	57	2.70	0.90	1.95	428	1.10	2.10	3.40	5.35	485.00	12.69	5.35	5.35	5.46	7.48	3.61	5.05
SBB16C	58,217	1.34	0.91	0.93	59	3.60	0.90	1.80	900	1.00	2.00	7.49	9.30	959.00	15.33	9.30	9.30	4.56	6.24	5.54	7.76
SBB16D	105,882	2.43	0.91	0.93	60	2.00	0.90	2.21	522	0.90	1.90	4.58	6.79	582.00	13.23	6.79	6.79	5.07	6.94	11.21	15.70
SBB16E	10,028	0.23	0.91	0.93	95	2.00	0.90	2.78	112	0.20	0.89	2.09	4.88	207.00	11.15	4.88	5.00	5.57	7.63	1.17	1.63
SBB17	32,200	0.74	0.91	0.93	46	1.80	0.90	2.01	456	0.90	1.90	4.00	6.01	502.00	12.79	6.01	6.01	5.27	7.22	3.54	4.96
SBB18	49,951	1.15	0.91	0.93	50	2.50	0.90	1.88	730	0.47	1.37	8.88	10.76	780.00	14.33	10.76	10.76	4.32	5.92	4.51	6.31
SBB19A	4,940	0.11	0.91	0.93	53	1.40	0.90	2.34	50	0.72	1.70	0.49	2.83	103.00	10.57	2.83	5.00	5.57	7.63	0.57	0.80
SBB19B	6,633	0.15	0.91	0.93	54	1.40	1.90	-9.46	65	1.10	2.10	0.52	-8.94	119.00	10.66	-8.94	5.00	5.57	7.63	0.77	1.08
SBB20A	14,873	0.34	0.91	0.93	50	2.40	0.90	1.90	250	0.55	1.48	2.81	4.71	300.00	11.67	4.71	5.00	5.57	7.63	1.73	2.42
SBB20B	15,183	0.35	0.91	0.93	50	2.30	0.90	1.93	250	0.55	1.48	2.81	4.74	300.00	11.67	4.74	5.00	5.57	7.63	1.77	2.47
SBB20C	16,792	0.39	0.91	0.93	50	2.30	0.90	1.93	250	0.55	1.48	2.81	4.74	300.00	11.67	4.74	5.00	5.57	7.63	1.95	2.74
SBB21	26,942	0.62	0.91	0.93	63	1.70	0.90	2.39	172	0.36	1.20	2.39	4.79	235.00	11.31	4.79	5.00	5.57	7.63	3.13	4.39
SBB22A	36,063	0.83	0.91	0.93	24	2.00	0.90	1.40	223	0.66	1.62	2.29	3.69	247.00	11.37	3.69	5.00	5.57	7.63	4.19	5.87
SBB22B	30,335	0.70	0.91	0.93	52	2.80	0.90	1.84	454	0.70	1.67	4.52	6.36	506.00	12.81	6.36	6.36	5.18	7.09	3.28	4.59
SBB22C	15,487	0.36	0.91	0.93	54	3.20	0.90	1.80	197	0.60	1.55	2.12	3.92	251.00	11.39	3.92	5.00	5.57	7.63	1.80	2.52
SBB23	56,676	1.30	0.91	0.93	53	2.20	0.90	2.02	840	0.57	1.51	9.29	11.31	893.00	14.96	11.31	11.31	4.24	5.81	5.02	7.03
SBB24A	35,480	0.81	0.91	0.93	44	2.70	0.90	1.71	566	0.27	1.04	9.10	10.81	610.00	13.39	10.81	10.81	4.31	5.91	3.20	4.47
SBB24B	22,051	0.51	0.91	0.93	48	2.00	0.90	1.98	260	0.30	1.09	3.96	5.94	308.00	11.71	5.94	5.94	5.29	7.24	2.44	3.41
SBB24C	31,541	0.72	0.91	0.93	47	1.60	0.90	2.11	253	0.20	0.89	4.73	6.84	300.00	11.67	6.84	6.84	5.06	6.93	3.33	4.67
SBB25	15,656	0.36	0.91	0.93	56	3.80	0.90	1.73	255	0.30	1.09	3.89	5.61	311.00	11.73	5.61	5.61	5.38	7.37	1.76	2.46
SBB26	26,565	0.61	0.91	0.93	51	3.10	0.90	1.76	315	0.10	0.63	8.34	10.10	366.00	12.03	10.10	10.10	4.42	6.06	2.45	3.44
SBB27	12,393	0.28	0.91	0.93	45	3.50	0.90	1.59	120	0.12	0.69	2.90	4.49	165.00	10.92	4.49	5.00	5.57	7.63	1.44	2.02
SBB28	9,696	0.22	0.91	0.93	47	2.10	0.90	1.93	128	0.30	1.09	1.95	3.88	175.00	10.97	3.88	5.00	5.57	7.63	1.13	1.58
SBB29	19,233	0.44	0.91	0.93	60	3.10	0.90	1.91	139	0.15	0.77	3.00	4.91	199.00	11.11	4.91	5.00	5.57	7.63	2.24	3.13
SBB30	13,070	0.30	0.91	0.93	43	1.90	0.90	1.91	195	0.10	0.63	5.16	7.07	238.00	11.32	7.07	7.07	5.00	6.86	1.37	1.91

Part 1: Runoff calculations - 100-year

Reproduced from Figure 4-1, FHWA HEC-22

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	Paved Areas				Initial/Overland Time				Travel Time												
Subbasin I.D.	Area ft^2	Area (acres)	C_{25}	C_{100}	Length Lo (ft)	Slope S_o (%)	K	t_i (minutes)	L (ft)	Slope S (%)	V (fps)	t_t (minutes)	Conc. Time t_c (minutes)	Total Length L_T (ft)	Check Urban t_c (minutes)	Calculated t_c (minutes)	Final t_c (minutes)	I_{25} (in./hr)	I_{100} (in./hr)	Q_{25} (cfs)	Q_{100} (cfs)
SBB3132	79,107	1.82	0.91	0.93	45	2.20	0.90	1.86	924	0.46	1.36	11.36	13.22	969.00	15.38	13.22	13.22	3.99	5.46	6.59	9.22
SBB33	28,649	0.66	0.91	0.93	56	2.70	0.90	1.93	278	1.10	2.10	2.21	4.14	334.00	11.86	4.14	5.00	5.57	7.63	3.33	4.67
SBB34A	29,061	0.67	0.91	0.93	27	2.00	0.90	1.48	119	1.70	2.61	0.76	2.24	146.00	10.81	2.24	5.00	5.57	7.63	3.38	4.73
SBB34B	23,340	0.54	0.91	0.93	28	3.60	0.90	1.24	65	3.60	3.81	0.28	1.53	93.00	10.52	1.53	5.00	5.57	7.63	2.71	3.80
SBB34C	17,543	0.40	0.91	0.93	57	2.40	0.90	2.03	351	1.30	2.28	2.56	4.59	408.00	12.27	4.59	5.00	5.57	7.63	2.04	2.86
SBB35	30,593	0.70	0.91	0.93	71	3.10	0.90	2.08	293	1.46	2.42	2.02	4.10	364.00	12.02	4.10	5.00	5.57	7.63	3.56	4.98
SBB36A	34,138	0.78	0.91	0.93	94	2.00	0.90	2.77	243	1.60	2.54	1.60	4.37	337.00	11.87	4.37	5.00	5.57	7.63	3.97	5.56
SBB36	44,738	1.03	0.91	0.93	50	2.40	0.90	1.90	714	1.46	2.42	4.91	6.82	764.00	14.24	6.82	6.82	5.06	6.94	4.73	6.63
SBB37A	31,977	0.73	0.91	0.93	94	2.80	0.90	2.48	353	1.00	2.00	2.94	5.41	447.00	12.48	5.41	5.41	5.44	7.45	3.63	5.09
SBB37B	11,467	0.26	0.91	0.93	59	3.70	0.90	1.79	169	0.96	1.96	1.44	3.22	228.00	11.27	3.22	5.00	5.57	7.63	1.33	1.87
SBB38	16,998	0.39	0.91	0.93	65	1.30	0.90	2.66	226	0.80	1.79	2.10	4.76	291.00	11.62	4.76	5.00	5.57	7.63	1.98	2.77
SBB39	18,119	0.42	0.91	0.93	57	3.50	0.90	1.79	200	1.00	2.00	1.66	3.46	257.00	11.43	3.46	5.00	5.57	7.63	2.11	2.95
NBB01	10,384	0.24	0.91	0.93	43	1.60	0.90	2.02	28	0.50	1.41	0.33	2.35	71.00	10.39	2.35	5.00	5.57	7.63	1.21	1.69
NBB02A1	16,632	0.38	0.91	0.93	62	1.80	0.90	2.33	250	0.29	1.07	3.88	6.21	312.00	11.73	6.21	6.21	5.22	7.15	1.81	2.54
NBB02A2	16,580	0.38	0.91	0.93	52	2.30	0.90	1.97	253	0.29	1.07	3.92	5.89	305.00	11.69	5.89	5.89	5.30	7.26	1.84	2.57
NBB02B1	16,797	0.39	0.91	0.93	62	2.40	0.90	2.12	250	0.23	0.96	4.36	6.47	312.00	11.73	6.47	6.47	5.15	7.05	1.81	2.53
NBB02B2	14,879	0.34	0.91	0.93	47	1.70	0.90	2.07	246	0.23	0.96	4.29	6.35	293.00	11.63	6.35	6.35	5.18	7.09	1.61	2.25
NBB02C	17,104	0.39	0.91	0.93	45	1.70	0.90	2.02	251	0.40	1.26	3.31	5.33	296.00	11.64	5.33	5.33	5.46	7.48	1.95	2.73
NBB03	15,075	0.35	0.91	0.93	46	2.10	0.90	1.91	53	0.10	0.63	1.40	3.31	99.00	10.55	3.31	5.00	5.57	7.63	1.75	2.46
NBB04	27,649	0.63	0.91	0.93	61	2.00	0.90	2.23	389	0.20	0.89	7.27	9.50	450.00	12.50	9.50	9.50	4.52	6.20	2.61	3.66
NBB05A	36,771	0.84	0.91	0.93	62	3.10	0.90	1.94	577	0.43	1.31	7.34	9.28	639.00	13.55	9.28	9.28	4.56	6.25	3.50	4.90
NBB05B	11,025	0.25	0.91	0.93	47	1.90	0.90	1.99	137	0.39	1.25	1.83	3.82	184.00	11.02	3.82	5.00	5.57	7.63	1.28	1.80
NBB06	18,457	0.42	0.91	0.93	57	3.50	0.90	1.79	215	1.08	2.08	1.72	3.51	272.00	11.51	3.51	5.00	5.57	7.63	2.15	3.01
NBB07	58,078	1.33	0.91	0.93	54	2.00	0.90	2.10	814	1.10	2.10	6.46	8.56	868.00	14.82	8.56	8.56	4.69	6.43	5.69	7.97
NBB08	9,759	0.22	0.91	0.93	55	1.90	0.90	2.16	76	1.03	2.03	0.62	2.78	131.00	10.73	2.78	5.00	5.57	7.63	1.14	1.59
NBB09	16,029	0.37	0.91	0.93	52	2.40	0.90	1.94	128	1.10	2.10	1.02	2.95	180.00	11.00	2.95	5.00	5.57	7.63	1.86	2.61
NBB10	23,978	0.55	0.91	0.93	49	2.40	0.90	1.88	302	1.10	2.10	2.40	4.28	351.00	11.95	4.28	5.00	5.57	7.63	2.79	3.91
NBB11	13,983	0.32	0.91	0.93	50	1.00	0.90	2.55	174	1.20	2.19	1.32	3.87	224.00	11.24	3.87	5.00	5.57	7.63	1.63	2.28
NBB12	18,064	0.41	0.91	0.93	69	1.20	0.90	2.81	200	0.30	1.09	3.05	5.86	269.00	11.49	5.86	5.86	5.31	7.27	2.00	2.81
NBB13A	45,736	1.05	0.91	0.93	95	2.10	0.90	2.74	644	0.96	1.96	5.47	8.21	739.00	14.11	8.21	8.21	4.76	6.52	4.55	6.37
NBB13B	42,663	0.98	0.91	0.93	95	2.60	0.90	2.55	644	0.90	1.90	5.65	8.20	739.00	14.11	8.20	8.20	4.76	6.52	4.24	5.94
NBB14A	32,846	0.75	0.91	0.93	73	2.30	0.90	2.33	489	0.90	1.90	4.29	6.62	562.00	13.12	6.62	6.62	5.11	7.00	3.51	4.91
NBB14B	31,952	0.73	0.91	0.93	73	2.20	0.90	2.36	489	0.90	1.90	4.29	6.66	562.00	13.12	6.66	6.66	5.10	6.99	3.41	4.77
NBB15	21,422	0.49	0.91	0.93	85	1.60	0.90	2.84	322	0.50	1.41	3.80	6.64	407.00	12.26	6.64	6.64	5.11	7.00	2.29	3.20
NBB16	9,315	0.21	0.91	0.93	61	1.20	0.90	2.65	133	0.30	1.09	2.03	4.67	194.00	11.08	4.67	5.00	5.57	7.63	1.08	1.52
NBB17A	15,390	0.35	0.91	0.93	60	1.90	0.90	2.25	189	0.40	1.26	2.49	4.74	249.00	11.38	4.74	5.00	5.57	7.63	1.79	2.51
NBB17B	16,679	0.38	0.91	0.93	60	2.30	0.90	2.11	246	0.70	1.67	2.45	4.56	306.00	11.70	4.56	5.00	5.57	7.63	1.94	2.72
NBB17C	13,250	0.30	0.91	0.93	60	2.30	0.90	2.11	210	0.40	1.26	2.77	4.88	270.00	11.50	4.88	5.00	5.57	7.63	1.54	2.16
NBB17D	9,700	0.22	0.91	0.93	60	2.50	0.90	2.05	136	0.60	1.55	1.46	3.52	196.00	11.09	3.52	5.00	5.57	7.63	1.13	1.58
NBB18	49,270	1.13	0.91	0.93	54	3.40	0.90	1.76	597	0.61	1.56	6.37	8.13	651.00	13.62	8.13	8.13	4.78	6.54	4.92	6.88
NBB19	8,470	0.19	0.91	0.93	53	2.30	0.90	1.99	103	0.31	1.11	1.54	3.53	156.00	10.87	3.53	5.00	5.57	7.63	0.99	1.38
NBB20	42,403	0.97	0.91	0.93	59	2.70	0.90	1.99	579	0.77	1.76	5.50	7.48	638.00	13.54	7.48	7.48	4.91	6.73	4.35	6.09
NBB21	11,253	0.26	0.91	0.93	47	2.80	0.90	1.75	100	0.80	1.79	0.93	2.68	147.00	10.82	2.68	5.00	5.57	7.63	1.31	1.83
NBB22	28,382	0.65	0.91	0.93	55	2.90	0.90	1.87	406	0.30	1.09	6.19	8.06	461.00	12.56	8.06	8.06	4.79	6.56	2.84	3.98
NBB23A	26,838	0.62	0.91	0.93	42	2.40	0.90	1.74	366	0.21	0.91	6.67	8.42	408.00	12.27	8.42	8.42	4.72	6.47	2.65	3.70
NBB23B	20,265	0.47	0.91	0.93	51	1.60	0.90	2.20	245	0.10	0.63	6.49	8.68	296.00	11.64	8.68	8.68	4.67	6.40	1.98	2.77
NBB23C	24,078	0.55	0.91	0.93	44	2.20	0.90	1.84	196	0.10	0.63	5.19	7.03	240.00	11.33	7.03	7.03	5.01	6.87	2.52	3.53
NBB24	15,267	0.35	0.91	0.93	49	3.10	0.90	1.73	178	0.10	0.63	4.71	6.44	227.00	11.26	6.44	6.44	5.16	7.06	1.64	2.30
NBB25	17,793	0.41	0.91	0.93	51	4.00	0.90	1.62	229	0.40	1.26	3.02	4.64	280.00	11.56	4.64	5.00	5.57	7.63	2.07	2.90
NBB26	25,703	0.59	0.91	0.93	50	3.70	0.90	1.65	352	0.20	0.89	6.58	8.22	402.00	12.23	8.22	8.22	4.76	6.52	2.55	3.58
NBB27	22,512	0.52	0.91	0.93	41	3.00	0.90	1.60	149	0.10	0.63	3.95	5.54	190.00	11.06	5.54	5.54	5.40	7.40	2.54	3.56
NBB28	41,417	0.95	0.91	0.93	55	3.20	0.90	1.81	578	0.20	0.89	10.80	12.61	633.00	13.52	12.61	12.61	4.06	5.56	3.51	4.92
NBB2930	28,089	0.64	0.91	0.93	57	3.70	0.90	1.76	238	0.40	1.26	3.14	4.90	295.00	11.64	4.90	5.00	5.57	7.63	3.27	4.58
NBB31	36,303	0.83	0.91	0.93	46	2.80	0.90	1.73	255	1.00	2.00	2.12	3.86	301.00	11.67	3.86	5.00	5.57	7.63	4.22	5.91
NBB32	25,743	0.59	0.91	0.93	55	3.50	0.90	1.76	128	1.80	2.69	0.79	2.55	183.00	11.02	2.55	5.00	5.57	7.63	2.99	4.19
NBB33	19,154	0.44	0.91	0.93	55	2.10	0.90	2.08	294	1.20	2.19	2.23	4.32	349.00	11.94	4.32	5.00	5.57	7.63	2.23	3.12
NBB33A	39,322	0.90	0.91	0.93	59	2.70	0.90	1.99	239	1.10	2.10	1.90	3.88	298.00	11.66	3.88	5.00	5.57	7.63	4.57	6.41
NBB34A	32,841	0.75	0.91	0.93	55	2.00	0.90	2.12	438	1.00	2.00	3.65	5.77	493.00	12.74	5.77	5.77	5.34	7.31	3.66	5.13
NBB34	6,405	0.15	0.91	0.93	44	2.00	0.90	1.90	106	1.50	2.45	0.72	2.62	150.00	10.83	2.62	5.00	5.57	7.63	0.75	1.04
NBB35	8,152	0.19	0.91	0.93	45	2.00	0.90	1.92	20	1.30	2.28	0.15	2.06	65.00	10.36	2.06	5.00	5.57	7.63	0.95	1.33
NBB36	105,840	2.43	0.91	0.93	81	1.60	0.90	2.77	1534	1.10	2.10	12.17	14.94	1615.00	18.97	14.94	14.94	3.79	5.18	8.37	11.71
NBB37	6,694	0.15	0.91	0.93	53	2.50	0.90	1.93	49	2.20	2.98	0.27	2.21	102.00	10.57	2.21	5.00	5.57	7.63	0.78	1.09

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Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS, DECATUR TO RAINBOW AND GOWAN OUTFALL - ALEXANDER ROAD FACILITIES**
Job no.: 23629.06
Prepared by : MM
Checked by : KR
Date: 4/5/2014
Computation: **Developed onsite: 100-year runoff and inlet capture**
References: Rational Method in accordance with CCRFCD's HC&DDM, 1996, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009
Curb opening and grate inlet capture for composite curb

Constant values		
Manning's coefficient	n =	0.015
Width of inlet	W =	1.5 ft
Gutter depression	a =	0.083 ft
	$T_{allowable}$ =	19.25 ft

Part 2: Allowable spread calculations - 100-yr

1	2	3	4	5	6	7	8	9	10	11	8	9	10	11	12	9	10	11	12	13
										Spread Calculation										
Subbasin I.D.	Inlet Type	Location	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Q_{100} (cfs)	Bypass from upstream basin (cfs)	$Q_{100\ w/bypass}$ (cfs)	S_L (ft/ft)	S_x (ft/ft)	Q_{S1} (cfs)	Q_{W1} (cfs)	E_{O1}	S_W	S_W/S_X	W/T	T_1 (ft)	T_{check}	T_{S1} (ft)	Q_{S2} (cfs)	Depth of flow for D (ft)
SBB01	Type DM2	14+80.00	5.00	10.00	2.15	0.00	2.15	0.003	0.025	1.23	0.92	0.43	0.081	3.2	0.15	9.81	yes	8.31	1.23	0.254
SBB01A	Existing inlet	15+54.00	2.00	8.00	2.80	0.16	2.95	0.007	0.016	1.88	1.07	0.36	0.072	4.5	0.12	12.51	yes	11.01	1.88	0.235
SBB02	Existing inlet	16+58.00	0.00	8.00	4.15	0.95	5.10	0.007	0.020	3.45	1.65	0.32	0.076	3.8	0.11	13.49	yes	11.99	3.45	0.293
SBB03	Type DM2	22+30.00	5.00	10.00	4.33	0	4.33	0.003	0.032	2.74	1.59	0.37	0.088	2.7	0.14	11.11	yes	9.61	2.74	0.343
SBB04A	Type DM2	25+42.00	5.00	10.00	3.52	1.28	4.80	0.002	0.023	3.43	1.36	0.28	0.079	3.4	0.10	15.01	yes	13.51	3.43	0.360
SBB04B					3.58	1.63	5.21	0.002	0.020	3.91	1.30	0.25	0.076	3.8	0.09	17.39	yes	15.89	3.91	0.371
SBB05					3.59	0	3.59	0.006	0.020	2.29	1.30	0.36	0.076	3.8	0.12	12.09	yes	10.59	2.29	0.265
SBB06A	Type DM2	34+40.00	7.50	10.00	1.97	3.59	5.56	0.004	0.031	3.63	1.93	0.35	0.087	2.8	0.13	11.82	yes	10.32	3.63	0.357
SBB06B					2.76	0.60	3.37	0.002	0.023	2.30	1.07	0.32	0.079	3.4	0.11	13.42	yes	11.92	2.29	0.323
SBB07A	Type DM2	39+85.00	5.00	7.50	2.34	3.37	5.71	0.002	0.026	4.14	1.57	0.27	0.082	3.1	0.10	15.27	yes	13.77	4.14	0.402
SBB07B	Type DM2	42+50.00	5.00	7.50	2.89	1.38	4.27	0.003	0.019	3.06	1.20	0.28	0.075	3.9	0.10	15.56	yes	14.06	3.06	0.322
SBB08					1.45	1.21	2.66	0.002	0.023	1.73	0.93	0.35	0.079	3.4	0.12	12.23	yes	10.73	1.73	0.296
SBB08A					1.78	2.66	4.44	0.005	0.023	2.93	1.52	0.34	0.079	3.4	0.12	12.50	yes	11.00	2.93	0.302
SBB09					3.11	4.44	7.56	0.011	0.028	4.87	2.69	0.36	0.084	3.0	0.13	11.65	yes	10.15	4.87	0.326
SBB10					5.53	0	5.53	0.010	0.015	3.91	1.63	0.29	0.071	4.7	0.10	15.57	yes	14.07	3.91	0.272
SBB11					2.57	0	2.57	0.011	0.014	1.53	1.04	0.40	0.070	5.0	0.13	11.58	yes	10.08	1.53	0.204
SBB12					1.61	0	1.61	0.013	0.029	0.56	1.06	0.66	0.085	2.9	0.26	5.77	yes	4.27	0.55	0.164
SBB13					2.61	0	2.61	0.008	0.034	1.20	1.42	0.54	0.090	2.6	0.21	7.14	yes	5.64	1.20	0.224
SBB14					2.37	0	2.37	0.009	0.015	1.40	0.97	0.41	0.071	4.7	0.13	11.26	yes	9.76	1.40	0.207
SBB15	Type DM2	65+28, 120' RT	2.50	5.00	3.46	0	3.46	0.008	0.012	2.39	1.07	0.31	0.068	5.6	0.10	15.53	yes	14.03	2.39	0.234
SBB16					9.86	0	9.86	0.010	0.019	7.30	2.56	0.26	0.075	3.9	0.09	16.83	yes	15.33	7.30	0.346
SBB16A	Type DM2	68+71	2.50	5.00	7.26	9.86	17.12	0.008	0.024	13.27	3.85	0.23	0.080	3.3	0.08	18.78	yes	17.28	13.27	0.462
SBB16B	Type DM2	73+20	2.50	5.00	5.05	11.44	16.49	0.011	0.027	12.23	4.26	0.26	0.083	3.1	0.09	16.17	yes	14.67	12.23	0.439
SBB16C	Type DM2	82+45	7.50	12.50	7.76	10.60	18.37	0.010	0.036	13.17	5.19	0.28	0.092	2.5	0.10	14.33	yes	12.83	13.17	0.491
SBB16D	Type 2 NDOT Grate	68+78.00			15.70		15.70													
SBB16E	Type 2 NDOT Grate	73+30.00			1.63		1.63													
SBB17	Type DM2	87+10.00	7.50	12.50	4.96	5.90	10.86	0.009	0.018	8.27	2.59	0.24	0.074	4.1	0.08	18.45	yes	16.95	8.27	0.361
SBB18	Type DM2	94+34.00	7.50	12.50	6.31	3.90	10.21	0.005	0.025	7.62	2.59	0.25	0.081	3.2	0.09	16.62	yes	15.12	7.62	0.424
SBB19A	Type DM2	96+18.00	7.50	12.50	0.80	2.30	3.11	0.007	0.014	2.05	1.05	0.34	0.070	5.0	0.11	13.78	yes	12.28	2.05	0.234
SBB19B	Type DM2				1.08	0.57	1.65	0.011	0.014	0.85	0.80	0.48	0.070	5.0	0.16	9.65	yes	8.15	0.85	0.176
SBB20A	Type DM2	99+50.00	12.50	17.50	2.42	1.65	4.07	0.006	0.024	2.57	1.50	0.37	0.080	3.3	0.13	11.53	yes	10.03	2.57	0.288
SBB20B	Type DM2	102+00.00	12.50	17.50	2.47	0.21	2.68	0.006	0.023	1.54	1.14	0.42	0.079	3.4	0.15	10.00	yes	8.50	1.54	0.244
SBB20C	Type DM2	104+60.00	12.50	17.50	2.74	0.09	2.82	0.006	0.023	1.65	1.17	0.42	0.079	3.4	0.15	10.22	yes	8.72	1.65	0.249
SBB21	Type DM2	106+65.00	5.00	7.50	4.39	0.10	4.49	0.004	0.017	3.25	1.24	0.28	0.073	4.3	0.09	16.20	yes	14.70	3.25	0.308
SBB22A					5.87	1.51	7.38	0.007	0.020	5.35	2.03	0.28	0.076	3.8	0.10	15.78	yes	14.28	5.35	0.339
SBB22B	Type DM2	111+30.00	5.00	15.00	4.59	7.38	11.97	0.007	0.028	8.70	3.27	0.27	0.084	3.0	0.10	15.24	yes	13.74	8.70	0.426
SBB22C	Type DM2	113+56.00	2.50	5.00	2.52	3.33	5.85	0.006	0.032	3.67	2.18	0.37	0.088	2.7	0.14	10.91	yes	9.41	3.67	0.337
SBB23					7.03	2.58	9.61	0.006	0.022	7.18	2.43	0.25	0.078	3.5	0.09	16.96	yes	15.46	7.18	0.390
SBB24A	Type DM2	128+90.00	5.00	7.50	4.47	0	4.47	0.003	0.027	3.01	1.46	0.33	0.083	3.1	0.12	12.79	yes	11.29	3.01	0.348
SBB24B	Type DM2	131+78.00	7.50	10.00	3.41	1.02	4.43	0.003	0.020	3.15	1.28	0.29	0.076	3.8	0.10	15.08	yes	13.58	3.15	0.325
SBB24C					4.67	0.73	5.39	0.002	0.016	4.21	1.18	0.22	0.072	4.5	0.07	20.28	**no**	18.78	4.21	0.360
SBB25	Type DM2	138+56.00	2.50	5.00	2.46	0	2.46	0.003	0.038	1.26	1.20	0.49	0.094	2.5	0.19	7.95	yes	6.45	1.26	0.272
SBB26					3.44	0.54	3.98	0.001	0.031	2.77	1.20	0.30	0.087	2.8	0.11	13.59	yes	12.09	2.77	0.412
SBB27					2.02	0	2.02	0.001	0.035	1.15	0.86	0.43	0.091	2.6	0.16	9.30	yes	7.80	1.15	0.304
SBB28					1.58	0	1.58	0.003	0.021	0.88	0.70	0.45	0.077	3.6	0.16	9.65	yes	8.15	0.88	0.223
SBB29					3.13	0	3.13	0.002	0.031	2.01	1.12	0.36	0.087	2.8	0.13	11.44	yes	9.94	2.01	0.345
SBB30	Type DM2	150+72.00	5.00	7.50	1.91	0	1.91	0.001	0.019	1.31	0.61	0.32	0.075	3.9	0.11	13.89	yes	12.39	1.31	0.290

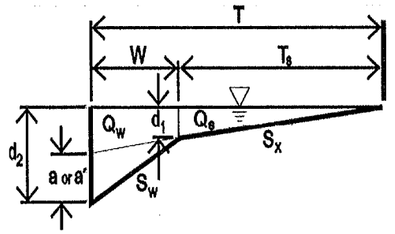
Part 2: Allowable spread calculations - 100-yr

1	2	3	4	5	6	7	8	9	10	11	8	9	10	11	12	9	10	11	12	13
										Spread Calculation										
Subbasin I.D.	Inlet Type	Location	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Q_{100} (cfs)	Bypass from upstream basin (cfs)	$Q_{100\ w/bypass}$ (cfs)	S_L (ft/ft)	S_x (ft/ft)	Q_{S1} (cfs)	Q_{W1} (cfs)	E_{O1}	S_W	S_W/S_X	W/T	T_1 (ft)	T_{check}	T_{S1} (ft)	Q_{S2} (cfs)	Depth of flow for D (ft)
SBB3132	Type DM2	160+22.00	10.00	15.00	9.22	0.19	9.41	0.005	0.022	7.11	2.30	0.24	0.078	3.5	0.09	17.52	yes	16.02	7.11	0.403
SBB33	Type DM2	163+00.00	10.00	15.00	4.67	1.41	6.08	0.011	0.027	3.77	2.31	0.38	0.083	3.1	0.14	10.94	yes	9.44	3.77	0.298
SBB34A	Type DM2	164+70.00	7.50	12.50	4.73	0.86	5.59	0.017	0.020	3.51	2.08	0.37	0.076	3.8	0.13	11.72	yes	10.22	3.51	0.258
SBB34B	Type DM2	165+60.00	10.00	15.00	3.80	1.57	5.37	0.036	0.036	2.36	3.01	0.56	0.092	2.5	0.22	6.80	yes	5.30	2.36	0.220
SBB34C	Type DM2	167+06.00	7.50	12.50	2.86	0.79	3.65	0.013	0.024	2.00	1.65	0.45	0.080	3.3	0.16	9.26	yes	7.76	2.00	0.234
SBB35	Type DM2	170+46.00	5.00	5.00	4.98	0	4.98	0.015	0.031	2.69	2.29	0.46	0.087	2.8	0.17	8.74	yes	7.24	2.69	0.261
SBB36A					5.56	1.98	7.54	0.016	0.020	5.08	2.46	0.33	0.076	3.8	0.11	13.37	yes	11.87	5.08	0.291
SBB36	Type DM2	178+00.00	5.00	10.00	6.63	7.54	14.17	0.015	0.024	10.30	3.87	0.27	0.080	3.3	0.10	15.54	yes	14.04	10.30	0.384
SBB37A	Type DM2	182+04.00	7.50	12.50	5.09	7.07	12.16	0.010	0.028	8.62	3.54	0.29	0.084	3.0	0.10	14.31	yes	12.81	8.62	0.400
SBB37B					1.87	3.70	5.57	0.010	0.037	3.10	2.47	0.44	0.093	2.5	0.17	8.89	yes	7.39	3.10	0.301
SBB38					2.77	5.57	8.33	0.008	0.013	6.50	1.83	0.22	0.069	5.3	0.07	20.91	**no**	19.41	6.50	0.316
SBB39	Existing inlet	188+53.00	3.00	3.00	2.95	8.33	11.29	0.010	0.035	7.51	3.78	0.33	0.091	2.6	0.12	12.08	yes	10.58	7.51	0.401
NBB01					1.69	0	1.69	0.005	0.016	0.97	0.72	0.43	0.072	4.5	0.14	10.62	yes	9.12	0.97	0.205
NBB02A1	Type DM2	19+04.00	2.50	5.00	2.54	0	2.54	0.003	0.018	1.67	0.87	0.34	0.074	4.1	0.12	13.01	yes	11.51	1.67	0.263
NBB02A2	Type DM2	21+68.00	2.50	5.00	2.57	0.97	3.54	0.003	0.023	2.36	1.19	0.34	0.079	3.4	0.12	12.73	yes	11.23	2.36	0.307
NBB02B1	Type DM2	24+30.00	2.50	5.00	2.53	1.41	3.94	0.002	0.024	2.70	1.24	0.31	0.080	3.3	0.11	13.53	yes	12.03	2.71	0.336
NBB02B2	Type DM2	26+92.00	2.50	5.00	2.25	1.57	3.83	0.002	0.017	2.80	1.03	0.27	0.073	4.3	0.09	16.62	yes	15.12	2.80	0.315
NBB02C	Type DM2	29+50.00	2.50	5.00	2.73	1.78	4.51	0.004	0.017	3.24	1.27	0.28	0.073	4.3	0.09	15.90	yes	14.40	3.24	0.303
NBB03					2.46	2.33	4.78	0.001	0.021	3.68	1.10	0.23	0.077	3.6	0.08	18.66	yes	17.16	3.68	0.412
NBB04	Type DM2	36+60.00	2.50	5.00	3.66	0	3.66	0.002	0.020	2.61	1.05	0.29	0.076	3.8	0.10	15.15	yes	13.65	2.60	0.326
NBB05A	Type DM2	42+50.00	5.00	7.50	4.90	1.52	6.42	0.004	0.031	4.29	2.14	0.33	0.087	2.8	0.12	12.33	yes	10.83	4.29	0.373
NBB05B	Type DM2	44+35.00	2.50	5.00	1.80	1.90	3.70	0.004	0.019	2.52	1.18	0.32	0.075	3.9	0.11	13.77	yes	12.27	2.52	0.288
NBB06					3.01	1.69	4.70	0.011	0.035	2.49	2.20	0.47	0.091	2.6	0.18	8.40	yes	6.90	2.49	0.272
NBB07					7.97	0	7.97	0.011	0.020	5.61	2.36	0.30	0.076	3.8	0.10	14.72	yes	13.22	5.61	0.318
NBB08					1.59	0	1.59	0.010	0.019	0.73	0.86	0.54	0.075	3.9	0.19	7.93	yes	6.43	0.73	0.177
NBB09					2.61	0	2.61	0.011	0.024	1.31	1.30	0.50	0.080	3.3	0.18	8.34	yes	6.84	1.31	0.211
NBB10					3.91	0	3.91	0.011	0.024	2.24	1.67	0.43	0.080	3.3	0.15	9.86	yes	8.36	2.24	0.248
NBB11	Existing inlet	67+10.00	2.50	5.00	2.28	0	2.28	0.012	0.010	1.42	0.85	0.37	0.066	6.6	0.11	13.50	yes	12.00	1.42	0.188
NBB12					2.81	0	2.81	0.003	0.012	2.04	0.77	0.27	0.068	5.6	0.09	17.38	yes	15.88	2.04	0.256
NBB13A	Type DM2	75+75.00	10.00	15.00	6.37	2.81	9.17	0.010	0.021	6.61	2.56	0.28	0.077	3.6	0.10	15.49	yes	13.99	6.61	0.346
NBB13B	Type DM2	82+52.00	7.50	12.50	5.94	1.99	7.93	0.009	0.026	5.36	2.57	0.32	0.082	3.1	0.12	12.95	yes	11.45	5.36	0.342
NBB14A	Type DM2	87+60.00	7.50	12.50	4.91	1.92	6.83	0.009	0.023	4.61	2.21	0.32	0.079	3.4	0.11	13.19	yes	11.69	4.61	0.318
NBB14B	Type DM2	92+52.00	7.50	12.50	4.77	1.64	6.41	0.009	0.022	4.32	2.08	0.33	0.078	3.5	0.11	13.23	yes	11.73	4.32	0.308
NBB15	Type DM2	95+90.00	7.50	12.50	3.20	1.52	4.72	0.005	0.016	3.40	1.32	0.28	0.072	4.5	0.09	16.10	yes	14.60	3.40	0.293
NBB16					1.52	0	1.52	0.003	0.012	0.98	0.54	0.36	0.068	5.6	0.11	13.55	yes	12.05	0.98	0.210
NBB17A	Type DM2	99+40.00	7.50	12.50	2.51	1.52	4.02	0.004	0.019	2.78	1.25	0.31	0.075	3.9	0.11	14.17	yes	12.67	2.78	0.296
NBB17B	Type DM2	101+90.00	7.50	12.50	2.72	0.53	3.25	0.007	0.023	1.91	1.34	0.41	0.079	3.4	0.15	10.30	yes	8.80	1.91	0.251
NBB17C	Type DM2	104+25.00	7.50	12.50	2.16	0.38	2.54	0.004	0.023	1.51	1.03	0.41	0.079	3.4	0.14	10.45	yes	8.95	1.51	0.255
NBB17D					1.58	0	1.58	0.006	0.025	0.72	0.86	0.55	0.081	3.2	0.20	7.46	yes	5.96	0.72	0.195
NBB18	Type DM2	112+80.00	7.50	10.00	6.88	1.58	8.46	0.006	0.034	5.63	2.84	0.33	0.090	2.6	0.12	12.10	yes	10.60	5.63	0.393
NBB19					1.38	1.89	3.27	0.003	0.023	2.12	1.15	0.35	0.079	3.4	0.12	12.16	yes	10.66	2.12	0.294
NBB20					6.09	3.27	9.36	0.008	0.027	6.55	2.81	0.30	0.083	3.1	0.11	13.91	yes	12.41	6.55	0.378
NBB21					1.83	0	1.83	0.008	0.028	0.79	1.04	0.57	0.084	3.0	0.22	6.95	yes	5.45	0.79	0.194
NBB22	Type DM2	126+68.00	2.50	5.00	3.98	0	3.98	0.003	0.029	2.54	1.43	0.36	0.085	2.9	0.13	11.43	yes	9.93	2.54	0.328
NBB23A	Type DM2	130+60.00	2.50	5.00	3.70	1.48	5.19	0.002	0.024	3.75	1.44	0.28	0.080	3.3	0.10	15.33	yes	13.83	3.75	0.379
NBB23B	Type DM2	133+32.00	2.50	5.00	2.77	2.31	5.07	0.001	0.016	4.08	0.99	0.20	0.072	4.5	0.07	22.64	**no**	21.14	4.08	0.398
NBB23C	Type DM2	135+37.00	2.50	5.00	3.53	2.37	5.90	0.001	0.022	4.62	1.28	0.22	0.078	3.5	0.08	19.63	**no**	18.13	4.61	0.449
NBB24					2.30	2.54	4.84	0.001	0.031	3.46	1.38	0.29	0.087	2.8	0.10	14.39	yes	12.89	3.29	0.436
NBB25					2.90	0	2.90	0.004	0.040	1.46	1.44	0.50	0.096	2.4	0.19	7.76	yes	6.26	1.46	0.274
NBB26	Type DM2	145+13.00	2.50	5.00	3.58	0	3.58	0.002	0.037	2.18	1.40	0.39	0.093	2.5	0.15	10.19	yes	8.69	2.18	0.349
NBB27					3.56	1.00	4.55	0.001	0.030	3.27	1.29	0.28	0.086	2.9	0.10	14.62	yes	13.12	3.27	0.432
NBB28					4.92	0	4.92	0.002	0.032	3.33	1.59	0.32	0.088	2.7	0.12	12.65	yes	11.15	3.33	0.392
NBB2930					4.58	0	4.58	0.004	0.037	2.72	1.86	0.41	0.093	2.5	0.15	9.79	yes	8.29	2.72	0.335
NBB31					5.91	0	5.91	0.010	0.028	3.64	2.27	0.38	0.084	3.0	0.14	10.77	yes	9.27	3.64	0.301
NBB32					4.19	0	4.19	0.018	0.035	1.95	2.25	0.54	0.091	2.6	0.21	7.21	yes	5.71	1.95	0.231
NBB33	Type DM2	166+52.00	10.00	15.00	3.12	4.19	7.31	0.012	0.021	4.98	2.34	0.32	0.077	3.6	0.11	13.56	yes	12.06	4.98	0.305
NBB33A	Type DM2	167+05.00	5.00	10.00	6.41	1.51	7.91	0.011	0.027	5.19	2.72	0.34	0.083	3.1	0.12	12.14	yes	10.64	5.19	0.330
NBB34A					5.13	2.81	7.93	0.010	0.020	5.62	2.31	0.29	0.076	3.8	0.10	14.97	yes	13.47	5.62	0.323
NBB34	Type DM2	168+35.00	5.00	10.00	1.04	7.93	8.98	0.015	0.020	6.28	2.70	0.30	0.076	3.8	0.10	14.51	yes	13.01	6.28	0.313
NBB35					1.33	0	1.33	0.013	0.020	0.51	0.82	0.62	0.076	3.8	0.22	6.71	yes	5.21	0.51	0.157
NBB36					11.71	0	11.71	0.011	0.016	9.06	2.65	0.23	0.072	4.5	0.08	19.69	**no**	18.19	9.06	0.350
NBB37	Existing Inlet	186+00.00	4.00	4.00	1.09	11.71	12.80	0.022	0.025	8.78	4.02	0.31	0.081	3.2	0.11	13.44	yes	11.94	8.78	0.344

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Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS, DECATUR TO RAINBOW AND GOWAN OUTFALL - ALEXANDER ROAD FACILITIES**
Job no.: 23629
Prepared by : MM
Checked by : KR
Date: 4/5/2014
Computation: **Developed onsite: 100-year runoff and inlet capture**
References: Rational Method in accordance with CCRFCD's HC&DDM, 1996, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009
Curb opening and grate inlet capture for composite curb

0
Manning's coefficient n = 0.015
Width of inlet W = 1.5 ft
Gutter depression a = 0.0833 ft



Part 3: Inlet capture calculations - 100-yr

1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
	Inlet sizes			With Clogging		Curb Opening Calculation					Grate Opening Calculation															
Subbasin I.D.	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Inlet Clogging Factor (%)	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Se (ft/ft)	L_T (ft)	L (ft)	E	Q_{ic} (cfs)	Q_g (cfs)	Q_{S3} (cfs)	Q_{W3} (cfs)	E_{O3}	W/T	T_3 (ft)	T_{S3} (ft)	Q_{S4} (cfs)	V (ft/s)	V_O (ft/s)	R_f	R_s	Q_{ig} (cfs)	Q_{100} intercept (cfs)	Q_{100} bypass (cfs)	Comments
SBB01	5.0	10.0	25	3.8	7.5	0.049	11.0	3.8	0.53	1.13	1.02	0.44	0.57	0.56	0.21	7.2	5.7	0.44	1.44	10.00	1.00	0.64	0.86	1.99	0.16	new curb opening and inlet; remaining bypass discharges into SBB01A
SBB01A	2.0	8.0	25	1.5	6.0	0.036	19.3	4.5	0.38	1.12	1.83	1.02	0.81	0.44	0.15	10.3	8.8	1.02	2.03	5.91	1.00	0.07	0.88	2.00	0.95	total discharges into existing inlet at Santa Fe Casino entrance
SBB02	0.0	8.0	25	0.0	6.0	0.038	23.8	6.0	0.41	0.19	4.91	3.30	1.61	0.33	0.11	13.3	11.8	3.30	2.69	0.00	0.76	0.00	0.00	0.19	4.91	total discharges into existing inlet at Santa Fe Casino entrance
SBB03	5.0	10.0	25	3.8	7.5	0.052	14.2	3.8	0.42	0.00	4.33	2.74	1.59	0.37	0.13	11.1	9.6	2.74	2.12	10.00	1.00	0.53	3.05	3.05	1.28	new curb opening and inlet; remaining bypass discharges into SBB04A
SBB04A	5.0	10.0	25	3.8	7.5	0.039	16.4	3.8	0.37	0.00	4.80	3.43	1.36	0.28	0.10	15.0	13.5	3.43	1.81	10.00	1.00	0.52	3.17	3.17	1.63	new curb opening and inlet; remaining bypass discharges into SBB04B
SBB04B																									5.21	discharges west into Lone Mountain Road
SBB05																									3.59	discharges into subbasin SBB06A
SBB06A	7.5	10.0	25	5.6	7.5	0.050	17.6	1.9	0.18	1.95	3.61	2.14	1.47	0.41	0.15	10.0	8.5	2.14	2.25	10.00	1.00	0.72	3.01	4.95	0.60	new curb opening and inlet; remaining bypass discharges into SBB06B
SBB06B																									3.37	discharges into SBB07A
SBB07A	5.0	7.5	25	3.8	5.6	0.041	16.3	1.9	0.20	1.13	4.58	3.21	1.37	0.30	0.11	14.0	12.5	3.20	1.75	10.00	1.00	0.57	3.20	4.33	1.38	new curb opening and inlet; remaining bypass discharges into SBB07B
SBB07B	5.0	7.5	25	3.8	5.6	0.035	17.7	1.9	0.18	0.78	3.49	2.42	1.07	0.31	0.10	14.4	12.9	2.42	1.72	10.00	1.00	0.50	2.27	3.05	1.21	new curb opening and inlet; remaining bypass discharges into SBB08
SBB08																									2.66	discharges into Ahern Rentals parking lot
SBB08A																									4.44	discharges into SBB09
SBB09																									7.56	discharges west into Red Coach Avenue
SBB10																									5.53	discharges into Draft House parking lot
SBB11																									2.57	discharges into Fat Burger/Arby's parking lot
SBB12																									1.61	discharges into Arby/APN 138-02-213-014 parking lot
SBB13																									2.61	discharges into Taco Bell/Discount Tire parking lot
SBB14																									2.37	discharges into Lee's Disct Liquor/APN13802213007 pkng lot
SBB15	2.5	5.0	25	1.9	3.8	0.029	24.6	1.9	0.13	0.46	3.00	2.01	0.98	0.33	0.10	14.7	13.2	2.01	2.22	6.76	1.00	0.07	1.13	1.59	1.86	discharges west into new curb opening and inlet in Craig Rd;
SBB16																									9.86	discharges into SBB16A
SBB16A	2.5	5.0	25	1.9	3.8	0.037	42.1	1.9	0.08	1.35	15.77	12.11	3.67	0.23	0.08	18.2	16.7	12.11	3.91	6.76	1.00	0.06	4.34	5.68	11.44	new curb opening and inlet; remaining bypass discharges into SBB16B
SBB16B	2.5	5.0	25	1.9	3.8	0.041	42.3	1.9	0.08	1.29	15.20	11.14	4.06	0.27	0.10	15.7	14.2	11.15	4.50	6.76	1.00	0.05	4.60	5.89	10.60	new curb opening and inlet; remaining bypass discharges into SBB01C
SBB16C	7.5	12.5	25	5.6	9.4	0.052	37.6	3.8	0.17	3.16	15.20	10.59	4.61	0.30	0.11	13.3	11.8	10.59	4.67	10.00	1.00	0.44	9.31	12.47	5.90	new curb opening and inlet to replace exisitng 2' inlet; remaining bypass discharges into SBB17
						See Grate sump calculations performed with Flow Master																		15.70	0.00	Grate only area drain sump; sized for 100% capture
						See Grate sump calculations performed with Flow Master																		1.63	0.00	Grate only area drain sump; sized for 100% capture
SBB17	7.5	12.5	25	5.6	9.4	0.031	39.5	3.8	0.16	1.78	9.08	6.75	2.32	0.26	0.09	17.2	15.7	6.75	3.33	10.00	1.00	0.42	5.18	6.96	3.90	new curb opening and inlet; remaining bypass discharges into SBB18
SBB18	7.5	12.5	25	5.6	9.4	0.039	27.7	3.8	0.23	2.35	7.86	5.65	2.21	0.28	0.10	15.0	13.5	5.65	2.73	10.00	1.00	0.59	5.56	7.91	2.30	new curb opening and inlet; remaining bypass discharges into SBB19A
SBB19A	7.5	12.5	25	5.6	9.4	0.033	21.2	3.8	0.30	0.92	2.19	1.33	0.86	0.39	0.13	11.9	10.4	1.33	2.07	10.00	1.00	0.57	1.62	2.54	0.57	new curb opening and inlet; remaining bypass discharges into SBB19B
SBB19B																									1.65	Discharges into SBB20A
SBB20A	12.5	17.5	25	9.4	13.1	0.044	18.3	3.8	0.34	1.38	2.69	1.53	1.16	0.43	0.15	9.8	8.3	1.53	2.24	10.00	1.00	0.87	2.49	3.87	0.21	new curb opening and inlet; remaining bypass discharges into SBB20B
SBB20B	12.5	17.5	25	9.4	13.1	0.047	14.9	3.8	0.41	1.09	1.59	0.77	0.82	0.52	0.19	8.0	6.5	0.77	1.97	10.00	1.00	0.89	1.50	2.59	0.09	new curb opening and inlet; remaining bypass discharges into SBB20C
	12.5	17.5	25	9.4	13.1	0.046	15.3	3.8	0.40	1.12	1.70	0.84	0.86	0.50	0.18	8.3	6.8	0.84	2.00	10.00	1.00	0.88	1.61	2.72	0.10	new curb opening and inlet; remaining bypass discharges into SBB21
SBB21	5.0	7.5	25	3.8	5.6	0.032	20.3	1.9	0.16	0.72	3.77	2.65	1.11	0.30	0.10	15.1	13.6	2.65	1.88	10.00	1.00	0.43	2.26	2.98	1.51	new curb opening and inlet; remaining bypass discharges into SBB22A
SBB22A																									7.38	discharges into SBB22B
SBB22B	5.0	15.0	25	3.8	11.3	0.043	31.5	7.5	0.39	4.64	7.33	4.91	2.42	0.33	0.12	12.6	11.1	4.91	3.21	10.00	1.00	0.32	4.01	8.65	3.33	new curb opening and inlet; remaining bypass discharges into SBB22C
SBB22C	2.5	5.0	25	1.9	3.8	0.053	19.7	1.9	0.16	0.96	4.89	2.94	1.95	0.40	0.15	10.2	8.7	2.94	2.85	6.76	1.00	0.12	2.30	3.27	2.58	new curb opening and inlet; remaining bypass discharges into SBB23
SBB23																									9.61	discharges to sw underdrains in Duncan Dr, then channel
SBB24A	5.0	7.5	25	3.8	5.6	0.045	15.2	1.9	0.21	0.94	3.53	2.27	1.26	0.36	0.13	11.7	10.2	2.27	1.86	10.00	1.00	0.55	2.51	3.46	1.02	new curb opening and inlet; remaining bypass discharges into SBB24B
SBB24B	7.5	10.0	25	5.6	7.5	0.036	17.9	1.9	0.18	0.80	3.63	2.49	1.14	0.31	0.11	13.9	12.4	2.49	1.81	10.00	1.00	0.71	2.90	3.70	0.73	new curb opening and inlet; remaining bypass discharges into SBB24C
SBB24C																									5.39	discharges west into Gowan Road
SBB25	2.5	5.0	25	1.9	3.8	0.065	9.8	1.9	0.32	0.78	1.68	0.74	0.94	0.56	0.22	6.8	5.3	0.74	1.79	6.76	1.00	0.27	1.14	1.92	0.54	new curb opening and inlet; remaining bypass discharges into SBB26
SBB26																									3.98	discharges into first driveway of 13812301013
SBB27																									2.02	discharges into second driveway of 13812301013
SBB28																									1.58	discharges west into Michael Way
SBB29																									3.13	discharges west into Michael Way
SBB30	5.0	7.5	25	3.8	5.6	0.037	9.0	1.9	0.34	0.66	1.25	0.78	0.47	0.38	0.13	11.7	10.2	0.78	0.92	10.00	1.00	0.76	1.06	1.72	0.19	new curb opening and inlet; remaining bypass discharges into SBB3132

Part 3: Inlet capture calculations - 100-yr

1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
	Inlet sizes			With Clogging		Curb Opening Calculation					Grate Opening Calculation															
Subbasin I.D.	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Inlet Clogging Factor (%)	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Se (ft/ft)	L_T (ft)	L (ft)	E	Q_{Ic} (cfs)	Q_g (cfs)	Q_{S3} (cfs)	Q_{W3} (cfs)	E_{O3}	W/T	T_3 (ft)	T_{S3} (ft)	Q_{S4} (cfs)	V (ft/s)	V_O (ft/s)	R_f	R_s	Q_{Ig} (cfs)	$Q_{100\ intercept}$ (cfs)	$Q_{100\ bypass}$ (cfs)	Comments
SBB3132	10.0	15.0	25	7.5	11.3	0.036	28.2	3.8	0.23	2.13	7.27	5.31	1.97	0.27	0.09	15.9	14.4	5.31	2.57	10.00	1.00	0.73	5.86	8.00	1.41	new curb opening and inlet; remaining bypass discharges into SBB33
SBB33	10.0	15.0	25	7.5	11.3	0.048	25.4	3.8	0.25	1.52	4.56	2.62	1.93	0.42	0.15	9.7	8.2	2.63	3.39	10.00	1.00	0.67	3.70	5.22	0.86	new curb opening and inlet; remaining bypass discharges into SBB34A
SBB34A	7.5	12.5	25	5.6	9.4	0.041	30.9	3.8	0.21	1.16	4.43	2.62	1.81	0.41	0.14	10.7	9.2	2.62	3.70	10.00	1.00	0.40	2.87	4.03	1.57	new curb opening and inlet; remaining bypass discharges into SBB34B
SBB34B	10.0	15.0	26	7.4	11.1	0.067	28.2	3.7	0.22	1.20	4.16	1.62	2.55	0.61	0.25	6.1	4.6	1.62	5.69	10.00	1.00	0.51	3.38	4.58	0.79	new curb opening and inlet; remaining bypass discharges into SBB34C
SBB34C	7.5	12.5	25	5.6	9.4	0.049	21.3	3.8	0.29	1.07	2.57	1.24	1.33	0.52	0.19	8.0	6.5	1.24	3.10	10.00	1.00	0.53	1.98	3.06	0.59	new curb opening and inlet; remaining discharge heads west around the corner on Cheyenne to an existing inlet
SBB35	5.0	5.0	25	3.8	3.8	0.057	23.1	0.0	0.00	0.00	4.98	2.69	2.29	0.46	0.17	8.7	7.2	2.69	4.00	10.00	1.00	0.26	3.00	3.00	1.98	new curb opening and inlet; remaining bypass discharges into SBB36A
SBB36A																									7.54	discharges into SBB36
SBB36	5.0	10.0	25	3.8	7.5	0.039	44.6	3.8	0.15	2.07	12.10	8.59	3.51	0.29	0.10	14.6	13.1	8.59	4.61	10.00	1.00	0.18	5.03	7.10	7.07	new curb opening and inlet; remaining bypass discharges into SBB37A
SBB37A	7.5	12.5	25	5.6	9.4	0.044	34.8	3.8	0.19	2.26	9.90	6.78	3.12	0.31	0.11	13.2	11.7	6.78	3.95	10.00	1.00	0.45	6.20	8.46	3.70	new curb opening and inlet; remaining bypass discharges into SBB37B
SBB37B																									5.57	discharges into SBB38
SBB38																									8.33	discharges into SBB39
SBB39	3.0	3.0	25	2.3	2.3	0.054	30.0	0.0	0.00	0.00	11.29	7.51	3.78	0.33	0.12	12.1	10.6	7.51	4.32	7.54	1.00	0.10	4.51	4.51	6.77	existing 3X3 curb opening and grate
NBB01																									1.69	discharges east into Rainbow Boulevard
NBB02A1	2.5	5.0	25	1.9	3.8	0.037	13.8	1.9	0.23	0.59	1.95	1.21	0.74	0.38	0.13	11.7	10.2	1.21	1.51	6.76	1.00	0.20	0.98	1.56	0.97	new curb opening and inlet; remaining bypass discharges into NBB02A2
NBB02A2	2.5	5.0	25	1.9	3.8	0.042	14.8	1.9	0.22	0.77	2.78	1.75	1.03	0.37	0.13	11.6	10.1	1.75	1.74	6.76	1.00	0.19	1.37	2.13	1.41	new curb opening and inlet; remaining bypass discharges into NBB02B1
NBB02B1	2.5	5.0	25	1.9	3.8	0.041	14.5	1.9	0.22	0.87	3.07	2.01	1.06	0.35	0.12	12.3	10.8	2.01	1.65	6.76	1.00	0.22	1.50	2.37	1.57	new curb opening and inlet; remaining bypass discharges into NBB02B2
NBB02B2	2.5	5.0	25	1.9	3.8	0.032	16.7	1.9	0.19	0.74	3.09	2.18	0.90	0.29	0.10	15.3	13.8	2.18	1.51	6.76	1.00	0.19	1.31	2.05	1.78	new curb opening and inlet; remaining bypass discharges into NBB02C
NBB02C	2.5	5.0	25	1.9	3.8	0.033	20.9	1.9	0.16	0.70	3.81	2.66	1.15	0.30	0.10	14.9	13.4	2.66	1.96	6.76	1.00	0.13	1.48	2.18	2.33	new curb opening and inlet; remaining bypass discharges into NBB03
NBB03			25																						4.78	discharges east into Ln Mtn Rd
NBB04	2.5	5.0	25	1.9	3.8	0.036	14.6	1.9	0.22	0.80	2.86	1.95	0.91	0.32	0.11	13.7	12.2	1.95	1.46	6.76	1.00	0.22	1.34	2.14	1.52	new curb opening and inlet; remaining bypass discharges into NBB05A
NBB05A	5.0	7.5	25	3.8	5.6	0.049	19.3	1.9	0.17	1.08	5.34	3.44	1.90	0.36	0.13	11.5	10.0	3.44	2.54	10.00	1.00	0.45	3.44	4.52	1.90	new curb opening and inlet; remaining bypass discharges into NBB05B
NBB05B	2.5	5.0	25	1.9	3.8	0.037	17.8	1.9	0.18	0.67	3.03	1.98	1.05	0.35	0.12	12.7	11.2	1.98	1.89	6.76	1.00	0.15	1.34	2.01	1.69	new curb opening and inlet; remaining bypass discharges into NBB06
NBB06																									4.70	discharges into APN 13802113001 parking lot
NBB07																									7.97	discharges east into Torrey Pines Drive
NBB08																									1.59	discharges east to parking lot,APN 13802204001 Checkr, BigO
NBB09																									2.61	discharges east to pkng lot (13802204001) upstream of DelTaco
NBB10																									3.91	discharges east into parking lot (APN 13802601001, Kmart)
NBB11	2.5	5.0	25	1.9	3.8	0.031	22.5	1.9	0.14	0.33	1.95	1.16	0.78	0.40	0.12	12.6	11.1	1.16	2.26	6.76	1.00	0.06	0.85	1.18	1.09	exisitng 2.5x5 discharges east into Craig Road
NBB12																									2.81	discharges east into Craig Road
NBB13A	10.0	15.0	25	7.5	11.3	0.037	34.2	3.8	0.19	1.73	7.44	5.18	2.26	0.30	0.11	14.3	12.8	5.18	3.38	10.00	1.00	0.62	5.45	7.18	1.99	new curb opening and inlet; remaining bypass discharges into NBB13B
	7.5	12.5	25	5.6	9.4	0.044	28.2	3.8	0.23	1.80	6.13	3.94	2.20	0.36	0.13	11.7	10.2	3.94	3.33	10.00	1.00	0.51	4.22	6.02	1.92	new curb opening and inlet; remaining bypass discharges into NBB14A
NBB14A	7.5	12.5	25	5.6	9.4	0.041	27.6	3.8	0.23	1.58	5.25	3.36	1.89	0.36	0.13	11.9	10.4	3.36	3.11	10.00	1.00	0.51	3.61	5.19	1.64	new curb opening and inlet; remaining bypass discharges into NBB14B
	7.5	12.5	25	5.6	9.4	0.040	27.3	3.8	0.23	1.50	4.91	3.14	1.77	0.36	0.13	11.9	10.4	3.14	3.03	10.00	1.00	0.51	3.39	4.88	1.52	new curb opening and inlet; remaining bypass discharges into NBB15
NBB15	7.5	12.5	25	5.6	9.4	0.032	23.2	3.8	0.27	1.28	3.44	2.34	1.10	0.32	0.11	14.2	12.7	2.34	2.05	10.00	1.00	0.61	2.52	3.81	0.92	new curb opening and inlet; remaining bypass discharges into NBB016
NBB16																									1.52	discharges east into Jones Blvd.
NBB17A	7.5	12.5	25	5.6	9.4	0.036	18.7	3.8	0.33	1.34	2.69	1.71	0.98	0.37	0.12	12.1	10.6	1.71	1.86	10.00	1.00	0.69	2.16	3.49	0.53	new curb opening and inlet; remaining bypass discharges into NBB17B
	7.5	12.5	25	5.6	9.4	0.046	17.5	3.8	0.35	1.14	2.11	1.08	1.03	0.49	0.17	8.6	7.1	1.08	2.30	10.00	1.00	0.64	1.72	2.87	0.38	new curb opening and inlet; remaining bypass discharges into NBB17C
	7.5	12.5	25	5.6	9.4	0.046	13.4	3.8	0.45	1.13	1.41	0.69	0.72	0.51	0.18	8.2	6.7	0.69	1.70	10.00	1.00	0.76	1.24	2.38	0.17	new curb opening and inlet; remaining bypass discharges into NBB17D
																									1.58	discharges into Alexander Road
NBB18	7.5	10.0	25	5.6	7.5	0.053	23.2	1.9	0.14	1.19	7.27	4.69	2.58	0.35	0.13	11.4	9.9	4.69	3.20	10.00	1.00	0.60	5.38	6.58	1.89	new curb opening and inlet; remaining bypass discharges into NBB19
NBB19																									3.27	discharges into NBB20
NBB20																									9.36	discharges east into parking lot (APN 13812110015)
NBB21																									1.83	discharges east into Duncan Drive
NBB22	2.5	5.0	25	1.9	3.8	0.049	14.2	1.9	0.22	0.89	3.08	1.86	1.23	0.40	0.15	10.3	8.8	1.86	1.91	6.76	1.00	0.20	1.60	2.50	1.48	new curb opening and inlet; remaining bypass discharges into NBB23A
NBB23A	2.5	5.0	25	1.9	3.8	0.039	16.3	1.9	0.20	1.02	4.16	2.91	1.26	0.30	0.11	14.1	12.6	2.91	1.71	6.76	1.00	0.21	1.85	2.88	2.31	new curb opening and inlet; remaining bypass discharges into NBB23B
NBB23B	2.5	5.0	25	1.9	3.8	0.027	16.3	1.9	0.20	1.00	4.07	3.20	0.87	0.21	0.07	20.8	19.3	3.20	1.16	6.76	1.00	0.26	1.70	2.70	2.37	new curb opening and inlet; remaining bypass discharges into NBB23C
NBB23C	2.5	5.0	25	1.9	3.8	0.034	15.0	1.9	0.21	1.26	4.65	3.54	1.11	0.24	0.08	17.9	16.4	3.54	1.29	6.76	1.00	0.28	2.10	3.36	2.54	new curb opening and inlet, bypass goes east in Gowan
NBB24																									4.84	discharges east into Gowan Road
NBB25																									2.90	discharges into NBB26
NBB26	2.5	5.0	25	1.9	3.8	0.059	10.8	1.9	0.29	1.04	2.54	1.41	1.12	0.44	0.17	8.9	7.4	1.41	1.67	6.76	1.00	0.29	1.54	2.58	1.00	new curb opening and inlet; remaining bypass discharges into NBB27
NBB27																									4.55	discharges east into Jay Avenue
NBB28																									4.92	discharges east into Ricky Road
NBB2930																									4.58	discharges east into Disct Muffler parking lot, APN 13812810003
NBB31																									5.91	discharges east into Donnie Avenue
NBB32																									4.19	discharges into NBB33
NBB33	10.0	15.0	25	7.5	11.3	0.039	32.1	3.8	0.20	1.47	5.85	3.81	2.04	0.35	0.12	12.4	10.9	3.81	3.48	10.00	1.00	0.60	4.34	5.81	1.51	new curb opening and inlet; remaining bypass discharges into NBB33A
NBB33A	5.0	10.0	25	3.8	7.5	0.046	29.1	3.8	0.22	1.74	6.17	3.84	2.33	0.38	0.14	11.0	9.5	3.84	3.64	10.00	1.00	0.27	3.37	5.11	2.81	new curb opening and inlet; remaining bypass discharges into NBB34A
NBB34A																									7.93	discharges into NBB34
NBB34	5.0	10.0	25	3.8	7.5	0.037	38.6	3.8	0.17	1.51	7.47	5.05	2.42	0.32	0.11	13.5	12.0	5.05	3.97	10.00	1.00	0.19	3.37	4.88	4.10	new curb opening and inlet; remaining bypass discharges into NBB35
NBB35																									1.33	discharges east into Cheyenne Ave
NBB36																									11.71	discharges into NBB37
NBB37	4.0	4.0	25	3.0	3.0	0.042	46.1	0.0	0.00	0.00	12.80	8.78	4.02	0.31	0.11	13.4	11.9	8.78	5.52	8.96	1.00	0.09	4.79	4.79	8.01	existing 4X4 curb opening and grate

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Phone: (702) 369-9396
Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS, DECATUR TO RAINBOW AND**
Job no.: 23629.06
Prepared by : MM
Checked by : KR
Date: 4/5/2014 14:08

Mannings Pipe Coefficient= 0.013

Part 4: Pipe Calculations and Street Capacity Check

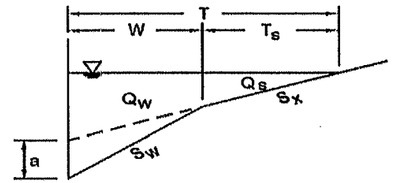
1	2	3	4	5	6	7	8	9
Subbasin I.D.	Station	Pipe Slope (ft/ft)	Required Minimum Pipe Diameter (in.)	Pipe size (in.)	10yr Depth X Velocity	10yr check<6	100yr Depth X Velocity	100yr check<8
SBB01	14+80.00	0.005	10.97	18	0.26	YES	0.37	YES
SBB01A	15+54.00				0.32	YES	0.48	YES
SBB02	16+58.00				0.43	YES	0.79	YES
SBB03	22+30.00	0.005	12.88	18	0.49	YES	0.73	YES
SBB04A	25+42.00	0.005	13.06	18	0.52	YES	0.65	YES
SBB04B								
SBB05								
SBB06A	34+40.00	0.005	15.45	18	0.60	YES	0.80	YES
SBB06B								
SBB07A	39+85.00	0.005	14.68	18	0.66	YES	0.70	YES
SBB07B	42+50.00	0.005	12.88	18	0.65	YES	0.55	YES
SBB08								
SBB08A								
SBB09								
SBB10								
SBB11								
SBB12								
SBB13								
SBB14								
SBB15	65+28, 120' RT	0.005	10.10	18	0.38	YES	0.52	YES
SBB16								
SBB16A	68+71	0.005	16.26	18	1.26	YES	1.81	YES
SBB16B	73+20	0.005	16.48	18	1.49	YES	1.98	YES
SBB16C	82+45	0.005	21.84	24	1.85	YES	2.29	YES
SBB16D	68+78.00	0.005	23.81	24				
SBB16E	73+30.00	0.005	10.19	18				
SBB17	87+10.00	0.005	17.55	18	1.37	YES	1.20	YES
SBB18	94+34.00	0.005	18.41	24	1.50	YES	1.16	YES
SBB19A	96+18.00	0.005	12.02	18	1.15	YES	0.48	YES
SBB19B								
SBB20A	99+50.00	0.005	14.08	18	1.41	YES	0.64	YES
SBB20B	102+00.00	0.005	12.11	18	1.33	YES	0.48	YES
SBB20C	104+60.00	0.005	12.34	18	1.29	YES	0.50	YES
SBB21	106+65.00	0.005	12.77	18	1.06	YES	0.58	YES
SBB22A								
SBB22B	111+30.00	0.005	19.04	24	1.81	YES	1.37	YES
SBB22C	113+56.00	0.005	13.21	18	1.78	YES	0.96	YES
SBB23								
SBB24A	128+90.00	0.005	13.50	18	0.47	YES	0.65	YES
SBB24B	131+78.00	0.005	13.85	18	0.53	YES	0.59	YES
SBB24C								
SBB25	138+56.00	0.005	10.83	18	0.35	YES	0.49	YES
SBB26								
SBB27								
SBB28								
SBB29								
SBB30	150+72.00	0.005	10.39	18	0.20	YES	0.27	YES

Part 4: Pipe Calculations and Street Capacity Check

1	2	3	4	5	6	7	8	9
Subbasin I.D.	Station	Pipe Slope (ft/ft)	Required Minimum Pipe Diameter (in.)	Pipe size (in.)	10yr Depth X Velocity	10yr check<6	100yr Depth X Velocity	100yr check<8
SBB3132	160+22.00	0.005	18.49	24	0.81	YES	1.04	YES
SBB33	163+00.00	0.005	15.75	18	1.16	YES	1.01	YES
SBB34A	164+70.00	0.005	14.29	18	1.22	YES	0.95	YES
SBB34B	165+60.00	0.005	15.00	18	1.76	YES	1.25	YES
SBB34C	167+06.00	0.005	12.89	18	1.28	YES	0.72	YES
SBB35	170+46.00	0.005	12.80	18	0.70	YES	1.04	YES
SBB36A								
SBB36	178+00.00	0.005	17.68	18	1.31	YES	1.77	YES
SBB37A	182+04.00	0.005	18.88	24	1.40	YES	1.58	YES
SBB37B								
SBB38								
SBB39	188+53.00				1.74	YES	1.73	YES
NBB01								
NBB02A1	19+04.00	0.005	10.03	18	0.29	YES	0.40	YES
NBB02A2	21+68.00	0.005	11.26	18	0.43	YES	0.53	YES
NBB02B1	24+30.00	0.005	11.71	18	0.48	YES	0.55	YES
NBB02B2	26+92.00	0.005	11.09	18	0.45	YES	0.48	YES
NBB02C	29+50.00	0.005	11.36	18	0.56	YES	0.59	YES
NBB03								
NBB04	36+60.00	0.005	11.27	18	0.35	YES	0.48	YES
NBB05A	42+50.00	0.005	14.92	18	0.73	YES	0.95	YES
NBB05B	44+35.00	0.005	11.01	18	0.57	YES	0.55	YES
NBB06								
NBB07								
NBB08								
NBB09								
NBB10								
NBB11	67+10.00				0.31	YES	0.43	YES
NBB12								
NBB13A	75+75.00	0.005	17.76	18	0.85	YES	1.17	YES
NBB13B	82+52.00	0.005	16.61	18	1.11	YES	1.14	YES
NBB14A	87+60.00	0.005	15.72	18	1.15	YES	0.99	YES
NBB14B	92+52.00	0.005	15.36	18	1.21	YES	0.93	YES
NBB15	95+90.00	0.005	13.99	18	0.93	YES	0.60	YES
NBB16								
NBB17A	99+40.00	0.005	13.55	18	0.32	YES	0.55	YES
NBB17B	101+90.00	0.005	12.58	18	0.51	YES	0.58	YES
NBB17C	104+25.00	0.005	11.73	18	0.50	YES	0.43	YES
NBB17D								
NBB18	112+80.00	0.005	17.18	18	0.76	YES	1.26	YES
NBB19								
NBB20								
NBB21								
NBB22	126+68.00	0.005	11.95	18	0.45	YES	0.63	YES
NBB23A	130+60.00	0.005	12.60	18	0.52	YES	0.65	YES
NBB23B	133+32.00	0.005	12.31	18	0.41	YES	0.46	YES
NBB23C	135+37.00	0.005	13.36	18	0.56	YES	0.58	YES
NBB24								
NBB25								
NBB26	145+13.00	0.005	12.09	18	0.42	YES	0.58	YES
NBB27								
NBB28								
NBB2930								
NBB31								
NBB32								
NBB33	166+52.00	0.005	16.40	18	0.77	YES	1.06	YES
NBB33A	167+05.00	0.005	15.62	18	1.10	YES	1.20	YES
NBB34A								
NBB34	168+35.00	0.005	15.36	18	1.21	YES	1.24	YES
NBB35								
NBB36								
NBB37	186+00.00				1.30	YES	1.90	YES

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Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS, DECATUR TO RAINBOW AND GOWAN OUTFALL - ALEXANDER ROAD FACILITIES**
Job no.: 23629.06
Prepared by : MM
Checked by : HM
Date: 4/8/2014 15:42
Computation: Developed onsite: 10-year runoff and inlet capture
References: Rational Method in accordance with CCRFCD's HC&DDM, 1996, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009 Curb opening and grate inlet capture for composite curb



Composite Section; Conventional Curb and Gutter
Reproduced from Figure 4-1, FHWA HEC-22

Part 1: Runoff calculations; 10-year

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	Paved Areas				Initial/Overland Time				Travel Time												
Subbasin I.D.	Area ft^2	Area (acres)	C_{10}	C_{100}	Length Lo (ft)	Slope S_o (%)	K	t_i (minutes)	L (ft)	Slope S (%)	V (fps)	t_t (minutes)	Conc. Time t_c (minutes)	Total Length L_T (ft)	Check Urban t_c (minutes)	Calculated t_c (minutes)	Final t_c (minutes)	I_{10} in./hr.	I_{100} in./hr.	Q_{10} cfs	Q_{100} cfs
SBB01	13,430	0.31	0.90	0.93	37	2.50	0.90	1.61	244	0.30	1.09	3.72	5.33	281.00	11.56	5.33	5.33	4.17	7.49	1.16	2.15
SBB01A	17,162	0.39	0.90	0.93	41	1.60	0.90	1.97	141	0.69	1.66	1.41	3.39	182.00	11.01	3.39	5.00	4.25	7.63	1.51	2.80
SBB02	25,506	0.59	0.90	0.93	52	2.00	0.90	2.06	150	0.70	1.67	1.49	3.55	202.00	11.12	3.55	5.00	4.25	7.63	2.24	4.15
SBB03	32,775	0.75	0.90	0.93	47	3.20	0.90	1.67	516	0.30	1.09	7.87	9.54	563.00	13.13	9.54	9.54	3.45	6.19	2.34	4.33
SBB04A	23,979	0.55	0.90	0.93	47	2.30	0.90	1.87	294	0.23	0.96	5.12	6.99	341.00	11.89	6.99	6.99	3.84	6.88	1.90	3.52
SBB04B	24,986	0.57	0.90	0.93	49	2.00	0.90	2.00	298	0.20	0.89	5.57	7.57	347.00	11.93	7.57	7.57	3.74	6.70	1.93	3.58
SBB05	22,523	0.52	0.90	0.93	56	2.00	0.90	2.14	301	0.60	1.55	3.24	5.38	357.00	11.98	5.38	5.38	4.16	7.47	1.94	3.59
SBB06A	12,067	0.28	0.90	0.93	43	3.10	0.90	1.62	188	0.40	1.26	2.48	4.10	231.00	11.28	4.10	5.00	4.25	7.63	1.06	1.97
SBB06B	19,082	0.44	0.90	0.93	46	2.30	0.90	1.85	292	0.20	0.89	5.46	7.31	338.00	11.88	7.31	7.31	3.78	6.78	1.49	2.76
SBB07A	14,803	0.34	0.90	0.93	53	2.60	0.90	1.91	194	0.20	0.89	3.63	5.53	247.00	11.37	5.53	5.53	4.13	7.40	1.26	2.34
SBB07B	18,258	0.42	0.90	0.93	53	1.90	0.90	2.12	216	0.28	1.06	3.41	5.52	269.00	11.49	5.52	5.52	4.13	7.41	1.56	2.89
SBB08	8,879	0.20	0.90	0.93	53	2.30	0.90	1.99	72	0.20	0.89	1.35	3.33	125.00	10.69	3.33	5.00	4.25	7.63	0.78	1.45
SBB08A	10,954	0.25	0.90	0.93	62	2.30	0.90	2.15	165	0.50	1.41	1.95	4.09	227.00	11.26	4.09	5.00	4.25	7.63	0.96	1.78
SBB09	19,119	0.44	0.90	0.93	53	2.80	0.90	1.86	153	1.10	2.10	1.21	3.07	206.00	11.14	3.07	5.00	4.25	7.63	1.68	3.11
SBB10	36,267	0.83	0.90	0.93	53	1.50	0.90	2.29	471	1.00	2.00	3.92	6.21	524.00	12.91	6.21	6.21	3.98	7.15	2.98	5.53
SBB11	15,762	0.36	0.90	0.93	57	1.40	0.90	2.43	186	1.14	2.14	1.45	3.88	243.00	11.35	3.88	5.00	4.25	7.63	1.38	2.57
SBB12	9,893	0.23	0.90	0.93	53	2.90	0.90	1.84	119	1.29	2.28	0.87	2.71	172.00	10.96	2.71	5.00	4.25	7.63	0.87	1.61
SBB13	16,052	0.37	0.90	0.93	60	3.40	0.90	1.85	162	0.80	1.79	1.51	3.36	222.00	11.23	3.36	5.00	4.25	7.63	1.41	2.61
SBB14	14,533	0.33	0.90	0.93	47	1.50	0.90	2.16	157	0.90	1.90	1.38	3.53	204.00	11.13	3.53	5.00	4.25	7.63	1.28	2.37
SBB15	21,216	0.49	0.90	0.93	61	1.20	0.90	2.65	209	0.80	1.79	1.95	4.59	270.00	11.50	4.59	5.00	4.25	7.63	1.86	3.46
SBB16	67,985	1.56	0.90	0.93	296	1.90	0.90	5.00	273	1.00	2.00	2.27	7.27	569.00	13.16	7.27	7.27	3.79	6.79	5.32	9.86
SBB16A	44,600	1.02	0.90	0.93	72	2.40	0.90	2.28	291	0.80	1.79	2.71	4.99	363.00	12.02	4.99	5.00	4.25	7.63	3.92	7.26
SBB16B	31,641	0.73	0.90	0.93	57	2.70	0.90	1.95	428	1.10	2.10	3.40	5.35	485.00	12.69	5.35	5.35	4.17	7.48	2.73	5.05
SBB16C	58,217	1.34	0.90	0.93	59	3.60	0.90	1.80	900	1.00	2.00	7.49	9.30	959.00	15.33	9.30	9.30	3.48	6.24	4.19	7.76
SBB16D	105,882	2.43	0.90	0.93	60	2.00	0.90	2.21	522	0.90	1.90	4.58	6.79	582.00	13.23	6.79	6.79	3.87	6.94	8.47	15.70
SBB16E	10,028	0.23	0.90	0.93	95	2.00	0.90	2.78	112	0.20	0.89	2.09	4.88	207.00	11.15	4.88	5.00	4.25	7.63	0.88	1.63
SBB17	32,200	0.74	0.90	0.93	46	1.80	0.90	2.01	456	0.90	1.90	4.00	6.01	502.00	12.79	6.01	6.01	4.02	7.22	2.68	4.96
SBB18	49,951	1.15	0.90	0.93	50	2.50	0.90	1.88	730	0.47	1.37	8.88	10.76	780.00	14.33	10.76	10.76	3.30	5.92	3.41	6.31
SBB19A	4,940	0.11	0.90	0.93	53	1.40	0.90	2.34	50	0.72	1.70	0.49	2.83	103.00	10.57	2.83	5.00	4.25	7.63	0.43	0.80
SBB19B	6,633	0.15	0.90	0.93	54	1.40	0.90	2.36	65	1.10	2.10	0.52	2.88	119.00	10.66	2.88	5.00	4.25	7.63	0.58	1.08
SBB20A	14,873	0.34	0.90	0.93	50	2.40	0.90	1.90	250	0.55	1.48	2.81	4.71	300.00	11.67	4.71	5.00	4.25	7.63	1.31	2.42
SBB20B	15,183	0.35	0.90	0.93	50	2.30	0.90	1.93	250	0.55	1.48	2.81	4.74	300.00	11.67	4.74	5.00	4.25	7.63	1.33	2.47
SBB20C	16,792	0.39	0.90	0.93	50	2.30	0.90	1.93	250	0.55	1.48	2.81	4.74	300.00	11.67	4.74	5.00	4.25	7.63	1.48	2.74
SBB21	26,942	0.62	0.90	0.93	63	1.70	0.90	2.39	172	0.36	1.20	2.39	4.79	235.00	11.31	4.79	5.00	4.25	7.63	2.37	4.39
SBB22A	36,063	0.83	0.90	0.93	24	2.00	0.90	1.40	223	0.66	1.62	2.29	3.69	247.00	11.37	3.69	5.00	4.25	7.63	3.17	5.87
SBB22B	30,335	0.70	0.90	0.93	52	2.80	0.90	1.84	454	0.70	1.67	4.52	6.36	506.00	12.81	6.36	6.36	3.95	7.09	2.48	4.59
SBB22C	15,487	0.36	0.90	0.93	54	3.20	0.90	1.80	197	0.60	1.55	2.12	3.92	251.00	11.39	3.92	5.00	4.25	7.63	1.36	2.52
SBB23	56,676	1.30	0.90	0.93	53	2.20	0.90	2.02	840	0.57	1.51	9.29	11.31	893.00	14.96	11.31	11.31	3.24	5.81	3.80	7.03
SBB24A	35,480	0.81	0.90	0.93	44	2.70	0.90	1.71	566	0.27	1.04	9.10	10.81	610.00	13.39	10.81	10.81	3.30	5.91	2.42	4.47
SBB24B	22,051	0.51	0.90	0.93	48	2.00	0.90	1.98	260	0.30	1.09	3.96	5.94	308.00	11.71	5.94	5.94	4.04	7.24	1.84	3.41
SBB24C	31,541	0.72	0.90	0.93	47	1.60	0.90	2.11	253	0.20	0.89	4.73	6.84	300.00	11.67	6.84	6.84	3.86	6.93	2.52	4.67
SBB25	15,656	0.36	0.90	0.93	56	3.80	0.90	1.73	255	0.30	1.09	3.89	5.61	311.00	11.73	5.61	5.61	4.11	7.37	1.33	2.46
SBB26	26,565	0.61	0.90	0.93	51	3.10	0.90	1.76	315	0.10	0.63	8.34	10.10	366.00	12.03	10.10	10.10	3.38	6.06	1.86	3.44
SBB27	12,393	0.28	0.90	0.93	45	3.50	0.90	1.59	120	0.12	0.69	2.90	4.49	165.00	10.92	4.49	5.00	4.25	7.63	1.09	2.02
SBB28	9,696	0.22	0.90	0.93	47	2.10	0.90	1.93	128	0.30	1.09	1.95	3.88	175.00	10.97	3.88	5.00	4.25	7.63	0.85	1.58
SBB29	19,233	0.44	0.90	0.93	60	3.10	0.90	1.91	139	0.15	0.77	3.00	4.91	199.00	11.11	4.91	5.00	4.25	7.63	1.69	3.13
SBB30	13,070	0.30	0.90	0.93	43	1.90	0.90	1.91	195	0.10	0.63	5.16	7.07	238.00	11.32	7.07	7.07	3.82	6.86	1.03	1.91
SBB3132	79,107	1.82	0.90	0.93	45	2.20	0.90	1.86	924	0.46	1.36	11.36	13.22	969.00	15.38	13.22	13.22	3.05	5.46	4.98	9.22
SBB33	28,649	0.66	0.90	0.93	56	2.70	0.90	1.93	278	1.10	2.10	2.21	4.14	334.00	11.86	4.14	5.00	4.25	7.63	2.52	4.67

Part 1: Runoff calculations; 10-year

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	Paved Areas				Initial/Overland Time				Travel Time												
Subbasin I.D.	Area ft^2	Area (acres)	C_{10}	C_{100}	Length Lo (ft)	Slope S_o (%)	K	t_i (minutes)	L (ft)	Slope S (%)	V (fps)	t_t (minutes)	Conc. Time t_c (minutes)	Total Length L_T (ft)	Check Urban t_c (minutes)	Calculated t_c (minutes)	Final t_c (minutes)	I_{10} **in./hr.**	I_{100} in./hr.	Q_{10} cfs	Q_{100} **cfs**
SBB34A	29,061	0.67	0.90	0.93	27	2.00	0.90	1.48	119	1.70	2.61	0.76	2.24	146.00	10.81	2.24	5.00	4.25	7.63	2.55	4.73
SBB34B	23,340	0.54	0.90	0.93	28	3.60	0.90	1.24	65	3.60	3.81	0.28	1.53	93.00	10.52	1.53	5.00	4.25	7.63	2.05	3.80
SBB34C	17,543	0.40	0.90	0.93	57	2.40	0.90	2.03	351	1.30	2.28	2.56	4.59	408.00	12.27	4.59	5.00	4.25	7.63	1.54	2.86
SBB35	30,593	0.70	0.90	0.93	71	3.10	0.90	2.08	293	1.46	2.42	2.02	4.10	364.00	12.02	4.10	5.00	4.25	7.63	2.69	4.98
SBB36A	34,138	0.78	0.90	0.93	94	2.00	0.90	2.77	243	1.60	2.54	1.60	4.37	337.00	11.87	4.37	5.00	4.25	7.63	3.00	5.56
SBB36	44,738	1.03	0.90	0.93	50	2.40	0.90	1.90	714	1.46	2.42	4.91	6.82	764.00	14.24	6.82	6.82	3.87	6.94	3.58	6.63
SBB37A	31,977	0.73	0.90	0.93	94	2.80	0.90	2.48	353	1.00	2.00	2.94	5.41	447.00	12.48	5.41	5.41	4.15	7.45	2.74	5.09
SBB37B	11,467	0.26	0.90	0.93	59	3.70	0.90	1.79	169	0.96	1.96	1.44	3.22	228.00	11.27	3.22	5.00	4.25	7.63	1.01	1.87
SBB38	16,998	0.39	0.90	0.93	65	1.30	0.90	2.66	226	0.80	1.79	2.10	4.76	291.00	11.62	4.76	5.00	4.25	7.63	1.49	2.77
SBB39	18,119	0.42	0.90	0.93	57	3.50	0.90	1.79	200	1.00	2.00	1.66	3.46	257.00	11.43	3.46	5.00	4.25	7.63	1.59	2.95
NBB01	10,384	0.24	0.90	0.93	43	1.60	0.90	2.02	28	0.50	1.41	0.33	2.35	71.00	10.39	2.35	5.00	4.25	7.63	0.91	1.69
NBB02A1	16,632	0.38	0.90	0.93	62	1.80	0.90	2.33	250	0.29	1.07	3.88	6.21	312.00	11.73	6.21	6.21	3.98	7.15	1.37	2.54
NBB02A2	16,580	0.38	0.90	0.93	52	2.30	0.90	1.97	253	0.29	1.07	3.92	5.89	305.00	11.69	5.89	5.89	4.05	7.26	1.39	2.57
NBB02B1	16,797	0.39	0.90	0.93	62	2.40	0.90	2.12	250	0.23	0.96	4.36	6.47	312.00	11.73	6.47	6.47	3.93	7.05	1.36	2.53
NBB02B2	14,879	0.34	0.90	0.93	47	1.70	0.90	2.07	246	0.23	0.96	4.29	6.35	293.00	11.63	6.35	6.35	3.96	7.09	1.22	2.25
NBB02C	17,104	0.39	0.90	0.93	45	1.70	0.90	2.02	251	0.40	1.26	3.31	5.33	296.00	11.64	5.33	5.33	4.17	7.48	1.47	2.73
NBB03	15,075	0.35	0.90	0.93	46	2.10	0.90	1.91	53	0.10	0.63	1.40	3.31	99.00	10.55	3.31	5.00	4.25	7.63	1.32	2.46
NBB04	27,649	0.63	0.90	0.93	61	2.00	0.90	2.23	389	0.20	0.89	7.27	9.50	450.00	12.50	9.50	9.50	3.46	6.20	1.97	3.66
NBB05A	36,771	0.84	0.90	0.93	62	3.10	0.90	1.94	577	0.43	1.31	7.34	9.28	639.00	13.55	9.28	9.28	3.49	6.25	2.65	4.90
NBB05B	11,025	0.25	0.90	0.93	47	1.90	0.90	1.99	137	0.39	1.25	1.83	3.82	184.00	11.02	3.82	5.00	4.25	7.63	0.97	1.80
NBB06	18,457	0.42	0.90	0.93	57	3.50	0.90	1.79	215	1.08	2.08	1.72	3.51	272.00	11.51	3.51	5.00	4.25	7.63	1.62	3.01
NBB07	58,078	1.33	0.90	0.93	54	2.00	0.90	2.10	814	1.10	2.10	6.46	8.56	868.00	14.82	8.56	8.56	3.59	6.43	4.30	7.97
NBB08	9,759	0.22	0.90	0.93	55	1.90	0.90	2.16	76	1.03	2.03	0.62	2.78	131.00	10.73	2.78	5.00	4.25	7.63	0.86	1.59
NBB09	16,029	0.37	0.90	0.93	52	2.40	0.90	1.94	128	1.10	2.10	1.02	2.95	180.00	11.00	2.95	5.00	4.25	7.63	1.41	2.61
NBB10	23,978	0.55	0.90	0.93	49	2.40	0.90	1.88	302	1.10	2.10	2.40	4.28	351.00	11.95	4.28	5.00	4.25	7.63	2.11	3.91
NBB11	13,983	0.32	0.90	0.93	50	1.00	0.90	2.55	174	1.20	2.19	1.32	3.87	224.00	11.24	3.87	5.00	4.25	7.63	1.23	2.28
NBB12	18,064	0.41	0.90	0.93	69	1.20	0.90	2.81	200	0.30	1.09	3.05	5.86	269.00	11.49	5.86	5.86	4.05	7.27	1.51	2.81
NBB13A	45,736	1.05	0.90	0.93	95	2.10	0.90	2.74	644	0.96	1.96	5.47	8.21	739.00	14.11	8.21	8.21	3.64	6.52	3.44	6.37
NBB13B	42,663	0.98	0.90	0.93	95	2.60	0.90	2.55	644	0.90	1.90	5.65	8.20	739.00	14.11	8.20	8.20	3.64	6.52	3.21	5.94
NBB14A	32,846	0.75	0.90	0.93	73	2.30	0.90	2.33	489	0.90	1.90	4.29	6.62	562.00	13.12	6.62	6.62	3.90	7.00	2.65	4.91
NBB14B	31,952	0.73	0.90	0.93	73	2.20	0.90	2.36	489	0.90	1.90	4.29	6.66	562.00	13.12	6.66	6.66	3.90	6.99	2.57	4.77
NBB15	21,422	0.49	0.90	0.93	85	1.60	0.90	2.84	322	0.50	1.41	3.80	6.64	407.00	12.26	6.64	6.64	3.90	7.00	1.73	3.20
NBB16	9,315	0.21	0.90	0.93	61	1.20	0.90	2.65	133	0.30	1.09	2.03	4.67	194.00	11.08	4.67	5.00	4.25	7.63	0.82	1.52
NBB17A	15,390	0.35	0.90	0.93	60	1.90	0.90	2.25	189	0.40	1.26	2.49	4.74	249.00	11.38	4.74	5.00	4.25	7.63	1.35	2.51
NBB17B	16,679	0.38	0.90	0.93	60	2.30	0.90	2.11	246	0.70	1.67	2.45	4.56	306.00	11.70	4.56	5.00	4.25	7.63	1.47	2.72
NBB17C	13,250	0.30	0.90	0.93	60	2.30	0.90	2.11	210	0.40	1.26	2.77	4.88	270.00	11.50	4.88	5.00	4.25	7.63	1.16	2.16
NBB17D	9,700	0.22	0.90	0.93	60	2.50	0.90	2.05	136	0.60	1.55	1.46	3.52	196.00	11.09	3.52	5.00	4.25	7.63	0.85	1.58
NBB18	49,270	1.13	0.90	0.93	54	3.40	0.90	1.76	597	0.61	1.56	6.37	8.13	651.00	13.62	8.13	8.13	3.65	6.54	3.72	6.88
NBB19	8,470	0.19	0.90	0.93	53	2.30	0.90	1.99	103	0.31	1.11	1.54	3.53	156.00	10.87	3.53	5.00	4.25	7.63	0.74	1.38
NBB20	42,403	0.97	0.90	0.93	59	2.70	0.90	1.99	579	0.77	1.76	5.50	7.48	638.00	13.54	7.48	7.48	3.75	6.73	3.29	6.09
NBB21	11,253	0.26	0.90	0.93	47	2.80	0.90	1.75	100	0.80	1.79	0.93	2.68	147.00	10.82	2.68	5.00	4.25	7.63	0.99	1.83
NBB22	28,382	0.65	0.90	0.93	55	2.90	0.90	1.87	406	0.30	1.09	6.19	8.06	461.00	12.56	8.06	8.06	3.66	6.56	2.15	3.98
NBB23A	26,838	0.62	0.90	0.93	42	2.40	0.90	1.74	366	0.21	0.91	6.67	8.42	408.00	12.27	8.42	8.42	3.61	6.47	2.00	3.70
NBB23B	20,265	0.47	0.90	0.93	51	1.60	0.90	2.20	245	0.10	0.63	6.49	8.68	296.00	11.64	8.68	8.68	3.57	6.40	1.49	2.77
NBB23C	24,078	0.55	0.90	0.93	44	2.20	0.90	1.84	196	0.10	0.63	5.19	7.03	240.00	11.33	7.03	7.03	3.83	6.87	1.91	3.53
NBB24	15,267	0.35	0.90	0.93	49	3.10	0.90	1.73	178	0.10	0.63	4.71	6.44	227.00	11.26	6.44	6.44	3.94	7.06	1.24	2.30
NBB25	17,793	0.41	0.90	0.93	51	4.00	0.90	1.62	229	0.40	1.26	3.02	4.64	280.00	11.56	4.64	5.00	4.25	7.63	1.56	2.90
NBB26	25,703	0.59	0.90	0.93	50	3.70	0.90	1.65	352	0.20	0.89	6.58	8.22	402.00	12.23	8.22	8.22	3.64	6.52	1.93	3.58
NBB27	22,512	0.52	0.90	0.93	41	3.00	0.90	1.60	149	0.10	0.63	3.95	5.54	190.00	11.06	5.54	5.54	4.12	7.40	1.92	3.56
NBB28	41,417	0.95	0.90	0.93	55	3.20	0.90	1.81	578	0.20	0.89	10.80	12.61	633.00	13.52	12.61	12.61	3.11	5.56	2.66	4.92
NBB2930	28,089	0.64	0.90	0.93	57	3.70	0.90	1.76	238	0.40	1.26	3.14	4.90	295.00	11.64	4.90	5.00	4.25	7.63	2.47	4.58
NBB31	36,303	0.83	0.90	0.93	46	2.80	0.90	1.73	255	1.00	2.00	2.12	3.86	301.00	11.67	3.86	5.00	4.25	7.63	3.19	5.91
NBB32	25,743	0.59	0.90	0.93	55	3.50	0.90	1.76	128	1.80	2.69	0.79	2.55	183.00	11.02	2.55	5.00	4.25	7.63	2.26	4.19
NBB33	19,154	0.44	0.90	0.93	55	2.10	0.90	2.08	294	1.20	2.19	2.23	4.32	349.00	11.94	4.32	5.00	4.25	7.63	1.68	3.12
NBB33A	39,322	0.90	0.90	0.93	59	2.70	0.90	1.99	239	1.10	2.10	1.90	3.88	298.00	11.66	3.88	5.00	4.25	7.63	3.45	6.41
NBB34A	32,841	0.75	0.90	0.93	55	2.00	0.90	2.12	438	1.00	2.00	3.65	5.77	493.00	12.74	5.77	5.77	4.08	7.31	2.77	5.13
NBB34	6,405	0.15	0.90	0.93	44	2.00	0.90	1.90	106	1.50	2.45	0.72	2.62	150.00	10.83	2.62	5.00	4.25	7.63	0.56	1.04
NBB35	8,152	0.19	0.90	0.93	45	2.00	0.90	1.92	20	1.30	2.28	0.15	2.06	65.00	10.36	2.06	5.00	4.25	7.63	0.72	1.33
NBB36	105,840	2.43	0.90	0.93	81	1.60	0.90	2.77	1534	1.10	2.10	12.17	14.94	1615.00	18.97	14.94	14.94	2.90	5.18	6.33	11.71
NBB37	6,694	0.15	0.90	0.93	53	2.50	0.90	1.93	49	2.20	2.98	0.27	2.21	102.00	10.57	2.21	5.00	4.25	7.63	0.59	1.09

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Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS, DECATUR TO RAINBOW AND GOWAN OUTFALL - ALEXANDER ROAD FACILITIES**
Job no.: 23629.06
Prepared by : MM
Checked by : HM
Date: 4/8/2014
Computation: Developed onsite: 10-year runoff and inlet capture
References: Rational Method in accordance with CCRFCD's HC&DDM, 1996, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009 Curb opening and grate inlet capture for composite curb

Constant values

Manning's coefficient	n =	0.015
Width of inlet	W =	1.5 ft
Gutter depression	a =	0.083 ft
	$T_{allowable}$ =	35.00 ft

Part 2: Allowable spread calculations; 10-year - "0" grate and curb lengths indicate drop inlet is not required to satisfy 10-year dryland criteria

1	2	3	4	5	6	7	8	9	10	Spread Calculation										
Subbasin I.D.	Inlet Type	Location	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Q_{10} cfs	Bypass from upstream basin (cfs)	$Q_{10\ w/bypass}$ (cfs)	S_L (ft/ft)	S_x (ft/ft)	Q_{S1} (cfs)	Q_{W1} (cfs)	E_{O1}	S_W	S_W/S_X	W/T	T_1 (ft)	T_{check}	T_{S1} (ft)	Q_{S2} (cfs)	Depth of flow for D (ft)
SBB01	Type DM2	14+80.00	0.00	0.00	1.16	0.00	1.16	0.003	0.025	0.53	0.62	0.54	0.081	3.2	0.20	7.58	yes	6.08	0.53	0.198
SBB01A	Existing inlet	15+54.00	2.50	5.00	1.51	1.16	2.67	0.007	0.016	1.65	1.01	0.38	0.072	4.5	0.13	12.00	yes	10.50	1.65	0.227
SBB02	Existing inlet	16+58.00	2.50	5.00	2.24	1.15	3.39	0.007	0.020	2.10	1.30	0.38	0.076	3.8	0.13	11.44	yes	9.94	2.09	0.252
SBB03	Type DM2	22+30.00	0.00	0.00	2.34	0	2.34	0.003	0.032	1.26	1.08	0.46	0.088	2.7	0.17	8.68	yes	7.18	1.26	0.265
SBB04A	Type DM2	25+42.00	0.00	0.00	1.90	2.34	4.24	0.002	0.023	2.97	1.27	0.30	0.079	3.4	0.10	14.30	yes	12.80	2.97	0.343
SBB04B					1.93	4.24	6.17	0.002	0.020	4.73	1.44	0.23	0.076	3.8	0.08	18.56	yes	17.06	4.73	0.395
SBB05					1.94	0	1.94	0.006	0.020	1.04	0.89	0.46	0.076	3.8	0.16	9.38	yes	7.88	1.04	0.211
SBB06A	Type DM2	34+40.00	0.00	0.00	1.06	1.94	3.00	0.004	0.031	1.69	1.31	0.44	0.087	2.8	0.16	9.24	yes	7.74	1.69	0.277
SBB06B					1.49	3.00	4.49	0.002	0.023	3.21	1.27	0.28	0.079	3.4	0.10	15.03	yes	13.53	3.21	0.360
SBB07A	Type DM2	39+85.00	0.00	0.00	1.26	4.49	5.75	0.002	0.026	4.17	1.58	0.27	0.082	3.1	0.10	15.32	yes	13.82	4.17	0.404
SBB07B	Type DM2	42+50.00	0.00	0.00	1.56	5.75	7.31	0.003	0.019	5.65	1.66	0.23	0.075	3.9	0.08	19.18	yes	17.68	5.65	0.391
SBB08					0.78	7.31	8.09	0.002	0.023	6.27	1.82	0.23	0.079	3.4	0.08	18.87	yes	17.37	6.27	0.448
SBB08A					0.96	8.09	9.05	0.005	0.023	6.71	2.33	0.26	0.079	3.4	0.09	16.52	yes	15.02	6.71	0.394
SBB09					1.68	9.05	10.73	0.011	0.028	7.39	3.34	0.31	0.084	3.0	0.11	13.37	yes	11.87	7.39	0.374
SBB10					2.98	0	2.98	0.010	0.015	1.85	1.13	0.38	0.071	4.7	0.12	12.13	yes	10.63	1.85	0.220
SBB11					1.38	0	1.38	0.011	0.014	0.66	0.72	0.52	0.070	5.0	0.17	8.86	yes	7.36	0.66	0.165
SBB12					0.87	0	0.87	0.013	0.029	0.18	0.69	0.80	0.085	2.9	0.35	4.29	yes	2.79	0.18	0.121
SBB13					1.41	0	1.41	0.008	0.034	0.47	0.94	0.67	0.090	2.6	0.27	5.47	yes	3.97	0.47	0.167
SBB14					1.28	0	1.28	0.009	0.015	0.60	0.67	0.53	0.071	4.7	0.17	8.62	yes	7.12	0.60	0.168
SBB15	Type DM2	65+28, 120' RT	0.00	0.00	1.86	0	1.86	0.008	0.012	1.11	0.75	0.40	0.068	5.6	0.12	12.03	yes	10.53	1.11	0.192
SBB16					5.32	0	5.32	0.010	0.019	3.55	1.77	0.33	0.075	3.9	0.11	13.20	yes	11.70	3.55	0.277
SBB16A	Type DM2	68+71	0.00	0.00	3.92	5.32	9.24	0.008	0.024	6.59	2.65	0.29	0.080	3.3	0.10	14.79	yes	13.29	6.59	0.366
SBB16B	Type DM2	73+20	0.00	0.00	2.73	9.24	11.96	0.011	0.027	8.46	3.50	0.29	0.083	3.1	0.11	14.28	yes	12.78	8.46	0.388
SBB16C	Type DM2	82+45	0.00	0.00	4.19	11.96	16.15	0.010	0.036	11.36	4.79	0.30	0.092	2.5	0.11	13.63	yes	12.13	11.36	0.466
SBB16D	Type 2 NDOT Grate	68+78.00																		
SBB16E	Type 2 NDOT Grate	73+30.00																		
SBB17	Type DM2	87+10.00	0.00	0.00	2.68	16.15	18.83	0.009	0.018	15.24	3.59	0.19	0.074	4.1	0.07	22.81	yes	21.31	15.24	0.440
SBB18	Type DM2	94+34.00	0.00	0.00	3.41	18.83	22.24	0.005	0.025	18.08	4.16	0.19	0.081	3.2	0.07	22.39	yes	20.89	18.08	0.568
SBB19A	Type DM2	96+18.00	0.00	0.00	0.43	22.24	22.67	0.007	0.014	19.33	3.35	0.15	0.070	5.0	0.05	29.92	yes	28.42	19.33	0.460
SBB19B	Type DM2				0.58	22.67	23.26	0.011	0.014	19.55	3.71	0.16	0.070	5.0	0.05	27.87	yes	26.37	19.55	0.431
SBB20A	Type DM2	99+50.00	0.00	0.00	1.31	23.26	24.56	0.006	0.024	20.10	4.46	0.18	0.080	3.3	0.06	23.16	yes	21.66	20.10	0.567
SBB20B	Type DM2	102+00.00	0.00	0.00	1.33	24.56	25.90	0.006	0.023	21.40	4.50	0.17	0.079	3.4	0.06	24.27	yes	22.77	21.40	0.572
SBB20C	Type DM2	104+60.00	0.00	0.00	1.48	25.90	27.37	0.006	0.023	22.72	4.65	0.17	0.079	3.4	0.06	24.78	yes	23.28	22.72	0.584
SBB21	Type DM2	106+65.00	0.00	0.00	2.37	27.37	29.74	0.004	0.017	25.93	3.81	0.13	0.073	4.3	0.04	33.50	yes	32.00	25.93	0.602
SBB22A					3.17	29.74	32.91	0.007	0.020	27.91	4.99	0.15	0.076	3.8	0.05	28.03	yes	26.53	27.91	0.584
SBB22B	Type DM2	111+30.00	0.00	0.00	2.48	32.91	35.38	0.007	0.028	29.03	6.36	0.18	0.084	3.0	0.07	23.07	yes	21.57	29.03	0.645
SBB22C	Type DM2	113+56.00	0.00	0.00	1.36	35.38	36.75	0.006	0.032	29.95	6.80	0.19	0.088	2.7	0.07	22.16	yes	20.66	29.95	0.697
SBB23					3.80	36.75	40.54	0.006	0.022	34.74	5.80	0.14	0.078	3.5	0.05	29.40	yes	27.90	34.74	0.664
SBB24A	Type DM2	128+90.00	0.00	0.00	2.42	0	2.42	0.003	0.027	1.42	1.00	0.41	0.083	3.1	0.15	10.01	yes	8.51	1.42	0.273
SBB24B	Type DM2	131+78.00	0.00	0.00	1.84	2.42	4.26	0.003	0.020	3.01	1.25	0.29	0.076	3.8	0.10	14.85	yes	13.35	3.01	0.320
SBB24C					2.52	4.26	6.77	0.002	0.016	5.42	1.35	0.20	0.072	4.5	0.07	22.14	yes	20.64	5.42	0.390
SBB25	Type DM2	138+56.00	0.00	0.00	1.33	0	1.33	0.003	0.038	0.53	0.80	0.60	0.094	2.5	0.24	6.15	yes	4.65	0.53	0.203
SBB26					1.86	1.33	3.18	0.001	0.031	2.14	1.05	0.33	0.087	2.8	0.12	12.47	yes	10.97	2.14	0.377
SBB27					1.09	0	1.09	0.001	0.035	0.51	0.58	0.53	0.091	2.6	0.21	7.23	yes	5.73	0.51	0.231
SBB28					0.85	0	0.85	0.003	0.021	0.37	0.48	0.57	0.077	3.6	0.20	7.41	yes	5.91	0.37	0.176
SBB29					1.69	0	1.69	0.002	0.031	0.93	0.76	0.45	0.087	2.8	0.17	8.94	yes	7.44	0.93	0.267
SBB30	Type DM2	150+72.00	0.00	0.00	1.03	0	1.03	0.001	0.019	0.61	0.42	0.41	0.075	3.9	0.14	10.83	yes	9.33	0.61	0.232
SBB3132	Type DM2	160+22.00	0.00	0.00	4.98	1.03	6.01	0.005	0.022	4.26	1.75	0.29	0.078	3.5	0.10	14.72	yes	13.22	4.26	0.341
SBB33	Type DM2	163+00.00	0.00	0.00	2.52	6.01	8.53	0.011	0.027	5.68	2.85	0.33	0.083	3.1	0.12	12.51	yes	11.01	5.68	0.340

Part 2: Allowable spread calculations; 10-year - "0" grate and curb lengths indicate drop inlet is not required to satisfy 10-year dryland criteria

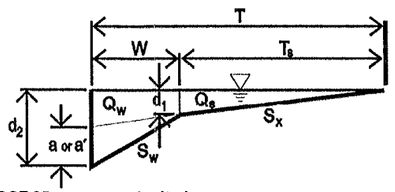
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
										Spread Calculation										
Subbasin I.D.	Inlet Type	Location	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Q_{10} cfs	Bypass from upstream basin (cfs)	$Q_{10\ w/bypass}$ (cfs)	S_L (ft/ft)	S_X (ft/ft)	Q_{S1} (cfs)	Q_{W1} (cfs)	E_{O1}	S_W	S_W/S_X	W/T	T_1 (ft)	T_{check}	T_{S1} (ft)	Q_{S2} (cfs)	Depth of flow for D (ft)
SBB34A	Type DM2	164+70.00	0.00	0.00	2.55	8.53	11.08	0.017	0.020	7.95	3.14	0.28	0.076	3.8	0.10	15.38	yes	13.88	7.95	0.331
SBB34B	Type DM2	165+60.00	0.00	0.00	2.05	11.08	13.13	0.036	0.036	7.79	5.34	0.41	0.092	2.5	0.15	9.79	yes	8.29	7.79	0.328
SBB34C	Type DM2	167+06.00	0.00	0.00	1.54	13.13	14.68	0.013	0.024	10.81	3.86	0.26	0.080	3.3	0.09	16.11	yes	14.61	10.81	0.398
SBB35	Type DM2	170+46.00	0.00	0.00	2.69	0	2.69	0.015	0.031	1.14	1.55	0.58	0.087	2.8	0.22	6.75	yes	5.25	1.14	0.200
SBB36A				0.00	3.00	2.69	5.69	0.016	0.020	3.61	2.08	0.37	0.076	3.8	0.13	11.94	yes	10.44	3.61	0.262
SBB36	Type DM2	178+00.00	0.00	0.00	3.58	5.69	9.26	0.015	0.024	6.28	2.99	0.32	0.080	3.3	0.11	13.16	yes	11.66	6.28	0.327
SBB37A	Type DM2	182+04.00	0.00	0.00	2.74	9.26	12.01	0.010	0.028	8.50	3.51	0.29	0.084	3.0	0.11	14.24	yes	12.74	8.50	0.398
SBB37B					1.01	12.01	13.01	0.010	0.037	8.80	4.21	0.32	0.093	2.5	0.12	12.42	yes	10.92	8.80	0.432
SBB38					1.49	13.01	14.51	0.008	0.013	11.98	2.53	0.17	0.069	5.3	0.06	25.90	yes	24.40	11.98	0.381
SBB39	Existing inlet	188+53.00	2.50	5.00	1.59	14.51	16.10	0.010	0.035	11.38	4.71	0.29	0.091	2.6	0.11	13.86	yes	12.36	11.38	0.463
NBB01					0.91	0	0.91	0.005	0.016	0.41	0.50	0.55	0.072	4.5	0.18	8.11	yes	6.61	0.41	0.165
NBB02A1	Type DM2	19+04.00	0.00	0.00	1.37	0	1.37	0.003	0.018	0.77	0.60	0.44	0.074	4.1	0.15	10.11	yes	8.61	0.77	0.211
NBB02A2	Type DM2	21+68.00	0.00	0.00	1.39	1.37	2.76	0.003	0.023	1.74	1.02	0.37	0.079	3.4	0.13	11.52	yes	10.02	1.74	0.279
NBB02B1	Type DM2	24+30.00	0.00	0.00	1.36	2.76	4.12	0.002	0.024	2.85	1.27	0.31	0.080	3.3	0.11	13.77	yes	12.27	2.85	0.342
NBB02B2	Type DM2	26+92.00	0.00	0.00	1.22	4.12	5.34	0.002	0.017	4.09	1.25	0.23	0.073	4.3	0.08	18.92	yes	17.42	4.09	0.354
NBB02C	Type DM2	29+50.00	0.00	0.00	1.47	5.34	6.81	0.004	0.017	5.20	1.62	0.24	0.073	4.3	0.08	18.68	yes	17.18	5.20	0.350
NBB03					1.32	6.81	8.13	0.001	0.021	6.62	1.52	0.19	0.077	3.6	0.07	22.87	yes	21.37	6.62	0.501
NBB04	Type DM2	36+60.00	0.00	0.00	1.97	0	1.97	0.002	0.020	1.25	0.73	0.37	0.076	3.8	0.13	11.86	yes	10.36	1.25	0.260
NBB05A	Type DM2	42+50.00	0.00	0.00	2.65	1.97	4.62	0.004	0.031	2.88	1.74	0.38	0.087	2.8	0.14	10.84	yes	9.34	2.88	0.326
NBB05B	Type DM2	44+35.00	0.00	0.00	0.97	4.62	5.59	0.004	0.019	4.08	1.51	0.27	0.075	3.9	0.09	16.21	yes	14.71	4.08	0.334
NBB06					1.62	5.59	7.21	0.011	0.035	4.32	2.89	0.40	0.091	2.6	0.15	9.97	yes	8.47	4.32	0.327
NBB07					4.30	0	4.30	0.011	0.020	2.67	1.63	0.38	0.076	3.8	0.13	11.51	yes	10.01	2.67	0.254
NBB08					0.86	0	0.86	0.010	0.019	0.27	0.59	0.68	0.075	3.9	0.25	5.94	yes	4.44	0.27	0.139
NBB09					1.41	0	1.41	0.011	0.024	0.53	0.88	0.63	0.080	3.3	0.24	6.36	yes	4.86	0.53	0.164
NBB10					2.11	0	2.11	0.011	0.024	0.97	1.14	0.54	0.080	3.3	0.20	7.61	yes	6.11	0.97	0.194
NBB11	Existing inlet	67+10.00	2.50	5.00	1.23	0	1.23	0.012	0.010	0.62	0.61	0.49	0.066	6.6	0.15	10.30	yes	8.80	0.62	0.156
NBB12					1.51	0	1.51	0.003	0.012	0.97	0.54	0.36	0.068	5.6	0.11	13.54	yes	12.04	0.97	0.210
NBB13A	Type DM2	75+75.00	0.00	0.00	3.44	1.51	4.95	0.010	0.021	3.18	1.77	0.36	0.077	3.6	0.12	12.14	yes	10.64	3.18	0.275
NBB13B	Type DM2	82+52.00			3.21	4.95	8.16	0.009	0.026	5.54	2.62	0.32	0.082	3.1	0.11	13.09	yes	11.59	5.54	0.346
NBB14A	Type DM2	87+60.00	0.00	0.00	2.65	8.16	10.81	0.009	0.023	7.89	2.92	0.27	0.079	3.4	0.10	15.79	yes	14.29	7.89	0.377
NBB14B	Type DM2	92+52.00			2.57	10.81	13.38	0.009	0.022	10.13	3.25	0.24	0.078	3.5	0.09	17.63	yes	16.13	10.13	0.405
NBB15	Type DM2	95+90.00	0.00	0.00	1.73	13.38	15.11	0.005	0.016	12.48	2.63	0.17	0.072	4.5	0.06	25.27	yes	23.77	12.48	0.440
NBB16					0.82	15.11	15.93	0.003	0.012	13.84	2.09	0.13	0.068	5.6	0.04	34.04	yes	32.54	13.84	0.456
NBB17A	Type DM2	99+40.00	0.00	0.00	1.35	0	1.35	0.004	0.019	0.70	0.65	0.48	0.075	3.9	0.17	9.07	yes	7.57	0.70	0.199
NBB17B	Type DM2	101+90.00	0.00	0.00	1.47	1.35	2.82	0.007	0.023	1.59	1.23	0.44	0.079	3.4	0.15	9.72	yes	8.22	1.59	0.238
NBB17C	Type DM2	104+25.00	0.00	0.00	1.16	2.82	3.98	0.004	0.023	2.62	1.36	0.34	0.079	3.4	0.12	12.51	yes	11.01	2.62	0.302
NBB17D					0.85	3.98	4.83	0.006	0.025	3.11	1.72	0.36	0.081	3.2	0.13	11.83	yes	10.33	3.11	0.304
NBB18	Type DM2	112+80.00	0.00	0.00	3.72	0	3.72	0.006	0.034	2.03	1.69	0.45	0.090	2.6	0.17	8.73	yes	7.23	2.03	0.278
NBB19			0.00	0.00	0.74	3.72	4.46	0.003	0.023	3.08	1.38	0.31	0.079	3.4	0.11	13.76	yes	12.26	3.08	0.331
NBB20					3.29	4.46	7.75	0.008	0.027	5.24	2.50	0.32	0.083	3.1	0.12	12.92	yes	11.42	5.24	0.351
NBB21					0.99	0	0.99	0.008	0.028	0.29	0.70	0.70	0.084	3.0	0.29	5.26	yes	3.76	0.29	0.147
NBB22	Type DM2	126+68.00	0.00	0.00	2.15	0	2.15	0.003	0.029	1.17	0.98	0.46	0.085	2.9	0.17	8.93	yes	7.43	1.17	0.255
NBB23A	Type DM2	130+60.00	0.00	0.00	2.00	2.15	4.15	0.002	0.024	2.89	1.25	0.30	0.080	3.3	0.11	14.05	yes	12.55	2.89	0.349
NBB23B	Type DM2	133+32.00	0.00	0.00	1.49	4.15	5.64	0.001	0.016	4.59	1.05	0.19	0.072	4.5	0.06	23.58	yes	22.08	4.59	0.413
NBB23C	Type DM2	135+37.00	0.00	0.00	1.91	5.64	7.55	0.001	0.022	6.06	1.49	0.20	0.078	3.5	0.07	21.58	yes	20.08	6.06	0.492
NBB24					1.24	7.55	8.79	0.001	0.031	6.83	1.96	0.22	0.087	2.8	0.08	18.45	yes	16.95	6.83	0.562
NBB25					1.56	0	1.56	0.004	0.040	0.61	0.96	0.61	0.096	2.4	0.25	6.00	yes	4.50	0.61	0.203
NBB26	Type DM2	145+13.00	0.00	0.00	1.93	0	1.93	0.002	0.037	0.99	0.94	0.49	0.093	2.5	0.19	7.96	yes	6.46	0.99	0.267
NBB27					1.92	1.93	3.85	0.001	0.030	2.69	1.16	0.30	0.086	2.9	0.11	13.70	yes	12.20	2.69	0.404
NBB28					2.66	0	2.66	0.002	0.032	1.57	1.08	0.41	0.088	2.7	0.15	9.92	yes	8.42	1.57	0.305
NBB2930					2.47	0	2.47	0.004	0.037	1.22	1.25	0.51	0.093	2.5	0.20	7.63	yes	6.13	1.22	0.255
NBB31					3.19	0	3.19	0.010	0.028	1.64	1.54	0.48	0.084	3.0	0.18	8.39	yes	6.89	1.64	0.234
NBB32					2.26	0	2.26	0.018	0.035	0.77	1.49	0.66	0.091	2.6	0.27	5.53	yes	4.03	0.77	0.172
NBB33	Type DM2	166+52.00	0.00	0.00	1.68	2.26	3.94	0.012	0.021	2.33	1.61	0.41	0.077	3.6	0.14	10.58	yes	9.08	2.33	0.243
NBB33A	Type DM2	167+05.00	0.00	0.00	3.45	3.94	7.40	0.011	0.027	4.79	2.61	0.35	0.083	3.1	0.13	11.83	yes	10.33	4.79	0.322
NBB34A					2.77	7.40	10.16	0.010	0.020	7.49	2.68	0.26	0.076	3.8	0.09	16.49	yes	14.99	7.49	0.353
NBB34	Type DM2	168+35.00	0.00	0.00	0.56	10.16	10.73	0.015	0.020	7.73	3.00	0.28	0.076	3.8	0.10	15.56	yes	14.06	7.73	0.335
NBB35					0.72	0	0.72	0.013	0.020	0.17	0.55	0.77	0.076	3.8	0.30	4.93	yes	3.43	0.17	0.122
NBB36					6.33	0	6.33	0.011	0.016	4.48	1.85	0.29	0.072	4.5	0.10	15.47	yes	13.97	4.48	0.283
NBB37	Existing Inlet	186+00.00	2.50	5.00	0.59	6.33	6.92	0.022	0.025	4.16	2.76	0.40	0.081	3.2	0.14	10.53	yes	9.03	4.16	0.272

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Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS, DECATUR TO RAINBOW AND**
Job no.: 23629.06
Prepared by : MM
Checked by : HM
Date: 4/8/2014
Computation: Developed onsite: 10-year runoff and inlet capture
References: Rational Method in accordance with CCRFCD's HC&DDM, 1996, NDOT Drainage Manual, 2006, and FHWA HEC-22, 2009 Curb opening and grate inlet capture for composite curb

Constant values

Manning's coefficient	n =	0.015
Width of inlet	W =	1.5 ft
Gutter depression	a =	0.083 ft



Part 3: Inlet capture calculations performed to determine number of inlets required to meet 10-year CCRFCD/RTC drylane criteria; actual capter is higher because more inlets are required to meet NDOT 25-year spread criteria

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	28
	Inlet sizes			With Clogging		Curb Opening Calculation					Grate Opening Calculation															
Subbasin I.D.	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Inlet Clogging Factor (%)	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Se (ft/ft)	L_T (ft)	L (ft)	E	Q_{ic} (cfs)	Q_g (cfs)	Q_{S3} (cfs)	Q_{W3} (cfs)	E_{O3}	W/T	T_3 (ft)	T_{S3} (ft)	Q_{S4} (cfs)	V (ft/s)	V_O (ft/s)	R_f	R_s	Q_{ig} (cfs)	Q_{10} intercept (cfs)	Q_{10} bypass (cfs)	Comments
SBB01																								0.00	1.16	new curb opening and inlet; remaining bypass discharges into SBB01A
SBB01A	2.5	5.0	25	1.9	3.8	0.04	18.26	1.88	0.18	0.47	2.19	1.29	0.90	0.41	0.14	11.07	9.57	1.29	2.10	6.76	1.00	0.11	1.04	1.51	1.15	total discharges into existing inlet at Santa Fe Casino entrance
SBB02	2.5	5.0	25	1.9	3.8	0.04	19.06	1.88	0.17	0.58	2.82	1.66	1.16	0.41	0.14	10.62	9.12	1.66	2.37	6.76	1.00	0.11	1.33	1.91	1.48	total discharges into existing inlet at Santa Fe Casino entrance
SBB03						Drop Inlet not requried to satisfy 10-year criteria																		0.00	2.34	new curb opening and inlet; remaining bypass discharges into SBB04A
SBB04A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	4.24	new curb opening and inlet; remaining bypass discharges into SBB04B
SBB04B																									6.17	discharges west into Lone Mountain Road
SBB05																									1.94	discharges into subbasin SBB06A
SBB06A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	3.00	new curb opening and inlet; remaining bypass discharges into SBB06B
SBB06B																									4.49	discharges into SBB07A
SBB07A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	5.75	new curb opening and inlet; remaining bypass discharges into SBB07B
SBB07B						Drop Inlet not requried to satisfy 10-year criteria																		0.00	7.31	new curb opening and inlet; remaining bypass discharges into SBB08
SBB08																									8.09	discharges into Ahern Rentals parking lot
SBB08A																									9.05	discharges into SBB09
SBB09																									10.73	discharges west into Red Coach Avenue
SBB10																									2.98	discharges into Draft House parking lot
SBB11																									1.38	discharges into Fat Burger/Arby's parking lot
SBB12																									0.87	discharges into Arby/APN 138-02-213-014 parking lot
SBB13																									1.41	discharges into Taco Bell/Discount Tire parking lot
SBB14																									1.28	discharges into Lee's Disct Liquor/APN13802213007 pkng lot
SBB15						Drop Inlet not requried to satisfy 10-year criteria																		0.00	1.86	discharges west into new curb opening and inlet in Craig Rd;
SBB16																									5.32	discharges into SBB16A
SBB16A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	9.24	new curb opening and inlet; remaining bypass discharges into SBB16B
SBB16B						Drop Inlet not requried to satisfy 10-year criteria																		0.00	11.96	new curb opening and inlet; remaining bypass discharges into SBB01C
SBB16C						Drop Inlet not requried to satisfy 10-year criteria																		0.00	16.15	new curb opening and inlet to replace exisitng 2' inlet; remaining bypass discharges into SBB17
SBB16D						See Grate sump calculations performed with Flow Master																		8.47	0.00	Grate only area drain sump; sized for 100% capture
SBB16E						See Grate sump calculations performed with Flow Master																		0.88	0.00	Grate only area drain sump; sized for 100% capture
SBB17						Drop Inlet not requried to satisfy 10-year criteria																		0.00	18.83	new curb opening and inlet; remaining bypass discharges into SBB18
SBB18						Drop Inlet not requried to satisfy 10-year criteria																		0.00	22.24	new curb opening and inlet; remaining bypass discharges into SBB19A
SBB19A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	22.67	new curb opening and inlet; remaining bypass discharges into SBB19B
SBB19B																									23.26	Discharges into SBB20A
SBB20A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	24.56	new curb opening and inlet; remaining bypass discharges into SBB20B
SBB20B						Drop Inlet not requried to satisfy 10-year criteria																		0.00	25.90	new curb opening and inlet; remaining bypass discharges into SBB20C
SBB20C						Drop Inlet not requried to satisfy 10-year criteria																		0.00	27.37	new curb opening and inlet; remaining bypass discharges into SBB21
SBB21						Drop Inlet not requried to satisfy 10-year criteria																		0.00	29.74	new curb opening and inlet; remaining bypass discharges into SBB22A
SBB22A																									32.91	discharges into SBB22B
SBB22B						Drop Inlet not requried to satisfy 10-year criteria																		0.00	35.38	new curb opening and inlet; remaining bypass discharges into SBB22C
SBB22C						Drop Inlet not requried to satisfy 10-year criteria																		0.00	36.75	new curb opening and inlet; remaining bypass discharges into SBB23
SBB23																									40.54	discharges to sw underdrains in Duncan Dr, then channel
SBB24A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	2.42	new curb opening and inlet; remaining bypass discharges into SBB24B
SBB24B						Drop Inlet not requried to satisfy 10-year criteria																		0.00	4.26	new curb opening and inlet; remaining bypass discharges into SBB24C
SBB24C																									6.77	discharges west into Gowan Road
SBB25						Drop Inlet not requried to satisfy 10-year criteria																		0.00	1.33	new curb opening and inlet; remaining bypass discharges into SBB26
SBB26																									3.18	discharges into first driveway of 13812301013
SBB27																									1.09	discharges into second driveway of 13812301013
SBB28																									0.85	discharges west into Michael Way
SBB29																									1.69	discharges west into Michael Way
SBB30						Drop Inlet not requried to satisfy 10-year criteria																		0.00	1.03	new curb opening and inlet; remaining bypass discharges into SBB3132
SBB3132						Drop Inlet not requried to satisfy 10-year criteria																		0.00	6.01	new curb opening and inlet; remaining bypass discharges into SBB33
SBB33						Drop Inlet not requried to satisfy 10-year criteria																		0.00	8.53	new curb opening and inlet; remaining bypass discharges into SBB34A

Part 3: Inlet capture calculations performed to determine number of inlets required to meet 10-year CCRFCD/RTC drylane criteria; actual capter is higher because more inlets are required to meet NDOT 25-year spread criteria

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	28
	Inlet sizes			With Clogging		Curb Opening Calculation					Grate Opening Calculation															
Subbasin I.D.	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Inlet Clogging Factor (%)	L_{grate} (ft)	$L_{curb\ opening}$ (ft)	Se (ft/ft)	L_T (ft)	L (ft)	E	Q_{Ic} (cfs)	Q_g (cfs)	Q_{S3} (cfs)	Q_{W3} (cfs)	E_{O3}	W/T	T_3 (ft)	T_{S3} (ft)	Q_{S4} (cfs)	V (ft/s)	V_O (ft/s)	R_f	R_s	Q_{Ig} (cfs)	$Q_{10\ intercept}$ (cfs)	$Q_{10\ bypass}$ (cfs)	Comments
SBB34A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	11.08	new curb opening and inlet; remaining bypass discharges into SBB34B
SBB34B						Drop Inlet not requried to satisfy 10-year criteria																		0.00	13.13	new curb opening and inlet; remaining bypass discharges into SBB34C
SBB34C						Drop Inlet not requried to satisfy 10-year criteria																		0.00	14.68	new curb opening and inlet; remaining discharge heads west around the corner on Cheyenne to an existing inlet
SBB35						Drop Inlet not requried to satisfy 10-year criteria																		0.00	2.69	new curb opening and inlet; remaining bypass discharges into SBB36A
SBB36A																									5.69	discharges into SBB36
SBB36						Drop Inlet not requried to satisfy 10-year criteria																		0.00	9.26	new curb opening and inlet; remaining bypass discharges into SBB37A
SBB37A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	12.01	new curb opening and inlet; remaining bypass discharges into SBB37B
SBB37B																									13.01	discharges into SBB38
SBB38																									14.51	discharges into SBB39
SBB39	2.5	5.0	25	1.9	3.8	0.05	35.76	1.88	0.09	1.49	14.61	10.17	4.44	0.30	0.11	13.35	11.85	10.17	4.59	6.76	1.00	0.06	5.05	6.53	9.56	existing 3X3 curb opening and grate
NBB01																									0.91	discharges east into Rainbow Boulevard
NBB02A1						Drop Inlet not requried to satisfy 10-year criteria																		0.00	1.37	new curb opening and inlet; remaining bypass discharges into NBB02A2
NBB02A2						Drop Inlet not requried to satisfy 10-year criteria																		0.00	2.76	new curb opening and inlet; remaining bypass discharges into NBB02B1
NBB02B1						Drop Inlet not requried to satisfy 10-year criteria																		0.00	4.12	new curb opening and inlet; remaining bypass discharges into NBB02B2
NBB02B2						Drop Inlet not requried to satisfy 10-year criteria																		0.00	5.34	new curb opening and inlet; remaining bypass discharges into NBB02C
NBB02C						Drop Inlet not requried to satisfy 10-year criteria																		0.00	6.81	new curb opening and inlet; remaining bypass discharges into NBB03
NBB03																									8.13	discharges east into Ln Mtn Rd
NBB04						Drop Inlet not requried to satisfy 10-year criteria																		0.00	1.97	new curb opening and inlet; remaining bypass discharges into NBB05A
NBB05A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	4.62	new curb opening and inlet; remaining bypass discharges into NBB05B
NBB05B						Drop Inlet not requried to satisfy 10-year criteria																		0.00	5.59	new curb opening and inlet; remaining bypass discharges into NBB06
NBB06																									7.21	discharges into APN 13802113001 parking lot
NBB07																									4.30	discharges east into Torrey Pines Drive
NBB08																									0.86	discharges east to parking lot,APN 13802204001 Checkr, BigO
NBB09																									1.41	discharges east to pkng lot (13802204001) upstream of DelTaco
NBB10																									2.11	discharges east into parking lot (APN 13802601001, Kmart)
NBB11	2.5	5.0	25	1.9	3.8	0.04	15.48	1.88	0.21	0.25	0.97	0.44	0.53	0.55	0.16	9.24	7.74	0.44	1.99	6.76	1.00	0.08	0.57	0.82	0.41	exisitng 2.5x5 discharges east into Craig Road
NBB12																									1.51	discharges east into Craig Road
NBB13A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	4.95	new curb opening and inlet; remaining bypass discharges into NBB13B
NBB13B						Drop Inlet not requried to satisfy 10-year criteria																		0.00	8.16	new curb opening and inlet; remaining bypass discharges into NBB14A
NBB14A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	10.81	new curb opening and inlet; remaining bypass discharges into NBB14B
NBB14B						Drop Inlet not requried to satisfy 10-year criteria																		0.00	13.38	new curb opening and inlet; remaining bypass discharges into NBB15
NBB15						Drop Inlet not requried to satisfy 10-year criteria																		0.00	15.11	new curb opening and inlet; remaining bypass discharges into NBB016
NBB16																									15.93	discharges east into Jones Blvd.
NBB17						Drop Inlet not requried to satisfy 10-year criteria																		0.00	1.35	new curb opening and inlet; remaining bypass discharges into NBB17B
NBB18						Drop Inlet not requried to satisfy 10-year criteria																		0.00	2.82	new curb opening and inlet; remaining bypass discharges into NBB17C
NBB19						Drop Inlet not requried to satisfy 10-year criteria																		0.00	3.98	new curb opening and inlet; remaining bypass discharges into NBB17D
NBB20																									4.83	discharges into Alexander Road
NBB21						Drop Inlet not requried to satisfy 10-year criteria																		0.00	3.72	new curb opening and inlet; remaining bypass discharges into NBB19
NBB19																									4.46	discharges into NBB20
NBB20																									7.75	discharges east into parking lot (APN 13812110015)
NBB21																									0.99	discharges east into Duncan Drive
NBB22						Drop Inlet not requried to satisfy 10-year criteria																		0.00	2.15	new curb opening and inlet; remaining bypass discharges into NBB23A
NBB23A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	4.15	new curb opening and inlet; remaining bypass discharges into NBB23B
NBB23B						Drop Inlet not requried to satisfy 10-year criteria																		0.00	5.64	new curb opening and inlet; remaining bypass discharges into NBB23C
NBB23C						Drop Inlet not requried to satisfy 10-year criteria																		0.00	7.55	new curb opening and inlet, bypass goes east in Gowan
NBB24																									8.79	discharges east into Gowan Road
NBB25																									1.56	discharges into NBB26
NBB26						Drop Inlet not requried to satisfy 10-year criteria																		0.00	1.93	new curb opening and inlet; remaining bypass discharges into NBB27
NBB27																									3.85	discharges east into Jay Avenue
NBB28																									2.66	discharges east into Ricky Road
NBB2930																									2.47	discharges east into Disct Muffler parking lot, APN 13812810003
NBB31																									3.19	discharges east into Donnie Avenue
NBB32																									2.26	discharges into NBB33
NBB33						Drop Inlet not requried to satisfy 10-year criteria																		0.00	3.94	new curb opening and inlet; remaining bypass discharges into NBB33A
NBB33A						Drop Inlet not requried to satisfy 10-year criteria																		0.00	7.40	new curb opening and inlet; remaining bypass discharges into NBB34A
NBB34A																									10.16	discharges into NBB34
NBB34						Drop Inlet not requried to satisfy 10-year criteria																		0.00	10.73	new curb opening and inlet; remaining bypass discharges into NBB35
NBB35																									0.72	discharges east into Cheyenne Ave
NBB36																									6.33	discharges into NBB37
NBB37	2.5	5.0	25	1.9	3.8	0.05	33.42	1.88	0.10	0.68	6.24	3.65	2.59	0.42	0.15	10.09	8.59	3.65	4.67	6.76	1.00	0.04	2.74	3.43	3.49	existing 4X4 curb opening and grate

Appendix C

STORMDRAIN WSPG ANALYSES

- Gowan Outfall – Alexander Road Facilities
  - WSPG Summary Table and Plot
  - WSPG Input and Output
- Stormdrain north of Cheyenne (east side)
  - WSPG Summary Table and Plot
  - WSPG Input and Output
- Stormdrain north of Cheyenne (west side)
  - WSPG Summary Table and Plot
  - WSPG Input and Output
- Stormdrain north of Gowan (east side)
  - WSPG Summary Table and Plot
  - WSPG Input and Output

WSPG BACKWATER ANALYSIS SUMMARY TABLE

Project: Rancho Capacity Improvements

Project No.: 23629

Gowan Outfall - Alexander Road Facilities

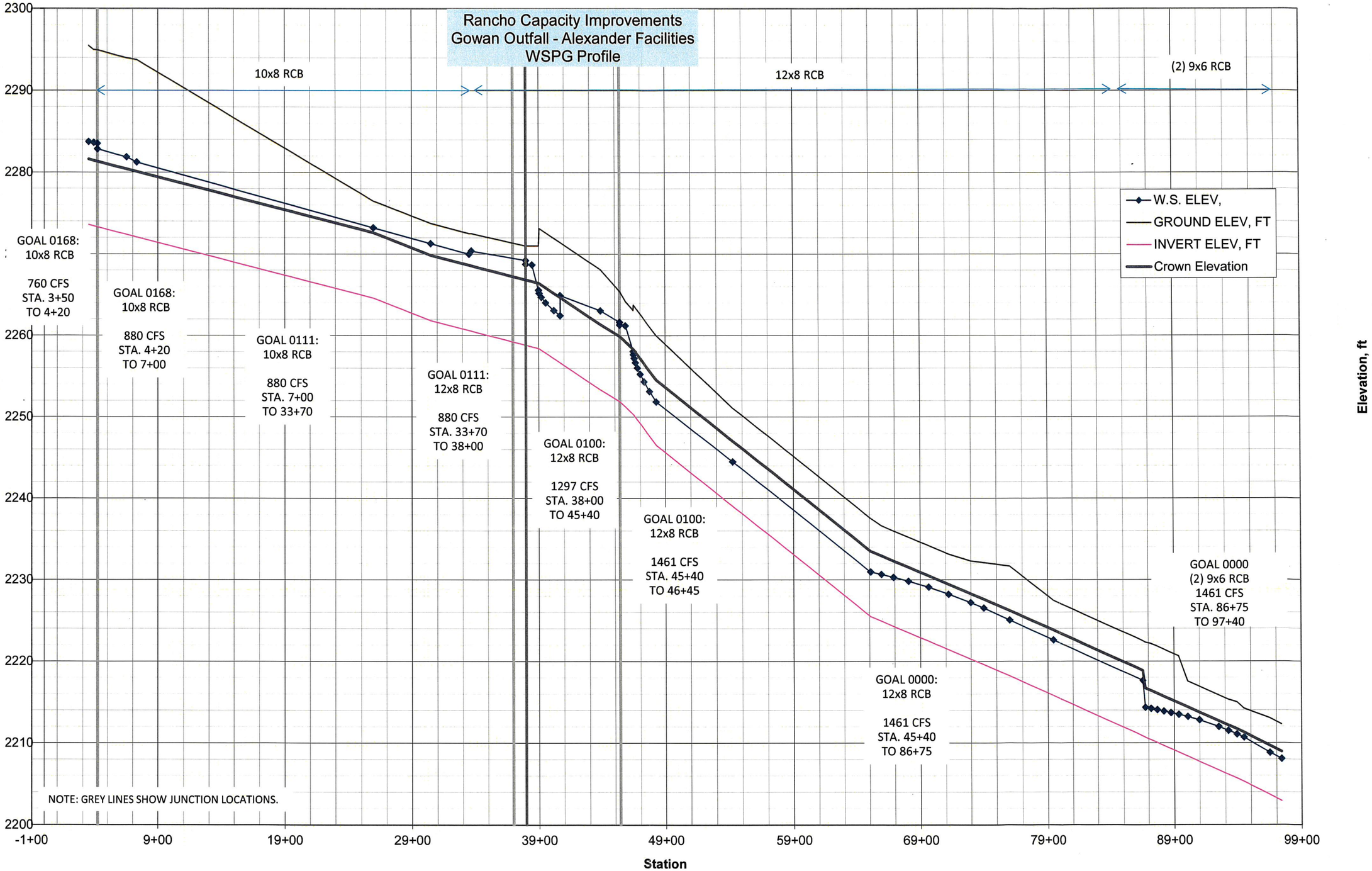
Date: 3/28/2014 0:00

STATION	LOCATION	INVERT ELEV, FT	GROUND ELEV, FT	W.S. ELEV, FT	DEPTH, FT	Q, CFS	VELOC., FT/S	VELOC. HEAD, FT	ENERGY GRADE LINE, FT	SUPER ELEV, FT (WSPG)	CRITICAL DEPTH, FT	FROUDE NUMBER	SLOPE, FT/FT	NORMAL DEPTH, FT	BOX SIZE W x H FT	HGL < 1.5 BELOW GRADE
97+40.91	Alexander - GOAL 0000	2202.95	2212.30	2208.07	5.12	1461.00	15.85	3.90	2211.97	0.00	5.89	0.00	0.0000	0.00	(2) 9x6	YES
96+48.48		2203.69	2213.04	2208.82	5.13	1461.00	15.83	3.89	2212.71	0.00	5.89	1.23	0.0080	5.12	(2) 9x6	YES
94+46.10		2205.31	2214.23	2210.69	5.38	1461.00	15.09	3.54	2214.22	0.00	5.89	1.15	0.0080	5.12	(2) 9x6	YES
93+90.51		2205.70	2215.00	2211.08	5.38	1461.00	15.10	3.54	2214.62	0.00	5.89	1.15	0.0070	5.38	(2) 9x6	YES
93+24.44		2206.16	2215.33	2211.51	5.35	1461.00	15.17	3.57	2215.08	0.00	5.89	1.16	0.0070	5.40	(2) 9x6	YES
92+50.47		2206.68	2215.85	2211.99	5.31	1461.00	15.29	3.63	2215.62	0.00	5.89	1.17	0.0070	5.39	(2) 9x6	YES
90+98.48		2207.74	2216.91	2212.80	5.06	1461.00	16.04	3.99	2216.79	0.00	5.89	1.26	0.0070	5.39	(2) 9x6	YES
90+07.38		2208.38	2217.55	2213.20	4.83	1461.00	16.82	4.39	2217.59	0.00	5.89	1.35	0.0070	5.39	(2) 9x6	YES
89+35.28		2208.88	2220.65	2213.48	4.60	1461.00	17.64	4.83	2218.31	0.00	5.89	1.45	0.0070	5.39	(2) 9x6	YES
88+75.67		2209.30	2221.07	2213.70	4.40	1461.00	18.46	5.29	2218.99	0.00	5.89	1.55	0.0070	5.38	(2) 9x6	YES
88+19.40		2209.69	2221.46	2213.89	4.19	1461.00	19.36	5.82	2219.70	0.00	5.89	1.67	0.0070	5.38	(2) 9x6	YES
87+67.92		2210.05	2221.82	2214.05	4.00	1461.00	20.30	6.40	2220.45	0.00	5.89	1.79	0.0070	5.38	(2) 9x6	YES
87+20.18		2210.39	2222.16	2214.20	3.81	1461.00	21.29	7.04	2221.24	0.00	5.89	1.92	0.0070	5.38	(2) 9x6	YES
86+75.54		2210.70	2222.32	2214.33	3.63	1461.00	22.33	7.74	2222.08	0.00	5.89	2.06	0.0070	5.38	(2) 9x6	YES
86+55.59		2210.84	2222.49	2217.63	6.79	1461.00	17.94	5.00	2222.62	0.00	7.72	1.21	0.0070	0.00	12x8	YES
79+45.33		2215.81	2227.46	2222.60	6.79	1461.00	17.94	5.00	2227.59	0.00	7.72	1.21	0.0070	6.79	12x8	YES
76+02.20		2218.21	2231.66	2225.04	6.83	1461.00	17.82	4.93	2229.97	0.00	7.72	1.20	0.0070	6.79	12x8	YES
74+02.13		2219.60	2232.10	2226.53	6.93	1461.00	17.57	4.79	2231.32	0.00	7.72	1.18	0.0070	6.81	12x8	YES
72+98.78		2220.28	2232.29	2227.19	6.91	1461.00	17.62	4.82	2232.01	0.00	7.72	1.18	0.0066	6.95	12x8	YES
71+22.74		2221.43	2233.13	2228.22	6.79	1461.00	17.94	5.00	2233.21	0.00	7.72	1.21	0.0065	6.97	12x8	YES
69+64.65		2222.48	2234.18	2229.08	6.60	1461.00	18.45	5.28	2234.36	0.00	7.72	1.27	0.0066	6.93	12x8	YES
68+07.00		2223.52	2235.22	2229.82	6.29	1461.00	19.35	5.81	2235.63	0.00	7.72	1.36	0.0066	6.93	12x8	YES
66+90.99		2224.29	2235.99	2230.29	6.00	1461.00	20.29	6.39	2236.69	0.00	7.72	1.46	0.0066	6.93	12x8	YES
65+94.23		2224.94	2236.64	2230.66	5.72	1461.00	21.28	7.03	2237.69	0.00	7.72	1.57	0.0066	6.93	12x8	YES
65+09.10		2225.50	2237.56	2230.96	5.46	1461.00	22.32	7.73	2238.69	0.00	7.72	1.68	0.0066	6.93	12x8	YES
54+28.01		2239.03	2251.09	2244.49	5.46	1461.00	22.32	7.73	2252.22	0.00	7.72	1.68	0.0125	5.46	12x8	YES
48+29.14		2246.53	2260.00	2251.84	5.31	1461.00	22.92	8.16	2260.00	0.00	7.72	1.75	0.0125	5.46	12x8	YES
47+76.94		2247.61	2261.08	2253.14	5.53	1461.00	22.01	7.52	2260.66	0.00	7.72	1.65	0.0207	4.54	12x8	YES
47+32.71		2248.53	2262.00	2254.33	5.80	1461.00	20.99	6.84	2261.17	0.00	7.72	1.54	0.0207	4.54	12x8	YES
47+01.11		2249.18	2262.65	2255.26	6.09	1461.00	20.01	6.22	2261.48	0.00	7.72	1.43	0.0207	4.54	12x8	YES
46+78.58		2249.65	2263.12	2256.03	6.38	1461.00	19.08	5.65	2261.68	0.00	7.72	1.33	0.0207	4.54	12x8	YES
46+62.95		2249.97	2263.44	2256.66	6.69	1461.00	18.19	5.14	2261.80	0.00	7.72	1.24	0.0207	4.54	12x8	YES
46+52.81		2250.18	2263.65	2257.20	7.02	1461.00	17.34	4.67	2261.87	0.00	7.72	1.15	0.0207	4.54	12x8	YES
46+47.22		2250.29	2263.76	2257.66	7.36	1461.00	16.54	4.25	2261.90	0.00	7.72	1.07	0.0207	4.54	12x8	YES

Project: Rancho Capacity Improvements
Project No.: 23629
Gowan Outfall - Alexander Road Facilities
Date: 3/28/2014 0:00

STATION	LOCATION	INVERT ELEV, FT	GROUND ELEV, FT	W.S. ELEV, FT	DEPTH, FT	Q, CFS	VELOC., FT/S	VELOC. HEAD, FT	ENERGY GRADE LINE, FT	SUPER ELEV, FT (WSPG)	CRITICAL DEPTH, FT	FROUDE NUMBER	SLOPE, FT/FT	NORMAL DEPTH, FT	BOX SIZE W x H FT	HGL < 1.5 BELOW GRADE
46+45.48	Rancho & Alexander- GOAL 0000	2250.33	2263.10	2258.05	7.72	1461.00	15.77	3.86	2261.91	0.00	7.72	1.00	0.0207	4.54	12x8	YES
45+85.48	Rancho & Jones - GOAL 0100	2251.25	2264.20	2261.21	9.96	1461.00	8.71	1.18	2262.39	0.00	5.32	0.54	0.0153	0.00	21x8	YES
45+40.48		2251.89	2265.43	2261.29	9.40	1461.00	8.71	1.18	2262.47	0.00	5.32	0.54	0.0142	3.23	21x8	YES
45+40.48		2251.89	2265.43	2261.64	9.75	1297.00	7.73	0.93	2262.56	0.00	4.91	0.00	0.0000	0.00	12x8	YES
45+40.48		2251.89	2265.43	2261.64	9.75	1297.00	13.55	2.85	2264.48	0.00	7.13	0.00	0.0000	0.00	12x8	YES
43+87.40		2253.36	2268.12	2263.07	9.71	1297.00	13.55	2.85	2265.91	0.00	7.13	0.85	0.0096	5.51	12x8	YES
40+69.55		2256.67	2271.43	2264.92	8.25	1297.00	13.55	2.85	2267.77	0.00	7.13	0.85	0.0104	5.35	12x8	YES
40+69.55		2256.67	2271.43	2262.46	5.78	1297.00	18.69	5.42	2267.88	0.00	7.13	1.37	0.0104	5.35	12x8	YES
40+20.20		2257.19	2271.95	2263.08	5.90	1297.00	18.34	5.22	2268.30	0.00	7.13	1.33	0.0104	5.35	12x8	YES
39+55.51		2257.86	2272.62	2264.04	6.18	1297.00	17.48	4.75	2268.79	0.00	7.13	1.24	0.0104	5.35	12x8	YES
39+21.25		2258.22	2272.98	2264.70	6.48	1297.00	16.67	4.31	2269.02	0.00	7.13	1.15	0.0104	5.35	12x8	YES
39+04.68		2258.39	2273.15	2265.19	6.80	1297.00	15.89	3.92	2269.11	0.00	7.13	1.07	0.0104	5.35	12x8	YES
39+00.00	Rancho - GOAL 0100	2258.44	2271.01	2265.57	7.13	1297.00	15.15	3.57	2269.14	0.00	7.13	1.00	0.0104	5.35	12x8	YES
38+50.00		2258.64	2271.00	2268.68	10.04	1297.00	7.55	0.89	2269.56	0.00	4.84	0.47	0.0040	0.00	24x8	YES
38+00.00		2258.84	2271.00	2268.75	9.91	1297.00	7.55	0.89	2269.63	0.00	4.84	0.47	0.0040	4.47	12x8	YES
38+00.00		2258.84	2271.00	2269.22	10.38	880.00	5.12	0.41	2269.63	0.00	3.73	0.00	0.0000	0.00	12x8	YES
38+00.00	Rancho - GOAL 0111	2258.84	2271.00	2269.22	10.38	880.00	9.19	1.31	2270.54	0.00	5.51	0.00	0.0000	0.00	12x8	YES
33+70.00	Rancho - GOAL 0111	2260.56	2272.52	2270.38	9.82	880.00	9.19	1.31	2271.69	0.00	5.51	0.57	0.0040	5.72	12x8	YES
33+50.00		2260.64	2272.52	2269.99	9.35	880.00	11.03	1.89	2271.88	0.00	6.22	0.69	0.0040	0.00	10x8	YES
30+50.00		2261.84	2273.76	2271.28	9.44	880.00	11.03	1.89	2273.17	0.00	6.22	0.69	0.0040	6.91	10x8	YES
26+00.00	Rancho - GOAL 0111	2264.62	2276.49	2273.21	8.59	880.00	11.03	1.89	2275.10	0.00	6.22	0.69	0.0062	5.84	10x8	YES
7+33.37	Craig and Rancho -GOAL 0168	2272.07	2293.75	2281.23	9.16	880.00	11.03	1.89	2283.12	0.00	6.22	0.69	0.0040	6.91	10x8	YES
6+50.63		2272.40	2293.98	2281.86	9.46	880.00	11.03	1.89	2283.75	0.00	6.22	0.69	0.0040	6.91	10x8	YES
4+20.00		2273.32	2294.95	2282.85	9.53	880.00	11.03	1.89	2284.74	0.00	6.22	0.69	0.0040	6.91	10x8	YES
4+20.00		2273.32	2294.95	2283.52	10.20	760.00	9.53	1.41	2284.93	0.00	5.64	0.00	0.0000	0.00	10x8	YES
3+90.00		2273.44	2295.00	2283.62	10.18	760.00	9.53	1.41	2285.03	0.00	5.64	0.60	0.0040	6.16	10x8	YES
3+50.00		2273.60	2295.50	2283.75	10.15	760.00	9.53	1.41	2285.16	0.00	5.64	0.60	0.0040	6.16	10x8	YES
3+50.00	Craig Rd - GOAL 0168	2273.60	2295.50	2283.75	10.15	760.00	9.53	1.41	2285.16	0.00	5.64	0.00	0.0000	0.00	10x8	YES

Rancho Capacity Improvements
Gowan Outfall - Alexander Facilities
WSPG Profile



```
[TITLE]
 Rancho Drive Capacity Improvements - Gowan Outfall Improvements


[REPORT]
COMPOSITE_ONLY

[NETWORK]
**TYPE          NAME
**-----         -------
"Outlet          ""Outlet""          "
"Reach           ""EndDes9740""      "
"Reach           ""Link47""          "
"Reach           ""Link46""          "
"Reach           ""Link45""          "
"Reach           ""Link44""          "
"Transition      ""Link43""          "
"Reach           ""Link80""          "
"Reach           ""Trans 2""         "
"Reach           ""Link40""          "
"Reach           ""Link39""          "
"Reach           ""Link38""          "
"Reach           ""sta48+29""        "
"Reach           ""Link96""          "
"Transition      ""Trans4585""       "
"Reach           ""shrtbx4540""      "
"Junction        ""J45+40""          "
"WallExit        ""WX45+40""         "
"Reach           ""Link112""         "
"Reach           ""Link100""         "
"Transition      ""Trans 3850""      "
"Reach           ""shrtbx3800""      "
"Junction        ""Jct3800""         "
"WallExit        ""WX3800""          "
"Reach           ""Link87""          "
"Transition      ""Trans3350""       "
"Reach           ""Sta:30+50""       "
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"Reach          ""Link101""       "
"Reach          ""Link105""       "
"Reach          ""Link106""       "
"Reach          ""Link107""       "
"Junction       ""Node105""       "
"Reach          ""Link110""       "
"Reach          ""Link111""       "
"Headwork       ""STA3+50""       "

**BRANCH DEFINITIONS

[OUTLET]
**NAME          STATION    INVERT     GROUND     CHANNEL    WATER SURFACE
**                         ELEV       ELEV       ID         ELEV (opt.)
**------------  ---------  ---------- ---------- ---------- ----------
"Outlet         -9740.91   2202.95    2212.3     ""2-9x6""   0          "

[HEADWORK]
**NAME          INVERT     GROUND     CHANNEL    FLOW       WATER SURFACE
**              ELEV       ELEV       ID                    ELEV (opt.)
**------------  ---------  ---------- ---------- ---------- ----------
"STA3+50        2273.6     2295.5     ""10X8 RCB""  760      0          "

[WALLENTRANCE]
**NAME          INVERT     GROUND     CHANNEL    LOSS
**              ELEV       ELEV       ID         COEFFICIENT(opt.)
**------------  ---------  ---------- ---------- --------------

[WALLEXIT]
**NAME          INVERT     GROUND     CHANNEL    LOSS
**              ELEV       ELEV       ID         COEFFICIENT(opt.)
**------------  ---------  ---------- ---------- --------------
"WX3800         2258.84    2271       ""12X8 RCB""  0          "
"WX45+40        2251.89    2265.43    ""12X8 RCB""  0          "

[BRIDGEENTRANCE]
**NAME          INVERT     GROUND     CHANNEL    REDUCTION
**              ELEV       ELEV       ID         FACTOR(opt.)
```

```
**------------      ---------  ----------  ----------  --------------

[BRIDGEEXIT]
**NAME              INVERT     GROUND      CHANNEL     REDUCTION
**                  ELEV       ELEV        ID          FACTOR(opt.)
**------------      ---------  ----------  ----------  --------------

[JOIN]
**NAME              INVERT     GROUND      CHANNEL     LENGTH      MANNINGS n  NUMBER OF   CONFLUENCE
**                  ELEV       ELEV        ID                                  BRANCHES    ANGLE
**------------      ---------  ----------  ----------  ----------  ----------  ----------  ----------

[JUNCTION]
**Name              INVERT     GROUND      CHANNEL     LENGTH      MANNINGS n  NUMBER OF   CONFLUENCE  FLOW
**                  ELEV       ELEV        ID                                  LATERALS    ANGLE
**------------      ---------  ----------  ----------  ----------  ----------  ----------  ----------  ----
------
"Jct3800            2258.84    2271        ""24x8box""  0          0.015       1           "
"Jct3800_Lateral1   2258.84                ""8X5 RCB""                                     0           417
"
"J45+40             2251.89    2265.43     ""21x8Box""  0          0.015       1           "
"J45+40_Lateral1    2251.89                ""8x4""                                         0           164
"
"Node105            2273.32    2294.95     ""10X8 RCB"" 0          0.015       1           "
"Node105_Lateral1   2273.32                ""48 INCH RCP""                                 50          120
"


[TRANSITION]
**NAME              INVERT     GROUND      CHANNEL     LENGTH      MANNINGS n
**                  ELEV       ELEV        ID
**------------      ---------  ----------  ----------  ----------  ----------
"Link43             2210.84    2222.49     ""12X8 RCB""  19.95     0.015       "
"Trans3350          2260.64    2272.52     ""10X8 RCB""  20        0.015       "
"Trans 3850         2258.64    2271        ""24x8box""   50        0.015       "
"Trans4585          2251.25    2264.2      ""21x8Box""   60        0.015       "
```

[REACH] **NAME NUMBER ** MANHOLES(opt) **---------- ------	INVERT ELEV ---------	GROUND ELEV ----------	CHANNEL ID ----------	LENGTH ----------	MANNINGS n ----------	CURVE (opt) ----------	ANGLE POINT(opt) ----------	----
"Link38 "	2225.5	2237.56	""12X8 RCB""	613.64	0.015	0	0	1
"Link39 "	2221.43	2233.13	""12X8 RCB""	176.04	0.015	0	0	1
"Link40 "	2220.28	2232.29	""12X8 RCB""	103.35	0.015	22.6	0	1
"Link46 "	2206.16	2215.33	""2-9x6""	66.07	0.015	24	0	0
"sta48+29 "	2246.53	2260	""12X8 RCB""	1679.96	0.015	26.5	0	0
"Link44 "	2210.7	2222.32	""2-9x6""	259.74	0.015	0	0	0
"Link45 "	2208.88	2220.65	""2-9x6""	389.16	0.015	0	0	0
"Link47 "	2205.7	2215	""2-9x6""	55.59	0.015	24	0	0
"EndDes9740 "	2205.31	2214.23	""2-9x6""	294.81	0.015	0	0	0
"Trans 2 "	2219.6	2232.1	""12X8 RCB""	200.07	0.015	22.6	0	0
"Sta:30+50 "	2261.84	2273.76	""10X8 RCB""	300	0.015	0	0	0
"Link80 "	2218.21	2231.66	""12X8 RCB""	1053.39	0.015	0	0	0
"Link87 "	2260.56	2272.52	""12X8 RCB""	430	0.015	0	0	0
"shrtbx3800 "	2258.84	2271	""24x8box""	50	0.015	0	0	0
"Link96 "	2250.33	2263.1	""12X8 RCB""	183.66	0.015	0	0	0

```
"shrtbx4540          2251.89     2265.43     ""21x8Box""    45          0.015       0           0           0
"
"Link100             2258.44     2271.01     ""12X8 RCB""   487.4       0.015       0           0           0
"
"Link101             2264.62     2276.49     ""10X8 RCB""   450         0.015       0           0           0
"
"Link105             2272.07     2293.75     ""10X8 RCB""   1866.63     0.015       0           0           0
"
"Link106             2272.4      2293.98     ""10X8 RCB""   82.74       0.015       47          0           0
"
"Link107             2273.32     2294.95     ""10X8 RCB""   230.63      0.015       0           0           0
"
"Link110             2273.44     2295        ""10X8 RCB""   30          0.015       0           0           0
"
"Link111             2273.6      2295.5      ""10X8 RCB""   40          0.015       0           0           0
"
"Link112             2253.36     2268.12     ""12X8 RCB""   153.08      0.015       79.5        0           0
"

[CHANNEL]
**REGULAR TYPES 1-4
**ID       TYPE HEIGHT     WIDTH      LEFT       RIGHT      NUMBER     AVG PIER   INVERT
**                                    SLOPE      SLOPE      PIERS      WIDTH      CROSS FALL
**------   ---- ---------- ---------- ---------- ---------- ---------- ---------- ----------
2-9x6        3   6          19         0          0          1          1          0
10X8 RCB     3   8          10         0          0          0          0          0
12X8 RCB     3   8          12         0          0          0          0          0
24x8box      3   8          21.5       0          0          0          0          0
8X5 RCB      3   5          8          0          0          0          0          0
21x8Box      3   8          21         0          0          0          0          0
8x4          3   4          8          0          0          0          0          0
48 INCH RCP  4   4          4

**IRREGULAR TYPES 5-6
**ID       TYPE NUMBER     AVG PIER   PIER1      PIER2      PIER3      PIER4      PIER5      PIER6
PIER7      PIER8      PIER9      PIER10
**                PIERS      WIDTH      ELEV       ELEV       ELEV       ELEV       ELEV       ELEV
ELEV       ELEV       ELEV       ELEV
```

```
**------   ---- ---------- ---------- ---------- ---------- ---------- ---------- ---------- --------
- ---------- ---------- ---------- ----------


[POINT]
**ID          XCOORD     YCOORD
**----------- ---------- ----------
```

```
************************************
Water Surface Profile Gradient (WSPG)
XP WSPG
Engine Version 1.3         06/09/2010
XP Software        www.xpsoftware.com
************************************

INPUT FILE
************************************
R:\23629-Rancho\06-Studies\01-70Rancho Rd and Gowan Outfall Combined\APPENDIX C-HYDRAULICS - STORM DRAIN, LATERALS AND GENERAL\70\700X1.300687P-767LIGNMENT 03-28-2014.wsx
Computed  03/28/14  16:53:38

TITLE INFORMATION
************************************
 Rancho Drive Capacity Improvements - Gowan Outfall Improvements

WARNING SUMMARY
************************************
 WARNING 36: D/S processing stopped in junction Node105 because critical momentum is greater than maximum momentum.
 WARNING 36: D/S processing stopped in junction Jct3800 because critical momentum is greater than maximum momentum.

RESULTS
************************************
```

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Main Line

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Composite Profile:

ELEMENT NAME	TYPE	STATION	INVERT ELEV	GROUND ELEV	W.S. ELEV	DEPTH	Q	VELOC.	VELOC. HEAD	ENERGY GRADE LN	SUPER ELEV	CRITICAL DEPTH	FROUDE NUMBER	SLOPE	NORMAL DEPTH	CROSS SECTION
###																
"Outlet"	Outlet	-9740.91	2202.95	2212.30	2208.072	5.122	1461.00	15.85	3.90	2211.97	0.000	5.893	0.000	0.00000	0.000	Tr./Rect.closed
	"i.p."	-9648.48	2203.69	2213.04	2208.817	5.128	1461.00	15.83	3.89	2212.71	0.000	5.893	1.232	0.00801	5.117	Tr./Rect.closed
"EndDes97"	Reach	-9446.10	2205.31	2214.23	2210.688	5.378	1461.00	15.09	3.54	2214.22	0.000	5.893	1.147	0.00801	5.117	Tr./Rect.closed
"Link47"	Reach	-9390.51	2205.70	2215.00	2211.075	5.375	1461.00	15.10	3.54	2214.62	0.000	5.893	1.148	0.00702	5.381	Tr./Rect.closed
"Link46"	Reach	-9324.44	2206.16	2215.33	2211.512	5.352	1461.00	15.17	3.57	2215.08	0.000	5.893	1.155	0.00696	5.397	Tr./Rect.closed
	"i.p."	-9250.47	2206.68	2215.85	2211.986	5.309	1461.00	15.29	3.63	2215.62	0.000	5.893	1.169	0.00699	5.389	Tr./Rect.closed
	"i.p."	-9098.48	2207.74	2216.91	2212.801	5.062	1461.00	16.04	3.99	2216.79	0.000	5.893	1.256	0.00699	5.389	Tr./Rect.closed
	"i.p."	-9007.38	2208.38	2217.55	2213.202	4.826	1461.00	16.82	4.39	2217.59	0.000	5.893	1.349	0.00699	5.389	Tr./Rect.closed
"Link45"	Reach	-8935.28	2208.88	2220.65	2213.481	4.601	1461.00	17.64	4.83	2218.31	0.000	5.893	1.449	0.00699	5.389	Tr./Rect.closed
	"i.p."	-8875.67	2209.30	2221.07	2213.695	4.398	1461.00	18.46	5.29	2218.99	0.000	5.893	1.551	0.00701	5.384	Tr./Rect.closed
	"i.p."	-8819.40	2209.69	2221.46	2213.885	4.193	1461.00	19.36	5.82	2219.70	0.000	5.893	1.666	0.00701	5.384	Tr./Rect.closed
	"i.p."	-8767.92	2210.05	2221.82	2214.051	3.998	1461.00	20.30	6.40	2220.45	0.000	5.893	1.789	0.00701	5.384	Tr./Rect.closed
	"i.p."	-8720.18	2210.39	2222.16	2214.199	3.812	1461.00	21.29	7.04	2221.24	0.000	5.893	1.922	0.00701	5.384	Tr./Rect.closed
"Link44"	Reach	-8675.54	2210.70	2222.32	2214.334	3.634	1461.00	22.33	7.74	2222.08	0.000	5.893	2.064	0.00701	5.384	Tr./Rect.closed
"Link43"	Transition	-8655.59	2210.84	2222.49	2217.628	6.788	1461.00	17.94	5.00	2222.62	0.000	7.723	1.213	0.00702	0.000	Tr./Rect.closed
	"i.p."	-7945.33	2215.81	2227.46	2222.597	6.788	1461.00	17.94	5.00	2227.59	0.000	7.723	1.213	0.00700	6.788	Tr./Rect.closed
"Link80"	Reach	-7602.20	2218.21	2231.66	2225.044	6.834	1461.00	17.82	4.93	2229.97	0.000	7.723	1.201	0.00700	6.788	Tr./Rect.closed
"Trans 2"	Reach	-7402.13	2219.60	2232.10	2226.529	6.929	1461.00	17.57	4.79	2231.32	0.000	7.723	1.176	0.00695	6.806	Tr./Rect.closed

"Link40"	Reach	-7298.78	2220.28	2232.29	2227.191	6.911	1461.00	17.62	4.82	2232.01	0.000	7.723	1.181	0.00658	6.949	Tr./Rect.closed
"Link39"	Reach	-7122.74	2221.43	2233.13	2228.217	6.787	1461.00	17.94	5.00	2233.21	0.000	7.723	1.213	0.00653	6.968	Tr./Rect.closed
	"i.p."	-6964.65	2222.48	2234.18	2229.079	6.601	1461.00	18.45	5.28	2234.36	0.000	7.723	1.265	0.00663	6.927	Tr./Rect.closed
	"i.p."	-6807.00	2223.52	2235.22	2229.818	6.293	1461.00	19.35	5.81	2235.63	0.000	7.723	1.359	0.00663	6.927	Tr./Rect.closed
	"i.p."	-6690.99	2224.29	2235.99	2230.294	6.001	1461.00	20.29	6.39	2236.69	0.000	7.723	1.460	0.00663	6.927	Tr./Rect.closed
	"i.p."	-6594.23	2224.94	2236.64	2230.657	5.721	1461.00	21.28	7.03	2237.69	0.000	7.723	1.568	0.00663	6.927	Tr./Rect.closed
"Link38"	Reach	-6509.10	2225.50	2237.56	2230.955	5.455	1461.00	22.32	7.73	2238.69	0.000	7.723	1.684	0.00663	6.927	Tr./Rect.closed
	"i.p."	-5428.01	2239.03	2251.09	2244.488	5.455	1461.00	22.32	7.73	2252.22	0.000	7.723	1.684	0.01252	5.455	Tr./Rect.closed
"sta48+29"	Reach	-4829.14	2246.53	2260.00	2251.842	5.312	1461.00	22.92	8.16	2260.00	0.000	7.723	1.752	0.01252	5.455	Tr./Rect.closed
	"i.p."	-4776.94	2247.61	2261.08	2253.141	5.531	1461.00	22.01	7.52	2260.66	0.000	7.723	1.649	0.02069	4.538	Tr./Rect.closed
	"i.p."	-4732.71	2248.53	2262.00	2254.327	5.801	1461.00	20.99	6.84	2261.17	0.000	7.723	1.535	0.02069	4.538	Tr./Rect.closed
	"i.p."	-4701.11	2249.18	2262.65	2255.264	6.085	1461.00	20.01	6.22	2261.48	0.000	7.723	1.430	0.02069	4.538	Tr./Rect.closed
	"i.p."	-4678.58	2249.65	2263.12	2256.027	6.382	1461.00	19.08	5.65	2261.68	0.000	7.723	1.331	0.02069	4.538	Tr./Rect.closed
	"i.p."	-4662.95	2249.97	2263.44	2256.662	6.693	1461.00	18.19	5.14	2261.80	0.000	7.723	1.239	0.02069	4.538	Tr./Rect.closed
	"i.p."	-4652.81	2250.18	2263.65	2257.198	7.020	1461.00	17.34	4.67	2261.87	0.000	7.723	1.154	0.02069	4.538	Tr./Rect.closed
	"i.p."	-4647.22	2250.29	2263.76	2257.656	7.362	1461.00	16.54	4.25	2261.90	0.000	7.723	1.074	0.02069	4.538	Tr./Rect.closed
"Link96"	Reach	-4645.48	2250.33	2263.10	2258.052	7.722	1461.00	15.77	3.86	2261.91	0.000	7.723	1.000	0.02069	4.538	Tr./Rect.closed
"Trans458"	Transition	-4585.48	2251.25	2264.20	2261.209	9.959	1461.00	8.71	1.18	2262.39	0.000	5.318	0.543	0.01533	0.000	Tr./Rect.closed
"shrtbx45"	Reach	-4540.48	2251.89	2265.43	2261.293	9.403	1461.00	8.71	1.18	2262.47	0.000	5.318	0.543	0.01422	3.225	Tr./Rect.closed
"J45+40"	Junction	-4540.48	2251.89	2265.43	2261.635	9.745	1297.00	7.73	0.93	2262.56	0.000	4.912	0.000	0.00000	0.000	Tr./Rect.closed
"WX45+40"	WallExt	-4540.48	2251.89	2265.43	2261.635	9.745	1297.00	13.55	2.85	2264.48	0.000	7.134	0.000	0.00000	0.000	Tr./Rect.closed
"Link112"	Reach	-4387.40	2253.36	2268.12	2263.065	9.705	1297.00	13.55	2.85	2265.91	0.000	7.134	0.845	0.00960	5.510	Tr./Rect.closed
HYDRAULIC	JUMP at -4069.55 of length 0.10															
	"i.p."	-4069.55	2256.67	2271.43	2264.920	8.248	1297.00	13.55	2.85	2267.77	0.000	7.134	0.845	0.01042	5.345	Tr./Rect.closed
	"i.p."	-4069.55	2256.67	2271.43	2262.457	5.784	1297.00	18.69	5.42	2267.88	0.000	7.134	1.369	0.01042	5.345	Tr./Rect.closed
	"i.p."	-4020.20	2257.19	2271.95	2263.082	5.895	1297.00	18.34	5.22	2268.30	0.000	7.134	1.331	0.01042	5.345	Tr./Rect.closed
	"i.p."	-3955.51	2257.86	2272.62	2264.044	6.182	1297.00	17.48	4.75	2268.79	0.000	7.134	1.239	0.01042	5.345	Tr./Rect.closed
	"i.p."	-3921.25	2258.22	2272.98	2264.703	6.484	1297.00	16.67	4.31	2269.02	0.000	7.134	1.154	0.01042	5.345	Tr./Rect.closed
	"i.p."	-3904.68	2258.39	2273.15	2265.192	6.801	1297.00	15.89	3.92	2269.11	0.000	7.134	1.074	0.01042	5.345	Tr./Rect.closed
"Link100"	Reach	-3900.00	2258.44	2271.01	2265.573	7.133	1297.00	15.15	3.57	2269.14	0.000	7.134	1.000	0.01042	5.345	Tr./Rect.closed
"Trans 38"	Transition	-3850.00	2258.64	2271.00	2268.677	10.037	1297.00	7.55	0.89	2269.56	0.000	4.835	0.471	0.00400	0.000	Tr./Rect.closed
"shrtbx38"	Reach	-3800.00	2258.84	2271.00	2268.746	9.906	1297.00	7.55	0.89	2269.63	0.000	4.835	0.471	0.00400	4.473	Tr./Rect.closed
"Jct3800"	Junction	-3800.00	2258.84	2271.00	2269.224	10.384	880.00	5.12	0.41	2269.63	0.000	3.733	0.000	0.00000	0.000	Tr./Rect.closed
"WX3800"	WallExt	-3800.00	2258.84	2271.00	2269.224	10.384	880.00	9.19	1.31	2270.54	0.000	5.507	0.000	0.00000	0.000	Tr./Rect.closed
"Link87"	Reach	-3370.00	2260.56	2272.52	2270.380	9.820	880.00	9.19	1.31	2271.69	0.000	5.507	0.573	0.00400	5.719	Tr./Rect.closed
"Trans335"	Transition	-3350.00	2260.64	2272.52	2269.987	9.347	880.00	11.03	1.89	2271.88	0.000	6.219	0.689	0.00400	0.000	Tr./Rect.closed
"Sta:30+5"	Reach	-3050.00	2261.84	2273.76	2271.276	9.436	880.00	11.03	1.89	2273.17	0.000	6.219	0.689	0.00400	6.906	Tr./Rect.closed
"Link101"	Reach	-2600.00	2264.62	2276.49	2273.209	8.589	880.00	11.03	1.89	2275.10	0.000	6.219	0.689	0.00618	5.838	Tr./Rect.closed
"Link105"	Reach	-733.37	2272.07	2293.75	2281.228	9.158	880.00	11.03	1.89	2283.12	0.000	6.219	0.689	0.00399	6.912	Tr./Rect.closed
"Link106"	Reach	-650.63	2272.40	2293.98	2281.857	9.457	880.00	11.03	1.89	2283.75	0.000	6.219	0.689	0.00399	6.914	Tr./Rect.closed
"Link107"	Reach	-420.00	2273.32	2294.95	2282.848	9.528	880.00	11.03	1.89	2284.74	0.000	6.219	0.689	0.00399	6.913	Tr./Rect.closed
"Node105"	Junction	-420.00	2273.32	2294.95	2283.522	10.202	760.00	9.53	1.41	2284.93	0.000	5.641	0.000	0.00000	0.000	Tr./Rect.closed
"Link110"	Reach	-390.00	2273.44	2295.00	2283.618	10.178	760.00	9.53	1.41	2285.03	0.000	5.641	0.595	0.00400	6.164	Tr./Rect.closed
"Link111"	Reach	-350.00	2273.60	2295.50	2283.746	10.146	760.00	9.53	1.41	2285.16	0.000	5.641	0.595	0.00400	6.164	Tr./Rect.closed
"STA3+50"	Headwrk	-350.00	2273.60	2295.50	2283.746	10.146	760.00	9.53	1.41	2285.16	0.000	5.641	0.000	0.00000	0.000	Tr./Rect.closed

*) in the W.S.ELEV column indicates flooding, it is set whenever W.S.ELEV > GROUND ELEV
i.p. = intermediate point processing results for reaches

WSPG BACKWATER ANALYSIS SUMMARY TABLE

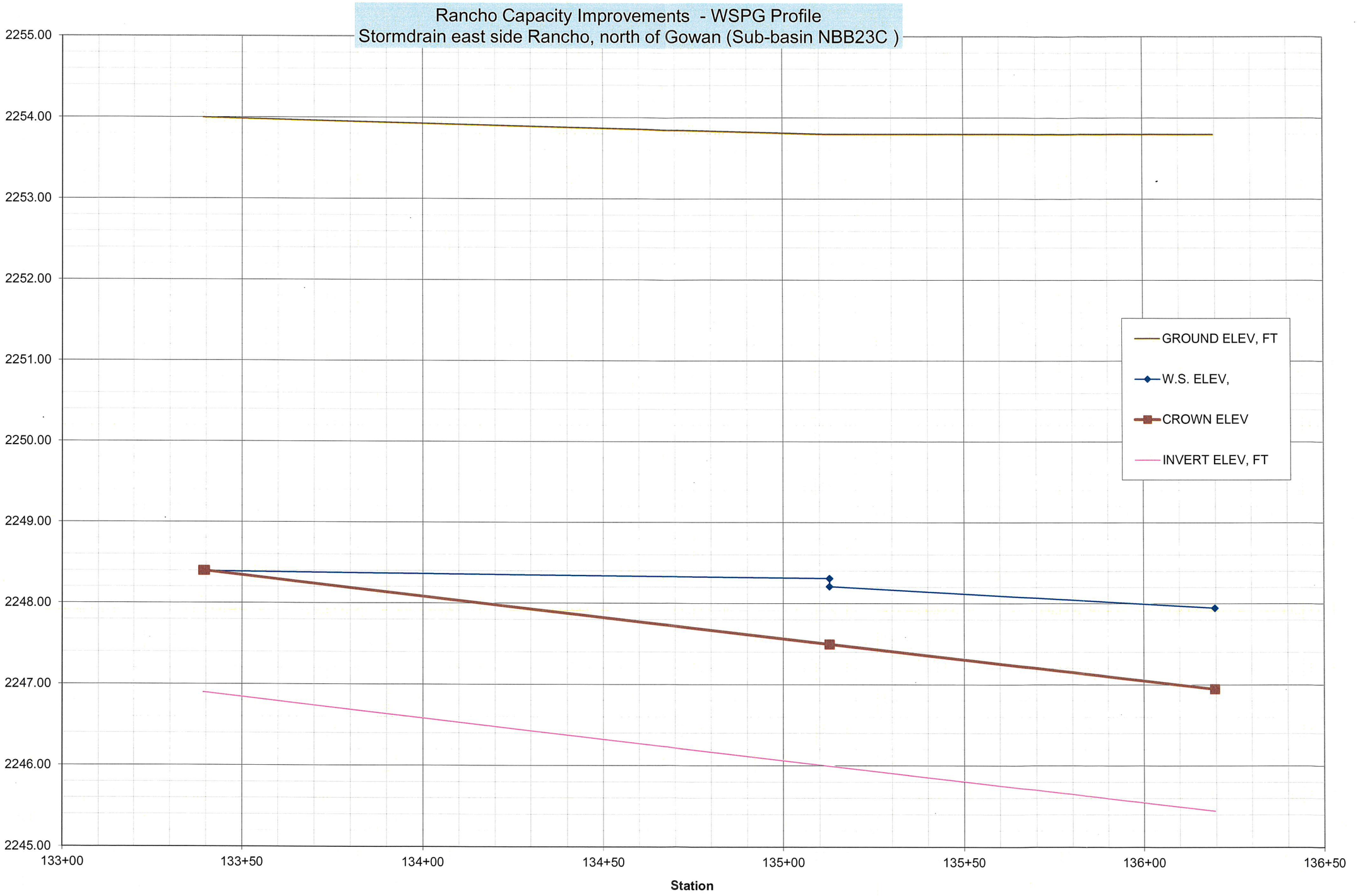
Project: Rancho-Gowan Outfall

Project No.: 23629

Stormdrain east side Rancho, north of Gowan (Sub-basin NBB23C)

Date: 3/28/2014

STATION	LOCATION	INVERT ELEV, FT	GROUND ELEV, FT	W.S. ELEV, FT	DEPTH, FT	Q, CFS	VELOC., FT/S	VELOC. HEAD, FT	ENERGY GRADE LINE, FT	SUPER ELEV, FT (WSPG)	CRITICAL DEPTH, FT	FROUDE NUMBER	SLOPE, FT/FT	NORMAL DEPTH, FT	CROSS SECTION	DIAMETER INCHES	HGL < 1.5 BELOW GRADE
136+19.70	Outlet	2245.45	2253.80	2247.95	2.50	4.48	2.54	0.10	2248.05	0.00	0.8120	0.0000	0.0000	0.00	Pipe	18	YES
135+12.72	Reach	2246.00	2253.80	2248.21	2.21	4.48	2.54	0.10	2248.31	0.00	0.8120	0.0000	0.0051	0.91	Pipe	18	YES
135+12.72	Junction	2246.00	2253.80	2248.31	2.31	2.01	1.14	0.02	2248.33	0.00	0.5350	0.0000	0.0000	0.00	Pipe	18	YES
133+39.72	"i.p."	2246.90	2254.00	2248.40	1.50	2.01	1.14	0.02	2248.42	0.00	0.5350	0.0240	0.0052	0.57	Pipe	18	YES
133+39.16	Reach	2246.90	2254.00	2248.40	1.50	2.01	1.14	0.02	2248.42	0.00	0.5350	0.0540	0.0052	0.57	Pipe	18	YES
133+39.16	Headwrk	2246.90	2254.00	2248.40	1.50	2.01	1.14	0.02	2248.42	0.00	0.5350	0.0000	0.0000	0.00	Pipe	18	YES


Rancho Capacity Improvements - WSPG Profile
Stormdrain east side Rancho, north of Gowan (Sub-basin NBB23C)
2255.00
2254.00
2253.00
2252.00
2251.00
2250.00
2249.00
2248.00
2247.00
2246.00
2245.00
133+00
133+50
134+00
134+50
135+00
135+50
136+00
136+50
Station
Elevation, ft
GROUND ELEV, FT
W.S. ELEV,
CROWN ELEV
INVERT ELEV, FT

[EAST SIDE RANCHO NORTH OF GOWAN]

[REPORT]
COMPOSITE_ONLY

[NETWORK]

**TYPE	NAME
Outlet	"8x5EXbox"
Reach	"NBB23C"
Junction	"48inMHgo2"
Reach	"NBB23B"
Headwork	"48inMHgo1"

**BRANCH DEFINITIONS

[OUTLET]

**NAME	STATION	INVERT ELEV	GROUND ELEV	CHANNEL ID	WATER SURFACE ELEV (opt.)
"8x5EXbox"	-13619.7	2245.45	2253.8	"18RCP"	2247.95

[HEADWORK]

**NAME	INVERT ELEV	GROUND ELEV	CHANNEL ID	FLOW	WATER SURFACE ELEV (opt.)
"48inMHgo1"	2246.9	2254	"18RCP"	2.01	0

[WALLENTRANCE]

**NAME	INVERT ELEV	GROUND ELEV	CHANNEL ID	LOSS COEFFICIENT(opt.)

[WALLEXIT]

**NAME	INVERT	GROUND	CHANNEL	LOSS

```
**                ELEV       ELEV       ID         COEFFICIENT(opt.)
**-------------   ---------  ---------- ---------- --------------

[BRIDGEENTRANCE]
**NAME            INVERT     GROUND     CHANNEL    REDUCTION
**                ELEV       ELEV       ID         FACTOR(opt.)
**-------------   ---------  ---------- ---------- --------------

[BRIDGEEXIT]
**NAME            INVERT     GROUND     CHANNEL    REDUCTION
**                ELEV       ELEV       ID         FACTOR(opt.)
**-------------   ---------  ---------- ---------- --------------

[JOIN]
**NAME            INVERT     GROUND     CHANNEL    LENGTH     MANNINGS n NUMBER OF  CONFLUENCE
**                ELEV       ELEV       ID                               BRANCHES   ANGLE
**-------------   ---------  ---------- ---------- ---------- ---------- ----------  ----------

[JUNCTION]
**Name            INVERT     GROUND     CHANNEL    LENGTH     MANNINGS n NUMBER OF  CONFLUENCE FLOW
**                ELEV       ELEV       ID                               LATERALS   ANGLE
**-------------   ---------  ---------- ---------- ---------- ---------- ----------  ---------- ----
------
"48inMHgo2"       2246       2253.8     "18RCP"    0          0.015      1
"48inMHgo2_Lateral1"2247.03              "18RCP"                                      0          2.47

[TRANSITION]
**NAME            INVERT     GROUND     CHANNEL    LENGTH     MANNINGS n
**                ELEV       ELEV       ID
**-------------   ---------  ---------- ---------- ---------- ----------

[REACH]
**NAME            INVERT     GROUND     CHANNEL    LENGTH     MANNINGS n CURVE      ANGLE
NUMBER
**                ELEV       ELEV       ID                               (opt)      POINT(opt)
MANHOLES(opt)
```

```
**------------      ---------  ---------- ----------  ---------- ----------  ---------- ----------  ----
------
"NBB23B"            2246.9     2254       "18RCP"     173.56     0.015       0          0           0
"NBB23C"            2246       2253.8     "18RCP"     106.98     0.015       0          15          0

[CHANNEL]
**REGULAR TYPES 1-4
**ID       TYPE HEIGHT     WIDTH      LEFT       RIGHT      NUMBER     AVG PIER   INVERT
**                                    SLOPE      SLOPE      PIERS      WIDTH      CROSS FALL
**------   ---- ---------- ---------- ---------- ---------- ---------- ---------- ----------
"18RCP"       4   1.5        1.5

**IRREGULAR TYPES 5-6
**ID       TYPE NUMBER     AVG PIER   PIER1      PIER2      PIER3      PIER4      PIER5      PIER6
PIER7      PIER8      PIER9      PIER10
**              PIERS      WIDTH      ELEV       ELEV       ELEV       ELEV       ELEV       ELEV
ELEV       ELEV       ELEV       ELEV
**------   ---- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------
- ---------- ---------- ---------- ----------


[POINT]
**ID          XCOORD     YCOORD
**----------- ---------- ----------
```

```
************************************
Water Surface Profile Gradient (WSPG)
XP WSPG
Engine Version 1.3          06/09/2010
XP Software         www.xpsoftware.com
************************************

INPUT FILE
************************************
R:\23629-Rancho\06-Studies\01-70Rancho Rd and Gowan Outfall Combined\APPENDIX C-HYDRAULICS - STORM DRAIN, LATERALS AND GENERAL\Main Laterals\NBB23CGOWAN\NBB23CGOWAN.wsx
Computed  03/28/14  19:46:21

TITLE INFORMATION
************************************

WARNING SUMMARY
************************************
 WARNING 36: D/S processing stopped in junction 48inMHgo2 because critical momentum is greater than maximum momentum.

RESULTS
************************************


=====================================================================
   Main Line
=====================================================================

 Composite Profile:

ELEMENT     TYPE        STATION     INVERT    GROUND    W.S.      DEPTH     Q         VELOC.    VELOC.    ENERGY      SUPER     CRITICAL  FROUDE    SLOPE     NORMAL    CROSS
NAME                                ELEV      ELEV      ELEV                                    HEAD      GRADE LN    ELEV      DEPTH     NUMBER              DEPTH     SECTION
---------- ---------- ----------  --------  --------  --------  --------  --------  --------  ------  ----------  ------  --------  ------  -------   ------    ----------
###
"8x5EXbox"  Outlet      -13619.70  2245.45   2253.80   2247.950   2.500     4.48      2.54     0.10    2248.05     0.000   0.812     0.000   0.00000   0.000     Pipe
"NBB23C"    Reach       -13512.72  2246.00   2253.80   2248.214   2.214     4.48      2.54     0.10    2248.31     0.000   0.812     0.000   0.00514   0.913     Pipe
"48inMHgo"  Junction    -13512.72  2246.00   2253.80   2248.313   2.313     2.01      1.14     0.02    2248.33     0.000   0.535     0.000   0.00000   0.000     Pipe
            "i.p."      -13339.72  2246.90   2254.70   2248.397   1.500     2.01      1.14     0.02    2248.42     0.000   0.535     0.024   0.00519   0.570     Pipe
"NBB23B"    Reach       -13339.16  2246.90   2254.00   2248.397   1.497     2.01      1.14     0.02    2248.42     0.000   0.535     0.054   0.00519   0.570     Pipe
"48inMHgo"  Headwrk     -13339.16  2246.90   2254.00   2248.397   1.497     2.01      1.14     0.02    2248.42     0.000   0.535     0.000   0.00000   0.000     Pipe

 *) in the W.S.ELEV column indicates flooding, it is set whenever W.S.ELEV > GROUND ELEV
    i.p. = intermediate point processing results for reaches
```

WSPG BACKWATER ANALYSIS SUMMARY TABLE

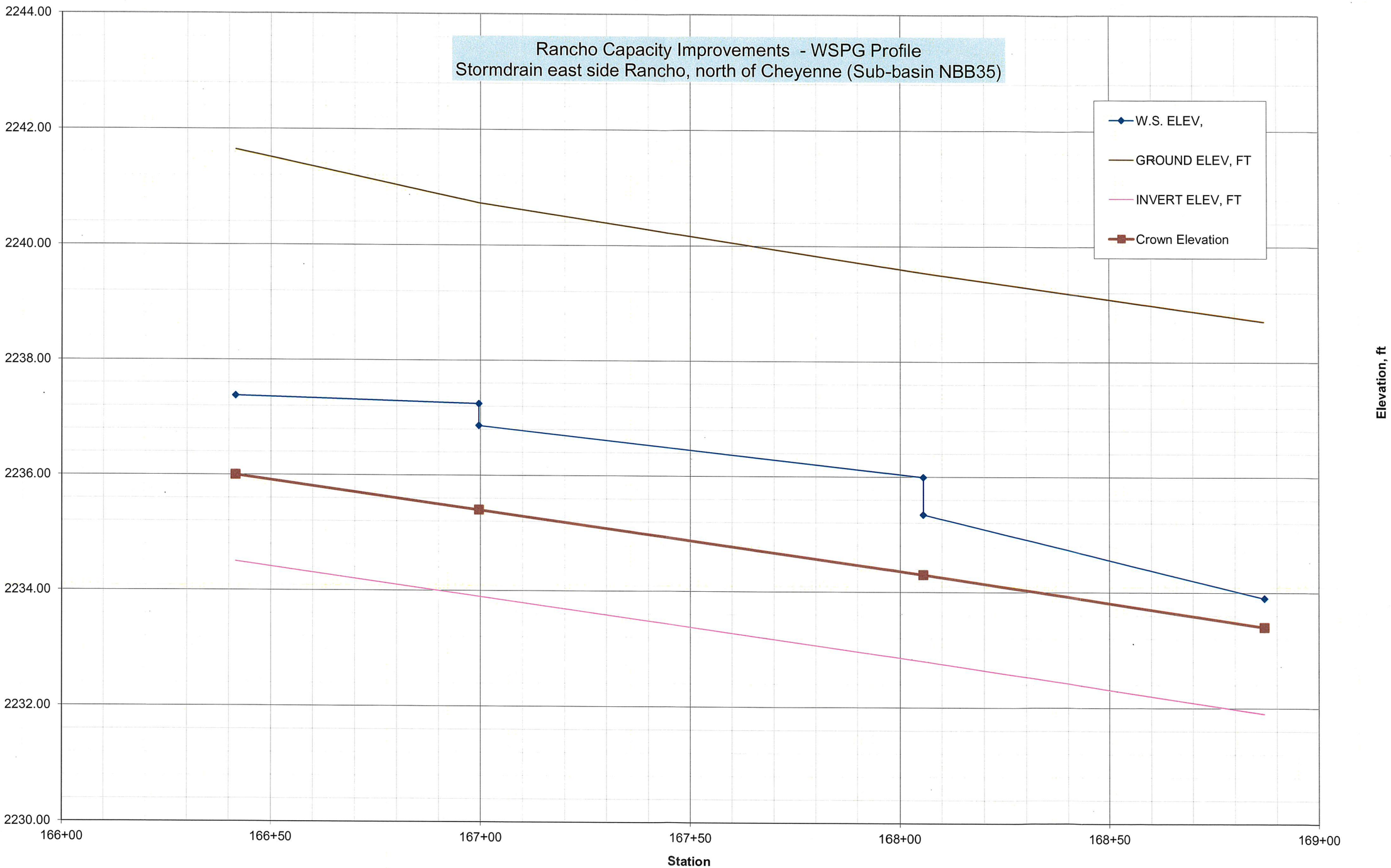
Project: Rancho-Gowan Outfall

Project No.: 23629

Stormdrain east side Rancho, north of Cheyenne (Sub-basin NBB35)

Date: 3/28/2014

STATION	LOCATION	INVERT ELEV, FT	GROUND ELEV, FT	W.S. ELEV, FT	DEPTH, FT	Q, CFS	VELOC., FT/S	VELOC. HEAD, FT	ENERGY GRADE LINE, FT	SUPER ELEV, FT (WSPG)	CRITICAL DEPTH, FT	FROUDE NUMBER	SLOPE, FT/FT	NORMAL DEPTH, FT	DIAMETER INCHES	HGL < 1.5 BELOW GRADE
168+87.00	Outlet	2231.90	2238.70	2233.90	2.00	11.96	6.77	0.71	2234.61	0.00	1.31	0.0000	0.0000	0.00	18	YES
168+05.49	Reach	2232.80	2239.54	2235.34	2.54	11.96	6.77	0.71	2236.05	0.00	1.31	0.0000	0.0110	1.50	18	YES
168+05.49	Junction	2232.80	2239.54	2235.99	3.19	8.26	4.67	0.34	2236.33	0.00	1.11	0.0000	0.0000	0.00	18	YES
166+99.55	Reach	2233.90	2240.73	2236.86	2.96	8.26	4.67	0.34	2237.20	0.00	1.11	0.0000	0.0104	1.10	18	YES
166+99.55	Junction	2233.90	2240.73	2237.24	3.34	4.37	2.47	0.09	2237.34	0.00	0.80	0.0000	0.0000	0.00	18	YES
166+41.55	Reach	2234.50	2241.65	2237.38	2.88	4.37	2.47	0.09	2237.47	0.00	0.80	0.0000	0.0103	0.73	18	YES
166+41.55	Headwrk	2234.50	2241.65	2237.38	2.88	4.37	2.47	0.09	2237.47	0.00	0.80	0.0000	0.0000	0.00	18	YES


Rancho Capacity Improvements - WSPG Profile
Stormdrain east side Rancho, north of Cheyenne (Sub-basin NBB35)
W.S. ELEV,
GROUND ELEV, FT
INVERT ELEV, FT
Crown Elevation
2244.00
2242.00
2240.00
2238.00
2236.00
2234.00
2232.00
2230.00
166+00
166+50
167+00
167+50
168+00
168+50
169+00
Station
Elevation, ft

[TITLE]

[REPORT]
COMPOSITE_ONLY

[NETWORK]

**TYPE	NAME
**	
**-----	-------
Outlet	"EX42RCP"
Reach	"Link3"
Junction	"NBB34"
Reach	"Link2"
Junction	"NBB33A"
Reach	"Link1"
Headwork	"NBB33"

**BRANCH DEFINITIONS

[OUTLET]

**NAME	STATION	INVERT ELEV	GROUND ELEV	CHANNEL ID	WATER SURFACE ELEV (opt.)
**					
**----------	---------	----------	----------	----------	----------
"EX42RCP"	-16887	2231.9	2238.7	"18RCP"	2233.9

[HEADWORK]

**NAME	INVERT ELEV	GROUND ELEV	CHANNEL ID	FLOW	WATER SURFACE ELEV (opt.)
**					
**----------	---------	----------	----------	----------	----------
"NBB33"	2234.5	2241.65	"18RCP"	4.37	0

[WALLENTRANCE]

**NAME	INVERT ELEV	GROUND ELEV	CHANNEL ID	LOSS COEFFICIENT(opt.)
**				
**----------	---------	----------	----------	----------

[WALLEXIT]

**NAME	INVERT ELEV	GROUND ELEV	CHANNEL ID	LOSS COEFFICIENT(opt.)

[BRIDGEENTRANCE]

**NAME	INVERT ELEV	GROUND ELEV	CHANNEL ID	REDUCTION FACTOR(opt.)

[BRIDGEEXIT]

**NAME	INVERT ELEV	GROUND ELEV	CHANNEL ID	REDUCTION FACTOR(opt.)

[JOIN]

**NAME	INVERT ELEV	GROUND ELEV	CHANNEL ID	LENGTH	MANNINGS n	NUMBER OF BRANCHES	CONFLUENCE ANGLE

[JUNCTION]

**Name	INVERT ELEV	GROUND ELEV	CHANNEL ID	LENGTH	MANNINGS n	NUMBER OF LATERALS	CONFLUENCE ANGLE	FLOW
"NBB33A"	2233.9	2240.73	"18RCP"	0	0.015	1		
"NBB33A_Lateral1"	2233.9		"18RCP"				45	3.89
"NBB34"	2232.8	2239.54	"18RCP"	0	0.015	1		
"NBB34_Lateral1"	2232.8		"18RCP"				45	3.7

[TRANSITION]

**NAME	INVERT ELEV	GROUND ELEV	CHANNEL ID	LENGTH	MANNINGS n

[REACH]

```
**NAME                INVERT     GROUND     CHANNEL    LENGTH     MANNINGS n CURVE      ANGLE
NUMBER
**                    ELEV       ELEV       ID                               (opt)      POINT(opt)
MANHOLES(opt)
**------------       ---------  ---------- ---------- ---------- ---------- ---------- ---------- ----
------
"Link1"               2234.5     2241.65    "18RCP"    58         0.015      0          0          0
"Link2"               2233.9     2240.73    "18RCP"    105.94     0.015      0          0          0
"Link3"               2232.8     2239.54    "18RCP"    81.51      0.015      0          15         0

[CHANNEL]
**REGULAR TYPES 1-4
**ID       TYPE HEIGHT     WIDTH      LEFT       RIGHT      NUMBER     AVG PIER   INVERT
**                                    SLOPE      SLOPE      PIERS      WIDTH      CROSS FALL
**------   ---- ---------- ---------- ---------- ---------- ---------- ---------- ----------
"18RCP"       4  1.5        1.5

**IRREGULAR TYPES 5-6
**ID       TYPE NUMBER     AVG PIER   PIER1      PIER2      PIER3      PIER4      PIER5      PIER6
PIER7      PIER8      PIER9      PIER10
**              PIERS      WIDTH      ELEV       ELEV       ELEV       ELEV       ELEV       ELEV
ELEV       ELEV       ELEV       ELEV
**------   ---- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------
- ---------- ---------- ---------- ----------

[POINT]
**ID          XCOORD     YCOORD
**----------- ---------- ----------
```

```
************************************
Water Surface Profile Gradient (WSPG)
XP WSPG
Engine Version 1.3         06/09/2010
XP Software        www.xpsoftware.com
************************************

INPUT FILE
************************************
R:\23629-Rancho\06-Studies\01-70Rancho Rd and Gowan Outfall Combined\APPENDIX C-HYDRAULICS - STORM DRAIN, LATERALS AND GENERAL\Main Laterals\NBB35
CHEYENNE\NBB35cheyenne.wsx
Computed  03/28/14  20:23:26

TITLE INFORMATION
************************************

WARNING SUMMARY
************************************
 WARNING 36: D/S processing stopped in junction NBB33A because critical momentum is greater than maximum momentum.
 WARNING 36: D/S processing stopped in junction NBB34 because critical momentum is greater than maximum momentum.

RESULTS
************************************


================================================================
   Main Line
================================================================

 Composite Profile:
```

ELEMENT NAME	TYPE	STATION	INVERT ELEV	GROUND ELEV	W.S. ELEV	DEPTH	Q	VELOC.	VELOC. HEAD	ENERGY GRADE LN	SUPER ELEV	CRITICAL DEPTH	FROUDE NUMBER	SLOPE	NORMAL DEPTH	CROSS SECTION
###																
"EX42RCP"	Outlet	-16887.00	2231.90	2238.70	2233.900	2.000	11.96	6.77	0.71	2234.61	0.000	1.313	0.000	0.00000	0.000	Pipe
"Link3"	Reach	-16805.49	2232.80	2239.54	2235.342	2.542	11.96	6.77	0.71	2236.05	0.000	1.313	0.000	0.01104	1.500	Pipe
"NBB34"	Junction	-16805.49	2232.80	2239.54	2235.990	3.190	8.26	4.67	0.34	2236.33	0.000	1.113	0.000	0.00000	0.000	Pipe
"Link2"	Reach	-16699.55	2233.90	2240.73	2236.862	2.962	8.26	4.67	0.34	2237.20	0.000	1.113	0.000	0.01038	1.103	Pipe
"NBB33A"	Junction	-16699.55	2233.90	2240.73	2237.244	3.344	4.37	2.47	0.09	2237.34	0.000	0.802	0.000	0.00000	0.000	Pipe
"Link1"	Reach	-16641.55	2234.50	2241.65	2237.378	2.878	4.37	2.47	0.09	2237.47	0.000	0.802	0.000	0.01034	0.725	Pipe
"NBB33"	Headwrk	-16641.55	2234.50	2241.65	2237.378	2.878	4.37	2.47	0.09	2237.47	0.000	0.802	0.000	0.00000	0.000	Pipe

*) in the W.S.ELEV column indicates flooding, it is set whenever W.S.ELEV > GROUND ELEV
i.p. = intermediate point processing results for reaches

WSPG BACKWATER ANALYSIS SUMMARY TABLE

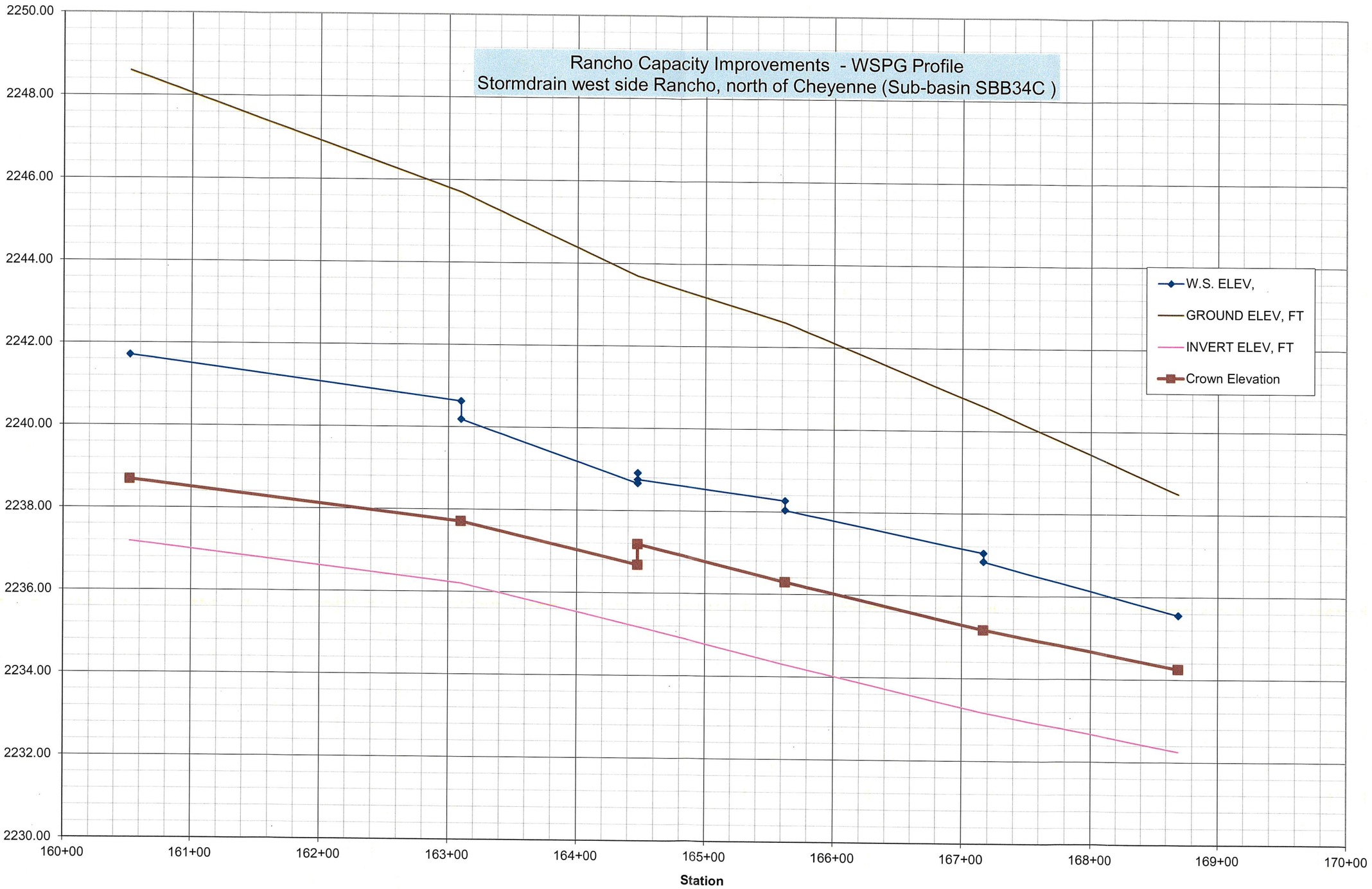
Project: Rancho-Gowan Outfall

Project No.: 23629

Stormdrain west side of Rancho, north of Cheyenne (Sub-basin SBB34C)

Date: 3/28/2014 0:00

STATION	LOCATION	ROW ID	ELEMENT NAME	TYPE	WSPG STATION	INVERT ELEV, FT	GROUND ELEV, FT	W.S. ELEV, FT	DEPTH, FT	Q, CFS	VELOC., FT/S	VELOC. HEAD, FT	ENERGY GRADE LINE, FT	SUPER ELEV, FT (WSPG)	CRITICAL DEPTH, FT	FROUDE NUMBER	SLOPE, FT/FT	NORMAL DEPTH, FT	DIAMETER INCHES	HGL < 1.5 BELOW GRADE
168+69.10	Existing CH5 MH - 42"	5	"42inEXch"	Outlet	-16869.10	2232.26	2238.50	2235.56	3.30	17.91	5.70	0.50	2236.06	0.00	1.52	0.00	0.00	0.00	24	YES
167+16.44		6	"sbb34c"	Reach	-16716.44	2233.18	2240.60	2236.83	3.65	17.91	5.70	0.50	2237.34	0.00	1.52	0.00	0.01	2.00	24	YES
167+16.44	CH4 MH	7	"48inMHch"	Junction	-16716.44	2233.18	2240.60	2237.04	3.86	15.78	5.02	0.39	2237.43	0.00	1.43	0.00	0.00	0.00	24	YES
165+62.43		8	"sbb34b"	Reach	-16562.43	2234.30	2242.60	2238.04	3.74	15.78	5.02	0.39	2238.43	0.00	1.43	0.00	0.01	1.55	24	YES
165+62.43	CH3B MH	9	"48inMHch"	Junction	-16562.43	2234.30	2242.60	2238.27	3.97	12.58	4.00	0.25	2238.52	0.00	1.28	0.00	0.00	0.00	24	YES
164+47.23		10	"sbb34a"	Reach	-16447.23	2235.19	2243.70	2238.76	3.57	12.58	4.00	0.25	2239.01	0.00	1.28	0.00	0.01	1.27	24	YES
164+47.23	CH3 MH	11	"48inMHch"	Junction	-16447.23	2235.19	2243.70	2238.92	3.73	9.59	3.05	0.14	2239.06	0.00	1.11	0.00	0.00	0.00	24	YES
164+47.13		12	"Link14"	Transition	-16447.13	2235.19	2243.70	2238.67	3.48	9.59	5.43	0.46	2239.12	0.00	1.20	0.00	0.00	0.00	18	YES
163+09.86		13	"sbb33"	Reach	-16309.86	2236.21	2245.70	2240.19	3.98	9.59	5.43	0.46	2240.65	0.00	1.20	0.00	0.01	1.50	18	YES
163+09.86	CH2 MH	14	"48inMHch"	Junction	-16309.86	2236.21	2245.70	2240.63	4.42	5.90	3.34	0.17	2240.80	0.00	0.94	0.00	0.00	0.00	18	YES
160+51.80		15	"sbb3132"	Transition	-16051.80	2237.19	2248.60	2241.71	4.52	5.90	3.34	0.17	2241.89	0.00	0.94	0.00	0.00	0.00	18	YES
160+51.80	CH1 MH	16	"48inMHch"	Headwrk	-16051.80	2237.19	2248.60	2241.71	4.52	5.90	3.34	0.17	2241.89	0.00	0.94	0.00	0.00	0.00	18	YES


Rancho Capacity Improvements - WSPG Profile
Stormdrain west side Rancho, north of Cheyenne (Sub-basin SBB34C)
W.S. ELEV,
GROUND ELEV, FT
INVERT ELEV, FT
Crown Elevation
Elevation, ft
2250.00
2248.00
2246.00
2244.00
2242.00
2240.00
2238.00
2236.00
2234.00
2232.00
2230.00
160+00
161+00
162+00
163+00
164+00
165+00
166+00
167+00
168+00
169+00
170+00
Station

[TITLE]

[REPORT]
COMPOSITE_ONLY

[NETWORK]

**TYPE	NAME
**-----	-------
Outlet	"42inEXch5"
Reach	"sbb34c"
Junction	"48inMHch4"
Reach	"sbb34b"
Junction	"48inMHch3b"
Reach	"sbb34a"
Junction	"48inMHch3"
Transition	"Link14"
Reach	"sbb33"
Junction	"48inMHch2"
Transition	"sbb3132"
Headwork	"48inMHch1"

**BRANCH DEFINITIONS

[OUTLET]

**NAME **	STATION	INVERT ELEV	GROUND ELEV	CHANNEL ID	WATER SURFACE ELEV (opt.)
**----------	---------	----------	----------	----------	----------
"42inEXch5"	-16869.1	2232.26	2238.5	"24RCP"	2235.56

[HEADWORK]

**NAME **	INVERT ELEV	GROUND ELEV	CHANNEL ID	FLOW	WATER SURFACE ELEV (opt.)
**----------	---------	----------	----------	----------	----------
"48inMHch1"	2237.19	2248.6	"18RCP"	5.9	0

```
[WALLENTRANCE]
**NAME           INVERT     GROUND     CHANNEL    LOSS
**               ELEV       ELEV       ID         COEFFICIENT(opt.)
**-------------  ---------  ---------- ---------- --------------

[WALLEXIT]
**NAME           INVERT     GROUND     CHANNEL    LOSS
**               ELEV       ELEV       ID         COEFFICIENT(opt.)
**-------------  ---------  ---------- ---------- --------------

[BRIDGEENTRANCE]
**NAME           INVERT     GROUND     CHANNEL    REDUCTION
**               ELEV       ELEV       ID         FACTOR(opt.)
**-------------  ---------  ---------- ---------- --------------

[BRIDGEEXIT]
**NAME           INVERT     GROUND     CHANNEL    REDUCTION
**               ELEV       ELEV       ID         FACTOR(opt.)
**-------------  ---------  ---------- ---------- --------------

[JOIN]
**NAME           INVERT     GROUND     CHANNEL    LENGTH     MANNINGS n NUMBER OF  CONFLUENCE
**               ELEV       ELEV       ID                               BRANCHES   ANGLE
**-------------  ---------  ---------- ---------- ---------- ---------- ---------- ----------

[JUNCTION]
**Name           INVERT     GROUND     CHANNEL    LENGTH     MANNINGS n NUMBER OF  CONFLUENCE FLOW
**               ELEV       ELEV       ID                               LATERALS   ANGLE
**-------------  ---------  ---------- ---------- ---------- ---------- ---------- ---------- ----
------
"48inMHch2"      2236.21    2245.7     "18RCP"    0          0.015      1
"48inMHch2_Lateral1"2236.21            "18RCP"                                     15         3.69

"48inMHch3"      2235.19    2243.7     "24RCP"    0          0.015      1
"48inMHch3_Lateral1"2235.19            "18RCP"                                     15         2.99

"48inMHch4"      2233.18    2240.6     "24RCP"    0          0.015      1
"48inMHch4_Lateral1"2233.18            "18RCP"                                     45         2.13
```

"48inMHch3b"	2234.3	2242.6	"24RCP"	0	0.015	1		
"48inMHch3b_Lateral1"	2234.3		"18RCP"				15	3.2

[TRANSITION]

**NAME	INVERT ELEV	GROUND ELEV	CHANNEL ID	LENGTH	MANNINGS n
"sbb3132"	2237.19	2248.6	"18RCP"	258.06	0.015
"Link14"	2235.19	2243.7	"18RCP"	0.1	0.015

[REACH]

**NAME	INVERT ELEV	GROUND ELEV	CHANNEL ID	LENGTH	MANNINGS n	CURVE (opt)	ANGLE POINT(opt)	NUMBER MANHOLES(opt)
"sbb33"	2236.21	2245.7	"18RCP"	137.27	0.015	0	0	0
"sbb34a"	2235.19	2243.7	"24RCP"	115.2	0.015	0	0	1
"sbb34c"	2233.18	2240.6	"24RCP"	152.66	0.015	0	0	0
"sbb34b"	2234.3	2242.6	"24RCP"	154.01	0.015	0	0	0

[CHANNEL]

**REGULAR TYPES 1-4

**ID	TYPE	HEIGHT	WIDTH	LEFT SLOPE	RIGHT SLOPE	NUMBER PIERS	AVG PIER WIDTH	INVERT CROSS FALL
"24RCP"	4	2	2					
"18RCP"	4	1.5	1.5					

**IRREGULAR TYPES 5-6

**ID	TYPE	NUMBER PIERS	AVG PIER WIDTH	PIER1 ELEV	PIER2 ELEV	PIER3 ELEV	PIER4 ELEV	PIER5 ELEV	PIER6 ELEV	PIER7 ELEV	PIER8 ELEV	PIER9 ELEV	PIER10 ELEV

```
**------    ---- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------
- ---------- ---------- ---------- ----------


[POINT]
**ID          XCOORD     YCOORD
**----------- ---------- ----------
```

```
**********************************
Water Surface Profile Gradient (WSPG
XP WSPG
Engine Version 1.3          06/09/201
XP Software         www.xpsoftware.cc
**********************************

INPUT FILE
**********************************
R:\23629-Rancho\06-Studies\01-70Rancals\SBB34C CHEYENNE\SBB34C
CHEYENNE.wsx
Computed  04/01/14  15:00:25

TITLE INFORMATION
**********************************

WARNING SUMMARY
**********************************
 WARNING 06: Upstream channel and dc
 WARNING 36: D/S processing stopped
 WARNING 36: D/S processing stopped
 WARNING 36: D/S processing stopped
 WARNING 36: D/S processing stopped

RESULTS
**********************************


====================================
   Main Line
====================================

 Composite Profile:

ELEMENT     TYPE        STATION     INV    NORMAL    CROSS
NAME                                ELE    DEPTH     SECTION
----------- ----------- ----------- ---    ------    ---------
###
"42inEXch"  Outlet      -16869.10   223)0  0.000      Pipe
"sbb34c"    Reach       -16716.44   223)3  2.000      Pipe
"48inMHch"  Junction    -16716.44   223)0  0.000      Pipe
"sbb34b"    Reach       -16562.43   223)7  1.547      Pipe
"48inMHch"  Junction    -16562.43   223)0  0.000      Pipe
"sbb34a"    Reach       -16447.23   223)3  1.268      Pipe
"48inMHch"  Junction    -16447.23   223)0  0.000      Pipe
"Link14"    Transition  -16447.13   223)0  0.000      Pipe
"sbb33"     Reach       -16309.86   223)3  1.500      Pipe
"48inMHch"  Junction    -16309.86   223)0  0.000      Pipe
"sbb3132"   Transition  -16051.80   223)0  0.000      Pipe
"48inMHch"  Headwrk     -16051.80   223)0  0.000      Pipe

 *) in the W.S.ELEV column indicates
    i.p. = intermediate point proces
```

Appendix D

HYDRAULIC CALCULATIONS

- Normal Depth Calculations
- Inlet capture Calculations (includes normal depth for swales south of Craig Road to establish water surface at drop inlet)
- Flowsplit Calculations
- HY-8 Calculations for Existing Culverts
- Outlet Structure for Gowan Outfall – Alexander Road Facilities
  - Normal depth calculation to determine EGL at orifice plate
  - HY-8 estimate for ponding depth upstream of orifice plate
  - Weir calculation for grate size
  - Orifice calculation for grate size

Worksheet for Sta 12+50 to 29+00, Exist. Swale Rainbow to Lone Mtn

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.027	
Channel Slope	0.00500	ft/ft
Normal Depth	2.50	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	12.00	ft

Results

Discharge	275.80	ft^3/s
Flow Area	48.75	ft^2
Wetted Perimeter	27.81	ft
Hydraulic Radius	1.75	ft
Top Width	27.00	ft
Critical Depth	2.11	ft
Critical Slope	0.00948	ft/ft
Velocity	5.66	ft/s
Velocity Head	0.50	ft
Specific Energy	3.00	ft
Froude Number	0.74	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.50	ft
Critical Depth	2.11	ft
Channel Slope	0.00500	ft/ft

Worksheet for Sta 12+50 to 29+00, Exist. Swale Rainbow to Lone Mtn

GVF Output Data

Critical Slope	0.00948	ft/ft

Cross Section for Sta 12+50 to 29+00, Exist. Swale Rainbow to Lone

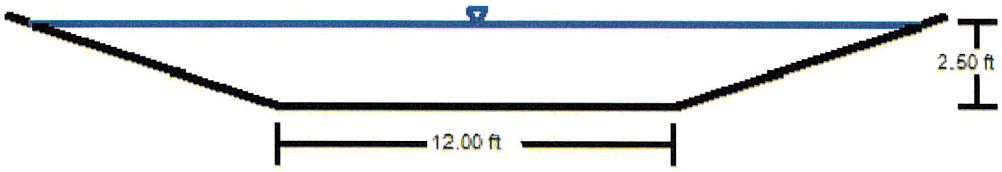
Project Description

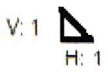
Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.027	
Channel Slope	0.00500	ft/ft
Normal Depth	2.50	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	12.00	ft
Discharge	275.80	ft³/s

Cross Section Image





Worksheet for Sta 55+00 to 63+80, Exist Swale Red Coach to Craig

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.016	
Channel Slope	0.00500	ft/ft
Normal Depth	1.00	ft
Left Side Slope	20.00	ft/ft (H:V)
Right Side Slope	20.00	ft/ft (H:V)
Bottom Width	2.00	ft

Results

Discharge	93.80	ft^3/s
Flow Area	22.00	ft^2
Wetted Perimeter	42.05	ft
Hydraulic Radius	0.52	ft
Top Width	42.00	ft
Critical Depth	1.02	ft
Critical Slope	0.00461	ft/ft
Velocity	4.26	ft/s
Velocity Head	0.28	ft
Specific Energy	1.28	ft
Froude Number	1.04	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.00	ft
Critical Depth	1.02	ft
Channel Slope	0.00500	ft/ft

Worksheet for Sta 55+00 to 63+80, Exist Swale Red Coach to Craig

GVF Output Data

Critical Slope	0.00461	ft/ft

Cross Section for Sta 55+00 to 63+80, Exist Swale Red Coach to Craig

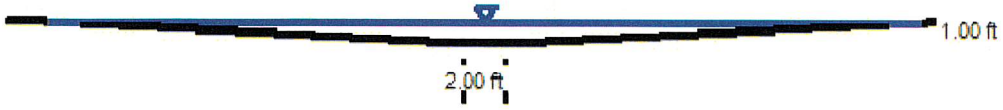
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.016	
Channel Slope	0.00500	ft/ft
Normal Depth	1.00	ft
Left Side Slope	20.00	ft/ft (H:V)
Right Side Slope	20.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	93.80	ft³/s

Cross Section Image





Sta 175+00 to 186+00, Exist. Swale 500 ft south of Cheyenne

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.033	
Channel Slope	0.01000	ft/ft
Normal Depth	5.00	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Bottom Width	2.00	ft

Results

Discharge	1443.88	ft^3/s
Flow Area	172.50	ft^2
Wetted Perimeter	68.06	ft
Hydraulic Radius	2.53	ft
Top Width	67.00	ft
Critical Depth	4.83	ft
Critical Slope	0.01196	ft/ft
Velocity	8.37	ft/s
Velocity Head	1.09	ft
Specific Energy	6.09	ft
Froude Number	0.92	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	5.00	ft
Critical Depth	4.83	ft
Channel Slope	0.01000	ft/ft

Sta 175+00 to 186+00, Exist. Swale 500 ft south of Cheyenne

GVF Output Data

Critical Slope	0.01196	ft/ft

Sta 175+00 to 186+00, Exist. Swale 500 ft south of Cheyenne

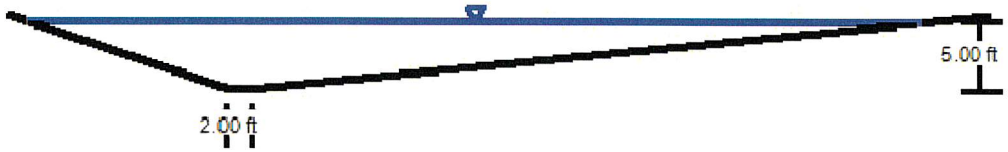
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.033	
Channel Slope	0.01000	ft/ft
Normal Depth	5.00	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	1443.88	ft^3/s

Cross Section Image





Worksheet for Rancho Cross Section at Craig - Half Street

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.80000	%
Discharge	136.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
-0+62.5	0.70
-0+52.5	0.50
-0+52.0	0.50
-0+52.0	0.00
-0+50.5	0.01
-0+50.5	0.02
-0+06.5	0.90
-0+06.5	1.40
0+00.0	1.40

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+62.5, 0.70)	(-0+50.5, 0.01)	0.013
(-0+50.5, 0.01)	(-0+06.5, 0.90)	0.013
(-0+06.5, 0.90)	(-0+06.5, 1.40)	0.015
(-0+06.5, 1.40)	(0+00.0, 1.40)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.89	ft

Worksheet for Rancho Cross Section at Craig - Half Street

Results

Elevation Range	0.000 to 1.397 ft		
Flow Area		23.73	ft²
Wetted Perimeter		56.592	ft
Hydraulic Radius		0.42	ft
Top Width		55.882	ft
Normal Depth		0.89	ft
Critical Depth		1.04	ft
Critical Slope		0.00304	ft/ft
Velocity		5.73	ft/s
Velocity Head		0.51	ft
Specific Energy		1.40	ft
Froude Number		1.55	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.89	ft
Critical Depth	1.04	ft
Channel Slope	0.80000	%
Critical Slope	0.00304	ft/ft

Cross Section for Rancho Cross Section at Craig - Half Street

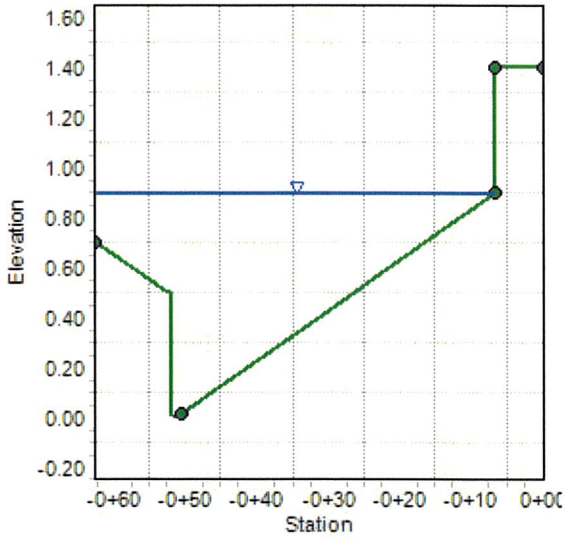
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.80000	%
Normal Depth	0.89	ft
Discharge	136.00	ft³/s

Cross Section Image



Worksheet for Sta. 70+00 Rancho S. of Craig: Flow depth at offsite

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.70000	%
Discharge	116.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
-0+74.5	5.00
-0+74.5	3.50
-0+73.0	-1.30
-0+69.0	-1.30
-0+62.5	0.70
-0+52.5	0.50
-0+52.0	0.50
-0+52.0	0.00
-0+50.5	0.01
-0+50.5	0.02
-0+06.5	0.90
-0+06.5	1.40
0+00.0	1.40

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+74.5, 5.00)	(-0+62.5, 0.70)	0.030
(-0+62.5, 0.70)	(-0+06.5, 0.90)	0.013
(-0+06.5, 0.90)	(-0+06.5, 1.40)	0.015
(-0+06.5, 1.40)	(0+00.0, 1.40)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method

Worksheet for Sta. 70+00 Rancho S. of Craig: Flow depth at offsite

Options

Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		1.98	ft
Elevation Range	-1.300 to 5.000 ft		
Flow Area		27.62	ft²
Wetted Perimeter		57.129	ft
Hydraulic Radius		0.48	ft
Top Width		54.866	ft
Normal Depth		1.98	ft
Critical Depth		2.00	ft
Critical Slope		0.00642	ft/ft
Velocity		4.20	ft/s
Velocity Head		0.27	ft
Specific Energy		2.25	ft
Froude Number		1.04	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.98	ft
Critical Depth	2.00	ft
Channel Slope	0.70000	%
Critical Slope	0.00642	ft/ft

Cross Section for Sta. 70+00 Rancho S. of Craig: Flow depth at offsite

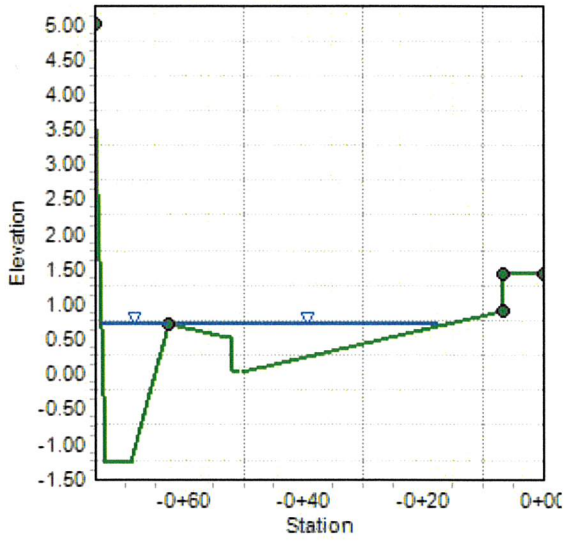
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.70000	%
Normal Depth	1.98	ft
Discharge	116.00	ft^3/s

Cross Section Image



Worksheet for Sta. 70+00 Flow Captured by inlet in swale

Project Description

Solve For	Spread

Input Data

Discharge		11.00	ft³/s
Left Side Slope		5.00	ft/ft (H:V)
Right Side Slope		5.00	ft/ft (H:V)
Bottom Width		4.00	ft
Grate Width		2.00	ft
Grate Length		4.00	ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%

Results

Spread	9.12	ft
Depth	0.51	ft
Wetted Perimeter	9.22	ft
Top Width	9.12	ft
Open Grate Area	3.60	ft²
Active Grate Weir Length	10.00	ft

Rating Table for Sta. 70+00 Flow Captured by inlet in swale

Project Description

Solve For	Spread

Input Data

Discharge		11.00	ft³/s
Left Side Slope		5.00	ft/ft (H:V)
Right Side Slope		5.00	ft/ft (H:V)
Bottom Width		4.00	ft
Grate Width		2.00	ft
Grate Length		4.00	ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%

Discharge (ft³/s)	Spread (ft)	Depth (ft)
10.00	8.81	0.48
12.00	9.43	0.54
14.00	10.02	0.60
16.00	10.84	0.68
18.00	12.65	0.87
20.00	14.68	1.07
22.00	16.93	1.29
24.00	19.39	1.54
26.00	22.06	1.81
28.00	24.94	2.09
30.00	28.04	2.40

Worksheet for Sta. 71+60 Rancho S. of Craig: Flow depth at offsite

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.70000	%
Discharge	86.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
-0+74.5	5.00
-0+74.5	3.50
-0+73.0	-1.30
-0+69.0	-1.30
-0+62.5	0.70
-0+52.5	0.50
-0+52.0	0.50
-0+52.0	0.00
-0+50.5	0.01
-0+50.5	0.02
-0+06.5	0.90
-0+06.5	1.40
0+00.0	1.40

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+74.5, 5.00)	(-0+62.5, 0.70)	0.030
(-0+62.5, 0.70)	(-0+06.5, 0.90)	0.013
(-0+06.5, 0.90)	(-0+06.5, 1.40)	0.015
(-0+06.5, 1.40)	(0+00.0, 1.40)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method

Worksheet for Sta. 71+60 Rancho S. of Craig: Flow depth at offsite

Options

Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		1.85	ft
Elevation Range	-1.300 to 5.000 ft		
Flow Area		21.48	ft²
Wetted Perimeter		43.837	ft
Hydraulic Radius		0.49	ft
Top Width		41.689	ft
Normal Depth		1.85	ft
Critical Depth		1.84	ft
Critical Slope		0.00724	ft/ft
Velocity		4.00	ft/s
Velocity Head		0.25	ft
Specific Energy		2.10	ft
Froude Number		0.98	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.85	ft
Critical Depth	1.84	ft
Channel Slope	0.70000	%
Critical Slope	0.00724	ft/ft

Cross Section for Sta. 71+60 Rancho S. of Craig: Flow depth at offsite

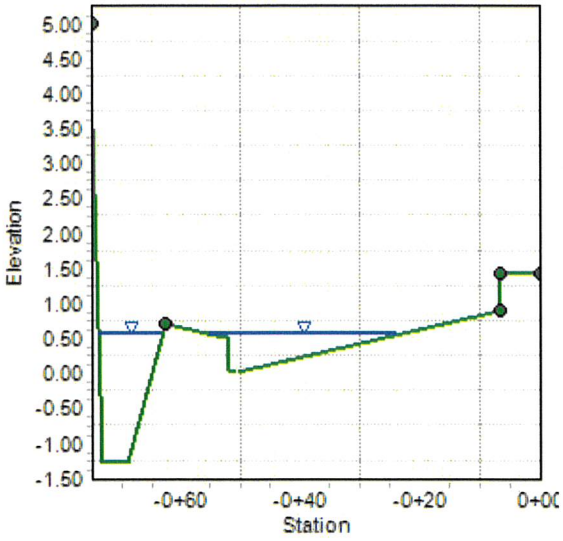
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.70000	%
Normal Depth	1.85	ft
Discharge	86.00	ft³/s

Cross Section Image



Worksheet for Sta. 71+60 Flow Captured by inlet in swale

Project Description

Solve For	Spread

Input Data

Discharge		1.00	ft³/s
Left Side Slope		5.00	ft/ft (H:V)
Right Side Slope		5.00	ft/ft (H:V)
Bottom Width		4.00	ft
Grate Width		2.00	ft
Grate Length		4.00	ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%

Results

Spread	5.04	ft
Depth	0.10	ft
Wetted Perimeter	5.06	ft
Top Width	5.04	ft
Open Grate Area	3.60	ft²
Active Grate Weir Length	10.00	ft

Rating Table for Sta. 71+60 Flow Captured by inlet in swale

Project Description

Solve For	Spread

Input Data

Discharge		1.00	ft³/s
Left Side Slope		5.00	ft/ft (H:V)
Right Side Slope		5.00	ft/ft (H:V)
Bottom Width		4.00	ft
Grate Width		2.00	ft
Grate Length		4.00	ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%

Discharge (ft³/s)	Spread (ft)	Depth (ft)
10.00	8.81	0.48
12.00	9.43	0.54
14.00	10.02	0.60
16.00	10.84	0.68
18.00	12.66	0.87
20.00	14.69	1.07
22.00	16.93	1.29
24.00	19.39	1.54
26.00	22.06	1.81
28.00	24.94	2.09
30.00	28.04	2.40

Stanley Consultants, Inc.
5820 S. Eastern Ave. Las Vegas, NV 89119
Phone: (702) 369-9396
Fax: (702) 369-9793

Stanley Consultants INC.

Flow Split Calculation

Project Name: Gowan Outfall - Alexander Road Facilities
Job Number: 23629
Date: 9/17/2012
Calculated By: Vflock

$$Q_L = \frac{Q_m^{0.93} * W_{ss}^{0.85}}{S_m^{0.41} * W_m^{0.79}} * 0.042$$

Equation 12.3: Standards Manual for Drainage Design and Floodplain Management in Tucson, Arizona, December, 1989 (Revised July, 1998), prepared for the City of Tucson Department of Transportation Engineering Division, by

Parameters:

- Q = total Q in the main street
- Q_m = Q in the main street (measured between curbs in cfs)
- W_{ss} = Width of the side street (in feet)
- S_m = Slope of the main street (in feet/foot)
- W_m = Width of the main street (in feet)
- Q_L = Lateral flow into the side street (in cfs)
- $Q_{L(total)}$ = QL + minimum (Qo, Actual Overbank Q)

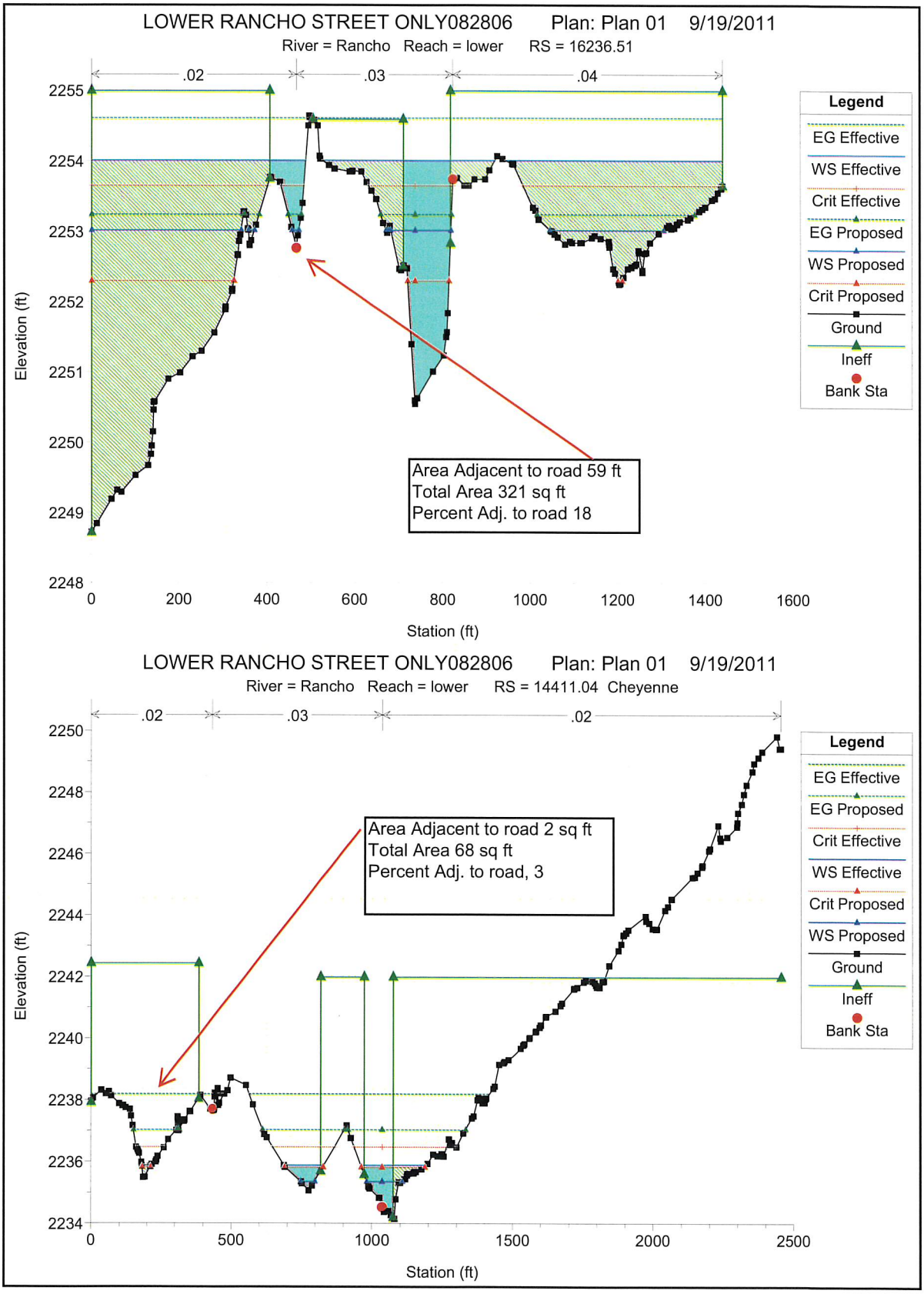
Overbank Flow

- Overbank Q = Overbank flow upstream of flow split [$(Q-Q_L)/2$]
- Qo = $46.8\ y_o\ W_{ss}\ (S_s^{0.5}) - Q_L$
- Qo = Maximum amount of overbank flow intercepted by side street
- Ss = Slope of the side street (in feet/foot)
- yo = average depth of overbank flow intercepted by side street

Note: Number of points at each flowsplit defines the curve used in the HEC-1 model.

Location: Gowan/Decatur Intersection

Point 1		Point 2		Point 3		Point 4	
Q =	360 cfs	Q =	260 cfs	Q =	200 cfs	Q =	100 cfs
Q_m =	303.19 cfs	Q_m =	220.09 cfs	Q_m =	175.38 cfs	Q_m =	89.33 cfs
W_{ss} =	100.00 ft	W_{ss} =	100.00 ft	W_{ss} =	100.00 ft	W_{ss} =	100.00 ft
S_m =	0.0153 ft/ft	S_m =	0.0153 ft/ft	S_m =	0.0153 ft/ft	S_m =	0.0153 ft/ft
W_m =	80.00 ft	W_m =	80.00 ft	W_m =	80.00 ft	W_m =	80.00 ft
Q_L =	**74.49 cfs**	**Q_L =**	**55.30 cfs**	**Q_L =**	**44.77 cfs**	**Q_L =**	**23.91 cfs**
Overbank Q =	**28.41 cfs**	**Overbank Q =**	**19.955 cfs**	**Overbank Q =**	**12.31 cfs**	**Overbank Q =**	**5.335 cfs**
W_{ss} =	100.00 ft	W_{ss} =	100.00 ft	W_{ss} =	100.00 ft	W_{ss} =	100.00 ft
Ss =	0.0050 ft/ft	Ss =	0.0050 ft/ft	Ss =	0.0050 ft/ft	Ss =	0.0050 ft/ft
yo =	0.55 ft	yo =	0.45 ft	yo =	0.39 ft	yo =	0.23 ft
Qo =	**107.52 cfs**	**Qo =**	**93.62 cfs**	**Qo =**	**84.29 cfs**	**Qo =**	**52.21 cfs**
$Q_{L\ (total)}$ =	**102.89 cfs**	**$Q_{L\ (total)}$ =**	**75.25 cfs**	**$Q_{L\ (total)}$ =**	**57.08 cfs**	**$Q_{L\ (total)}$ =**	**29.24 cfs**
Q_{TOTAL}	360.00		260.00		200.00		100.00
$Q_{ALEXANDER}$	102.89		75.25		57.08		29.24
Q_{GOWAN}	257.11		184.75		142.92		70.76


LOWER RANCHO STREET ONLY082806 Plan: Plan 01 9/19/2011
River = Rancho Reach = lower RS = 16236.51
.02
.03
.04
Elevation (ft)
2255
2254
2253
2252
2251
2250
2249
2248
0
200
400
600
800
1000
1200
1400
1600
Station (ft)
Legend
EG Effective
WS Effective
Crit Effective
EG Proposed
WS Proposed
Crit Proposed
Ground
Ineff
Bank Sta
Area Adjacent to road 59 ft
Total Area 321 sq ft
Percent Adj. to road 18
LOWER RANCHO STREET ONLY082806 Plan: Plan 01 9/19/2011
River = Rancho Reach = lower RS = 14411.04 Cheyenne
.02
.03
.02
Elevation (ft)
2250
2248
2246
2244
2242
2240
2238
2236
2234
0
500
1000
1500
2000
2500
Station (ft)
Legend
EG Effective
EG Proposed
Crit Effective
WS Effective
Crit Proposed
WS Proposed
Ground
Ineff
Bank Sta
Area Adjacent to road 2 sq ft
Total Area 68 sq ft
Percent Adj. to road, 3

HY-8 Culvert Analysis Report
Existing Concrete Channel North of Craig Rd
48" RCP and (2) 7' x 3' RCB

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 36 cfs

Design Flow: 91 cfs

Maximum Flow: 111 cfs

Table 1 - Summary of Culvert Flows at Crossing: North Craig Channel

Headwater Elevation (ft)	Total Discharge (cfs)	48INCH Discharge (cfs)	7x3 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2003.07	36.00	35.99	0.00	0.00	5
2003.38	43.50	43.50	0.00	0.00	4
2003.68	51.00	50.99	0.00	0.00	3
2003.97	58.50	58.50	0.00	0.00	3
2004.25	66.00	66.00	0.00	0.00	3
2004.54	73.50	73.48	0.00	0.00	4
2004.84	81.00	80.97	0.00	0.00	7
2005.10	88.50	87.28	1.18	0.00	6
2005.16	91.00	88.65	2.33	0.00	5
2005.41	103.50	94.14	9.35	0.00	5
2005.54	111.00	96.89	14.08	0.00	4
2009.00	393.17	121.25	271.91	0.00	Overtopping

Table 2 - Culvert Summary Table: 48INCH

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
36.00	35.99	2003.07	2.566	1.508	1-S2n	1.356	1.785	1.451	1.022	8.741	8.807
43.50	43.50	2003.38	2.884	1.797	1-S2n	1.505	1.972	1.615	1.166	9.141	9.324
51.00	50.99	2003.68	3.180	2.085	1-S2n	1.639	2.139	1.768	1.305	9.513	9.767
58.50	58.50	2003.97	3.466	2.385	1-S2n	1.773	2.298	1.914	1.440	9.850	10.155
66.00	66.00	2004.25	3.749	2.697	1-S2n	1.900	2.449	2.053	1.572	10.160	10.498
73.50	73.48	2004.54	4.036	3.015	5-S2n	2.023	2.588	2.187	1.701	10.453	10.805
81.00	80.97	2004.84	4.336	3.348	5-S2n	2.146	2.723	2.318	1.827	10.733	11.084
88.50	87.28	2005.10	4.601	3.636	5-S2n	2.248	2.829	2.425	1.952	10.960	11.337
91.00	88.65	2005.16	4.661	3.700	5-S2n	2.271	2.851	2.448	1.993	11.008	11.417
103.50	94.14	2005.41	4.907	3.958	5-S2n	2.360	2.938	2.539	2.196	11.192	11.784
111.00	96.89	2005.54	5.036	4.091	5-S2n	2.404	2.980	2.584	2.316	11.281	11.982

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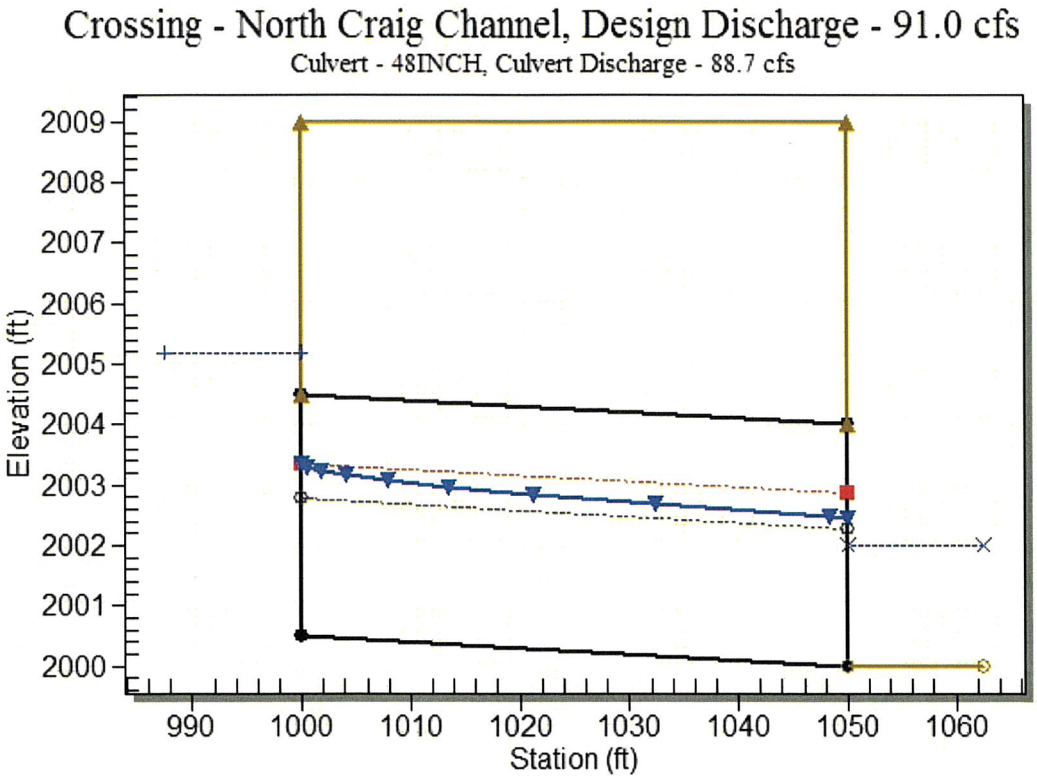
Straight Culvert

Inlet Elevation (invert): 2000.50 ft, Outlet Elevation (invert): 2000.00 ft

Culvert Length: 50.00 ft, Culvert Slope: 0.0100

****

Water Surface Profile Plot for Culvert: 48INCH



Culvert Data Summary - 48INCH

Barrel Shape: Circular

Barrel Diameter: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0130

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 3 - Culvert Summary Table: 7x3

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
36.00	0.00	2003.07	0.000	0.000	0-NF	0.000	0.000	0.000	1.022	0.000	8.807
43.50	0.00	2003.38	0.000	0.000	0-NF	0.000	0.000	0.000	1.166	0.000	9.324
51.00	0.00	2003.68	0.000	0.000	0-NF	0.000	0.000	0.000	1.305	0.000	9.767
58.50	0.00	2003.97	0.000	0.000	0-NF	0.000	0.000	0.000	1.440	0.000	10.155
66.00	0.00	2004.25	0.000	0.000	0-NF	0.000	0.000	0.000	1.572	0.000	10.498
73.50	0.00	2004.54	0.000	0.000	0-NF	0.000	0.000	0.000	1.701	0.000	10.805
81.00	0.00	2004.84	0.000	0.000	0-NF	0.000	0.000	0.000	1.827	0.000	11.084
88.50	1.18	2005.10	0.102	0.0*	1-S2n	0.018	0.060	0.018	1.952	4.582	11.337
91.00	2.33	2005.16	0.162	0.0*	1-S2n	0.036	0.095	0.036	1.993	4.582	11.417
103.50	9.35	2005.41	0.408	0.0*	1-S2n	0.146	0.240	0.146	2.196	4.582	11.784
111.00	14.08	2005.54	0.536	0.0*	1-S2n	0.219	0.315	0.219	2.316	4.582	11.982

* Full Flow Headwater elevation is below inlet invert.

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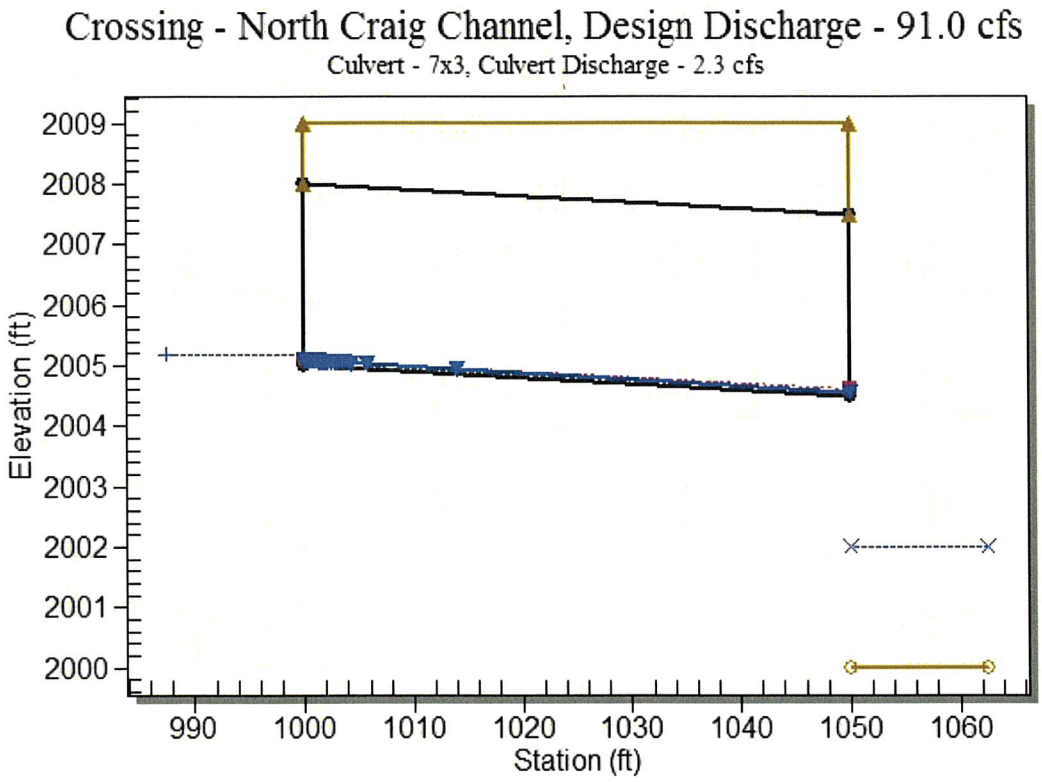
Straight Culvert

Inlet Elevation (invert): 2005.00 ft, Outlet Elevation (invert): 2004.50 ft

Culvert Length: 50.00 ft, Culvert Slope: 0.0100

****

Water Surface Profile Plot for Culvert: 7x3



Culvert Data Summary - 7x3

Barrel Shape: Concrete Box

Barrel Span: 7.00 ft

Barrel Rise: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0130

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

Roadway Data for Crossing: North Craig Channel

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 17.00 ft

Crest Elevation: 2009.00 ft

Roadway Surface: Paved

Roadway Top Width: 50.00 ft

Worksheet for EGL for interim Flow in GOAL at outlet structure

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.015	
Channel Slope	1.04000	%
Height	8.000	ft
Bottom Width	12.00	ft
Discharge	284.00	ft³/s

Results

Normal Depth	1.86	ft
Flow Area	22.28	ft²
Wetted Perimeter	15.71	ft
Hydraulic Radius	1.42	ft
Top Width	12.00	ft
Critical Depth	2.59	ft
Percent Full	23.2	%
Critical Slope	0.00385	ft/ft
Velocity	12.75	ft/s
Velocity Head	2.53	ft
Specific Energy	4.38	ft
Froude Number	1.65	
Discharge Full	1738.46	ft³/s
Slope Full	0.38970	ft/ft
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.000	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	23.20	%
Downstream Velocity	Infinity	ft/s

Worksheet for EGL for interim Flow in GOAL at outlet structure

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.86	ft
Critical Depth	2.59	ft
Channel Slope	1.04000	%
Critical Slope	0.00385	ft/ft

HY-8 Culvert Analysis Report
Outlet Structure at NW corner Rancho and Alexander

Assume 18-inch orifice plate is culvert size.
Assume grate weir length and elevation are the crest length and elevation.
Headwater elevation is approximate elevation of ponding at outlet structure. Verify depth above grate using a weir calculation for the grate.

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 100 cfs

Design Flow: 198 cfs

Maximum Flow: 284 cfs

Table 1 - Summary of Culvert Flows at Crossing: OutletStructure

Headwater Elevation (ft)	Total Discharge (cfs)	18-in orifice plate Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2267.74	100.00	23.44	76.54	17
2267.85	118.40	23.53	94.74	4
2267.95	136.80	23.62	113.10	4
2268.06	155.20	23.70	131.46	4
2268.15	173.60	23.77	149.80	4
2268.24	192.00	23.85	168.00	3
2268.27	198.00	23.87	174.07	3
2268.42	228.80	23.99	204.71	3
2268.50	247.20	24.05	223.11	3
2268.58	265.60	24.12	241.47	3
2268.66	284.00	24.18	259.81	3
2267.00	22.83	22.83	0.00	Overtopping

Table 2 - Culvert Summary Table: 18-in orifice plate

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
100.00	23.44	2267.74	8.232	13.865	6-FFc	1.500	1.500	1.500	0.681	13.263	7.340
118.40	23.53	2267.85	8.291	13.978	6-FFc	1.500	1.500	1.500	0.756	13.315	7.831
136.80	23.62	2267.95	8.346	14.084	6-FFc	1.500	1.500	1.500	0.827	13.364	8.275
155.20	23.70	2268.06	8.399	14.185	6-FFc	1.500	1.500	1.500	0.894	13.410	8.682
173.60	23.77	2268.15	8.449	14.281	6-FFc	1.500	1.500	1.500	0.958	13.454	9.059
192.00	23.85	2268.24	8.496	14.372	6-FFc	1.500	1.500	1.500	1.020	13.495	9.410
198.00	23.87	2268.27	8.512	14.402	6-FFc	1.500	1.500	1.500	1.040	13.509	9.519
228.80	23.99	2268.42	8.588	14.547	6-FFc	1.500	1.500	1.500	1.138	13.575	10.051
247.20	24.05	2268.50	8.631	14.631	6-FFc	1.500	1.500	1.500	1.195	13.612	10.346
265.60	24.12	2268.58	8.673	14.712	6-FFc	1.500	1.500	1.500	1.250	13.649	10.626
284.00	24.18	2268.66	8.715	14.791	6-FFc	1.500	1.500	1.500	1.304	13.684	10.894

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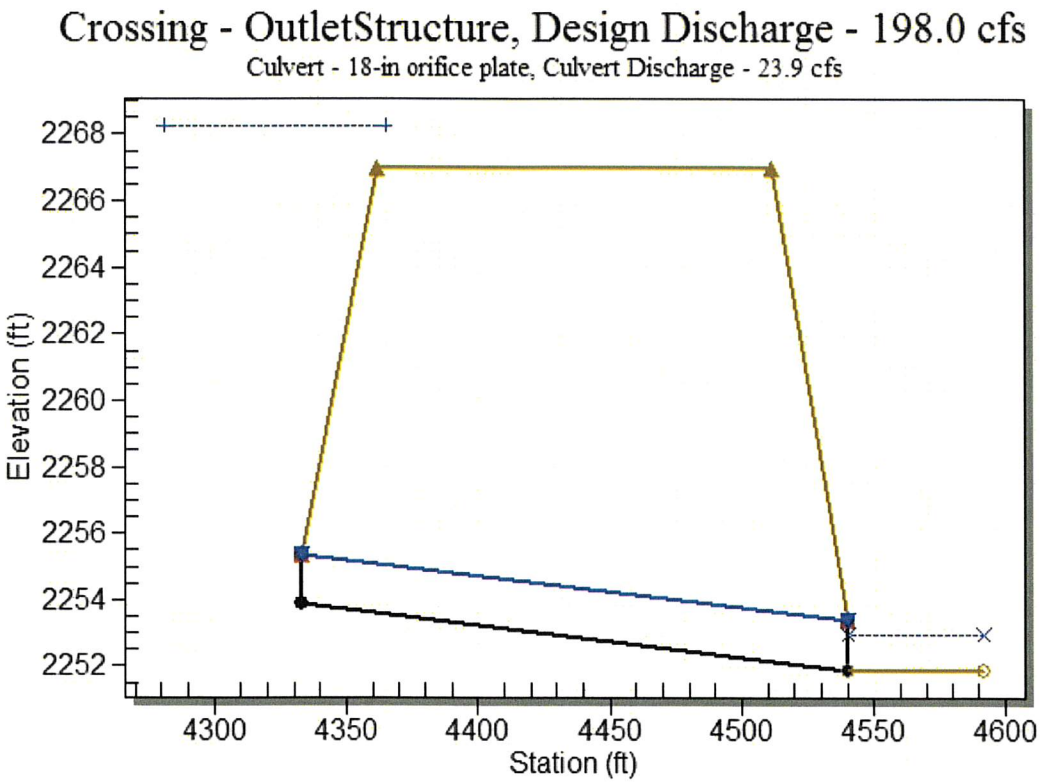
Straight Culvert

Inlet Elevation (invert): 2253.87 ft, Outlet Elevation (invert): 2251.89 ft

Culvert Length: 207.01 ft, Culvert Slope: 0.0096

****

Water Surface Profile Plot for Culvert: 18-in orifice plate



Site Data - 18-in orifice plate

Site Data Option: Culvert Invert Data

Inlet Station: 4333.00 ft

Inlet Elevation: 2253.87 ft

Outlet Station: 4540.00 ft

Outlet Elevation: 2251.89 ft

Number of Barrels: 1

Culvert Data Summary - 18-in orifice plate

Barrel Shape: Circular

Barrel Diameter: 1.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0130

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Worksheet for Grate at Outlet Structure

Project Description

Solve For	Discharge

Input Data

Headwater Elevation	2268.70	ft
Crest Elevation	2267.00	ft
Weir Coefficient	3.01	US
Crest Length	40.00	ft

Results

Discharge	266.87	ft^3/s
Headwater Height Above Crest	1.70	ft
Flow Area	68.00	ft^2
Velocity	3.92	ft/s
Wetted Perimeter	43.40	ft
Top Width	40.00	ft

Worksheet for Outlet Structure - Grate Size with 50% clogging

Project Description

Solve For	Headwater Elevation

Input Data

Discharge	285.00	ft^3/s
Centroid Elevation	2267.75	ft
Tailwater Elevation	2268.70	ft
Discharge Coefficient	0.65	
Opening Area	100.00	ft^2

Results

Headwater Elevation	2269.00	ft
Headwater Height Above Centroid	1.25	ft
Tailwater Height Above Centroid	0.95	ft
Velocity	2.85	ft/s

Appendix E

UTILITY CONFLICT MATRIX

Stanley Consultants, Inc.
5820 S. Eastern Ave., Suite 200, Las Vegas, NV 89119
Phone: (702) 369-9396

Project: **RANCHO DRIVE CAPACITY IMPROVEMENTS, DECATUR TO RAINBOW - UTILITY CONFLICT MATRIX**
Job no.: 23629
Prepared by : MM
Checked by : LL
Date: 4/2/2014
Computation: Utility Conflict Matrix

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
001	**16+75**	UT-02	LT 55'	New Sidewalk and Ramp installation will conflict with existing location of traffic controller box, ITS box, and small vault.	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conflicts to be Relocated
002	**17+90**	UT-02	LT 55'	Proposed Street Light installation location is over an Existing 6x6 RCB Storm Drain.	Street Light	Storm Drain	City/ County/NDOT	Street lights to be Relocated
003	**17+91**	UT-02	LT 55'	Proposed Street Light installation location is over existing ITS conduits	Street Light	ITS-Traffic		ITS conduit to be protected in place
004	**18+00**	UT-02	LT 55'	Proposed tree well located over RCB Storm Drain	Landscape	Storm Drain	City/ County/NDOT	Tree wells relocated to miss majority of RCB encroachment into sidewalk amenity zone. Proposed tree species are known for having less intrusive roots.
005	**18+80**	UT-02	LT 55'	Proposed tree well located over RCB Storm Drain	Landscape	Storm Drain	City/ County/NDOT	See conflict resolution #4
006	**18+90**	UT-02	LT 55'	Proposed fire hydrant by standard should be within 5' of BC; Exist RCB Storm Drain is there.	Firehydrant	Water	City/ County/NDOT	Fire Hydrants to be relocated
007	**19+00**	UT-02	LT 55'	Proposed Street Light installation location is NEAR an Existing 6x6 RCB Storm Drain.	Street Light	Street Light		Street lights to be Relocated
008	**19+01**	UT-02	LT 55'	Proposed street light location overlaps new drop inlet storm drain location	Street Light	Storm Drain		Drop inlet relocated
009	**19+02**	UT-02	LT 55'	Proposed street light location is over existing ITS conduits.	Street Light- ITS-Traffic	Traffic Communications		ITS conduit to be protected in place
010	**21+65**	UT-03	LT 55'	Conflict with proposed Storm Drain drop inlet over existing ITS lines	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
011	**22+35**	UT-03	RT 55'	Proposed streetlight on top of proposed Storm Drain drop inlet - graphics	Street Light	Storm Drain/Street light	N/A	Proposed street light relocated
012	**24+25**	UT-03	LT 55'	Conflict with proposed Storm Drain drop inlet over existing ITS lines	ITS-Traffic	Storm Drain/Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
013	**24+75**	UT-03	LT 55'	Proposed streetlight on top of proposed Storm Drain drop inlet - graphics.	Street Light	Storm Drain/Street light	N/A	Proposed street light relocated
014	**24+76**	UT-03	LT 55'	Proposed tree well located over existing ITS line	Landscape - ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
015	**25+40**	UT-03	RT 55'	Proposed streetlight on top of proposed Storm Drain drop inlet - graphics.	Street Light	Storm Drain/Street light	N/A	Proposed street light relocated
016	**25+50**	UT-03	LT 55'	Conflict with proposed tree well over existing ITS lines	ITS-Traffic	Traffic Communications	City/ County/NDOT	TREE wells to be Relocated
017	**25+80**	UT-03	LT 55'	Conflict with proposed STREET LIGHT over existing ITS lines	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
018	**26+30**	UT-03	LT 55'	Conflict with proposed tree well over existing ITS lines	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
019	**26+95**	UT-03	LT 55'	Conflict with proposed Storm Drain drop inlet over existing ITS lines.	ITS-Traffic	Storm Drain/Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
020	**26+96**	UT-03	LT 55'	proposed streetlight on top of proposed Storm Drain drop inlet - graphics	Street Light	Storm Drain/Street light	N/A	Proposed street light relocated
021	**27+75**	UT-04	LT 55'	Conflict with proposed tree well over existing ITS lines	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
022	**28+05**	UT-04	LT 55'	Conflict with proposed sidewalk and utility box	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
023	**28+10**	UT-04	LT 55'	Conflict with proposed tree well over existing ITS lines	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
024	**29+05**	UT-04	LT 55'	Conflict with proposed tree well over existing ITS lines	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
025	**29+10**	UT-04	LT 55'	Conflict with proposed tree well over existing ITS lines	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
026	**29+20**	UT-04	LT 55'	Conflict with existing fire hydrant and proposed sidewalk; to be relocated	Fire Hydrant	Water line	City of Las Vegas	Fire Hydrants to be relocated
027	**29+60**	UT-04	LT 55'	Conflict with proposed Storm Drain drop inlet over existing ITS lines.	ITS-Traffic	Storm Drain	City/ County/NDOT	ITS conduit to be protected in place
028	**29+75**	UT-04	LT 55'	Conflict with proposed tree well over existing ITS lines	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
029	30+70	UT-04	RT 55'	Conflict with proposed sidewalk ramp and existing overhead utility pole	Existing communications and power pole	overhead fiber/ overhead power	Zayo/NVE	POWER ; multiple utiltites to be relocated on utiltiy pole: FIBER
030	30+70	UT-04	RT 55'	New Sidewalk and Ramp installation will conflict with existing location of traffic controller box.	Traffic	Traffic Communications	City/ County/NDOT	TRAFFIC facilities to be relocated
031	31+20	UT-04	RT 55'	Conflict with proposed tree well over existing 21" sewer and Telephone	Sewer			Tree wells to be Relocated
032	32+25	UT-04	RT 55'	Conflict with proposed STREET LIGHT over existing 21" sewer	Sewer			Street lights to be Relocated; Sewer pipe to be protected by CIPP
033	32+30	UT-04	LT 115'	Conflict with proposed sidewalk ramp and existing overhead utility pole	Existing communications and power pole	overhead fiber/ overhead power	Zayo/NVE	POWER ; multiple utiltites to be relocated on utiltiy pole: FIBER
034	32+80	UT-04	LT 65'	Conflict with proposed sidewalk and existing overhead utility pole	Existing communications and power pole	overhead fiber/ overhead power/overhead catv	Zayo/NVE/cox	POWER ; multiple utiltites to be relocated on utiltiy pole: CABLE, FIBER
035	32+80	UT-04	LT 55'	Conflict with proposed STREET LIGHT over Telephone lines	Telephone	telephone	century link	TELEPHONE to be relocated
036	32+80	UT-04	LT 55'	Conflict with proposed STREET LIGHT over existing ITS	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
037	32+90	UT-04	LT 55'	Conflict with proposed tree well over Telephone lines	Telephone	telephone	century link	TELEPHONE to be relocated
038	33+00	UT-04	LT 55'	New Sidewalk installation will conflict with existing location of traffic controller box.	Traffic	Traffic Communications	City/ County/NDOT	TRAFFIC facilities to be relocated
039	33+00	UT-04	LT 55'	New Sidewalk installation will conflict with existing location of power box.	Power	power	NVE	POWER facilities to be relocated
040	33+10	UT-04	LT 55'	New Sidewalk installation will conflict with existing location of power box.	Power	power	NVE	POWER facilities to be relocated
041	33+40	UT-04	RT 55'	Conflict with proposed STREET LIGHT over existing 21" sewer	Sewer			Street lights to be Relocated
042	33+80	UT-04	LT 55'	Conflict with proposed STREET LIGHT over Telephone lines	Telephone	telephone	century link	TELEPHONE to be relocated
043	33+81	UT-04	LT 55'	Conflict with proposed STREET LIGHT over existing ITS	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
044	33+90	UT-04	RT 55'	Conflict with proposed tree well over existing 21" sewer and Telephone	Sewer			TREE wells to be Relocated
045	34+45	UT-04	RT 55'	Conflict with proposed Storm Drain lateral and existing 21" sewer and Telephone	Sewer/Telephone	Storm Drain	Century Link - telephone;	TELEPHONE to be relocated; SEWER to be protected in place.
046	34+55	UT-04	LT 55'	Conflict with proposed tree well over Telephone lines	Telephone	telephone	century link	TELEPHONE to be relocated
047	34+56	UT-04	RT 55'	Conflict with proposed STREET LIGHT over existing 21" sewer	Sewer			Street lights to be Relocated
048	34+65	UT-04	RT 55'	Conflict with proposed tree well over existing 21" sewer and Telephone	Sewer			TREE wells to be Relocated
049	34+75	UT-04	LT 55'	Conflict with proposed STREET LIGHT over Telephone lines	Telephone	telephone	century link	TELEPHONE to be relocated
050	34+75	UT-04	LT 55'	Conflict with proposed STREET LIGHT over existing ITS	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
051	35+30	UT-04	LT 55'	Conflict with proposed tree well over existing Telephone lines	Telephone	telephone	century link	TELEPHONE to be relocated
052	35+30	UT-04	LT 55'	Conflict with proposed tree well over existing ITS	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
053	35+30	UT-04	LT 55'	New Sidewalk installation will conflict with existing location of power box.	Power	Power	NVE	POWER facilities to be relocated
054	35+30	UT-04	LT 55'	Conflict with existing fire hydrant and proposed sidewalk; to be relocated	Existing Fire Hydrant	Water line	City of Las Vegas	Fire Hydrants to be relocated
055	35+75	UT-04	RT 55'	Conflict with proposed STREET LIGHT over existing 21" sewer	Sewer			Street lights to be Relocated
056	35+85	UT-04	LT 55'	Conflict with proposed STREET LIGHT over Telephone lines	Telephone	telephone	century link	TELEPHONE to be relocated
057	35+85	UT-04	LT 55'	Conflict with proposed STREET LIGHT over existing ITS	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
058	36+10 to 42+75	UT-05	LT 55'	Conflict with proposed tree well over existing ITS	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
059	36+10	UT-05	RT 55'	Conflict with proposed tree well over existing 21" sewer and Telephone	Sewer/Telephone			TREE wells to be Relocated
060	36+60	UT-05	LT 55'	Conflict with proposed Storm Drain lateral with existing ITS	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
061	36+90	UT-05	LT 55'	Conflict with proposed tree well over existing ITS lines	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
062	36+91	UT-05	LT 55'	Conflict with proposed STREET LIGHT over existing ITS lines	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
063	36+92	UT-05	RT 55'	Conflict with proposed STREET LIGHT over existing 21" sewer and Telephone	Sewer	sewer, telephone	Century link	Street lights to be Relocated
064	38+00	UT-05	RT 55'	Conflict with proposed STREET LIGHT over existing 21" sewer and Telephone	Sewer			Street lights to be Relocated
065	38+45	UT-05	RT 55'	Conflict with proposed tree well over existing 21" sewer and Telephone	Sewer			TREE wells to be Relocated
066	38+60	UT-05	RT 55'	Conflict with existing fire hydrant and proposed sidewalk; to be relocated	Existing Fire Hydrant	Water line	City of Las Vegas	Fire Hydrants to be relocated
067	39+20	UT-05	RT 55'	Conflict with proposed STREET LIGHT and tree well over existing 21" sewer and Telephone	Sewer	sewer, telephone	Century link	Street lights to be Relocated
068	39+90	UT-05	RT 55'	Conflict with proposed Storm Drain lateral and existing 21" sewer and Telephone	Sewer/Telephone	Storm Drain	Century Link - telephone; sewer	TELEPHONE to be relocated; SEWER to be protected in place.
069	40+40	UT-05	RT 55'	Conflict with proposed STREET LIGHT over existing 21" sewer and Telephone	Sewer	sewer, telephone	Century link	Street lights to be Relocated

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
070	**41+30**	UT-05	RT 55'	Conflict with proposed tree well over existing 21" sewer and Telephone	Sewer			TREE wells to be Relocated
071	**41+50**	UT-05	RT 55'	Conflict with proposed STREET LIGHT over existing 21" sewer and Telephone	Sewer	sewer, telephone	Century link	Street lights to be Relocated
072	**42+60**	UT-05	RT 55'	Conflict with proposed STREET LIGHT well over existing 21" sewer and Telephone	Sewer	sewer, telephone	Century link	Street lights to be Relocated
073	**42+60**	UT-05	RT 55'	Conflict with proposed tree well over existing 21" sewer and Telephone	Sewer			TREE wells to be Relocated
074	**42+75**	UT-05	LT 55'	Conflict with proposed Storm Drain drop inlet and existing ITS	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
075	**43+75**	UT-05	RT 55'	Conflict with proposed STREET LIGHT over existing 21" sewer and Telephone	Sewer	sewer, telephone	Century link	Sewer to be protected in place; Street lights to be Relocated
076	**44+30**	UT-06	LT 55'	conflict with proposed Storm Drain lateral and tree well over existing ITS line	ITS-Traffic	Traffic Communications	City/ County/NDOT	ITS conduit to be protected in place
077	**44+60 to 61+80**	UT-06	RT 55'	Conflict with proposed tree wells over existing 21" sewer	Sewer			Sewer to be CIPP lined
078	**44+90 to 61+80**	UT-06	RT 55'	Conflict with proposed STREET LIGHTs over existing 21" sewer	Sewer			Street lights to be Relocated
079	**45+10**	UT-06	LT 55'	Conflict with proposed tree well over existing and ITS line	ITS-Traffic			TREE wells to be Relocated
080	**45+55**	UT-06	LT 55'	Conflict with proposed sidewalk location and cable TV	Cable	CATV	Cox	CATV to be relocated
081	**45+90**	UT-06	RT 55'	Conflict with proposed tree well and Under Ground Power	Power	UGP	NVE	POWER facilities to be relocated
082	**46+40**	UT-06	LT 55'	Conflict with location of new sidewalk and existing telephone box	Telephone	Telephone	Century Link	TELEPHONE to be relocated
083	**47+25**	UT-06	RT 55'	Conflict with existing water meters, valves, and hydrant with location of new sidewalk.	Water	Water line	City of Las Vegas	WATER facilitites to be Relocated
084	**49+00**	UT-06	LT 55'	Conflict with proposed sidewalk location and existing power facilities	Power	UGP	NVE	POWER facilities to be relocated
085	**49+25**	UT-06	LT 55'	Conflict with proposed sidewalk ramp and existing overhead utility pole	Existing communications and power pole	overhead fiber/ overhead power	Century Link/NVE	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
086	**50+20**	UT-06	LT 55'	Conflict with location of new sidewalk and existing telephone box	Telephone	Telephone	Century Link	TELEPHONE to be relocated
087	**50+25**	UT-06	RT 55'	Conflict with existing water facilities and proposed extension of RCB Storm Drain	Water	Storm Drain/Water	City of Las Vegas	Due to upstream drainage improvements, flow to dual RCB storm drain at this location is minimal. Retaining wall and field inlets proposed in place of RCB extension.
088	**50+40**	UT-06	RT 55'	Conflict with existing electrical boxes and proposed extension of RCB Storm Drain	Electrical/Storm Drain	Storm Drain/Power	NVE	See conflict resolution #87
089	**50+60**	UT-06	RT 55'	Conflict with proposed sidewalk location and existing telephone facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
090	**50+61**	UT-06	RT 55'	Conflict with location of new Storm Drain RCB and existing telephone lines	Telephone	Storm Drain/Telephone	Century Link	See conflict resolution #87
091	**50+62**	UT-06	RT 55'	Conflict with location of new Storm Drain RCB and existing 6" sewer line	Sewer Lateral	Storm Drain/Sewer	City of Las Vegas/private	See conflict resolution #87
092	**51+75**	UT-06	LT 55'	Conflict with location of new sidewalk and existing telephone box	Telephone	Telephone	Century Link	TELEPHONE to be relocated
093	**52+50**	UT-07	RT 55'	Conflict with existing water facilities and proposed extension of RCB Storm Drain	Water	Storm Drain/Water	City of Las Vegas	See conflict resolution #87
094	**53+10**	UT-07	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	Contractor to rotate sewer manhole cone
095	**53+10**	UT-07	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
096	**54+50**	UT-07	LT 55'	Conflict with existing Telephone facilities with proposed sidewalk	Telephone	Telephone	Century Link	TELEPHONE to be relocated
097	**54+50**	UT-07	LT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
098	**54+60**	UT-07	RT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
099	**55+75**	UT-07	RT 55'	Conflict with existing water meters, valves, and hydrant with location of new sidewalk.	Water	Water line	City of Las Vegas	WATER facilitites to be Relocated
100	**56+75**	UT-07	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
101	**58+50**	UT-07	RT 55'	Conflict with existing water meters, valves, and hydrant with location of new sidewalk.	Water	Water line	City of Las Vegas	WATER facilitites to be Relocated
102	**58+51**	UT-07	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
103	**58+52**	UT-07	LT 55'	Conflict with existing private street light/parking with proposed sidewalk	streetlight/parking light	electrical	Tonopah-craig road co LLP	Protect private light in place. IF relocation is necssary, City and Private owner to decide where private light is to be relocated.
104	**58+20**	UT-07	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
105	**59+25**	UT-07	LT 55'	Conflict with existing telephone box and proposed sidewalk	Telephone	Telephone	Century Link	TELEPHONE to be relocated
106	**60+75**	UT-07	RT 55'	Conflict with existing water meters, valves, and hydrant with location of new sidewalk.	Water	Water line	City of Las Vegas	WATER facilitites to be Relocated
107	**60+75**	UT-07	LT 55'	Conflict with existing telephone box and proposed sidewalk	Telephone	Telephone	Century Link	TELEPHONE to be relocated
108	**61+50**	UT-08	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
109	**61+90 to 77+75**	UT-08	LT 55'	Conflict with proposed tree wells and street lights over existing ITS	ITS-Traffic	ITS-Traffic	City-NDOT	ITS conflicts to be Relocated

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
110	61+90 to 77+75	UT-08	LT 55'	Conflict with proposed tree wells and street lights underground power	Power	Power	NVE	POWER linees to be relocated
111	61+90 to 77+75	UT-08	LT 55'	Conflict with proposed tree wells and street lights over underground telephone	Telephone	Telephone	Century Link	TELEPHONE to be relocated
112	61+90 to 77+75	UT-08	LT 55'	Conflict with proposed tree wells and street lights over underground cable TV lines	CATV	CATV	Cox	CATV toi be relocated
113	62+00	UT-08	RT 55'	New Sidewalk installation will conflict with existing location of street light box	Power	Power	NVE	POWER facilities to be relocated
114	63+50	UT-08	LT 55'	New sidewalk installation will conflict with existing location telephone facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
115	65+00	UT-08/ UT-24	RT 261'	Conflict with existing 10-inch steel gas line and proposed 48-inch RCP connection to proposed 10' X 8' RCB storm drain	GAS	Storm Drain/Gas	Southwest Gas	GAS to be Relocated if necessary
116	65+35	UT-08/ UT-24	RT 212'	Conflict with existing 10" Steel GAS line and Proposed 10X8 connection from existing dual 7x3 RCB storm drain.	GAS	Storm Drain/Gas	Southwest Gas	GAS to be Relocated if necessary
117	65+00	UT-08/ UT-24	360' RT on Craig Rd	Conflict with future 10x 8 Storm Drain RCB and 30" SCCP waterline	Water	Water line	City of Las Vegas	WATER line to be Relocated ABOVE future RCB. New crown elevation = 2291.00
118	65+25	UT-08	RT 110'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
119	65+26	UT-08	RT 110'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
120	65+27	UT-08	RT 110'	Conflict with proposed Storm Drain drop inlet and underground power	Power	Storm Drain -Power	NVE	POWER lines to be relocated
121	65+28	UT-08	RT 110'	Conflict with proposed Storm Drain drop inlet and cable TV	CATV	Storm Drain/CATV	Cox	CATV to be relocated
122	65+29	UT-08	RT 110'	Conflict with proposed Storm Drain drop inlet and and telephone	Telephone	Telephone	Century Link	TELEPHONE to be relocated
123	65+60	UT-08	RT 60'	INTERNAL- Conflict with proposed location of new traffic signal pole; right turn median has been redesigned; plans show the pole in the middle of the turn lane. The location of the proposed signal pole could conflict with underground Cable TV.	Traffic	Traffic Signal	INTERNAL	CATV to be relocated if necessary
124	65+78	UT-08	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
125	65+79	UT-08	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
126	65+80	UT-08	LT 55'	Conflict with proposed sidewalk and existing CATV boxes/facilities	CATV	CATV	Cox	CATV to be relocated
127	65+85	UT-08	RT 160'	Conflict with existing 10" Steel GAS line and 24" connection from existing storm drain RCB.	GAS	Storm Drain	Southwest Gas	This is a future storm drain connection. Gas line to be relocated in future if necessary.
128	66+15	UT-08	LT 55'	Conflict with proposed sidewalk and existing traffic controller box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
129	66+25	UT-08	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
130	67+00	UT-08	LT 80'	Conflict with proposed location of Storm Drain drop inlet and existing underground power	Power	Storm Drain/Power	NVE	POWER lines to be relocated
131	67+00	UT-08	LT 80'	Conflict with proposed location of Storm Drain drop inlet and existing cable TV	Cable TV	Storm Drain/Cable TV	Cox	CATV to be relocated
132	67+00	UT-08	LT 80'	Conflict with proposed location of Storm Drain drop inlet and existing and telephone	Telephone	Storm Drain/Telephone	Century Link	TELEPHONE to be relocated
133	67+01	UT-08	LT 80'	Conflict with proposed Storm Drain box with existing underground power	Power	Storm Drain/Power	NVE	POWER linees to be relocated
134	67+01	UT-08	LT 80'	Conflict with proposed Storm Drain box with existing underground telephone	Telephone	Storm Drain/Telephone	Century Link	TELEPHONE to be relocated
135	67+01	UT-08	LT 80'	Conflict with proposed Storm Drain box with existing cable TV	Cable TV	Storm Drain/Cable TV	Cox	CATV to be relocated
136	67+01	UT-08	LT 80'	Conflict with proposed Storm Drain box with existing proposed street light	Street Light	Storm Drain	INTERNAL	Street lights to be Relocated
137	67+02	UT-08	LT 80'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
138	67+10	UT-08	RT 70'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
139	67+11	UT-08	LT 80'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
140	67+20	UT-08	LT 80'	Conflict with proposed sidewalk and existing CATV boxes/facilities	CATV	CATV	Cox	CATV to be relocated
141	67+21	UT-08	LT 80'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
142	67+27	UT-08	RT 44'	Conflict with proposed 10X8 RCB Storm Drain with existing 10" steel Gas line	GAS	Storm Drain	Southwest Gas	GAS to be Relocated if necessary
143	67+65	UT-08	RT 55'	Conflict with proposed location of new traffic signal pole and existing dual 7x3 drainage box culvert.	Traffic	Traffic Signal	INTERNAL	RCB to be abandoned, removed as necessary
144	67+80	UT-08	LT 165'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
145	67+85	UT-08	RT 55'	Conflict with proposed tree well over existing dual 7x3 drainage box culvert.	Landscape	Storm Drain /Landscape		TREE wells to be Relocated
146	68+06	UT-08	RT 13.5'	Conflict with proposed 10X8 RCB Storm Drain with existing 10" steel Gas line (16" steel sleeve)	GAS	Storm Drain	Southwest Gas	GAS Protect in place; 5' clearance to top of proposed box; coordinate with SW gas and relocate if necessary
147	68+20	UT-08	LT 215'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
148	68+75	UT-08	LT 55'	Conflict with existing utility pole with new median layout. Pole is now in the right turn lane	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Pole location to be revised
149	68+80	UT-08	RT 55'	Conflict with proposed Storm Drain drop inlet and existing 15" VCP sewer	Sewer	Storm Drain/Sewer		RESOLVED - 15" Sewer will be abandoned
150	69+10	UT-08	LT 140'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
151	**69+30**	UT-08	LT 155'	Conflict with existing Fiber optic facilities with proposed sidewalk	Fiber Optic	Fiber Optic	ZAYO	FIBER optic facilities to be relocated
152	**69+31**	UT-08	LT 155'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
153	**69+40**	UT-08	LT 165'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
154	**69+80**	UT-08	RT 55'	New Sidewalk installation will conflict with existing location of street light box	Power	Power	NVE	POWER facilities to be relocated
155	**70+00**	UT-09	RT 70'	Conflict with proposed Storm Drain area drain and existing 8" ACP water	Water	Water	LVVWD	WATER to be relocated
156	**70+50**	UT-09	RT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
157	**71+75**	UT-09	RT 70'	Conflict with proposed Storm Drain area drain and existing 8" ACP water	Water	Water	LVVWD	WATER to be relocated
158	**71+90**	UT-09	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
159	**73+25**	UT-09	RT 55'	Conflict with proposed Storm Drain drop inlet and existing 15' VCP sewer	Sewer	Storm Drain/Sewer		RESOLVED - 15" Sewer will be abandoned
160	**73+35**	UT-09	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
161	**73+50**	UT-09	RT 55'	Conflict with proposed street light with existing 15" VCP Sewer	Sewer	Storm Drain/Sewer		RESOLVED - 15" Sewer will be abandoned
162	**73+90**	UT-09	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
163	**74+00**	UT-09	RT 55'	Conflict with proposed tree well with existing 15" VCP Sewer	Sewer	Storm Drain/Sewer		RESOLVED - 15" Sewer will be abandoned
164	**74+65**	UT-09	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
165	**74+80**	UT-09	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
166	**76+25**	UT-09	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
167	**78+00**	UT-10	RT 7.5	Conflict with proposed 12X8 RCB Storm Drain with existing CATV	CATV	Storm Drain	Cox	CATV to be relocated
168	**78+00**	UT-10	RT 7.5	Conflict with proposed 12X8 RCB Storm Drain with existing underground power	Power	Storm Drain	NVE	POWER facilities to be relocated
169	**78+00**	UT-10	RT 7.5	Conflict with proposed 12X8 RCB Storm Drain with existing underground telephone	Telephone	Storm Drain	Century Link	TELEPHONE to be relocated
170	**78+10 to 94+00**	UT-10	RT 55'	Conflict with proposed tree wells and street lights over existing 15" VCP sewer	Sewer	Sewer	INTERNAL	RESOLVED - 15" Sewer will be abandoned
171	**78+10 to 94+00**	UT-10	RT 55'	Conflict with proposed tree wells and street lights over existing underground power	Power	Power	NVE	POWER lines to be relocated
172	**78+10 to 94+00**	UT-10	RT 55'	Conflict with proposed tree wells and street lights over existing underground telephone	Telephone	Telephone	Century Link	TELEPHONE to be relocated
173	**78+10 to 94+00**	UT-10	RT 55'	Conflict with proposed tree wells and street lights over existing 4" PE gas line	Gas	Gas	SW Gas	GAS line to be protected in place; root barrier if necessary; coordinate with SW Gas
174	**78+80**	UT-10	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
175	**78+95**	UT-10	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
176	**79+00 to 79+40**	UT-10	RT 55'	Conflict with existing Power facilities/boxes with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
177	**79+00 to 94+00**	UT-10	LT 55'	Conflict with proposed tree wells and street lights over existing ITS line	ITS-Traffic	Traffic Communications	City, County, NDOT	ITS conflicts to be Relocated
178	**79+00 to 94+00**	UT-10	LT 55'	Conflict with proposed tree wells and street lights over underground power	Power	Power	NVE	POWER facilities to be relocated
179	**79+85**	UT-10	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
180	**79+85**	UT-10	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
181	**81+65**	UT-10	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
182	**82+55**	UT-10	LT 55'	Conflict with proposed location of Storm Drain drop inlet and existing ITS line	Storm Drain/ITS-Traffic	Storm Drain/ITS-Traffic	City,county,NDOT/NVE	ITS conflicts to be Relocated
183	**82+55**	UT-10	LT 55'	Conflict with proposed location of Storm Drain drop inlet and existing underground power	Storm Drain/Power	Storm Drain/Power	NVE	POWER lines to be relocated
184	**82+55**	UT-10	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing 15" Sewer	Sewer	Storm Drain/Sewer	City of Las Vegas	RESOLVED - 15" Sewer will be abandoned
185	**82+55**	UT-10	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing underground power	Power	Storm Drain/Power	NVE	POWER lines to be relocated
186	**82+55**	UT-10	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing cable TV	CATV	Storm Drain/Cable TV	Cox	CATV to be relocated
187	**82+55**	UT-10	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing telephone	Telephone	Storm Drain/Telephone	Century Link	TELEPHONE to be relocated

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
188	82+95	UT-10	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
189	83+45	UT-10	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
190	84+55	UT-10	RT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
191	85+00	UT-10	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
192	85+25	UT-10	RT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is 2 feet in the proposed sidewalk.
193	86+90	UT-10	RT 55'	New Sidewalk installation will conflict with existing location of street light box	Power	Power	NVE	POWER facilities to be relocated
194	86+95	UT-10	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
195	87+00	UT-10	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
196	87+10	UT-10	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing 15" Sewer	Sewer	Storm Drain/Sewer	City of Las Vegas	RESOLVED - 15" Sewer will be abandoned
197	87+10	UT-10	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing underground power	Power	Storm Drain/Power	NVE	POWER lines to be relocated
198	87+10	UT-10	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing cable TV	CATV	Storm Drain/Cable TV	Cox	CATV to be relocated
199	87+10	UT-10	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing telephone	Telephone	Storm Drain/Telephone	Century Link	TELEPHONE to be relocated
200	88+80	UT-11	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is 2 feet in the proposed sidewalk.
201	89+70	UT-11	RT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
202	90+20	UT-11	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
203	90+60	UT-11	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
204	90+95	UT-11	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
205	91+60	UT-11	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
206	92+50	UT-11	RT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
207	93+00	UT-11	RT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
208	93+60	UT-11	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
209	93+70	UT-11	RT 55'	New Sidewalk installation will conflict with existing location of street light box	Power	Power	NVE	POWER facilities to be relocated
210	94+00 to 110+00	UT-12	RT 55'	Conflict with proposed tree wells and street lights over existing 15" VCP sewer	Sewer	Sewer	City of Las Vegas	RESOLVED - 15" Sewer will be abandoned
211	94+00 to 110+00	UT-12	RT 55'	Conflict with proposed tree wells and street lights over existing underground power	Power	Power	NVE	POWER lines to be relocated
212	94+00 to 110+00	UT-12	RT 55'	Conflict with proposed tree wells and street lights over existing underground telephone	Telephone	Telephone	Century Link	TELEPHONE to be relocated
213	94+00 to 110+00	UT-12	RT 55'	Conflict with proposed tree wells and street lights over existing 4" PE gas line	Gas	Gas	SW Gas	GAS: coordinate with SW Gas and relocate if necessary
214	94+00 to 110+00	UT-12	RT 55'	Conflict with proposed tree wells and street lights over existing 24" sewer line at 103+00 to 110+00	Sewer	Sewer	City of Las Vegas	RESOLVED - 24" Sewer will be abandoned
215	94+00 to 110+01	UT-12	LT 55'	Conflict with proposed tree wells and street lights over existing ITS line	ITS-Traffic	ITS-Traffic	CLV-NDOT	ITS conflicts to be Relocated
216	94+00 to 110+01	UT-12	LT 55'	Conflict with proposed tree wells and street lights over existing underground power	Power	Power	NVE	POWER lines to be relocated
217	94+00 to 110+01	UT-12	LT 55'	Conflict with proposed tree wells and street lights over existing underground telephone	Telephone	Telephone	Century Link	TELEPHONE to be relocated

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
218	94+00 to 110+01	UT-12	LT 55'	Conflict with proposed tree wells and street lights over existing underground cable TV	CATV	CATV	Cox	CATV to be relocated
219	94+00 to 110+01	UT-12	LT 55'	Conflict with proposed tree wells and street lights over existing 4" PE gas line	Gas	Gas	SW Gas	GAS: coordinate with SW Gas and relocate if necessary
220	94+00 to 110+01	UT-12	LT 55'	Conflict with proposed tree wells and street lights over existing 24" ACP water line.	Water	Water	Las Vegas Valley Water District	WATER line to be relocated
221	94+20	UT-12	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is 2 feet in the proposed sidewalk.
222	94+25	UT-12	RT 55'	Conflict with proposed location of Storm Drain drop inlet with existing 15" Sewer	Sewer	Storm Drain/Sewer	City of Las Vegas	RESOLVED - 15" Sewer will be abandoned
223	94+25	UT-12	RT 55'	Conflict with proposed location of Storm Drain drop inlet with existing underground power	Power	Storm Drain/Power	NVE	POWER lines to be relocated
224	94+25	UT-12	RT 55'	Conflict with proposed location of Storm Drain drop inlet with existing telephone	Telephone	Storm Drain/Telephone	Century Link	TELEPHONE to be relocated
225	94+28	UT-12	RT 37'	Conflict with proposed 12X8 RCB Storm Drain with existing CATV	CATV	Storm Drain/Cable TV	Cox	CATV to be relocated
226	94+35	UT-12	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
227	94+60	UT-12	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
228	94+65	UT-12	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
229	94+70	UT-12	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
230	95+25	UT-12	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is 2 feet in the proposed sidewalk.
231	96+00	UT-12	RT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
232	96+15	UT-12	RT 55'	Conflict with proposed location of Storm Drain drop inlet with existing 15" Sewer	Sewer	Storm Drain/Sewer	City of Las Vegas	RESOLVED - 15" Sewer will be abandoned
233	96+15	UT-12	RT 55'	Conflict with proposed location of Storm Drain drop inlet with existing underground power	Power	Storm Drain/Power	NVE	POWER lines to be relocated
234	96+15	UT-12	RT 55'	Conflict with proposed location of Storm Drain drop inlet with existing telephone	Telephone	Storm Drain/Telephone	Century Link	TELEPHONE to be relocated
235	96+35	UT-12	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
236	96+60	UT-12	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
237	97+55	UT-12	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
238	97+75	UT-12	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
239	98+25	UT-12	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
240	98+29	UT-12	RT 11.5'	Conflict with proposed 12X8 RCB Storm Drain with existing CATV	CATV	Storm Drain	Cox	CATV to be relocated
241	98+29	UT-12	RT 11.5'	Conflict with proposed 12X8 RCB Storm Drain with existing underground power	Power	Storm Drain	NVE	POWER facilities to be relocated
242	98+29	UT-12	RT 11.5'	Conflict with proposed 12X8 RCB Storm Drain with existing underground telephone	Telephone	Storm Drain	Century Link	TELEPHONE to be relocated
243	98+50	UT-12	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
244	98+60	UT-12	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
245	98+70	UT-12	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
246	99+00	UT-12	LT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
247	101+10	UT-12	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
248	101+35	UT-12	LT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
249	101+90	UT-12	LT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
250	103+00	UT-13	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
251	103+00	UT-13	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
252	103+75	UT-13	RT 75'	Conflict with proposed storm drain bubbler structure with existing 12" ACP water line	Water	Water	LVVWD	WATER line to be relocated
253	104+11	UT-13	0	Conflict with proposed 12X8 RCB Storm Drain with existing 4" PE Gas line with a 6" steel sleeve	Gas	Storm Drain	SW Gas	GAS: coordinate with SW Gas and relocate if necessary
254	104+60	UT-13	LT 55'	Conflict with proposed location of Storm Drain drop inlet with existing 15" Sewer	Sewer	Sewer	City of Las Vegas	RESOLVED - 15" Sewer will be abandoned
255	104+60	UT-13	LT 55'	Conflict with proposed location of Storm Drain drop inlet with existing underground power	Power	Power	NVE	POWER lines to be relocated
256	104+60	UT-13	LT 55'	Conflict with proposed location of Storm Drain drop inlet with existing telephone	Telephone	Telephone	Century Link	TELEPHONE to be relocated
257	104+70	UT-13	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
258	105+40	UT-13	LT 27'	Conflict with proposed 12X8 RCB Storm Drain with existing 24" ACP Water line	Water	Storm Drain	Las Vegas Valley Water District	WATER line to be relocated

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
259	106+10	UT-13	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
260	106+25	UT-13	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
261	106+40	UT-13	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
262	107+30	UT-13	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
263	107+90	UT-13	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
264	108+95	UT-13	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
265	109+00 to 126+00	UT-14	LT 55'	Conflict with proposed tree wells and street lights over existing 4" steel gas line	Gas	Gas	Southwest gas	GAS: coordinate with SW Gas and relocate if necessary
266	109+00 to 126+00	UT-14	RT 55'	Conflict with proposed tree wells and street lights over existing ITS line	ITS-Traffic	ITS-Traffic	CLV-NDOT	ITS conflicts to be Relocated
267	109+00 to 126+00	UT-14	RT 55'	Conflict with proposed tree wells and street lights over existing 24"/21" RCP sewer line	Sewer	Sewer	City of Las Vegas	RESOLVED - 21"/24"" Sewer will be abandoned
268	110+50	UT-14	RT 55'	Conflict with existing water meters, valves, and hydrant with location of new sidewalk.	Existing water facilities	Water line	City of Las Vegas	WATER facilitites to be Relocated
269	111+10	UT-14	RT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
270	111+50	UT-14	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
271	111+65	UT-14	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
272	113+15	UT-14	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
273	113+40	UT-14	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
274	114+70	UT-14	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
275	115+00	UT-14	RT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
276	116+00	UT-14	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
277	116+50	UT-14	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
278	118+35	UT-15	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
279	118+40	UT-15	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
280	119+90	UT-15	LT 55'	Conflict with existing water meters with location of new sidewalk.	Existing water facilities	Water line	City of Las Vegas	WATER facilitites to be Relocated
281	120+00	UT-15	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
282	120+30	UT-15	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
283	121+40	UT-15	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
284	123+10	UT-15	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
285	123+15	UT-15	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
286	124+40	UT-15	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
287	124+50	UT-15	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
288	125+00	UT-15	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
289	126+00 to 135+50	UT-16	LT 55'	Conflict with proposed tree wells over existing 4" steel gas line	Gas	Gas	Southwest gas	GAS: coordinate with SW Gas and relocate if necessary
290	135+50 to 146+00	UT-16	LT 55'	Conflict with proposed tree wells AND Streetlights over existing 4" steel gas line	Gas	Gas	Southwest gas	GAS: coordinate with SW Gas and relocate if necessary
291	135+50 to 146+00	UT-16	LT 55'	Conflict with proposed tree wells AND Streetlights over existing underground telephone	Telephone	Telephone	Century Link	TELEPHONE to be relocated
292	135+50 to 146+00	UT-16	LT 55'	Conflict with proposed tree wells and street lights over existing underground cable TV	CATV	CATV	Cox	CATV to be relocated
293	126+00 to 142+00	UT-16	RT 55'	Conflict with proposed tree wells and street lights over existing 24" RCP sewer	Sewer	Sewer	City of Las Vegas	SEWER: to be CIPP lined, protect in place, install over Sewer stations 131+00 to 140+00; coordinate with CLV sewer department
294	126+00 to 142+00	UT-16	RT 55'	Conflict with proposed tree wells and street lights over existing underground telephone	Telephone	Telephone	Century Link	TELEPHONE to be relocated
295	126+00 to 142+00	UT-16	RT 55'	Conflict with proposed tree wells and street lights over existing ITS line	ITS-Traffic	ITS-Traffic	CLV-NDOT	ITS conflicts to be Relocated
296	126+00 to 142+00	UT-16	RT 55'	Conflict with proposed tree wells and street lights over existing underground power	Power	Power	NVE	POWER lines to be relocated
297	127+25	UT-16	LT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
298	127+40	UT-16	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
299	128+10	UT-16	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
300	128+15	UT-16	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
301	128+75	UT-16	RT 60'	Conflict with proposed storm drain lateral and existing 6" PVC Water	Water	Water	LVVWD	Water line to be relocated.
302	128+90	UT-16	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing 24" RCP Sewer	Sewer	Storm Drain/Sewer	City of Las Vegas	RESOLVED - 24" Sewer will be abandoned
303	128+90	UT-16	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing ITS	ITS-Traffic	Storm Drain/ITS-Traffic	CLV-NDOT	ITS conflicts to be Relocated
304	129+60	UT-16	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
305	130+60	UT-16	LT 55'	Conflict with proposed location of Storm Drain drop inlet and existing 4" Steel gas line	Gas	Storm Drain/Gas	Southwest Gas	GAS: coordinate with SW Gas and relocate if necessary

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
306	**131+50**	UT-16	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
307	**131+65**	UT-16	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: 24" to be protected in place and CIPP lined. Rotate eccentric cone.
308	**131+80**	UT-16	RT 60'	Conflict with proposed storm drain lateral and existing 6" PVC Water	Water	Water	LVVWD	Water line to be relocated.
309	**131+80**	UT-16	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
310	**133+50**	UT-17	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
311	**134+50**	UT-17	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
312	**134+75**	UT-17	RT 60'	Conflict with proposed sidewalk and existing street light box	Power	Power	NVE	POWER facilities to be relocated
313	**134+76**	UT-17	RT 95'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
314	**135+25**	UT-17	LT 55'	Conflict with proposed 18 inch RCP Storm Drain line and existing Sewer	Sewer	Storm Drain/Sewer	INTERNAL/city of las Vegas	STORM DRAIN line proposed; check elevation of both utilitis by pothole data, realign storm drain line from existing sewer lateral
315	**135+35**	UT-17	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
316	**135+70**	UT-17	RT 55'	Conflict with proposed sidewalk and existing CATV boxes/facilities	CATV	CATV	Cox	CATV to be relocated
317	**135+75**	UT-17	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
318	**135+77**	UT-17	RT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
319	**135+78**	UT-17	RT 55'	Conflict with proposed sidewalk and existing street light box	Power	Power	NVE	POWER facilities to be relocated
320	**135+85**	UT-17	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
321	**135+85**	UT-17	RT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
322	**136+10**	UT-17	LT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
323	**136+30**	UT-17	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
324	**136+45**	UT-17	RT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
325	**137+25**	UT-17	LT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
326	**137+95**	UT-17	LT 110'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard wood utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
327	**138+55**	UT-17	RT 55'	Conflict with proposed location of Storm Drain drop inlet with existing 24" Sewer	Sewer	Storm Drain/Sewer	City of Las Vegas	SEWER: 24" to be protected in place and CIPP lined.
328	**138+55**	UT-17	RT 55'	Conflict with proposed location of Storm Drain drop inlet with existing ITS	ITS-Traffic	Storm Drain/ ITS-Traffic	CLV-NDOT	ITS conflicts to be Relocated
329	**138+55**	UT-17	RT 55'	Conflict with proposed location of Storm Drain drop inlet with existing underground power	Power	Storm Drain/Power	NVE	POWER lines to be relocated
330	**138+55**	UT-17	RT 55'	Conflict with proposed location of Storm Drain drop inlet with existing telephone	Telephone	Storm Drain/Telephone	Century Link	TELEPHONE to be relocated
331	**139+55**	UT-17	LT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Storm Drain/Power	NVE	POWER facilities to be relocated
332	**139+70**	UT-17	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
333	**139+85**	UT-17	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
334	**140+90**	UT-17	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
335	**141+30**	UT-17	RT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
336	**141+60**	UT-17	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: 24" to be protected in place and CIPP lined. Rotate eccentric cone.
337	**142+00 to 150+50**	UT-18	LT 55'	Conflict with proposed tree wells over existing 4" steel gas and 8" PRIVATE PVC Sewer	Gas	Gas	Southwest Gas	GAS: coordinate with SW Gas and relocate if necessary
338	**142+00 to 150+50**	UT-18	RT 55'	Conflict with proposed tree wells AND Streetlights over 24" RCP Sewer line	Sewer	Sewer	City of Las Vegas	RESOLVED - 24" Sewer will be abandoned

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
339	142+00 to 150+50	UT-18	RT 55'	Conflict with proposed tree wells and street lights over existing underground telephone	Telephone	Telephone	Century Link	TELEPHONE to be relocated
340	142+00 to 150+50	UT-18	RT 55'	Conflict with proposed tree wells and street lights over existing ITS line	ITS-Traffic	ITS-Traffic	CLV-NDOT	ITS conflicts to be Relocated
350	142+90	UT-18	RT 55'	Conflict with proposed sidewalk and existing street light box	Power	Power	NVE	POWER facilities to be relocated
351	143+25	UT-18	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
352	143+95	UT-18	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
353	145+10	UT-18	LT 55'	Conflict with proposed location of Storm Drain drop inlet and existing 4" Steel gas line	Gas	Storm Drain/Gas	Southwest Gas	GAS: coordinate with SW Gas and relocate if necessary
354	145+10	UT-18	LT 55'	Conflict with proposed location of Storm Drain drop inlet and existing 8" PVC Sewer	Sewer	Storm Drain/Sewer	City of Las Vegas	SEWER: Protect in place, verify with pothole depth data
355	146+10	UT-18	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
356	147+80	UT-18	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utilitites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
357	150+10	UT-19	RT 55'	Conflict with proposed sidewalk and existing street light box	Power	Power	NVE	POWER facilities to be relocated
358	150+45	UT-19	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
359	150+50	UT-19	LT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	RESOLVED - 24" Sewer will be abandoned
341	150+50 to 158+00	UT-19	LT 55'	Conflict with proposed tree wells and street lights over existing 4" steel gas line	Gas	Gas	Southwest Gas	GAS: coordinate with SW Gas and relocate if necessary
342	150+50 to 158+00	UT-19	LT 55'	Conflict with proposed tree wells AND Streetlights over existing underground telephone	Telephone	Telephone	Century Link	TELEPHONE to be relocated
343	150+50 to 158+00	UT-19	LT 55'	Conflict with proposed tree wells AND Streetlights over 8" and 14" Water (CNLV)	Water	Water	City of NORTH Las Vegas	WATER: City of NORTH Las Vegas water Facilities to be relocated
344	150+50 to 158+00	UT-19	LT 55'	Conflict with proposed tree wells AND Streetlights over 8" PVC Sewer	Sewer	Sewer	City of Las Vegas	SEWER: Protect in place, verify with pothole depth data
345	150+50 to 158+00	UT-19	RT 55'	Conflict with proposed tree wells AND Streetlights over 24" RCP Sewer line	Sewer	Sewer	City of Las Vegas	RESOLVED - 24" Sewer will be abandoned
346	150+50 to 158+00	UT-19	RT 55'	Conflict with proposed tree wells and street lights over existing ITS line	ITS-Traffic	ITS-Traffic	CLV-NDOT	ITS conflicts to be Relocated
347	150+50 to 158+00	UT-19	RT 55'	Conflict with proposed tree wells AND Streetlights over existing underground telephone	Telephone	Telephone	Century Link	TELEPHONE to be relocated
348	150+50 to 158+00	UT-19	RT 55'	Conflict with proposed tree wells AND Streetlights over 8" and 14" Water (CNLV)	Water	Water	City of NORTH Las Vegas	WATER: City of NORTH Las Vegas water Facilities to be relocated
349	150+50 to 158+00	UT-19	RT 55'	Conflict with proposed tree wells and street lights over existing 2" PE Gas line	Gas	Gas	Southwest Gas	GAS: coordinate with SW Gas and relocate if necessary
360	150+60	UT-19	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
361	150+90	UT-19	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
362	151+00	UT-19	LT 55'	Conflict with existing Water meter, BFP, with location of new sidewalk.	Existing water facilities	Water line	City of NORTH Las Vegas	WATER: City of NORTH Las Vegas water Facilities to be relocated
363	151+10	UT-19	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	RESOLVED - 24" Sewer will be abandoned
364	151+40	UT-19	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
365	151+75	UT-19	LT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	RESOLVED - 24" Sewer will be abandoned
366	152+15	UT-19	LT 55'	Conflict with existing Water BFP with location of new sidewalk.	Existing water facilities	Water line	City of NORTH Las Vegas	WATER: City of NORTH Las Vegas water Facilities to be relocated
367	152+40	UT-19	LT 55'	Conflict with existing Water meter, with location of new sidewalk.	Existing water facilities	Water line	City of NORTH Las Vegas	WATER: City of NORTH Las Vegas water Facilities to be relocated

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
368	152+50	UT-19	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
369	152+65	UT-19	RT 55'	Conflict with proposed sidewalk and existing street light box	Power	Power	NVE	POWER facilities to be relocated
370	152+66	UT-19	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
371	153+75	UT-19	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
372	153+85	UT-19	LT 55'	Conflict with existing Water meter, BFP, with location of new sidewalk.	Existing water facilities	Water line	City of NORTH Las Vegas	WATER: City of NORTH Las Vegas water Facilities to be relocated
373	154+00	UT-19	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	RESOLVED - 24" Sewer will be abandoned
374	154+20	UT-19	LT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
375	154+30	UT-19	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
376	154+50	UT-19	LT 55'	Conflict with proposed sidewalk and existing street light box	Power	Power	NVE	POWER facilities to be relocated
377	155+40	UT-19	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
378	155+50	UT-19	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	RESOLVED - 24" Sewer will be abandoned
379	156+25	UT-19	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
380	156+80	UT-19	LT 55'	Conflict with existing Water meter, BFP, with location of new sidewalk.	Existing water facilities	Water line	City of NORTH Las Vegas	WATER: City of NORTH Las Vegas water Facilities to be relocated
381	157+40	UT-19	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
382	157+50	UT-19	LT 55'	Conflict with existing Water facilities; water meter, BFP, hydrant, rppa with location of new sidewalk.	Existing water facilities	Water line	City of NORTH Las Vegas	WATER: City of NORTH Las Vegas water Facilities to be relocated
383	157+75	UT-19	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
384	158+00 to 166+00	UT-20	LT 55'	Conflict with proposed tree wells AND Streetlights over 4" steel Gas line	Gas	Gas	Southwest Gas	GAS: coordinate with SW Gas and relocate if necessary
385	158+00 to 166+00	UT-20	RT 55'	Conflict with proposed tree wells AND Streetlights over 24" RCP Sewer line	Sewer	Sewer	City of Las Vegas	RESOLVED - 24" Sewer will be abandoned
386	158+00 to 166+00	UT-20	RT 55'	Conflict with proposed tree wells AND Streetlights over 18" RCP Sewer line	Sewer	Sewer	City of Las Vegas	RESOLVED - 18" Sewer will be abandoned
387	158+00 to 166+00	UT-20	RT 55'	Conflict with proposed tree wells AND street lights over existing 2" PE Gas line	Gas	Gas	Southwest Gas	GAS: coordinate with SW Gas and relocate if necessary
388	166+00 to 174+00	UT-20	LT 55'	Conflict with proposed tree wells AND Streetlights over 4" steel Gas	Gas	Gas	Southwest Gas	GAS: coordinate with SW Gas and relocate if necessary
389	166+00 to 174+00	UT-20	LT 55'	Conflict with proposed tree wells and street lights over existing underground power	Power	Power	NVE	POWER lines to be relocated
390	166+00 to 174+00	UT-20	LT 55'	Conflict with proposed tree wells and street lights over existing ITS line	ITS-Traffic	ITS-Traffic	CLV-NDOT	ITS conflicts to be Relocated
391	158+20	UT-20	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
392	159+75	UT-20	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
393	159+75	UT-20	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	TRAFFIC facilities to be relocated
394	160+25	UT-20	RT 55'	Conflict with proposed location of Storm Drain drop inlet with existing 4" steel Gas	Gas	Storm Drain/Gas	Southwest Gas	GAS: coordinate with SW Gas and relocate if necessary
395	160+25	UT-20	RT 55'	Conflict with proposed location of Storm Drain drop inlet with existing 8" PVC Sewer	Sewer	Storm Drain/Sewer	City of Las Vegas	RESOLVED - 15" Sewer will be abandoned
396	160+25	UT-20	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing ITS	ITS-Traffic	Storm Drain/ITS-Traffic	CLV-NDOT	ITS conflicts to be Relocated

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
397	160+80	UT-20	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	Standard utility poles to remain in place, unless otherwise decided by city to be relocated. Current location is zero to 3 feet in the proposed sidewalk.
398	161+25	UT-20	RT 55'	Conflict with proposed sidewalk and existing street light box	Power	Power	NVE	POWER facilities to be relocated
399	162+25	UT-20	LT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
400	162+60	UT-20	LT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
401	162+70	UT-20	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
402	163+25	UT-20	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utilitites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
403	163+30	UT-20	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
404	165+20	UT-20	LT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
405	165+25	UT-20	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
406	165+30	UT-20	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utilitites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
407	165+40	UT-20	LT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
408	167+00	UT-21	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utilitites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
409	167+05	UT-21	RT 190'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utilitites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
410	167+10	UT-21	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing 18" Sewer	Storm Drain/ Sewer	Storm Drain/ Sewer	INTERNAL/City of Las Vegas	RESOLVED - 18" Sewer will be abandoned
411	167+15	UT-21	LT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
412	167+40	UT-21	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
413	167+50	UT-21	LT 55'	Conflict with existing Power facilities with proposed sidewalk	Power	Power	NVE	POWER facilities to be relocated
414	167+60	UT-21	RT 80'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
415	167+61	UT-21	RT 90'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utilitites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
416	167+80	UT-21	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
417	168+20	UT-21	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
418	168+25	UT-21	LT 55'	Conflict with proposed location of Storm Drain drop inlet with existing 4" steel Gas	Gas	Storm Drain/Gas	Southwest Gas	GAS: coordinate with SW Gas and relocate if necessary
419	168+25	UT-21	LT 55'	Conflict with proposed location of Storm Drain drop inlet and existing ITS	ITS-Traffic	Storm Drain/ITS-Traffic	CLV-NDOT	ITS conflicts to be Relocated
420	168+35	UT-21	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
421	168+60	UT-21	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utilitites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
422	168+75	UT-21	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
423	169+05	UT-21	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
424	169+10	UT-21	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utilitites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
425	169+25	UT-21	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
426	169+60	UT-21	RT 10'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
427	170+40	UT-21	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
428	170+75	UT-21	LT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
429	171+90	UT-21	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
430	172+25	UT-21	LT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
431	172+60	UT-21	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utilitites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
432	173+55	UT-21	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
433	174+00 to 186+00	UT-22	LT 55'	Conflict with proposed tree wells AND Streetlights over 4" steel Gas line	Gas	Gas	Southwest Gas	GAS: coordinate with SW Gas and relocate if necessary
434	174+00 to 186+00	UT-22	LT 55'	Conflict with proposed tree wells and street lights over existing ITS line	ITS-Traffic	ITS-Traffic	CLV-NDOT	ITS conflicts to be Relocated
435	174+00 to 186+00	UT-22	RT 55'	Conflict with proposed tree wells AND Streetlights; 21" RCP Sewer	Sewer	Sewer	City of Las Vegas	SEWER: to be CIPP lined, protect in place, install over Sewer stations 131+00 to 140+00; coordinate with CLV sewer department
436	174+30	UT-22	RT 0'	Conflict with proposed sidewalk and existing street light box	Power	Power	NVE	POWER facilities to be relocated
437	174+75	UT-22	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
438	175+05	UT-22	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated

Conflict No.	Station	Utility Plan Sheet Number	Offset	Description of Potential Conflict	Utility Conflict Description	Type	Utility Company/Utility Owner/Agency	Resolution
439	175+45	UT-22	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
440	175+50	UT-22	LT 55'	Conflict with proposed sidewalk and existing street light box	Power	Power	NVE	POWER facilities to be relocated
441	176+60	UT-22	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: Remove sewer manhole cone per CCRWD 3.18a, crack base, fill with slurry
442	178+00	UT-22	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing 18" Sewer	Storm Drain/ Sewer	Storm Drain/ Sewer	INTERNAL/City of Las Vegas	RESOLVED - 18" Sewer will be abandoned
443	178+00	UT-22	RT 55'	Conflict with proposed location of Storm Drain drop inlet and existing underground telephone	Telephone	Telephone	Century Link	TELEPHONE to be relocated
444	178+35	UT-22	LT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
445	179+35	UT-22	RT 55'	Conflict with proposed sidewalk and existing telephone boxes/facilities	Telephone	Telephone	Century Link	TELEPHONE to be relocated
446	179+50	UT-22	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
447	179+90	UT-22	RT 55'	Conflict with existing utility pole with proposed sidewalk	Power/CATV/Telephone/ Fiber	Power/CATV/Telephone/ Fiber	NVE/Cox/Centurylink/Zayo	POWER ; multiple utiltites to be relocated on utiltiy pole: TELEPHONE, CABLE, FIBER
448	179+95	UT-22	RT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
449	180+85	UT-22	RT 55'	Conflict with existing sewer manhole with proposed sidewalk - rotate eccentric cone	Sewer	Sewer	City of Las Vegas	SEWER: 21" to be protected in place. Rotate eccentric cone.
450	182+25	UT-22	LT 55'	Conflict with proposed sidewalk and existing traffic controller facilities/box	Traffic	Traffic	NDOT/City	TRAFFIC facilities to be relocated
451	108+50 Alexander Alignment	SD-31	0	Conflict with future storm drain and existing 8" PVC Water	Water	Water	LVVWD	WATER line to be relocated.
452	112+00 Alexander Alignment	SD-32	0	Conflict with future storm drain and existing 8" PVC Water	Water	Water	LVVWD	WATER line to be relocated.
453	113+50 Alexander Alignment	SD-32	0	Conflict with future storm drain and existing 8" PVC Water	Water	Water	LVVWD	WATER line to be relocated.
454	116+50 Alexander Alignment	SD-32	0	Conflict with future storm drain and existing 8" PVC Water	Water	Water	LVVWD	WATER line to be relocated.
455	122+50 Alexander Alignment	SD-33	0	Conflict with future storm drain and existing 6" ACP Water	Water	Water	LVVWD	WATER line to be relocated.
456	122+50 Alexander Alignment	SD-33	RT 40'	Conflict with future storm drain and existing 6" ACP Water	Water	Water	LVVWD	WATER line to be relocated.
457	132+50 Alexander Alignment	SD-34	0	Conflict with future storm drain and existing 6" ACP Water	Water	Water	LVVWD	WATER line to be relocated.
458	156+75 Alexander alignment	SD-37	0	Conflict with future storm drain with 16 inch Waterline at Alexander/Decatur Intersection	Waterline	Storm Drain/Water	CNLV	WATER Line to be relocated

Appendix G

REFERENCES

- City / NDOT correspondence
- DM2 Drop Inlet Detail
- CCRFCD MPU 10-year plan
- Gowan Lone Mountain Stormdrain Improvement Plans

Murvosh, Helena

Subject: FW: City of LV Rancho Widening Projects - 9/13 NDOT Drainage Meeting

Importance: High

From: Gina Venglass
Sent: Monday, September 19, 2011 4:10 PM
To: 'eyount@dot.state.nv.us'; 'jramirez@dot.state.nv.us'
Cc: Jeremy Leavitt; Robert Welch; Randy McConnell; Michael Sturdivant
Subject: City of LV Rancho Widening Projects - 9/13 NDOT Drainage Meeting

Good afternoon,
Below are some notes I took at the September 13th meeting.

- In the case where curb lines move inward, NDOT will require a pre and post hydraulic model for 25 and 100 year storms. In the case where curb lines are moving out, a hydraulic model is not required but a more qualitative analysis can be done.
-NDOT requires protection of 25 year storm, however if pre-model already shows inundation then NDOT will evaluate at that time on how to proceed. They would prefer that the project provide necessary protection or at least minimize inundation.
-Onsite areas would be analyzed when not already impacted by offsite flows. NDOT will require ½ dry lane in the lane adjacent to the transit lane for areas affected only by onsite flow.
-Model for offsite flow will be necessary to show impact of addition of curb. NDOT is agreeable to discuss software used to generate model, but HEC-RAS is their preference. If ultimate flow rate is used and reduces could reduce facility sizes, NDOT is agreeable to evaluate.
-If water surface not raising with 100 year event prove no adverse impacts/worsening condition.
- Considering this is an existing area, not a brand new roadway, NDOT would be open to suggestions to meet drainage criteria and alleviate flooding issues.

Rob provided an update of City of Las Vegas facilities that would be installed by the time this project is funded:
-Washington/Vegas
-Decatur
-Lone Mountain
-There are no additional regional facilities, however there are local facility impacts
-The study for Rancho will account for Washington, Vegas and Lone Mountain flood control facilities in-place, especially if the curb in Washington is already out of the flood zone.

Please reply to all of you have a suggested change.

Thank you both again for meeting with us.

Gina M. Venglass, P.E.
City of Las Vegas Public Works
Capital Project Management
phone (702) 229-6790

SPECIFICATION REFERENCE	
501	CONCRETE
501	CONCRETE STRUCTURES
501	REINFORCING STEEL
501	STEEL

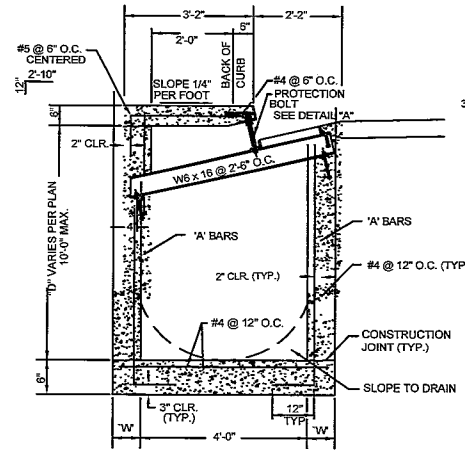
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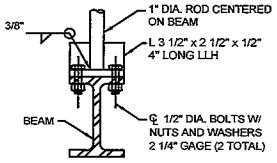
UNIFORM STANDARD DRAWINGS
CLARK COUNTY AREA

TYPE "C-D" MODIFIED
DROP INLET

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9-14-06	412.1

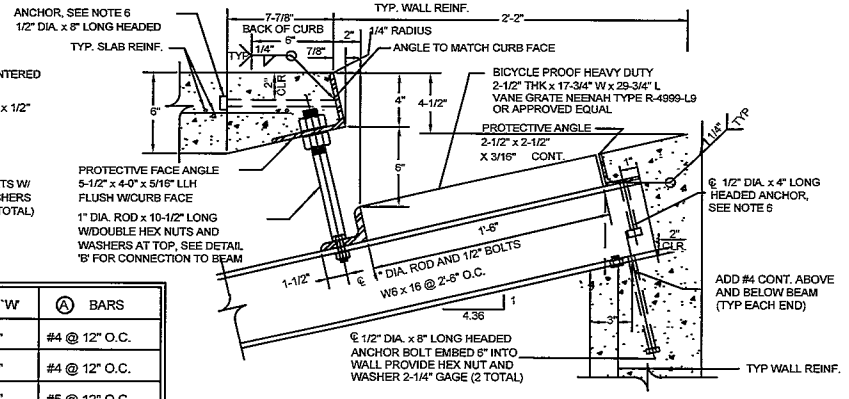


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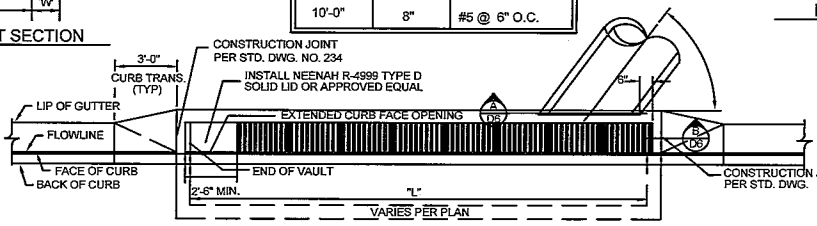


DETAIL "B"

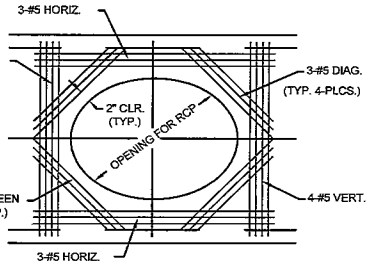
D (MAX)	DIM. 'W'	Ⓐ BARS
4'-0"	6"	#4 @ 12" O.C.
6'-0"	6"	#4 @ 12" O.C.
8'-0"	8"	#5 @ 12" O.C.
10'-0"	8"	#5 @ 6" O.C.



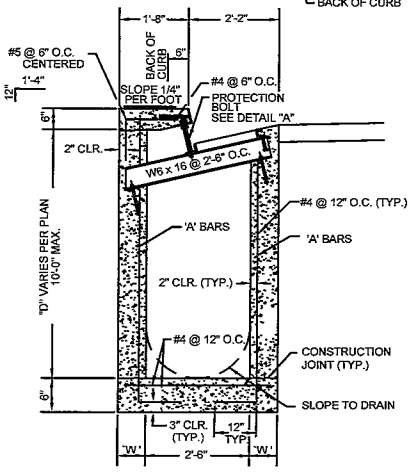
PROTECTIVE FACE & ROD - DETAIL "A"



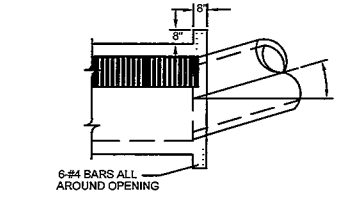
DROP INLET LAYOUT PLAN



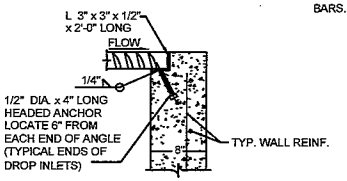
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TYPE "DM2" DROP INLET SECTION



ALTERNATE CONNECTION DETAIL



SECTION "B"

NOTES:

1. ALL EXPOSED METALS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
2. PROVIDE 1/2" (MIN.) CLEARANCE ALL AROUND THE STEEL BEAM, DRY PACK AFTER INSTALLATION.
3. WHEN REQUIRED BY LENGTH OF OPENING, PLATE ANGLE MAY BE DELIVERED IN SECTIONS AND BUTT WELDED IN PLACE.
4. ALL GALVANIZED DAMAGED BY WELDING SHALL RECEIVE TWO COATS OF GALVALLOY OR EQUAL.
5. CONCRETE SHALL BE MODIFIED CLASS DA 4000 PSI, SEE SPECIAL PROVISIONS SECTION 501.
6. ANGLE ANCHORS SHALL BE EMBEDDED MIDPOINT IN EACH ENDWALL AND EVENLY SPACED, (MAXIMUM SPACING OF 2').

SPECIFICATION REFERENCE

501	CONCRETE
501	CONCRETE STRUCTURES
501	REINFORCING STEEL
501	STEEL

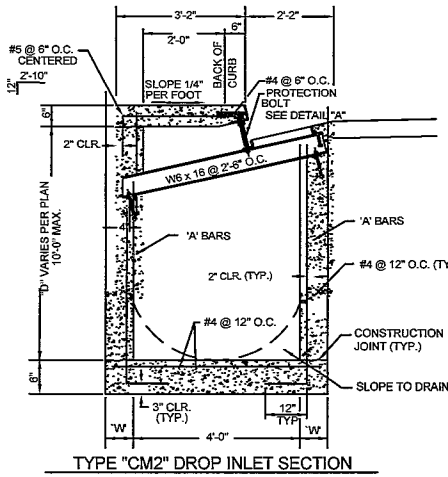
AGENCY APPROVED

B	C	H	L	M	N

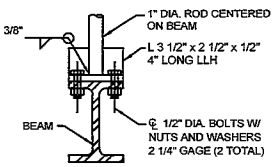
DATE 9-14-06 | DWG. NO. 412.1

UNIFORM STANDARD DRAWINGS
CLARK COUNTY AREA

TYPE "C-D" MODIFIED DROP INLET

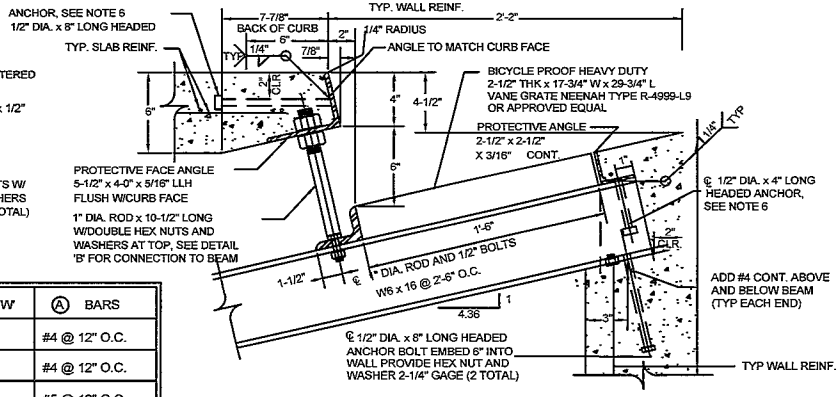


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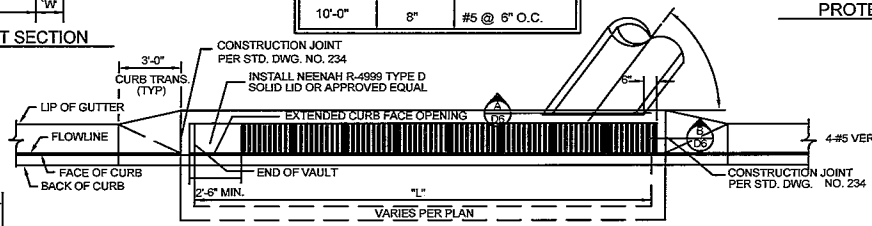


DETAIL "B"

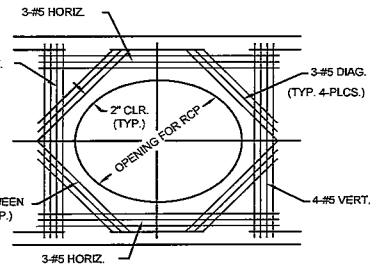
D (MAX)	DIM. 'W'	Ⓐ BARS
4'-0"	6"	#4 @ 12" O.C.
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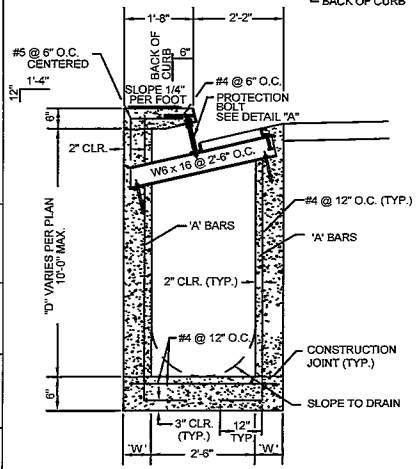
PROTECTIVE FACE & ROD - DETAIL "A"



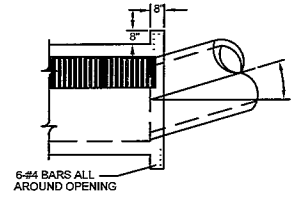
DROP INLET LAYOUT PLAN



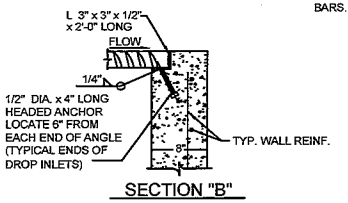
SECTION "A"



TYPE "DM2" DROP INLET SECTION



ALTERNATE CONNECTION DETAIL

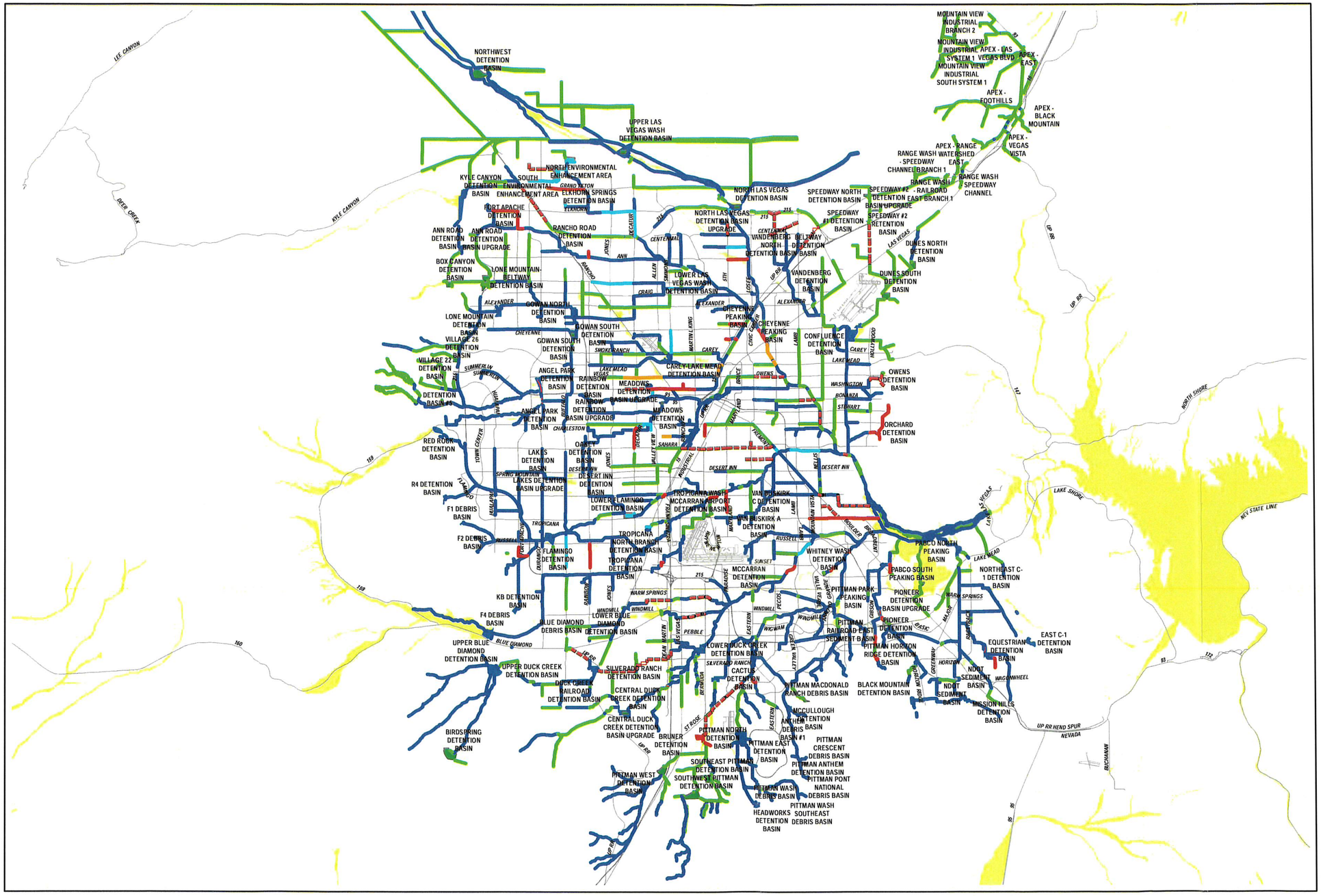


SECTION "B"

NOTES:

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TEN-YEAR CONSTRUCTION PROGRAM
LAS VEGAS VALLEY



LEGEND

Conveyances

STATUS

- Completed
- Under Construction
- EFS
- Proposed
- Ten Year - 1st Five
- Ten Year - 2nd Five

Detention Basins

STATUS

- Completed
- Under Construction
- EFS
- Proposed
- Ten Year - 1st Five
- Ten Year - 2nd Five

100 Year Flood Zones

- 100-Year Flood Zone

1 inch = 4.3 miles

THIS MAP IS FOR GRAPHIC USE ONLY AND DOES NOT REPRESENT A SURVEY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA DELINEATED HEREON.

DATA SOURCES:
CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
CLARK COUNTY GISMO
FEMA

FLOOD INSURANCE (FIRM) INFORMATION:
FEMA 2002 DIGITAL FIRM. NOT THE EFFECTIVE FIRM. ALL INFORMATION IS SUBJECT TO CHANGE. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA DELINEATED HEREON. ALL INQUIRIES INTO THE STATUS OF CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT FACILITIES SHOULD BE MADE TO THE DISTRICT OFFICE AT 600 S. GRAND CENTRAL PKWY, SUITE 309, LAS VEGAS, NEVADA 89106-4511.

May, 2011

REGIONAL FLOOD CONTROL DISTRICT

IMPROVEMENT PLANS
FOR
GOWAN OUTFALL LONE MOUNTAIN BRANCH
RANCHO TO DECATUR

CITY OF LAS VEGAS
STATE OF NEVADA
BID NO. 10.1730.17

Mayor:
Oscar B. Goodman

Councilmen:
Gary Reese (Mayor Pro-Tem)
Steve Wolfson
Lois Tarkanian
Steven D. Ross
Ricki Y. Barlow
Stavros S. Anthony

City Manager:
Elizabeth N. Fretwell

Director of Public Works:
Jorge Cervantes, P.E., P.T.O.E.

City Engineer:
Cheri Edelman, P.E.

DEPARTMENT OF PUBLIC WORKS
400 STEWART AVENUE
LAS VEGAS, NV 89101
(702) 229-6276

FUNDED BY:
CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

REVIEWED BY:

Cheri Edelman — 8/31/10
CLV City Engineer — Date

8/31/10
CLV Construction Management — Date

Gina M. Wenglass — 8/31/10
CLV Engineering Project Manager — Date

9/1/10
CLV Traffic Engineer — Date

8/12/2010
Clark County Regional Flood Control District — Date

NDOT ENCROACHMENT PERMIT #111463-2009
Nevada Department Of Transportation — Date

Richard Nextlebuch — 2/25/2010
CenturyLink — Date

Las Vegas Valley Water District Engineering Services Manager
Project # 115373 Date: 08/16/10
Sheets: G1-G4, C1-C14, C16-C23, C25-C31 & S5

3/4/10
NV Energy Distribution — Date

03/11/10
Southwest Gas Company Corporation — Date

2-25-10
Cox Communication Las Vegas, Inc. — Date

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NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

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HANSEN NO.
H# 23160

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REV	DATE	BY	REVISION

SHEET: COVER SHEET
TITLE: GOWAN OUTFALL LONE MOUNTAIN BRANCH RANCHO TO DECATUR

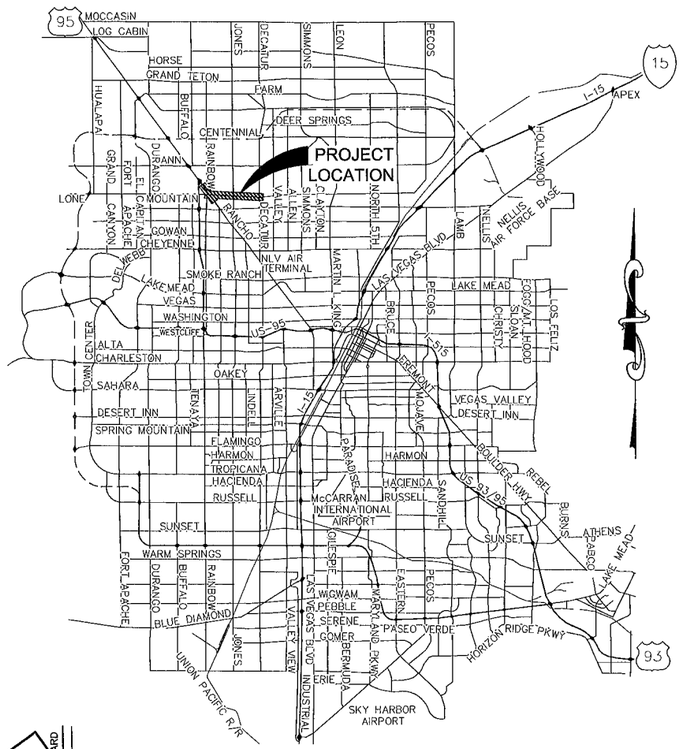
DRAWN BY: RKB
DESIGNED BY: CLB
CHECKED BY: JEP
PROJECT NO: 512-535
SCALE: HORIZ VERT

SEAL
SIGNATURE ENGINEER JERRY E. PRUITT Exp. 12/31/2011 CIVIL No. 11902 STATE OF NEVADA
2-26-10

SHEET
G1
1 OF 67 SHEETS

DRAWING NO.
731-53E

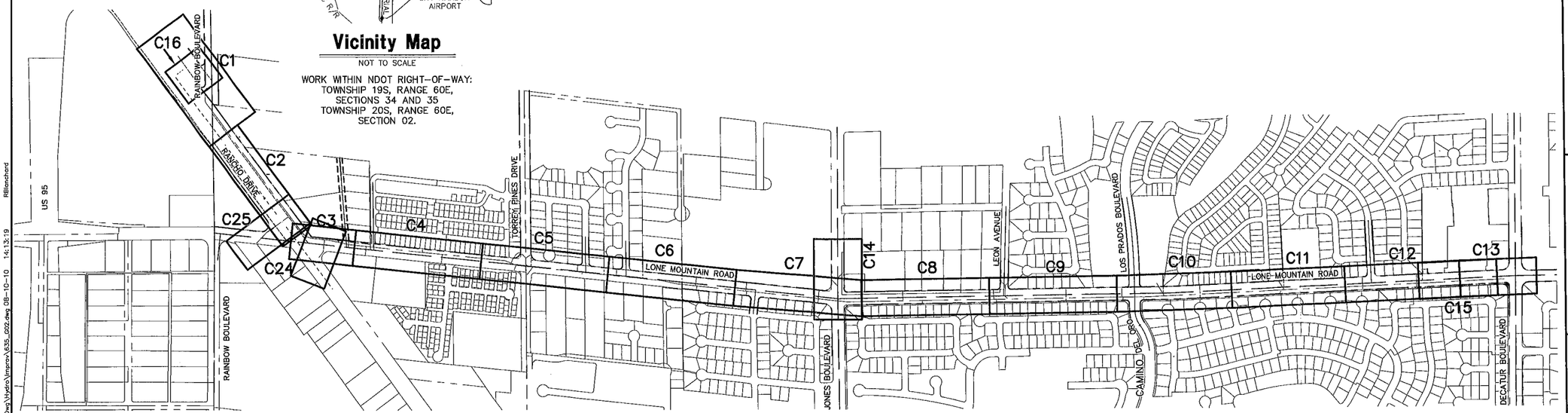
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Vicinity Map

NOT TO SCALE

WORK WITHIN NDOT RIGHT-OF-WAY:
TOWNSHIP 19S, RANGE 60E,
SECTIONS 34 AND 35
TOWNSHIP 20S, RANGE 60E,
SECTION 02.



Location/Key Map

NOT TO SCALE

INDEX OF DRAWINGS

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1	G1	COVER SHEET
2	G2	VICINITY MAP AND SHEET INDEX
3	G3	GENERAL NOTES
4	G4	LEGEND, SYMBOLS, AND ABBREVIATIONS
5	G5	SURVEY CONTROL PLAN
6	G6	HORIZONTAL CONTROL PLAN
7	G7	RIGHT-OF-WAY PLAN
8	G8	RIGHT-OF-WAY PLAN
9	G9	RIGHT-OF-WAY PLAN
10	G10	RIGHT-OF-WAY PLAN
11	C1	PLAN & PROFILE "O" 287+00.00 TO "O" 278+00.00
12	C2	PLAN & PROFILE "O" 278+00.00 TO "O" 268+32.63
13	C3	PLAN & PROFILE "O" 268+32.63 TO "LM" 30+50.00
14	C4	PLAN & PROFILE "LM" 30+50.00 TO "LM" 40+50.00
15	C5	PLAN & PROFILE "LM" 40+50.00 TO "LM" 50+50.00
16	C6	PLAN & PROFILE "LM" 50+50.00 TO "LM" 60+50.00
17	C7	PLAN & PROFILE "LM" 60+50.00 TO "LM" 70+50.00
18	C8	PLAN & PROFILE "LM" 70+50.00 TO "LM" 80+50.00
19	C9	PLAN & PROFILE "LM" 80+50.00 TO "LM" 90+50.00
20	C10	PLAN & PROFILE "LM" 90+50.00 TO "LM" 99+50.00
21	C11	PLAN & PROFILE "LM" 99+50.00 TO "LM" 108+50.00
22	C12	PLAN & PROFILE "LM" 108+50.00 TO "LM" 117+50.00
23	C13	PLAN & PROFILE "LM" 117+50.00 TO END
24	C14	PLAN & PROFILE JONES BOULEVARD
25	C15	PLAN & PROFILE 12" SANITARY SEWER
26	C16	ENLARGEMENT – RAINBOW BOULEVARD AND RANCHO DRIVE
27	C17	ENLARGEMENT – TORREY PINES DRIVE AND LONE MOUNTAIN ROAD
28	C18	ENLARGEMENT – JONES BOULEVARD AND LONE MOUNTAIN ROAD
29	C19	ENLARGEMENT – LEON AVENUE AND LONE MOUNTAIN ROAD
30	C20	ENLARGEMENT – LOS PRADOS BOULEVARD AND LONE MOUNTAIN ROAD
31	C21	PLAN & PROFILE WATER RELOCATION
32	C22	PLAN & PROFILE WATER RELOCATIONS
33	C23	ACP WATERLINE REPLACEMENTS
34	C24	TRAFFIC PLANS – RANCHO/LONE MOUNTAIN
35	C25	PLAN & PROFILE RANCHO/LONE MOUNTAIN STORM DRAIN
36	C26	LATERAL PROFILES
37	C27	LATERAL PROFILES
38	C28	LATERAL PROFILES
39	C29	LATERAL PROFILES
40	C30	LATERAL PROFILES
41	C31	LATERAL PROFILES AND PLAN AND PROFILE
42	C32	DETAILS – TYPE "CM" DROP INLET
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45	C35	DETAILS
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50	ST1	STRIPING DETAILS
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55	S3	CONCRETE JUNCTION STRUCTURE RANCHO DRIVE "O" 269+74.92
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58	S6	STRUCTURAL DETAILS – JUNCTION BOX – "LM" 68+77.97
59	S7	STRUCTURAL DETAILS – JUNCTION STRUCTURE – "LM" 82+27.94
60	S8	STRUCTURAL DETAILS – JUNCTION STRUCTURE – "LM" 93+60.76 – 81.15' LT
		NV ENERGY
61	1	EXHIBIT "A"
62	2	EXHIBIT "A" – PROFILE ELEVATION
63	3	EXHIBIT "A" – PROFILE ELEVATION
64	4	EXHIBIT "A" – PROFILE ELEVATION
65	5	EXHIBIT "A" – PROFILE ELEVATION
66	6	EXHIBIT "A" – PROFILE ELEVATION
67	7	EXHIBIT "A"

APPROVED FOR CONSTRUCTION
LAS VEGAS VALLEY WATER DISTRICT
ENGINEERING SERVICES MANAGER
PROJECT NO. 115373 DATE: 8/16/10

HANSEN NO. H# 23160

REV	DATE	BY	REVISION

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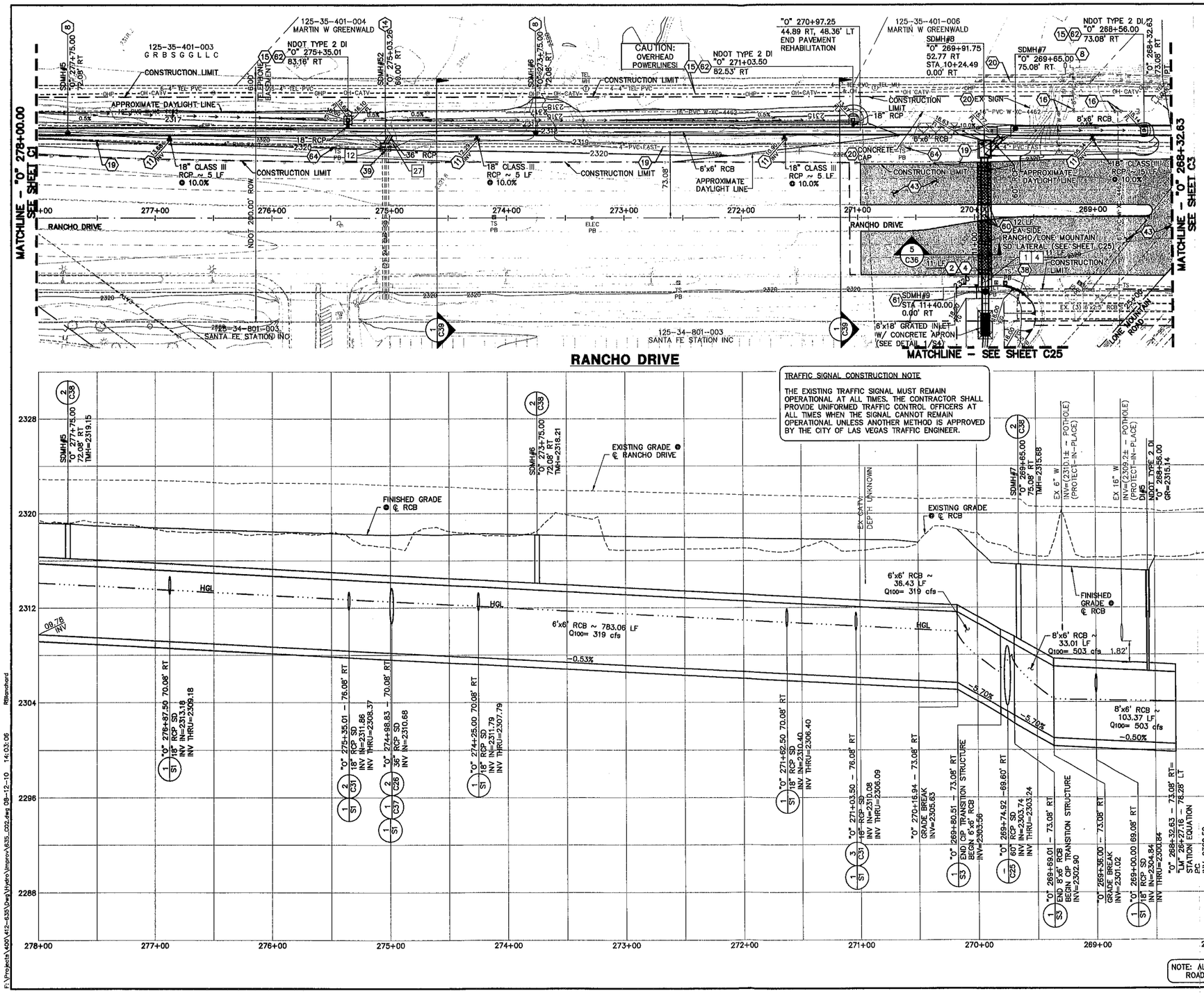
SHEET: VICINITY MAP AND SHEET INDEX
TITLE: GOWAN OUTFALL LONE MOUNTAIN BRANCH RANCHO TO DECATUR

DRAWN BY: DWJ
DESIGNED BY: CJB
CHECKED BY: WEF
PROJECT NO: 412-635
SCALE: HORIZ / VERT

SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY L. PRUITT Exp. 12/31/2011 CIVIL No. 11902
8-16-10

SHEET G2
2 OF 67 SHEETS
DRAWING NO. 731-53E

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RANCHO DRIVE

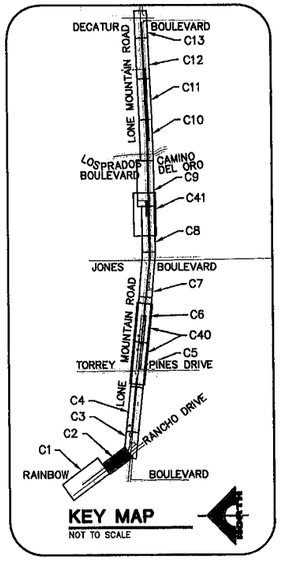
TRAFFIC SIGNAL CONSTRUCTION NOTE

THE EXISTING TRAFFIC SIGNAL MUST REMAIN OPERATIONAL AT ALL TIMES. THE CONTRACTOR SHALL PROVIDE UNIFORMED TRAFFIC CONTROL OFFICERS AT ALL TIMES WHEN THE SIGNAL CANNOT REMAIN OPERATIONAL UNLESS ANOTHER METHOD IS APPROVED BY THE CITY OF LAS VEGAS TRAFFIC ENGINEER.

NOTE: ALL STATIONING FROM CENTERLINE OF ROADWAY UNLESS OTHERWISE NOTED.

NORTH
SCALE 1" = 40'

40 0 40 80
SCALE FEET



KEY MAP
NOT TO SCALE

LEGEND

- 3/4" ROTOMILL AND 3/4" PLANTMIX BITUMINOUS OPEN-GRADED SURFACE (PG 76-22NV) (1/2" SIZE)
- 6" PLANTMIX BITUMINOUS SURFACE (PG 76-22NV) (TYPE 2D) OVER 12" TYPE I CLASS B AGGREGATE BASE
- PERMANENT ASPHALT PATCH MATCH EXISTING
- NEW CURB, GUTTER, AND SIDEWALK

NOTE: SEE SHEET G4 FOR CONSTRUCTION AND REMOVAL NOTES.

NOTE: ALL RCP TO HAVE RUBBER GASKETS

APPROVED FOR CONSTRUCTION AND UPACS
LAS VEGAS VALLEY WATER DISTRICT
ENGINEERING SERVICES MANAGER
PROJECT NO. 116373 DATE: 08/16/10

DISCLAIMER NOTE

UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UNDERGROUND AND OVERHEAD UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811 or 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

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REV	DATE	BY	REVISION

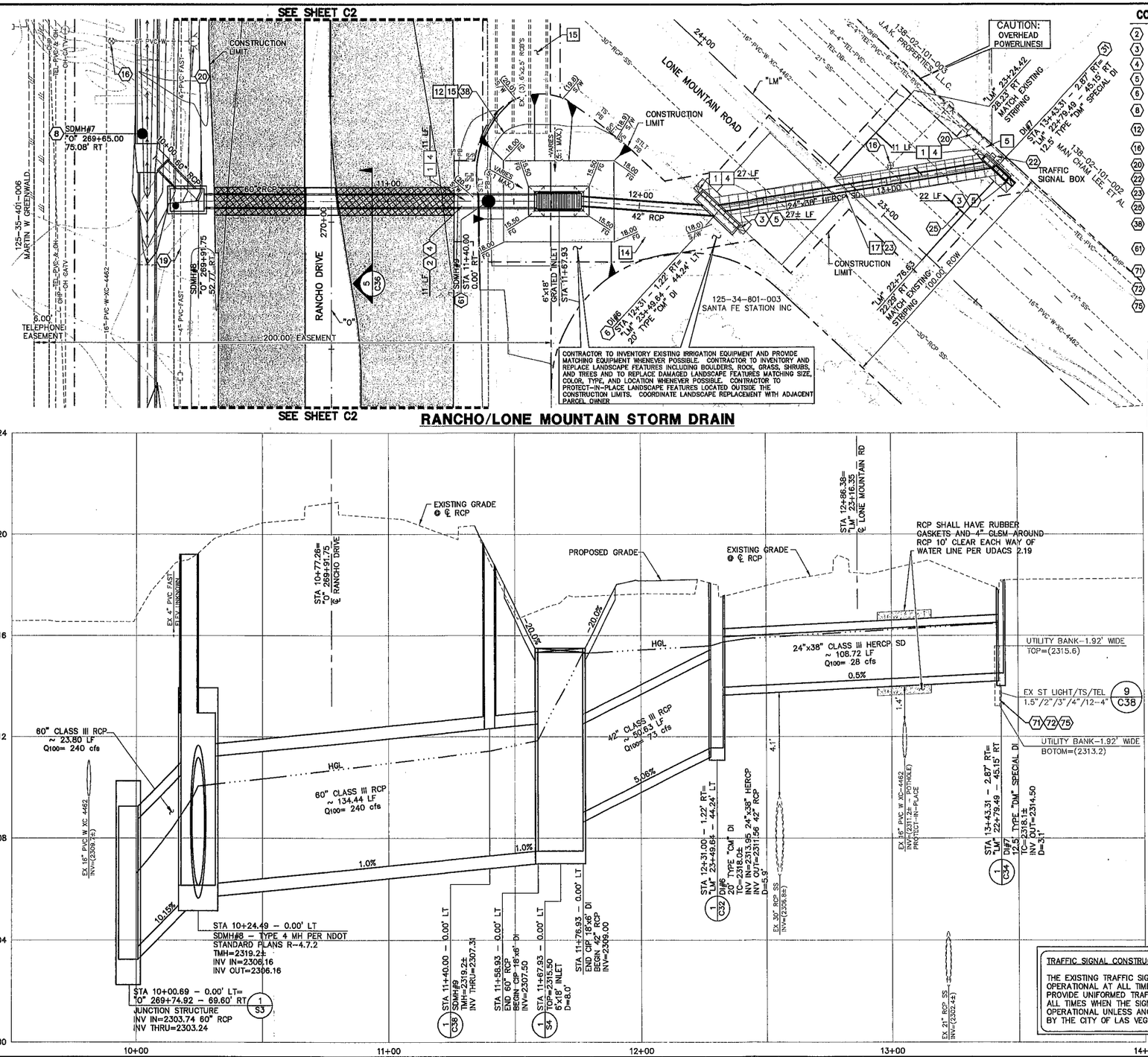
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TITLE: GOWAN CUTFALL LONE MOUNTAIN BRANCH RANCHO TO DECATUR

DRAWN BY: DWJ
DESIGNED BY: CLB
CHECKED BY: WEE
PROJECT NO: 412-6335
SCALE: 1" = 40' HORIZ, 1" = 4' VERT

SEAL
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY E. QUITT Exp. 12/31/2011 CIVIL No. 11907
8-11-10

SHEET C2
12 OF 67 SHEETS
DRAWING NO. 731-53E

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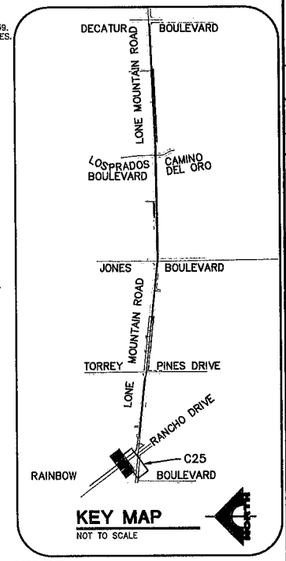
CONSTRUCTION NOTES

2 CONSTRUCT TYPE S CURB AND GUTTER PER NDOT STANDARD PLANS R-5.1.1
3 CONSTRUCT CURB AND GUTTER PER USD 216
4 CONSTRUCT SIDEWALK PER NDOT STANDARD PLANS R-5.2.1
5 CONSTRUCT SIDEWALK PER USD 234
6 CONSTRUCT TYPE "CM" DROP INLET (SEE DETAIL 1/C32)
8 CONSTRUCT ACCESS MANHOLE WITH COVER (SEE DETAIL 2/C38)
12 CONSTRUCT TYPE II STORM DRAIN MH PER USD 405
16 ADJUST EXISTING WATER VALVE BOX TO FINISHED GRADE PER UDACS PLATE No. 39. VALVE SHALL BE ACCESSIBLE AT ALL TIMES.
20 PROTECT-IN-PLACE
22 RELOCATE AS NECESSARY
23 CONSTRUCT MEDIAN ISLAND PER USD 219, MATCH EXISTING
25 INSTALL TYPE 4 LANE LINE (RPM) PER USD 244A
38 CONSTRUCT ROB PLUG PER (SEE DETAIL 6/S1)
61 PREFABRICATED ECCENTRIC MANHOLE TEE (SEE DETAIL 1/C38)
71 EXISTING TEL PVC/FO TO BE RELOCATED BY CENTURYLINK
72 EXISTING ITS TO BE RELOCATED BY CONTRACTOR
75 EXISTING STLT TO BE RELOCATE BY CONTRACTOR

REMOVAL NOTES

1 REMOVE CURB AND GUTTER
4 REMOVE SIDEWALK
5 REMOVE SIDEWALK UNDERDRAIN
12 REMOVE CONCRETE HEADWALL
14 REMOVE CONCRETE VALLEY GUTTER
15 ABANDON STORM DRAIN
17 REMOVE MEDIAN ISLAND

SCALE 1" = 20'
20 0 20 40
SCALE FEET



KEY MAP
NOT TO SCALE

LEGEND

- 3/4" PLANTMIX BITUMINOUS OPEN-GRADED SURFACE (PG 76-22NV) (1/2" SIZE)
- 6" PLANTMIX BITUMINOUS SURFACE (PG 76-22NV) (TYPE 2C) OVER 12" TYPE I CLASS B AGGREGATE BASE
- PERMANENT ASPHALT PATCH MATCH EXISTING
- NEW CURB, GUTTER, AND SIDEWALK
- 3/4" ROTOMILL AND 3/4" UTACS SURFACE

NOTE: SEE SHEET G4 FOR CONSTRUCTION AND REMOVAL NOTES.

NOTE: ALL RCP TO HAVE RUBBER GASKETS

NOTE: ALL STATIONING FROM CENTERLINE OF ROADWAY UNLESS OTHERWISE NOTED.

APPROVED FOR CONSTRUCTION
2ND UDACS
LAS VEGAS VALLEY WATER DISTRICT
ENGINEERING SERVICES MANAGER
PROJECT NO. 115373 DATE: 08/16/10

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REV	DATE	BY	REVISION

SHEET: PLAN & PROFILE RANCHO/LONE MOUNTAIN STORM DRAIN
TITLE: GOWAN OUTFALL LONE MOUNTAIN BRANCH RANCHO TO DECATUR

DRAWN BY: DJU
DESIGNED BY: CJB
CHECKED BY: WEH
PROJECT NO: 412-635
SCALE: 1"=20' HORIZ 1"=2' VERT

SEAL: PROFESSIONAL ENGINEER — JERRY E. LPRUITT — Exp. 12/31/2011 — CIVIL — No. 11907 — STATE OF NEVADA

SHEET C25
35 OF 67 SHEETS
DRAWING NO. 731-53E
HANSEN NO. H# 23160

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Appendix H

RESPONSE TO COMMENTS

Item #	Report/ Plan Sheet	Comment	Consultant Response
Nevada Department of Transportation - Hydraulics, Joselio Ramirez, 1/29/2012, comments on Rancho Capacity Improvements			
1	TDR (Hydro & Hydra Calcs.)	• Per NDOT Drainage Manual, a minimum time of concentration (Tc) of 5 minutes is used for directly connected impervious drainage basins. • Also a minimum Tc of 10 minutes is used for basins including pervious areas.	The calculations are correct: a minimum Tc of 5 minutes was used for impervious areas and 10 for pervious areas. The spreadsheet shows calculated Tc; however, the minimum times were used to calculate intensity. To clarify, a column was added to the spreadsheet, which shows the minimum Tc value used.
2	TDR (Hydro & Hydra Calcs.)	• As per the "TERMS AND CONDITIONS RELATING TO RIGHT-OF-WAY OCCUPANCY PERMITS", "Construction of new facilities or modifications of existing drainage structures within the Department R/W shall be in compliance with current Department Standard Plans and Specifications for Roadway and Bridge Construction and the Department's Drainage Manual."	Proposed facilities and modifications to existing drainage structures comply with the requirements in the current Department Standard Plans and Specifications for Roadway and Bridge Construction and the Department's Drainage Manual. To minimize conflicts with existing utilities, we are proposing the Clark County type DM2 inlet, see response to comment #4.
3	TDR (Hydro & Hydra Calcs.)	• Both alternatives show existing hydraulic structures being extended up to or extended outside NDOT R/W line; this condition will have constructability issues and maintenance restrictions, depending who will be responsible to maintain those facilities. • In addition, the proposed design shall have no adverse hydraulic impact to adjacent property owners as a result of concentrated flows discharging into their property. • The same principles above apply to the proposed hydraulic features being connected to existing structure outside NDOT R/W, who will be responsible to maintain these hydraulic structures? Some of those hydraulic structures may require maintenance access. • If NDOT Maintenance Force becomes responsible to maintain the hydraulic features then maintenance space/access must be provided. • It will be necessary to verify and document that the proposed improvements will not have adverse impact to adjacent properties.	• The extenst of the existing drainage easements were added to the plan. Included with the plans is a right-of-way plan that shows the extents of additional right-of-way/easements that are needed for construction and maintenance. The City of Las Vegas will coordinate with NDOT for acquisition of these easements. • Inlets were located to discharge into existing/proposed stormdrains, swales and historic points of concentrated flows. Note that recent construction of the Gowan Outfall - Lone Mountain stormdrian facility greatly decreases the amount of historic flow conveyed to property between Rainbow and Lone Mountain. Compairsons to the LOMR flow rates are on Figure E1-E11. • The City of Las Vegas will coordinate with NDOT to acquire drainage easements shown on the right-of-way plan; the City of Las Vegas will also coordinate an interlocal agreement with NDOT. • Existing and proposed easements will provide the area needed maintenance. • The proposed improvements were designed so that the ultimate condition improves flood protection of adjacent properties and so that the interim condition perpetuates the existing conditions, see the discussion in Section 7.

Item #	Report/ Plan Sheet	Comment	Consultant Response
4	TDR (Hydro & Hydra Calcs.)	• Storm drain (drop inlets, manholes, connections, etc.) shall be constructed per NDOT Standard Plans and Specifications for Roadway and Bridge Construction and the Department's Drainage Manual. • Manholes shall be included as part of the storm drain design. • Manholes are utilized to provide access to storm drain for inspection and culvert cleanout. For manhole design spacing, please refer to Department's Drainage Manual Sec. 3.3.2.2.4 Manholes.	• NDOT Standard Plans are used throughout the project with the following exceptions: • Because of the numerous existing utilities in the sidewalk area, the proposed drop inlets are DM2, Clark County Area Uniform Standard Drawing No. 412.1, which is included in the Appendix G. This inlet is similar to the NDOT Type 11 inlet except that the grate is a 1.5 ft wide vane grate and the portion of the the inlet behind the curb is 6 in. narrower. • Manholes for the RCB stormdrain system between Craig and Alexandar are Clark County Standard manholes because the City is expected to be responsible for maintaining this system. • A custom reverse sidewalk underdrain design is used at locations where the street drains to existing swales behind the right of way, but where cover is not adequate to install a pipe. • Manholes are included in the design • Spacing complies with the Department's Drainage Manual: 300 ft for < 24 in. diameter RCP systems and 400 ft elsewhere.
5	TDR (Hydro & Hydra Calcs.)	• Please consider constructing manholes instead of junction boxes. • When connecting NDOT drainage structures to CLV structures, please construct manholes within NDOT R/W or at the R/W line for access to NDOT Maintenance personnel. • The alignment of the storm drain trunk lines should be set to connect from drop inlet to drop inlet as opposed to have the drain trunk lines under the travel lanes or shoulders. By connection the mainline from drop inlet to drop inlet it should decrease the need for manholes, reduce pipe quantities for laterals and avoid sharp connections.	• The junction box is no longer proposed because the inlet will tie into the regional system. • Manholes are proposed in NDOT R/W. • We agree; however the alignment was not revised because the existing utilities in the sidewalk areas would require extensive and costly relocation. Additionally, the plan includes trees and fire hydrants within the 5 feet behind the curb, which would conflict with stormdrain.
6	D-4 and E-4 (approx Station 71+00 to 74+60) SD-5	• The proposed (2) 7'X 3'X 132' RCB that runs parallel to the roadway the inner box is inside NDOT R/W, the outer box is outside NDOT R/W. Then the extension to the existing RCB on the south side, (2) 7'X 3'X 129' RCB, extends from inside NDOT R/W to the outside, who is going to maintain this RCB?	This RCB is now proposed to be removed and replaced with an RCB stormdrain system that is the Clark County Regional Flood Control Facility Gowan Outfall – Alexander Road. The City of Las Vegas anticipates an interlocal agreement will be needed for maintenance of the facility with NDOT maintaining the drop inlets and laterals and the City of Las Vegas maintaining the box culvert.
Nevada Department of Transportation - Hydraulic Division, 6/5/2013, comments for Gowan Outfall - Alexander Branch stormdrain			

Item #	Report/ Plan Sheet	Comment	Consultant Response
1	All sheets	Applies to ALL streets showing improvements in Rancho Drive, Rancho Drive is an NDOT maintained roadway and so NDOT standard details should be used within the Rancho Drive right-of-way (as applicable). This would include manholes, drop inlets, etc., unless justification is provided and accepted for the use of a structure from a different jurisdiction.	NDOT Standard Plans are used throughout the project with the exception of those locations discussed in the response to comment #4 above, dated 1/29/2012.
2	All sheets	Applies to all sheets. From a hydraulic perspective constructing the pipes at a 45 degree angle from the drop inlets to the RCB is great. However, from a cost and construction perspective, it may be better to just install the laterals from the drop inlets perpendicular into the RCB.	As previously discussed, the alignment was not revised because the existing utilities in the sidewalk areas as well as proposed trees and fire hydrants.
3	All sheets	Applies to all sheets. From a global perspective, provide a flowline and direction of flow where all roadside ditches will remain or be constructed.	Flowline tags and invert elevations for culverts were added to the plans. Curb and gutter are proposed the entire length of the project; so no roadway ditches are being proposed. The capacity of existing swales in landscape easements will be preserved
4	SD-2	Two drop inlets are proposed outside of the right-of-way, is there an existing drainage easement that covers these locations? If not, a permanent drainage easement will be required for construction and maintenance of these facilities.	There is an existing easement here. The existing drainage easements were added to the plans. A right-of-way plan shows where new easements are required. The City of Las Vegas will coordinate with NDOT for these easements.
5	SD-3	It appears to me that the proposed 6' X 3' box on the south side of the proposed RCB is proposed because this is the inlet side of the 6' X 3' box. I think that recommendation 3 above will provide the clarification necessary to address this item.	Correct. Profiles of the laterals are included in the plans.

Item #	Report/ Plan Sheet	Comment	Consultant Response
6	SD-6	It is recognized that the proposed layout is provided as a way of completing the improvements proposed under the "Rancho Drive Capacity Improvements" project. NDOT Hydraulics does not support your proposal to install an "orifice plate" and a "bleeder line" to take a 12' X 8' RCB to a 24" RCP. The typical way to construct a storm drain is to begin the construction from the downstream end of the facility and construct the facility to the upstream end. There have been times when a facility is constructed somewhere in the middle, but normally NDOT's policy is to cap the facility or have the reduction take place at the inlet to the facility. In this manner, the existing condition remains the same prior to and after the facility is installed. I recognize that with the construction of the large RCB, some of the existing facilities are impacted. But maybe the proposed RCB can carry this flow and show that is accepts the same amount of flow the existing facility did (but the lack of a downstream facility may still be the problem). If you believe the proposed Orifice Plate and bubbler system are the only answer to this matter, please provide as much information as possible, including design calculations and modeling, complete dimensions, full explanation of what will happen to the water once it exists the bubbler, including the anticipated impacts to the surrounding properites and roadway. (Note: WSPG calculations do not say that the water surface elevation exceeds the ground elevation at stations provided on WSPG. And the Worksheet for Bubbler Orifice seems an insufficient analysis for the proposed objective.)	Since the submittal of the study for this stormdrain system, a Clark County Regional Flood Control Project has started that will complete the design of the downstream system. If construction of the downstream system is granted funded, we will revised the 90% plans to incorporate those improvements. For this 70% submittal, we are showing the outlet structure and providing the following information/calculations: -The system is capped at the upstream end. -The system was revised so that the upstream existing 48-in. pipe in Craig will not be connected during the interim condition. -Calculations for the flow captured by inlets during the existing condition are provided. -Additional calculations for the outlet structure are provided including anticipated ponding depth upstream of the bleeder line; grate opening calculations; and information on how flow splits after discharged from the stormdrain system. -A detail of the bubbler is provided.
7	SD-7	I recognize that Alexander Road is not an NDOT facility, but I just wanted to point out that the manhole size varies from 48" to 60"throughout the 24" RCP section. NDOT standards would allow for manholes to be the smaller 48" diameter, since the pipe size is under 33" O.D.	City of Las Vegas requested use of Clark County Standards in those areas outside of NDOT right-of-way
8	General Note	As shown as blanks in the notes, details will be necessary to complete the construction of these facilities.	Additional details are included on the 70% plans and complete structural will be included with the 90% submittal.
9	Drainage Study	Please provide a summary table with the spread information – required, proposed and existing (if appropriate).	A summary table with spread information was added to report, Appendix B ; please note the information was previously provided with the calculation included in the Appendix with the Onsite Hydrology/Hydraulics.

Item #	Report/ Plan Sheet	Comment	Consultant Response
10	Drainage Study	For the Orifice Plate and Bubbler System, please provide as much information as possible, including design calculations and modeling, complete dimensions, full explanation of what will happen to the water once it exits the bubbler, including the anticipated impacts to the surrounding properties and roadway. The information provided is insufficient for this critical facility.	An interim condition discussion was added to the study; the requested calculations are included and discussed.
City of Las Vegas - Flood Control, Peter Jackson, 11/8/2012, comments for Rancho Capacity Improvements			
	General	The 30% submittal included a Drainage Design Report that addressed the existing & proposed conditions based upon RTC and NDOT criteria. The drainage facilities shown on the 30% plans do not reflect the additional scope to provide the Clark County Regional Flood Control District (CCRFCD) Master Plan facilities (MPU) and will be subject to refinement based upon the submittal of an updated Drainage Design Report. The consultant will provide the updated Drainage Design Report incorporating the MPU facility in Rancho between Craig Road and Alexander Road for review prior to the 70% submittal. Detailed drainage review will be provided after submittal of the updated Drainage Design Report. The following comments are provided to assist in the storm drain system design and the preparation of the Drainage Design Report:	The Preliminary Design Report for the Gowan Outfall – Alexander Road Facilities was submitted to the City of Las Vegas for review on December 6, 2012.
1	General	The proposed storm drain system needs to be further discussed as the design progresses toward the 70% submittal. Flood Control recommends that progress plans for the storm drain system be provided for review and input prior to the 70% submittal. The Drainage Design Report needs to discuss the system limitations and recommended system changes based upon the hydrology and hydraulics of the area.	Progress meetings were held prior to submittal of the preliminary plan for the Gowan-Alexader stormdrain. Comments were received for this plan and are addressed here and in the final report, which combines the hydraulics and hydrology for Rancho Capacity improvements and the Gowan-Alexander system.
2	General	The system proposes both local and Clark County Regional Flood Control District - Master Plan (MPU) facilities. Flood Control recommends that a bleeder storm drain be provided for the MPU facility at the Rancho & Alexander intersection to provide for interim system drainage of the proposed MPU facility east in Alexander Road.	The recommended bleeder line is provided.
3	Report/ Cost estimate	The project's drainage improvements will need to clearly identify those costs associated with the proposed CCRFCD MPU facility.	An updated cost estimate was submitted with the 70% improvement plans; costs for the project are separated based on anticipated funding source.

Item #	Report/ Plan Sheet	Comment	Consultant Response
4	Report	The Drainage Design Report needs an Exhibit that shows the recommended storm drain system and labels the key concentration points with associated flows. The summary should include collected storm drain flows and the remaining street surface flows within the project area.	Requested exhibit was included in the preliminary report for Gowan-Alexander stormdrain; onsite basin maps submitted with this final report include capture and bypass for the ultimate and interim conditions, Figure E1 to E11.
5	Report/ Plans	The Drainage Design Report needs to include a discussion on the utility conflicts along the proposed storm drain alignment and the potential impacts on the project construction. Plans must reflect the existing sewer system, including the residential/commercial lateral facility connections.	A discussion on utility conflicts was part of the preliminary report and is also included in this final report. The stormdrain laterals shown on the improvement plans were coordinated with the City of Las Vegas Sewer Rehabilitation Group F project.
6	Report/ Plans	The engineer must review the pipe size and hydraulics to verify system design parameters to keep the HGL a minimum of 12-inches below the finish grade. If the HGL is less than 18-inches below the finish grade, the City will require the installation of slotted & bolt down manholes. Additionally, the manhole concrete collars will need to be extended to prevent collar blow outs.	A WSPG backwater analysis is included; the HGL of the Gowan Outfall – Alexander Road Facilities is 1.5 ft or more below the finish grade.
7	Plans	Provide Plan and Profiles of the entire storm drain facility including laterals with the next submittal. Include the pipe system design Q on the storm drain profile sheets. Provide details and sections of the proposed collection system.	Plan and profile of stormdrain system and laterals is provided.
8	Plans	Provide storm drain design plans with the next submittal that include the design data and the complete construction notes. Include the Inlet type, lengths, depth, number of grates, etc.	Storm drain design plans are provided.
9	Plans	Provide detail sheets showing the drop inlet details for the proposed storm drain using the standard CM-DM/412A inlets. Other inlet designs will be reviewed on a case by case basis.	The standard is referenced for the DM2 inlet to reduce conflicts with existing utilities in the sidewalk area; details for the reverse sidewalk underdrain are provided.
10	Plans	The Engineer should acquire and verify utility pothole information as soon as practical to determine additional constraints on the storm drain system design based upon the proposed design information. Consideration on utility relocations and impacts must be identified.	Potholes were acquired; where possible, design was updated to minimize conflicts. Because of the anticipated delay to the project while funding is acquired, potholes were not acquired for traffic signal lines and only a minimum of potholes were acquired for dry utilities. Therefore, additional potholes and utility coordination will be needed at the 90%.

Item #	Report/ Plan Sheet	Comment	Consultant Response
11	Plans	Provide Manholes along the storm drain at 400-foot maximum spacing. Adjust spacing to include manholes near the junction structures, if required for maintenance consideration. Consider using pre-cast Manhole Tees where applicable along the storm drain alignment to reduce costs.	Manholes for the RCB and in Alexander are provided at 400-ft spacing. In NDOT R/W and for pipe diameters, 24-in or less, manholes are provided along the storm drain at 300-ft maximum spacing to meet NDOT criteria. A significant number of the manholes for this project will be eliminated with the design of the CCRFCD stormdrain in Alexander between Rancho and Decatur; therefore, we will revisit options for use of manhole tees at the 90% submittal.
12	Report	Provide an updated geotechnical analysis with the next submittal. The 70% submittal must address design considerations to mitigate the impacts to the storm drain system design based upon the geotechnical analysis.	Geotechnical report is provided.
13	Report	Provide inlet calculations based upon system design with the 70% submittal. Verify the grate type on the calculations to show vaned grates for the CM-DM/412.1 inlets. CM-DM Inlets have equal curb opening and grate lengths.	Updated calculations are included with this study. The inlets associated with the CCRFCD facility were sized for the 100 year event. The inlet capture calculations for the remaining inlets were for the 25-year event. The calculations were performed for the vane grates, specifically, the splash over velocity is referenced from curve for curved vane in FHWA HEC-22 Chart 5. Equal lengths curb opening and grate lengths are not used in the calculation because the plans call out for at least one solid grate at upstream end of inlet.
14	Plans	The plans need to clearly identify the storm drain removal item limits.	Removal limits shown on removal plans.
15	Plans	The existing and proposed utility crossings of the storm drain must be shown on the storm drain plan and profiles sheets and on the lateral profiles.	Crossings shown on lateral plans and stormdrain profile.
16	Plans	Provide detail sheets showing typical details needed for the construction, connection and any special transition structure details. Structural details, if required, must be submitted by the 90% submittal.	Detail sheets are provide; additional structural details will be provided at the 90%
17	Plans	Provide preliminary plan and profiles for relocated sewer and/or water lines as necessary with the next submittal. Verify the material type of existing water lines such as ACP which will require special handling.	Preliminary design of water and sewer relocation in Rancho are provided. For discussion of existing utilities in Alexander, see response to comment #15 below, that was received from the City 10/23/12.
18	Plans	Provide a minimum 1-foot vertical separation between sewer and storm drain crossings. Separations less than 2-feet will require protection of the sewer line.	Profiles show required clearances or required protection/relocation.
19	Plans	Show the storm drain angle points by Station location and angle change.	Agree. We anticipate some changes will be made to the plans, so tables with angles will be provided at the 90%

Item #	Report/ Plan Sheet	Comment	Consultant Response
20	Cost Estimate	Provide a detailed cost estimate with the next submittal for review. The cost estimate must be refined prior to the 90% submittal and request for construction funding to assure that the requested and allocated storm drain funds are sufficient for construction. The cost estimate must include the cost allocations by funding source.	An updated cost estimate was submitted with the 70% improvement plans; costs for the project are separated based on anticipated funding source.
21	Report	The Final Design report needs to include an electronic copy of the entire report with the input and output files for the hydraulics and hydrology.	A CD with the final report and copies of the hydrologic model is provided.
22	Plans	Add a note for all storm drain drop inlets that references the newly adopted USDCCA Drawing No. 421 (Stormwater Quality Management Stamp and Sign Detail).	Detail reference was added to plans.
23	Report	Discuss and show any Traffic Signal underground impacts to the proposed storm drain system.	Because of the anticipated delay to the project while funding is acquired, potholes were not acquired for traffic signal lines and only a minimum of potholes were acquired for dry utilities. Therefore, additional potholes and utility coordination will be needed at the 90%.
24	Plans	Provide additional inlets along Rancho, between Rainbow and Lone Mountain to utilize the existing stub locations provided with the recently completed MPU Facility (GOLO 0275).	Inlets were provided at all of the stubs constructed with the GOLO275 system.
25	Plans	Provide updated drainage easement locations based upon the 70% design level plan improvements for those facility extensions past the existing Right-of-Way.	An updated right-of-way plan is provided.
26	General	The proposed street light foundations appear to impact existing storm drain improvements. Potholing is recommended to reduce conflicts.	Potholes were acquired; where possible, design was updated to minimize conflicts. Because of the anticipated delay to the project while funding is acquired, potholes were not acquired for traffic signal lines and only a minimum of potholes were acquired for dry utilities. Therefore, additional potholes and utility coordination will be needed at the 90%.
27	Plans	There are numerous locations where existing rock rip-rap will need to be relocated and/or replaced. Identify impacted locations at the 70% submittal.	Impacted areas are identified on plans. Because of the anticipated delays while acquiring funding for the project, the impacts will need to be re-evaluated at the 90%
28	Plans	Additional comments are shown on the attached plans.	Redlined comments were incorporated in the plan.
City of Las Vegas - Flood Control, Peter Jackson, 10/23/2012, comments for Gowan Outfall - Alexander Branch stormdrain			

Item #	Report/ Plan Sheet	Comment	Consultant Response
1	Report	The proposed Clark County Regional Flood Control District -Master Plan (MPU) facilities needs to be discussed further as the design relates to the existing interim condition. Flood Control recommends that' the proposed MPU storm drain system at Craig Road is not connected to the existing local storm drain to maintain the current flows going to the east. This will reduce the impacts of the flow to the Alexander Road and Rancho Drive intersection . Provide revised interim flow impacts to the system and evaluate the impacts to the proposed bubbler needed at the Alexander intersection near Station 43+25.	Plans were revised to protect the existing 48 in. stormdrain in place. A revised analysis was performed and is included in the study. An interim condition analysis is also included in the study.
2	Report	Review the surface flow impacts to the proposed 6' x 3' RCB near Station 21+95. Provide detailed grading analysis to determine if the existing 7' x 3' RCB on the west side of Rancho Drive near Station 23+00 can be eliminated based upon the flow to the proposed 6' x 3' RCB. Based upon the analysis, revise the storm drain near Station 31+95 accordingly. Elimination of this shallow storm drain in the sidewalk area enables the complete street improvements with trees. See Sheets SD-3 through SD-5.	Plan was revised to abandon the 6'x3' RCB crossing, but to protect the 7'x3' RCB.
3	Report/ Plans	Flood Control requires a storm drain lateral be provided to the south leg of Jones Boulevard to accommodate the existing low point in Jones south of the Rancho intersection to collect the flow from MPU Basin PT5A2-C that is routed east in Alexander per the MPU.	The requested lateral was added to the plan.
4	Plans	Provide a maintenance access structure within the median for the MPU facility near Station 12+25. The bubbler structure at the Alexander intersection near Station 43+25 will also serve as a maintenance access structure.	Maintenance access structure was added to the plan.
5	Report	The Drainage Design Report needs an Exhibit that shows the recommended storm drain system and labels the key concentration points with associated flows. The summary should include collected storm drain flows and the remaining street surface flows within the project area for both the existing interim condition and the ultimate MPU facility.	The concentration points, flow rates, inlet capture and bypass flows were added to the onsite exhibit, Figure E1-E11.
6	Plans	Incorporate the proposed MPU facility plans into the overall design project for this segment of the Rancho Capacity Improvements between Decatur and Rainbow.	The stormdrain plans were incorporated into the 70% submittal of the Rancho Capacity Improvement Project.

Item #	Report/ Plan Sheet	Comment	Consultant Response
7	Plans	The current design parameter is to use pre-cast RCB 's and the curve sections need to be covered within the specifications. Provide curve data for the proposed RCB' s. Review the ability to use pre- cast components for the proposed junction structures given the traffic requirements along Rancho.	Plans revised to show curve data. The confluence structures were reviewed. It appears that the connection of the structure to the two RCB systems at the upstream end, will need to be cast-in-place. This may negate the benefits of having the remaining parts of the structure be pre-cast. Stanley will investigate further at the 90%.
8	Plans	Provide Plan and Profiles of the entire storm drain facility including laterals with the next submittal. Label the Q100 and Qinterim flows on the storm drain profile sheets. Provide details and sections of the proposed collection system.	Plan and profile of stormdrain system and laterals is provided. Design flow rates are labeled.
9	Report	Provide updated inlet calculations based upon system design with the 70% submittal.	Provided.
10	Plans	Provide storm drain design plans with the next submittal that include the design data and the complete construction notes. Include the Inlet type, lengths, depth, number of grates, etc. Provide drop inlet details with the next submittal.	70% stormdrain design plan is included with the Rancho Capacity Improvement 70% submittal. The standard is referenced for the DM2 inlet to reduce conflicts with existing utilities in the sidewalk area; details for the reverse sidewalk underdrain are provided.
11	Plans	Provide Manholes along the storm drain at 400-foot maximum spacing. Adjust spacing to include Manholes near the junction structures, as needed for maintenance consideration. Consider using pre- cast Manhole Tees where applicable along the storm drain alignment to reduce costs.	As previously discussed, manholes for the RCB and in Alexander are provided at 400-ft spacing. In NDOT R/W and for pipe diameters, 24-in or less, manholes are provided along the storm drain at 300-ft maximum spacing to meet NDOT criteria. A significant number of the manholes for this project will be eliminated with the design of the CCRFCD stormdrain in Alexander between Rancho and Decatur; therefore, we will revisit options for use of manhole tees at the 90% submittal.
12	Plans	Provide detail sheets showing typical details needed for the construction, connection and any special transition structure details. Structural details, if required, must be submitted by the 90% submittal.	Additional details are included on the70% plans and complete structural will be included with the 90% submittal.
13	Report	The previous preliminary Geotechnical Analysis for the Rancho Capacity Improvement project needs to be updated to address the proposed MPU facility. Provide an updated geotechnical analysis with the 70% submittal.	Geotechnical report is provided.
14	Plans	The plans need to clearly identify the storm drain removal item limits.	Removal limits clarified on plans.

Item #	Report/ Plan Sheet	Comment	Consultant Response
15	Plans	Review the sewer impacts along the Alexander Road alignment with Sewer Collection System Planning. Provide preliminary sewer relocation plans with the 70% submittal to identify system impacts.	Stanley Engineers met with Tim Park of the City of Las Vegas to discuss the plans for sewer in Alexander. A future relief sewer is planned. Additional coordination will be performed as part of the design for the portion of the Gowan Outfall located in Alexander. The design of this project is starting. Because that project is expected to be completed prior to the Rancho Drive improvements, the necessary relocations will be shown on those plans.
16	Plans	Flood Control recommends that any proposed water line relocations also consider the ultimate system geometry to accommodate the future system within Alexander Road.	Waterline crossings are shown in the future final location; the design of the crossings will be accomplished with the separate project for the portion of the Gowan Outfall that will be located in Alexander.
17	Plans	The Engineer should acquire and verify utility pothole information as soon as practical to determine additional constraints on the storm drain system design based upon the proposed design information. Consideration on utility relocations and impacts must be identified.	Potholes were acquired; where possible, design was updated to minimize conflicts. Because of the anticipated delay to the project while funding is acquired, potholes were not acquired for traffic signal lines and only a minimum of potholes were acquired for dry utilities. Therefore, additional potholes and utility coordination will be needed at the 90%.
18	Plans	The existing and proposed utility crossings of the storm drain must be shown on the storm drain plan and profiles sheets and on the lateral profiles.	Provided.
19	Plans	Provide preliminary plan and profiles for relocated sewer and/or water lines as necessary with the next submittal. Verify the material type of existing water lines as ACP will require special handling.	Preliminary design of water and sewer relocation in Rancho are provided. For discussion of existing utilities in Alexander, see response to comment #15 above that was received from the City 10/23/12.
20	Plans	Provide a minimum 1-foot vertical separation between sewer and storm drain crossings. Separations less than 2-feet will require protection of the sewer line.	Profiles show required clearances or required protection/relocation.
21	Cost Estimate	Provide a detailed cost estimate with the 70% submittal that identifies the CCRFCD MPU facility costs as a separate funding source. The cost estimate must be refined prior to the 90% submittal and request for construction funding to assure that the requested and allocated storm drain funds are sufficient for construction. The cost estimate must include the total cost allocations by funding source.	An updated cost estimate was submitted with the 70% improvement plans; costs for the project are separated based on anticipated funding source. The estimate will be updated at 90%
22	Report	The Final Design report needs to include an electronic copy of the entire report with the input and output files for the hydraulics and hydrology.	A CD with the final report and copies of the hydrologic model is provided.

Item #	Report/ Plan Sheet	Comment	Consultant Response
23	Report/ Plans	Discuss and show any Traffic Signal underground impacts to the proposed storm drain system.	Because of the anticipated delay to the project while funding is acquired, potholes were not acquired for traffic signal lines and only a minimum of potholes were acquired for dry utilities. Therefore, additional potholes and utility coordination will be needed at the 90%.
24	Plans	Provide updated drainage easement locations based upon the 70% design level plan improvements for those facility extensions past the existing Right-of-Way.	An updated right-of-way plan is provided.
25	Plans	Additional comments are shown on the attached plans MPU facility plans.	Redlined comments were incorporated in the plan.
Clark County Regional Flood Control, Todd Myers, comments for Gowan Outfall - Alexander Branch stormdrain			
1	General:	District supports constructing the MPU facilities within Rancho as a part of the Rancho Drive Capacity Improvement (RDCI) project. However, the downstream facilities within Alexander Road between Simmons Street and Rancho (GOOF 0199-0375 and GOAL 0000) do not exist. This project must be designed to match existing surface flow conditions with no adverse impacts to downstream properties under interim conditions.	The location of the bubbler for the system is proposed upstream of the Rancho/Alexander intersection so that flow will split in a manner that is consistent with the existing condition. Further discussion is included in the interim conditin hydrology section of the report, Section 7.
2	General:	Please provide funding status for the RDCI project.	Currently there is no funding for construction of the project.
3	General:	Under interim conditions a 24" RCP "throw-away" storm drain is proposed to be constructed between Rancho Drive and Decatur Boulevard . District policy does not allow funding of "throw-away" systems. Therefore, if project moves forward as proposed, City must obtain an alternative funding source for the 24" RCP interim storm drain.	Design of the section of the Gowan-Outfall Alexander Branch system that is located in Alexander is now funded and will likely be constructed before the portion in Rancho.
4	Hydrology:	VTN is currently completing design for the Simmons Street Drainage improvements between the Gowan Outfall Channel and Alexander Road for the City of North Las Vegas. Please coordinate hydrology with Melissa Murphy of VTN to ensure design flow rates are consistent between the two projects.	Stanley Engineers contacted Melissa Murphy to discuss the approved flow rates for the downstream system. The design for the Simmone is 200 cfs less than what is currently expected to be discharged from the Gowan Outfall - Alexander Branch. Additional coordination is required and will be performed as part of the design of the Gowan Outfall in Alexander.
5	Hydrology:	Please provide an exhibit that compares existing, interim and ultimate condition flow rates within the project limits and directly downstream. The exhibit should identify flow rates at key concentration points, quantifying both storm drain and surface flow conditions.	Provided in Figure E1-E11.
6	Hydraulic Analysis -	Please provide a table and exhibit identifying data input locations and key input/output information and results.	A WSPG summary table and plot are provided in Appendix C. The stationing matches that of the stormdrain profile.

Item #	Report/ Plan Sheet	Comment	Consultant Response
7	Hydraulic Analysis - WSPG:	Provide a sensitivity analysis utilizing a manning's "n" value of .015.	Manning's N was revised to 0.015
8	Geotechnical Report:	Provide Geotechnical Report updated for subsurface investigation, with the 70% submittal.	Provided.
9	Cost Estimate	Please verify the unit costs for RCB's and RCP's. Based on recent bid tabs the RCB costs appear high, and the RCP costs appear low. Revise accordingly.	Revised cost estimate is included with the 70% plan submittal.
10	Cost Estimate	Remove, or break out cost for 24" RCP interim storm drain.	Costs for the bleeder line are separated from those of the facility.
11	Plans	Please incorporate the Gowan Outfall - Alexander Road Facilities plans into the RDCI plans.	The stormdrain plans were incorporated into the 70% submittal of the Rancho Capacity Improvement Project.
12	CV	Note District as funding source, and add a District signature block.	The project does not yet have funding so this was removed from the cover.
13	G-3	Update with latest City General Notes.	Updated.
14	TY-1	Revise trench sections to utilize vertical walls. See redline check prints for additional comments.	Revised.
15	SD-1	If feasible, revise profile to avoid relocating the 30" SCCP waterline in future phase. Provide removal limits. Typical all.	The slope of the stormdrain is already 0.4 percent and has manholes that are 10 feet deep. The cost savings associated with protectinf the pipe in place appear to be negated by those of further deepening the stormdrain; instead an option of using two lower profile pipes under the waterline is shown.
16	SD-2	Provide lateral profiles with 70% submittal.	Lateral profiles are provided.
17	SD-5	Consider moving cast in place junction structure to the south, farther out of intersection.	Structure was shifted farther south.
18	SD-8	If project moves forward with interim storm drain, design relocations to accommodate ultimate MPU facility.	At this time, the relocations will be designed as part of the Gowan Outfall project for the stormdrain in Alexander. The ultimate location of relocations are shown for those water and sewer utilities that would be required for the bleeder line; the profiles for all relocations will be included with the plan set for the portion of the stormdrain in Alexander.
19	General	Provide construction details with next submittal.	Additional details pare rovided; complete structural details will be provided at the 90%.
20	General	See additional comments on attached red-lined check prints	Redlined comments were incorporated in the plan. Please note following: - Roadway median is being replaced with Rancho Project. - The sewer in Rancho from Craig to Alexander will be relocated prior to start of Rancho Project

NORTH

GRAPHIC SCALE
1500 0 750 1500 3000
(IN FEET)
1 inch = 1500ft.

LEGEND

- BASIN BOUNDARY
- NW29B-C — BASIN NAME
- C3AB1 — CONCENTRATION POINT DESIGNATION
- CONCENTRATION POINT
- ALEXANDER RD — STREET NAME
- GOLO 0275 — EXISTING RFCD FACILITIES WITH FACILITY ID
- CULVERT CROSSINGS (REFERENCED FROM LOMR BY LBG)

SDN3 BASIN BOUNDARY FROM RANCHO LOMR

HEC-1 OFFSITE MODEL RESULTS (SDN 3 STORM)

BASIN/ HEC-1 STATION	AREA, sq mi	EXISTING CONDITION Q10, CFS	EXISTING CONDITION Q25, CFS	EXISTING CONDITION Q100, CFS	INTERIM CONDITION Q25, CFS	INTERIM CONDITION Q100, CFS
CNW1C2	0.6	84	172	320	172	320
CGCC4	0.74	18	60	233	60	233
CPDGCD	0.26	29	65	131	65	131
CGCB11	1.47	84	229	565	229	565
CLONE	0.46	106	188	322	188	322
C17BJ	5.61	205	430	1256	430	1256
C14CG	0.19	17	30	94	30	94
2CPT6B	6.31	222	478	1175	478	1175
C3AB1	1.52	45	95	196	95	196
C3AB2	1.57	64	103	202	103	202
CPT2B2	1.65	30	49	77	49	77
C2B3	1.67	38	60	91	60	91
C2A2	4.9	43	83	205	83	205
C2B1	4.97	21	36	138	36	138
2C2B3	5.17	21	37	136	35	135
CPT51	5.24	34	51	81	N/A	N/A
CPT52	6.15	140	254	453	254	453
2CPT51	6.62	163	292	514	270	478
D6RCHO	6.62	53	65	103	65	118
6REMAIN	6.62	108	224	408	228	450
C5A6	6.88	157	324	582	328	614
C5A7	7.81	57	155	280	159	285
C5A9	7.85	34	129	202	131	203
LWRRNCH	7.98	171	393	690	392	693
DEASTGOW	7.98	13	39	229	39	232
CCY08C	8.08	32	52	270	52	271
CCPT56B	8.19	239	369	842	388	875
CCCPT56B	8.46	244	384	918	402	945
CBDVMORB	7.98	170	360	694	360	696
RTCHY	7.98	57	213	514	213	515
CX4X3	2.01	207	338	531	338	531
DVBOX	2.01	N/A	210	210	210	210
DVBOX	2.01	N/A	128	321	128	321

Note: Existing offsite flow rates listed are surface flows. See onsite interim sub-basin map for detailed information regarding onsite basins, inlet capture, and flow conveyed in proposed stormdrain systems. See Appendix A for summary sheet of all offsite basin and concentration point HEC-1 models.

REVISIONS

NO.	DATE:	DESCRIPTION	APP'D

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: JEREMY LEAVITT

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM
DATE: JANUARY 2012

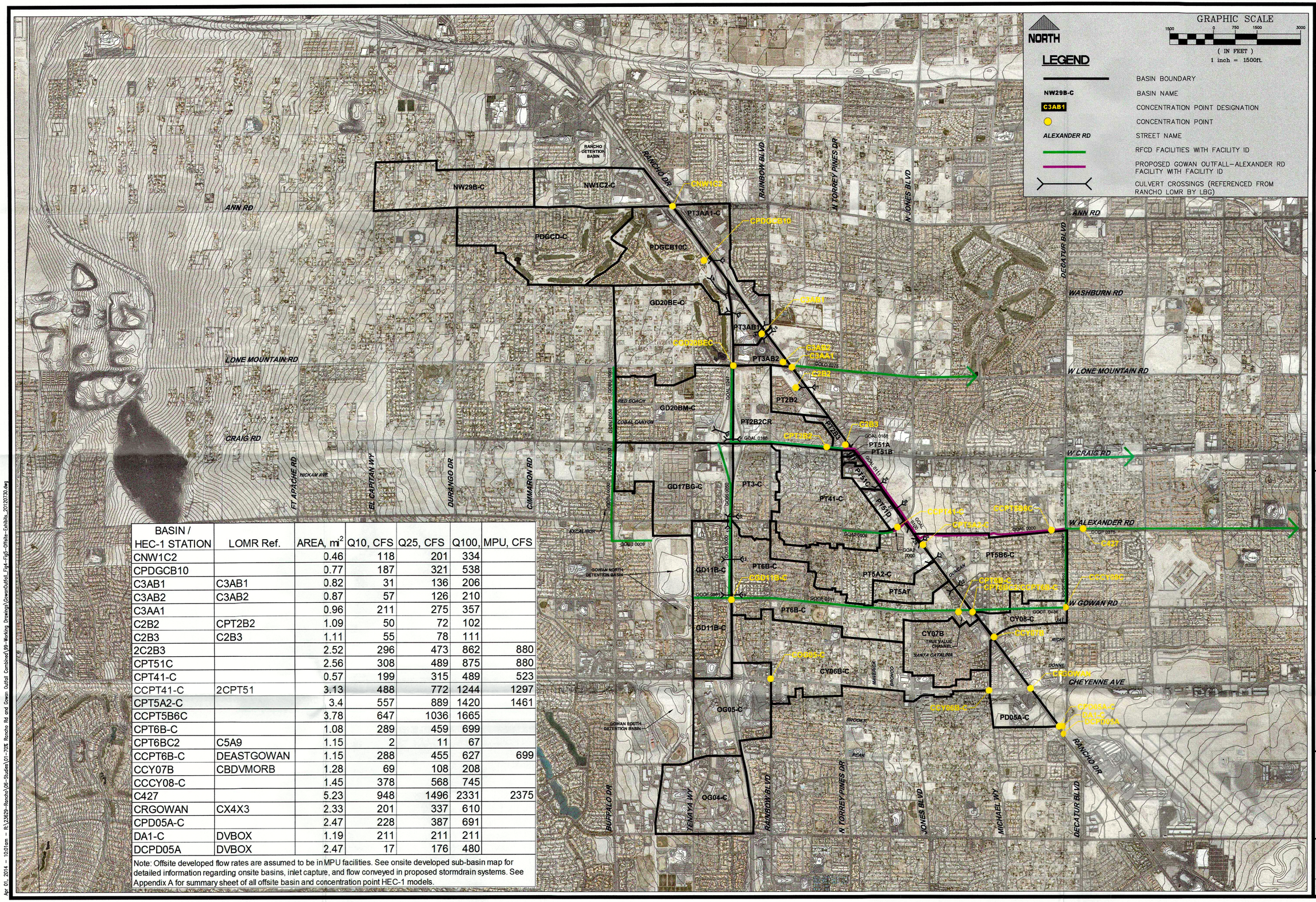
TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS

SHEET: EXISTING AND INTERIM OFFSITE CONDITIONS

RANCHO DRIVE, DECATUR BLVD TO RAINBOW BLVD, AND GOWAN OUTFALL–ALEXANDER RD FACILITIES

Figure 4

Apr 01, 2014 – 10:08am – R:\2829-Rancho\06-Studies\01-705 Rancho Rd and Gowan Outfall Combined\09-Working Drawings\GowanOutfall_Fig4--Fig5--Offsite--Exhibits_20120730.dwg



BASIN / HEC-1 STATION	LOMR Ref.	AREA, mi^2	Q10, CFS	Q25, CFS	Q100,	MPU, CFS
CNW1C2		0.46	118	201	334	
CPDGCB10		0.77	187	321	538	
C3AB1	C3AB1	0.82	31	136	206	
C3AB2	C3AB2	0.87	57	126	210	
C3AA1		0.96	211	275	357	
C2B2	CPT2B2	1.09	50	72	102	
C2B3	C2B3	1.11	55	78	111	
2C2B3		2.52	296	473	862	880
CPT51C		2.56	308	489	875	880
CPT41-C		0.57	199	315	489	523
CCPT41-C	2CPT51	3.13	488	772	1244	1297
CPT5A2-C		3.4	557	889	1420	1461
CCPT5B6C		3.78	647	1036	1665	
CPT6B-C		1.08	289	459	699	
CPT6BC2	C5A9	1.15	2	11	67	
CCPT6B-C	DEASTGOWAN	1.15	288	455	627	699
CCY07B	CBDVMORB	1.28	69	108	208	
CCCY08-C		1.45	378	568	745	
C427		5.23	948	1496	2331	2375
CRGOWAN	CX4X3	2.33	201	337	610	
CPD05A-C		2.47	228	387	691	
DA1-C	DVBOX	1.19	211	211	211	
DCPD05A	DVBOX	2.47	17	176	480	

Note: Offsite developed flow rates are assumed to be in MPU facilities. See onsite developed sub-basin map for detailed information regarding onsite basins, inlet capture, and flow conveyed in proposed stormdrain systems. See Appendix A for summary sheet of all offsite basin and concentration point HEC-1 models.

REVISIONS

NO.	DATE:	DESCRIPTION	APP'D

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

CITY ENGINEER: DAVID N. BOWERS, P.E., P.T.O.E.
PROGRAM MANAGER: JEREMY LEAVITT

DESIGNED BY: DB
DRAWN BY: SE
CHECKED BY: HM
DATE: JANUARY 2012

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
SHEET: DEVELOPED OFFSITE CONDITIONS

RANCHO DRIVE, DECATUR BLVD TO RAINBOW BLVD, AND GOWAN OUTFALL–ALEXANDER RD FACILITIES

Figure 5

Apr 01, 2014 – 10:01am – R:\23629-Rancho\06-Studies\01-70% Rancho Rd and Gowan Outfall Combined\99-Working Drawings\Gowan0utfall_Fig4-PgS-Offsite-Exhibits_20120730.dwg