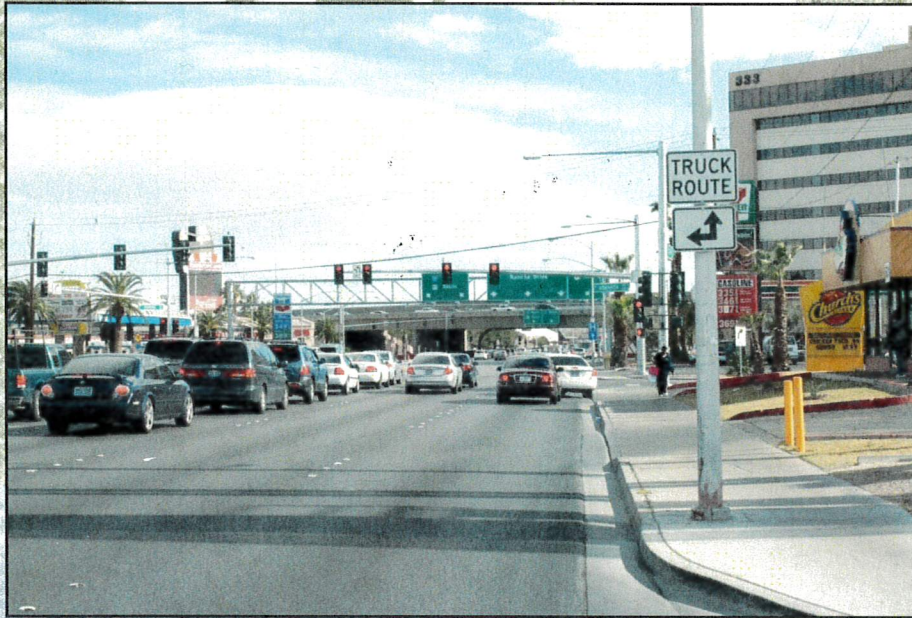


Rancho Drive Capacity Improvements Bonanza Road to Decatur Boulevard (Rancho Drive South) Technical Drainage Report



30% Submittal
May 2012

Prepared by:



On Behalf of:



City of Las Vegas, Nevada



**RANCHO DRIVE CAPACITY IMPROVEMENTS
BONANZA TO DECATUR**

30% Technical Drainage Report

May 2012

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City of Las Vegas**

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1.0 INTRODUCTION AND PURPOSE

1.1 Location of Project

The proposed improvements are within the City of Las Vegas (CLV) on Rancho Drive between Bonanza Road and Decatur Boulevard. The project site for Rancho Drive Capacity Improvements – Between Decatur and Bonanza (Project) is located entirely within the McCarran Airport Rainfall Area (Figure 5 of Appendix A) and within Nevada Department of Transportation (NDOT) jurisdiction. Refer to Figure 1 in Appendix A for the vicinity map.

The limits of the watershed tributary to the project extend from Rancho Drive on the east to Tenaya Way on the west, and Gowan Road on the north to Bonanza Road on the south. The watershed is a nearly fully developed urban area with exception to some undeveloped lots on the east and west sides of Rancho Drive. Refer to Figure 2 - 2008 MPU Hydrologic Map in Appendix A.

1.2 Project Description

The purpose of the Project is to provide additional traffic capacity to Rancho Drive by constructing improvements such as; sawtooths, curb and gutter, 10-foot wide sidewalks, ADA sidewalk ramps, bus turnouts, turn lanes at selected intersections, new street lights, traffic signals, signing and striping, median modifications, mill and overlay, adjustments to existing ITS fiber line, and adding lanes on southbound Rancho Drive beginning north of Ernest May to US-95 left-turn lanes south of Bonanza Road. Two design options are prepared at 30% design submittal.

Option A: Rancho Drive between Vegas Drive and Decatur Boulevard, will be redesigned to include a fourth dedicated transit lane, in both directions, using the available 125-foot right-of-way. In this option, the existing curb line will be relocated toward the centerline to provide the needed width for the 10-foot sidewalk and amenity zone.

Option B: Rancho Drive, between Vegas Drive and Decatur Boulevard, will be redesigned to include a fourth dedicated transit lane in both directions. In this option, the existing curb line will remain in place and additional right-of-way will be acquired to provide width for the 10-foot sidewalk and amenity zone. At locations where existing structures or obstructions preclude a wider sidewalk, a 5-foot wide sidewalk will be proposed.

1.3 Drainage Design Scope

The purpose of this drainage report is to provide a hydrologic and hydraulic analysis following NDOT and CLV criteria for existing, interim and ultimate developed conditions. Design includes analysis for offsite and onsite flows, evaluation of existing storm drain facilities, street hydraulics analysis, sizing of proposed drop inlets and proposing a new storm drain system as required to minimize the impact of flooding along



Rancho Drive. The analysis includes providing a cost estimate for drainage facilities proposed for the two design options in the interim and ultimate conditions.

During the coordination meeting on April 19, 2012 with CLV, it was determined that the hydraulic analysis for this project would be performed for the following four (4) scenarios:

1. Existing Condition Analysis - Verify NDOT 100-year criteria including offsite and onsite flows. This will be the base line for comparison against the interim condition analysis.
2. Interim Condition Analysis - Verify NDOT 100-year criteria including offsite and onsite flows for project improvement Options A & B.
 - a. If the interim condition is worse than existing condition, propose a system to bring down the excess depth of water to match the existing condition.
3. Interim Condition Analysis - Verify NDOT 25-year criteria for onsite flows for project improvement Options A & B.
 - a. If NDOT 25-year criterion is not met, propose a system to meet the criteria.
4. Ultimate Condition Analysis- Verify Regional Transportation Commission (RTC) 10-year and 100-year criteria for onsite flows for project improvement Options A & B assuming all future MPU facilities are in place.
 - a. If RTC 10-year or 100-year criteria are not met, propose a system to meet each of the criteria.

Based on the above scenarios, two cost estimates are prepared to provide CLV with a difference in costs between the drainage infrastructures needed, for both Option A and B:

1. To meet NDOT 25-year and 100-year criteria in interim condition.
2. To meet RTC 10-year and 100-year criteria in ultimate condition.

For the purpose of this report, the following basic definitions are assumed:

- The existing condition is considered as the existing condition of the street, with the existing MPU facilities in place.
- Interim condition is considered as the period when the Project improvements are in place, with existing MPU facilities as is.
- Ultimate condition will be the period when the Project improvements are in place and all proposed MPU facilities in the project limits will be built out and fully functional.

A detailed hydraulic analysis is discussed in section 4.0 of the report.



2.0 GENERAL DRAINAGE DESCRIPTION

2.1 Project Site Characteristics and Drainage patterns

The primary drainage conveyance facilities within the watershed are streets. However, several existing MPU facilities convey the flow along and across Rancho Drive. Refer to Figure 3 and Figure 3A in Appendix A for the 2008 MPU Facilities Map and Inventory. Several as-built plans from various studies showing the built-in existing facilities were reviewed for the project.

The onsite drainage pattern is generally from north to south along Rancho Drive. The offsite flow pattern is generally flowing from west to east and northwest to southeast. There is a low point at the south end of the project, near the intersection of Rancho Drive and Bonanza Road.

2.2 FEMA Flood Insurance Rate Maps

Special Flood Hazard Areas (SFHA) for CLV are outlined in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), dated November 16, 2011. Upon reviewing Map Numbers 32003C2170 F and 32003C2155 F, the proposed site lies within a FEMA designated Zone X. This area is described to be outside of the 0.2% annual chance of flood, which indicates the project area is not located within a FEMA floodplain. Refer to Figure 4 in Appendix A.

2.3 Reference Studies

The Central Neighborhood Flood Control Master Plan study (CNFCMP), approved March 2005, was prepared by PBS&J and obtained from CLV for review. The study provides a comprehensive hydrologic analysis and storm drain facility plan for the Central Watershed. This study is used as the basis for the hydrologic and hydraulic analysis for the current project.

The 2008 Clark County Regional Flood Control District (CCRFCDD) Las Vegas Valley Flood Control Master Plan Update (MPU) study is referenced to identify the most current developments and existing regional flood control facilities within the project's tributary area. The Project is located in the Central Watershed as defined by the 2008 MPU and within the 2005 CNFCMP study area.

Rancho Drive/US 95 Letter of Map Revision (LOMR), prepared for CLV by The Louis Berger Group, Inc., in November 2006, is also referenced to verify the recently approved FEMA flood zones (Zone X) within the project limits. Several other as-built plans from various drainage studies within the vicinity of the project limits are obtained for referencing the existing facilities.

2.4 Regional Flood Control Facilities

There are several existing regional flood control facilities within the project limits that convey the majority of offsite flows from the west side of the project limits to the east



side, that otherwise might impact Rancho Drive on the west side. For convenience, the facilities are grouped into the following major systems:

- Peak Channel System: An existing 15' wide x 6' deep open channel (Peak Channel) runs west to east just north of Madre Mesa Drive and converts to a 12' x 8' reinforced concrete box (RCB) at Decatur Boulevard and runs south along Rancho Drive. The system turns east at Smoke Ranch Drive, and eventually connects to the 607 ac-ft Carey-Lake Mead Detention Basin.
- Lake Mead Boulevard System: An existing 84-inch reinforced concrete pipe (RCP) runs from west to east on Lake Mead Boulevard, across Rancho Drive.
- Vegas Drive System: An existing 84-inch RCP runs from west to east on Vegas Drive, across Rancho Drive.
- Washington Avenue System: A proposed 8' x 7' RCB runs from west to east on Washington Avenue, across Rancho Drive. This system will be in place in the ultimate condition. Currently at Washington Avenue and Rancho Drive an existing 8' x 6' RCB is in place and runs south along Rancho Drive starting at this intersection.

2.5 Utility information

Existing utilities located within the project s limits were obtained by contacting the utility companies. Please refer to Appendix C for the utility matrix. Based upon as-builts provided by the agencies, the existing water, sewer, storm drain, electrical, and gas utilities were drafted in AutoCAD. HMH provided survey data that included additional utility information such as existing manhole locations, water valves, and invert elevations for drop inlets. Utility conflicts will be addressed at a later phase of the project.

3.0 HYDROLOGY

3.1 HCDDM Design Criteria and NDOT Design Criteria

- The design events evaluated for this project were the 10-year and 100-year events, for a 6-hour return period, per the design criteria set forth in the CCRFCD Hydrologic Criteria and Drainage Design Manual (HCDDM) and 25-year and 100-year frequency per the requirements of NDOT drainage manual. RTC follows the same criteria as CCRFCD.
- A minimum time of concentration of 5 minutes is used for directly connected impervious sub-basins, in accordance with both CCRFCD HCDDM and NDOT Drainage Manual.

3.2 Hydrologic Method

Offsite Peak Flows: The US Army Corps of Engineers computer software HEC-1 Flood Hydrograph Package (USACOE, 1998) was used to develop offsite peak flows to assess impacts to the project site. The HEC-1 model for the Project is based on the CNFCMP 10-year HEC-1 model. The 10-year HEC-1 model presented in the CNFCMP study is detailed and includes numerous flow splits to accurately estimate street and facility flows. The street flows were then used to determine the need for local drainage facilities and



collectors. At 30% design phase, this model is considered applicable to the current Project's existing, interim and ultimate conditions since the majority of the watershed tributary area was in a developed condition at the time that study was conducted. Refer to Appendix B for offsite basin maps and HEC-1 calculations.

Onsite Peak Flows: Onsite flows for the project are developed using both the rational method and modified rational method as required by NDOT criteria and CCRFCD HCDDM respectively. The peak flows were determined for existing, interim Option A and Option B, and ultimate Option A and Option B conditions. Refer to Appendix B for onsite basin maps and runoff calculations for existing, interim and ultimate conditions.

3.2.1 Rainfall Area and Intensities

The project site is located within the McCarran Airport Rainfall Area, in Section 18, 19, 20, and 29 of Township 20 south, Range 61 east, Clark County, Nevada. Refer to Figure 5 in Appendix A. The Depth-Duration-Frequency curves from Figures 503, 504 and 506 of HCDDM are used to obtain the rainfall depths. Refer to Figures 6, 6A and 6B in Appendix A. The 10-year, 25-year and 100-year 6-hour rainfall depths are 1.58 inches, 2.05 inches and 2.77 inches respectively. Refer to Figure 7 in Appendix A. The storm distribution that will be used for this project is SDN3 due to the total drainage area being less than 8 square miles. Refer to Figure 8 and 9 in Appendix A for the storm distribution and depth-area reduction factor tables.

3.2.2 Curve Number, Soil Types and Land Use

Precipitation losses were determined using the SCS Curve Number Method in accordance with section 603 of HCDDM. The curve number is a parameter assigned to the drainage basin and used in the HEC-1 model to estimate rainfall loss from infiltration. For urban areas, the value of the curve number is based on the basin land use, soil type, and antecedent moisture condition (AMC). For the CCRFCD area, an AMC-II condition is used for determining storm runoff.

The Project watershed lies within a nearly fully developed urban area consisting of single and multi-family residences. There are sparse commercial and public parcels. The CNFCMP study followed the 2002 MPU, considering the existing conditions at the time of the study (2005), to determine the soil group and land use for the offsite watershed tributary of this Project. The Curve Numbers (CN) used in the offsite HEC-1 model for the Project follow the values obtained from the CNFCMP study. The Project watershed consists of A, B, C & D soil types. The CN values utilized for the onsite runoff calculations for the Project were calculated using the soil group and land use information provided in the 2008 MPU.

3.2.3 Time of Concentration and Lag Time

For the offsite HEC-1 model, the time of concentration (T_c) and lag time calculations are used per the CNFCMP study. The T_c and lag time calculations for onsite rational and modified rational method are performed based on the methodology described in section



606 of the HCDDM. Tc and runoff calculations for onsite basins are provided in Appendix B.

3.3 Existing Condition

For this report, existing condition is considered the existing condition of the street with the existing MPU facilities in place.

3.3.1 Offsite Flows

Offsite flows in existing condition are calculated using the HEC-1 model, based on the CNFCMP study's 10-year HEC-1 model. Offsite flows impact Rancho Drive on the west side of the street. The street capacity of Rancho Drive is determined to be able to carry the offsite flows on the west side of the street, without overtopping the crown. This was determined by taking cross sections along Rancho Drive at key locations and comparing the normal depth of the flow to the top of the median or crown in Rancho Drive. Therefore, no offsite flows impact the east side of the street and only runoff from onsite basins on the east side impact Rancho Drive on the east half.

For the existing drop inlets, the offsite flow was distributed per linear foot on the west side of Rancho Drive. The quantities and locations where offsite flows are impacting Rancho Drive are provided below:

- Peak Channel to Smoke Ranch Drive: Per the HEC-1 model, 1603 cfs (100-year) of offsite flow is combined at the Peak System combination point. Per as-builts (CLV #103408) provided by CLV, the MPU system LVRA 0012 (12'x8' RCB) that is within Rancho Drive on the west side of the street collects 1256 cfs. Refer to as-builts for Rancho Drive Drainage Improvement Plans- Phase II (CLV # 103408), provided in Appendix C. Therefore, out of the 1603 cfs, 347 cfs will remain on west side of Rancho Drive in the 100-year event. During the 10-year (332 cfs) and 25-year (931 cfs) storm events, all flow will be collected in the 12' x 8' RCB, hence, no offsite flow stays on the street during these events.
- Smoke Ranch Drive to Lake Mead Boulevard: Per the HEC-1 model, the Smoke Ranch MPU facility collects and conveys all offsite flow west of Rancho Drive between Smoke Ranch Drive and Lake Mead Boulevard. Flows are conveyed west to east in this system, hence, there are no offsite flows between Smoke Ranch Drive and Lake Mead Boulevard.
- Lake Mead Boulevard to Vegas Drive: Per the HEC-1 model, offsite basin LM09 contributes a flow of 169 cfs in the 100-year storm impacting Rancho Drive on the west side, just south of Lake Mead Boulevard. Offsite basins VG21, VG20 and VG22 contribute 116 cfs, 138 cfs and 172 cfs along Rancho Drive between Lake Mead Boulevard and Vegas Drive.



- Vegas Drive to Washington Avenue: Per the HEC-1 model, offsite basin WA13 contributes 180 cfs and WA14 contributes 57 cfs in the 100-year event, impacting the west side of Rancho Drive.
- Washington Avenue to Bonanza Avenue: Per the HEC-1 model, offsite basin WA11-C contributes 83 cfs in the 100-year event, impacting the west side of Rancho Drive.

The offsite basin maps are provided in Appendix B. The HEC- 1 models for the 10-year, 25-year and 100-year storm events are also provided in Appendix B.

3.3.2 Onsite Flows

Onsite flows for the existing condition are developed using both rational method and modified rational method as required by NDOT and CCRFCD HCDDM criteria respectively. The limits of onsite basins are determined based on several parameters such as right of way limits, major cross streets, medians, grade changes, and existing drop inlets. The peak runoff values are calculated based on the geometry of the street, longitudinal slope, cross slope, and surface roughness. Other hydrologic factors used in quantifying the runoff are discussed in sections 3.2.1 through 3.2.3 above. Refer to Appendix B for onsite basin maps and runoff calculations for existing condition.

3.4 Interim Condition

For this report, interim condition is considered as the period when the Project improvements are in place, with existing MPU facilities.

3.4.1 Offsite Flows

Offsite flows in interim condition are considered as the same as the flows calculated in existing condition, due to negligible land use changes since 2005. For interim offsite flows, only the 100-year storm event is necessary to meet NDOT 100-year criteria. The offsite basin map is provided in Appendix B along with the HEC-1 models.

3.4.2 Onsite Flows

The geometry of the street cross sections is revised to match the proposed Option A and Option B roadway design. In particular, a gutter width of 1.5 feet is considered on both northbound and southbound lane geometries. Interim proposed cross slopes of the road were taken to be the same as existing condition. For interim onsite flows, only the 25-year storm event was analyzed to meet NDOT 25-year criteria. Refer to Appendix B for onsite basin maps and runoff calculations for Option A and B.

3.5 Ultimate Condition

For this report, ultimate condition will be the period when the Project improvements are in place and all proposed MPU facilities in the project limits will be built out and fully functional.



3.5.1 Offsite Flows

Offsite flows in ultimate condition are the same as the flows calculated in existing condition, with the exception that the flows will be completely intercepted by the major MPU facilities within the project limits. Therefore, for the purpose of hydraulic analysis of Rancho Drive the following flows are considered in each segment of the project, in ultimate condition:

- Peak Channel to Smoke Ranch Drive: The MPU facility- existing Peak Channel, 12' x 8' RCB in Rancho Drive will intercept all offsite flow at the north end of the Project. Per the HEC-1 model, the existing Smoke Ranch MPU facility collects and conveys all offsite flow from west to east and there is no by pass on Rancho Drive, beyond this facility. Hence, there are no offsite flows that impact Rancho Drive within this segment of the project.
- Smoke Ranch Drive to Lake Mead Boulevard: The proposed MPU facility in Lake Mead Boulevard (LVLM 0271 – 12'x8' RCB) will intercept all offsite flow within this segment, hence there is no offsite flow impacting Rancho Drive in this segment.
- Lake Mead Boulevard to Vegas Drive: The existing Vegas Drive MPU facility (LVOW 0146 - 84" RCP) will intercept all offsite flow within this segment of the project and convey it east, hence there is no offsite flow impacting Rancho Drive.
- Vegas Drive to Washington Avenue: The proposed MPU facility in Washington Avenue (LV15 0474 – 8"x6" RCB) will intercept all offsite flow within this segment of the project and convey it east, hence there is no offsite flow impacting Rancho Drive.
- Washington Avenue to Bonanza Avenue: There is an existing MPU facility (LCRA 0050 - 8'x6' RCB and LCRA 0004 - 12'x6' RCB) in place along Rancho Drive between Washington Avenue and Bonanza Avenue that collects all offsite flow between these two streets, thus there is no offsite flow impacting Rancho Drive.

3.5.2 Onsite Flows

Onsite flows in ultimate condition are considered the same as the flows calculated in interim condition, due to completion of the onsite roadway Project. Onsite flows will analyze RTC criteria for 10-year and 100-year events. Refer to Appendix B for onsite basin maps and runoff calculations for Option A and B.

4.0 HYDRAULICS

The hydraulic analysis of the storm drain system is performed according to the procedures and criteria presented in NDOT Drainage Manual, CCRFCD HCDDM and key issues discussed with CLV during the progress meetings. The meeting



minutes are provided in Appendix C. The HCDDM criteria and NDOT criteria are presented below:

4.1 HCDDM Design Criteria

- a. The street capacity calculations are based on CCRFCD criteria for the allowable capacity of a street in minor (10-year) and major (100-year) storm events:

Minor Storm - 10 year (Street right-of-way width $\geq$ 80 feet)

- A 12-foot wide dry lane shall be maintained in each direction (center turning lane cannot be used for a dry lane)
- The depth of flow at intersections with other streets with ROW widths greater than or equal to 80 feet shall be curb height (typically 6 inches) or less.
- The product of the flow depth (feet) in the gutter flow line times the average flow velocity (feet per second (fps)) shall be less than or equal to 6.

Major Storm - 100 year

- The product of the flow depth (feet) in the gutter flow line times the average flow velocity (fps) shall be less than or equal to 8.
 - The depth of flow in the gutter flow line shall be less than or equal to 2 feet.
 - The transverse street flow on through traffic streets shall be at a depth less than or equal to 1 foot and a depth times velocity less than or equal to 8. This shall not be used to determine the allowable transverse flow depth for a culvert.
- b. A clogging factor of 50% is applied to size the drop inlets.
 - c. The minimum slope for storm drains is 0.25% and a minimum velocity of 3 fps shall be maintained.
 - d. The minimum pipe size for storm drain laterals is 18 inches.
 - e. The Hydraulic Grade Line (HGL) for storm drains will be 1 foot below the finished grade.
 - f. Manholes are spaced at a maximum of 400 feet per the CCRFCD HCDDM.

4.2 NDOT Design Criteria

- a. 25-year design storm frequency is the minimum design return frequency for this project, based on the type of roadway classification for Rancho Drive. Rancho Drive is classified as "Other Principal Arterial".
- b. The spread criteria required by NDOT is $\frac{1}{2}$ of travel lane. Spread limits specified are as measured into the traveled lane beyond any available parking lanes, bike lanes, and shoulder widths. Turn pockets and bus turnouts are not considered as the travel lane. Auxiliary lanes are considered as travel lane.
- c. Roadway surface drainage facilities shall be designed to collect all flows reaching the roadway, surface runoff generated both on the roadway itself, and flows



reaching the roadway prism from upstream and adjacent basins such as parking lots or cross streets that direct flows onto the roadway surface.

- d. The 100-year event (developed conditions flows) must be evaluated to the extent necessary to ensure no adverse impacts are created (for e.g.: impact on sag locations).
- e. Gutter grades should not be less than 0.3% for curbed pavements (not less than 0.2% in very flat terrain).
- f. A minimum of 2% typical cross slope is desirable for all roadway surfaces. The typical roadway cross slope shall not be less than 1.5% without approval from the Chief Hydrologic Engineer.
- g. Inlets shall be placed to intercept flows to meet the spread criteria.
- h. Use a minimum 25% clogging factor for inlets on grade that are expected to be subject to debris. In sag locations, a 50% clogging factor shall be applied by providing double the required inlet capacity.
- i. Maintain a minimum flow velocity in storm drain trunk lines (more than 2 upstream inlets) of 3 fps at the design flow.
- j. Minimum pipe diameters for storm drains are 18 inches for trunk lines, 15 inches for lateral connectors, and 12 inches for down drains.
- k. NDOT has no specific criteria for 100-year, but requires no adverse impact to the existing conditions in a 100-year event. Refer to NDOT Drainage Manual 2006 section 3.3.2.2.

4.3 Street Flow Capacities vs. Normal Depth

CCRCD HCDDM and NDOT criteria for street capacities are considered for this project. Street flow capacity calculations are performed using Bentley FlowMaster, 2008 software. Street carrying capacity is determined based on the agency's criteria, geometry of the street, longitudinal slope, cross slope, and surface roughness. Street flow capacity for Rancho Drive is evaluated at each concentration point and upstream location of existing drop inlets. All cross sections are identified by the approximate station of the different alignments on Rancho Drive. Where the flows on the street exceed the street carrying capacity, drop inlets are proposed to intercept the excess flows or existing drop inlets are upsized.

Survey provided by HMM and contour data are used to obtain the existing right-of-way limits and longitudinal slopes of the streets. Where needed, reasonable engineering judgment is utilized to build the cross sections.

4.4 Drop Inlet Analysis

Existing drop inlets are analyzed for their interception capacity and where the spread criteria is not met, the existing drop inlets are proposed to be extended. At locations where spread criteria is not met and there are no existing drop inlets, new drop inlets are proposed. Inlet capture calculations were performed for 10-year, 25-year and 100-year storm events as required by RTC and NDOT respectively. A clogging factor of 25% is applied to size the inlets in accordance with NDOT criteria and a 50% clogging factor is applied to meet RTCs criteria.



Existing drop inlet parameters such as length, width, and type are obtained from field measurements. Proposed drop inlets are standard Type C drop inlets, varying in lengths from 3 feet to 33 feet. These parameters are applied in FlowMaster to obtain the interception capacities of the drop inlets. Based on the intercepted flows, the storm drain system in Rancho Drive is designed.

4.4.1 Existing Condition

CCRFC 100-year street flow criteria requires that the depth of water times velocity of water, $D \times V$ value, be equal to or less than 8 and the maximum allowable depth of water be less than 2 feet.

Cross sections were taken at every existing catch basin on Rancho Drive as well as at other critical points such as at intersections and back of curb returns. A maximum allowable depth (D_{max}) value that results in the maximum $D \times V$ value, nearest to 8 is calculated, based on each specific cross section. This was done using FlowMaster. The lower value out of the D_{max} and 2 feet is considered as the controlling depth. Using FlowMaster, the maximum quantity of flow corresponding to the D_{max} is calculated. This is the maximum street capacity Rancho Drive can carry in a 100-year storm event. FlowMaster calculations for maximum CCRFC 100-year street capacity are provided in Appendix E- A.1.i and A.2.i for east and west sides respectively. Spreadsheet calculations are provided in Appendix D, A-1 and A-2.

The actual offsite runoff (HEC-1) calculated for 100-year storm event, is entered into FlowMaster at each specific cross section and the corresponding normal depths (D_{Q100}) are calculated. Since there are no offsite flows impacting the east side of Rancho Drive, onsite flows calculated using rational method per NDOT criteria are used to calculate a corresponding D_{Q100} . The D_{Q100} value and D_{max} values are compared to see if the street meets the criteria. The D_{Q100} value is also verified if less than 2 feet. FlowMaster calculations for offsite 100-year flows (west side) and onsite 100-year flows (east side) are provided in Appendix E- A.1.ii and A.2.ii respectively. Spreadsheet calculations are provided in Appendix D, A.A-1 and A.A-2.

All existing drop inlets are analyzed for interception capacities. Where street criteria is not met, some of the existing drop inlets are proposed to be extended to meet the required spread. FlowMaster calculations for drop inlet analysis are provided in Appendix E- A.1.iii and A.2.iii. Refer to Appendix D, A-1 and A-2 for spreadsheet calculations for drop inlet analysis.

4.4.2 Interim Condition

Onsite runoff in a 25-year storm, calculated from rational method is verified to meet NDOT 25-year criteria in interim condition. Offsite flows are also verified to meet NDOT 100-year criteria in interim condition. FlowMaster cross sections are revised per the proposed roadway geometry for Options A and B.



NDOT 25- year criteria:

NDOT 25-year street flow criterion requires $\frac{1}{2}$ dry lane in the travel lane. If there are transit (bus) lanes, or right turn pockets, the criterion applies to the lane adjacent to the transit lane. With the available “non-dry” length and the existing cross slope, a $D_{\max}$ for water on the street is calculated. Using FlowMaster, the maximum quantity of flow corresponding to the $D_{\max}$ is calculated. FlowMaster calculations for maximum NDOT 25-year street capacity are presented in Appendix E - C.1.i, C.2.i, C.3.i, C.4.i for east side Option A, Option B and west side Option A and Option B respectively.

The actual onsite runoff calculated for a 25-year storm event (rational method) is entered into FlowMaster and the corresponding normal depths (D_{Q25}) are calculated. The calculations are performed for Option A and B on east and west sides of Rancho Drive. The D_{Q25} value and $D_{\max}$ values are compared to see if the street meets the criteria. FlowMaster calculations for rational 25-year flows (west side) and rational 25-year flows (east side) are provided in Appendix E - C.1.ii, C.2.ii, C.3.ii, C.4.ii for east side Option A, Option B, and west side Option A and Option B respectively. Spreadsheet calculations showing the street criteria analysis are provided in Appendix D, C-1 and C-2.

Several drop inlets are proposed in both Options A and B to capture the excess flow where spread criteria is not. All existing drop inlets are analyzed for interception capacities. Where needed, some of the existing drop inlets are proposed to be extended to meet the required spread. FlowMaster calculations for drop inlet analysis are provided in Appendix E- C.1.iii, C.2.iii, C.3.iii and C.4.iii corresponding to east side Option A, Option B, west side Option A and Option B respectively. Spreadsheet calculations showing the drop inlet analysis are provided in Appendix D, C-1 and C-2.

NDOT 100- year criteria:

NDOT has no specific criteria for 100-year, but requires no adverse impact to the existing conditions in a 100-year event. Hence, CCRFCD criteria- $D \times V < 8$ and $D_{\max} < 2$ feet is applied to verify the street criteria.

Using the revised geometry of street cross sections, for Option A and Option B, a $D_{\max}$ value that results in the maximum $D \times V$ value, nearest to 8, is calculated. The lower value out of the $D_{\max}$ and 2 feet is considered as the controlling depth. Using FlowMaster, the maximum quantity of flow corresponding to the $D_{\max}$ is calculated. This is the maximum street capacity Rancho Drive can carry in a 100-year storm event with roadway geometry for Option A and Option B. FlowMaster calculations for $D_{\max}$ are provided in Appendix E - B.1.i, B.2.i, B.3.i, B.4.i for east side Option A, Option B, and west side Option A and Option B respectively.

The actual offsite runoff (HEC-1) calculated for 100-year storm event, is entered into FlowMaster and the corresponding D_{Q100} are calculated. Since there are no offsite flows



impacting the east side of Rancho Drive, onsite flows calculated using rational method per NDOT criteria are used to calculate a corresponding D_{Q100} . The calculations are performed for Option A and B on east and west sides of Rancho Drive. The D_{Q100} value and D_{max} values are compared to see if the street meets the criteria. The D_{Q100} value is also verified if less than 2 feet. FlowMaster calculations for street capacity analysis are provided in Appendix E - B.1.ii, B.2.ii, B.3.ii, B.4.ii for east side Option A, Option B, west side Option A and Option B respectively. Spreadsheet calculations showing the street criteria analysis are provided in Appendix D, B-1 and B-2.

Where street criteria are not met, drop inlets are proposed to capture the excess flow such that the spread criteria will be met. All existing drop inlets are analyzed for interception capacities. Where needed, some of the existing drop inlets are proposed to be extended to meet the required spread. FlowMaster calculations for drop inlet analysis are provided in Appendix E - B.1.iii, B.2.iii, B.3.iii, B.4.iii for east side Option A, Option B and west side Option A and Option B respectively. Spreadsheet calculations showing the drop inlet analysis are provided in Appendix D, B-1 and B-2.

4.4.3 Ultimate Condition

Onsite runoff in 10-year and 100-year storm events, calculated from modified rational method are verified to meet RTC 10-year and 100-year criteria in ultimate condition. RTC uses the same criteria as CCRFCD. FlowMaster cross sections are revised per the proposed roadway geometry for Options A and B. Any planned improvements to MPU facilities and any proposed MPU facilities are considered to be built-out and fully functional in ultimate condition. As a result, all offsite flows and upstream onsite flows are assumed to be picked up by MPU facilities, which are located along Smoke Ranch Road, Lake Mead Boulevard, Vegas Drive and Washington Avenue as they cross Rancho Drive. The controlling flows in ultimate condition are mentioned in section 3.5.1.

CCRFCD 10-year street flow criteria requires having a 12-foot dry lane in each direction, in addition to the center turn lane width. In addition, $D \times V$ less than 6 criteria is also required. With the available "non-dry" length and the existing cross slope, a D_{max} for water on the street is calculated. Using FlowMaster, the maximum quantity of flow corresponding to the D_{max} is calculated. The $D_{max} \times V$ value corresponding to the D_{max} is verified to be less than 6. Where $D_{max} \times V$ is greater than 6, the depth is revised iteratively, until $D \times V$ is equal or less than 6. The resulting depth is considered D_{max} . FlowMaster calculations for D_{max} are provided in Appendix E - D.1.i, D.2.i, D.3.i, and D.4.i for east side Option A, Option B and west side Option A and Option B respectively.

CCRFCD 100-year street flow criteria requires that the $D \times V$ value be equal or less than 8 and the maximum allowable depth of water be less than 2 feet. Maximum allowable street capacity corresponding to a D_{max} allowable to meet CCRFCD 100-year criteria is calculated as discussed in section 4.5.2. FlowMaster calculations for D_{max} are provided in Appendix E - D.1.i, D.2.i, D.3.i, and D.4.i for east side Option A, Option B and west side Option A and Option B respectively.



The onsite runoff calculated for 10-year and 100-year storm events, using modified rational method, are entered into FlowMaster and the corresponding normal depths (D_{Q100} and D_{Q10}) are calculated. The calculations are performed for Option A and B on east and west sides of Rancho Drive. The D_{Q100} and D_{Q10} values and D_{max} values for 10-year and 100-year storms are compared respectively to see if the street meets the criteria. FlowMaster calculations for modified rational 10-year and 100-year flows are provided in Appendix E - D.1.ii, D.2.ii, D.3.ii, and D.4.ii for east side Option A, Option B, and west side Option A and Option B respectively. Spreadsheet calculations showing the street criteria analysis are provided in Appendix D, D-1 and D-2.

Drop inlets are proposed in both Options A and B to capture the excess flow where spread criteria is not met. All existing drop inlets are analyzed for interception capacities. Where needed, some of the existing drop inlets are proposed to be extended to meet the required spread. FlowMaster calculations for drop inlet analysis for 10-year and 100-year flows are provided in Appendix E- D.1.iii, D.2.iii, D.3.iii, and D.4.iii corresponding to east side Option A, Option B, and west side Option A and Option B respectively. Spreadsheet calculations showing the drop inlet analysis are provided in Appendix D, D-1 and D-2.

4.4.4 Storm Drain Design

For the storm drain design, the main objective is to compare the 100-year normal depths of flow for interim and ultimate conditions to that of existing condition to ensure that the interim and ultimate normal depths are less than or equal to the existing condition. For interim condition NDOT 25-year and 100-year criteria was met, and when 100-year normal depths are compared on both the east and west side of Rancho Drive, for both Option A and B, it can be seen that the normal depths are less than or equal to the normal depths of the existing condition. This indicates that in the 100-year storm event, flooding on Rancho Drive has been improved for interim condition. The comparison of the normal depths for east and west side of Rancho Drive can be found in Appendix D.E.

A storm drain pipe has been sized to collect both the east and west side flow that existing and proposed catch basins collect. The storm drain pipe would be situated on west side of Rancho Drive. The actual location will be determined in the next submittal, once utility conflicts can be identified. The slope of the RCP is designed at the average longitudinal slope of Rancho Drive. The storm drain pipe starts with a 2 foot diameter at approximately station "L" 92+86, south of Lake Mead Boulevard. The pipe continues to upsize as it moves south along Rancho Drive towards Vegas Drive, where it connects to MPU facility LVOW 0146, an existing 84" RCP. The size of the RCP varies from 2 feet up to 7 feet between Lake Mead Boulevard and Vegas Drive and collects 625 cfs of flow for the 100-year interim condition Option A and 606 cfs for Option B.

A storm drain pipe has been designed to collect flow just south of Vegas Drive to Washington Avenue. It will collect flow from both the west and east sides of Rancho Drive. It varies in size from 2 feet in diameter to 5 feet in diameter and collects 184 cfs of flow in Option A and 191 cfs for Option B. This system connects to the MPU facility



at Washington Drive, LCRA 0050, an existing 8'x6' RCB that parallels Rancho Drive and continues south to Interstate 95. Pipe sizing calculations using FlowMaster are provided in Appendix E. A summary of the pipe sizes are presented in a spreadsheet in Appendix D.

In ultimate condition, CCRFCD 10-year and 100-year criteria are met. The main difference between ultimate condition and existing condition 100-year normal depths on the west side of Rancho Drive has to do with offsite flows being collected by future MPU facilities before reaching Rancho Drive. The east side receives relatively the same amount of flow. If the Rancho Drive storm drain system is built at ultimate condition, after the MPU facilities have been constructed, a RCP will not be needed as the existing catch basins intercept enough flow to meet criteria. This is true for both Option A and B. If the system is built in interim condition, the RCP will be necessary and will remain in place for ultimate condition along with the upsized and proposed catch basins.

NDOT 25-year criterion proves to be the most controlling factor for limiting normal depth for surface flow within Rancho Drive. As a result this criteria causes the most upsizing for existing catch basins. The 100-year storm is run through these catch basins, along with any catch basins upsized to meet 100-year criteria to size the RCP that will go along the west side of the road.

5.0 QUANTITY AND COST ESTIMATE

A preliminary estimate of quantities and costs for drainage at 30% design phase are calculated based upon the number of drop inlets, and length of storm drain pipe needed to construct the proposed storm drain system. Quantity and cost estimates are prepared for the two scenarios:

- 1) To meet NDOT 25-year and 100-year criteria in interim condition
- 2) To meet RTC 10-year and 100-year criteria in ultimate condition

A total of four cost estimates corresponding to NDOT 25-year and 100-year - Option A, and Option B, RTC 10-year and 100-year- Option A and Option B are prepared and presented in Appendix D.G

The highest drainage costs for the project resulted from NDOT 25-year and 100-year cost estimates for both Option A (approximately \$2.7 Million) and Option B (approximately \$2.6 Million). These estimates are presented in Table 5.1 below.

A breakdown of these costs for the three roadway segments as defined in the Alternative Analysis Report of this Project are also provided in Appendix D.G. The three segments are

- Southern Segment from Bonanza to Washington Avenue
- Central Segment from Washington Avenue to Vegas Drive and
- Northern Segment from Vegas Drive to Decatur Boulevard



Table 5-1

RANCHO DRIVE CAPACITY IMPROVEMENTS -BONANZA TO DECATUR 30% - DESIGN - DRAINAGE QUANTITY AND COST ESTIMATE INTERIM NDOT 25 & 100 YR - OPTION A					
ITEM NO.	ITEM DESCRIPTION	UNIT	APPROX QTY	UNIT PRICE	EXTENDED PRICE
603.01	24-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	1,877	\$150	\$281,550
603.02	30-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	1,213	\$150	\$181,950
603.03	36-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	215	\$250	\$53,750
603.04	42-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	751	\$275	\$206,525
603.05	48-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	516	\$325	\$167,700
603.06	54-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	1,054	\$325	\$342,550
603.07	60-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	340	\$325	\$110,500
603.08	66-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	689	\$350	\$241,150
603.09	72-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	710	\$400	\$284,000
603.10	84-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	320	\$400	\$128,000
609.11	3-FOOT TYPE DMDROP INLET	EA	23	\$5,000	\$115,000
609.12	6-FOOT TYPE DMDROP INLET	EA	1	\$6,000	\$6,000
609.13	7.5-FOOT TYPE DMDROP INLET	EA	2	\$8,000	\$16,000
609.14	9-FOOT TYPE DMDROP INLET	EA	1	\$8,500	\$8,500
609.15	10-FOOT TYPE DMDROP INLET	EA	4	\$9,000	\$36,000
609.16	12-FOOT TYPE DMDROP INLET	EA	1	\$11,000	\$11,000
609.17	12.5-FOOT TYPE DMDROP INLET	EA	1	\$11,000	\$11,000
609.18	15-FOOT TYPE DMDROP INLET	EA	1	\$12,500	\$12,500
609.19	20-FOOT TYPE DMDROP INLET	EA	3	\$13,900	\$41,700
609.20	21-FOOT TYPE DMDROP INLET	EA	3	\$13,900	\$41,700
609.21	24-FOOT TYPE DMDROP INLET	EA	1	\$14,600	\$14,600
609.22	33-FOOT TYPE DMDROP INLET	EA	1	\$18,000	\$18,000
				SUBTOTAL	\$2,329,675
				20% CONTINGENCY	\$465,935
				TOTAL	\$2,795,610



Table 5-2

RANCHO DRIVE CAPACITY IMPROVEMENTS -BONANZA TO DECATUR 30% - DESIGN - DRAINAGE QUANTITY AND COST ESTIMATE INTERIM NDOT 25 & 100 YR - OPTION B					
ITEM NO.	ITEM DESCRIPTION	UOM	APPROX QTY	UNIT PRICE	EXTENDED PRICE
603.01	24-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	1,077	\$150	\$161,550
603.02	30-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	1,213	\$150	\$181,950
603.03	36-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	215	\$250	\$53,750
603.04	42-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	751	\$275	\$206,525
603.05	48-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	184	\$325	\$59,800
603.06	54-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	1,226	\$325	\$398,450
603.07	60-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	340	\$325	\$110,500
603.08	66-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	368	\$350	\$128,800
603.09	72-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	1,031	\$400	\$412,400
603.10	78-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	35	\$425	\$14,875
609.11	84-INCH REINFORCED CONCRETE PIPE (CLASS III)	LF	165	\$450	\$74,250
609.12	3-FOOT TYPE DMDROP INLET	EA	19	\$5,000	\$95,000
609.13	5-FOOT TYPE DMDROP INLET	EA	4	\$5,000	\$20,000
609.14	6-FOOT TYPE DMDROP INLET	EA	2	\$6,000	\$12,000
609.15	7.5-FOOT TYPE DMDROP INLET	EA	2	\$8,000	\$16,000
609.16	9-FOOT TYPE DMDROP INLET	EA	1	\$8,500	\$8,500
609.17	10-FOOT TYPE DMDROP INLET	EA	3	\$9,000	\$27,000
609.18	12-FOOT TYPE DMDROP INLET	EA	1	\$11,000	\$11,000
609.19	12.5-FOOT TYPE DMDROP INLET	EA	2	\$11,000	\$22,000
609.20	15-FOOT TYPE DMDROP INLET	EA	1	\$12,500	\$12,500
609.21	18-FOOT TYPE DMDROP INLET	EA	2	\$15,000	\$30,000
609.22	20-FOOT TYPE DMDROP INLET	EA	3	\$13,900	\$41,700
609.23	21-FOOT TYPE DMDROP INLET	EA	4	\$13,900	\$55,600
609.24	24-FOOT TYPE DMDROP INLET	EA	2	\$14,600	\$29,200
				SUBTOTAL	\$2,183,350
				20% CONTINGENCY	\$436,670
				TOTAL	\$2,620,020



6.0 CONCLUSION

This study was completed in accordance with the criteria set forth by the Clark County Regional Flood Control District, Nevada Department of Transportation, Regional Transportation Commission, and the City of Las Vegas local floodplain ordinances. The proposed storm drain system is designed to meet RTC 10-year and 100-year criteria in the ultimate condition and NDOT 25-year and 100-year criteria in interim condition. There are two options being proposed for the roadway layout, each of which affects the normal depth of the flow in the street. Existing condition 100-year flows were used as the base model for normal depth comparison to interim and ultimate condition. In interim condition, 25-year and 100-year flows were analyzed based on NDOT criteria and in ultimate condition, 10-year and 100-year flows were analyzed based on CCRFCD criteria. Option B yields a higher cost in interim condition due to the number of catch basins being upsized. Also, because the allowable spread width for Option A is wider than Option B, due to the bus transit lane, fewer proposed inlets and inlet upsizing are necessary.

It is PB's recommendation that due to the number of inlets needed to be upsized based on NDOT criteria compared to that of CCRFCD criteria, the City of Las Vegas and NDOT agree to a less strict spread width criteria. This will reduce the overall cost of the project with respect to the drainage design. It has also been made aware that there is a high ground water table in the area which will need to be observed when determining the depth of the RCP that will need to be placed on the west side of Rancho Drive in interim condition. If the improvements on Rancho Drive are constructed after the future MPU facilities are built, the proposed RCP will not be necessary as all existing drop inlets currently meet CCRFCD 10-year and 100-year criteria when looking at onsite flows. Utility conflicts with the RCP will need to be carefully looked at to minimize conflicts when identifying the location of where the RCP will be placed.



7.0 REFERENCES

[CCRFCD, 1999]. *Hydrologic Criteria and Drainage Design Manual*.
Prepared by Montgomery Watson, for: Clark County Regional Flood Control District,
1999.

[MPU, 2008]. *Las Vegas Valley Flood Control Master Plan Update*,
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[HEC, 1997]. *HEC-1 Flood Hydrograph Package Version 4.1*,
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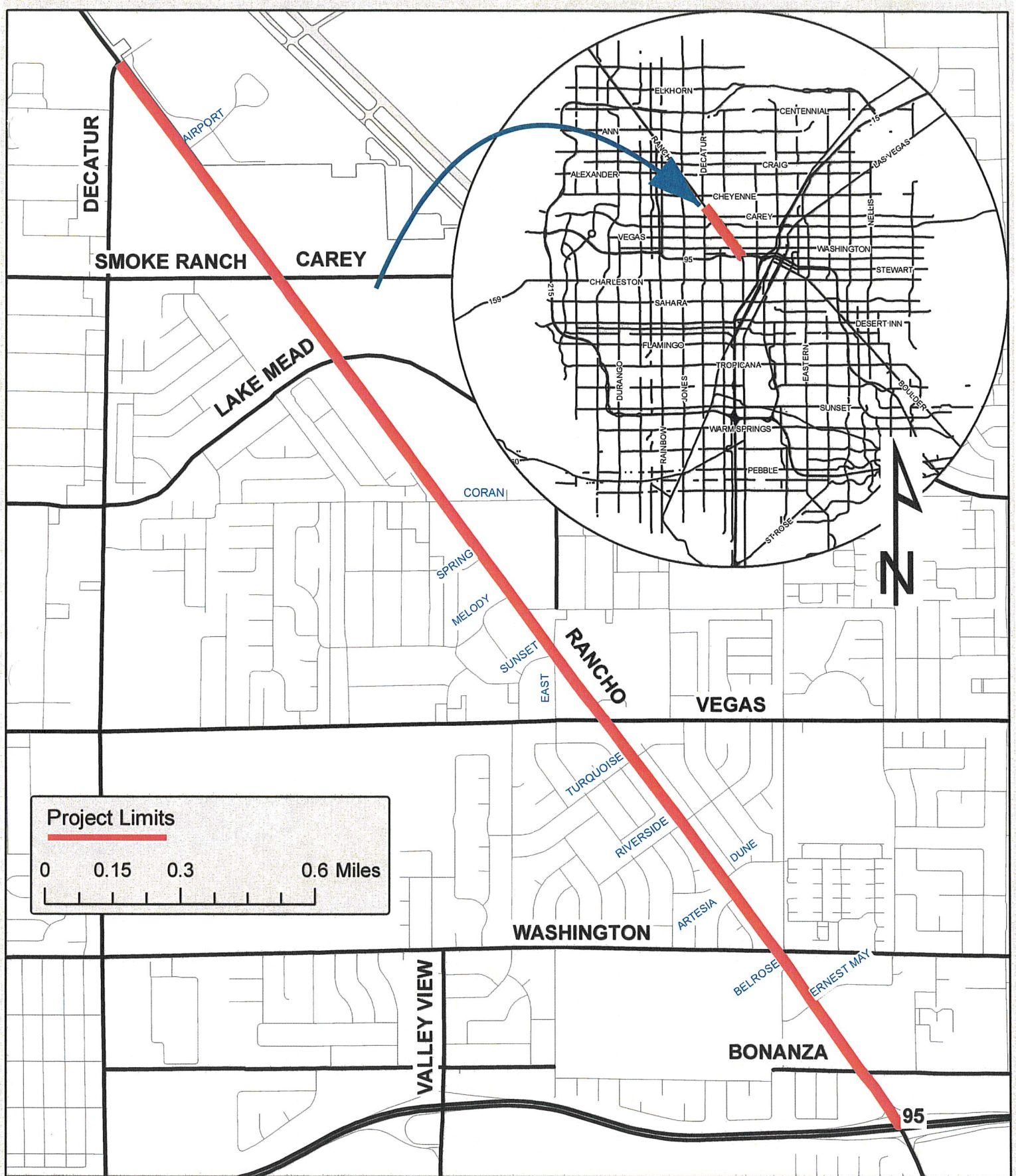
FlowMaster 2008 Bentley Systems, Inc. Haestad Methods Solution Center.

Central Neighborhood Flood Control Master Plan
Prepared by: PBS&J, March 2005, for City of Las Vegas

Rancho Drive/US 95 LOMR
Prepared by: The Louis Berger Group, Inc., November 2006, for City of Las Vegas

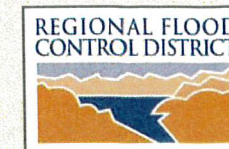
Appendix A- Figures & Maps

- Figure 1 - Vicinity Map
- Figure 2 - 2008 MPU Hydrologic Map
- Figure 3 - 2008 MPU Facilities Map
- Figure 3A - 2008 MPU Facility Inventory
- Figure 4 - FEMA FIRM Panels
- Figure 5 - McCarran Airport Rainfall Area - HCDDM Figure 513
- Figure 6 - 10-year Depth-Duration-Frequency - Values - HCDDM Figure 503
- Figure 6A - 10-year Depth-Duration-Frequency - Values - HCDDM Figure 504
- Figure 6B - 100-year Depth-Duration-Frequency - Values - HCDDM Figure 506
- Figure 7 - Depth-Duration-Frequency-Values - HCDDM Table 505
- Figure 8 - SDN3 - HCDDM Table 503
- Figure 9 - Six Hour Depth - Area Reduction Factors - HCDDM Table 502



Rancho Drive Capacity Improvements

FIGURE 1



2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

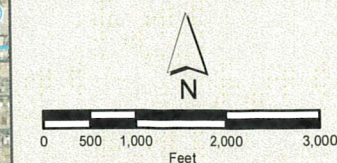
FIGURE F-26
FLOOD CONTROL FACILITIES

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 |



Refer to Figure G-2 for Aerial Source(s)

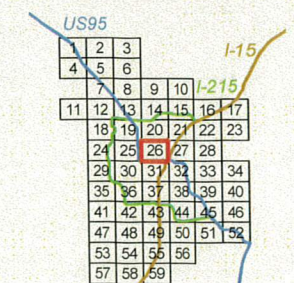
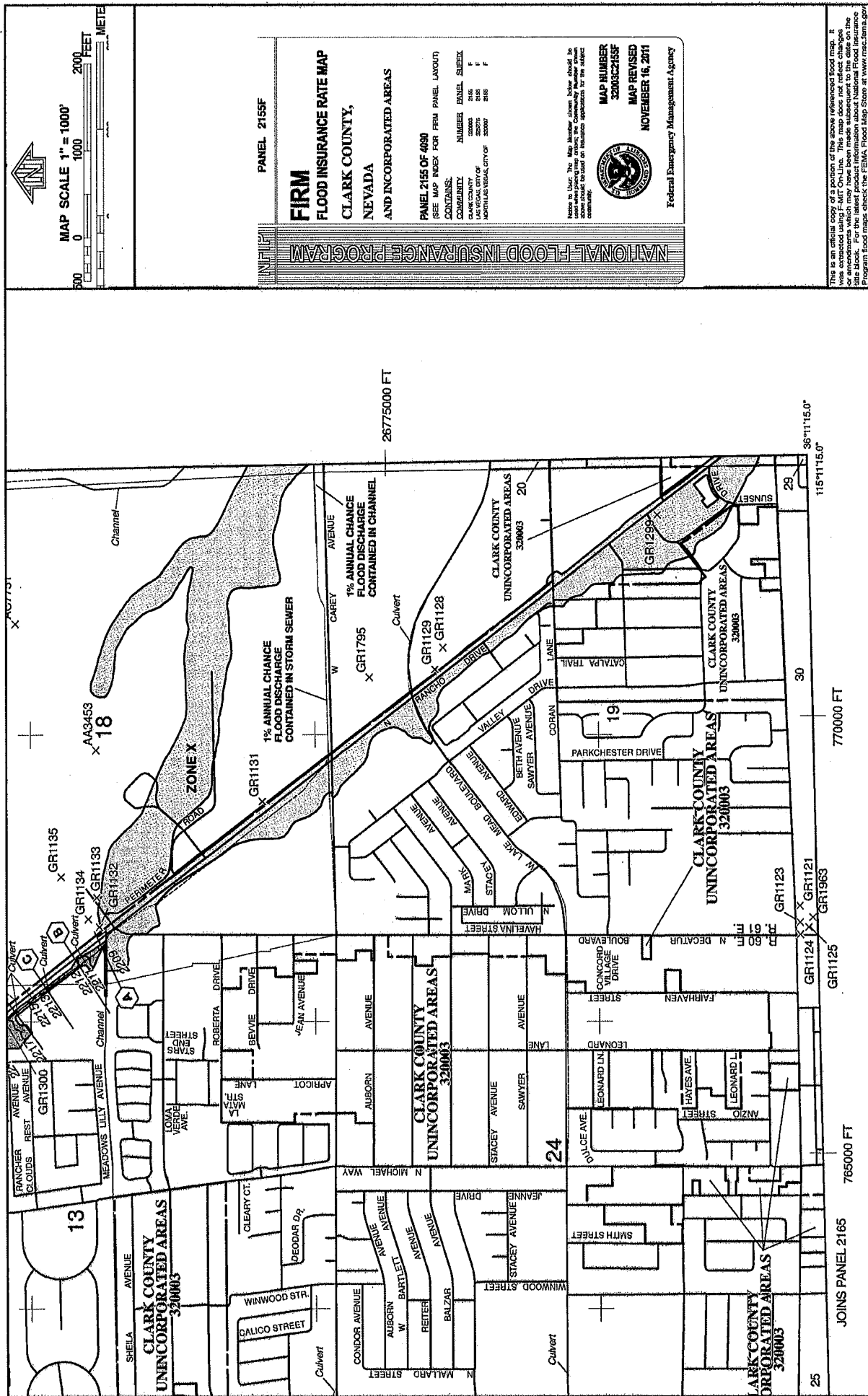


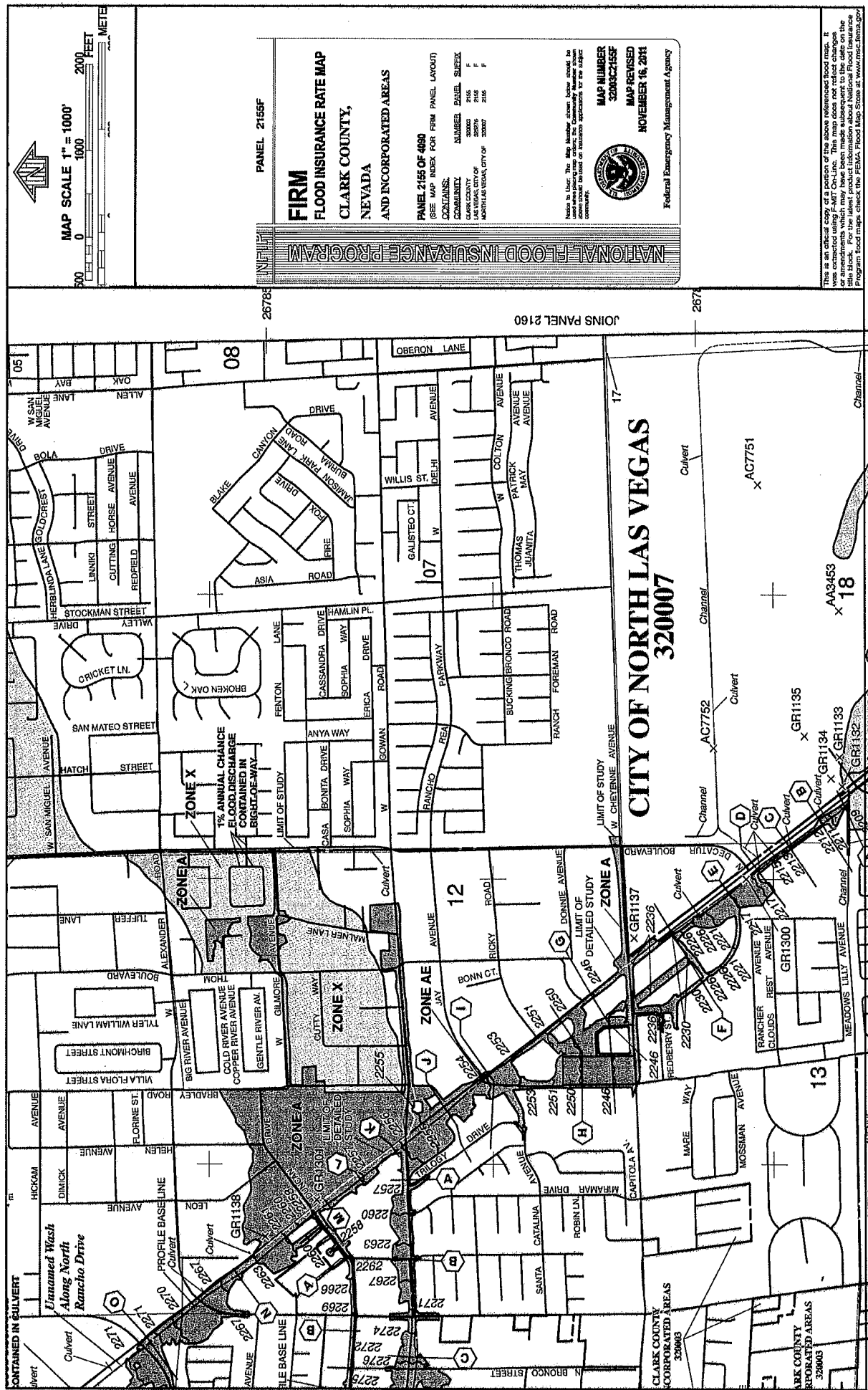
FIGURE 3

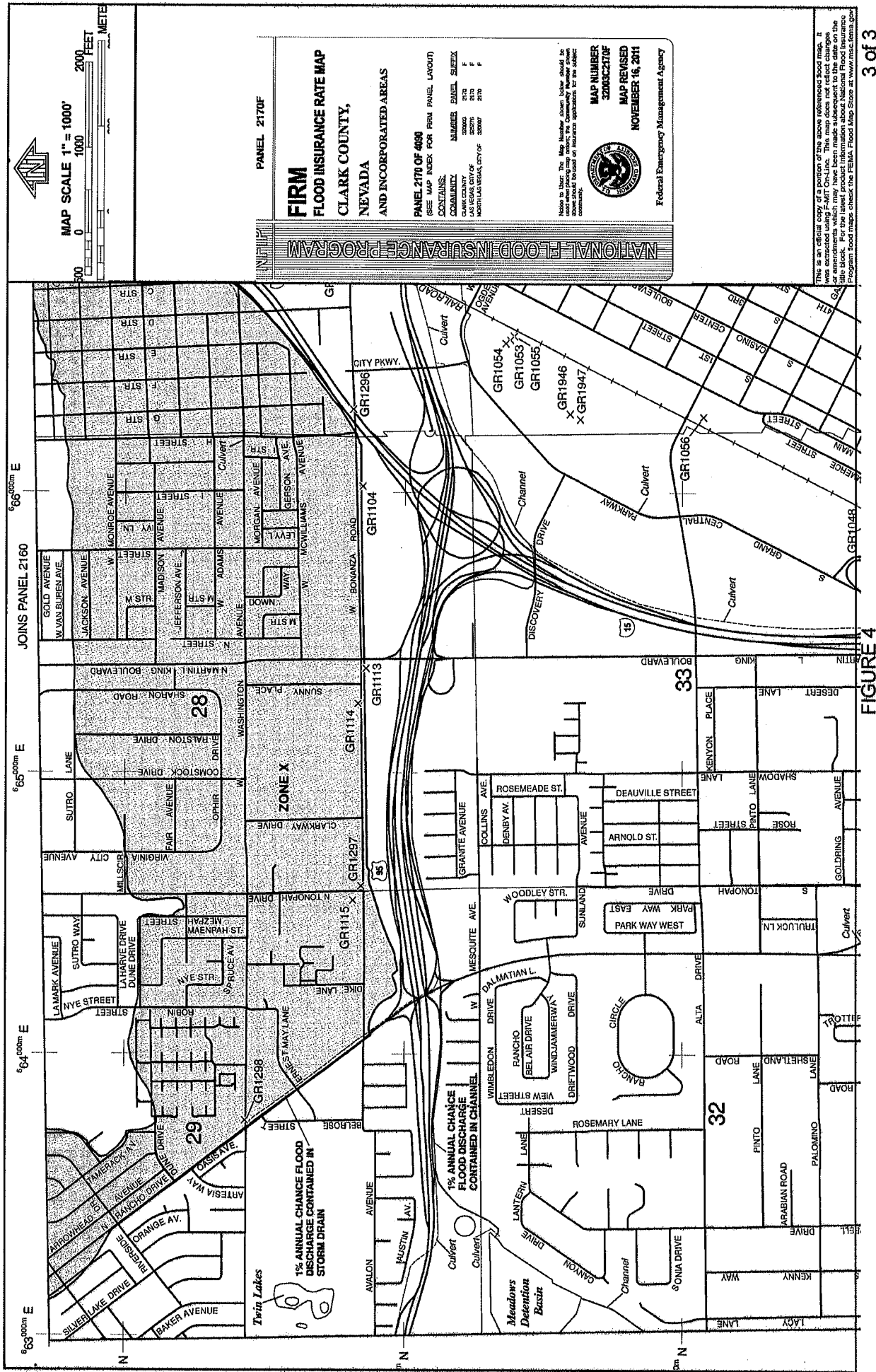
ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
FW15		FREEWAY CHANNEL FROM DESERT INN TO EXPRESSWAY						
0000	E	3: 12" X 10" RCB	2170	3728	CAL93	SW4	10.63	0.17
GOOF		GOWAN OUTFALL FACILITIES						
0485	E	90" RCP	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	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
LVLN		LAS VEGAS WASH - LAKE MEAD						
0033	E	60" RCP (Replace w/ LVLN0034)	1186	994	CLM20-C	NW3SC	1.36	1.62
0034	P0	12' X 5' RCB (Replaces LVLN0033)	1186	994	CLM20-C	NW3SC	1.36	1.62
0059	E	72" RCP (Replace w/ LVLN0060)	5952	994	CLM20-C	NW3SC	1.36	0.66
0060	P0	12' X 6' RCB (Replaces LVLN0059)	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/ LVLN0226)	641	1933	CLM10-C	NW3	3.02	1.35
0226	P0	2: 10' X 8' RCB (Replaces LVLN0225)	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/ LVLN0271)	3473	1933	CLM10-C	NW3	3.02	1.35
0271	P0	12' X 8' RCB (Replaces LVLN0270)	3473	1933	CLM10-C	NW3	3.02	1.35
0336	E	84" RCP (Replace w/ LVLN0337)	1050	1652	CLM06-C	NW3	2.61	1.16
0337	P0	12' X 8' RCB (Replaces LVLN0336)	1050	1652	CLM06-C	NW3	2.61	1.16
0355	E	90" RCP (Replace w/ LVLN0356)	1840	1652	CLM06-C	NW3	2.61	0.40
0356	P0	12' X 11' RCB (Replaces LVLN0355)	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

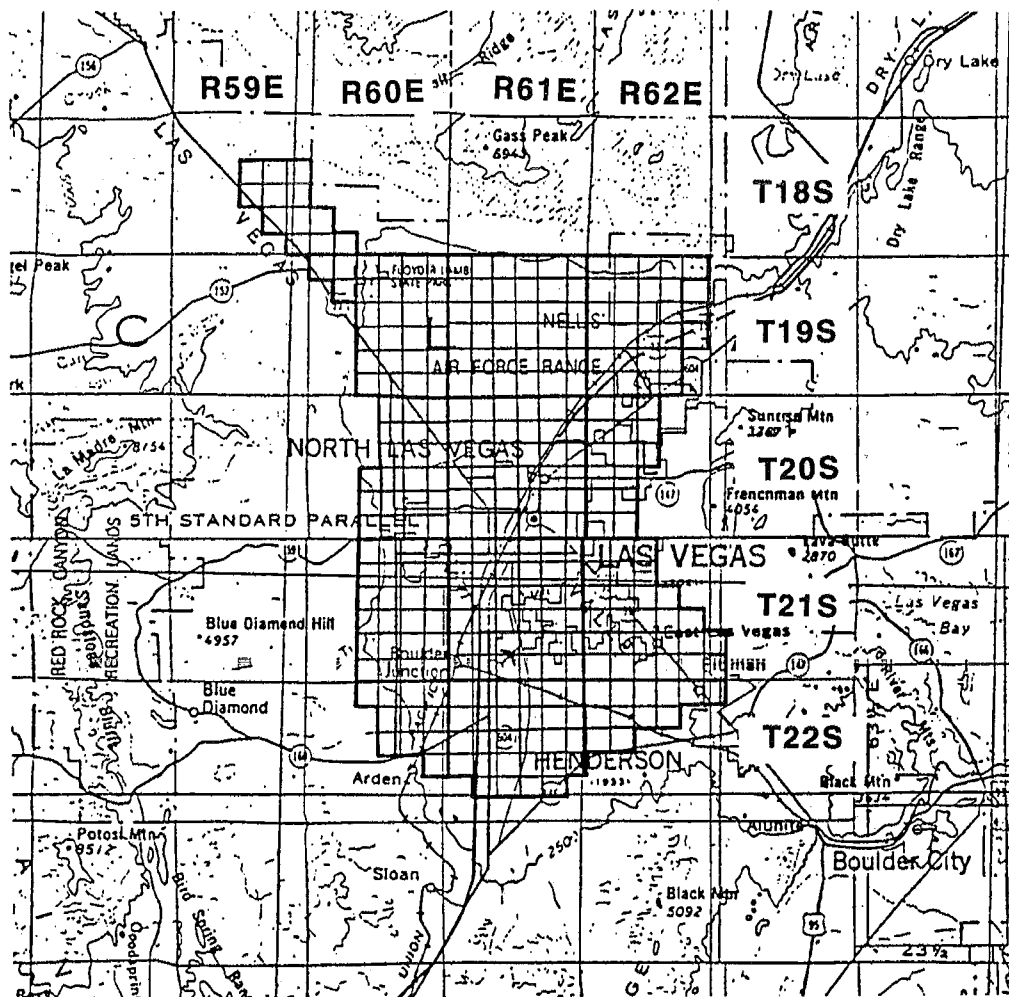






HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

McCARRAN AIRPORT RAINFALL AREA



TOWNSHIP	RANGE	SECTIONS	TOWNSHIP	RANGE	SECTIONS
18 South	59 East	13-15,22-26,36	20 South	62 East	4-9,16-20,29-32
18 South	60 East	30-32	21 South	60 East	1-4,9-16,21-28,33-36
19 South	60 East	1-6,8-16,21-28,33-36	21 South	61 East	ALL SECTIONS
19 South	61 East	ALL SECTIONS	21 South	62 East	4-9,15-23, 25-36
19 South	62 East	2-11,14-23,27-34	22 South	60 East	1-4,10-15,24
20 South	60 East	1-3,10-15,21-28,33-36	22 South	61 East	1-24,26-29
20 South	61 East	ALL SECTIONS	22 South	62 East	1-10,17-18

Notes:

1. Refer to Table 505 and Figure 516 Depth-Duration-Frequency values in the McCarran Airport Rainfall Area.
2. Refer to Table 506 and Figure 517 for Time-Intensity-Frequency values on the McCarran Airport Rainfall Area.

Revision	Date

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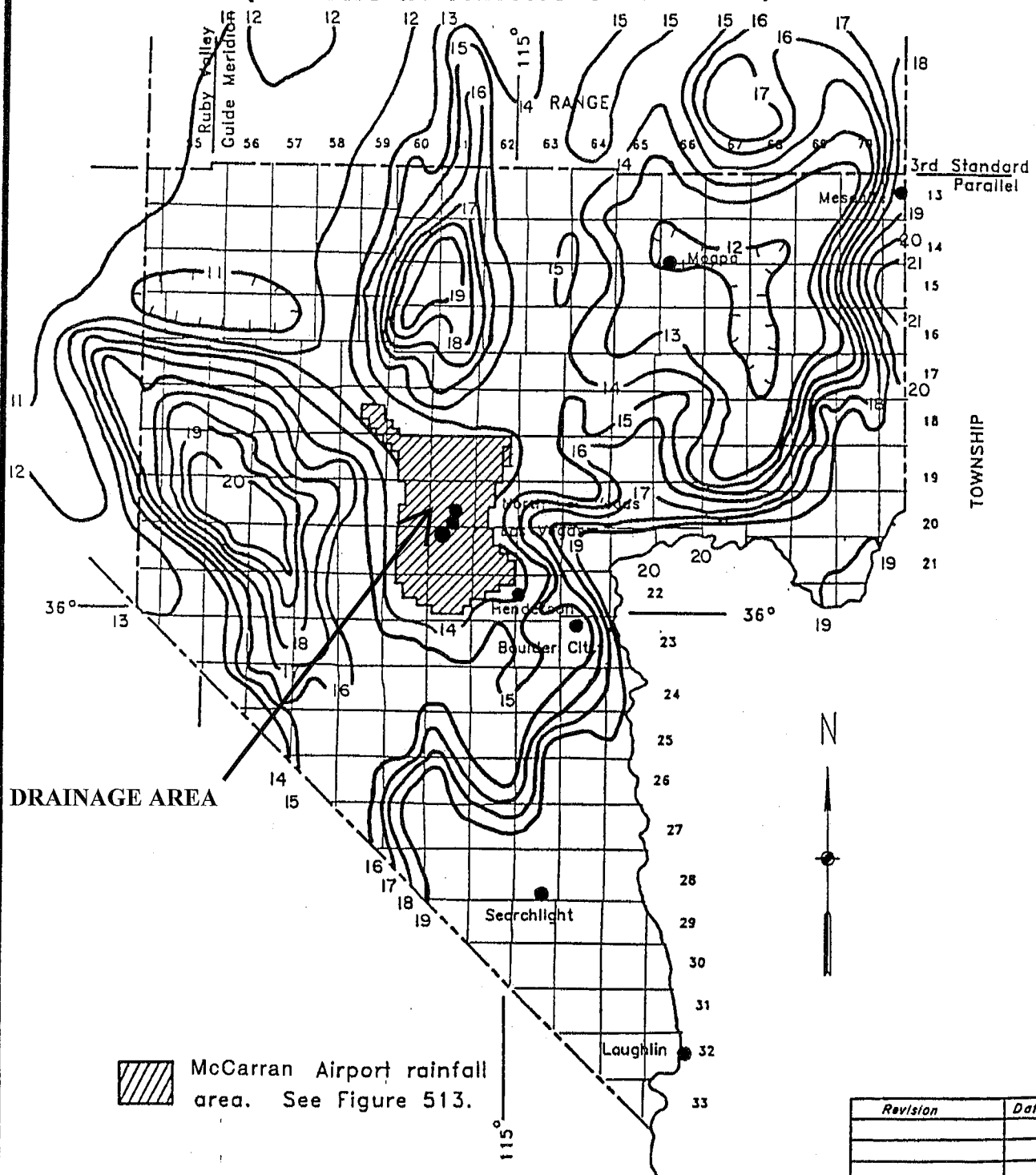
REFERENCE:

USACE, Los Angeles District, 1988

FIGURE 513
FIGURE 5

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RAINFALL DEPTH-DURATION-FREQUENCY 10-YEAR, 6-HOUR (DEPTHS IN TENTHS OF INCHES)



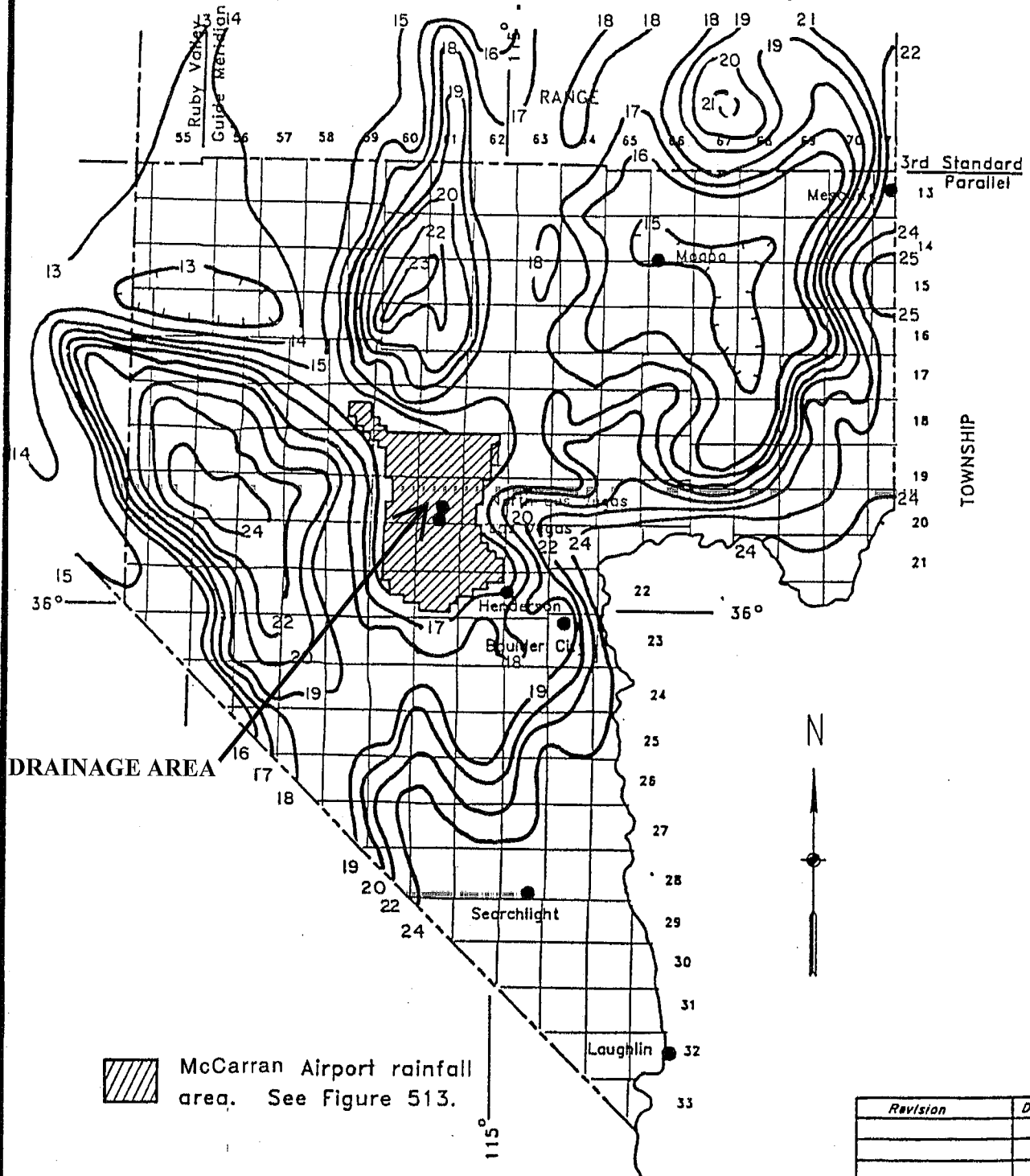
WRC
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REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 503

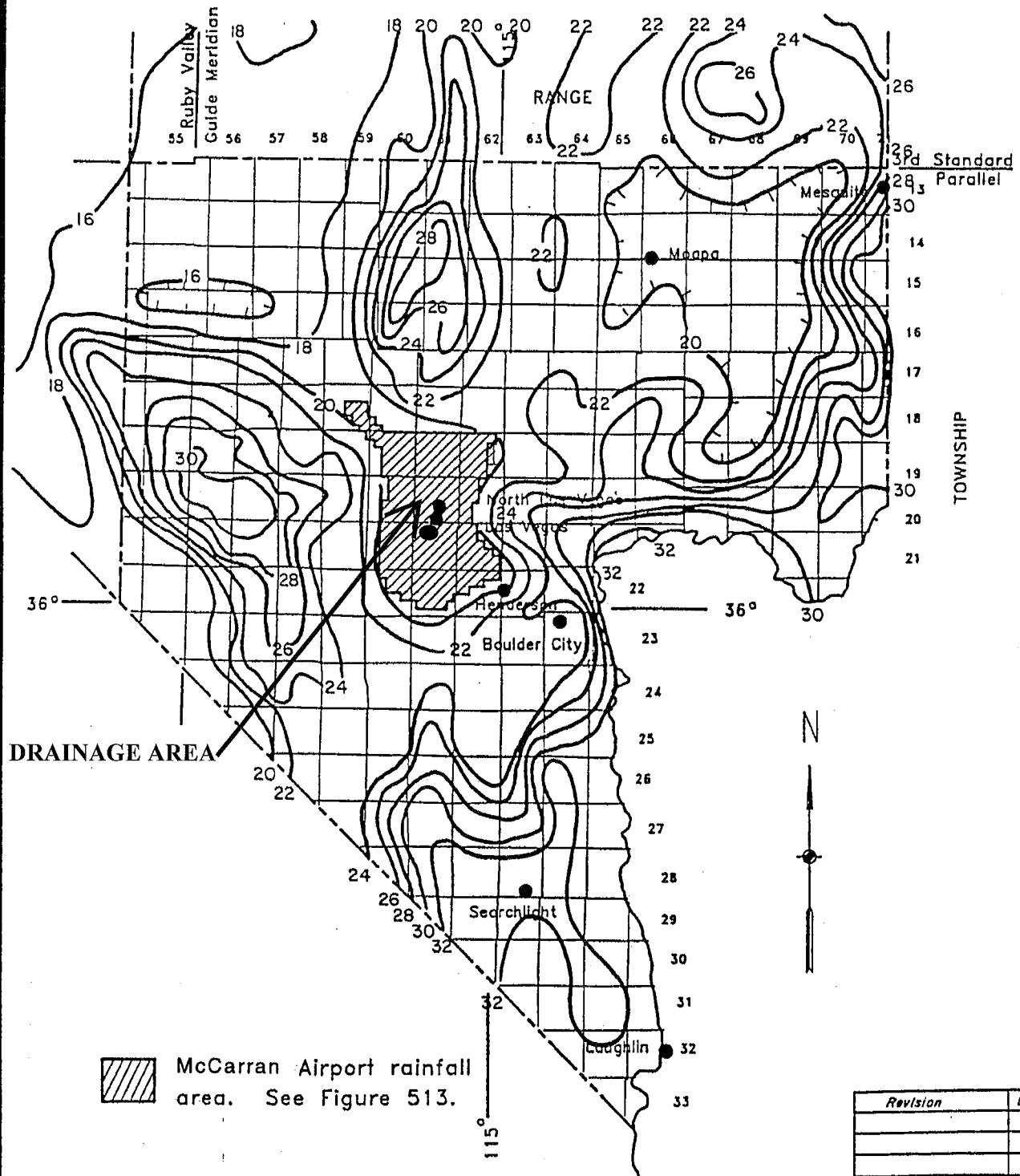
FIGURE 6

RAINFALL DEPTH-DURATION-FREQUENCY
25-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RAINFALL DEPTH-DURATION-FREQUENCY 100-YEAR, 6-HOUR (DEPTHS IN TENTHS OF INCHES)



WRC
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REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 506

FIGURE 6B

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX-HOUR STORM DISTRIBUTIONS

Percent of Total Storm Depth				Percent of Total Storm Depth			
Storm Time (In Minutes)	SDN3	SDN4	SDN5	Storm Time (In Minutes)	SDN3	SDN4	SDN5
0	0.0	0.0	0.0	185	32.2	37.6	43.0
5	2.0	2.0	2.0	190	35.2	41.5	47.7
10	5.7	5.8	5.9	195	40.9	46.2	51.4
15	7.0	7.5	8.0	200	49.9	53.0	56.1
20	8.7	9.9	11.0	205	59.0	61.0	63.0
25	10.8	12.6	14.4	210	71.0	71.0	71.0
30	12.4	13.7	15.0	215	74.4	73.2	72.0
35	13.0	14.5	16.0	220	78.1	75.6	73.1
40	13.0	14.9	16.8	225	81.2	78.2	75.2
45	13.0	15.1	17.1	230	81.9	79.9	77.9
50	13.0	15.5	18.0	235	83.5	81.3	79.0
55	13.0	15.6	18.2	240	85.1	82.3	79.5
60	13.0	15.9	18.7	245	85.6	83.0	80.4
65	13.3	16.2	19.0	250	86.0	83.5	81.0
70	14.0	16.9	19.7	255	86.8	84.4	82.0
75	14.2	17.2	20.2	260	87.6	85.1	82.6
80	14.8	17.9	21.0	265	88.8	86.4	84.0
85	15.8	18.9	22.0	270	91.0	88.5	85.9
90	17.2	20.1	23.0	275	92.6	90.8	88.9
95	18.1	21.1	24.1	280	93.7	92.4	91.0
100	19.0	22.0	25.0	285	95.0	94.4	93.8
105	19.7	22.8	25.9	290	97.0	96.8	96.6
110	19.9	23.2	26.5	295	97.6	97.3	97.0
115	20.0	24.0	28.0	300	98.2	97.8	97.4
120	20.1	24.6	29.0	305	98.5	98.2	97.9
125	20.4	25.2	30.0	310	98.7	98.4	98.1
130	21.4	26.0	30.5	315	98.9	98.6	98.3
135	22.9	26.9	30.9	320	99.0	98.8	98.5
140	24.1	27.6	31.0	325	99.3	99.1	98.9
145	24.9	28.3	31.7	330	99.3	99.2	99.0
150	25.1	28.6	32.1	335	99.4	99.3	99.2
155	25.6	29.2	32.7	340	99.5	99.4	99.3
160	27.0	30.2	33.3	345	99.8	99.7	99.6
165	27.8	31.2	34.6	350	99.8	99.8	99.7
170	28.1	32.1	36.1	355	99.9	99.9	99.9
175	28.3	33.2	38.1	360	100.0	100.0	100.0
180	29.5	35.2	40.8				

- Notes: 1. For drainage areas less than 8 square miles in size, use SDN 3.
 2. For drainage areas greater than or equal to 8 square miles and less than 12 square miles in size, use SDN 4.
 3. For drainage areas greater than or equal to 12 square miles, use SDN 5.
 4. A graphical representation of these values is presented on Figure 515.

Revision	Date

REFERENCE:

TABLE 503

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX HOUR DEPTH-AREA REDUCTION FACTORS

<u>Drainage Area (Square Miles)</u>	<u>Six-Hour Depth-Area Reduction Factor</u>
0.0	1.00
0.5	0.98
1.0	0.97
2.0	0.93
4.0	0.91
6.0	0.90
8.0	0.88
10.0	0.86
20.0	0.79
30.0	0.74
50.0	0.68
100.0	0.60
150.0	0.55
200.0	0.51
300.0	0.46
400.0	0.42
500.0	0.39

- NOTES: 1. A graphical representation of these factors is presented in Figure 514.
2. Consult with the local entity and/or the CCRFCD for guidance in using the Depth-Area Reduction Factors for drainage areas greater than 200 square miles.

<i>Revision</i>	<i>Date</i>

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REFERENCE:

USACE, Los Angeles District, 1988

TABLE 502

Appendix B- Hydrology

- A. Off-site Basin Map
- B. Off-site HEC- 1- 10 yr Storm Event
- C. Off-site HEC- 1- 25 yr Storm Event
- D. Off-site HEC- 1- 100 yr Storm Event
- E. On-site Basin Map- Existing Condition
- F. Time of Concentration Calculations- Existing Condition
- G. Runoff Calculations- Existing Condition
- H. On-site Basin Map- Option A
- I. Time of Concentration Calculations- Option A
- J. Runoff Calculations – Option A
- K. On-site Basin Map- Option B
- L. Time of Concentration Calculations- Option B
- M. Runoff Calculations- Option B

A. Off-site Basin Map

B. Off-site HEC-1 -10 Year Storm Event

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1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JAN 1997
* VERSION 4.1
*
* RUN DATE 05MAR12 TIME 14:26:24
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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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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 ***

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1 ID CLV CENTRAL NEIGHBORHOOD FLOOD CONTROL MASTER PLAN 2003
2 ID CENTRAL BASIN (NORTHWEST AREA)
3 ID DESIGN STORM = 10-YEAR 6-HR STORM
4 ID STORM DISTRIBUTION = SDN #3
5 ID MODELED BY PBS&J (STEPHEN C. ALTMAN P.E.)
6 ID ORIGINAL INPUT FILE = ENW310.DAT
7 ID INPUT FILE DATE = OCTOBER, 2003/ MODEL REVISED BY PB ON APRIL 2, 2012
8 ID REFERENCED HYDROLOGIC MODELS:
9 ID CITY OF LAS VEGAS CITY WIDE HYDROLOGY ANALYSIS (PBS&J 1997)
10 ID RANCHO DRIVE DRAINAGE IMPROVEMENTS PEAK DRIVE TO LAKE MEAD BOULEVARD
11 ID (MONTGOMERY WATSON 2000)
12 ID CCRFCD 2002 LAS VEGAS VALLEY MASTER PLAN UPDATE (PBS&J, GCW, LBG)
13 ID
14 ID EXISTING CONDITION = FUTURE LAND USE + EXISTING FACILITIES
15 ID NO STORM CENTERING
16 ID COMPOSITE CURVE NUMBERS
17 ID 2002 MPU SUBBASINS USED FOR OFFSITE AREAS EXCEPT WHERE SPECIFIED
18 ID
19 ID NOTE: LOCATIONS AND DESCRIPTIONS OF PROPOSED MPU FACILITIES ARE STATED IN
20 ID THE MODEL. HOWEVER, ROUTINGS IN THESE LOCATIONS REFLECT THE EXISTING
21 ID CONDITION.
22 ID
23 ID JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
24 ID
25 ID CONCENTRATION AREA DARF
26 ID POINT SQ. MI.
27 ID 0-0.5 0.990
28 ID 0.5-1 0.975
29 ID 1-2 0.950
30 ID 2-3 0.925
31 ID 3-4 0.915
32 ID 4-5 0.908
33 ID 5-6 0.903
34 ID 6-7 0.895
35 ID 7-8 0.885
36 ID
37 ID
38 ID
39 ID JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
40 ID
41 ID 100-YEAR, 6-HOUR STORM, SDN3

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42 ID
 43 IT 5 0 0 300
 44 IO 5 0 0
 45 IN 5 0 0
 46 JR PREC 0.564 0.556 0.542 0.527 0.522 0.518 0.515 0.510 0.50
 *

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

47 KK OG04-C
 48 BA 0.288
 49 PB 2.77
 50 PC 0.000 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
 51 PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
 52 PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
 53 PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
 54 PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
 55 PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
 56 PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
 57 PC 0.997 0.999 1.000
 58 LS 0 90.3
 59 UD 0.320
 *

60 KK DOG04-C
 61 KM FLOW SPLIT TO PD01-C
 62 KM OKG289, 270, 264, AND 262
 63 KM COMBINED CAPACITY = 124 CFS
 64 DT DPD01
 65 DI 0 51 125 500 1000
 66 DQ 0 50 124 124 124
 *

67 KKRDOG04-C
 68 KM ROUTE DOG04-C TO COG05-C
 69 KM US95 TO RANCHO
 70 RD 4100 0.0007 0.016 0 TRAP 0 50
 *

71 KK OG05-C
 72 BA 0.266
 73 PB 2.77
 74 LS 0 90.5
 75 UD 0.392
 *

76 KK COG05-C
 77 KM COMBINE RDOG04-C AND OG05-C
 78 KM RAINBOW AND CHEYENNE
 79 HC 2
 *

80 KKRCOG05-C
 81 KM ROUTE RCOG05-C TO CCY06B-C
 82 KM CHEYENNE
 83 RD 7500 0.0097 0.016 0 TRAP 0 50
 *

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PAGE 3

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

84 KK CY06B-C
 85 BA 0.498
 86 PB 2.77
 87 LS 0 86.5
 88 UD 0.697
 *

89 KKCCY06B-C
 90 KM COMBINE RCOG05-C AND CY06B-C
 91 KM MICHAEL AND CHEYENNE
 92 HC 2
 *

93 KK RCCY06B
 94 KM ROUTE CCY06B TO CRGOWAN
 95 KM CHEYENNE
 96 RD 1400 0.01 0.016 0 TRAP 0 50

 * FLOW SPLIT FROM GOWAN WATERSHED
 * *****
 *
 *

97 KK PDGCD-C
 98 BA 0.441
 99 PB 2.77
 100 LS 0 80.3
 101 UD 0.544
 *

102 KKRPDGCDC
 103 KM ROUTE PDGCD-C TO RRPDGCDC
 104 KM FROM CWH
 105 RD 3080 0.0065 0.03 0 TRAP 30 2
 *

106 KK RRPDGCDC
 107 KM ROUTE RPDGCDC-C TO CPDGCBC10
 108 KM LINING = CONCRETE
 109 KM FROM CWH
 110 RD 1610 0.0062 0.015 0 TRAP 8 2
 *

111 KK NW29B-C
 112 BA 0.286
 113 PB 2.80
 114 LS 0 80.5
 115 UD 0.405
 *

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PAGE 4

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

116 KKRNW29B-C
 117 KM ROUTE NW29B-C TO CNW1C2
 118 KM ANN ROAD
 119 RD 4500 0.0122 0.016 0 TRAP 0 50
 *

120 KK NW1C2-C
 121 BA 0.207
 122 PB 2.77
 123 LS 0 88.7
 124 UD 0.411
 *

125 KK CNW1C2
 126 KM COMBINE RNW29B-C AND NW1C2-C
 127 KM ANN ROAD AND RANCHO
 128 HC 2
 *
 *

129 KK RCNW1C2
 130 KM ROUTE CNW1C2 TO CPDGCBC10
 131 KM RANCHO
 132 RD 2300 0.0087 0.016 0 TRAP 0 50
 *

133 KKPDGCBC10-C
 134 BA 0.308
 135 PB 2.77
 136 LS 0 83.8
 137 UD 0.416
 *

138 KKCPDGCBC10
 139 KM COMBINE PDGCBC10-C AND RCNW1C2
 140 KM NEAR US95 AND RANCHO INTERSECTION
 141 HC 2
 *

142 KKDPDGCBC10
 143 KM FLOW SPLIT ACROSS RANCHO TO PT3AA1
 144 KM 10'X 3' RCB (139 CFS) CULVERT 3
 145 KM FROM U.S. 95 / RANCHO FIS
 146 KM D95A

147 DTDPT3AA11
 148 DI 0 51 101 118 140 318 10000
 149 DQ 0 50 100 117 139 139 139
 *

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PAGE 5

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

150 KKCPDGCB10
 151 KM COMBINE RRPDGC D AND DPDGCB10
 152 KM NEAR US95 AND RANCHO INTERSECTION
 153 HC 2
 *

154 KK RCPDGCB
 155 KM ROUTE DCPDGCB TO CGD20BEC
 156 KM LOCAL FACILITY ALONG U.S. 95
 157 RD 1750 0.0029 0.025 0 TRAP 20 2
 *

158 KKGD20BE-C
 159 BA 0.427
 160 PB 2.77
 161 LS 0 83.4
 162 UD 0.467
 *

163 KKCGD20BEC
 164 KM COMBINE GD20BE-C AND RCPDGCB
 165 KM COMBINATION OF US 95 AND LONE MOUNTAIN
 166 HC 2
 *

167 KKRCGD20BE
 168 KM ROUTE CGD20BEC TO CGD20BMC
 169 KM NEWLY PROPOSED REGIONAL FACILITY
 170 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 171 KM FACILITY # = GOAL 0247
 172 KM LINING = CONCRETE
 173 RD 2640 0.003 0.02 0 TRAP 20 5
 *

174 KKGD20BM-C
 175 BA 0.343
 176 PB 2.77
 177 LS 0 89.4
 178 UD 0.456
 *

179 KKCGD20BMC
 180 KM COMBINE GD20BM-C AND RCGD20BE
 181 KM US 95 AND CRAIG ROAD
 182 HC 2
 *

183 KKRCGD20BM
 184 KM ROUTE CGD20BMC TO CGD17BG
 185 KM NEWLY PROPOSED REGIONAL FACILITY
 186 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 187 KM FACILITY # = GOAL 0168
 188 KM LINING = RCB
 189 RD 2640 0.003 0.02 0 TRAP 20 5
 *

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

190 KKGD17BG-C
 191 BA 0.364
 192 PB 2.77
 193 LS 0 87.7
 194 UD 0.478
 *

195 KK CGD17BG
 196 KM COMBINE GD11B-C AND GD17BG-C
 197 KM LONE MOUNTAIN AND US 95
 198 HC 2
 *

199 KK RGD17BG
 200 KM ROUTE CGD17BG TO CGD11B-C
 201 KM FACILITY = GOWAN OUTFALL - U.S. 95 CHANNEL
 202 KM FACILITY # = GO95 0000
 203 KM LINING = CONCRETE
 204 RD 2640 0.003 0.02 0 TRAP 20 5
 *

205 KK GD11B-C
 206 BA 0.262
 207 PB 2.77
 208 LS 0 90.6
 209 UD 0.278
 *

210 KKCGD11B-C
 211 KM COMBINE GD11B-C AND RGD17BG
 212 KM GOWAN AND US 95
 213 HC 2
 *

214 KK RCGD11B
 215 KM ROUTE CGD11B-C TO CPT6B-C
 216 KM FACILITY = GOWAN OUTFALL FACILITIES
 217 KM FACILITY # = GOOF 0511
 218 KM LINING = RCB
 219 RD 8500 0.005 0.015 0 TRAP 8 0
 *

220 KK PT6B-C
 221 BA 0.454
 222 PB 2.77
 223 LS 0 86.1
 224 UD 0.756
 *

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PAGE 7

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

225 KK CPT6B-C
 226 KM COMBINE PT6B-C AND RCGD11B
 227 KM GOWAN AND US 95
 228 HC 2
 *

229 KKDPT6B-C1
 230 KM FLOW SPLIT TO GOWAN OUTFALL
 231 KM DGOW1A
 232 KM FROM CWH
 233 DT DGOW1A
 234 DI 0 31 51 71 101 301 561 600 3000 5000
 235 DQ 0 30 50 70 100 300 560 560 560 560
 *

236 KKDPT6B-C2
 237 KM FLOW SPLIT TO TRILOGY CHANNEL
 238 KM DTRILGY
 239 KM FROM CWH
 240 DT DTRILGY
 241 DI 0 31 91 202 349 625 1214 1944 2801
 242 DQ 0 3 33 55 95 173 267 374 491
 *

243 KK PT2B2-C
 244 BA 0.299
 245 PB 2.77
 246 LS 0 92.2
 247 UD 0.417
 *

248 KK RCPT2B2
 249 KM ROUTE CPT2B2 TO CPT41-C
 250 KM NEWLY PROPOSED REGIONAL FACILITY
 251 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 252 KM FACILITY # = GOAL 0111
 253 KM LINING = RCB
 254 RD 3000 0.0083 0.015 0 TRAP 10 0
 *

255 KK PT3-C
 256 BA 0.172
 257 PB 2.77
 258 LS 0 89.5
 259 UD 0.372
 *

260 KK RCPT3-C
 261 KM ROUTE CPT3B-C TO CPT41-C
 262 KM ALEXANDER
 263 RD 5500 0.0081 0.016 0 TRAP 0 50
 *

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PAGE 8

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

264 KK PT41-C
 265 BA 0.436
 266 PB 2.77
 267 LS 0 88.6
 268 UD 0.424
 *

269 KK CPT41-C
 270 KM COMBINE RCPT2B2, RCPT3-C AND PT41-C
 271 KM ALEXANDER AND RANCHO
 272 HC 3
 *

273 KKRCPT41-C
 274 KM ROUTE CPT41-C TO CPT5A20C
 275 KM NEWLY PROPOSED REGIONAL FACILITY
 276 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 277 KM FACILITY # = GOAL 0100
 278 KM LINING = RCB
 279 RD 600 0.003 0.015 0 TRAP 12 0
 *

280 KK PT5A2-C
 281 BA 0.341
 282 PB 2.77
 283 LS 0 86.7
 284 UD 0.644
 *

285 KK CPT5A2-C
 286 KM COMBINE PT5A2-C AND RCPT41-C
 287 KM ALEXANDER AND RANCHO
 288 HC 2
 *

289 KK RCPT5A2
 290 KM ROUTE CPT5A2-C TO CPT5B6
 291 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 292 KM FACILITY # = GOAL 0000
 293 KM LINING = RCB
 294 RD 5280 0.01 0.015 0 TRAP 10 0
 *

295 KKCCPT6B-C
 296 KM COMBINE CPT6B-C AND RCPT5A2
 297 KM GOWAN AND US 95
 298 HC 2
 *

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PAGE 9

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

299 KK DRANCHO
 300 KM FLOW SPLIT TO GOWAN OUTFALL
 301 KM DGOWAN
 302 KM FROM CWH
 303 DT DGOWAN
 304 DI 0 51 101 301 501 600 800 1500 2000 5000
 305 DQ 0 1 1 1 1 100 300 1000 1500 4500
 *

306 KK RDRANCH
 307 KM ROUTE DRANCHO TO CCY07B

308 KM RANCHO
 309 RD 1300 0.004 0.016 0 TRAP 0 50
 *
 310 KK DTRILGY
 311 KM RETRIEVE DTRILGY
 312 DR DTRILGY
 *
 313 KK CY07B
 314 BA 0.203
 315 PB 2.77
 316 LS 0 89.1
 317 UD 0.461
 *
 318 KK CCY07B
 319 KM COMBINE DRANCHO, DTRILGY AND CY07B
 320 KM GOWAN AND RANCHO
 321 HC 3
 *
 322 KK DCY07B
 323 KM FLOW SPLIT TO CENTRAL BASIN
 324 KM DIVERT FLOW EAST IN RAN 190
 325 KM OPPOSITE OF D9RCHO
 326 KM FROM CWH
 327 DT DCENT1
 328 DI 0 19 73 100 1000 2000
 329 DQ 0 1 1 28 928 1928
 *
 330 KK DGOWAN
 331 KM RETRIEVE DGOWAN
 332 DR DGOWAN
 *
 333 KK RDGOWAN
 334 KM ROUTE DGOWAN TO CCCY08-C
 335 KM GOWAN
 336 RD 3300 0.006 0.016 0 TRAP 0 50
 *

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PAGE 10

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

337 KK DGOW1A
 338 KM RETRIEVE DGOW1A
 339 DR DGOW1A
 *
 340 KK RDGOW1A
 341 KM ROUTE PT6B-C TO CCCY08-C
 342 KM FACILITY = GOWAN OUTFALL FACILITIES
 343 KM FACILITY # = GOOF 0486
 344 KM LINING = RCB
 345 RD 3300 0.006 0.015 0 TRAP 8 0
 *
 346 KKCCPT6B-C
 347 KM COMBINE RCPT6B-C AND RDGOW1A
 348 KM GOWAN AND DECATUR
 349 HC 2
 *
 350 KK CY08-C
 351 BA 0.094
 352 PB 2.77
 353 LS 0 88.6
 354 UD 0.306
 *
 355 KK CCY08-C
 356 KM COMBINE CY08-C, CCPT6B-C, AND DCY07B
 357 KM GOWAN AND DECATUR
 358 HC 3
 *
 359 KK DGOW2A
 360 KM DIVERT FLOW TO GOWAN OUTFALL (GOOF 0511) AT RANCHO

361 KM DIVERSION BASED ON GOWAN ROAD DRAINAGE STUDY BY POGGEMEYER
 362 KM 8'X 5' RCB, CAPACITY = 630 CFS
 363 KM REMAINING FLOW CONTINUES EAST IN GOWAN RD. AND ENTERS THE CENTRAL BASIN
 364 KM OPPOSITE OF DGOW2A IN CWH
 365 DTDCENTRAL
 366 DI 0 31 51 71 101 301 601 631 3000 5000
 367 DQ 0 1 1 1 1 1 1 1 2370 4370
 *

368 KK D3ALL
 369 KM DIVERT OUT ALL FLOW TO GOWAN OUTFALL (GOOF 0511) AT RANCHO
 370 DT D3ALL
 371 DI 0 100 500 1000 5000
 372 DQ 0 100 500 1000 5000
 *

* *****
 * END OF IMPORT FROM GOWAN WATERSHED
 * *****
 *

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

373 KK DCENT1
 374 KM RETRIEVE DCENT1
 375 DR DCENT1
 *

376 KK RDCENT1
 377 KM ROUTE DCENT1
 378 KM RANCHO
 * KO 1 1 21
 379 RD 2100 0.0076 0.016 0 TRAP 0 50
 *

380 KK CRGOWAN
 381 KM COMBINE RDCENT1, D3ALL, AND RCCY06B
 382 KM RANCHO AND CHEYENNE
 383 HC 3
 *

384 KKRCRGOWAN
 385 KM ROUTE CRGOWAN TO CPD05A-C
 386 KM RANCHO
 387 RD 1700 0.0088 0.016 0 TRAP 0 50
 *

388 KK PD05A-C
 389 BA 0.136
 390 PB 2.77
 391 LS 0 93.1
 392 UD 0.406
 *

393 KKCPD05A-C
 394 KM COMBINE PD05A-C AND RCRGOWAN
 395 KM RANCHO AND DECATUR
 396 HC 2
 *

397 KK DCPD05A
 398 KM FLOW SPLIT TO PD04B-C
 399 KM OPPOSITE OF DA2 FLOW SPLIT IN CWH
 400 KM CAPACITY RAN 170 = 210 CFS
 401 KM DIVERTED FLOW GOES DOWN WEST SIDE OF RANCHO
 402 DT DA1-C
 403 DI 0 51 101 211 500 1000 5000
 404 DQ 0 51 101 211 211 211 211
 *

405 KK RCPD05
 406 KM ROUTE CPD05A-C TO CPD04B-C
 407 KM RANCHO
 408 RD 1500 0.006 0.016 0 TRAP 0 50
 *

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


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409      KK   DPD01
410      KM   RETRIEVE DPD01
411      DR   DPD01
      *

412      KK   RDPD01
413      KM   ROUTE DPD01 TO CPD01-C
414      KM   PEAK DRIVE
415      RD   3500 0.0103 0.016 0 TRAP 0 50
      *

416      KK   PD01-C
417      BA   0.377
418      PB   2.77
419      LS   0 83.8
420      UD   0.436
      *

421      KK   CPD01-C
422      KM   COMBINE RDPD01 AND PD01-C
423      KM   TORREY PINES AND PEAK DRIVE
424      HC   2
      *

425      KK   RCPD01
426      KM   ROUTE CPD01-C TO CCY04A-C
427      KM   FACILITY = LAS VEGAS WASH - SMOKE RANCH
428      KM   FACILITY # = LVPK 0106
429      KM   LINING = RCB
430      RD   2600 0.00542 0.015 0 TRAP 8 0
      *

431      KK   CY04A-C
432      BA   0.457
433      PB   2.77
434      LS   0 86.8
435      UD   0.489
      *

436      KKCCY04A-C
437      KM   COMBINE RCPD01 AND CY04A-C
438      KM   JONES AND PEAK DRIVE
439      HC   2
      *

440      KK   DCY04C
441      KM   DIVERT FLOW TO EXISTING REGIONAL FACILITY LVSR 0500
442      KM   FROM CWH
443      KM   CAPACITY LVSR 0500 = 231 CFS
444      DT   DLVSR1
445      DI   0 51 101 232 500 1000 5000
446      DQ   0 50 100 231 231 231 231
      *

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

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447      KK   RCCY04A
448      KM   ROUTE CCY04A TO CPD04B-C
449      KM   FACILITY = LAS VEGAS WASH - PEAK DRIVE
450      KM   FACILITY # = LVPK 0000,0019,0058, 0104
451      KM   LINING = RCB
452      RD   5730 0.01 0.015 0 TRAP 9 0
      *

453      KK   PD04B-C
454      BA   0.468
455      PB   2.77
456      LS   0 87.8
457      UD   0.539
      *

458      KKCPD04B-C
459      KM   COMBINE RCCY04A AND PD04B-C
460      KM   RANCHO AND PEAK DRIVE
461      HC   2
      *

462      KKCCPD04B-C
463      KM   COMBINE RCPD05 AND CPD04B-C

```

464 KM RANCHO AND PEAK DRIVE
 465 HC 2
 *
 466 KK RCPD04B
 467 KM ROUTE CCPD04B-C TO CSR05B
 468 KM FACILITY = LAS VEGAS WASH - RANCHO
 469 KM FACILITY # = LVRA 0012
 470 KM LINING = RCB
 471 RD 3300 0.0058 0.015 0 TRAP 12 0
 *

472 KK OG03-C
 473 BA 0.325
 474 PB 2.77
 475 LS 0 87.0
 476 UD 0.389
 *

477 KK ROG03-C
 478 KM ROUTE OG03-C TO SR00A-C
 479 KM SMOKE RANCH
 480 RD 3400 0.0121 0.016 0 TRAP 0 50
 *

481 KK OG02-C
 482 BA 0.318
 483 PB 2.77
 484 LS 0 90.2
 485 UD 0.351
 *

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

486 KK ROG02-C
 487 KM ROUTE OG02-C TO CLM01-C
 488 KM LAKE MEAD BOULEVARD
 489 RD 3400 0.0129 0.016 0 TRAP 0 50
 *

490 KK LM01-C
 491 BA 0.327
 492 PB 2.77
 493 LS 0 81.8
 494 UD 0.405
 *

495 KK CLM01-C
 496 KM COMBINE ROG02-C AND LM01-C
 497 KM TORREY PINES AND LAKE MEAD
 498 HC 2
 *

499 KK SR01E
 500 KM DIVERSION AT LAKE MEAD AND TORREY PINES
 501 KM SPLIT FLOW TO TORREY PINES
 502 KM FROM CWH
 503 KM REMAINING FLOW IN LAKE MEAD RETRIEVED LATER IN MODEL WHEN NEEDED
 504 DT DSR01F
 505 DI 0 41 73 172 572 1072 5000
 506 DQ 0 40 72 132 371 671 3067
 *

507 KK RCLM01-C
 508 KM ROUTE OG02-C TO CLM01-C
 509 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
 510 KM FACILITY # = LVSR 0546
 511 KM LINING = RCB
 512 RD 2640 0.0057 0.015 0 TRAP 8 0
 *

513 KK SR00A-C
 514 BA 0.367
 515 PB 2.77
 516 LS 0 84.1
 517 UD 0.446
 *

518 KK CSR00A

519 KM COMBINE RCLM01-C AND SR00A-C
520 KM TORREY PINES AND SMOKE RANCH
521 HC 2
*

1

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

522 KK CCSR00A
523 KM COMBINE ROG03-C AND CSR00A
524 KM TORREY PINES AND SMOKE RANCH
525 HC 2
*

526 KK RCSR00A
527 KM ROUTE CSR00A TO CSR02E
528 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
529 KM FACILITY # = LVSR 0496
530 KM LINING = RCB
531 RD 2600 0.0127 0.015 0 TRAP 10 0
*

532 KK DLVSR1
533 KM RETRIEVE DLVSR1
534 DR DLVSR1
*

535 KK RDLVSR1
536 KM ROUTE DLVSR1 TO CSR02E
537 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
538 KM FACILITY # = LVSR 0500
539 KM LINING = RCP
540 RD 2770 0.0054 0.013 0 CIRC 5
*

541 KK SR02E-C
542 BA 0.302
543 PB 2.77
544 LS 0 86.1
545 UD 0.374
*

546 KK CSR02E
547 KM COMBINE SR02E-C, RDLVSR1, AND RCSR00A
548 KM JONES AND SMOKE RANCH
549 HC 3
*

550 KK RCSR02E
551 KM ROUTE CSR02E TO CSR05D
552 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
553 KM FACILITY # = LVSR 0396,0446
554 KM LINING = RCB
555 RD 5280 0.0106 0.015 0 TRAP 10 0
*

556 KK SR05D-C
557 BA 0.303
558 PB 2.77
559 LS 0 89.7
560 UD 0.533
*

1

HEC-1 INPUT

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

561 KK CSR05D
562 KM COMBINE RCSR02E AND SR05D-C
563 KM SMOKE RANCH AND DECATUR
564 HC 2
*

565 KK RCSR05D
566 KM ROUTE CSR05D TO CSR05B
567 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
568 KM FACILITY # = LVSR 0359
569 KM LINING = RCB
570 RD 2000 0.0075 0.015 0 TRAP 10 0
*

571 KK SR05B-C
 572 BA 0.357
 573 PB 2.77
 574 LS 0 89.2
 575 UD 0.664
 *

576 KK CSR05B
 577 KM COMBINE RCSR05D AND SR05B-C
 578 KM SMOKE RANCH AND RANCHO
 579 HC 2
 *

580 KK DCSR05B
 581 KM DIVERT FLOW IN EXISTING LVSR 0359 (LVSR 0360 IN CWH)
 582 KM CAPACITY = 231 CFS
 583 DT DLVSR2
 584 DI 0 231 5000
 585 DQ 0 231 231
 *

586 KKDDCSR05B
 587 KM DIVERT FLOW INTO DROP INLETS FOR LVSR 0273 STUB OUT
 588 KM CAPACITY = 182 CFS (109 CFS NORTH, 73 CFS SOUTH)
 589 DT DLVSR3
 590 DI 0 182 5000
 591 DQ 0 182 182
 *

592 KKDD3CSR05B
 593 KM DIVERT FLOW INTO EXISTING CHANNEL SOUTH OF RANCHO
 594 KM D3SR07 IN CWH
 595 KM CAPACITY = 670 CFS
 596 DT DLVRA
 597 DI 0 50 100 200 400 600 670 1000 5000
 598 DQ 0 50 100 200 400 600 670 670 670
 *

HEC-1 INPUT

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

599 KKDD4CSR05B
 600 KM SPLIT FLOW 50% IN RANCHO. 50% IN CAREY
 601 KM SPLIT TO RANCHO
 602 KM OPPOSITE OF D4SR07 IN CWH
 603 DT DRAN
 604 DI 0 50 100 300 500 1000 2500 5000
 605 DQ 0 25 50 150 250 500 1250 2500
 *

606 KK DSR05B
 607 KM DIVERT OUT STREET FLOW ALL FLOW TO BE BROUGHT IN LATER IN MODEL
 608 DT DSMOKE
 609 DI 0 1000 5000
 610 DQ 0 1000 5000
 *

611 KK DLVSR3
 612 KM RETRIEVE FLOW IN LVSR
 613 DR DLVSR3
 *

614 KK CCSR05B
 615 KM COMBINE RPD04B, LVSR3 AND DSR05B (ZERO FLOW)
 616 KM SMOKE RANCH AND RANCHO
 617 HC 3
 *

618 KKDDCCSR05B
 619 KM DIVERT OUT ALL FLOW IN LVSR FACILITY
 620 DT DLVSR4
 621 DI 0 1000 5000
 622 DQ 0 1000 5000
 *

* NO BYPASS FLOW ON RANCHO - END OF SEG 1 (NORTH OF SMOKE RANCH)
 *
 * ONSITE DRAINAGE DICTATE FLOW RATE - FROM SMOKE RANCH TO LAKE MEAD
 *

623 KK DSR01F
 624 KM RETRIEVE DSR01F
 625 DR DSR01F
 *
 626 KK RDSR01F
 627 KM ROUTE DSR01F TO CLM02-C
 628 KM FACILITY = LAS VEGAS WASH - LAKE MEAD
 629 KM FACILITY # = LVLM 0475
 630 KM LINING = RCP
 631 RD 2632 0.0124 0.013 0 CIRC 4
 *

HEC-1 INPUT

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

632 KK LM02-C
 633 BA 0.293
 634 PB 2.77
 635 LS 0 85.0
 636 UD 0.367
 *

637 KK CLM02-C
 638 KM COMBINE LM02-C AND RDSR01F
 639 KM
 640 HC 2
 *

641 KKRC LM02-C
 642 KM ROUTE CLM02-C TO CLM03-C
 643 KM FACILITY = LAS VEGAS WASH - LAKE MEAD
 644 KM FACILITY # = LVLM 0442,0453,0460
 645 KM LINING = RCP
 646 RD 2800 0.0139 0.013 0 CIRC 5
 *

647 KK LM03-C
 648 BA 0.336
 649 PB 2.77
 650 LS 0 90.5
 651 UD 0.378
 *

652 KK CLM03-C
 653 KM COMBINE RCLM02-C AND LM03-C
 654 KM MICHAEL AND LAKE MEAD
 655 HC 2
 *

656 KKRC LM03-C
 657 KM ROUTE CLM03-C TO CLM05-C
 658 KM FACILITY = LAS VEGAS WASH - LAKE MEAD
 659 KM FACILITY # = LVLM 0388,0399,0416
 660 KM LINING = RCP
 661 RD 2600 0.0115 0.013 0 CIRC 6
 *

662 KK LM05-C
 663 BA 0.365
 664 PB 2.77
 665 LS 0 88.1
 666 UD 0.387
 *

HEC-1 INPUT

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

667 KK CLM05-C
 668 KM COMBINE RCLM03-C AND LM05-C
 669 KM DECATUR AND LAKE MEAD
 670 HC 2
 *

671 KKRC LM05-C
 672 KM ROUTE CLM05-C TO CLM06-C
 673 KM FACILITY = LAS VEGAS WASH - LAKE MEAD
 674 KM FACILITY # = LVLM 0337,0356
 675 KM LINING = RCP

```

676      RD      3300  0.0061  0.015      0  CIRC      7      0
        *

677      KK LM06B-C
678      BA      0.354
679      PB      2.77
680      LS      0      89.5
681      UD      0.468
        *

682      KK CLM06-C
683      KM COMBINE RCLM05-C AND LM06B-C
684      KM RANCHO AND LAKE MEAD
685      HC      2
        *

686      KK DLVLMRA
687      KM SAME AS DLVLMRA FROM CWH
688      KM FLOW IS DIVERTED TO EXISTING REGIONAL FACILITY LVLM 0270
689      KM 90" RCP CAPACITY = 940 CFS
690      KM 940 CFS IS DIVERTED
691      DT DLVLM4
692      DI      0      50      100      400      600      700      800      940      1000      5000
693      DQ      0      50      100      400      600      700      800      940      940      940
        *

694      KK DSURF1
695      KM SAME AS DSURF1 FROM CWH
696      KM 33% DIVERTED TO VALLEY DRIVE TO LAKE MEAD
697      KM REMAINING IN LAKE MEAD
698      DT DVALDR
699      DI      0      30      90      150      300      600      1200      1800      3000      6000
700      DQ      0      10      30      50      100      200      400      600      1000      2000
        *

701      KK DLVRA
702      KM RETRIEVE DLVRA
703      DR DLVRA
        *

                                HEC-1 INPUT

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

704      KK RDLVRA
705      KM ROUTE RDLVRA TO CLM06-C
706      KM EXISTING CHANNEL
707      RD      1200  0.01  0.02      0  TRAP      8      2
        *

708      KK DRAN
709      KM RETRIEVE DRAN
710      DR DRAN
        *

711      KK RDRAN
712      KM ROUTE RDLVRA TO CLM06-C
713      KM RANCHO
714      RD      1200  0.01  0.02      0  TRAP      0      50
        *

715      KK DLVLM4
716      KM RETRIEVE DLVLM4
717      DR DLVLM4
        *

718      KKCLM06-C
719      KM COMBINE CLM06-C, DLVLM4, RDRAN, AND RDLVRA
720      KM RANCHO AND LAKE MEAD
721      HC      4
        *

722      KK DLVLMRA
723      KM SAME AS DLVLMRA FROM CWH
724      KM REPEAT DIVERSION TO LVLM SYSTEM SINCE THERE IS CAPACITY IN PIPE FOR 10-YEAR
725      KM FLOW IS DIVERTED TO EXISTING REGIONAL FACILITY LVLM 0270
726      KM 90" RCP CAPACITY = 940 CFS
727      KM 940 CFS IS DIVERTED
728      DT DLVLM5
729      DI      0      50      100      400      600      700      800      940      1000      5000
730      DQ      0      50      100      400      600      700      800      940      940      940

```

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*
 731 KK DSURF2
 732 KM SAME AS DSURF2 FROM CWH
 733 KM DIVERT 50% OR REMAINING FLOW TO LAKE MEAD
 734 KM REMAINING IN RANCHO
 735 DT DLAKEM
 736 DI 0 30 90 150 300 600 1200 1800 3000 6000
 737 DQ 0 10 30 50 100 200 400 600 1000 2000
 *

738 KK D1LM09
 739 KM SAME AS D1LM09 FROM CWH
 740 KM FLOW IS DIVERTED ACROSS RANCHO IN RAN 119
 741 KM 6' X 3' RCB CAPACITY = 168 CFS
 742 KM CAPACITY BASED ON INLET CONTROL NOMOGRAPH
 743 KM THE REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO
 HEC-1 INPUT

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

744 DT DRAN119
 745 DI 0 50 100 168 500 1000 5000
 746 DQ 0 50 100 168 168 168 168
 *

747 KK D2LM09
 748 KM SAME AS D2LM09 FROM CWH
 749 KM FLOW IS DIVERTED ACROSS RANCHO IN RAN 118
 750 KM 6' X 3' RCB CAPACITY = 168 CFS
 751 KM CAPACITY BASED ON INLET CONTROL NOMOGRAPH
 752 KM THE REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO
 753 DT DRAN118
 754 DI 0 50 100 168 500 1000 5000
 755 DQ 0 50 100 168 168 168 168
 *

756 KK RD2LM09
 757 KM ROUTE D2LM09 TO CLM09
 758 KM RANCHO
 759 RD 800 0.01 0.016 0 TRAP 0 50
 *

760 KK DVALDR
 761 KM RETRIEVE DVALDR
 762 DR DVALDR
 *
 * UNSTABLE ROUTING REMOVED
 * KK RDVALDR
 * KM ROUTE DVALDR TO CLM09
 * KM VALLEY DRIVE
 * RD 2900 0.0086 0.016 0 TRAP 0 50
 *

763 KK LM09
 764 BA 0.123
 765 PB 2.77
 766 LS 0 92.6
 767 UD 0.212
 *

768 KK CLM09
 769 KM COMBINE RDVALDR, RD2LM09, AND LM09
 770 KM RANCHO AND CORAN
 771 HC 3
 *

772 KK D3LM09
 773 KM SAME AS D3LM09 FROM CWH
 774 KM FLOW IS DIVERTED ACROSS RANCHO TO CORAN
 775 KM CAPACITY OF WEST HALF STREET OF RANCHO AT TOP OF MEDIAN WILL
 776 KM REMAIN AND CONTINUE SOUTHEAST IN RANCHO
 777 KM LOW FLOWS WILL REMAIN IN RANCHO AND FLOW SOUTHEAST
 778 DT DCORAN
 779 DI 0 51 201 300 400 500 600 800 1000 5000
 780 DQ 0 0 0 50 100 150 200 400 600 4600
 *

HEC-1 INPUT

PAGE 22

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

781 KK RD3LM09
782 KM ROUTE D3LM09 TO CVG21
783 KM RANCHO
784 RD 900 0.01 0.016 0 TRAP 0 50
*

785 KK VG21
786 BA 0.098
787 PB 2.77
788 LS 0 88.1
789 UD 0.201
*

790 KK CVG21
791 KM COMBINE RD3LM09 AND VG21
792 KM RANCHO AND CORAN
793 HC 2
*

794 KK DVG21
795 KM SAME AS DVG21 FROM CWH
796 KM DIVERSION AT RANCHO AND HOLLY
797 KM FLOW IS DIVERTED ACROSS RANCHO TO HOLLY
798 KM REMAINING FLOW CONTINUES SOUTHEAST IN RANCHO TO VG20
799 KM LOW FLOWS WILL REMAIN IN RANCHO AND FLOW SOUTHEAST
800 KM MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
801 DT DHOLLY
802 DI 0 51 201 300 400 500 600 800 1000
803 DQ 0 0 0 100 200 300 350 450 550
*

804 KK LM08
805 BA 0.056
806 PB 2.77
807 LS 0 91.3
808 UD 0.158
*

809 KK RLM08
810 KM ROUTE LM08 TO CVG20
811 RD 4100 0.011 0.016 0 TRAP 0 50
*

812 KK VG20
813 BA 0.134
814 PB 2.77
815 LS 0 90.1
816 UD 0.349
*

1

HEC-1 INPUT

PAGE 23

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

817 KK CVG20
818 KM COMBINE RLM08, DVG21 AND VG20
819 KM RANCHO AND HOLLY
820 HC 3
*

821 KK RCVG20
822 KM ROUTE CVG20 TO CVG22
823 KM RANCHO
824 RD 1500 0.0133 0.015 0 CIRC 7.5
*

825 KK VG22
826 BA 0.176
827 PB 2.77
828 LS 0 90.9
829 UD 0.412
*

830 KK CVG22
831 KM COMBINE RCVG20 AND VG22
832 KM RANCHO AND VEGAS
833 HC 2
*

834 KKOG011A-C

835 BA 0.441
 836 PB 2.77
 837 LS 0 85.5
 838 UD 0.428
 *

839 KK ROG011A
 840 KM ROUTE OG011A-C TO CVG02-C
 841 KM VEGAS DRIVE
 842 RD 3200 0.0172 0.015 0 TRAP 0 50
 *

843 KK VG02-C
 844 BA 0.224
 845 PB 2.77
 846 LS 0 81.7
 847 UD 0.386
 *

848 KK CVG02-C
 849 KM COMBINE ROG011A AND VG02-C
 850 KM TORREY PINES AND VEGAS DRIVE
 851 HC 2
 *

1

HEC-1 INPUT

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

852 KK RCVG02
 853 KM ROUTE CVG02-C TO CVG03-C
 854 KM FACILITY = OWENS AVENUE SYSTEM
 855 KM FACILITY # = LVOW 0460
 856 KM LINING = RCB
 857 RD 2700 0.0148 0.015 0 TRAP 0 50
 *

858 KK VG03-C
 859 BA 0.279
 860 PB 2.77
 861 LS 0 79.7
 862 UD 0.401
 *

863 KK CVG03-C
 864 KM COMBINE RCVG02 AND VG03-C
 865 KM JONES AND VEGAS DRIVE
 866 HC 2
 *

867 KK RCVG03
 868 KM ROUTE CVG03-C TO CVG04-C
 869 KM FACILITY = OWENS AVENUE SYSTEM
 870 KM FACILITY # = LVOW 0360
 871 KM LINING = RCB
 872 RD 2700 0.0148 0.016 0 TRAP 0 50
 *

873 KK VG04-C
 874 BA 0.240
 875 PB 2.77
 876 LS 0 90.9
 877 UD 0.373
 *

878 KK CVG04-C
 879 KM COMBINE RCVG03 AND VG04-C
 880 KM MICHAEL AND VEGAS DRIVE
 881 HC 2
 *

882 KK RCVG04
 883 KM ROUTE CVG04 TO CWA08A
 884 KM VEGAS DRIVE
 885 RD 2600 0.0135 0.016 0 TRAP 0 50
 *

886 KK WA08A
 887 BA 0.026
 888 PB 2.77
 889 LS 0 92.5

890 UD 0.180
*

HEC-1 INPUT

PAGE 25

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

891 KK CWA08A
892 KM COMBINE WA08A AND RCVG04
893 KM MICHAEL AND VEGAS DRIVE
894 HC 2
*

895 KK RCWA08A
896 KM ROUTE CWA08A TO CVG06
897 KM VEGAS DRIVE
898 RD 4000 0.0138 0.016 0 TRAP 0 50
*

899 KK VG06
900 BA 0.186
901 PB 2.77
902 LS 0 87.5
903 UD 0.280
*

904 KK CVG06
905 KM COMBINE RCWA08A AND VG06
906 KM VALLEY VIEW AND VEGAS DRIVE
907 HC 2
*

908 KK RCVG06
909 KM ROUTE CVG06 TO CCVG22
910 KM VEGAS DRIVE
911 RD 1900 0.0174 0.016 0 TRAP 0 50
*

912 KK CCVG22
913 KM COMBINE CVG22 AND RCVG06
914 KM RANCHO AND VEGAS DRIVE
915 HC 2
*

916 KKDCVG20-C
917 KM FLOW SPLIT FROM CLV
918 KM REVISED FROM MPU BASED ON COMMENT FROM CLV
919 KM 100-YEAR FLOW LISTED ON PLANS = 530 CFS
920 KM STREET FLOW - 75% OWENS/25% RANCHO
921 DT LV15
922 DI 0 570 670 1570 2570
923 DQ 0 0 25 250 500
*

924 KKRDCVG20-C
925 KM ROUTE DCVG20-C TO CVG23
926 KM FACILITY = OWENS AVENUE SYSTEM
927 KM FACILITY # = LVOW 0146
928 KM LINING = RCP
929 RD 800 0.009 0.015 0 TRAP 8 0
*

* KMFLOW SPLIT AT OWEN AND RANCHO. FLOW TO OWEN DURING MINOR EVENT
* KMSTART FLOW ANALYSIS AT OWENS, SOUTH OF RANCHO
* KMINSEERRT DUMMY TO AVOID ZERO FLOW
* KMCOMBINE FLOW SPLIT AT VEGAS AND RANCHO
*

HEC-1 INPUT

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

930 KK LV15
931 KM RETRIEVE
932 DR LV15
*

933 KK RLV15
934 KM ROUTE LV15 TO CWA15A-C
935 KM RANCHO
936 RD 3000 0.0045 0.016 0 TRAP 0 50
*

937 KK DUMMY
 938 KM DUMMY AREA TO AVOID ZERO FLOW
 939 BA 0.0001
 940 PB 2.77
 941 LS 0 90
 942 UD 0.10
 *
 943 KK CRLV15
 944 KM COMBINE DUMMY AND LV15 - FLOW SPLIT AT OWENS
 945 HC 2
 *
 946 KK WA12
 947 BA 0.069
 948 PB 2.77
 949 LS 0 90.5
 950 UD 0.130
 *
 951 KK WA13
 952 BA 0.160
 953 PB 2.77
 954 LS 0 90.8
 955 UD 0.304
 *
 956 KK CWA13
 957 KM COMBINE WA12 AND WA13
 958 KM RANCHO AND WASHINGTON
 959 HC 2
 *
 960 KK CWA13
 961 KM COMBINE FLOW - OVERFLOW AT OWENS AND BASIN FLOW - WA13 AND WA14
 962 HC 2
 *

HEC-1 INPUT

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

963 KK WA14
 964 BA 0.043
 965 PB 2.77
 966 LS 0 90.7
 967 UD 0.202
 *
 968 KK CWA14
 969 KM COMBINE FLOW FROM CWA13 AND WA14
 970 HC 2
 *
 971 KK WA01-C
 972 BA 0.221
 973 PB 2.77
 974 LS 0 87.5
 975 UD 0.252
 *
 976 KK RWA01
 977 KM ROUTE WA01-C TO CWA04-C
 978 KM WASHINGTON STREET
 979 RD 5300 0.0151 0.016 0 TRAP 0 50
 *
 980 KK WA04-C
 981 BA 0.219
 982 PB 2.77
 983 LS 0 88.1
 984 UD 0.473
 *
 985 KK CWA04-C
 986 KM COMBINE RWA01 AND WA04-C
 987 KM MICHAEL AND WASHINGTON
 988 HC 2
 *

989 KK RCWA04
 990 KM ROUTE CWA04-C TO CWA09-C
 991 KM FACILITY = FREEWAY CHANNEL
 992 KM FACILITY # = LV15 0602
 993 KM LINING = RCP
 994 RD 5900 0.0144 0.016 0 TRAP 0 50
 *

995 KK WA09-C
 996 BA 0.093
 997 PB 2.77
 998 LS 0 91.3
 999 UD 0.363
 *

HEC-1 INPUT

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

1000 KK CWA09-C
 1001 KM COMBINE RCWA04 AND WA09-C
 1002 KM VALLEY VIEW AND WASHINGTON
 1003 HC 2
 *

1004 KK RCWA09
 1005 KM ROUTE CWA09-C TO CWA10NW
 1006 KM FACILITY = FREEWAY CHANNEL
 1007 KM FACILITY # = LV15 0602
 1008 KM LINING = RCP
 1009 RD 700 0.0083 0.016 0 TRAP 0 50
 *

1010 KK WA10-C
 1011 BA 0.446
 1012 PB 2.77
 1013 LS 0 91.4
 1014 UD 0.358
 *

1015 KK WA10D
 1016 KM FLOW SPLIT TO SOUTHEAST CENTRAL BASIN
 1017 KM OPPOSITE SPLIT OF WA10NW IN SOUTHEAST CENTRAL BASIN FLOW
 1018 KM FROM LOUIS BERGER U.S. 95 WIDENING STUDY
 1019 KM CAPACITY OF CHANNEL = 250 CFS IS DIVERTED
 1020 KM EXCESS FLOW CONTINUES DOWN WASHINGTON
 1021 DT WA10SE
 1022 DI 0 10 250 275 300 800 1000 3000
 1023 DQ 0 10 250 250 250 250 250 250
 *

1024 KK CWA10NW
 1025 KM COMBINE WA10D AND RCWA09
 1026 KM VALLEY VIEW AND WASHINGTON
 1027 HC 2
 *
 * KMROUTE FLOW ON WASHINGTON
 *

1028 KKRCWA10NW
 1029 KM ROUTE CWA10NW TO CWA13-C
 1030 KM FACILITY = FREEWAY CHANNEL
 1031 KM FACILITY # = LV15 0528
 1032 KM LINING = RCB
 1033 RD 3900 0.0119 0.016 0 TRAP 0 50
 *

1034 KK WA11-C
 1035 BA 0.085
 1036 PB 2.77
 1037 LS 0 86.8
 1038 UD 0.286
 *
 *

HEC-1 INPUT

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

1039 KK CWA13
 1040 KM SAME TITLE AS 100-YEAR

```

1041      KM FLOW SPLIT TO SOUTHEAST CENTRAL BASIN
1042      KM RANCHO AND WASHINGTON
1043      KM SPLIT TAKEN FROM 30% DRAINAGE DESIGN FOR U.S.95 WIDENING BY VTN NEVADA (2001)
1044      KM OPPOSITE SPLIT OF WA13SE IN SOUTHEAST CENTRAL BASIN MODEL
1045      DT WA13SE
1046      DI      0      500      812      1000      1200
1047      DQ      0      303      490      609      727
          *

1048      KK RCRLV15
1049      KM ROUTE CRLV15 TO CCWA15A
1050      RD      1500      0.009      0.016      0      TRAP      0      50
          *

1051      KK LC16-C
1052      BA      0.263
1053      PB      2.77
1054      LS      0      87.2
1055      UD      0.344
          *

1056      KK      END
1057      KM      END OF PROJECT AT BONANZA
1058      HC      4
1059      ZZ

```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```

INPUT
LINE      (V) ROUTING      (--->) DIVERSION OR PUMP FLOW

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

47      OG04-C
      .
      .
64      .----->      DPD01
60      DOG04-C
      V
      V
67      RDOG04-C
      .
      .
71      .      OG05-C
      .
      .
76      COG05-C.....
      V
      V
80      RCOG05-C
      .
      .
84      .      CY06B-C
      .
      .
89      CCY06B-C.....
      V
      V
93      RCCY06B
      .
      .
97      .      PDGCD-C
      .      V
      .      V
102     .      RPDGCD-C
      .      V
      .      V
106     .      RRPDGCD
      .
      .
111     .      .      NW29B-C
      .      .      V
      .      .      V
116     .      .      RNW29B-C
      .      .
      .      .
120     .      .      .      NW1C2-C
      .      .      .
      .      .      .
125     .      .      CNW1C2.....
      .      .      V
      .      .      V

```


129	.	.	RCNW1C2	.
	.	.		.
133	.	.	PDGCB10-	.
	.	.		.
138	.	.	CPDGCB10.....	.
	.	.		.
147	.	.	----->DPT3AA11	.
142	.	.	DPDGCB10	.
	.	.		.
150	.	.	CPDGCB10.....	.
	.	.	V	.
	.	.	V	.
154	.	.	RCPDGCB	.
	.	.		.
158	.	.	GD20BE-C	.
	.	.		.
163	.	.	CGD20BEC.....	.
	.	.	V	.
	.	.	V	.
167	.	.	RCGD20BE	.
	.	.		.
174	.	.	GD20BM-C	.
	.	.		.
179	.	.	CGD20BMC.....	.
	.	.	V	.
	.	.	V	.
183	.	.	RCGD20BM	.
	.	.		.
190	.	.	GD17BG-C	.
	.	.		.
195	.	.	CGD17BG.....	.
	.	.	V	.
	.	.	V	.
199	.	.	RGD17BG	.
	.	.		.
205	.	.	GD11B-C	.
	.	.		.
210	.	.	CGD11B-C.....	.
	.	.	V	.
	.	.	V	.
214	.	.	RCGD11B	.
	.	.		.
220	.	.	PT6B-C	.
	.	.		.
225	.	.	CPT6B-C.....	.
	.	.		.
233	.	.	-----> DGOW1A	.
229	.	.	DPT6B-C1	.
	.	.		.
240	.	.	-----> DTRILGY	.
236	.	.	DPT6B-C2	.
	.	.		.
243	.	.	PT2B2-C	.
	.	.	V	.
	.	.	V	.
248	.	.	RCPT2B2	.
	.	.		.
255	.	.	PT3-C	.
	.	.	V	.
	.	.	V	.
260	.	.	RCPT3-C	.
	.	.		.

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264      .          .          .          .          PT41-C
269      .          .          CPT41-C .....
                V
273      .          .          RCPT41-C
                V
280      .          .          PT5A2-C
                V
285      .          .          CPT5A2-C .....
                V
289      .          .          RCPT5A2
                V
295      .          CCPT6B-C .....
303      .          -----> DGOWAN
299      .          DRANCHO
                V
306      .          RDRANCH
                V
312      .          .          <----- DTRILGY
310      .          DTRILGY
                V
313      .          .          CY07B
                V
318      .          CCY07B .....
327      .          -----> DCENT1
322      .          DCY07B
                V
332      .          .          <----- DGOWAN
330      .          DGOWAN
                V
333      .          RDGOWAN
                V
339      .          .          <----- DGOW1A
337      .          DGOW1A
                V
340      .          RDGOW1A
                V
346      .          CCPT6B-C .....
350      .          .          CY08-C
                V
355      .          CCY08-C .....
365      .          ----->DCENTRAL
359      .          DGOW2A
                V
370      .          -----> D3ALL
368      .          D3ALL
                V
375      .          .          <----- DCENT1
373      .          DCENT1
                V
376      .          RDCENT1
                V
380      CRGOWAN.....

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      V
      V
384   RCRGOWAN
      .
      .
388   .      PD05A-C
      .
      .
393   CPD05A-C.....
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402   .----->   DA1-C
397   DCPD05A
      V
      V
405   RCPD05
      .
      .
411   .      .<----- DPD01
409   .      DPD01
      .      V
      .      V
412   .      RDPD01
      .
      .
416   .      .      PD01-C
      .      .
      .
421   .      CPD01-C.....
      .      V
      .      V
425   .      RCPD01
      .
      .
431   .      .      CY04A-C
      .      .
      .
436   .      CCY04A-C.....
      .
      .
444   .      .----->   DLVSR1
440   .      DCY04C
      .      V
      .      V
447   .      RCCY04A
      .
      .
453   .      .      PD04B-C
      .      .
      .
458   .      CPD04B-C.....
      .
      .
462   CCPD04B-.....
      V
      V
466   RCPD04B
      .
      .
472   .      OG03-C
      .      V
      .      V
477   .      ROG03-C
      .
      .
481   .      .      OG02-C
      .      .      V
      .      .      V
486   .      .      ROG02-C
      .
      .
490   .      .      .      LM01-C
      .      .
      .
495   .      .      CLM01-C.....
      .
      .
504   .      .      .----->   DSR01F
499   .      .      SR01E
      .      .      V
      .      .      V

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507      .      .      RCLM01-C
      .      .      .
513      .      .      .      SR00A-C
      .      .      .      .
518      .      .      CSR00A.....
      .      .      .
522      .      CCSR00A.....
      .      .      V
      .      .      V
526      .      RCSR00A
      .      .      .
534      .      .      .      .<----- DLVSR1
532      .      .      DLVSR1
      .      .      V
      .      .      V
535      .      .      RDLVSR1
      .      .      .
541      .      .      .      SR02E-C
      .      .      .      .
546      .      .      CSR02E.....
      .      .      V
      .      .      V
550      .      RCSR02E
      .      .      .
556      .      .      SR05D-C
      .      .      .
561      .      .      CSR05D.....
      .      .      V
      .      .      V
565      .      RCSR05D
      .      .      .
571      .      .      SR05B-C
      .      .      .
576      .      .      CSR05B.....
      .      .      .
583      .      .      .-----> DLVSR2
580      .      DCSR05B
      .      .      .
589      .      .      .-----> DLVSR3
586      .      DDCSR05B
      .      .      .
596      .      .      .-----> DLVRA
592      .      D3CSR05B
      .      .      .
603      .      .      .-----> DRAN
599      .      D4CSR05B
      .      .      .
608      .      .      .-----> DSMOKE
606      .      DSR05B
      .      .      .
613      .      .      .      .<----- DLVSR3
611      .      .      DLVSR3
      .      .      .
614      .      CCSR05B.....
      .      .      .
620      .      .      .-----> DLVSR4
618      .      DCCSR05B
      .      .      .
625      .      .      .<----- DSR01F
623      .      DSR01F
      .      .      V
      .      .      V

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626 . RDSR01F
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632 . LM02-C
.
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637 . CLM02-C.....
. V
. V
641 . RCLM02-C
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647 . LM03-C
.
.
652 . CLM03-C.....
. V
. V
656 . RCLM03-C
.
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662 . LM05-C
.
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667 . CLM05-C.....
. V
. V
671 . RCLM05-C
.
.
677 . LM06B-C
.
.
682 . CLM06-C.....
.
.
691 . -----> DLVLM4
686 . DLVLMRA
.
.
698 . -----> DVALDR
694 . DSURF1
.
.
703 . <----- DLVRA
701 . DLVRA
. V
. V
704 . RDLVRA
.
.
710 . <----- DRAN
708 . DRAN
. V
. V
711 . RDRAN
.
.
717 . <----- DLVLM4
715 . DLVLM4
.
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718 . CCLM06-C.....
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728 . -----> DLVLM5
722 . DLVLMRA
.
.
735 . -----> DLAKEM
731 . DSURF2
.
.
744 . -----> DRAN119
738 . D1LM09
.
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753 . -----> DRAN118
747 . D2LM09
. V
. V

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882	.	.	RCVG04	.	
	.	.	.	.	
886	.	.	.	WA08A	.
	.	.	.	.	.
891	.	.	CWA08A.....	.	.
	.	.	V	.	.
	.	.	V	.	.
895	.	.	RCWA08A	.	.
	.	.	.	.	.
899	.	.	.	VG06	.
	.	.	.	.	.
904	.	.	CVG06.....	.	.
	.	.	V	.	.
	.	.	V	.	.
908	.	.	RCVG06	.	.
	.	.	.	.	.
912	.	.	CCVG22.....	.	.
	.	.	.	.	.
921	.	.	----->	LV15	.
916	.	.	DCVG20-C	.	.
	.	.	V	.	.
	.	.	V	.	.
924	.	.	RDCVG20-	.	.
	.	.	.	.	.
932	.	.	.	<-----	LV15
930	.	.	LV15	.	.
	.	.	V	.	.
	.	.	V	.	.
933	.	.	RLV15	.	.
	.	.	.	.	.
937	.	.	.	DUMMY	.
	.	.	.	.	.
943	.	.	CRLV15.....	.	.
	.	.	.	.	.
946	.	.	.	WA12	.
	.	.	.	.	.
951	.	.	.	.	WA13
	.	.	.	.	.
956	.	.	.	CWA13.....	.
	.	.	.	.	.
960	.	.	CWA13.....	.	.
	.	.	.	.	.
963	.	.	.	WA14	.
	.	.	.	.	.
968	.	.	CWA14.....	.	.
	.	.	.	.	.
971	.	.	.	WA01-C	.
	.	.	.	V	.
	.	.	.	V	.
976	.	.	.	RWA01	.
	.	.	.	.	.
980	.	.	.	.	WA04-C
	.	.	.	.	.
985	.	.	.	CWA04-C.....	.
	.	.	.	V	.
	.	.	.	V	.
989	.	.	.	RCWA04	.
	.	.	.	.	.
995	.	.	.	.	WA09-C
	.	.	.	.	.
1000	.	.	.	CWA09-C.....	.

6-7 0.510
7-8 0.504

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)

100-YEAR, 6-HOUR STORM, SDN3

44 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

.56 .56 .54 .53 .52 .52 .51 .51 .50

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	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7	RATIO 8	RATIO 9
					.56	.56	.54	.53	.52	.52	.51	.51	.50
HYDROGRAPH AT													
+	OG04-C	.29	1	FLOW	136.	133.	127.	121.	119.	118.	117.	115.	111.
				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.	120.	118.	117.	116.	114.	110.
				TIME	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	DOG04-C	.29	1	FLOW	12.	9.	3.	1.	1.	1.	1.	1.	1.
				TIME	3.75	3.75	3.75	3.50	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.	1.
				TIME	5.08	5.17	5.50	5.67	5.67	5.67	5.67	5.67	5.67
HYDROGRAPH AT													
+	OG05-C	.27	1	FLOW	115.	112.	108.	103.	101.	100.	99.	97.	94.
				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	115.	112.	108.	103.	101.	100.	99.	97.	94.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RCOG05-C	.55	1	FLOW	115.	113.	108.	103.	101.	100.	99.	97.	94.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17

HYDROGRAPH AT													
+	CY06B-C	.50	1	FLOW TIME	111. 4.17	108. 4.17	103. 4.17	97. 4.17	95. 4.17	93. 4.17	92. 4.17	90. 4.17	87. 4.17
2 COMBINED AT													
+	CCY06B-C	1.05	1	FLOW TIME	226. 4.17	221. 4.17	210. 4.17	200. 4.17	196. 4.17	193. 4.17	191. 4.17	187. 4.17	180. 4.17
ROUTED TO													
+	RCCY06B	1.05	1	FLOW TIME	225. 4.25	221. 4.25	210. 4.25	199. 4.25	197. 4.25	192. 4.25	190. 4.25	187. 4.25	179. 4.25
HYDROGRAPH AT													
+	PDGCD-C	.44	1	FLOW TIME	64. 4.08	62. 4.08	58. 4.08	53. 4.08	52. 4.08	51. 4.08	50. 4.08	48. 4.08	46. 4.08
ROUTED TO													
+	RPDGCD-C	.44	1	FLOW TIME	64. 4.25	61. 4.25	57. 4.25	53. 4.25	51. 4.33	50. 4.33	49. 4.33	48. 4.33	45. 4.33
ROUTED TO													
+	RRPDGCD	.44	1	FLOW TIME	63. 4.33	61. 4.33	57. 4.33	52. 4.33	51. 4.33	50. 4.33	49. 4.33	48. 4.33	45. 4.33
HYDROGRAPH AT													
+	NW29B-C	.29	1	FLOW TIME	52. 3.92	50. 3.92	47. 3.92	43. 3.92	42. 3.92	41. 3.92	41. 3.92	39. 3.92	37. 3.92
ROUTED TO													
+	RNW29B-C	.29	1	FLOW TIME	52. 4.17	50. 4.17	46. 4.17	43. 4.17	42. 4.17	41. 4.17	40. 4.17	39. 4.17	37. 4.17
HYDROGRAPH AT													
+	NW1C2-C	.21	1	FLOW TIME	76. 3.83	74. 3.83	71. 3.83	67. 3.83	66. 3.83	65. 3.83	64. 3.83	63. 3.83	61. 3.83
2 COMBINED AT													
+	CNW1C2	.49	1	FLOW TIME	115. 4.00	111. 4.00	104. 4.00	98. 4.00	95. 4.00	93. 4.00	91. 4.00	89. 4.00	84. 4.08
ROUTED TO													
+	RCNW1C2	.49	1	FLOW TIME	115. 4.08	112. 4.17	106. 4.17	102. 4.17	99. 4.17	97. 4.17	95. 4.17	92. 4.17	87. 4.17
HYDROGRAPH AT													
+	PDGCB10-	.31	1	FLOW TIME	75. 3.92	72. 3.92	68. 3.92	64. 3.92	62. 3.92	61. 3.92	60. 3.92	59. 3.92	56. 3.92
2 COMBINED AT													
+	CPDGCB10	.80	1	FLOW TIME	180. 4.08	173. 4.08	163. 4.08	152. 4.08	149. 4.08	146. 4.08	143. 4.08	139. 4.08	130. 4.17
DIVERSION TO													
+	DPT3AA11	.80	1	FLOW TIME	139. 3.92	139. 3.92	139. 4.00	139. 4.08	139. 4.08	139. 4.08	139. 4.08	138. 4.08	129. 4.17
HYDROGRAPH AT													
+	DPDGCB10	.80	1	FLOW TIME	41. 4.08	34. 4.08	24. 4.08	13. 4.08	10. 4.08	7. 4.08	4. 4.08	1. 3.67	1. 3.67
2 COMBINED AT													
+	CPDGCB10	1.24	1	FLOW TIME	88. 4.17	81. 4.17	68. 4.17	55. 4.17	52. 4.33	51. 4.33	50. 4.33	49. 4.33	46. 4.33
ROUTED TO													
+	RCPDGCB	1.24	1	FLOW TIME	90. 4.25	84. 4.25	71. 4.25	59. 4.33	55. 4.33	52. 4.33	50. 4.50	49. 4.50	46. 4.50
HYDROGRAPH AT													
+	GD20BE-C	.43	1	FLOW TIME	93. 4.00	90. 4.00	85. 4.00	79. 4.00	77. 4.00	76. 4.00	75. 4.00	73. 4.00	70. 4.00
2 COMBINED AT													
+	CGD20BEC	1.67	1	FLOW TIME	160. 4.25	151. 4.25	135. 4.25	111. 4.33	106. 4.33	102. 4.33	99. 4.33	95. 4.33	90. 4.33
ROUTED TO													
+	RCGD20BE	1.67	1	FLOW TIME	156. 4.42	148. 4.42	129. 4.42	111. 4.50	106. 4.50	101. 4.50	98. 4.50	93. 4.50	88. 4.58
HYDROGRAPH AT													

+		GD20BM-C	.34	1	FLOW TIME	126. 3.92	123. 3.92	117. 3.92	112. 3.92	110. 3.92	108. 3.92	107. 3.92	105. 3.92	102. 3.92
	2 COMBINED AT													
+		CGD20BMC	2.01	1	FLOW TIME	228. 4.33	210. 4.33	193. 4.00	182. 4.00	178. 4.00	175. 4.00	173. 4.00	169. 4.00	162. 4.00
	ROUTED TO													
+		RCGD20BM	2.01	1	FLOW TIME	222. 4.50	207. 4.50	191. 4.17	180. 4.17	177. 4.17	174. 4.17	172. 4.17	168. 4.17	161. 4.17
	HYDROGRAPH AT													
+		GD17BG-C	.36	1	FLOW TIME	113. 3.92	110. 3.92	105. 3.92	99. 3.92	98. 3.92	96. 3.92	95. 3.92	93. 3.92	90. 3.92
	2 COMBINED AT													
+		CGD17BG	2.38	1	FLOW TIME	311. 4.08	303. 4.08	287. 4.08	271. 4.08	265. 4.08	261. 4.08	258. 4.08	252. 4.08	242. 4.08
	ROUTED TO													
+		RGD17BG	2.38	1	FLOW TIME	310. 4.17	301. 4.17	285. 4.17	268. 4.17	263. 4.17	258. 4.17	255. 4.17	250. 4.25	240. 4.25
	HYDROGRAPH AT													
+		GD11B-C	.26	1	FLOW TIME	133. 3.75	130. 3.75	125. 3.75	119. 3.75	117. 3.75	116. 3.75	115. 3.75	113. 3.75	109. 3.75
	2 COMBINED AT													
+		CGD11B-C	2.64	1	FLOW TIME	363. 4.17	353. 4.17	335. 4.17	316. 4.17	310. 4.17	305. 4.17	301. 4.17	295. 4.17	282. 4.17
	ROUTED TO													
+		RCGD11B	2.64	1	FLOW TIME	364. 4.25	353. 4.25	335. 4.25	315. 4.25	308. 4.25	303. 4.25	299. 4.25	292. 4.25	279. 4.25
	HYDROGRAPH AT													
+		PT6B-C	.45	1	FLOW TIME	93. 4.25	90. 4.25	85. 4.25	81. 4.25	79. 4.25	78. 4.25	77. 4.25	75. 4.25	72. 4.25
	2 COMBINED AT													
+		CPT6B-C	3.09	1	FLOW TIME	456. 4.25	443. 4.25	420. 4.25	396. 4.25	387. 4.25	381. 4.25	376. 4.25	368. 4.25	351. 4.25
	DIVERSION TO													
+		DGOW1A	3.09	1	FLOW TIME	455. 4.25	442. 4.25	419. 4.25	395. 4.25	386. 4.25	380. 4.25	375. 4.25	367. 4.25	350. 4.25
	HYDROGRAPH AT													
+		DPT6B-C1	3.09	1	FLOW TIME	1. 3.50	1. 3.50	1. 3.50	1. 3.58	1. 3.58	1. 3.58	1. 3.58	1. 3.58	1. 3.58
	DIVERSION TO													
+		D'TRILGY	3.09	1	FLOW TIME	0. 3.50	0. 3.50	0. 3.50	0. 3.58	0. 3.58	0. 3.58	0. 3.58	0. 3.58	0. 3.58
	HYDROGRAPH AT													
+		DPT6B-C2	3.09	1	FLOW TIME	1. 3.50	1. 3.50	1. 3.50	1. 3.58	1. 3.58	1. 3.58	1. 3.58	1. 3.58	1. 3.58
	HYDROGRAPH AT													
+		PT2B2-C	.30	1	FLOW TIME	141. 3.83	138. 3.83	133. 3.83	127. 3.83	125. 3.83	124. 3.83	122. 3.83	121. 3.83	117. 3.83
	ROUTED TO													
+		RCPT2B2	.30	1	FLOW TIME	140. 3.92	136. 3.92	131. 3.92	126. 3.92	125. 3.92	123. 3.92	121. 3.92	120. 3.92	116. 3.92
	HYDROGRAPH AT													
+		PT3-C	.17	1	FLOW TIME	71. 3.83	69. 3.83	66. 3.83	63. 3.83	62. 3.83	61. 3.83	61. 3.83	59. 3.83	57. 3.83
	ROUTED TO													
+		RCPT3-C	.17	1	FLOW TIME	71. 4.08	69. 4.17	66. 4.17	63. 4.17	62. 4.17	61. 4.17	61. 4.17	60. 4.17	58. 4.17
	HYDROGRAPH AT													
+		PT41-C	.44	1	FLOW TIME	156. 3.92	152. 3.92	145. 3.92	138. 3.92	135. 3.92	133. 3.92	132. 3.92	130. 3.92	125. 3.92
	3 COMBINED AT													
+		CPT41-C	.91	1	FLOW	343.	335.	321.	305.	300.	297.	293.	288.	278.

				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO														
+	RCPT41-C	.91	1	FLOW TIME	342.4.00	334.4.00	320.4.00	304.4.00	299.4.00	295.4.00	292.4.00	286.4.00	276.4.00	
HYDROGRAPH AT														
+	PT5A2-C	.34	1	FLOW TIME	81.4.17	79.4.17	75.4.17	71.4.17	70.4.17	69.4.17	68.4.17	67.4.17	64.4.17	
2 COMBINED AT														
+	CPT5A2-C	1.25	1	FLOW TIME	420.4.00	409.4.00	391.4.00	371.4.00	365.4.00	360.4.00	356.4.00	349.4.00	336.4.00	
ROUTED TO														
+	RCPT5A2	1.25	1	FLOW TIME	415.4.08	403.4.08	386.4.08	369.4.08	360.4.08	355.4.08	354.4.08	345.4.08	334.4.08	
2 COMBINED AT														
+	CCPT6B-C	4.34	1	FLOW TIME	416.4.08	404.4.08	387.4.08	370.4.08	361.4.08	356.4.08	355.4.08	346.4.08	335.4.08	
DIVERSION TO														
+	DGOWAN	4.34	1	FLOW TIME	1.3.50	1.3.50	1.3.50	1.3.58	1.3.58	1.3.58	1.3.58	1.3.58	1.3.58	
HYDROGRAPH AT														
+	DRANCHO	4.34	1	FLOW TIME	415.4.08	403.4.08	386.4.08	369.4.08	360.4.08	355.4.08	354.4.08	345.4.08	334.4.08	
ROUTED TO														
+	RDRANCH	4.34	1	FLOW TIME	408.4.08	401.4.08	379.4.08	365.4.17	354.4.17	349.4.17	347.4.17	342.4.17	328.4.17	
HYDROGRAPH AT														
+	DTRILGY	.00	1	FLOW TIME	0.3.50	0.3.50	0.3.50	0.3.58	0.3.58	0.3.58	0.3.58	0.3.58	0.3.58	
HYDROGRAPH AT														
+	CY07B	.20	1	FLOW TIME	72.3.92	70.3.92	67.3.92	64.3.92	63.3.92	62.3.92	61.3.92	60.3.92	58.3.92	
3 COMBINED AT														
+	CCY07B	4.54	1	FLOW TIME	473.4.08	464.4.08	439.4.08	420.4.08	408.4.08	403.4.08	400.4.08	393.4.08	375.4.08	
DIVERSION TO														
+	DCENT1	4.54	1	FLOW TIME	401.4.08	392.4.08	367.4.08	348.4.08	336.4.08	331.4.08	328.4.08	321.4.08	303.4.08	
HYDROGRAPH AT														
+	DCY07B	4.54	1	FLOW TIME	72.3.58	72.3.58	72.3.58	72.3.58	72.3.58	72.3.67	72.3.67	72.3.67	72.3.67	
HYDROGRAPH AT														
+	DGOWAN	.00	1	FLOW TIME	1.3.50	1.3.50	1.3.50	1.3.58	1.3.58	1.3.58	1.3.58	1.3.58	1.3.58	
ROUTED TO														
+	RDGOWAN	.00	1	FLOW TIME	1.4.25	1.4.25	1.4.25	1.4.25	1.4.25	1.4.33	1.4.33	1.4.33	1.4.33	
HYDROGRAPH AT														
+	DGOW1A	.00	1	FLOW TIME	455.4.25	442.4.25	419.4.25	395.4.25	386.4.25	380.4.25	375.4.25	367.4.25	350.4.25	
ROUTED TO														
+	RDGOW1A	.00	1	FLOW TIME	451.4.25	438.4.25	415.4.33	391.4.33	384.4.33	378.4.33	373.4.33	366.4.33	350.4.33	
2 COMBINED AT														
+	CCPT6B-C	.00	1	FLOW TIME	452.4.25	439.4.25	416.4.33	392.4.33	385.4.33	379.4.33	374.4.33	367.4.33	351.4.33	
HYDROGRAPH AT														
+	CY08-C	.09	1	FLOW TIME	40.3.75	39.3.75	37.3.75	35.3.75	35.3.75	34.3.75	34.3.75	33.3.75	32.3.75	
3 COMBINED AT														
+	CCY08-C	4.64	1	FLOW TIME	539.4.25	525.4.25	502.4.25	475.4.33	468.4.33	461.4.33	456.4.33	449.4.33	433.4.33	

DIVERSION TO														
+	DCENTRAL	4.64	1	FLOW	1.	1.	1.	1.	1.	1.	1.	1.	1.	3.44
				TIME	3.17	3.17	3.25	3.33	3.33	3.33	3.33	3.33	3.33	
HYDROGRAPH AT														
+	DGOW2A	4.64	1	FLOW	538.	524.	501.	474.	467.	460.	455.	448.	432.	
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33	
DIVERSION TO														
+	D3ALL	4.64	1	FLOW	538.	524.	501.	474.	467.	460.	455.	448.	432.	
				TIME	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33	4.33	
HYDROGRAPH AT														
+	D3ALL	4.64	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.	0.	
				TIME	.00	.00	.00	.00	.00	.00	.00	.00	.00	
HYDROGRAPH AT														
+	DCENT1	.00	1	FLOW	401.	392.	367.	348.	336.	331.	328.	321.	303.	
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	
ROUTED TO														
+	RDCENT1	.00	1	FLOW	401.	392.	368.	348.	336.	331.	328.	320.	303.	
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	
3 COMBINED AT														
+	CRGOWAN	5.69	1	FLOW	622.	605.	571.	543.	529.	518.	514.	506.	482.	
				TIME	4.17	4.17	4.17	4.25	4.25	4.25	4.25	4.25	4.25	
ROUTED TO														
+	RCRGOWAN	5.69	1	FLOW	621.	600.	567.	540.	524.	518.	513.	500.	477.	
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	
HYDROGRAPH AT														
+	PD05A-C	.14	1	FLOW	69.	68.	65.	63.	62.	61.	61.	60.	58.	
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
2 COMBINED AT														
+	CPD05A-C	5.83	1	FLOW	658.	637.	603.	575.	557.	551.	546.	532.	509.	
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	
DIVERSION TO														
+	DA1-C	5.83	1	FLOW	211.	211.	211.	211.	211.	211.	211.	211.	211.	
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	4.00	
HYDROGRAPH AT														
+	DCPD05A	5.83	1	FLOW	447.	426.	392.	364.	346.	340.	335.	321.	298.	
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	
ROUTED TO														
+	RCPD05	5.83	1	FLOW	439.	421.	388.	361.	343.	335.	332.	318.	297.	
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	
HYDROGRAPH AT														
+	DPD01	.00	1	FLOW	124.	124.	124.	120.	118.	117.	116.	114.	110.	
				TIME	3.67	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
ROUTED TO														
+	RDPD01	.00	1	FLOW	128.	128.	126.	121.	119.	118.	116.	114.	111.	
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	
HYDROGRAPH AT														
+	PD01-C	.38	1	FLOW	89.	86.	81.	76.	74.	73.	72.	70.	67.	
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	
2 COMBINED AT														
+	CPD01-C	.38	1	FLOW	216.	214.	207.	197.	193.	190.	188.	185.	177.	
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	
ROUTED TO														
+	RCPD01	.38	1	FLOW	214.	211.	203.	193.	189.	187.	185.	181.	174.	
				TIME	3.92	3.92	3.92	4.00	4.00	4.00	4.00	4.00	4.00	
HYDROGRAPH AT														
+	CY04A-C	.46	1	FLOW	131.	127.	121.	114.	112.	110.	109.	107.	103.	
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
2 COMBINED AT														
+	CCY04A-C	.83	1	FLOW	344.	337.	324.	307.	301.	297.	294.	288.	277.	
				TIME	3.92	3.92	4.00	4.00	4.00	4.00	4.00	4.00	4.00	

DIVERSION TO														
+	DLVSR1	.83	1	FLOW TIME	231. 3.75	231. 3.75	231. 3.83	231. 3.83	231. 3.83	231. 3.83	231. 3.83	231. 3.83	231. 3.83	
HYDROGRAPH AT														
+	DCY04C	.83	1	FLOW TIME	113. 3.92	106. 3.92	93. 4.00	76. 4.00	70. 4.00	66. 4.00	63. 4.00	57. 4.00	46. 4.00	
ROUTED TO														
+	RCCY04A	.83	1	FLOW TIME	132. 4.00	118. 4.00	114. 4.08	98. 4.08	92. 4.08	86. 4.08	81. 4.08	66. 4.08	56. 4.17	
HYDROGRAPH AT														
+	PD04B-C	.47	1	FLOW TIME	137. 4.00	134. 4.00	127. 4.00	121. 4.00	118. 4.00	117. 4.00	115. 4.00	113. 4.00	109. 4.00	
2 COMBINED AT														
+	CPD04B-C	1.30	1	FLOW TIME	269. 4.00	251. 4.00	239. 4.08	217. 4.08	209. 4.08	201. 4.08	195. 4.08	177. 4.08	157. 4.17	
2 COMBINED AT														
+	CCPD04B-	7.13	1	FLOW TIME	620. 4.25	598. 4.25	550. 4.25	495. 4.25	474. 4.25	459. 4.25	448. 4.25	426. 4.33	394. 4.33	
ROUTED TO														
+	RCPD04B	7.13	1	FLOW TIME	609. 4.25	584. 4.25	530. 4.33	484. 4.33	463. 4.33	451. 4.33	443. 4.33	421. 4.33	386. 4.33	
HYDROGRAPH AT														
+	OG03-C	.32	1	FLOW TIME	107. 3.83	104. 3.83	99. 3.83	94. 3.83	92. 3.83	91. 3.83	90. 3.83	88. 3.83	84. 3.83	
ROUTED TO														
+	ROG03-C	.32	1	FLOW TIME	108. 4.00	105. 4.00	100. 4.00	95. 4.00	93. 4.00	91. 4.00	90. 4.00	89. 4.00	85. 4.00	
HYDROGRAPH AT														
+	OG02-C	.32	1	FLOW TIME	141. 3.83	138. 3.83	132. 3.83	126. 3.83	124. 3.83	122. 3.83	121. 3.83	119. 3.83	115. 3.83	
ROUTED TO														
+	ROG02-C	.32	1	FLOW TIME	143. 3.92	140. 3.92	134. 3.92	127. 3.92	125. 3.92	124. 3.92	122. 3.92	120. 3.92	116. 3.92	
HYDROGRAPH AT														
+	LM01-C	.33	1	FLOW TIME	66. 3.92	64. 3.92	60. 3.92	56. 3.92	54. 3.92	53. 3.92	52. 3.92	51. 3.92	48. 3.92	
2 COMBINED AT														
+	CLM01-C	.64	1	FLOW TIME	209. 3.92	203. 3.92	194. 3.92	183. 3.92	180. 3.92	177. 3.92	175. 3.92	171. 3.92	165. 3.92	
DIVERSION TO														
+	DSR01F	.64	1	FLOW TIME	154. 3.92	151. 3.92	145. 3.92	139. 3.92	137. 3.92	135. 3.92	134. 3.92	132. 3.92	128. 3.92	
HYDROGRAPH AT														
+	SR01E	.64	1	FLOW TIME	55. 3.92	53. 3.92	49. 3.92	44. 3.92	43. 3.92	42. 3.92	41. 3.92	40. 3.92	37. 3.92	
ROUTED TO														
+	RCLM01-C	.64	1	FLOW TIME	54. 4.00	53. 4.00	48. 4.00	44. 4.00	42. 4.00	41. 4.00	40. 4.00	39. 4.00	36. 3.92	
HYDROGRAPH AT														
+	SR00A-C	.37	1	FLOW TIME	88. 3.92	85. 3.92	80. 3.92	75. 3.92	73. 3.92	72. 3.92	71. 3.92	69. 3.92	66. 3.92	
2 COMBINED AT														
+	CSR00A	1.01	1	FLOW TIME	140. 4.00	136. 4.00	127. 4.00	118. 4.00	115. 3.92	113. 3.92	111. 3.92	108. 3.92	102. 3.92	
2 COMBINED AT														
+	CCSR00A	1.34	1	FLOW TIME	248. 4.00	241. 4.00	227. 4.00	212. 4.00	207. 4.00	204. 4.00	201. 4.00	196. 4.00	187. 4.00	
ROUTED TO														
+	RCSR00A	1.34	1	FLOW TIME	246. 4.00	239. 4.00	226. 4.00	212. 4.00	207. 4.00	202. 4.00	200. 4.00	196. 4.00	187. 4.00	
HYDROGRAPH AT														

+	DLVSR1	.00	1	FLOW TIME	231. 3.75	231. 3.75	231. 3.83	231. 3.83	231. 3.83	231. 3.83	231. 3.83	231. 3.83	231. 3.83	231. 3.83
ROUTED TO														
+	RDLVSR1	.00	1	FLOW TIME	231. 3.92	231. 3.92	231. 3.92	231. 3.92	231. 3.92	231. 3.92	231. 3.92	231. 3.92	231. 3.92	231. 4.08
HYDROGRAPH AT														
+	SR02E-C	.30	1	FLOW TIME	95. 3.83	92. 3.83	87. 3.83	82. 3.83	81. 3.83	80. 3.83	79. 3.83	77. 3.83	74. 3.83	74. 3.83
3 COMBINED AT														
+	CSR02E	1.64	1	FLOW TIME	560. 4.00	551. 4.00	534. 4.00	515. 4.00	509. 4.00	503. 4.00	500. 4.00	494. 4.00	482. 4.00	482. 4.00
ROUTED TO														
+	RCSR02E	1.64	1	FLOW TIME	556. 4.00	548. 4.00	530. 4.00	511. 4.00	503. 4.08	498. 4.08	494. 4.00	489. 4.00	476. 4.08	476. 4.08
HYDROGRAPH AT														
+	SR05D-C	.30	1	FLOW TIME	104. 4.00	101. 4.00	97. 4.00	92. 4.00	91. 4.00	89. 4.00	89. 4.00	87. 4.00	84. 4.00	84. 4.00
2 COMBINED AT														
+	CSR05D	1.94	1	FLOW TIME	660. 4.00	649. 4.00	627. 4.00	604. 4.00	593. 4.00	585. 4.00	583. 4.00	576. 4.00	558. 4.08	558. 4.08
ROUTED TO														
+	RCSR05D	1.94	1	FLOW TIME	654. 4.00	642. 4.08	621. 4.08	598. 4.08	592. 4.08	585. 4.08	580. 4.08	574. 4.08	558. 4.08	558. 4.08
HYDROGRAPH AT														
+	SR05B-C	.36	1	FLOW TIME	102. 4.17	100. 4.17	95. 4.17	91. 4.17	89. 4.17	88. 4.17	87. 4.17	85. 4.17	82. 4.17	82. 4.17
2 COMBINED AT														
+	CSR05B	2.30	1	FLOW TIME	755. 4.08	741. 4.08	716. 4.08	688. 4.08	680. 4.08	672. 4.08	666. 4.08	658. 4.08	639. 4.08	639. 4.08
DIVERSION TO														
+	DLVSR2	2.30	1	FLOW TIME	231. 3.67	231. 3.67	231. 3.75	231. 3.75	231. 3.75	231. 3.75	231. 3.75	231. 3.75	231. 3.75	231. 3.75
HYDROGRAPH AT														
+	DCSR05B	2.30	1	FLOW TIME	524. 4.08	510. 4.08	485. 4.08	457. 4.08	449. 4.08	441. 4.08	435. 4.08	427. 4.08	408. 4.08	408. 4.08
DIVERSION TO														
+	DLVSR3	2.30	1	FLOW TIME	182. 3.75	182. 3.83	182. 3.83	182. 3.83	182. 3.83	182. 3.83	182. 3.83	182. 3.83	182. 3.83	182. 3.83
HYDROGRAPH AT														
+	DDCSR05B	2.30	1	FLOW TIME	342. 4.08	328. 4.08	303. 4.08	275. 4.08	267. 4.08	259. 4.08	253. 4.08	245. 4.08	226. 4.08	226. 4.08
DIVERSION TO														
+	DLVRA	2.30	1	FLOW TIME	342. 4.08	328. 4.08	303. 4.08	275. 4.08	267. 4.08	259. 4.08	253. 4.08	245. 4.08	226. 4.08	226. 4.08
HYDROGRAPH AT														
+	D3CSR05B	2.30	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
DIVERSION TO														
+	DRAN	2.30	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT														
+	D4CSR05B	2.30	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
DIVERSION TO														
+	DSMOKE	2.30	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT														
+	DSR05B	2.30	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT														
+	DLVSR3	.00	1	FLOW	182.	182.	182.	182.	182.	182.	182.	182.	182.	182.

				TIME	3.75	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
3 COMBINED AT													
+	CCSR05B	9.43	1	FLOW TIME	791. 4.25	766. 4.25	712. 4.33	666. 4.33	645. 4.33	633. 4.33	625. 4.33	603. 4.33	568. 4.33
DIVERSION TO													
+	DLVSR4	9.43	1	FLOW TIME	791. 4.25	766. 4.25	712. 4.33	666. 4.33	645. 4.33	633. 4.33	625. 4.33	603. 4.33	568. 4.33
HYDROGRAPH AT													
+	DCCSR05B	9.43	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT													
+	DSR01F	.00	1	FLOW TIME	154. 3.92	151. 3.92	145. 3.92	139. 3.92	137. 3.92	135. 3.92	134. 3.92	132. 3.92	128. 3.92
ROUTED TO													
+	RDSR01F	.00	1	FLOW TIME	152. 4.00	148. 4.00	143. 4.00	138. 4.00	135. 4.00	133. 4.00	132. 4.00	131. 4.00	126. 4.00
HYDROGRAPH AT													
+	LM02-C	.29	1	FLOW TIME	84. 3.83	82. 3.83	77. 3.83	73. 3.83	71. 3.83	70. 3.83	69. 3.83	68. 3.83	65. 3.83
2 COMBINED AT													
+	CLM02-C	.29	1	FLOW TIME	233. 3.92	227. 3.92	217. 3.92	207. 3.92	203. 3.92	200. 3.92	197. 3.92	194. 3.92	187. 3.92
ROUTED TO													
+	RCLM02-C	.29	1	FLOW TIME	230. 3.92	223. 4.00	214. 4.00	204. 4.00	200. 4.00	198. 4.00	195. 4.00	192. 4.00	185. 4.00
HYDROGRAPH AT													
+	LM03-C	.34	1	FLOW TIME	148. 3.83	144. 3.83	139. 3.83	132. 3.83	130. 3.83	128. 3.83	127. 3.83	125. 3.83	121. 3.83
2 COMBINED AT													
+	CLM03-C	.63	1	FLOW TIME	371. 3.92	360. 3.92	345. 3.92	328. 3.92	323. 3.92	319. 3.92	315. 3.92	309. 3.92	298. 3.92
ROUTED TO													
+	RCLM03-C	.63	1	FLOW TIME	367. 3.92	356. 3.92	340. 3.92	324. 3.92	319. 3.92	315. 3.92	310. 3.92	305. 3.92	294. 3.92
HYDROGRAPH AT													
+	LM05-C	.37	1	FLOW TIME	132. 3.83	129. 3.83	123. 3.83	116. 3.83	114. 3.83	113. 3.83	111. 3.83	109. 3.83	105. 3.83
2 COMBINED AT													
+	CLM05-C	.99	1	FLOW TIME	496. 3.92	481. 3.92	460. 3.92	437. 3.92	431. 3.92	425. 3.92	419. 3.92	412. 3.92	397. 3.92
ROUTED TO													
+	RCLM05-C	.99	1	FLOW TIME	488. 4.00	473. 4.00	454. 4.00	432. 4.00	426. 4.00	419. 4.00	412. 4.00	406. 4.00	393. 4.00
HYDROGRAPH AT													
+	LM06B-C	.35	1	FLOW TIME	129. 3.92	126. 3.92	120. 3.92	114. 3.92	112. 3.92	111. 3.92	110. 3.92	108. 3.92	104. 3.92
2 COMBINED AT													
+	CLM06-C	1.35	1	FLOW TIME	614. 4.00	596. 4.00	571. 4.00	544. 4.00	536. 4.00	528. 4.00	520. 4.00	512. 4.00	496. 4.00
DIVERSION TO													
+	DLVLM4	1.35	1	FLOW TIME	614. 4.00	596. 4.00	571. 4.00	544. 4.00	536. 4.00	528. 4.00	520. 4.00	512. 4.00	496. 4.00
HYDROGRAPH AT													
+	DLVLMRA	1.35	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
DIVERSION TO													
+	DVALDR	1.35	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT													
+	DSURF1	1.35	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00

HYDROGRAPH AT +	DLVRA	.00	1	FLOW TIME	342. 4.08	328. 4.08	303. 4.08	275. 4.08	267. 4.08	259. 4.08	253. 4.08	245. 4.08	240. 4.08
ROUTED TO +	RDLVRA	.00	1	FLOW TIME	341. 4.08	327. 4.08	301. 4.08	273. 4.08	263. 4.08	255. 4.08	250. 4.08	241. 4.08	222. 4.08
HYDROGRAPH AT +	DRAN	.00	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
ROUTED TO +	RDRAN	.00	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT +	DLVLM4	.00	1	FLOW TIME	614. 4.00	596. 4.00	571. 4.00	544. 4.00	536. 4.00	528. 4.00	520. 4.00	512. 4.00	496. 4.00
4 COMBINED AT +	CCLM06-C	1.35	1	FLOW TIME	938. 4.00	905. 4.00	852. 4.00	793. 4.00	772. 4.00	757. 4.08	746. 4.08	728. 4.08	692. 4.08
DIVERSION TO +	DLVLM5	1.35	1	FLOW TIME	938. 4.00	905. 4.00	852. 4.00	793. 4.00	772. 4.00	757. 4.08	746. 4.08	728. 4.08	692. 4.08
HYDROGRAPH AT +	DLVLMRA	1.35	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
DIVERSION TO +	DLAKEM	1.35	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT +	DSURF2	1.35	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
DIVERSION TO +	DRAN119	1.35	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT +	D1LM09	1.35	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
DIVERSION TO +	DRAN118	1.35	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT +	D2LM09	1.35	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
ROUTED TO +	RD2LM09	1.35	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT +	DVALDR	.00	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT +	LM09	.12	1	FLOW TIME	80. 3.67	79. 3.67	76. 3.67	73. 3.67	72. 3.67	71. 3.67	70. 3.67	69. 3.67	67. 3.67
3 COMBINED AT +	CLM09	1.47	1	FLOW TIME	80. 3.67	79. 3.67	76. 3.67	73. 3.67	72. 3.67	71. 3.67	70. 3.67	69. 3.67	67. 3.67
DIVERSION TO +	DCORAN	1.47	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT +	D3LM09	1.47	1	FLOW TIME	80. 3.67	79. 3.67	76. 3.67	73. 3.67	72. 3.67	71. 3.67	70. 3.67	69. 3.67	67. 3.67

ROUTED TO													
+	RD3LM09	1.47	1	FLOW TIME	80. 3.67	78. 3.67	75. 3.67	72. 3.67	71. 3.67	70. 3.67	70. 3.67	68. 3.67	66. 3.67
HYDROGRAPH AT													
+	VG21	.10	1	FLOW TIME	47. 3.67	46. 3.67	44. 3.67	42. 3.67	41. 3.67	40. 3.67	40. 3.67	39. 3.67	38. 3.67
2 COMBINED AT													
+	CVG21	1.57	1	FLOW TIME	127. 3.67	124. 3.67	119. 3.67	113. 3.67	112. 3.67	110. 3.67	109. 3.67	107. 3.67	104. 3.67
DIVERSION TO													
+	DHOLLY	1.57	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT													
+	DVG21	1.57	1	FLOW TIME	127. 3.67	124. 3.67	119. 3.67	113. 3.67	112. 3.67	110. 3.67	109. 3.67	107. 3.67	104. 3.67
HYDROGRAPH AT													
+	LM08	.06	1	FLOW TIME	38. 3.58	37. 3.58	36. 3.58	34. 3.58	34. 3.58	33. 3.58	33. 3.58	32. 3.58	31. 3.58
ROUTED TO													
+	RLM08	.06	1	FLOW TIME	38. 3.83	37. 3.83	36. 3.83	34. 3.83	34. 3.83	33. 3.83	31. 3.83	31. 3.83	31. 3.83
HYDROGRAPH AT													
+	VG20	.13	1	FLOW TIME	59. 3.83	58. 3.83	55. 3.83	53. 3.83	52. 3.83	51. 3.83	51. 3.83	50. 3.83	48. 3.83
3 COMBINED AT													
+	CVG20	1.76	1	FLOW TIME	208. 3.75	203. 3.75	195. 3.75	186. 3.75	183. 3.75	180. 3.75	177. 3.75	175. 3.75	169. 3.75
ROUTED TO													
+	RCVG20	1.76	1	FLOW TIME	205. 3.75	200. 3.75	192. 3.75	183. 3.75	180. 3.75	177. 3.75	175. 3.75	172. 3.75	166. 3.75
HYDROGRAPH AT													
+	VG22	.18	1	FLOW TIME	76. 3.83	74. 3.83	71. 3.83	68. 3.83	67. 3.83	66. 3.83	66. 3.83	64. 3.83	62. 3.83
2 COMBINED AT													
+	CVG22	1.94	1	FLOW TIME	277. 3.75	270. 3.75	259. 3.75	246. 3.75	243. 3.75	239. 3.83	236. 3.75	232. 3.75	225. 3.83
HYDROGRAPH AT													
+	OG011A-C	.44	1	FLOW TIME	122. 3.92	119. 3.92	112. 3.92	106. 3.92	104. 3.92	102. 3.92	101. 3.92	99. 3.92	94. 3.92
ROUTED TO													
+	ROG011A	.44	1	FLOW TIME	122. 4.00	119. 4.00	112. 4.00	106. 4.00	104. 4.00	102. 4.00	101. 4.00	98. 4.00	92. 4.00
HYDROGRAPH AT													
+	VG02-C	.22	1	FLOW TIME	46. 3.92	44. 3.92	41. 3.92	39. 3.92	38. 3.92	37. 3.92	36. 3.92	35. 3.92	33. 3.92
2 COMBINED AT													
+	CVG02-C	.67	1	FLOW TIME	165. 4.00	160. 4.00	151. 4.00	142. 4.00	139. 4.00	137. 4.00	135. 4.00	132. 4.00	124. 4.00
ROUTED TO													
+	RCVG02	.67	1	FLOW TIME	166. 4.08	161. 4.08	152. 4.08	143. 4.08	140. 4.08	137. 4.08	135. 4.08	132. 4.08	124. 4.08
HYDROGRAPH AT													
+	VG03-C	.28	1	FLOW TIME	46. 3.92	44. 3.92	41. 3.92	37. 3.92	36. 3.92	36. 3.92	35. 3.92	34. 3.92	32. 3.92
2 COMBINED AT													
+	CVG03-C	.94	1	FLOW TIME	206. 4.08	199. 4.08	188. 4.08	176. 4.08	172. 4.08	169. 4.08	167. 4.08	163. 4.08	153. 4.08
ROUTED TO													
+	RCVG03	.94	1	FLOW TIME	207. 4.17	200. 4.17	189. 4.17	176. 4.17	172. 4.17	169. 4.17	167. 4.17	163. 4.17	153. 4.17
HYDROGRAPH AT													

+	VG04-C	.24	1	FLOW TIME	109. 3.83	107. 3.83	103. 3.83	98. 3.83	97. 3.83	95. 3.83	94. 3.83	93. 3.83	90. 3.83
+	2 COMBINED AT CVG04-C	1.18	1	FLOW TIME	282. 4.08	273. 4.08	258. 4.08	242. 4.08	236. 4.08	232. 4.08	229. 4.08	224. 4.08	211. 4.08
+	ROUTED TO RCVG04	1.18	1	FLOW TIME	283. 4.17	274. 4.17	259. 4.17	243. 4.17	237. 4.17	233. 4.17	230. 4.17	225. 4.17	214. 4.17
+	HYDROGRAPH AT WA08A	.03	1	FLOW TIME	18. 3.58	18. 3.58	17. 3.58	16. 3.58	16. 3.58	16. 3.58	16. 3.58	16. 3.58	15. 3.58
+	2 COMBINED AT CWA08A	1.21	1	FLOW TIME	286. 4.17	278. 4.17	262. 4.17	246. 4.17	241. 4.17	237. 4.17	233. 4.17	228. 4.17	217. 4.17
+	ROUTED TO RCWA08A	1.21	1	FLOW TIME	289. 4.25	279. 4.25	262. 4.33	248. 4.33	243. 4.33	239. 4.33	236. 4.33	231. 4.33	219. 4.33
+	HYDROGRAPH AT VG06	.19	1	FLOW TIME	75. 3.75	73. 3.75	70. 3.75	66. 3.75	65. 3.75	64. 3.75	63. 3.75	62. 3.75	59. 3.75
+	2 COMBINED AT CVG06	1.40	1	FLOW TIME	314. 4.25	304. 4.25	286. 4.25	266. 4.25	261. 4.33	256. 4.33	253. 4.33	248. 4.33	236. 4.33
+	ROUTED TO RCVG06	1.40	1	FLOW TIME	309. 4.33	302. 4.33	285. 4.33	266. 4.33	258. 4.33	254. 4.33	252. 4.33	244. 4.42	233. 4.42
+	2 COMBINED AT CCVG22	3.33	1	FLOW TIME	417. 4.25	402. 4.25	378. 4.25	354. 3.92	347. 3.92	342. 3.92	338. 3.92	331. 3.92	320. 3.92
+	DIVERSION TO LV15	3.33	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	
+	HYDROGRAPH AT DCVG20-C	3.33	1	FLOW TIME	417. 4.25	402. 4.25	378. 4.25	354. 3.92	347. 3.92	342. 3.92	338. 3.92	331. 3.92	320. 3.92
+	ROUTED TO RDCVG20-	3.33	1	FLOW TIME	416. 4.25	401. 4.25	377. 4.25	353. 3.92	347. 3.92	342. 3.92	337. 3.92	331. 3.92	320. 3.92
+	HYDROGRAPH AT LV15	.00	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
+	ROUTED TO RLV15	.00	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
+	HYDROGRAPH AT DUMMY	.00	1	FLOW TIME	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50
+	2 COMBINED AT CRLV15	.00	1	FLOW TIME	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50
+	HYDROGRAPH AT WA12	.07	1	FLOW TIME	47. 3.58	46. 3.58	44. 3.58	42. 3.58	41. 3.58	41. 3.58	40. 3.58	40. 3.58	38. 3.58
+	HYDROGRAPH AT WA13	.16	1	FLOW TIME	80. 3.75	78. 3.75	75. 3.75	72. 3.75	71. 3.75	70. 3.75	69. 3.75	68. 3.75	66. 3.75
+	2 COMBINED AT CWA13	.23	1	FLOW TIME	114. 3.67	111. 3.67	107. 3.67	102. 3.67	100. 3.67	99. 3.67	98. 3.67	96. 3.67	93. 3.67
+	2 COMBINED AT CWA13	.23	1	FLOW	114.	111.	107.	102.	100.	99.	98.	97.	93.

				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	WA14	.04	1	FLOW	25.	24.	23.	22.	22.	22.	22.	21.	20.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
2 COMBINED AT														
+	CWA14	.27	1	FLOW	139.	136.	130.	124.	122.	121.	120.	118.	114.	
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
HYDROGRAPH AT	WA01-C	.22	1	FLOW	93.	91.	86.	82.	80.	79.	78.	77.	74.	
+				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	
ROUTED TO														
+	RWA01	.22	1	FLOW	96.	93.	89.	84.	82.	81.	80.	76.	74.	
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	
HYDROGRAPH AT	WA04-C	.22	1	FLOW	71.	69.	66.	62.	61.	60.	60.	59.	56.	
+				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	
2 COMBINED AT														
+	CWA04-C	.44	1	FLOW	166.	162.	154.	146.	144.	142.	140.	134.	130.	
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	
ROUTED TO														
+	RCWA04	.44	1	FLOW	168.	164.	157.	150.	148.	146.	145.	139.	135.	
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	
HYDROGRAPH AT	WA09-C	.09	1	FLOW	44.	43.	41.	40.	39.	38.	38.	38.	36.	
+				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
2 COMBINED AT														
+	CWA09-C	.53	1	FLOW	197.	191.	181.	173.	171.	168.	167.	160.	156.	
				TIME	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.17	4.17	
ROUTED TO														
+	RCWA09	.53	1	FLOW	195.	190.	181.	172.	169.	166.	165.	159.	153.	
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	
HYDROGRAPH AT	WA10-C	.45	1	FLOW	213.	209.	201.	192.	189.	187.	185.	182.	176.	
+				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
DIVERSION TO														
+	WA10SE	.45	1	FLOW	213.	209.	201.	192.	189.	187.	185.	182.	176.	
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	
HYDROGRAPH AT	WA10D	.45	1	FLOW	0.	0.	0.	0.	0.	0.	0.	0.	0.	
+				TIME	.00	.00	.00	.00	.00	.00	.00	.00	.00	
2 COMBINED AT														
+	CWA10NW	.98	1	FLOW	195.	190.	181.	172.	169.	166.	165.	159.	153.	
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	
ROUTED TO														
+	RCWA10NW	.98	1	FLOW	198.	194.	185.	176.	173.	170.	169.	162.	156.	
				TIME	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	
HYDROGRAPH AT	WA11-C	.09	1	FLOW	32.	31.	30.	28.	28.	27.	27.	26.	25.	
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
DIVERSION TO														
+	WA13SE	.09	1	FLOW	19.	19.	18.	17.	17.	16.	16.	16.	15.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
HYDROGRAPH AT	CWA13	.09	1	FLOW	13.	12.	12.	11.	11.	11.	11.	10.	10.	
+				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
ROUTED TO														
+	RCRLV15	.09	1	FLOW	13.	12.	12.	11.	11.	11.	11.	10.	10.	
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92	3.92	
HYDROGRAPH AT	LC16-C	.26	1	FLOW	94.	91.	87.	82.	81.	80.	79.	77.	74.	
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	

4 COMBINED AT
+ END 1.60 1 FLOW 275. 266. 253. 241. 237. 233. 231. 224. 220
TIME 4.25 4.25 4.33 4.33 4.33 4.33 4.33 4.33 4.33

1

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

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	INTERPOLATED TO COMPUTATION INTERVAL			
						DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)
FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	2.90	305.00	.02	5.00	2.90	305.00	.02
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2877E+00 EXCESS= .0000E+00 OUTFLOW= .2776E+00 BASIN STORAGE= .6606E-02 PERCENT ERROR= 1.2									
FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	2.00	310.00	.01	5.00	2.00	310.00	.01
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2316E+00 EXCESS= .0000E+00 OUTFLOW= .2255E+00 BASIN STORAGE= .8010E-02 PERCENT ERROR= -.8									
FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	1.12	330.00	.01	5.00	1.12	330.00	.01
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1708E+00 EXCESS= .0000E+00 OUTFLOW= .1693E+00 BASIN STORAGE= .6798E-02 PERCENT ERROR= -3.2									
FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	.94	340.00	.01	5.00	.94	340.00	.01
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1519E+00 EXCESS= .0000E+00 OUTFLOW= .1504E+00 BASIN STORAGE= .7193E-02 PERCENT ERROR= -3.8									
FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	.93	340.00	.01	5.00	.93	340.00	.01
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1504E+00 EXCESS= .0000E+00 OUTFLOW= .1489E+00 BASIN STORAGE= .7053E-02 PERCENT ERROR= -3.7									
FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	.93	340.00	.01	5.00	.93	340.00	.01
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1492E+00 EXCESS= .0000E+00 OUTFLOW= .1477E+00 BASIN STORAGE= .6970E-02 PERCENT ERROR= -3.7									
FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	.93	340.00	.01	5.00	.93	340.00	.01
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1483E+00 EXCESS= .0000E+00 OUTFLOW= .1468E+00 BASIN STORAGE= .6945E-02 PERCENT ERROR= -3.7									
FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	.93	340.00	.01	5.00	.93	340.00	.01
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1468E+00 EXCESS= .0000E+00 OUTFLOW= .1453E+00 BASIN STORAGE= .6905E-02 PERCENT ERROR= -3.7									
FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	.92	340.00	.01	5.00	.92	340.00	.01
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1439E+00 EXCESS= .0000E+00 OUTFLOW= .1424E+00 BASIN STORAGE= .6679E-02 PERCENT ERROR= -3.6									
FOR PLAN = 1	RATIO=	.00							
RCOG05-C	MANE	5.00	115.37	250.00	.38	5.00	115.37	250.00	.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1110E+02 EXCESS= .0000E+00 OUTFLOW= .1111E+02 BASIN STORAGE= .4937E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
RCOG05-C MANE 5.00 112.63 250.00 .37 5.00 112.63 250.00 .37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1079E+02 EXCESS= .0000E+00 OUTFLOW= .1081E+02 BASIN STORAGE= .4110E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
RCOG05-C MANE 5.00 107.86 250.00 .35 5.00 107.86 250.00 .35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1029E+02 EXCESS= .0000E+00 OUTFLOW= .1031E+02 BASIN STORAGE= .4721E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
RCOG05-C MANE 5.00 102.76 250.00 .33 5.00 102.76 250.00 .33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9804E+01 EXCESS= .0000E+00 OUTFLOW= .9820E+01 BASIN STORAGE= .4704E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
RCOG05-C MANE 5.00 101.06 250.00 .33 5.00 101.06 250.00 .33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9647E+01 EXCESS= .0000E+00 OUTFLOW= .9663E+01 BASIN STORAGE= .4664E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
RCOG05-C MANE 5.00 99.71 250.00 .32 5.00 99.71 250.00 .32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9522E+01 EXCESS= .0000E+00 OUTFLOW= .9537E+01 BASIN STORAGE= .4562E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
RCOG05-C MANE 5.00 98.70 250.00 .32 5.00 98.70 250.00 .32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9428E+01 EXCESS= .0000E+00 OUTFLOW= .9444E+01 BASIN STORAGE= .4550E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
RCOG05-C MANE 5.00 97.01 250.00 .31 5.00 97.01 250.00 .31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9272E+01 EXCESS= .0000E+00 OUTFLOW= .9288E+01 BASIN STORAGE= .4496E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
RCOG05-C MANE 5.00 93.64 250.00 .30 5.00 93.64 250.00 .30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8962E+01 EXCESS= .0000E+00 OUTFLOW= .8978E+01 BASIN STORAGE= .4290E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00
RCCY06B MANE 3.78 226.55 253.31 .46 5.00 225.09 255.00 .46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2591E+02 EXCESS= .0000E+00 OUTFLOW= .2591E+02 BASIN STORAGE= .8416E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCCY06B MANE 3.81 220.66 254.98 .45 5.00 220.63 255.00 .45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2520E+02 EXCESS= .0000E+00 OUTFLOW= .2520E+02 BASIN STORAGE= .8947E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RCCY06B MANE 3.85 211.17 254.17 .43 5.00 210.37 255.00 .43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2399E+02 EXCESS= .0000E+00 OUTFLOW= .2399E+02 BASIN STORAGE= .8357E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCCY06B	MANE	3.90	200.13	253.66	.41	5.00	199.23	255.00	.41
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2276E+02 EXCESS= .0000E+00 OUTFLOW= .2276E+02 BASIN STORAGE= .7384E-03 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
RCCY06B	MANE	3.92	196.69	254.81	.40	5.00	196.53	255.00	.40
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2235E+02 EXCESS= .0000E+00 OUTFLOW= .2236E+02 BASIN STORAGE= .7670E-03 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
RCCY06B	MANE	3.93	193.03	255.76	.39	5.00	192.33	255.00	.39
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2204E+02 EXCESS= .0000E+00 OUTFLOW= .2205E+02 BASIN STORAGE= .8412E-03 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
RCCY06B	MANE	3.95	189.71	256.47	.39	5.00	189.62	255.00	.39
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2181E+02 EXCESS= .0000E+00 OUTFLOW= .2181E+02 BASIN STORAGE= .7265E-03 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
RCCY06B	MANE	3.96	188.09	253.72	.38	5.00	187.37	255.00	.38
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2140E+02 EXCESS= .0000E+00 OUTFLOW= .2140E+02 BASIN STORAGE= .7496E-03 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
RCCY06B	MANE	4.00	180.03	256.19	.37	5.00	179.30	255.00	.37
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2062E+02 EXCESS= .0000E+00 OUTFLOW= .2062E+02 BASIN STORAGE= .7794E-03 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
RPDGCD-C	MANE	3.25	63.87	256.75	.33	5.00	63.62	255.00	.33
CONTINUITY SUMMARY (AC-FT) - INFLOW= .7681E+01 EXCESS= .0000E+00 OUTFLOW= .7692E+01 BASIN STORAGE= .6061E-02 PERCENT ERROR= -.2									
FOR PLAN = 1 RATIO= .00									
RPDGCD-C	MANE	3.25	61.46	256.75	.32	5.00	61.15	255.00	.32
CONTINUITY SUMMARY (AC-FT) - INFLOW= .7414E+01 EXCESS= .0000E+00 OUTFLOW= .7425E+01 BASIN STORAGE= .5972E-02 PERCENT ERROR= -.2									
FOR PLAN = 1 RATIO= .00									
RPDGCD-C	MANE	3.00	57.20	258.00	.30	5.00	57.05	255.00	.30
CONTINUITY SUMMARY (AC-FT) - INFLOW= .6954E+01 EXCESS= .0000E+00 OUTFLOW= .6962E+01 BASIN STORAGE= .5913E-02 PERCENT ERROR= -.2									
FOR PLAN = 1 RATIO= .00									
RPDGCD-C	MANE	3.00	52.88	258.00	.28	5.00	52.56	255.00	.28
CONTINUITY SUMMARY (AC-FT) - INFLOW= .6471E+01 EXCESS= .0000E+00 OUTFLOW= .6481E+01 BASIN STORAGE= .5893E-02 PERCENT ERROR= -.2									
FOR PLAN = 1 RATIO= .00									
RPDGCD-C	MANE	3.00	51.45	258.00	.27	5.00	51.09	260.00	.27
CONTINUITY SUMMARY (AC-FT) - INFLOW= .6313E+01 EXCESS= .0000E+00 OUTFLOW= .6323E+01 BASIN STORAGE= .5626E-02 PERCENT ERROR= -.2									
FOR PLAN = 1 RATIO= .00									
RPDGCD-C	MANE	3.00	50.32	258.00	.26	5.00	50.00	260.00	.26
CONTINUITY SUMMARY (AC-FT) - INFLOW= .6188E+01 EXCESS= .0000E+00 OUTFLOW= .6198E+01 BASIN STORAGE= .5478E-02 PERCENT ERROR= -.2									

C. Off-site HEC-1 -25 Year Storm Event

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1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JAN 1997
* VERSION 4.1
*
* RUN DATE 05MAR12 TIME 14:27:52
*
*****

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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 X X X
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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 -AMSK- 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 ***

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1 ID CLV CENTRAL NEIGHBORHOOD FLOOD CONTROL MASTER PLAN 2003
2 ID CENTRAL BASIN (NORTHWEST AREA)
3 ID DESIGN STORM = 25-YEAR 6-HR STORM
4 ID STORM DISTRIBUTION = SDN #3
5 ID MODELED BY PBS&J (STEPHEN C. ALTMAN P.E.)
6 ID ORIGINL INPUT FILE = ENW310.DAT
7 ID INPUT FILE DATE = OCTOBER, 2003/ MODEL REVISED BY PB ON APRIL 1, 2012
8 ID REFERENCED HYDROLOGIC MODELS:
9 ID CITY OF LAS VEGAS CITY WIDE HYDROLOGY ANALYSIS (PBS&J 1997)
10 ID RANCHO DRIVE DRAINAGE IMPROVEMENTS PEAK DRIVE TO LAKE MEAD BOULEVARD
11 ID (MONTGOMERY WATSON 2000)
12 ID CCRPCD 2002 LAS VEGAS VALLEY MASTER PLAN UPDATE (PBS&J, GCW, LBG)
13 ID
14 ID EXISTING CONDITION = FUTURE LAND USE + EXISTING FACILITIES
15 ID NO STORM CENTERING
16 ID COMPOSITE CURVE NUMBERS
17 ID 2002 MPU SUBBASINS USED FOR OFFSITE AREAS EXCEPT WHERE SPECIFIED
18 ID
19 ID NOTE: LOCATIONS AND DESCRIPTIONS OF PROPOSED MPU FACILITIES ARE STATED IN
20 ID THE MODEL. HOWEVER, ROUTINGS IN THESE LOCATIONS REFLECT THE EXISTING
21 ID CONDITION.
22 ID
23 ID JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
24 ID
25 ID CONCENTRATION AREA DARF
26 ID POINT SQ. MI.
27 ID 0-0.5 0.990
28 ID 0.5-1 0.975
29 ID 1-2 0.950
30 ID 2-3 0.925
31 ID 3-4 0.915
32 ID 4-5 0.908
33 ID 5-6 0.903
34 ID 6-7 0.895
35 ID 7-8 0.885
36 ID
37 ID
38 ID
39 ID JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
40 ID
41 ID 100-YEAR, 6-HOUR STORM, SDN3

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42	ID												
43	IT	5	0	0	300								
44	IO	5	0	0									
45	IN	5	0	0									
46	JR	PREC	0.732	0.721	0.703	0.684	0.677	0.671	0.668	0.662	0.654		
	*												

HEC-1 INPUT

PAGE 2

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
47	KK OG04-C
48	BA 0.288
49	PB 2.77
50	PC 0.000 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
51	PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
52	PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
53	PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
54	PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
55	PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
56	PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
57	PC 0.997 0.999 1.000
58	LS 0 90.3
59	UD 0.320
	*

60	KK DOG04-C
61	KM FLOW SPLIT TO PD01-C
62	KM OKG289, 270, 264, AND 262
63	KM COMBINED CAPACITY = 124 CFS
64	DT DPD01
65	DI 0 51 125 500 1000
66	DQ 0 50 124 124 124
	*

67	KKRDOG04-C
68	KM ROUTE DOG04-C TO COG05-C
69	KM US95 TO RANCHO
70	RD 4100 0.0007 0.016 0 TRAP 0 50
	*

71	KK OG05-C
72	BA 0.266
73	PB 2.77
74	LS 0 90.5
75	UD 0.392
	*

76	KK COG05-C
77	KM COMBINE RDOG04-C AND OG05-C
78	KM RAINBOW AND CHEYENNE
79	HC 2
	*

80	KKRCOG05-C
81	KM ROUTE RCOG05-C TO CCY06B-C
82	KM CHEYENNE
83	RD 7500 0.0097 0.016 0 TRAP 0 50
	*

HEC-1 INPUT

PAGE 3

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
84	KK CY06B-C
85	BA 0.498
86	PB 2.77
87	LS 0 86.5
88	UD 0.697
	*
89	KKCCY06B-C
90	KM COMBINE RCOG05-C AND CY06B-C
91	KM MICHAEL AND CHEYENNE
92	HC 2
	*
93	KK RCCY06B
94	KM ROUTE CCY06B TO CRGOWAN
95	KM CHEYENNE
96	RD 1400 0.01 0.016 0 TRAP 0 50

* *****
 * FLOW SPLIT FROM GOWAN WATERSHED
 * *****
 *
 *

97 KK PDGCD-C
 98 BA 0.441
 99 PB 2.77
 100 LS 0 80.3
 101 UD 0.544
 *

102 KKRPDGCDC
 103 KM ROUTE PDGCD-C TO RRDPDGCDC
 104 KM FROM CWH
 105 RD 3080 0.0065 0.03 0 TRAP 30 2
 *

106 KK RRPDGCDC
 107 KM ROUTE RPDGCDC-C TO CPDGCBC10
 108 KM LINING = CONCRETE
 109 KM FROM CWH
 110 RD 1610 0.0062 0.015 0 TRAP 8 2
 *

111 KK NW29B-C
 112 BA 0.286
 113 PB 2.80
 114 LS 0 80.5
 115 UD 0.405
 *

HEC-1 INPUT

PAGE 4

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

116 KKRNW29B-C
 117 KM ROUTE NW29B-C TO CNW1C2
 118 KM ANN ROAD
 119 RD 4500 0.0122 0.016 0 TRAP 0 50
 *

120 KK NW1C2-C
 121 BA 0.207
 122 PB 2.77
 123 LS 0 88.7
 124 UD 0.411
 *

125 KK CNW1C2
 126 KM COMBINE RNW29B-C AND NW1C2-C
 127 KM ANN ROAD AND RANCHO
 128 HC 2
 *
 *

129 KK RCNW1C2
 130 KM ROUTE CNW1C2 TO CPDGCBC10
 131 KM RANCHO
 132 RD 2300 0.0087 0.016 0 TRAP 0 50
 *

133 KKPDGCBC10-C
 134 BA 0.308
 135 PB 2.77
 136 LS 0 83.8
 137 UD 0.416
 *

138 KKCPDGCBC10
 139 KM COMBINE PDGCBC10-C AND RCNW1C2
 140 KM NEAR US95 AND RANCHO INTERSECTION
 141 HC 2
 *

142 KKDPDGCBC10
 143 KM FLOW SPLIT ACROSS RANCHO TO PT3AA1
 144 KM 10'X 3' RCB (139 CFS) CULVERT 3
 145 KM FROM U.S. 95 / RANCHO FIS
 146 KM D95A

147 DTDPT3AA11
 148 DI 0 51 101 118 140 318 10000
 149 DQ 0 50 100 117 139 139 139
 *

HEC-1 INPUT

PAGE 5

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

150 KKCPDGC10
 151 KM COMBINE RRPDGC10 AND DPDGC10
 152 KM NEAR US95 AND RANCHO INTERSECTION
 153 HC 2
 *

154 KK RCPDGC10
 155 KM ROUTE DCPDGC10 TO CGD20BEC
 156 KM LOCAL FACILITY ALONG U.S. 95
 157 RD 1750 0.0029 0.025 0 TRAP 20 2
 *

158 KKGD20BE-C
 159 BA 0.427
 160 PB 2.77
 161 LS 0 83.4
 162 UD 0.467
 *

163 KKCGD20BEC
 164 KM COMBINE GD20BE-C AND RCPDGC10
 165 KM COMBINATION OF US 95 AND LONE MOUNTAIN
 166 HC 2
 *

167 KKRCGD20BE
 168 KM ROUTE CGD20BEC TO CGD20BMC
 169 KM NEWLY PROPOSED REGIONAL FACILITY
 170 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 171 KM FACILITY # = GOAL 0247
 172 KM LINING = CONCRETE
 173 RD 2640 0.003 0.02 0 TRAP 20 5
 *

174 KKGD20BM-C
 175 BA 0.343
 176 PB 2.77
 177 LS 0 89.4
 178 UD 0.456
 *

179 KKCGD20BMC
 180 KM COMBINE GD20BM-C AND RCGD20BE
 181 KM US 95 AND CRAIG ROAD
 182 HC 2
 *

183 KKRCGD20BM
 184 KM ROUTE CGD20BMC TO CGD17BG
 185 KM NEWLY PROPOSED REGIONAL FACILITY
 186 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 187 KM FACILITY # = GOAL 0168
 188 KM LINING = RCB
 189 RD 2640 0.003 0.02 0 TRAP 20 5
 *

HEC-1 INPUT

PAGE 6

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

190 KKGD17BG-C
 191 BA 0.364
 192 PB 2.77
 193 LS 0 87.7
 194 UD 0.478
 *

195 KK CGD17BG
 196 KM COMBINE GD11B-C AND GD17BG-C
 197 KM LONE MOUNTAIN AND US 95
 198 HC 2
 *

199 KK RGD17BG
 200 KM ROUTE CGD17BG TO CGD11B-C
 201 KM FACILITY = GOWAN OUTFALL - U.S. 95 CHANNEL
 202 KM FACILITY # = GO95 0000
 203 KM LINING = CONCRETE
 204 RD 2640 0.003 0.02 0 TRAP 20 5
 *

205 KK GD11B-C
 206 BA 0.262
 207 PB 2.77
 208 LS 0 90.6
 209 UD 0.278
 *

210 KKCGD11B-C
 211 KM COMBINE GD11B-C AND RGD17BG
 212 KM GOWAN AND US 95
 213 HC 2
 *

214 KK RCGD11B
 215 KM ROUTE CGD11B-C TO CPT6B-C
 216 KM FACILITY = GOWAN OUTFALL FACILITIES
 217 KM FACILITY # = GOOF 0511
 218 KM LINING = RCB
 219 RD 8500 0.005 0.015 0 TRAP 8 0
 *

220 KK PT6B-C
 221 BA 0.454
 222 PB 2.77
 223 LS 0 86.1
 224 UD 0.756
 *

HEC-1 INPUT

PAGE 7

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

225 KK CPT6B-C
 226 KM COMBINE PT6B-C AND RCGD11B
 227 KM GOWAN AND US 95
 228 HC 2
 *

229 KKDPT6B-C1
 230 KM FLOW SPLIT TO GOWAN OUTFALL
 231 KM DGOW1A
 232 KM FROM CWH
 233 DT DGOW1A
 234 DI 0 31 51 71 101 301 561 600 3000 5000
 235 DQ 0 30 50 70 100 300 560 560 560 560
 *

236 KKDPT6B-C2
 237 KM FLOW SPLIT TO TRILOGY CHANNEL
 238 KM DTRILGY
 239 KM FROM CWH
 240 DT DTRILGY
 241 DI 0 31 91 202 349 625 1214 1944 2801
 242 DQ 0 3 33 55 95 173 267 374 491
 *

243 KK PT2B2-C
 244 BA 0.299
 245 PB 2.77
 246 LS 0 92.2
 247 UD 0.417
 *

248 KK RCPT2B2
 249 KM ROUTE CPT2B2 TO CPT41-C
 250 KM NEWLY PROPOSED REGIONAL FACILITY
 251 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 252 KM FACILITY # = GOAL 0111
 253 KM LINING = RCB
 254 RD 3000 0.0083 0.015 0 TRAP 10 0
 *

255 KK PT3-C
 256 BA 0.172
 257 PB 2.77
 258 LS 0 89.5
 259 UD 0.372
 *

260 KK RCPT3-C
 261 KM ROUTE CPT3B-C TO CPT41-C
 262 KM ALEXANDER
 263 RD 5500 0.0081 0.016 0 TRAP 0 50
 *

HEC-1 INPUT

PAGE 8

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

264 KK PT41-C
 265 BA 0.436
 266 PB 2.77
 267 LS 0 88.6
 268 UD 0.424
 *

269 KK CPT41-C
 270 KM COMBINE RCPT2B2, RCPT3-C AND PT41-C
 271 KM ALEXANDER AND RANCHO
 272 HC 3
 *

273 KKRCPT41-C
 274 KM ROUTE CPT41-C TO CPT5A20C
 275 KM NEWLY PROPOSED REGIONAL FACILITY
 276 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 277 KM FACILITY # = GOAL 0100
 278 KM LINING = RCB
 279 RD 600 0.003 0.015 0 TRAP 12 0
 *

280 KK PT5A2-C
 281 BA 0.341
 282 PB 2.77
 283 LS 0 86.7
 284 UD 0.644
 *

285 KKRCPT5A2-C
 286 KM COMBINE PT5A2-C AND RCPT41-C
 287 KM ALEXANDER AND RANCHO
 288 HC 2
 *

289 KK RCPT5A2
 290 KM ROUTE CPT5A2-C TO CPT5B6
 291 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 292 KM FACILITY # = GOAL 0000
 293 KM LINING = RCB
 294 RD 5280 0.01 0.015 0 TRAP 10 0
 *

295 KKCCPT6B-C
 296 KM COMBINE CPT6B-C AND RCPT5A2
 297 KM GOWAN AND US 95
 298 HC 2
 *

HEC-1 INPUT

PAGE 9

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

299 KK DRANCHO
 300 KM FLOW SPLIT TO GOWAN OUTFALL
 301 KM DGOWAN
 302 KM FROM CWH
 303 DT DGOWAN
 304 DI 0 51 101 301 501 600 800 1500 2000 5000
 305 DQ 0 1 1 1 1 100 300 1000 1500 4500
 *

306 KK RDRANCH
 307 KM ROUTE DRANCHO TO CCY07B

308 KM RANCHO
309 RD 1300 0.004 0.016 0 TRAP 0 50
*

310 KK DTRILGY
311 KM RETRIEVE DTRILGY
312 DR DTRILGY
*

313 KK CY07B
314 BA 0.203
315 PB 2.77
316 LS 0 89.1
317 UD 0.461
*

318 KK CCY07B
319 KM COMBINE DRANCHO, DTRILGY AND CY07B
320 KM GOWAN AND RANCHO
321 HC 3
*

322 KK DCY07B
323 KM FLOW SPLIT TO CENTRAL BASIN
324 KM DIVERT FLOW EAST IN RAN 190
325 KM OPPOSITE OF D9RCHO
326 KM FROM CWH
327 DT DCENT1
328 DI 0 19 73 100 1000 2000
329 DQ 0 1 1 28 928 1928
*

330 KK DGOWAN
331 KM RETRIEVE DGOWAN
332 DR DGOWAN
*

333 KK RDGOWAN
334 KM ROUTE DGOWAN TO CCCY08-C
335 KM GOWAN
336 RD 3300 0.006 0.016 0 TRAP 0 50
*

HEC-1 INPUT

PAGE 10

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

337 KK DGOW1A
338 KM RETRIEVE DGOW1A
339 DR DGOW1A
*

340 KK RDGOW1A
341 KM ROUTE PT6B-C TO CCCY08-C
342 KM FACILITY = GOWAN OUTFALL FACILITIES
343 KM FACILITY # = GOOF 0486
344 KM LINING = RCB
345 RD 3300 0.006 0.015 0 TRAP 8 0
*

346 KKCCPT6B-C
347 KM COMBINE RCPT6B-C AND RDGOW1A
348 KM GOWAN AND DECATUR
349 HC 2
*

350 KK CY08-C
351 BA 0.094
352 PB 2.77
353 LS 0 88.6
354 UD 0.306
*

355 KK CCY08-C
356 KM COMBINE CY08-C, CCPT6B-C, AND DCY07B
357 KM GOWAN AND DECATUR
358 HC 3
*

359 KK DGOW2A
360 KM DIVERT FLOW TO GOWAN OUTFALL (GOOF 0511) AT RANCHO

361 KM DIVERSION BASED ON GOWAN ROAD DRAINAGE STUDY BY POGGEMEYER
 362 KM 8'X 5' RCB, CAPACITY = 630 CFS
 363 KM REMAINING FLOW CONTINUES EAST IN GOWAN RD. AND ENTERS THE CENTRAL BASIN
 364 KM OPPOSITE OF DGOW2A IN CWH
 365 DTDCENTRAL
 366 DI 0 31 51 71 101 301 601 631 3000 5000
 367 DQ 0 1 1 1 1 1 1 1 2370 4370
 *

368 KK D3ALL
 369 KM DIVERT OUT ALL FLOW TO GOWAN OUTFALL (GOOF 0511) AT RANCHO
 370 DT D3ALL
 371 DI 0 100 500 1000 5000
 372 DQ 0 100 500 1000 5000
 *

* *****
 * END OF IMPORT FROM GOWAN WATERSHED
 * *****
 *

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

373 KK DCENT1
 374 KM RETRIEVE DCENT1
 375 DR DCENT1
 *

376 KK RDCENT1
 377 KM ROUTE DCENT1
 378 KM RANCHO
 * KO 1 1 21
 379 RD 2100 0.0076 0.016 0 TRAP 0 50
 *

380 KK CRGOWAN
 381 KM COMBINE RDCENT1, D3ALL, AND RCCY06B
 382 KM RANCHO AND CHEYENNE
 383 HC 3
 *

384 KKRCRGOWAN
 385 KM ROUTE CRGOWAN TO CPD05A-C
 386 KM RANCHO
 387 RD 1700 0.0088 0.016 0 TRAP 0 50
 *

388 KK PD05A-C
 389 BA 0.136
 390 PB 2.77
 391 LS 0 93.1
 392 UD 0.406
 *

393 KKCPD05A-C
 394 KM COMBINE PD05A-C AND RCRGOWAN
 395 KM RANCHO AND DECATUR
 396 HC 2
 *

397 KK DCPD05A
 398 KM FLOW SPLIT TO PD04B-C
 399 KM OPPOSITE OF DA2 FLOW SPLIT IN CWH
 400 KM CAPACITY RAN 170 = 210 CFS
 401 KM DIVERTED FLOW GOES DOWN WEST SIDE OF RANCHO
 402 DT DA1-C
 403 DI 0 51 101 211 500 1000 5000
 404 DQ 0 51 101 211 211 211 211
 *

405 KK RCPD05
 406 KM ROUTE CPD05A-C TO CPD04B-C
 407 KM RANCHO
 408 RD 1500 0.006 0.016 0 TRAP 0 50
 *

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

```

409      KK   DPD01
410      KM   RETRIEVE DPD01
411      DR   DPD01
      *

412      KK   RDPD01
413      KM   ROUTE DPD01 TO CPD01-C
414      KM   PEAK DRIVE
415      RD   3500 0.0103 0.016      0      TRAP      0      50
      *

416      KK   PD01-C
417      BA   0.377
418      PB   2.77
419      LS   0      83.8
420      UD   0.436
      *

421      KK   CPD01-C
422      KM   COMBINE RDPD01 AND PD01-C
423      KM   TORREY PINES AND PEAK DRIVE
424      HC   2
      *

425      KK   RCPD01
426      KM   ROUTE CPD01-C TO CCY04A-C
427      KM   FACILITY = LAS VEGAS WASH - SMOKE RANCH
428      KM   FACILITY # = LVPK 0106
429      KM   LINING = RCB
430      RD   2600 0.00542 0.015      0      TRAP      8      0
      *

431      KK   CY04A-C
432      BA   0.457
433      PB   2.77
434      LS   0      86.8
435      UD   0.489
      *

436      KKCCY04A-C
437      KM   COMBINE RCPD01 AND CY04A-C
438      KM   JONES AND PEAK DRIVE
439      HC   2
      *

440      KK   DCY04C
441      KM   DIVERT FLOW TO EXISTING REGIONAL FACILITY LVSR 0500
442      KM   FROM CWH
443      KM   CAPACITY LVSR 0500 = 231 CFS
444      DT   DLVSR1
445      DI   0      51      101      232      500      1000      5000
446      DQ   0      50      100      231      231      231      231
      *

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

447      KK   RCCY04A
448      KM   ROUTE CCY04A TO CPD04B-C
449      KM   FACILITY = LAS VEGAS WASH - PEAK DRIVE
450      KM   FACILITY # = LVPK 0000,0019,0058, 0104
451      KM   LINING = RCB
452      RD   5730 0.01 0.015      0      TRAP      9      0
      *

453      KK   PD04B-C
454      BA   0.468
455      PB   2.77
456      LS   0      87.8
457      UD   0.539
      *

458      KKCPD04B-C
459      KM   COMBINE RCCY04A AND PD04B-C
460      KM   RANCHO AND PEAK DRIVE
461      HC   2
      *

462      KKCCPD04B-C
463      KM   COMBINE RCPD05 AND CPD04B-C

```

464 KM RANCHO AND PEAK DRIVE
465 HC 2
*

466 KK RCPD04B
467 KM ROUTE CCPD04B-C TO CSR05B
468 KM FACILITY = LAS VEGAS WASH - RANCHO
469 KM FACILITY # = LVRA 0012
470 KM LINING = RCB
471 RD 3300 0.0058 0.015 0 TRAP 12 0
*

472 KK OG03-C
473 BA 0.325
474 PB 2.77
475 LS 0 87.0
476 UD 0.389
*

477 KK ROG03-C
478 KM ROUTE OG03-C TO SR00A-C
479 KM SMOKE RANCH
480 RD 3400 0.0121 0.016 0 TRAP 0 50
*

481 KK OG02-C
482 BA 0.318
483 PB 2.77
484 LS 0 90.2
485 UD 0.351
*

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

486 KK ROG02-C
487 KM ROUTE OG02-C TO CLM01-C
488 KM LAKE MEAD BOULEVARD
489 RD 3400 0.0129 0.016 0 TRAP 0 50
*

490 KK LM01-C
491 BA 0.327
492 PB 2.77
493 LS 0 81.8
494 UD 0.405
*

495 KK CLM01-C
496 KM COMBINE ROG02-C AND LM01-C
497 KM TORREY PINES AND LAKE MEAD
498 HC 2
*

499 KK SR01E
500 KM DIVERSION AT LAKE MEAD AND TORREY PINES
501 KM SPLIT FLOW TO TORREY PINES
502 KM FROM CWH
503 KM REMAINING FLOW IN LAKE MEAD RETRIEVED LATER IN MODEL WHEN NEEDED
504 DT DSR01F
505 DI 0 41 73 172 572 1072 5000
506 DQ 0 40 72 132 371 671 3067
*

507 KK RCLM01-C
508 KM ROUTE OG02-C TO CLM01-C
509 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
510 KM FACILITY # = LVSR 0546
511 KM LINING = RCB
512 RD 2640 0.0057 0.015 0 TRAP 8 0
*

513 KK SR00A-C
514 BA 0.367
515 PB 2.77
516 LS 0 84.1
517 UD 0.446
*

518 KK CSR00A

519 KM COMBINE RCLM01-C AND SR00A-C
520 KM TORREY PINES AND SMOKE RANCH
521 HC 2
*

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

522 KK CCSR00A
523 KM COMBINE ROG03-C AND CSR00A
524 KM TORREY PINES AND SMOKE RANCH
525 HC 2
*
526 KK RCSR00A
527 KM ROUTE CSR00A TO CSR02E
528 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
529 KM FACILITY # = LVSR 0496
530 KM LINING = RCB
531 RD 2600 0.0127 0.015 0 TRAP 10 0
*

532 KK DLVSR1
533 KM RETRIEVE DLVSR1
534 DR DLVSR1
*

535 KK RDLVSR1
536 KM ROUTE DLVSR1 TO CSR02E
537 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
538 KM FACILITY # = LVSR 0500
539 KM LINING = RCP
540 RD 2770 0.0054 0.013 0 CIRC 5
*

541 KK SR02E-C
542 BA 0.302
543 PB 2.77
544 LS 0 86.1
545 UD 0.374
*

546 KK CSR02E
547 KM COMBINE SR02E-C, RDLVSR1, AND RCSR00A
548 KM JONES AND SMOKE RANCH
549 HC 3
*

550 KK RCSR02E
551 KM ROUTE CSR02E TO CSR05D
552 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
553 KM FACILITY # = LVSR 0396,0446
554 KM LINING = RCB
555 RD 5280 0.0106 0.015 0 TRAP 10 0
*

556 KK SR05D-C
557 BA 0.303
558 PB 2.77
559 LS 0 89.7
560 UD 0.533
*

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

561 KK CSR05D
562 KM COMBINE RCSR02E AND SR05D-C
563 KM SMOKE RANCH AND DECATUR
564 HC 2
*

565 KK RCSR05D
566 KM ROUTE CSR05D TO CSR05B
567 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
568 KM FACILITY # = LVSR 0359
569 KM LINING = RCB
570 RD 2000 0.0075 0.015 0 TRAP 10 0
*

571 KK SR05B-C
 572 BA 0.357
 573 PB 2.77
 574 LS 0 89.2
 575 UD 0.664
 *

576 KK CSR05B
 577 KM COMBINE RCSR05D AND SR05B-C
 578 KM SMOKE RANCH AND RANCHO
 579 HC 2
 *

580 KK DCSR05B
 581 KM DIVERT FLOW IN EXISTING LVSR 0359 (LVSR 0360 IN CWH)
 582 KM CAPACITY = 231 CFS
 583 DT DLVSR2
 584 DI 0 231 5000
 585 DQ 0 231 231
 *

586 KKDDCSR05B
 587 KM DIVERT FLOW INTO DROP INLETS FOR LVSR 0273 STUB OUT
 588 KM CAPACITY = 182 CFS (109 CFS NORTH, 73 CFS SOUTH)
 589 DT DLVSR3
 590 DI 0 182 5000
 591 DQ 0 182 182
 *

592 KKD3CSR05B
 593 KM DIVERT FLOW INTO EXISTING CHANNEL SOUTH OF RANCHO
 594 KM D3SR07 IN CWH
 595 KM CAPACITY = 670 CFS
 596 DT DLVRA
 597 DI 0 50 100 200 400 600 670 1000 5000
 598 DQ 0 50 100 200 400 600 670 670 670
 *

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

599 KKD4CSR05B
 600 KM SPLIT FLOW 50% IN RANCHO. 50% IN CAREY
 601 KM SPLIT TO RANCHO
 602 KM OPPOSITE OF D4SR07 IN CWH
 603 DT DRAN
 604 DI 0 50 100 300 500 1000 2500 5000
 605 DQ 0 25 50 150 250 500 1250 2500
 *

606 KK DSR05B
 607 KM DIVERT OUT STREET FLOW ALL FLOW TO BE BROUGHT IN LATER IN MODEL
 608 DT DSMOKE
 609 DI 0 1000 5000
 610 DQ 0 1000 5000
 *

611 KK DLVSR3
 612 KM RETRIEVE FLOW IN LVSR
 613 DR DLVSR3
 *

614 KK CCSR05B
 615 KM COMBINE RPD04B, LVSR3 AND DSR05B (ZERO FLOW)
 616 KM SMOKE RANCH AND RANCHO
 617 HC 3
 *

618 KKDCCSR05B
 619 KM DIVERT OUT ALL FLOW IN LVSR FACILITY
 620 DT DLVSR4
 621 DI 0 1000 5000
 622 DQ 0 1000 5000
 *

* NO BYPASS FLOW ON RANCHO - END OF SEG 1 (NORTH OF SMOKE RANCH)
 *
 * ONSITE DRAINAGE DICTATE FLOW RATE - FROM SMOKE RANCH TO LAKE MEAD
 *

623 KK DSR01F
 624 KM RETRIEVE DSR01F
 625 DR DSR01F
 *
 626 KK RDSR01F
 627 KM ROUTE DSR01F TO CLM02-C
 628 KM FACILITY = LAS VEGAS WASH - LAKE MEAD
 629 KM FACILITY # = LVLM 0475
 630 KM LINING = RCP
 631 RD 2632 0.0124 0.013 0 CIRC 4
 *

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

632 KK LM02-C
 633 BA 0.293
 634 PB 2.77
 635 LS 0 85.0
 636 UD 0.367
 *

637 KK CLM02-C
 638 KM COMBINE LM02-C AND RDSR01F
 639 KM
 640 HC 2
 *

641 KK RCLM02-C
 642 KM ROUTE CLM02-C TO CLM03-C
 643 KM FACILITY = LAS VEGAS WASH - LAKE MEAD
 644 KM FACILITY # = LVLM 0442,0453,0460
 645 KM LINING = RCP
 646 RD 2800 0.0139 0.013 0 CIRC 5
 *

647 KK LM03-C
 648 BA 0.336
 649 PB 2.77
 650 LS 0 90.5
 651 UD 0.378
 *

652 KK CLM03-C
 653 KM COMBINE RCLM02-C AND LM03-C
 654 KM MICHAEL AND LAKE MEAD
 655 HC 2
 *

656 KK RCLM03-C
 657 KM ROUTE CLM03-C TO CLM05-C
 658 KM FACILITY = LAS VEGAS WASH - LAKE MEAD
 659 KM FACILITY # = LVLM 0388,0399,0416
 660 KM LINING = RCP
 661 RD 2600 0.0115 0.013 0 CIRC 6
 *

662 KK LM05-C
 663 BA 0.365
 664 PB 2.77
 665 LS 0 88.1
 666 UD 0.387
 *

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

667 KK CLM05-C
 668 KM COMBINE RCLM03-C AND LM05-C
 669 KM DECATUR AND LAKE MEAD
 670 HC 2
 *

671 KK RCLM05-C
 672 KM ROUTE CLM05-C TO CLM06-C
 673 KM FACILITY = LAS VEGAS WASH - LAKE MEAD
 674 KM FACILITY # = LVLM 0337,0356
 675 KM LINING = RCP

```

676      RD  3300  0.0061  0.015      0  CIRC      7      0
      *

677      KK LM06B-C
678      BA   0.354
679      PB   2.77
680      LS      0      89.5
681      UD   0.468
      *

682      KK CLM06-C
683      KM COMBINE RCLM05-C AND LM06B-C
684      KM RANCHO AND LAKE MEAD
685      HC      2
      *

686      KK DLVLMRA
687      KM SAME AS DLVLMRA FROM CWH
688      KM FLOW IS DIVERTED TO EXISTING REGIONAL FACILITY LVLM 0270
689      KM 90" RCP CAPACITY = 940 CFS
690      KM 940 CFS IS DIVERTED
691      DT DLVLM4
692      DI      0      50      100      400      600      700      800      940      1000      5000
693      DQ      0      50      100      400      600      700      800      940      940      940
      *

694      KK DSURF1
695      KM SAME AS DSURF1 FROM CWH
696      KM 33% DIVERTED TO VALLEY DRIVE TO LAKE MEAD
697      KM REMAINING IN LAKE MEAD
698      DT DVALDR
699      DI      0      30      90      150      300      600      1200      1800      3000      6000
700      DQ      0      10      30      50      100      200      400      600      1000      2000
      *

701      KK DLVRA
702      KM RETRIEVE DLVRA
703      DR DLVRA
      *

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

704      KK RDLVRA
705      KM ROUTE RDLVRA TO CLM06-C
706      KM EXISTING CHANNEL
707      RD  1200   0.01   0.02      0   TRAP      8      2
      *

708      KK DRAN
709      KM RETRIEVE DRAN
710      DR DRAN
      *

711      KK RDRAN
712      KM ROUTE RDLVRA TO CLM06-C
713      KM RANCHO
714      RD  1200   0.01   0.02      0   TRAP      0      50
      *

715      KK DLVLM4
716      KM RETRIEVE DLVLM4
717      DR DLVLM4
      *

718      KKCLM06-C
719      KM COMBINE CLM06-C, DLVLM4, RDRAN, AND RDLVRA
720      KM RANCHO AND LAKE MEAD
721      HC      4
      *

722      KK DLVLMRA
723      KM SAME AS DLVLMRA FROM CWH
724      KM REPEAT DIVERSION TO LVLM SYSTEM SINCE THERE IS CAPACITY IN PIPE FOR 10-YEAR
725      KM FLOW IS DIVERTED TO EXISTING REGIONAL FACILITY LVLM 0270
726      KM 90" RCP CAPACITY = 940 CFS
727      KM 940 CFS IS DIVERTED
728      DT DLVLM5
729      DI      0      50      100      400      600      700      800      940      1000      5000
730      DQ      0      50      100      400      600      700      800      940      940      940

```

*
 731 KK DSURF2
 732 KM SAME AS DSURF2 FROM CWH
 733 KM DIVERT 50% OR REMAINING FLOW TO LAKE MEAD
 734 KM REMAINING IN RANCHO
 735 DT DLAKEM
 736 DI 0 30 90 150 300 600 1200 1800 3000 6000
 737 DQ 0 10 30 50 100 200 400 600 1000 2000
 *

738 KK D1LM09
 739 KM SAME AS D1LM09 FROM CWH
 740 KM FLOW IS DIVERTED ACROSS RANCHO IN RAN 119
 741 KM 6' X 3' RCB CAPACITY = 168 CFS
 742 KM CAPACITY BASED ON INLET CONTROL NOMOGRAPH
 743 KM THE REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO
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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

744 DT DRAN119
 745 DI 0 50 100 168 500 1000 5000
 746 DQ 0 50 100 168 168 168 168
 *

747 KK D2LM09
 748 KM SAME AS D2LM09 FROM CWH
 749 KM FLOW IS DIVERTED ACROSS RANCHO IN RAN 118
 750 KM 6' X 3' RCB CAPACITY = 168 CFS
 751 KM CAPACITY BASED ON INLET CONTROL NOMOGRAPH
 752 KM THE REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO
 753 DT DRAN118
 754 DI 0 50 100 168 500 1000 5000
 755 DQ 0 50 100 168 168 168 168
 *

756 KK RD2LM09
 757 KM ROUTE D2LM09 TO CLM09
 758 KM RANCHO
 759 RD 800 0.01 0.016 0 TRAP 0 50
 *

760 KK DVALDR
 761 KM RETRIEVE DVALDR
 762 DR DVALDR
 *
 * UNSTABLE ROUTING REMOVED
 * KK RDVALDR
 * KM ROUTE DVALDR TO CLM09
 * KM VALLEY DRIVE
 * RD 2900 0.0086 0.016 0 TRAP 0 50
 *

763 KK LM09
 764 BA 0.123
 765 PB 2.77
 766 LS 0 92.6
 767 UD 0.212
 *

768 KK CLM09
 769 KM COMBINE RDVALDR, RD2LM09, AND LM09
 770 KM RANCHO AND CORAN
 771 HC 3
 *

772 KK D3LM09
 773 KM SAME AS D3LM09 FROM CWH
 774 KM FLOW IS DIVERTED ACROSS RANCHO TO CORAN
 775 KM CAPACITY OF WEST HALF STREET OF RANCHO AT TOP OF MEDIAN WILL
 776 KM REMAIN AND CONTINUE SOUTHEAST IN RANCHO
 777 KM LOW FLOWS WILL REMAIN IN RANCHO AND FLOW SOUTHEAST
 778 DT DCORAN
 779 DI 0 51 201 300 400 500 600 800 1000 5000
 780 DQ 0 0 0 50 100 150 200 400 600 4600
 *

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

781	KK	RD3LM09								
782	KM	ROUTE D3LM09 TO CVG21								
783	KM	RANCHO								
784	RD	900	0.01	0.016	0	TRAP	0		50	
	*									
785	KK	VG21								
786	BA	0.098								
787	PB	2.77								
788	LS	0	88.1							
789	UD	0.201								
	*									
790	KK	CVG21								
791	KM	COMBINE RD3LM09 AND VG21								
792	KM	RANCHO AND CORAN								
793	HC	2								
	*									
794	KK	DVG21								
795	KM	SAME AS DVG21 FROM CWH								
796	KM	DIVERSION AT RANCHO AND HOLLY								
797	KM	FLOW IS DIVERTED ACROSS RANCHO TO HOLLY								
798	KM	REMAINING FLOW CONTINUES SOUTHEAST IN RANCHO TO VG20								
799	KM	LOW FLOWS WILL REMAIN IN RANCHO AND FLOW SOUTHEAST								
800	KM	MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW								
801	DT	DHOLLY								
802	DI	0	51	201	300	400	500	600	800	1000
803	DQ	0	0	0	100	200	300	350	450	550
	*									
804	KK	LM08								
805	BA	0.056								
806	PB	2.77								
807	LS	0	91.3							
808	UD	0.158								
	*									
809	KK	RLM08								
810	KM	ROUTE LM08 TO CVG20								
811	RD	4100	0.011	0.016	0	TRAP	0		50	
	*									
812	KK	VG20								
813	BA	0.134								
814	PB	2.77								
815	LS	0	90.1							
816	UD	0.349								
	*									

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LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
817	KK CVG20
818	KM COMBINE RLM08, DVG21 AND VG20
819	KM RANCHO AND HOLLY
820	HC 3
	*
821	KK RCVG20
822	KM ROUTE CVG20 TO CVG22
823	KM RANCHO
824	RD 1500 0.0133 0.015 0 CIRC 7.5
	*
825	KK VG22
826	BA 0.176
827	PB 2.77
828	LS 0 90.9
829	UD 0.412
	*
830	KK CVG22
831	KM COMBINE RCVG20 AND VG22
832	KM RANCHO AND VEGAS
833	HC 2
	*
834	KKOG011A-C

835	BA	0.441							
836	PB	2.77							
837	LS	0	85.5						
838	UD	0.428							
	*								
839	KK	ROG011A							
840	KM	ROUTE OG011A-C TO CVG02-C							
841	KM	VEGAS DRIVE							
842	RD	3200	0.0172	0.015	0	TRAP	0	50	
	*								
843	KK	VG02-C							
844	BA	0.224							
845	PB	2.77							
846	LS	0	81.7						
847	UD	0.386							
	*								
848	KK	CVG02-C							
849	KM	COMBINE ROG011A AND VG02-C							
850	KM	TORREY PINES AND VEGAS DRIVE							
851	HC	2							
	*								

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

852	KK	RCVG02							
853	KM	ROUTE CVG02-C TO CVG03-C							
854	KM	FACILITY = OWENS AVENUE SYSTEM							
855	KM	FACILITY # = LVOW 0460							
856	KM	LINING = RCB							
857	RD	2700	0.0148	0.015	0	TRAP	0	50	
	*								
858	KK	VG03-C							
859	BA	0.279							
860	PB	2.77							
861	LS	0	79.7						
862	UD	0.401							
	*								
863	KK	CVG03-C							
864	KM	COMBINE RCVG02 AND VG03-C							
865	KM	JONES AND VEGAS DRIVE							
866	HC	2							
	*								
867	KK	RCVG03							
868	KM	ROUTE CVG03-C TO CVG04-C							
869	KM	FACILITY = OWENS AVENUE SYSTEM							
870	KM	FACILITY # = LVOW 0360							
871	KM	LINING = RCB							
872	RD	2700	0.0148	0.016	0	TRAP	0	50	
	*								
873	KK	VG04-C							
874	BA	0.240							
875	PB	2.77							
876	LS	0	90.9						
877	UD	0.373							
	*								
878	KK	CVG04-C							
879	KM	COMBINE RCVG03 AND VG04-C							
880	KM	MICHAEL AND VEGAS DRIVE							
881	HC	2							
	*								
882	KK	RCVG04							
883	KM	ROUTE CVG04 TO CWA08A							
884	KM	VEGAS DRIVE							
885	RD	2600	0.0135	0.016	0	TRAP	0	50	
	*								
886	KK	WA08A							
887	BA	0.026							
888	PB	2.77							
889	LS	0	92.5						

890 UD 0.180
*

HEC-1 INPUT

PAGE 25

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

891 KK CWA08A
892 KM COMBINE WA08A AND RCVG04
893 KM MICHAEL AND VEGAS DRIVE
894 HC 2
*

895 KK RCWA08A
896 KM ROUTE CWA08A TO CVG06
897 KM VEGAS DRIVE
898 RD 4000 0.0138 0.016 0 TRAP 0 50
*

899 KK VG06
900 BA 0.186
901 PB 2.77
902 LS 0 87.5
903 UD 0.280
*

904 KK CVG06
905 KM COMBINE RCWA08A AND VG06
906 KM VALLEY VIEW AND VEGAS DRIVE
907 HC 2
*

908 KK RCVG06
909 KM ROUTE CVG06 TO CCVG22
910 KM VEGAS DRIVE
911 RD 1900 0.0174 0.016 0 TRAP 0 50
*

912 KK CCVG22
913 KM COMBINE CVG22 AND RCVG06
914 KM RANCHO AND VEGAS DRIVE
915 HC 2
*

916 KKDCVG20-C
917 KM FLOW SPLIT FROM CLV
918 KM REVISED FROM MPU BASED ON COMMENT FROM CLV
919 KM 100-YEAR FLOW LISTED ON PLANS = 530 CFS
920 KM STREET FLOW - 75% OWENS/25% RANCHO
921 DT LV15
922 DI 0 570 670 1570 2570
923 DQ 0 0 25 250 500
*

924 KKRDCVG20-C
925 KM ROUTE DCVG20-C TO CVG23
926 KM FACILITY = OWENS AVENUE SYSTEM
927 KM FACILITY # = LVOW 0146
928 KM LINING = RCP
929 RD 800 0.009 0.015 0 TRAP 8 0
*

* KMFLOW SPLIT AT OWEN AND RANCHO. FLOW TO OWEN DURING MINOR EVENT
* KMSTART FLOW ANALYSIS AT OWENS, SOUTH OF RANCHO
* KMINSSERT DUMMY TO AVOID ZERO FLOW
* KMCOMBINE FLOW SPLIT AT VEGAS AND RANCHO
*

HEC-1 INPUT

PAGE 26

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

930 KK LV15
931 KM RETRIEVE
932 DR LV15
*

933 KK RLV15
934 KM ROUTE LV15 TO CWA15A-C
935 KM RANCHO
936 RD 3000 0.0045 0.016 0 TRAP 0 50
*

937 KK DUMMY
 938 KM DUMMY AREA TO AVOID ZERO FLOW
 939 BA 0.0001
 940 PB 2.77
 941 LS 0 90
 942 UD 0.10
 *

943 KK CRLV15
 944 KM COMBINE DUMMY AND LV15 - FLOW SPLIT AT OWENS
 945 HC 2
 *

946 KK WA12
 947 BA 0.069
 948 PB 2.77
 949 LS 0 90.5
 950 UD 0.130
 *

951 KK WA13
 952 BA 0.160
 953 PB 2.77
 954 LS 0 90.8
 955 UD 0.304
 *

956 KK CWA13
 957 KM COMBINE WA12 AND WA13
 958 KM RANCHO AND WASHINGTON
 959 HC 2
 *

960 KK CWA13
 961 KM COMBINE FLOW - OVERFLOW AT OWENS AND BASIN FLOW - WA13 AND WA14
 962 HC 2
 *

HEC-1 INPUT

PAGE 27

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

963 KK WA14
 964 BA 0.043
 965 PB 2.77
 966 LS 0 90.7
 967 UD 0.202
 *

968 KK CWA14
 969 KM COMBINE FLOW FROM CWA13 AND WA14
 970 HC 2
 *

971 KK WA01-C
 972 BA 0.221
 973 PB 2.77
 974 LS 0 87.5
 975 UD 0.252
 *

976 KK RWA01
 977 KM ROUTE WA01-C TO CWA04-C
 978 KM WASHINGTON STREET
 979 RD 5300 0.0151 0.016 0 TRAP 0 50
 *

980 KK WA04-C
 981 BA 0.219
 982 PB 2.77
 983 LS 0 88.1
 984 UD 0.473
 *

985 KK CWA04-C
 986 KM COMBINE RWA01 AND WA04-C
 987 KM MICHAEL AND WASHINGTON
 988 HC 2
 *

989 KK RCWA04
 990 KM ROUTE CWA04-C TO CWA09-C
 991 KM FACILITY = FREEWAY CHANNEL
 992 KM FACILITY # = LV15 0602
 993 KM LINING = RCP
 994 RD 5900 0.0144 0.016 0 TRAP 0 50
 *

995 KK WA09-C
 996 BA 0.093
 997 PB 2.77
 998 LS 0 91.3
 999 UD 0.363
 *

HEC-1 INPUT

PAGE 28

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

1000 KK CWA09-C
 1001 KM COMBINE RCWA04 AND WA09-C
 1002 KM VALLEY VIEW AND WASHINGTON
 1003 HC 2
 *

1004 KK RCWA09
 1005 KM ROUTE CWA09-C TO CWA10NW
 1006 KM FACILITY = FREEWAY CHANNEL
 1007 KM FACILITY # = LV15 0602
 1008 KM LINING = RCP
 1009 RD 700 0.0083 0.016 0 TRAP 0 50
 *

1010 KK WA10-C
 1011 BA 0.446
 1012 PB 2.77
 1013 LS 0 91.4
 1014 UD 0.358
 *

1015 KK WA10D
 1016 KM FLOW SPLIT TO SOUTHEAST CENTRAL BASIN
 1017 KM OPPOSITE SPLIT OF WA10NW IN SOUTHEAST CENTRAL BASIN FLOW
 1018 KM FROM LOUIS BERGER U.S. 95 WIDENING STUDY
 1019 KM CAPACITY OF CHANNEL = 250 CFS IS DIVERTED
 1020 KM EXCESS FLOW CONTINUES DOWN WASHINGTON
 1021 DT WA10SE
 1022 DI 0 10 250 275 300 800 1000 3000
 1023 DQ 0 10 250 250 250 250 250 250
 *

1024 KK CWA10NW
 1025 KM COMBINE WA10D AND RCWA09
 1026 KM VALLEY VIEW AND WASHINGTON
 1027 HC 2
 *
 * KMROUTE FLOW ON WASHINGTON
 *

1028 KKRCWA10NW
 1029 KM ROUTE CWA10NW TO CWA13-C
 1030 KM FACILITY = FREEWAY CHANNEL
 1031 KM FACILITY # = LV15 0528
 1032 KM LINING = RCB
 1033 RD 3900 0.0119 0.016 0 TRAP 0 50
 *

1034 KK WA11-C
 1035 BA 0.085
 1036 PB 2.77
 1037 LS 0 86.8
 1038 UD 0.286
 *
 *

HEC-1 INPUT

PAGE 29

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

1039 KK CWA13
 1040 KM SAME TITLE AS 100-YEAR

```

1041      KM FLOW SPLIT TO SOUTHEAST CENTRAL BASIN
1042      KM RANCHO AND WASHINGTON
1043      KM SPLIT TAKEN FROM 30% DRAINAGE DESIGN FOR U.S.95 WIDENING BY VTN NEVADA (2001)
1044      KM OPPOSITE SPLIT OF WA13SE IN SOUTHEAST CENTRAL BASIN MODEL
1045      DT WA13SE
1046      DI      0      500      812      1000      1200
1047      DQ      0      303      490      609      727
          *

1048      KK RCRLV15
1049      KM ROUTE CRLV15 TO CCWA15A
1050      RD      1500      0.009      0.016      0      TRAP      0      50
          *

1051      KK LC16-C
1052      BA      0.263
1053      PB      2.77
1054      LS      0      87.2
1055      UD      0.344
          *

1056      KK      END
1057      KM      END OF PROJECT AT BONANZA
1058      HC      4
1059      ZZ

```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```

INPUT
LINE      (V) ROUTING      (--->) DIVERSION OR PUMP FLOW

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

47      OG04-C
      .
      .
64      .----->      DPD01
60      DOG04-C
      V
      V
67      RDOG04-C
      .
      .
71      .      OG05-C
      .
      .
76      COG05-C.....
      V
      V
80      RCOG05-C
      .
      .
84      .      CY06B-C
      .
      .
89      CCY06B-C.....
      V
      V
93      RCCY06B
      .
      .
97      .      PDGCD-C
      .      V
      .      V
102     .      RPDGCD-C
      .      V
      .      V
106     .      RRPDGCD
      .
      .
111     .      .      NW29B-C
      .      .      V
      .      .      V
116     .      .      RNW29B-C
      .      .
      .      .
120     .      .      .      NW1C2-C
      .      .      .
      .      .      .
125     .      .      CNW1C2.....
      .      .      V
      .      .      V

```

129	.	.	RCNW1C2	.
133	.	.		PDGCB10-
138	.	.	CPDGCB10.....	.
147	.	.		----->DPT3AA11
142	.	.	DPDGC10	.
150	.	.	CPDGCB10.....	.
	.	.	V	.
	.	.	V	.
154	.	.	RCPDGCB	.
158	.	.		GD20BE-C
163	.	.	CGD20BEC.....	.
	.	.	V	.
	.	.	V	.
167	.	.	RCGD20BE	.
174	.	.		GD20BM-C
179	.	.	CGD20BMC.....	.
	.	.	V	.
	.	.	V	.
183	.	.	RCGD20BM	.
190	.	.		GD17BG-C
195	.	.	CGD17BG.....	.
	.	.	V	.
	.	.	V	.
199	.	.	RGD17BG	.
205	.	.		GD11B-C
210	.	.	CGD11B-C.....	.
	.	.	V	.
	.	.	V	.
214	.	.	RCGD11B	.
220	.	.		PT6B-C
225	.	.	CPT6B-C.....	.
233	.	.		-----> DGOW1A
229	.	.	DPT6B-C1	.
240	.	.		-----> DTRILGY
236	.	.	DPT6B-C2	.
243	.	.		PT2B2-C
	.	.	V	.
	.	.	V	.
248	.	.	RCPT2B2	.
255	.	.		PT3-C
	.	.		V
	.	.		V
260	.	.		RCPT3-C
	.	.		.
	.	.		.


```

      V
      V
384   RCRGOWAN
      .
      .
388   .      PD05A-C
      .
393   CPD05A-C.....
      .
      .----->   DA1-C
402   DCPD05A
397   .
      V
      V
405   RCPD05
      .
      .
411   .      .<----- DPD01
409   .      DPD01
      .      V
      .      V
412   .      RDPD01
      .
      .
416   .      .      PD01-C
      .      .
421   .      CPD01-C.....
      .      V
      .      V
425   .      RCPD01
      .
      .
431   .      .      CY04A-C
      .      .
436   .      CCY04A-C.....
      .
      .----->   DLVSR1
444   .      DCY04C
440   .      V
      .      V
447   .      RCCY04A
      .
      .
453   .      .      PD04B-C
      .      .
458   .      CPD04B-C.....
      .
462   CCPD04B-.....
      V
      V
466   RCPD04B
      .
      .
472   .      OG03-C
      .      V
      .      V
477   .      ROG03-C
      .
      .
481   .      .      OG02-C
      .      .      V
      .      .      V
486   .      .      ROG02-C
      .      .
490   .      .      .      LM01-C
      .      .
495   .      .      CLM01-C.....
      .
504   .      .      .----->   DSR01F
499   .      .      SR01E
      .      .      V
      .      .      V

```



```

626 . RDSR01F
.
.
632 . LM02-C
.
.
637 . CLM02-C.....
. V
. V
641 . RCLM02-C
.
.
647 . LM03-C
.
.
652 . CLM03-C.....
. V
. V
656 . RCLM03-C
.
.
662 . LM05-C
.
.
667 . CLM05-C.....
. V
. V
671 . RCLM05-C
.
.
677 . LM06B-C
.
.
682 . CLM06-C.....
.
.
691 . -----> DLVLM4
686 . DLVLMRA
.
.
698 . -----> DVALDR
694 . DSURF1
.
.
703 . .<----- DLVRA
701 . DLVRA
. V
. V
704 . RDLVRA
.
.
710 . .<----- DRAN
708 . DRAN
. V
. V
711 . RDRAN
.
.
717 . .<----- DLVLM4
715 . DLVLM4
.
.
718 . CCLM06-C.....
.
.
728 . -----> DLVLM5
722 . DLVLMRA
.
.
735 . -----> DLAKEM
731 . DSURF2
.
.
744 . -----> DRAN119
738 . D1LM09
.
.
753 . -----> DRAN118
747 . D2LM09
. V
. V

```

```

756      . RD2LM09
      .
      .
762      . .<----- DVALDR
760      . DVALDR
      .
      .
763      . . LM09
      .
      .
768      . CLM09.....
      .
      .
778      . -----> DCORAN
772      . D3LM09
      . V
      . V
781      . RD3LM09
      .
      .
785      . . VG21
      .
      .
790      . CVG21.....
      .
      .
801      . -----> DHOLLY
794      . DVG21
      .
      .
804      . . LM08
      . . V
      . . V
809      . . RLM08
      .
      .
812      . . . VG20
      .
      .
817      . CVG20.....
      . V
      . V
821      . RCVG20
      .
      .
825      . . VG22
      .
      .
830      . CVG22.....
      .
      .
834      . . OG011A-C
      . . V
      . . V
839      . . ROG011A
      .
      .
843      . . . VG02-C
      .
      .
848      . . CVG02-C.....
      . . V
      . . V
852      . . RCVG02
      .
      .
858      . . . VG03-C
      .
      .
863      . . CVG03-C.....
      . . V
      . . V
867      . . RCVG03
      .
      .
873      . . . VG04-C
      .
      .
878      . . CVG04-C.....
      . . V
      . . V

```

882	.	.	RCVG04	.
886	.	.	.	WA08A
891	.	.	CWA08A.....	.
	.	.	V	.
	.	.	V	.
895	.	.	RCWA08A	.
899	.	.	.	VG06
904	.	.	CVG06.....	.
	.	.	V	.
	.	.	V	.
908	.	.	RCVG06	.
912	.	.	CCVG22.....	.
921	.	.	----->	LV15
916	.	.	DCVG20-C	.
	.	.	V	.
	.	.	V	.
924	.	.	RDCVG20-	.
932	.	.	.	<----- LV15
930	.	.	LV15	.
	.	.	V	.
	.	.	V	.
933	.	.	RLV15	.
937	.	.	.	DUMMY
943	.	.	CRLV15.....	.
946	.	.	.	WA12
951	.	.	.	WA13
956	.	.	.	CWA13.....
960	.	.	CWA13.....	.
963	.	.	.	WA14
968	.	.	CWA14.....	.
971	.	.	WA01-C	.
	.	.	V	.
	.	.	V	.
976	.	.	RWA01	.
980	.	.	.	WA04-C
985	.	.	CWA04-C.....	.
	.	.	V	.
	.	.	V	.
989	.	.	RCWA04	.
995	.	.	.	WA09-C
1000	.	.	CWA09-C.....	.

```

      V
      V
1004      RCWA09
      .
      .
1010      WA10-C
      .
1021      .-----> WA10SE
1015      WA10D
      .
1024      CWA10NW.....
      V
      V
1028      RCWA10NW
      .
1034      WA11-C
      .
1045      .-----> WA13SE
1039      CWA13
      V
      V
1048      RCRLV15
      .
1051      LC16-C
      .
1056      END.....

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   JAN 1997                      *
*   VERSION 4.1                   *
*
* RUN DATE 05MAR12 TIME 14:27:52 *
*
*****

```

```

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

```

CLV CENTRAL NEIGHBORHOOD FLOOD CONTROL MASTER PLAN 2003
 CENTRAL BASIN (NORTHWEST AREA)
 DESIGN STORM = 25-YEAR 6-HR STORM
 STORM DISTRIBUTION = SDN #3
 MODELED BY PBS&J (STEPHEN C. ALTMAN P.E.)
 INPUT FILE = ENW310.DAT
 INPUT FILE DATE = OCTOBER, 2003
 REFERENCED HYDROLOGIC MODELS:
 CITY OF LAS VEGAS CITY WIDE HYDROLOGY ANALYSIS (PBS&J 1997)
 RANCHO DRIVE DRAINAGE IMPROVEMENTS PEAK DRIVE TO LAKE MEAD BOULEVARD
 (MONTGOMERY WATSON 2000)
 CCRFCD 2002 LAS VEGAS VALLEY MASTER PLAN UPDATE (PBS&J, GCW, LBG)

EXISTING CONDITION = FUTURE LAND USE + EXISTING FACILITIES
 NO STORM CENTERING
 COMPOSITE CURVE NUMBERS
 2002 MPU SUBBASINS USED FOR OFFSITE AREAS EXCEPT WHERE SPECIFIED

NOTE: LOCATIONS AND DESCRIPTIONS OF PROPOSED MPU FACILITIES ARE STATED IN
 THE MODEL. HOWEVER, ROUTINGS IN THESE LOCATIONS REFLECT THE EXISTING
 CONDITION.

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

CONCENTRATION POINT	AREA SQ. MI.	DARF
	0-0.5	0.990
	0.5-1	0.975
	1-2	0.950
	2-3	0.925
	3-4	0.915
	4-5	0.908
	5-6	0.903

6-7 0.895
7-8 0.885

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)

100-YEAR, 6-HOUR STORM, SDN3

44 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

.73 .72 .70 .68 .68 .67 .67 .66 .65

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	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7	RATIO 8	RATIO 9
					.73	.72	.70	.68	.68	.67	.67	.66	.65
HYDROGRAPH AT													
+	OG04-C	.29	1	FLOW	204.	199.	192.	184.	181.	179.	178.	175.	172.
				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	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	DOG04-C	.29	1	FLOW	80.	75.	68.	60.	57.	55.	54.	51.	48.
				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	40.	37.	32.	27.	25.	23.	23.	21.	20.
				TIME	4.42	4.50	4.50	4.50	4.50	4.50	4.58	4.58	4.58
HYDROGRAPH AT													
+	OG05-C	.27	1	FLOW	172.	168.	162.	155.	153.	151.	150.	148.	145.
				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	172.	168.	162.	155.	153.	151.	150.	148.	145.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO													
+	RCOG05-C	.55	1	FLOW	172.	169.	163.	156.	154.	152.	151.	149.	146.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17

HYDROGRAPH AT													
+	CY06B-C	.50	1	FLOW TIME	180. 4.17	176. 4.17	168. 4.17	160. 4.17	157. 4.17	155. 4.17	153. 4.17	151. 4.17	147. 4.17
2 COMBINED AT													
+	CCY06B-C	1.05	1	FLOW TIME	353. 4.17	344. 4.17	331. 4.17	316. 4.17	311. 4.17	306. 4.17	304. 4.17	300. 4.17	294. 4.17
ROUTED TO													
+	RCCY06B	1.05	1	FLOW TIME	348. 4.17	341. 4.17	326. 4.25	313. 4.25	307. 4.25	302. 4.17	300. 4.25	297. 4.25	290. 4.25
HYDROGRAPH AT													
+	PDGCD-C	.44	1	FLOW TIME	121. 4.08	117. 4.08	111. 4.08	104. 4.08	101. 4.08	99. 4.08	98. 4.08	96. 4.08	94. 4.08
ROUTED TO													
+	RPDGCD-C	.44	1	FLOW TIME	121. 4.17	117. 4.17	109. 4.25	103. 4.25	100. 4.25	98. 4.25	97. 4.25	95. 4.25	93. 4.25
ROUTED TO													
+	RRPDGCD	.44	1	FLOW TIME	121. 4.25	117. 4.25	109. 4.25	102. 4.25	100. 4.25	98. 4.25	97. 4.25	95. 4.25	92. 4.25
HYDROGRAPH AT													
+	NW29B-C	.29	1	FLOW TIME	97. 3.92	94. 3.92	89. 3.92	84. 3.92	82. 3.92	80. 3.92	79. 3.92	78. 3.92	75. 3.92
ROUTED TO													
+	RNW29B-C	.29	1	FLOW TIME	98. 4.08	95. 4.08	88. 4.08	83. 4.08	81. 4.08	79. 4.08	78. 4.08	77. 4.08	74. 4.08
HYDROGRAPH AT													
+	NW1C2-C	.21	1	FLOW TIME	118. 3.83	115. 3.83	110. 3.83	105. 3.83	104. 3.83	102. 3.83	101. 3.83	100. 3.83	98. 3.83
2 COMBINED AT													
+	CNW1C2	.49	1	FLOW TIME	201. 4.00	195. 4.00	183. 4.00	174. 4.00	171. 4.00	168. 4.00	167. 4.00	164. 4.00	160. 4.00
ROUTED TO													
+	RCNW1C2	.49	1	FLOW TIME	201. 4.08	195. 4.08	184. 4.08	174. 4.08	171. 4.08	168. 4.08	167. 4.08	164. 4.08	160. 4.08
HYDROGRAPH AT													
+	PDGCB10-	.31	1	FLOW TIME	127. 3.92	124. 3.92	118. 3.92	112. 3.92	109. 3.92	108. 3.92	107. 3.92	105. 3.92	102. 3.92
2 COMBINED AT													
+	CPDGCB10	.80	1	FLOW TIME	314. 4.00	304. 4.00	287. 4.00	272. 4.00	266. 4.00	261. 4.00	259. 4.00	253. 4.00	247. 4.00
DIVERSION TO													
+	DPT3AA11	.80	1	FLOW TIME	139. 3.67	139. 3.67	139. 3.67	139. 3.75	139. 3.75	139. 3.75	139. 3.75	139. 3.75	139. 3.75
HYDROGRAPH AT													
+	DPDGCB10	.80	1	FLOW TIME	175. 4.00	165. 4.00	148. 4.00	133. 4.00	127. 4.00	122. 4.00	120. 4.00	114. 4.00	108. 4.00
2 COMBINED AT													
+	CPDGCB10	1.24	1	FLOW TIME	277. 4.08	264. 4.08	240. 4.08	219. 4.08	211. 4.08	204. 4.08	201. 4.08	194. 4.08	185. 4.08
ROUTED TO													
+	RCPDGCB	1.24	1	FLOW TIME	275. 4.17	263. 4.17	238. 4.17	218. 4.17	210. 4.17	203. 4.17	200. 4.17	193. 4.17	184. 4.17
HYDROGRAPH AT													
+	GD20BE-C	.43	1	FLOW TIME	161. 3.92	157. 3.92	149. 3.92	141. 3.92	138. 3.92	135. 3.92	134. 3.92	132. 3.92	128. 3.92
2 COMBINED AT													
+	CGD20BEC	1.67	1	FLOW TIME	416. 4.08	398. 4.08	364. 4.08	335. 4.08	325. 4.17	316. 4.17	312. 4.17	303. 4.17	292. 4.17
ROUTED TO													
+	RCGD20BE	1.67	1	FLOW TIME	410. 4.25	394. 4.25	363. 4.25	336. 4.25	326. 4.25	317. 4.25	313. 4.25	304. 4.25	293. 4.25
HYDROGRAPH AT													

+		GD20BM-C	.34	1	FLOW TIME	192. 3.92	187. 3.92	180. 3.92	173. 3.92	170. 3.92	167. 3.92	166. 3.92	164. 3.92	161. 3.92
	2 COMBINED AT													
+		CGD20BMC	2.01	1	FLOW TIME	555. 4.17	533. 4.17	494. 4.17	459. 4.17	443. 4.17	430. 4.17	424. 4.17	412. 4.25	399. 4.25
	ROUTED TO													
+		RCGD20BM	2.01	1	FLOW TIME	553. 4.25	531. 4.25	493. 4.25	452. 4.33	440. 4.33	429. 4.33	424. 4.33	412. 4.33	398. 4.33
	HYDROGRAPH AT													
+		GD17BG-C	.36	1	FLOW TIME	179. 3.92	175. 3.92	168. 3.92	160. 3.92	157. 3.92	155. 3.92	154. 3.92	151. 3.92	148. 3.92
	2 COMBINED AT													
+		CGD17BG	2.38	1	FLOW TIME	680. 4.25	655. 4.25	612. 4.25	563. 4.25	545. 4.25	529. 4.25	522. 4.25	505. 4.25	489. 4.33
	ROUTED TO													
+		RGD17BG	2.38	1	FLOW TIME	676. 4.33	650. 4.33	605. 4.33	556. 4.33	537. 4.33	523. 4.42	516. 4.42	503. 4.42	485. 4.42
	HYDROGRAPH AT													
+		GD11B-C	.26	1	FLOW TIME	199. 3.67	194. 3.67	187. 3.67	180. 3.67	177. 3.67	174. 3.67	173. 3.67	171. 3.67	168. 3.67
	2 COMBINED AT													
+		CGD11B-C	2.64	1	FLOW TIME	724. 4.33	697. 4.33	651. 4.33	599. 4.33	580. 4.33	564. 4.33	557. 4.33	540. 4.33	520. 4.42
	ROUTED TO													
+		RCGD11B	2.64	1	FLOW TIME	721. 4.42	694. 4.42	648. 4.42	596. 4.42	578. 4.42	561. 4.42	554. 4.42	537. 4.42	518. 4.50
	HYDROGRAPH AT													
+		PT6B-C	.45	1	FLOW TIME	152. 4.25	148. 4.25	141. 4.25	134. 4.25	132. 4.25	130. 4.25	129. 4.25	126. 4.25	124. 4.25
	2 COMBINED AT													
+		CPT6B-C	3.09	1	FLOW TIME	864. 4.42	834. 4.42	781. 4.42	723. 4.42	702. 4.42	684. 4.42	675. 4.42	657. 4.42	637. 4.42
	DIVERSION TO													
+		DGOW1A	3.09	1	FLOW TIME	560. 3.92	560. 4.00	560. 4.00	560. 4.00	560. 4.08	560. 4.08	560. 4.08	560. 4.08	560. 4.08
	HYDROGRAPH AT													
+		DPT6B-C1	3.09	1	FLOW TIME	304. 4.42	274. 4.42	221. 4.42	163. 4.42	142. 4.42	124. 4.42	115. 4.42	97. 4.42	72. 4.42
	DIVERSION TO													
+		DTRILGY	3.09	1	FLOW TIME	83. 4.42	74. 4.42	60. 4.42	47. 4.42	43. 4.42	40. 4.42	38. 4.42	34. 4.42	23. 4.42
	HYDROGRAPH AT													
+		DPT6B-C2	3.09	1	FLOW TIME	221. 4.42	199. 4.42	161. 4.42	116. 4.42	99. 4.42	84. 4.42	78. 4.42	63. 4.42	48. 4.42
	HYDROGRAPH AT													
+		PT2B2-C	.30	1	FLOW TIME	205. 3.83	200. 3.83	194. 3.83	186. 3.83	184. 3.83	181. 3.83	180. 3.83	178. 3.83	175. 3.83
	ROUTED TO													
+		RCPT2B2	.30	1	FLOW TIME	202. 3.92	198. 3.92	191. 3.92	184. 3.92	182. 3.92	179. 3.92	178. 3.92	176. 3.92	173. 3.92
	HYDROGRAPH AT													
+		PT3-C	.17	1	FLOW TIME	108. 3.83	105. 3.83	101. 3.83	97. 3.83	95. 3.83	94. 3.83	93. 3.83	92. 3.83	90. 3.83
	ROUTED TO													
+		RCPT3-C	.17	1	FLOW TIME	109. 4.08	106. 4.08	102. 4.08	98. 4.08	96. 4.08	95. 4.08	94. 4.08	93. 4.08	91. 4.08
	HYDROGRAPH AT													
+		PT41-C	.44	1	FLOW TIME	241. 3.83	235. 3.83	226. 3.83	216. 3.83	212. 3.83	209. 3.83	208. 3.83	205. 3.83	200. 3.83
	3 COMBINED AT													
+		CPT41-C	.91	1	FLOW	526.	513.	493.	471.	464.	457.	453.	447.	437.

				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
	RCPT41-C	.91	1	FLOW	522.	509.	489.	468.	460.	455.	452.	445.	437.
				TIME	3.92	3.92	3.92	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT													
+	PT5A2-C	.34	1	FLOW	132.	128.	123.	117.	115.	113.	112.	110.	108.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
2 COMBINED AT													
+	CPT5A2-C	1.25	1	FLOW	646.	631.	607.	580.	571.	563.	559.	551.	540.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RCPT5A2	1.25	1	FLOW	643.	626.	601.	576.	564.	557.	553.	544.	534.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT													
+	CCPT6B-C	4.34	1	FLOW	751.	719.	666.	616.	602.	588.	580.	569.	543.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO													
+	DGOWAN	4.34	1	FLOW	251.	219.	166.	116.	102.	88.	80.	69.	43.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	DRANCHO	4.34	1	FLOW	500.	500.	500.	500.	500.	500.	500.	500.	500.
				TIME	3.83	3.83	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RDRANCH	4.34	1	FLOW	502.	502.	503.	502.	502.	501.	501.	501.	502.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.08	4.08
HYDROGRAPH AT													
+	DTRILGY	.00	1	FLOW	83.	74.	60.	47.	43.	40.	38.	34.	23.
				TIME	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
HYDROGRAPH AT													
+	CY07B	.20	1	FLOW	111.	108.	104.	100.	98.	97.	96.	95.	93.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
3 COMBINED AT													
+	CCY07B	4.54	1	FLOW	646.	639.	628.	614.	610.	604.	601.	594.	590.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.00
DIVERSION TO													
+	DCENT1	4.54	1	FLOW	574.	567.	556.	542.	538.	532.	529.	522.	518.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17	4.00
HYDROGRAPH AT													
+	DCY07B	4.54	1	FLOW	72.	72.	72.	72.	72.	72.	72.	72.	72.
				TIME	3.42	3.42	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT													
+	DGOWAN	.00	1	FLOW	251.	219.	166.	116.	102.	88.	80.	69.	43.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RDGOWAN	.00	1	FLOW	256.	230.	193.	118.	102.	91.	86.	74.	44.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	DGOW1A	.00	1	FLOW	560.	560.	560.	560.	560.	560.	560.	560.	560.
				TIME	3.92	4.00	4.00	4.00	4.08	4.08	4.08	4.08	4.08
ROUTED TO													
+	RDGOW1A	.00	1	FLOW	561.	560.	561.	561.	560.	561.	561.	561.	561.
				TIME	4.00	4.08	4.08	4.08	4.17	4.17	4.17	4.17	4.17
2 COMBINED AT													
+	CCPT6B-C	.00	1	FLOW	816.	790.	753.	678.	662.	651.	646.	634.	604.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT													
+	CY08-C	.09	1	FLOW	62.	60.	58.	55.	54.	54.	53.	52.	51.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT													
+	CCY08-C	4.64	1	FLOW	910.	884.	846.	770.	750.	739.	734.	721.	692.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33	4.33	4.33	4.33

DIVERSION TO													
+	DCENTRAL	4.64	1	FLOW TIME	280. 4.25	254. 4.25	216. 4.25	140. 4.25	120. 4.33	109. 4.33	104. 4.33	91. 4.33	4.33
HYDROGRAPH AT													
+	DGOW2A	4.64	1	FLOW TIME	630. 3.92	630. 3.92	630. 4.00	630. 4.00	630. 4.00	630. 4.08	630. 4.08	630. 4.08	630. 4.08
DIVERSION TO													
+	D3ALL	4.64	1	FLOW TIME	630. 3.92	630. 3.92	630. 4.00	630. 4.00	630. 4.00	630. 4.08	630. 4.08	630. 4.08	630. 4.08
HYDROGRAPH AT													
+	D3ALL	4.64	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT													
+	DCENT1	.00	1	FLOW TIME	574. 4.08	567. 4.08	556. 4.08	542. 4.17	538. 4.17	532. 4.17	529. 4.17	522. 4.17	518. 4.00
ROUTED TO													
+	RDCEM1	.00	1	FLOW TIME	576. 4.17	569. 4.17	556. 4.25	544. 4.25	538. 4.25	530. 4.25	526. 4.25	523. 4.08	521. 4.08
3 COMBINED AT													
+	CRGOWAN	5.69	1	FLOW TIME	925. 4.17	911. 4.17	883. 4.25	857. 4.25	845. 4.25	832. 4.25	826. 4.25	814. 4.25	806. 4.17
ROUTED TO													
+	RCRGOWAN	5.69	1	FLOW TIME	923. 4.25	906. 4.25	881. 4.25	850. 4.25	840. 4.25	832. 4.25	826. 4.25	811. 4.25	801. 4.25
HYDROGRAPH AT													
+	PD05A-C	.14	1	FLOW TIME	99. 3.83	97. 3.83	94. 3.83	90. 3.83	89. 3.83	88. 3.83	88. 3.83	86. 3.83	85. 3.83
2 COMBINED AT													
+	CPD05A-C	5.83	1	FLOW TIME	976. 4.25	958. 4.25	931. 4.25	898. 4.25	888. 4.25	879. 4.25	872. 4.25	859. 4.17	850. 4.17
DIVERSION TO													
+	DA1-C	5.83	1	FLOW TIME	211. 3.75	211. 3.75	211. 3.75	211. 3.75	211. 3.75	211. 3.83	211. 3.83	211. 3.83	211. 3.83
HYDROGRAPH AT													
+	DCPD05A	5.83	1	FLOW TIME	765. 4.25	747. 4.25	720. 4.25	687. 4.25	677. 4.25	668. 4.25	661. 4.25	648. 4.17	639. 4.17
ROUTED TO													
+	RCPD05	5.83	1	FLOW TIME	761. 4.25	747. 4.25	713. 4.25	685. 4.25	673. 4.25	663. 4.25	658. 4.25	649. 4.25	639. 4.25
HYDROGRAPH AT													
+	DPD01	.00	1	FLOW TIME	124. 3.58	124. 3.58	124. 3.58	124. 3.58	124. 3.58	124. 3.58	124. 3.58	124. 3.58	124. 3.58
ROUTED TO													
+	RDPD01	.00	1	FLOW TIME	132. 3.75	131. 3.75	129. 3.75	128. 3.83	129. 3.83	129. 3.83	129. 3.83	130. 3.83	130. 3.83
HYDROGRAPH AT													
+	PD01-C	.38	1	FLOW TIME	152. 3.92	148. 3.92	141. 3.92	134. 3.92	131. 3.92	129. 3.92	127. 3.92	125. 3.92	122. 3.92
2 COMBINED AT													
+	CPD01-C	.38	1	FLOW TIME	274. 3.92	270. 3.83	264. 3.83	258. 3.83	256. 3.83	254. 3.83	253. 3.83	251. 3.83	249. 3.83
ROUTED TO													
+	RCPD01	.38	1	FLOW TIME	274. 3.92	270. 3.92	263. 3.92	257. 3.92	254. 3.92	252. 3.92	252. 3.92	249. 3.92	246. 3.92
HYDROGRAPH AT													
+	CY04A-C	.46	1	FLOW TIME	210. 3.92	204. 3.92	195. 3.92	186. 3.92	183. 3.92	180. 3.92	178. 3.92	176. 3.92	172. 3.92
2 COMBINED AT													
+	CCY04A-C	.83	1	FLOW TIME	484. 3.92	474. 3.92	458. 3.92	443. 3.92	437. 3.92	432. 3.92	430. 3.92	425. 3.92	417. 3.92

DIVERSION TO	DLVSR1	.83	1	FLOW TIME	231. 3.67	231. 3.67	231. 3.67	231. 3.67	231. 3.67	231. 3.67	231. 3.67	231. 3.67	231. 3.67
HYDROGRAPH AT													
+ HYDROGRAPH AT	DCY04C	.83	1	FLOW TIME	253. 3.92	243. 3.92	227. 3.92	212. 3.92	206. 3.92	201. 3.92	199. 3.92	194. 3.92	187. 3.92
ROUTED TO													
+ ROUTED TO	RCCY04A	.83	1	FLOW TIME	256. 4.00	244. 4.00	225. 4.00	217. 3.92	212. 3.92	209. 3.92	209. 3.92	205. 3.92	198. 3.92
HYDROGRAPH AT													
+ HYDROGRAPH AT	PD04B-C	.47	1	FLOW TIME	216. 4.00	211. 4.00	202. 4.00	193. 4.00	190. 4.00	187. 4.00	186. 4.00	183. 4.00	179. 4.00
2 COMBINED AT													
+ 2 COMBINED AT	CPD04B-C	1.30	1	FLOW TIME	472. 4.00	455. 4.00	428. 4.00	405. 3.92	397. 3.92	391. 3.92	389. 3.92	383. 3.92	372. 3.92
2 COMBINED AT													
+ 2 COMBINED AT	CCPD04B-	7.13	1	FLOW TIME	1150. 4.17	1126. 4.17	1074. 4.17	1018. 4.17	995. 4.17	979. 4.17	970. 4.17	953. 4.17	931. 4.17
ROUTED TO													
+ ROUTED TO	RCPD04B	7.13	1	FLOW TIME	1136. 4.17	1112. 4.17	1059. 4.17	1005. 4.25	985. 4.25	969. 4.25	962. 4.25	945. 4.25	926. 4.25
HYDROGRAPH AT													
+ HYDROGRAPH AT	OG03-C	.32	1	FLOW TIME	172. 3.83	168. 3.83	160. 3.83	153. 3.83	150. 3.83	148. 3.83	147. 3.83	144. 3.83	141. 3.83
ROUTED TO													
+ ROUTED TO	ROG03-C	.32	1	FLOW TIME	172. 4.00	167. 4.00	160. 4.00	153. 4.00	150. 4.00	148. 4.00	147. 4.00	145. 4.00	142. 4.00
HYDROGRAPH AT													
+ HYDROGRAPH AT	OG02-C	.32	1	FLOW TIME	212. 3.75	208. 3.75	200. 3.75	192. 3.75	189. 3.75	186. 3.75	185. 3.75	182. 3.75	179. 3.75
ROUTED TO													
+ ROUTED TO	ROG02-C	.32	1	FLOW TIME	215. 3.92	210. 3.92	202. 3.92	194. 3.92	191. 3.92	189. 3.92	187. 3.92	185. 3.92	181. 3.92
HYDROGRAPH AT													
+ HYDROGRAPH AT	LM01-C	.33	1	FLOW TIME	119. 3.92	115. 3.92	110. 3.92	103. 3.92	101. 3.92	99. 3.92	98. 3.92	96. 3.92	94. 3.92
2 COMBINED AT													
+ 2 COMBINED AT	CLM01-C	.64	1	FLOW TIME	334. 3.92	326. 3.92	312. 3.92	298. 3.92	292. 3.92	288. 3.92	286. 3.92	281. 3.92	275. 3.92
DIVERSION TO													
+ DIVERSION TO	DSR01F	.64	1	FLOW TIME	229. 3.92	224. 3.92	216. 3.92	207. 3.92	204. 3.92	201. 3.92	200. 3.92	197. 3.92	193. 3.92
HYDROGRAPH AT													
+ HYDROGRAPH AT	SR01E	.64	1	FLOW TIME	105. 3.92	102. 3.92	96. 3.92	91. 3.92	88. 3.92	87. 3.92	86. 3.92	84. 3.92	81. 3.92
ROUTED TO													
+ ROUTED TO	RCLM01-C	.64	1	FLOW TIME	103. 3.92	99. 3.92	94. 3.92	88. 4.00	86. 3.92	84. 4.00	83. 3.92	82. 4.00	79. 3.92
HYDROGRAPH AT													
+ HYDROGRAPH AT	SR00A-C	.37	1	FLOW TIME	150. 3.92	145. 3.92	139. 3.92	131. 3.92	129. 3.92	126. 3.92	125. 3.92	123. 3.92	120. 3.92
2 COMBINED AT													
+ 2 COMBINED AT	CSR00A	1.01	1	FLOW TIME	253. 3.92	245. 3.92	233. 3.92	218. 3.92	215. 3.92	209. 3.92	208. 3.92	204. 3.92	199. 3.92
2 COMBINED AT													
+ 2 COMBINED AT	CCSR00A	1.34	1	FLOW TIME	423. 3.92	410. 3.92	391. 3.92	369. 3.92	363. 3.92	355. 4.00	352. 3.92	346. 4.00	338. 3.92
ROUTED TO													
+ ROUTED TO	RCSR00A	1.34	1	FLOW TIME	418. 4.00	407. 4.00	388. 4.00	368. 4.00	361. 4.00	354. 4.00	351. 4.00	346. 4.00	337. 4.00
HYDROGRAPH AT													

+	DLVSR1	.00	1	FLOW TIME	231. 3.67	231. 3.67	231. 3.67	231. 3.67	231. 3.67	231. 3.67	231. 3.67	231. 3.67	231. 3.67
ROUTED TO													
+	RDLVSR1	.00	1	FLOW TIME	231. 3.92	231. 3.92	231. 3.92	231. 3.92	231. 3.92	231. 3.92	231. 3.92	231. 3.92	231. 3.92
HYDROGRAPH AT													
+	SR02E-C	.30	1	FLOW TIME	154. 3.83	150. 3.83	144. 3.83	137. 3.83	134. 3.83	132. 3.83	131. 3.83	129. 3.83	126. 3.83
3 COMBINED AT													
+	CSR02E	1.64	1	FLOW TIME	791. 3.92	774. 3.92	749. 3.92	720. 3.92	711. 3.92	702. 3.92	699. 3.92	690. 3.92	679. 3.92
ROUTED TO													
+	RCSR02E	1.64	1	FLOW TIME	786. 4.00	769. 4.00	745. 4.00	718. 4.00	710. 4.00	699. 4.00	696. 4.00	690. 4.00	677. 4.00
HYDROGRAPH AT													
+	SR05D-C	.30	1	FLOW TIME	157. 4.00	154. 4.00	148. 4.00	142. 4.00	140. 4.00	138. 4.00	137. 4.00	135. 4.00	132. 4.00
2 COMBINED AT													
+	CSR05D	1.94	1	FLOW TIME	943. 4.00	923. 4.00	892. 4.00	860. 4.00	850. 4.00	837. 4.00	833. 4.00	824. 4.00	810. 4.00
ROUTED TO													
+	RCSR05D	1.94	1	FLOW TIME	940. 4.00	920. 4.00	889. 4.00	855. 4.00	845. 4.00	833. 4.00	829. 4.00	819. 4.00	805. 4.00
HYDROGRAPH AT													
+	SR05B-C	.36	1	FLOW TIME	157. 4.08	153. 4.08	147. 4.08	141. 4.17	138. 4.17	136. 4.17	135. 4.17	133. 4.17	131. 4.17
2 COMBINED AT													
+	CSR05B	2.30	1	FLOW TIME	1091. 4.00	1067. 4.00	1030. 4.00	990. 4.00	978. 4.00	964. 4.00	959. 4.00	947. 4.00	930. 4.00
DIVERSION TO													
+	DLVSR2	2.30	1	FLOW TIME	231. 3.58	231. 3.58	231. 3.58	231. 3.58	231. 3.58	231. 3.58	231. 3.58	231. 3.58	231. 3.58
HYDROGRAPH AT													
+	DCSR05B	2.30	1	FLOW TIME	860. 4.00	836. 4.00	799. 4.00	759. 4.00	747. 4.00	733. 4.00	728. 4.00	716. 4.00	699. 4.00
DIVERSION TO													
+	DLVSR3	2.30	1	FLOW TIME	182. 3.67	182. 3.67	182. 3.67	182. 3.67	182. 3.67	182. 3.67	182. 3.67	182. 3.67	182. 3.75
HYDROGRAPH AT													
+	DDCSR05B	2.30	1	FLOW TIME	678. 4.00	654. 4.00	617. 4.00	577. 4.00	565. 4.00	551. 4.00	546. 4.00	534. 4.00	517. 4.00
DIVERSION TO													
+	DLVRA	2.30	1	FLOW TIME	670. 4.00	654. 4.00	617. 4.00	577. 4.00	565. 4.00	551. 4.00	546. 4.00	534. 4.00	517. 4.00
HYDROGRAPH AT													
+	D3CSR05B	2.30	1	FLOW TIME	8. 4.00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
DIVERSION TO													
+	DRAN	2.30	1	FLOW TIME	4. 4.00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT													
+	D4CSR05B	2.30	1	FLOW TIME	4. 4.00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
DIVERSION TO													
+	DSMOKE	2.30	1	FLOW TIME	4. 4.00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT													
+	DSR05B	2.30	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT													
+	DLVSR3	.00	1	FLOW	182.	182.	182.	182.	182.	182.	182.	182.	182.

				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.75
3 COMBINED AT													
+	CCSR05B	9.43	1	FLOW TIME	1318. 4.17	1294. 4.17	1241. 4.17	1187. 4.25	1167. 4.25	1151. 4.25	1144. 4.25	1127. 4.25	1108. 4.25
DIVERSION TO													
+	DLVSR4	9.43	1	FLOW TIME	1318. 4.17	1294. 4.17	1241. 4.17	1187. 4.25	1167. 4.25	1151. 4.25	1144. 4.25	1127. 4.25	1108. 4.25
HYDROGRAPH AT													
+	DCCSR05B	9.43	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT													
+	DSR01F	.00	1	FLOW TIME	229. 3.92	224. 3.92	216. 3.92	207. 3.92	204. 3.92	201. 3.92	200. 3.92	197. 3.92	193. 3.92
ROUTED TO													
+	RDSR01F	.00	1	FLOW TIME	227. 3.92	222. 3.92	214. 3.92	204. 3.92	202. 3.92	199. 3.92	197. 3.92	194. 3.92	192. 3.92
HYDROGRAPH AT													
+	LM02-C	.29	1	FLOW TIME	141. 3.83	137. 3.83	131. 3.83	124. 3.83	122. 3.83	120. 3.83	119. 3.83	117. 3.83	114. 3.83
2 COMBINED AT													
+	CLM02-C	.29	1	FLOW TIME	361. 3.92	352. 3.92	338. 3.92	323. 3.92	318. 3.92	313. 3.92	311. 3.92	306. 3.92	300. 3.92
ROUTED TO													
+	RCLM02-C	.29	1	FLOW TIME	359. 3.92	349. 3.92	335. 3.92	320. 3.92	315. 3.92	311. 3.92	308. 3.92	302. 3.92	298. 3.92
HYDROGRAPH AT													
+	LM03-C	.34	1	FLOW TIME	221. 3.83	216. 3.83	208. 3.83	200. 3.83	197. 3.83	194. 3.83	193. 3.83	190. 3.83	187. 3.83
2 COMBINED AT													
+	CLM03-C	.63	1	FLOW TIME	567. 3.92	554. 3.92	532. 3.92	509. 3.92	501. 3.92	495. 3.92	490. 3.92	482. 3.92	475. 3.92
ROUTED TO													
+	RCLM03-C	.63	1	FLOW TIME	565. 3.92	551. 3.92	529. 3.92	506. 3.92	499. 3.92	491. 3.92	487. 3.92	480. 3.92	471. 3.92
HYDROGRAPH AT													
+	LM05-C	.37	1	FLOW TIME	207. 3.83	202. 3.83	194. 3.83	185. 3.83	182. 3.83	179. 3.83	178. 3.83	175. 3.83	172. 3.83
2 COMBINED AT													
+	CLM05-C	.99	1	FLOW TIME	764. 3.92	745. 3.92	716. 3.92	684. 3.92	674. 3.92	664. 3.92	658. 3.92	649. 3.92	637. 3.92
ROUTED TO													
+	RCLM05-C	.99	1	FLOW TIME	752. 3.92	734. 3.92	704. 3.92	672. 3.92	661. 3.92	652. 3.92	647. 3.92	637. 3.92	624. 3.92
HYDROGRAPH AT													
+	LM06B-C	.35	1	FLOW TIME	196. 3.92	192. 3.92	184. 3.92	177. 3.92	174. 3.92	171. 3.92	170. 3.92	168. 3.92	164. 3.92
2 COMBINED AT													
+	CLM06-C	1.35	1	FLOW TIME	949. 3.92	926. 3.92	888. 3.92	849. 3.92	835. 3.92	823. 3.92	817. 3.92	804. 3.92	789. 3.92
DIVERSION TO													
+	DLVLM4	1.35	1	FLOW TIME	940. 3.92	926. 3.92	888. 3.92	849. 3.92	835. 3.92	823. 3.92	817. 3.92	804. 3.92	789. 3.92
HYDROGRAPH AT													
+	DLVLMRA	1.35	1	FLOW TIME	9. 3.92	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
DIVERSION TO													
+	DVALDR	1.35	1	FLOW TIME	3. 3.92	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT													
+	DSURF1	1.35	1	FLOW TIME	6. 3.92	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00

HYDROGRAPH AT +	DLVRA	.00	1	FLOW TIME	670. 4.00	654. 4.00	617. 4.00	577. 4.00	565. 4.00	551. 4.00	546. 4.00	534. 4.00	511. 4.00
ROUTED TO +	RDLVRA	.00	1	FLOW TIME	663. 4.00	645. 4.00	608. 4.00	570. 4.08	556. 4.08	544. 4.08	539. 4.08	527. 4.08	512. 4.08
HYDROGRAPH AT +	DRAN	.00	1	FLOW TIME	4. 4.00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
ROUTED TO +	RDRAN	.00	1	FLOW TIME	3. 4.17	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT +	DLVLM4	.00	1	FLOW TIME	940. 3.92	926. 3.92	888. 3.92	849. 3.92	835. 3.92	823. 3.92	817. 3.92	804. 3.92	789. 3.92
4 COMBINED AT +	CCLM06-C	1.35	1	FLOW TIME	1599. 4.00	1559. 4.00	1487. 4.00	1409. 4.00	1383. 4.00	1358. 4.00	1346. 4.00	1321. 4.00	1292. 4.00
DIVERSION TO +	DLVLM5	1.35	1	FLOW TIME	940. 3.75	940. 3.75	940. 3.83	940. 3.83	940. 3.83	940. 3.83	940. 3.83	940. 3.83	940. 3.83
HYDROGRAPH AT +	DLVLMRA	1.35	1	FLOW TIME	659. 4.00	619. 4.00	547. 4.00	469. 4.00	443. 4.00	418. 4.00	406. 4.00	381. 4.00	352. 4.00
DIVERSION TO +	DLAKEM	1.35	1	FLOW TIME	220. 4.00	206. 4.00	182. 4.00	156. 4.00	148. 4.00	139. 4.00	135. 4.00	127. 4.00	117. 4.00
HYDROGRAPH AT +	DSURF2	1.35	1	FLOW TIME	439. 4.00	413. 4.00	364. 4.00	312. 4.00	295. 4.00	279. 4.00	270. 4.00	254. 4.00	234. 4.00
DIVERSION TO +	DRAN119	1.35	1	FLOW TIME	168. 3.83	168. 3.83	168. 3.83	168. 3.92	168. 3.92	168. 3.92	168. 3.92	168. 3.92	168. 3.92
HYDROGRAPH AT +	D1LM09	1.35	1	FLOW TIME	271. 4.00	245. 4.00	196. 4.00	144. 4.00	127. 4.00	111. 4.00	102. 4.00	86. 4.00	66. 4.00
DIVERSION TO +	DRAN118	1.35	1	FLOW TIME	168. 3.92	168. 3.92	168. 4.00	144. 4.00	127. 4.00	111. 4.00	102. 4.00	86. 4.00	66. 4.00
HYDROGRAPH AT +	D2LM09	1.35	1	FLOW TIME	103. 4.00	77. 4.00	28. 4.00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
ROUTED TO +	RD2LM09	1.35	1	FLOW TIME	91. 4.00	62. 4.00	19. 4.08	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT +	DVALDR	.00	1	FLOW TIME	3. 3.92	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT +	LM09	.12	1	FLOW TIME	115. 3.67	113. 3.67	109. 3.67	105. 3.67	103. 3.67	102. 3.67	102. 3.67	100. 3.67	99. 3.67
3 COMBINED AT +	CLM09	1.47	1	FLOW TIME	138. 4.00	113. 3.67	109. 3.67	105. 3.67	103. 3.67	102. 3.67	102. 3.67	100. 3.67	99. 3.67
DIVERSION TO +	DCORAN	1.47	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT +	D3LM09	1.47	1	FLOW TIME	138. 4.00	113. 3.67	109. 3.67	105. 3.67	103. 3.67	102. 3.67	102. 3.67	100. 3.67	99. 3.67

ROUTED TO													
+	RD3LM09	1.47	1	FLOW TIME	130. 4.08	113. 3.67	108. 3.67	105. 3.67	103. 3.67	102. 3.67	102. 3.67	100. 3.67	98. 3.67
HYDROGRAPH AT													
+	VG21	.10	1	FLOW TIME	73. 3.67	71. 3.67	68. 3.67	66. 3.67	64. 3.67	63. 3.67	63. 3.67	62. 3.67	61. 3.67
2 COMBINED AT													
+	CVG21	1.57	1	FLOW TIME	189. 3.67	185. 3.67	177. 3.67	171. 3.67	167. 3.67	165. 3.67	165. 3.67	162. 3.67	159. 3.67
DIVERSION TO													
+	DHOLLY	1.57	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT													
+	DVG21	1.57	1	FLOW TIME	189. 3.67	185. 3.67	177. 3.67	171. 3.67	167. 3.67	165. 3.67	165. 3.67	162. 3.67	159. 3.67
HYDROGRAPH AT													
+	LM08	.06	1	FLOW TIME	56. 3.58	55. 3.58	53. 3.58	51. 3.58	50. 3.58	49. 3.58	49. 3.58	48. 3.58	48. 3.58
ROUTED TO													
+	RLM08	.06	1	FLOW TIME	54. 3.83	52. 3.83	51. 3.83	48. 3.83	47. 3.83	47. 3.83	47. 3.83	46. 3.83	47. 3.83
HYDROGRAPH AT													
+	VG20	.13	1	FLOW TIME	89. 3.75	87. 3.75	84. 3.75	81. 3.75	79. 3.75	78. 3.75	78. 3.75	77. 3.75	75. 3.75
3 COMBINED AT													
+	CVG20	1.76	1	FLOW TIME	312. 3.75	305. 3.75	293. 3.75	280. 3.75	276. 3.75	272. 3.75	271. 3.75	267. 3.75	263. 3.75
ROUTED TO													
+	RCVG20	1.76	1	FLOW TIME	310. 3.75	303. 3.75	291. 3.75	279. 3.75	274. 3.75	271. 3.75	269. 3.75	265. 3.75	261. 3.75
HYDROGRAPH AT													
+	VG22	.18	1	FLOW TIME	113. 3.83	111. 3.83	107. 3.83	102. 3.83	101. 3.83	100. 3.83	99. 3.83	98. 3.83	96. 3.83
2 COMBINED AT													
+	CVG22	1.94	1	FLOW TIME	418. 3.75	408. 3.75	392. 3.75	375. 3.75	369. 3.75	365. 3.75	362. 3.75	357. 3.75	351. 3.75
HYDROGRAPH AT													
+	OG011A-C	.44	1	FLOW TIME	201. 3.92	196. 3.92	187. 3.92	178. 3.92	174. 3.92	172. 3.92	170. 3.92	167. 3.92	163. 3.92
ROUTED TO													
+	ROG011A	.44	1	FLOW TIME	202. 4.00	196. 4.00	188. 4.00	178. 4.00	175. 4.00	172. 4.00	171. 4.00	168. 4.00	164. 4.00
HYDROGRAPH AT													
+	VG02-C	.22	1	FLOW TIME	83. 3.83	81. 3.83	76. 3.83	72. 3.83	70. 3.83	69. 3.83	68. 3.83	67. 3.83	65. 3.83
2 COMBINED AT													
+	CVG02-C	.67	1	FLOW TIME	280. 3.92	272. 3.92	259. 3.92	245. 3.92	240. 3.92	236. 3.92	234. 3.92	229. 3.92	224. 4.00
ROUTED TO													
+	RCVG02	.67	1	FLOW TIME	280. 4.00	272. 4.00	259. 4.00	245. 4.00	240. 4.08	236. 4.08	234. 4.08	230. 4.08	225. 4.08
HYDROGRAPH AT													
+	VG03-C	.28	1	FLOW TIME	87. 3.92	84. 3.92	80. 3.92	75. 3.92	73. 3.92	71. 3.92	71. 3.92	69. 3.92	67. 3.92
2 COMBINED AT													
+	CVG03-C	.94	1	FLOW TIME	362. 4.00	351. 4.00	334. 4.00	316. 4.00	309. 4.00	303. 4.00	300. 4.00	295. 4.00	287. 4.00
ROUTED TO													
+	RCVG03	.94	1	FLOW TIME	363. 4.08	352. 4.08	334. 4.08	316. 4.08	309. 4.08	304. 4.08	301. 4.08	295. 4.08	287. 4.08
HYDROGRAPH AT													

+	VG04-C	.24	1	FLOW TIME	162. 3.83	159. 3.83	153. 3.83	147. 3.83	145. 3.83	143. 3.83	142. 3.83	140. 3.83	137. 3.83
2 COMBINED AT													
+	CVG04-C	1.18	1	FLOW TIME	483. 4.00	469. 4.00	446. 4.00	422. 4.00	413. 4.00	405. 4.00	402. 4.00	394. 4.00	384. 4.00
ROUTED TO													
+	RCVG04	1.18	1	FLOW TIME	485. 4.08	470. 4.08	447. 4.08	423. 4.08	415. 4.08	407. 4.08	403. 4.08	396. 4.08	386. 4.08
HYDROGRAPH AT													
+	WA08A	.03	1	FLOW TIME	26. 3.58	26. 3.58	25. 3.58	24. 3.58	24. 3.58	23. 3.58	23. 3.58	23. 3.58	22. 3.58
2 COMBINED AT													
+	CWA08A	1.21	1	FLOW TIME	491. 4.08	477. 4.08	454. 4.08	430. 4.08	421. 4.08	413. 4.08	409. 4.08	402. 4.08	391. 4.08
ROUTED TO													
+	RCWA08A	1.21	1	FLOW TIME	489. 4.17	475. 4.17	453. 4.25	430. 4.25	422. 4.25	415. 4.25	411. 4.25	404. 4.25	395. 4.25
HYDROGRAPH AT													
+	VG06	.19	1	FLOW TIME	118. 3.75	115. 3.75	110. 3.75	105. 3.75	104. 3.75	102. 3.75	101. 3.75	100. 3.75	98. 3.75
2 COMBINED AT													
+	CVG06	1.40	1	FLOW TIME	537. 4.17	521. 4.17	495. 4.17	468. 4.17	457. 4.17	449. 4.17	444. 4.17	437. 4.25	427. 4.25
ROUTED TO													
+	RCVG06	1.40	1	FLOW TIME	531. 4.25	517. 4.25	493. 4.25	467. 4.25	455. 4.25	448. 4.25	445. 4.25	436. 4.25	424. 4.25
2 COMBINED AT													
+	CCVG22	3.33	1	FLOW TIME	791. 4.08	746. 4.17	681. 4.17	633. 4.17	619. 4.17	608. 4.17	604. 4.17	590. 4.17	575. 4.17
DIVERSION TO													
+	LV15	3.33	1	FLOW TIME	55. 4.08	44. 4.17	28. 4.17	16. 4.17	12. 4.17	10. 4.17	8. 4.17	5. 4.17	4. 4.17
HYDROGRAPH AT													
+	DCVG20-C	3.33	1	FLOW TIME	736. 4.08	702. 4.17	653. 4.17	617. 4.17	607. 4.17	599. 4.17	595. 4.17	585. 4.17	574. 4.17
ROUTED TO													
+	RDCVG20-	3.33	1	FLOW TIME	734. 4.17	702. 4.17	652. 4.17	616. 4.17	606. 4.17	598. 4.17	594. 4.17	584. 4.17	573. 4.17
HYDROGRAPH AT													
+	LV15	.00	1	FLOW TIME	55. 4.08	44. 4.17	28. 4.17	16. 4.17	12. 4.17	10. 4.17	8. 4.17	5. 4.17	1. 4.17
ROUTED TO													
+	RLV15	.00	1	FLOW TIME	55. 4.33	41. 4.33	26. 4.42	15. 4.50	11. 4.50	8. 4.58	7. 4.58	4. 4.67	0. 5.00
HYDROGRAPH AT													
+	DUMMY	.00	1	FLOW TIME	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50
2 COMBINED AT													
+	CRLV15	.00	1	FLOW TIME	55. 4.33	41. 4.33	26. 4.42	15. 4.50	12. 4.50	8. 4.58	7. 4.58	4. 4.67	0. 5.00
HYDROGRAPH AT													
+	WA12	.07	1	FLOW TIME	69. 3.58	67. 3.58	65. 3.58	62. 3.58	62. 3.58	61. 3.58	60. 3.58	60. 3.58	58. 3.58
HYDROGRAPH AT													
+	WA13	.16	1	FLOW TIME	119. 3.75	116. 3.75	112. 3.75	108. 3.75	106. 3.75	105. 3.75	104. 3.75	103. 3.75	101. 3.75
2 COMBINED AT													
+	CWA13	.23	1	FLOW TIME	170. 3.67	166. 3.67	160. 3.67	153. 3.67	151. 3.67	149. 3.67	148. 3.67	146. 3.67	143. 3.67
2 COMBINED AT													
+	CWA13	.23	1	FLOW	170.	166.	160.	154.	151.	149.	148.	146.	144.

				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
(	HYDROGRAPH AT												
	WA14	.04	1	FLOW	37.	36.	35.	34.	33.	33.	32.	32.	31.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
	2 COMBINED AT												
+	CWA14	.27	1	FLOW	206.	202.	195.	187.	184.	182.	180.	178.	175.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
	HYDROGRAPH AT												
+	WA01-C	.22	1	FLOW	148.	144.	138.	132.	130.	128.	127.	125.	122.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
	ROUTED TO												
+	RWA01	.22	1	FLOW	149.	145.	140.	134.	131.	129.	129.	127.	124.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
	HYDROGRAPH AT												
+	WA04-C	.22	1	FLOW	111.	108.	104.	99.	98.	96.	96.	94.	92.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
	2 COMBINED AT												
+	CWA04-C	.44	1	FLOW	260.	254.	244.	233.	229.	226.	224.	221.	216.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
	ROUTED TO												
+	RCWA04	.44	1	FLOW	264.	258.	248.	237.	233.	230.	228.	225.	220.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
	HYDROGRAPH AT												
+	WA09-C	.09	1	FLOW	65.	63.	61.	59.	58.	57.	57.	56.	55.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
	2 COMBINED AT												
+	CWA09-C	.53	1	FLOW	308.	301.	289.	276.	272.	269.	267.	263.	258.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
	ROUTED TO												
+	RCWA09	.53	1	FLOW	304.	295.	284.	270.	265.	262.	259.	255.	249.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
(	HYDROGRAPH AT												
+	WA10-C	.45	1	FLOW	314.	307.	296.	285.	281.	277.	275.	271.	267.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	DIVERSION TO												
+	WA10SE	.45	1	FLOW	250.	250.	250.	250.	250.	250.	250.	250.	250.
				TIME	3.67	3.67	3.67	3.67	3.67	3.75	3.75	3.75	3.75
	HYDROGRAPH AT												
+	WA10D	.45	1	FLOW	64.	57.	46.	35.	31.	27.	25.	21.	17.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	2 COMBINED AT												
+	CWA10NW	.98	1	FLOW	304.	295.	284.	270.	265.	262.	259.	255.	249.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
	ROUTED TO												
+	RCWA10NW	.98	1	FLOW	300.	295.	288.	280.	278.	275.	273.	269.	262.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
	HYDROGRAPH AT												
+	WA11-C	.09	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
	DIVERSION TO												
+	WA13SE	.09	1	FLOW	31.	30.	29.	28.	27.	27.	27.	26.	26.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	HYDROGRAPH AT												
+	CWA13	.09	1	FLOW	20.	20.	19.	18.	18.	17.	17.	17.	17.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
	ROUTED TO												
+	RCRLV15	.09	1	FLOW	20.	20.	19.	18.	18.	18.	17.	17.	17.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
(	HYDROGRAPH AT												
	LC16-C	.26	1	FLOW	149.	145.	139.	132.	130.	128.	127.	125.	123.
				TIME	3.75	3.75	3.75	3.75	3.75	3.83	3.83	3.83	3.83

4 COMBINED AT
 + END 1.60 1 FLOW 481. 458. 425. 398. 394. 390. 387. 382. 3
 TIME 4.17 4.17 4.25 4.25 4.25 4.25 4.25 4.25 4.25

1

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

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	DT (MIN)	INTERPOLATED TO COMPUTATION INTERVAL		VOLUME (IN)
							PEAK (CFS)	TIME TO PEAK (MIN)	
FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	40.12	265.00	.14	5.00	40.12	265.00	.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2362E+01 EXCESS= .0000E+00 OUTFLOW= .2224E+01 BASIN STORAGE= .5966E-02 PERCENT ERROR= 5.6

FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	36.75	270.00	.13	5.00	36.75	270.00	.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2197E+01 EXCESS= .0000E+00 OUTFLOW= .2059E+01 BASIN STORAGE= .5730E-02 PERCENT ERROR= 6.0

FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	32.38	270.00	.12	5.00	32.38	270.00	.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1927E+01 EXCESS= .0000E+00 OUTFLOW= .1801E+01 BASIN STORAGE= .8164E-02 PERCENT ERROR= 6.1

FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	27.47	270.00	.10	5.00	27.47	270.00	.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1643E+01 EXCESS= .0000E+00 OUTFLOW= .1547E+01 BASIN STORAGE= .7910E-02 PERCENT ERROR= 5.4

FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	25.17	270.00	.09	5.00	25.17	270.00	.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1539E+01 EXCESS= .0000E+00 OUTFLOW= .1440E+01 BASIN STORAGE= .6145E-02 PERCENT ERROR= 6.0

FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	23.40	270.00	.09	5.00	23.40	270.00	.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1450E+01 EXCESS= .0000E+00 OUTFLOW= .1350E+01 BASIN STORAGE= .6100E-02 PERCENT ERROR= 6.5

FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	22.54	275.00	.08	5.00	22.54	275.00	.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1405E+01 EXCESS= .0000E+00 OUTFLOW= .1305E+01 BASIN STORAGE= .6077E-02 PERCENT ERROR= 6.7

FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	21.33	275.00	.08	5.00	21.33	275.00	.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1327E+01 EXCESS= .0000E+00 OUTFLOW= .1233E+01 BASIN STORAGE= .6032E-02 PERCENT ERROR= 6.6

FOR PLAN = 1	RATIO=	.00							
RDOG04-C	MANE	5.00	19.63	275.00	.07	5.00	19.63	275.00	.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1223E+01 EXCESS= .0000E+00 OUTFLOW= .1146E+01 BASIN STORAGE= .5971E-02 PERCENT ERROR= 5.8

FOR PLAN = 1	RATIO=	.00							
RCOG05-C	MANE	5.00	172.38	250.00	.63	5.00	172.38	250.00	.63

D. Off-site HEC-1 -100 Year Storm Event

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*       JAN 1997
*       VERSION 4.1
*
* RUN DATE 05MAR12 TIME 14:28:39
*
*****

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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 XXXX   X
X   X X   X   X   XX
X   X X   X   X   X
XXXXXXX XXXX   X   XXXXX X
X   X X   X   X   X
X   X X   X   X   X
X   X XXXXXXX XXXX   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 -AMSK- 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 ***

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1 ID CLV CENTRAL NEIGHBORHOOD FLOOD CONTROL MASTER PLAN 2003
2 ID CENTRAL BASIN (NORTHWEST AREA)
3 ID DESIGN STORM = 100-YEAR 6-HR STORM
4 ID STORM DISTRIBUTION = SDN #3
5 ID MODELED BY PBS&J (STEPHEN C. ALTMAN P.E.)
6 ID ORIGINAL INPUT FILE = ENW310.DAT
7 ID INPUT FILE DATE = OCTOBER, 2003/ MODEL REVISED BY PB ON APRIL 1, 2012
8 ID REFERENCED HYDROLOGIC MODELS:
9 ID CITY OF LAS VEGAS CITY WIDE HYDROLOGY ANALYSIS (PBS&J 1997)
10 ID RANCHO DRIVE DRAINAGE IMPROVEMENTS PEAK DRIVE TO LAKE MEAD BOULEVARD
11 ID (MONTGOMERY WATSON 2000)
12 ID CCRFCD 2002 LAS VEGAS VALLEY MASTER PLAN UPDATE (PBS&J, GCW, LBG)
13 ID
14 ID EXISTING CONDITION = FUTURE LAND USE + EXISTING FACILITIES
15 ID NO STORM CENTERING
16 ID COMPOSITE CURVE NUMBERS
17 ID 2002 MPU SUBBASINS USED FOR OFFSITE AREAS EXCEPT WHERE SPECIFIED
18 ID
19 ID NOTE: LOCATIONS AND DESCRIPTIONS OF PROPOSED MPU FACILITIES ARE STATED IN
20 ID THE MODEL. HOWEVER, ROUTINGS IN THESE LOCATIONS REFLECT THE EXISTING
21 ID CONDITION.
22 ID
23 ID JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:
24 ID
25 ID CONCENTRATION AREA DARF
26 ID POINT SQ. MI.
27 ID 0-0.5 0.990
28 ID 0.5-1 0.975
29 ID 1-2 0.950
30 ID 2-3 0.925
31 ID 3-4 0.915
32 ID 4-5 0.908
33 ID 5-6 0.903
34 ID 6-7 0.895
35 ID 7-8 0.885
36 ID
37 ID
38 ID
39 ID JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
40 ID
41 ID 100-YEAR, 6-HOUR STORM, SDN3

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42	ID											
43	IT	5	0	0	300							
44	IO	5	0	0								
45	IN	5	0	0								
46	JR	PREC	0.990	0.975	0.950	0.925	0.915	0.908	0.903	0.895	0.885	
	*											

HEC-1 INPUT

PAGE 2

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

47	KK	OG04-C										
48	BA	0.288										
49	PB	2.77										
50	PC	0.000	0.020	0.057	0.070	0.087	0.108	0.124	0.130	0.130	0.130	
51	PC	0.130	0.130	0.130	0.133	0.140	0.142	0.148	0.158	0.172	0.181	
52	PC	0.190	0.197	0.199	0.200	0.201	0.204	0.214	0.229	0.241	0.249	
53	PC	0.251	0.256	0.270	0.278	0.281	0.283	0.295	0.322	0.352	0.409	
54	PC	0.499	0.590	0.710	0.744	0.781	0.812	0.819	0.835	0.851	0.856	
55	PC	0.860	0.868	0.876	0.888	0.910	0.926	0.937	0.950	0.970	0.976	
56	PC	0.982	0.985	0.987	0.989	0.990	0.993	0.993	0.994	0.995	0.998	
57	PC	0.997	0.999	1.000								
58	LS	0	90.3									
59	UD	0.320										
	*											

60	KK	DOG04-C										
61	KM	FLOW SPLIT TO PD01-C										
62	KM	OKG289, 270, 264, AND 262										
63	KM	COMBINED CAPACITY = 124 CFS										
64	DT	DPD01										
65	DI	0	51	125	500	1000						
66	DQ	0	50	124	124	124						
	*											

67	KKRDOG04-C											
68	KM	ROUTE DOG04-C TO COG05-C										
69	KM	US95 TO RANCHO										
70	RD	4100	0.0007	0.016	0	TRAP	0	50				
	*											

71	KK	OG05-C										
72	BA	0.266										
73	PB	2.77										
74	LS	0	90.5									
75	UD	0.392										
	*											

76	KK	COG05-C										
77	KM	COMBINE RDOG04-C AND OG05-C										
78	KM	RAINBOW AND CHEYENNE										
79	HC	2										
	*											

80	KKRCOG05-C											
81	KM	ROUTE RCOG05-C TO CCY06B-C										
82	KM	CHEYENNE										
83	RD	7500	0.0097	0.016	0	TRAP	0	50				
	*											

HEC-1 INPUT

PAGE 3

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

84	KK	CY06B-C										
85	BA	0.498										
86	PB	2.77										
87	LS	0	86.5									
88	UD	0.697										
	*											

89	KKCCY06B-C											
90	KM	COMBINE RCOG05-C AND CY06B-C										
91	KM	MICHAEL AND CHEYENNE										
92	HC	2										
	*											

93	KK	RCCY06B										
94	KM	ROUTE CCY06B TO CRGOWAN										
95	KM	CHEYENNE										
96	RD	1400	0.01	0.016	0	TRAP	0	50				

* *****
 * FLOW SPLIT FROM GOWAN WATERSHED
 * *****
 *

97 KK PDGCD-C
 98 BA 0.441
 99 PB 2.77
 100 LS 0 80.3
 101 UD 0.544
 *

102 KKRPDGCD-C
 103 KM ROUTE PDGCD-C TO RRPDGC
 104 KM FROM CWH
 105 RD 3080 0.0065 0.03 0 TRAP 30 2
 *

106 KK RRPDGC
 107 KM ROUTE RPDGC-C TO CPDGC10
 108 KM LINING = CONCRETE
 109 KM FROM CWH
 110 RD 1610 0.0062 0.015 0 TRAP 8 2
 *

111 KK NW29B-C
 112 BA 0.286
 113 PB 2.80
 114 LS 0 80.5
 115 UD 0.405
 *

HEC-1 INPUT

PAGE 4

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

116 KKRNW29B-C
 117 KM ROUTE NW29B-C TO CNW1C2
 118 KM ANN ROAD
 119 RD 4500 0.0122 0.016 0 TRAP 0 50
 *

120 KK NW1C2-C
 121 BA 0.207
 122 PB 2.77
 123 LS 0 88.7
 124 UD 0.411
 *

125 KK CNW1C2
 126 KM COMBINE RNW29B-C AND NW1C2-C
 127 KM ANN ROAD AND RANCHO
 128 HC 2
 *

129 KK RCNW1C2
 130 KM ROUTE CNW1C2 TO CPDGC10
 131 KM RANCHO
 132 RD 2300 0.0087 0.016 0 TRAP 0 50
 *

133 KKPDGCB10-C
 134 BA 0.308
 135 PB 2.77
 136 LS 0 83.8
 137 UD 0.416
 *

138 KKCPDGC10
 139 KM COMBINE PDGCB10-C AND RCNW1C2
 140 KM NEAR US95 AND RANCHO INTERSECTION
 141 HC 2
 *

142 KKDPDGC10
 143 KM FLOW SPLIT ACROSS RANCHO TO PT3AA1
 144 KM 10'X 3' RCB (139 CFS) CULVERT 3
 145 KM FROM U.S. 95 / RANCHO FIS
 146 KM D95A

147 DTDP3AA11
 148 DI 0 51 101 118 140 318 10000
 149 DQ 0 50 100 117 139 139 139
 *

HEC-1 INPUT

PAGE 5

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

150 KKCPDGCB10
 151 KM COMBINE RRPDGCD AND DPDGCB10
 152 KM NEAR US95 AND RANCHO INTERSECTION
 153 HC 2
 *

154 KK RCPDGCB
 155 KM ROUTE DCPDGCB TO CGD20BEC
 156 KM LOCAL FACILITY ALONG U.S. 95
 157 RD 1750 0.0029 0.025 0 TRAP 20 2
 *

158 KKGD20BE-C
 159 BA 0.427
 160 PB 2.77
 161 LS 0 83.4
 162 UD 0.467
 *

163 KKCGD20BEC
 164 KM COMBINE GD20BE-C AND RCPDGCB
 165 KM COMBINATION OF US 95 AND LONE MOUNTAIN
 166 HC 2
 *

167 KKRCGD20BE
 168 KM ROUTE CGD20BEC TO CGD20BMC
 169 KM NEWLY PROPOSED REGIONAL FACILITY
 170 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 171 KM FACILITY # = GOAL 0247
 172 KM LINING = CONCRETE
 173 RD 2640 0.003 0.02 0 TRAP 20 5
 *

174 KKGD20BM-C
 175 BA 0.343
 176 PB 2.77
 177 LS 0 89.4
 178 UD 0.456
 *

179 KKCGD20BMC
 180 KM COMBINE GD20BM-C AND RCGD20BE
 181 KM US 95 AND CRAIG ROAD
 182 HC 2
 *

183 KKRCGD20BM
 184 KM ROUTE CGD20BMC TO CGD17BG
 185 KM NEWLY PROPOSED REGIONAL FACILITY
 186 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 187 KM FACILITY # = GOAL 0168
 188 KM LINING = RCB
 189 RD 2640 0.003 0.02 0 TRAP 20 5
 *

HEC-1 INPUT

PAGE 6

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

190 KKGD17BG-C
 191 BA 0.364
 192 PB 2.77
 193 LS 0 87.7
 194 UD 0.478
 *

195 KK CGD17BG
 196 KM COMBINE GD11B-C AND GD17BG-C
 197 KM LONE MOUNTAIN AND US 95
 198 HC 2
 *

199 KK RGD17BG
 200 KM ROUTE CGD17BG TO CGD11B-C
 201 KM FACILITY = GOWAN OUTFALL - U.S. 95 CHANNEL
 202 KM FACILITY # = GO95 0000
 203 KM LINING = CONCRETE
 204 RD 2640 0.003 0.02 0 TRAP 20 5
 *
 205 KK GD11B-C
 206 BA 0.262
 207 PB 2.77
 208 LS 0 90.6
 209 UD 0.278
 *
 210 KKCGD11B-C
 211 KM COMBINE GD11B-C AND RGD17BG
 212 KM GOWAN AND US 95
 213 HC 2
 *
 214 KK RCGD11B
 215 KM ROUTE CGD11B-C TO CPT6B-C
 216 KM FACILITY = GOWAN OUTFALL FACILITIES
 217 KM FACILITY # = GOOF 0511
 218 KM LINING = RCB
 219 RD 8500 0.005 0.015 0 TRAP 8 0
 *
 220 KK PT6B-C
 221 BA 0.454
 222 PB 2.77
 223 LS 0 86.1
 224 UD 0.756
 *

HEC-1 INPUT

PAGE 7

1
 LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
 225 KK CPT6B-C
 226 KM COMBINE PT6B-C AND RCGD11B
 227 KM GOWAN AND US 95
 228 HC 2
 *
 229 KKDPT6B-C1
 230 KM FLOW SPLIT TO GOWAN OUTFALL
 231 KM DGOW1A
 232 KM FROM CWH
 233 DT DGOW1A
 234 DI 0 31 51 71 101 301 561 600 3000 5000
 235 DQ 0 30 50 70 100 300 560 560 560 560
 *
 236 KKDPT6B-C2
 237 KM FLOW SPLIT TO TRILOGY CHANNEL
 238 KM DTRILGY
 239 KM FROM CWH
 240 DT DTRILGY
 241 DI 0 31 91 202 349 625 1214 1944 2801
 242 DQ 0 3 33 55 95 173 267 374 491
 *
 243 KK PT2B2-C
 244 BA 0.299
 245 PB 2.77
 246 LS 0 92.2
 247 UD 0.417
 *
 248 KK RCPT2B2
 249 KM ROUTE CPT2B2 TO CPT41-C
 250 KM NEWLY PROPOSED REGIONAL FACILITY
 251 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 252 KM FACILITY # = GOAL 0111
 253 KM LINING = RCB
 254 RD 3000 0.0083 0.015 0 TRAP 10 0
 *

255 KK PT3-C
 256 BA 0.172
 257 PB 2.77
 258 LS 0 89.5
 259 UD 0.372
 *

260 KK RCPT3-C
 261 KM ROUTE CPT3B-C TO CPT41-C
 262 KM ALEXANDER
 263 RD 5500 0.0081 0.016 0 TRAP 0 50
 *

HEC-1 INPUT

PAGE 8

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

264 KK PT41-C
 265 BA 0.436
 266 PB 2.77
 267 LS 0 88.6
 268 UD 0.424
 *

269 KK CPT41-C
 270 KM COMBINE RCPT2B2, RCPT3-C AND PT41-C
 271 KM ALEXANDER AND RANCHO
 272 HC 3
 *

273 KKRCPT41-C
 274 KM ROUTE CPT41-C TO CPT5A20C
 275 KM NEWLY PROPOSED REGIONAL FACILITY
 276 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 277 KM FACILITY # = GOAL 0100
 278 KM LINING = RCB
 279 RD 600 0.003 0.015 0 TRAP 12 0
 *

280 KK PT5A2-C
 281 BA 0.341
 282 PB 2.77
 283 LS 0 86.7
 284 UD 0.644
 *

285 KK CPT5A2-C
 286 KM COMBINE PT5A2-C AND RCPT41-C
 287 KM ALEXANDER AND RANCHO
 288 HC 2
 *

289 KK RCPT5A2
 290 KM ROUTE CPT5A2-C TO CPT5B6
 291 KM FACILITY = GOWAN OUTFALL - ALEXANDER ROAD FACILITY
 292 KM FACILITY # = GOAL 0000
 293 KM LINING = RCB
 294 RD 5280 0.01 0.015 0 TRAP 10 0
 *

295 KKCCPT6B-C
 296 KM COMBINE CPT6B-C AND RCPT5A2
 297 KM GOWAN AND US 95
 298 HC 2
 *

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

299 KK DRANCHO
 300 KM FLOW SPLIT TO GOWAN OUTFALL
 301 KM DGOWAN
 302 KM FROM CWH
 303 DT DGOWAN
 304 DI 0 51 101 301 501 600 800 1500 2000 5000
 305 DQ 0 1 1 1 1 100 300 1000 1500 4500
 *

306 KK RDRANCH
 307 KM ROUTE DRANCHO TO CCY07B

308 KM RANCHO
309 RD 1300 0.004 0.016 0 TRAP 0 50
*

310 KK DTRILGY
311 KM RETRIEVE DTRILGY
312 DR DTRILGY
*

313 KK CY07B
314 BA 0.203
315 PB 2.77
316 LS 0 89.1
317 UD 0.461
*

318 KK CCY07B
319 KM COMBINE DRANCHO, DTRILGY AND CY07B
320 KM GOWAN AND RANCHO
321 HC 3
*

322 KK DCY07B
323 KM FLOW SPLIT TO CENTRAL BASIN
324 KM DIVERT FLOW EAST IN RAN 190
325 KM OPPOSITE OF D9RCHO
326 KM FROM CWH
327 DT DCENT1
328 DI 0 19 73 100 1000 2000
329 DQ 0 1 1 28 928 1928
*

330 KK DGOWAN
331 KM RETRIEVE DGOWAN
332 DR DGOWAN
*

333 KK RDGOWAN
334 KM ROUTE DGOWAN TO CCCY08-C
335 KM GOWAN
336 RD 3300 0.006 0.016 0 TRAP 0 50
*

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

337 KK DGOW1A
338 KM RETRIEVE DGOW1A
339 DR DGOW1A
*

340 KK RDGOW1A
341 KM ROUTE PT6B-C TO CCCY08-C
342 KM FACILITY = GOWAN OUTFALL FACILITIES
343 KM FACILITY # = GOOF 0486
344 KM LINING = RCB
345 RD 3300 0.006 0.015 0 TRAP 8 0
*

346 KKCCPT6B-C
347 KM COMBINE RCPT6B-C AND RDGOW1A
348 KM GOWAN AND DECATUR
349 HC 2
*

350 KK CY08-C
351 BA 0.094
352 PB 2.77
353 LS 0 88.6
354 UD 0.306
*

355 KK CCY08-C
356 KM COMBINE CY08-C, CCPT6B-C, AND DCY07B
357 KM GOWAN AND DECATUR
358 HC 3
*

359 KK DGOW2A
360 KM DIVERT FLOW TO GOWAN OUTFALL (GOOF 0511) AT RANCHO

361 KM DIVERSION BASED ON GOWAN ROAD DRAINAGE STUDY BY POGGEMEYER
 362 KM 8'X 5' RCB, CAPACITY = 630 CFS
 363 KM REMAINING FLOW CONTINUES EAST IN GOWAN RD. AND ENTERS THE CENTRAL BASIN
 364 KM OPPOSITE OF DGOW2A IN CWH
 365 DTDCENTRAL
 366 DI 0 31 51 71 101 301 601 631 3000 5000
 367 DQ 0 1 1 1 1 1 1 1 2370 4370
 *

368 KK D3ALL
 369 KM DIVERT OUT ALL FLOW TO GOWAN OUTFALL (GOOF 0511) AT RANCHO
 370 DT D3ALL
 371 DI 0 100 500 1000 5000
 372 DQ 0 100 500 1000 5000
 *

* *****
 * END OF IMPORT FROM GOWAN WATERSHED
 * *****
 *

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

373 KK DCENT1
 374 KM RETRIEVE DCENT1
 375 DR DCENT1
 *

376 KK RDCENT1
 377 KM ROUTE DCENT1
 378 KM RANCHO
 * KO 1 1 21
 379 RD 2100 0.0076 0.016 0 TRAP 0 50
 *

380 KK CRGOWAN
 381 KM COMBINE RDCENT1, D3ALL, AND RCCY06B
 382 KM RANCHO AND CHEYENNE
 383 HC 3
 *

384 KKRCRGOWAN
 385 KM ROUTE CRGOWAN TO CPD05A-C
 386 KM RANCHO
 387 RD 1700 0.0088 0.016 0 TRAP 0 50
 *

388 KK PD05A-C
 389 BA 0.136
 390 PB 2.77
 391 LS 0 93.1
 392 UD 0.406
 *

393 KKCPD05A-C
 394 KM COMBINE PD05A-C AND RCRGOWAN
 395 KM RANCHO AND DECATUR
 396 HC 2
 *

397 KK DCPD05A
 398 KM FLOW SPLIT TO PD04B-C
 399 KM OPPOSITE OF DA2 FLOW SPLIT IN CWH
 400 KM CAPACITY RAN 170 = 210 CFS
 401 KM DIVERTED FLOW GOES DOWN WEST SIDE OF RANCHO
 402 DT DA1-C
 403 DI 0 51 101 211 500 1000 5000
 404 DQ 0 51 101 211 211 211 211
 *

405 KK RCPD05
 406 KM ROUTE CPD05A-C TO CPD04B-C
 407 KM RANCHO
 408 RD 1500 0.006 0.016 0 TRAP 0 50
 *

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

```

409      KK   DPD01
410      KM   RETRIEVE DPD01
411      DR   DPD01
      *

412      KK   RDPD01
413      KM   ROUTE DPD01 TO CPD01-C
414      KM   PEAK DRIVE
415      RD   3500 0.0103 0.016 0 TRAP 0 50
      *

416      KK   PD01-C
417      BA   0.377
418      PB   2.77
419      LS   0 83.8
420      UD   0.436
      *

421      KK   CPD01-C
422      KM   COMBINE RDPD01 AND PD01-C
423      KM   TORREY PINES AND PEAK DRIVE
424      HC   2
      *

425      KK   RCPD01
426      KM   ROUTE CPD01-C TO CCY04A-C
427      KM   FACILITY = LAS VEGAS WASH - SMOKE RANCH
428      KM   FACILITY # = LVPK 0106
429      KM   LINING = RCB
430      RD   2600 0.00542 0.015 0 TRAP 8 0
      *

431      KK   CY04A-C
432      BA   0.457
433      PB   2.77
434      LS   0 86.8
435      UD   0.489
      *

436      KKCCY04A-C
437      KM   COMBINE RCPD01 AND CY04A-C
438      KM   JONES AND PEAK DRIVE
439      HC   2
      *

440      KK   DCY04C
441      KM   DIVERT FLOW TO EXISTING REGIONAL FACILITY LVSR 0500
442      KM   FROM CWH
443      KM   CAPACITY LVSR 0500 = 231 CFS
444      DT   DLVSR1
445      DI   0 51 101 232 500 1000 5000
446      DQ   0 50 100 231 231 231 231
      *

      HEC-1 INPUT

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

447      KK   RCCY04A
448      KM   ROUTE CCY04A TO CPD04B-C
449      KM   FACILITY = LAS VEGAS WASH - PEAK DRIVE
450      KM   FACILITY # = LVPK 0000,0019,0058, 0104
451      KM   LINING = RCB
452      RD   5730 0.01 0.015 0 TRAP 9 0
      *

453      KK   PD04B-C
454      BA   0.468
455      PB   2.77
456      LS   0 87.8
457      UD   0.539
      *

458      KKCPD04B-C
459      KM   COMBINE RCCY04A AND PD04B-C
460      KM   RANCHO AND PEAK DRIVE
461      HC   2
      *

462      KKCCPD04B-C
463      KM   COMBINE RCPD05 AND CPD04B-C

```

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464 KM RANCHO AND PEAK DRIVE
 465 HC 2
 *
 466 KK RCPD04B
 467 KM ROUTE CCPD04B-C TO CSR05B
 468 KM FACILITY = LAS VEGAS WASH - RANCHO
 469 KM FACILITY # = LVRA 0012
 470 KM LINING = RCB
 471 RD 3300 0.0058 0.015 0 TRAP 12 0
 *
 472 KK OG03-C
 473 BA 0.325
 474 PB 2.77
 475 LS 0 87.0
 476 UD 0.389
 *
 477 KK ROG03-C
 478 KM ROUTE OG03-C TO SR00A-C
 479 KM SMOKE RANCH
 480 RD 3400 0.0121 0.016 0 TRAP 0 50
 *
 481 KK OG02-C
 482 BA 0.318
 483 PB 2.77
 484 LS 0 90.2
 485 UD 0.351
 *

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

486 KK ROG02-C
 487 KM ROUTE OG02-C TO CLM01-C
 488 KM LAKE MEAD BOULEVARD
 489 RD 3400 0.0129 0.016 0 TRAP 0 50
 *
 490 KK LM01-C
 491 BA 0.327
 492 PB 2.77
 493 LS 0 81.8
 494 UD 0.405
 *
 495 KK CLM01-C
 496 KM COMBINE ROG02-C AND LM01-C
 497 KM TORREY PINES AND LAKE MEAD
 498 HC 2
 *
 499 KK SR01E
 500 KM DIVERSION AT LAKE MEAD AND TORREY PINES
 501 KM SPLIT FLOW TO TORREY PINES
 502 KM FROM CWH
 503 KM REMAINING FLOW IN LAKE MEAD RETRIEVED LATER IN MODEL WHEN NEEDED
 504 DT DSR01F
 505 DI 0 41 73 172 572 1072 5000
 506 DQ 0 40 72 132 371 671 3067
 *
 507 KK RCLM01-C
 508 KM ROUTE OG02-C TO CLM01-C
 509 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
 510 KM FACILITY # = LVSR 0546
 511 KM LINING = RCB
 512 RD 2640 0.0057 0.015 0 TRAP 8 0
 *
 513 KK SR00A-C
 514 BA 0.367
 515 PB 2.77
 516 LS 0 84.1
 517 UD 0.446
 *
 518 KK CSR00A

519 KM COMBINE RCLM01-C AND SR00A-C
520 KM TORREY PINES AND SMOKE RANCH
521 HC 2
*

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

522 KK CCSR00A
523 KM COMBINE ROG03-C AND CSR00A
524 KM TORREY PINES AND SMOKE RANCH
525 HC 2
*

526 KK RCSR00A
527 KM ROUTE CSR00A TO CSR02E
528 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
529 KM FACILITY # = LVSR 0496
530 KM LINING = RCB
531 RD 2600 0.0127 0.015 0 TRAP 10 0
*

532 KK DLVSR1
533 KM RETRIEVE DLVSR1
534 DR DLVSR1
*

535 KK RDLVSR1
536 KM ROUTE DLVSR1 TO CSR02E
537 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
538 KM FACILITY # = LVSR 0500
539 KM LINING = RCP
540 RD 2770 0.0054 0.013 0 CIRC 5
*

541 KK SR02E-C
542 BA 0.302
543 PB 2.77
544 LS 0 86.1
545 UD 0.374
*

546 KK CSR02E
547 KM COMBINE SR02E-C, RDLVSR1, AND RCSR00A
548 KM JONES AND SMOKE RANCH
549 HC 3
*

550 KK RCSR02E
551 KM ROUTE CSR02E TO CSR05D
552 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
553 KM FACILITY # = LVSR 0396,0446
554 KM LINING = RCB
555 RD 5280 0.0106 0.015 0 TRAP 10 0
*

556 KK SR05D-C
557 BA 0.303
558 PB 2.77
559 LS 0 89.7
560 UD 0.533
*

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

561 KK CSR05D
562 KM COMBINE RCSR02E AND SR05D-C
563 KM SMOKE RANCH AND DECATUR
564 HC 2
*

565 KK RCSR05D
566 KM ROUTE CSR05D TO CSR05B
567 KM FACILITY = LAS VEGAS WASH - SMOKE RANCH
568 KM FACILITY # = LVSR 0359
569 KM LINING = RCB
570 RD 2000 0.0075 0.015 0 TRAP 10 0
*

571 KK SR05B-C
 572 BA 0.357
 573 PB 2.77
 574 LS 0 89.2
 575 UD 0.664
 *

576 KK CSR05B
 577 KM COMBINE RCSR05D AND SR05B-C
 578 KM SMOKE RANCH AND RANCHO
 579 HC 2
 *

580 KK DCSR05B
 581 KM DIVERT FLOW IN EXISTING LVSR 0359 (LVSR 0360 IN CWH)
 582 KM CAPACITY = 231 CFS
 583 DT DLVSR2
 584 DI 0 231 5000
 585 DQ 0 231 231
 *

586 KKDDCSR05B
 587 KM DIVERT FLOW INTO DROP INLETS FOR LVSR 0273 STUB OUT
 588 KM CAPACITY = 182 CFS (109 CFS NORTH, 73 CFS SOUTH)
 589 DT DLVSR3
 590 DI 0 182 5000
 591 DQ 0 182 182
 *

592 KKD3CSR05B
 593 KM DIVERT FLOW INTO EXISTING CHANNEL SOUTH OF RANCHO
 594 KM D3SR07 IN CWH
 595 KM CAPACITY = 670 CFS
 596 DT DLVRA
 597 DI 0 50 100 200 400 600 670 1000 5000
 598 DQ 0 50 100 200 400 600 670 670 670
 *

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

599 KKD4CSR05B
 600 KM SPLIT FLOW 50% IN RANCHO. 50% IN CAREY
 601 KM SPLIT TO RANCHO
 602 KM OPPOSITE OF D4SR07 IN CWH
 603 DT DRAN
 604 DI 0 50 100 300 500 1000 2500 5000
 605 DQ 0 25 50 150 250 500 1250 2500
 *

606 KK DSR05B
 607 KM DIVERT OUT STREET FLOW ALL FLOW TO BE BROUGHT IN LATER IN MODEL
 608 DT DSMOKE
 609 DI 0 1000 5000
 610 DQ 0 1000 5000
 *

611 KK DLVSR3
 612 KM RETRIEVE FLOW IN LVSR
 613 DR DLVSR3
 *

614 KK CCSR05B
 615 KM COMBINE RPD04B, LVSR3 AND DSR05B (ZERO FLOW)
 616 KM SMOKE RANCH AND RANCHO
 617 HC 3
 *

618 KKDDCCSR05B
 619 KM DIVERT OUT ALL FLOW IN LVSR FACILITY
 620 DT DLVSR4
 621 DI 0 1000 5000
 622 DQ 0 1000 5000
 *

* NO BYPASS FLOW ON RANCHO - END OF SEG 1 (NORTH OF SMOKE RANCH)
 *
 * ONSITE DRAINAGE DICTATE FLOW RATE - FROM SMOKE RANCH TO LAKE MEAD
 *

623 KK DSR01F
 624 KM RETRIEVE DSR01F
 625 DR DSR01F
 *
 626 KK RDSR01F
 627 KM ROUTE DSR01F TO CLM02-C
 628 KM FACILITY = LAS VEGAS WASH - LAKE MEAD
 629 KM FACILITY # = LVLM 0475
 630 KM LINING = RCP
 631 RD 2632 0.0124 0.013 0 CIRC 4
 *

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

632 KK LM02-C
 633 BA 0.293
 634 PB 2.77
 635 LS 0 85.0
 636 UD 0.367
 *
 637 KK CLM02-C
 638 KM COMBINE LM02-C AND RDSR01F
 639 KM
 640 HC 2
 *
 641 KK RCLM02-C
 642 KM ROUTE CLM02-C TO CLM03-C
 643 KM FACILITY = LAS VEGAS WASH - LAKE MEAD
 644 KM FACILITY # = LVLM 0442,0453,0460
 645 KM LINING = RCP
 646 RD 2800 0.0139 0.013 0 CIRC 5
 *

647 KK LM03-C
 648 BA 0.336
 649 PB 2.77
 650 LS 0 90.5
 651 UD 0.378
 *
 652 KK CLM03-C
 653 KM COMBINE RCLM02-C AND LM03-C
 654 KM MICHAEL AND LAKE MEAD
 655 HC 2
 *
 656 KK RCLM03-C
 657 KM ROUTE CLM03-C TO CLM05-C
 658 KM FACILITY = LAS VEGAS WASH - LAKE MEAD
 659 KM FACILITY # = LVLM 0388,0399,0416
 660 KM LINING = RCP
 661 RD 2600 0.0115 0.013 0 CIRC 6
 *

662 KK LM05-C
 663 BA 0.365
 664 PB 2.77
 665 LS 0 88.1
 666 UD 0.387
 *
 667 KK CLM05-C
 668 KM COMBINE RCLM03-C AND LM05-C
 669 KM DECATUR AND LAKE MEAD
 670 HC 2
 *

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

671 KK RCLM05-C
 672 KM ROUTE CLM05-C TO CLM06-C
 673 KM FACILITY = LAS VEGAS WASH - LAKE MEAD
 674 KM FACILITY # = LVLM 0337,0356
 675 KM LINING = RCP

```

676      RD      3300  0.0061  0.015      0  CIRC      7      0
        *

677      KK LM06B-C
678      BA      0.354
679      PB      2.77
680      LS      0      89.5
681      UD      0.468
        *

682      KK CLM06-C
683      KM COMBINE RCLM05-C AND LM06B-C
684      KM RANCHO AND LAKE MEAD
685      HC      2
        *

686      KK DLVLMRA
687      KM SAME AS DLVLMRA FROM CWH
688      KM FLOW IS DIVERTED TO EXISTING REGIONAL FACILITY LVLM 0270
689      KM 90" RCP CAPACITY = 940 CFS
690      KM 940 CFS IS DIVERTED
691      DT DLVLM4
692      DI      0      50      100      400      600      700      800      940      1000      5000
693      DQ      0      50      100      400      600      700      800      940      940      940
        *

694      KK DSURF1
695      KM SAME AS DSURF1 FROM CWH
696      KM 33% DIVERTED TO VALLEY DRIVE TO LAKE MEAD
697      KM REMAINING IN LAKE MEAD
698      DT DVALDR
699      DI      0      30      90      150      300      600      1200      1800      3000      6000
700      DQ      0      10      30      50      100      200      400      600      1000      2000
        *

701      KK DLVRA
702      KM RETRIEVE DLVRA
703      DR DLVRA
        *

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

704      KK RDLVRA
705      KM ROUTE RDLVRA TO CLM06-C
706      KM EXISTING CHANNEL
707      RD      1200  0.01  0.02      0  TRAP      8      2
        *

708      KK DRAN
709      KM RETRIEVE DRAN
710      DR DRAN
        *

711      KK RDRAN
712      KM ROUTE RDLVRA TO CLM06-C
713      KM RANCHO
714      RD      1200  0.01  0.02      0  TRAP      0      50
        *

715      KK DLVLM4
716      KM RETRIEVE DLVLM4
717      DR DLVLM4
        *

718      KKCCLM06-C
719      KM COMBINE CLM06-C, DLVLM4, RDRAN, AND RDLVRA
720      KM RANCHO AND LAKE MEAD
721      HC      4
        *

722      KK DLVLMRA
723      KM SAME AS DLVLMRA FROM CWH
724      KM REPEAT DIVERSION TO LVLM SYSTEM SINCE THERE IS CAPACITY IN PIPE FOR 10-YEAR
725      KM FLOW IS DIVERTED TO EXISTING REGIONAL FACILITY LVLM 0270
726      KM 90" RCP CAPACITY = 940 CFS
727      KM 940 CFS IS DIVERTED
728      DT DLVLM5
729      DI      0      50      100      400      600      700      800      940      1000      5000
730      DQ      0      50      100      400      600      700      800      940      940      940

```

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*
 731 KK DSURF2
 732 KM SAME AS DSURF2 FROM CWH
 733 KM DIVERT 50% OR REMAINING FLOW TO LAKE MEAD
 734 KM REMAINING IN RANCHO
 735 DT DLAKEM
 736 DI 0 30 90 150 300 600 1200 1800 3000 6000
 737 DQ 0 10 30 50 100 200 400 600 1000 2000
 *

738 KK D1LM09
 739 KM SAME AS D1LM09 FROM CWH
 740 KM FLOW IS DIVERTED ACROSS RANCHO IN RAN 119
 741 KM 6' X 3' RCB CAPACITY = 168 CFS
 742 KM CAPACITY BASED ON INLET CONTROL NOMOGRAPH
 743 KM THE REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO
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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

744 DT DRAN119
 745 DI 0 50 100 168 500 1000 5000
 746 DQ 0 50 100 168 168 168 168
 *

747 KK D2LM09
 748 KM SAME AS D2LM09 FROM CWH
 749 KM FLOW IS DIVERTED ACROSS RANCHO IN RAN 118
 750 KM 6' X 3' RCB CAPACITY = 168 CFS
 751 KM CAPACITY BASED ON INLET CONTROL NOMOGRAPH
 752 KM THE REMAINING FLOW CONTINUES SOUTHEAST ALONG RANCHO
 753 DT DRAN118
 754 DI 0 50 100 168 500 1000 5000
 755 DQ 0 50 100 168 168 168 168
 *

756 KK RD2LM09
 757 KM ROUTE D2LM09 TO CLM09
 758 KM RANCHO
 759 RD 800 0.01 0.016 0 TRAP 0 50
 *

760 KK DVALDR
 761 KM RETRIEVE DVALDR
 762 DR DVALDR
 *
 * UNSTABLE ROUTING REMOVED
 * KK RDVALDR
 * KM ROUTE DVALDR TO CLM09
 * KM VALLEY DRIVE
 * RD 2900 0.0086 0.016 0 TRAP 0 50
 *

763 KK LM09
 764 BA 0.123
 765 PB 2.77
 766 LS 0 92.6
 767 UD 0.212
 *

768 KK CLM09
 769 KM COMBINE RDVALDR, RD2LM09, AND LM09
 770 KM RANCHO AND CORAN
 771 HC 3
 *

772 KK D3LM09
 773 KM SAME AS D3LM09 FROM CWH
 774 KM FLOW IS DIVERTED ACROSS RANCHO TO CORAN
 775 KM CAPACITY OF WEST HALF STREET OF RANCHO AT TOP OF MEDIAN WILL
 776 KM REMAIN AND CONTINUE SOUTHEAST IN RANCHO
 777 KM LOW FLOWS WILL REMAIN IN RANCHO AND FLOW SOUTHEAST
 778 DT DCORAN
 779 DI 0 51 201 300 400 500 600 800 1000 5000
 780 DQ 0 0 0 50 100 150 200 400 600 4600
 *

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

781 KK RD3LM09
 782 KM ROUTE D3LM09 TO CVG21
 783 KM RANCHO
 784 RD 900 0.01 0.016 0 TRAP 0 50
 *
 785 KK VG21
 786 BA 0.098
 787 PB 2.77
 788 LS 0 88.1
 789 UD 0.201
 *
 790 KK CVG21
 791 KM COMBINE RD3LM09 AND VG21
 792 KM RANCHO AND CORAN
 793 HC 2
 *
 794 KK DVG21
 795 KM SAME AS DVG21 FROM CWH
 796 KM DIVERSION AT RANCHO AND HOLLY
 797 KM FLOW IS DIVERTED ACROSS RANCHO TO HOLLY
 798 KM REMAINING FLOW CONTINUES SOUTHEAST IN RANCHO TO VG20
 799 KM LOW FLOWS WILL REMAIN IN RANCHO AND FLOW SOUTHEAST
 800 KM MINIMUM OF 1 CFS WILL REMAIN TO AVOID ZERO FLOW
 801 DT DHOLLY
 802 DI 0 51 201 300 400 500 600 800 1000
 803 DQ 0 0 0 100 200 300 350 450 550
 *
 804 KK LM08
 805 BA 0.056
 806 PB 2.77
 807 LS 0 91.3
 808 UD 0.158
 *
 809 KK RLM08
 810 KM ROUTE LM08 TO CVG20
 811 RD 4100 0.011 0.016 0 TRAP 0 50
 *
 812 KK VG20
 813 BA 0.134
 814 PB 2.77
 815 LS 0 90.1
 816 UD 0.349
 *

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1
 LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
 817 KK CVG20
 818 KM COMBINE RLM08, DVG21 AND VG20
 819 KM RANCHO AND HOLLY
 820 HC 3
 *
 821 KK RCVG20
 822 KM ROUTE CVG20 TO CVG22
 823 KM RANCHO
 824 RD 1500 0.0133 0.015 0 CIRC 7.5
 *
 825 KK VG22
 826 BA 0.176
 827 PB 2.77
 828 LS 0 90.9
 829 UD 0.412
 *
 830 KK CVG22
 831 KM COMBINE RCVG20 AND VG22
 832 KM RANCHO AND VEGAS
 833 HC 2
 *
 834 KKOG011A-C

835 BA 0.441
 836 PB 2.77
 837 LS 0 85.5
 838 UD 0.428
 *

839 KK ROG011A
 840 KM ROUTE OG011A-C TO CVG02-C
 841 KM VEGAS DRIVE
 842 RD 3200 0.0172 0.015 0 TRAP 0 50
 *

843 KK VG02-C
 844 BA 0.224
 845 PB 2.77
 846 LS 0 81.7
 847 UD 0.386
 *

848 KK CVG02-C
 849 KM COMBINE ROG011A AND VG02-C
 850 KM TORREY PINES AND VEGAS DRIVE
 851 HC 2
 *

HEC-1 INPUT

PAGE 24

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

852 KK RCVG02
 853 KM ROUTE CVG02-C TO CVG03-C
 854 KM FACILITY = OWENS AVENUE SYSTEM
 855 KM FACILITY # = LVOW 0460
 856 KM LINING = RCB
 857 RD 2700 0.0148 0.015 0 TRAP 0 50
 *

858 KK VG03-C
 859 BA 0.279
 860 PB 2.77
 861 LS 0 79.7
 862 UD 0.401
 *

863 KK CVG03-C
 864 KM COMBINE RCVG02 AND VG03-C
 865 KM JONES AND VEGAS DRIVE
 866 HC 2
 *

867 KK RCVG03
 868 KM ROUTE CVG03-C TO CVG04-C
 869 KM FACILITY = OWENS AVENUE SYSTEM
 870 KM FACILITY # = LVOW 0360
 871 KM LINING = RCB
 872 RD 2700 0.0148 0.016 0 TRAP 0 50
 *

873 KK VG04-C
 874 BA 0.240
 875 PB 2.77
 876 LS 0 90.9
 877 UD 0.373
 *

878 KK CVG04-C
 879 KM COMBINE RCVG03 AND VG04-C
 880 KM MICHAEL AND VEGAS DRIVE
 881 HC 2
 *

882 KK RCVG04
 883 KM ROUTE CVG04 TO CWA08A
 884 KM VEGAS DRIVE
 885 RD 2600 0.0135 0.016 0 TRAP 0 50
 *

886 KK WA08A
 887 BA 0.026
 888 PB 2.77
 889 LS 0 92.5

890 UD 0.180

*

HEC-1 INPUT

PAGE 25

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

891 KK CWA08A
892 KM COMBINE WA08A AND RCVG04
893 KM MICHAEL AND VEGAS DRIVE
894 HC 2
*

895 KK RCWA08A
896 KM ROUTE CWA08A TO CVG06
897 KM VEGAS DRIVE
898 RD 4000 0.0138 0.016 0 TRAP 0 50
*

899 KK VG06
900 BA 0.186
901 PB 2.77
902 LS 0 87.5
903 UD 0.280
*

904 KK CVG06
905 KM COMBINE RCWA08A AND VG06
906 KM VALLEY VIEW AND VEGAS DRIVE
907 HC 2
*

908 KK RCVG06
909 KM ROUTE CVG06 TO CCVG22
910 KM VEGAS DRIVE
911 RD 1900 0.0174 0.016 0 TRAP 0 50
*

912 KK CCVG22
913 KM COMBINE CVG22 AND RCVG06
914 KM RANCHO AND VEGAS DRIVE
915 HC 2
*

916 KKDCVG20-C
917 KM FLOW SPLIT FROM CLV
918 KM REVISED FROM MPU BASED ON COMMENT FROM CLV
919 KM 100-YEAR FLOW LISTED ON PLANS = 530 CFS
920 KM STREET FLOW - 75% OWENS/25% RANCHO
921 DT LV15
922 DI 0 570 670 1570 2570
923 DQ 0 0 25 250 500
*

924 KKRDVG20-C
925 KM ROUTE DCVG20-C TO CVG23
926 KM FACILITY = OWENS AVENUE SYSTEM
927 KM FACILITY # = LVOW 0146
928 KM LINING = RCP
929 RD 800 0.009 0.015 0 TRAP 8 0
*

* KMFLOW SPLIT AT OWEN AND RANCHO. FLOW TO OWEN DURING MINOR EVENT
* KMSTART FLOW ANALYSIS AT OWENS, SOUTH OF RANCHO
* KMINSSERT DUMMY TO AVOID ZERO FLOW
* KMCOMBINE FLOW SPLIT AT VEGAS AND RANCHO
*

HEC-1 INPUT

PAGE 26

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

930 KK LV15
931 KM RETRIEVE
932 DR LV15
*

933 KK RLV15
934 KM ROUTE LV15 TO CWA15A-C
935 KM RANCHO
936 RD 3000 0.0045 0.016 0 TRAP 0 50
*

```

937      KK      DUMMY
938      KM      DUMMY AREA TO AVOID ZERO FLOW
939      BA      0.0001
940      PB      2.77
941      LS      0          90
942      UD      0.10
          *

943      KK      CRLV15
944      KM      COMBINE DUMMY AND LV15 - FLOW SPLIT AT OWENS
945      HC      2
          *

946      KK      WA12
947      BA      0.069
948      PB      2.77
949      LS      0          90.5
950      UD      0.130
          *

951      KK      WA13
952      BA      0.160
953      PB      2.77
954      LS      0          90.8
955      UD      0.304
          *

956      KK      CWA13
957      KM      COMBINE WA12 AND WA13
958      KM      RANCHO AND WASHINGTON
959      HC      2
          *

960      KK      CWA13
961      KM      COMBINE FLOW - OVERFLOW AT OWENS AND BASIN FLOW - WA13 AND WA14
962      HC      2
          *

```

HEC-1 INPUT

PAGE 27

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

```

963      KK      WA14
964      BA      0.043
965      PB      2.77
966      LS      0          90.7
967      UD      0.202
          *

968      KK      CWA14
969      KM      COMBINE FLOW FROM CWA13 AND WA14
970      HC      2
          *

971      KK      WA01-C
972      BA      0.221
973      PB      2.77
974      LS      0          87.5
975      UD      0.252
          *

976      KK      RWA01
977      KM      ROUTE WA01-C TO CWA04-C
978      KM      WASHINGTON STREET
979      RD      5300 0.0151 0.016      0      TRAP      0      50
          *

980      KK      WA04-C
981      BA      0.219
982      PB      2.77
983      LS      0          88.1
984      UD      0.473
          *

985      KK      CWA04-C
986      KM      COMBINE RWA01 AND WA04-C
987      KM      MICHAEL AND WASHINGTON
988      HC      2
          *

```

989 KK RCWA04
 990 KM ROUTE CWA04-C TO CWA09-C
 991 KM FACILITY = FREEWAY CHANNEL
 992 KM FACILITY # = LV15 0602
 993 KM LINING = RCP
 994 RD 5900 0.0144 0.016 0 TRAP 0 50
 *

995 KK WA09-C
 996 BA 0.093
 997 PB 2.77
 998 LS 0 91.3
 999 UD 0.363
 *

HEC-1 INPUT

PAGE 28

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

1000 KK CWA09-C
 1001 KM COMBINE RCWA04 AND WA09-C
 1002 KM VALLEY VIEW AND WASHINGTON
 1003 HC 2
 *

1004 KK RCWA09
 1005 KM ROUTE CWA09-C TO CWA10NW
 1006 KM FACILITY = FREEWAY CHANNEL
 1007 KM FACILITY # = LV15 0602
 1008 KM LINING = RCP
 1009 RD 700 0.0083 0.016 0 TRAP 0 50
 *

1010 KK WA10-C
 1011 BA 0.446
 1012 PB 2.77
 1013 LS 0 91.4
 1014 UD 0.358
 *

1015 KK WA10D
 1016 KM FLOW SPLIT TO SOUTHEAST CENTRAL BASIN
 1017 KM OPPOSITE SPLIT OF WA10NW IN SOUTHEAST CENTRAL BASIN FLOW
 1018 KM FROM LOUIS BERGER U.S. 95 WIDENING STUDY
 1019 KM CAPACITY OF CHANNEL = 250 CFS IS DIVERTED
 1020 KM EXCESS FLOW CONTINUES DOWN WASHINGTON
 1021 DT WA10SE
 1022 DI 0 10 250 275 300 800 1000 3000
 1023 DQ 0 10 250 250 250 250 250 250
 *

1024 KK CWA10NW
 1025 KM COMBINE WA10D AND RCWA09
 1026 KM VALLEY VIEW AND WASHINGTON
 1027 HC 2
 *
 * KMROUTE FLOW ON WASHINGTON
 *

1028 KKRCWA10NW
 1029 KM ROUTE CWA10NW TO CWA13-C
 1030 KM FACILITY = FREEWAY CHANNEL
 1031 KM FACILITY # = LV15 0528
 1032 KM LINING = RCB
 1033 RD 3900 0.0119 0.016 0 TRAP 0 50
 *

1034 KK WA11-C
 1035 BA 0.085
 1036 PB 2.77
 1037 LS 0 86.8
 1038 UD 0.286
 *
 *

HEC-1 INPUT

PAGE 29

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

1039 KK CWA13
 1040 KM SAME TITLE AS 100-YEAR

1041 KM FLOW SPLIT TO SOUTHEAST CENTRAL BASIN
 1042 KM RANCHO AND WASHINGTON
 1043 KM SPLIT TAKEN FROM 30% DRAINAGE DESIGN FOR U.S.95 WIDENING BY VTN NEVADA (2001)
 1044 KM OPPOSITE SPLIT OF WA13SE IN SOUTHEAST CENTRAL BASIN MODEL
 1045 DT WA13SE
 1046 DI 0 500 812 1000 1200
 1047 DQ 0 303 490 609 727
 *
 1048 KK RCRLV15
 1049 KM ROUTE CRLV15 TO CCWA15A
 1050 RD 1500 0.009 0.016 0 TRAP 0 50
 *
 1051 KK LC16-C
 1052 BA 0.263
 1053 PB 2.77
 1054 LS 0 87.2
 1055 UD 0.344
 *
 1056 KK END
 1057 KM END OF PROJECT AT BONANZA
 1058 HC 4
 1059 ZZ

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
 LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
 NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW
 47 OG04-C
 .
 .
 64 .-----> DPD01
 60 DOG04-C
 V
 V
 67 RDOG04-C
 .
 .
 71 . OG05-C
 .
 .
 76 COG05-C.....
 V
 V
 80 RCOG05-C
 .
 .
 84 . CY06B-C
 .
 .
 89 CCY06B-C.....
 V
 V
 93 RCCY06B
 .
 .
 97 . PDGCD-C
 . V
 . V
 102 . RPDGCD-C
 . V
 . V
 106 . RRPDGCD
 .
 .
 111 . . NW29B-C
 . . V
 . . V
 116 . . RNW29B-C
 . .
 . .
 120 . . NW1C2-C
 . .
 . .
 125 . . CNW1C2.....
 . . V
 . . V

129	.	.	RCNW1C2	.
133	.	.		PDGCB10-
138	.	.	CPDGCB10.....	.
147	.	.		----->DPT3AA11
142	.	.	DPDGCB10	.
150	.	.	CPDGCB10.....	.
	.	.	V	.
	.	.	V	.
154	.	.	RCPDGCB	.
158	.	.		GD20BE-C
163	.	.	CGD20BEC.....	.
	.	.	V	.
	.	.	V	.
167	.	.	RCGD20BE	.
174	.	.		GD20BM-C
179	.	.	CGD20BMC.....	.
	.	.	V	.
	.	.	V	.
183	.	.	RCGD20BM	.
190	.	.		GD17BG-C
195	.	.	CGD17BG.....	.
	.	.	V	.
	.	.	V	.
199	.	.	RGD17BG	.
205	.	.		GD11B-C
210	.	.	CGD11B-C.....	.
	.	.	V	.
	.	.	V	.
214	.	.	RCGD11B	.
220	.	.		PT6B-C
225	.	.	CPT6B-C.....	.
233	.	.		-----> DGOW1A
229	.	.	DPT6B-C1	.
240	.	.		-----> DTRILGY
236	.	.	DPT6B-C2	.
243	.	.		PT2B2-C
	.	.	V	.
	.	.	V	.
248	.	.	RCPT2B2	.
255	.	.		PT3-C
	.	.		V
	.	.		V
260	.	.		RCPT3-C
	.	.		.

264	.	.	.	.	PT41-C
269	.	.	.	.	.
	.	.	.	.	.
273	.	.	.	.	.
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280	.	.	.	.	PT5A2-C
	.	.	.	.	.
285	.	.	.	.	.
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289	.	.	.	.	.
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376	.	.	.	.	.
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380	.	.	.	.	.

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      V
      V
384  RCRGOWAN
      .
388      PD05A-C
      .
393  CPD05A-C.....
      .
402      ----->  DA1-C
397  DCPD05A
      V
      V
405  RCPD05
      .
411      .<-----  DPD01
409      .    DPD01
      .    V
      .    V
412      .    RDPD01
      .
416      .    PD01-C
      .
421      .    CPD01-C.....
      .    V
      .    V
425      .    RCPD01
      .
431      .    CY04A-C
      .
436      .    CCY04A-C.....
      .
444      .    ----->  DLVSR1
440      .    DCY04C
      .    V
      .    V
447      .    RCCY04A
      .
453      .    PD04B-C
      .
458      .    CPD04B-C.....
      .
462  CCPD04B-.....
      V
      V
466  RCPD04B
      .
472      .    OG03-C
      .    V
      .    V
477      .    ROG03-C
      .
481      .    OG02-C
      .    V
      .    V
486      .    ROG02-C
      .
490      .    LM01-C
      .
495      .    CLM01-C.....
      .
504      .    ----->  DSR01F
499      .    SR01E
      .    V
      .    V

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507      .      .      RCLM01-C
513      .      .      .      SR00A-C
518      .      .      CSR00A.....
522      .      CCSR00A.....
          .      V
          .      V
526      .      RCSR00A
          .
          .
534      .      .      .      .<----- DLVSR1
532      .      .      DLVSR1
          .      V
          .      V
535      .      .      RDLVSR1
          .
          .
541      .      .      .      SR02E-C
          .
          .
546      .      .      CSR02E.....
          .      V
          .      V
550      .      .      RCSR02E
          .
          .
556      .      .      .      SR05D-C
          .
          .
561      .      .      CSR05D.....
          .      V
          .      V
565      .      .      RCSR05D
          .
          .
571      .      .      .      SR05B-C
          .
          .
576      .      .      CSR05B.....
          .
          .
583      .      .      .      .-----> DLVSR2
580      .      .      DCSR05B
          .
          .
589      .      .      .      .-----> DLVSR3
586      .      .      DDCSR05B
          .
          .
596      .      .      .      .-----> DLVRA
592      .      .      D3CSR05B
          .
          .
603      .      .      .      .-----> DRAN
599      .      .      D4CSR05B
          .
          .
608      .      .      .      .-----> DSMOKE
606      .      .      DSR05B
          .
          .
613      .      .      .      .<----- DLVSR3
611      .      .      .      DLVSR3
          .
          .
614      .      .      CCSR05B.....
          .
          .
620      .      .      .      .-----> DLVSR4
618      .      .      DCCSR05B
          .
          .
625      .      .      .      .<----- DSR01F
623      .      .      .      DSR01F
          .      V
          .      V

```

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626      . RDSR01F
        .
632      .          LM02-C
        .
637      . CLM02-C.....
        .      V
        .      V
641      . RCLM02-C
        .
647      .          LM03-C
        .
652      . CLM03-C.....
        .      V
        .      V
656      . RCLM03-C
        .
662      .          LM05-C
        .
667      . CLM05-C.....
        .      V
        .      V
671      . RCLM05-C
        .
677      .          LM06B-C
        .
682      . CLM06-C.....
        .
691      . -----> DLVLM4
686      . DLVLMRA
        .
698      . -----> DVALDR
694      . DSURF1
        .
703      .          .<----- DLVRA
701      .          DLVRA
        .          V
        .          V
704      .          RDLVRA
        .
710      .          .<----- DRAN
708      .          DRAN
        .          V
        .          V
711      .          RDRAN
        .
717      .          .<----- DLVLM4
715      .          DLVLM4
        .
718      . CCLM06-C.....
        .
728      . -----> DLVLM5
722      . DLVLMRA
        .
735      . -----> DLAKEM
731      . DSURF2
        .
744      . -----> DRAN119
738      . D1LM09
        .
753      . -----> DRAN118
747      . D2LM09
        .      V
        .      V

```

```

756      . RD2LM09
      .
      .
762      .          .<----- DVALDR
760      .          DVALDR
      .
      .
763      .          . LM09
      .          .
      .          .
768      . CLM09.....
      .
      .
778      . -----> DCORAN
772      . D3LM09
      .   V
      .   V
781      . RD3LM09
      .
      .
785      .          VG21
      .          .
      .          .
790      . CVG21.....
      .
      .
801      . -----> DHOLLY
794      . DVG21
      .
      .
804      .          LM08
      .          V
      .          V
809      .          RLM08
      .          .
      .          .
812      .          . VG20
      .          .
      .          .
817      . CVG20.....
      .   V
      .   V
821      . RCVG20
      .
      .
825      .          VG22
      .          .
      .          .
830      . CVG22.....
      .
      .
834      .          OG011A-C
      .          V
      .          V
839      .          ROG011A
      .          .
      .          .
843      .          . VG02-C
      .          .
      .          .
848      .          . CVG02-C.....
      .          V
      .          V
852      .          RCVG02
      .          .
      .          .
858      .          . VG03-C
      .          .
      .          .
863      .          . CVG03-C.....
      .          V
      .          V
867      .          RCVG03
      .          .
      .          .
873      .          . VG04-C
      .          .
      .          .
878      .          . CVG04-C.....
      .          V
      .          V

```

882	.	.	RCVG04	.
886	.	.	.	WA08A
891	.	.	CWA08A.....	.
	.	.	V	.
	.	.	V	.
895	.	.	RCWA08A	.
899	.	.	.	VG06
904	.	.	CVG06.....	.
	.	.	V	.
	.	.	V	.
908	.	.	RCVG06	.
912	.	.	CCVG22.....	.
921	.	.	----->	LV15
916	.	.	DCVG20-C	.
	.	.	V	.
	.	.	V	.
924	.	.	RDCVG20-	.
932	.	.	.	<----- LV15
930	.	.	LV15	.
	.	.	V	.
	.	.	V	.
933	.	.	RLV15	.
937	.	.	.	DUMMY
943	.	.	CRLV15.....	.
946	.	.	.	WA12
951	.	.	.	WA13
956	.	.	CWA13.....	.
960	.	.	CWA13.....	.
963	.	.	.	WA14
968	.	.	CWA14.....	.
971	.	.	WA01-C	.
	.	.	V	.
	.	.	V	.
976	.	.	RWA01	.
980	.	.	.	WA04-C
985	.	.	CWA04-C.....	.
	.	.	V	.
	.	.	V	.
989	.	.	RCWA04	.
995	.	.	.	WA09-C
1000	.	.	CWA09-C.....	.

```

      .      .      .      .      V
      .      .      .      .      V
1004  .      .      .      .      RCWA09
      .      .      .      .      .
1010  .      .      .      .      .      WA10-C
      .      .      .      .      .      .
1021  .      .      .      .      .      .      WA10SE
1015  .      .      .      .      .      .      WA10D
      .      .      .      .      .      .      .
1024  .      .      .      .      .      .      .      CWA10NW
      .      .      .      .      .      .      .      .      V
      .      .      .      .      .      .      .      .      V
1028  .      .      .      .      .      .      .      .      RCWA10NW
      .      .      .      .      .      .      .      .      .
1034  .      .      .      .      .      .      .      .      .      WA11-C
      .      .      .      .      .      .      .      .      .      .
1045  .      .      .      .      .      .      .      .      .      .      WA13SE
1039  .      .      .      .      .      .      .      .      .      .      CWA13
      .      .      .      .      .      .      .      .      .      .      V
      .      .      .      .      .      .      .      .      .      .      V
1048  .      .      .      .      .      .      .      .      .      .      RCRLV15
      .      .      .      .      .      .      .      .      .      .      .
1051  .      .      .      .      .      .      .      .      .      .      .      LC16-C
      .      .      .      .      .      .      .      .      .      .      .
1056  .      .      .      .      .      .      .      .      .      .      .      .      END

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   JAN   1997                *
*   VERSION 4.1              *
* RUN DATE 05MAR12 TIME 14:28:39 *
*                               *
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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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CLV CENTRAL NEIGHBORHOOD FLOOD CONTROL MASTER PLAN 2003
CENTRAL BASIN (NORTHWEST AREA)
DESIGN STORM = 100-YEAR 6-HR STORM
STORM DISTRIBUTION = SDN #3
MODELED BY PBS&J (STEPHEN C. ALTMAN P.E.)
INPUT FILE = ENW310.DAT
INPUT FILE DATE = OCTOBER, 2003
REFERENCED HYDROLOGIC MODELS:
CITY OF LAS VEGAS CITY WIDE HYDROLOGY ANALYSIS (PBS&J 1997)
RANCHO DRIVE DRAINAGE IMPROVEMENTS PEAK DRIVE TO LAKE MEAD BOULEVARD
(MONTGOMERY WATSON 2000)
CCRFCD 2002 LAS VEGAS VALLEY MASTER PLAN UPDATE (PBS&J, GCW, LBG)

EXISTING CONDITION = FUTURE LAND USE + EXISTING FACILITIES
NO STORM CENTERING
COMPOSITE CURVE NUMBERS
2002 MPU SUBBASINS USED FOR OFFSITE AREAS EXCEPT WHERE SPECIFIED

NOTE: LOCATIONS AND DESCRIPTIONS OF PROPOSED MPU FACILITIES ARE STATED IN THE MODEL. HOWEVER, ROUTINGS IN THESE LOCATIONS REFLECT THE EXISTING CONDITION.

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES:

CONCENTRATION POINT	AREA SQ. MI.	DARF
	0-0.5	0.990
	0.5-1	0.975
	1-2	0.950
	2-3	0.925
	3-4	0.915
	4-5	0.908
	5-6	0.903

6-7 0.895
7-8 0.885

JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)

100-YEAR, 6-HOUR STORM, SDN3

44 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

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 +	OG04-C	.29	1	FLOW TIME	312. 3.75	305. 3.75	295. 3.75	284. 3.75	280. 3.75	277. 3.75	275. 3.75	272. 3.75	268. 3.75
DIVERSION TO +	DPD01	.29	1	FLOW TIME	124. 3.50	124. 3.50	124. 3.50	124. 3.50	124. 3.50	124. 3.50	124. 3.50	124. 3.50	124. 3.50
HYDROGRAPH AT +	DOG04-C	.29	1	FLOW TIME	188. 3.75	181. 3.75	171. 3.75	160. 3.75	156. 3.75	153. 3.75	151. 3.75	148. 3.75	144. 3.75
ROUTED TO +	RDOG04-C	.29	1	FLOW TIME	122. 4.25	117. 4.25	108. 4.33	101. 4.33	98. 4.33	95. 4.33	94. 4.33	91. 4.33	88. 4.33
HYDROGRAPH AT +	OG05-C	.27	1	FLOW TIME	262. 3.83	257. 3.83	248. 3.83	239. 3.83	235. 3.83	233. 3.83	231. 3.83	228. 3.83	225. 3.83
2 COMBINED AT +	COG05-C	.55	1	FLOW TIME	267. 4.17	258. 4.17	248. 3.83	239. 3.83	236. 3.83	233. 3.83	232. 3.83	229. 3.83	225. 3.83
ROUTED TO +	RCOG05-C	.55	1	FLOW TIME	264. 4.08	259. 4.08	250. 4.08	240. 4.08	237. 4.08	234. 4.08	232. 4.08	229. 4.08	226. 4.08

HYDROGRAPH AT													
+	CY06B-C	.50	1	FLOW TIME	295. 4.17	288. 4.17	277. 4.17	265. 4.17	261. 4.17	258. 4.17	256. 4.17	252. 4.17	247. 4.17
2 COMBINED AT													
+	CCY06B-C	1.05	1	FLOW TIME	556. 4.08	544. 4.17	523. 4.17	503. 4.17	495. 4.17	490. 4.17	486. 4.17	479. 4.17	471. 4.17
ROUTED TO													
+	RCCY06B	1.05	1	FLOW TIME	556. 4.17	543. 4.17	524. 4.17	503. 4.17	495. 4.17	488. 4.17	484. 4.17	479. 4.17	471. 4.17
HYDROGRAPH AT													
+	PDGCD-C	.44	1	FLOW TIME	224. 4.00	218. 4.00	208. 4.00	197. 4.00	193. 4.00	190. 4.00	188. 4.00	185. 4.00	181. 4.00
ROUTED TO													
+	RPDGCD-C	.44	1	FLOW TIME	224. 4.17	217. 4.17	207. 4.17	197. 4.17	193. 4.17	190. 4.17	188. 4.17	185. 4.17	181. 4.17
ROUTED TO													
+	RRPDGCD	.44	1	FLOW TIME	223. 4.17	217. 4.17	206. 4.17	196. 4.17	191. 4.17	189. 4.17	187. 4.17	183. 4.17	179. 4.17
HYDROGRAPH AT													
+	NW29B-C	.29	1	FLOW TIME	177. 3.83	172. 3.83	164. 3.83	156. 3.83	153. 3.83	150. 3.83	149. 3.83	146. 3.83	143. 3.83
ROUTED TO													
+	RNW29B-C	.29	1	FLOW TIME	178. 4.00	173. 4.00	164. 4.00	156. 4.08	153. 4.08	151. 4.08	149. 4.08	147. 4.08	144. 4.08
HYDROGRAPH AT													
+	NW1C2-C	.21	1	FLOW TIME	185. 3.83	181. 3.83	175. 3.83	168. 3.83	165. 3.83	164. 3.83	162. 3.83	160. 3.83	157. 3.83
2 COMBINED AT													
+	CNW1C2	.49	1	FLOW TIME	344. 3.92	335. 3.92	320. 4.00	306. 4.00	300. 4.00	297. 4.00	294. 4.00	289. 4.00	284. 4.00
ROUTED TO													
+	RCNW1C2	.49	1	FLOW TIME	344. 4.00	335. 4.00	321. 4.08	307. 4.08	301. 4.08	297. 4.08	295. 4.08	290. 4.08	285. 4.08
HYDROGRAPH AT													
+	PDGCB10-	.31	1	FLOW TIME	218. 3.83	213. 3.83	204. 3.83	195. 3.83	191. 3.83	188. 3.83	187. 3.83	184. 3.83	180. 3.83
2 COMBINED AT													
+	CPDGCB10	.80	1	FLOW TIME	545. 4.00	531. 4.00	508. 4.00	485. 4.00	476. 4.00	469. 4.00	465. 4.00	458. 4.00	449. 4.00
DIVERSION TO													
+	DPT3AA11	.80	1	FLOW TIME	139. 3.58	139. 3.58	139. 3.58	139. 3.58	139. 3.58	139. 3.58	139. 3.58	139. 3.58	139. 3.58
HYDROGRAPH AT													
+	DPDGCB10	.80	1	FLOW TIME	406. 4.00	392. 4.00	369. 4.00	346. 4.00	337. 4.00	330. 4.00	326. 4.00	319. 4.00	310. 4.00
2 COMBINED AT													
+	CPDGCB10	1.24	1	FLOW TIME	600. 4.00	581. 4.00	547. 4.08	515. 4.08	502. 4.08	494. 4.08	488. 4.08	477. 4.08	465. 4.08
ROUTED TO													
+	RCPDGCB	1.24	1	FLOW TIME	592. 4.08	578. 4.08	540. 4.08	506. 4.08	499. 4.08	485. 4.08	477. 4.08	473. 4.08	454. 4.08
HYDROGRAPH AT													
+	GD20BE-C	.43	1	FLOW TIME	279. 3.92	272. 3.92	260. 3.92	249. 3.92	244. 3.92	241. 3.92	238. 3.92	235. 3.92	230. 3.92
2 COMBINED AT													
+	CGD20BEC	1.67	1	FLOW TIME	844. 4.08	823. 4.08	775. 4.08	731. 4.08	720. 4.08	704. 4.08	693. 4.08	686. 4.08	663. 4.08
ROUTED TO													
+	RCGD20BE	1.67	1	FLOW TIME	839. 4.17	818. 4.17	771. 4.17	728. 4.17	716. 4.17	700. 4.17	690. 4.17	683. 4.17	660. 4.17
HYDROGRAPH AT													

+	GD20BM-C	.34	1	FLOW TIME	297. 3.92	291. 3.92	281. 3.92	270. 3.92	266. 3.92	263. 3.92	261. 3.92	258. 3.92	254. 3.92
+	2 COMBINED AT CGD20BMC	2.01	1	FLOW TIME	1088. 4.08	1055. 4.08	998. 4.08	944. 4.08	926. 4.08	906. 4.08	896. 4.08	883. 4.08	855. 4.08
+	ROUTED TO RCGD20BM	2.01	1	FLOW TIME	1083. 4.17	1051. 4.17	995. 4.17	941. 4.17	923. 4.17	904. 4.17	894. 4.17	881. 4.17	854. 4.17
+	HYDROGRAPH AT GD17BG-C	.36	1	FLOW TIME	287. 3.92	280. 3.92	270. 3.92	259. 3.92	255. 3.92	252. 3.92	250. 3.92	247. 3.92	242. 3.92
+	2 COMBINED AT CGD17BG	2.38	1	FLOW TIME	1312. 4.17	1275. 4.17	1211. 4.17	1149. 4.17	1128. 4.17	1106. 4.17	1095. 4.17	1079. 4.17	1049. 4.17
+	ROUTED TO RGD17BG	2.38	1	FLOW TIME	1285. 4.25	1261. 4.25	1196. 4.25	1143. 4.25	1122. 4.25	1101. 4.25	1090. 4.25	1074. 4.25	1045. 4.25
+	HYDROGRAPH AT GD11B-C	.26	1	FLOW TIME	304. 3.67	298. 3.67	287. 3.67	277. 3.67	273. 3.67	270. 3.67	268. 3.67	265. 3.67	261. 3.67
+	2 COMBINED AT CGD11B-C	2.64	1	FLOW TIME	1395. 4.17	1365. 4.17	1291. 4.17	1231. 4.17	1203. 4.17	1182. 4.17	1168. 4.25	1152. 4.25	1122. 4.25
+	ROUTED TO RCGD11B	2.64	1	FLOW TIME	1379. 4.25	1359. 4.25	1290. 4.25	1227. 4.25	1191. 4.25	1188. 4.25	1158. 4.25	1134. 4.25	1114. 4.25
+	HYDROGRAPH AT PT6B-C	.45	1	FLOW TIME	250. 4.25	244. 4.25	234. 4.25	224. 4.25	220. 4.25	218. 4.25	216. 4.25	213. 4.25	209. 4.25
+	2 COMBINED AT CPT6B-C	3.09	1	FLOW TIME	1629. 4.25	1603. 4.25	1524. 4.25	1452. 4.25	1412. 4.25	1405. 4.25	1374. 4.25	1347. 4.25	1314. 4.25
+	DIVERSION TO DGOW1A	3.09	1	FLOW TIME	560. 3.75	560. 3.75	560. 3.75	560. 3.75	560. 3.75	560. 3.75	560. 3.75	560. 3.83	560. 3.83
+	HYDROGRAPH AT DPT6B-C1	3.09	1	FLOW TIME	1069. 4.25	1043. 4.25	964. 4.25	892. 4.25	852. 4.25	845. 4.25	814. 4.25	787. 4.25	762. 4.25
+	DIVERSION TO DTRILGY	3.09	1	FLOW TIME	244. 4.25	240. 4.25	227. 4.25	216. 4.25	209. 4.25	208. 4.25	203. 4.25	199. 4.25	195. 4.25
+	HYDROGRAPH AT DPT6B-C2	3.09	1	FLOW TIME	825. 4.25	803. 4.25	737. 4.25	676. 4.25	643. 4.25	637. 4.25	611. 4.25	588. 4.25	568. 4.25
+	HYDROGRAPH AT PT2B2-C	.30	1	FLOW TIME	304. 3.83	299. 3.83	289. 3.83	279. 3.83	275. 3.83	273. 3.83	271. 3.83	268. 3.83	264. 3.83
+	ROUTED TO RCPT2B2	.30	1	FLOW TIME	299. 3.92	294. 3.92	284. 3.92	275. 3.92	272. 3.92	268. 3.92	266. 3.92	264. 3.92	260. 3.92
+	HYDROGRAPH AT PT3-C	.17	1	FLOW TIME	166. 3.83	163. 3.83	157. 3.83	152. 3.83	149. 3.83	148. 3.83	147. 3.83	145. 3.83	142. 3.83
+	ROUTED TO RCPT3-C	.17	1	FLOW TIME	167. 4.08	164. 4.08	158. 4.08	152. 4.08	150. 4.08	149. 4.08	148. 4.08	146. 4.08	143. 4.08
+	HYDROGRAPH AT PT41-C	.44	1	FLOW TIME	381. 3.83	373. 3.83	359. 3.83	345. 3.83	340. 3.83	336. 3.83	333. 3.83	329. 3.83	323. 3.83
+	3 COMBINED AT CPT41-C	.91	1	FLOW	821.	804.	775.	746.	735.	726.	720.	712.	700.

				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO														
+	RCPT41-C	.91	1	FLOW	817.	801.	771.	742.	732.	723.	717.	709.	697.	
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	
HYDROGRAPH AT														
+	PT5A2-C	.34	1	FLOW	215.	210.	201.	193.	190.	188.	186.	183.	180.	
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	
2 COMBINED AT														
+	CPT5A2-C	1.25	1	FLOW	1011.	990.	952.	916.	902.	891.	884.	874.	858.	
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	
ROUTED TO														
+	RCPT5A2	1.25	1	FLOW	1008.	989.	950.	914.	903.	890.	885.	874.	858.	
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
2 COMBINED AT														
+	CCPT6B-C	4.34	1	FLOW	1680.	1638.	1531.	1438.	1391.	1369.	1344.	1311.	1272.	
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	
DIVERSION TO														
+	DGOWAN	4.34	1	FLOW	1180.	1138.	1031.	938.	891.	869.	844.	811.	772.	
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	
HYDROGRAPH AT														
+	DRANCHO	4.34	1	FLOW	500.	500.	500.	500.	500.	500.	500.	500.	500.	
				TIME	3.67	3.67	3.67	3.67	3.75	3.75	3.75	3.75	3.75	
ROUTED TO														
+	RDRANCH	4.34	1	FLOW	501.	501.	501.	501.	501.	501.	501.	501.	501.	
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	
HYDROGRAPH AT														
+	DTRILGY	.00	1	FLOW	244.	240.	227.	216.	209.	208.	203.	199.	195.	
				TIME	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	
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	4.54	1	FLOW	869.	861.	842.	825.	817.	813.	809.	803.	796.	
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	
DIVERSION TO														
+	DCENT1	4.54	1	FLOW	797.	789.	770.	753.	745.	741.	737.	731.	724.	
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	
HYDROGRAPH AT														
+	DCY07B	4.54	1	FLOW	72.	72.	72.	72.	72.	72.	72.	72.	72.	
				TIME	2.75	2.83	2.83	2.92	3.00	3.00	3.00	3.08	3.08	
HYDROGRAPH AT														
+	DGOWAN	.00	1	FLOW	1180.	1138.	1031.	938.	891.	869.	844.	811.	772.	
				TIME	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	
ROUTED TO														
+	RDGOWAN	.00	1	FLOW	1174.	1126.	1021.	924.	878.	860.	835.	804.	765.	
				TIME	4.25	4.25	4.25	4.25	4.25	4.33	4.25	4.25	4.25	
HYDROGRAPH AT														
+	DGOW1A	.00	1	FLOW	560.	560.	560.	560.	560.	560.	560.	560.	560.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.83	3.83	
ROUTED TO														
+	RDGOW1A	.00	1	FLOW	562.	562.	562.	563.	563.	563.	563.	563.	561.	
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.92	
2 COMBINED AT														
+	CCPT6B-C	.00	1	FLOW	1734.	1686.	1581.	1484.	1438.	1420.	1395.	1364.	1325.	
				TIME	4.25	4.25	4.25	4.25	4.25	4.33	4.25	4.25	4.25	
HYDROGRAPH AT														
+	CY08-C	.09	1	FLOW	97.	95.	91.	88.	86.	86.	85.	84.	82.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
3 COMBINED AT														
+	CCY08-C	4.64	1	FLOW	1840.	1791.	1684.	1587.	1540.	1516.	1496.	1465.	1425.	
				TIME	4.25	4.25	4.25	4.25	4.25	4.33	4.25	4.25	4.25	

DIVERSION TO +	DCENTRAL	4.64	1	FLOW TIME	1210. 4.25	1161. 4.25	1054. 4.25	957. 4.25	910. 4.25	886. 4.33	866. 4.25	835. 4.25	795. 4.25
HYDROGRAPH AT +	DGOW2A	4.64	1	FLOW TIME	630. 3.75	630. 3.75	630. 3.75	630. 3.75	630. 3.75	630. 3.75	630. 3.75	630. 3.75	630. 3.75
DIVERSION TO +	D3ALL	4.64	1	FLOW TIME	630. 3.75	630. 3.75	630. 3.75	630. 3.75	630. 3.75	630. 3.75	630. 3.75	630. 3.75	630. 3.75
HYDROGRAPH AT +	D3ALL	4.64	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
HYDROGRAPH AT +	DCENT1	.00	1	FLOW TIME	797. 4.17	789. 4.17	770. 4.17	753. 4.17	745. 4.17	741. 4.17	737. 4.17	731. 4.17	724. 4.17
ROUTED TO +	RDCEM1	.00	1	FLOW TIME	792. 4.17	784. 4.25	768. 4.25	751. 4.25	742. 4.25	739. 4.25	734. 4.25	728. 4.25	722. 4.25
3 COMBINED AT +	CRGOWAN	5.69	1	FLOW TIME	1349. 4.17	1326. 4.17	1291. 4.17	1250. 4.17	1233. 4.17	1221. 4.17	1214. 4.17	1201. 4.17	1184. 4.17
ROUTED TO +	RCRGOWAN	5.69	1	FLOW TIME	1345. 4.25	1322. 4.25	1287. 4.25	1247. 4.25	1230. 4.25	1221. 4.25	1214. 4.25	1200. 4.25	1183. 4.25
HYDROGRAPH AT +	PD05A-C	.14	1	FLOW TIME	145. 3.83	142. 3.83	138. 3.83	133. 3.83	131. 3.83	130. 3.83	129. 3.83	128. 3.83	126. 3.83
2 COMBINED AT +	CPD05A-C	5.83	1	FLOW TIME	1424. 4.17	1403. 4.17	1360. 4.17	1317. 4.25	1299. 4.25	1289. 4.25	1281. 4.25	1267. 4.25	1250. 4.25
DIVERSION TO +	DA1-C	5.83	1	FLOW TIME	211. 3.58	211. 3.58	211. 3.58	211. 3.58	211. 3.67	211. 3.67	211. 3.67	211. 3.67	211. 3.67
HYDROGRAPH AT +	DCPD05A	5.83	1	FLOW TIME	1213. 4.17	1192. 4.17	1149. 4.17	1106. 4.25	1088. 4.25	1078. 4.25	1070. 4.25	1056. 4.25	1039. 4.25
ROUTED TO +	RCPD05	5.83	1	FLOW TIME	1213. 4.25	1190. 4.25	1153. 4.25	1105. 4.25	1089. 4.25	1077. 4.25	1066. 4.25	1055. 4.25	1037. 4.25
HYDROGRAPH AT +	DPD01	.00	1	FLOW TIME	124. 3.50	124. 3.50	124. 3.50	124. 3.50	124. 3.50	124. 3.50	124. 3.50	124. 3.50	124. 3.50
ROUTED TO +	RDPD01	.00	1	FLOW TIME	134. 3.67	133. 3.67	132. 3.67	130. 3.67	129. 3.67	129. 3.67	129. 3.67	128. 3.75	129. 3.75
HYDROGRAPH AT +	PD01-C	.38	1	FLOW TIME	260. 3.92	254. 3.92	243. 3.92	232. 3.92	228. 3.92	225. 3.92	223. 3.92	220. 3.92	215. 3.92
2 COMBINED AT +	CPD01-C	.38	1	FLOW TIME	388. 3.92	381. 3.92	370. 3.92	358. 3.92	354. 3.92	351. 3.92	348. 3.92	345. 3.92	340. 3.92
ROUTED TO +	RCPD01	.38	1	FLOW TIME	385. 3.92	378. 3.92	366. 3.92	355. 3.92	351. 3.92	348. 3.92	346. 3.92	342. 3.92	338. 3.92
HYDROGRAPH AT +	CY04A-C	.46	1	FLOW TIME	341. 3.92	334. 3.92	321. 3.92	308. 3.92	302. 3.92	299. 3.92	296. 3.92	292. 3.92	287. 3.92
2 COMBINED AT +	CCY04A-C	.83	1	FLOW TIME	726. 3.92	712. 3.92	687. 3.92	663. 3.92	653. 3.92	646. 3.92	642. 3.92	634. 3.92	625. 3.92

DIVERSION TO														
+	DLVSR1	.83	1	FLOW TIME	231. 3.50	231. 3.50	231. 3.58	231. 3.58	231. 3.58	231. 3.58	231. 3.58	231. 3.58	231. 3.58	231. 3.58
HYDROGRAPH AT														
+	DCY04C	.83	1	FLOW TIME	495. 3.92	481. 3.92	456. 3.92	432. 3.92	422. 3.92	415. 3.92	411. 3.92	403. 3.92	394. 3.92	392. 3.92
ROUTED TO														
+	RCCY04A	.83	1	FLOW TIME	487. 4.00	474. 4.00	449. 4.00	429. 4.00	417. 4.00	411. 4.00	408. 4.00	398. 4.00	391. 4.00	391. 4.00
HYDROGRAPH AT														
+	PD04B-C	.47	1	FLOW TIME	345. 4.00	338. 4.00	325. 4.00	312. 4.00	307. 4.00	304. 4.00	301. 4.00	297. 4.00	292. 4.00	292. 4.00
2 COMBINED AT														
+	CPD04B-C	1.30	1	FLOW TIME	833. 4.00	812. 4.00	774. 4.00	741. 4.00	724. 4.00	715. 4.00	710. 4.00	695. 4.00	683. 4.00	683. 4.00
2 COMBINED AT														
+	CCPD04B-	7.13	1	FLOW TIME	1916. 4.17	1874. 4.17	1804. 4.17	1718. 4.17	1696. 4.17	1673. 4.17	1655. 4.17	1634. 4.17	1603. 4.17	1603. 4.17
ROUTED TO														
+	RCPD04B	7.13	1	FLOW TIME	1913. 4.17	1870. 4.17	1798. 4.17	1713. 4.17	1689. 4.17	1667. 4.17	1649. 4.17	1629. 4.17	1597. 4.17	1597. 4.17
HYDROGRAPH AT														
+	OG03-C	.32	1	FLOW TIME	278. 3.83	272. 3.83	261. 3.83	251. 3.83	247. 3.83	244. 3.83	242. 3.83	238. 3.83	234. 3.83	234. 3.83
ROUTED TO														
+	ROG03-C	.32	1	FLOW TIME	278. 3.92	272. 3.92	261. 3.92	251. 3.92	246. 3.92	243. 3.92	241. 3.92	238. 3.92	234. 3.92	234. 3.92
HYDROGRAPH AT														
+	OG02-C	.32	1	FLOW TIME	327. 3.75	320. 3.75	309. 3.75	298. 3.75	293. 3.75	290. 3.75	288. 3.75	284. 3.75	280. 3.75	280. 3.75
ROUTED TO														
+	ROG02-C	.32	1	FLOW TIME	327. 3.92	321. 3.92	310. 3.92	299. 3.92	295. 3.92	292. 3.92	289. 3.92	286. 3.92	281. 3.92	281. 3.92
HYDROGRAPH AT														
+	LM01-C	.33	1	FLOW TIME	213. 3.83	207. 3.83	198. 3.83	188. 3.83	184. 3.83	182. 3.83	180. 3.83	177. 3.83	173. 3.83	173. 3.83
2 COMBINED AT														
+	CLM01-C	.64	1	FLOW TIME	538. 3.92	526. 3.92	506. 3.92	486. 3.92	478. 3.92	472. 3.92	468. 3.92	462. 3.92	454. 3.92	454. 3.92
DIVERSION TO														
+	DSR01F	.64	1	FLOW TIME	351. 3.92	343. 3.92	331. 3.92	319. 3.92	315. 3.92	311. 3.92	309. 3.92	305. 3.92	300. 3.92	300. 3.92
HYDROGRAPH AT														
+	SR01E	.64	1	FLOW TIME	187. 3.92	182. 3.92	174. 3.92	166. 3.92	163. 3.92	161. 3.92	159. 3.92	157. 3.92	153. 3.92	153. 3.92
ROUTED TO														
+	RCLM01-C	.64	1	FLOW TIME	187. 3.92	182. 3.92	174. 3.92	165. 3.92	162. 3.92	160. 3.92	158. 3.92	155. 3.92	152. 3.92	152. 3.92
HYDROGRAPH AT														
+	SR00A-C	.37	1	FLOW TIME	255. 3.92	248. 3.92	238. 3.92	227. 3.92	223. 3.92	220. 3.92	218. 3.92	215. 3.92	211. 3.92	211. 3.92
2 COMBINED AT														
+	CSR00A	1.01	1	FLOW TIME	442. 3.92	430. 3.92	411. 3.92	393. 3.92	385. 3.92	380. 3.92	376. 3.92	370. 3.92	363. 3.92	363. 3.92
2 COMBINED AT														
+	CCSR00A	1.34	1	FLOW TIME	720. 3.92	702. 3.92	673. 3.92	643. 3.92	632. 3.92	624. 3.92	618. 3.92	608. 3.92	597. 3.92	597. 3.92
ROUTED TO														
+	RCSR00A	1.34	1	FLOW TIME	711. 3.92	693. 3.92	663. 3.92	634. 3.92	622. 3.92	614. 3.92	608. 3.92	599. 3.92	587. 3.92	587. 3.92
HYDROGRAPH AT														

+		DLVSR1	.00	1	FLOW TIME	231. 3.50	231. 3.50	231. 3.58	231. 3.58	231. 3.58	231. 3.58	231. 3.58	231. 3.58	231. 3.58
	ROUTED TO													
+		RDLVSR1	.00	1	FLOW TIME	231. 3.75	231. 3.75	231. 3.75	231. 3.75	231. 3.75	231. 3.75	231. 3.75	231. 3.75	231. 3.75
	HYDROGRAPH AT													
+		SR02E-C	.30	1	FLOW TIME	253. 3.83	247. 3.83	237. 3.83	228. 3.83	224. 3.83	221. 3.83	219. 3.83	216. 3.83	212. 3.83
	3 COMBINED AT													
+		CSR02E	1.64	1	FLOW TIME	1181. 3.92	1158. 3.92	1119. 3.92	1080. 3.92	1065. 3.92	1054. 3.92	1047. 3.92	1034. 3.92	1019. 3.92
	ROUTED TO													
+		RCSR02E	1.64	1	FLOW TIME	1168. 3.92	1147. 3.92	1107. 3.92	1064. 3.92	1053. 3.92	1040. 3.92	1030. 3.92	1022. 4.00	1003. 4.00
	HYDROGRAPH AT													
+		SR05D-C	.30	1	FLOW TIME	243. 4.00	238. 4.00	230. 4.00	221. 4.00	218. 4.00	216. 4.00	214. 4.00	211. 4.00	208. 4.00
	2 COMBINED AT													
+		CSR05D	1.94	1	FLOW TIME	1410. 3.92	1383. 3.92	1334. 3.92	1283. 3.92	1269. 4.00	1253. 4.00	1244. 4.00	1233. 4.00	1211. 4.00
	ROUTED TO													
+		RCSR05D	1.94	1	FLOW TIME	1402. 4.00	1379. 4.00	1330. 4.00	1282. 4.00	1268. 4.00	1253. 4.00	1243. 4.00	1233. 4.00	1210. 4.00
	HYDROGRAPH AT													
+		SR05B-C	.36	1	FLOW TIME	245. 4.08	240. 4.08	231. 4.08	223. 4.08	219. 4.08	217. 4.08	215. 4.08	212. 4.08	209. 4.08
	2 COMBINED AT													
+		CSR05B	2.30	1	FLOW TIME	1640. 4.00	1611. 4.00	1554. 4.00	1497. 4.00	1480. 4.00	1462. 4.00	1450. 4.00	1438. 4.00	1412. 4.00
	DIVERSION TO													
+		DLVSR2	2.30	1	FLOW TIME	231. 3.42	231. 3.42	231. 3.42	231. 3.42	231. 3.50	231. 3.50	231. 3.50	231. 3.50	231. 3.50
	HYDROGRAPH AT													
+		DCSR05B	2.30	1	FLOW TIME	1409. 4.00	1380. 4.00	1323. 4.00	1266. 4.00	1249. 4.00	1231. 4.00	1219. 4.00	1207. 4.00	1181. 4.00
	DIVERSION TO													
+		DLVSR3	2.30	1	FLOW TIME	182. 3.50	182. 3.58	182. 3.58	182. 3.58	182. 3.58	182. 3.58	182. 3.58	182. 3.58	182. 3.58
	HYDROGRAPH AT													
+		DDCSR05B	2.30	1	FLOW TIME	1227. 4.00	1198. 4.00	1141. 4.00	1084. 4.00	1067. 4.00	1049. 4.00	1037. 4.00	1025. 4.00	999. 4.00
	DIVERSION TO													
+		DLVRA	2.30	1	FLOW TIME	670. 3.75	670. 3.75	670. 3.75	670. 3.75	670. 3.75	670. 3.75	670. 3.75	670. 3.83	670. 3.83
	HYDROGRAPH AT													
+		D3CSR05B	2.30	1	FLOW TIME	557. 4.00	528. 4.00	471. 4.00	414. 4.00	397. 4.00	379. 4.00	367. 4.00	355. 4.00	329. 4.00
	DIVERSION TO													
+		DRAN	2.30	1	FLOW TIME	278. 4.00	264. 4.00	235. 4.00	207. 4.00	199. 4.00	189. 4.00	184. 4.00	177. 4.00	164. 4.00
	HYDROGRAPH AT													
+		D4CSR05B	2.30	1	FLOW TIME	278. 4.00	264. 4.00	235. 4.00	207. 4.00	199. 4.00	189. 4.00	184. 4.00	177. 4.00	164. 4.00
	DIVERSION TO													
+		DSMOKE	2.30	1	FLOW TIME	278. 4.00	264. 4.00	235. 4.00	207. 4.00	199. 4.00	189. 4.00	184. 4.00	177. 4.00	164. 4.00
	HYDROGRAPH AT													
+		DSR05B	2.30	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00
	HYDROGRAPH AT													
+		DLVSR3	.00	1	FLOW	182.	182.	182.	182.	182.	182.	182.	182.	182.

				TIME	3.50	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
(3 COMBINED AT														
	CCSR05B	9.43	1	FLOW TIME	2095. 4.17	2052. 4.17	1980. 4.17	1895. 4.17	1871. 4.17	1849. 4.17	1831. 4.17	1811. 4.17	1779. 4.17	
DIVERSION TO														
+	DLVSR4	9.43	1	FLOW TIME	2095. 4.17	2052. 4.17	1980. 4.17	1895. 4.17	1871. 4.17	1849. 4.17	1831. 4.17	1811. 4.17	1779. 4.17	
HYDROGRAPH AT														
+	DCCSR05B	9.43	1	FLOW TIME	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	0. .00	
HYDROGRAPH AT														
+	DSR01F	.00	1	FLOW TIME	351. 3.92	343. 3.92	331. 3.92	319. 3.92	315. 3.92	311. 3.92	309. 3.92	305. 3.92	300. 3.92	
ROUTED TO														
+	RDSR01F	.00	1	FLOW TIME	351. 3.92	342. 3.92	331. 3.92	319. 3.92	313. 3.92	310. 3.92	308. 3.92	305. 3.92	299. 3.92	
HYDROGRAPH AT														
+	LM02-C	.29	1	FLOW TIME	235. 3.83	229. 3.83	220. 3.83	211. 3.83	207. 3.83	204. 3.83	203. 3.83	200. 3.83	196. 3.83	
2 COMBINED AT														
+	CLM02-C	.29	1	FLOW TIME	572. 3.92	559. 3.83	538. 3.92	518. 3.92	508. 3.92	503. 3.92	499. 3.92	493. 3.92	484. 3.92	
ROUTED TO														
+	RCLM02-C	.29	1	FLOW TIME	571. 3.92	558. 3.92	537. 3.92	517. 3.92	507. 3.92	502. 3.92	499. 3.92	492. 3.92	482. 3.92	
HYDROGRAPH AT														
+	LM03-C	.34	1	FLOW TIME	336. 3.83	329. 3.83	318. 3.83	307. 3.83	302. 3.83	299. 3.83	297. 3.83	293. 3.83	289. 3.83	
2 COMBINED AT														
+	CLM03-C	.63	1	FLOW TIME	891. 3.83	871. 3.83	838. 3.83	806. 3.92	793. 3.83	784. 3.83	778. 3.92	768. 3.92	754. 3.92	
ROUTED TO														
+	RCLM03-C	.63	1	FLOW TIME	887. 3.92	867. 3.92	836. 3.92	804. 3.92	791. 3.92	783. 3.92	777. 3.92	767. 3.92	754. 3.92	
HYDROGRAPH AT														
+	LM05-C	.37	1	FLOW TIME	328. 3.83	321. 3.83	309. 3.83	297. 3.83	292. 3.83	289. 3.83	287. 3.83	283. 3.83	278. 3.83	
2 COMBINED AT														
+	CLM05-C	.99	1	FLOW TIME	1200. 3.92	1174. 3.92	1131. 3.92	1088. 3.92	1071. 3.92	1059. 3.92	1051. 3.92	1037. 3.92	1020. 3.92	
ROUTED TO														
+	RCLM05-C	.99	1	FLOW TIME	1193. 3.92	1169. 3.92	1123. 3.92	1081. 3.92	1062. 3.92	1051. 3.92	1043. 3.92	1031. 3.92	1011. 3.92	
HYDROGRAPH AT														
+	LM06B-C	.35	1	FLOW TIME	304. 3.92	298. 3.92	287. 3.92	277. 3.92	273. 3.92	270. 3.92	267. 3.92	264. 3.92	260. 3.92	
2 COMBINED AT														
+	CLM06-C	1.35	1	FLOW TIME	1497. 3.92	1467. 3.92	1410. 3.92	1358. 3.92	1335. 3.92	1320. 3.92	1310. 3.92	1295. 3.92	1271. 3.92	
DIVERSION TO														
+	DLVLM4	1.35	1	FLOW TIME	940. 3.67	940. 3.67	940. 3.75	940. 3.75	940. 3.75	940. 3.75	940. 3.75	940. 3.75	940. 3.75	
HYDROGRAPH AT														
+	DLVLMRA	1.35	1	FLOW TIME	557. 3.92	527. 3.92	470. 3.92	418. 3.92	395. 3.92	380. 3.92	370. 3.92	355. 3.92	331. 3.92	
DIVERSION TO														
+	DVALDR	1.35	1	FLOW TIME	186. 3.92	176. 3.92	157. 3.92	139. 3.92	132. 3.92	127. 3.92	123. 3.92	118. 3.92	110. 3.92	
HYDROGRAPH AT														
(	DSURF1	1.35	1	FLOW TIME	372. 3.92	351. 3.92	313. 3.92	278. 3.92	263. 3.92	254. 3.92	247. 3.92	237. 3.92	221. 3.92	

+	VG04-C	.24	1	FLOW TIME	245. 3.83	240. 3.83	232. 3.83	224. 3.83	221. 3.83	218. 3.83	217. 3.83	214. 3.83	211. 3.83
+	2 COMBINED AT CVG04-C	1.18	1	FLOW TIME	818. 4.00	802. 4.00	762. 4.00	739. 4.00	726. 4.00	716. 4.00	710. 4.00	699. 4.00	685. 4.00
+	ROUTED TO RCVG04	1.18	1	FLOW TIME	807. 4.08	788. 4.08	755. 4.08	726. 4.08	717. 4.08	713. 4.08	706. 4.08	689. 4.08	673. 4.08
+	HYDROGRAPH AT WA08A	.03	1	FLOW TIME	39. 3.58	38. 3.58	37. 3.58	36. 3.58	35. 3.58	35. 3.58	34. 3.58	34. 3.58	34. 3.58
+	2 COMBINED AT CWA08A	1.21	1	FLOW TIME	817. 4.08	797. 4.08	764. 4.08	735. 4.08	725. 4.08	722. 4.08	714. 4.08	698. 4.08	682. 4.08
+	ROUTED TO RCWA08A	1.21	1	FLOW TIME	821. 4.17	800. 4.17	767. 4.17	738. 4.17	729. 4.17	727. 4.17	717. 4.17	700. 4.17	684. 4.17
+	HYDROGRAPH AT VG06	.19	1	FLOW TIME	188. 3.67	184. 3.67	177. 3.67	170. 3.67	167. 3.75	165. 3.75	164. 3.75	162. 3.75	159. 3.75
+	2 COMBINED AT CVG06	1.40	1	FLOW TIME	894. 4.17	872. 4.17	836. 4.17	805. 4.17	795. 4.17	792. 4.17	781. 4.17	763. 4.17	746. 4.17
+	ROUTED TO RCVG06	1.40	1	FLOW TIME	894. 4.17	872. 4.17	832. 4.17	800. 4.17	792. 4.17	788. 4.17	775. 4.17	755. 4.17	740. 4.17
+	2 COMBINED AT CCVG22	3.33	1	FLOW TIME	1328. 4.08	1297. 4.08	1246. 4.08	1206. 4.08	1191. 4.17	1185. 4.17	1171. 4.17	1148. 4.17	1131. 4.17
+	DIVERSION TO LV15	3.33	1	FLOW TIME	189. 4.08	182. 4.08	169. 4.08	159. 4.08	155. 4.17	154. 4.17	150. 4.17	145. 4.17	14. 4.
+	HYDROGRAPH AT DCVG20-C	3.33	1	FLOW TIME	1138. 4.08	1115. 4.08	1077. 4.08	1047. 4.08	1036. 4.17	1031. 4.17	1021. 4.17	1004. 4.17	990. 4.17
+	ROUTED TO RDCVG20-	3.33	1	FLOW TIME	1136. 4.08	1113. 4.08	1075. 4.08	1044. 4.08	1035. 4.17	1031. 4.17	1020. 4.17	1003. 4.17	990. 4.17
+	HYDROGRAPH AT LV15	.00	1	FLOW TIME	189. 4.08	182. 4.08	169. 4.08	159. 4.08	155. 4.17	154. 4.17	150. 4.17	145. 4.17	140. 4.17
+	ROUTED TO RLV15	.00	1	FLOW TIME	188. 4.25	180. 4.25	167. 4.25	157. 4.25	154. 4.33	152. 4.33	149. 4.33	143. 4.33	139. 4.33
+	HYDROGRAPH AT DUMMY	.00	1	FLOW TIME	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50	0. 3.50
+	2 COMBINED AT CRLV15	.00	1	FLOW TIME	188. 4.25	180. 4.25	167. 4.25	157. 4.25	154. 4.33	152. 4.33	149. 4.33	144. 4.33	139. 4.33
+	HYDROGRAPH AT WA12	.07	1	FLOW TIME	104. 3.58	102. 3.58	99. 3.58	95. 3.58	94. 3.58	93. 3.58	92. 3.58	91. 3.58	90. 3.58
+	HYDROGRAPH AT WA13	.16	1	FLOW TIME	180. 3.75	176. 3.75	170. 3.75	165. 3.75	162. 3.75	160. 3.75	159. 3.75	157. 3.75	155. 3.75
+	2 COMBINED AT CWA13	.23	1	FLOW TIME	257. 3.67	252. 3.67	244. 3.67	235. 3.67	232. 3.67	229. 3.67	228. 3.67	225. 3.67	221. 3.67
+	2 COMBINED AT CWA13	.23	1	FLOW	271. 3.67	260. 3.67	246. 3.67	235. 3.67	232. 3.67	229. 3.67	228. 3.67	225. 3.67	222. 3.67

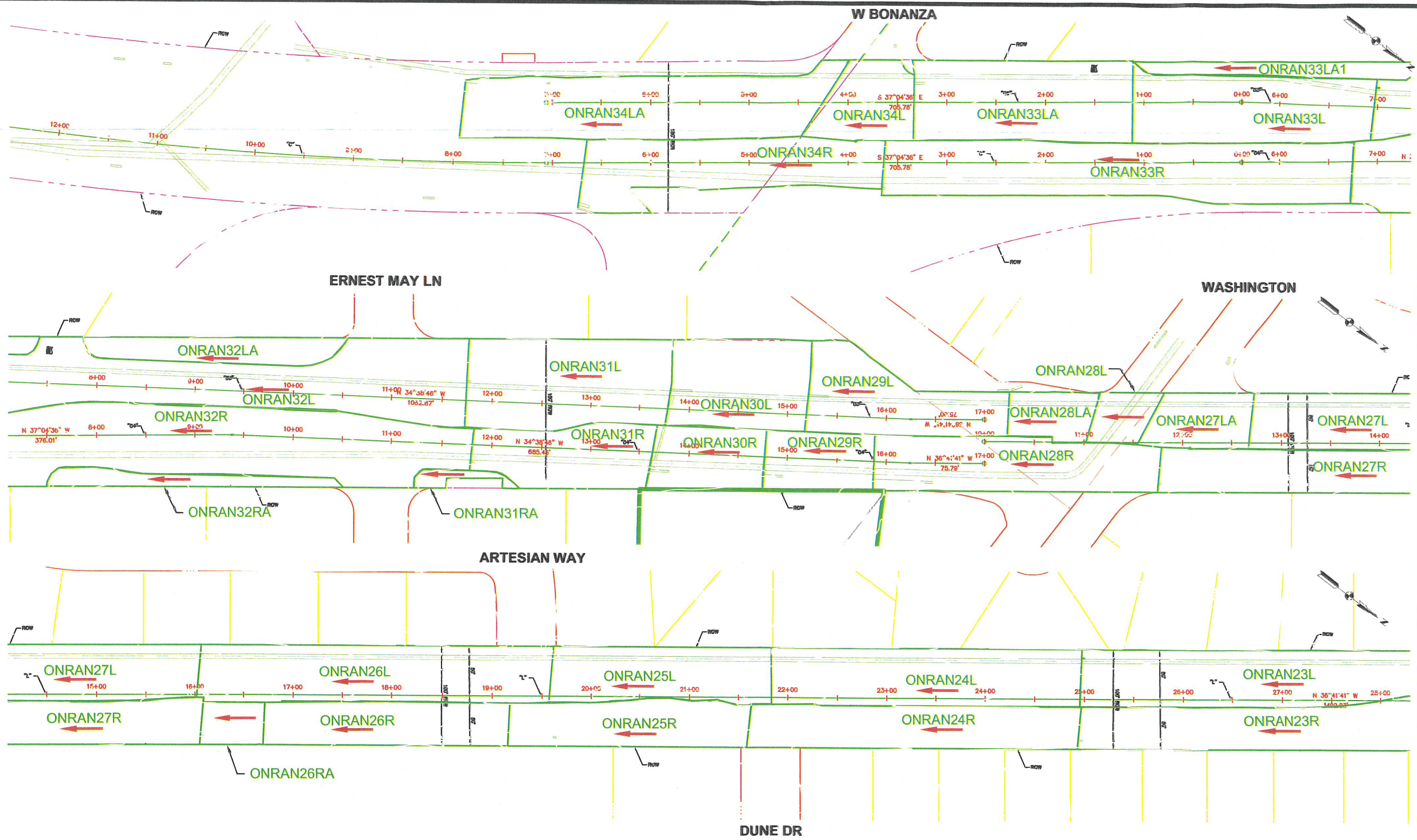
				TIME	4.08	4.08	4.08	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	WA14	.04	1	FLOW	57.	55.	54.	52.	51.	50.	50.	49.	49.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT													
+	CWA14	.27	1	FLOW	313.	307.	296.	286.	282.	279.	277.	274.	269.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT													
+	WA01-C	.22	1	FLOW	238.	232.	223.	215.	211.	209.	207.	204.	201.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
ROUTED TO													
+	RWA01	.22	1	FLOW	239.	233.	224.	215.	211.	209.	207.	204.	200.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	WA04-C	.22	1	FLOW	177.	173.	166.	160.	157.	156.	154.	152.	150.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT													
+	CWA04-C	.44	1	FLOW	410.	401.	386.	370.	364.	360.	357.	353.	347.
				TIME	3.83	3.83	3.83	3.83	3.92	3.92	3.92	3.92	3.92
ROUTED TO													
+	RCWA04	.44	1	FLOW	412.	404.	390.	375.	370.	366.	363.	358.	352.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	WA09-C	.09	1	FLOW	98.	96.	92.	89.	88.	87.	86.	85.	84.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CWA09-C	.53	1	FLOW	489.	478.	460.	441.	434.	429.	425.	419.	411.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RCWA09	.53	1	FLOW	480.	469.	453.	435.	429.	424.	421.	415.	409.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	WA10-C	.45	1	FLOW	474.	465.	449.	434.	427.	423.	420.	415.	409.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO													
+	WA10SE	.45	1	FLOW	250.	250.	250.	250.	250.	250.	250.	250.	250.
				TIME	3.50	3.58	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT													
+	WA10D	.45	1	FLOW	224.	215.	199.	184.	177.	173.	170.	165.	159.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT													
+	CWA10NW	.98	1	FLOW	594.	575.	544.	513.	501.	492.	486.	477.	464.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO													
+	RCWA10NW	.98	1	FLOW	596.	577.	545.	514.	500.	492.	485.	474.	461.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT													
+	WA11-C	.09	1	FLOW	83.	81.	78.	75.	74.	73.	72.	71.	70.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO													
+	WA13SE	.09	1	FLOW	50.	49.	47.	45.	45.	44.	44.	43.	42.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT													
+	CWA13	.09	1	FLOW	33.	32.	31.	29.	29.	29.	28.	28.	28.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO													
+	RCRLV15	.09	1	FLOW	33.	32.	31.	30.	29.	29.	29.	28.	28.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT													
+	LC16-C	.26	1	FLOW	241.	236.	226.	217.	214.	211.	209.	207.	203.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75

4 COMBINED AT
+ END 1.60 1 FLOW 1058. 1024. 971. 914. 892. 878. 866. 849. 841
1 TIME 4.08 4.08 4.08 4.08 4.08 4.08 4.08 4.08 4.08

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

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	INTERPOLATED TO COMPUTATION INTERVAL			
						DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)
FOR PLAN = 1	RATIO= .00								
RDOG04-C	MANE	5.00	122.07	255.00	.44	5.00	122.07	255.00	.44
CONTINUITY SUMMARY (AC-FT) - INFLOW= .7116E+01 EXCESS= .0000E+00 OUTFLOW= .6799E+01 BASIN STORAGE= .6026E-02 PERCENT ERROR= 4.4									
FOR PLAN = 1	RATIO= .00								
RDOG04-C	MANE	5.00	116.80	255.00	.42	5.00	116.80	255.00	.42
CONTINUITY SUMMARY (AC-FT) - INFLOW= .6818E+01 EXCESS= .0000E+00 OUTFLOW= .6518E+01 BASIN STORAGE= .5955E-02 PERCENT ERROR= 4.3									
FOR PLAN = 1	RATIO= .00								
RDOG04-C	MANE	5.00	108.40	260.00	.39	5.00	108.40	260.00	.39
CONTINUITY SUMMARY (AC-FT) - INFLOW= .6321E+01 EXCESS= .0000E+00 OUTFLOW= .6040E+01 BASIN STORAGE= .5720E-02 PERCENT ERROR= 4.4									
FOR PLAN = 1	RATIO= .00								
RDOG04-C	MANE	5.00	100.75	260.00	.36	5.00	100.75	260.00	.36
CONTINUITY SUMMARY (AC-FT) - INFLOW= .5825E+01 EXCESS= .0000E+00 OUTFLOW= .5548E+01 BASIN STORAGE= .8180E-02 PERCENT ERROR= 4.6									
FOR PLAN = 1	RATIO= .00								
RDOG04-C	MANE	5.00	97.64	260.00	.35	5.00	97.64	260.00	.35
CONTINUITY SUMMARY (AC-FT) - INFLOW= .5627E+01 EXCESS= .0000E+00 OUTFLOW= .5348E+01 BASIN STORAGE= .8110E-02 PERCENT ERROR= 4.8									
FOR PLAN = 1	RATIO= .00								
RDOG04-C	MANE	5.00	95.44	260.00	.34	5.00	95.44	260.00	.34
CONTINUITY SUMMARY (AC-FT) - INFLOW= .5488E+01 EXCESS= .0000E+00 OUTFLOW= .5206E+01 BASIN STORAGE= .8061E-02 PERCENT ERROR= 5.0									
FOR PLAN = 1	RATIO= .00								
RDOG04-C	MANE	5.00	93.85	260.00	.33	5.00	93.85	260.00	.33
CONTINUITY SUMMARY (AC-FT) - INFLOW= .5389E+01 EXCESS= .0000E+00 OUTFLOW= .5104E+01 BASIN STORAGE= .7921E-02 PERCENT ERROR= 5.2									
FOR PLAN = 1	RATIO= .00								
RDOG04-C	MANE	5.00	91.30	260.00	.32	5.00	91.30	260.00	.32
CONTINUITY SUMMARY (AC-FT) - INFLOW= .5233E+01 EXCESS= .0000E+00 OUTFLOW= .4941E+01 BASIN STORAGE= .7865E-02 PERCENT ERROR= 5.4									
FOR PLAN = 1	RATIO= .00								
RDOG04-C	MANE	5.00	88.09	260.00	.31	5.00	88.09	260.00	.31
CONTINUITY SUMMARY (AC-FT) - INFLOW= .5047E+01 EXCESS= .0000E+00 OUTFLOW= .4746E+01 BASIN STORAGE= .7795E-02 PERCENT ERROR= 5.8									
FOR PLAN = 1	RATIO= .00								
RCOG05-C	MANE	5.00	264.25	245.00	1.09	5.00	264.25	245.00	1.09

E. On-site Basin Map- Existing Condition



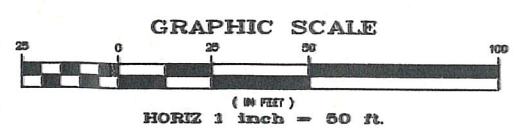
Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN23R	0.58	1.93	2.58	3.58	1.98	2.65	3.68
ONRAN23L	0.64	2.20	2.93	4.07	2.25	3.01	4.17
ONRAN24R	0.32	1.18	1.58	2.20	1.20	1.62	2.24
ONRAN24L	0.41	1.51	2.02	2.80	1.54	2.07	2.87
ONRAN25R	0.21	0.79	1.07	1.48	0.79	1.07	1.48
ONRAN25L	0.25	0.93	1.25	1.73	0.95	1.27	1.76
ONRAN26R	0.24	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN26L	0.46	1.62	2.17	3.02	1.67	2.23	3.09
ONRAN26RA	0.06	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN27R	0.43	1.48	1.98	2.75	1.52	2.03	2.81
ONRAN27L	0.42	1.51	2.02	2.80	1.54	2.07	2.86
ONRAN27LA	0.13	0.49	0.66	0.91	0.49	0.66	0.91

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN28R	0.34	1.28	1.73	2.39	1.29	1.73	2.39
ONRAN28L	0.06	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN28LA	0.09	0.34	0.46	0.63	0.34	0.46	0.63
ONRAN29R	0.14	0.53	0.71	0.98	0.53	0.71	0.98
ONRAN29L	0.28	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN30R	0.17	0.64	0.86	1.20	0.64	0.86	1.20
ONRAN30L	0.28	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN31R	0.24	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN31RA	0.02	0.06	0.08	0.11	0.06	0.08	0.11
ONRAN31L	0.42	1.59	2.13	2.95	1.59	2.13	2.95
ONRAN32R	0.76	2.60	3.47	4.82	2.67	3.58	4.96
ONRAN32RA	0.08	0.24	0.31	0.44	0.24	0.31	0.44

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN32L	0.63	2.21	2.96	4.11	2.27	3.04	4.21
ONRAN32LA	0.14	0.42	0.55	0.76	0.42	0.55	0.76
ONRAN33LA1	0.10	0.30	0.39	0.54	0.30	0.39	0.54
ONRAN33R	0.61	2.13	2.85	3.95	2.18	2.92	4.05
ONRAN33L	0.38	1.42	1.91	2.65	1.44	1.93	2.67
ONRAN33LA	0.40	1.51	2.03	2.81	1.51	2.03	2.81
ONRAN34L	0.16	0.60	0.81	1.12	0.60	0.81	1.12
ONRAN34R	0.37	1.38	1.85	2.56	1.40	1.88	2.60
ONRAN34LA	0.52	1.88	2.52	3.49	1.93	2.59	3.59

LEGEND:

- SUB-BASIN BOUNDARIES
- ONRAN DRAINAGE BASIN ID
- FLOW DIRECTION



REVISIONS

NO.	DATE	DESCRIPTION

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
BONANZA TO DECATUR

SHEET: 1 of 4
DRAWING NO. XXXX

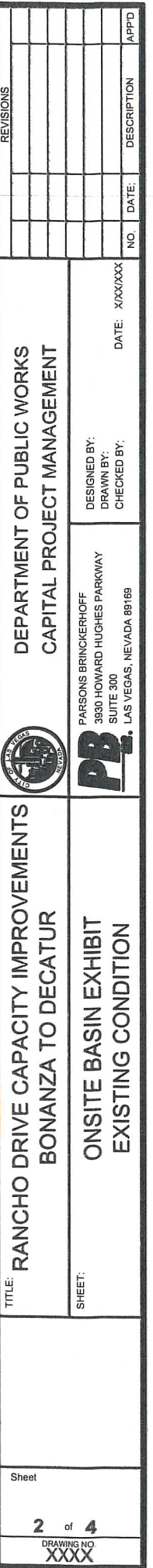
DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

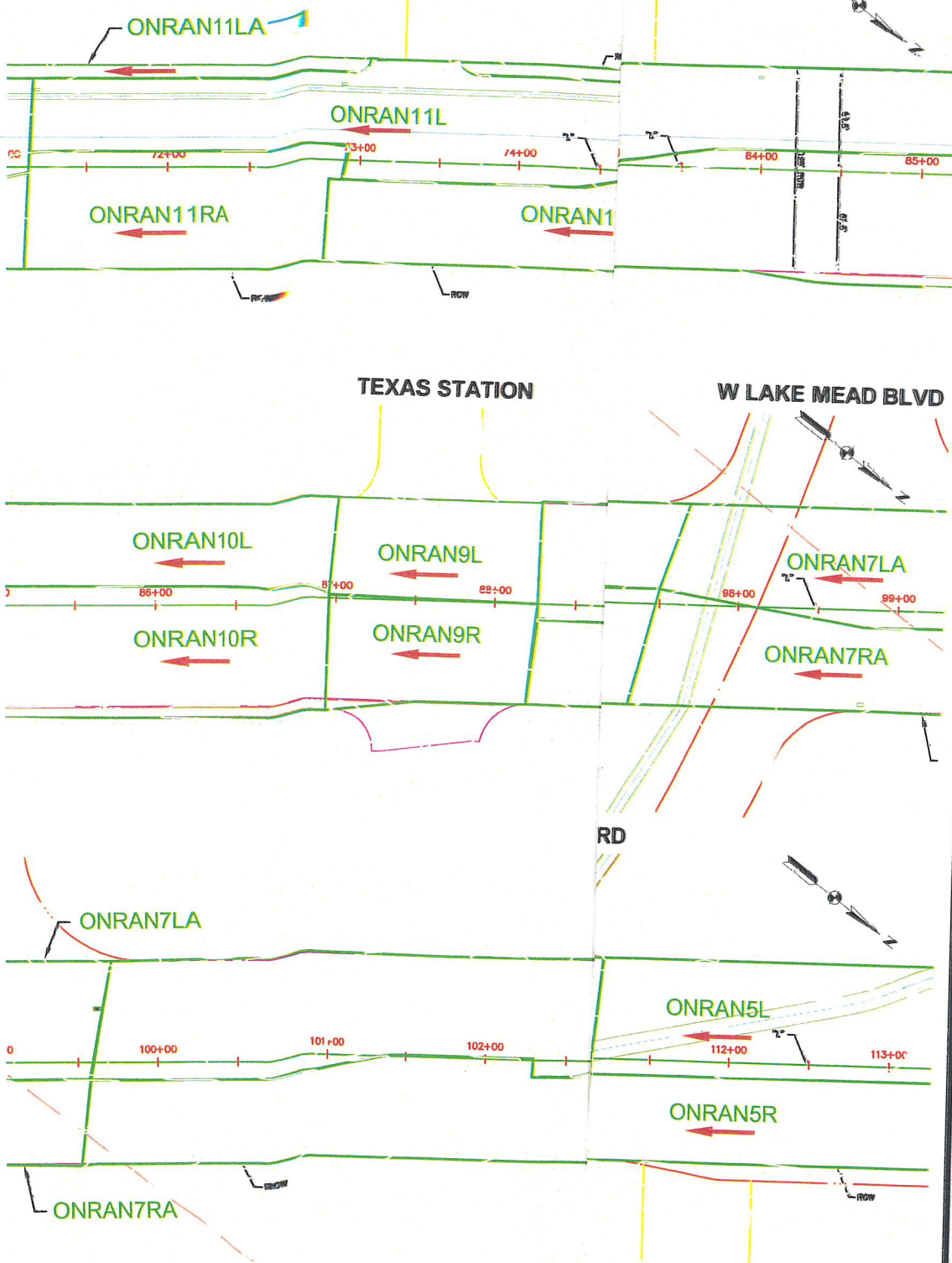
DESIGNED BY: PARSONS BRINCKERHOFF
DRAWN BY: 3930 HOWARD HUGHES PARKWAY
CHECKED BY: SUITE 300
LAS VEGAS, NEVADA 89169

DATE: X/XX/XX

ONSITE BASIN EXHIBIT
EXISTING CONDITION

30% SUBMITTAL

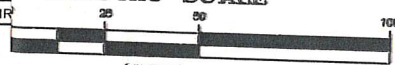




Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN5R	1.11	3.30	4.38	6.07	3.37	4.47	6.22
ONRAN5L	1.14	3.44	4.57	6.35	3.50	4.65	6.47
ONRAN6R	0.20	0.76	1.02	1.41	0.76	1.02	1.41
ONRAN6L	0.18	0.68	0.91	1.27	0.68	0.91	1.27
ONRAN7R	1.40	4.40	5.84	8.14	4.55	6.06	8.42
ONRAN7L	1.53	5.01	6.68	9.29	5.13	6.85	9.52
ONRAN7LA	0.32	1.21	1.63	2.25	1.21	1.63	2.25
ONRAN7RA	0.28	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN8R	1.38	4.29	5.70	7.94	4.43	5.90	8.21
ONRAN8L	1.44	4.50	5.98	8.33	4.64	6.17	8.59
ONRAN9R	0.19	0.72	0.96	1.34	0.72	0.96	1.34
ONRAN9L	0.18	0.68	0.91	1.27	0.68	0.91	1.27

Basin Name
ONRAN10F
ONRAN10I
ONRAN11F
ONRAN11I
ONRAN11L
ONRAN11LA
ONRAN11R

GRAPHIC SCALE



30% SUBMITTAL

REVISIONS

NO.	DATE	DESCRIPTION	APPD

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

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DRAWN BY:
CHECKED BY:

DATE: XXX/XXX



PARSONS BRINCKERHOFF
3930 HOWARD HUGHES PARKWAY
SUITE 300
LAS VEGAS, NEVADA 89169



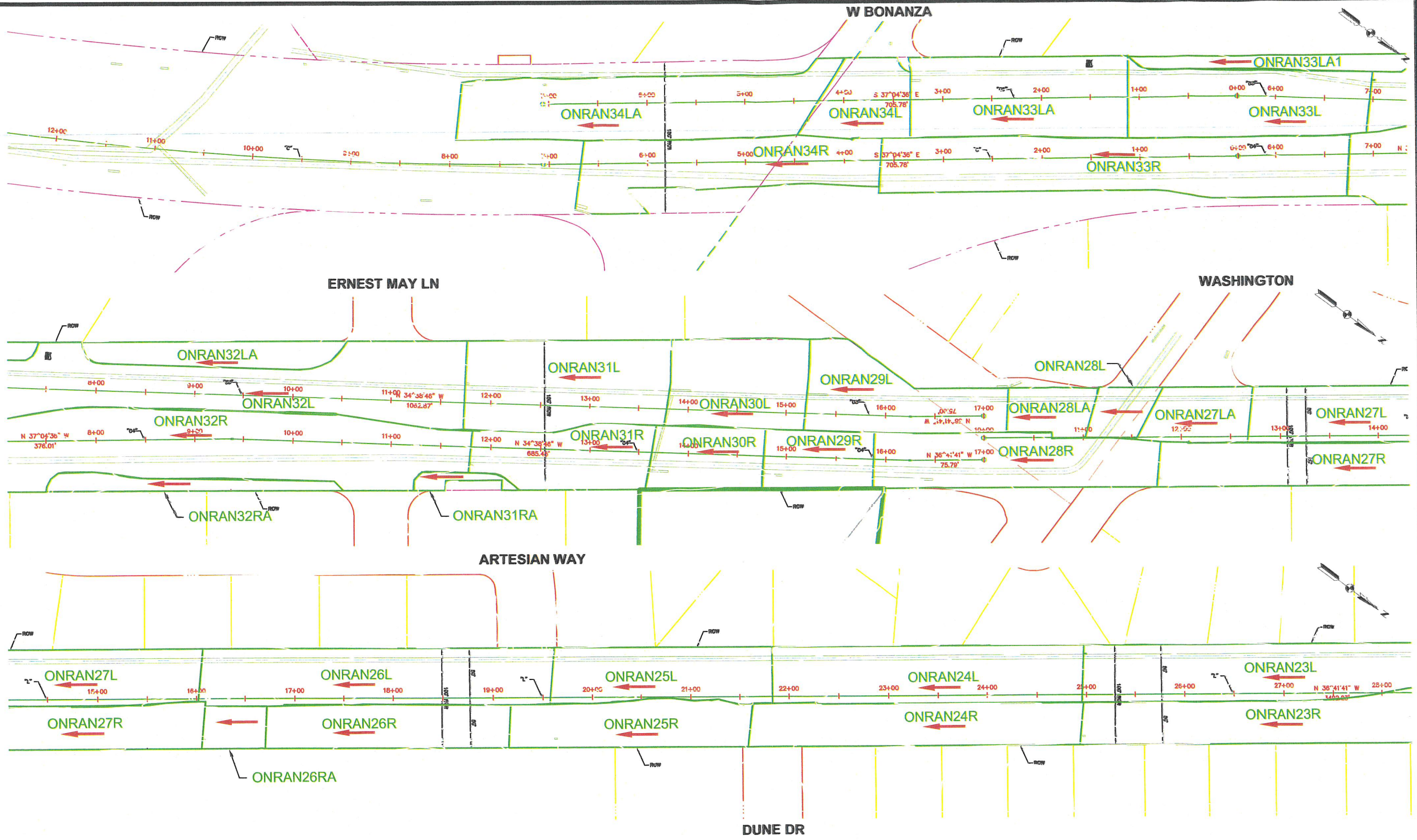
TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
BONANZA TO DECATUR

SHEET: ONSITE BASIN EXHIBIT
EXISTING CONDITION

Sheet

3 of 4

DRAWING NO
XXXX



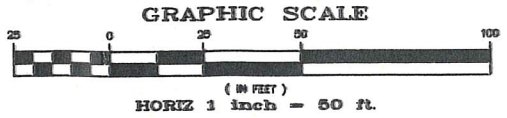
Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN23R	0.58	1.93	2.58	3.58	1.98	2.65	3.68
ONRAN23L	0.64	2.20	2.93	4.07	2.25	3.01	4.17
ONRAN24R	0.32	1.18	1.58	2.20	1.20	1.62	2.24
ONRAN24L	0.41	1.51	2.02	2.80	1.54	2.07	2.87
ONRAN25R	0.21	0.79	1.07	1.48	0.79	1.07	1.48
ONRAN25L	0.25	0.93	1.25	1.73	0.95	1.27	1.76
ONRAN26R	0.24	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN26L	0.46	1.62	2.17	3.02	1.67	2.23	3.09
ONRAN26RA	0.06	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN27R	0.43	1.48	1.98	2.75	1.52	2.03	2.81
ONRAN27L	0.42	1.51	2.02	2.80	1.54	2.07	2.86
ONRAN27LA	0.13	0.49	0.66	0.91	0.49	0.66	0.91

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN28R	0.34	1.28	1.73	2.39	1.29	1.73	2.39
ONRAN28L	0.06	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN28LA	0.09	0.34	0.46	0.63	0.34	0.46	0.63
ONRAN29R	0.14	0.53	0.71	0.98	0.53	0.71	0.98
ONRAN29L	0.28	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN30R	0.17	0.64	0.86	1.20	0.64	0.86	1.20
ONRAN30L	0.28	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN31R	0.24	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN31RA	0.02	0.06	0.08	0.11	0.06	0.08	0.11
ONRAN31L	0.42	1.59	2.13	2.95	1.59	2.13	2.95
ONRAN32R	0.76	2.60	3.47	4.82	2.67	3.58	4.96
ONRAN32RA	0.08	0.24	0.31	0.44	0.24	0.31	0.44

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN32L	0.63	2.21	2.96	4.11	2.27	3.04	4.21
ONRAN32LA	0.14	0.42	0.55	0.76	0.42	0.55	0.76
ONRAN33LA1	0.10	0.30	0.39	0.54	0.30	0.39	0.54
ONRAN33R	0.61	2.13	2.85	3.95	2.18	2.92	4.05
ONRAN33L	0.38	1.42	1.91	2.65	1.44	1.93	2.67
ONRAN33LA	0.40	1.51	2.03	2.81	1.51	2.03	2.81
ONRAN34L	0.16	0.60	0.81	1.12	0.60	0.81	1.12
ONRAN34R	0.37	1.38	1.85	2.56	1.40	1.88	2.60
ONRAN34LA	0.52	1.88	2.52	3.49	1.93	2.59	3.59

LEGEND:

- SUB-BASIN BOUNDARIES
- ONRAN DRAINAGE BASIN ID
- FLOW DIRECTION



30% SUBMITTAL

REVISIONS

NO.	DATE	DESCRIPTION	APPD

DESIGNED BY:
DRAWN BY:
CHECKED BY:

DATE: X/XX/XX

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

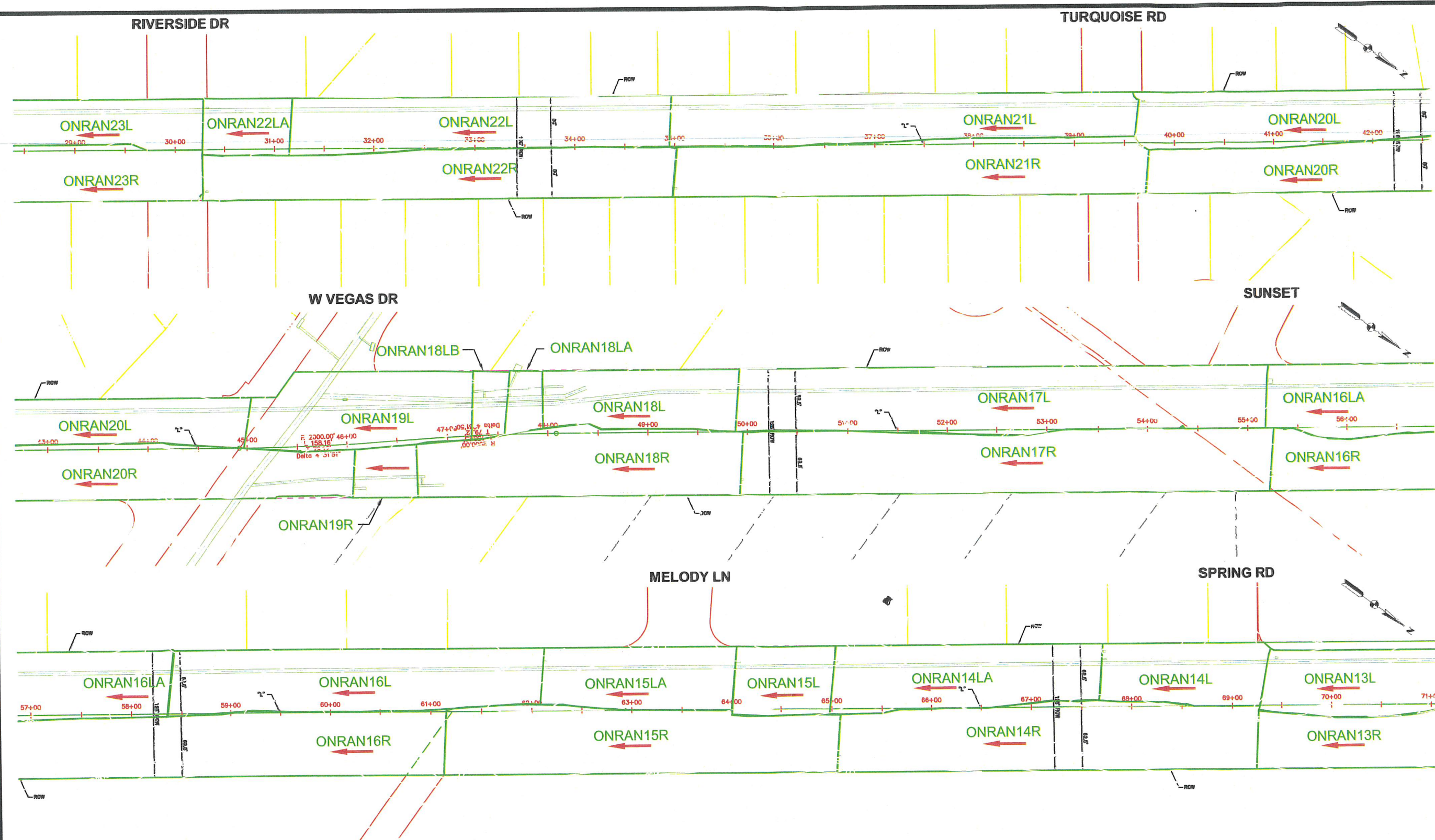
PARSONS BRINCKERHOFF
3930 HOWARD HUGHES PARKWAY
SUITE 300
LAS VEGAS, NEVADA 89169

PB

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
BONANZA TO DECATUR

SHEET: 1 of 4
DRAWING NO. XXXX

ONSITE BASIN EXHIBIT
EXISTING CONDITION



Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN13R	0.22	0.83	1.12	1.55	0.83	1.12	1.55
ONRAN13L	0.27	1.02	1.37	1.90	1.02	1.37	1.90
ONRAN14R	0.61	2.24	3.00	4.16	2.29	3.08	4.26
ONRAN14L	0.22	0.83	1.12	1.55	0.83	1.12	1.55
ONRAN14LA	0.38	1.44	1.93	2.67	1.44	1.93	2.67
ONRAN15R	0.56	2.05	2.75	3.82	2.10	2.82	3.91
ONRAN15L	0.15	0.57	0.76	1.05	0.57	0.76	1.05
ONRAN15LA	0.26	0.98	1.32	1.83	0.98	1.32	1.83
ONRAN16R	0.80	2.84	3.80	5.27	2.91	3.90	5.40
ONRAN16L	0.52	1.95	2.61	3.62	1.97	2.64	3.66
ONRAN16LA	0.50	1.89	2.54	3.52	1.89	2.54	3.52
ONRAN17R	0.74	2.58	3.45	4.78	2.64	3.54	4.91

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN17L	0.77	2.69	3.60	4.99	2.75	3.69	5.12
ONRAN18R	0.47	1.76	2.36	3.27	1.78	2.39	3.30
ONRAN18L	0.26	0.98	1.31	1.82	0.98	1.31	1.82
ONRAN18LA	0.05	0.18	0.25	0.34	0.18	0.25	0.34
ONRAN18LB	0.05	0.19	0.25	0.35	0.19	0.25	0.35
ONRAN19R	0.06	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN19L	0.36	1.36	1.83	2.53	1.36	1.83	2.53
ONRAN20R	0.72	2.36	3.14	4.37	2.42	3.22	4.48
ONRAN20L	0.61	2.05	2.74	3.81	2.10	2.81	3.90
ONRAN21R	0.58	1.98	2.65	3.67	2.03	2.72	3.77
ONRAN21L	0.50	1.73	2.32	3.22	1.77	2.37	3.29
ONRAN22R	0.51	1.67	2.23	3.10	1.71	2.29	3.18

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN22L	0.45	1.55	2.07	2.87	1.59	2.12	2.94
ONRAN23R	0.58	1.93	2.58	3.58	1.98	2.65	3.68
ONRAN22LA	0.11	0.43	0.58	0.80	0.43	0.58	0.80
ONRAN23R	0.58	1.98	2.64	3.67	2.03	2.71	3.76
ONRAN23L	0.64	2.20	2.93	4.07	2.25	3.01	4.17

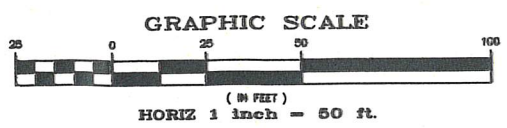
LEGEND:

SUB-BASIN BOUNDARIES

ONRAN

DRAINAGE BASIN ID

FLOW DIRECTION



30% SUBMITTAL

REVISIONS

NO.	DATE	DESCRIPTION	APP'D

DEPARTMENT OF PUBLIC WORKS

CAPITAL PROJECT MANAGEMENT

DESIGNED BY:
DRAWN BY:
CHECKED BY:

DATE: XXXXXX

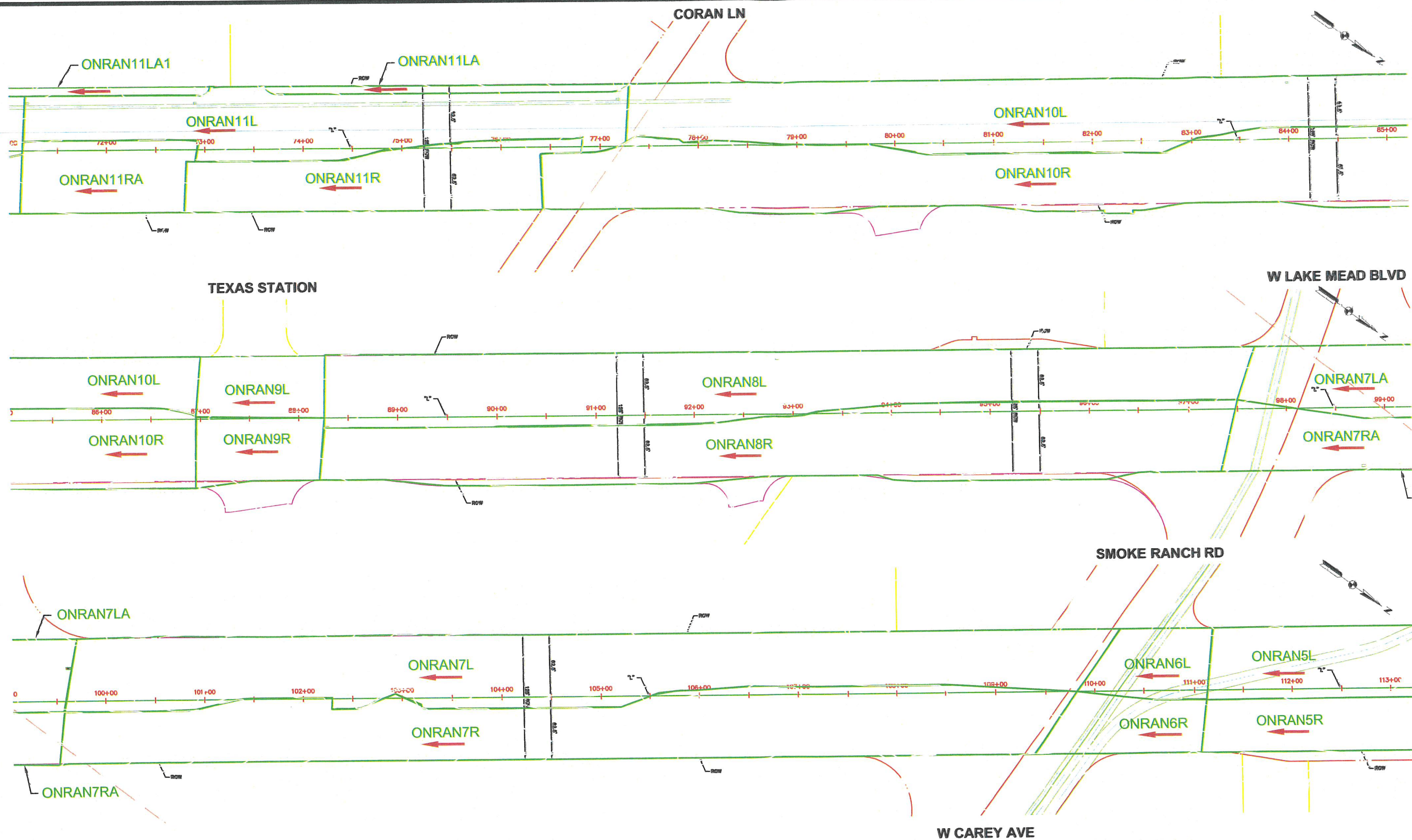
PARSONS BRINCKERHOFF
3930 HOWARD HUGHES PARKWAY
SUITE 300
LAS VEGAS, NEVADA 89169

PB

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
BONANZA TO DECATUR

SHEET: 2 of 4
DRAWING NO. XXXX

ONSITE BASIN EXHIBIT
EXISTING CONDITION

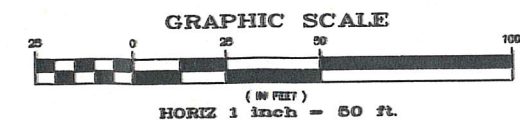


Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN5R	1.11	3.30	4.38	6.07	3.37	4.47	6.22
ONRAN5L	1.14	3.44	4.57	6.35	3.50	4.65	6.47
ONRAN6R	0.20	0.76	1.02	1.41	0.78	1.02	1.41
ONRAN6L	0.18	0.68	0.91	1.27	0.68	0.91	1.27
ONRAN7R	1.40	4.40	5.84	8.14	4.55	6.06	8.42
ONRAN7L	1.53	5.01	6.68	9.29	5.13	6.85	9.52
ONRAN7LA	0.32	1.21	1.63	2.25	1.21	1.63	2.25
ONRAN7RA	0.28	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN8R	1.38	4.29	5.70	7.94	4.43	5.90	8.21
ONRAN8L	1.44	4.50	5.98	8.33	4.64	6.17	8.59
ONRAN9R	0.19	0.72	0.96	1.34	0.72	0.96	1.34
ONRAN9L	0.18	0.68	0.91	1.27	0.68	0.91	1.27

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN10R	1.62	5.07	6.74	9.38	5.24	6.97	9.70
ONRAN10L	1.35	4.39	5.84	8.12	4.51	6.01	8.36
ONRAN11R	0.49	1.84	2.48	3.43	1.85	2.49	3.45
ONRAN11L	0.76	2.74	3.67	5.09	2.81	3.76	5.22
ONRAN11LA	0.06	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11LA1	0.06	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11RA	0.28	1.06	1.42	1.97	1.06	1.42	1.97

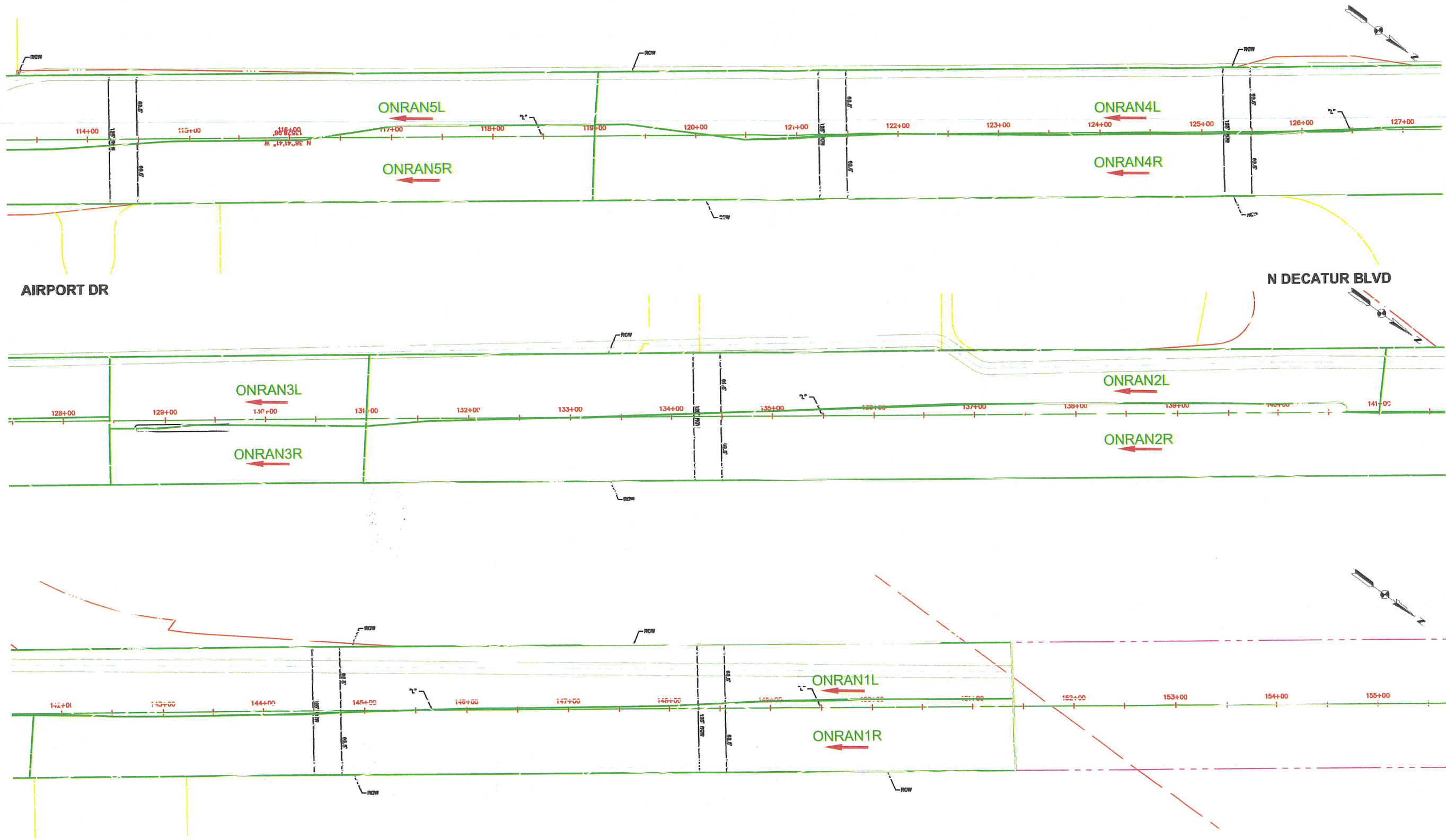
LEGEND:

- SUB-BASIN BOUNDARIES
- ONRAN DRAINAGE BASIN ID
- FLOW DIRECTION



30% SUBMITTAL

REVISIONS <table border="1"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>																																						NO. DATE: DESCRIPTION XXXXXX XXXXXX XXXXXX	
DEPARTMENT OF PUBLIC WORKS CAPITAL PROJECT MANAGEMENT																																							
DESIGNED BY: PARSONS BRINCKERHOFF DRAWN BY: 3930 HOWARD HUGHES PARKWAY CHECKED BY: SUITE 300 LAS VEGAS, NEVADA 89169		DATE: XXXXXX NO. DATE: DESCRIPTION XXXXXX XXXXXX XXXXXX																																					
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SHEET:		ONSITE BASIN EXHIBIT EXISTING CONDITION																																					
3 of 4 DRAWING NO. XXXX																																							

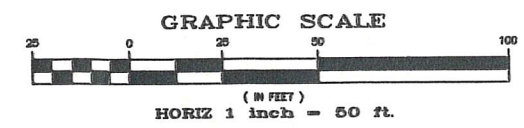


N DECATUR BLVD

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN1R	1.43	4.10	5.46	7.51	4.20	5.59	7.72
ONRAN1L	1.43	4.47	5.93	8.26	4.63	6.17	8.58
ONRAN2R	1.65	4.59	6.13	8.38	4.71	6.29	8.64
ONRAN2L	1.32	3.80	5.06	6.96	3.87	5.15	7.11
ONRAN3R	0.32	1.21	1.63	2.25	1.21	1.63	2.25
ONRAN3L	0.40	1.51	2.03	2.81	1.51	2.03	2.81
ONRAN4R	1.37	4.08	5.42	7.50	4.15	5.52	7.67
ONRAN4L	1.26	3.73	4.96	6.86	3.80	5.05	7.01
ONRAN5R	1.11	3.30	4.38	6.07	3.37	4.47	6.22
ONRAN5L	1.14	3.44	4.57	6.35	3.50	4.65	6.47

LEGEND:

- SUB-BASIN BOUNDARIES
- ONRAN DRAINAGE BASIN ID
- FLOW DIRECTION



30% SUBMITTAL

REVISIONS <table border="1"> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>																						NO. DATE DESCRIPTION APPD NO. DATE DESCRIPTION APPD
DEPARTMENT OF PUBLIC WORKS CAPITAL PROJECT MANAGEMENT DESIGNED BY: PARSONS BRINCKERHOFF DRAWN BY: 3930 HOWARD HUGHES PARKWAY CHECKED BY: SUITE 300 LAS VEGAS, NEVADA 89169		DATE: XXXXXX DATE: XXXXXX																				
TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS BONANZA TO DECATUR SHEET:		ONSITE BASIN EXHIBIT EXISTING CONDITION																				
Sheet		4 of 4 DRAWING NO. XXXX																				

F. Time of Concentration Calculations- Existing Condition



RANCHO DRIVE CAPACITY IMPROVEMENTS- BONANZA TO DECATUR
TIME OF CONCENTRATION CALCULATION - EXISTING CONDITIONS - ON-SITE BASIN MODEL
RATIONAL AND MODIFIED RATIONAL METHODS

31690A
Made by: KS
Date 3/2/2012
Checked by NA
Date: 3/10/2012

Sub-Basin Data	2	4	CN	K	5A	5B	Area	7	8	Initial/Overland Time (T _i)				Travel Time (T _t)		Tc Check (Unorganized Basins)		18	19	Used	18	19	Used	Tc (Min)	Tc (Min)	18	19	Used	Tc (Min)	Tc (Min)		
										9	10	T _i (Min)	Modified Rational	Rational	(ft)	Slope	Velocity														V ₁	V ₂
Basin	P/L	Soil group		Modified Rational	C ₁₀	K	Area	Area	Lo Initial Length	Slope	T _i (Min)	Modified Rational	Rational	(ft)	Slope	Velocity	V ₁	V ₂	T _i	Total length	T _c check	(Min)	Rational									
ONFRANT1R	P	C	92.00	0.82	0.90	1.43	0.0022	58	2.00	3.07	2.23	2.23	2.23	976	0.005	1.43	2.16	9.50	1034	15.74	12.57	13								11.73	12	
ONFRANT1L	P	C	92.00	0.82	0.90	1.43	0.0022	54	2.00	2.96	2.15	2.15	2.15	615	0.005	1.43	2.16	6.72	669	13.72	9.68	10								8.87	9	
ONFRAN2R	P	C	92.00	0.82	0.90	1.65	0.0026	70	2.00	3.37	2.45	2.45	2.45	1070	0.005	1.43	2.16	10.22	1140	16.33	13.60	14								12.67	13	
ONFRAN2L	P	D	93.00	0.84	0.90	1.32	0.0021	52	2.00	2.77	2.11	2.11	2.11	1000	0.005	1.43	2.16	9.69	1052	15.84	12.45	12								11.79	12	
ONFRAN3R	P	D	93.00	0.84	0.90	0.32	0.0005	42	2.00	2.49	1.90	2.50	2.01	202	0.010	2.02	3.06	2.06	292	11.62	4.55	5								3.96	5	
ONFRAN3L	P	D	93.00	0.84	0.90	0.40	0.0006	68	2.00	3.16	2.41	2.50	2.01	250	0.013	2.29	3.48	1.82	318	11.77	4.98	5								4.23	5	
ONFRAN4R	P	D	93.00	0.84	0.90	1.37	0.0021	60	2.00	2.97	2.27	2.97	2.02	950	0.006	1.60	2.43	8.29	1010	15.61	11.26	11								10.55	11	
ONFRAN4L	P	D	93.00	0.84	0.90	1.26	0.0020	60	2.00	2.97	2.27	2.97	2.02	950	0.006	1.56	2.37	8.49	1010	15.61	11.46	11								10.78	11	
ONFRAN5R	P	D	93.00	0.84	0.90	1.11	0.0017	72	2.00	3.26	2.48	2.48	2.48	790	0.005	1.43	2.16	8.07	862	14.79	11.32	11								10.55	11	
ONFRAN5L	P	D	93.00	0.84	0.90	1.14	0.0018	48	2.00	2.66	2.03	2.03	2.03	790	0.005	1.43	2.16	8.07	838	14.66	10.73	11								10.09	10	
ONFRAN6R	P	D	93.00	0.84	0.90	0.20	0.0003	46	2.00	2.60	1.98	1.98	1.98	90	0.005	1.43	2.16	1.05	136	10.76	3.65	5								3.03	5	
ONFRAN6L	P	D	93.00	0.84	0.90	0.18	0.0003	52	2.00	2.77	2.11	2.11	2.11	150	0.005	1.43	2.16	1.75	202	11.12	4.52	5								3.88	5	
ONFRAN7R	P	D	93.00	0.84	0.90	1.40	0.0022	70	2.00	3.21	2.45	2.45	2.45	942	0.011	2.08	3.15	6.35	1012	15.62	9.56	10								8.79	9	
ONFRAN7L	P	D	93.00	0.84	0.90	1.53	0.0024	38	2.00	2.96	1.80	1.80	1.80	942	0.011	2.12	3.21	6.23	980	15.44	8.59	9								8.03	8	
ONFRAN7LA	P	D	93.00	0.84	0.90	0.32	0.0005	66	2.00	3.12	2.38	2.38	2.38	165	0.012	2.22	3.37	1.24	231	11.28	4.35	5								3.61	5	
ONFRAN7RA	P	D	93.00	0.84	0.90	0.28	0.0004	54	2.00	2.82	2.15	2.15	2.15	165	0.012	2.21	3.35	1.24	219	11.22	4.06	5								3.39	5	
ONFRAN8R	P	D	93.00	0.84	0.90	1.38	0.0022	62	2.00	3.02	2.30	2.30	2.30	906	0.009	1.89	2.87	6.75	968	15.38	9.78	10								9.06	9	
ONFRAN8L	P	D	93.00	0.84	0.90	1.44	0.0023	54	2.00	2.82	2.15	2.15	2.15	922	0.009	1.89	2.87	6.85	976	15.42	9.67	10								9.00	9	
ONFRAN9R	P	D	93.00	0.84	0.90	0.19	0.0003	60	2.00	2.97	2.27	2.27	2.27	126	0.008	1.81	2.74	1.16	186	11.03	4.13	5								3.43	5	
ONFRAN9L	P	D	93.00	0.84	0.90	0.18	0.0003	62	2.00	3.02	2.30	2.30	2.30	126	0.008	1.81	2.74	1.16	188	11.04	4.13	5								3.46	5	
ONFRAN10R	P	D	93.00	0.84	0.90	1.62	0.0025	66	2.00	3.12	2.38	2.38	2.38	1053	0.012	2.21	3.35	6.52	1119	16.22	9.63	10								8.89	9	
ONFRAN10L	P	D	93.00	0.84	0.90	1.35	0.0021	49	2.00	2.69	2.05	2.05	2.05	970	0.012	2.21	3.35	6.10	1019	15.66	8.79	9								8.15	8	
ONFRAN11R	P	D	93.00	0.84	0.90	0.49	0.0008	54	2.00	2.82	2.15	2.15	2.15	360	0.017	2.61	3.95	2.30	414	12.30	5.12	5								4.45	5	
ONFRAN11L	P	D	93.00	0.84	0.90	0.76	0.0012	46	2.00	2.60	1.98	1.98	1.98	610	0.017	2.61	3.95	3.66	656	13.64	6.26	6								5.64	6	
ONFRAN11LA	L	D	93.00	0.84	0.88	0.88	0.0001	10	2.00	1.21	1.02	1.02	1.02	366	0.017	1.93	3.83	3.16	376	12.09	4.37	10								4.18	10	
ONFRAN11LA1	L	D	93.00	0.84	0.88	0.88	0.0001	18	2.00	1.63	1.36	1.36	1.36	372	0.017	1.93	3.83	3.21	390	12.17	4.84	10								4.58	10	
ONFRAN11RA	P	D	93.00	0.84	0.90	0.28	0.0004	56	2.00	2.87	2.19	2.19	2.19	166	0.012	2.21	3.35	1.25	222	11.23	4.12	5								3.44	5	
ONFRAN13R	P	D	93.00	0.84	0.90	0.22	0.0003	43	2.00	2.52	1.92	1.92	1.92	186	0.011	2.09	3.17	1.48	229	11.27	4.00	5								3.40	5	
ONFRAN13L	P	D	93.00	0.84	0.90	0.90	0.0004	58	2.00	2.92	2.23	2.23	2.23	186	0.011	2.12	3.21	1.46	244	11.36	4.38	5								3.69	5	
ONFRAN14R	P	D	93.00	0.84	0.90	0.61	0.0010	47	2.00	2.63	2.00	2.00	2.00	418	0.012	2.21	3.35	3.15	465	12.58	5.78	6								5.15	5	
ONFRAN14L	P	D	93.00	0.84	0.90	0.22	0.0003	63	2.00	3.05	2.32	2.32	2.32	163	0.012	2.21	3.35	1.23	226	11.26	4.27	5								3.55	5	
ONFRAN14LA	P	D	93.00	0.84	0.90	0.38	0.0006	60	2.00	2.97	2.27	2.27	2.27	265	0.012	2.21	3.35	2.00	325	11.81	4.97	5								4.26	5	
ONFRAN15R	P	D	93.00	0.84	0.90	0.56	0.0009	46	2.00	2.80	1.98	1.98	1.98	392	0.010	2.04	3.09	3.20	438	12.43	5.80	6								5.19	5	
ONFRAN15L	P	D	93.00	0.84	0.90	0.15	0.0002	66	2.00	3.12	2.38	2.38	2.38	95	0.010	2.02	3.06	0.78	161	10.89	3.90	5								3.16	5	
ONFRAN15LA	P	D	93.00	0.84	0.90	0.26	0.0004	52	2.00	2.77	2.11	2.11	2.11	190	0.010	2.02	3.06	1.57	242	11.34	4.33	5								3.68	5	
ONFRAN16R	P	D	93.00	0.84	0.90	0.90	0.0013	47	2.00	2.63	2.00	2.00	2.00	587	0.013	2.30	3.49	4.03	634	13.52	6.66	7								6.04	6	
ONFRAN16L	P	D	93.00	0.84	0.90	0.52	0.0008	48	2.00	2.66	2.03	2.03	2.03	369	0.014	2.35	3.56	2.62	417	12.32	5.28	5								4.65	5	
ONFRAN16LA	P	D	93.00	0.84	0.90	0.50	0.0008	47	2.00	2.63	2.00	2.00	2.00	316	0.013	2.27	3.43	2.32	363	12.02	4.95	5								4.33	5	
ONFRAN17R	P	D	93.00	0.84	0.90	0.74	0.0012	46	2.00	2.80	1.98	1.98	1.98	528	0.009	1.92	2.90	4.51	574	13.19	7.11	7								6.49	6	
ONFRAN17L	P	D	93.00	0.84	0.90	0.77	0.0012	44	2.00	2.54	1.94	1.94	1.94	528	0.009	1.92	2.90	4.51	572	13.18	7.05	7								6.45	6	
ONFRAN18R	P	D	93.00	0.84	0.90	0.47	0.0007	48	2.00	2.66	2.03	2.03	2.03	320	0.010	2.06	3.12	2.59	368	12.04	5.25	5								4.61	5	
ONFRAN18L	P	D	93.00	0.84	0.90	0.26	0.0004	59	2.00	2																						



RANCHO DRIVE CAPACITY IMPROVEMENTS- BONANZA TO DECATUR
TIME OF CONCENTRATION CALCULATION - EXISTING CONDITIONS - ON-SITE BASIN MODEL
RATIONAL AND MODIFIED RATIONAL METHODS

31690A
Made by: KS
Date 3/2/2012
Checked by NA
Date: 3/10/2012

Sub-Basin Data	1	2	4	5	5A	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Basin	P/L	Soil group	CN	K	C ₁₀	Area	Area	Lo Initial Length	Slope	T _i (Min)	T _i (Min)	Travel Length	Travel Time (T _i)	Velocity	Velocity	Total length	T _c check	Modified Rational	Used	Used
						(Acres)	(sq mi)	(ft)	(%)	Modified Rational	Rational	(ft)	(ft)	(ft/sec)	(ft/sec)	(ft)	(Min)	(Min)	Compared	Compared
ONRAN20R	P	D	93.00	0.84	0.90	0.72	0.0011	37	2.00	2.33	1.78	632	0.006	1.56	2.37	669	13.72	8.59	9	8.03
ONRAN20L	P	D	93.00	0.84	0.90	0.61	0.0010	39	2.00	2.40	1.88	535	0.006	1.56	2.37	574	13.19	7.97	8	7.40
ONRAN21R	P	D	93.00	0.84	0.90	0.58	0.0009	45	2.00	2.57	1.93	472	0.006	1.56	2.37	503	12.87	7.80	8	6.99
ONRAN21L	P	D	93.00	0.84	0.90	0.50	0.0008	35	2.00	2.27	1.73	466	0.006	1.56	2.37	501	12.78	7.23	7	6.69
ONRAN22R	P	D	93.00	0.84	0.90	0.51	0.0008	40	2.00	2.43	1.85	470	0.004	1.28	1.94	510	12.83	8.56	9	7.98
ONRAN22L	P	D	93.00	0.84	0.90	0.45	0.0007	42	2.00	2.49	1.90	378	0.004	1.28	1.94	420	12.33	7.42	7	6.83
ONRAN23R	P	D	93.00	0.84	0.90	0.58	0.0009	48	2.00	2.66	2.03	531	0.006	1.56	2.37	554	13.22	8.20	8	7.57
ONRAN23L	P	D	93.00	0.84	0.90	0.11	0.0002	48	2.00	2.86	2.03	88	0.006	1.56	2.37	136	10.76	3.60	5	2.98
ONRAN24L	P	D	93.00	0.84	0.90	0.41	0.0006	42	2.00	2.49	1.90	330	0.007	1.69	2.56	372	12.07	5.74	6	5.15
ONRAN24R	P	D	93.00	0.84	0.90	0.64	0.0010	38	2.00	2.36	1.80	530	0.007	1.69	2.56	568	13.16	7.49	7	6.93
ONRAN25R	P	D	93.00	0.84	0.90	0.32	0.0005	34	2.00	2.24	1.71	292	0.005	1.43	2.16	326	11.81	5.64	6	5.11
ONRAN25L	P	D	93.00	0.84	0.90	0.21	0.0003	40	2.00	2.43	1.85	196	0.005	1.43	2.16	236	11.31	4.71	5	4.14
ONRAN26R	P	D	93.00	0.84	0.90	0.25	0.0004	56	2.00	2.87	2.19	222	0.005	1.43	2.16	259	11.54	5.46	5	4.78
ONRAN26L	P	D	93.00	0.84	0.90	0.24	0.0004	36	2.00	2.30	1.75	172	0.005	1.43	2.16	201	11.16	4.31	5	3.76
ONRAN27R	P	D	93.00	0.84	0.90	0.46	0.0007	48	2.00	2.86	2.03	353	0.005	1.43	2.16	401	12.23	6.78	7	6.14
ONRAN27L	P	D	93.00	0.84	0.90	0.06	0.0001	36	2.00	2.30	1.75	62	0.005	1.43	2.16	98	10.54	3.03	5	2.48
ONRAN28R	P	D	93.00	0.84	0.90	0.43	0.0007	38	2.00	2.36	1.80	430	0.005	1.43	2.16	468	12.60	7.38	7	6.82
ONRAN28L	P	D	93.00	0.84	0.90	0.42	0.0007	44	2.00	2.54	1.94	331	0.005	1.43	2.16	375	12.08	6.41	6	5.80
ONRAN29R	P	D	93.00	0.84	0.90	0.13	0.0002	50	2.00	2.71	2.07	98	0.005	1.43	2.16	148	10.82	3.86	5	3.21
ONRAN29L	P	D	93.00	0.84	0.90	0.34	0.0005	38	2.00	2.36	1.80	288	0.008	1.81	2.74	326	11.81	5.02	5	4.46
ONRAN30R	P	D	93.00	0.84	0.90	0.06	0.0001	60	2.00	2.97	2.27	52	0.008	1.81	2.74	112	10.62	3.45	5	2.74
ONRAN30L	P	D	93.00	0.84	0.90	0.09	0.0001	42	2.00	2.49	1.90	82	0.008	1.81	2.74	124	10.69	3.24	5	2.65
ONRAN31R	L	D	93.00	0.84	0.90	0.14	0.0002	44	2.00	2.54	1.94	109	0.008	1.81	2.74	153	10.85	3.55	5	2.95
ONRAN31L	P	D	93.00	0.84	0.90	0.28	0.0004	46	2.00	2.80	1.98	200	0.008	1.81	2.74	246	11.37	4.45	5	3.83
ONRAN32R	P	D	93.00	0.84	0.90	0.17	0.0003	46	2.00	2.60	1.98	112	0.008	1.81	2.74	153	10.88	3.64	5	3.02
ONRAN32L	P	D	93.00	0.84	0.90	0.28	0.0004	35	2.00	2.27	1.73	140	0.008	1.81	2.74	175	10.97	3.56	5	3.02
ONRAN33R	P	D	93.00	0.84	0.90	0.24	0.0004	46	2.00	2.60	1.98	180	0.008	1.81	2.74	226	11.26	4.26	5	3.64
ONRAN33L	L	D	93.00	0.84	0.90	0.02	0.0000	10	2.00	1.21	1.02	86	0.008	1.32	2.63	96	10.53	2.30	10	2.10
ONRAN34R	P	D	93.00	0.84	0.90	0.42	0.0007	36	2.00	2.30	1.75	204	0.008	1.81	2.74	240	11.33	4.18	5	3.64
ONRAN34L	P	D	93.00	0.84	0.90	0.78	0.0012	58	2.00	2.92	2.23	504	0.008	1.81	2.74	562	13.12	7.56	8	6.86
ONRAN35R	P	D	93.00	0.84	0.90	0.08	0.0001	8	2.00	1.09	0.91	292	0.008	1.32	2.63	300	11.67	4.76	10	4.59
ONRAN35L	L	D	93.00	0.84	0.90	0.63	0.0010	44	2.00	2.54	1.94	474	0.008	1.81	2.74	518	12.88	6.92	7	6.31
ONRAN36R	P	D	93.00	0.84	0.90	0.14	0.0002	21	2.00	1.76	1.47	247	0.008	1.32	2.63	268	11.49	4.87	10	4.58
ONRAN36L	L	D	93.00	0.84	0.90	0.10	0.0002	16	2.00	1.53	1.29	282	0.008	1.32	2.63	293	11.66	5.09	10	4.84
ONRAN37R	P	D	93.00	0.84	0.90	0.61	0.0010	50	2.00	2.71	2.07	474	0.008	1.81	2.74	524	12.91	7.09	7	6.44
ONRAN37L	P	D	93.00	0.84	0.90	0.38	0.0006	60	2.00	2.97	2.27	244	0.008	1.81	2.74	304	11.69	5.22	5	4.52
ONRAN38R	P	D	93.00	0.84	0.90	0.40	0.0006	58	2.00	2.92	2.23	224	0.008	1.81	2.74	282	11.57	4.99	5	4.29
ONRAN38L	P	D	93.00	0.84	0.90	0.16	0.0003	58	2.00	2.92	2.23	84	0.008	1.81	2.74	142	10.79	3.70	5	3.00
ONRAN39R	P	D	93.00	0.84	0.90	0.37	0.0006	48	2.00	2.66	2.03	302	0.008	1.81	2.74	350	11.94	5.44	5	4.81
ONRAN39L	P	D	93.00	0.84	0.90	0.52	0.0008	54	2.00	2.82	2.15	364	0.008	1.81	2.74	418	12.32	6.18	6	5.51

G. Runoff Calculations- Existing Condition



**RANCHO DRIVE CAPACITY IMPROVMENTS- BONANZA TO DECATUR
RUNOFF CALCULATIONS - EXISTING CONDITIONS - ON-SITE BASIN MODEL
RATIONAL AND MODIFIED RATIONAL METHODS**

31690A

Made by: NA

Date 3/2/2012

Checked by KS

Date: 3/10/2012

Basin Name	Area (ac)	P/L	Runoff Coef. (C)			T _c (min)		Intensity (in./hr.) Modified Rational			Intensity (in./hr.) Rational			Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
			10-year	25-year	100-year	Modified Rational	Rational	10-year	25-year	100-year	10-year	25-year	100-year	10-year	25-year	100-year	10-year	25-year	100-year
ONRAN1R	1.43	P	0.90	0.92	0.93	12.57	11.73	3.18	4.15	5.65	3.26	4.25	5.80	4.10	5.46	7.51	4.20	5.59	7.72
ONRAN1L	1.43	P	0.90	0.92	0.93	9.68	8.87	3.47	4.51	6.21	3.60	4.69	6.45	4.47	5.93	8.26	4.63	6.17	8.58
ONRAN2R	1.65	P	0.90	0.92	0.93	13.60	12.67	3.09	4.04	5.46	3.17	4.14	5.63	4.59	6.13	8.38	4.71	6.29	8.64
ONRAN2L	1.32	P	0.90	0.92	0.93	12.45	11.79	3.19	4.17	5.67	3.26	4.24	5.79	3.80	5.06	6.96	3.87	5.15	7.11
ONRAN3R	0.32	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.21	1.63	2.25	1.21	1.63	2.25
ONRAN3L	0.40	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.51	2.03	2.81	1.51	2.03	2.81
ONRAN4R	1.37	P	0.90	0.92	0.93	11.26	10.55	3.31	4.30	5.89	3.37	4.38	6.02	4.08	5.42	7.50	4.15	5.52	7.67
ONRAN4L	1.26	P	0.90	0.92	0.93	11.46	10.76	3.29	4.28	5.85	3.35	4.36	5.98	3.73	4.96	6.86	3.80	5.05	7.01
ONRAN5R	1.11	P	0.90	0.92	0.93	11.32	10.55	3.30	4.29	5.88	3.37	4.38	6.02	3.30	4.38	6.07	3.37	4.47	6.22
ONRAN5L	1.14	P	0.90	0.92	0.93	10.73	10.09	3.35	4.36	5.99	3.41	4.43	6.10	3.44	4.57	6.35	3.50	4.65	6.47
ONRAN6R	0.20	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.76	1.02	1.41	0.76	1.02	1.41
ONRAN6L	0.18	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.68	0.91	1.27	0.68	0.91	1.27
ONRAN7R	1.40	P	0.90	0.92	0.93	9.56	8.79	3.49	4.54	6.25	3.61	4.70	6.47	4.40	5.84	8.14	4.55	6.06	8.42
ONRAN7L	1.53	P	0.90	0.92	0.93	8.59	8.03	3.64	4.74	6.53	3.73	4.87	6.69	5.01	6.68	9.29	5.13	6.85	9.52
ONRAN7LA	0.32	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.21	1.63	2.25	1.21	1.63	2.25
ONRAN7RA	0.28	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN8R	1.38	P	0.90	0.92	0.93	9.78	9.06	3.46	4.49	6.19	3.57	4.65	6.39	4.29	5.70	7.94	4.43	5.90	8.21
ONRAN8L	1.44	P	0.90	0.92	0.93	9.67	9.00	3.47	4.51	6.22	3.58	4.66	6.41	4.50	5.98	8.33	4.64	6.17	8.59
ONRAN9R	0.19	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.72	0.96	1.34	0.72	0.96	1.34
ONRAN9L	0.18	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.68	0.91	1.27	0.68	0.91	1.27
ONRAN10R	1.62	P	0.90	0.92	0.93	9.63	8.89	3.48	4.52	6.23	3.59	4.68	6.44	5.07	6.74	9.38	5.24	6.97	9.70
ONRAN10L	1.35	P	0.90	0.92	0.93	8.79	8.15	3.61	4.70	6.47	3.71	4.84	6.66	4.39	5.84	8.12	4.51	6.01	8.36
ONRAN11R	0.49	P	0.90	0.92	0.93	5.12	5.00	4.18	5.50	7.53	4.20	5.52	7.56	1.84	2.48	3.43	1.85	2.49	3.45
ONRAN11L	0.76	P	0.90	0.92	0.93	6.26	5.64	4.01	5.25	7.20	4.10	5.38	7.38	2.74	3.67	5.09	2.81	3.76	5.22
ONRAN11LA	0.06	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11LA1	0.06	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11RA	0.28	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN13R	0.22	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.83	1.12	1.55	0.83	1.12	1.55
ONRAN13L	0.27	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.02	1.37	1.90	1.02	1.37	1.90
ONRAN14R	0.61	P	0.90	0.92	0.93	5.78	5.15	4.08	5.35	7.34	4.18	5.49	7.52	2.24	3.00	4.16	2.29	3.08	4.26
ONRAN114L	0.22	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.83	1.12	1.55	0.83	1.12	1.55
ONRAN14LA	0.38	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.44	1.93	2.67	1.44	1.93	2.67
ONRAN15R	0.56	P	0.90	0.92	0.93	5.80	5.19	4.08	5.35	7.33	4.17	5.48	7.51	2.05	2.75	3.82	2.10	2.82	3.91
ONRAN15L	0.15	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.57	0.76	1.05	0.57	0.76	1.05
ONRAN15LA	0.26	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.98	1.32	1.83	0.98	1.32	1.83
ONRAN16R	0.80	P	0.90	0.92	0.93	6.66	6.04	3.94	5.16	7.08	4.04	5.30	7.26	2.84	3.80	5.27	2.91	3.90	5.40
ONRAN16L	0.52	P	0.90	0.92	0.93	5.28	5.00	4.16	5.46	7.48	4.20	5.52	7.56	1.95	2.61	3.62	1.97	2.64	3.66
ONRAN16LA	0.50	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.89	2.54	3.52	1.89	2.54	3.52
ONRAN17R	0.74	P	0.90	0.92	0.93	7.11	6.49	3.87	5.06	6.95	3.97	5.20	7.13	2.58	3.45	4.78	2.64	3.54	4.91
ONRAN17L	0.77	P	0.90	0.92	0.93	7.05	6.45	3.88	5.08	6.97	3.98	5.21	7.15	2.69	3.60	4.99	2.75	3.69	5.12
ONRAN18R	0.47	P	0.90	0.92	0.93	5.25	5.00	4.16	5.47	7.49	4.20	5.52	7.56	1.76	2.36	3.27	1.78	2.39	3.30
ONRAN18L	0.26	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.98	1.31	1.82	0.98	1.31	1.82
ONRAN18LA	0.05	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.18	0.25	0.34	0.18	0.25	0.34
ONRAN18LB	0.05	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.19	0.25	0.35	0.19	0.25	0.35
ONRAN19R	0.06	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN19L	0.36	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.36	1.83	2.53	1.36	1.83	2.53
ONRAN20R	0.72	P	0.90	0.92	0.93	8.59	8.03	3.64	4.75	6.53	3.73	4.87	6.69	2.36	3.14	4.37	2.42	3.22	4.48
ONRAN20L	0.61	P	0.90	0.92	0.93	7.97	7.40	3.74	4.88	6.71	3.83	5.00	6.87	2.05	2.74	3.81	2.10	2.81	3.90
ONRAN21R	0.58	P	0.90	0.92	0.93	7.60	6.99	3.79	4.96	6.81	3.89	5.09	6.99	1.98	2.65	3.67	2.03	2.72	3.77
ONRAN21L	0.50	P	0.90	0.92	0.93	7.23	6.69	3.85	5.04	6.92	3.94	5.15	7.07	1.73	2.32	3.22	1.77	2.37	3.29
ONRAN22R	0.51	P	0.90	0.92	0.93	8.56	7.98	3.65	4.75	6.54	3.74	4.88	6.70	1.67	2.23	3.10	1.71	2.29	3.18
ONRAN22L	0.45	P	0.90	0.92	0.93	7.42	6.83	3.82	5.00	6.87	3.92	5.13	7.04	1.55	2.07	2.87	1.59	2.12	2.94



**RANCHO DRIVE CAPACITY IMPROVMENTS- BONANZA TO DECATUR
RUNOFF CALCULATIONS - EXISTING CONDITIONS - ON-SITE BASIN MODEL
RATIONAL AND MODIFIED RATIONAL METHODS**

31690A

Made by: NA

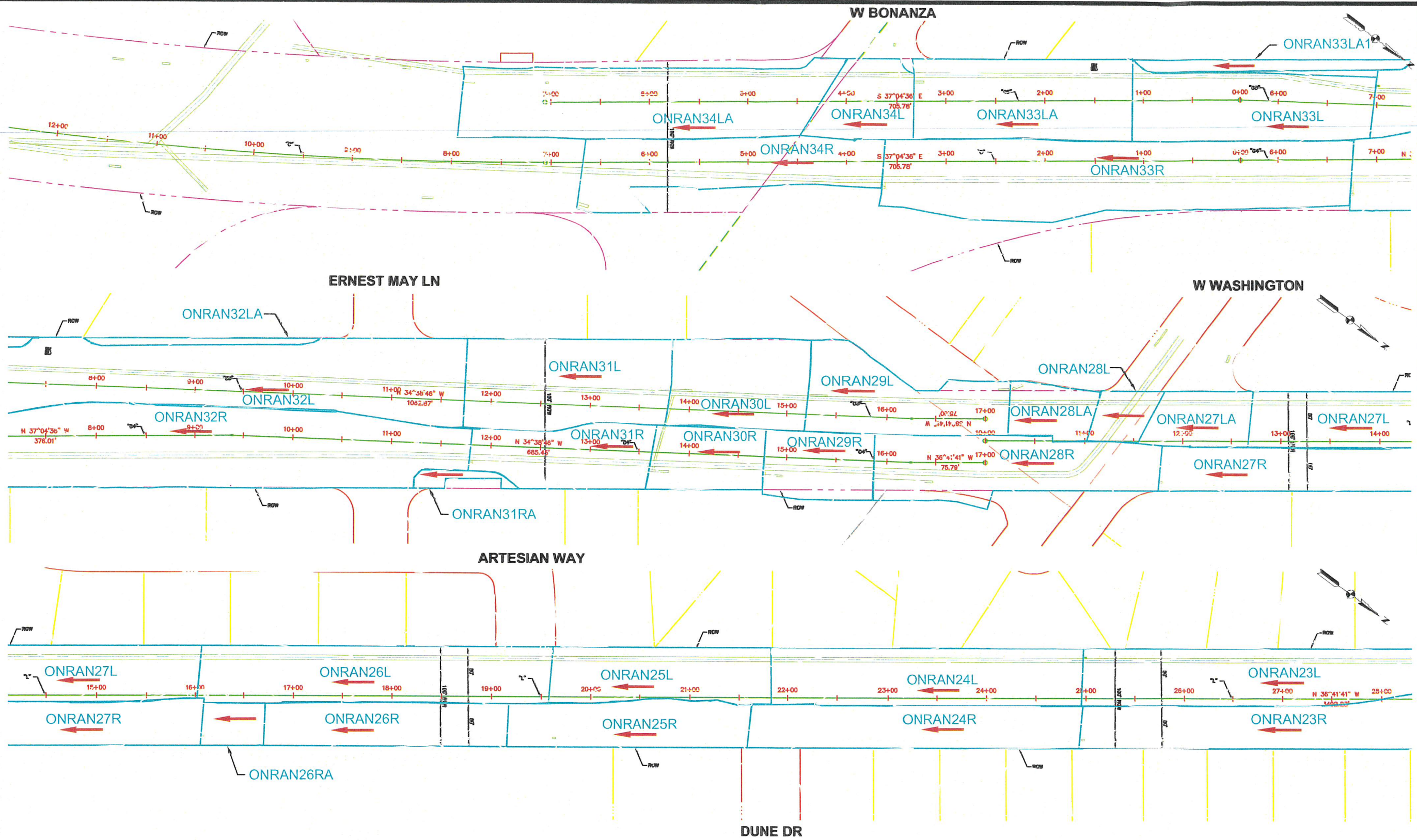
Date 3/2/2012

Checked by KS

Date: 3/10/2012

Basin Name	Area (ac)	P/L	Runoff Coef. (C)			T _c (min)		Intensity (in./hr.) Modified Rational			Intensity (in./hr.) Rational			Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
			10-year	25-year	100-year	Modified Rational	Rational	10-year	25-year	100-year	10-year	25-year	100-year	10-year	25-year	100-year	10-year	25-year	100-year
ONRAN23R	0.58	P	0.90	0.92	0.93	8.20	7.57	3.70	4.83	6.64	3.80	4.97	6.82	1.93	2.58	3.58	1.98	2.65	3.68
ONRAN22LA	0.11	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.43	0.58	0.80	0.43	0.58	0.80
ONRAN24L	0.41	P	0.90	0.92	0.93	5.74	5.15	4.08	5.36	7.35	4.18	5.49	7.52	1.51	2.02	2.80	1.54	2.07	2.87
ONRAN23L	0.64	P	0.90	0.92	0.93	7.49	6.93	3.81	4.98	6.84	3.90	5.11	7.01	2.20	2.93	4.07	2.25	3.01	4.17
ONRAN24R	0.32	P	0.90	0.92	0.93	5.64	5.11	4.10	5.38	7.38	4.18	5.50	7.53	1.18	1.58	2.20	1.20	1.62	2.24
ONRAN25R	0.21	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.79	1.07	1.48	0.79	1.07	1.48
ONRAN25L	0.25	P	0.90	0.92	0.93	5.46	5.00	4.13	5.42	7.43	4.20	5.52	7.56	0.93	1.25	1.73	0.95	1.27	1.76
ONRAN26R	0.24	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN26L	0.46	P	0.90	0.92	0.93	6.78	6.14	3.92	5.14	7.05	4.02	5.27	7.23	1.62	2.17	3.02	1.67	2.23	3.09
ONRAN26RA	0.06	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN27R	0.43	P	0.90	0.92	0.93	7.38	6.82	3.83	5.01	6.87	3.92	5.13	7.04	1.48	1.98	2.75	1.52	2.03	2.81
ONRAN27L	0.42	P	0.90	0.92	0.93	6.41	5.80	3.98	5.22	7.16	4.08	5.35	7.33	1.51	2.02	2.80	1.54	2.07	2.86
ONRAN27LA	0.13	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.49	0.66	0.91	0.49	0.66	0.91
ONRAN28R	0.34	P	0.90	0.92	0.93	5.02	5.00	4.20	5.52	7.55	4.20	5.52	7.56	1.28	1.73	2.39	1.29	1.73	2.39
ONRAN28L	0.06	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN28LA	0.09	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.34	0.46	0.63	0.34	0.46	0.63
ONRAN29R	0.14	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.53	0.71	0.98	0.53	0.71	0.98
ONRAN29L	0.28	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN30R	0.17	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.64	0.86	1.20	0.64	0.86	1.20
ONRAN30L	0.28	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN31R	0.24	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN31RA	0.02	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.06	0.08	0.11	0.06	0.08	0.11
ONRAN31L	0.42	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.59	2.13	2.95	1.59	2.13	2.95
ONRAN32R	0.76	P	0.90	0.92	0.93	7.56	6.86	3.80	4.97	6.83	3.91	5.12	7.02	2.60	3.47	4.82	2.67	3.58	4.96
ONRAN32RA	0.08	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.24	0.31	0.44	0.24	0.31	0.44
ONRAN32L	0.63	P	0.90	0.92	0.93	6.92	6.31	3.90	5.11	7.01	4.00	5.24	7.18	2.21	2.96	4.11	2.27	3.04	4.21
ONRAN32LA	0.14	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.42	0.55	0.76	0.42	0.55	0.76
ONRAN33LA1	0.10	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.30	0.39	0.54	0.30	0.39	0.54
ONRAN33R	0.61	P	0.90	0.92	0.93	7.09	6.44	3.88	5.07	6.96	3.98	5.21	7.15	2.13	2.85	3.95	2.18	2.92	4.05
ONRAN33L	0.38	P	0.90	0.92	0.93	5.22	5.00	4.17	5.47	7.50	4.20	5.52	7.56	1.42	1.91	2.65	1.44	1.93	2.67
ONRAN33LA	0.40	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.51	2.03	2.81	1.51	2.03	2.81
ONRAN34L	0.16	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.60	0.81	1.12	0.60	0.81	1.12
ONRAN34R	0.37	P	0.90	0.92	0.93	5.44	5.00	4.13	5.42	7.43	4.20	5.52	7.56	1.38	1.85	2.56	1.40	1.88	2.60
ONRAN34LA	0.52	P	0.90	0.92	0.93	6.18	5.51	4.02	5.27	7.22	4.12	5.41	7.42	1.88	2.52	3.49	1.93	2.59	3.59

H. On-site Basin Map- Option A



Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN23R	0.58	1.93	2.58	3.58	1.98	2.65	3.68
ONRAN23L	0.64	2.20	2.93	4.07	2.25	3.01	4.17
ONRAN24R	0.32	1.16	1.58	2.20	1.20	1.62	2.24
ONRAN24L	0.41	1.51	2.02	2.80	1.54	2.07	2.87
ONRAN25R	0.21	0.79	1.07	1.48	0.79	1.07	1.48
ONRAN25L	0.25	0.93	1.25	1.73	0.95	1.27	1.76
ONRAN26R	0.24	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN26L	0.46	1.62	2.17	3.02	1.67	2.23	3.09
ONRAN26RA	0.06	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN27R	0.43	1.48	1.98	2.75	1.52	2.03	2.81
ONRAN27L	0.42	1.51	2.02	2.80	1.54	2.07	2.86
ONRAN27LA	0.13	0.49	0.66	0.91	0.49	0.66	0.91

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN28R	0.38	1.44	1.93	2.67	1.44	1.93	2.67
ONRAN28L	0.06	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN28LA	0.10	0.38	0.51	0.70	0.38	0.51	0.70
ONRAN29R	0.17	0.64	0.86	1.20	0.64	0.86	1.20
ONRAN29L	0.30	1.13	1.52	2.11	1.13	1.52	2.11
ONRAN30R	0.17	0.64	0.86	1.20	0.64	0.86	1.20
ONRAN30L	0.28	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN31R	0.24	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN31RA	0.02	0.06	0.08	0.11	0.06	0.08	0.11
ONRAN31L	0.42	1.59	2.13	2.95	1.59	2.13	2.95
ONRAN32R	0.86	2.94	3.93	5.46	3.03	4.05	5.62
ONRAN32L	0.74	2.60	3.48	4.82	2.66	3.57	4.94

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN32LA	0.04	0.12	0.16	0.22	0.12	0.16	0.22
ONRAN33LA1	0.10	0.30	0.39	0.54	0.30	0.39	0.54
ONRAN33R	0.78	2.72	3.64	5.05	2.79	3.74	5.18
ONRAN33L	0.38	1.42	1.91	2.65	1.44	1.93	2.67
ONRAN33LA	0.40	1.51	2.03	2.81	1.51	2.03	2.81
ONRAN34L	0.16	0.60	0.81	1.12	0.60	0.81	1.12
ONRAN34R	0.37	1.38	1.85	2.56	1.40	1.88	2.60
ONRAN34LA	0.58	2.10	2.81	3.90	2.15	2.89	4.00

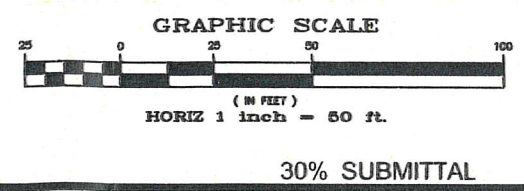
LEGEND:

SUB-BASIN BOUNDARIES

ONRAN

DRAINAGE BASIN ID

FLOW DIRECTION



REVISIONS

NO.	DATE	DESCRIPTION	APPD.

DESIGNED BY:
DRAWN BY:
CHECKED BY:
DATE: XXXXXX

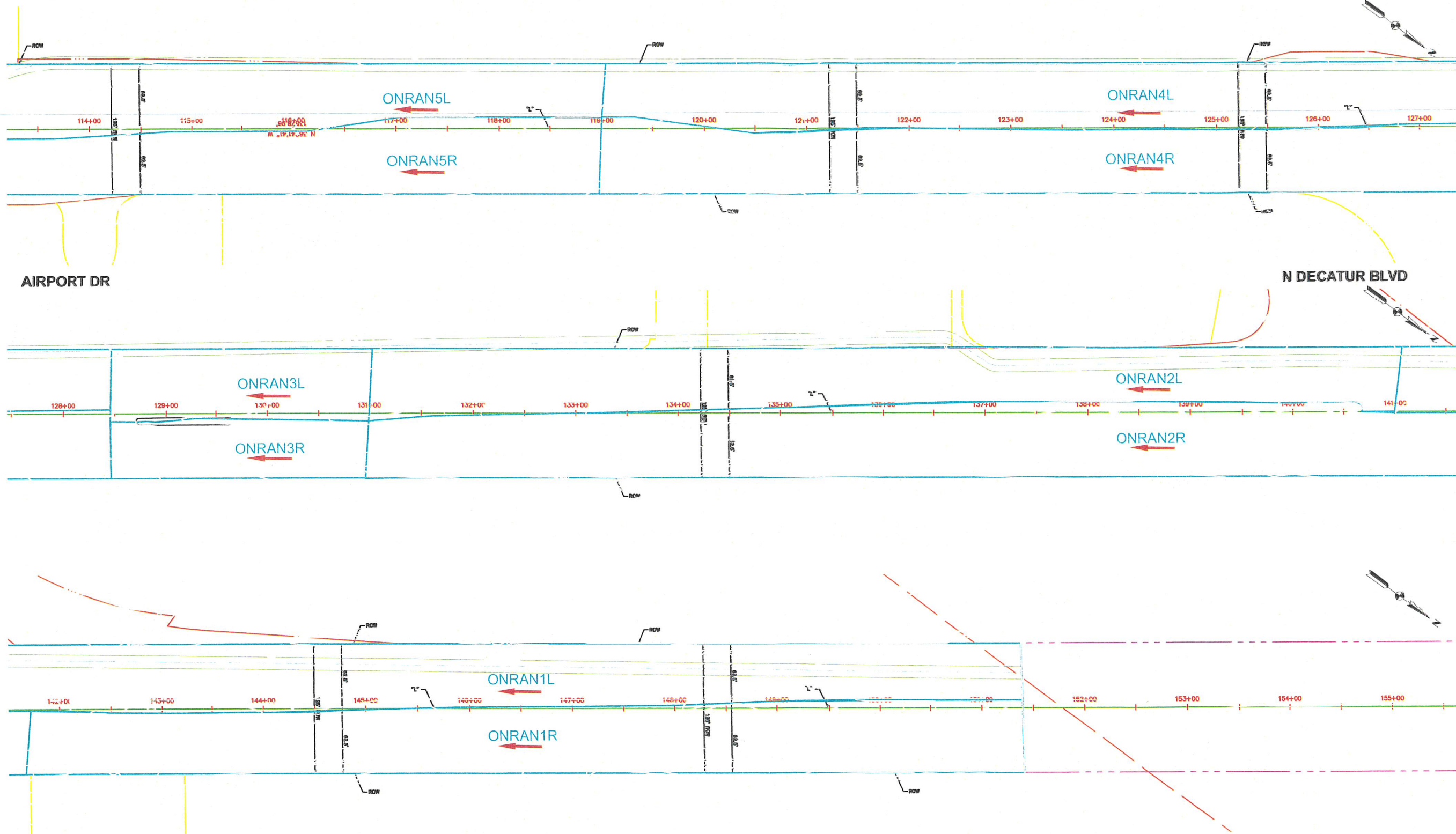
DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

PARSONS BRINCKERHOFF
3930 HOWARD HUGHES PARKWAY
SUITE 300
LAS VEGAS, NEVADA 89169

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
BONANZA TO DECATUR

SHEET: ONSITE BASIN EXHIBIT
OPTION A

1 of 4
DRAWING NO. XXXX



N DECATUR BLVD

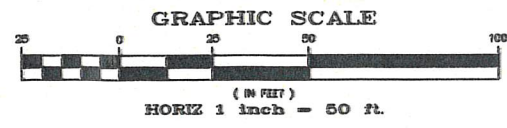
Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN1R	1.43	4.10	5.46	7.51	4.20	5.59	7.72
ONRAN1L	1.43	4.47	5.93	8.26	4.63	6.17	8.58
ONRAN2R	1.65	4.59	6.13	8.38	4.71	6.29	8.64
ONRAN2L	1.32	3.80	5.06	6.96	3.87	5.15	7.11
ONRAN3R	0.32	1.21	1.63	2.25	1.21	1.63	2.25
ONRAN3L	0.40	1.51	2.03	2.81	1.51	2.03	2.81
ONRAN4R	1.37	4.08	5.42	7.50	4.15	5.52	7.67
ONRAN4L	1.26	3.73	4.96	6.86	3.80	5.05	7.01
ONRAN5R	1.11	3.30	4.38	6.07	3.37	4.47	6.22
ONRAN5L	1.14	3.44	4.57	6.35	3.50	4.65	6.47

LEGEND:

— SUB-BASIN BOUNDARIES

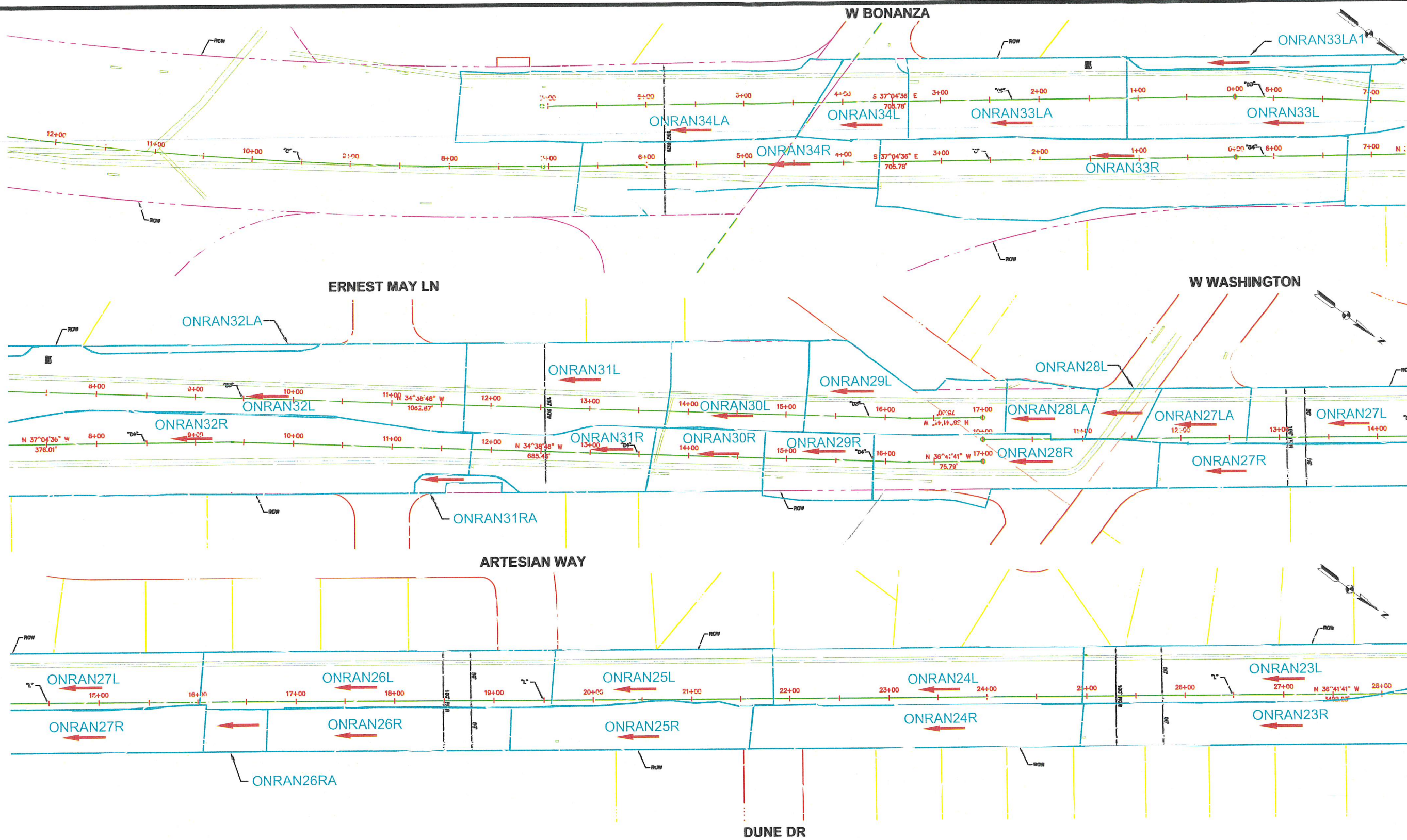
ONRAN DRAINAGE BASIN ID

→ FLOW DIRECTION



30% SUBMITTAL

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TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS BONANZA TO DECATUR SHEET:		ONSITE BASIN EXHIBIT OPTION A Sheet																	
4 of 4 DRAWING NO. XXXX		4 of 4 DRAWING NO. XXXX																	



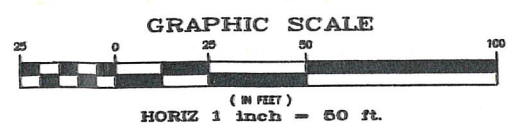
Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN23R	0.58	1.93	2.58	3.58	1.98	2.65	3.68
ONRAN23L	0.64	2.20	2.93	4.07	2.25	3.01	4.17
ONRAN24R	0.32	1.18	1.58	2.20	1.20	1.62	2.24
ONRAN24L	0.41	1.51	2.02	2.80	1.54	2.07	2.87
ONRAN25R	0.21	0.79	1.07	1.48	0.79	1.07	1.48
ONRAN25L	0.25	0.93	1.25	1.73	0.95	1.27	1.76
ONRAN26R	0.24	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN26L	0.46	1.62	2.17	3.02	1.67	2.23	3.09
ONRAN26RA	0.06	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN27R	0.43	1.48	1.98	2.75	1.52	2.03	2.81
ONRAN27L	0.42	1.51	2.02	2.80	1.54	2.07	2.86
ONRAN27LA	0.13	0.49	0.66	0.91	0.49	0.66	0.91

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN28R	0.38	1.44	1.93	2.67	1.44	1.93	2.67
ONRAN28L	0.06	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN28LA	0.10	0.38	0.51	0.70	0.38	0.51	0.70
ONRAN29R	0.17	0.64	0.86	1.20	0.64	0.86	1.20
ONRAN29L	0.30	1.13	1.52	2.11	1.13	1.52	2.11
ONRAN30R	0.17	0.64	0.86	1.20	0.64	0.86	1.20
ONRAN30L	0.28	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN31R	0.24	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN31RA	0.02	0.06	0.08	0.11	0.06	0.08	0.11
ONRAN31L	0.42	1.59	2.13	2.95	1.59	2.13	2.95
ONRAN32R	0.86	2.94	3.93	5.46	3.03	4.05	5.62
ONRAN32L	0.74	2.60	3.48	4.82	2.66	3.57	4.94

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN32LA	0.04	0.12	0.16	0.22	0.12	0.16	0.22
ONRAN33LA1	0.10	0.30	0.39	0.54	0.30	0.39	0.54
ONRAN33R	0.78	2.72	3.64	5.05	2.79	3.74	5.18
ONRAN33L	0.38	1.42	1.91	2.65	1.44	1.93	2.67
ONRAN33LA	0.40	1.51	2.03	2.81	1.51	2.03	2.81
ONRAN34L	0.16	0.60	0.81	1.12	0.60	0.81	1.12
ONRAN34R	0.37	1.38	1.85	2.56	1.40	1.88	2.60
ONRAN34LA	0.58	2.10	2.81	3.90	2.15	2.89	4.00

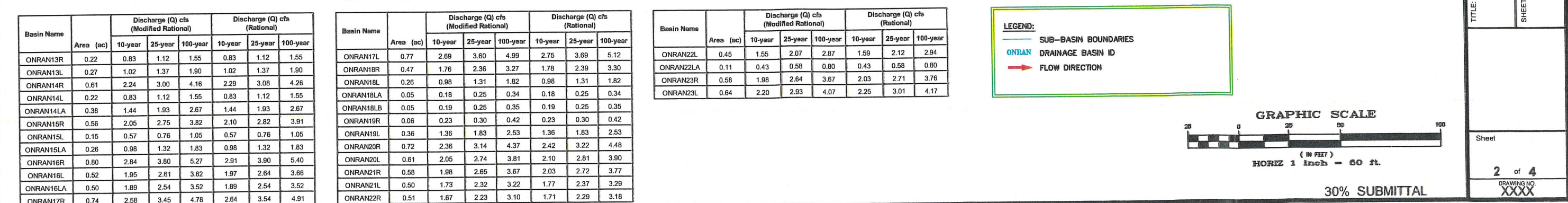
LEGEND:

- SUB-BASIN BOUNDARIES
- ONRAN DRAINAGE BASIN ID
- FLOW DIRECTION



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REVISIONS NO. DATE DESCRIPTION 1 10/1/2011 10/1/2011		DESIGNED BY: PARSONS BRINCKERHOFF DRAWN BY: 3930 HOWARD HUGHES PARKWAY CHECKED BY: SUITE 300 LAS VEGAS, NEVADA 89169	DATE: 10/1/2011
DEPARTMENT OF PUBLIC WORKS CAPITAL PROJECT MANAGEMENT			
TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS BONANZA TO DECATUR SHEET: ONSITE BASIN EXHIBIT OPTION A			





Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN10R	1.65	5.16	6.86	9.55	5.34	7.10	9.88
ONRAN10L	1.35	4.39	5.84	8.12	4.51	6.01	8.36
ONRAN11R	0.49	1.84	2.48	3.43	1.85	2.49	3.45
ONRAN11L	0.76	2.74	3.67	5.09	2.81	3.76	5.22
ONRAN11LA	0.06	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11LA1	0.06	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11RA	0.28	1.06	1.42	1.97	1.06	1.42	1.97

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN10R	1.65	5.16	6.86	9.55	5.34	7.10	9.88
ONRAN10L	1.35	4.39	5.84	8.12	4.51	6.01	8.36
ONRAN11R	0.49	1.84	2.48	3.43	1.85	2.49	3.45
ONRAN11L	0.76	2.74	3.67	5.09	2.81	3.76	5.22
ONRAN11LA	0.06	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11LA1	0.06	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11RA	0.28	1.06	1.42	1.97	1.06	1.42	1.97

GRAPHIC SCALE



30% SUBMITTAL

3 of 4 DRAWING NO XXXX	Sheet	TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS BONANZA TO DECATUR		 DEPARTMENT OF PUBLIC WORKS CAPITAL PROJECT MANAGEMENT	DESIGNED BY: DRAWN BY: CHECKED BY:	DATE: X/XX/XX	NO.	DATE:	DESCRIPTION	APPD
		SHEET: ONSITE BASIN EXHIBIT OPTION A	 PARSONS BRINCKERHOFF 3930 HOWARD HUGHES PARKWAY SUITE 300 LAS VEGAS, NEVADA 89169							

I. Time of Concentration Calculations- Option A



RANCHO DRIVE CAPACITY IMPROVEMENTS- BONANZA TO DECATUR
TIME OF CONCENTRATION CALCULATION - OPTION A CONDITIONS - ON-SITE BASIN MODEL
RATIONAL AND MODIFIED RATIONAL METHODS

31690A
Made by: NA
Date 3/2/2012
Checked by KS
Date: 3/10/2012

Sub-Basin Data		2		4		5		5A		5B		6		7		8		Initial/Overland Time (T _i)				Travel Time (T _t)				Tc Check (Urbanized Basins)				Date: 3/10/2015		
Basin	P/L	Soil group	CN	K	C ₀	K	Area	Area	5B	6	7	8	Lo Initial Length	Slope	T _i (Min)	T _i (Min)	Travel Length	Slope	Velocity	V1	Velocity	V2	14	15	16	17	Compared Tc (Min)	Used Tc (Min)	18	19	Used Tc (Min)	
		P	C	92.00	0.82	0.90	1.43	0.0022	58	2.00	3.07	2.23	0.005	1.43	2.16	9.50	1034	15.74	12.57	13	11.73	12										
ONRANT1R	P	C	92.00	0.82	0.90	1.43	0.0022	58	2.00	3.07	2.23	0.005	1.43	2.16	9.50	1034	15.74	12.57	13	11.73	12											
ONRANT1L	P	C	92.00	0.82	0.90	1.43	0.0022	58	2.00	2.96	2.15	0.005	1.43	2.16	6.72	689	13.72	9.68	10	8.87	9											
ONRANT2R	P	C	92.00	0.82	0.90	1.65	0.0026	70	2.00	3.37	2.45	0.005	1.43	2.16	10.22	1140	16.33	13.60	14	12.67	13											
ONRANT2L	P	D	93.00	0.84	0.90	1.32	0.0021	52	2.00	2.77	2.11	0.005	1.43	2.16	9.69	1082	15.84	12.45	12	11.79	12											
ONRANT3R	P	D	93.00	0.84	0.90	0.90	0.0006	42	2.00	2.49	1.90	0.005	1.43	2.02	3.06	2.06	282	11.62	4.55	5	3.96	5										
ONRANT3L	P	D	93.00	0.84	0.90	0.40	0.0006	68	2.00	3.16	2.41	0.005	1.43	2.02	3.06	2.06	282	11.62	4.55	5	3.96	5										
ONRANT4R	P	D	93.00	0.84	0.90	0.40	0.0006	68	2.00	3.16	2.41	0.005	1.43	2.02	3.06	2.06	282	11.62	4.55	5	3.96	5										
ONRANT4L	P	D	93.00	0.84	0.90	1.37	0.0021	60	2.00	2.97	2.27	0.005	1.43	2.16	8.29	1010	15.61	11.77	4.98	5	4.23	5										
ONRANT5R	P	D	93.00	0.84	0.90	1.26	0.0020	60	2.00	2.97	2.27	0.005	1.43	2.16	8.29	1010	15.61	11.77	4.98	5	4.23	5										
ONRANT5L	P	D	93.00	0.84	0.90	1.11	0.0017	72	2.00	3.26	2.48	0.005	1.43	2.16	8.07	862	14.79	11.32	11	10.59	11											
ONRANT6R	P	D	93.00	0.84	0.90	0.90	0.0003	48	2.00	2.66	2.03	0.005	1.43	2.16	8.07	862	14.79	11.32	11	10.59	11											
ONRANT6L	P	D	93.00	0.84	0.90	0.20	0.0003	48	2.00	2.66	2.03	0.005	1.43	2.16	8.07	862	14.79	11.32	11	10.59	11											
ONRANT7R	P	D	93.00	0.84	0.90	0.18	0.0003	48	2.00	2.66	2.03	0.005	1.43	2.16	8.07	862	14.79	11.32	11	10.59	11											
ONRANT7L	P	D	93.00	0.84	0.90	0.90	0.0003	52	2.00	2.77	2.11	0.005	1.43	2.16	8.07	862	14.79	11.32	11	10.59	11											
ONRANT8R	P	D	93.00	0.84	0.90	1.42	0.0022	70	2.00	3.21	2.45	0.011	2.08	3.15	6.35	1012	15.62	10.76	3.65	5	3.03	5										
ONRANT8L	P	D	93.00	0.84	0.90	0.90	0.0025	38	2.00	2.36	1.80	0.012	2.21	3.21	6.23	990	15.44	8.59	9	8.03	9											
ONRANT9R	P	D	93.00	0.84	0.90	0.90	0.0005	66	2.00	3.12	2.38	0.012	2.21	3.35	1.24	231	11.28	4.35	5	3.61	5											
ONRANT9L	P	D	93.00	0.84	0.90	0.29	0.0005	54	2.00	2.82	2.15	0.012	2.21	3.35	1.24	231	11.28	4.35	5	3.61	5											
ONRANT10R	P	D	93.00	0.84	0.90	1.45	0.0023	62	2.00	3.02	2.30	0.009	1.89	2.87	6.75	968	15.38	9.78	10	9.06	9											
ONRANT10L	P	D	93.00	0.84	0.90	1.42	0.0022	54	2.00	2.82	2.15	0.009	1.89	2.87	6.75	968	15.38	9.78	10	9.06	9											
ONRANT11R	P	D	93.00	0.84	0.90	0.21	0.0003	60	2.00	2.97	2.27	0.008	1.81	2.74	1.16	186	11.03	4.13	5	3.43	5											
ONRANT11L	P	D	93.00	0.84	0.90	0.18	0.0003	62	2.00	3.02	2.30	0.008	1.81	2.74	1.16	186	11.03	4.13	5	3.43	5											
ONRANT12R	P	D	93.00	0.84	0.90	1.65	0.0028	66	2.00	3.12	2.38	0.012	2.21	3.35	6.52	1119	16.22	9.93	10	8.49	9											
ONRANT12L	P	D	93.00	0.84	0.90	1.35	0.0021	49	2.00	2.69	2.05	0.012	2.21	3.35	6.10	1019	15.66	8.79	9	8.15	8											
ONRANT13R	P	D	93.00	0.84	0.90	0.49	0.0008	54	2.00	2.82	2.15	0.017	2.61	3.95	2.30	414	12.30	5.12	5	4.45	5											
ONRANT13L	P	D	93.00	0.84	0.90	0.76	0.0012	46	2.00	2.60	1.98	0.017	2.61	3.95	2.30	414	12.30	5.12	5	4.45	5											
ONRANT14R	P	D	93.00	0.84	0.90	0.88	0.0008	60	2.00	2.60	1.98	0.017	2.61	3.95	2.30	414	12.30	5.12	5	4.45	5											
ONRANT14L	P	D	93.00	0.84	0.90	0.06	0.0001	10	2.00	1.21	1.02	0.017	1.93	3.83	3.16	376	12.09	4.37	10	4.18	10											
ONRANT15R	P	D	93.00	0.84	0.90	0.88	0.0008	60	2.00	2.60	1.98	0.017	2.61	3.95	2.30	414	12.30	5.12	5	4.45	5											
ONRANT15L	P	D	93.00	0.84	0.90	0.56	0.0009	46	2.00	2.80	1.98	0.017	2.61	3.95	2.30	414	12.30	5.12	5	4.45	5											
ONRANT16R	P	D	93.00	0.84	0.90	0.15	0.0004	66	2.00	3.12	2.38	0.010	2.02	3.09	3.20	438	12.43	5.80	6	5.19	6											
ONRANT16L	P	D	93.00	0.84	0.90	0.26	0.0002	52	2.00	2.77	2.11	0.010	2.02	3.06	0.78	161	10.89	3.90	5	3.16	5											
ONRANT17R	P	D	93.00	0.84	0.90	0.90	0.0013	47	2.00	2.63	2.00	0.013	2.35	3.56	2.82	417	13.52	6.66	7	6.04	6											
ONRANT17L	P	D	93.00	0.84	0.90	0.52	0.0008	48	2.00	2.63	2.00	0.013	2.35	3.56	2.82	417	13.52	6.66	7	6.04	6											
ONRANT18R	P	D	93.00	0.84	0.90	0.90	0.0008	47	2.00	2.63	2.00	0.012	2.21	3.35	3.15	465	12.58	5.78	6	5.15	5											
ONRANT18L	P	D	93.00	0.84	0.90	0.74	0.0012	46	2.00	2.60	1.98	0.010	2.04	3.09	3.20	438	12.43	5.80	6	5.19	6											
ONRANT19R	P	D	93.00	0.84	0.90	0.90	0.0007	44	2.00	2.60	1.98	0.010	2.04	3.09	3.20	438	12.43	5.80	6	5.19	6											
ONRANT19L	P	D	93.00	0.84	0.90	0.77	0.0012	44	2.00	2.60	1.98	0.010	2.04	3.09	3.20	438	12.43	5.80	6	5.19	6											
ONRANT20R	P	D	93.00	0.84	0.90	0.47	0.0007	48	2.00	2.66	2.03	0.010	2.06	3.12	2.59	368	12.04	5.25	5	4.61	5											
ONRANT20L	P	D	93.00	0.84	0.90	0.26	0.0004	59	2.00	2.95	2.25	0.010	2.06	3.12	1.55	251	11.39	4.50	5	3.80	5											
ONRANT21R	P	D	93.00	0.84	0.90	0.90	0.0001	57	2.00	2.90	2.21	0.010	2.02	3.06	0.28	91	10.51	3.18	5	2.49	5											
ONRANT21L	P	D	93.00	0.84	0.90	0.05	0.0001	57	2.00	2.90	2.21	0.010	2.02	3.06	0.28	91	10.51	3.18	5	2.49	5											
ONRANT22R	P	D	93.00	0.84	0.90	0.06	0.0001	41	2.00	2.46	1.87	0.010	2.02	3.06	0.50	102	10.57	2.96	5	2.36	5											



RANCHO DRIVE CAPACITY IMPROVEMENTS- BONANZA TO DECATUR
TIME OF CONCENTRATION CALCULATION - OPTION A CONDITIONS - ON-SITE BASIN MODEL
RATIONAL AND MODIFIED RATIONAL METHODS

31690A
Made by: NA
Date 3/2/2012
Checked by KS
Date: 3/10/2012

Sub-Basin Data	2	P/L	Soil group	CN	K	C ₁₀	5A	5B	6	Area	7	8	Initial/Overland Time (T _i)				Travel Time (T _t)		13	14	15	16	17	Tc Check (Urbanized Basins)	18	19	Used	18	Compared	Tc (Min)	Tc (Min)	19	Used	Tc (Min)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
													Lo Initial	Slope	T _i (Min)	Modified Rational	T _i (Min)	Length																	Slope	Velocity	V ₁	V ₂	T _t	Total length	T _c check	Modified Rational	Compared	Used	Tc (Min)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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RANCHO DRIVE CAPACITY IMPROVEMENTS- BONANZA TO DECATUR
TIME OF CONCENTRATION CALCULATION - OPTION A CONDITIONS - ON-SITE BASIN MODEL
RATIONAL AND MODIFIED RATIONAL METHODS

31690A
Made by: NA
Date 3/22/2012
Checked by KS
Date: 3/10/2012

Sub-Basin Data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Basin	P/L	Soil group	CN	K	C _u	K	C _u	Lo Initial Length	Slope	T _i (Min)	T _i (Min)	Slope	Velocity V1	Velocity V2	T _i	Total length	T _c check	Used	Used
								(ft)	(%)	Modified Rational	Rational	(ft/ft)	(fps)	(fps)	(Min)	(ft)	(Min)	Modified Rational	Rational

Equations Used

- 2 P/L Paved or Desert Landscaping- condition of basin
- 4 CN For soil group C, use 92 from CCRFCD, 1999 Table 602, 1 of 4
For soil group D, use 93 from CCRFCD, 1999 Table 602, 1 of 4
- 5A 10-Year Runoff Coefficient, for paved; Use 0.9 from CCRFCD, 1999 - Table 601
- 5 K $K = 0.0132CN - 0.39$ From CCRFCD, 1999- Equation 603
- 5B Equals C_u From CCRFCD, 1999 Page 605, first paragraph, Table 601 (For Modified Rational Method)
(For Rational Method)
- 10 $T_i = 1.8(1.1 + K)C_u^{0.5} / S^{0.3}$ From CCRFCD, 1999 - Equation 602
 $L = 500ft - max$
- 13 V1 where $C_s = V1 = CS^{1/2}$
 $C = 14.80$ (for Non-Urbanized Areas)
 20.20 (for Urbanized Areas, "Paved")
- 14 V2 where $C_s = V2 = CS^{1/2}$
 $C = 29.40$ (for Non-Urbanized Areas)
 30.60 (for Urbanized Areas, "paved")
- 15 Tt Length/(Velocity*60)
Since L_0 is limited to 500ft max, per Tt equation,
Tt for $L \leq 500ft$, use V1 Con. 1
Tt for $L > 500ft$, use V2 for $L = 500$ Con. 2
- 17 Tc check $T_c = (L/180) + 10$ From CCRFCD, 1999 - Equation 604
 $L = L_0 + Travel length$ Tc check is for urbanized areas only
- 18 Tc If Tc check $\leq T_i + T_t$, use Tc check
If Tc check $> T_i + T_t$, use $T_i + T_t$
- 19 used Tc If Tc Min for paved/urbanized areas, is less than 5 min, use 5 min
If Tc Min for unpaved/non-urbanized areas, is less than 10 min, use 10 min
The minimum recommended for non-urban watersheds is 10 minutes. (CCRFCD, 1999 - Page 605)
The minimum recommended for urbanized areas is 5 minutes. (CCRFCD, 1999 - Page 606)

J. Runoff Calculations- Option A



**RANCHO DRIVE CAPACITY IMPROVMENTS- BONANZA TO DECATUR
RUNOFF CALCULATIONS - OPTION A CONDITIONS - ON-SITE BASIN MODEL
RATIONAL AND MODIFIED RATIONAL METHODS**

31690A

Made by: NA

Date 3/2/2012

Checked by KS

Date: 3/10/2012

Basin Name	Area (ac)	P/L	Runoff Coef. (C)			T _c (min)		Intensity (in./hr.) Modified Rational			Intensity (in./hr.) Rational			Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
			10-year	25-year	100-year	Modified Rational	Rational	10-year	25-year	100-year	10-year	25-year	100-year	10-year	25-year	100-year	10-year	25-year	100-year
ONRAN1R	1.43	P	0.90	0.92	0.93	12.57	11.73	3.18	4.15	5.65	3.26	4.25	5.80	4.10	5.46	7.51	4.20	5.59	7.72
ONRAN1L	1.43	P	0.90	0.92	0.93	9.68	8.87	3.47	4.51	6.21	3.60	4.69	6.45	4.47	5.93	8.26	4.63	6.17	8.58
ONRAN2R	1.65	P	0.90	0.92	0.93	13.60	12.67	3.09	4.04	5.46	3.17	4.14	5.63	4.59	6.13	8.38	4.71	6.29	8.64
ONRAN2L	1.32	P	0.90	0.92	0.93	12.45	11.79	3.19	4.17	5.67	3.26	4.24	5.79	3.80	5.06	6.96	3.87	5.15	7.11
ONRAN3R	0.32	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.21	1.63	2.25	1.21	1.63	2.25
ONRAN3L	0.40	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.51	2.03	2.81	1.51	2.03	2.81
ONRAN4R	1.37	P	0.90	0.92	0.93	11.26	10.55	3.31	4.30	5.89	3.37	4.38	6.02	4.08	5.42	7.50	4.15	5.52	7.67
ONRAN4L	1.26	P	0.90	0.92	0.93	11.46	10.76	3.29	4.28	5.85	3.35	4.36	5.98	3.73	4.96	6.86	3.80	5.05	7.01
ONRAN5R	1.11	P	0.90	0.92	0.93	11.32	10.55	3.30	4.29	5.88	3.37	4.38	6.02	3.30	4.38	6.07	3.37	4.47	6.22
ONRAN5L	1.14	P	0.90	0.92	0.93	10.73	10.09	3.35	4.36	5.99	3.41	4.43	6.10	3.44	4.57	6.35	3.50	4.65	6.47
ONRAN6R	0.20	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.76	1.02	1.41	0.76	1.02	1.41
ONRAN6L	0.18	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.68	0.91	1.27	0.68	0.91	1.27
ONRAN7R	1.42	P	0.90	0.92	0.93	9.56	8.79	3.49	4.54	6.25	3.61	4.70	6.47	4.46	5.93	8.25	4.61	6.14	8.54
ONRAN7L	1.59	P	0.90	0.92	0.93	8.59	8.03	3.64	4.74	6.53	3.73	4.87	6.69	5.21	6.94	9.65	5.33	7.12	9.89
ONRAN7LA	0.32	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.21	1.63	2.25	1.21	1.63	2.25
ONRAN7RA	0.29	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.10	1.47	2.04	1.10	1.47	2.04
ONRAN8R	1.45	P	0.90	0.92	0.93	9.78	9.06	3.46	4.49	6.19	3.57	4.65	6.39	4.51	5.99	8.34	4.66	6.20	8.62
ONRAN8L	1.42	P	0.90	0.92	0.93	9.67	9.00	3.47	4.51	6.22	3.58	4.66	6.41	4.44	5.90	8.21	4.57	6.09	8.47
ONRAN9R	0.21	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.79	1.07	1.48	0.79	1.07	1.48
ONRAN9L	0.18	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.68	0.91	1.27	0.68	0.91	1.27
ONRAN10R	1.65	P	0.90	0.92	0.93	9.63	8.89	3.48	4.52	6.23	3.59	4.68	6.44	5.16	6.86	9.55	5.34	7.10	9.88
ONRAN10L	1.35	P	0.90	0.92	0.93	8.79	8.15	3.61	4.70	6.47	3.71	4.84	6.66	4.39	5.84	8.12	4.51	6.01	8.36
ONRAN11R	0.49	P	0.90	0.92	0.93	5.12	5.00	4.18	5.50	7.53	4.20	5.52	7.56	1.84	2.48	3.43	1.85	2.49	3.45
ONRAN11L	0.76	P	0.90	0.92	0.93	6.26	5.64	4.01	5.25	7.20	4.10	5.38	7.38	2.74	3.67	5.09	2.81	3.76	5.22
ONRAN11LA	0.06	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11LA1	0.06	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11RA	0.28	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN13R	0.22	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.83	1.12	1.55	0.83	1.12	1.55
ONRAN13L	0.27	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.02	1.37	1.90	1.02	1.37	1.90
ONRAN14R	0.61	P	0.90	0.92	0.93	5.78	5.15	4.08	5.35	7.34	4.18	5.49	7.52	2.24	3.00	4.16	2.29	3.08	4.26
ONRAN14L	0.22	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.83	1.12	1.55	0.83	1.12	1.55
ONRAN14LA	0.38	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.44	1.93	2.67	1.44	1.93	2.67
ONRAN15R	0.56	P	0.90	0.92	0.93	5.80	5.19	4.08	5.35	7.33	4.17	5.48	7.51	2.05	2.75	3.82	2.10	2.82	3.91
ONRAN15L	0.15	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.57	0.76	1.05	0.57	0.76	1.05
ONRAN15LA	0.26	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.98	1.32	1.83	0.98	1.32	1.83
ONRAN16R	0.80	P	0.90	0.92	0.93	6.66	6.04	3.94	5.16	7.08	4.04	5.30	7.26	2.84	3.80	5.27	2.91	3.90	5.40
ONRAN16L	0.52	P	0.90	0.92	0.93	5.28	5.00	4.16	5.46	7.48	4.20	5.52	7.56	1.95	2.61	3.62	1.97	2.64	3.66
ONRAN16LA	0.50	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.89	2.54	3.52	1.89	2.54	3.52
ONRAN17R	0.74	P	0.90	0.92	0.93	7.11	6.49	3.87	5.06	6.95	3.97	5.20	7.13	2.58	3.45	4.78	2.64	3.54	4.91
ONRAN17L	0.77	P	0.90	0.92	0.93	7.05	6.45	3.88	5.08	6.97	3.98	5.21	7.15	2.69	3.60	4.99	2.75	3.69	5.12
ONRAN18R	0.47	P	0.90	0.92	0.93	5.25	5.00	4.16	5.47	7.49	4.20	5.52	7.56	1.76	2.36	3.27	1.78	2.39	3.30
ONRAN18L	0.26	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.98	1.31	1.82	0.98	1.31	1.82
ONRAN18LA	0.05	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.18	0.25	0.34	0.18	0.25	0.34
ONRAN18LB	0.05	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.19	0.25	0.35	0.19	0.25	0.35
ONRAN19R	0.06	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN19L	0.36	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.36	1.83	2.53	1.36	1.83	2.53



RANCHO DRIVE CAPACITY IMPROVMENTS- BONANZA TO DECATUR
RUNOFF CALCULATIONS - OPTION A CONDITIONS - ON-SITE BASIN MODEL
RATIONAL AND MODIFIED RATIONAL METHODS

31690A

Made by: NA

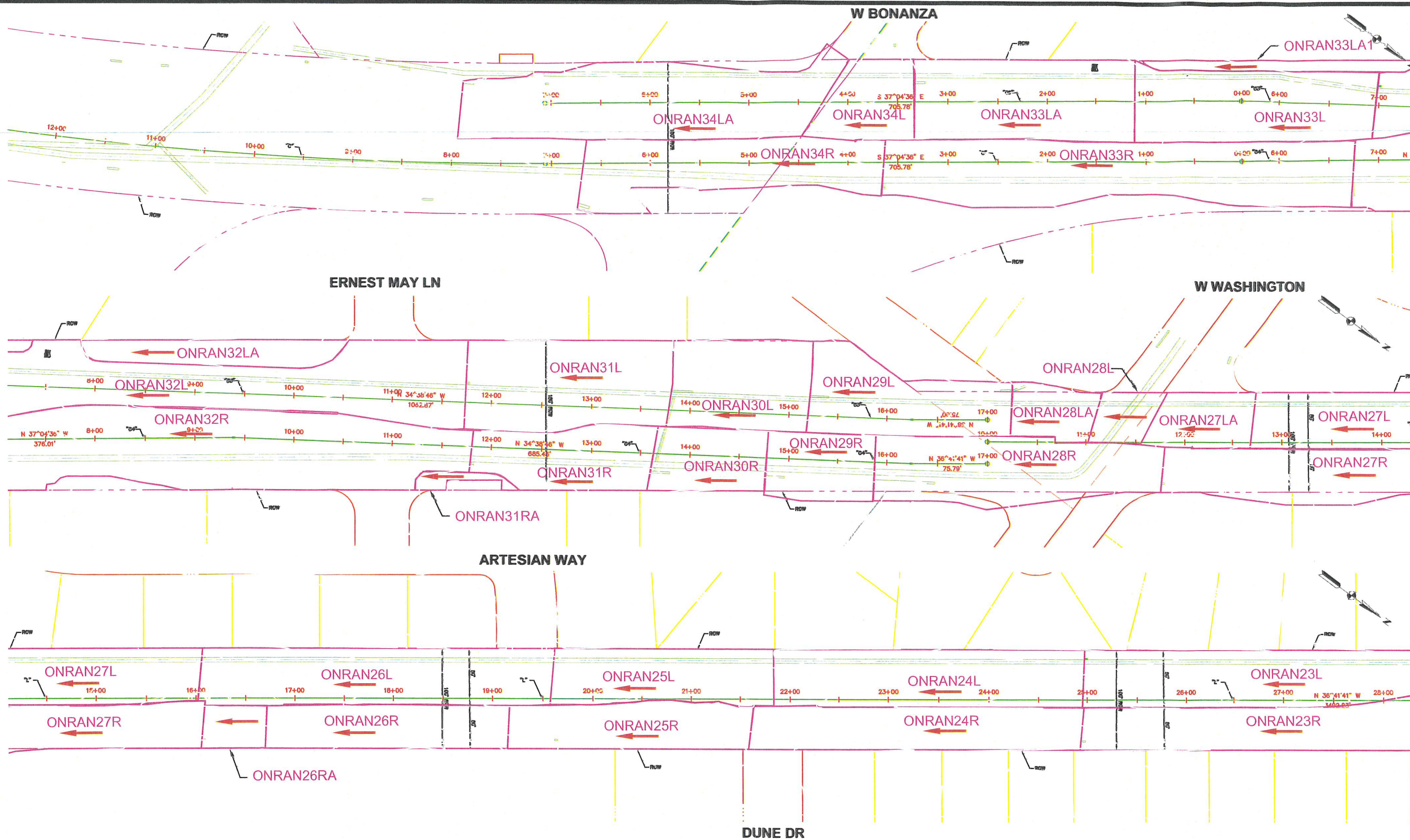
Date 3/2/2012

Checked by KS

Date: 3/10/2012

Basin Name	Area (ac)	P/L	Runoff Coef. (C)			T _c (min)		Intensity (in./hr.) Modified Rational			Intensity (in./hr.) Rational			Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
			10-year	25-year	100-year	Modified Rational	Rational	10-year	25-year	100-year	10-year	25-year	100-year	10-year	25-year	100-year	10-year	25-year	100-year
ONRAN20R	0.72	P	0.90	0.92	0.93	8.59	8.03	3.64	4.75	6.53	3.73	4.87	6.69	2.36	3.14	4.37	2.42	3.22	4.48
ONRAN20L	0.61	P	0.90	0.92	0.93	7.97	7.40	3.74	4.88	6.71	3.83	5.00	6.87	2.05	2.74	3.81	2.10	2.81	3.90
ONRAN21R	0.58	P	0.90	0.92	0.93	7.60	6.99	3.79	4.96	6.81	3.89	5.09	6.99	1.98	2.65	3.67	2.03	2.72	3.77
ONRAN21L	0.50	P	0.90	0.92	0.93	7.23	6.69	3.85	5.04	6.92	3.94	5.15	7.07	1.73	2.32	3.22	1.77	2.37	3.29
ONRAN22R	0.51	P	0.90	0.92	0.93	8.56	7.98	3.65	4.75	6.54	3.74	4.88	6.70	1.67	2.23	3.10	1.71	2.29	3.18
ONRAN22L	0.45	P	0.90	0.92	0.93	7.42	6.83	3.82	5.00	6.87	3.92	5.13	7.04	1.55	2.07	2.87	1.59	2.12	2.94
ONRAN22LA	0.11	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.43	0.58	0.80	0.43	0.58	0.80
ONRAN24L	0.41	P	0.90	0.92	0.93	5.74	5.15	4.08	5.36	7.35	4.18	5.49	7.52	1.51	2.02	2.80	1.54	2.07	2.87
ONRAN23R	0.58	P	0.90	0.92	0.93	7.61	7.02	3.79	4.96	6.81	3.88	5.08	6.98	1.98	2.64	3.67	2.03	2.71	3.76
ONRAN23L	0.64	P	0.90	0.92	0.93	7.49	6.93	3.81	4.98	6.84	3.90	5.11	7.01	2.20	2.93	4.07	2.25	3.01	4.17
ONRAN24R	0.32	P	0.90	0.92	0.93	5.64	5.11	4.10	5.38	7.38	4.18	5.50	7.53	1.18	1.58	2.20	1.20	1.62	2.24
ONRAN25R	0.21	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.79	1.07	1.48	0.79	1.07	1.48
ONRAN25L	0.25	P	0.90	0.92	0.93	5.46	5.00	4.13	5.42	7.43	4.20	5.52	7.56	0.93	1.25	1.73	0.95	1.27	1.76
ONRAN26R	0.24	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN26L	0.46	P	0.90	0.92	0.93	6.78	6.14	3.92	5.14	7.05	4.02	5.27	7.23	1.62	2.17	3.02	1.67	2.23	3.09
ONRAN26RA	0.06	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN27R	0.43	P	0.90	0.92	0.93	7.38	6.82	3.83	5.01	6.87	3.92	5.13	7.04	1.48	1.98	2.75	1.52	2.03	2.81
ONRAN27L	0.42	P	0.90	0.92	0.93	6.41	5.80	3.98	5.22	7.16	4.08	5.35	7.33	1.51	2.02	2.80	1.54	2.07	2.86
ONRAN27LA	0.13	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.49	0.66	0.91	0.49	0.66	0.91
ONRAN28R	0.38	P	0.90	0.92	0.93	5.02	5.00	4.20	5.52	7.55	4.20	5.52	7.56	1.44	1.93	2.67	1.44	1.93	2.67
ONRAN28L	0.06	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN28LA	0.10	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.38	0.51	0.70	0.38	0.51	0.70
ONRAN29R	0.17	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.64	0.86	1.20	0.64	0.86	1.20
ONRAN29L	0.30	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.13	1.52	2.11	1.13	1.52	2.11
ONRAN30R	0.17	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.64	0.86	1.20	0.64	0.86	1.20
ONRAN30L	0.28	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN31R	0.24	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN31RA	0.02	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.06	0.08	0.11	0.06	0.08	0.11
ONRAN31L	0.42	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.59	2.13	2.95	1.59	2.13	2.95
ONRAN32R	0.86	P	0.90	0.92	0.93	7.56	6.86	3.80	4.97	6.83	3.91	5.12	7.02	2.94	3.93	5.46	3.03	4.05	5.62
ONRAN32L	0.74	P	0.90	0.92	0.93	6.92	6.31	3.90	5.11	7.01	4.00	5.24	7.18	2.60	3.48	4.82	2.66	3.57	4.94
ONRAN32LA	0.04	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.12	0.16	0.22	0.12	0.16	0.22
ONRAN33LA1	0.10	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.30	0.39	0.54	0.30	0.39	0.54
ONRAN33R	0.78	P	0.90	0.92	0.93	7.09	6.44	3.88	5.07	6.96	3.98	5.21	7.15	2.72	3.64	5.05	2.79	3.74	5.18
ONRAN33LA	0.40	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.51	2.03	2.81	1.51	2.03	2.81
ONRAN34L	0.16	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.60	0.81	1.12	0.60	0.81	1.12
ONRAN34R	0.37	P	0.90	0.92	0.93	5.44	5.00	4.13	5.42	7.43	4.20	5.52	7.56	1.38	1.85	2.56	1.40	1.88	2.60
ONRAN34LA	0.58	P	0.90	0.92	0.93	6.18	5.51	4.02	5.27	7.22	4.12	5.41	7.42	2.10	2.81	3.90	2.15	2.89	4.00

K. On-site Basin Map- Option B



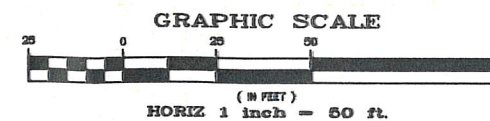
Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN23R	0.58	1.93	2.58	3.58	1.98	2.65	3.68
ONRAN23L	0.64	2.20	2.93	4.07	2.25	3.01	4.17
ONRAN24R	0.32	1.18	1.58	2.20	1.20	1.62	2.24
ONRAN24L	0.41	1.51	2.02	2.80	1.54	2.07	2.87
ONRAN25R	0.21	0.79	1.07	1.48	0.79	1.07	1.48
ONRAN25L	0.25	0.93	1.25	1.73	0.95	1.27	1.76
ONRAN26R	0.24	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN26L	0.46	1.62	2.17	3.02	1.67	2.23	3.09
ONRAN26RA	0.06	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN27R	0.47	1.63	2.18	3.03	1.67	2.24	3.10
ONRAN27L	0.42	1.51	2.02	2.80	1.54	2.07	2.86
ONRAN27LA	0.13	0.49	0.66	0.91	0.49	0.66	0.91

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN28R	0.34	1.28	1.73	2.39	1.29	1.73	2.39
ONRAN28L	0.06	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN28LA	0.10	0.38	0.51	0.70	0.38	0.51	0.70
ONRAN29R	0.16	0.60	0.81	1.12	0.60	0.81	1.12
ONRAN29L	0.31	1.17	1.57	2.18	1.17	1.57	2.18
ONRAN30R	0.17	0.64	0.86	1.20	0.64	0.86	1.20
ONRAN30L	0.28	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN31R	0.24	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN31RA	0.02	0.06	0.08	0.11	0.06	0.08	0.11
ONRAN31L	0.42	1.59	2.13	2.95	1.59	2.13	2.95
ONRAN32R	0.82	2.81	3.75	5.21	2.89	3.86	5.36
ONRAN32L	0.63	2.21	2.96	4.11	2.27	3.04	4.21

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN32LA	0.14	0.42	0.55	0.76	0.42	0.55	0.76
ONRAN33LA1	0.06	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN33R	0.66	2.30	3.08	4.27	2.36	3.16	4.39
ONRAN33L	0.38	1.42	1.91	2.65	1.44	1.93	2.67
ONRAN33LA	0.39	1.47	1.98	2.74	1.47	1.98	2.74
ONRAN34L	0.16	0.60	0.81	1.12	0.60	0.81	1.12
ONRAN34R	0.37	1.38	1.85	2.56	1.40	1.88	2.60
ONRAN34LA	0.52	1.88	2.52	3.49	1.93	2.59	3.59

LEGEND:

- SUB-BASIN BOUNDARIES
- ONRAN DRAINAGE BASIN ID
- FLOW DIRECTION



REVISIONS

NO.	DATE	DESCRIPTION	APP'D

DESIGNED BY:
DRAWN BY:
CHECKED BY:

DATE: XXXX/XXX

PARSONS BRINCKERHOFF
3930 HOWARD HUGHES PARKWAY
SUITE 300
LAS VEGAS, NEVADA 89169

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

RANCH DRIVE CAPACITY IMPROVEMENTS
BONANZA TO DECATUR

ONSITE BASIN EXHIBIT
OPTION B

TITLE:

SHEET:

Sheet

1 of 4
DRAWING NO.
XXXX

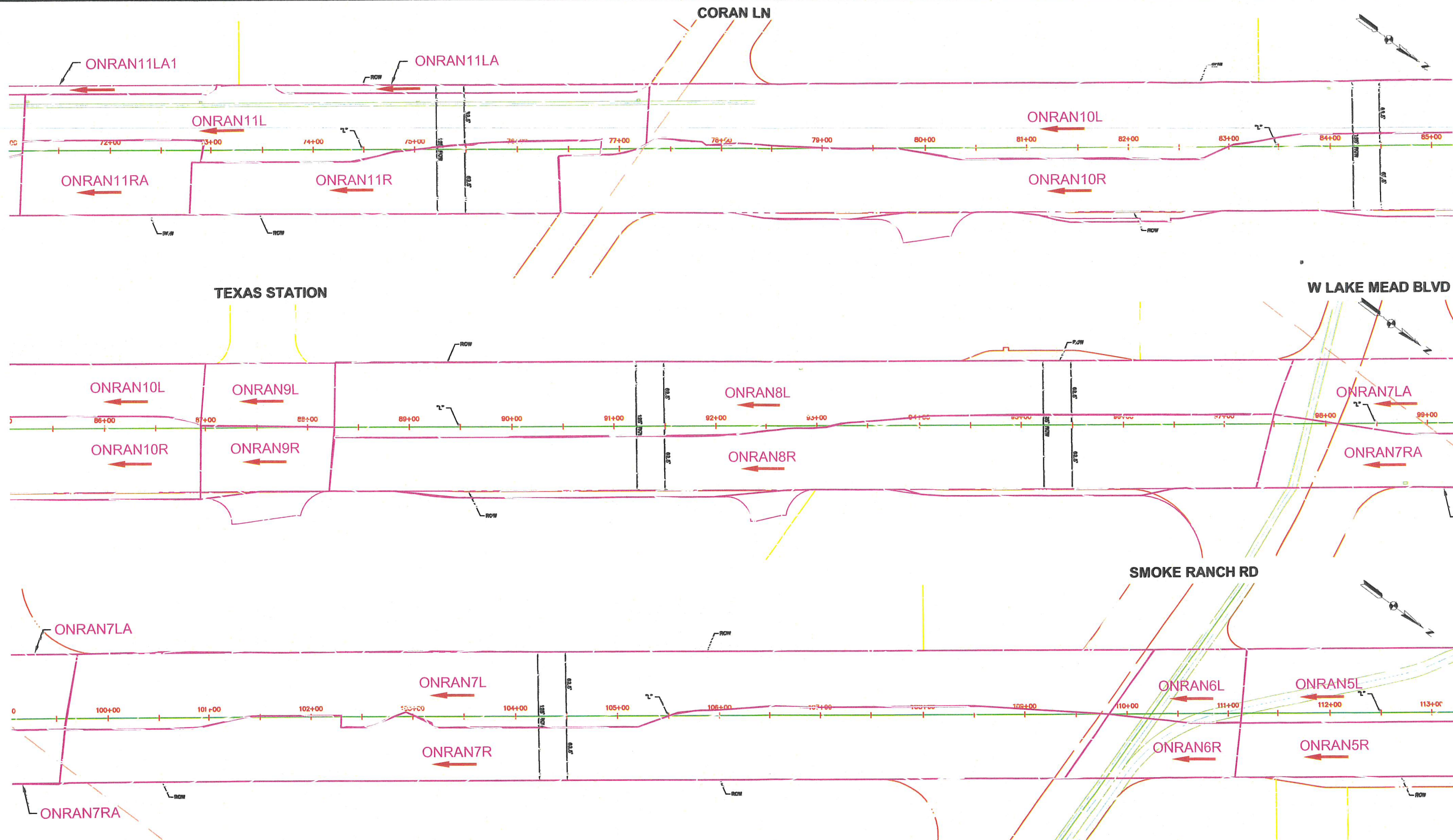
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Sheet

2 of **4**

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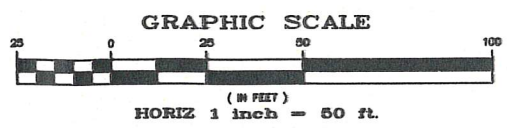


Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN5R	1.11	3.30	4.38	6.07	3.37	4.47	6.22
ONRAN5L	1.14	3.44	4.57	6.35	3.50	4.65	6.47
ONRAN6R	0.20	0.76	1.02	1.41	0.76	1.02	1.41
ONRAN6L	0.18	0.68	0.91	1.27	0.68	0.91	1.27
ONRAN7R	1.42	4.46	5.93	8.25	4.61	6.14	8.54
ONRAN7L	1.59	5.21	6.94	9.65	5.33	7.12	9.89
ONRAN7LA	0.32	1.21	1.63	2.25	1.21	1.63	2.25
ONRAN7RA	0.29	1.10	1.47	2.04	1.10	1.47	2.04
ONRAN8R	1.45	4.51	5.99	8.34	4.66	6.20	8.62
ONRAN8L	1.42	4.44	5.90	8.21	4.57	6.09	8.47
ONRAN9R	0.21	0.79	1.07	1.48	0.79	1.07	1.48
ONRAN9L	0.18	0.68	0.91	1.27	0.68	0.91	1.27

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN10R	1.65	5.16	6.86	9.55	5.34	7.10	9.88
ONRAN10L	1.35	4.39	5.84	8.12	4.51	6.01	8.36
ONRAN11R	0.49	1.84	2.48	3.43	1.85	2.49	3.45
ONRAN11L	0.76	2.74	3.67	5.09	2.81	3.76	5.22
ONRAN11LA	0.06	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11LA1	0.06	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11RA	0.28	1.06	1.42	1.97	1.06	1.42	1.97

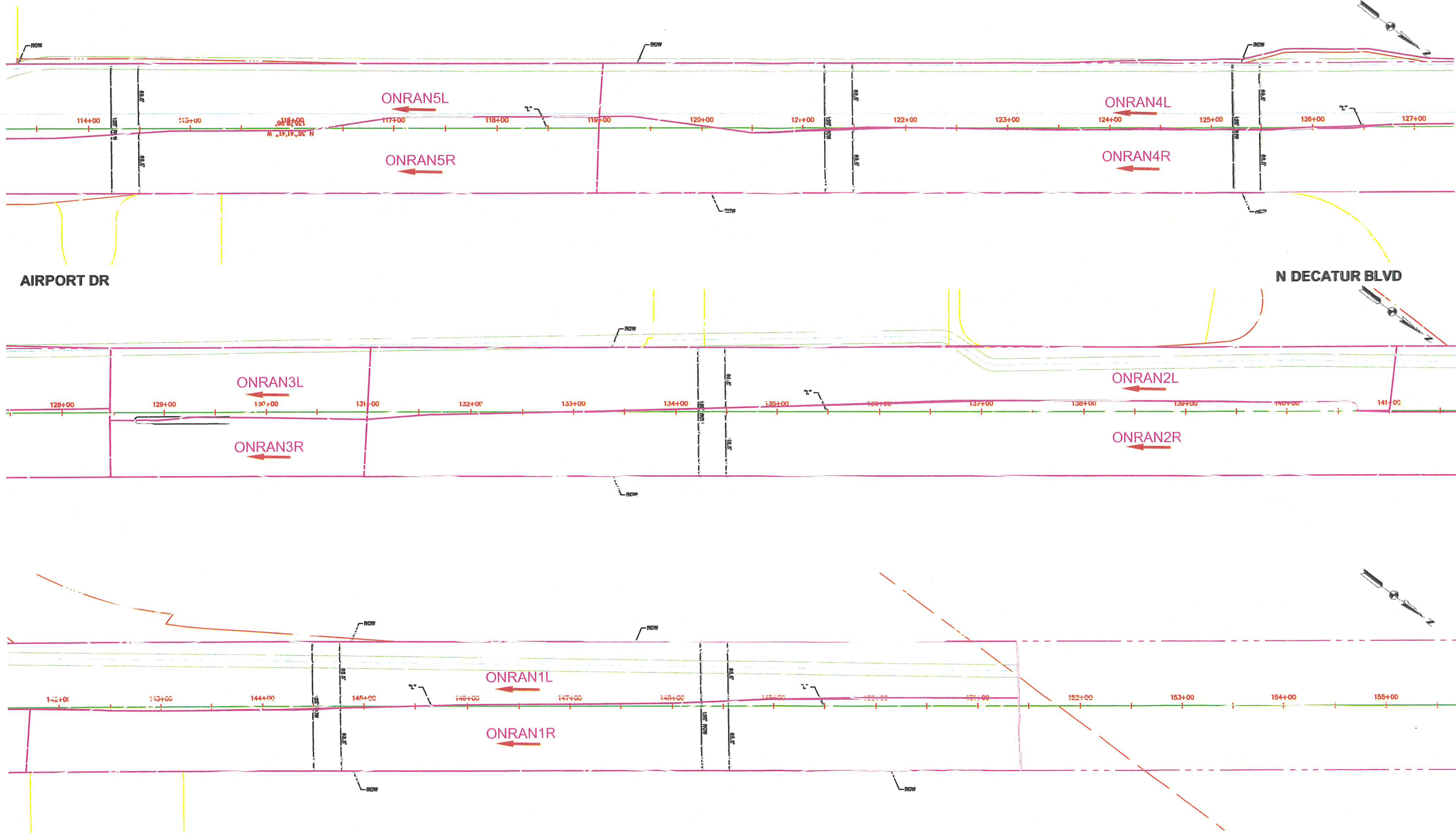
LEGEND:

- SUB-BASIN BOUNDARIES
- ONRAN DRAINAGE BASIN ID
- FLOW DIRECTION



30% SUBMITTAL

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DESIGNED BY: PARSONS BRINCKERHOFF DRAWN BY: 3930 HOWARD HUGHES PARKWAY CHECKED BY: SUITE 300 LAS VEGAS, NEVADA 89169		DEPARTMENT OF PUBLIC WORKS CAPITAL PROJECT MANAGEMENT																														
TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS BONANZA TO DECATUR		SHEET: 3 of 4 DRAWING NO. XXXX																														
ONSITE BASIN EXHIBIT OPTION B		DATE: X/XX/XX																														

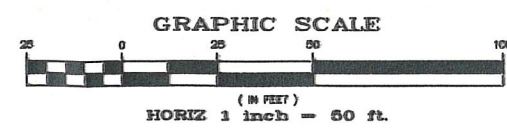


N DECATUR BLVD

Basin Name	Area (ac)	Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
		10-year	25-year	100-year	10-year	25-year	100-year
ONRAN1R	1.43	4.10	5.46	7.51	4.20	5.59	7.72
ONRAN1L	1.43	4.47	5.93	8.26	4.63	6.17	8.58
ONRAN2R	1.65	4.59	6.13	8.38	4.71	6.29	8.64
ONRAN2L	1.32	3.80	5.06	6.96	3.87	5.15	7.11
ONRAN3R	0.32	1.21	1.63	2.25	1.21	1.63	2.25
ONRAN3L	0.40	1.51	2.03	2.81	1.51	2.03	2.81
ONRAN4R	1.37	4.06	5.42	7.50	4.15	5.52	7.67
ONRAN4L	1.32	3.90	5.19	7.16	3.98	5.29	7.34
ONRAN5R	1.11	3.30	4.38	6.07	3.37	4.47	6.22
ONRAN5L	1.14	3.44	4.57	6.35	3.50	4.65	6.47

LEGEND:

- SUB-BASIN BOUNDARIES
- ONRAN DRAINAGE BASIN ID
- FLOW DIRECTION



30% SUBMITTAL

REVISIONS <table border="1"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>																																DESIGNED BY: [blank] DRAWN BY: [blank] CHECKED BY: [blank] DATE: X/XX/XX NO. [blank] DESCRIPTION [blank] APPD [blank]
DEPARTMENT OF PUBLIC WORKS CAPITAL PROJECT MANAGEMENT  PARSONS BRINCKERHOFF 3830 HOWARD HUGHES PARKWAY SUITE 300 LAS VEGAS, NEVADA 89169		TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS BONANZA TO DECATUR SHEET: ONSITE BASIN EXHIBIT OPTION B																														
Sheet		4 of 4 DRAWING NO. XXXX																														

L. Time of Concentration Calculations- Option B



RANCHO DRIVE CAPACITY IMPROVEMENTS- BONANZA TO DECATUR
TIME OF CONCENTRATION CALCULATION - OPTION B CONDITIONS - ON-SITE BASIN MODEL
RATIONAL AND MODIFIED RATIONAL METHODS

31690A
Made by: NA
Date 3/22/2012
Checked by KS
Date: 3/10/2012

Sub-Basin Data	2	P/L	Soil group	4	5	5A	5B	6	7	8	Initial/Overland Time (T _i)				Travel Time (T _t)		13	14	15	16	Tc Check (Urbanized Basins)		18	19
											C _n	K	C _o	K	Area	Area					Lo Initial Length	Slope		
Basin				CN	K			Area	(sq mi)	(ft)	(%)	Rational	(ft)	(ftft)	(fps)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		
ONFRANT1R	P	C	92.00	0.82	0.90	1.43	0.0022	58	2.00	3.07	2.23	976	0.005	1.43	2.16	9.50	1034	15.74	12.57	13	11.73	12		
ONFRANT1L	P	C	92.00	0.82	0.90	1.43	0.0022	54	2.00	2.96	2.15	615	0.005	1.43	2.16	6.72	669	13.72	9.68	10	8.87	9		
ONFRANT1P	P	C	92.00	0.82	0.90	1.65	0.0026	70	2.00	3.37	2.45	1070	0.005	1.43	2.16	10.22	1140	16.33	13.60	14	12.67	13		
ONFRANT2L	P	D	93.00	0.84	0.90	1.32	0.0021	52	2.00	2.77	2.11	1000	0.005	1.43	2.16	9.69	1052	15.84	12.45	12	11.79	12		
ONFRANT3P	P	D	93.00	0.84	0.90	0.32	0.0005	48	2.00	2.49	1.90	250	0.010	2.02	3.08	2.08	282	11.62	4.55	5	3.96	5		
ONFRANT3L	P	D	93.00	0.84	0.90	0.40	0.0006	62	2.00	3.16	2.41	250	0.013	2.29	3.48	1.82	318	11.77	4.96	5	4.23	5		
ONFRANT4P	P	D	93.00	0.84	0.90	1.37	0.0021	60	2.00	2.97	2.27	950	0.006	1.60	2.43	8.29	1010	15.61	11.26	11	10.55	11		
ONFRANT4L	P	D	93.00	0.84	0.90	1.32	0.0021	72	2.00	3.26	2.43	790	0.005	1.43	2.16	8.07	862	14.79	11.32	11	10.55	11		
ONFRANT5P	P	D	93.00	0.84	0.90	1.14	0.0017	48	2.00	2.66	2.03	790	0.005	1.43	2.16	8.07	838	10.73	11	10.09	10			
ONFRANT5L	P	D	93.00	0.84	0.90	0.90	0.0018	46	2.00	2.60	1.98	30	0.005	1.43	2.16	1.05	136	10.76	3.65	5	3.03	5		
ONFRANT6P	P	D	93.00	0.84	0.90	0.20	0.0003	46	2.00	2.60	1.98	30	0.005	1.43	2.16	1.05	136	10.76	3.65	5	3.03	5		
ONFRANT6L	P	D	93.00	0.84	0.90	0.20	0.0003	52	2.00	2.77	2.11	150	0.005	1.43	2.16	1.75	202	11.12	4.62	5	3.96	5		
ONFRANT7P	P	D	93.00	0.84	0.90	0.18	0.0003	52	2.00	2.77	2.11	150	0.005	1.43	2.16	1.75	202	11.12	4.62	5	3.96	5		
ONFRANT7L	P	D	93.00	0.84	0.90	0.90	0.0022	70	2.00	3.21	2.45	942	0.011	2.08	3.15	6.35	1012	15.62	9.56	10	8.79	9		
ONFRANT7R	P	D	93.00	0.84	0.90	1.40	0.0022	70	2.00	3.21	2.45	942	0.011	2.08	3.15	6.35	1012	15.62	9.56	10	8.79	9		
ONFRANT7L	P	D	93.00	0.84	0.90	1.53	0.0024	38	2.00	2.36	1.80	942	0.011	2.12	3.21	6.23	980	15.44	8.59	9	8.03	8		
ONFRANT8L	P	D	93.00	0.84	0.90	0.32	0.0005	66	2.00	3.12	2.38	165	0.012	2.22	3.37	1.24	231	11.28	4.35	5	3.61	5		
ONFRANT9L	P	D	93.00	0.84	0.90	0.28	0.0004	54	2.00	2.82	2.15	165	0.012	2.21	3.35	1.24	219	11.22	4.06	5	3.39	5		
ONFRANT9P	P	D	93.00	0.84	0.90	0.90	0.0022	62	2.00	3.02	2.30	906	0.009	1.89	2.87	6.75	968	15.38	9.78	10	9.06	9		
ONFRANT9L	P	D	93.00	0.84	0.90	1.38	0.0022	62	2.00	3.02	2.30	906	0.009	1.89	2.87	6.75	968	15.38	9.78	10	9.06	9		
ONFRANT9P	P	D	93.00	0.84	0.90	0.90	0.0023	54	2.00	2.82	2.15	922	0.009	1.89	2.87	6.85	976	15.42	9.67	10	9.00	9		
ONFRANT9L	P	D	93.00	0.84	0.90	0.19	0.0003	60	2.00	2.97	2.27	126	0.008	1.81	2.74	1.16	186	11.03	4.13	5	3.43	5		
ONFRANT9P	P	D	93.00	0.84	0.90	0.18	0.0003	62	2.00	3.02	2.30	126	0.008	1.81	2.74	1.16	186	11.04	4.18	5	3.46	5		
ONFRANT9L	P	D	93.00	0.84	0.90	1.62	0.0025	66	2.00	3.12	2.38	1053	0.012	2.21	3.35	6.52	1119	16.22	9.63	10	8.69	9		
ONFRANT10P	P	D	93.00	0.84	0.90	0.90	0.0021	49	2.00	2.69	2.05	970	0.012	2.21	3.35	6.10	1019	15.66	8.79	9	8.15	8		
ONFRANT10L	P	D	93.00	0.84	0.90	1.35	0.0021	49	2.00	2.69	2.05	970	0.012	2.21	3.35	6.10	1019	15.66	8.79	9	8.15	8		
ONFRANT11P	P	D	93.00	0.84	0.90	0.49	0.0008	54	2.00	2.82	2.15	360	0.017	2.61	3.95	2.30	414	12.30	5.12	5	4.45	5		
ONFRANT11L	P	D	93.00	0.84	0.90	0.76	0.0012	46	2.00	2.60	1.98	610	0.017	2.61	3.95	3.66	656	13.64	6.26	6	5.64	6		
ONFRANT11L	L	D	93.00	0.84	0.88	0.88	0.0001	10	2.00	1.21	1.02	366	0.017	1.93	3.83	3.16	376	12.09	4.37	10	4.18	10		
ONFRANT11LA1	L	D	93.00	0.84	0.88	0.88	0.0001	18	2.00	1.63	1.36	372	0.017	1.93	3.83	3.21	390	12.17	4.84	10	4.58	10		
ONFRANT11TRA	P	D	93.00	0.84	0.90	0.28	0.0004	56	2.00	2.87	2.19	166	0.012	2.21	3.35	1.25	222	11.23	4.12	5	3.44	5		
ONFRANT13P	P	D	93.00	0.84	0.90	0.22	0.0003	43	2.00	2.52	1.92	186	0.011	2.09	3.17	1.48	229	11.27	4.00	5	3.40	5		
ONFRANT13L	P	D	93.00	0.84	0.90	0.90	0.0022	48	2.00	2.92	2.23	186	0.011	2.12	3.21	1.46	244	11.36	4.38	5	3.69	5		
ONFRANT14P	P	D	93.00	0.84	0.90	0.27	0.0004	58	2.00	2.92	2.23	186	0.011	2.12	3.21	1.46	244	11.36	4.38	5	3.69	5		
ONFRANT14L	P	D	93.00	0.84	0.90	0.61	0.0010	47	2.00	2.63	2.00	418	0.012	2.21	3.35	3.15	465	12.58	5.78	6	5.15	5		
ONFRANT14P	P	D	93.00	0.84	0.90	0.22	0.0003	63	2.00	3.05	2.30	163	0.012	2.21	3.35	1.23	226	11.26	4.27	5	3.55	5		
ONFRANT14L	L	D	93.00	0.84	0.90	0.38	0.0006	60	2.00	2.97	2.27	265	0.012	2.21	3.35	2.00	325	11.81	4.97	5	4.26	5		
ONFRANT15P	P	D	93.00	0.84	0.90	0.56	0.0009	46	2.00	2.60	1.98	392	0.010	2.04	3.09	3.20	438	12.43	5.80	6	5.19	5		
ONFRANT15L	P	D	93.00	0.84	0.90	0.90	0.0022	66	2.00	3.12	2.38	95	0.010	2.02	3.06	0.78	161	10.69	3.90	5	3.16	5		
ONFRANT15LA	P	D	93.00	0.84	0.90	0.15	0.0002	66	2.00	3.12	2.38	95	0.010	2.02	3.06	0.78	161	10.69	3.90	5	3.16	5		
ONFRANT16P	P	D	93.00	0.84	0.90	0.26	0.0004	52	2.00	2.77	2.11	190	0.010	2.02	3.06	1.57	242	11.34	4.33	5	3.68	5		
ONFRANT16L	P	D	93.00	0.84	0.90	0.90	0.0022	47	2.00	2.63	2.00	587	0.013	2.30	3.49	4.03	634	13.52	6.66	7	6.04	6		
ONFRANT16P	P	D	93.00	0.84	0.90	0.80	0.0013	47	2.00	2.63	2.00	587	0.013	2.30	3.49	4.03	634	13.52	6.66	7	6.04	6		
ONFRANT16L	L	D	93.00	0.84	0.90	0.52	0.0008	48	2.00	2.66	2.03	369	0.014	2.35	3.56	2.62	417	12.32	5.28	5	4.85	5		
ONFRANT16L	P	D	93.00	0.84	0.90	0.90	0.0022	48	2.00	2.66	2.03	369	0.014	2.35	3.56	2.62	417	12.32	5.28	5	4.85	5		
ONFRANT16LA	P	D	93.00	0.84	0.90	0.50	0.0008	47	2.00	2.63	2.00	316	0.013	2.27	3.43	2.32	383	12.02	4.95	5	4.33	5		
ONFRANT16LA	L	D	93.00	0.84	0.90	0.74	0.0012	46	2.00	2.60	1.98	528	0.009	1.92	2.90	4.51	574	13.19	7.11	7	6.49	6		
ONFRANT17P	P	D	93.00	0.84	0.90	0.90	0.0022	44	2.00	2.54	1.94	320	0.009	1.92	2.90	4.51	574	13.18	7.05	7	6.45	6		
ONFRANT17L	P	D	93.00	0.84	0.90	0.90	0.0022	44	2.00	2.54	1.94	320	0.009	1.92	2.90	4.51	574	13.18	7.05	7	6.45	6		
ONFRANT18P	P	D	93.00	0.84	0.90	0.47	0.0007	48	2.00	2.66	2.03	320	0.010	2.06	3.12	2.59	366	12.04	5.25	5	4.61	5		
ONFRANT18L	P	D	93.00	0.84	0.90	0.26	0.0004	59	2.00	2.95	2.25	192	0.010	2.02	3.06									

Page 2 of 3



**RANCHO DRIVE CAPACITY IMPROVEMENTS- BONANZA TO DECATUR
TIME OF CONCENTRATION CALCULATION - OPTION B CONDITIONS - ON-SITE BASIN MODEL
RATIONAL AND MODIFIED RATIONAL METHODS**

31690A
Made by: NA
Date 3/2/2012
Checked by KS
Date: 3/10/2012

Sub-Basin Data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Basin	P/L	Soil group	CN	K	C _u	K	Area	Lo Initial Length	Slope	T _r (Min)	Travel Length	Slope	Velocity V1	Velocity V2	T _r	Total length	T _c check	Used	T _c (Min)
																		Compared	Used
																		T _c (Min)	T _c (Min)
																		Modified Rational	Rational

Equations Used

- 2 P/G Paved or Desert Landscaping- condition of basin
- 4 CN For soil group C, use 92 from CCRFCD, 1999 Table 602, 1 of 4
For soil group D, use 93 from CCRFCD, 1999 Table 602, 1 of 4
- 5A 10-Year Runoff Coefficient, for paved; Use 0.9 from CCRFCD, 1999 - Table 601
- 5 K = 0.0132CN-0.39 From CCRFCD, 1999 - Equation 603
- 5B K Equals C_u From CCRFCD, 1999 Page 605, first paragraph, Table 601 (For Modified Rational Method)
(For Rational Method)
- 10 T_r = 1.49(1.49-K)C_u0.5/S^{0.3} From CCRFCD, 1999 - Equation 602
Lo=500ft-max
- 13 V1 where C= V1=CS^{1/2}
C= 14.80 (for Non-Urbanized Areas)
20.20 (for Urbanized Areas, "Paved") From page 606, paragraph 2, CCRFCD, 1999
- 14 V2 where C= V2=CS^{1/2}
C= 29.40 (for Non-Urbanized Areas)
30.60 (for Urbanized Areas, "paved")
- 15 T_r Length/(Velocity *60) Con.1+ Con.2 (Length-ft; Velocity-fps)
Since Lo is limited to 500ft max, per T_r equation,
T_r for L<= 500ft, use V1 Con. 1
T_r for L >= 500ft, use V2 for L=500 Con. 2
- 17 T_c check T_c=(L/180)+10 From CCRFCD, 1999 - Equation 604
L = Lo + Travel length T_c check is for urbanized areas only
- 18 T_c If T_c check <= T_r+T_r, use T_c check
If T_c check > T_r+T_r, use T_r+T_r
- 19 used T_c If T_c Min for paved/ urbanized areas, is less than 5 min, use 5 min
If T_c Min for unpaved/non-urbanized areas, is less than 10 min, use 10 min
The minimum to recommended for non-urban watersheds is 10 minutes. (CCRFCD, 1999 - Page 605)
The minimum to recommended for urbanized areas is 5 minutes. (CCRFCD, 1999 - Page 606)

M. Runoff Calculations- Option B



**RANCHO DRIVE CAPACITY IMPROVMENTS- BONANZA TO DECATUR
RUNOFF CALCULATIONS - OPTION B CONDITIONS - ON-SITE BASIN MODEL
RATIONAL AND MODIFIED RATIONAL METHODS**

31690A

Made by: NA

Date 3/2/2012

Checked by KS

Date: 3/10/2012

Basin Name	Area (ac)	P/L	Runoff Coef. (C)			T _c (min)		Intensity (in./hr.) Modified Rational			Intensity (in./hr.) Rational			Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
			10-year	25-year	100-year	Modified Rational	Rational	10-year	25-year	100-year	10-year	25-year	100-year	10-year	25-year	100-year	10-year	25-year	100-year
ONRAN1R	1.43	P	0.90	0.92	0.93	12.57	11.73	3.18	4.15	5.65	3.26	4.25	5.80	4.10	5.46	7.51	4.20	5.59	7.72
ONRAN1L	1.43	P	0.90	0.92	0.93	9.68	8.87	3.47	4.51	6.21	3.60	4.69	6.45	4.47	5.93	8.26	4.63	6.17	8.58
ONRAN2R	1.65	P	0.90	0.92	0.93	13.60	12.67	3.09	4.04	5.46	3.17	4.14	5.63	4.59	6.13	8.38	4.71	6.29	8.64
ONRAN2L	1.32	P	0.90	0.92	0.93	12.45	11.79	3.19	4.17	5.67	3.26	4.24	5.79	3.80	5.06	6.96	3.87	5.15	7.11
ONRAN3R	0.32	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.21	1.63	2.25	1.21	1.63	2.25
ONRAN3L	0.40	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.51	2.03	2.81	1.51	2.03	2.81
ONRAN4R	1.37	P	0.90	0.92	0.93	11.26	10.55	3.31	4.30	5.89	3.37	4.38	6.02	4.08	5.42	7.50	4.15	5.52	7.67
ONRAN4L	1.32	P	0.90	0.92	0.93	11.46	10.76	3.29	4.28	5.85	3.35	4.36	5.98	3.90	5.19	7.18	3.98	5.29	7.34
ONRAN5R	1.11	P	0.90	0.92	0.93	11.32	10.55	3.30	4.29	5.88	3.37	4.38	6.02	3.30	4.38	6.07	3.37	4.47	6.22
ONRAN5L	1.14	P	0.90	0.92	0.93	10.73	10.09	3.35	4.36	5.99	3.41	4.43	6.10	3.44	4.57	6.35	3.50	4.65	6.47
ONRAN6R	0.20	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.76	1.02	1.41	0.76	1.02	1.41
ONRAN6L	0.18	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.68	0.91	1.27	0.68	0.91	1.27
ONRAN7R	1.40	P	0.90	0.92	0.93	9.56	8.79	3.49	4.54	6.25	3.61	4.70	6.47	4.40	5.84	8.14	4.55	6.06	8.42
ONRAN7L	1.53	P	0.90	0.92	0.93	8.59	8.03	3.64	4.74	6.53	3.73	4.87	6.69	5.01	6.68	9.29	5.13	6.85	9.52
ONRAN7LA	0.32	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.21	1.63	2.25	1.21	1.63	2.25
ONRAN7RA	0.28	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN8R	1.38	P	0.90	0.92	0.93	9.78	9.06	3.46	4.49	6.19	3.57	4.65	6.39	4.29	5.70	7.94	4.43	5.90	8.21
ONRAN8L	1.44	P	0.90	0.92	0.93	9.67	9.00	3.47	4.51	6.22	3.58	4.66	6.41	4.50	5.98	8.33	4.64	6.17	8.59
ONRAN9R	0.19	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.72	0.96	1.34	0.72	0.96	1.34
ONRAN9L	0.18	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.68	0.91	1.27	0.68	0.91	1.27
ONRAN10R	1.62	P	0.90	0.92	0.93	9.63	8.89	3.48	4.52	6.23	3.59	4.68	6.44	5.07	6.74	9.38	5.24	6.97	9.70
ONRAN10L	1.35	P	0.90	0.92	0.93	8.79	8.15	3.61	4.70	6.47	3.71	4.84	6.66	4.39	5.84	8.12	4.51	6.01	8.36
ONRAN11R	0.49	P	0.90	0.92	0.93	5.12	5.00	4.18	5.50	7.53	4.20	5.52	7.56	1.84	2.48	3.43	1.85	2.49	3.45
ONRAN11L	0.76	P	0.90	0.92	0.93	6.26	5.64	4.01	5.25	7.20	4.10	5.38	7.38	2.74	3.67	5.09	2.81	3.76	5.22
ONRAN11LA	0.06	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11LA1	0.06	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN11RA	0.28	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN13R	0.22	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.83	1.12	1.55	0.83	1.12	1.55
ONRAN13L	0.27	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.02	1.37	1.90	1.02	1.37	1.90
ONRAN14R	0.61	P	0.90	0.92	0.93	5.78	5.15	4.08	5.35	7.34	4.18	5.49	7.52	2.24	3.00	4.16	2.29	3.08	4.26
ONRAN14L	0.22	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.83	1.12	1.55	0.83	1.12	1.55
ONRAN14LA	0.38	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.44	1.93	2.67	1.44	1.93	2.67
ONRAN15R	0.56	P	0.90	0.92	0.93	5.80	5.19	4.08	5.35	7.33	4.17	5.48	7.51	2.05	2.75	3.82	2.10	2.82	3.91
ONRAN15L	0.15	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.57	0.76	1.05	0.57	0.76	1.05
ONRAN15LA	0.26	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.98	1.32	1.83	0.98	1.32	1.83
ONRAN16R	0.80	P	0.90	0.92	0.93	6.66	6.04	3.94	5.16	7.08	4.04	5.30	7.26	2.84	3.80	5.27	2.91	3.90	5.40
ONRAN16L	0.52	P	0.90	0.92	0.93	5.28	5.00	4.16	5.46	7.48	4.20	5.52	7.56	1.95	2.61	3.62	1.97	2.64	3.66
ONRAN16LA	0.50	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.89	2.54	3.52	1.89	2.54	3.52
ONRAN17R	0.74	P	0.90	0.92	0.93	7.11	6.49	3.87	5.06	6.95	3.97	5.20	7.13	2.58	3.45	4.78	2.64	3.54	4.91
ONRAN17L	0.77	P	0.90	0.92	0.93	7.05	6.45	3.88	5.08	6.97	3.98	5.21	7.15	2.69	3.60	4.99	2.75	3.69	5.12
ONRAN18R	0.47	P	0.90	0.92	0.93	5.25	5.00	4.16	5.47	7.49	4.20	5.52	7.56	1.76	2.36	3.27	1.78	2.39	3.30
ONRAN18L	0.26	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.98	1.31	1.82	0.98	1.31	1.82
ONRAN18LA	0.05	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.18	0.25	0.34	0.18	0.25	0.34
ONRAN18LB	0.05	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.19	0.25	0.35	0.19	0.25	0.35
ONRAN19R	0.06	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN19L	0.36	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.36	1.83	2.53	1.36	1.83	2.53
ONRAN20R	0.72	P	0.90	0.92	0.93	8.59	8.03	3.64	4.75	6.53	3.73	4.87	6.69	2.36	3.14	4.37	2.42	3.22	4.48
ONRAN20L	0.61	P	0.90	0.92	0.93	7.97	7.40	3.74	4.88	6.71	3.83	5.00	6.87	2.05	2.74	3.81	2.10	2.81	3.90
ONRAN21R	0.58	P	0.90	0.92	0.93	7.60	6.99	3.79	4.96	6.81	3.89	5.09	6.99	1.98	2.65	3.67	2.03	2.72	3.77
ONRAN21L	0.50	P	0.90	0.92	0.93	7.23	6.69	3.85	5.04	6.92	3.94	5.15	7.07	1.73	2.32	3.22	1.77	2.37	3.29
ONRAN22R	0.51	P	0.90	0.92	0.93	8.56	7.98	3.65	4.75	6.54	3.74	4.88	6.70	1.67	2.23	3.10	1.71	2.29	3.18
ONRAN22L	0.45	P	0.90	0.92	0.93	7.42	6.83	3.82	5.00	6.87	3.92	5.13	7.04	1.55	2.07	2.87	1.59	2.12	2.94
ONRAN23R	0.58	P	0.90	0.92	0.93	8.20	7.57	3.70	4.83	6.64	3.80	4.97	6.82	1.93	2.58	3.58	1.98	2.65	3.68



**RANCHO DRIVE CAPACITY IMPROVMENTS- BONANZA TO DECATUR
RUNOFF CALCULATIONS - OPTION B CONDITIONS - ON-SITE BASIN MODEL
RATIONAL AND MODIFIED RATIONAL METHODS**

31690A

Made by: NA

Date 3/2/2012

Checked by KS

Date: 3/10/2012

Basin Name	Area (ac)	P/L	Runoff Coef. (C)			T _c (min)		Intensity (in./hr.) Modified Rational			Intensity (in./hr.) Rational			Discharge (Q) cfs (Modified Rational)			Discharge (Q) cfs (Rational)		
			10-year	25-year	100-year	Modified Rational	Rational	10-year	25-year	100-year	10-year	25-year	100-year	10-year	25-year	100-year	10-year	25-year	100-year
ONRAN22LA	0.11	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.43	0.58	0.80	0.43	0.58	0.80
ONRAN24L	0.41	P	0.90	0.92	0.93	5.74	5.15	4.08	5.36	7.35	4.18	5.49	7.52	1.51	2.02	2.80	1.54	2.07	2.87
ONRAN23L	0.64	P	0.90	0.92	0.93	7.49	6.93	3.81	4.98	6.84	3.90	5.11	7.01	2.20	2.93	4.07	2.25	3.01	4.17
ONRAN24R	0.32	P	0.90	0.92	0.93	5.64	5.11	4.10	5.38	7.38	4.18	5.50	7.53	1.18	1.58	2.20	1.20	1.62	2.24
ONRAN25R	0.21	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.79	1.07	1.48	0.79	1.07	1.48
ONRAN25L	0.25	P	0.90	0.92	0.93	5.46	5.00	4.13	5.42	7.43	4.20	5.52	7.56	0.93	1.25	1.73	0.95	1.27	1.76
ONRAN26R	0.24	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN26L	0.46	P	0.90	0.92	0.93	6.78	6.14	3.92	5.14	7.05	4.02	5.27	7.23	1.62	2.17	3.02	1.67	2.23	3.09
ONRAN26RA	0.06	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN27R	0.47	P	0.90	0.92	0.93	7.38	6.82	3.83	5.01	6.87	3.92	5.13	7.04	1.63	2.18	3.03	1.67	2.24	3.10
ONRAN27L	0.42	P	0.90	0.92	0.93	6.41	5.80	3.98	5.22	7.16	4.08	5.35	7.33	1.51	2.02	2.80	1.54	2.07	2.86
ONRAN27LA	0.13	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.49	0.66	0.91	0.49	0.66	0.91
ONRAN28R	0.34	P	0.90	0.92	0.93	5.02	5.00	4.20	5.52	7.55	4.20	5.52	7.56	1.28	1.73	2.39	1.29	1.73	2.39
ONRAN28L	0.06	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.23	0.30	0.42	0.23	0.30	0.42
ONRAN28LA	0.10	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.38	0.51	0.70	0.38	0.51	0.70
ONRAN29R	0.16	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.60	0.81	1.12	0.60	0.81	1.12
ONRAN29L	0.31	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.17	1.57	2.18	1.17	1.57	2.18
ONRAN30R	0.17	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.64	0.86	1.20	0.64	0.86	1.20
ONRAN30L	0.28	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.06	1.42	1.97	1.06	1.42	1.97
ONRAN31R	0.24	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.91	1.22	1.69	0.91	1.22	1.69
ONRAN31RA	0.02	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.06	0.08	0.11	0.06	0.08	0.11
ONRAN31L	0.42	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.59	2.13	2.95	1.59	2.13	2.95
ONRAN32R	0.82	P	0.90	0.92	0.93	7.56	6.86	3.80	4.97	6.83	3.91	5.12	7.02	2.81	3.75	5.21	2.89	3.86	5.36
ONRAN32L	0.63	P	0.90	0.92	0.93	6.92	6.31	3.90	5.11	7.01	4.00	5.24	7.18	2.21	2.96	4.11	2.27	3.04	4.21
ONRAN32LA	0.14	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.42	0.55	0.76	0.42	0.55	0.76
ONRAN33LA1	0.06	L	0.88	0.88	0.89	10.00	10.00	3.42	4.44	6.12	3.42	4.44	6.12	0.18	0.23	0.33	0.18	0.23	0.33
ONRAN33R	0.66	P	0.90	0.92	0.93	7.09	6.44	3.88	5.07	6.96	3.98	5.21	7.15	2.30	3.08	4.27	2.36	3.16	4.39
ONRAN33LA	0.39	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	1.47	1.98	2.74	1.47	1.98	2.74
ONRAN34L	0.16	P	0.90	0.92	0.93	5.00	5.00	4.20	5.52	7.56	4.20	5.52	7.56	0.60	0.81	1.12	0.60	0.81	1.12
ONRAN34R	0.37	P	0.90	0.92	0.93	5.44	5.00	4.13	5.42	7.43	4.20	5.52	7.56	1.38	1.85	2.56	1.40	1.88	2.60
ONRAN34LA	0.52	P	0.90	0.92	0.93	6.18	5.51	4.02	5.27	7.22	4.12	5.41	7.42	1.88	2.52	3.49	1.93	2.59	3.59

Appendix C

- A. Meeting Minutes
- B. Utility Matrix
- C. As-built- Rancho Drive Drainage Improvement Plans- Phase II (CLV # 103408)

A. Meeting Minutes

Meeting Minutes

April 19, 2012

Time/ Place: April 19, 2012 10:00 a.m.
Granite Conference Room
City of Las Vegas Public Works

Attendance: Michael Sturdivant, City of Las Vegas
Jeremy Leavitt, City of Las Vegas
Gina Venglass, City of Las Vegas
Oh-sang Kwon, City of Las Vegas
Peter Jackson, Flood Control
James Marrs, PB
Kamkshi Sistla, PB
Nick Appuglise, PB
Dan Bender, Stanley Consultants

Subject: Rancho Drive (South)- Decatur to Bonanza , Drainage concept
Meeting

City of Las Vegas, PB and Stanley Consulting met to finalize the drainage analysis approach for the technical drainage report submittal. The purpose of the meeting was to establish a consistent approach for both projects prior to submittal to NDOT for review.

The following four (4) conditions are to be developed in the performance of the drainage analysis:

1. Existing Condition Analysis - Verify NDOT's 100-yr criteria for offsite flows. This will be the base line for comparison against the interim condition analysis (#2) below.
2. Interim Condition Analysis - Verify NDOT's 100-yr criteria for offsite flows for project improvement options A & B
 - a. If Interim Condition is worse than Existing condition, propose a system to bring down the excess depth of water to match the Existing Condition
3. Interim Condition Analysis - Verify NDOT's 25-yr criterion for onsite flows for Options A & B
 - a. If NDOT's 25-yr criterion is not met, propose a system to meet the criteria.
4. Ultimate Condition Analysis- Verify RTC's 10-yr and 100-yr criteria for onsite flows, for Options A & B, with all future MPU facilities in place.
 - a. If RTC's 10-yr or 100-yr criteria are not met, propose a system to meet each of the criteria.

B. Utility Matrix

RANCHO DRIVE CAPACITY IMPROVEMENTS- BONANZA TO DECATUR UTILITY MATRIX

TITLE	FIRST NAME	LAST NAME	COMPANY	ADDRESS	CITY, STATE	ZIP	PHONE
Mr. Ms.	Bob Linda	Middag Pistone	Southwest Gas Corporation	6355 Shatz Street	North Las Vegas, NV	89115	(702) 365-2071 702-365-2165
Ms.	Lisa Debbie Don	Harvey Lamm Jackson	Nevada Energy Transmission Nevada Energy Distribution	7155 Lindell Road	Las Vegas, NV	89118	(702) 402-5327 702-402-6811 (702) 402-6815
Mr.	Steven	Jackson	Las Vegas Valley Water District	1001 S. Valley View Blvd.	Las Vegas, NV	89153	
Mr.	Doney Dan	Villareal Defiesta	Cox Communications	1700 Vegas Drive	Las Vegas, NV	89106	(702) 210-5985 702-384-8084; Ext 8276
Mr.	Tim	Parks	CLV Collection Systems Planning (Sanitary Sewer)	333 N. Rancho Dr	Las Vegas, NV	89106	(702) 229-2178
Ms.	Kathleen	Minert	Clark County Water Reclamation District	5857 East Flamingo Road	Las Vegas, NV	89122	(702) 434-6600
Mr.	Peter	Jackson	City of Las Vegas, Flood Control	333 N. Rancho Dr	Las Vegas, NV	89106	(702) 229-1815
Mrs.	Steven	Turner	Centurylink	6700 Via Austi Pkwy	Las Vegas, NV	89119	(702) 244-7883
Ms. Mr.	Eric Gwen	Haught Matsuo	Southern Nevada Water Authority City of North Las Vegas	100 City Pkwy	Las Vegas, NV	89101	702-862-3459 702-822-3372
Ms.	Sara	Martel	NDOT	1263 South Stewart Street, Room 013,	Carson City, NV	89712	775-888-7115

C. As-built- Rancho Drive Drainage Improvement Plans- Phase II
(CLV # 103408)

Appendix D-Hydraulics (Spreadsheets)

A. Existing Condition

A-1: East side

Street Flow Capacity – On-site (Rational) 100-year East
Drop Inlet Analysis – On-site (Rational) 100-year East

A-2: West side

Street Flow Capacity – Off-site 100-year West
Drop Inlet Analysis – Off-site 100-year West

B. Interim Condition: NDOT 100 yr Flows

B-1: East side

Street Flow Capacity – NDOT 100-year Option A East
Drop Inlet Analysis – NDOT 100-year Option A East
Street Flow Capacity – NDOT 100-year Option B East
Drop Inlet Analysis – NDOT 100-year Option B East

B-2: West side

Street Flow Capacity – NDOT 100-year Option A West
Drop Inlet Analysis – NDOT 100-year Option A West
Street Flow Capacity – NDOT 100-year Option B West
Drop Inlet Analysis – NDOT 100-year Option B West

C. Interim Condition: NDOT 25 yr Flows

C-1: East side

Street Flow Capacity – NDOT 25-year Option A East
Drop Inlet Analysis – NDOT 25-year Option A East
Street Flow Capacity – NDOT 25-year Option B East
Drop Inlet Analysis – NDOT 25-year Option B East

C-2: West side

Street Flow Capacity – NDOT 25-year Option A West
Drop Inlet Analysis – NDOT 25-year Option A West
Street Flow Capacity – NDOT 25-year Option B West
Drop Inlet Analysis – NDOT 25-year Option B West

D. Ultimate Condition: RTC 10 yr and 100 yr Flows

D-1: East side

Street Flow Capacity – RTC 10-year Option A East
Street Flow Capacity – RTC 100-year Option A East
Drop Inlet Analysis – RTC 10-year and 100-year Option A East
Street Flow Capacity – RTC 10-year Option B East
Street Flow Capacity – RTC 100-year Option B East
Drop Inlet Analysis – RTC 10-year and 100-year Option B East

D-2: West side

Street Flow Capacity – RTC 10-year Option A West
Street Flow Capacity – RTC 100-year Option A West
Drop Inlet Analysis – RTC 10-year and 100-year Option A West
Street Flow Capacity – RTC 10-year Option B West
Street Flow Capacity – RTC 100-year Option B West
Drop Inlet Analysis – RTC 10-year and 100-year Option B West

E. Normal Depth Calculations

F. Pipe Capacity calculations

G. Quantity and Cost Estimate

A. Existing Condition

A-1: East Side

EXISTING CONDITION

Street Flow Capacity-NDOT 100-year East

			Discharge : Calculated by FM				Normal Depth: D _{Q100} Calculated by FM					
Cross-Section	Street Location	Slope (%)	100-Year Flow Capacity					100-Year Flow Capacity (on-site Rational flow) D X V < 8 & D _{Q100} < 2 Criteria for NDOT				
			D _{max} (ft)	V (fps)	DxV _{max}	Q _{max} (cfs)	Q ₁₀₀ (cfs)	D _{Q100}	V _{Q100}	DQ100 x VQ100	D _{Q100} x V _{Q100} < 8 (Met/Not met)	D _{Q100} < 2 (Met/ Not met)
"L" 112+00	North of Smoke Ranch	0.30	1.69	4.75	8.00	195.60	13.89	0.63	2.45	1.54	Met	Met
"L" 100+00	North of Lake Mead	1.81	0.98	8.13	8.00	137.05	9.95	0.34	4.03	1.37	Met	Met
"L" 98+80	North of Lake Mead	0.74	1.20	6.67	8.00	212.69	10.56	0.37	2.74	1.01	Met	Met
"L" 78+25	North of Coran	1.39	1.00	7.91	7.91	211.74	19.98	0.40	4.12	1.65	Met	Met
"L" 65+08	South of Spring	2.38	0.97	8.23	7.98	92.86	29.24	0.67	5.53	3.71	Met	Met
"L" 49+96	South of Melody	0.89	1.09	7.32	7.98	190.91	36.03	0.60	4.14	2.48	Met	Met
"L" 46+93	South of Melody	1.07	1.19	6.60	7.85	127.52	31.55	0.60	4.52	2.71	Met	Met
"L" 46+16	South of Melody	1.15	1.00	7.95	7.95	187.45	24.35	0.48	4.04	1.94	Met	Met
"L" 39+75	South of Vegas	1.15	1.33	5.99	7.97	127.92	28.41	0.72	5.26	3.79	Met	Met
"L" 12+10	South of Vegas	0.70	1.14	6.92	7.89	184.63	40.40	0.65	5.45	3.54	Met	Met
"4" 16+47	South of Washington	0.50	1.38	5.79	7.99	211.65	34.54	0.71	3.48	2.47	Met	Met
"4" 14+96	South of Washington	0.88	1.15	6.92	7.96	211.94	28.02	0.55	3.89	2.14	Met	Met
"4" 13+80	South of Washington	0.88	1.17	6.72	7.86	199.05	22.52	0.52	3.76	1.96	Met	Met
"4" 11+83	South of Washington	0.60	1.24	6.41	7.95	180.66	18.32	0.53	3.14	1.66	Met	Met
"4" 6+76	South of Washington	0.50	1.41	5.63	7.94	212.48	18.24	0.57	2.98	1.70	Met	Met
"C" 3+50	South of Washington	0.66	1.28	6.19	7.92	298.96	17.16	0.44	2.93	1.29	Met	Met

EXISTING CONDITION

Drop Inlet Analysis-NDOT 100-yr East

DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 100-yr Bypass Q (cfs)	100-Year (onsite Rational)					
				Gutter Flow- Half Street (cfs)	100 yr Criteria Half Street (cfs)	Analysis (Need DI/ DI not needed)	DI Length (ft)	Intercept Flow (cfs)	Bypass Flow (cfs)
"L" 98+80	"L" 100-00 + 0.3*ONRAN7RA	"L" 100+00	9.95	10.56	212.69	DI not needed	3.00	3.74	6.86
"L" 65+08	bypass from x-section "L" 78+25+ ONRAN11R+ONRAN11RA+ONRAN13R+ ONRAN14R	"L" 78+25	19.98	29.24	92.86	DI not needed	3.00	7.43	21.81
"L" 49+96	bypass from DI @ "L" 65+08+ORAN15R+ONRAN16R+ ONRAN17R	"L" 65+08	21.81	36.03	190.91	DI not needed	3.00	7.78	28.25
"L" 46+93	bypass from DI @ "L" 49+96 +ONRAN18R	"L" 49+96	28.25	31.55	127.52	DI not needed	3.00	7.07	23.93
"L" 46+16	bypass from DI @ "L" 46+93 +ONRAN19R	"L" 46+93	23.93	24.35	187.45	DI not needed	3.00	6.23	18.12
"L" 39+75	bypass from DI @ 46+16+ ONRAN21R	"L" 46+16	18.12	28.41	127.92	DI not needed	3.00	6.86	21.55
"L" 12+10	bypass from DI @ "L" 39+75+ ONRAN22R, 23R, 24R, 25R, 26RA, 27R	"L" 39+75	21.55	40.40	184.63	DI not needed	3.00	8.25	32.15
"4" 16+47	bypass from DI @ "L" 12+10+ ONRAN28R	"L" 12+10	32.15	34.54	184.63	DI not needed	3.00	7.49	27.04
"4" 14+96	bypass from DI @ "4" 16+47+ ONRAN29R	"4" 16+47	27.04	28.02	211.65	DI not needed	3.00	6.70	21.32
"4" 13+80	bypass from DI @ "4" 14+96 + ONRAN30R	"4" 14+96	21.32	22.52	211.94	DI not needed	3.00	5.89	16.63
"4" 11+83	bypass from DI @ "4" 13+80 + ONRAN31R	"4" 13+80	16.63	18.32	199.05	DI not needed	3.00	5.15	13.17
"4" 6+76	bypass from DI @ "4" 11+83 + ONRAN32R+ONRAN32RA	"4" 11+83	13.17	18.24	180.66	DI not needed	3.00	5.13	13.11
"C" 3+50	bypass from DI @ "C" 3+50 ONRAN33R	"C" 3+50	13.11	17.16	212.48	DI not needed	3.00	4.96	12.20

A-2: West Side

EXISTING CONDITION

Street Flow Capacity-Off-site 100-year West

Cross-Section	Street Location	Slope (%)	Discharge : Calculated by FM					Normal Depth: D_{Q100} Calculated by FM				
			100-Year Flow Capacity					100-Year Flow Capacity (HEC-1 Off-site flow) $D \times V < 8$ & $D_{Q100} < 2$ Criteria for NDOT				
			D_{max} (FT)	V (FPS)	$D \times V_{max}$	Q_{max} (CFS)	Q_{100} (CFS)	D_{Q100}	V_{Q100}	$D_{Q100} \times V_{Q100}$	$D_{Q100} \times V_{Q100} < 8$ (Met/Not Met)	$D_{Q100} < 2$ (Met/Not Met)
"L" 144+00	Peak System	0.50	1.42	5.59	7.94	241.21	347.00	1.02	5.03	5.13	Met	Met
"L" 112+00	North of Smoke Ranch	0.30	1.44	5.51	7.93	330.26	244.33	1.26	4.90	6.17	Met	Met
"L" 100+00 ¹	North of Lake Mead	1.81	0.97	8.21	7.96	242.39	10.92	0.43	3.78	1.63	Met	Met
"L" 92+86	South of Lake Mead	0.80	1.17	6.74	7.89	218.02	41.40	0.72	4.66	3.36	Met	Met
"L" 84+00	South of Lake Mead	1.49	1.04	7.57	7.87	88.95	108.19	1.13	7.70	8.70	Not Met	Met
"L" 79+00	North of Coran	1.39	0.99	7.95	7.87	299.23	142.72	1.04	7.35	7.64	Met	Met
"L" 77+20	South of Coran	1.36	1.18	6.75	7.97	202.12	142.72	1.04	7.35	7.64	Met	Met
"L" 75+05	South of Coran	1.63	1.01	7.88	7.96	126.13	154.13	1.09	8.28	9.03	Not Met	Met
"L" 72+91	South of Coran	1.76	0.98	8.05	7.89	148.69	162.57	1.01	8.27	8.35	Not Met	Met
"L" 71+21	South of Coran	1.47	1.01	7.79	7.87	161.02	167.90	1.02	7.92	8.08	Not Met	Met
"L" 69+47	South of Coran	1.04	1.16	6.82	7.91	187.36	173.57	1.13	6.62	7.48	Met	Met
"L" 67+75	South of Spring	0.82	1.19	6.66	7.93	160.32	179.70	1.24	6.96	8.63	Not Met	Met
"L" 65+08	South of Spring	2.38	0.80	9.87	7.90	243.61	224.87	0.77	9.57	7.37	Met	Met
"L" 64+09	South of Spring	0.96	1.25	6.33	7.91	164.86	203.43	1.32	6.87	9.07	Not Met	Met
"L" 62+15	South of Melody	1.34	1.03	7.70	7.93	157.56	195.16	1.11	8.37	9.29	Not Met	Met
"L" 58+47	South of Melody	1.63	1.15	6.95	7.99	105.17	208.76	1.37	9.10	12.47	Not Met	Met
"L" 55+26	South of Melody	0.50	1.32	6.06	8.00	289.01	218.16	1.19	5.42	6.45	Met	Met
"L" 49+96	South of Melody	0.89	1.16	6.83	7.92	159.22	216.78	1.29	7.71	9.95	Not Met	Met
"L" 48+16	South of Melody	0.70	1.22	6.54	7.98	186.24	234.56	1.27	7.70	9.78	Not Met	Met
"L" 47+81	South of Melody	1.18	1.11	7.17	7.96	170.68	89.43	0.87	6.10	5.31	Met	Met
"L" 47+49	South of Melody	1.07	1.11	7.21	8.00	194.55	28.59	0.59	4.50	2.66	Met	Met
"L" 39+75	South of Vegas	1.15	1.07	7.41	7.93	156.81	36.20	0.63	4.85	3.06	Met	Met
"L" 35+04	South of Vegas	1.15	1.02	7.83	7.99	175.85	53.04	0.73	5.34	3.90	Met	Met
"L" 30+34	South of Vegas	0.30	1.64	4.83	7.92	257.13	68.75	1.16	2.87	3.33	Met	Met
"L" 25+01	South of Vegas	0.65	1.33	6.02	8.01	188.16	81.65	1.06	4.33	4.59	Met	Met
"L" 19+64	South of Vegas	0.48	1.28	6.23	7.97	257.83	138.30	1.00	4.88	4.88	Met	Met
"L" 16+09	South of Vegas	0.50	1.31	6.04	7.91	181.69	151.30	1.25	5.87	7.34	Met	Met
"L" 12+76	South of Vegas	0.70	1.16	6.85	7.95	243.52	157.73	0.98	5.77	5.65	Met	Met
"L" 11+00	South of Washington	0.60	1.19	6.67	7.94	236.11	130.73	0.94	5.29	4.97	Met	Met
"L" 10+38	South of Washington	0.60	1.43	5.55	7.94	160.47	115.99	1.29	5.12	6.60	Met	Met
"4" 15+39	South of Washington	0.82	1.16	6.90	8.00	168.25	60.82	0.81	4.85	3.93	Met	Met
"4" 14+00	South of Washington	0.88	1.10	7.22	7.94	178.64	35.58	1.10	7.22	7.94	Met	Met
"4" 11+76	South of Washington	0.80	1.12	7.08	7.93	239.53	28.31	0.52	3.56	1.85	Met	Met
"4" 7+04	South of Washington	0.50	1.34	5.94	7.96	233.17	20.82	0.56	2.95	1.65	Met	Met
"C" 3+22	South of Washington	0.66	1.31	6.05	7.93	170.01	15.12	0.53	3.27	1.73	Met	Met

¹Q100- Onsite basins dictate- NDOT's 100yr flow is considered instead of HEC-1 offsite flow;

EXISTING CONDITION

Drop Inlet Analysis-off-site100-year West

DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 100-yr Bypass Q (CFS)	100-Year					Does DI need to be extended based on bypass flow 100-yr	
				Gutter Flow- Half Street (CFS)	100 yr Criteria Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)		Bypass Flow (CFS)
"L" 92+86, 56.76' LT	490 LF of LM09	N/A	N/A	41.40	218.02	DI not needed	3.00	8.41	32.99	
"L" 84+00, 57.02' LT	890 LF of LM09	"L" 92+86, 56.76' LT	32.99	108.19	88.95	Need DI	3.00	17.87	90.32	Extend DI
"L" 77+20, 48.97' LT	620 LF of LM09	"L" 84+00, 57.02' LT	90.32	142.72	202.12	DI not needed	3.00	18.69	124.03	OK
"L" 75+05, 48.01' LT	215 LF of VG21	"L" 77+20, 48.97' LT	124.03	154.13	126.13	Need DI	3.00	21.66	132.47	Extend DI
"L" 72+91, 47.92' LT	215 LF of VG21	"L" 75+05, 48.01' LT	132.47	162.57	148.69	Need DI	3.00	18.47	144.10	OK
"L" 71+21, 48.04' LT	170 LF of VG21	"L" 72+91, 47.92' LT	144.10	167.90	161.02	Need DI	3.00	19.53	148.37	OK
"L" 69+47, 48.08' LT	180 LF of VG21	"L" 71+21, 48.04' LT	148.37	173.57	187.36	DI not needed	3.00	19.07	154.50	OK
"L" 67+75, 48.02' LT	140 LF of VG2C	"L" 69+47, 48.08' LT	154.50	179.70	160.32	Need DI	3.00	19.83	159.87	OK
"L" 65+08, 48.24' LT	260 LF of VG2C	"L" 67+75, 48.02' LT	159.87	224.87	243.61	DI not needed	3.00	16.27	163.43	OK
"L" 64+09, 48.15' LT	160 LF of VG2C	"L" 65+08, 48.24' LT	163.43	203.43	164.86	Need DI	3.00	21.27	182.16	Extend DI
"L" 62+15, 48.24' LT	145 LF of VG22	"L" 64+09, 48.15' LT	182.16	195.16	157.56	Need DI	3.00	19.70	175.46	Extend DI
"L" 58+47, 48.24' LT	370 LF of VG22	"L" 62+15, 48.24' LT	175.46	208.76	105.17	Need DI	3.00	19.40	189.36	Extend DI
"L" 55+26, 56.61' LT	320 LF of VG22	"L" 58+47, 48.24' LT	189.36	218.16	289.01	DI not needed	4'x4'	49.98	168.18	OK
"L" 49+96, 47.95' LT	530 LF of VG22	"L" 55+26, 56.61' LT	168.18	216.78	159.22	Need DI	3.00	25.02	191.76	Extend DI
"L" 48+16, 47.37' LT	475 LF of VG22	"L" 49+96, 47.95' LT	191.76	234.56	186.24	Need DI	21.00	145.13	89.43	OK
"L" 47+81, 46.43' LT	Bypass from "L" 47+81, 46.43' LT	"L" 48+16, 47.37' LT	89.43	89.43	170.68	DI not needed	21.00	60.84	28.59	OK
"L" 47+49, 45.49' LT	Bypass from "L" 47+49, 45.49' LT	"L" 47+81, 46.43' LT	28.59	28.59	194.55	DI not needed	21.00	22.09	6.50	OK
"L" 39+75, 42.19' LT	540 LF of WA13	"L" 47+49, 45.49' LT	6.50	36.20	156.81	DI not needed	3.00	8.96	27.24	OK
"L" 35+04, 42.12' LT	470 LF of WA13	"L" 39+75, 42.19' LT	27.24	53.04	175.85	DI not needed	3.00	10.09	42.95	OK
"L" 30+34, 42.41' LT	470 LF of WA13	"L" 35+04, 42.12' LT	42.95	68.75	257.13	DI not needed	3.00	16.10	52.65	OK
"L" 25+01, 42.19' LT	530 LF of WA13	"L" 30+34, 42.41' LT	52.65	81.65	188.16	DI not needed	3.00	12.10	69.55	OK
"L" 19+64, 42.17' LT	1250 LF of WA13	"L" 25+01, 42.19' LT	69.55	138.30	257.83	DI not needed	3.00	16.50	121.80	OK
"L" 16+09, 42.17' LT	360 LF of WA14	"L" 19+64, 42.17' LT	121.80	151.30	181.69	DI not needed	3.00	20.57	130.73	OK
"L" 12+76, 41.85' LT	330 LF of WA14	"L" 16+09, 42.17' LT	130.73	157.73	243.52	DI not needed	3.00	141.11	55.83	OK
"L" 11+00, 44.40' LT	Bypass from "L" 12+76, 41.85' LT	"L" 12+76, 41.85' LT	55.83	130.73	236.11	DI not needed	3.00	14.74	115.99	OK
"L" 10+38, 56.68' LT	Bypass from "L" 11+00, 44.40' LT	"L" 11+00, 44.40' LT	115.99	115.99	160.47	DI not needed	20.00	83.29	32.70	OK
"4" 15+39, 64.12' LT	190 LF of WA11-C	"L" 10+38, 56.68' LT	32.70	60.82	168.25	DI not needed	20.00	45.94	14.88	OK
"4" 14+00, 64.26' LT	140 LF of WA11-C	"4" 15+39, 64.12' LT	14.88	35.58	178.64	DI not needed	20.00	27.97	7.61	OK
"4" 11+76, 64.29' LT	260 LF of WA11-C	"4" 14+00, 64.26' LT	7.61	28.31	239.53	DI not needed	3.00	7.49	20.82	OK
"4" 7+04, 74.17' LT	Bypass from "4" 11+76, 64.29' LT	"4" 11+76, 64.29' LT	20.82	20.82	233.17	DI not needed	3.00	5.70	15.12	OK
"C" 3+22, 26.36' LT		"4" 7+04, 74.17' LT	15.12	15.12	170.01	DI not needed	10.00	8.70	6.42	OK

B. Interim Condition- NDOT 100 yr Flows

B-1: East Side

INTERIM CONDITION												
Street Flow Capacity-NDOT 100-year East Option A												
			Discharge: Calculated by FM				Normal Depth: D_{Q100} Calculated by FM					
Cross-Section	Street Location	Slope (%)	100-Year Flow Capacity					$D \times V < 8$ & $D_{Q100} < 2$ Criteria for RTC				
			D_{max} (ft)	V (fps)	$D \times V_{max}$	Q_{max} (CFS)	Q_{100} (CFS)	D_{Q100}	V_{Q100}	$D_{Q100} \times V_{Q100}$	$D_{Q100} \times V_{Q100} < 8$ (Met/Not Met)	$D_{Q100} < 2$ (Met/Not Met)
"L" 112+00	North of Smoke Ranch	0.30	1.70	4.88	8.30	199.94	24.77	0.83	2.77	2.30	Met	Met
"L" 100+00	North of Lake Mead	1.81	1.01	7.88	7.96	95.34	9.95	0.63	2.28	1.44	Met	Met
"L" 98+80	North of Lake Mead	0.74	1.25	6.66	8.33	217.29	10.56	0.54	2.78	1.50	Met	Met
"L" 78+25	North of Coran	1.39	1.01	7.76	7.84	197.38	21.41	0.50	4.01	2.01	Met	Met
"L" 65+08	South of Spring	2.38	0.86	9.27	7.97	206.24	32.63	0.49	5.10	2.50	Met	Met
"L" 65+08 D/S of DI	South of Spring	2.38	0.86	9.27	7.97	206.24	22.02	0.44	4.62	2.03	Met	Met
"L" 49+96	South of Melody	0.89	1.10	7.21	7.93	176.19	36.24	0.66	3.96	2.61	Met	Met
"L" 49+96 D/S of DI	South of Melody	0.89	1.10	7.21	7.93	176.19	1.62	0.26	1.85	0.48	Met	Met
"L" 46+93	South of Melody	1.07	1.09	7.27	7.92	155.98	4.92	0.37	2.75	1.02	Met	Met
"L" 46+16	South of Melody	1.15	1.01	7.77	7.85	174.71	2.99	0.29	2.29	0.66	Met	Met
"L" 39+75	South of Vegas	1.15	0.93	8.52	7.92	215.08	5.75	0.26	2.04	0.53	Met	Met
"L" 39+75 D/S of DI	South of Vegas	1.15	0.93	8.52	7.92	215.08	0.55	0.17	1.09	0.19	Met	Met
"L" 12+10	South of Vegas	0.70	1.16	6.84	7.93	179.96	19.90	0.56	3.08	1.72	Met	Met
"L" 12+10 D/S of DI	South of Vegas	0.70	1.16	6.84	7.93	179.96	1.12	0.25	1.53	0.38	Met	Met
"4" 16+47	South of Washington	0.50	1.44	5.55	7.99	215.99	2.67	0.35	1.80	0.63	Met	Met
"4" 14+96	South of Washington	0.88	1.25	6.37	7.96	159.75	2.27	0.31	2.22	0.69	Met	Met
"4" 13+80	South of Washington	0.88	1.18	6.69	7.89	191.76	2.06	0.45	2.03	0.91	Met	Met
"4" 11+83	South of Washington	0.60	1.25	6.34	7.93	176.75	2.42	0.32	1.84	0.59	Met	Met
"4" 6+76	South of Washington	0.50	1.32	6.00	7.92	177.12	6.69	0.45	2.24	1.01	Met	Met
"4" 6+76 D/S of DI	South of Washington	0.50	1.32	6.00	7.92	177.12	1.28	0.28	1.50	0.42	Met	Met
"C" 3+50	South of Washington	0.66	1.16	6.83	7.92	198.87	6.46	0.38	2.17	0.82	Met	Met
"C" 3+50 D/S of DI	South of Washington	0.66	1.16	6.83	7.92	198.87	0.80	0.20	1.32	0.26	Met	Met

INTERIM CONDITION

Drop Inlet Analysis-NDOT 100-year East Option A

DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 100-yr Bypass Q (CFS)	100-Year					Does DI need to be extended based on bypass flow 10-yr	Does DI need to be extended based on bypass flow 100-yr
				Gutter Flow- Half Street (CFS)	100-yr Criteria Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)	
"L" 98+80	ONRANR, ONRAN7R, 0.3*ONRAN7RA bypass from x-section "L" 78+25+	N/A	N/A	10.56	217.29	DI not needed	3.00	3.77	6.79	OK
"L" 65+08	ONRAN11R+ONRAN11RA+ONRAN13R+ ONRAN14R	"L" 78+25	21.41	32.63	206.24	DI not needed	3.00	7.84	24.79	OK
"L" 65+08 Extend	bypass from x-section "L" 78+25+ ONRAN11R+ONRAN11RA+ONRAN13R+ ONRAN14R	"L" 78+25	21.41	32.63	206.24	DI not needed	6.00	10.61	22.02	OK
"L" 49+96	bypass from DI @ "L" 65+08+ORAN15R+ONRAN16R+ ONRAN17R	"L" 65+08	22.02	36.24	176.19	DI not needed	3.00	8.00	28.24	OK
"L" 49+96 Extend	bypass from DI @ "L" 65+08+ORAN15R+ONRAN16R+ ONRAN17R	"L" 65+08	22.02	36.24	176.19	DI not needed	33.00	34.62	1.62	OK
"L" 46+93	bypass from DI @ "L" 49+96 +ONRAN18R	"L" 49+96	1.62	4.92	155.98	DI not needed	3.00	2.35	2.57	OK
"L" 46+16	bypass from DI @ "L" 46+93 +ONRAN19R	"L" 46+93	2.57	2.99	174.71	DI not needed	3.00	1.72	1.27	OK
"L" 39+75	bypass from DI @ 46+16+ ONRAN21R	"L" 46+16	1.27	5.75	215.08	DI not needed	3.00	2.60	3.15	OK
"L" 39+75 Extend	bypass from DI @ 46+16+ ONRAN21R	"L" 46+16	1.27	5.75	215.08	DI not needed	15.00	5.20	0.55	OK
"L" 12+10	bypass from DI @ "L" 39+75+ ONRAN22R, 23R, 24R, 25R, 26RA, 27R	"L" 39+75	0.55	19.90	179.96	DI not needed	3.00	5.58	14.32	OK
"L" 12+10 Extend	bypass from DI @ "L" 39+75+ ONRAN22R, 23R, 24R, 25R, 26RA, 27R	"L" 39+75	0.55	19.90	179.96	DI not needed	24.00	18.78	1.12	OK
"4" 16+47	bypass from DI @ "L" 12+10+ ONRAN28R	N/A	1.12	2.67	215.99	DI not needed	3.00	1.54	1.07	OK
"4" 14+96	bypass from DI @ "4" 16+47+ ONRAN29R	"4" 16+47	1.07	2.27	159.75	DI not needed	3.00	1.41	0.86	OK
"4" 13+80	bypass from DI @ "4" 14+96 + ONRAN30R	"4" 14+96	0.86	2.06	191.76	DI not needed	3.00	1.33	0.73	OK
"4" 11+83	bypass from DI @ "4" 13+80 + ONRAN31R	"4" 13+80	0.73	2.42	176.75	DI not needed	3.00	1.43	0.96	OK

INTERIM CONDITION

Drop Inlet Analysis-NDOT 100-year East Option A

DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 100-yr Bypass Q (CFS)	100-Year					Does DI need to be extended based on bypass flow 10-yr	Does DI need to be extended based on bypass flow 100-yr
				Gutter Flow- Half Street (CFS)	100-yr Criteria Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)	
"4" 6+76	bypass from DI @ "4" 11+83 + ONRAN32R+ONRAN32RA	"4" 11+83	0.96	6.69	177.12	DI not needed	3.00	2.86	3.83	OK
"4" 6+76 Extend	bypass from DI @ "4" 11+83 + ONRAN32R+ONRAN32RA	"4" 11+83	0.96	6.69	177.12	DI not needed	9.00	5.41	1.28	OK
"C" 3+50	bypass from DI @ "c" 3+50 ONRAN33R	"C" 3+50	1.28	6.46	198.87	DI not needed	3.00	2.77	3.69	OK
"C" 3+50 Extend	bypass from DI @ "c" 3+50 ONRAN33R	"C" 3+50	1.28	6.46	198.87	DI not needed	12.00	5.86	0.80	OK

All Drop inlets are extended based on Interim 25-yr criteria

INTERIM CONDITION

Street Flow Capacity-NDOT 100-year East Option B

			Discharge: Calculated by FM				Normal Depth: D _{Q100} Calculated by FM						
Cross-Section	Street Location	Slope (%)	100-Year Flow Capacity				D X V < 8 & D _{Q100} < 2 Criteria for RTC						
			D _{max} (ft)	V (fps)	DxV _{max}	Q _{max} (CFS)	Q ₁₀₀ (CFS)	D _{Q100}	V _{Q100}	D _{Q100} x V _{Q100}	D _{Q100} x V _{Q100} < 8 (Met/Not Met)	D _{Q100} < 2 (Met/ Not Met)	
"L" 112+00	North of Smoke Ranch	0.30	1.70	4.69	7.97	179.16	24.77	0.85	2.83	2.41	Met	Met	
"L" 112+00 D/S of DI	North of Smoke Ranch	0.30	1.70	4.69	7.97	179.16	1.81	0.36	1.48	0.53	Met	Met	
"L" 100+00	North of Lake Mead	1.81	1.01	7.88	7.96	89.88	9.83	0.64	2.31	1.48	Met	Met	
"L" 100+00 D/S of DI	North of Lake Mead	1.81	1.01	7.88	7.96	89.88	5.27	0.52	1.98	1.03	Met	Met	
"L" 98+80	North of Lake Mead	0.74	1.21	6.58	7.96	174.39	10.42	0.56	2.05	1.15	Met	Met	
"L" 98+80 D/S of DI	North of Lake Mead	0.74	1.21	6.58	7.96	174.39	4.68	0.44	1.68	0.74	Met	Met	
"L" 78+25	North of Coran	1.39	1.07	7.33	7.84	189.20	20.62	0.52	4.14	2.15	Met	Met	
"L" 78+25 D/S of DI	North of Coran	1.39	1.07	7.33	7.84	189.20	0.59	0.52	4.14	2.15	Met	Met	
"L" 65+08	South of Spring	2.38	0.85	9.21	7.83	165.06	11.70	0.38	4.15	1.58	Met	Met	
"L" 65+08 D/S of DI	South of Spring	2.38	0.85	9.21	7.83	165.06	1.79	0.25	2.16	0.54	Met	Met	
"L" 49+96	South of Melody	0.89	1.14	6.91	7.88	171.21	16.01	0.53	3.38	1.79	Met	Met	
"L" 46+93	South of Melody	1.07	1.14	7.00	7.98	149.25	5.06	0.38	2.88	1.09	Met	Met	
"L" 46+16	South of Melody	1.15	1.05	7.49	7.86	167.94	3.09	0.31	2.43	0.75	Met	Met	
"L" 39+75	South of Vegas	1.15	0.96	8.23	7.90	213.67	5.11	0.30	2.20	0.66	Met	Met	
"L" 39+75 D/S of DI	South of Vegas	1.15	0.96	8.23	7.90	213.67	0.45	0.18	1.26	0.23	Met	Met	
"L" 12+10	South of Vegas	0.70	1.20	6.56	7.87	176.17	20.01	0.59	3.25	1.92	Met	Met	
"L" 12+10 D/S of DI	South of Vegas	0.70	1.20	6.56	7.87	176.17	1.82	0.29	1.81	0.52	Met	Met	
"4" 16+47	South of Washington	0.50	1.47	5.41	7.95	202.29	2.39	0.34	1.79	0.61	Met	Met	
"4" 14+96	South of Washington	0.88	1.25	6.38	7.98	147.21	2.06	0.30	2.09	0.63	Met	Met	
"4" 13+80	South of Washington	0.88	1.15	6.84	7.87	157.62	1.93	0.29	3.09	0.90	Met	Met	
"4" 11+83	South of Washington	0.60	1.28	6.19	7.92	166.74	2.35	0.33	1.90	0.63	Met	Met	
"4" 6+76	South of Washington	0.50	1.42	5.55	7.88	186.56	6.38	0.46	2.29	1.05	Met	Met	
"4" 6+76 D/S of DI	South of Washington	0.50	1.42	5.55	7.88	186.56	1.19	0.28	1.53	0.43	Met	Met	
"C" 3+50	South of Washington	0.66	1.19	6.68	7.95	188.09	5.58	0.39	2.22	0.87	Met	Met	
"C" 3+50 D/S of DI	South of Washington	0.66	1.19	6.68	7.95	188.09	0.62	0.42	2.36	0.99	Met	Met	

INTERIM CONDITION										
Drop Inlet Analysis-NDOT 100-year East Option B										
DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 100-yr Bypass Q (CFS)	100-Year					Does DI need to be extended based on bypass flow 100-yr	
				Gutter Flow- Half Street (CFS)	100-yr Criteria Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)		Bypass Flow (CFS)
"L" 112+00	ONRAN2R, ONRAN3R, ONRAN4R, ONRAN5R	N/A	N/A	24.77	179.16	DI not needed	18.00	22.96	1.81	OK
"L" 100+00	ONRAN6R, ONRAN7R	No bypass past SMR	N/A	9.83	89.88	DI not needed	6.00	5.15	5.27	OK
"L" 98+80	ONRAN6R, ONRAN7R, 0.3*ONRAN7RA	N/A	N/A	10.42	174.39	DI not needed	3.00	3.74	6.68	OK
"L" 98+80 Extend	ONRAN6R, ONRAN7R, 0.3*ONRAN7RA	N/A	N/A	10.42	174.39	DI not needed	6.00	5.74	4.68	OK
"L" 78+25	0.7*ONRAN7RA, ONRAN8R, bypass from x-section "L" 78+25+ ONRAN11R+ONRAN11RA+ONRAN13R+ ONRAN14R	No bypass past LM	N/A	20.62	189.20	DI not needed	24.00	9.83	0.59	OK
"L" 65+08	bypass from x-section "L" 78+25+ ONRAN11R+ONRAN11RA+ONRAN13R+ ONRAN14R	"L" 78+25	0.59	11.70	165.06	DI not needed	3.00	4.23	7.47	OK
"L" 65+08 Extend	bypass from x-section "L" 78+25+ ONRAN11R+ONRAN11RA+ONRAN13R+ ONRAN14R	"L" 78+25	0.59	11.70	165.06	DI not needed	21.00	9.91	1.79	OK
"L" 49+96	bypass from DI @ "L" 65+08+ORAN15R+ONRAN16R+ ONRAN17R	"L" 65+08	1.79	16.01	171.21	DI not needed	3.00	4.87	11.14	OK
"L" 49+96 Extend	bypass from DI @ "L" 65+08+ORAN15R+ONRAN16R+ ONRAN17R	"L" 65+08	1.79	16.01	149.25	DI not needed	18.00	14.25	1.76	OK
"L" 46+93	bypass from DI @ "L" 49+96 +ONRAN18R	"L" 49+96	1.76	5.06	149.25	DI not needed	3.00	2.39	2.67	OK
"L" 46+16	bypass from DI @ "L" 46+93 +ONRAN19R	"L" 46+93	2.67	3.09	167.94	DI not needed	3.00	1.75	1.34	OK
"L" 39+75	bypass from DI @ 46+16+ ONRAN21R	"L" 46+16	1.34	5.11	213.67	DI not needed	3.00	2.41	2.70	OK
"L" 39+75 Extend	bypass from DI @ 46+16+ ONRAN21R	"L" 46+16	1.34	5.11	213.67	DI not needed	15.00	4.66	0.45	OK
"L" 12+10	bypass from DI @ "L" 39+75+ ONRAN22R, 23R, 24R, 25R, 26RA, 27R	"L" 39+75	0.45	20.01	176.17	DI not needed	3.00	5.44	14.57	OK
"L" 12+10 Extend	bypass from DI @ "L" 39+75+ ONRAN22R, 23R, 24R, 25R, 26RA, 27R	"L" 39+75	0.45	20.01	176.17	DI not needed	24.00	18.19	1.82	OK
"4" 16+47	bypass from DI @ "L" 12+10+ ONRAN28R	"L" 12+10	N/A	2.39	202.29	DI not needed	3.00	1.45	0.94	OK

INTERIM CONDITION

Drop Inlet Analysis-NDOT 100-year East Option B

DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 100-yr Bypass Q (CFS)	100-Year						Does DI need to be extended based on bypass flow 100-yr
				Gutter Flow- Half Street (CFS)	100-yr Criteria Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)	
"4" 14+96	bypass from DI @ "4" 16+47+ ONRAN29R	"4" 16+47	0.94	2.06	147.21	DI not needed	3.00	1.33	0.73	OK
"4" 13+80	bypass from DI @ "4" 14+96 + ONRAN30R	"4" 14+96	0.73	1.93	157.62	DI not needed	3.00	1.27	0.66	OK
"4" 11+83	bypass from DI @ "4" 13+80 + ONRAN31R	"4" 13+80	0.66	2.35	166.74	DI not needed	3.00	1.44	0.91	OK
"4" 6+76	bypass from DI @ "4" 11+83 + ONRAN32R+ONRAN32RA	"4" 11+83	0.91	6.38	186.56	DI not needed	3.00	2.77	3.61	OK
"4" 6+76 Extend	bypass from DI @ "4" 11+83 + ONRAN32R+ONRAN32RA	"4" 11+83	0.91	6.38	186.56	DI not needed	9.00	5.19	1.19	OK
"C" 3+50	bypass from DI @ "C" 3+50 ONRAN33R	"4" 6+76	1.19	5.58	188.09	DI not needed	3.00	1.60	1.17	OK
"C" 3+50 Extend	bypass from DI @ "C" 3+50 ONRAN33R	"4" 6+76	1.19	5.58	188.09	DI not needed	12.00	4.96	0.62	OK

All Drop inlets are extended based on Interim 25-yr criteria

B-2: West Side

INTERIM CONDITION

Street Flow Capacity-NDOT 100-year West Option A

			Discharge : Calculated by FM				Normal Depth: D _{Q100} Calculated by FM					
Cross-Section	Street Location	Slope (%)	100-Year Flow Capacity				D X V < 8 & D _{Q100} < 2 Criteria for NDOT					
			D _{max} (ft)	V (fps)	DxV _{max}	Q _{max} (cfs)	Q ₁₀₀ (cfs)	D _{Q100}	V _{Q100}	D _{Q100} x V _{Q100}	D _{Q100} x V _{Q100} < 8 (Met/Not Met)	D _{Q100} < 2 (Met/ Not Met)
"L" 112+00	North of Smoke Ranch	0.30	1.49	5.34	7.96	303.36	22.98	0.63	2.21	1.39	Met	Met
"L" 100+00	North of Lake Mead	1.81	1.01	7.83	7.91	141.78	10.92	0.43	4.14	1.78	Met	Met
"L" 92+86	South of Lake Mead	0.80	1.22	6.52	7.95	196.84	41.40	0.72	4.11	2.96	Met	Met
"L" 84+00	South of Lake Mead	1.49	1.07	7.46	7.98	107.33	107.92	1.07	7.47	7.99	Met	Met
"L" 79+00	North of Coran	1.39	1.09	7.26	7.91	182.09	139.89	1.00	6.80	6.80	Met	Met
"L" 77+20	South of Coran	1.36	1.10	7.25	7.98	142.70	139.89	0.50	4.06	2.03	Met	Met
"L" 75+05	South of Coran	1.63	1.04	7.64	7.95	112.52	149.12	1.15	8.19	9.42	Not Met	Met
"L" 75+05 D/S of DI	South of Coran	1.63	1.04	7.64	7.95	112.52	105.43	1.02	7.52	7.67	Met	Met
"L" 72+91	South of Coran	1.76	1.02	7.81	7.97	131.55	135.53	1.03	7.87	8.11	Not Met	Met
"L" 71+21	South of Coran	1.47	1.08	7.41	8.00	148.73	139.61	1.05	7.30	7.67	Met	Met
"L" 69+47	South of Coran	1.04	1.19	6.69	7.96	202.95	144.20	1.06	6.15	6.52	Met	Met
"L" 67+75	South of Spring	0.82	1.22	6.48	7.91	188.73	151.29	1.14	5.95	6.78	Met	Met
"L" 65+08	South of Spring	2.38	0.86	9.18	7.89	243.53	197.61	0.80	8.45	6.76	Met	Met
"L" 64+09	South of Spring	0.96	1.22	6.55	7.99	197.56	218.03	1.26	6.71	8.45	Not Met	Met
"L" 62+15	South of Melody	1.34	1.10	7.19	7.91	143.75	207.06	1.25	7.88	9.85	Not Met	Met
"L" 62+15 D/S of DI	South of Melody	1.34	1.10	7.19	7.91	143.75	141.52	1.09	7.16	7.80	Met	Met
"L" 58+47	South of Melody	1.63	1.15	6.95	7.99	105.17	174.82	1.22	8.54	10.42	Not Met	Met
"L" 58+47 D/S of DI	South of Melody	1.63	1.15	6.95	7.99	105.17	103.47	1.01	7.49	7.56	Met	Met
"L" 55+26	South of Melody	0.50	1.44	5.52	7.95	221.90	132.27	1.21	4.71	5.70	Met	Met
"L" 49+96	South of Melody	0.89	1.24	6.39	7.92	150.64	139.39	1.21	6.27	7.59	Met	Met
"L" 48+16	South of Melody	0.70	1.31	6.07	7.95	180.15	160.75	1.27	5.80	7.37	Met	Met
"L" 47+81	South of Melody	1.18	1.14	6.93	7.90	148.53	31.76	0.67	4.71	3.16	Met	Met
"L" 47+49	South of Melody	1.07	1.15	6.94	7.98	221.16	3.69	0.34	2.67	0.91	Met	Met
"L" 39+75	South of Vegas	1.15	1.15	6.88	7.91	142.32	29.82	0.67	4.65	3.12	Met	Met
"L" 35+04	South of Vegas	1.15	1.06	7.47	7.92	155.70	47.57	0.73	4.91	3.58	Met	Met
"L" 30+34	South of Vegas	0.30	1.71	4.65	7.95	155.76	63.77	1.24	3.72	4.61	Met	Met
"L" 25+01	South of Vegas	0.65	1.25	6.36	7.95	203.66	75.70	0.91	4.36	3.97	Met	Met
"L" 25+01 D/S of DI	South of Vegas	0.65	1.25	6.36	7.95	203.66	37.07	0.72	3.65	2.63	Met	Met
"L" 19+64	South of Vegas	0.48	1.32	6.04	7.97	225.63	105.82	1.01	4.52	4.57	Met	Met
"L" 19+64 D/S of DI	South of Vegas	0.48	1.32	6.04	7.97	225.63	51.88	0.81	3.44	2.79	Met	Met
"L" 16+09	South of Vegas	0.50	1.34	5.92	7.93	161.93	81.38	1.06	4.52	4.79	Met	Met
"L" 12+76	South of Vegas	0.70	1.20	6.62	7.94	212.81	93.18	0.91	4.78	4.35	Met	Met
"L" 12+76 D/S of DI	South of Vegas	0.70	1.20	6.62	7.94	212.81	62.90	0.81	4.14	3.35	Met	Met
"L" 11+00	South of Washington	0.60	1.25	6.39	7.99	219.40	66.18	0.84	3.99	3.35	Met	Met
"L" 10+38	South of Washington	0.60	1.43	5.55	7.94	160.47	55.71	1.00	4.28	4.28	Met	Met
"4" 15+39	South of Washington	0.82	1.19	6.68	7.95	151.82	39.05	0.87	4.73	4.12	Met	Met
"4" 14+00	South of Washington	0.88	1.23	6.41	7.88	186.74	47.47	0.77	4.50	3.47	Met	Met
"4" 11+76	South of Washington	0.80	1.26	6.25	7.88	250.83	27.80	0.61	3.55	2.17	Met	Met

INTERIM CONDITION										
Drop Inlet Analysis-NDOT 100-year West Option A										
DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 100-yr Bypass Q (CFS)	Gutter Flow- Half Street (CFS)	100 yr Criteria Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)	Does DI need to be extended based on bypass flow 100-yr
"L" 92+86, 56.76' LT	490 LF of LM09	N/A	N/A	41.40	196.84	DI not needed	3.00	8.68	32.72	OK
"L" 84+00, 57.02' LT	890 LF of LM09	"L" 92+86, 56.76' LT	32.72	107.92	107.33	Need DI	3.00	20.43	87.49	OK
"L" 77+20, 48.97' LT	620 LF of LM09	"L" 84+00, 57.02' LT	87.49	139.89	142.70	DI not needed	3.00	20.87	119.02	OK
"L" 75+05, 48.01' LT	215 LF of VG21	"L" 77+20, 48.97' LT	119.02	149.12	112.52	Need DI	3.00	22.41	126.71	Extend DI
"L" 75+05, 48.01' LT Extended	215 LF of VG21	"L" 75+05, 48.01' LT	119.02	149.12	112.52	Need DI	7.50	43.69	105.43	OK
"L" 72+91, 47.92' LT	215 LF of VG21	"L" 75+05, 48.01' LT Extended	105.43	135.53	131.55	Need DI	3.00	19.72	115.81	OK
"L" 71+21, 48.04' LT	170 LF of VG21	"L" 72+91, 47.92' LT	115.81	139.61	148.73	DI not needed	3.00	20.61	119.00	OK
"L" 69+47, 48.08' LT	180 LF of VG21	"L" 71+21, 48.04' LT	119.00	144.20	202.95	DI not needed	3.00	18.11	126.09	OK
"L" 67+75, 48.02' LT	140 LF of VG20	"L" 69+47, 48.08' LT	126.09	151.29	188.73	DI not needed	3.00	18.68	132.61	OK
"L" 65+08, 48.24' LT	260 LF of VG20	"L" 67+75, 48.02' LT	132.61	197.61	243.53	DI not needed	3.00	19.59	178.03	OK
"L" 64+09, 48.15' LT	160 LF of VG20	"L" 65+08, 48.24' LT	178.03	218.03	197.56	Need DI	3.00	23.97	194.06	OK
"L" 62+15, 48.24' LT	145 LF of VG22	"L" 64+09, 48.15' LT	194.06	207.06	143.75	Need DI	3.00	23.29	183.77	Extend DI
"L" 62+15, 48.24' LT Extended	145 LF of VG22	"L" 64+09, 48.15' LT	194.06	207.06	143.75	Need DI	10.00	65.54	141.52	OK
"L" 58+47, 48.24' LT	370 LF of VG22	"L" 62+15, 48.24' LT Extended	141.52	174.82	105.17	Need DI	3.00	20.78	154.04	Extend DI
"L" 58+47, 48.24' LT Extended	370 LF of VG22	"L" 62+15, 48.24' LT Extended	141.52	174.82	105.17	Need DI	12.50	71.35	103.47	OK
"L" 55+26, 56.61' LT	320 LF of VG22	"L" 58+47, 48.24' LT Extended	103.47	132.27	221.90	DI not needed	4'x4'	41.48	90.79	OK
"L" 49+96, 47.95' LT	530 LF of VG22	"L" 55+26, 56.61' LT	90.79	139.39	150.64	DI not needed	3.00	21.44	117.95	OK
"L" 48+16, 47.37' LT	475 LF of VG22	"L" 49+96, 47.95' LT	117.95	160.75	180.15	DI not needed	21.00	129.99	31.76	OK
"L" 47+81, 46.43' LT	Bypass from "L" 48+16, 47.37' LT	"L" 48+16, 47.37' LT	31.76	31.76	148.53	DI not needed	21.00	28.07	3.69	OK
"L" 47+49, 45.49' LT	Bypass from "L" 47+81, 45.49' LT	"L" 47+81, 46.43' LT	3.69	3.69	221.16	DI not needed	21.00	3.57	0.12	OK
"L" 39+75, 42.19' LT	540 LF of WA13	"L" 47+49, 45.49' LT	0.12	29.82	142.32	DI not needed	3.00	8.05	21.77	OK
"L" 35+04, 42.12' LT	470 LF of WA13	"L" 39+75, 42.19' LT	21.77	47.57	155.70	DI not needed	3.00	9.60	37.97	OK
"L" 30+34, 42.41' LT	470 LF of WA13	"L" 35+04, 42.12' LT	37.97	63.77	155.76	DI not needed	3.00	17.07	46.70	OK
"L" 25+01, 42.19' LT Extended*	530 LF of WA13	"L" 30+34, 42.41' LT	46.70	75.70	203.66	DI not needed	10.00	38.63	37.07	OK
"L" 19+64, 42.17' LT Extended*	1250 LF of WA13	"L" 25+01, 42.19' LT	37.07	105.82	225.63	DI not needed	10.00	53.94	51.88	OK
"L" 16+09, 42.17' LT	360 LF of WA14	"L" 19+64, 42.17'	51.88	81.38	161.93	DI not needed	3.00	15.20	66.18	OK
"L" 12+76, 41.85' LT Extended*	330 LF of WA14	"L" 16+09, 42.17' LT	66.18	93.18	212.81	DI not needed	7.50	30.28	62.90	OK
"L" 11+00, 44.40' LT	Bypass from "L" 12+76, 41.85' LT	"L" 12+76, 41.85' LT	62.90	66.18	219.40	DI not needed	3.00	10.47	55.71	OK
"L" 10+38, 56.68' LT	Bypass from "L" 11+00, 44.40' LT	"L" 11+00, 44.40' LT	55.71	55.71	160.47	DI not needed	20.00	44.78	10.93	OK
"4" 15+39, 64.12' LT	190 LF of WA11-C	"L" 10+38, 56.68' LT	10.93	39.05	151.82	DI not needed	20.00	9.00	26.77	OK
"4" 14+00, 64.26' LT	140 LF of WA11-C	"4" 15+39, 64.12' LT	26.77	47.47	186.74	DI not needed	20.00	40.37	7.10	OK
"4" 11+76, 64.29' LT	260 LF of WA11-C	"4" 14+00, 64.26' LT	7.10	27.80	250.83	DI not needed	3.00	7.61	20.19	OK
"4" 7+04, 74.17' LT Extended*	Bypass from "4" 11+76, 64.29' LT	"4" 11+76, 64.29' LT	20.19	20.19	233.17	DI not needed	10.00	14.78	5.41	OK
"C" 3+22, 26.36' LT Extended*	"4" 7+04, 74.17' LT Extended*	"4" 7+04, 74.17' LT	5.41	5.41	290.38	DI not needed	12.50	4.75	0.66	OK

*These catch basins are extended based on Interim 25-yr criteria

INTERIM CONDITION

Street Flow Capacity-NDOT 100-year West Option B

			Discharge : Calculated by FM				Normal Depth: D _{Q100} Calculated by FM					
Cross-Section	Street Location	Slope (%)	100-Year Flow Capacity				D X V < 8 & D _{Q100} < 2 Criteria for NDOT					
			D _{max} (ft)	V (fps)	DxV _{max}	Q _{max} (cfs)	Q ₁₀₀ (cfs)	D _{Q100}	V _{Q100}	D _{Q100} x V _{Q100}	D _{Q100} x V _{Q100} < 8 (Met/Not Met)	D _{Q100} < 2 (Met/ Not Met)
"L" 112+00	North of Smoke Ranch	0.30	1.47	5.44	8.00	270.97	23.30	0.63	2.22	1.40	Met	Met
"L" 100+00	North of Lake Mead	1.81	1.01	7.83	7.91	141.80	10.55	0.57	2.09	1.19	Met	Met
"L" 92+86	South of Lake Mead	0.80	1.17	6.76	7.91	175.46	41.40	0.64	4.12	2.64	Met	Met
"L" 84+00	South of Lake Mead	1.49	1.07	7.46	7.98	106.73	107.92	1.07	7.48	8.00	Not Met	Met
"L" 79+00	North of Coran	1.39	1.09	7.26	7.91	182.09	139.89	1.00	6.80	6.80	Met	Met
"L" 77+20	South of Coran	1.36	1.10	7.25	7.98	137.05	139.89	1.11	7.29	8.09	Not Met	Met
"L" 75+05	South of Coran	1.63	1.04	7.64	7.95	112.09	149.12	1.15	8.20	9.43	Not Met	Met
"L" 75+05 D/S of DI	South of Coran	1.63	1.04	7.64	7.95	112.09	105.43	1.02	7.52	7.67	Met	Met
"L" 72+91	South of Coran	1.76	1.02	7.81	7.97	132.37	135.53	1.03	7.85	8.09	Not Met	Met
"L" 71+21	South of Coran	1.47	1.06	7.48	7.93	143.55	139.61	1.05	7.39	7.76	Met	Met
"L" 69+47	South of Coran	1.04	1.10	7.23	7.95	174.47	144.20	1.03	6.71	6.91	Met	Met
"L" 67+75	South of Spring	0.82	1.18	6.78	8.00	173.78	151.29	1.12	6.43	7.20	Met	Met
"L" 65+08	South of Spring	2.38	0.84	9.47	7.95	224.53	197.61	0.80	9.00	7.20	Met	Met
"L" 65+08 D/S of DI	South of Spring	2.38	0.84	9.47	7.95	224.53	132.61	0.70	7.69	5.38	Met	Met
"L" 64+09	South of Spring	0.96	1.18	6.69	7.89	186.60	209.42	1.22	7.00	8.54	Not Met	Met
"L" 64+09 D/S of DI	South of Spring	0.96	1.18	6.69	7.89	186.60	169.42	1.00	5.66	5.66	Met	Met
"L" 62+15	South of Melody	1.34	1.09	7.32	7.98	144.46	182.42	1.17	8.03	9.40	Not Met	Met
"L" 62+15 D/S of DI	South of Melody	1.34	1.09	7.32	7.98	144.46	122.20	1.04	6.89	7.17	Met	Met
"L" 58+47	South of Melody	1.63	1.04	7.64	7.95	111.56	155.50	1.17	8.30	9.71	Not Met	Met
"L" 58+47 D/S of DI	South of Melody	1.63	1.04	7.64	7.95	111.56	89.82	0.96	7.24	6.95	Met	Met
"L" 55+26	South of Melody	0.50	1.39	5.72	7.95	207.49	118.62	1.17	4.59	5.37	Met	Met
"L" 49+96	South of Melody	0.89	1.24	6.39	7.92	151.43	128.48	1.17	6.13	7.17	Met	Met
"L" 48+16	South of Melody	0.70	1.33	5.95	7.91	183.08	150.89	1.24	5.67	7.03	Met	Met
"L" 47+81	South of Melody	1.18	1.14	6.93	7.90	148.36	29.01	0.65	4.61	3.00	Met	Met
"L" 47+49	South of Melody	1.07	1.06	7.41	7.85	284.65	3.20	0.28	2.08	0.58	Met	Met
"L" 39+75	South of Vegas	1.15	1.15	6.88	7.91	147.00	29.79	0.67	4.62	3.10	Met	Met
"L" 35+04	South of Vegas	1.15	1.07	7.36	7.88	158.52	47.55	0.73	4.92	3.59	Met	Met
"L" 35+04 D/S of DI	South of Vegas	1.15	1.07	7.36	7.88	158.52	34.56	0.66	4.54	3.00	Met	Met
"L" 30+34	South of Vegas	0.30	1.71	4.65	7.95	155.93	60.36	1.21	3.66	4.43	Met	Met
"L" 25+01	South of Vegas	0.65	1.26	6.28	7.91	210.65	72.88	0.90	4.31	3.88	Met	Met
"L" 25+01 D/S of DI	South of Vegas	0.65	1.26	6.28	7.91	210.65	45.14	0.76	3.82	2.90	Met	Met
"L" 19+64	South of Vegas	0.48	1.33	5.98	7.95	234.66	113.89	1.03	4.50	4.64	Met	Met
"L" 19+64 D/S of DI	South of Vegas	0.48	1.33	5.98	7.95	234.66	70.53	0.89	3.72	3.31	Met	Met
"L" 16+09	South of Vegas	0.50	1.36	5.84	7.94	169.82	100.03	1.14	4.75	5.42	Met	Met
"L" 12+76	South of Vegas	0.70	1.21	6.54	7.91	220.21	109.78	0.96	4.97	4.77	Met	Met
"L" 12+76 D/S of DI	South of Vegas	0.70	1.21	6.54	7.91	220.21	76.03	0.86	4.33	3.72	Met	Met

INTERIM CONDITION												
Street Flow Capacity-NDOT 100-year West Option B												
			Discharge : Calculated by FM				Normal Depth: D _{Q100} Calculated by FM					
Cross-Section	Street Location	Slope (%)	100-Year Flow Capacity				D X V < 8 & D _{Q100} < 2 Criteria for NDOT					
			D _{max} (ft)	V (fps)	DXV _{max}	Q _{max} (cfs)	Q ₁₀₀ (cfs)	D _{Q100}	V _{Q100}	D _{Q100} x V _{Q100}	D _{Q100} x V _{Q100} < 8 (Met/Not Met)	D _{Q100} < 2 (Met/ Not Met)
"L" 11+00	South of Washington	0.60	1.25	6.39	7.99	219.40	76.03	0.87	4.37	3.80	Met	Met
"L" 10+38	South of Washington	0.60	1.43	5.55	7.94	160.47	64.66	1.05	4.44	4.66	Met	Met
"4" 15+39	South of Washington	0.82	1.27	6.28	7.98	171.04	36.19	0.75	4.26	3.20	Met	Met
"4" 14+00	South of Washington	0.88	1.23	6.48	7.97	188.10	24.73	0.62	3.83	2.37	Met	Met
"4" 11+76	South of Washington	0.80	1.20	6.62	7.94	230.90	23.31	0.57	3.39	1.93	Met	Met
"4" 7+04	South of Washington	0.50	1.40	5.66	7.92	279.95	16.49	0.55	2.61	1.44	Met	Met
"4" 7+04 D/S of DI	South of Washington	0.50	1.40	5.66	7.92	279.95	4.03	0.36	1.84	0.66	Met	Met
"C" 3+22	South of Washington	0.66	1.30	6.06	7.88	269.43	4.03	0.34	2.03	0.69	Met	Met
"C" 3+22 D/S of DI	South of Washington	0.66	1.30	6.06	7.88	269.43	0.40	0.19	1.19	0.23	Met	Met

INTERIM CONDITION										
Drop Inlet Analysis-NDOT 100-year West Option B										
DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 100-yr Bypass Q (CFS)	Gutter Flow-Half Street (CFS)	100 yr Criteria Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)	Does DI need to be extended based on bypass flow 100-yr
"L" 92+86, 56.76' LT	490 LF of LM09	N/A	N/A	41.40	175.46	DI not needed	3.00	8.68	32.72	OK
"L" 84+00, 57.02' LT	890 LF of LM09	"L" 92+86, 56.76' LT	32.72	107.92	106.73	Need DI	3.00	20.43	87.49	OK
"L" 77+20, 48.97' LT	620 LF of LM09	"L" 84+00, 57.02' LT	87.49	139.89	137.05	Need DI	3.00	20.87	119.02	OK
"L" 75+05, 48.01' LT	215 LF of VG21	"L" 77+20, 48.97' LT	119.02	149.12	112.09	Need DI	3.00	25.07	124.05	Extend DI
"L" 75+05, 48.01' LT Extended	215 LF of VG21	"L" 77+20, 48.97' LT	119.02	149.12	112.09	Need DI	5.00	43.69	105.43	OK
"L" 72+91, 47.92' LT	215 LF of VG21	"L" 75+05, 48.01' LT	105.43	135.53	132.37	Need DI	3.00	19.72	115.81	OK
"L" 71+21, 48.04' LT	170 LF of VG21	"L" 72+91, 47.92' LT	115.81	139.61	143.55	DI not needed	3.00	20.61	119.00	OK
"L" 69+47, 48.08' LT	180 LF of VG21	"L" 71+21, 48.04' LT	119.00	144.20	174.47	DI not needed	3.00	18.11	126.09	OK
"L" 67+75, 48.02' LT	140 LF of VG20	"L" 69+47, 48.08' LT	126.09	151.29	173.78	DI not needed	3.00	18.68	132.61	OK
"L" 65+08, 48.24' LT Extended*	260 LF of VG20	"L" 67+75, 48.02' LT	132.61	197.61	224.53	DI not needed	5.00	28.19	169.42	OK
"L" 64+09, 48.15' LT	160 LF of VG20	"L" 65+08, 48.24' LT Extended	169.42	209.42	186.60	Need DI	3.00	23.39	186.03	OK
"L" 64+09, 48.15' LT Extended	160 LF of VG20	"L" 65+08, 48.24' LT Extended	169.42	209.42	186.60	Need DI	5.00	33.38	176.04	OK
"L" 62+15, 48.24' LT	145 LF of VG22	"L" 64+09, 48.15' LT Extended	176.04	182.42	144.46	Need DI	3.00	21.63	160.79	Extend DI
"L" 62+15, 48.24' LT Extended	145 LF of VG22	"L" 64+09, 48.15' LT Extended	176.04	182.42	144.46	Need DI	10.00	60.22	122.20	OK
"L" 58+47, 48.24' LT	370 LF of VG22	"L" 62+15, 48.24' LT	122.20	155.50	111.56	Need DI	3.00	19.73	135.77	Extend DI
"L" 58+47, 48.24' LT Extended	370 LF of VG22	"L" 62+15, 48.24' LT	122.20	155.50	111.56	Need DI	12.50	65.68	89.82	OK
"L" 55+26, 56.61' LT	320 LF of VG22	"L" 58+47, 48.24' LT	89.82	118.62	207.49	DI not needed	4'x4'	38.74	79.88	OK
"L" 49+96, 47.95' LT	530 LF of VG22	"L" 55+26, 56.61' LT	79.88	128.48	151.43	DI not needed	3.00	20.39	108.09	OK
"L" 48+16, 47.37' LT	475 LF of VG22	"L" 49+96, 47.95' LT	108.09	150.89	183.08	DI not needed	21.00	121.88	29.01	OK
"L" 47+81, 46.43' LT	Bypass from "L" 48+16, 47.37' LT	"L" 48+16, 47.37' LT	29.01	29.01	148.36	DI not needed	21.00	25.81	3.20	OK
"L" 47+49, 45.49' LT	Bypass from "L" 47+81, 45.49' LT	"L" 47+81, 46.43' LT	3.20	3.20	284.65	DI not needed	21.00	3.11	0.09	OK
"L" 39+75, 42.19' LT	540 LF of WA13	"L" 47+49, 45.49' LT	0.09	29.79	147.00	DI not needed	3.00	8.04	21.75	OK
"L" 35+04, 42.12' LT Extended*	470 LF of WA13	"L" 39+75, 42.19' LT	21.75	47.55	158.52	DI not needed	5.00	12.99	34.56	OK
"L" 30+34, 42.41' LT	470 LF of WA13	"L" 35+04, 42.12' LT Extended	34.56	60.36	155.93	DI not needed	3.00	16.48	43.88	OK
"L" 25+01, 42.19' LT Extended*	530 LF of WA13	"L" 30+34, 42.41' LT	43.88	72.88	210.65	DI not needed	7.50	27.74	45.14	OK
"L" 19+64, 42.17' LT Extended*	1250 LF of WA13	"L" 25+01, 42.19' LT Extended	45.14	113.89	234.66	DI not needed	10.00	64.76	70.53	OK
"L" 16+09, 42.17' LT	360 LF of WA14	"L" 19+64, 42.17' LT Extended	70.53	100.03	169.82	DI not needed	3.00	17.25	82.78	OK
"L" 12+76, 41.85' LT Extended*	330 LF of WA14	"L" 16+09, 42.17' LT	82.78	109.78	220.21	DI not needed	7.50	33.75	76.03	OK
"L" 11+00, 44.40' LT	Bypass from "L" 12+76, 41.85' LT	"L" 12+76, 41.85' LT Extended	76.03	76.03	219.40	DI not needed	3.00	11.37	64.66	OK
"L" 10+38, 56.68' LT	Bypass from "L" 11+00, 44.40' LT	"L" 11+00, 44.40' LT	64.66	64.66	160.47	DI not needed	20.00	56.59	8.07	OK
"4" 15+39, 64.12' LT	190 LF of WA11-C	"L" 10+38, 56.68' LT	8.07	36.19	171.04	DI not needed	20.00	32.16	4.03	OK
"4" 14+00, 64.26' LT	140 LF of WA11-C	"4" 15+39, 64.12' LT	4.03	24.73	188.10	DI not needed	20.00	22.12	2.61	OK
"4" 11+76, 64.29' LT	260 LF of WA11-C	"4" 14+00, 64.26' LT	2.61	23.31	230.90	DI not needed	3.00	6.82	16.49	OK
"4" 7+04, 74.17' LT Extended*	Bypass from "4" 11+76, 64.29' LT	"4" 11+76, 64.29' LT	16.49	16.49	279.95	DI not needed	10.00	12.46	4.03	OK
"C" 3+22, 26.36' LT Extended*	Bypass from "4" 11+76, 64.29' LT	"4" 7+04, 74.17' LT Extended	4.03	4.03	269.43	DI not needed	12.50	3.63	0.40	OK

*These catch basins are extended based on Interim 25-yr criteria

C. Interim Condition- NDOT 25 –yr Flows

C-1: East Side

Interim Condition

Street Flow Capacity-NDOT 25-year East Option A

		Normal Depth: D _{Q25} Calculated by FM								
Cross-Section	Street Location	Slope (%)	Cross Slope (%)	Bus Lane Width (FT)	Adjacent Lane Width (FT)	25-Year Flow Capacity			25-Year Flow Capacity D _{Q25} Vs. D _{max}	
						Dry Lane Criteria for NDOT				
						D _{max} (FT)	Q (Half Street) (CFS)	Q ₂₅ (Half Street) (CFS)		
										D _{Q25}
"L" 112+00	North of Smoke Ranch	0.30	3.48	11.50	11.00	0.72	16.38	17.90	0.74	Not Met
"L" 100+00	North of Lake Mead	1.81	3.94	11.50	11.00	0.79	47.08	7.16	0.57	Met
"L" 98+80	North of Lake Mead	0.74	2.22	11.50	11.00	0.50	12.59	7.60	0.49	Met
"L" 78+25	North of Coran	1.39	1.84	11.50	11.00	0.44	13.60	15.40	0.46	Not Met
"L" 65+08	South of Spring	2.38	1.45	11.50	11.00	0.37	12.04	18.70	0.42	Not Met
"L" 65+08 D/S of DI	South of Spring	2.38	1.45	11.50	11.00	0.37	12.04	11.27	0.36	Met
"L" 49+96	South of Melody	0.89	2.08	0.00	11.00	0.24	1.12	21.53	0.56	Not Met
"L" 49+96 D/S of DI	South of Melody	0.89	2.08	0.00	11.00	0.24	1.12	0.68	0.21	Met
"L" 46+93	South of Melody	1.07	2.58	0.00	11.00	0.27	1.70	3.07	0.32	Not Met
"L" 46+16	South of Melody	1.15	1.88	0.00	11.00	0.40	9.12	1.63	0.25	Met
"L" 39+75	South of Vegas	1.15	0.75	0.00	11.00	0.17	0.48	3.70	0.24	Not Met
"L" 39+75 D/S of DI	South of Vegas	1.15	0.75	0.00	11.00	0.17	0.48	0.25	0.15	Met
"L" 12+10	South of Vegas	0.70	2.04	0.00	11.00	0.24	1.01	14.21	0.50	Not Met
"L" 12+10 D/S of DI	South of Vegas	0.70	2.04	0.00	11.00	0.24	1.01	0.64	0.21	Met
"4" 16+47	South of Washington	0.50	2.57	10.00	11.00	0.52	10.09	2.57	0.34	Met
"4" 14+96	South of Washington	0.88	2.98	0.00	11.00	0.29	1.78	1.90	0.30	Not Met
"4" 13+80	South of Washington	0.88	2.30	0.00	11.00	0.25	1.21	1.50	0.26	Not Met
"4" 11+83	South of Washington	0.60	2.46	0.00	11.00	0.26	1.13	1.65	0.29	Not Met
"4" 6+76	South of Washington	0.50	2.63	0.00	11.00	0.27	1.15	4.65	0.41	Not Met
"4" 6+76 D/S of DI	South of Washington	0.50	2.63	0.00	11.00	0.27	1.15	0.71	0.24	Met
"C" 3+50	South of Washington	0.66	1.69	0.00	11.00	0.22	0.76	4.45	0.34	Not Met
"C" 3+50 D/S of DI	South of Washington	0.66	1.69	0.00	11.00	0.22	0.76	0.42	0.19	Met

INTERIM CONDITION

Drop Inlet Analysis-NDOT-25 Year East Option A

DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 25yr Bypass Q (CFS)	25-year						Does DI need to be extended based on bypass flow 25-yr
				Gutter Flow- Half Street (CFS)	25-yr Criteria (drylane) Flow Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)	
"L" 112+00	ONRAN2R, ONRAN3R, ONRAN4R, ONRAN5R	N/A	N/A	17.90	16.38	Need DI	5.59	12.31	12.76	OK
"L" 98+80	ONRAN6R, ONRAN7R, 0.3*ONRAN7RA	"L" 100+00	7.16	7.60	12.59	DI not needed	3.00	3.07	4.53	OK
"L" 78+25	0.7*ONRAN7RA, ONRAN8R, ONRAN9R, ONRAN10R	No bypass past LM	N/A	15.40	13.60	Need DI	3.00	4.81	10.59	OK
"L" 65+08	bypass from x-section "L" 78+25+ ONRAN11R+ONRAN11RA+ONRAN13R+ ONRAN14R	"L" 78+25	10.59	18.70	12.04	Need DI	3.00	5.61	13.09	Extend DI
"L" 65+08 Extend	bypass from x-section "L" 78+25+ ONRAN11R+ONRAN11RA+ONRAN13R+ ONRAN14R	"L" 78+25	10.59	18.70	12.04	Need DI	6.00	7.43	11.27	OK
"L" 49+96	bypass from DI @ "L" 65+08+ORAN15R+ONRAN16R+ ONRAN17R	"L" 65+08	11.27	21.53	1.12	Need DI	3.00	5.83	15.70	Extend DI
"L" 49+96 Extend	bypass from DI @ "L" 65+08+ORAN15R+ONRAN16R+ ONRAN17R	"L" 65+08	11.27	21.53	1.12	Need DI	33.00	20.85	0.68	OK
"L" 46+93	bypass from DI @ "L" 49+96 +ONRAN18R	"L" 49+96	0.68	3.07	1.70	Need DI	3.00	1.74	1.33	OK
"L" 46+16	bypass from DI @ "L" 46+93 +ONRAN19R	"L" 46+93	1.33	1.63	9.12	DI not needed	3.00	1.15	0.48	OK

INTERIM CONDITION

Drop Inlet Analysis-NDOT-25 Year East Option A

DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 25yr Bypass Q (CFS)	25-year						Does DI need to be extended based on bypass flow 25-yr
				Gutter Flow- Half Street (CFS)	25-yr Criteria (drylane) Flow Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)	
"L" 39+75	bypass from DI @ 46+16+ ONRAN21R	"L" 46+16	0.48	3.70	0.48	Need DI	3.00	1.97	1.73	Extend DI
"L" 39+75 Extend	bypass from DI @ 46+16+ ONRAN21R	"L" 46+16	0.48	3.70	0.48	Need DI	15.00	3.45	0.25	OK
"L" 12+10	bypass from DI @ "L" 39+75+ ONRAN22R, 23R, 24R, 25R, 26RA, 27R	"L" 39+75	0.25	14.21	1.01	Need DI	3.00	4.46	9.82	Extend DI
"L" 12+10 Extend	bypass from DI @ "L" 39+75+ ONRAN22R, 23R, 24R, 25R, 26RA, 27R	"L" 39+75	0.25	14.21	1.01	Need DI	24.00	13.57	0.64	OK
"4" 16+47	bypass from DI @ "L" 12+10+ ONRAN28R	"L" 12+10	0.64	2.57	10.09	DI not needed	3.00	1.53	1.04	OK
"4" 14+96	bypass from DI @ "4" 16+47+ ONRAN29R	"4" 16+47	1.04	1.90	1.78	Need DI	3.00	1.26	0.64	OK
"4" 13+80	bypass from DI @ "4" 14+96 + ONRAN30R	"4" 14+96	0.64	1.50	1.21	Need DI	3.00	1.07	0.43	OK
"4" 11+83	bypass from DI @ "4" 13+80 + ONRAN31R	"4" 13+80	0.43	1.65	1.13	Need DI	3.00	1.13	0.52	OK
"4" 6+76	bypass from DI @ "4" 11+83 + ONRAN32R+ONRAN32RA	"4" 11+83	0.52	4.65	1.15	Need DI	3.00	2.26	2.39	Extend DI
"4" 6+76 Extend	bypass from DI @ "4" 11+83 + ONRAN32R+ONRAN32RA	"4" 11+83	0.52	4.65	1.15	Need DI	9.00	3.94	0.71	OK
"C" 3+50	bypass from DI @ "C" 3+50 ONRAN33R	"C" 3+50	0.71	4.45	0.76	Need DI	3.00	2.19	2.26	Extend DI
"C" 3+50 Extend	bypass from DI @ "C" 3+50 ONRAN33R	"C" 3+50	0.71	4.45	0.76	Need DI	12.00	4.03	0.42	OK

Interim Condition

Street Flow Capacity-NDOT 25-year East Option B

			Normal Depth: D _{Q25} Calculated by FM							
Cross-Section	Street Location	Slope (%)	Cross Slope (%)	Bus Lane Width (FT)	Adjacent Lane Width (FT)	25-Year Flow Capacity		25-Year Flow Capacity		
						Dry Lane Criteria for NDOT		D _{Q25} Vs. D _{max}		
						D _{max} (FT)	Q (Half Street) (CFS)	Q ₂₅ (Half Street) (CFS)	D _{Q25}	D _{Q25} < D _{dry-lane} (Met/ Not Met)
"L" 112+00	North of Smoke Ranch	0.30	3.48	0.00	11.00	0.32	1.28	17.90	0.76	Not Met
"L" 100+00	North of Lake Mead	1.81	3.94	0.00	11.00	0.34	3.59	7.07	0.57	Not Met
"L" 98+80	North of Lake Mead	0.74	2.22	0.00	11.00	0.25	1.06	3.55	0.35	Not Met
"L" 98+80 D/S of DI	North of Lake Mead	0.74	2.22	0.00	11.00	0.25	1.06	0.99	0.25	Met
"L" 78+25	North of Coran	1.39	1.84	0.00	11.00	0.23	1.15	14.83	0.47	Not Met
"L" 65+08	South of Spring	2.38	1.45	0.00	11.00	0.20	0.94	9.18	0.36	Not Met
"L" 65+08 D/S of DI	South of Spring	2.38	1.45	0.00	11.00	0.20	0.94	0.88	0.20	Met
"L" 49+96	South of Melody	0.89	2.08	0.00	11.00	0.24	1.03	11.14	0.48	Not Met
"L" 46+93	South of Melody	1.07	2.58	0.00	11.00	0.27	1.57	3.37	0.34	Not Met
"L" 46+16	South of Melody	1.15	1.88	0.00	11.00	0.23	1.04	1.82	0.27	Not Met
"L" 39+75	South of Vegas	1.15	0.75	0.00	11.00	0.17	0.37	3.80	0.28	Not Met
"L" 39+75 D/S of DI	South of Vegas	1.15	0.75	0.00	11.00	0.17	0.37	0.26	0.16	Met
"L" 12+10	South of Vegas	0.70	2.04	0.00	11.00	0.24	0.92	14.36	0.53	Not Met
"L" 12+10 D/S of DI	South of Vegas	0.70	2.04	0.00	11.00	0.24	0.92	0.65	0.22	Met
"4" 16+47	South of Washington	0.50	2.57	10.00	11.00	0.52	9.38	2.38	0.34	Met
"4" 14+96	South of Washington	0.88	2.98	0.00	11.00	0.29	1.71	1.74	0.29	Not Met
"4" 13+80	South of Washington	0.88	2.30	0.00	11.00	0.25	1.14	1.42	0.27	Not Met
"4" 11+83	South of Washington	0.60	2.46	0.00	11.00	0.26	1.05	1.61	0.29	Not Met
"4" 6+76	South of Washington	0.50	2.63	0.00	11.00	0.27	1.07	4.44	0.41	Not Met
"4" 6+76 D/S of DI	South of Washington	0.50	2.63	0.00	11.00	0.27	1.07	0.87	0.25	Met
"C" 3+50	South of Washington	0.66	1.69	0.00	11.00	0.22	0.69	4.03	0.35	Not Met
"C" 3+50 D/S of DI	South of Washington	0.66	1.69	0.00	11.00	0.22	0.69	0.36	0.19	Met

INTERIM CONDITION

Drop Inlet Analysis-NDOT-25 Year East Option B

DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 25yr Bypass Q (CFS)	25-year					Does DI need to be extended based on bypass flow 25-yr	
				Gutter Flow- Half Street (CFS)	25-yr Criteria (drylane) Flow Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)		Bypass Flow (CFS)
"L" 112+00	ONRAN2R, ONRAN3R, ONRAN4R, ONRAN5R	N/A	N/A	17.90	1.28	Need DI	18.00	16.83	1.07	OK
"L" 100+00	ONRAN6R, ONRAN7R	No bypass past SMR	N/A	7.07	3.59	Need DI	6.00	3.95	3.12	OK
"L" 98+80	ONRAN6R, ONRAN7R, 0.3*ONRAN7RA	"L" 100+00	3.12	3.55	1.06	Need DI	3.00	1.89	1.66	Extend DI
"L" 98+80 Extend	ONRAN6R, ONRAN7R, 0.3*ONRAN7RA	"L" 100+00	3.12	3.55	1.06	Need DI	6.00	2.56	0.99	OK
"L" 78+25	0.7*ONRAN7RA, ONRAN8R, ONRAN9R, ONRAN10R	No bypass past LM	N/A	14.83	1.15	Need DI	24.00	13.76	1.07	OK
"L" 65+08	bypass from DI @ "L" 78+25+ ONRAN11R+ONRAN11RA+ONRAN13R+ ONRAN14R	"L" 78+25	1.07	9.18	0.94	Need DI	3.00	3.65	5.53	Extend DI
"L" 65+08 Extend	bypass from x-section "L" 78+25+ ONRAN11R+ONRAN11RA+ONRAN13R+ ONRAN14R	"L" 78+25	1.07	9.18	0.94	Need DI	21.00	8.30	0.88	OK
"L" 49+96	bypass from DI @ "L" 65+08+ORAN15R+ONRAN16R+ ONRAN17R	"L" 65+08	0.88	11.14	1.03	Need DI	3.00	3.89	7.25	Extend DI
"L" 49+96 Extend	bypass from DI @ "L" 65+08+ORAN15R+ONRAN16R+ ONRAN17R	"L" 65+08	0.88	11.14	1.03	Need DI	18.00	10.16	0.98	OK
"L" 46+93	bypass from DI @ "L" 49+96 +ONRAN18R	"L" 49+96	0.98	3.37	1.57	Need DI	3.00	1.85	1.52	OK
"L" 46+16	bypass from DI @ "L" 46+93 +ONRAN19R	"L" 46+93	1.52	1.82	1.04	Need DI	3.00	1.24	0.58	OK
"L" 39+75	bypass from DI @ 46+16+ ONRAN21R	"L" 46+16	0.58	3.80	0.37	Need DI	3.00	2.00	1.80	Extend DI
"L" 39+75 Extend	bypass from DI @ 46+16+ ONRAN21R	"L" 46+16	0.58	3.80	0.37	Need DI	15.00	3.54	0.26	OK
"L" 12+10	bypass from DI @ "L" 39+75+ ONRAN22R, 23R, 24R, 25R, 26RA, 27R	"L" 39+75	0.26	14.36	0.92	Need DI	3.00	4.47	9.89	Extend DI

INTERIM CONDITION

Drop Inlet Analysis-NDOT-25 Year East Option B

DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 25yr Bypass Q (CFS)	25-year						Does DI need to be extended based on bypass flow 25-yr
				Gutter Flow- Half Street (CFS)	25-yr Criteria (drylane) Flow Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)	
"L" 12+10 Extend	bypass from DI @ "L" 39+75+ ONRAN22R, 23R, 24R, 25R, 26RA, 27R	"L" 39+75	0.26	14.36	0.92	Need DI	24.00	13.71	0.65	OK
"4" 16+47	bypass from DI @ "L" 12+10+ ONRAN28R	"L" 12+10	0.65	2.38	9.38	DI not needed	3.00	1.45	0.93	OK
"4" 14+96	bypass from DI @ "4" 16+47+ ONRAN29R	"4" 16+47	0.93	1.74	1.71	Need DI	3.00	1.18	0.56	OK
"4" 13+80	bypass from DI @ "4" 14+96 + ONRAN30R	"4" 14+96	0.56	1.42	1.14	Need DI	3.00	1.03	0.39	OK
"4" 11+83	bypass from DI @ "4" 13+80 + ONRAN31R	"4" 13+80	0.39	1.61	1.05	Need DI	3.00	1.11	0.50	OK
"4" 6+76	bypass from DI @ "4" 11+83 + ONRAN32R+ONRAN32RA	"4" 11+83	0.50	4.44	1.07	Need DI	3.00	2.19	2.25	Extend DI
"4" 6+76 Extend	bypass from DI @ "4" 11+83 + ONRAN32R+ONRAN32RA	"4" 11+83	0.50	4.44	1.07	Need DI	9.00	3.57	0.87	OK
"C" 3+50	bypass from DI @ "C" 3+50 ONRAN33R	"C" 3+50	0.87	4.03	0.69	Need DI	3.00	2.05	1.98	Extend DI
"C" 3+50 Extend	bypass from DI @ "C" 3+50 ONRAN33R	"C" 3+50	1.98	4.03	0.69	Need DI	12.00	3.67	0.36	OK

C-2: West Side

INTERIM CONDITION

Drop Inlet Analysis-NDOT-25 Year West Option A

DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 25yr Bypass Q (CFS)	25-year						Does DI need to be extended based on bypass flow 25-yr
				Gutter Flow- Half Street (CFS)	25-yr Criteria (drylane) Flow Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)	
"L" 112+00, 48.00' LT	ONRAN2L, 3L, 4L, 5L	N/A	N/A	15.67	3.2	Need DI	12.50	13.07	2.60	OK
"L" 92+86, 56.76' LT	ONRAN7LA, 1/2 ONRAN8L	N/A	N/A	4.67	10.18	DI not needed	3.00	2.26	2.41	OK
"L" 84+00, 57.02' LT	1/2 ONRAN8L, ONRAN9L, 1/3 ONRAN10L	"L" 92+86, 56.76' LT	2.41	8.37	33.88	DI not needed	3.00	4.40	4.33	OK
"L" 77+20, 48.97' LT	2/3 ONRAN 10L	"L" 84+00, 57.02' LT	4.33	7.25	21.24	DI not needed	3.00	3.33	3.92	OK
"L" 75+05, 48.01' LT	1/2 ONRAN11LA, 1/3 ONRAN11L	"L" 77+20, 48.97' LT	3.92	4.12	31.42	DI not needed	3.00	2.46	1.66	OK
"L" 72+91, 47.92' LT	1/2 ONRAN11LA, 1/3 ONRAN11L	"L" 75+05, 48.01' LT	1.66	3.03	23.46	DI not needed	3.00	1.90	1.13	OK
"L" 71+21, 48.04' LT	1/2 ONRAN11LA1, 1/3 ONRAN11L	"L" 72+91, 47.92' LT	1.13	2.50	19.06	DI not needed	3.00	1.65	0.85	OK
"L" 69+47, 48.08' LT	1/2 ONRAN11LA1, ONRAN13L	"L" 71+21, 48.04' LT	0.85	2.34	11.41	DI not needed	3.00	1.44	0.90	OK
"L" 67+75, 48.02' LT	ONRAN14L	"L" 69+47, 48.08' LT	0.90	2.02	12.36	DI not needed	3.00	1.29	0.73	OK
"L" 65+08, 48.24' LT	ONRAN14LA	"L" 67+75, 48.02' LT	0.73	2.66	5.67	DI not needed	3.00	1.67	0.99	OK
"L" 64+09, 48.15' LT	ONRAN15L	"L" 65+08, 48.24' LT	0.99	1.75	11.97	DI not needed	3.00	1.20	0.55	OK
"L" 62+15, 48.24' LT	ONRAN15LA	"L" 64+09, 48.15' LT	0.55	1.87	19.52	DI not needed	3.00	1.28	0.59	OK
"L" 58+47, 48.24' LT	ONRAN16L	"L" 62+15, 48.24' LT	0.59	3.23	31.24	DI not needed	3.00	1.86	1.37	OK
"L" 55+26, 56.61' LT	ONRAN16LA	"L" 58+47, 48.24' LT	1.37	3.91	9.93	DI not needed	4'x4'	3.64	0.27	OK
"L" 49+96, 47.95' LT	ONRAN17L	"L" 55+26, 56.61' LT	0.27	1.59	19.07	DI not needed	3.00	1.03	0.28	OK
"L" 48+16, 47.37' LT	ONRAN18L	"L" 49+96, 47.95' LT	0.28	1.59	13.63	DI not needed	21.00	1.58	0.01	OK
"L" 47+81, 46.43' LT	ONRAN18LA	"L" 48+16, 47.37' LT	0.01	0.26	19.24	DI not needed	21.00	0.26	0.00	OK
"L" 47+49, 45.49' LT	ONRAN18LB	"L" 47+81, 46.43' LT	0.00	0.25	9.55	DI not needed	21.00	0.25	0.00	OK
"L" 39+75, 42.19' LT	ONRAN19L, ONRAN20L	"L" 47+49, 45.49' LT	0.00	1.83	1.65	Need DI	3.00	1.32	0.51	OK
"L" 35+04, 42.12' LT	ONRAN21L	"L" 39+75, 42.19' LT	0.51	2.88	1.22	Need DI	3.00	1.69	1.19	OK
"L" 30+34, 42.41' LT	ONRAN22L, ONRAN22LA	"L" 35+04, 42.12' LT	1.19	3.31	1.62	Need DI	3.00	2.25	1.06	OK
"L" 25+01, 42.19' LT	ONRAN23L	"L" 30+34, 42.41' LT	1.06	4.07	0.81	Need DI	3.00	2.02	2.05	Extend DI

INTERIM CONDITION

Drop Inlet Analysis-NDOT-25 Year West Option A

DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 25yr Bypass Q (CFS)	25-year						Does DI need to be extended based on bypass flow 25-yr
				Gutter Flow- Half Street (CFS)	25-yr Criteria (drylane) Flow Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)	
"L" 25+01, 42.19' LT Extended	ONRAN23L	"L" 30+34, 42.41' LT	1.06	4.07	0.81	Need DI	10.00	3.52	0.55	OK
"L" 19+64, 42.17' LT	ONRAN24L, ONRAN25L	"L" 25+01, 42.19' LT Extended	0.55	3.89	0.63	Need DI	3.00	1.97	1.92	Extend DI
"L" 19+64, 42.17' LT Extended	ONRAN24L, ONRAN25L	"L" 25+01, 42.19' LT Extended	0.55	3.89	0.63	Need DI	10.00	3.45	0.44	OK
"L" 16+09, 42.17' LT	ONRAN26L	"L" 19+64, 42.17' LT Extended	0.44	2.67	1.11	Need DI	3.00	1.68	0.99	OK
"L" 12+76, 41.85' LT	ONRAN27L	"L" 16+09, 42.17' LT	0.99	3.06	0.76	Need DI	3.00	1.61	1.45	Extend DI
"L" 12+76, 41.85' LT Extended	ONRAN27L	"L" 16+09, 42.17' LT	0.99	3.06	0.76	Need DI	7.50	2.42	0.64	OK
"L" 11+00, 44.40' LT	ONRAN27LA, ONRAN28L	"L" 12+76, 41.85' LT Extended	0.64	1.60	0.70	Need DI	3.00	1.05	0.55	OK
"L" 10+38, 56.68' LT	ONRAN28LA	"L" 11+00, 44.40' LT	0.55	1.53	1.76	DI not needed	20.00	1.51	0.01	OK
"4" 15+39, 64.12' LT	ONRAN29L	"L" 10+38, 56.68' LT	0.01	1.53	1.42	Need DI	20.00	1.52	0.01	OK
"4" 14+00, 64.26' LT	ONRAN30L	"4" 15+39, 64.12' LT	0.01	1.43	0.25	Need DI	20.00	1.42	0.01	OK
"4" 11+76, 64.29' LT	ONRAN31L	"4" 14+00, 64.26' LT	0.01	2.14	0.81	Need DI	3.00	1.44	0.70	OK
"4" 7+04, 74.17' LT	ONRAN32LA, ONRAN32L	"4" 11+76, 64.29' LT	0.70	4.42	0.76	Need DI	3.00	2.23	2.19	Extend DI
"4" 7+04, 74.17' LT Extended	ONRAN32LA, ONRAN32L	"4" 11+76, 64.29' LT	0.70	4.42	0.76	Need DI	10.00	3.91	0.51	OK
"C" 3+22, 26.36' LT	ONRAN33L, ONRAN33LA, ONRAN33LA1	"4" 7+04, 74.17' LT Extended	0.51	4.96	0.75	Need DI	10.00	4.08	0.88	Extend DI
"C" 3+22, 26.36' LT Extended	ONRAN33L, ONRAN33LA, ONRAN33LA1	"4" 7+04, 74.17' LT Extended	0.51	4.96	0.75	Need DI	12.50	4.39	0.57	OK

In Interim Onsite flow stops at Smoke Ranch and Lake Mead. It bypasses at Vegas and Washington.

Interim Condition

Street Flow Capacity-NDOT 25-year West Option B

Normal Depth: D _{Q25} Calculated by FM										
Cross-Section	Street Location	Slope (%)	Cross Slope (%)	Transit Lane Width (FT)	Adjacent Lane Width (FT)	25-Year Flow Capacity		25-Year Flow Capacity		
						Dry Lane Criteria for NDOT		D _{Q25} Vs. D _{max}		
						D _{max} (FT)	Q (Half Street) (CFS)	Q ₂₅ (Half Street) (CFS)	D _{Q25}	D _{Q25} < D _{dry-lane} (Met/ Not Met)
"L" 112+00	North of Smoke Ranch	0.30	1.34	0.00	14.00	0.22	0.51	17.12	0.57	Not Met
"L" 100+00	North of Lake Mead	1.81	2.35	0.00	14.00	0.29	2.74	7.76	0.39	Not Met
"L" 92+86	South of Lake Mead	0.80	2.06	0.00	14.00	0.27	1.50	4.67	0.37	Not Met
"L" 84+00	South of Lake Mead	1.49	3.51	0.00	14.00	0.37	4.48	7.16	0.43	Not Met
"L" 79+00	North of Coran	1.39	2.00	10.00	14.00	0.46	12.83	7.52	0.39	Met
"L" 77+20	South of Coran	1.36	2.68	6.00	14.00	0.47	10.64	7.52	0.42	Met
"L" 75+05	South of Coran	1.63	3.19	6.00	14.00	0.54	16.44	5.48	0.38	Met
"L" 72+91	South of Coran	1.76	2.61	0.00	14.50	0.31	3.36	3.88	0.32	Not Met
"L" 71+21	South of Coran	1.47	2.47	0.00	14.40	0.30	2.82	3.01	0.31	Not Met
"L" 69+47	South of Coran	1.04	2.00	0.00	14.60	0.27	1.84	2.63	0.30	Not Met
"L" 67+75	South of Spring	0.82	2.18	0.00	14.00	0.28	1.77	2.19	0.30	Not Met
"L" 65+08	South of Spring	2.38	1.00	0.00	14.00	0.19	0.92	2.75	0.24	Not Met
"L" 65+08 D/S of DI	South of Spring	2.38	1.00	0.00	14.00	0.19	0.92	0.86	0.19	Met
"L" 64+09	South of Spring	0.96	2.12	0.00	14.00	0.27	1.71	1.62	0.27	Met
"L" 62+15	South of Melody	1.34	2.58	0.00	14.00	0.31	2.95	1.80	0.27	Met
"L" 58+47	South of Melody	1.63	3.20	0.00	14.00	0.35	4.27	3.19	0.32	Met
"L" 55+26	South of Melody	0.50	2.28	0.00	14.00	0.28	1.36	3.88	0.38	Not Met
"L" 49+96	South of Melody	0.89	2.86	17.50	11.00	0.78	39.80	3.95	0.37	Met
"L" 48+16	South of Melody	0.70	2.52	17.00	14.00	0.73	32.14	3.01	0.34	Met
"L" 47+81	South of Melody	1.18	2.62	16.00	14.00	0.73	40.51	0.29	0.16	Met
"L" 47+49	South of Melody	1.07	1.74	14.50	14.00	0.50	25.62	0.25	0.16	Met
"L" 39+75	South of Vegas	1.15	2.68	0.00	14.00	0.31	2.67	4.64	0.37	Not Met
"L" 35+04	South of Vegas	1.15	2.13	0.00	14.00	0.27	1.87	4.53	0.35	Not Met
"L" 35+04 D/S of DI	South of Vegas	1.15	2.13	0.00	14.00	0.27	1.87	1.78	0.27	Met
"L" 30+34	South of Vegas	0.30	4.05	0.00	14.00	0.41	2.62	4.48	0.49	Not Met
"L" 25+01	South of Vegas	0.65	1.93	0.00	14.00	0.26	1.29	4.67	0.37	Not Met
"L" 25+01 D/S of DI	South of Vegas	0.65	1.93	0.00	14.00	0.26	1.29	1.13	0.25	Met
"L" 19+64	South of Vegas	0.48	1.67	0.00	14.00	0.24	0.88	4.47	0.38	Not Met
"L" 19+64 D/S of DI	South of Vegas	0.48	1.67	0.00	14.00	0.24	0.88	0.56	0.21	Met
"L" 16+09	South of Vegas	0.50	2.64	0.00	14.00	0.31	1.77	2.79	0.36	Not Met
"L" 12+76	South of Vegas	0.70	1.68	0.00	14.00	0.24	1.06	3.13	0.32	Not Met
"L" 12+76 D/S of DI	South of Vegas	0.70	1.68	0.00	14.00	0.24	1.06	0.67	0.21	Met
"L" 11+00	South of Washington	0.60	1.66	0.00	10.50	0.21	0.58	1.63	0.27	Not Met
"L" 10+38	South of Washington	0.60	2.70	16.00	10.50	0.70	16.57	1.08	0.26	Met
"4" 15+39	South of Washington	0.82	2.65	0.00	14.00	0.31	2.27	1.57	0.27	Met

Interim Condition

Street Flow Capacity-NDOT 25-year West Option B

Normal Depth: D _{Q25} Calculated by FM								
Cross-Section	Street Location	Slope (%)	Cross Slope (%)	Transit Lane Width (FT)	Adjacent Lane Width (FT)	25-Year Flow Capacity		
						Dry Lane Criteria for NDOT		
						D _{max} (FT)	Q (Half Street) (CFS)	Q ₂₅ (Half Street) (CFS)
						D _{Q25} Vs. D _{max}		
						D _{Q25} < D _{dry-lane} (Met/ Not Met)		
"4" 14+00	South of Washington	0.88	2.24	0.00	14.00	1.81		
"4" 11+76	South of Washington	0.80	1.68	0.00	12.00	0.96		
"4" 7+04	South of Washington	0.50	1.68	0.00	12.00	0.76		
"4" 7+04 D/S of DI	South of Washington	0.50	1.68	0.00	12.00	0.76		
"C" 3+22	South of Washington	0.66	1.61	0.00	12.00	0.75		
"C" 3+22 D/S of DI	South of Washington	0.66	1.61	0.00	12.00	0.75		
						1.43		
						2.14		
						4.28		
						0.48		
						4.68		
						0.52		
						0.26		
						0.28		
						0.37		
						0.20		
						0.36		
						0.20		
						Met		
						Not Met		
						Not Met		
						Met		
						Not Met		
						Met		

INTERIM CONDITION

Drop Inlet Analysis-NDOT-25 Year West Option B

DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 25yr Bypass Q (CFS)	25-year					Does DI need to be extended based on bypass flow 25 yr	
				Gutter Flow- Half Street (CFS)	25-yr Criteria (drylane) Flow Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)		Bypass Flow (CFS)
"L" 112+00, 48.00' LT	ONRAN2L, 3L, 4L, 5L	N/A	N/A	17.12	0.51	Need DI	32.50	16.80	0.32	OK
"L" 100+00, 52.00' LT	ONRAN6L, ONRAN7L	N/A	N/A	7.76	2.74	Need DI	10.00	5.74	2.02	OK
"L" 92+86, 56.76' LT	ONRAN7LA, 1/2 ONRAN8L	N/A	N/A	4.67	1.50	Need DI	3.00	2.26	2.41	Extend DI
"L" 92+86, 56.76' LT Extended	ONRAN7LA, 1/2 ONRAN8L	N/A	N/A	4.67	1.50	Need DI	7.50	3.51	1.16	OK
"L" 84+00, 57.02' LT	1/2 ONRAN8L, ONRAN9L, 1/3 ONRAN10L	"L" 92+86, 56.76' LT Extended	1.16	7.16	4.48	Need DI	3.00	3.65	3.51	OK
"L" 77+20, 48.97' LT	2/3 ONRAN 10L	"L" 84+00, 57.02' LT	3.51	7.52	10.64	DI not needed	3.00	3.41	4.11	OK
"L" 75+05, 48.01' LT	1/2 ONRAN11LA, 1/3 ONRAN11L	"L" 77+20, 48.97' LT	4.11	5.48	16.44	DI not needed	3.00	2.97	2.51	OK
"L" 72+91, 47.92' LT	1/2 ONRAN11LA, 1/3 ONRAN11L	"L" 75+05, 48.01' LT	2.51	3.88	3.36	Need DI	3.00	2.24	1.64	OK
"L" 71+21, 48.04' LT	1/2 ONRAN11LA, 1/3 ONRAN11L	"L" 72+91, 47.92' LT	1.64	3.01	2.82	Need DI	3.00	1.87	1.14	OK
"L" 69+47, 48.08' LT	1/2 ONRAN11LA, 1/3 ONRAN11L	"L" 71+21, 48.04' LT	1.14	2.63	1.84	Need DI	3.00	1.56	1.07	OK
"L" 67+75, 48.02' LT	ONRAN14L	"L" 69+47, 48.08' LT	1.07	2.19	1.77	Need DI	3.00	1.37	0.82	OK
"L" 65+08, 48.24' LT	ONRAN14LA	"L" 67+75, 48.02' LT	0.82	2.75	0.92	Need DI	3.00	1.71	1.04	Extend DI
"L" 65+08, 48.24' LT Extended	ONRAN14LA	"L" 67+75, 48.02' LT	0.82	2.75	0.92	Need DI	5.00	1.89	0.86	OK
"L" 64+09, 48.15' LT	ONRAN15L	"L" 65+08, 48.24' LT Extended	0.86	1.62	1.71	DI not needed	3.00	1.14	0.48	OK
"L" 62+15, 48.24' LT	ONRAN15LA	"L" 64+09, 48.15' LT	0.48	1.80	2.95	DI not needed	3.00	1.25	0.55	OK
"L" 58+47, 48.24' LT	ONRAN16L	"L" 62+15, 48.24' LT	0.55	3.19	4.27	DI not needed	3.00	1.85	1.34	OK
"L" 55+26, 56.61' LT	ONRAN16LA	"L" 58+47, 48.24' LT	1.34	3.88	1.36	Need DI	4'x4'	3.62	0.26	OK
"L" 49+96, 47.95' LT	ONRAN17L	"L" 55+26, 56.61' LT	0.26	3.95	39.80	DI not needed	3.00	2.25	1.70	OK
"L" 48+16, 47.37' LT	ONRAN18L	"L" 49+96, 47.95' LT	1.70	3.01	32.14	DI not needed	21.00	2.97	0.04	OK
"L" 47+81, 46.43' LT	ONRAN18LA	"L" 48+16, 47.37' LT	0.04	0.29	40.51	DI not needed	21.00	0.29	0.00	OK
"L" 47+49, 45.49' LT	ONRAN18LB	"L" 47+81, 46.43' LT	0.00	0.25	25.62	DI not needed	21.00	0.25	0.00	OK
"L" 39+75, 42.19' LT	ONRAN19L, ONRAN20L	"L" 47+49, 45.49' LT	0.00	4.64	2.67	Need DI	3.00	2.48	2.16	OK
"L" 35+04, 42.12' LT	ONRAN21L	"L" 39+75, 42.19' LT	2.16	4.53	1.87	Need DI	3.00	2.26	2.27	Extend DI
"L" 35+04, 42.12' LT Extended	ONRAN21L	"L" 39+75, 42.19' LT	2.16	4.53	1.87	Need DI	5.00	2.75	1.78	OK
"L" 30+34, 42.41' LT	ONRAN22L, ONRAN22LA	"L" 35+04, 42.12' LT Extended	1.78	4.48	2.62	Need DI	3.00	2.82	1.66	OK
"L" 25+01, 42.19' LT	ONRAN23L	"L" 30+34, 42.41' LT	1.66	4.67	1.29	Need DI	3.00	2.20	2.47	Extend DI
"L" 25+01, 42.19' LT Extended	ONRAN23L	"L" 30+34, 42.41' LT	1.66	4.67	1.29	Need DI	7.50	3.54	1.13	OK
"L" 19+64, 42.17' LT	ONRAN24L, ONRAN25L	"L" 25+01, 42.19' LT Extended	1.13	4.47	0.88	Need DI	3.00	2.16	2.31	Extend DI
"L" 19+64, 42.17' LT Extended	ONRAN24L, ONRAN25L	"L" 25+01, 42.19' LT Extended	1.13	4.47	0.88	Need DI	10.00	3.91	0.56	OK
"L" 16+09, 42.17' LT	ONRAN26L	"L" 19+64, 42.17' LT Extended	0.56	2.79	1.77	Need DI	3.00	1.73	1.06	OK
"L" 12+76, 41.85' LT	ONRAN27L	"L" 16+09, 42.17' LT	1.06	3.13	1.06	Need DI	3.00	1.63	1.50	Extend DI
"L" 12+76, 41.85' LT Extended	ONRAN27L	"L" 16+09, 42.17' LT	1.06	3.13	1.06	Need DI	7.50	2.46	0.67	OK
"L" 11+00, 44.40' LT	ONRAN27LA, ONRAN28L	"L" 12+76, 41.85' LT Extended	0.67	1.63	0.58	Need DI	3.00	1.06	0.57	OK
"L" 10+38, 56.68' LT	ONRAN28LA	"L" 11+00, 44.40' LT	0.57	1.08	16.57	DI not needed	20.00	1.08	0.00	OK
"L" 15+39, 64.12' LT	ONRAN29L	"L" 10+38, 56.68' LT	0.00	1.57	2.27	DI not needed	20.00	1.56	0.01	OK
"L" 14+00, 64.26' LT	ONRAN30L	"L" 15+39, 64.12' LT	0.01	1.43	1.81	DI not needed	20.00	1.42	0.01	OK
"L" 11+76, 64.29' LT	ONRAN31L	"L" 14+00, 64.26' LT	0.01	2.14	0.96	Need DI	3.00	1.44	0.70	OK

INTERIM CONDITION											
Drop Inlet Analysis-NDOT-25 Year West Option B											
DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 25yr Bypass Q (CFS)	25-year					Intercept Flow (CFS)	Bypass Flow (CFS)	Does DI need to be extended based on bypass flow 25 yr
				Gutter Flow- Half Street (CFS)	25-yr Criteria (drylane) Flow Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)				
"4" 7+04, 74.17' LT	ONRAN321A, ONRAN321	"4" 11+76, 64.29' LT	0.70	4.28	0.76	Need DI	3.00	2.19	2.09	Extend DI	
"4" 7+04, 74.17' LT Extended	ONRAN321A, ONRAN321	"4" 11+76, 64.29' LT	0.70	4.28	0.76	Need DI	10.00	3.80	0.48	OK	
"C" 3+22, 26.36' LT	ONRAN331, ONRAN331A, ONRAN331A1	"4" 7+04, 74.17' LT Extended	0.48	4.68	0.75	Need DI	10.00	3.88	0.80	Extend DI	
"C" 3+22, 26.36' LT Extended	ONRAN331, ONRAN331A, ONRAN331A1	"4" 7+04, 74.17' LT Extended	0.48	4.68	0.75	Need DI	12.50	4.16	0.52	OK	

D. Ultimate Condition- RTC 10-yr and 100-yr Flows

D. Ultimate Condition- RTC 10-yr and 100-yr Flows

D-1: East Side

ULTIMATE CONDITION
Street Flow Capacity-RTC 10-year East Option A

							Discharge : Calculated by FM				Normal Depth: D _{Q10} Calculated by FM					
Cross-Section	Street Location	Slope (%)	Cross Slope (%)	Non Dry Length (FT)	Total Length (FT)	Center Turn Lane (FT)	10-Year Flow Capacity Dry Lane Criteria for RTC				Dry Lane and D X V < 6 Criteria for RTC					
							D (FT)	V (FPS)	DxV	Q (Half Street) (CFS)	Q ₁₀ (Half Street) (CFS)	D _{Q10} (FT)	V _{Q10} (FT)	D _{Q10} < D _{dry-lane} (Met/ Not Met)	D _{Q10} X V _{Q10}	D _{Q10} X V _{Q10} < 6
"L" 112+00	North of Smoke Ranch	0.30	3.48	32.61	46.11	0.00	1.13	3.47	3.94	60.44	13.17	0.67	2.37	Met	1.59	MET
"L" 100+00	North of Lake Mead	1.81	3.94	33.89	47.39	0.00	0.85	6.96	5.92	58.17	5.22	0.51	1.95	Met	0.99	MET
"L" 98+80	North of Lake Mead	0.74	2.22	32.19	45.69	0.00	0.71	3.84	2.74	37.80	5.55	0.39	2.39	Met	0.93	MET
"L" 78+25	North of Coran	1.39	1.84	32.21	45.71	0.00	0.59	4.54	2.69	35.47	11.24	0.42	3.42	Met	1.44	MET
"L" 65+08	South of Spring	2.38	1.45	32.50	46.00	0.00	0.47	4.90	2.31	27.82	17.21	0.47	3.80	Met	1.79	MET
"L" 49+96	South of Melody	0.89	2.08	21.00	34.50	0.00	0.44	2.88	1.26	10.00	17.76	0.52	3.31	Not Met	1.72	MET
"L" 49+96 D/S of DI	South of Melody	0.89	2.08	21.00	34.50	0.00	0.44	2.88	1.26	10.00	8.49	0.42	2.76	Met	1.16	MET
"L" 46+93	South of Melody	1.07	2.58	21.00	34.50	0.00	0.54	3.76	2.04	17.46	10.25	0.46	3.29	Met	1.51	MET
"L" 46+16	South of Melody	1.15	1.88	21.00	34.50	0.00	0.40	3.00	1.19	9.12	6.75	0.37	2.79	Met	1.03	MET
"L" 39+75	South of Vegas	1.15	0.75	20.00	33.50	0.00	0.15	0.92	0.14	0.21	2.36	0.22	1.52	Not Met	0.33	MET
"L" 39+75 D/S of DI	South of Vegas	1.15	0.75	20.00	33.50	0.00	0.15	0.92	0.14	0.21	0.03	0.06	1.05	Met	0.06	MET
"L" 12+10	South of Vegas	0.70	2.04	20.00	33.50	0.00	0.41	2.40	0.98	7.21	10.25	0.45	2.61	Not Met	1.17	MET
"4" 16+47	South of Washington	0.50	2.57	30.00	53.50	10.00	0.77	3.37	2.60	33.66	1.44	0.29	1.55	Met	0.45	MET
"4" 14+96	South of Washington	0.88	2.98	27.80	51.30	10.00	0.83	4.74	3.92	48.86	1.01	0.25	1.84	Met	0.46	MET
"4" 13+80	South of Washington	0.88	2.30	32.00	45.50	0.00	0.74	4.33	3.19	45.18	0.80	0.22	1.63	Met	0.36	MET
"4" 11+83	South of Washington	0.60	2.46	22.00	35.50	0.00	0.54	2.81	1.52	13.55	0.99	0.25	1.49	Met	0.37	MET
"4" 6+76	South of Washington	0.50	2.63	22.00	35.50	0.00	0.58	2.72	1.57	14.64	3.16	0.36	1.86	Met	0.67	MET
"C" 3+50	South of Washington	0.66	1.69	22.00	35.50	0.00	0.37	2.11	0.79	5.74	4.11	0.34	1.95	Met	0.66	MET

ULTIMATE CONDITION

Street Flow Capacity-RTC 100-year Option B East

			Discharge: Calculated by FM				Normal Depth: D _{Q100} Calculated by FM					
Cross-Section	Street Location	Slope (%)	100-Year Flow Capacity					D X V < 8 & D _{Q100} < 2 Criteria for RTC				
			D _{max} (ft)	V (fps)	DxV _{max}	Q _{max} (CFS)	Q ₁₀₀ (CFS)	D _{Q100}	V _{Q100}	D _{Q100} x V _{Q100}	D _{Q100} x V _{Q100} < 8 (Met/Not Met)	D _{Q100} < 2 (Met/ Not Met)
"L" 112+00	North of Smoke Ranch	0.30	1.70	4.69	7.97	179.16	24.20	0.84	2.81	2.36	Met	Met
"L" 100+00	North of Lake Mead	1.81	1.01	7.88	7.96	89.88	9.54	0.63	2.30	1.45	Met	Met
"L" 98+80	North of Lake Mead	0.74	1.21	6.58	7.96	174.39	10.13	0.56	2.04	1.14	Met	Met
"L" 78+25	North of Coran	1.39	1.07	7.33	7.84	189.20	20.03	0.52	4.11	2.14	Met	Met
"L" 65+08	South of Spring	2.38	0.85	9.21	7.83	165.06	31.14	0.56	4.32	2.42	Met	Met
"L" 65+08 D/S of DI	South of Spring	2.38	0.85	9.21	7.83	165.06	14.10	0.44	3.55	1.56	Met	Met
"L" 49+96	South of Melody	0.89	1.14	6.91	7.88	171.21	19.82	0.57	3.56	2.03	Met	Met
"L" 46+93	South of Melody	1.07	1.14	7.00	7.98	149.25	17.55	0.56	3.91	2.19	Met	Met
"L" 46+16	South of Melody	1.15	1.05	7.49	7.86	167.94	12.84	0.47	3.44	1.62	Met	Met
"L" 39+75	South of Vegas	1.15	0.96	8.23	7.90	213.67	12.23	0.37	2.73	1.01	Met	Met
"L" 39+75 D/S of DI	South of Vegas	1.15	0.96	8.23	7.90	213.67	1.05	0.21	1.51	0.32	Met	Met
"L" 12+10	South of Vegas	0.70	1.20	6.56	7.87	176.17	20.22	0.59	3.26	1.92	Met	Met
"4" 16+47	South of Washington	0.50	1.47	5.41	7.95	202.29	17.13	0.63	2.91	1.83	Met	Met
"4" 14+96	South of Washington	0.88	1.25	6.38	7.98	147.21	13.31	0.52	3.30	1.72	Met	Met
"4" 13+80	South of Washington	0.88	1.15	6.84	7.87	157.62	10.20	0.48	3.09	1.48	Met	Met
"4" 11+83	South of Washington	0.60	1.28	6.19	7.92	166.74	8.21	0.48	2.57	1.23	Met	Met
"4" 6+76	South of Washington	0.50	1.42	5.55	7.88	186.56	10.33	0.54	2.58	1.39	Met	Met
"C" 3+50	South of Washington	0.66	1.19	6.68	7.95	188.09	7.92	0.43	2.45	1.05	Met	Met

ULTIMATE CONDITION																		
Drop Inlet Analysis-RTC 10-yr & 100-yr East Option B																		
DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream Bypass DI	Upstream 10-yr Bypass Q (CFS)	Upstream 100-yr Bypass Q (CFS)	10-year						100-Year						Does DI need to be extended based on bypass flow 10-yr	Does DI need to be extended based on bypass flow 100-yr
					Gutter Flow- Half Street (CFS)	10-yr Criteria (drylane) Flow Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)	Gutter Flow- Half Street (CFS)	100-yr Criteria Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)		
"L" 98+80	ONRAN6R, ONRAN7R, 0.3*ONRAN7RA	N/A	N/A	N/A	5.47	13.64	DI not needed	3.00	2.51	2.96	10.13	174.39	DI not needed	3.00	3.64	6.49	OK	OK
"L" 65+08	bypass from x-section "L" 78+25+ ONRAN11R+ONRAN11RA+ONRAN13R+ ONRAN14R	"L" 78+25	10.82	20.03	16.80	7.61	Need DI	3.00	5.36	11.44	31.14	165.06	DI not needed	3.00	7.71	23.43	Extend DI	OK
"L" 65+08 Extend	bypass from x-section "L" 78+25+ ONRAN11R+ONRAN11RA+ONRAN13R+ ONRAN14R	"L" 78+25	10.82	20.03	16.80	7.61	Need DI	15.00	10.85	5.95	31.14	165.06	DI not needed	15.00	17.04	14.10	OK	OK
"L" 49+96	bypass from DI @ "L" 65+08+ORAN15R+ONRAN16R+ ONRAN17R	"L" 65+08 Extend	5.95	14.10	13.42	14.34	Need DI	3.00	4.33	9.09	19.82	171.21	DI not needed	3.00	5.54	14.28	OK	OK
"L" 46+93	bypass from DI @ "L" 49+96 +ONRAN18R	"L" 49+96	9.09	14.28	10.85	20.17	DI not needed	3.00	3.86	6.99	17.55	149.25	DI not needed	3.00	5.13	12.42	OK	OK
"L" 46+16	bypass from DI @ "L" 46+93 +ONRAN19R	"L" 46+93	6.99	12.42	7.22	9.82	DI not needed	3.00	3.04	4.18	12.84	167.94	DI not needed	3.00	4.28	8.56	OK	OK
"L" 39+75	bypass from DI @ 46+16+ ONRAN21R	"L" 46+16	4.18	8.56	6.54	0.37	Need DI	3.00	2.86	3.68	12.23	213.67	DI not needed	3.00	4.16	8.07	Extend DI	OK
"L" 39+75 Extend	bypass from DI @ 46+16+ ONRAN21R	"L" 39+75	4.18	8.56	6.54	0.37	Need DI	24.00	6.25	0.29	12.23	213.67	DI not needed	24.00	11.18	1.05	OK	OK
"L" 12+10	bypass from DI @ "L" 39+75+ ONRAN22R, 23R, 24R, 25R, 26RA, 27R	"L" 39+75 Extend	0.29	1.05	10.62	9.60	Need DI	3.00	3.74	6.88	20.22	176.17	DI not needed	3.00	5.48	14.74	OK	OK
"4" 16+47	bypass from DI @ "L" 12+10+ ONRAN28R	"L" 12+10	6.88	14.74	8.16	31.02	DI not needed	3.00	3.17	4.99	17.13	202.29	DI not needed	3.00	4.94	12.19	OK	OK
"4" 14+96	bypass from DI @ "4" 16+47+ ONRAN29R	"4" 16+47	4.99	12.19	5.59	46.86	DI not needed	3.00	2.56	3.03	13.31	147.21	DI not needed	3.00	4.31	9.00	OK	OK
"4" 13+80	bypass from DI @ "4" 14+96 + ONRAN30R	"4" 14+96	3.03	9.00	3.67	9.86	DI not needed	3.00	1.98	1.69	10.20	157.62	DI not needed	3.00	3.68	6.52	OK	OK
"4" 11+83	bypass from DI @ "4" 13+80 + ONRAN31R	"4" 13+80	1.69	6.52	2.60	11.96	DI not needed	3.00	1.71	1.25	8.21	166.74	DI not needed	3.00	3.19	5.02	OK	OK
"4" 6+76	bypass from DI @ "4" 11+83 + ONRAN32R+ONRAN32RA	"4" 11+83	1.25	5.02	4.12	42.05	DI not needed	3.00	2.11	2.06	10.33	186.56	DI not needed	3.00	3.65	6.68	OK	OK
"C" 3+50	bypass from DI @ "c" 3+50 ONRAN33R	"4" 6+76	2.06	3.65	6.33	4.81	Need DI	3.00	2.75	3.64	7.92	188.09	DI not needed	3.00	3.13	4.79	OK	OK

D-2: West Side

ULTIMATE CONDITION

Street Flow Capacity-RTC 10-year West Option A

							Discharge : Calculated by FM				Normal Depth: D _{Q10} Calculated by FM					
Cross-Section	Street Location	Slope (%)	Cross Slope (%)	Non Dry Length (FT)	Total Length (FT)	Center Turn Lane (FT)	10-Year Flow Capacity Dry Lane Criteria for RTC				Dry Lane and D X V < 6 Criteria for RTC					
							D (FT)	V (FPS)	DxV	Q (Half Street) (CFS)	Q ₁₀ (Half Street) (CFS)	D _{Q10} (FT)	V _{Q10} (FT)	D _{Q10} < D _{dry-lane} (Met/ Not Met)	D _{Q10} X V _{Q10}	D _{Q10} X V _{Q10} < 6
"L" 112+00	North of Smoke Ranch	0.30	1.34	32.00	56.00	10.50	0.55	1.99	1.10	14.96	12.47	0.52	1.90	Met	0.99	MET
"L" 100+00	North of Lake Mead	1.81	2.35	42.50	66.00	10.00	0.86	6.96	5.99	88.44	5.9	0.36	3.56	Met	1.28	MET
"L" 92+86	South of Lake Mead	0.80	2.06	22.00	46.50	11.00	0.58	3.42	1.98	19.93	3.43	0.34	2.22	Met	0.75	MET
"L" 84+00	South of Lake Mead	1.49	3.51	20.50	45.00	11.00	0.84	6.25	5.25	53.09	5.90	0.40	3.63	Met	1.45	MET
"L" 79+00	North of Coran	1.39	2.00	32.50	58.00	12.00	0.77	5.60	4.34	64.53	6.27	0.37	3.15	Met	1.17	MET
"L" 77+20	South of Coran	1.36	2.68	34.50	58.00	10.00	0.92	6.35	5.84	84.49	6.27	0.39	3.34	Met	1.30	MET
"L" 75+05	South of Coran	1.63	3.19	21.50	46.00	11.00	0.81	6.38	5.17	54.79	3.33	0.32	3.20	Met	1.02	MET
"L" 72+91	South of Coran	1.76	2.61	21.50	46.00	11.00	0.69	5.87	4.02	41.79	2.14	0.27	2.83	Met	0.76	MET
"L" 71+21	South of Coran	1.47	2.47	32.50	46.00	0.00	0.74	5.60	4.14	49.60	1.58	0.25	2.43	Met	0.61	MET
"L" 69+47	South of Coran	1.04	2.00	32.50	56.00	10.00	0.77	4.87	3.77	56.58	1.44	0.25	1.98	Met	0.50	MET
"L" 67+75	South of Spring	0.82	2.18	21.50	46.00	11.00	0.59	3.54	2.10	20.74	1.18	0.25	1.76	Met	0.44	MET
"L" 65+08	South of Spring	2.38	1.00	32.50	56.00	10.00	0.45	4.74	2.13	28.33	1.68	0.22	2.40	Met	0.53	MET
"L" 64+09	South of Spring	0.96	2.12	32.50	56.00	10.00	0.81	4.86	3.95	59.82	0.96	0.23	1.77	Met	0.41	MET
"L" 62+15	South of Melody	1.34	2.58	21.50	46.00	11.00	0.68	5.06	3.44	35.16	1.11	0.23	2.19	Met	0.50	MET
"L" 58+47	South of Melody	1.63	3.20	21.50	46.00	11.00	0.81	6.38	5.18	54.47	2.12	0.28	2.87	Met	0.80	MET
"L" 55+26	South of Melody	0.50	2.28	32.50	56.00	10.00	0.87	3.70	3.20	50.25	2.53	0.34	1.77	Met	0.60	MET
"L" 49+96	South of Melody	0.89	2.86	21.50	46.00	11.00	0.74	4.40	3.25	33.92	2.73	0.33	2.36	Met	0.78	MET
"L" 48+16	South of Melody	0.70	2.52	35.00	48.50	0.00	1.01	4.89	4.92	83.21	1.91	0.99	1.93	Met	1.91	MET
"L" 47+81	South of Melody	1.18	2.62	32.50	56.00	10.00	0.97	6.17	5.98	93.32	0.18	0.14	1.51	Met	0.21	MET
"L" 47+49	South of Melody	1.07	1.74	32.50	56.00	10.00	0.69	4.53	3.13	46.52	0.19	0.14	1.45	Met	0.20	MET
"L" 39+75	South of Vegas	1.15	2.68	20.00	43.50	10.00	0.66	4.60	3.04	28.19	3.41	0.34	2.72	Met	0.92	MET
"L" 35+04	South of Vegas	1.15	2.13	20.00	33.50	0.00	0.55	3.97	2.19	20.18	3.06	0.31	2.49	Met	0.77	MET
"L" 30+34	South of Vegas	0.30	4.05	20.00	43.50	10.00	0.93	3.04	2.84	28.44	3.22	0.44	1.77	Met	0.78	MET
"L" 25+01	South of Vegas	0.65	1.93	20.00	43.50	10.00	0.51	2.80	1.43	12.81	3.23	0.34	1.99	Met	0.68	MET
"L" 19+64	South of Vegas	0.48	1.67	20.00	43.50	10.00	0.46	2.20	1.01	8.86	3.90	0.36	1.81	Met	0.65	MET
"L" 16+09	South of Vegas	0.50	2.64	20.00	33.50	0.00	0.65	2.99	1.95	18.47	3.54	0.38	1.99	Met	0.76	MET
"L" 12+76	South of Vegas	0.70	1.68	20.00	43.50	10.00	0.46	2.66	1.22	10.70	3.00	0.32	1.95	Met	0.62	MET
"L" 11+00	South of Washington	0.60	1.66	26.00	39.50	0.00	0.56	2.88	1.60	18.68	2.09	0.29	1.69	Met	0.49	MET
"L" 10+38	South of Washington	0.60	2.70	30.00	43.50	0.00	0.93	4.00	3.74	42.09	1.17	0.27	1.99	Met	0.54	MET
"4" 15+39	South of Washington	0.82	2.65	21.00	34.50	0.00	0.68	3.96	2.70	27.16	1.13	0.25	1.82	Met	0.46	MET
"4" 14+00	South of Washington	0.88	2.24	36.00	49.50	0.00	0.93	5.16	4.80	81.89	1.06	0.24	1.78	Met	0.43	MET
"4" 11+76	South of Washington	0.80	1.68	43.50	67.00	10.00	0.86	4.62	3.95	80.36	1.59	0.26	1.76	Met	0.46	MET
"4" 7+04	South of Washington	0.50	1.68	47.00	70.50	10.00	0.91	3.81	3.48	75.61	2.72	0.32	1.67	Met	0.53	MET
"C" 3+22	South of Washington	0.66	1.61	54.00	77.50	10.00	0.99	4.66	4.63	115.44	3.32	0.33	1.93	Met	0.64	MET

ULTIMATE CONDITION

Street Flow Capacity-RTC 100-year West Option A

			Discharge: Calculated by FM				Normal Depth: D _{Q100} Calculated by FM					
Cross-Section	Street Location	Slope (%)	100-Year Flow Capacity				D X V < 8 & D _{Q100} < 2 Criteria for RTC					
			D _{max} (FT)	V (FPS)	DxV _{max}	Q _{max} (CFS)	Q ₁₀₀ (CFS)	D _{Q100}	V _{Q100}	D _{Q100} x V _{Q100}	D _{Q100} x V _{Q100} < 8 (Met/Not Met)	D _{Q100} < 2 (Met/ Not Met)
"L" 112+00	North of Smoke Ranch	0.30	1.49	5.34	7.96	303.36	22.98	0.63	2.21	1.39	Met	Met
"L" 100+00	North of Lake Mead	1.81	1.01	7.83	7.91	141.78	10.92	0.43	4.14	1.78	Met	Met
"L" 92+86	South of Lake Mead	0.80	1.22	6.52	7.95	196.84	6.36	0.40	2.58	1.03	Met	Met
"L" 84+00	South of Lake Mead	1.49	1.07	7.46	7.98	107.33	11.68	0.50	4.29	2.15	Met	Met
"L" 79+00	North of Coran	1.39	1.09	7.26	7.91	182.09	12.02	0.45	3.69	1.66	Met	Met
"L" 77+20	South of Coran	1.36	1.10	7.25	7.98	142.70	12.02	0.48	3.92	1.88	Met	Met
"L" 75+05	South of Coran	1.63	1.04	7.64	7.95	112.52	9.25	0.45	4.10	1.85	Met	Met
"L" 72+91	South of Coran	1.76	1.02	7.81	7.97	131.55	6.72	0.38	3.73	1.42	Met	Met
"L" 71+21	South of Coran	1.47	1.08	7.41	8.00	148.73	5.31	0.36	3.24	1.17	Met	Met
"L" 69+47	South of Coran	1.04	1.19	6.69	7.96	202.95	4.59	0.35	2.61	0.91	Met	Met
"L" 67+75	South of Spring	0.82	1.22	6.48	7.91	188.73	3.86	0.35	2.33	0.82	Met	Met
"L" 65+08	South of Spring	2.38	0.86	9.18	7.89	243.53	4.51	0.27	3.01	0.81	Met	Met
"L" 64+09	South of Spring	0.96	1.22	6.55	7.99	197.56	3.14	0.32	2.35	0.75	Met	Met
"L" 62+15	South of Melody	1.34	1.10	7.19	7.91	143.75	3.15	0.32	2.79	0.89	Met	Met
"L" 58+47	South of Melody	1.63	1.15	6.95	7.99	105.17	4.90	0.37	3.52	1.30	Met	Met
"L" 55+26	South of Melody	0.50	1.44	5.52	7.95	221.90	5.92	0.43	2.18	0.94	Met	Met
"L" 49+96	South of Melody	0.89	1.24	6.39	7.92	150.64	5.96	0.42	2.86	1.20	Met	Met
"L" 48+16	South of Melody	0.70	1.31	6.07	7.95	180.15	4.79	0.39	2.41	0.94	Met	Met
"L" 47+81	South of Melody	1.18	1.14	6.93	7.90	148.53	0.44	0.18	1.72	0.31	Met	Met
"L" 47+49	South of Melody	1.07	1.15	6.94	7.98	221.16	0.35	0.17	1.57	0.27	Met	Met
"L" 39+75	South of Vegas	1.15	1.15	6.88	7.91	142.32	6.34	0.41	3.17	1.30	Met	Met
"L" 35+04	South of Vegas	1.15	1.06	7.47	7.92	155.70	6.48	0.39	3.00	1.17	Met	Met
"L" 30+34	South of Vegas	0.30	1.71	4.65	7.95	155.76	7.27	0.58	2.16	1.25	Met	Met
"L" 25+01	South of Vegas	0.65	1.25	6.36	7.95	203.66	7.51	0.43	2.45	1.05	Met	Met
"L" 19+64	South of Vegas	0.48	1.32	6.04	7.97	225.63	9.09	0.47	2.23	1.05	Met	Met
"L" 16+09	South of Vegas	0.50	1.34	5.92	7.93	161.93	8.81	0.51	2.49	1.27	Met	Met
"L" 12+76	South of Vegas	0.70	1.20	6.62	7.94	212.81	7.95	0.42	2.47	1.04	Met	Met
"L" 11+00	South of Washington	0.60	1.25	6.39	7.99	219.40	6.39	0.40	2.21	0.88	Met	Met
"L" 10+38	South of Washington	0.60	1.43	5.55	7.94	160.47	4.56	0.46	2.46	1.13	Met	Met
"4" 15+39	South of Washington	0.82	1.19	6.68	7.95	151.82	2.19	0.31	2.13	0.66	Met	Met
"4" 14+00	South of Washington	0.88	1.23	6.41	7.88	186.74	1.97	0.29	2.06	0.60	Met	Met
"4" 11+76	South of Washington	0.80	1.26	6.25	7.88	250.83	2.96	0.31	2.04	0.63	Met	Met
"4" 7+04	South of Washington	0.50	1.34	5.94	7.96	233.17	5.05	0.39	1.95	0.76	Met	Met
"C" 3+22	South of Washington	0.66	1.42	5.61	7.97	290.38	8.80	0.43	2.45	1.05	Met	Met

ULTIMATE CONDITION																		
Drop Inlet Analysis-RTC 10-yr & 100-yr West Option A																		
DI Station/Offset	Contributing Basins	Upstream Bypass DI	Upstream 10-yr Bypass Q (CFS)	Upstream 100-yr Bypass Q (CFS)	10-year						100-Year						Does DI need to be extended based on bypass flow 10-yr	Does DI need to be extended based on bypass flow 100-yr
					Gutter Flow- Half Street (CFS)	10-yr Criteria (drylane) Flow Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)	Gutter Flow- Half Street (CFS)	100-yr Criteria Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)		
"L" 92+86, 56.76' LT	ONRAN7LA, 1/2 ONRAN8L	N/A	N/A	N/A	3.43	19.93	DI not needed	3.00	1.89	1.54	6.36	196.84	DI not needed	3.00	2.76	3.60	OK	OK
"L" 84+00, 57.02' LT	1/2 ONRAN8L, ONRAN9L, 1/3 ONRAN10L	"L" 92+86, 56.76' LT	1.54	3.60	5.90	53.09	DI not needed	3.00	3.65	3.35	11.68	107.33	DI not needed	3.00	5.08	6.60	OK	OK
"L" 77+20, 48.97' LT	2/3 ONRAN 10L	"L" 84+00, 57.02' LT	3.35	6.60	6.27	84.49	DI not needed	3.00	3.09	3.18	12.02	142.70	DI not needed	3.00	4.63	7.39	OK	OK
"L" 75+05, 48.01' LT	1/2 ONRAN11LA, 1/3 ONRAN11L	"L" 77+20, 48.97' LT	3.18	7.39	3.33	54.79	DI not needed	3.00	2.19	1.14	9.25	112.52	DI not needed	3.00	4.39	4.86	OK	OK
"L" 72+91, 47.92' LT	1/2 ONRAN11LA, 1/3 ONRAN11L	"L" 75+05, 48.01' LT	1.14	4.86	2.14	41.79	DI not needed	3.00	1.56	0.58	6.72	131.55	DI not needed	3.00	3.27	3.45	OK	OK
"L" 71+21, 48.04' LT	1/2 ONRAN11LA1, 1/3 ONRAN11L	"L" 72+91, 47.92' LT	0.58	3.45	1.58	49.60	DI not needed	3.00	1.25	0.33	5.31	148.73	DI not needed	3.00	2.78	2.53	OK	OK
"L" 69+47, 48.08' LT	1/2 ONRAN11LA1, ONRAN13L	"L" 71+21, 48.04' LT	0.33	2.53	1.44	56.58	DI not needed	3.00	1.09	0.35	4.59	202.95	DI not needed	3.00	2.28	2.31	OK	OK
"L" 67+75, 48.02' LT	ONRAN14L	"L" 69+47, 48.08' LT	0.35	2.31	1.18	20.74	DI not needed	3.00	0.94	0.24	3.86	188.73	DI not needed	3.00	2.02	1.84	OK	OK
"L" 65+08, 48.24' LT	ONRAN14LA	"L" 67+75, 48.02' LT	0.24	1.84	1.68	28.33	DI not needed	3.00	1.29	0.39	4.51	243.53	DI not needed	3.00	2.42	2.09	OK	OK
"L" 64+09, 48.15' LT	ONRAN15L	"L" 65+08, 48.24' LT	0.39	2.09	0.96	59.82	DI not needed	3.00	0.83	0.13	3.14	197.56	DI not needed	3.00	1.82	1.32	OK	OK
"L" 62+15, 48.24' LT	ONRAN15LA	"L" 64+09, 48.15' LT	0.13	1.32	1.11	35.16	DI not needed	3.00	0.94	0.17	3.15	143.75	DI not needed	3.00	1.87	1.28	OK	OK
"L" 58+47, 48.24' LT	ONRAN16L	"L" 62+15, 48.24' LT	0.17	1.28	2.12	54.47	DI not needed	3.00	1.48	0.64	4.90	105.17	DI not needed	3.00	2.50	2.40	OK	OK
"L" 55+26, 56.61' LT	ONRAN16LA	"L" 58+47, 48.24' LT	0.64	2.40	2.53	50.25	DI not needed	4'x4'	2.49	0.04	5.92	221.90	DI not needed	4'x4'	4.95	0.97	OK	OK
"L" 49+96, 47.95' LT	ONRAN17L	"L" 55+26, 56.61' LT	0.04	0.97	2.73	33.92	DI not needed	3.00	1.80	0.93	5.96	150.64	DI not needed	3.00	2.99	2.97	OK	OK
"L" 48+16, 47.37' LT	ONRAN18L	"L" 49+96, 47.95' LT	0.93	2.97	1.91	83.21	DI not needed	21.00	1.91	0.00	4.79	180.15	DI not needed	21.00	4.69	0.10	OK	OK
"L" 47+81, 46.43' LT	ONRAN18LA	"L" 48+16, 47.37' LT	0.00	0.10	0.18	93.32	DI not needed	21.00	0.18	0.00	0.44	148.53	DI not needed	21.00	0.44	0.00	OK	OK
"L" 47+49, 45.49' LT	ONRAN18LB	"L" 47+81, 46.43' LT	0.00	0.00	0.19	46.52	DI not needed	21.00	0.19	0.00	0.35	221.16	DI not needed	21.00	0.35	0.00	OK	OK
"L" 39+75, 42.19' LT	ONRAN19L, ONRAN20L	"L" 47+49, 45.49' LT	0.00	0.00	3.41	28.19	DI not needed	3.00	2.08	1.33	6.34	142.32	DI not needed	3.00	3.08	3.26	OK	OK
"L" 35+04, 42.12' LT	ONRAN21L	"L" 39+75, 42.19' LT	1.33	3.26	3.06	20.18	DI not needed	3.00	1.82	1.24	6.48	155.70	DI not needed	3.00	2.88	3.60	OK	OK
"L" 30+34, 42.41' LT	ONRAN22L, ONRAN22LA	"L" 35+04, 42.12' LT	1.24	3.60	3.22	28.44	DI not needed	3.00	2.19	1.03	7.27	155.76	DI not needed	3.00	3.83	3.44	OK	OK
"L" 25+01, 42.19' LT	ONRAN23L	"L" 30+34, 42.41' LT	1.03	3.44	3.23	12.81	DI not needed	3.00	1.77	1.46	7.51	203.66	DI not needed	3.00	2.95	4.56	OK	OK
"L" 19+64, 42.17' LT	ONRAN24L, ONRAN25L	"L" 25+01, 42.19' LT	1.46	4.56	3.90	8.86	DI not needed	3.00	1.98	1.92	9.09	225.63	DI not needed	3.00	3.30	5.79	OK	OK
"L" 16+09, 42.17' LT	ONRAN26L	"L" 19+64, 42.17' LT	1.92	5.79	3.54	18.47	DI not needed	3.00	2.05	1.49	8.81	161.93	DI not needed	3.00	3.66	5.15	OK	OK
"L" 12+76, 41.85' LT	ONRAN27L	"L" 16+09, 42.17' LT	1.49	5.15	3.00	10.70	DI not needed	3.00	1.63	1.37	7.95	212.81	DI not needed	3.00	2.90	5.05	OK	OK
"L" 11+00, 44.40' LT	ONRAN27LA, ONRAN28L	"L" 12+76, 41.85' LT	1.37	5.05	2.09	18.68	DI not needed	3.00	1.30	0.79	6.39	219.40	DI not needed	3.00	2.53	3.86	OK	OK
"L" 10+38, 56.68' LT	ONRAN28LA	"L" 11+00, 44.40' LT	0.79	3.86	1.17	42.09	DI not needed	20.00	1.17	0.00	4.56	160.47	DI not needed	20.00	4.48	0.08	OK	OK
"4" 15+39, 64.12' LT	ONRAN29L	"L" 10+38, 56.68' LT	0.00	0.08	1.13	27.16	DI not needed	20.00	1.13	0.00	2.19	151.82	DI not needed	20.00	2.18	0.00	OK	OK
"4" 14+00, 64.26' LT	ONRAN30L	"4" 15+39, 64.12' LT	0.00	0.00	1.06	81.89	DI not needed	20.00	1.06	0.00	1.97	186.74	DI not needed	20.00	1.96	0.01	OK	OK
"4" 11+76, 64.29' LT	ONRAN31L	"4" 14+00, 64.26' LT	0.00	0.01	1.59	80.36	DI not needed	3.00	1.21	0.38	2.96	250.83	DI not needed	3.00	1.84	1.12	OK	OK
"4" 7+04, 74.17' LT	ONRAN32LA, ONRAN32L	"4" 11+76, 64.29' LT	0.38	1.12	2.72	75.61	DI not needed	3.00	0.38	0.00	5.05	233.17	DI not needed	3.00	2.42	2.63	OK	OK
"C" 3+22, 26.36' LT	ONRAN33L, ONRAN33LA, ONRAN33LA1	"4" 7+04, 74.17' LT	0.00	2.63	3.32	115.44	DI not needed	10.00	2.73	0.59	8.80	290.38	DI not needed	10.00	5.84	2.96	OK	OK

ULTIMATE CONDITION																
Street Flow Capacity-RTC 10-year Option B West																
							Discharge : Calculated by FM				Normal Depth: D _{Q10} Calculated by FM					
Cross-Section	Street Location	Slope (%)	Cross Slope (%)	Non Dry Length (FT)	Total Length (FT)	Center Turn Lane (FT)	10-Year Flow Capacity Dry Lane Criteria for RTC				Dry Lane and D X V < 6 Criteria for RTC					
							D (FT)	V (FPS)	DxV	Q (Half Street) (CFS)	Q ₁₀ (Half Street) (CFS)	D _{Q10} (FT)	V _{Q10} (FT)	D _{Q10} < D _{dry-lane} (Met/ Not Met)	D _{Q10} X V _{Q10}	D _{Q10} X V _{Q10} < 6
"L" 112+00	North of Smoke Ranch	0.30	1.34	24.00	47.50	10.00	0.45	1.68	0.75	7.64	12.65	0.52	1.91	Not Met	0.99	MET
"L" 100+00	North of Lake Mead	1.81	2.35	34.00	57.50	10.00	0.86	6.96	5.99	88.46	10.6	0.43	4.11	Met	1.77	MET
"L" 92+86	South of Lake Mead	0.80	2.06	24.00	37.50	0.00	0.62	3.61	2.23	24.39	3.43	0.33	2.21	Met	0.73	MET
"L" 84+00	South of Lake Mead	1.49	3.51	13.00	37.50	11.00	0.58	4.77	2.77	17.78	5.93	0.40	3.64	Met	1.46	MET
"L" 79+00	North of Coran	1.39	2.00	34.00	59.50	12.00	0.80	5.76	4.63	72.39	5.57	0.35	3.06	Met	1.07	MET
"L" 77+20	South of Coran	1.36	2.68	23.50	47.00	10.00	0.75	6.35	4.79	81.04	5.57	0.38	3.27	Met	1.24	MET
"L" 75+05	South of Coran	1.63	3.19	29.50	43.00	0.00	0.88	6.78	5.97	69.40	3.70	0.33	3.28	Met	1.08	MET
"L" 72+91	South of Coran	1.76	2.61	13.00	37.50	11.00	0.46	4.31	2.00	12.12	3.50	0.31	3.18	Met	0.99	MET
"L" 71+21	South of Coran	1.47	2.47	13.50	38.00	11.00	0.74	5.64	4.17	49.24	2.46	0.29	2.70	Met	0.78	MET
"L" 69+47	South of Coran	1.04	2.00	25.00	38.50	0.00	0.62	4.13	2.58	29.28	2.48	0.29	2.25	Met	0.65	MET
"L" 67+75	South of Spring	0.82	2.18	13.00	37.50	11.00	0.41	2.66	1.09	6.49	1.74	0.28	1.93	Met	0.54	MET
"L" 65+08	South of Spring	2.38	1.00	24.00	47.50	10.00	0.36	3.90	1.42	12.98	2.38	0.23	2.59	Met	0.60	MET
"L" 64+09	South of Spring	0.96	2.12	24.00	47.50	10.00	0.63	4.02	2.55	28.00	1.32	0.25	1.91	Met	0.48	MET
"L" 62+15	South of Melody	1.34	2.58	13.00	37.50	11.00	0.46	3.76	1.73	10.66	1.26	0.24	2.25	Met	0.54	MET
"L" 58+47	South of Melody	1.63	3.20	13.00	37.50	11.00	0.54	4.74	2.56	16.37	2.19	0.28	2.90	Met	0.81	MET
"L" 55+26	South of Melody	0.50	2.28	24.00	47.50	10.00	0.67	3.05	2.05	22.98	2.57	0.34	1.78	Met	0.61	MET
"L" 49+96	South of Melody	0.89	2.86	38.00	51.50	0.00	1.05	5.68	5.96	94.25	2.74	0.33	2.36	Met	0.78	MET
"L" 48+16	South of Melody	0.70	2.52	42.00	55.50	0.00	1.13	5.30	5.99	115.05	1.92	0.30	1.93	Met	0.58	MET
"L" 47+81	South of Melody	1.18	2.62	37.00	60.50	10.00	0.97	6.17	5.98	93.22	0.18	0.14	1.52	Met	0.21	MET
"L" 47+49	South of Melody	1.07	1.74	37.50	61.00	10.00	0.78	5.04	3.92	107.37	0.19	0.15	1.19	Met	0.18	MET
"L" 39+75	South of Vegas	1.15	2.68	23.00	46.50	10.00	0.74	5.00	3.70	40.82	3.41	0.33	2.71	Met	0.89	MET
"L" 35+04	South of Vegas	1.15	2.13	22.50	36.00	0.00	0.60	4.24	2.56	26.22	3.06	0.31	2.50	Met	0.78	MET
"L" 30+34	South of Vegas	0.30	4.05	23.00	46.50	10.00	1.06	3.33	3.52	41.19	3.22	0.44	1.77	Met	0.78	MET
"L" 25+01	South of Vegas	0.65	1.93	23.00	46.50	10.00	0.57	3.06	1.74	18.34	3.23	0.34	1.99	Met	0.68	MET
"L" 19+64	South of Vegas	0.48	1.67	23.00	46.50	10.00	0.51	2.40	1.22	12.40	3.90	0.36	1.80	Met	0.65	MET
"L" 16+09	South of Vegas	0.50	2.64	23.00	36.50	0.00	0.73	3.26	2.39	26.12	3.54	0.38	1.99	Met	0.76	MET
"L" 12+76	South of Vegas	0.70	1.68	23.00	46.50	10.00	0.51	2.89	1.48	14.98	3.00	0.32	1.95	Met	0.62	MET
"L" 11+00	South of Washington	0.60	1.66	26.00	39.50	0.00	0.56	2.88	1.60	18.68	2.09	0.29	1.68	Met	0.49	MET
"L" 10+38	South of Washington	0.60	2.70	30.00	43.50	0.00	0.93	4.00	3.74	42.09	1.17	0.27	1.99	Met	0.54	MET
"4" 15+39	South of Washington	0.82	2.65	28.00	52.50	11.00	0.87	4.75	4.12	55.89	1.17	0.26	1.84	Met	0.48	MET
"4" 14+00	South of Washington	0.88	2.24	24.00	48.50	11.00	0.66	4.00	2.65	29.43	1.06	0.24	1.78	Met	0.43	MET
"4" 11+76	South of Washington	0.80	1.68	29.00	52.50	10.00	0.61	3.56	2.18	28.29	1.59	0.26	1.76	Met	0.46	MET
"4" 7+04	South of Washington	0.50	1.68	43.00	66.50	10.00	0.85	3.62	3.07	61.35	3.01	0.33	1.72	Met	0.57	MET
"C" 3+22	South of Washington	0.66	1.61	43.00	66.50	10.00	0.82	4.05	3.31	66.05	4.39	0.35	2.07	Met	0.72	MET

ULTIMATE CONDITION

Street Flow Capacity-RTC 100-year Option B West

			Discharge: Calculated by FM				Normal Depth: D _{Q100} Calculated by FM						
Cross-Section	Street Location	Slope (%)	100-Year Flow Capacity				D X V < 8 & D _{Q100} < 2 Criteria for RTC						
			D _{max} (FT)	V (FPS)	DxV _{max}	Q _{max} (CFS)	Q ₁₀₀ (CFS)	D _{Q100}	V _{Q100}	D _{Q100} x V _{Q100}	D _{Q100} x V _{Q100} < 8 (Met/Not Met)	D _{Q100} < 2 (Met/Not Met)	
"L" 112+00	North of Smoke Ranch	0.30	1.47	5.44	8.00	270.97	23.30	0.63	2.22	1.40	Met	Met	
"L" 100+00	North of Lake Mead	1.81	1.01	7.83	7.91	141.80	10.55	0.57	2.09	1.19	Met	Met	
"L" 92+86	South of Lake Mead	0.80	1.17	6.76	7.91	175.46	6.41	0.32	2.58	0.83	Met	Met	
"L" 84+00	South of Lake Mead	1.49	1.07	7.46	7.98	106.73	11.78	0.50	4.31	2.16	Met	Met	
"L" 79+00	North of Coran	1.39	1.09	7.26	7.91	182.09	12.09	0.45	3.70	1.67	Met	Met	
"L" 77+20	South of Coran	1.36	1.10	7.25	7.98	137.05	12.09	0.49	3.96	1.94	Met	Met	
"L" 75+05	South of Coran	1.63	1.04	7.64	7.95	112.09	9.30	0.45	4.11	1.85	Met	Met	
"L" 72+91	South of Coran	1.76	1.02	7.81	7.97	132.37	6.91	0.39	3.75	1.46	Met	Met	
"L" 71+21	South of Coran	1.47	1.06	7.48	7.93	143.55	5.45	0.37	3.27	1.21	Met	Met	
"L" 69+47	South of Coran	1.04	1.10	7.23	7.95	174.47	4.69	0.35	2.62	0.92	Met	Met	
"L" 67+75	South of Spring	0.82	1.18	6.78	8.00	173.78	3.93	0.35	2.35	0.82	Met	Met	
"L" 65+08	South of Spring	2.38	0.84	9.47	7.95	224.53	4.56	0.27	3.02	0.82	Met	Met	
"L" 64+09	South of Spring	0.96	1.18	6.69	7.89	186.60	3.17	0.32	2.35	0.75	Met	Met	
"L" 62+15	South of Melody	1.34	1.09	7.32	7.98	144.46	3.16	0.32	2.79	0.89	Met	Met	
"L" 58+47	South of Melody	1.63	1.04	7.64	7.95	111.56	4.91	0.37	3.52	1.30	Met	Met	
"L" 55+26	South of Melody	0.50	1.39	5.72	7.95	207.49	5.93	0.43	2.18	0.94	Met	Met	
"L" 49+96	South of Melody	0.89	1.24	6.39	7.92	151.43	5.97	0.42	2.86	1.20	Met	Met	
"L" 48+16	South of Melody	0.70	1.33	5.95	7.91	183.08	4.80	0.40	2.41	0.96	Met	Met	
"L" 47+81	South of Melody	1.18	1.14	6.93	7.90	148.36	0.44	0.18	1.71	0.31	Met	Met	
"L" 47+49	South of Melody	1.07	1.06	7.41	7.85	284.65	0.35	0.17	1.28	0.22	Met	Met	
"L" 39+75	South of Vegas	1.15	1.15	6.88	7.91	147.00	6.34	0.40	3.15	1.26	Met	Met	
"L" 35+04	South of Vegas	1.15	1.07	7.36	7.88	158.52	6.48	0.39	3.00	1.17	Met	Met	
"L" 30+34	South of Vegas	0.30	1.71	4.65	7.95	155.93	5.58	0.53	2.02	1.07	Met	Met	
"L" 25+01	South of Vegas	0.65	1.26	6.28	7.91	210.65	6.44	0.41	2.36	0.97	Met	Met	
"L" 19+64	South of Vegas	0.48	1.33	5.98	7.95	234.66	8.27	0.45	2.17	0.98	Met	Met	
"L" 16+09	South of Vegas	0.50	1.36	5.84	7.94	169.82	8.17	0.50	2.44	1.22	Met	Met	
"L" 12+76	South of Vegas	0.70	1.21	6.54	7.91	220.21	7.48	0.41	2.44	1.00	Met	Met	
"L" 11+00	South of Washington	0.60	1.25	6.39	7.99	219.40	6.02	0.40	2.18	0.87	Met	Met	
"L" 10+38	South of Washington	0.60	1.43	5.55	7.94	160.47	4.28	0.45	2.46	1.11	Met	Met	
"4" 15+39	South of Washington	0.82	1.27	6.28	7.98	171.04	2.25	0.31	2.15	0.67	Met	Met	
"4" 14+00	South of Washington	0.88	1.23	6.48	7.97	188.10	1.98	0.29	2.06	0.60	Met	Met	
"4" 11+76	South of Washington	0.80	1.20	6.62	7.94	230.90	2.96	0.31	2.04	0.63	Met	Met	
"4" 7+04	South of Washington	0.50	1.40	5.66	7.92	279.95	3.75	0.35	1.81	0.63	Met	Met	
"C" 3+22	South of Washington	0.66	1.30	6.06	7.88	269.43	7.55	0.41	2.37	0.97	Met	Met	

ULTIMATE CONDITION

Drop Inlet Analysis-RTC 10-yr & 100-yr West Option B

DI Station/Offset	Contributing Basins (Offsite/Onsite)	Upstream 10-yr Bypass Q (CFS)	Upstream 100-yr Bypass Q (CFS)	10-year						100-Year						Does DI need to be extended based on bypass flow 10-yr	Does DI need to be extended based on bypass flow 100-yr
				Gutter Flow- Half Street (CFS)	10-yr Criteria (drylane) Flow Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)	Gutter Flow- Half Street (CFS)	100-yr Criteria Half Street (CFS)	Analysis (Need DI/ DI not needed)	DI Length (FT)	Intercept Flow (CFS)	Bypass Flow (CFS)		
"L" 92+86, 56.76' LT	ONRAN7LA, 1/2 ONRAN8L	N/A	N/A	3.43	24.39	DI not needed	3.00	1.89	1.54	6.41	175.46	DI not needed	3.00	2.77	3.64	OK	OK
"L" 84+00, 57.02' LT	1/2 ONRAN8L, ONRAN9L, 1/3 ONRAN10L	1.54	3.64	5.93	17.78	DI not needed	3.00	3.28	2.65	11.78	106.73	DI not needed	3.00	5.11	6.67	OK	OK
"L" 77+20, 48.97' LT	2/3 ONRAN 10L	2.65	6.67	5.57	72.39	DI not needed	3.00	2.87	2.70	12.09	182.09	DI not needed	3.00	4.65	7.44	OK	OK
"L" 75+05, 48.01' LT	1/2 ONRAN11LA, 1/3 ONRAN11L	2.70	7.44	3.70	81.04	DI not needed	3.00	3.07	2.50	9.30	137.05	DI not needed	3.00	4.41	4.89	OK	OK
"L" 72+91, 47.92' LT	1/2 ONRAN11LA, 1/3 ONRAN11L	2.50	4.89	3.50	69.40	DI not needed	3.00	2.24	1.46	6.91	112.09	DI not needed	3.00	3.32	3.59	OK	OK
"L" 71+21, 48.04' LT	1/2 ONRAN11LA1, 1/3 ONRAN11L	1.46	3.59	2.46	12.12	DI not needed	3.00	2.13	1.37	5.45	132.37	DI not needed	3.00	2.82	2.63	OK	OK
"L" 69+47, 48.08' LT	1/2 ONRAN11LA1, ONRAN13L	1.37	2.63	2.48	49.24	DI not needed	3.00	1.55	0.91	4.69	143.55	DI not needed	3.00	2.31	2.38	OK	OK
"L" 67+75, 48.02' LT	ONRAN14L	0.91	2.38	1.74	29.28	DI not needed	3.00	1.54	0.94	3.93	174.47	DI not needed	3.00	2.04	1.89	OK	OK
"L" 65+08, 48.24' LT	ONRAN14LA	0.94	1.89	2.38	6.49	DI not needed	3.00	1.63	0.75	4.56	173.78	DI not needed	3.00	2.44	2.12	OK	OK
"L" 64+09, 48.15' LT	ONRAN15L	0.75	2.12	1.32	12.98	DI not needed	3.00	1.04	0.28	3.17	224.53	DI not needed	3.00	1.84	1.33	OK	OK
"L" 62+15, 48.24' LT	ONRAN15LA	0.28	1.33	1.26	28.00	DI not needed	3.00	1.02	0.24	3.16	186.60	DI not needed	3.00	1.87	1.29	OK	OK
"L" 58+47, 48.24' LT	ONRAN16L	0.24	1.29	2.19	10.66	DI not needed	3.00	1.51	0.68	4.91	144.46	DI not needed	3.00	2.50	2.41	OK	OK
"L" 55+26, 56.61' LT	ONRAN16LA	0.68	2.41	2.57	16.37	DI not needed	4'x4'	2.52	0.05	5.93	111.56	DI not needed	4'x4'	4.95	0.98	OK	OK
"L" 49+96, 47.95' LT	ONRAN17L	0.05	0.98	2.74	22.98	DI not needed	3.00	1.80	0.94	5.97	207.49	DI not needed	3.00	2.99	2.98	OK	OK
"L" 48+16, 47.37' LT	ONRAN18L	0.94	2.98	1.92	94.25	DI not needed	21.00	1.92	0.00	4.80	151.43	DI not needed	21.00	4.70	0.10	OK	OK
"L" 47+81, 46.43' LT	ONRAN18LA	0.00	0.10	0.18	115.05	DI not needed	21.00	0.18	0.00	0.44	183.08	DI not needed	21.00	0.44	0.00	OK	OK
"L" 47+49, 45.49' LT	ONRAN18LB	0.00	0.00	0.19	93.22	DI not needed	21.00	0.19	0.00	0.35	148.36	DI not needed	21.00	0.35	0.00	OK	OK
"L" 39+75, 42.19' LT	ONRAN19L, ONRAN20L	0.00	0.00	3.41	107.37	DI not needed	3.00	2.08	1.33	6.34	284.65	DI not needed	3.00	3.08	3.26	OK	OK
"L" 35+04, 42.12' LT	ONRAN21L	1.33	3.26	3.06	40.82	DI not needed	3.00	1.82	1.24	6.48	147.00	DI not needed	3.00	2.88	3.60	OK	OK
"L" 30+34, 42.41' LT	ONRAN22L, ONRAN22LA	1.24	3.60	3.22	26.22	DI not needed	3.00	2.19	1.03	5.58	158.52	DI not needed	3.00	3.21	2.37	OK	OK
"L" 25+01, 42.19' LT	ONRAN23L	1.03	2.37	3.23	41.19	DI not needed	3.00	1.77	1.46	6.44	155.93	DI not needed	3.00	2.70	3.74	OK	OK
"L" 19+64, 42.17' LT	ONRAN24L, ONRAN25L	1.46	3.74	3.90	18.34	DI not needed	3.00	1.98	1.92	8.27	210.65	DI not needed	3.00	3.12	5.15	OK	OK
"L" 16+09, 42.17' LT	ONRAN26L	1.92	5.15	3.54	12.40	DI not needed	3.00	2.05	1.49	8.17	234.66	DI not needed	3.00	3.49	4.68	OK	OK
"L" 12+76, 41.85' LT	ONRAN27L	1.49	4.68	3.00	26.12	DI not needed	3.00	1.63	1.37	7.48	169.82	DI not needed	3.00	2.80	4.68	OK	OK
"L" 11+00, 44.40' LT	ONRAN27LA, ONRAN28L	1.37	4.68	2.09	14.98	DI not needed	3.00	1.30	0.79	6.02	220.21	DI not needed	3.00	2.44	3.58	OK	OK
"L" 10+38, 56.68' LT	ONRAN28LA	0.79	3.58	1.17	18.68	DI not needed	20.00	1.17	0.00	4.28	219.40	DI not needed	20.00	4.21	0.07	OK	OK
"4" 15+39, 64.12' LT	ONRAN29L	0.00	0.07	1.17	42.09	DI not needed	20.00	1.17	0.00	2.25	160.47	DI not needed	20.00	2.24	0.01	OK	OK
"4" 14+00, 64.26' LT	ONRAN30L	0.00	0.01	1.06	55.89	DI not needed	20.00	1.06	0.00	1.98	171.04	DI not needed	20.00	1.97	0.01	OK	OK
"4" 11+76, 64.29' LT	ONRAN31L	0.00	0.01	1.59	29.43	DI not needed	3.00	1.21	0.38	2.96	188.10	DI not needed	3.00	1.84	1.12	OK	OK
"4" 7+04, 74.17' LT	ONRAN32LA, ONRAN32L	0.38	1.12	3.01	28.29	DI not needed	3.00	1.75	1.26	3.75	230.90	DI not needed	3.00	2.01	1.74	OK	OK
"C" 3+22, 26.36' LT	ONRAN33L, ONRAN33LA, ONRAN33LA1	1.26	1.74	4.39	61.35	DI not needed	10.00	3.42	0.97	7.55	279.95	DI not needed	10.00	5.21	2.34	OK	OK

E. Normal Depth Calculations

RANCHO DRIVE CAPACITY IMPROVEMENTS- BONANZA TO DECATUR

Normal Depth Summary (ft) West Side of Rancho									
Catch Basin Location	Existing Condition 100-yr	Interim Condition 100-yr		Interim Condition 25-yr		Ultimate Condition 10-yr		Ultimate Condition 100-yr	
		Option A	Option B	Option A	Option B	Option A	Option B	Option A	Option B
"L" 112+00	1.26	0.63	0.63	0.55	0.57	0.52	0.52	0.52	0.63
"L" 100+00	0.43	0.43	0.57	0.39	0.39	0.36	0.43	0.36	0.57
"L" 92+86	0.72	0.72	0.64	0.37	0.37	0.34	0.33	0.34	0.32
"L" 84+00	1.13	1.07	1.07	0.45	0.43	0.40	0.40	0.40	0.50
"L" 79+00	1.04	1.00	1.00	0.38	0.39	0.37	0.35	0.37	0.45
"L" 77+20	1.04	0.50	1.11	0.41	0.42	0.39	0.38	0.39	0.49
"L" 75+05	1.09	1.02	1.02	0.35	0.38	0.32	0.33	0.32	0.45
"L" 72+91	1.01	1.03	1.03	0.30	0.32	0.27	0.31	0.27	0.39
"L" 71+21	1.02	1.05	1.05	0.29	0.31	0.25	0.29	0.25	0.37
"L" 69+47	1.13	1.06	1.03	0.29	0.30	0.25	0.29	0.25	0.35
"L" 67+75	1.24	1.14	1.12	0.29	0.30	0.25	0.28	0.25	0.35
"L" 65+08	0.77	0.80	0.70	0.24	0.19	0.22	0.23	0.22	0.27
"L" 64+09	1.32	1.26	1.00	0.27	0.27	0.23	0.25	0.23	0.32
"L" 62+15	1.11	1.09	1.04	0.27	0.27	0.23	0.24	0.23	0.32
"L" 58+47	1.37	1.01	1.19	0.32	0.32	0.28	0.28	0.28	0.37
"L" 55+26	1.19	1.21	1.19	0.38	0.38	0.34	0.34	0.34	0.43
"L" 49+96	1.29	1.21	1.26	0.37	0.37	0.33	0.33	0.33	0.42
"L" 48+16	1.27	1.27	0.66	0.28	0.34	0.99	0.30	0.99	0.40
"L" 47+81	0.87	0.67	0.56	0.16	0.16	0.14	0.14	0.14	0.18
"L" 47+49	0.59	0.34	0.70	0.16	0.16	0.14	0.15	0.14	0.17
"L" 39+75	0.63	0.67	0.75	0.28	0.37	0.34	0.33	0.34	0.40
"L" 35+04	0.73	0.73	0.92	0.30	0.27	0.31	0.31	0.31	0.39
"L" 30+34	1.16	1.24	1.09	0.44	0.49	0.44	0.44	0.44	0.53

RANCHO DRIVE CAPACITY IMPROVEMENTS- BONANZA TO DECATUR

Normal Depth Summary (ft) West Side of Rancho

Catch Basin Location	Existing Condition 100-yr	Interim Condition 100-yr		Interim Condition 25-yr		Ultimate Condition 10-yr		Ultimate Condition 100-yr	
		Option A	Option B	Option A	Option B	Option A	Option B	Option A	Option B
"L" 25+01	1.06	0.72	1.06	0.21	0.25	0.34	0.34	0.34	0.41
"L" 19+64	1.00	0.81	1.28	0.21	0.21	0.36	0.36	0.36	0.45
"L" 16+09	1.25	1.06	1.17	0.35	0.36	0.38	0.38	0.38	0.50
"L" 12+76	0.98	0.81	0.61	0.21	0.21	0.32	0.32	0.32	0.41
"L" 11+00	0.94	0.84	0.38	0.27	0.27	0.29	0.29	0.29	0.40
"L" 10+38	1.29	1.00	0.30	0.26	0.26	0.27	0.27	0.27	0.45
"4" 15+39	0.81	0.87	0.75	0.28	0.27	0.25	0.26	0.25	0.31
"4" 14+00	1.10	0.77	0.62	0.26	0.26	0.24	0.24	0.24	0.29
"4" 11+76	0.52	0.61	0.57	0.28	0.28	0.26	0.26	0.26	0.31
"4" 7+04	0.56	0.59	0.36	0.21	0.20	0.32	0.33	0.32	0.35
"C" 3+22	0.53	0.38	0.19	0.21	0.20	0.33	0.35	0.33	0.41

Notes:

1. All NDOT and RTC Criteria met for Interim and Ultimate conditions
2. Normal Depth values reflect Q prior to being collected in catch basin locations except where existing catch basins are extended

RANCHO DRIVE CAPACITY IMPROVEMENTS- BONANZA TO DECATUR

Normal Depth Summary (ft) East Side of Rancho

Catch Basin Location	Existing Condition 100-yr	Interim Condition 100-yr		Interim Condition 25-yr		Ultimate Condition 10-yr		Ultimate Condition 100-yr	
		Option A	Option B	Option A	Option B	Option A	Option B	Option A	Option B
"L" 112+00	0.63	0.83	0.85	0.74	0.76	0.67	0.68	0.82	0.68
"L" 100+00	0.34	0.63	0.36	0.57	0.57	0.51	0.52	0.63	0.52
"L" 98+80	0.37	0.54	0.64	0.49	0.25	0.39	0.46	0.47	0.46
"L" 78+25	0.40	0.50	0.52	0.46	0.47	0.42	0.43	0.50	0.43
"L" 65+08	0.67	0.49	0.56	0.36	0.20	0.47	0.34	0.53	0.34
"L" 49+96	0.60	0.44	0.44	0.21	0.48	0.42	0.50	0.56	0.50
"L" 46+93	0.60	0.66	0.52	0.32	0.34	0.46	0.48	0.61	0.48
"L" 46+16	0.48	0.26	0.52	0.25	0.27	0.37	0.39	0.50	0.39
"L" 39+75	0.72	0.37	0.38	0.15	0.16	0.06	0.16	0.21	0.16
"L" 12+10	0.65	0.29	0.25	0.21	0.22	0.45	0.48	0.56	0.48
"4" 16+47	0.71	0.26	0.53	0.34	0.34	0.29	0.50	0.35	0.50
"4" 14+96	0.55	0.17	0.38	0.30	0.29	0.25	0.42	0.31	0.42
"4" 13+80	0.52	0.56	0.31	0.26	0.27	0.22	0.35	0.29	0.35
"4" 11+83	0.53	0.25	0.30	0.29	0.29	0.25	0.34	0.32	0.34
"4" 6+76	0.57	0.35	0.18	0.24	0.25	0.36	0.40	0.45	0.40
"C" 3+50	0.44	0.31	0.59	0.19	0.19	0.34	0.40	0.42	0.40

Notes:

1. All NDOT and RTC Criteria met for Interim and Ultimate conditions
2. Normal Depth values reflect Q prior to being collected in catch basin locations except where existing catch basins are extended

RANCHO DRIVE CAPACITY IMPROVEMENTS- BONANZA TO DECATUR

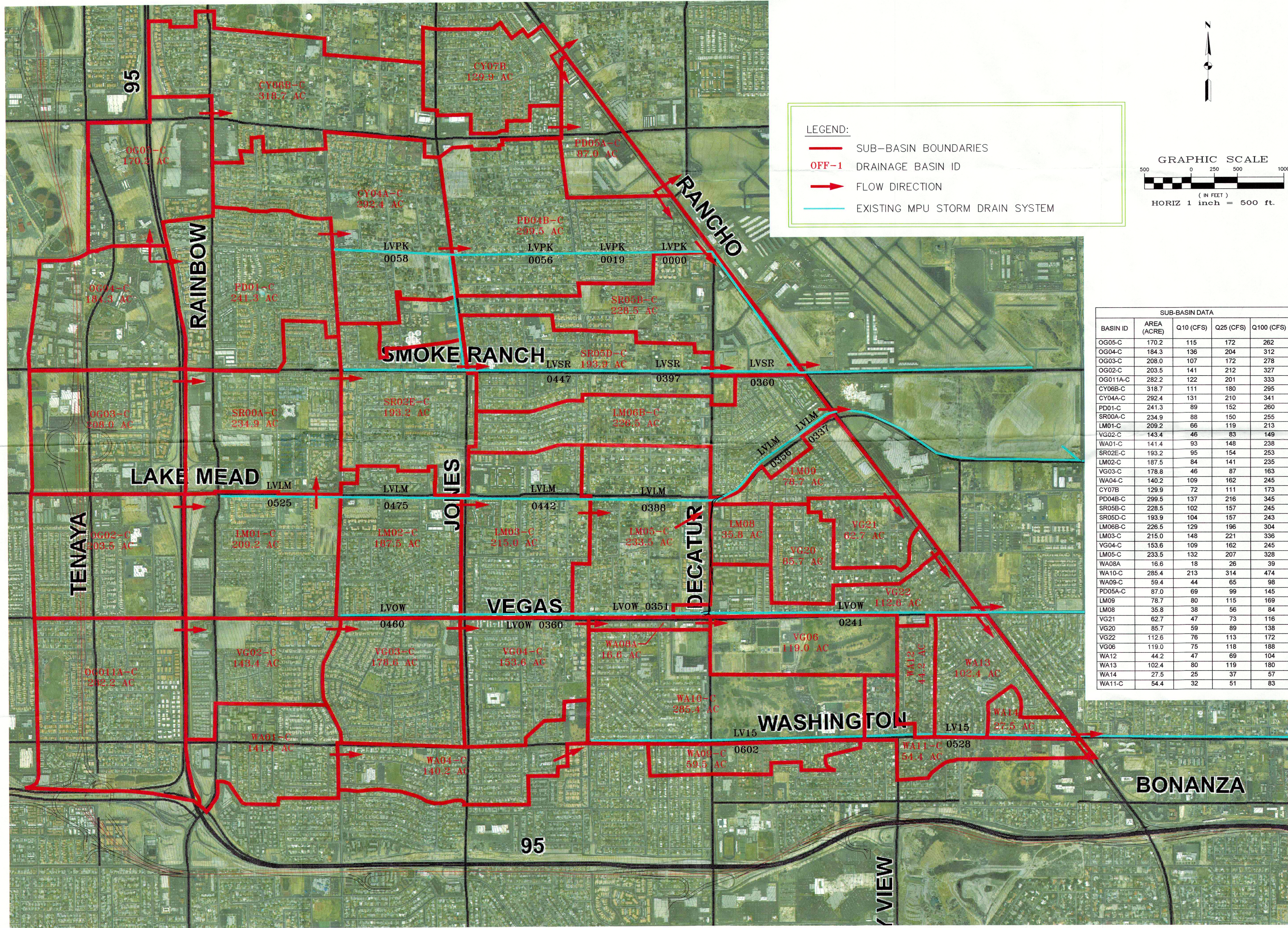
Normal Depth Comparison (ft) West Side of Rancho

Catch Basin Location	Existing Condition 100-yr	Interim Condition 100-yr		Ultimate Condition 100-yr	
		Option A	Option B	Option A	Option B
"L" 92+86	0.72	0.68	0.67	0.34	0.26
"L" 84+00	1.13	1.00	1.00	0.41	0.42
"L" 77+20	1.04	1.03	1.05	0.41	0.42
"L" 75+05	1.09	1.02	1.02	0.36	0.36
"L" 72+91	1.01	0.98	0.97	0.31	0.32
"L" 71+21	1.02	1.00	1.00	0.29	0.29
"L" 69+47	1.13	1.01	0.99	0.29	0.29
"L" 67+75	1.24	1.10	1.08	0.28	0.29
"L" 65+08	0.77	0.77	0.76	0.23	0.23
"L" 64+09	1.32	1.21	1.16	0.25	0.25
"L" 62+15	1.11	1.09	1.04	0.24	0.24
"L" 58+47	1.37	1.01	0.96	0.29	0.29
"L" 55+26	1.19	1.07	1.02	0.25	0.26
"L" 49+96	1.29	1.14	1.10	0.34	0.34
"L" 48+16	1.27	0.73	0.71	0.12	0.12
"L" 47+81	0.87	0.34	0.32	0.00	0.00
"L" 47+49	0.59	0.12	0.10	0.00	0.00
"L" 39+75	0.63	0.60	0.60	0.33	0.33
"L" 35+04	0.73	0.68	0.66	0.32	0.33
"L" 30+34	1.16	1.11	1.08	0.45	0.40
"L" 25+01	1.06	0.72	0.76	0.37	0.35
"L" 19+64	1.00	0.81	0.89	0.41	0.39
"L" 16+09	1.25	1.00	1.10	0.43	0.42
"L" 12+76	0.98	0.81	0.86	0.37	0.36
"L" 11+00	0.94	0.80	0.82	0.35	0.34
"L" 10+38	1.29	0.61	0.55	0.10	0.09
"4" 15+39	0.81	0.68	0.37	0.00	0.05
"4" 14+00	1.10	0.42	0.31	0.05	0.05
"4" 11+76	0.52	0.55	0.51	0.24	0.24
"4" 7+04	0.56	0.39	0.36	0.32	0.29
"C" 3+22	0.53	0.21	0.19	0.32	0.30

Notes:

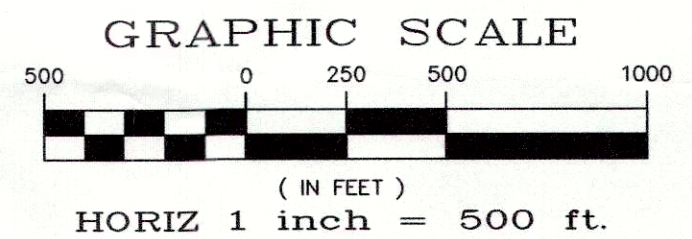
1. All NDOT and RTC Criteria met for Interim and Ultimate conditions
2. Normal Depth values reflect Q after being collected in catch basin location

F. Pipe Capacity Calculations



LEGEND:

- SUB-BASIN BOUNDARIES
- OFF-1 DRAINAGE BASIN ID
- FLOW DIRECTION
- EXISTING MPU STORM DRAIN SYSTEM



SUB-BASIN DATA				
BASIN ID	AREA (ACRE)	Q10 (CFS)	Q25 (CFS)	Q100 (CFS)
OG05-C	170.2	115	172	262
OG04-C	184.3	136	204	312
OG03-C	208.0	107	172	278
OG02-C	203.5	141	212	327
OG011A-C	282.2	122	201	333
CY06B-C	318.7	111	180	295
CY04A-C	292.4	131	210	341
PD01-C	241.3	89	152	260
SR00A-C	234.9	88	150	255
LM01-C	209.2	66	119	213
VG02-C	143.4	46	83	149
WA01-C	141.4	93	148	238
SR02E-C	193.2	95	154	253
LM02-C	187.5	84	141	235
VG03-C	178.8	46	87	163
WA04-C	140.2	109	162	245
CY07B	129.9	72	111	173
PD04B-C	299.5	137	216	345
SR05B-C	228.5	102	157	245
SR05D-C	193.9	104	157	243
LM06B-C	226.5	129	196	304
LM03-C	215.0	148	221	336
VG04-C	153.6	109	162	245
LM05-C	233.5	132	207	328
WA08A	16.6	18	26	39
WA10-C	285.4	213	314	474
WA09-C	59.4	44	65	98
PD05A-C	87.0	69	99	145
LM09	78.7	80	115	169
LM08	35.8	38	56	84
VG21	62.7	47	73	116
VG20	85.7	59	89	138
VG22	112.6	76	113	172
VG06	119.0	75	118	188
WA12	44.2	47	69	104
WA13	102.4	80	119	180
WA14	27.5	25	37	57
WA11-C	54.4	32	51	83

REVISIONS

NO.	DATE	DESCRIPTION	APPD.

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

DESIGNED BY: NA
DRAWN BY: RM
CHECKED BY: EH

DATE: XXX/XX/XX

PARSONS BRINCKERHOFF
3930 HOWARD HUGHES PARKWAY
SUITE 300
LAS VEGAS, NEVADA 89169

TITLE: RANCHO DRIVE CAPACITY IMPROVEMENTS
BONANZA TO DECATUR

SHEET: DRAINAGE BASIN EXHIBIT
OFFSITE BASINS

Sheet

1 of 1
DRAWING NO. XXXX