DS #: 4991

APN: 138-32-312-013

PROJECT: Renaissance Lot 1

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: June 11, 2018
TO: **Land Development Services** Department of Building & Safety				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **Renaissance Lot 1**			**COPIES TO:** GCW Engineers / Surveyors
Cross Streets:	SEC of Alta Drive & Rampart Boulevard			RA Southeast Land Company
File Number:	F:\Depot\DSMemos\DS4991A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	138-32-312-013			CCRFCD
Zoning Action:	TMP-71533			
FEMA Flood Zone	YES	NO	X	
Proposed Storm Drain	YES	NO	X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	5/16/2018	6/7/2018	See Comments Below	$400.00	495840: $400
			TOTAL FEES (LDDRS):	**$400.00**	----

REMARKS:

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
X	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. Provide a copy of the zoning/planning conditions associated with this site (**TMP-71533**) with the next submittal to verify compliance with conditions. *Flood Control* will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the *City Council*). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.

2. Sites with a grade difference of 2 feet above or below existing are required to have approval from the *City Planning and Development Department*. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to the *City Planning Department* (229-6301). The engineer must provide Planning approval with the next submittal.

3. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

4. Revise the assessor parcel number of the subject site in *Standard Form 1* from "138-32-723-001" to "**138-32-312-013**".

5. Identify and label existing storm drain systems in the perimeter streets (*Alta Drive* and *Rampart Boulevard*) with *City of Las Vegas* recorded drawing numbers on the grading plans.

6. The proposed onsite storm drains crisscrossing future parcels within the subject lot. Address whether there is a tentative map (ie, final map) to subdivide the subject lot into three parcels. If yes, there shall be a note to provide for inter-site drainage right. Otherwise, drainage easements must be identified and granted prior to the final approval of the subject drainage study. Review and resolve in the next submittal.

7. *Section Details E/DT-1* and *G/DT-1* show proposed landscape scarps which will sheet flow to the adjacent sidewalk and is not acceptable. Provide a swale adjacent to the sidewalk and conveys to a point discharge under the sidewalk. Review and revise accordingly.

8. Provide a note on the grading plans: All onsite storm drains and the associated facilities are privately owned and to be privately maintained by the property owner.

9. Provide a note on the grading plans to direct the contractor to clean out and conduct flow test of the existing storm drain systems prior to the rough grading of the site.

10. Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (*Stormwater Quality Management Stamp and Sign Detail*).

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

END OF REMARKS

ays

T/R/S: T20S/R60E/32
AREA L-32

TRANSACTION REPORT

JUN/11/2018/MON 05:34 PM

FAX(TX)

#	DATE	START T.	RECEIVER	COM.TIME	PAGE	TYPE/NOTE	FILE
001	JUN/11	05:33PM	7028042299	0:00:40	2	MEMORY OK SG3	1456

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Parcel Number:	138-32-312-013		CCRFCD
Zoning Action:	TMP-71533		
FEMA Flood Zone	YES	NO X	
Proposed Storm Drain	YES	NO X	

HISTORY	**DATE RECEIVED**	**DATE REVIEWED**	**COMMENTS**	**REVIEW FEES**	**FEES PAID Payment Trn #**
1st Submittal	5/16/2018	6/7/2018	See Comments Below	$400.00	495840: $400
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TECHNICAL DRAINAGE STUDY
FOR
RENAISSANCE LOT 1

840-060

May 2018

GCW
ENGINEERS \ SURVEYORS

Prepared for:

EHB Companies LLC
1215 Ft. Apache Road Suite 120
Las Vegas, NV 89117

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Renaissance Lot 1 Date: May 15, 2018

Location of Development: a) Descriptive (Cross Streets) North/South: Rampart Boulevard

East/West: Alta Drive

b) Section: 32 Township: 20S Range: 60E

c) APN : 138-32-723-001

Name of Owner: RA Southeast Land Company LLC

Telephone No.: 702-940-6930 Fax No.: 702-970-6931 E-Mail Address: Info@EHBCompanies.com

Address: 9755 W. Charleston Blvd Las Vegas NV 89117

Contact Person-Name: Todd Kelley, P.E. **Telephone No.:** (702) 804-2144

* **E-Mail Address:** TKelley@gcwengineering.com **Fax No.:** (702) 804-2299

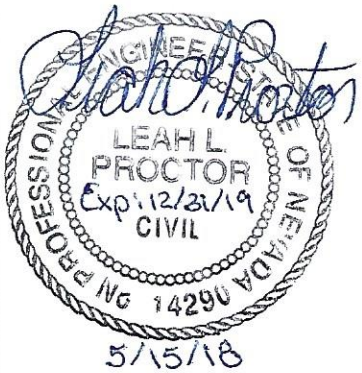
Firm: GCW

Address: 1555 S. Rainbow Blvd Las Vegas, NV 89146

Type of Land Development/Land Disturbance Process:

	Rezoning		Subdivision Map		Clearing and Grading Only
	Parcel Map		Planned Unit Development	X	Other (Please specify below) Commercial Subdivision
	Large Parcel Map		Building Permit		

1. Total Owned Land Area: At Site: 7.8 ac Being Developed/Disturbed: 7.8 ac
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ **Yes**** ☒ **No**
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ **Yes**** ☐ **No**
4. Proposed type of development (Residential, Commercial, Etc.): Commercial
5. Approximate upstream land area which drains to the subject site: 2 acres
6. Has the site drainage been evaluated in the past? ☒ **YES** ☐ **NO** If yes, please identify documentation: Boca Park North Phase III @ Peccole Town Center DS 2799 & Peccole Town Center DS2248
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: 60" RCP under Alta Drive and surface flow to Alta Drive
8. Briefly describe your proposed schedule for the subject project: ASAP



5/15/18

Engineer's Seal

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

*New Required Field

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

Local Entity File No.

Revision	Date

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

The following checklist is intended as a supplemental guide for the engineer preparing a Technical Drainage Study submittal to the City of Las Vegas. This supplement focuses on requirements specific to the City of Las Vegas. The requirements presented are in addition to the Clark County Regional Flood Control District (CCRFCD) Manual Standard Form 2. The listed items are the minimum information required prior to the City performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the CCRFCD Hydrologic Criteria and Drainage Design Manual (Design Manual).

An appointment must be made to preview this checklist in conjunction with CCRFCD Standard Form 2 prior to the City accepting a new drainage study for review. The engineer must contact the Flood Control Section at (702) 229-6541 to schedule a submittal appointment.

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

I. GENERAL REQUIREMENT		
Yes	No	
WILL OBTAIN		A notarized letter from the adjacent property owner(s) allowing off-site grading. (A copy of the letter must be received prior to final acceptance of the drainage study.)
X		Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions.
X		An electronic copy of the complete submittal is required to be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output device replicating your submittal. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats. If figures are in color, they must be scanned in color and saved as a separate file. __GP____ by initial here, the engineer on record acknowledges that the electronic copy is an identical replicate of the original hard copy submitted to the City of Las Vegas.

II. GRADING PLAN INFORMATION		
Yes	No	
X		(1) 24" X 36" copy of the Grading Plan, (including all Detail Sheets) sealed by the engineer.
X		Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street. Note: Proposed top of curb elevations must be provided for both sides of roadways even if only half street construction is required.
X		Label existing topography at a minimum 5 foot elevation interval including adjacent developments, finished floor elevations of existing buildings and top of existing curbs extending 100 feet* around the perimeter of the site. (*Measured from the centerline of the adjacent roadway.)

II. GRADING PLAN INFORMATION		
Yes	No	
X		Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains.
X		All existing and "to be constructed" walls with cross-sections showing wall type, (e.g. block wall, retaining wall, flood wall, etc.), with limits clearly defined, adjacent ground elevations. Wall heights must meet current ordinances and in no case exceed 14 feet above the adjacent property.
X		Street slopes for both interior and perimeter streets. Note: The minimum slope for a roadway is 0.4 percent, a minimum 18-inch storm drain must be provided where minimum slopes cannot be met.
X		Back of lot elevations and lot drainage pattern for all lots including common lots.
X		Sites with a grade difference two feet above or below existing ground are required to have approval from City of Las Vegas Current Planning. Current Planning approval is required prior to final approval of the drainage study.
X		On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners. (The project must pass flows through the site every 600 feet where the project is blocking flow paths.)
	X	This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included.
	X	Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
	NA	Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
	NA	Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
	NA	The limits of the flood zones and the base flood elevations (BFE) must be shown on all grading plans for all developments within a Special Flood Hazard Zone A, AO, AE, etc.
X		Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections.
X		Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
	NA	Lots with “B and C Type Drainage” that drain from one lot to another through a drainage easement shall be required to install an underground nuisance drainage system or a 2-foot valley gutter. 16” x 24” minimum block wall openings are required for both options.
	NA	Bubblers are required across 80 foot and greater ROW streets. When flows exceed 10 cfs, bubblers larger than 18 inches will be required up to a maximum of 36”. Inlets must be sized to match the pipe size provided.

- Contact the Flood Control Section regarding the drainage study review fee. These fees are payable at the time of submittal.
- The Drainage Study must be conditionally approved prior to submitting improvement plans to the Civil and Planning Development of the Department of Building and Safety for review.

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Renaissance Lot1	Map ID:
Firm Name: GCW	Engineer: Todd Kelley
Address: 1555 S. Rainbow Boulevard	
City: Las Vegas	State: NV Zip: 89145
Phone Number: (702) 804-2144	Fax Number: (702) 804-2299
Property Owner: RA Southeast Land Company LLC	
Address: 9755 W. Charleston Blvd	
City: Las Vegas	State: NV Zip: 89117

Reviewed By:	Date Received:	Date Accepted for Review:

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

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

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

I. GENERAL REQUIREMENT

Yes	No	
X		Design Manual **Standard Form 1** with the engineer's seal and signature.
X		Design Manual **Standard Form 4**.
X		2 copies of the 24" x 36" Drainage Plan.
Will Obtain		A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

Yes	No	
X		A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
X		A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

Yes	No	
X		Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.
X		On-site drainage basin maps for existing and proposed conditions showing the existing topography, basin boundaries, concentration points, and on-site and off-site flows in cfs.
X		Vicinity Map with local and major cross streets identified and a north arrow.

III. DRAINAGE PLAN

Yes	No	
X		Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada.
X		Minimum scale: 1" = 60'.
X		Project name.
X		Vicinity Map with local and major cross streets.
X		Revision box.
X		North arrow and bar scale.
X		Engineer's/consultant's address and phone number.
X		Elevation datum and benchmark.
X		Legend for symbols and abbreviations.
X		Cut/fill scarps, where applicable.
X		Street names, grades, widths.
X		Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street.
X		Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.
	NA	Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
X		Proposed typical street sections.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
	NA	Streets with off-set crowns.
X		Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X		Property lines.
X		Right-of-way lines and widths, existing and proposed.
X		Existing improvements and their elevations.
X		Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
X		Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X		Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
X		Location and cross-section of street capacity calculations.
	NA	Cross-sectional detail for channels, including cutoff wall locations.
X		Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
X		Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
	NA	Location and detail of existing, proposed, and future block wall openings. Minimum size is 16" x 48". Wrought iron gate is required for flows > 10 cfs.
	NA	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.
X		Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit.
	NA	Building and/or lot numbers.
	NA	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
X		Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
	NA	For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
	NA	Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
X		Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
	NA	Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

Yes	No	
X		Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
X		Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
X		Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
X		Use of correct precipitation values in and around the McCarran Airport rainfall area.
X		A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
X		A summary table of stormwater flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where applicable.
X		Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
X		On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.
	NA	Calculation for impervious area for parking lots and LIDs (if required).

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
	X	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
X		Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. Q_{100} d x v $\leq$ 8. Q_{10} d x v $\leq$ 6 and 12 foot dry lane for rights-of-way $\geq$ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
X		A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
	NA	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
X		Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.
X		Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the Q_{100} weir height or flow depth, whichever is greater.
	NA	A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones. • Field survey data. • Input and output information. • Plotted cross-sections based on survey with proper encroachments. • A map showing the location of the cross-sections. • Analysis of both sub and super-critical flow segments. • A summary table and a discussion of the results in the text of the report.
X		Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
X		Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation.
X		The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
	NA	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:	**STANDARD FORM 2**

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1.4 CCRFCD FACILITY INFORMATION 3
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2008 MPU CCRFCD Hydrologic Map
2013 MPU CCRFCD Facilities Map
Custom Soils Report

Appendix C Hydrologic Analysis

Rainfall Maps
Runoff Curve Number Calculations
Standard Form 4
Existing & Developed Conditions HEC-1 Analysis

Appendix D Hydraulics

Drop Inlet Calculations
Normal Depth Calculations
WSPG

Appendix E Reference Material

Technical Drainage Study for Boca Park Phase III
Technical Drainage Study for Village at Queensridge
Technical Drainage Study for Queens Borrough Culvert
Technical Drainage Study for Peccole Town Center
Technical Drainage Study for Elysian Renaissance

Appendix F Grading Plans and Details

1. INTRODUCTION

1.1 Project Overview & Study Purpose

The purpose of this technical drainage study submittal for Renaissance Lot 1 is to address grading/drainage design of the proposed 7.5-acre commercial subdivision. The subject site is in the western portion of the Las Vegas Valley in the City of Las Vegas, Nevada.

This Technical Drainage Study was prepared in accordance with criteria specified in the *Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual* (latest update), which is referred to in this document as the "*Drainage Manual*". All pertinent reference material and calculations is presented in the Appendix of this report.

Waters of the United States. Many of the dry streams of the southwestern United States have been found to be jurisdictional Waters of the United States (WOUS) which requires special permitting from the United States Army Corps of Engineers (USACE) to commence grading/construction. The purpose of this Technical Drainage Study was only to provide concurrence with local drainage criteria as stated above. The scope of this Technical Drainage Study does not include an assessment of Jurisdictional WOUS for the subject property and therefore does not address special permitting that may be required by the USACE.

1.2 Site Description & Location

The subject site is specifically located in the north half (N1/2) of the southwest quarter (SW1/4) of Section 32, Township 20 South, Range 60 East, M.D.B. & M., Clark County, Nevada. The subject site is bound on the north by Alta Drive which is an 80-foot ROW and fully developed. It is bound on the east by a proposed multi-family residential site currently under review. It is bound on the west by Rampart Boulevard which is a 100-foot ROW and fully developed. It is bound on the south by the existing commercial center Bocca Park North. See *Figure 1, Vicinity Map*, and *Figure 2*, *Location Map*.

1.3 FEMA Flood Zone Designation

The subject site is not located within a Federal Emergency Management Agency Special Flood Hazard Area Zone A. According to the FEMA FIRM Map Index, Panel 32003C2145F, dated November 16, 2011, the subject site is located within "Zone X" which is described as "Areas determined to be outside the 0.2% annual chance floodplain". The FIRM Map Index Page has been annotated and included in the appendix of this report.

1.4 CCRFCD Facility Information

The subject site proposes to discharge runoff into an existing 60" RCP under Alta Drive that outlets into Regional Facility APSO 0000 (dual 12'x12' RCB's). Please refer to Figure F-30, from the 2013 CCRFCD Las Vegas Valley Flood Control Master Plan Update (MPU) for facility location and description. The subject study will be submitted to the CCRFCD for approval.

1.5 Reference Studies

There were several approved drainage studies on file for developments near the subject site. Some studies were reviewed for general, while some were cited for specific hydrologic/hydraulic data. We generally concur with all data cited from the following studies unless stated otherwise:

1. **Technical Drainage Study for Boca Park North (Phase III) at Peccole Town Center, By; VTN, December 12, 2000 DS2799**

The Technical Drainage Study (TDS) for Boca Park North (Phase III) at Peccole Town Center was prepared for a 42-acre commercial site on the southeast corner of Rampart Boulevard and Alta Drive - which includes the subject site parcel. This study was reviewed to help evaluate offsite hydrologic conditions and reference existing storm drain runoff.

2. **Technical Drainage Study for The Village at Queensridge – Update #5, By; GC Wallace, April 2010, DS4018**

The Technical Drainage Study (TDS) for The Village at Queensridge was prepared for a commercial site on the northeast corner of Rampart Boulevard and Alta Drive. This study was reviewed to reference surface runoff on the north side of Alta Drive.

3. **Technical Drainage Study for Queens Borrough Culvert, By; GC Wallace Inc., October 2004, DS3674**

The Technical Drainage Study for Queens Borrough Culvert was prepared for the hydrologic and hydraulic analysis of the Regional Drainage Facility APSO 0000. This study referenced the HGL in the 60" RCP storm drain under Alta Drive.

4. **Technical Drainage Study for Peccole Town Center, By; VTN., June 1998, DS2248**

The Technical Drainage Study for Peccole Town Center was prepared for the hydrologic and hydraulic analysis of a 42-acre commercial site on the southeast corner of Rampart Boulevard and Alta Drive - which includes the subject site. This study was referenced for runoff in Rampart Boulevard.

5. **Technical Drainage Study for Elysian Renaissance, By; GCW, March 2018, DS4957A**

The Technical Drainage Study for Elysian Renaissance was prepared for the hydrologic and hydraulic analysis of a 15-acre commercial site on the southeast corner of Rampart Boulevard and Alta Drive (specifically in the northwest corner of the Peccole Town Center shopping center). This study is currently in review and was referenced for hydrologic and hydraulic information that impacts the subject study.

2. METHODOLOGY

2.1 Compliance

The methodologies utilized in the preparation of this study comply with the CCRFCD Hydrologic Criteria and *Drainage Design Manual* (latest update).

2.2 Hydrologic Modeling

Modeling: The SCS Unit Hydrograph Method (SCS Method) was utilized to determine peak flow rates. The SCS Method utilizes precipitation, drainage area, curve number and lag time parameters to determine peak flow rates. The SCS Method routine within the U.S. Army Corp of Engineers ***HEC-1*** was utilized to model the drainage sub-basins analyzed by this study.

Precipitation: Rainfall depths were calculated based on the CCRFCD Drainage Manual Criteria. This site is not located within the McCarran airport rainfall area. The rainfall depths of 1.6" and 2.86" in the 10- and 100-year, 6-hour storm events respectively were determined using Figures 503 & 506 from the CCRFCD Manual (see appendix). In the hydrologic HEC-1 model, there were no losses allowed for Depth Area.

Curve Number: The Hydrologic Soils Group (HSG) for the subject site was determined from the USDA Soils Conservation Service to be within Group D (see appendix). A Curve Number Determination spreadsheet is in the appendix.

Lag Time: The lag time is defined as the time measured from the center of mass of effective rainfall to the time to peak of the outflow hydrograph. The lag time is related to the time of concentration as 0.6 times the time of concentration. The time of concentration is defined as the time required for runoff to flow from the hydraulically most distant point of a sub-basin to the outlet point of the sub-basin. Standard Form 4, as outlined in the *Drainage Manual*, was utilized to determine the lag times for sub-basins modeled. A copy of lag time computations is included in the appendix. The model included no losses in the hydrograph due to translation (no routing reaches).

It is noted that the *Drainage Manual* limits the lag time for steep and small watersheds. For undeveloped areas, the limit is 0.1 hours, while for developed areas, the limit is 0.05 hours. In the subject study, the limit was met and hence the times of concentration were shortened only to the limit allowed by the *Drainage Manual* for several basins studied.

3. EXISTING CONDITIONS DRAINAGE

Under existing drainage conditions, the subject site and surrounding offsite areas are analyzed in current conditions.

3.1 Onsite and Offsite Existing Conditions

Existing basins and/or combination points are shown on Figure 3 *Existing Conditions Drainage Map* - along with runoff results. Existing conditions are described as follows:

Runoff from offsite basin OFF1E (south of the subject site) combines with runoff from onsite basin ON2E at point ECP1. Runoff from point ECP1 discharges onto the adjacent parcel to the east and combines with offsite basin OFF2E at point ECP2. Runoff from point ECP2 discharges onto Alta Drive.

Rampart Boulevard: Runoff in Rampart Boulevard at was estimated from the Peccole Town Center study. Per the attached annotated excerpts, runoff in Rampart Boulevard (full street) south of Alta Drive is estimated to be 2/47 cfs in the 10yr/100yr storm events. Therefore, the runoff in the eastern half of Rampart Boulevard is an estimated 1/24 cfs at point RAM. These results include runoff intercepted by drop inlets along Rampart Boulevard. Point RAM combines with basin RB at point RAM1 for a combine runoff flow of 3/27 cfs.

Alta Drive: For conservative results, runoff from point RAM1 was analyzed to flow east down the south side of Alta Drive and combine with onsite basin ON1E at point ALT1. Point ALT1 will continue east down Alta Drive and combine with basin AD and point ECP2 at point ALT2.

Per the Village at Queensridge TDS, runoff in Alta Drive west of Rampart Boulevard is intercepted by storm drain facilities (see annotated excerpts). The only runoff on the north side of Alta Drive adjacent to the subject site is runoff generated by the north side of Alta Drive – which is negligible and not expected to overtop the crown to impact the subject site.

4. INTERIM CONDITIONS DRAINAGE

Under interim conditions, the onsite area becomes developed, and the offsite areas remain in existing conditions. Since all surrounding areas are developed, there was no need to analyze interim conditions. Please note that Elysian Renaissance to east of the subject site is under review and is expected to be developed concurrently.

5. DEVELOPED CONDITIONS DRAINAGE

Under developed conditions, the onsite and offsite area are analyzed applying future developed conditions. Developed basins and/or combination points are shown on Figure 4 *Developed Conditions Drainage Map* - along with runoff results. Please note that the adjacent parcel to the east (Elysian Renaissance DS4957A) is currently under review and was analyzed as developed in under these conditions. The following describes the subject study developed conditions:

Runoff in Rampart Boulevard at was estimated from the Peccole Town Center study. Per the attached annotated excerpts, runoff in Rampart Boulevard (full street) south of Alta Drive is estimated to be 2/47 cfs in the 10yr/100yr storm events. Therefore, the runoff in the eastern half of Rampart Boulevard is an estimated 1/24 cfs at point RAM. These results include runoff intercepted by drop inlets along Rampart Boulevard. Point RAM combines with basin RB at point RAM1 for a combine runoff flow of 3/27 cfs.

Runoff from Basin OFF1E (see Figure 3) will discharge onto the proposed interior street of the subject site. This basin was divided into two basins (OFF1a and OFF1b) as shown on Figure 4. Runoff from basin OFF1a will flow down the west half of the interior street and combine with basins ON1D and ON2D at point PT1. Runoff from point PT1 will discharge onto Rampart Boulevard and flow north where it will combine with point RAM and basin RB at point RAM1. For conservative results, runoff from point RAM1 was analyzed to flow east down the south side of Alta Drive. Runoff from point RAM1 will combine with basins ON3D and AD at point ALT1.

Runoff from basin OFF1b (approximately half of basin OFF1E as shown on Figure 3) will flow down the east half of the interior street (see Figure 4) and combine with basin ON4D at point PT2. Runoff from point PT2 will flow north down the perimeter street between the subject site and the adjacent parcel on the east to point PT3. Runoff from point PT3 will combine with runoff from offsite basin ON6D (see excerpts from Elysian Renaissance) at point PT4. Runoff from point PT4 will discharge onto Alta Drive and combine with point ALT1 at point ALT2.

**Please note that that developed conditions surface runoff discharging onto the adjacent parcel to the east has been decreased from existing conditions. Elysian Renaissance was designed for worst case interim conditions which analyzed existing runoff from the subject site at point ECP1 (9/19 cfs) - see annotated excerpts from the Elysian TDS and Figure 3 of the subject study TDS. Developed conditions (from the subject study) estimated that runoff discharging onto the adjacent parcel is approximately 2/4 cfs (see PT2 on Figure 4). Therefore, there is a surface runoff reduction of 7/15 cfs.

**Also note that downstream surface runoff on Alta Drive has been reduced in developed conditions. The Elysian Renaissance TDS in worst case interim conditions estimated that 21/65 cfs would impact Section 1 (see Figure 4 from Elysian TDS excerpts). If runoff from ALT2 (11/45 cfs) of the subject study were combined with Elysian basins ON8D (2/4 cfs), ON10D (2/4 cfs) and approximately half of ALT (1/2 cfs), this would total approximately 16/55 cfs at Section 1 of the Elysian TDS. Since all criteria was met for the Elysian interim conditions in Alta Drive (including the 10yr dry lane criteria), developed conditions criteria will also be met. Therefore, no downstream impact analysis was necessary.

6. HYDRAULICS

6.1 Drop Inlet Calculations

The drop inlet designs are explained below, and the results are shown on Figure 4.

Inlet 1: Inlet 1 is a 2'x2' grate inlet (in a sump) designed to intercept 4 cfs from basin ON6D. A 50% clogging factor was applied to the calculation. If the inlet becomes clogged, runoff will discharge over the curb onto the interior streets.

Inlet 2: Inlet 2 is a 2'x2' grate inlet (in a sump) designed to intercept 8 cfs from basin ON7D. A 50% clogging factor was applied to the calculation. If the inlet becomes clogged, runoff will discharge over the curb onto the interior streets or the perimeter street between the subject site and the parcel to the east.

Inlet 3: Inlet 3 is a 2'x2' grate inlet (in a sump) designed to intercept 6 cfs from basin ON8D. A 50% clogging factor was applied to the calculation. If the inlet becomes clogged, runoff will discharge over the curb onto the interior streets or the perimeter street between the subject site and the parcel to the east.

6.2 Normal Depth Calculations

Normal depth flow calculations for the 10- and 100-year storm events under developed conditions have been analyzed using the Flow Master V8i computer program. Cross section locations and results are shown on Figure 4 and described as follows;

Section 1: Section 1 is the eastern half street analysis in Rampart Boulevard. Runoff at this location is from point RAM1 and estimated to be 6/34 cfs. Figure 4 shows that the DxV criteria is met for both conditions as well as the 10yr dry lane criteria.

Section 2: Section 2 is the southern have of Alta Drive. Runoff at this location is from point ALT2 and estimated to be 11/45. The results on Figure 4 shows that the DxV criteria is met for both conditions as well as the 10yr dry lane criteria.

Section 3: Section 3 an interior street section as shown on Figure 4. Runoff at this location during the 10yr/100yr storm event from point PT1 and estimated to be is 3/7 cfs.

Section 4: Section 4 an interior street section as shown on Figure 4. Runoff at this location during the 10yr/100yr storm event from point PT1 and estimated to be is 2/4 cfs.

6.3 WSPG

The WSPG program was used to model the storm drain system as shown on Figure 4. This area was previously analyzed (under developed conditions) to include the entire Peccole Town Center (which includes most of the commercial center on the southeast corner of Rampart Boulevard and Alta Drive and north of Charleston Boulevard). Also referenced is the recently submitted TDS for Elysian Renaissance. Storm drain runoff quantities referenced from these studies are labeled on the storm drain alignment shown on Figure 4 and annotated excerpts from these studies are in the appendix. Please note that the revised estimated storm drain runoff analyzed in the subject study is 270 cfs. This is a reduction from the 295 cfs estimated and approved in the Boca Park TDS.

Three separate main lines were modeled separately along with 2 laterals. The results are explained as follows:

Main1: Main1 extends from the invert of the existing dual 12'x12' RCB's (Regional APSO 0000) to the proposed lateral as shown on the Strom Drain Alignment Exhibit. The outlet HGL was referenced from Village at Queensridge Culvert.

Main2: Main2 extends from the proposed 30" storm drain to the existing manhole where P-81 and P-73 converge and is shown on the Strom Drain Alignment Exhibit.

The laterals for Inlet 2 (SD-3) and Inlet 3 (SD-4) were modeled separately and the results are in the appendix. The outlet HGL's were referenced from corresponding Main Lines.

7. CONCLUSIONS & RECOMMENDATIONS

This study and improvement drawings complies with the drainage laws and regulations set forth by The City of Las Vegas and the Clark County Regional Flood Control District.

Development of the site and the offsite street improvements is not expected to have a negative drainage impact on any upstream or downstream properties.

The proposed roadway sections are adequately protected from flood damage caused by a 100-year flood or less, as specified by the CCRFCD Hydrologic Criteria and Drainage Design Manual.

This site is not within a Special Flood Hazard Zone as designated by FEMA.

Nuisance flows are directed from the proposed site into public street sections and storm drains.

8. REFERENCES

1. **Hydrologic Criteria and Drainage Design Manual. Clark County Regional Flood Control District, 1990.**

2. **USCS Web soil survey http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm**

3. **FlowMaster V8i Hydraulic Toolbox**

4. **Technical Drainage Study for Boca Park North (Phase III) at Peccole Town Center, By; VTN, December 12, 2000 DS2799**

5. **Technical Drainage Study for The Village at Queensridge – Update #5, By; GC Wallace, April 2010, DS4018**

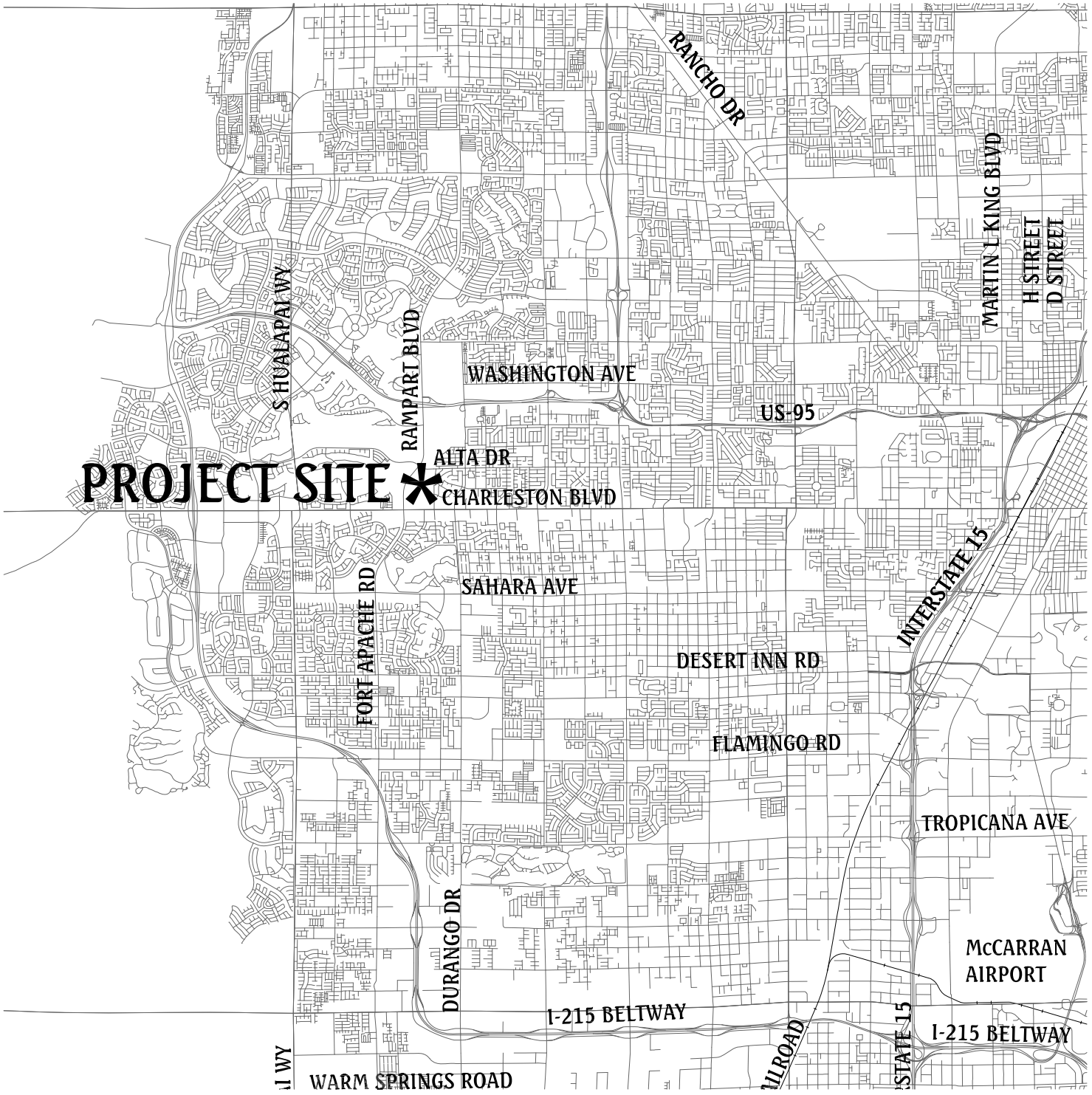
6. **Technical Drainage Study for Queens Borrough Culvert, By; GC Wallace Inc., October 2004, DS3674**

7. **Technical Drainage Study for Peccole Town Center, By; VTN., June 1998, DS2248**

8. **Technical Drainage Study for Elysian Renaissance, By; GCW, March 2018, DS4957A**

APPENDIX

APPENDIX A FIGURES



RENAISSANCE LOT 1

FIGURE 1

VICINITY MAP

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com



NORTH

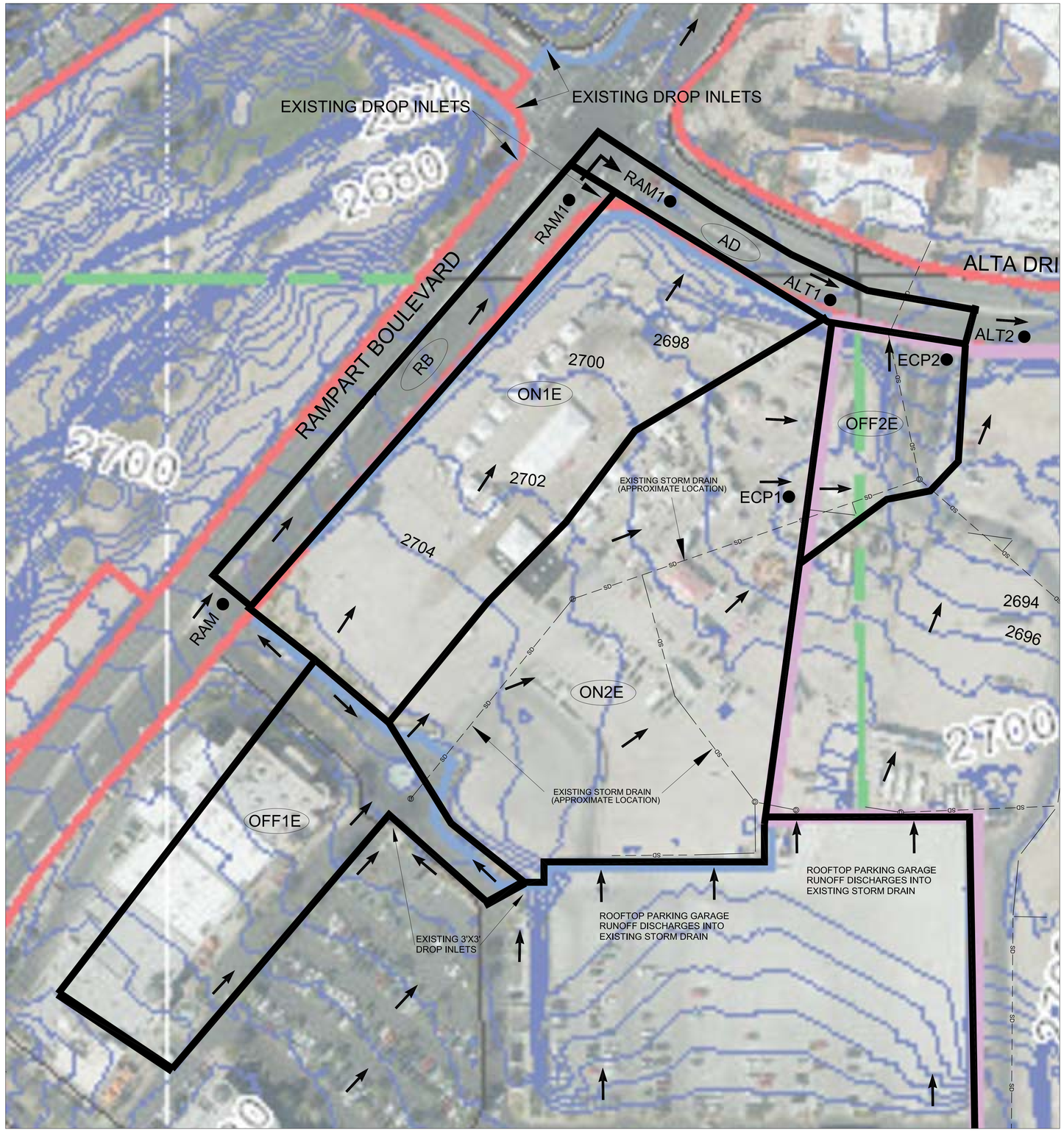
NTS

RENAISSANCE LOT1

FIGURE 2

LOCATION MAP

GCW ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com



NORTH

GRAPHIC SCALE

60 0 30 60

(IN FEET)

1 inch = 60 ft.

DRAINAGE LEGEND	
XT32	BASIN IDENTIFICATION
	BASIN BOUNDARY
CPT4	CONCENTRATION POINT
	FLOW PATH

PEAK FLOW RATES FOR EXISTING CONDITIONS
RENAISSANCE LOT1

CONC. POINT/ DRAINAGE AREA / FACILITY	AREA, ACRES	PEAK FLOW, CFS		NOTES
		10-YR	100-YR	
ON1E	3.12	5	9	
RAM		1	24	
RB	0.74	2	3	1
RAM1		3	27	RAM+RB
AD	0.48	1	2	
ALT1		9	38	ON1E+RAM1+AD
OFF1E	1.94	3	7	
ON2E	4.17	6	12	
ECP1		9	19	OFF1E+ON2E
OFF2E	0.75	1	2	
ECP2		10	21	ECP1+OFF2E
ALT2		19	59	ALT1+ECP2

1. Referenced from Peccole Town Center study. Runoff generated in eastern half of Rampart Boulevard expected to flow down the south half of Alta Drive.

REV.	DATE	DESCRIPTION	DATE	AGEN. APP.	DATE	CGW APP.

PROJECT NO.

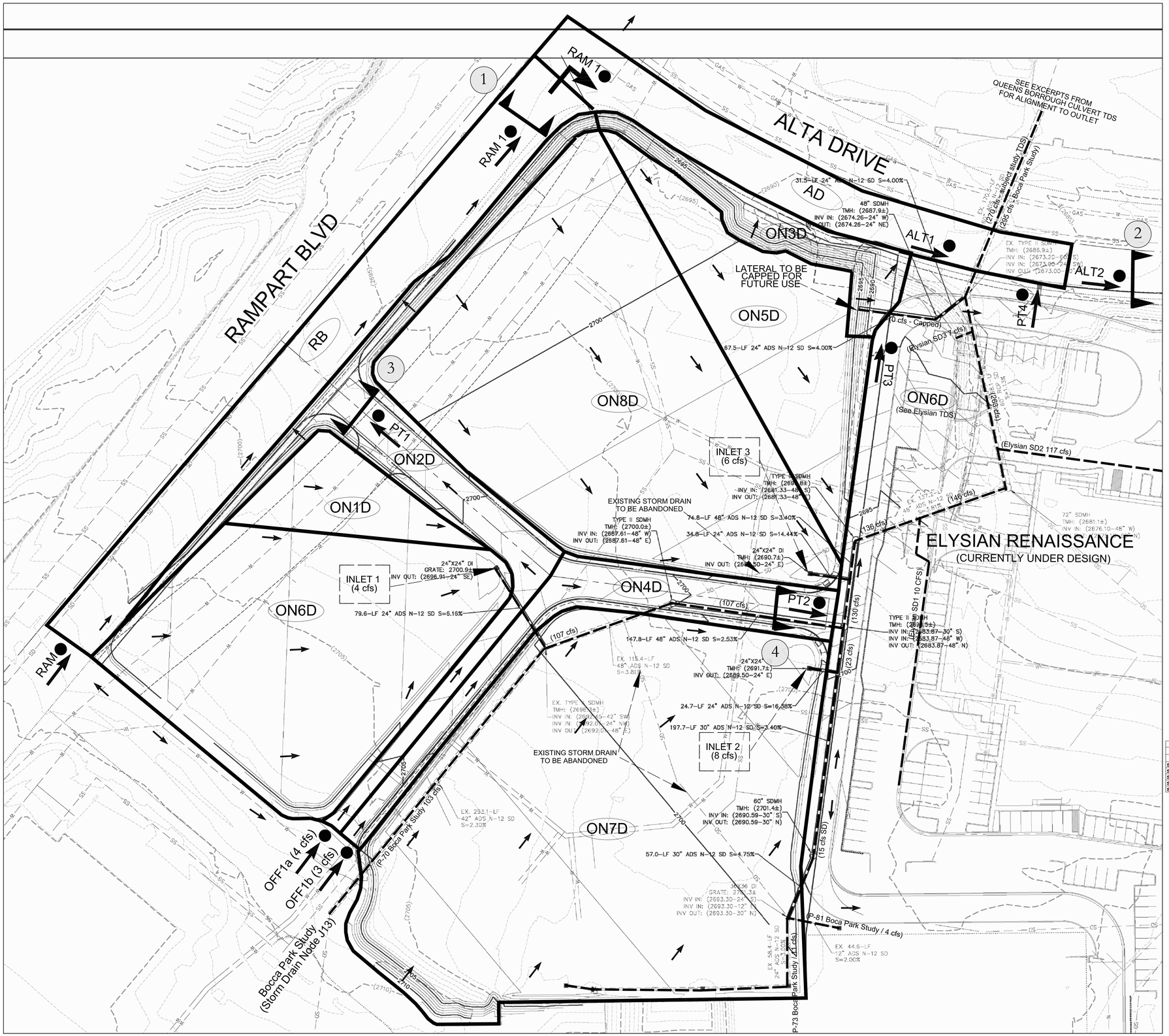
DESIGN:
DRAWN: LLP
CHECK:
PLOT DATE:
PLOT TIME:

GCW
ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

FIGURE 3

EXISTING CONDITIONS DRAINAGE MAP

RENAISSANCE LOT 1



DRAINAGE LEGEND

XT32	BASIN IDENTIFICATION
	BASIN BOUNDARY
CPT4	CONCENTRATION POINT
	FLOW PATH
(CPT4)	STORM DRAIN LOCATION AND 100YR RUNOFF
X	HYDRAULIC CROSS SECTION

NORTH

GRAPHIC SCALE

40 0 20 40

(IN FEET)

1 inch = 40 ft.

PEAK FLOW RATES FOR DEVELOPED CONDITIONS
RENAISSANCE LOT 1

CONC. POINT/ DRAINAGE AREA / FACILITY	AREA, ACRES	PEAK FLOW, CFS 10-YR	PEAK FLOW, CFS 100-YR	NOTES
OFF1a		2	4	Half of OFF1E -See Figure 3
ON1D	0.23	<1	1	
ON2D	0.054	1	2	
PT1		3	7	OFF1a+ON1D+ON2D
RAM		1	24	1
RB	0.74	2	3	
RAM1		6	34	PT1+RAM+RB
AD	1.48	1	2	
ON3D	0.22	<1	1	
ALT1		7	37	RAM1+AD+ON3D
OFF1b		1	3	Half of OFF1E - See Figure 3
ON4D	0.37	1	1	
PT2		2	4	OFF1b+ON4D
ON5D	0.63	1	2	
PT3		3	6	PT2+ON5D
ON6D (offsite)	0.64	1	2	2
PT4		4	8	PT3+ON6D
ALT2		11	45	ALT1+PT4
ON6D	1.26	2	4	
ON7D	2.54	4	8	
ON8D	1.86	3	6	

1. Referenced from Peccole Town Center study. Runoff generated from eastern half of Rampart Boulevard expected to flow down the south half of Alta Drive.
2. Referenced from Elysian Renaisance TDS

STORM DRAIN CALCS FOR DEVELOPED CONDITIONS
RENAISSANCE LOT 1

INLET / NODE	STORM DRAIN RUNOFF / INTERCEPTION (cfs)	NOTES
P-70	103	See Bocca Park Study
INLET 1	4	
TOTAL1	107	P70+INLET1
P-81	4	See Bocca Park Study
P-73	11	See Bocca Park Study
INLET 2	8	
TOTAL2	23	P81 + P73 + INLET2
INLET 3	6	
TOTAL3	136	TOTAL1 + TOTAL2 + INLET3
Elysian SD1	10	See Elysian TDS
Elysian SD2	117	See Elysian TDS
Elysian SD3	7	See Elysian TDS
TOTAL 4	270	TOTAL 3 + Elysian

STREET CAPACITY CALCULATIONS DEVELOPED CONDITIONS - RENAISSANCE LOT1

HYDRAULIC SECTION	SLOPE, %	Q_{10} / Q_{100} CFS	D_{10} / D_{100}, FEET	V_{10} / V_{100}, FPS	V_{10},* D_{10} / V_{100},* D_{100}	Dry Lane Met Yes/No
Section 1 - Rampart East Half (MIN)	1.1	6/34	0.42/0.67	2.63/3.80	1.1/2.5	YES
Section 1 - Rampart East Half (MAX)	4.0	6/34	0.35/0.57	4.30/6.13	1.51/3.49	YES
Section 2 - Alta Drive South Half	2.1	11/45	0.48/0.73	4.41/5.81	2.1/4.24	YES
Section 3 - Interior Street	2.3	3/7	0.27/0.34	2.69/3.21	0.73/1.09	NA
Section 4 - Interior Street	1.7	2/4	0.25/0.30	2.17/2.50	0.54/0.75	NA

				DESCRIPTION
				DATE
				AGEN APP
				DATE
				GCW APP
				DATE
				REV

PROJECT NO.

DESIGN:
DRAWN: LLP
CHECK:
PLOT DATE:
PLOT TIME:

GCW
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com
ENGINEERS \ SURVEYORS

FIGURE 4

DEVELOPED CONDITIONS DRAINAGE MAP

RENAISSANCE LOT 1

APPENDIX B SUPPORTING DOCUMENTS

NOTES

This map is for assessment use only and does NOT represent a survey.

No liability is assumed for the accuracy of the data deliniated herein. Information on roads and other non-assessed parcels may be obtained from the Road Document Listing in the Assessor's Office.

This map is compiled from official records, including surveys and deeds, but only contains the information required for assessment. See the recorded documents for more detailed legal information.

USE THIS SCALE(FEET) WHEN MAP REDUCED FROM 11X17 ORIGINAL

0 100 200 400 600 800

MAP LEGEND

- PARCEL BOUNDARY
- SUB BOUNDARY
- PM/LD BOUNDARY
- ROAD EASEMENT
- MATCH / LEADER LINE
- HISTORIC LOT LINE
- HISTORIC SUB BOUNDARY
- HISTORIC PM/LD BOUNDARY
- SECTION LINE
- CONDOMINIUM UNIT
- AIR SPACE PCL
- RIGHT OF WAY PCL
- SUB-SURFACE PCL

001 ROAD PARCEL NUMBER
001 PARCEL NUMER
1.00 ACREAGE
202 PARCEL SUB/SEQ NUMBER
PB 24-45 PLAT RECORDING NUMBER
5 BLOCK NUMBER
5 LOT NUMBER
GL5 GOV. LOT NUMBER

ASSESSOR'S PARCELS - CLARK CO., NV.
Michele W. Shafe - Assessor

BOOK T20S R60E

SEC. 32

MAP N 2 SW 4

138-32-3

27	126	125	124			
36	137	138	139			
65	164	163	162			
74	175	176	177			

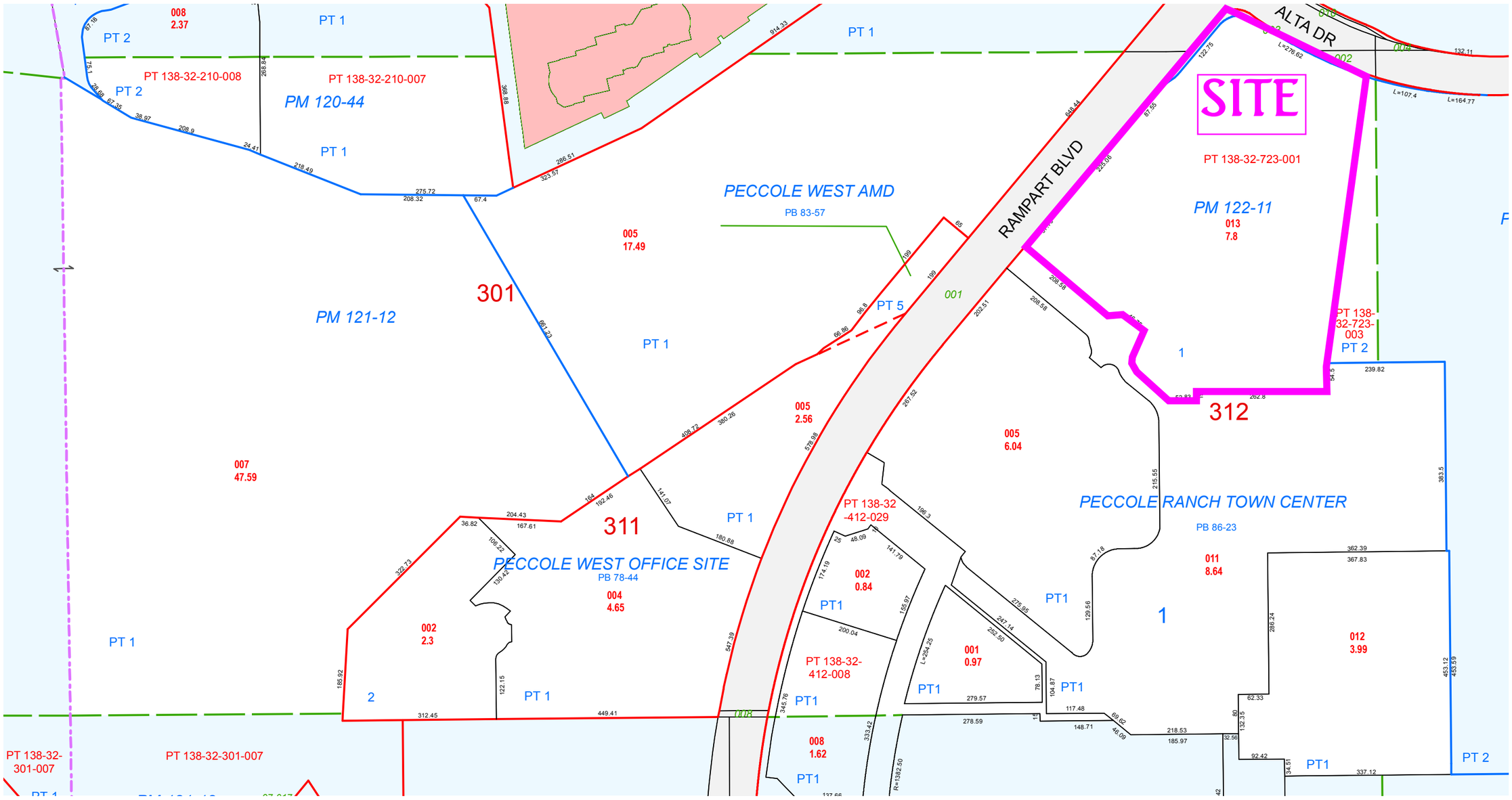
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7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

8	4	8	4
5	1	5	1
6	2	6	2
7	3	7	3
8	4	8	4
5	1	5	1

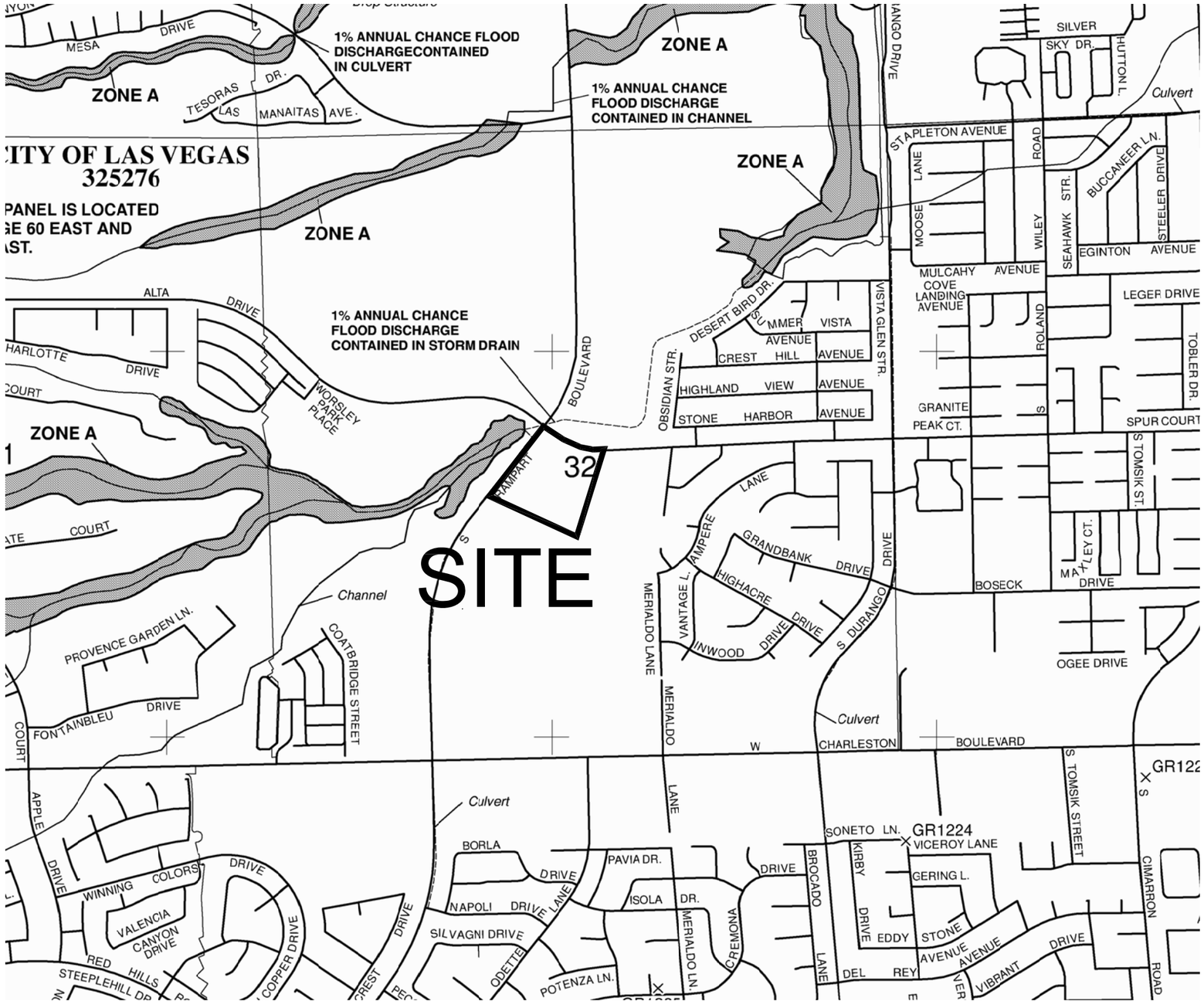
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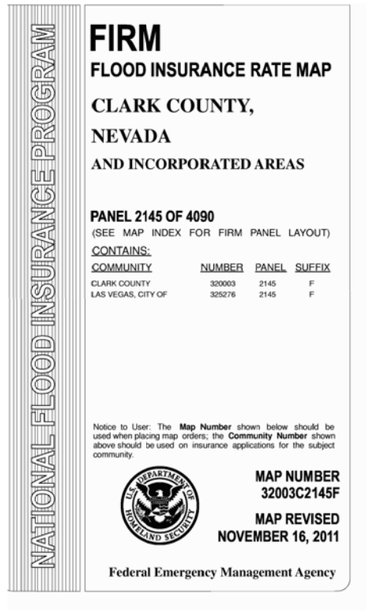
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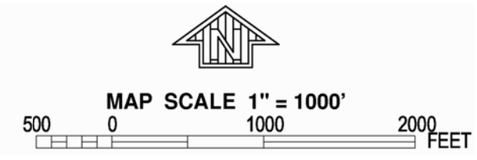
CLARK COUNTY ASSESSOR MAPPING DIVISION NEVADA



TAX DIST 200







GCW
ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

RENAISSANCE LOT 1

FIRM PANEL 2145F

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
APDG		**ANGEL PARK - DURANGO**						
0000	E	84" RCP	2600	842	C38B	ALLGOW3	0.79	0.70
0060	E	72" RCP	1901	374	38A	ALLGOW3	0.35	0.96
APMD		**ANGEL PARK - MIDDLE BRANCH**						
0027	E	1: 12' X 10' and 2: 12' X 2' RCBC @ Canyon Run	170	6048	C11A-3*	ALLGOW4	11.31	3.00
0030	E	Natural Wash	7000	6048	C11A-3*	ALLGOW4	11.31	3.00
0132	E	2: 12'x10' RCBC @ Hualapai	120	6048	C11A-3*	ALLGOW4	11.31	1.00
0133	E	Natural Wash	3015	6048	C11A-3*	ALLGOW4	11.31	3.00
APNO		**ANGEL PARK NORTH**						
0001	E	1,512 ac-ft Angel Park Detention Basin		9199	ANGLPKIN	ALLGOW5	21.99	
APP1		**ANGEL PARK - PECCOLE 1**						
0000	E	72" RCP	2982	442	PIC-B	ALLGOW3	0.44	2.40
0056	E	2: 60" RCP	1385	442	PIC-B	ALLGOW3	0.44	2.40
APP2		**ANGEL PARK - PECCOLE 2**						
0000	E	Grass Chnl 10'W 5'D 2:1 SS	4793	2004	C57B-1	ALLGOW3	1.93	2.10
APSO		**ANGEL PARK - SOUTH BRANCH**						
0000	E	2: 12' X 12' RCB	2506	4628	CC57B-4	ALLGOW3	5.24	1.62
0020	E	2: 12' X 12' RCBC @ Rampart	350	4628	CC57B-4	ALLGOW3	5.24	1.80
0050	E	Natural Wash	209	4628	CC57B-4	ALLGOW3	5.24	1.84
0067	E	Natural Wash	8300	2384	C57B-2	ALLGOW3	2.67	2.10
0204	E	2: 8' X 8' RCBC @ Hualapai	326	2056	C12B	ALLGOW3	2.00	2.66
0205	E	Natural Wash	2380	2056	C12B	ALLGOW3	2.00	3.46
0254	E	2: 8' X 8' RCBC @ Town Center Dr.	190	1932	C12A	ALLGOW3	1.74	3.00
0255	E	24' X 12' RCAC @ Town Center Dr.	140	1932	C12A	ALLGOW3	1.74	3.00
FLBF		**FLAMINGO WASH - BUFFALO**						
0152	E	10' X 7' RCB	3460	814	CLF11	FLAM3A	4.29	0.32
0228	E	96" RCP	1330	746	CLF9	FLAM3A	0.94	1.00
0252	E	9' X 6' RCB	170	746	CLF9	FLAM3A	0.94	1.00
0258	E	96" RCP	1140	746	CLF9	FLAM3A	0.94	0.50
0278	E	90" RCP	2640	506	LF8	FLAM3A	0.51	0.50
0328	E	54" RCP	660	506	LF8	FLAM3A	0.51	0.30
FLDI		**DESERT INN DRAIN**						
0000	E	9' X 6' RCB	190	1145	CLF4	FLAM3A	1.38	2.71
0004	E	96" RCP	2670	1145	CLF4	FLAM3A	1.38	1.00
0050	E	90" RCP	1390	1145	CLF4	FLAM3A	1.38	1.65
0075	E	84" RCP	1010	874	CLF3	FLAM3A	0.94	1.87
0095	E	96" RCP	200	874	CLF3	FLAM3A	0.94	1.87
0100	E	72" RCP	190	277	LF1	FLAM3A	0.37	1.86
0105	E	60" RCP	2510	277	LF1	FLAM3A	0.37	1.85
FLDR		**DURANGO COLLECTOR**						
0179	E	60" RCP	1810	260	CUFS23	FLAM3A	0.45	1.21
FLDY		**FLAMINGO WASH - DARBY STORM DRAIN**						
0000	E	84" RCP	100	558	CLF24	FLAM3A	0.76	0.25
0002	E	10' X 3' RCB	50	558	CLF24	FLAM3A	0.76	0.25
0004	E	60" RCP	680	558	CLF24	FLAM3A	0.76	2.80
0013	E	78" RCP	560	558	CLF24	FLAM3A	0.76	1.79
FLLA		**FLAMINGO WASH - LATERAL (FLAMINGO/RAINBOW)**						
0227	E	93" RCP	1360	640	CLF28	FLAM3B	1.03	0.40
0254	E	90" RCP	2730	403	CLF27	FLAM3A	1.54	0.40
0305	E	1,556 cfs PMF Spillway		1556	CLF25	FLAM3A	1.03	
0306	E	30" RCP with 18" Orifice Outlet	160	29	DIDB	FLAM3A	1.03	0.43
0308	E	62 ac-ft Desert Inn Detention Basin		744	CLF25	FLAM3A	1.03	
0322	E	81" RCP	1370	224	LF25	FLAM3A	0.27	0.50
0345	E	81" RCP	1340	224	LF25	FLAM3A	0.27	0.50
0369	E	72" RCP	670					0.50
0379	E	66" RCP	1320					0.50

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
FLMN		**FLAMINGO WASH - MONTESSOURI NORTH STORM DRAIN**						
0000	E	78" RCP	1340	558	CLF24	FLAM3A	0.76	0.50
0025	E	72" RCP	1330	558	CLF24	FLAM3A	0.76	0.50
0050	E	66" RCP	500	372	LF23	FLAM3A	0.38	0.50
0060	E	54" RCP	800	372	LF23	FLAM3A	0.38	0.50
0075	E	48" RCP	30	372	LF23	FLAM3A	0.38	0.50
FLMS		**FLAMINGO WASH - MONTESSOURI SOUTH STORM DRAIN**						
0000	E	54" RCP	630					0.52
FLSM		**SPRING MOUNTAIN DRAIN**						
0000	E	60" RCP	4590	116	CLF10W	FLAM3A	2.84	2.50
0083	E	36" RCP	570	86	LAKEDB	FLAM3A	2.62	1.90
0086	E	36" RCP Outlet	90	86	LAKEDB	FLAM3A	2.62	
0087	E	143 ac-ft Lakes Detention Basin		1976	CLF7	FLAM3A	2.62	
0088	P1	Upgrade to 165 ac-ft Lakes Detention Basin		1976	CLF7	FLAM3A	2.62	
0100	E	12' X 8' RCB	310	1976	CLF7	FLAM3A	2.62	1.25
0125	E	96" RCP	3040	750	CLF6N	FLAM3A	0.87	0.80
0180	E	90" RCP	2350	526	LF5	FLAM3A	0.49	0.50
GOSO		**GOWAN SOUTH FACILITIES**						
0297	E	12' X 7' RCB	2124	1825	CW1BB-C	ALLGOW3	2.14	1.60
0336	E	12' X 7' RCB	602	1593	C1-WESTC	ALLGOW3	1.84	3.40
0352	E	2: 8' X 5' RCB	2740	1374	C1-DUCHC	ALLGOW3	1.60	0.73
0404	E	2: 8' X 4' RCB	2660	1125	C1-ALTAC	ALLGOW3	1.32	0.80
0455	E	2: 12' X 4' RCB	350	665	C1-HOLMC	ALLGOW3	0.81	0.30
0462	E	12' X 4' RCB	1330	665	C1-HOLMC	ALLGOW3	0.81	0.30
GOWC		**GOWAN SOUTH FACILITIES - WEST CLIFF**						
0000	E	24" RCP	5400	257	1-WEST-C	ALLGOW3	0.24	1.67
LCCH		**LAS VEGAS CREEK CHANNEL**						
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
0499	E	42" RCP Outlet	660	85	RAINBWDB	SW3	1.11	1.88
0513	E	102 ac-ft Rainbow Detention Basin		970	RAINBWIN	SW3	1.11	
0518	E	60" RCP Connector Pipe Under Rainbow Blvd	670	970	RAINBWIN	SW3	1.11	1.85
LCLO		**LAS VEGAS CREEK - LORENZI**						
0000	E	7' X 6' RCB	445	265	DAL00A	SW3	0.41	3.37
0008	E	7' X 6' RCB	2415	265	DAL00A	SW3	0.41	0.40
0054	E	7' X 5' RCB	169	265	DAL00A	SW3	0.41	1.00
MEAL		**MEADOWS ALTA**						
0160	E	36" RCP	2600	331	CUS	SW3	0.56	1.25
0209	E	48" RCP	2500	150	DCR2	SW3	0.41	1.70
0256	E	38" X 60" HERCP	81	150	DCR2	SW3	0.41	1.48
0258	E	48" RCP	275	150	DCR2	SW3	0.41	4.07
MECH		**EXTENSION OF MEADOWS / CHARLESTON**						
0310	E	24" RCP	1000	32	OAKEYOT	SW3	1.88	1.43
0323	E	15" RCP Outlet	200	32	OAKEYDB	SW3	1.88	
0324	E	201 ac-ft Oakey Detention Basin		1652	OAKEYIN	SW3	1.88	
0334	E	11' X 6' RCB	200	573	C5-OAK-C	SW3	0.56	0.50
0337	E	9' X 6' RCB	520	573	C5-OAK-C	SW3	0.56	0.50
0338	E	10' X 8' RCB	2060	1131	C3A-OAKC	SW3	1.32	1.62
0351	E	90" RCP	1350	573	C5-OAK-C	SW3	0.56	0.50
0378	E	10' X 8' RCB	745	1131	C3A-OAKC	SW3	1.32	2.00
0380	E	66" RCP	385	352	3-HOLM-C	SW3	0.33	2.00
0387	E	66" RCP	300	403	3A-OAK-C	SW3	0.43	3.08
0390	E	83" X 53" RCP	50	352	3-HOLM-C	SW3	0.33	2.00
0400	E	10' X 6' RCB	1890	823	C3-ELP-C	SW3	0.88	1.43
0405	E	66" RCP	1390	403	3A-OAK-C	SW3	0.43	1.00
0410	E	66" RCP	182	352	3-HOLM-C	SW3	0.33	2.00
0420	E	66" RCP	1410	352	3-HOLM-C	SW3	0.33	2.00

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
MECN		**MEADOWS - CHARLESTON**						
0123	P1	8' X 6' RCB	5200	821	CCH09-C	SW3	0.72	1.64
0223	P1	6' X 5' RCB	2700	422	CCH05-C	SW3	0.34	2.04
RRFA		**RED ROCK - FORT APACHE COLLECTOR**						
0105	E	78" RCP	1330	463	CUFR22	FLAM3A	0.77	0.94
0130	E	66" RCP	690	331	UFR21	FLAM3A	0.51	0.93
0143	E	48" RCP	1330	331	UFR21	FLAM3A	0.51	2.54
RRHU		**RED ROCK - HUALAPAI COLLECTOR**						
0015	E	10' X 10' RCB	560	1199	CUFR13N	FLAM3A	1.52	1.30
0025	E	11' X 5.5' RCAP	3310	1199	CUFR13N	FLAM3A	1.52	1.30
0079	E	8' X 6' RCB	2650	981	CUFR11	FLAM3A	1.09	1.30
0129	E	7' X 6' RCB	2630	842	CUFR10	FLAM3A	0.82	1.20

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

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

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

REGIONAL FLOOD CONTROL DISTRICT

2013 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F - 30

LEGEND

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

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

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

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

Construction Features

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

REGIONAL FLOOD CONTROL DISTRICT

2013
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F- 30
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

- 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

N

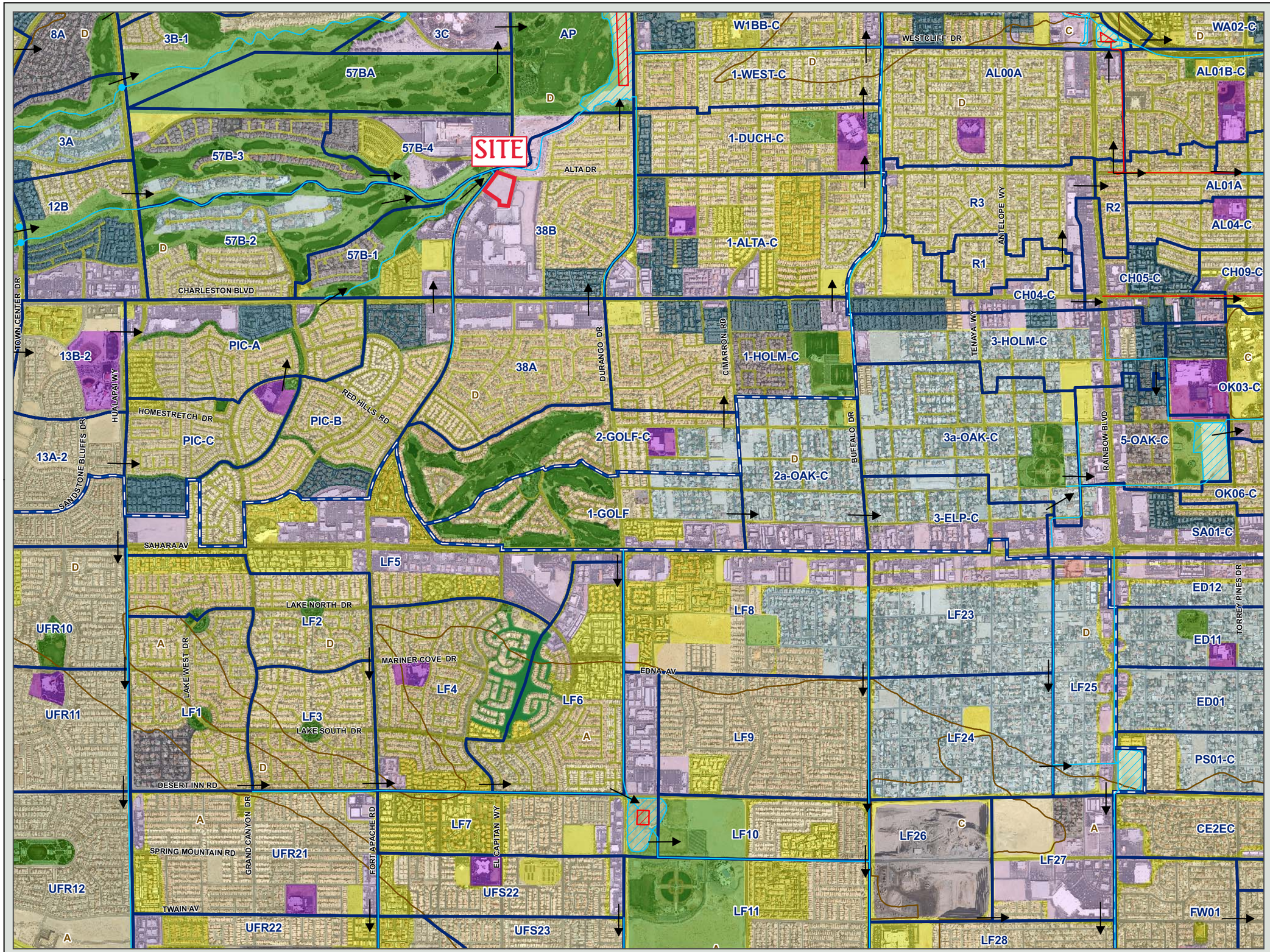
0 500 1,000 2,000 3,000
Feet

Scale: 1 inch = 2,000 feet

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

US95 I-15 I-215

1	2	3		A1	A2	
4	5	6		A3	A4	
	7	8	9	10	A5	A6
11	12	13	14	15	16	17
	18	19	20	21	22	23
	24	25	26	27	28	
	29	30	31	32	33	34
	35	36	37	38	39	40
	41	42	43	44	45	46
	47	48	49	50	51	52
	53	54	55	56		
	57	58	59			



REGIONAL FLOOD CONTROL DISTRICT

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE H- 30
HYDROLOGIC SUMMARY

LEGEND

- Ultimate Development Boundary
- Watershed Boundary
- Subbasin Boundary
- Drought Ordinance Boundary
- Flow Arrows

Flood Control Facilities

- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Category A Remove & Replace/ Parallel Facilities
- Category B Remove & Replace/ Parallel Facilities

Type Hydrologic Soil Groups

- A Low Runoff Potential
- B Moderately Low Runoff Potential
- C Moderately High Runoff Potential
- D High Runoff Potential/Rock Outcrops

Typical Land Use

- 1 Undeveloped Land, Open Desert
- 2 Parks, Golf Courses
- 3 Rural
- 4 / 14* Low Density Residential
- 5 / 15* Medium Density Residential
- 6 / 16* High Density Residential
- 7 / 17* Public Facility, Residential
- 8 / 18* Very High Density Residential
- 9 / 19* Commerical, Retail, Casino, High Rise Condominiums
- 10 / 20* Light Industrial
- 11 / 21* Heavy Industrial
- 12 / 22* Schools
- 13 Lakes

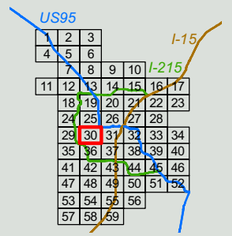
* Drought Ordinance Applied

N

0 500 1,000 2,000 3,000
Feet

Scale: 1 inch = 2,000 feet

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



PBS&J
PB

Search

Properties and Qualities Ratings

Open All | Close All

- Soil Chemical Properties
- Soil Erosion Factors
- Soil Health Properties
- Soil Physical Properties
- **Soil Qualities and Features**
  - AASHTO Group Classification (Surface)
  - Depth to a Selected Soil Restrictive Layer
  - Depth to Any Soil Restrictive Layer
  - Drainage Class
  - Frost Action
  - Frost-Free Days
  - Hydrologic Soil Group

View Description | View Rating

View Options

Map ☑
Table ☑
Description of Rating ☑
Rating Options ☑
Detailed Description ☐

Advanced Options

Aggregation Method: Dominant Component
Component Percent Cutoff:
Tie-break Rule: Lower / Higher

View Description | View Rating

- Map Unit Name
- Parent Material Name
- Representative Slope
- Unified Soil Classification (Surface)
- Water Features

Map — Hydrologic Soil Group

Scale (not to scale)



Warning: Soil Ratings Map may not be valid at this scale.

You have zoomed in beyond the scale at which the soil map for this area is intended to be used. Mapping of soils is done at a particular scale. The soil surveys that comprise your AOI were mapped at 1:24,000. The design of map units and the level of detail shown in the resulting soil map are dependent o that map scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Tables — Hydrologic Soil Group — Summary By Map Unit

Summary by Map Unit — Las Vegas Valley Area, Nevada, Part of Clark County (NV788)

Summary by Map Unit — Las Vegas Valley Area, Nevada, Part of Clark County (NV788)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
152	Cave gravelly fine sandy loam, 0 to 4 percent slopes	D	113.3	100.0%
Totals for Area of Interest			**113.3**	**100.0%**

Description — Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options — Hydrologic Soil Group

Aggregation Method: Dominant Component

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

APPENDIX C HYDROLOGIC ANALYSIS

PRECIPITATION ADJUSTMENT RATIOS

Recurrence Interval	Ratio to NOAA Atlas 2
2-year	1.00
5-year	1.16
10-year	1.24
25-year	1.33
50-year	1.39
100-year	1.43

NOTE:
1. Multiply the values obtained from the NOAA Atlas 2 by the above ratios to obtain the adjusted precipitation values.
2. NOAA Atlas 2 values for use with TR-55 shall not be adjusted by the above ratios.
3. Tables 505 and 506 require no adjustments.

Revision	Date

SIX-HOUR STORM DISTRIBUTIONS

Storm Time (In Minutes)	Percent of Total Storm Depth SDN3	SDN4	SDN5
0	0.0	0.0	0.0
5	2.0	2.0	2.0
10	5.7	5.8	5.9
15	7.0	7.5	8.0
20	8.7	9.9	11.0
25	10.8	12.6	14.4
30	12.4	13.7	15.0
35	13.0	14.5	16.0
40	13.0	14.9	16.8
45	13.0	15.1	17.1
50	13.0	15.5	18.0
55	13.0	15.6	18.2
60	13.0	15.9	18.7
65	13.3	16.2	19.0
70	14.0	16.9	19.7
75	14.2	17.2	20.2
80	14.8	17.9	21.0
85	15.8	18.9	22.0
90	17.2	20.1	23.0
95	18.1	21.1	24.1
100	19.0	22.0	25.0
105	19.7	22.8	25.9
110	19.9	23.2	26.5
115	20.0	24.0	28.0
120	20.1	24.6	29.0
125	20.4	25.2	30.0
130	21.4	26.0	30.5
135	22.9	26.9	30.9
140	24.1	27.6	31.0
145	24.9	28.3	31.7
150	25.1	28.6	32.1
155	25.6	29.2	32.7
160	27.0	30.2	33.3
165	27.8	31.2	34.6
170	28.1	32.1	36.1
175	28.3	33.2	38.1
180	29.5	35.2	40.8

Storm Time (In Minutes)	Percent of Total Storm Depth SDN3	SDN4	SDN5
185	32.2	37.6	43.0
190	35.2	41.5	47.7
195	40.9	46.2	51.4
200	49.9	53.0	56.1
205	59.0	61.0	63.0
210	71.0	71.0	71.0
215	74.4	73.2	72.0
220	78.1	75.6	73.1
225	81.2	78.2	75.2
230	81.9	79.9	77.9
235	83.5	81.3	79.0
240	85.1	82.3	79.5
245	85.6	83.0	80.4
250	86.0	83.5	81.0
255	86.8	84.4	82.0
260	87.6	85.1	82.6
265	88.8	86.4	84.0
270	91.0	88.5	85.9
275	92.6	90.8	88.9
280	93.7	92.4	91.0
285	95.0	94.4	93.8
290	97.0	96.8	96.6
295	97.6	97.3	97.0
300	98.2	97.8	97.4
305	98.5	98.2	97.9
310	98.7	98.4	98.1
315	98.9	98.6	98.3
320	99.0	98.8	98.5
325	99.3	99.1	98.9
330	99.3	99.2	99.0
335	99.4	99.3	99.2
340	99.5	99.4	99.3
345	99.8	99.7	99.6
350	99.8	99.8	99.7
355	99.9	99.9	99.9
360	100.0	100.0	100.0

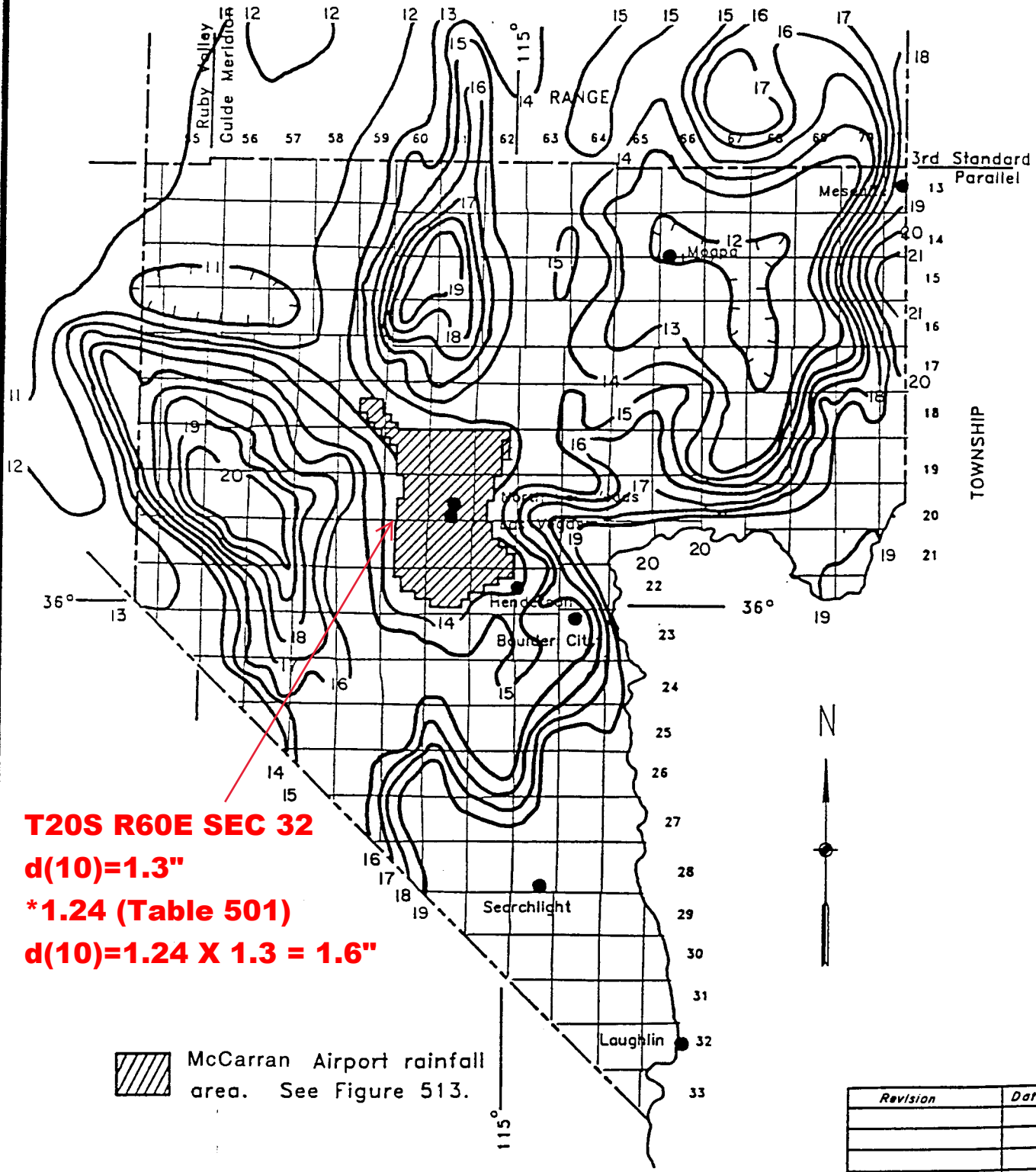
Notes:
1. For drainage areas less than 8 square miles in size, use SDN 3.
2. For drainage areas greater than or equal to 8 square miles and less than 12 square miles in size, use SDN 4.
3. For drainage areas greater than or equal to 12 square miles, use SDN 5.
4. A graphical representation of these values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

Revision	Date

REFERENCE:

TABLE 503

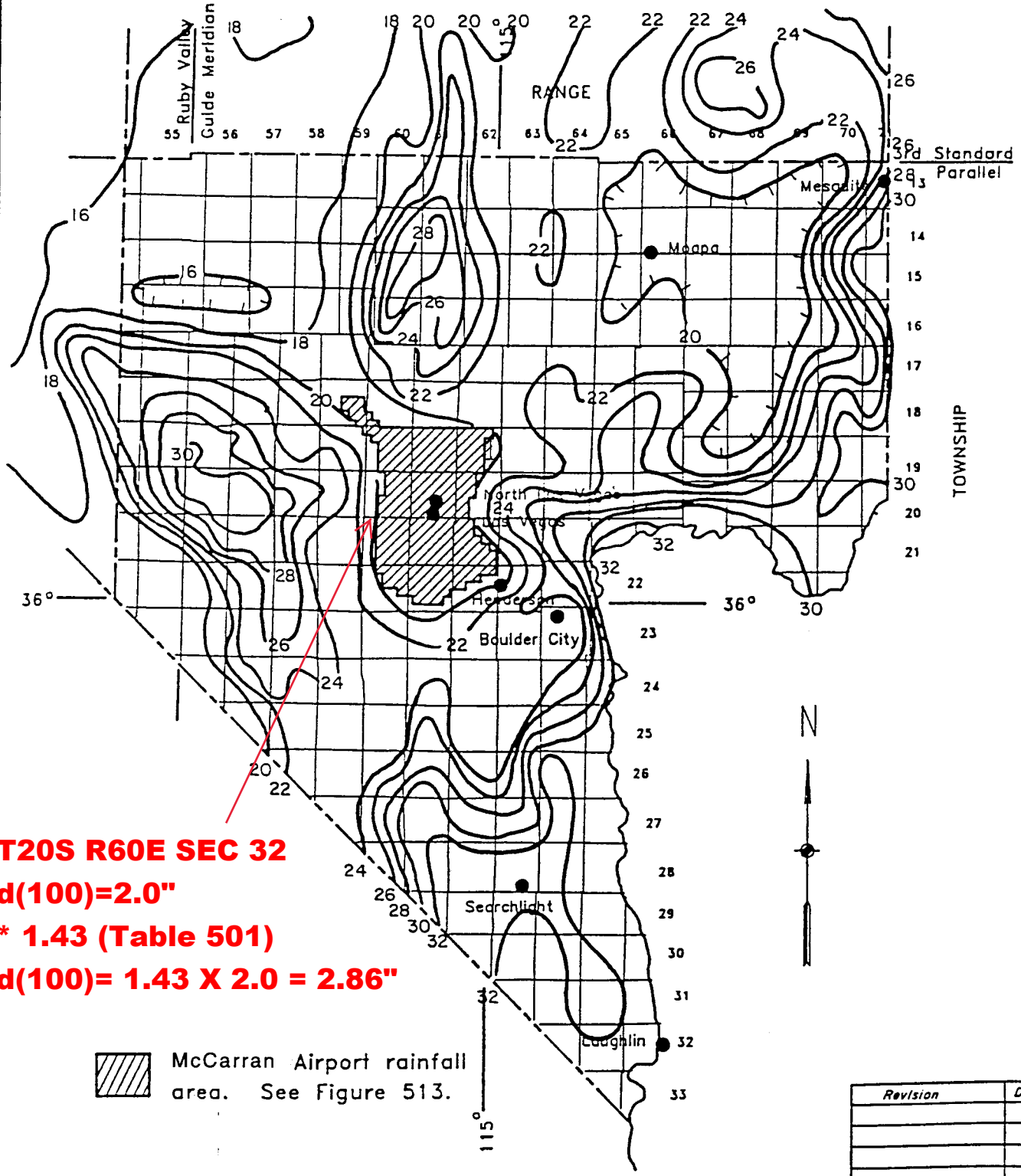
RAINFALL DEPTH-DURATION-FREQUENCY
10-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



Revision	Date

WRC ENGINEERING	REFERENCE: NOAA ATLAS 2, VOLUME VII NEVADA, 1973	FIGURE 503

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



Revision	Date

WRC ENGINEERING	REFERENCE: NOAA ATLAS 2, VOLUME VII NEVADA, 1973	FIGURE 506

CURVE NUMBER DETERMINATION

Renaissance Lot 1

4/30/2018 BY L. PROCTOR

BASIN	HYDROLOGIC SOIL GROUP	LAND USE	CURVE NUMBER	PERCENT OF TOTAL	FINAL CN	REMARKS
ON1D, ON3D, ON5D, ON6D, ON7D, ON8D, OFF1E	D	COMMERCIAL & BUSINESS	95	100	**95**	Table 602, 1 of 4
ON2D, ON4D, RB, AD	D	STREETS AND ROADS	98	100	98	Table 602, 1 of 4
ON1E, ON2E, OFF2E	D	NEWLEY GRADED	94	100	**94**	Table 602, 1 of 4

STANDARD FORM 4 - RENAISSANCE LOT1

Momentum Engineers, Ltd.
6101 Kings Brook Ct.
Las Vegas NV 89149

Sub-Basin Data					Initial/Overland Time (T_i)			Travel Time (T_t)					T_c	T_c Check (Urbanized Basins)		Final T_c	T_{lag}	Remarks
DESIG	CN	K	AREA (acres)	AREA (mi^2)	LENGTH (ft)	SLOPE (%)	T_i (min)	LENGTH (ft)	SLOPE (%)	V_1 (fps)	V_2 (fps)	T_t (min)	$T_c=T_i+T_t$ (min)	TOTAL (ft)	T_c (min)	T_c (min)	T_{lag} (hrs)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
DEVELOPED CONDITIONS																		
ON1D	95	0.864	0.23	0.0004	50	0.5	3.8	210	1.0	2.0	N/A	1.7	5.5	260	11.4	5.5	0.055	
ON2D	98	0.904	0.54	0.0008	18	2	1.2	830	2.5	3.2	4.8	3.7	4.9	848	14.7	4.9	0.050	
ON3D	95	0.864	0.22	0.0003	20	50	0.5	285	2.3	3.1	N/A	1.6	2.1	305	11.7	2.1	0.050	
ON4D	98	0.904	0.37	0.0006	18	2	1.2	530	2.5	3.2	4.8	2.7	3.9	548	13.0	3.9	0.050	
ON5D	95	0.864	0.63	0.0010	20	0.5	2.4	390	1.0	2.0	N/A	3.2	5.6	410	12.3	5.6	0.056	
ON6D	95	0.864	1.26	0.0020	50	0.5	3.8	350	1.0	2.0	N/A	2.9	6.7	400	12.2	6.7	0.067	
ON7D	95	0.864	2.54	0.0040	50	0.5	3.8	450	1.0	2.0	N/A	3.7	7.5	500	12.8	7.5	0.075	
ON8D	95	0.864	1.86	0.0029	100	0.5	5.4	420	1.0	2.0	N/A	3.5	8.8	520	12.9	8.8	0.088	
OFF1E	95	0.864	1.94	0.0030	50	0.5	3.8	465	3.1	3.5	N/A	2.2	6.0	515	12.9	6.0	0.060	
RB	98	0.904	0.74	0.0012	50	2	2.0	640	2.9	3.4	5.2	2.9	4.9	690	13.8	4.9	0.050	
AD	98	0.904	0.48	0.0008	45	2	1.9	490	2.3	3.1	N/A	2.7	4.5	535	13.0	4.5	0.050	
UNDEVELOPED CONDITIONS																		
ON1E	94	0.851	3.12	0.0049	100	0.5	5.7	635	1.6	2.6	3.9	3.8	9.5	N/A	N/A	9.5	0.100	
ON2E	94	0.851	4.17	0.0065	100	0.5	5.7	540	2.1	2.2	4.3	4.0	9.7	N/A	N/A	9.7	0.100	
OFF2E	94	0.851	0.75	0.0012	75	1.5	3.4	155	4.8	3.2	N/A	0.8	4.2	N/A	N/A	4.2	0.100	

$T_i=(1.8(1.1-K)L^{(1/2)})/(S^{1/3})$
$T_c=T_i+T_t$
$K=0.0132(CN)-.39$
$T_{lag} = 0.6T_c$

For the travel time (T_t) calculations,
V_1 applies to the first 500 feet of travel distance;
V_2 applies to the remaining travel distance.

Travel Time Velocity Formulas

Existing	Developed
$V_1 = 14.8*(S/100)^{1/2}$	$V_1 = 20.2*(S/100)^{1/2}$
$V_2 = 29.4*(S/100)^{1/2}$	$V_2 = 30.6*(S/100)^{1/2}$

All basins over one square mile are calculated by the equation
$T_{lag}=20Kn(L*L_c/S^{0.5})^{0.33}$
(SEE SEPARATE SPREADSHEET)

REFERENCE: **CCRFCD HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL**

STANDARD FORM 4

```
1****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS      *
*             JUN   1998               *                    *    HYDROLOGIC ENGINEERING CENTER     *
*           VERSION 4.1                *                    *          609 SECOND STREET           *
*                                      *                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE   25APR18  TIME  13:50:58  *                    *          (916) 756-1104              *
*                                      *                    *                                      *
****************************************                    ****************************************

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

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

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


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

                         *DIAGRAM
            1            ID
            2            ID     6- HOUR, 10- AND 100-YEAR  EXISTING AND DEVELOPED CONDITIONS MODEL
            3            ID     EHB RENAISSANCE
            4            ID     MOMENTUM ENGINEERS FOR GCW - L PROCTOR
            5            ID
            6            ID
            7            ID     6-HOUR STORM DISTRIBUTION #3
            8            ID     10 AND 100 YEAR STORM EVENTS
            9            ID     OUTSIDE OF MCCARRAN AIRPORT RAINFALL AREA
           10            ID
           11            ID
           12            ID
           13            IT       5       0       0     300
           14            IO       5       0       0
           15            IN       5       0       0
           16            JR    PREC    0.56       1

           17            KK    ON1E
           18            KM          <<<<<<<<<<<<<<<<<<<<EXISTING CONDITIONS>>>>>>>>>>>>>>>>>>>>
           19            BA   .0049
           20            PB    2.86
           21            KM           SDN #3
           22            PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
           23            PC   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
           24            PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
           25            PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
           26            PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
           27            PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
           28            PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
           29            PC   0.998   0.999   1.000
           30            LS       0      95
           31            UD   0.100
                         *

           32            KK      RB
           33            BA   .0012
           34            LS       0      98
           35            UD   0.050
                         *

           36            KK      AD
           37            BA   .0008
           38            LS       0      98
           39            UD   0.050
                         *

           40            KK   OFF1E
           41            BA   .0030
           42            LS       0      95
           43            UD   0.060
                         *
```



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

           44            KK    ON2E
           45            BA   .0065
```

```
             46          LS       0      94
             47          UD   0.100
                         *

             48          KK    ECP1
             49          KM   OFF1E+ON2E
             50          HC       2
                         *

             51          KK   OFF2E
             52          BA   .0012
             53          LS       0      94
             54          UD   0.100
                         *

             55          KK    ECP2
             56          KM   ECP1+OFF2E
             57          HC       2
                         *

             58          KK    ON1D
             59          KM          <<<<<<<<<<<<<<<<<<<<DEVELOPED CONDITIONS>>>>>>>>>>>>>>>>>>>>
             60          BA   .0004
             61          LS       0      95
             62          UD   0.055
                         *

             63          KK    ON2D
             64          BA   .0008
             65          LS       0      98
             66          UD   0.050
                         *

             67          KK      RB
             68          BA   .0012
             69          LS       0      98
             70          UD   0.050
                         *

             71          KK    COM1
             72          KM   DUMMY COMBINATION POINT
             73          HC       3
                         *

             74          KK    ON3D
             75          BA   .0003
             76          LS       0      95
             77          UD   0.050
                         *
1                                          HEC-1 INPUT                                                PAGE  3

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

             78          KK    ON4D
             79          BA   .0006
             80          LS       0      98
             81          UD   0.050
                         *

             82          KK    ON5D
             83          BA   .0010
             84          LS       0      95
             85          UD   0.056
                         *

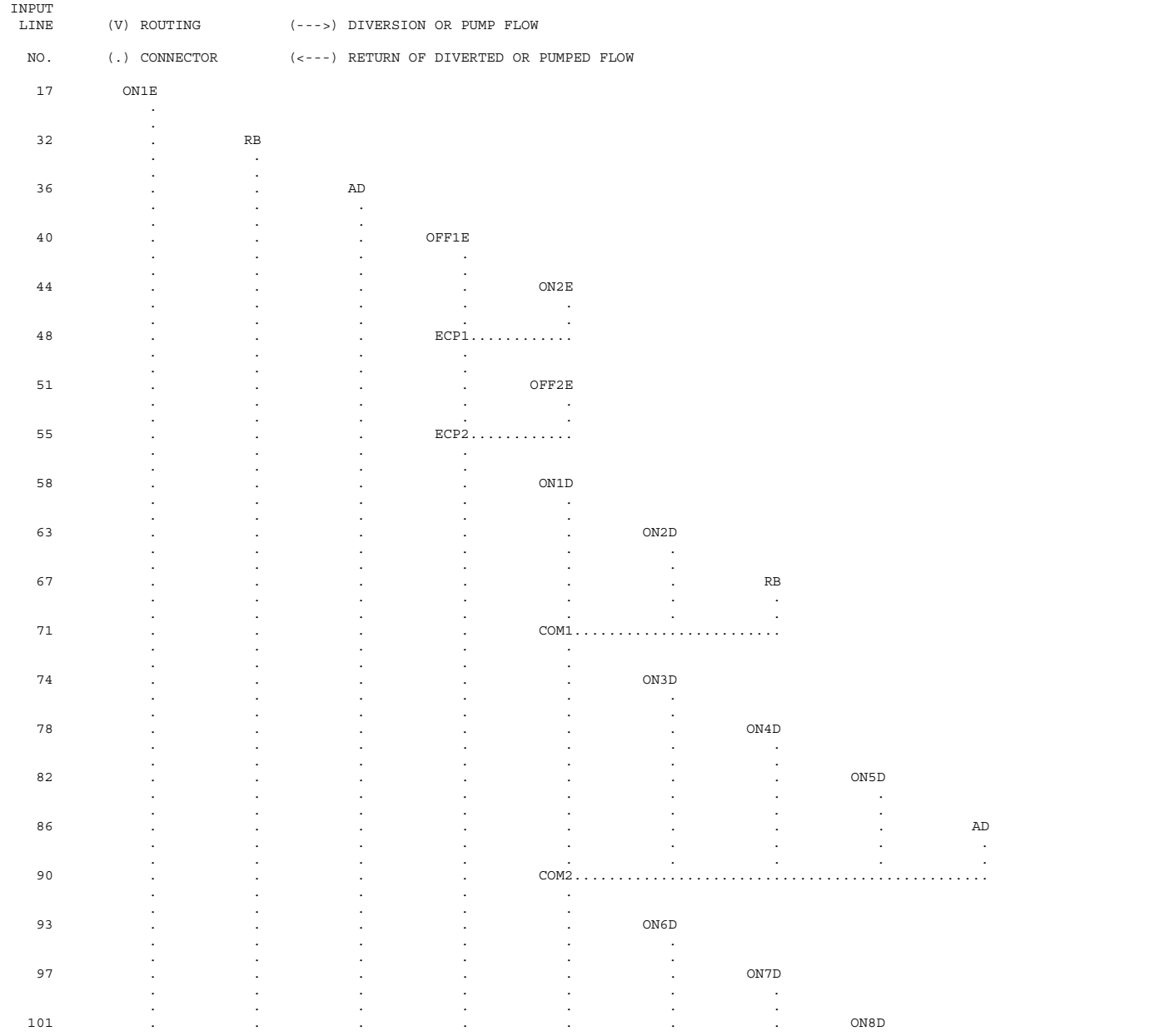
             86          KK      AD
             87          BA   .0008
             88          LS       0      98
             89          UD   0.050
                         *

             90          KK    COM2
             91          KM   DUMMY COMBINATION POINT
             92          HC       5
                         *

             93          KK    ON6D
             94          BA   .0020
             95          LS       0      95
             96          UD   0.067
                         *

             97          KK    ON7D
             98          BA   .0040
             99          LS       0      95
            100          UD   0.075
                         *

            101          KK    ON8D
            102          BA   .0029
            103          LS       0      95
            104          UD   0.088
                         *
            105          ZZ
1
                 SCHEMATIC DIAGRAM OF STREAM NETWORK
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************                    ****************************************
*                                       *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *    U.S. ARMY CORPS OF ENGINEERS      *
*               JUN   1998              *                    *    HYDROLOGIC ENGINEERING CENTER     *
*            VERSION 4.1                *                    *          609 SECOND STREET           *
*                                       *                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE   25APR18  TIME  13:50:58   *                    *           (916) 756-1104             *
*                                       *                    *                                      *
*****************************************                    ****************************************
```

6- HOUR, 10- AND 100-YEAR EXISTING AND DEVELOPED CONDITIONS MODEL
EHB RENAISSANCE
MOMENTUM ENGINEERS FOR GCW - L PROCTOR

6-HOUR STORM DISTRIBUTION #3
10 AND 100 YEAR STORM EVENTS
OUTSIDE OF MCCARRAN AIRPORT RAINFALL AREA

```
  14 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      1.00
1

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


                                                                    RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN            RATIO 1  RATIO 2
                                                        .56     1.00

 HYDROGRAPH AT
+                   ON1E       .00     1   FLOW           5.       9.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                     RB       .00     1   FLOW           2.       3.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                     AD       .00     1   FLOW           1.       2.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                   OFF1E      .00     1   FLOW           3.       7.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                   ON2E       .01     1   FLOW           6.      12.
                                           TIME         3.50     3.50

  2 COMBINED AT
+                   ECP1       .01     1   FLOW           9.      19.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                   OFF2E      .00     1   FLOW           1.       2.
                                           TIME         3.50     3.50

  2 COMBINED AT
+                   ECP2       .01     1   FLOW          10.      21.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                   ON1D       .00     1   FLOW           0.       1.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                   ON2D       .00     1   FLOW           1.       2.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                     RB       .00     1   FLOW           2.       3.
                                           TIME         3.50     3.50

  3 COMBINED AT
+                   COM1       .00     1   FLOW           3.       6.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                   ON3D       .00     1   FLOW           0.       1.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                   ON4D       .00     1   FLOW           1.       1.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                   ON5D       .00     1   FLOW           1.       2.
                                           TIME         3.50     3.50
```

```
 HYDROGRAPH AT
+                    AD       .00     1   FLOW           1.       2.
                                          TIME         3.50     3.50

  5 COMBINED AT
+                   COM2       .01     1   FLOW           6.      12.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                   ON6D       .00     1   FLOW           2.       4.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                   ON7D       .00     1   FLOW           4.       8.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                   ON8D       .00     1   FLOW           3.       6.
                                          TIME         3.50     3.50


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

APPENDIX D
HYDRAULIC CALCULATIONS

DROP INLET CALCULATIONS

Worksheet for Inlet 1

Project Description

Solve For	Spread

Input Data

Discharge		4.00	ft³/s
Left Side Slope		1.00	ft/ft (H:V)
Right Side Slope		1.00	ft/ft (H:V)
Bottom Width		2.00	ft
Grate Width		2.00	ft
Grate Length		2.00	ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%

Results

Spread	2.73	ft
Depth	0.37	ft
Wetted Perimeter	3.04	ft
Top Width	2.73	ft
Open Grate Area	1.80	ft²
Active Grate Weir Length	6.00	ft

Worksheet for Inlet 2

Project Description

Solve For	Spread

Input Data

Discharge		8.00	ft³/s
Left Side Slope		1.00	ft/ft (H:V)
Right Side Slope		1.00	ft/ft (H:V)
Bottom Width		2.00	ft
Grate Width		2.00	ft
Grate Length		2.00	ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%

Results

Spread	3.37	ft
Depth	0.68	ft
Wetted Perimeter	3.93	ft
Top Width	3.37	ft
Open Grate Area	1.80	ft²
Active Grate Weir Length	6.00	ft

Worksheet for Inlet 3

Project Description

Solve For	Spread

Input Data

Discharge		6.00	ft³/s
Left Side Slope		1.00	ft/ft (H:V)
Right Side Slope		1.00	ft/ft (H:V)
Bottom Width		2.00	ft
Grate Width		2.00	ft
Grate Length		2.00	ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%

Results

Spread	2.96	ft
Depth	0.48	ft
Wetted Perimeter	3.36	ft
Top Width	2.96	ft
Open Grate Area	1.80	ft²
Active Grate Weir Length	6.00	ft

NORMAL DEPTH CALCULATIONS

Worksheet for Section 1 Rampart 10yr MAX

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04000	ft/ft
Discharge	6.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.76
0+00	1.26
0+63	0.17
0+63	0.13
0+65	0.00
0+65	0.50
0+65	0.50
0+70	0.60
0+70	1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.76)	(0+70, 1.00)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.35	ft
Elevation Range	0.00 to 1.76 ft	
Flow Area	1.39	ft²
Wetted Perimeter	12.45	ft

Worksheet for Section 1 Rampart 10yr MAX

Results

Hydraulic Radius		0.11	ft
Top Width		12.05	ft
Normal Depth		0.35	ft
Critical Depth		0.44	ft
Critical Slope		0.00719	ft/ft
Velocity		4.30	ft/s
Velocity Head		0.29	ft
Specific Energy		0.64	ft
Froude Number		2.23	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.35	ft
Critical Depth	0.44	ft
Channel Slope	0.04000	ft/ft
Critical Slope	0.00719	ft/ft

Cross Section for Section 1 Rampart 10yr MAX

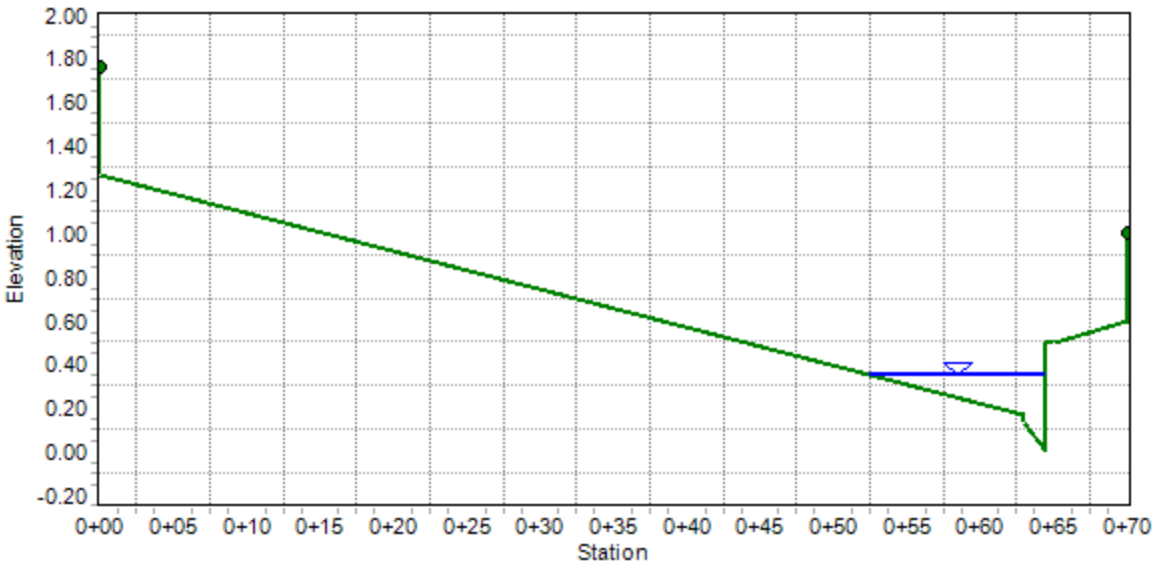
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04000	ft/ft
Normal Depth	0.35	ft
Discharge	6.00	ft³/s

Cross Section Image



Worksheet for Section 1 Rampart 10yr MIN

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01100	ft/ft
Discharge	6.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.76
0+00	1.26
0+63	0.17
0+63	0.13
0+65	0.00
0+65	0.50
0+65	0.50
0+70	0.60
0+70	1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.76)	(0+70, 1.00)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.42	ft
Elevation Range	0.00 to 1.76 ft	
Flow Area	2.28	ft²
Wetted Perimeter	16.19	ft

Worksheet for Section 1 Rampart 10yr MIN

Results

Hydraulic Radius		0.14	ft
Top Width		15.73	ft
Normal Depth		0.42	ft
Critical Depth		0.44	ft
Critical Slope		0.00719	ft/ft
Velocity		2.63	ft/s
Velocity Head		0.11	ft
Specific Energy		0.52	ft
Froude Number		1.22	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth		0.00	ft
Length		0.00	ft
Number Of Steps		0	

GVF Output Data

Upstream Depth		0.00	ft
Profile Description			
Profile Headloss		0.00	ft
Downstream Velocity		Infinity	ft/s
Upstream Velocity		Infinity	ft/s
Normal Depth		0.42	ft
Critical Depth		0.44	ft
Channel Slope		0.01100	ft/ft
Critical Slope		0.00719	ft/ft

Cross Section for Section 1 Rampart 10yr MIN

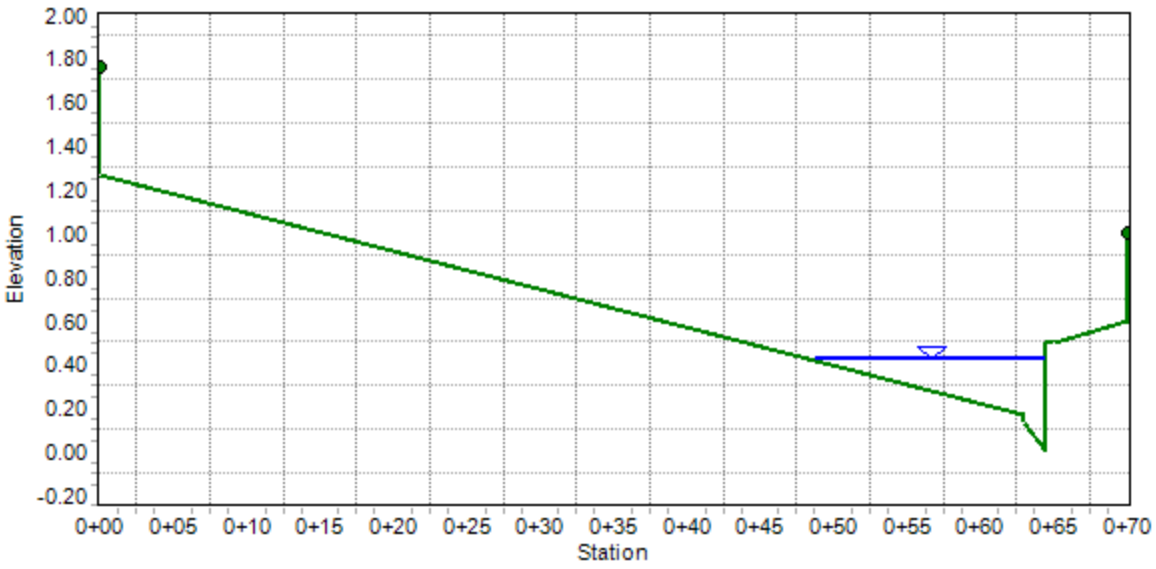
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01100	ft/ft
Normal Depth	0.42	ft
Discharge	6.00	ft³/s

Cross Section Image



Worksheet for Section 1 Rampart 100yr MAX

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04000	ft/ft
Discharge	34.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.76
0+00	1.26
0+63	0.17
0+63	0.13
0+65	0.00
0+65	0.50
0+65	0.50
0+70	0.60
0+70	1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.76)	(0+70, 1.00)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.57	ft
Elevation Range	0.00 to 1.76 ft	
Flow Area	5.55	ft²
Wetted Perimeter	29.20	ft

Worksheet for Section 1 Rampart 100yr MAX

Results

Hydraulic Radius		0.19	ft
Top Width		28.65	ft
Normal Depth		0.57	ft
Critical Depth		0.73	ft
Critical Slope		0.00581	ft/ft
Velocity		6.13	ft/s
Velocity Head		0.58	ft
Specific Energy		1.15	ft
Froude Number		2.46	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.57	ft
Critical Depth	0.73	ft
Channel Slope	0.04000	ft/ft
Critical Slope	0.00581	ft/ft

Cross Section for Section 1 Rampart 100yr MAX

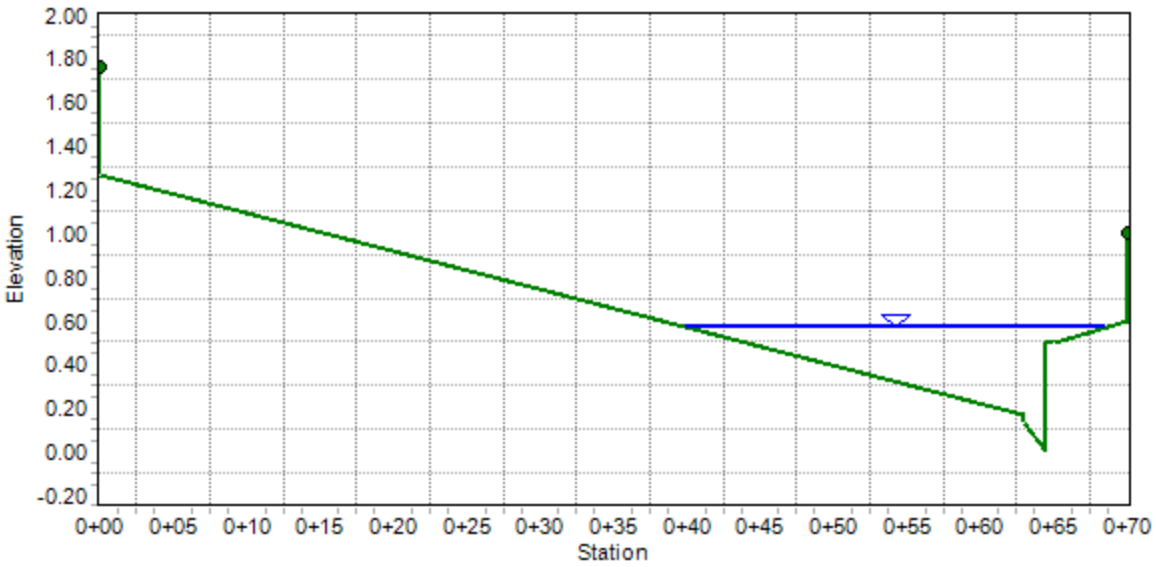
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04000	ft/ft
Normal Depth	0.57	ft
Discharge	34.00	ft³/s

Cross Section Image



Worksheet for Section 1 Rampart 100yr MIN

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01100	ft/ft
Discharge	34.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	1.76
0+00	1.26
0+63	0.17
0+63	0.13
0+65	0.00
0+65	0.50
0+65	0.50
0+70	0.60
0+70	1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 1.76)	(0+70, 1.00)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.67	ft
Elevation Range	0.00 to 1.76 ft	
Flow Area	8.95	ft²
Wetted Perimeter	36.74	ft

Worksheet for Section 1 Rampart 100yr MIN

Results

Hydraulic Radius		0.24	ft
Top Width		36.11	ft
Normal Depth		0.67	ft
Critical Depth		0.73	ft
Critical Slope		0.00581	ft/ft
Velocity		3.80	ft/s
Velocity Head		0.22	ft
Specific Energy		0.90	ft
Froude Number		1.35	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.67	ft
Critical Depth	0.73	ft
Channel Slope	0.01100	ft/ft
Critical Slope	0.00581	ft/ft

Cross Section for Section 1 Rampart 100yr MIN

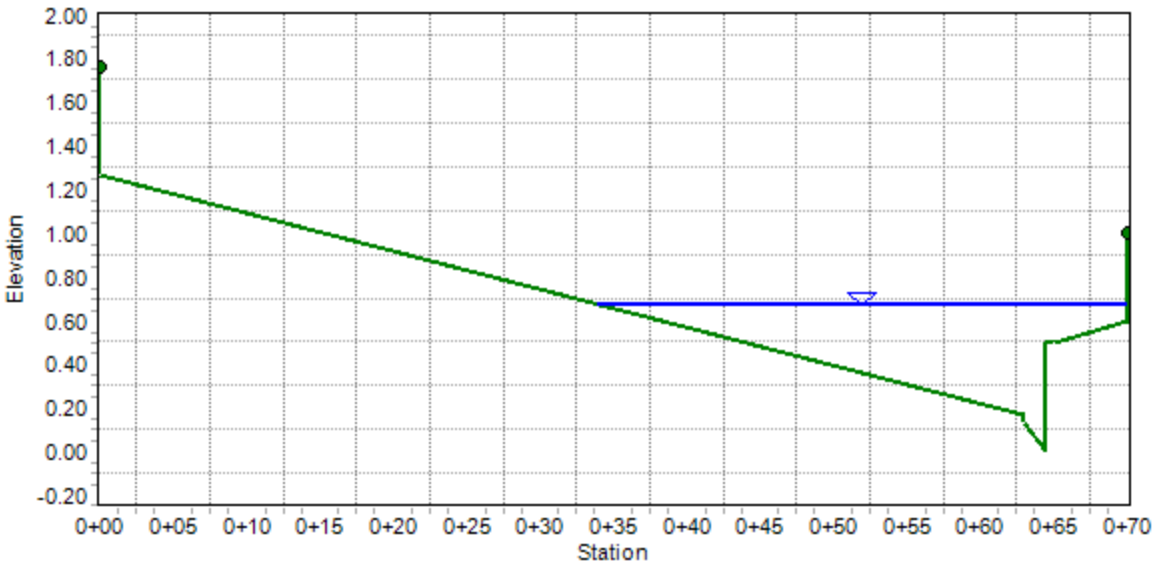
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01100	ft/ft
Normal Depth	0.67	ft
Discharge	34.00	ft³/s

Cross Section Image



Worksheet for Section 2 Alta 10yr

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02100	ft/ft
Discharge	11.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+54	1.37
0+54	1.00
0+83	0.17
0+83	0.13
0+85	0.00
0+85	0.50
0+85	0.50
0+90	0.60
0+90	1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+54, 1.37)	(0+90, 1.00)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.48	ft
Elevation Range	0.00 to 1.37 ft	
Flow Area	2.50	ft²
Wetted Perimeter	13.32	ft

Worksheet for Section 2 Alta 10yr

Results

Hydraulic Radius		0.19	ft
Top Width		12.80	ft
Normal Depth		0.48	ft
Critical Depth		0.59	ft
Critical Slope		0.00656	ft/ft
Velocity		4.41	ft/s
Velocity Head		0.30	ft
Specific Energy		0.78	ft
Froude Number		1.76	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.48	ft
Critical Depth	0.59	ft
Channel Slope	0.02100	ft/ft
Critical Slope	0.00656	ft/ft

Cross Section for Section 2 Alta 10yr

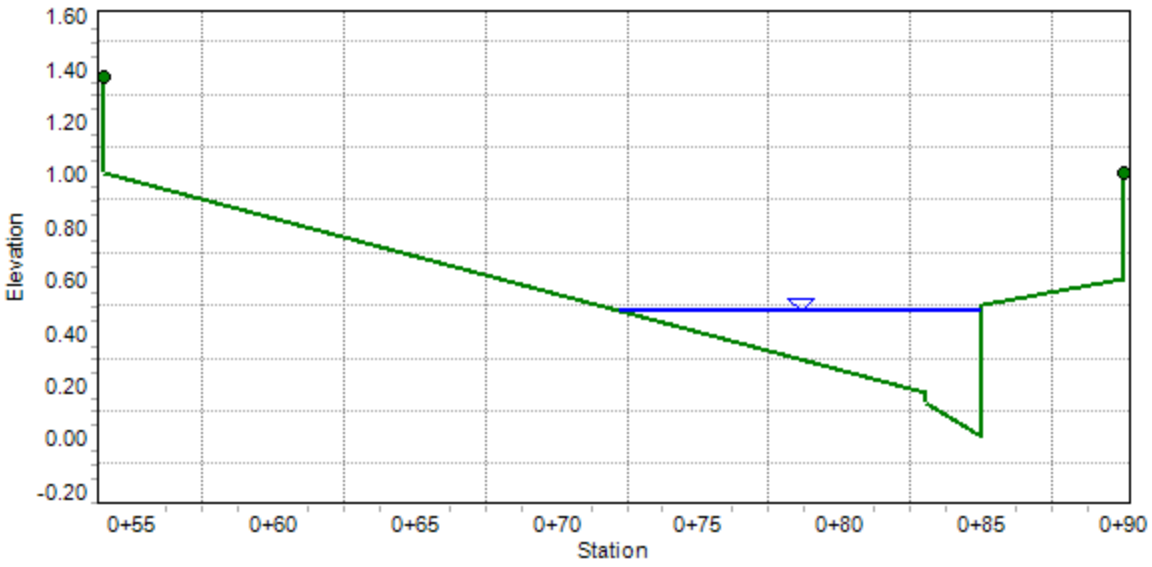
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02100	ft/ft
Normal Depth	0.48	ft
Discharge	11.00	ft³/s

Cross Section Image



Worksheet for Section 2 Alta 100yr

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02100	ft/ft
Discharge	45.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+54	1.37
0+54	1.00
0+83	0.17
0+83	0.13
0+85	0.00
0+85	0.50
0+85	0.50
0+90	0.60
0+90	1.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+54, 1.37)	(0+90, 1.00)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.73	ft
Elevation Range	0.00 to 1.37 ft	
Flow Area	7.74	ft²
Wetted Perimeter	27.30	ft

Worksheet for Section 2 Alta 100yr

Results

Hydraulic Radius		0.28	ft
Top Width		26.61	ft
Normal Depth		0.73	ft
Critical Depth		0.90	ft
Critical Slope		0.00528	ft/ft
Velocity		5.81	ft/s
Velocity Head		0.52	ft
Specific Energy		1.26	ft
Froude Number		1.90	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.73	ft
Critical Depth	0.90	ft
Channel Slope	0.02100	ft/ft
Critical Slope	0.00528	ft/ft

Cross Section for Section 2 Alta 100yr

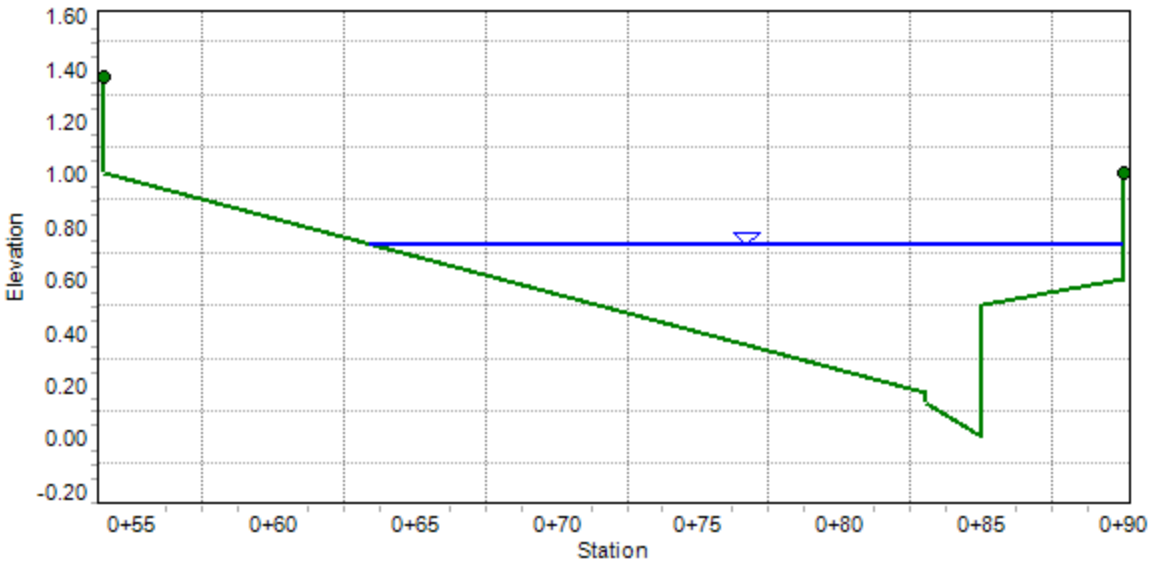
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

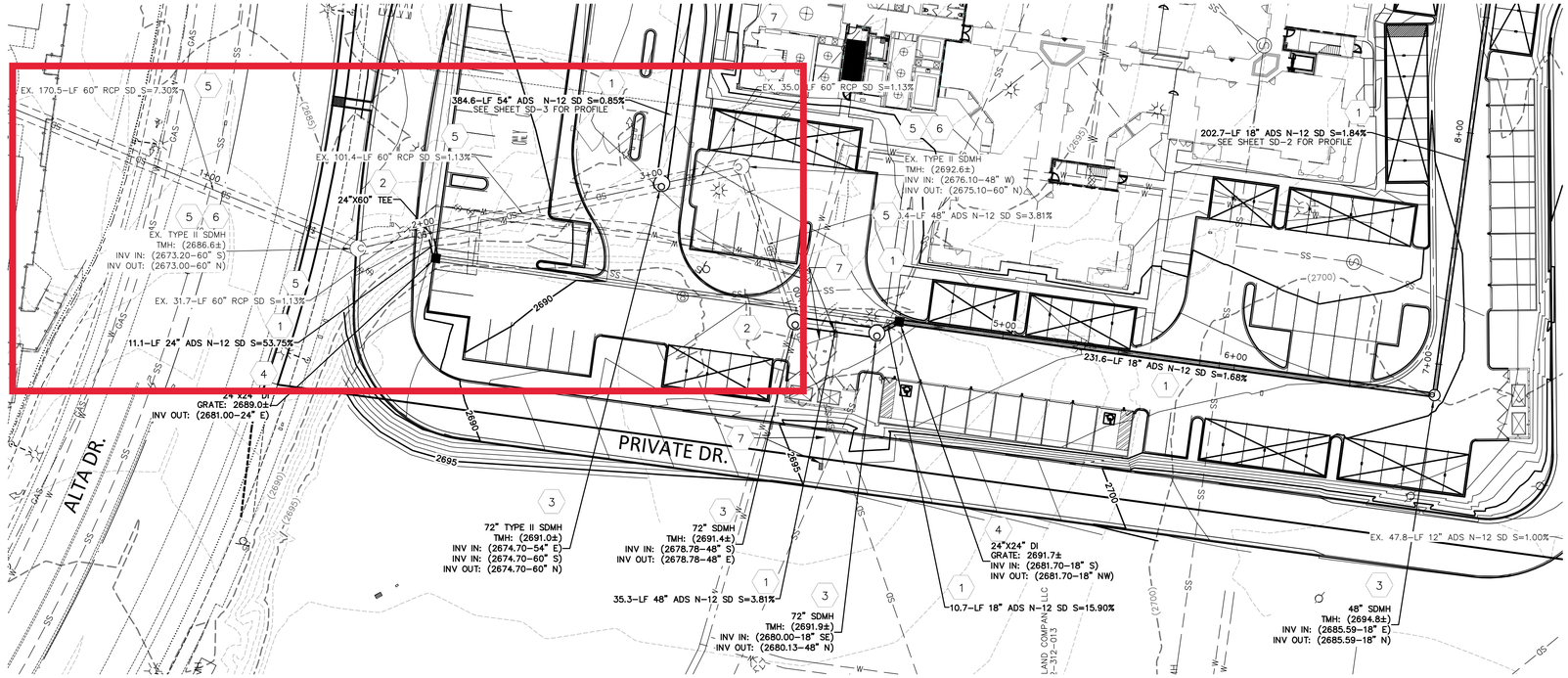
Input Data

Channel Slope	0.02100	ft/ft
Normal Depth	0.73	ft
Discharge	45.00	ft³/s

Cross Section Image

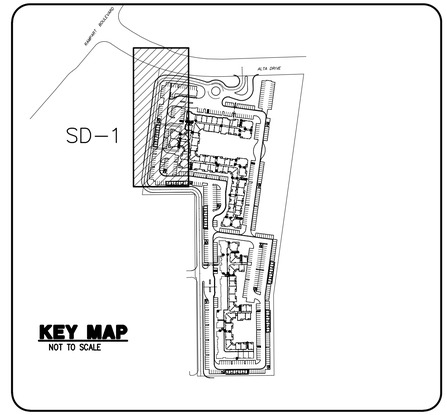


WSPG



SD-1 PLAN VIEW

SCALE: 1"=30' HORIZONTAL



NORTH

30' 0' 15' 30'

SCALE: 1" = 30'

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811
OR 1-800-227-2600

FAST
Call before you UnderGround
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

NOTE TO CONTRACTOR

EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

NOTE

ALL ONSITE STORM DRAINS AND ASSOCIATED STORM FACILITIES ARE PRIVATELY OWNED AND TO BE PRIVATELY MAINTAINED.

CONSTRUCTION NOTES

STORM DRAIN

1. INSTALL ADS N–12 STORM DRAIN PIPE, SEE PLAN FOR SIZE.
2. INSTALL ADS INSERTA TEE, SEE PLAN FOR SIZE.
3. CONSTRUCT TYPE II SD MANHOLE PER USDCCA DWG NO. 405.2, SEE PLAN FOR SIZE.
4. CONSTRUCT JENSEN PRECAST SD DROP INLET WITH TRAFFIC FRAME AND GRATE PER DETAIL SHEET D–2, SEE PLAN FOR SIZE. USE EXTENSIONS AS NEEDED.
5. RETAIN AND PROTECT EXISTING STORM DRAIN STRUCTURE.
6. ADJUST TO NEW FINISH GRADE.
7. ABANDON EXISTING STORM DRAIN STRUCTURE.

NOTE: SEE SHEET C2, C3 & C4 FOR ABBREVIATIONS AND QUANTITIES

BENCHMARK

STATION	ELEVATION	DESCRIPTION
OLVOO 32C4	SET 820.819 (M) 2692.97 (FT.)	BEING A RIVET & PLATE TOP CURB SE CORNER OF RAMPART AND ALTA.

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE–OBSERVED 2005–2007)
BASED UPON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD '88)

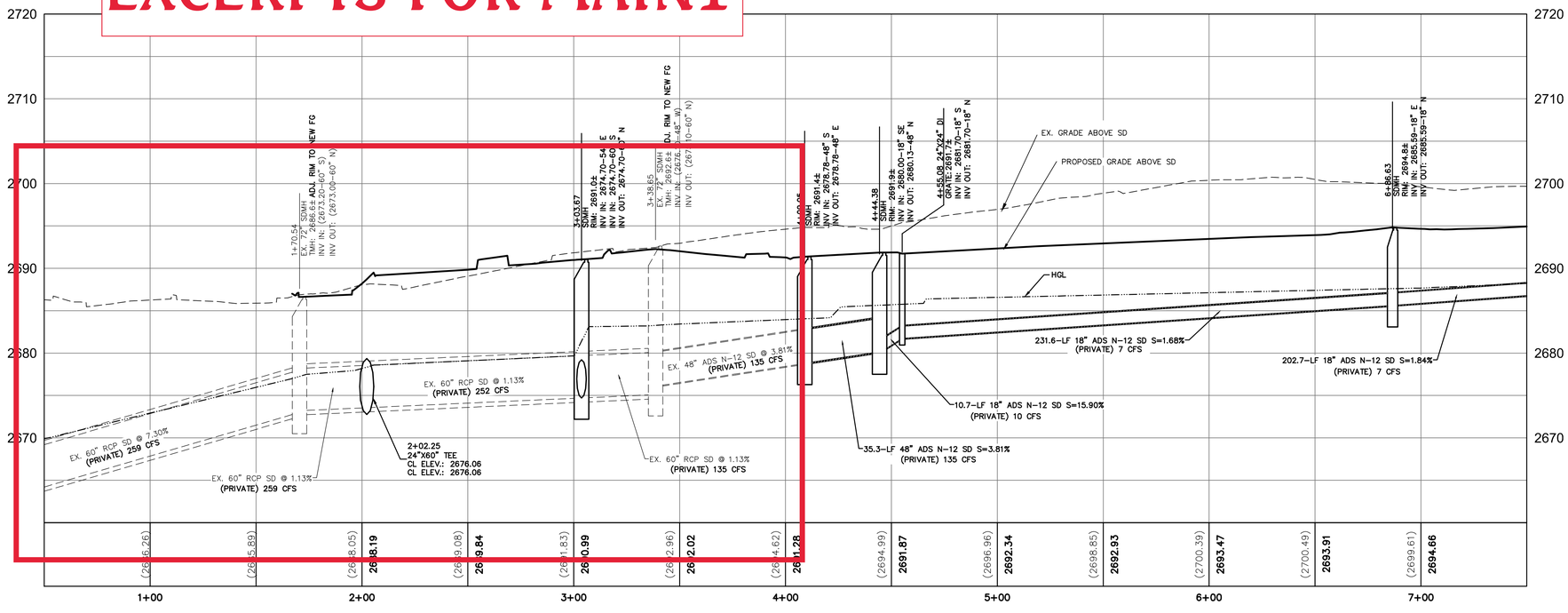
ADD 2000 TO ALL SPOT ELEVATION TAGS.

BASIS OF BEARINGS

SOUTH 00°32'07" EAST, BEING THE BEARING OF THE CENTERLINE OF RAMPART BOULEVARD AS SHOWN IN FILE 117, PAGE 83 OF PARCEL MAPS ON FILE AT CLARK COUNTY, NEVADA RECORDER'S OFFICE.

H# –

CLV DWG# –



SD-1 PROFILE

SCALE: 1"=30' HORIZONTAL
1"=3' VERTICAL

EXCERPTS FOR MAIN1

NOT FOR CONSTRUCTION

DATE:

REV	DATE	DESCRIPTION	AGEN APP	DATE	CCW APP	DATE

TODD N. KELLEY
Exp. 6/30/2019
CIVIL
STATE OF NEVADA
ENGINEER
PROFESSIONAL

PROJECT NO. 894-002

DESIGN:
DRAWN:
CHECK:
PLOT DATE: 03-14-18
PLOT TIME: 10:10:20

GCW
ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

F:\Projects\800\894-002\DWG\Production\8942c016.dwg
Todd Kelley

THE CALIDA GROUP

ELYSIAN AT RENAISSANCE

STORM DRAIN PLAN AND PROFILE 1

DRAWING
SD-1
16 OF 31 SHTS

STORM DRAIN ALIGNMENT

See Excerpts from Village at Queensridge Culvert for remaining downstream alignment

MAIN1

MAIN2

SD4

SD3

MAIN1

PARCEL 2

PARCEL 3

PARCEL 4

RAMPART BLVD.

DR.

NORTH

SCALE 1"=40'

80 40 0 40 FEET

SCALE

DATE APRIL 13, 2018

REV	DATE	DESCRIPTION	DSGN APP	DATE	ENGR APP	DATE	GOV APP	DATE

PROJECT NO. 894-002

DESIGN:

DRAWN:

CHECK:

PLOT DATE: 04-20-18

PLOT TIME: 09:19:22

GC1
ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2099
gcengineering.com

F:\PROJECTS\2017\045-SKD\CIVIL\EXHIBITS\RENAISSANCE_PIPES.DWG

TODD KELLEY

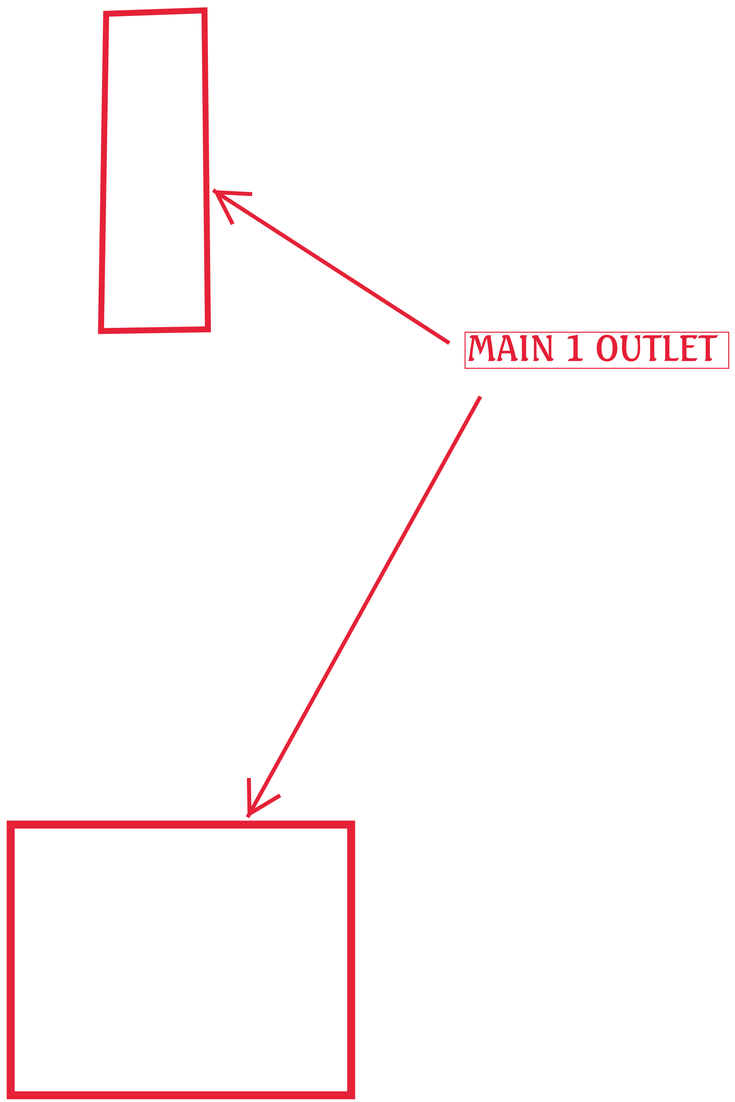
THE CALIDA GROUP

RENAISSANCE

MASTER UTILITY PLAN

DRAWING
MUP
1 OF 1 SHTS

STORM DRAIN1 ALIGNMENT



WSPG STATION EQUIVALENTS

MODEL: MAIN1

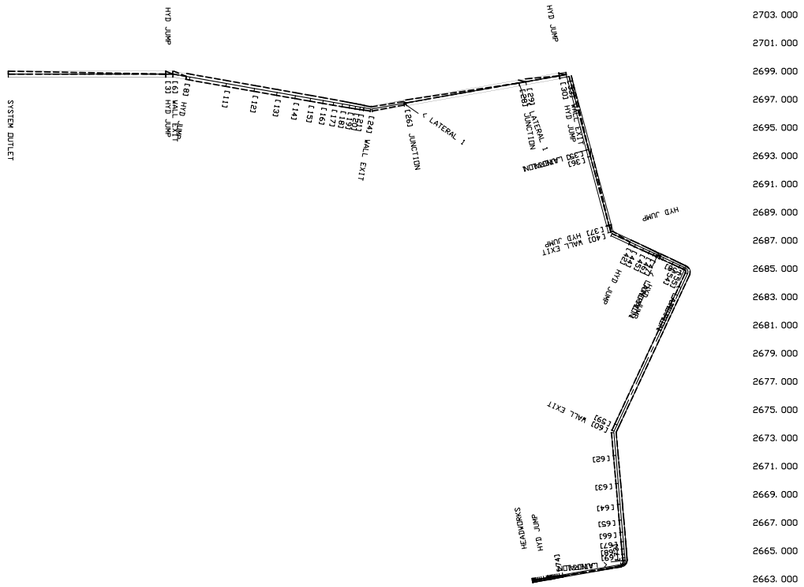
STA. WSPG MODEL	STA. DESIGN DRAWINGS
3+67.67	4+75.85
3+67.74	5+50.65
2+19.96	6+98.45
1+04.59	8+13.85
0+25.00	8+93.45

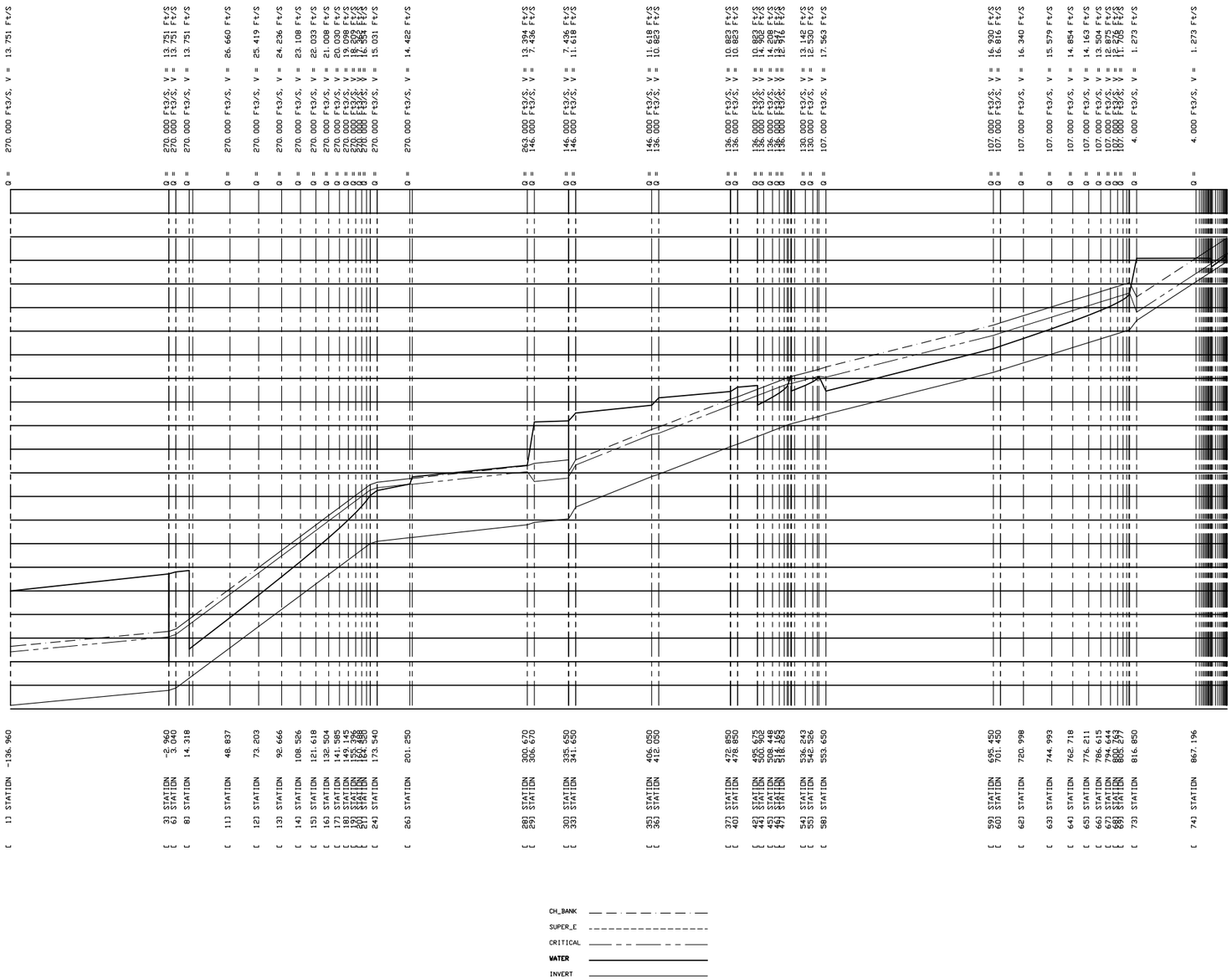
MODEL: MAIN2

STA. WSPG MODEL	STA. DESIGN DRAWINGS
3+67.74	5+50.65
2+40.26	5+90.13
0+82.04	7+48.35
0+25.00	8+05.35

WSPG MAIN1

WATER SURFACE PRESSURE GRADIENT ANALYSIS (PLAN & PROFILE) MAIN1





Program Package Serial Number: 7204 Date: 4-27-2018 Time: 5:54:19 File: MAIN1.WSW

Renaissance Lot 1 0

[No.]	TYPE OPERATION	STATION (FT)	INV ELEV (FT)	WATER LEVEL (FT)	CHAN HT (FT)	TYPE CHANNEL	'N'	#PIER/PIP	FLOW RATE (CFS)	VELOCITY (FT/S)	TOP WIDTH (FT)	CHAN WDTH (FT)	PIER WIDTH (FT)	ZL	ZR	SUPEL RT B (FT)	SUPEL LT B (FT)	CRIT DPTH (FT)	RADIUS/<PT (FT OR <)	RMKS
[1]	SYSTEM OUTLET	-136.960	2659.300	9.700	5.000	PIPE	.013	0	270.000	13.751	.000	5.000	.000	.000	.000	.000	.000	4.537	.000	
[2]	REACH	-136.960	2659.300	9.701	5.000	PIPE	.013	0	270.000	13.751	.000	5.000	.000	.000	.000	.000	.000	4.537	.000	
[3]	HYD JUMP	-2.960	2660.570	9.871	5.000	PIPE	.014	0	270.000	13.751	.000	5.000	.000	.000	.000	.000	.000	4.537	.000	HYD JUMP
[4]	HYD JUMP	-2.960	2660.570	2.445	5.000	PIPE	.014	0	270.000	28.291	4.999	5.000	.000	.000	.000	.000	.000	4.537	.000	HYD JUMP
[5]	REACH	-2.960	2660.570	9.871	5.000	PIPE	.014	0	270.000	13.751	.000	5.000	.000	.000	.000	.000	.000	4.537	.000	
[6]	REACH	3.040	2660.770	9.842	5.000	PIPE	.013	0	270.000	13.751	.000	5.000	.000	.000	.000	.000	.000	4.537	.000	
[7]	WALL EXIT	3.040	2660.770	9.843	5.000	PIPE	.013	0	270.000	13.751	.000	5.000	.000	.000	.000	.000	.000	4.537	10.000	
[8]	HYD JUMP	14.318	2661.608	9.122	5.000	PIPE	.013	0	270.000	13.751	.000	5.000	.000	.000	.000	.000	.000	4.537	.000	HYD JUMP
[9]	REACH	14.318	2661.608	2.458	5.000	PIPE	.013	0	270.000	28.105	4.999	5.000	.000	.000	.000	.000	.000	4.537	.000	
[10]	REACH	17.387	2661.836	2.468	5.000	PIPE	.013	0	270.000	27.961	5.000	5.000	.000	.000	.000	.000	.000	4.537	.000	
[11]	REACH	48.837	2664.175	2.562	5.000	PIPE	.013	0	270.000	26.660	4.998	5.000	.000	.000	.000	.000	.000	4.537	.000	
[12]	REACH	73.203	2665.986	2.661	5.000	PIPE	.013	0	270.000	25.419	4.990	5.000	.000	.000	.000	.000	.000	4.537	.000	
[13]	REACH	92.666	2667.433	2.765	5.000	PIPE	.013	0	270.000	24.236	4.972	5.000	.000	.000	.000	.000	.000	4.537	.000	
[14]	REACH	108.526	2668.612	2.875	5.000	PIPE	.013	0	270.000	23.108	4.944	5.000	.000	.000	.000	.000	.000	4.537	.000	
[15]	REACH	121.618	2669.586	2.990	5.000	PIPE	.013	0	270.000	22.033	4.903	5.000	.000	.000	.000	.000	.000	4.537	.000	
[16]	REACH	132.504	2670.395	3.113	5.000	PIPE	.013	0	270.000	21.008	4.847	5.000	.000	.000	.000	.000	.000	4.537	.000	
[17]	REACH	141.585	2671.070	3.243	5.000	PIPE	.013	0	270.000	20.030	4.774	5.000	.000	.000	.000	.000	.000	4.537	.000	
[18]	REACH	149.145	2671.632	3.383	5.000	PIPE	.013	0	270.000	19.098	4.678	5.000	.000	.000	.000	.000	.000	4.537	.000	
[19]	REACH	155.396	2672.097	3.532	5.000	PIPE	.013	0	270.000	18.209	4.554	5.000	.000	.000	.000	.000	.000	4.537	.000	
[20]	REACH	160.488	2672.476	3.693	5.000	PIPE	.013	0	270.000	17.362	4.393	5.000	.000	.000	.000	.000	.000	4.537	.000	
[21]	REACH	164.520	2672.775	3.871	5.000	PIPE	.013	0	270.000	16.554	4.181	5.000	.000	.000	.000	.000	.000	4.537	.000	
[22]	REACH	167.540	2673.000	4.068	5.000	PIPE	.014	0	270.000	15.781	3.894	5.000	.000	.000	.000	.000	.000	4.537	.000	
[23]	REACH	167.704	2673.005	4.073	5.000	PIPE	.014	0	270.000	15.764	3.886	5.000	.000	.000	.000	.000	.000	4.537	.000	
[24]	REACH	173.540	2673.200	4.300	5.000	PIPE	.013	0	270.000	15.031	3.470	5.000	.000	.000	.000	.000	.000	4.537	.000	
[25]	WALL EXIT	173.540	2673.200	4.299	5.000	PIPE	.013	0	270.000	15.033	3.472	5.000	.000	.000	.000	.000	.000	4.537	-20.000	
[26]	REACH	201.250	2673.510	4.537	5.000	PIPE	.014	0	270.000	14.422	2.900	5.000	.000	.000	.000	.000	.000	4.537	.000	
[27]	JUNCTION	203.250	2673.530	5.123	5.000	PIPE	.013	0	263.000	13.394	.000	5.000	.000	.000	.000	.000	.000	4.499	.000	
[28]	REACH	300.670	2674.600	5.046	5.000	PIPE	.014	0	263.000	13.394	.000	5.000	.000	.000	.000	.000	.000	4.499	.000	
[29]	JUNCTION	306.670	2674.800	8.511	5.000	PIPE	.013	0	146.000	7.436	.000	5.000	.000	.000	.000	.000	.000	3.463	.000	
[30]	HYD JUMP	335.650	2675.100	8.302	5.000	PIPE	.014	0	146.000	7.436	.000	5.000	.000	.000	.000	.000	.000	3.463	.000	HYD JUMP
[31]	HYD JUMP	335.650	2675.100	2.166	5.000	PIPE	.014	0	146.000	17.910	4.955	5.000	.000	.000	.000	.000	.000	3.463	.000	HYD JUMP
[32]	REACH	335.650	2675.100	8.302	4.000	PIPE	.014	0	146.000	11.618	.000	4.000	.000	.000	.000	.000	.000	3.563	.000	
[33]	REACH	341.650	2676.100	7.962	4.000	PIPE	.013	0	146.000	11.618	.000	4.000	.000	.000	.000	.000	.000	3.563	.000	
[34]	WALL EXIT	341.650	2676.100	7.962	4.000	PIPE	.013	0	146.000	11.618	.000	4.000	.000	.000	.000	.000	.000	3.563	85.000	
[35]	REACH	406.050	2678.680	6.047	4.000	PIPE	.014	0	146.000	11.618	.000	4.000	.000	.000	.000	.000	.000	3.563	.000	
[36]	JUNCTION	412.050	2678.880	6.469	4.000	PIPE	.013	0	136.000	10.823	.000	4.000	.000	.000	.000	.000	.000	3.472	.000	
[37]	HYD JUMP	472.850	2681.230	4.664	4.000	PIPE	.014	0	136.000	10.823	.000	4.000	.000	.000	.000	.000	.000	3.472	.000	HYD JUMP
[38]	HYD JUMP	472.850	2681.230	2.485	4.000	PIPE	.014	0	136.000	16.578	3.881	4.000	.000	.000	.000	.000	.000	3.472	.000	HYD JUMP
[39]	REACH	472.850	2681.230	4.664	4.000	PIPE	.014	0	136.000	10.823	.000	4.000	.000	.000	.000	.000	.000	3.472	.000	
[40]	REACH	478.850	2681.430	4.827	4.000	PIPE	.013	0	136.000	10.823	.000	4.000	.000	.000	.000	.000	.000	3.472	.000	
[41]	WALL EXIT	478.850	2681.430	4.827	4.000	PIPE	.013	0	136.000	10.823	.000	4.000	.000	.000	.000	.000	.000	3.472	-50.000	
[42]	HYD JUMP	495.675	2682.077	4.323	4.000	PIPE	.013	0	136.000	10.823	.000	4.000	.000	.000	.000	.000	.000	3.472	.000	HYD JUMP
[43]	REACH	495.675	2682.077	2.663	4.000	PIPE	.013	0	136.000	15.305	3.774	4.000	.000	.000	.000	.000	.000	3.472	.000	
[44]	REACH	500.902	2682.278	2.727	4.000	PIPE	.013	0	136.000	14.902	3.726	4.000	.000	.000	.000	.000	.000	3.472	.000	
[45]	REACH	508.448	2682.568	2.849	4.000	PIPE	.013	0	136.000	14.208	3.622	4.000	.000	.000	.000	.000	.000	3.472	.000	
[46]	REACH	514.165	2682.788	2.980	4.000	PIPE	.013	0	136.000	13.547	3.487	4.000	.000	.000	.000	.000	.000	3.472	.000	
[47]	REACH	518.263	2682.946	3.123	4.000	PIPE	.013	0	136.000	12.916	3.309	4.000	.000	.000	.000	.000	.000	3.472	.000	
[48]	REACH	520.826	2683.044	3.285	4.000	PIPE	.013	0	136.000	12.315	3.065	4.000	.000	.000	.000	.000	.000	3.472	.000	
[49]	REACH	521.760	2683.080	3.472	4.000	PIPE	.014	0	136.000	11.740	2.708	4.000	.000	.000	.000	.000	.000	3.472	.000	
[50]	JUNCTION	523.760	2683.140	4.079	4.000	PIPE	.013	0	130.000	10.345	.000	4.000	.000	.000	.000	.000	.000	3.411	.000	
[51]	HYD JUMP	524.438	2683.158	4.063	4.000	PIPE	.013	0	130.000	10.345	.000	4.000	.000	.000	.000	.000	.000	3.411	.000	HYD JUMP
[52]	REACH	524.438	2683.158	2.777	4.000	PIPE	.013	0	130.000	13.960	3.686	4.000	.000	.000	.000	.000	.000	3.411	.000	
[53]	REACH	527.147	2683.229	2.810	4.000	PIPE	.013	0	130.000	13.783	3.657	4.000	.000	.000	.000	.000	.000	3.411	.000	
[54]	REACH	536.243	2683.469	2.938	4.000	PIPE	.013	0	130.000	13.142	3.533	4.000	.000	.000	.000	.000	.000	3.411	.000	
[55]	REACH	542.526	2683.635	3.077	4.000	PIPE	.013	0	130.000	12.530	3.370	4.000	.000	.000	.000	.000	.000	3.411	.000	
[56]	REACH	546.317	2683.735	3.233	4.000	PIPE	.013	0	130.000	11.947	3.150	4.000	.000	.000	.000	.000	.000	3.411	.000	
[57]	REACH	547.650	2683.770	3.411	4.000	PIPE	.014	0	130.000	11.388	2.835	4.000	.000	.000	.000	.000	.000	3.411	3.820	
[58]	JUNCTION	553.650	2683.970	1.952	4.000	PIPE	.013	0	107.000	17.563	3.999	4.000	.000	.000	.000	.000	.000	3.130	.000	
[59]	REACH	695.450	2687.510	2.009	4.000	PIPE	.014	0	107.000	16.930	4.000	4.000	.000	.000	.000	.000	.000	3.130	.000	
[60]	REACH	701.450	2687.710	2.020	4.000	PIPE	.013	0	107.000	16.816	4.000	4.000	.000	.000	.000	.000	.000	3.130	.000	
[61]	WALL EXIT	701.450	2687.710	2.019	4.000	PIPE	.013	0	107.000	16.826	4.000	4.000	.000	.000	.000	.000	.000	3.130	-30.000	
[62]	REACH	720.998	2688.317	2.067	4.000	PIPE	.013	0	107.000	16.340	3.998	4.000	.000	.000	.000	.000	.000	3.130	.000	
[63]	REACH	744.993	2689.063	2.146	4.000	PIPE	.013	0	107.000	15.579	3.989	4.000	.000	.000	.000	.000	.000	3.130	.000	
[64]	REACH	762.718	2689.614	2.230	4.000	PIPE	.013	0	107.000	14.854	3.973	4.000	.000	.000	.000	.000	.000	3.130	.000	
[65]	REACH	776.211	2690.033	2.320	4.000	PIPE	.013	0	107.000	14.163	3.949	4.000	.000	.000	.000	.000	.000	3.130	.000	
[66]	REACH	786.615	2690.357	2.413	4.000	PIPE	.013	0	107.000	13.504	3.914	4.000	.000	.000	.000	.000	.000	3.130	.000	
[67]	REACH	794.644	2690.606	2.513	4.000	PIPE	.013	0	107.000	12.875	3.866	4.000	.000	.000	.000	.000	.000	3.130	.000	
[68]	REACH	800.763	2690.796	2.619	4.000	PIPE	.013	0	107.000	12.276	3.804	4.000	.000	.000	.000	.000	.000	3.130	.000	
[69]	REACH	805.277	2690.937	2.731	4.000	PIPE	.013	0	107.000	11.705	3.723	4.000	.000	.000	.000	.000	.000	3.130	.000	
[70]	REACH	808.393	2691.034	2.852	4.000	PIPE	.013	0	107.000	11.160	3.618	4.000	.000	.000	.000	.000	.000	3.130	.000	
[71]	REACH	810.232	2691.091	2.984	4.000	PIPE	.013	0	107.000	10.641	3.482	4.000	.000	.000	.000	.000	.000	3.130	.000	
[72]	REACH	810.850	2691.110	3.130	4.000	PIPE	.014	0	107.000	10.143	3.300	4.000	.000	.000	.000	.000	.000	3.130	4.044	
[73]	JUNCTION	816.850	2691.910	5.264	2.000	PIPE	.013	0	4.000	1.273	.000	2.000	.000	.000	.000	.000	.000	.701	.000	
[74]	REACH	867.196	2695.190	2.000	2.000	PIPE	.013	0	4.000	1.273	.000	2.000	.000	.000	.000	.000	.000	.701	.000	
[75]	REACH	870.000	2695.372	1.815	2.000	PIPE	.013	0	4.000	1.335	1.160	2.000	.000	.000	.000	.000	.000	.701	.000	
[76]	REACH	871.618	2695.478	1.707	2.000	PIPE	.013	0	4.000	1.401	1.415	2.000	.000	.000	.000	.000	.000	.701	.000	
[77]	REACH	872.941	2695.564	1.618	2.000	PIPE	.013	0	4.000	1.469	1.572	2.000	.000	.000	.000	.000	.000	.701	.000	
[78]	REACH	874.089	2695.639	1.540	2.000	PIPE	.013	0	4.000	1.541	1.683	2.000	.000	.000	.000	.000	.000	.701	.000	
[79]	REACH	875.113	2695.706	1.470	2.000	PIPE	.013	0	4.000	1.616	1.765	2.000	.000	.000	.000	.000	.000	.701	.000	
[80]	REACH	876.041	2695.766	1.406	2.000	PIPE	.013	0	4.000	1.695	1.828	2.000	.000	.000	.000	.000	.000	.701	.000	
[81]	REACH	876.889	2695.821	1.347	2.000	PIPE	.013	0	4.000	1.777	1.876	2.000	.000	.000	.000	.000	.000	.701	.000	
[82]	REACH	877.669	2695.872	1.292	2.000	PIPE	.013	0	4.000	1.864	1.913	2.000	.000	.000	.000	.000	.000	.701	.000	
[83]	REACH	878.388	2695.919	1.240	2.000	PIPE	.013	0	4.000	1.955	1.942	2.000	.000	.000	.000	.000	.000	.701	.000	
[84]	REACH	879.052	2695.962	1.191	2.000	PIPE	.013	0	4.000	2.051	1.963	2.000	.000	.000	.000	.000	.000	.701	.000	
[85]	REACH	879.666	2696.002	1.145	2.000	PIPE	.013	0	4.000	2.151	1.979	2.000	.000	.000	.000	.000	.000	.701	.000	
[86]	HYD JUMP	880.100	2696.031	1.101	2.000	PIPE	.013	0	4.000	2.256	1.990	2.000	.000	.000	.000	.000	.000	.701	.000	HYD JUMP
[87]	REACH	880.100	2696.031	.406	2.000	PIPE	.013	0	4.000	8.745	1.609	2.000	.000	.000	.000	.000	.000	.701	.000	
[88]	REACH	881.112	2696.096	.420	2.000	PIPE	.013	0	4.000	8.336	1.629	2.000	.000	.000	.000	.000	.000	.701	.000	
[89]	REACH	883.589	2696.257	.434	2.000	PIPE	.013	0	4.000	7.948	1.649	2.000	.000	.000	.000	.000	.000	.701	.000	
[90]	REACH	885.558	2696.385	.449	2.000	PIPE	.013	0	4.000	7.578	1.669	2.000	.000	.000	.000	.000	.000	.701	.000	
[91]	REACH	887.154	2696.489	.465	2.000	PIPE	.013	0	4.000	7.226	1.689	2.000	.000	.000	.000	.000	.000	.701	.000	
[92]	REACH	888.461	2696.574	.481	2.000	PIPE	.013	0	4.000	6.890	1.709	2.000	.000	.000	.000	.000	.000	.701	.000	
[93]	REACH	889.539	2696.645	.497	2.000	PIPE	.013	0	4.000	6.569	1.728	2.000	.000	.000	.000	.000	.000	.701	.000	
[94]	REACH	890.430	2696.703	.514	2.000	PIPE	.013	0	4.000	6.263	1.748	2.000	.000	.000	.000	.000	.000	.701	.000	
[95]	REACH	891.167	2696.751	.532	2.000	PIPE	.013	0	4.000	5.972	1.767	2.000	.000	.000	.000	.000	.000	.701	.000	
[96]	REACH	891.771	2696.790	.550	2.000	PIPE	.013	0	4.000	5.694	1.786	2.000	.000	.000	.000	.000	.000	.701	.000	
[97]	REACH	892.261	2696.822	.569	2.000	PIPE	.013	0	4.000	5.429	1.805	2.000	.000	.000	.000	.000	.000	.701	.000	
[98]	REACH	892.650	2696.848	.589	2.000	PIPE	.013	0	4.000	5.176	1.823	2.000	.000	.000	.000	.000	.000	.701	.000	
[99]	REACH	892.954	2696.867	.610	2.000	PIPE	.013	0	4.000	4.935	1.841	2.000	.000	.000	.000	.000	.000	.701	.000	
[100]	REACH	893.178	2696.882	.631	2.000	PIPE	.013	0	4.000	4.706	1.859	2.000	.000	.000	.000	.000	.000	.701	.000	
[101]	REACH	893.332	2696.892	.653	2.000	PIPE	.013	0	4.000	4.487	1.876	2.000	.000	.000	.000	.000	.000	.701	.000	
[102]	REACH	893.421	2696.898	.676	2.000	PIPE	.013	0	4.000	4.278	1.892	2.000	.000	.000	.000	.000	.000	.701	.000	
[103]	HEADWORKS	893.450	2696.900	.701	2.000	PIPE	.013	0	4.000	4.071	1.909	2.000	.000	.000	.000	.000	.000	.701	.000	

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T1 Renaissance Lot 1                                                0
T2       1         2         3         4         5         6         7         8         9
T3 456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
SO   -136.9602659.300  4                          2669.000
WX   -136.9602659.300  4
R      -2.9602660.570  4      .013                                    .000  00.000
WE     -2.9602660.570  4       .20
R       3.0402660.770  4      .014                                    .000  10.000 0
WX      3.0402660.770  4
R     167.5402673.000  4      .013                                    .000 000.000 0
WE    167.5402673.000  4       .20
R     173.5402673.200  4      .014                                    .000 -20.000 0
WX    173.5402673.200  4
R     201.2502673.510  4      .013                                    .000  00.000 0
JX    203.2502673.530  4  3   .014    7.000         2676.060         45.0       00.000
R     300.6702674.600  4      .013                                    .000  00.000 0
JX    306.6702674.800  4  5   .014  117.000         2675.200         80.0       00.000
R     335.6502675.100  4      .013                                    .000  00.000 0
WE    335.6502675.100  4       .20
R     341.6502676.100  1      .014                                    .000  85.000 0
WX    341.6502676.100  1
R     406.0502678.680  1      .013                                    .000  00.000 0
JX    412.0502678.880  1  1   .014   10.000         2678.780         90.0      000.000
R     472.8502681.230  1      .013                                    .000  00.000 0
WE    472.8502681.230  1       .20
R     478.8502681.430  1      .014                                    .000 -50.000 0
WX    478.8502681.430  1
R     521.7602683.080  1      .013                                    .000  00.000 0
JX    523.7602683.140  1  3   .014    6.000         2683.370         90.0       00.000
R     547.6502683.770  1      .013                                    .000  00.000 0
JX    553.6502683.970  1  2   .014   23.000         2683.370         90.0       90.000
R     695.4502687.510  1      .013                                    .000  00.000 0
WE    695.4502687.510  1       .20
R     701.4502687.710  1      .014                                    .000 -30.000 0
WX    701.4502687.710  1
R     810.8502691.110  1      .013                                    .000  00.000 0
JX    816.8502691.910  1  1   .014  103.000         2692.450         90.0       85.000
R     893.4502696.900  3      .013                                    .000  00.000 0
SH    893.4502696.900  3                          2696.900
CD   1  4   0    .000   4.000     .000  .000  .000   .00
CD   2  4   0    .000   2.500     .000  .000  .000   .00
CD   3  4   0    .000   2.000     .000  .000  .000   .00
CD   4  4   0    .000   5.000     .000  .000  .000   .00
CD   5  4   0    .000   4.500    0.000  .000  .000   .00
CD   6  3   0    .000   4.000    8.000  .000  .000   .00
CD   8  3   0    .000   5.000    3.000  .000  .000   .00
Q             4.000   .0
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Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-27-2018 Time: 5:54:19

Renaissance Lot 1 0

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-136.960	2659.300	9.700	2669.000	270.00	13.75	2.94	2671.94	.00	4.54	.00	5.000	.000	.00	0 .0
WALL EXIT														
-136.960	2659.300	9.701	2669.001	270.00	13.75	2.94	2671.94	.00	4.54	.00	5.000	.000	.00	0 .0
134.000	.0095					.0107	1.44	9.70	.00	4.49	.013	.00	.00	PIPE
-2.960	2660.570	9.871	2670.441	270.00	13.75	2.94	2673.38	.00	4.54	.00	5.000	.000	.00	0 .0
HYDRAULIC JUMP														
-2.960	2660.570	2.445	2663.015	270.00	28.29	12.43	2675.44	.00	4.54	5.00	5.000	.000	.00	0 .0
HYDRAULIC DROP														
-2.960	2660.570	9.871	2670.441	270.00	13.75	2.94	2673.38	.00	4.54	.00	5.000	.000	.00	0 .0
6.000	.0333					.0125	.07	9.87	.00	2.82	.014	.00	.00	PIPE
3.040	2660.770	9.842	2670.612	270.00	13.75	2.94	2673.55	.00	4.54	.00	5.000	.000	.00	0 .0
WALL EXIT														
3.040	2660.770	9.843	2670.613	270.00	13.75	2.94	2673.55	.00	4.54	.00	5.000	.000	.00	0 .0
11.278	.0743					.0107	.12	9.84	.00	2.14	.013	.00	.00	PIPE
14.318	2661.608	9.122	2670.730	270.00	13.75	2.94	2673.67	.00	4.54	.00	5.000	.000	.00	0 .0
HYDRAULIC JUMP														
14.318	2661.608	2.458	2664.066	270.00	28.11	12.27	2676.33	.00	4.54	5.00	5.000	.000	.00	0 .0
3.068	.0743					.0452	.14	2.46	3.57	2.14	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-27-2018 Time: 5:54:19

Renaissance Lot 1

0

1 2 3 4 5 6 7

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
17.387	2661.836	2.468	2664.304	270.00	27.96	12.14	2676.44	.00	4.54	5.00	5.000	.000	.00	0 .0
31.450	.0743					.0423	1.33	2.47	3.55	2.14	.013	.00	.00	PIPE
48.837	2664.175	2.562	2666.737	270.00	26.66	11.04	2677.77	.00	4.54	5.00	5.000	.000	.00	0 .0
24.366	.0743					.0372	.91	2.56	3.30	2.14	.013	.00	.00	PIPE
73.203	2665.986	2.661	2668.647	270.00	25.42	10.03	2678.68	.00	4.54	4.99	5.000	.000	.00	0 .0
19.463	.0743					.0328	.64	2.66	3.07	2.14	.013	.00	.00	PIPE
92.666	2667.433	2.765	2670.198	270.00	24.24	9.12	2679.32	.00	4.54	4.97	5.000	.000	.00	0 .0
15.860	.0743					.0290	.46	2.77	2.85	2.14	.013	.00	.00	PIPE
108.526	2668.612	2.875	2671.487	270.00	23.11	8.29	2679.78	.00	4.54	4.94	5.000	.000	.00	0 .0
13.092	.0743					.0256	.34	2.87	2.65	2.14	.013	.00	.00	PIPE
121.618	2669.586	2.991	2672.576	270.00	22.03	7.54	2680.11	.00	4.54	4.90	5.000	.000	.00	0 .0
10.886	.0743					.0227	.25	2.99	2.46	2.14	.013	.00	.00	PIPE
132.504	2670.395	3.113	2673.508	270.00	21.01	6.85	2680.36	.00	4.54	4.85	5.000	.000	.00	0 .0
9.081	.0743					.0201	.18	3.11	2.27	2.14	.013	.00	.00	PIPE
141.585	2671.070	3.244	2674.313	270.00	20.03	6.23	2680.54	.00	4.54	4.77	5.000	.000	.00	0 .0
7.560	.0743					.0178	.13	3.24	2.10	2.14	.013	.00	.00	PIPE
149.145	2671.632	3.383	2675.015	270.00	19.10	5.66	2680.68	.00	4.54	4.68	5.000	.000	.00	0 .0
6.251	.0743					.0159	.10	3.38	1.94	2.14	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-27-2018 Time: 5:54:19

Renaissance Lot 1

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
155.396	2672.097	3.532	2675.629	270.00	18.21	5.15	2680.78	.00	4.54	4.55	5.000	.000	.00	0 .0
5.092	.0743					.0142	.07	3.53	1.78	2.14	.013	.00	.00	PIPE
160.488	2672.476	3.694	2676.169	270.00	17.36	4.68	2680.85	.00	4.54	4.39	5.000	.000	.00	0 .0
4.032	.0743					.0127	.05	3.69	1.63	2.14	.013	.00	.00	PIPE
164.520	2672.775	3.871	2676.646	270.00	16.55	4.26	2680.90	.00	4.54	4.18	5.000	.000	.00	0 .0
3.020	.0743					.0115	.03	3.87	1.48	2.14	.013	.00	.00	PIPE
167.540	2673.000	4.068	2677.068	270.00	15.78	3.87	2680.94	.00	4.54	3.89	5.000	.000	.00	0 .0
.164	.0333					.0126	.00	4.07	1.33	2.82	.014	.00	.00	PIPE
167.704	2673.005	4.073	2677.078	270.00	15.76	3.86	2680.94	.00	4.54	3.89	5.000	.000	.00	0 .0
5.836	.0333					.0121	.07	4.07	1.32	2.82	.014	.00	.00	PIPE
173.540	2673.200	4.300	2677.500	270.00	15.03	3.51	2681.01	.00	4.54	3.47	5.000	.000	.00	0 .0
WALL EXIT														
173.540	2673.200	4.299	2677.499	270.00	15.03	3.51	2681.01	.00	4.54	3.47	5.000	.000	.00	0 .0
27.710	.0112					.0097	.27	4.30	1.16	4.01	.013	.00	.00	PIPE
201.250	2673.510	4.537	2678.047	270.00	14.42	3.23	2681.28	.00	4.54	2.90	5.000	.000	.00	0 .0
JUNCT STR	.0100					.0114	.02	4.54	1.00		.014	.00	.00	PIPE
203.250	2673.530	5.123	2678.653	263.00	13.39	2.79	2681.44	.00	4.50	.00	5.000	.000	.00	0 .0
97.420	.0110					.0102	.99	5.12	.00	3.94	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-27-2018 Time: 5:54:19

Renaissance Lot 1 0

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
300.670	2674.600	5.046	2679.646	263.00	13.39	2.79	2682.43	.00	4.50	.00	5.000	.000	.00	0 .0
JUNCT STR	.0333					.0077	.05	5.05	.00		.014	.00	.00	PIPE
306.670	2674.800	8.511	2683.311	146.00	7.44	.86	2684.17	.00	3.46	.00	5.000	.000	.00	0 .0
28.980	.0104					.0031	.09	8.51	.00	2.65	.013	.00	.00	PIPE
335.650	2675.100	8.302	2683.402	146.00	7.44	.86	2684.26	.00	3.46	.00	5.000	.000	.00	0 .0
HYDRAULIC JUMP														
335.650	2675.100	2.166	2677.266	146.00	17.91	4.98	2682.25	.00	3.46	4.96	5.000	.000	.00	0 .0
HYDRAULIC DROP														
335.650	2675.100	8.302	2683.402	146.00	11.62	2.10	2685.50	.00	3.56	.00	4.000	.000	.00	0 .0
6.000	.1667					.0120	.07	8.30	.00	1.41	.014	.00	.00	PIPE
341.650	2676.100	7.962	2684.062	146.00	11.62	2.10	2686.16	.00	3.56	.00	4.000	.000	.00	0 .0
WALL EXIT														
341.650	2676.100	7.962	2684.062	146.00	11.62	2.10	2686.16	.00	3.56	.00	4.000	.000	.00	0 .0
64.400	.0401					.0103	.67	7.96	.00	2.02	.013	.00	.00	PIPE
406.050	2678.680	6.047	2684.727	146.00	11.62	2.10	2686.82	.00	3.56	.00	4.000	.000	.00	0 .0
JUNCT STR	.0333					.0112	.07	6.05	.00		.014	.00	.00	PIPE
412.050	2678.880	6.469	2685.349	136.00	10.82	1.82	2687.17	.00	3.47	.00	4.000	.000	.00	0 .0
60.800	.0387					.0090	.55	6.47	.00	1.96	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-27-2018 Time: 5:54:19

Renaissance Lot 1

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
472.850	2681.230	4.664	2685.894	136.00	10.82	1.82	2687.71	.00	3.47	.00	4.000	.000	.00	0 .0
HYDRAULIC JUMP														
472.850	2681.230	2.485	2683.715	136.00	16.58	4.27	2687.98	.00	3.47	3.88	4.000	.000	.00	0 .0
HYDRAULIC DROP														
472.850	2681.230	4.664	2685.894	136.00	10.82	1.82	2687.71	.00	3.47	.00	4.000	.000	.00	0 .0
6.000	.0333					.0104	.06	4.66	.00	2.14	.014	.00	.00	PIPE
478.850	2681.430	4.827	2686.257	136.00	10.82	1.82	2688.08	.00	3.47	.00	4.000	.000	.00	0 .0
WALL EXIT														
478.850	2681.430	4.827	2686.257	136.00	10.82	1.82	2688.08	.00	3.47	.00	4.000	.000	.00	0 .0
16.825	.0385					.0090	.15	4.83	.00	1.96	.013	.00	.00	PIPE
495.675	2682.077	4.323	2686.400	136.00	10.82	1.82	2688.22	.00	3.47	.00	4.000	.000	.00	0 .0
HYDRAULIC JUMP														
495.675	2682.077	2.663	2684.740	136.00	15.31	3.64	2688.38	.00	3.47	3.77	4.000	.000	.00	0 .0
5.227	.0385					.0142	.07	2.66	1.76	1.96	.013	.00	.00	PIPE
500.902	2682.278	2.727	2685.005	136.00	14.90	3.45	2688.45	.00	3.47	3.73	4.000	.000	.00	0 .0
7.546	.0385					.0130	.10	2.73	1.68	1.96	.013	.00	.00	PIPE
508.448	2682.568	2.848	2685.417	136.00	14.21	3.13	2688.55	.00	3.47	3.62	4.000	.000	.00	0 .0
5.717	.0385					.0116	.07	2.85	1.54	1.96	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-27-2018 Time: 5:54:19

Renaissance Lot 1

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
514.165	2682.788	2.980	2685.768	136.00	13.55	2.85	2688.62	.00	3.47	3.49	4.000	.000	.00	0 .0
4.098	.0385					.0104	.04	2.98	1.41	1.96	.013	.00	.00	PIPE
518.263	2682.946	3.124	2686.069	136.00	12.92	2.59	2688.66	.00	3.47	3.31	4.000	.000	.00	0 .0
2.564	.0385					.0094	.02	3.12	1.28	1.96	.013	.00	.00	PIPE
520.826	2683.044	3.285	2686.329	136.00	12.32	2.36	2688.68	.00	3.47	3.07	4.000	.000	.00	0 .0
.934	.0385					.0086	.01	3.28	1.14	1.96	.013	.00	.00	PIPE
521.760	2683.080	3.472	2686.552	136.00	11.74	2.14	2688.69	.00	3.47	2.71	4.000	.000	.00	0 .0
JUNCT STR	.0299					.0095	.02	3.47	1.00		.014	.00	.00	PIPE
523.760	2683.140	4.079	2687.219	130.00	10.35	1.66	2688.88	.00	3.41	.00	4.000	.000	.00	0 .0
.678	.0264					.0082	.01	4.08	.00	2.13	.013	.00	.00	PIPE
524.438	2683.158	4.064	2687.221	130.00	10.35	1.66	2688.88	.00	3.41	.00	4.000	.000	.00	0 .0
HYDRAULIC JUMP														
524.438	2683.158	2.777	2685.935	130.00	13.96	3.03	2688.96	.00	3.41	3.69	4.000	.000	.00	0 .0
2.709	.0264					.0118	.03	2.78	1.55	2.13	.013	.00	.00	PIPE
527.147	2683.229	2.810	2686.039	130.00	13.78	2.95	2688.99	.00	3.41	3.66	4.000	.000	.00	0 .0
9.096	.0264					.0110	.10	2.81	1.51	2.13	.013	.00	.00	PIPE
536.243	2683.469	2.938	2686.407	130.00	13.14	2.68	2689.09	.00	3.41	3.53	4.000	.000	.00	0 .0
6.283	.0264					.0098	.06	2.94	1.38	2.13	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-27-2018 Time: 5:54:19

Renaissance Lot 1

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
542.526	2683.635	3.078	2686.712	130.00	12.53	2.44	2689.15	.00	3.41	3.37	4.000	.000	.00	0 .0
3.791	.0264					.0089	.03	3.08	1.26	2.13	.013	.00	.00	PIPE
546.317	2683.735	3.233	2686.968	130.00	11.95	2.22	2689.18	.00	3.41	3.15	4.000	.000	.00	0 .0
1.333	.0264					.0080	.01	3.23	1.13	2.13	.013	.00	.00	PIPE
547.650	2683.770	3.411	2687.181	130.00	11.39	2.01	2689.19	4.00	3.41	2.84	4.000	.000	.00	0 .0
JUNCT STR	.0333							4.00	1.00		.014	.00	.00	PIPE
553.650	2683.970	1.952	2685.922	107.00	17.56	4.79	2690.71	.00	3.13	4.00	4.000	.000	.00	0 .0
141.800	.0250					.0230	3.26	1.95	2.51	1.93	.013	.00	.00	PIPE
695.450	2687.510	2.009	2689.519	107.00	16.93	4.45	2693.97	.00	3.13	4.00	4.000	.000	.00	0 .0
6.000	.0333					.0251	.15	2.01	2.37	1.86	.014	.00	.00	PIPE
701.450	2687.710	2.020	2689.730	107.00	16.82	4.39	2694.12	.00	3.13	4.00	4.000	.000	.00	0 .0
WALL EXIT														
701.450	2687.710	2.019	2689.729	107.00	16.83	4.40	2694.13	.00	3.13	4.00	4.000	.000	.00	0 .0
19.548	.0311					.0207	.40	2.02	2.35	1.81	.013	.00	.00	PIPE
720.998	2688.317	2.066	2690.384	107.00	16.34	4.15	2694.53	.00	3.13	4.00	4.000	.000	.00	0 .0
23.995	.0311					.0187	.45	2.07	2.25	1.81	.013	.00	.00	PIPE
744.993	2689.063	2.146	2691.209	107.00	15.58	3.77	2694.98	.00	3.13	3.99	4.000	.000	.00	0 .0
17.725	.0311					.0165	.29	2.15	2.09	1.81	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-27-2018 Time: 5:54:19

Renaissance Lot 1

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
762.718	2689.614	2.231	2691.844	107.00	14.85	3.43	2695.27	.00	3.13	3.97	4.000	.000	.00	0 .0
13.493	.0311					.0146	.20	2.23	1.94	1.81	.013	.00	.00	PIPE
776.211	2690.033	2.319	2692.353	107.00	14.16	3.11	2695.47	.00	3.13	3.95	4.000	.000	.00	0 .0
10.404	.0311					.0129	.13	2.32	1.80	1.81	.013	.00	.00	PIPE
786.615	2690.357	2.413	2692.770	107.00	13.50	2.83	2695.60	.00	3.13	3.91	4.000	.000	.00	0 .0
8.030	.0311					.0114	.09	2.41	1.67	1.81	.013	.00	.00	PIPE
794.645	2690.606	2.512	2693.119	107.00	12.88	2.57	2695.69	.00	3.13	3.87	4.000	.000	.00	0 .0
6.119	.0311					.0101	.06	2.51	1.55	1.81	.013	.00	.00	PIPE
800.763	2690.796	2.618	2693.415	107.00	12.28	2.34	2695.75	.00	3.13	3.80	4.000	.000	.00	0 .0
4.514	.0311					.0090	.04	2.62	1.43	1.81	.013	.00	.00	PIPE
805.277	2690.937	2.731	2693.668	107.00	11.70	2.13	2695.80	.00	3.13	3.72	4.000	.000	.00	0 .0
3.115	.0311					.0080	.02	2.73	1.32	1.81	.013	.00	.00	PIPE
808.393	2691.034	2.853	2693.886	107.00	11.16	1.93	2695.82	.00	3.13	3.62	4.000	.000	.00	0 .0
1.840	.0311					.0071	.01	2.85	1.21	1.81	.013	.00	.00	PIPE
810.232	2691.091	2.984	2694.075	107.00	10.64	1.76	2695.83	.00	3.13	3.48	4.000	.000	.00	0 .0
.618	.0311					.0064	.00	2.98	1.10	1.81	.013	.00	.00	PIPE
810.850	2691.110	3.130	2694.240	107.00	10.14	1.60	2695.84	4.00	3.13	3.30	4.000	.000	.00	0 .0
JUNCT STR	.1333					.0035	.02	4.00	1.00		.014	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-27-2018 Time: 5:54:19

Renaissance Lot 1

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
816.850	2691.910	5.264	2697.174	4.00	1.27	.03	2697.20	.00	.70	.00	2.000	.000	.00	0 .0
50.346	.0651					.0003	.02	5.26	.00	.36	.013	.00	.00	PIPE
867.196	2695.190	2.000	2697.190	4.00	1.27	.03	2697.21	.00	.70	.00	2.000	.000	.00	0 .0
2.804	.0651					.0003	.00	2.00	.00	.36	.013	.00	.00	PIPE
870.000	2695.372	1.815	2697.187	4.00	1.34	.03	2697.21	.00	.70	1.16	2.000	.000	.00	0 .0
1.618	.0651					.0003	.00	1.81	.15	.36	.013	.00	.00	PIPE
871.618	2695.478	1.707	2697.185	4.00	1.40	.03	2697.22	.00	.70	1.41	2.000	.000	.00	0 .0
1.323	.0651					.0003	.00	1.71	.17	.36	.013	.00	.00	PIPE
872.941	2695.564	1.618	2697.182	4.00	1.47	.03	2697.22	.00	.70	1.57	2.000	.000	.00	0 .0
1.149	.0651					.0003	.00	1.62	.20	.36	.013	.00	.00	PIPE
874.089	2695.639	1.540	2697.179	4.00	1.54	.04	2697.22	.00	.70	1.68	2.000	.000	.00	0 .0
1.024	.0651					.0004	.00	1.54	.22	.36	.013	.00	.00	PIPE
875.113	2695.706	1.470	2697.176	4.00	1.62	.04	2697.22	.00	.70	1.77	2.000	.000	.00	0 .0
.928	.0651					.0004	.00	1.47	.24	.36	.013	.00	.00	PIPE
876.041	2695.766	1.406	2697.172	4.00	1.69	.04	2697.22	.00	.70	1.83	2.000	.000	.00	0 .0
.848	.0651					.0005	.00	1.41	.26	.36	.013	.00	.00	PIPE
876.889	2695.821	1.347	2697.168	4.00	1.78	.05	2697.22	.00	.70	1.88	2.000	.000	.00	0 .0
.780	.0651					.0005	.00	1.35	.29	.36	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-27-2018 Time: 5:54:19

Renaissance Lot 1

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Station / L/Elem	Invert Elev / Ch Slope	Depth (FT) /	Water Elev /	Q (CFS) /	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El. / SE Dpth	Super Elev / Froude N	Critical Depth / Norm Dp	Flow Top Width / "N"	Height/Dia.-FT / X-Fall	Base Wt or I.D. / ZR	ZL	No Wth Prs/Pip / Type Ch
877.669	2695.872	1.292	2697.164	4.00	1.86	.05	2697.22	.00	.70	1.91	2.000	.000	.00	0 .0
.719	.0651					.0006	.00	1.29	.31	.36	.013	.00	.00	PIPE
878.388	2695.919	1.240	2697.159	4.00	1.96	.06	2697.22	.00	.70	1.94	2.000	.000	.00	0 .0
.665	.0651					.0007	.00	1.24	.34	.36	.013	.00	.00	PIPE
879.052	2695.962	1.191	2697.153	4.00	2.05	.07	2697.22	.00	.70	1.96	2.000	.000	.00	0 .0
.613	.0651					.0008	.00	1.19	.36	.36	.013	.00	.00	PIPE
879.665	2696.002	1.145	2697.147	4.00	2.15	.07	2697.22	.00	.70	1.98	2.000	.000	.00	0 .0
.434	.0651					.0009	.00	1.15	.39	.36	.013	.00	.00	PIPE
880.100	2696.031	1.101	2697.132	4.00	2.26	.08	2697.21	.00	.70	1.99	2.000	.000	.00	0 .0
HYDRAULIC JUMP														
880.100	2696.031	.406	2696.437	4.00	8.74	1.19	2697.62	.00	.70	1.61	2.000	.000	.00	0 .0
1.012	.0651					.0358	.04	.41	2.89	.36	.013	.00	.00	PIPE
881.112	2696.096	.420	2696.516	4.00	8.34	1.08	2697.59	.00	.70	1.63	2.000	.000	.00	0 .0
2.477	.0651					.0313	.08	.42	2.71	.36	.013	.00	.00	PIPE
883.589	2696.257	.434	2696.691	4.00	7.95	.98	2697.67	.00	.70	1.65	2.000	.000	.00	0 .0
1.969	.0651					.0274	.05	.43	2.54	.36	.013	.00	.00	PIPE
885.558	2696.385	.449	2696.834	4.00	7.58	.89	2697.73	.00	.70	1.67	2.000	.000	.00	0 .0
1.596	.0651					.0239	.04	.45	2.38	.36	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-27-2018 Time: 5:54:19

Renaissance Lot 1

0

1 2 3 4 5 6 7

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
887.154	2696.489	.465	2696.954	4.00	7.23	.81	2697.76	.00	.70	1.69	2.000	.000	.00	0 .0
1.307	.0651					.0209	.03	.46	2.22	.36	.013	.00	.00	PIPE
888.461	2696.574	.480	2697.055	4.00	6.89	.74	2697.79	.00	.70	1.71	2.000	.000	.00	0 .0
1.078	.0651					.0183	.02	.48	2.08	.36	.013	.00	.00	PIPE
889.539	2696.645	.497	2697.142	4.00	6.57	.67	2697.81	.00	.70	1.73	2.000	.000	.00	0 .0
.891	.0651					.0160	.01	.50	1.95	.36	.013	.00	.00	PIPE
890.430	2696.703	.514	2697.217	4.00	6.26	.61	2697.83	.00	.70	1.75	2.000	.000	.00	0 .0
.737	.0651					.0140	.01	.51	1.83	.36	.013	.00	.00	PIPE
891.167	2696.751	.532	2697.283	4.00	5.97	.55	2697.84	.00	.70	1.77	2.000	.000	.00	0 .0
.604	.0651					.0122	.01	.53	1.71	.36	.013	.00	.00	PIPE
891.771	2696.790	.550	2697.340	4.00	5.69	.50	2697.84	.00	.70	1.79	2.000	.000	.00	0 .0
.490	.0651					.0107	.01	.55	1.60	.36	.013	.00	.00	PIPE
892.261	2696.822	.569	2697.391	4.00	5.43	.46	2697.85	.00	.70	1.80	2.000	.000	.00	0 .0
.389	.0651					.0094	.00	.57	1.50	.36	.013	.00	.00	PIPE
892.650	2696.848	.589	2697.437	4.00	5.18	.42	2697.85	.00	.70	1.82	2.000	.000	.00	0 .0
.304	.0651					.0082	.00	.59	1.40	.36	.013	.00	.00	PIPE
892.954	2696.867	.610	2697.477	4.00	4.94	.38	2697.86	.00	.70	1.84	2.000	.000	.00	0 .0
.224	.0651					.0072	.00	.61	1.31	.36	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-27-2018 Time: 5:54:19

Renaissance Lot 1

0

1 2 3 4 5 6 7

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
893.178	2696.882	.631	2697.513	4.00	4.71	.34	2697.86	.00	.70	1.86	2.000	.000	.00	0 .0
.154	.0651					.0063	.00	.63	1.23	.36	.013	.00	.00	PIPE
893.332	2696.892	.653	2697.545	4.00	4.49	.31	2697.86	.00	.70	1.88	2.000	.000	.00	0 .0
.089	.0651					.0055	.00	.65	1.15	.36	.013	.00	.00	PIPE
893.421	2696.898	.676	2697.574	4.00	4.28	.28	2697.86	.00	.70	1.89	2.000	.000	.00	0 .0
.029	.0651					.0048	.00	.68	1.07	.36	.013	.00	.00	PIPE
893.450	2696.900	.701	2697.601	4.00	4.07	.26	2697.86	.00	.70	1.91	2.000	.000	.00	0 .0

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	4	0		4.000														
CD	2	4	0		2.500														
CD	3	4	0		2.000														
CD	4	4	0		5.000														
CD	5	4	0		4.500														
CD	6	3	0	.000	4.000	8.000	.000	.000	.00										
CD	8	3	0	.000	5.000	3.000	.000	.000	.00										

W S P G W

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

Renaissance Lot 1 0

HEADING LINE NO 2 IS -

1 2 3 4 5 6 7

HEADING LINE NO 3 IS -

4567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567

W S P G W

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	-136.960	2659.300	4	2669.000

ELEMENT NO 2 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	-136.960	2659.300	4

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	-2.960	2660.570	4	.013	.000	.000	.000	0

ELEMENT NO 4 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	-2.960	2660.570	4	.200

ELEMENT NO 5 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	3.040	2660.770	4	.014	.000	.000	10.000	0

ELEMENT NO 6 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	3.040	2660.770	4

ELEMENT NO 7 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	167.540	2673.000	4	.013	.000	.000	.000	0

ELEMENT NO 8 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	167.540	2673.000	4	.200

ELEMENT NO 9 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	173.540	2673.200	4	.014	.000	.000	-20.000	0

ELEMENT NO 10 IS A WALL EXIT *

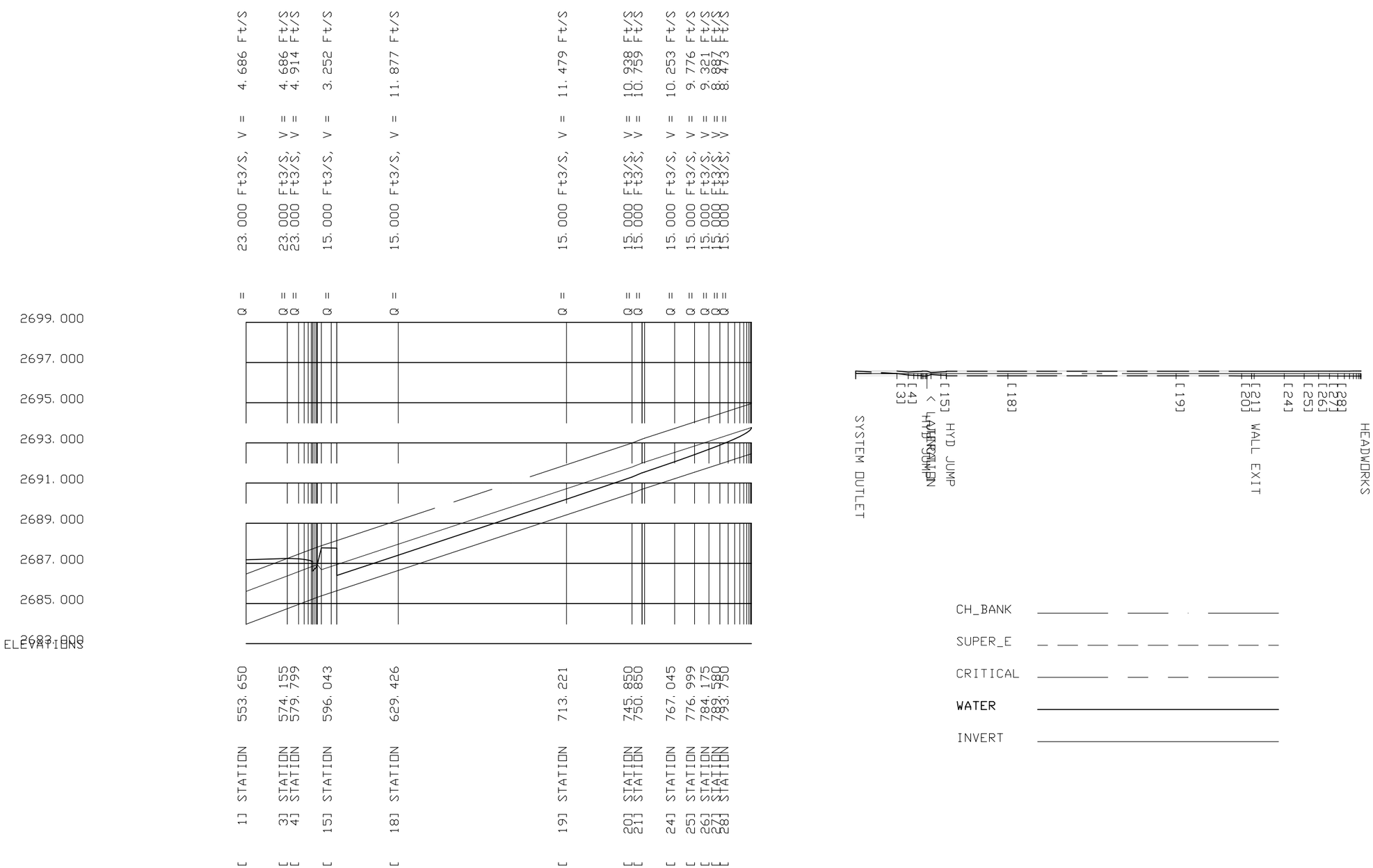
U/S DATA	STATION	INVERT	SECT
	173.540	2673.200	4

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 ELEMENT NO  11 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           201.250 2673.510    4               .013                             .000     .000       .000     0
 ELEMENT NO  12 IS A JUNCTION           *         *     *     *                 *                  *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           203.250 2673.530    4     3     0   .014     7.000      .000  2676.060      .000  45.000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
                                                  W S P G W                                                    PAGE NO   3
                          WATER SURFACE PROFILE - ELEMENT CARD LISTING
 ELEMENT NO  13 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           300.670 2674.600    4               .013                             .000     .000       .000     0
 ELEMENT NO  14 IS A JUNCTION           *         *     *     *                 *                  *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           306.670 2674.800    4     5     0   .014   117.000      .000  2675.200      .000  80.000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
 ELEMENT NO  15 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           335.650 2675.100    4               .013                             .000     .000       .000     0
 ELEMENT NO  16 IS A  WALL  ENTRANCE                  *
                U/S DATA   STATION    INVERT  SECT              FP
                           335.650 2675.100    4               .200
WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS
 ELEMENT NO  17 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           341.650 2676.100    1               .014                             .000     .000     85.000     0
 ELEMENT NO  18 IS A  WALL  EXIT                      *
                U/S DATA   STATION    INVERT  SECT
                           341.650 2676.100    1
 ELEMENT NO  19 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           406.050 2678.680    1               .013                             .000     .000       .000     0
 ELEMENT NO  20 IS A JUNCTION           *         *     *     *                 *                  *                *
                U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                           412.050 2678.880    1     1     0   .014    10.000      .000  2678.780      .000  90.000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
 ELEMENT NO  21 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           472.850 2681.230    1               .013                             .000     .000       .000     0
 ELEMENT NO  22 IS A  WALL  ENTRANCE                  *
                U/S DATA   STATION    INVERT  SECT              FP
                           472.850 2681.230    1               .200
                                                  W S P G W                                                    PAGE NO   4
                          WATER SURFACE PROFILE - ELEMENT CARD LISTING
 ELEMENT NO  23 IS A REACH              *         *     *
                U/S DATA   STATION    INVERT  SECT               N                            RADIUS    ANGLE     ANG PT  MAN H
                           478.850 2681.430    1               .014                             .000     .000    -50.000     0
 ELEMENT NO  24 IS A  WALL  EXIT                      *
                U/S DATA   STATION    INVERT  SECT
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                          478.850 2681.430    1
 ELEMENT NO  25 IS A REACH             *         *     *
                 U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                          521.760 2683.080    1               .013                           .000     .000      .000     0
 ELEMENT NO  26 IS A JUNCTION          *         *     *     *               *                  *                *
                 U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                          523.760 2683.140    1     3     0   .014     6.000      .000  2683.370      .000  90.000     .000
                                                                                          RADIUS    ANGLE
                                                                                            .000     .000
 ELEMENT NO  27 IS A REACH             *         *     *
                 U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                          547.650 2683.770    1               .013                           .000     .000      .000     0
 ELEMENT NO  28 IS A JUNCTION          *         *     *     *               *                  *                *
                 U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                          553.650 2683.970    1     2     0   .014    23.000      .000  2683.370      .000  90.000     .000
                                                                                          RADIUS    ANGLE
                                                                                           3.820  90.000
 ELEMENT NO  29 IS A REACH             *         *     *
                 U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                          695.450 2687.510    1               .013                           .000     .000      .000     0
 ELEMENT NO  30 IS A  WALL  ENTRANCE                 *
                 U/S DATA   STATION    INVERT  SECT              FP
                          695.450 2687.510    1               .200
 ELEMENT NO  31 IS A REACH             *         *     *
                 U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                          701.450 2687.710    1               .014                           .000     .000   -30.000     0
 ELEMENT NO  32 IS A  WALL  EXIT                     *
                 U/S DATA   STATION    INVERT  SECT
                          701.450 2687.710    1
                                          W S P G W                                                                PAGE NO   5
                        WATER SURFACE PROFILE - ELEMENT CARD LISTING
 ELEMENT NO  33 IS A REACH             *         *     *
                 U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                          810.850 2691.110    1               .013                           .000     .000      .000     0
 ELEMENT NO  34 IS A JUNCTION          *         *     *     *               *                  *                *
                 U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3        Q4     INVERT-3 INVERT-4  PHI 3  PHI 4
                          816.850 2691.910    1     1     0   .014   103.000      .000  2692.450      .000  90.000     .000
                                                                                          RADIUS    ANGLE
                                                                                           4.044  85.000
WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS
 ELEMENT NO  35 IS A REACH             *         *     *
                 U/S DATA   STATION    INVERT  SECT               N                          RADIUS    ANGLE     ANG PT  MAN H
                          893.450 2696.900    3               .013                           .000     .000      .000     0
 ELEMENT NO  36 IS A SYSTEM HEADWORKS                *                   *
                 U/S DATA   STATION    INVERT  SECT                                  W S ELEV
                          893.450 2696.900    3                                    2696.900
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WSPG MAIN2

WATER SURFACE PRESSURE GRADIENT ANALYSIS (PLAN & PROFILE) MAIN2



Program Package Serial Number: 7204 Date: 4-28-2018 Time: 7:57:56 File: MAIN2.WSW

Renaissance Lot 1 MAIN2 0

[No.]	TYPE OPERATION	STATION (FT)	INV ELEV (FT)	WATER LEVEL (FT)	CHAN HT (FT)	TYPE CHANNEL	"N"	#PIER/PIP	FLOW RATE (CFS)	VELOCITY (FT/S)	TOP WIDTH (FT)	CHAN WIDTH (FT)	PIER WIDTH (FT)	ZL	ZR	SUPEL RT B (FT)	SUPEL LT B (FT)	CRIT DPTH (FT)	RADIUS/<PT (FT OR <)	RMKS
[1]	SYSTEM OUTLET	553.650	2683.970	3.210	2.500	PIPE	.013	0	23.000	4.686	.000	2.500	.000	.000	.000	.000	.000	1.632	.000	
[2]	REACH	553.650	2683.970	3.210	2.500	PIPE	.013	0	23.000	4.686	.000	2.500	.000	.000	.000	.000	.000	1.632	.000	
[3]	REACH	574.155	2684.744	2.500	2.500	PIPE	.013	0	23.000	4.686	.000	2.500	.000	.000	.000	.000	.000	1.632	.000	
[4]	REACH	579.799	2684.958	2.268	2.500	PIPE	.013	0	23.000	4.914	1.450	2.500	.000	.000	.000	.000	.000	1.632	.000	
[5]	REACH	582.580	2685.063	2.133	2.500	PIPE	.013	0	23.000	5.154	1.768	2.500	.000	.000	.000	.000	.000	1.632	.000	
[6]	REACH	584.591	2685.138	2.023	2.500	PIPE	.013	0	23.000	5.406	1.965	2.500	.000	.000	.000	.000	.000	1.632	.000	
[7]	REACH	586.098	2685.195	1.926	2.500	PIPE	.013	0	23.000	5.670	2.104	2.500	.000	.000	.000	.000	.000	1.632	.000	
[8]	HYD JUMP	586.714	2685.219	1.873	2.500	PIPE	.013	0	23.000	5.828	2.167	2.500	.000	.000	.000	.000	.000	1.632	.000	HYD JUMP
[9]	REACH	586.714	2685.219	1.389	2.500	PIPE	.013	0	23.000	8.205	2.484	2.500	.000	.000	.000	.000	.000	1.632	.000	
[10]	REACH	587.499	2685.249	1.445	2.500	PIPE	.013	0	23.000	7.823	2.469	2.500	.000	.000	.000	.000	.000	1.632	.000	
[11]	REACH	588.419	2685.283	1.504	2.500	PIPE	.013	0	23.000	7.459	2.448	2.500	.000	.000	.000	.000	.000	1.632	.000	
[12]	REACH	588.955	2685.303	1.566	2.500	PIPE	.013	0	23.000	7.112	2.419	2.500	.000	.000	.000	.000	.000	1.632	.000	
[13]	REACH	589.130	2685.310	1.632	2.500	PIPE	.014	0	23.000	6.776	2.380	2.500	.000	.000	.000	.000	.000	1.632	.000	
[14]	JUNCTION	591.130	2685.380	2.395	2.500	PIPE	.013	0	15.000	3.101	1.004	2.500	.000	.000	.000	.000	.000	1.306	.000	
[15]	REACH	596.043	2685.542	2.224	2.500	PIPE	.013	0	15.000	3.252	1.568	2.500	.000	.000	.000	.000	.000	1.306	.000	
[16]	HYD JUMP	598.812	2685.634	2.123	2.500	PIPE	.013	0	15.000	3.376	1.789	2.500	.000	.000	.000	.000	.000	1.306	.000	HYD JUMP
[17]	REACH	598.812	2685.634	.760	2.500	PIPE	.013	0	15.000	11.877	2.300	2.500	.000	.000	.000	.000	.000	1.306	.000	
[18]	REACH	629.426	2686.645	.760	2.500	PIPE	.013	0	15.000	11.877	2.300	2.500	.000	.000	.000	.000	.000	1.306	.000	
[19]	REACH	713.221	2689.412	.780	2.500	PIPE	.013	0	15.000	11.479	2.316	2.500	.000	.000	.000	.000	.000	1.306	.000	
[20]	REACH	745.850	2690.490	.807	2.500	PIPE	.014	0	15.000	10.938	2.338	2.500	.000	.000	.000	.000	.000	1.306	.000	
[21]	REACH	750.850	2690.690	.817	2.500	PIPE	.013	0	15.000	10.759	2.345	2.500	.000	.000	.000	.000	.000	1.306	.000	
[22]	WALL EXIT	750.850	2690.689	.816	2.500	PIPE	.013	0	15.000	10.783	2.344	2.500	.000	.000	.000	.000	.000	1.306	.000	
[23]	REACH	752.097	2690.730	.817	2.500	PIPE	.013	0	15.000	10.753	2.346	2.500	.000	.000	.000	.000	.000	1.306	.000	
[24]	REACH	767.045	2691.216	.846	2.500	PIPE	.013	0	15.000	10.253	2.366	2.500	.000	.000	.000	.000	.000	1.306	.000	
[25]	REACH	776.999	2691.539	.876	2.500	PIPE	.013	0	15.000	9.776	2.386	2.500	.000	.000	.000	.000	.000	1.306	.000	
[26]	REACH	784.175	2691.772	.908	2.500	PIPE	.013	0	15.000	9.321	2.404	2.500	.000	.000	.000	.000	.000	1.306	.000	
[27]	REACH	789.580	2691.948	.940	2.500	PIPE	.013	0	15.000	8.887	2.422	2.500	.000	.000	.000	.000	.000	1.306	.000	
[28]	REACH	793.750	2692.083	.974	2.500	PIPE	.013	0	15.000	8.473	2.438	2.500	.000	.000	.000	.000	.000	1.306	.000	
[29]	REACH	797.003	2692.189	1.009	2.500	PIPE	.013	0	15.000	8.079	2.453	2.500	.000	.000	.000	.000	.000	1.306	.000	
[30]	REACH	799.543	2692.271	1.046	2.500	PIPE	.013	0	15.000	7.703	2.467	2.500	.000	.000	.000	.000	.000	1.306	.000	
[31]	REACH	801.503	2692.335	1.085	2.500	PIPE	.013	0	15.000	7.345	2.478	2.500	.000	.000	.000	.000	.000	1.306	.000	
[32]	REACH	802.990	2692.383	1.125	2.500	PIPE	.013	0	15.000	7.003	2.487	2.500	.000	.000	.000	.000	.000	1.306	.000	
[33]	REACH	804.069	2692.418	1.167	2.500	PIPE	.013	0	15.000	6.677	2.494	2.500	.000	.000	.000	.000	.000	1.306	.000	
[34]	REACH	804.798	2692.442	1.211	2.500	PIPE	.013	0	15.000	6.366	2.499	2.500	.000	.000	.000	.000	.000	1.306	.000	
[35]	REACH	805.215	2692.456	1.256	2.500	PIPE	.013	0	15.000	6.070	2.500	2.500	.000	.000	.000	.000	.000	1.306	.000	
[36]	HEADWORKS	805.350	2692.460	1.306	2.500	PIPE	.013	0	15.000	5.782	2.497	2.500	.000	.000	.000	.000	.000	1.306	.000	

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T1 Renaissance Lot 1 MAIN2                                                0
T2       1         2         3         4         5         6         7         8         9
T3 456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
SO    553.6502683.970  2                          2687.180
WX    553.6502683.970  2
R     589.1302685.310  2      .013                                  .000  00.000 0
JX    591.1302685.380  2  3   .014    8.000         2685.000         90.0       00.000
R     745.8502690.490  2      .013                                  .000  00.000 0
WE    745.8502690.490  2       .20
R     750.8502690.690  2      .014                                  .000  10.000 0
WX    750.8502690.690  2
R     805.3502692.460  2      .013                                  .000  00.000 0
SH    805.3502692.460  2                          2692.4600
CD   1  4   0    .000   1.000     .000  .000  .000   .00
CD   2  4   0    .000   2.500     .000  .000  .000   .00
CD   3  4   0    .000   2.000     .000  .000  .000   .00
CD   4  4   0    .000   5.000     .000  .000  .000   .00
CD   5  4   0    .000   4.500    0.000  .000  .000   .00
CD   6  3   0    .000   4.000    8.000  .000  .000   .00
CD   8  3   0    .000   5.000    3.000  .000  .000   .00
Q            15.000   .0
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Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-28-2018 Time: 7:57:56

Renaissance Lot 1 MAIN2

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
553.650	2683.970	3.210	2687.180	23.00	4.69	.34	2687.52	.00	1.63	.00	2.500	.000	.00	0 .0
WALL EXIT														
553.650	2683.970	3.210	2687.180	23.00	4.69	.34	2687.52	.00	1.63	.00	2.500	.000	.00	0 .0
20.505	.0378					.0031	.06	3.21	.00	.92	.013	.00	.00	PIPE
574.155	2684.744	2.500	2687.244	23.00	4.69	.34	2687.59	.00	1.63	.00	2.500	.000	.00	0 .0
5.644	.0378					.0029	.02	2.50	.00	.92	.013	.00	.00	PIPE
579.799	2684.958	2.268	2687.226	23.00	4.91	.38	2687.60	.00	1.63	1.45	2.500	.000	.00	0 .0
2.780	.0378					.0028	.01	2.27	.48	.92	.013	.00	.00	PIPE
582.580	2685.063	2.134	2687.196	23.00	5.15	.41	2687.61	.00	1.63	1.77	2.500	.000	.00	0 .0
2.011	.0378					.0031	.01	2.13	.57	.92	.013	.00	.00	PIPE
584.591	2685.138	2.023	2687.161	23.00	5.41	.45	2687.61	.00	1.63	1.97	2.500	.000	.00	0 .0
1.507	.0378					.0034	.01	2.02	.65	.92	.013	.00	.00	PIPE
586.098	2685.195	1.925	2687.121	23.00	5.67	.50	2687.62	.00	1.63	2.10	2.500	.000	.00	0 .0
.616	.0378					.0037	.00	1.93	.72	.92	.013	.00	.00	PIPE
586.714	2685.219	1.874	2687.092	23.00	5.83	.53	2687.62	.00	1.63	2.17	2.500	.000	.00	0 .0
HYDRAULIC JUMP														
586.714	2685.219	1.390	2686.608	23.00	8.21	1.05	2687.65	.00	1.63	2.48	2.500	.000	.00	0 .0
.785	.0378					.0083	.01	1.39	1.36	.92	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-28-2018 Time: 7:57:56

Renaissance Lot 1 MAIN2

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
587.499	2685.249	1.445	2686.694	23.00	7.82	.95	2687.64	.00	1.63	2.47	2.500	.000	.00	0 .0
.921	.0378					.0074	.01	1.45	1.26	.92	.013	.00	.00	PIPE
588.419	2685.283	1.503	2686.787	23.00	7.46	.86	2687.65	.00	1.63	2.45	2.500	.000	.00	0 .0
.536	.0378					.0065	.00	1.50	1.17	.92	.013	.00	.00	PIPE
588.955	2685.303	1.565	2686.869	23.00	7.11	.79	2687.65	.00	1.63	2.42	2.500	.000	.00	0 .0
.175	.0378					.0058	.00	1.57	1.08	.92	.013	.00	.00	PIPE
589.130	2685.310	1.632	2686.942	23.00	6.78	.71	2687.66	.00	1.63	2.38	2.500	.000	.00	0 .0
JUNCT STR	.0349					.0038	.01	1.63	1.00		.014	.00	.00	PIPE
591.130	2685.380	2.395	2687.775	15.00	3.10	.15	2687.92	.00	1.31	1.00	2.500	.000	.00	0 .0
4.913	.0330					.0012	.01	2.39	.25	.76	.013	.00	.00	PIPE
596.043	2685.542	2.223	2687.766	15.00	3.25	.16	2687.93	.00	1.31	1.57	2.500	.000	.00	0 .0
2.769	.0330					.0012	.00	2.22	.33	.76	.013	.00	.00	PIPE
598.812	2685.634	2.123	2687.757	15.00	3.38	.18	2687.93	.00	1.31	1.79	2.500	.000	.00	0 .0
HYDRAULIC JUMP														
598.812	2685.634	.761	2686.394	15.00	11.88	2.19	2688.58	.00	1.31	2.30	2.500	.000	.00	0 .0
30.614	.0330					.0330	1.01	.76	2.82	.76	.013	.00	.00	PIPE
629.426	2686.645	.761	2687.405	15.00	11.88	2.19	2689.60	.00	1.31	2.30	2.500	.000	.00	0 .0
83.795	.0330					.0315	2.64	.76	2.82	.76	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-28-2018 Time: 7:57:56

Renaissance Lot 1 MAIN2

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
713.221	2689.412	.780	2690.192	15.00	11.48	2.05	2692.24	.00	1.31	2.32	2.500	.000	.00	0 .0
32.629	.0330					.0282	.92	.78	2.69	.76	.013	.00	.00	PIPE
745.850	2690.490	.807	2691.297	15.00	10.94	1.86	2693.16	.00	1.31	2.34	2.500	.000	.00	0 .0
5.000	.0400					.0298	.15	.81	2.52	.75	.014	.00	.00	PIPE
750.850	2690.690	.817	2691.507	15.00	10.76	1.80	2693.30	.00	1.31	2.35	2.500	.000	.00	0 .0
WALL	EXIT													
750.850	2690.689	.816	2691.505	15.00	10.78	1.81	2693.31	.00	1.31	2.34	2.500	.000	.00	0 .0
1.247	.0325					.0251	.03	.82	2.47	.76	.013	.00	.00	PIPE
752.097	2690.730	.817	2691.547	15.00	10.75	1.80	2693.34	.00	1.31	2.35	2.500	.000	.00	0 .0
14.948	.0325					.0235	.35	.82	2.46	.76	.013	.00	.00	PIPE
767.045	2691.216	.846	2692.062	15.00	10.25	1.63	2693.69	.00	1.31	2.37	2.500	.000	.00	0 .0
9.954	.0325					.0206	.20	.85	2.30	.76	.013	.00	.00	PIPE
776.999	2691.539	.876	2692.415	15.00	9.78	1.48	2693.90	.00	1.31	2.39	2.500	.000	.00	0 .0
7.176	.0325					.0180	.13	.88	2.15	.76	.013	.00	.00	PIPE
784.175	2691.772	.908	2692.680	15.00	9.32	1.35	2694.03	.00	1.31	2.40	2.500	.000	.00	0 .0
5.405	.0325					.0158	.09	.91	2.01	.76	.013	.00	.00	PIPE
789.580	2691.948	.940	2692.888	15.00	8.89	1.23	2694.11	.00	1.31	2.42	2.500	.000	.00	0 .0
4.171	.0325					.0139	.06	.94	1.88	.76	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-28-2018 Time: 7:57:56

Renaissance Lot 1 MAIN2

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
793.750	2692.083	.974	2693.057	15.00	8.47	1.11	2694.17	.00	1.31	2.44	2.500	.000	.00	0 .0
3.253	.0325					.0122	.04	.97	1.75	.76	.013	.00	.00	PIPE
797.003	2692.189	1.009	2693.198	15.00	8.08	1.01	2694.21	.00	1.31	2.45	2.500	.000	.00	0 .0
2.539	.0325					.0107	.03	1.01	1.64	.76	.013	.00	.00	PIPE
799.543	2692.271	1.046	2693.317	15.00	7.70	.92	2694.24	.00	1.31	2.47	2.500	.000	.00	0 .0
1.960	.0325					.0094	.02	1.05	1.53	.76	.013	.00	.00	PIPE
801.503	2692.335	1.085	2693.420	15.00	7.34	.84	2694.26	.00	1.31	2.48	2.500	.000	.00	0 .0
1.487	.0325					.0082	.01	1.08	1.43	.76	.013	.00	.00	PIPE
802.990	2692.383	1.125	2693.508	15.00	7.00	.76	2694.27	.00	1.31	2.49	2.500	.000	.00	0 .0
1.079	.0325					.0072	.01	1.12	1.33	.76	.013	.00	.00	PIPE
804.069	2692.418	1.167	2693.585	15.00	6.68	.69	2694.28	.00	1.31	2.49	2.500	.000	.00	0 .0
.729	.0325					.0064	.00	1.17	1.24	.76	.013	.00	.00	PIPE
804.798	2692.442	1.211	2693.653	15.00	6.37	.63	2694.28	.00	1.31	2.50	2.500	.000	.00	0 .0
.417	.0325					.0056	.00	1.21	1.16	.76	.013	.00	.00	PIPE
805.215	2692.456	1.257	2693.712	15.00	6.07	.57	2694.28	.00	1.31	2.50	2.500	.000	.00	0 .0
.135	.0325					.0049	.00	1.26	1.08	.76	.013	.00	.00	PIPE
805.350	2692.460	1.306	2693.766	15.00	5.78	.52	2694.29	.00	1.31	2.50	2.500	.000	.00	0 .0

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	4	0		1.000														
CD	2	4	0		2.500														
CD	3	4	0		2.000														
CD	4	4	0		5.000														
CD	5	4	0		4.500														
CD	6	3	0	.000	4.000	8.000	.000	.000	.00										
CD	8	3	0	.000	5.000	3.000	.000	.000	.00										

W S P G W

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

Renaissance Lot 1 MAIN2 0

HEADING LINE NO 2 IS -

1 2 3 4 5 6 7

HEADING LINE NO 3 IS -

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W S P G W

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	553.650	2683.970	2	2687.180

ELEMENT NO 2 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	553.650	2683.970	2

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	589.130	2685.310	2	.013	.000	.000	.000	0

ELEMENT NO 4 IS A JUNCTION * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	591.130	2685.380	2	3	0	.014	8.000	.000	2685.000	.000	90.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 5 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	745.850	2690.490	2	.013	.000	.000	.000	0

ELEMENT NO 6 IS A WALL ENTRANCE *

U/S DATA	STATION	INVERT	SECT	FP
	745.850	2690.490	2	.200

ELEMENT NO 7 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	750.850	2690.690	2	.014	.000	.000	10.000	0

ELEMENT NO 8 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	750.850	2690.690	2

ELEMENT NO 9 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	805.350	2692.460	2	.013	.000	.000	.000	0

ELEMENT NO 10 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	805.350	2692.460	2	2692.460

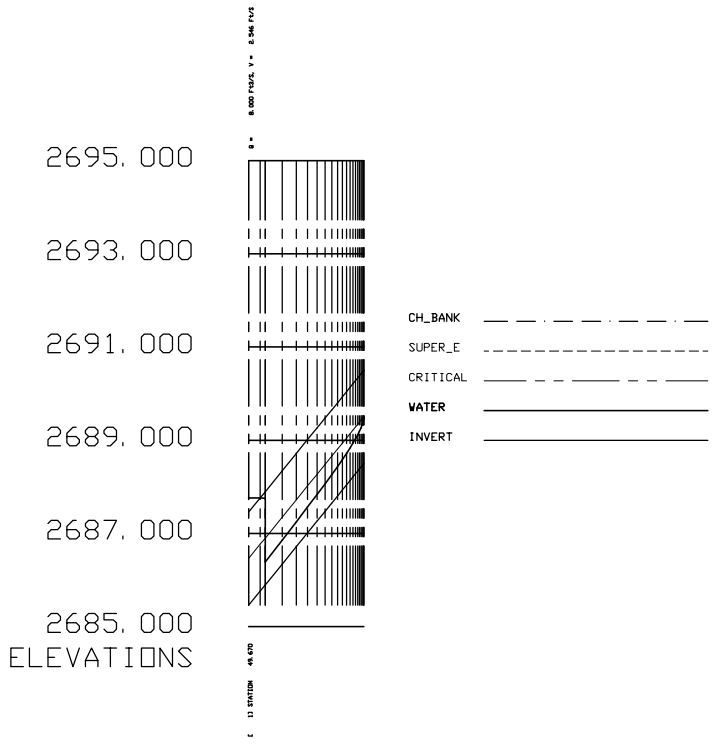
WSPG SD3

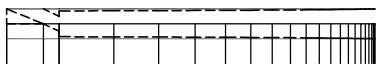
WATER SURFACE PRESSURE GRADIENT ANALYSIS (PLAN & PROFILE) SD3

Program Package Serial Number: 7204 Date: 4-29-2018 Time: 10:11:15 File: SD3.WSW

Renaissance Lot 1 Lateral SD3

[No.]	TYPE OPERATION	STATION (FT)	INV ELEV (FT)	WATER LEVEL (FT)	CHAN HT (FT)	TYPE CHANNEL	'N'	#PIER/PIP	FLOW RATE (CFS)	VELOCITY (FT/S)	TOP WIDTH (FT)	CHAN WDTH (FT)	PIER WIDTH (FT)	ZL	ZR	SUPEL RT B (FT)	SUPEL LT B (FT)	CRIT DPTH (FT)	RADIUS/<PT (FT OR <)	RMKS
[1]	SYSTEM OUTLET	49.670	2685.460	2.300	2.000	PIPE	.013	0	8.000	2.546	.000	2.000	.000	.000	.000	.000	.000	1.007	.000	
[2]	REACH	49.670	2685.460	2.301	2.000	PIPE	.013	0	8.000	2.546	.000	2.000	.000	.000	.000	.000	.000	1.007	.000	
[3]	REACH	52.139	2685.764	2.000	2.000	PIPE	.013	0	8.000	2.546	.000	2.000	.000	.000	.000	.000	.000	1.007	.000	
[4]	HYD JUMP	53.188	2685.893	1.865	2.000	PIPE	.013	0	8.000	2.623	1.004	2.000	.000	.000	.000	.000	.000	1.007	.000	HYD JUMP
[5]	REACH	53.188	2685.893	.498	2.000	PIPE	.013	0	8.000	13.114	1.729	2.000	.000	.000	.000	.000	.000	1.007	.000	
[6]	REACH	56.855	2686.344	.515	2.000	PIPE	.013	0	8.000	12.503	1.749	2.000	.000	.000	.000	.000	.000	1.007	.000	
[7]	REACH	59.865	2686.715	.532	2.000	PIPE	.013	0	8.000	11.921	1.768	2.000	.000	.000	.000	.000	.000	1.007	.000	
[8]	REACH	62.316	2687.016	.551	2.000	PIPE	.013	0	8.000	11.366	1.787	2.000	.000	.000	.000	.000	.000	1.007	.000	
[9]	REACH	64.345	2687.266	.570	2.000	PIPE	.013	0	8.000	10.837	1.806	2.000	.000	.000	.000	.000	.000	1.007	.000	
[10]	REACH	66.046	2687.476	.589	2.000	PIPE	.013	0	8.000	10.333	1.824	2.000	.000	.000	.000	.000	.000	1.007	.000	
[11]	REACH	67.485	2687.653	.610	2.000	PIPE	.013	0	8.000	9.852	1.842	2.000	.000	.000	.000	.000	.000	1.007	.000	
[12]	REACH	68.709	2687.803	.632	2.000	PIPE	.013	0	8.000	9.394	1.860	2.000	.000	.000	.000	.000	.000	1.007	.000	
[13]	REACH	69.753	2687.932	.654	2.000	PIPE	.013	0	8.000	8.957	1.877	2.000	.000	.000	.000	.000	.000	1.007	.000	
[14]	REACH	70.643	2688.041	.678	2.000	PIPE	.013	0	8.000	8.540	1.893	2.000	.000	.000	.000	.000	.000	1.007	.000	
[15]	REACH	71.403	2688.135	.701	2.000	PIPE	.013	0	8.000	8.142	1.909	2.000	.000	.000	.000	.000	.000	1.007	.000	
[16]	REACH	72.049	2688.214	.726	2.000	PIPE	.013	0	8.000	7.763	1.924	2.000	.000	.000	.000	.000	.000	1.007	.000	
[17]	REACH	72.594	2688.281	.753	2.000	PIPE	.013	0	8.000	7.402	1.938	2.000	.000	.000	.000	.000	.000	1.007	.000	
[18]	REACH	73.050	2688.337	.780	2.000	PIPE	.013	0	8.000	7.058	1.951	2.000	.000	.000	.000	.000	.000	1.007	.000	
[19]	REACH	73.426	2688.384	.808	2.000	PIPE	.013	0	8.000	6.729	1.963	2.000	.000	.000	.000	.000	.000	1.007	.000	
[20]	REACH	73.730	2688.421	.838	2.000	PIPE	.013	0	8.000	6.416	1.973	2.000	.000	.000	.000	.000	.000	1.007	.000	
[21]	REACH	73.970	2688.451	.868	2.000	PIPE	.013	0	8.000	6.117	1.982	2.000	.000	.000	.000	.000	.000	1.007	.000	
[22]	REACH	74.149	2688.473	.900	2.000	PIPE	.013	0	8.000	5.833	1.990	2.000	.000	.000	.000	.000	.000	1.007	.000	
[23]	REACH	74.273	2688.488	.934	2.000	PIPE	.013	0	8.000	5.561	1.996	2.000	.000	.000	.000	.000	.000	1.007	.000	
[24]	REACH	74.346	2688.497	.969	2.000	PIPE	.013	0	8.000	5.303	1.999	2.000	.000	.000	.000	.000	.000	1.007	.000	
[25]	HEADWORKS	74.370	2688.500	1.007	2.000	PIPE	.013	0	8.000	5.049	2.000	2.000	.000	.000	.000	.000	.000	1.007	.000	





SYSTEM OUTLET

HEADWORKS

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T1 Renaissance Lot 1 Lateral SD3                                                0
T2       1         2         3         4         5         6         7         8
9
T3
456789012345678901234567890123456789012345678901234567890123456789012345678901234
567890
SO     49.6702685.460  3                         2687.760
WX     49.6702685.460  3
R      74.3702688.500  3      .013                                  .000  00.000
0
SH     74.3702688.500  3                         2688.5000
CD   1  4   0    .000   1.000     .000  .000  .000   .00
CD   2  4   0    .000   2.500     .000  .000  .000   .00
CD   3  4   0    .000   2.000     .000  .000  .000   .00
CD   4  4   0    .000   5.000     .000  .000  .000   .00
CD   5  4   0    .000   4.500    0.000  .000  .000   .00
CD   6  3   0    .000   4.000    8.000  .000  .000   .00
CD   8  3   0    .000   5.000    3.000  .000  .000   .00
Q             8.000   .0
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Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-29-2018 Time:10:11:15

Renaissance Lot 1 Lateral SD3

1 2 3 4 5 6 7

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
49.670	2685.460	2.300	2687.760	8.00	2.55	.10	2687.86	.00	1.01	.00	2.000	.000	.00	0 .0
WALL EXIT														
49.670	2685.460	2.301	2687.761	8.00	2.55	.10	2687.86	.00	1.01	.00	2.000	.000	.00	0 .0
2.469	.1231					.0012	.00	2.30	.00	.43	.013	.00	.00	PIPE
52.139	2685.764	2.000	2687.764	8.00	2.55	.10	2687.86	.00	1.01	.00	2.000	.000	.00	0 .0
1.049	.1231					.0012	.00	2.00	.00	.43	.013	.00	.00	PIPE
53.188	2685.893	1.865	2687.758	8.00	2.62	.11	2687.86	.00	1.01	1.00	2.000	.000	.00	0 .0
HYDRAULIC JUMP														
53.188	2685.893	.498	2686.391	8.00	13.11	2.67	2689.06	.00	1.01	1.73	2.000	.000	.00	0 .0
3.667	.1231					.0637	.23	.50	3.89	.43	.013	.00	.00	PIPE
56.855	2686.344	.515	2686.859	8.00	12.50	2.43	2689.29	.00	1.01	1.75	2.000	.000	.00	0 .0
3.010	.1231					.0557	.17	.51	3.64	.43	.013	.00	.00	PIPE
59.865	2686.715	.533	2687.247	8.00	11.92	2.21	2689.45	.00	1.01	1.77	2.000	.000	.00	0 .0
2.450	.1231					.0487	.12	.53	3.41	.43	.013	.00	.00	PIPE
62.316	2687.016	.551	2687.567	8.00	11.37	2.01	2689.57	.00	1.01	1.79	2.000	.000	.00	0 .0
2.029	.1231					.0426	.09	.55	3.19	.43	.013	.00	.00	PIPE
64.345	2687.266	.570	2687.836	8.00	10.84	1.82	2689.66	.00	1.01	1.81	2.000	.000	.00	0 .0
1.701	.1231					.0373	.06	.57	2.99	.43	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-29-2018 Time:10:11:15

Renaissance Lot 1 Lateral SD3

1 2 3 4 5 6 7

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
66.046	2687.476	.590	2688.065	8.00	10.33	1.66	2689.72	.00	1.01	1.82	2.000	.000	.00	0 .0
1.439	.1231					.0327	.05	.59	2.80	.43	.013	.00	.00	PIPE
67.485	2687.653	.611	2688.263	8.00	9.85	1.51	2689.77	.00	1.01	1.84	2.000	.000	.00	0 .0
1.224	.1231					.0286	.03	.61	2.62	.43	.013	.00	.00	PIPE
68.709	2687.803	.632	2688.435	8.00	9.39	1.37	2689.81	.00	1.01	1.86	2.000	.000	.00	0 .0
1.044	.1231					.0250	.03	.63	2.45	.43	.013	.00	.00	PIPE
69.753	2687.932	.654	2688.586	8.00	8.96	1.25	2689.83	.00	1.01	1.88	2.000	.000	.00	0 .0
.890	.1231					.0219	.02	.65	2.29	.43	.013	.00	.00	PIPE
70.643	2688.041	.677	2688.719	8.00	8.54	1.13	2689.85	.00	1.01	1.89	2.000	.000	.00	0 .0
.760	.1231					.0192	.01	.68	2.14	.43	.013	.00	.00	PIPE
71.403	2688.135	.701	2688.836	8.00	8.14	1.03	2689.87	.00	1.01	1.91	2.000	.000	.00	0 .0
.646	.1231					.0168	.01	.70	2.00	.43	.013	.00	.00	PIPE
72.049	2688.214	.726	2688.940	8.00	7.76	.94	2689.88	.00	1.01	1.92	2.000	.000	.00	0 .0
.545	.1231					.0148	.01	.73	1.87	.43	.013	.00	.00	PIPE
72.594	2688.281	.752	2689.034	8.00	7.40	.85	2689.88	.00	1.01	1.94	2.000	.000	.00	0 .0
.456	.1231					.0130	.01	.75	1.75	.43	.013	.00	.00	PIPE
73.050	2688.337	.780	2689.117	8.00	7.06	.77	2689.89	.00	1.01	1.95	2.000	.000	.00	0 .0
.376	.1231					.0114	.00	.78	1.63	.43	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-29-2018 Time:10:11:15

Renaissance Lot 1 Lateral SD3

1 2 3 4 5 6 7

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
73.426	2688.384	.808	2689.192	8.00	6.73	.70	2689.89	.00	1.01	1.96	2.000	.000	.00	0 .0
.304	.1231					.0100	.00	.81	1.52	.43	.013	.00	.00	PIPE
73.730	2688.421	.837	2689.259	8.00	6.42	.64	2689.90	.00	1.01	1.97	2.000	.000	.00	0 .0
.240	.1231					.0088	.00	.84	1.42	.43	.013	.00	.00	PIPE
73.970	2688.451	.868	2689.319	8.00	6.12	.58	2689.90	.00	1.01	1.98	2.000	.000	.00	0 .0
.179	.1231					.0077	.00	.87	1.33	.43	.013	.00	.00	PIPE
74.149	2688.473	.900	2689.373	8.00	5.83	.53	2689.90	.00	1.01	1.99	2.000	.000	.00	0 .0
.124	.1231					.0068	.00	.90	1.24	.43	.013	.00	.00	PIPE
74.273	2688.488	.934	2689.422	8.00	5.56	.48	2689.90	.00	1.01	2.00	2.000	.000	.00	0 .0
.073	.1231					.0060	.00	.93	1.15	.43	.013	.00	.00	PIPE
74.346	2688.497	.969	2689.466	8.00	5.30	.44	2689.90	.00	1.01	2.00	2.000	.000	.00	0 .0
.024	.1231					.0052	.00	.97	1.08	.43	.013	.00	.00	PIPE
74.370	2688.500	1.007	2689.507	8.00	5.05	.40	2689.90	.00	1.01	2.00	2.000	.000	.00	0 .0

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	4	0		1.000														
CD	2	4	0		2.500														
CD	3	4	0		2.000														
CD	4	4	0		5.000														
CD	5	4	0		4.500														
CD	6	3	0	.000	4.000	8.000	.000	.000	.00										
CD	8	3	0	.000	5.000	3.000	.000	.000	.00										

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

Renaissance Lot 1 Lateral SD3

HEADING LINE NO 2 IS -

1 2 3 4 5 6 7

HEADING LINE NO 3 IS -

4567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	49.670	2685.460	3	2687.760

ELEMENT NO 2 IS A WALL EXIT *

U/S DATA	STATION	INVERT	SECT
	49.670	2685.460	3

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	74.370	2688.500	3	.013	.000	.000	.000	0

ELEMENT NO 4 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	74.370	2688.500	3	2688.500

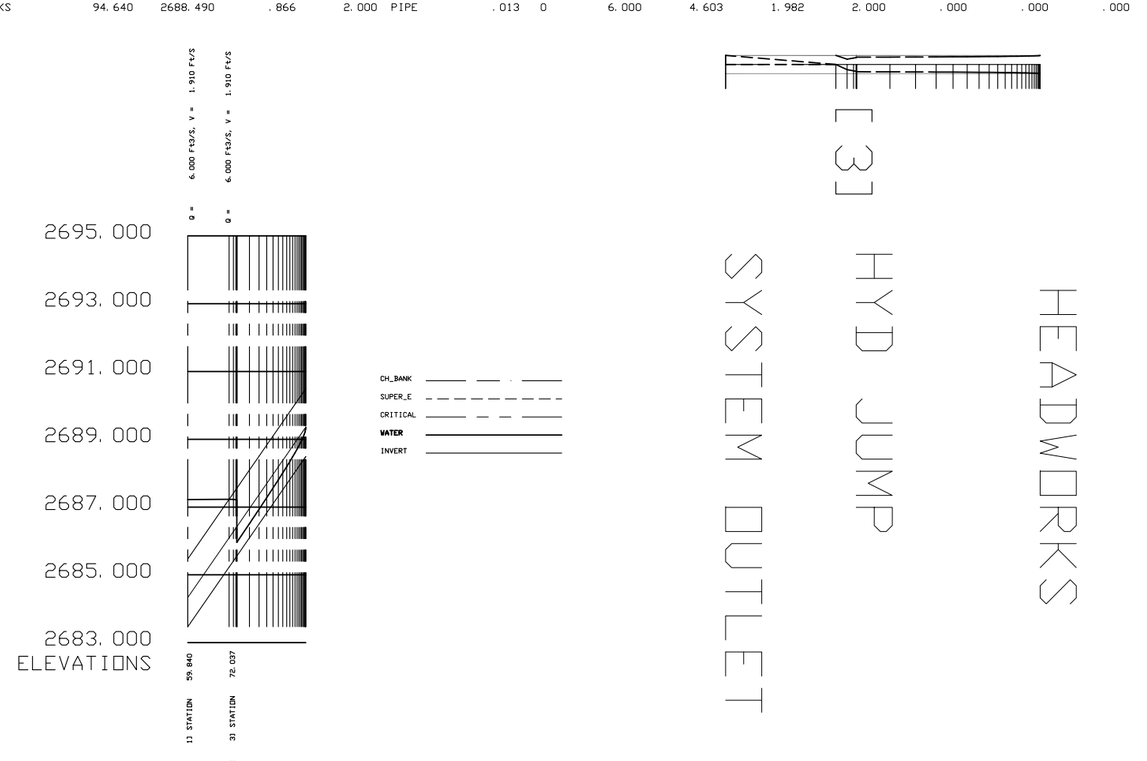
WSPG SD4

WATER SURFACE PRESSURE GRADIENT ANALYSIS (PLAN & PROFILE) SD4

Program Package Serial Number: 7204 Date: 4-29-2018 Time: 10:21:13 File: SD4.WSW

Renaissance Lot 1 Lateral SD4

[No.]	TYPE OPERATION	STATION (FT)	INV ELEV (FT)	WATER LEVEL (FT)	CHAN HT (FT)	TYPE CHANNEL	'N'	#PIER/PIP	FLOW RATE (CFS)	VELOCITY (FT/S)	TOP WIDTH (FT)	CHAN WDTH (FT)	PIER WIDTH (FT)	ZL	ZR	SUPEL RT B (FT)	SUPEL LT B (FT)	CRIT DPTH (FT)	RADIUS/<PT (FT DR <)	RMKS
[1]	SYSTEM OUTLET	59.840	2683.470	3.750	2.000	PIPE	.013	0	6.000	1.910	.000	2.000	.000	.000	.000	.000	.000	.866	.000	
[2]	REACH	59.840	2683.470	3.751	2.000	PIPE	.013	0	6.000	1.910	.000	2.000	.000	.000	.000	.000	.000	.866	.000	
[3]	REACH	72.037	2685.229	2.000	2.000	PIPE	.013	0	6.000	1.910	.000	2.000	.000	.000	.000	.000	.000	.866	.000	
[4]	REACH	73.282	2685.409	1.815	2.000	PIPE	.013	0	6.000	2.003	1.160	2.000	.000	.000	.000	.000	.000	.866	.000	
[5]	REACH	73.988	2685.511	1.707	2.000	PIPE	.013	0	6.000	2.101	1.415	2.000	.000	.000	.000	.000	.000	.866	.000	
[6]	HYD JUMP	74.283	2685.553	1.655	2.000	PIPE	.013	0	6.000	2.159	1.512	2.000	.000	.000	.000	.000	.000	.866	.000	HYD JUMP
[7]	REACH	74.283	2685.553	.406	2.000	PIPE	.013	0	6.000	13.154	1.608	2.000	.000	.000	.000	.000	.000	.866	.000	
[8]	REACH	74.356	2685.563	.406	2.000	PIPE	.013	0	6.000	13.154	1.608	2.000	.000	.000	.000	.000	.000	.866	.000	
[9]	REACH	78.018	2686.092	.419	2.000	PIPE	.013	0	6.000	12.542	1.628	2.000	.000	.000	.000	.000	.000	.866	.000	
[10]	REACH	80.856	2686.501	.434	2.000	PIPE	.013	0	6.000	11.958	1.648	2.000	.000	.000	.000	.000	.000	.866	.000	
[11]	REACH	83.134	2686.830	.448	2.000	PIPE	.013	0	6.000	11.401	1.668	2.000	.000	.000	.000	.000	.000	.866	.000	
[12]	REACH	85.002	2687.099	.464	2.000	PIPE	.013	0	6.000	10.871	1.688	2.000	.000	.000	.000	.000	.000	.866	.000	
[13]	REACH	86.563	2687.324	.480	2.000	PIPE	.013	0	6.000	10.365	1.708	2.000	.000	.000	.000	.000	.000	.866	.000	
[14]	REACH	87.878	2687.514	.496	2.000	PIPE	.013	0	6.000	9.883	1.727	2.000	.000	.000	.000	.000	.000	.866	.000	
[15]	REACH	88.998	2687.676	.513	2.000	PIPE	.013	0	6.000	9.423	1.747	2.000	.000	.000	.000	.000	.000	.866	.000	
[16]	REACH	89.954	2687.814	.530	2.000	PIPE	.013	0	6.000	8.984	1.766	2.000	.000	.000	.000	.000	.000	.866	.000	
[17]	REACH	90.774	2687.932	.549	2.000	PIPE	.013	0	6.000	8.566	1.785	2.000	.000	.000	.000	.000	.000	.866	.000	
[18]	REACH	91.480	2688.034	.568	2.000	PIPE	.013	0	6.000	8.167	1.804	2.000	.000	.000	.000	.000	.000	.866	.000	
[19]	REACH	92.084	2688.121	.588	2.000	PIPE	.013	0	6.000	7.787	1.822	2.000	.000	.000	.000	.000	.000	.866	.000	
[20]	REACH	92.602	2688.196	.608	2.000	PIPE	.013	0	6.000	7.425	1.840	2.000	.000	.000	.000	.000	.000	.866	.000	
[21]	REACH	93.043	2688.260	.629	2.000	PIPE	.013	0	6.000	7.079	1.858	2.000	.000	.000	.000	.000	.000	.866	.000	
[22]	REACH	93.418	2688.313	.652	2.000	PIPE	.013	0	6.000	6.750	1.875	2.000	.000	.000	.000	.000	.000	.866	.000	
[23]	REACH	93.731	2688.359	.674	2.000	PIPE	.013	0	6.000	6.436	1.891	2.000	.000	.000	.000	.000	.000	.866	.000	
[24]	REACH	93.990	2688.396	.699	2.000	PIPE	.013	0	6.000	6.136	1.907	2.000	.000	.000	.000	.000	.000	.866	.000	
[25]	REACH	94.199	2688.426	.724	2.000	PIPE	.013	0	6.000	5.851	1.922	2.000	.000	.000	.000	.000	.000	.866	.000	
[26]	REACH	94.364	2688.450	.750	2.000	PIPE	.013	0	6.000	5.578	1.936	2.000	.000	.000	.000	.000	.000	.866	.000	
[27]	REACH	94.488	2688.468	.777	2.000	PIPE	.013	0	6.000	5.319	1.949	2.000	.000	.000	.000	.000	.000	.866	.000	
[28]	REACH	94.573	2688.480	.805	2.000	PIPE	.013	0	6.000	5.071	1.962	2.000	.000	.000	.000	.000	.000	.866	.000	
[29]	REACH	94.623	2688.488	.834	2.000	PIPE	.013	0	6.000	4.835	1.972	2.000	.000	.000	.000	.000	.000	.866	.000	
[30]	HEADWORKS	94.640	2688.490	.866	2.000	PIPE	.013	0	6.000	4.603	1.982	2.000	.000	.000	.000	.000	.000	.866	.000	



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T1 Renaissance Lot 1 Lateral SD4                                                0
T2       1         2         3         4         5         6         7         8
9
T3
456789012345678901234567890123456789012345678901234567890123456789012345678901234
567890
SO     59.8402683.470  3                         2687.220
WX     59.8402683.470  3
R      94.6402688.490  3      .013                                  .000  00.000
0
SH     94.6402688.490  3                         2688.4900
CD   1  4   0    .000   1.000     .000  .000  .000   .00
CD   2  4   0    .000   2.500     .000  .000  .000   .00
CD   3  4   0    .000   2.000     .000  .000  .000   .00
CD   4  4   0    .000   5.000     .000  .000  .000   .00
CD   5  4   0    .000   4.500    0.000  .000  .000   .00
CD   6  3   0    .000   4.000    8.000  .000  .000   .00
CD   8  3   0    .000   5.000    3.000  .000  .000   .00
Q             6.000   .0
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Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-29-2018 Time:10:21:13

Renaissance Lot 1 Lateral SD4

1 2 3 4 5 6 7

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
59.840	2683.470	3.750	2687.220	6.00	1.91	.06	2687.28	.00	.87	.00	2.000	.000	.00	0 .0
WALL EXIT														
59.840	2683.470	3.751	2687.221	6.00	1.91	.06	2687.28	.00	.87	.00	2.000	.000	.00	0 .0
12.197	.1443					.0007	.01	3.75	.00	.36	.013	.00	.00	PIPE
72.037	2685.229	2.000	2687.229	6.00	1.91	.06	2687.29	.00	.87	.00	2.000	.000	.00	0 .0
1.245	.1443					.0007	.00	2.00	.00	.36	.013	.00	.00	PIPE
73.282	2685.409	1.815	2687.224	6.00	2.00	.06	2687.29	.00	.87	1.16	2.000	.000	.00	0 .0
.707	.1443					.0006	.00	1.81	.22	.36	.013	.00	.00	PIPE
73.988	2685.511	1.707	2687.218	6.00	2.10	.07	2687.29	.00	.87	1.41	2.000	.000	.00	0 .0
.295	.1443					.0007	.00	1.71	.26	.36	.013	.00	.00	PIPE
74.283	2685.553	1.655	2687.208	6.00	2.16	.07	2687.28	.00	.87	1.51	2.000	.000	.00	0 .0
HYDRAULIC JUMP														
74.283	2685.553	.406	2685.959	6.00	13.15	2.69	2688.65	.00	.87	1.61	2.000	.000	.00	0 .0
.073	.1443					.0868	.01	.41	4.35	.36	.013	.00	.00	PIPE
74.356	2685.563	.406	2685.969	6.00	13.15	2.69	2688.66	.00	.87	1.61	2.000	.000	.00	0 .0
3.662	.1443					.0813	.30	.41	4.35	.36	.013	.00	.00	PIPE
78.018	2686.092	.419	2686.511	6.00	12.54	2.44	2688.95	.00	.87	1.63	2.000	.000	.00	0 .0
2.838	.1443					.0711	.20	.42	4.08	.36	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-29-2018 Time:10:21:13

Renaissance Lot 1 Lateral SD4

1 2 3 4 5 6 7

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
80.856	2686.501	.434	2686.935	6.00	11.96	2.22	2689.16	.00	.87	1.65	2.000	.000	.00	0 .0
2.278	.1443					.0621	.14	.43	3.82	.36	.013	.00	.00	PIPE
83.134	2686.830	.448	2687.278	6.00	11.40	2.02	2689.30	.00	.87	1.67	2.000	.000	.00	0 .0
1.868	.1443					.0543	.10	.45	3.58	.36	.013	.00	.00	PIPE
85.002	2687.099	.464	2687.563	6.00	10.87	1.84	2689.40	.00	.87	1.69	2.000	.000	.00	0 .0
1.560	.1443					.0475	.07	.46	3.35	.36	.013	.00	.00	PIPE
86.563	2687.324	.479	2687.804	6.00	10.36	1.67	2689.47	.00	.87	1.71	2.000	.000	.00	0 .0
1.315	.1443					.0415	.05	.48	3.14	.36	.013	.00	.00	PIPE
87.878	2687.514	.496	2688.010	6.00	9.88	1.52	2689.53	.00	.87	1.73	2.000	.000	.00	0 .0
1.120	.1443					.0363	.04	.50	2.94	.36	.013	.00	.00	PIPE
88.998	2687.676	.513	2688.189	6.00	9.42	1.38	2689.57	.00	.87	1.75	2.000	.000	.00	0 .0
.957	.1443					.0317	.03	.51	2.75	.36	.013	.00	.00	PIPE
89.954	2687.814	.531	2688.344	6.00	8.98	1.25	2689.60	.00	.87	1.77	2.000	.000	.00	0 .0
.820	.1443					.0278	.02	.53	2.57	.36	.013	.00	.00	PIPE
90.774	2687.932	.549	2688.481	6.00	8.57	1.14	2689.62	.00	.87	1.79	2.000	.000	.00	0 .0
.705	.1443					.0243	.02	.55	2.41	.36	.013	.00	.00	PIPE
91.480	2688.034	.568	2688.602	6.00	8.17	1.04	2689.64	.00	.87	1.80	2.000	.000	.00	0 .0
.605	.1443					.0213	.01	.57	2.26	.36	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-29-2018 Time:10:21:13

Renaissance Lot 1 Lateral SD4

1 2 3 4 5 6 7

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Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
92.084	2688.121	.588	2688.709	6.00	7.79	.94	2689.65	.00	.87	1.82	2.000	.000	.00	0 .0
.518	.1443					.0186	.01	.59	2.11	.36	.013	.00	.00	PIPE
92.602	2688.196	.608	2688.804	6.00	7.42	.86	2689.66	.00	.87	1.84	2.000	.000	.00	0 .0
.441	.1443					.0163	.01	.61	1.97	.36	.013	.00	.00	PIPE
93.043	2688.260	.630	2688.889	6.00	7.08	.78	2689.67	.00	.87	1.86	2.000	.000	.00	0 .0
.374	.1443					.0143	.01	.63	1.85	.36	.013	.00	.00	PIPE
93.418	2688.313	.652	2688.965	6.00	6.75	.71	2689.67	.00	.87	1.87	2.000	.000	.00	0 .0
.313	.1443					.0125	.00	.65	1.73	.36	.013	.00	.00	PIPE
93.731	2688.359	.675	2689.033	6.00	6.44	.64	2689.68	.00	.87	1.89	2.000	.000	.00	0 .0
.259	.1443					.0110	.00	.67	1.62	.36	.013	.00	.00	PIPE
93.990	2688.396	.699	2689.095	6.00	6.14	.58	2689.68	.00	.87	1.91	2.000	.000	.00	0 .0
.209	.1443					.0096	.00	.70	1.51	.36	.013	.00	.00	PIPE
94.199	2688.426	.724	2689.150	6.00	5.85	.53	2689.68	.00	.87	1.92	2.000	.000	.00	0 .0
.165	.1443					.0084	.00	.72	1.41	.36	.013	.00	.00	PIPE
94.364	2688.450	.750	2689.200	6.00	5.58	.48	2689.68	.00	.87	1.94	2.000	.000	.00	0 .0
.124	.1443					.0074	.00	.75	1.32	.36	.013	.00	.00	PIPE
94.488	2688.468	.777	2689.245	6.00	5.32	.44	2689.68	.00	.87	1.95	2.000	.000	.00	0 .0
.085	.1443					.0065	.00	.78	1.23	.36	.013	.00	.00	PIPE

Program Package Serial Number: 7204

WATER SURFACE PROFILE LISTING Date: 4-29-2018 Time:10:21:13

Renaissance Lot 1 Lateral SD4

1 2 3 4 5 6 7

4567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
94.573	2688.480	.805	2689.285	6.00	5.07	.40	2689.68	.00	.87	1.96	2.000	.000	.00	0 .0
.051	.1443					.0057	.00	.80	1.15	.36	.013	.00	.00	PIPE
94.623	2688.488	.834	2689.322	6.00	4.84	.36	2689.68	.00	.87	1.97	2.000	.000	.00	0 .0
.017	.1443					.0050	.00	.83	1.07	.36	.013	.00	.00	PIPE
94.640	2688.490	.866	2689.356	6.00	4.60	.33	2689.69	.00	.87	1.98	2.000	.000	.00	0 .0

```
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Date: 4-29-2018  Time:10:21: 7
                                          WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING
PAGE    1
  CARD  SECT  CHN   NO OF  AVE PIER  HEIGHT 1  BASE    ZL    ZR    INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)
Y(6)  Y(7)  Y(8)  Y(9)  Y(10)
  CODE   NO   TYPE PIER/PIP WIDTH    DIAMETER  WIDTH              DROP

  CD      1    4      0             1.000
  CD      2    4      0             2.500
  CD      3    4      0             2.000
  CD      4    4      0             5.000
  CD      5    4      0             4.500
  CD      6    3      0     .000    4.000    8.000    .000   .000    .00
  CD      8    3      0     .000    5.000    3.000    .000   .000    .00
                                                    W S P G W
PAGE NO   1
                                 WATER SURFACE PROFILE - TITLE CARD LISTING
 HEADING LINE NO 1 IS -
                                   Renaissance Lot 1 Lateral SD4
 HEADING LINE NO 2 IS -
                                        1         2         3         4         5         6         7
 HEADING LINE NO 3 IS -

4567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567
                                                    W S P G W
PAGE NO   2
                                 WATER SURFACE PROFILE - ELEMENT CARD LISTING
  ELEMENT NO   1 IS A SYSTEM OUTLET     *         *     *
                       U/S DATA   STATION    INVERT  SECT                                        W S ELEV
                                    59.840 2683.470    3                                         2687.220
  ELEMENT NO   2 IS A  WALL  EXIT                      *
                       U/S DATA   STATION    INVERT  SECT
                                    59.840 2683.470    3
  ELEMENT NO   3 IS A REACH             *         *     *
                       U/S DATA   STATION    INVERT  SECT               N
RADIUS    ANGLE     ANG PT  MAN H
                                    94.640 2688.490    3               .013
.000     .000      .000     0
```

ELEMENT NO 4 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	94.640	2688.490	3	2688.490

APPENDIX E
REFERENCE MATERIAL

BOCCA PARK EXCERPTS

CITY OF LAS VEGAS
INTER-OFFICE MEMORANDUM

DATE: July 20, 2001

TO:
Land Development Services
Department of Public Works

FROM:
Albert Sung, P.E.
Flood Control Project Engineer
Department of Public Works

SUBJECT:	Drainage Study for: **"Boca Park North (Phase III) @ Peccole Town Center"**		
Cross Streets:	SE corner of Alta Drive & Rampart Blvd.		
File Number:	F:\Depot\DSmemos\DS2799D.doc		
Parcel Number:	138-32-412-016		
Zoning Action:	C-1		
FEMA Flood Zone	YES	NO **X**	
Proposed Storm Drain	YES **X** onsite	NO	

COPIES TO:
VTN Nevada
Triple Five Nevada Development
Cheri Edelman, P. E., DevCo
CCRFCD

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1st Submittal	11/15/2000	11/27/2000	Not Acceptable	$250.00
Express Plan Check	12/12/2000	12/12/2000	Conditionally Accepted	$250.00
CCRFCD	1/18/2001	1/18/2001	Concurrence	NC
2nd Submittal	7/11/2001	7/20/2001	See Comments Below	$250.00
			TOTAL FEES (LDDRS):	**$750.00**

REMARKS:

2nd Submittal (Update No. 1 to Update No. 7 to DS2248)

The Drainage Study for the subject project has been reviewed and:

X	is acceptable in concept subject to conformance to all CLV standards and the following conditions:
	must be resubmitted or supplemented including the following:
	must have Clark County Regional Flood Control District (CCRFCD) concurrence

1. Per previous comment #1, approval from CLV Current Planning Division must be obtained prior to final acceptance of the improvement plans.
2. A technical drainage update will be required for each specific site upon development.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the CLV Flood Control Section. Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the City of Las Vegas reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

END OF REMARKS
Ssn, ays

T/R/S: **T20S/R60E/32**
AREA L-32

5334-2

C L A R K C O U N T Y
REGIONAL FLOOD CONTROL DISTRICT



Gale Wm. Fraser, II, P.E.
General Manager/Chief Engineer

BOARD OF DIRECTORS

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Clark County

January 10, 2001

Mr. Randy Fultz, P. E.
City of Las Vegas Public Works
731 4th Street
Las Vegas, NV 89101

DISTRICT CONCURRENCE: **BOCA PARK NORTH (PHASE III) AT PECCOLE TOWN CENTER (DS2799)**

Dear Mr. Fultz:

The District has reviewed the Technical Drainage Study dated November 15, 2000, and Addendum No. 1 dated December 12, 2000, for the above-captioned project as submitted by VTN Nevada. In addition, the District is in receipt of the Conditional Letter of Acceptance from the City of Las Vegas Public Works dated December 12, 2000.

The District concurs with the acceptance of this Technical Drainage Study by the City of Las Vegas Public Works.

The District's review of this project was limited to issues of Regional Flood Control Significance as defined in the Uniform Regulations for the Control of Drainage.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, the information submitted by VTN Nevada may be superseded. Compliance with the regulatory elements and design standards specified in the Uniform Regulations for the Control of Drainage does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for the information, data, or conclusions presented by the consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

GALE WM. FRASER II, P.E.
General Manager/Chief Engineer

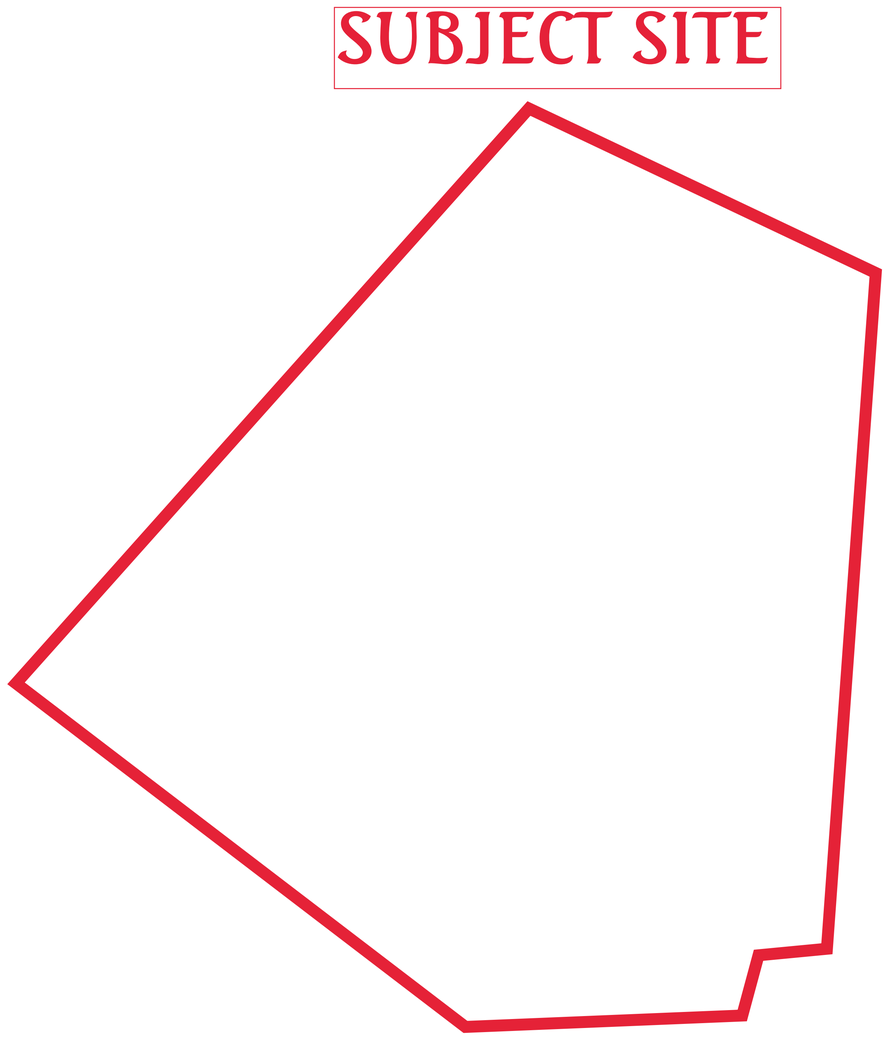
BY: Jon H. Hayslip, P.E.
Senior Engineer

cc: VTN Nevada

JHH:jms

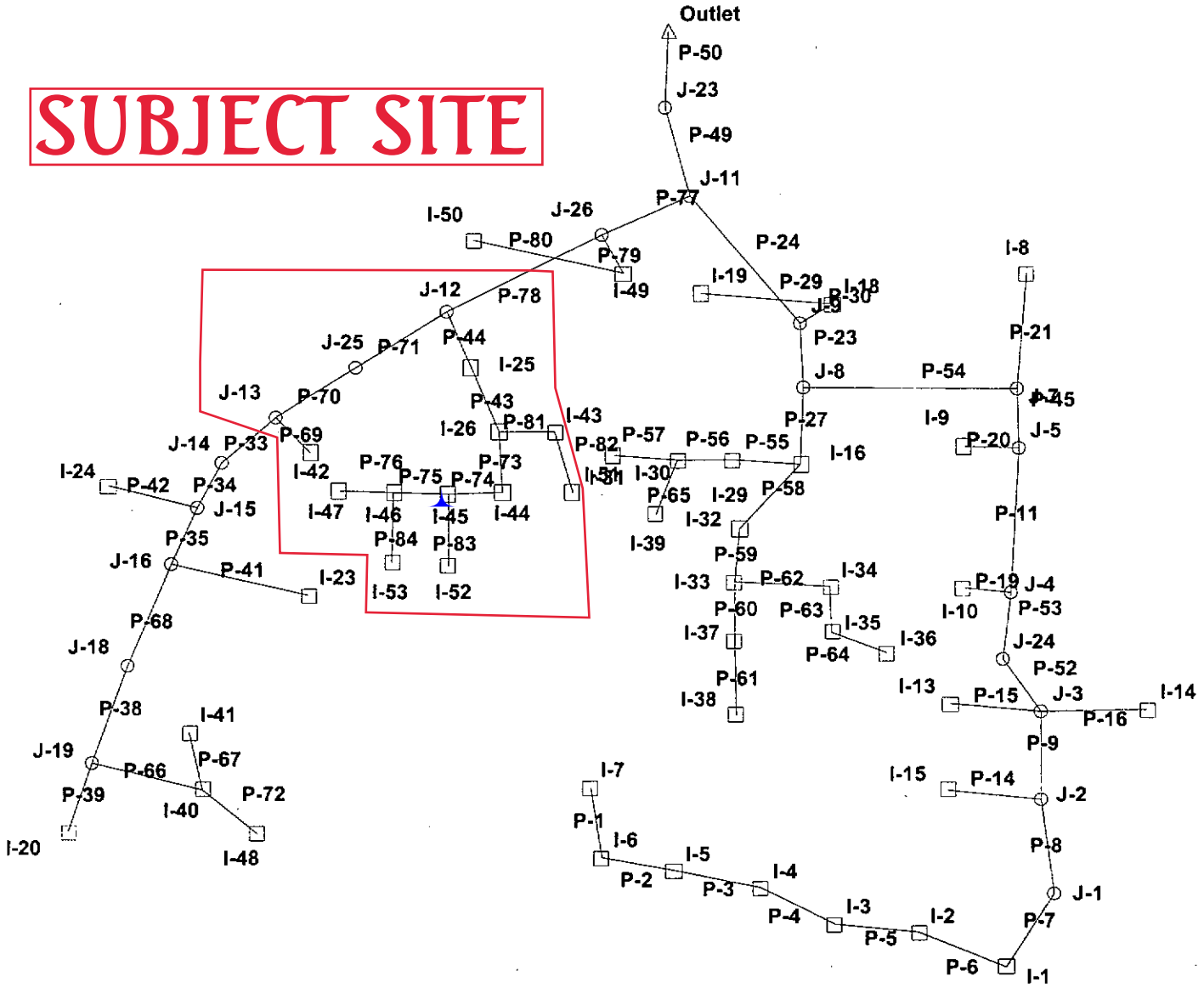
File: 20-60-32.vtn

600 S. Grand Central Parkway, Suite 300 • Las Vegas, Nevada 89106-4511
(702) 455-3139 • FAX: (702) 455-3870
Website: http://www.ccrfcd.org


SUBJECT SITE


BASIN 1

BASIN	AREA	%	@ 4.16 CFS/AC	GRATE EFFECTIVE PERIMETER
A	1.1	2.5	4	12
B	1.9	4.4	8	12
C	1	2.5	4	12
D	0.6	1.4	2	9
E	0.5	1.1	2	12
F	0.2	0.4	1	12
G	0.5	1.1	2	9
H	1.8	4.2	7	9
I	0.2	0.4	1	12
J	1.1	2.5	4	9
K	1.1	2.5	4	9
L	1.5	3.5	6	NA
M	0.7	1.6	3	9
N	3.2	7.5	13	NA
O	0.7	1.6	3 + (3 from b)	9
P	0.05	0.1	0	8
Q	0.1	0.2	0	8
R	0.1	0.2	0	8
S	0.4	0.9	2	9
T	0.2	0.4	1	9
U	0.2	0.4	1	8
V	0.05	0.1	0	8
W	0.05	0.1	0	8
X	0.3	0.7	1	9
Y	0.2	0.4	1	9
Z	1	2.3	3	12
1	0.2	0.4	1	9
2	0.2	0.4	1	9
3	2.7	6.3	11	9
4	2.8	6.5	12	18
5	1.4	3.2	6	9
6	2	4.6	8	9
7	2.8	6.5	12	NA
8	2	4.6	8	NA
9	0.8	1.8	3	NA
10	0.4	0.9	2 + (4 from 1/2a)	9
11	0.9	2.1	4 + (4 from 1/2a)	9
12	0.4	0.9	2	8
13	0.9	2.1	4	8
14	0.1	0.2	0	12
15	0.06	0.1	0	8
16	1	2.3	3	8
17	1.5	3.5	6	8
18	1.1	2.5	4	8
a	1.7	3.9	7	add to #10 & #11
b	0.7	1.6	3	add to letter O
c	1.1	2.5	4	9


SUBJECT SITE
Outlet
P-50
J-23
P-49
J-11
P-77
I-50
J-26
P-80
P-79
I-49
P-24
I-8
I-19
P-29
I-18
P-30
J-12
P-78
J-9
P-23
P-21
J-25
P-71
P-44
I-25
J-8
P-54
J-13
P-70
P-43
I-43
P-27
I-9
P-20
J-5
J-14
P-33
P-69
I-26
P-81
P-82
P-57
P-56
P-55
I-16
I-24
P-42
P-34
I-42
P-76
P-75
P-74
P-73
I-31
I-30
P-65
I-29
P-58
J-15
I-47
I-46
I-45
I-44
I-32
P-11
P-35
P-84
P-83
I-39
P-59
J-16
P-41
I-23
I-53
I-52
I-33
P-62
I-34
P-19
J-4
P-60
P-63
I-10
P-53
P-68
I-35
I-37
I-36
P-64
J-24
J-18
P-52
P-61
I-13
P-15
J-3
I-14
I-38
P-16
P-38
I-41
P-9
J-19
P-66
P-67
I-7
I-15
P-14
J-2
P-39
P-72
I-40
P-1
P-8
I-6
I-5
I-4
I-20
P-2
P-3
J-1
I-3
I-2
P-7
P-4
P-5
P-6
I-1
I-48

Scenario: Base

Combined Pipe\Node Report

Label	Upstream Node	Downstream Node	Length (ft)	Section Size	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Energy Grade Line In (ft)
P-1	I-7	I-6	94.00	18 inch	N/A	2,708.45	2,707.45	0.010638	N/A	N/A	N/A
P-2	I-6	I-5	147.00	18 inch	N/A	2,707.25	2,705.10	0.014626	N/A	N/A	N/A
P-3	I-5	I-4	212.00	24 inch	N/A	2,704.60	2,702.00	0.012264	N/A	N/A	N/A
P-4	I-4	I-3	56.00	24 inch	N/A	2,701.80	2,700.60	0.021429	N/A	N/A	N/A
P-5	I-3	I-2	141.00	24 inch	N/A	2,700.40	2,697.50	0.020567	N/A	N/A	N/A
P-6	I-2	I-1	91.00	24 inch	N/A	2,697.30	2,691.80	0.060440	N/A	N/A	N/A
P-7	I-1	J-1	147.00	48 inch	N/A	2,689.60	2,688.60	0.006803	N/A	N/A	N/A
P-8	J-1	J-2	223.00	48 inch	N/A	2,688.55	2,686.95	0.007175	N/A	N/A	N/A
P-9	J-2	J-3	131.00	48 inch	N/A	2,686.94	2,686.00	0.007176	N/A	N/A	N/A
P-11	J-4	J-5	210.00	48 inch	N/A	2,683.91	2,681.99	0.009133	N/A	N/A	N/A
P-14	I-15	J-2	13.00	24 inch	N/A	2,688.40	2,688.00	0.030769	N/A	N/A	N/A
P-15	I-13	J-3	9.00	24 inch	N/A	2,688.40	2,688.22	0.020000	N/A	N/A	N/A
P-16	I-14	J-3	37.00	24 inch	N/A	2,688.50	2,687.76	0.020000	N/A	N/A	N/A
P-19	I-10	J-4	9.00	24 inch	N/A	2,688.90	2,685.40	0.388889	N/A	N/A	N/A
P-20	I-9	J-5	9.00	24 inch	N/A	2,688.99	2,683.50	0.610000	N/A	N/A	N/A
P-21	I-8	J-7	190.00	18 inch	N/A	2,688.58	2,684.78	0.020000	N/A	N/A	N/A
P-23	J-8	J-9	112.00	54 inch	N/A	2,677.82	2,676.57	0.011143	N/A	N/A	N/A
P-24	J-9	J-11	126.00	54 inch	N/A	2,676.57	2,675.25	0.010476	N/A	N/A	N/A
P-27	I-16	J-8	212.00	30 inch	N/A	2,690.70	2,680.95	0.045991	N/A	N/A	N/A
P-29	I-19	I-18	49.00	18 inch	N/A	2,687.00	2,685.33	0.034082	N/A	N/A	N/A
P-30	I-18	J-9	16.00	24 inch	N/A	2,685.00	2,678.10	0.431250	N/A	N/A	N/A
P-33	J-14	J-13	158.00	42 inch	N/A	2,699.20	2,695.53	0.023228	N/A	N/A	N/A
P-34	J-15	J-14	48.00	42 inch	N/A	2,699.79	2,699.30	0.010208	N/A	N/A	N/A
P-35	J-16	J-15	83.00	42 inch	N/A	2,700.62	2,699.79	0.010000	N/A	N/A	N/A
P-38	J-19	J-18	158.00	42 inch	N/A	2,706.00	2,704.42	0.010019	N/A	N/A	N/A
P-39	I-20	J-19	157.00	36 inch	N/A	2,708.13	2,706.53	0.010191	N/A	N/A	N/A
P-41	I-23	J-16	130.00	24 inch	N/A	2,705.20	2,701.46	0.028769	N/A	N/A	N/A
P-42	I-24	J-15	31.00	24 inch	N/A	2,704.30	2,700.70	0.116129	N/A	N/A	N/A
P-43	I-26	I-25	142.00	30 inch	N/A	2,692.60	2,691.46	0.008028	N/A	N/A	N/A
P-44	I-25	J-12	155.00	30 inch	N/A	2,691.40	2,690.15	0.008065	N/A	N/A	N/A
P-45	J-5	J-7	162.00	48 inch	N/A	2,681.99	2,680.50	0.009210	N/A	N/A	N/A
P-49	J-11	J-23	158.00	60 inch	N/A	2,675.10	2,673.20	0.012025	N/A	N/A	N/A
P-50	J-23	Outlet	145.00	60 inch	N/A	2,673.00	2,659.23	0.094945	N/A	N/A	N/A
P-52	J-3	J-24	95.00	48 inch	N/A	2,685.96	2,685.26	0.007368	N/A	N/A	N/A
P-53	J-24	J-4	140.00	48 inch	N/A	2,685.21	2,683.91	0.009286	N/A	N/A	N/A
P-54	J-7	J-8	213.00	54 inch	N/A	2,680.13	2,677.90	0.010469	N/A	N/A	N/A
P-55	I-29	I-16	68.00	18 inch	N/A	2,693.50	2,691.72	0.026176	N/A	N/A	N/A
P-56	I-30	I-29	68.00	12 inch	N/A	2,694.50	2,693.60	0.013235	N/A	N/A	N/A
P-57	I-31	I-30	61.00	12 inch	N/A	2,695.50	2,694.75	0.012295	N/A	N/A	N/A
P-58	I-32	I-16	84.00	24 inch	N/A	2,691.85	2,690.90	0.011310	N/A	N/A	N/A
P-59	I-33	I-32	63.00	24 inch	N/A	2,692.90	2,691.97	0.014762	N/A	N/A	N/A
P-60	I-37	I-33	42.00	18 inch	N/A	2,693.40	2,692.95	0.010714	N/A	N/A	N/A
P-61	I-38	I-37	109.00	18 inch	N/A	2,706.70	2,705.72	0.008991	N/A	N/A	N/A
P-62	I-34	I-33	42.00	18 inch	N/A	2,693.40	2,692.95	0.010714	N/A	N/A	N/A
P-63	I-35	I-34	55.00	18 inch	N/A	2,694.00	2,693.45	0.010000	N/A	N/A	N/A
P-64	I-36	I-35	70.00	12 inch	N/A	2,695.00	2,694.30	0.010000	N/A	N/A	N/A
P-65	I-39	I-30	85.00	12 inch	N/A	2,700.90	2,694.75	0.072353	N/A	N/A	N/A
P-66	I-40	J-19	23.00	24 inch	N/A	2,710.00	2,706.53	0.150870	N/A	N/A	N/A
P-67	I-41	I-40	39.00	18 inch	N/A	2,712.00	2,710.50	0.038462	N/A	N/A	N/A
P-68	J-18	J-16	371.00	42 inch	N/A	2,704.42	2,700.62	0.010243	N/A	N/A	N/A
P-69	I-42	J-13	28.00	18 inch	N/A	2,698.10	2,696.40	0.060714	N/A	N/A	N/A

Scenario: Base

Combined Pipe\Node Report

Label	Upstream Node	Downstream Node	Length (ft)	Section Size	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Energy Grade Line In (ft)
P-70	J-13	J-25	133.00	42 inch	N/A	2,695.53	2,692.45	0.023158	N/A	N/A	N/A
P-71	J-25	J-12	64.00	48 inch	N/A	2,692.01	2,689.52	0.038906	N/A	N/A	N/A
P-72	I-48	I-40	80.00	18 inch	N/A	2,712.05	2,710.50	0.019375	N/A	N/A	N/A
P-73	I-44	I-26	60.00	24 inch	N/A	2,693.24	2,692.71	0.008833	N/A	N/A	N/A
P-74	I-45	I-44	58.00	24 inch	N/A	2,693.70	2,693.24	0.007931	N/A	N/A	N/A
P-75	I-46	I-45	118.00	24 inch	N/A	2,694.80	2,693.76	0.008814	N/A	N/A	N/A
P-76	I-47	I-46	16.00	18 inch	N/A	2,696.60	2,694.80	0.112500	N/A	N/A	N/A
P-77	J-26	J-11	77.00	48 inch	N/A	2,679.09	2,676.10	0.038831	N/A	N/A	N/A
P-78	J-12	J-26	269.00	48 inch	N/A	2,689.52	2,679.09	0.038773	N/A	N/A	N/A
P-79	I-49	J-26	16.00	24 inch	N/A	2,686.80	2,680.30	0.406250	N/A	N/A	N/A
P-80	I-50	I-49	58.00	18 inch	N/A	2,690.90	2,689.22	0.028966	N/A	N/A	N/A
P-81	I-43	I-26	54.00	12 inch	N/A	2,694.80	2,693.46	0.024815	N/A	N/A	N/A
P-82	I-51	I-43	80.00	12 inch	N/A	2,700.90	2,694.80	0.076250	N/A	N/A	N/A
P-83	I-52	I-45	70.00	12 inch	N/A	2,700.90	2,694.60	0.090000	N/A	N/A	N/A
P-84	I-53	I-46	70.00	12 inch	N/A	2,700.90	2,694.80	0.087143	N/A	N/A	N/A

```
------------------ Beginning Calculation Cycle ------------------
Discharge: 3.00 cfs  at node I-39
Discharge: 1.00 cfs  at node I-31
Discharge: 4.00 cfs  at node I-30
Discharge: 4.00 cfs  at node I-29
Discharge: 2.00 cfs  at node I-38
Discharge: 3.00 cfs  at node I-37
Discharge: 1.00 cfs  at node I-36
Discharge: 2.00 cfs  at node I-35
Discharge: 3.00 cfs  at node I-34
Discharge: 7.00 cfs  at node I-33
Discharge: 8.00 cfs  at node I-32
Discharge: 28.00 cfs  at node I-16
Discharge: 13.00 cfs  at node I-8
Discharge: 4.00 cfs  at node I-10
Discharge: 4.00 cfs  at node I-7
Discharge: 4.00 cfs  at node I-6
Discharge: 12.00 cfs  at node I-5
Discharge: 16.00 cfs  at node I-4
Discharge: 18.00 cfs  at node I-3
Discharge: 22.00 cfs  at node I-2
Discharge: 89.00 cfs  at node I-1
Discharge: 89.00 cfs  at node J-1
Discharge: 7.00 cfs  at node I-15
Discharge: 96.00 cfs  at node J-2
Discharge: 4.00 cfs  at node I-13
Discharge: 1.00 cfs  at node I-14
Discharge: 101.00 cfs  at node J-3
Discharge: 101.00 cfs  at node J-24
Discharge: 105.00 cfs  at node J-4
Discharge: 3.00 cfs  at node I-9
Discharge: 108.00 cfs  at node J-5
Discharge: 121.00 cfs  at node J-7
Discharge: 149.00 cfs  at node J-8
Discharge: 4.00 cfs  at node I-19
Discharge: 8.00 cfs  at node I-18
Discharge: 157.00 cfs  at node J-9
Discharge: 3.00 cfs  at node I-52
Discharge: 6.00 cfs  at node I-53
Discharge: 2.00 cfs  at node I-47
Discharge: 8.00 cfs  at node I-46
Discharge: 11.00 cfs  at node I-45
Discharge: 11.00 cfs  at node I-44
Discharge: 4.00 cfs  at node I-51
Discharge: 4.00 cfs  at node I-43
Discharge: 18.00 cfs  at node I-26
Discharge: 22.00 cfs  at node I-25
Discharge: 6.00 cfs  at node I-24
Discharge: 12.00 cfs  at node I-23
Discharge: 66.00 cfs  at node I-20
Discharge: 1.00 cfs  at node I-48
Discharge: 11.00 cfs  at node I-41
Discharge: 13.00 cfs  at node I-40
Discharge: 79.00 cfs  at node J-19
Discharge: 79.00 cfs  at node J-18
Discharge: 91.00 cfs  at node J-16
Discharge: 97.00 cfs  at node J-15
Discharge: 97.00 cfs  at node J-14
Discharge: 6.00 cfs  at node I-42
Discharge: 103.00 cfs  at node J-13
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Discharge: 103.00 cfs  at node J-25
Discharge: 125.00 cfs  at node J-12
Discharge: 7.50 cfs  at node I-50
Discharge: 13.00 cfs  at node I-49
Discharge: 138.00 cfs  at node J-26
Discharge: 295.00 cfs  at node J-11
Discharge: 295.00 cfs  at node J-23
Discharge: 295.00 cfs  at node Outlet
Beginning iteration 1
Discharge: 3.00 cfs  at node I-39
Discharge: 1.00 cfs  at node I-31
Discharge: 4.00 cfs  at node I-30
Discharge: 4.00 cfs  at node I-29
Discharge: 2.00 cfs  at node I-38
Discharge: 3.00 cfs  at node I-37
Discharge: 1.00 cfs  at node I-36
Discharge: 2.00 cfs  at node I-35
Discharge: 3.00 cfs  at node I-34
Discharge: 7.00 cfs  at node I-33
Discharge: 8.00 cfs  at node I-32
Discharge: 28.00 cfs  at node I-16
Discharge: 13.00 cfs  at node I-8
Discharge: 4.00 cfs  at node I-10
Discharge: 4.00 cfs  at node I-7
Discharge: 4.00 cfs  at node I-6
Discharge: 12.00 cfs  at node I-5
Discharge: 16.00 cfs  at node I-4
Discharge: 18.00 cfs  at node I-3
Discharge: 22.00 cfs  at node I-2
Discharge: 89.00 cfs  at node I-1
Discharge: 89.00 cfs  at node J-1
Discharge: 7.00 cfs  at node I-15
Discharge: 96.00 cfs  at node J-2
Discharge: 4.00 cfs  at node I-13
Discharge: 1.00 cfs  at node I-14
Discharge: 101.00 cfs  at node J-3
Discharge: 101.00 cfs  at node J-24
Discharge: 105.00 cfs  at node J-4
Discharge: 3.00 cfs  at node I-9
Discharge: 108.00 cfs  at node J-5
Discharge: 121.00 cfs  at node J-7
Discharge: 149.00 cfs  at node J-8
Discharge: 4.00 cfs  at node I-19
Discharge: 8.00 cfs  at node I-18
Discharge: 157.00 cfs  at node J-9
Discharge: 3.00 cfs  at node I-52
Discharge: 6.00 cfs  at node I-53
Discharge: 2.00 cfs  at node I-47
Discharge: 8.00 cfs  at node I-46
Discharge: 11.00 cfs  at node I-45
Discharge: 11.00 cfs  at node I-44
Discharge: 4.00 cfs  at node I-51
Discharge: 4.00 cfs  at node I-43
Discharge: 18.00 cfs  at node I-26
Discharge: 22.00 cfs  at node I-25
Discharge: 6.00 cfs  at node I-24
Discharge: 12.00 cfs  at node I-23
Discharge: 66.00 cfs  at node I-20
Discharge: 1.00 cfs  at node I-48
Discharge: 11.00 cfs  at node I-41
```

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Discharge: 13.00 cfs  at node I-40
Discharge: 79.00 cfs  at node J-19
Discharge: 79.00 cfs  at node J-18
Discharge: 91.00 cfs  at node J-16
Discharge: 97.00 cfs  at node J-15
Discharge: 97.00 cfs  at node J-14
Discharge: 6.00 cfs  at node I-42
Discharge: 103.00 cfs  at node J-13
Discharge: 103.00 cfs  at node J-25
Discharge: 125.00 cfs  at node J-12
Discharge: 7.50 cfs  at node I-50
Discharge: 13.00 cfs  at node I-49
Discharge: 138.00 cfs  at node J-26
Discharge: 295.00 cfs  at node J-11
Discharge: 295.00 cfs  at node J-23
Discharge: 295.00 cfs  at node Outlet
Discharge Convergence Achieved in 1 iterations: relative error:  0.0
Warning: No Duration data exists in IDF Table
Information: Outlet Known flow propogated from upstream junctions.
Information: J-23 Known flow propogated from upstream junctions.
Information: J-11 Known flow propogated from upstream junctions.
Information: J-9 Known flow propogated from upstream junctions.
Information: J-8 Known flow propogated from upstream junctions.
---------- Calculations Complete ----------

** Analysis Options **
Friction method:  Manning's Formula
HGL Convergence Test:  0.001000
Maximum Network Traversals:  5
Number of Pipe Profile Steps:  5
Discharge Convergence Test:  0.001000
Maximum Design Passes:  3
```

---------- Network Quick View ----------

Label	Length	Size	Discharge	Hydraulic Grade Upstream	Hydraulic Grade Downstream
P-1	94.00	18 inch	4.00	2,709.22	2,708.05
P-2	147.00	18 inch	4.00	2,708.02	2,705.84
P-3	212.00	24 inch	12.00	2,705.84	2,703.24
P-4	56.00	24 inch	16.00	2,703.24	2,701.93
P-5	141.00	24 inch	18.00	2,701.93	2,698.98
P-6	91.00	24 inch	22.00	2,698.98	2,692.64
P-7	147.00	48 inch	89.00	2,692.46	2,691.41
P-8	223.00	48 inch	89.00	2,691.41	2,689.91
P-9	131.00	48 inch	96.00	2,689.91	2,689.00
P-11	210.00	48 inch	105.00	2,687.01	2,685.14
P-14	13.00	24 inch	7.00	2,689.88	2,689.91
P-15	9.00	24 inch	4.00	2,689.10	2,689.00
P-16	37.00	24 inch	1.00	2,688.97	2,689.00
P-19	9.00	24 inch	4.00	2,689.60	2,687.01
P-20	9.00	24 inch	3.00	2,689.59	2,685.14
P-21	190.00	18 inch	13.00	2,689.93	2,685.80
P-23	112.00	54 inch	149.00	2,681.40	2,680.24
P-27	212.00	30 inch	28.00	2,692.50	2,681.88
P-29	49.00	18 inch	4.00	2,687.77	2,686.01
P-30	16.00	24 inch	8.00	2,686.01	2,680.24

| Hydraulic Grade |

Label	Length	Size	Discharge	Upstream	Downstream
P-33	158.00	42 inch	97.00	2,702.23	2,698.63
P-34	48.00	42 inch	97.00	2,702.82	2,702.23
P-35	83.00	42 inch	91.00	2,703.58	2,702.82
P-38	158.00	42 inch	79.00	2,708.78	2,707.20
P-39	157.00	36 inch	66.00	2,710.73	2,708.79
P-41	130.00	24 inch	12.00	2,706.44	2,703.58
P-42	31.00	24 inch	6.00	2,705.17	2,702.82
P-43	142.00	30 inch	18.00	2,694.04	2,693.00
P-44	155.00	30 inch	22.00	2,693.00	2,692.88
P-45	162.00	48 inch	108.00	2,685.14	2,683.37
P-49	158.00	60 inch	295.00	2,679.75	2,677.65
P-50	145.00	60 inch	295.00	2,677.65	2,663.88
P-24	126.00	54 inch	157.00	2,680.24	2,679.75
P-52	95.00	48 inch	101.00	2,689.00	2,688.26
P-53	140.00	48 inch	101.00	2,688.26	2,687.01
P-54	213.00	54 inch	121.00	2,683.37	2,681.40
P-55	68.00	18 inch	4.00	2,694.27	2,692.50
P-56	68.00	12 inch	4.00	2,695.35	2,694.34
P-57	61.00	12 inch	1.00	2,695.92	2,695.35
P-58	84.00	24 inch	8.00	2,692.86	2,692.50

				Hydraulic Grade	
Label	Length	Size	Discharge	Upstream	Downstream
P-59	63.00	24 inch	7.00	2,693.84	2,692.86
P-60	42.00	18 inch	3.00	2,694.06	2,693.84
P-61	109.00	18 inch	2.00	2,707.23	2,706.16
P-62	42.00	18 inch	3.00	2,694.06	2,693.84
P-63	55.00	18 inch	2.00	2,694.53	2,694.06
P-64	70.00	12 inch	1.00	2,695.42	2,694.65
P-65	85.00	12 inch	3.00	2,701.64	2,695.35
P-66	23.00	24 inch	13.00	2,711.30	2,708.78
P-67	39.00	18 inch	11.00	2,713.27	2,711.32
P-68	371.00	42 inch	79.00	2,707.20	2,703.58
P-69	28.00	18 inch	6.00	2,699.05	2,698.63
P-70	133.00	42 inch	103.00	2,698.63	2,695.08
P-71	64.00	48 inch	103.00	2,695.08	2,692.88
P-72	80.00	18 inch	1.00	2,712.42	2,711.30
P-73	60.00	24 inch	11.00	2,694.43	2,694.04
P-74	58.00	24 inch	11.00	2,694.89	2,694.43
P-75	118.00	24 inch	8.00	2,695.81	2,694.89
P-76	16.00	18 inch	2.00	2,697.13	2,695.81
P-77	77.00	48 inch	138.00	2,682.58	2,679.75
P-78	269.00	48 inch	125.00	2,692.88	2,682.58

				Hydraulic Grade	
Label	Length	Size	Discharge	Upstream	Downstream
P-79	16.00	24 inch	13.00	2,688.10	2,682.58
P-80	58.00	18 inch	7.50	2,691.96	2,689.87
P-81	54.00	12 inch	4.00	2,695.65	2,694.05
P-82	80.00	12 inch	4.00	2,701.75	2,695.65
P-83	70.00	12 inch	3.00	2,701.64	2,694.95
P-84	70.00	12 inch	6.00	2,701.86	2,695.81

		Elevations		
Label	Discharge	Ground	Upstream HGL	Downstream HGL
I-1	89.00	2,704.80	2,692.46	2,692.46
I-2	22.00	2,705.50	2,698.98	2,698.98
I-3	18.00	2,708.60	2,701.93	2,701.93
I-4	16.00	2,708.00	2,703.24	2,703.24

I-5	12.00	2,708.10	2,705.84	2,705.84
I-6	4.00	2,712.95	2,708.02	2,708.02
I-7	4.00	2,712.95	2,709.22	2,709.22
J-1	89.00	2,704.60	2,691.41	2,691.41
J-2	96.00	2,697.40	2,689.91	2,689.91
J-3	101.00	2,693.00	2,689.00	2,689.00
J-4	105.00	2,699.00	2,687.01	2,687.01
J-5	108.00	2,701.00	2,685.14	2,685.14
J-7	121.00	2,698.00	2,683.37	2,683.37
I-8	13.00	2,691.56	2,689.93	2,689.93
I-9	3.00	2,696.10	2,689.59	2,689.59
I-10	4.00	2,696.90	2,689.60	2,689.60
I-13	4.00	2,692.40	2,689.10	2,689.10
I-14	1.00	2,691.50	2,688.97	2,688.97
I-15	7.00	2,692.40	2,689.88	2,689.88
J-8	149.00	2,694.30	2,681.40	2,681.40

		Elevations	
Label	Discharge	Ground	Upstream HGL	Downstream HGL
J-9	157.00	2,691.80	2,680.24	2,680.24
J-11	295.00	2,692.40	2,679.75	2,679.75
Outlet	295.00	2,680.00	2,663.88	2,663.88
I-16	28.00	2,697.70	2,692.50	2,692.50
I-18	8.00	2,691.00	2,686.01	2,686.01
I-19	4.00	2,691.00	2,687.77	2,687.77
J-12	125.00	2,701.50	2,692.88	2,692.88
J-13	103.00	2,704.00	2,698.63	2,698.63
J-14	97.00	2,708.40	2,702.23	2,702.23
J-15	97.00	2,710.50	2,702.82	2,702.82
J-16	91.00	2,712.50	2,703.58	2,703.58
J-18	79.00	2,715.85	2,707.20	2,707.20
I-20	66.00	2,718.60	2,710.73	2,710.73
J-19	79.00	2,716.90	2,708.78	2,708.78
I-23	12.00	2,710.20	2,706.44	2,706.44
I-24	6.00	2,710.30	2,705.17	2,705.17
I-25	22.00	2,699.90	2,693.00	2,693.00
I-26	18.00	2,701.10	2,694.04	2,694.04
J-23	295.00	2,687.50	2,677.65	2,677.65
J-24	101.00	2,698.00	2,688.26	2,688.26

		Elevations	
Label	Discharge	Ground	Upstream HGL	Downstream HGL
I-29	4.00	2,699.50	2,694.27	2,694.27
I-30	4.00	2,699.50	2,695.35	2,695.35
I-31	1.00	2,699.50	2,695.92	2,695.92
I-32	8.00	2,697.85	2,692.86	2,692.86
I-33	7.00	2,697.90	2,693.84	2,693.84
I-34	3.00	2,698.40	2,694.06	2,694.06
I-35	2.00	2,698.00	2,694.53	2,694.53
I-36	1.00	2,698.00	2,695.42	2,695.42
I-37	3.00	2,711.70	2,694.06	2,694.06
I-38	2.00	2,711.70	2,707.23	2,707.23
I-39	3.00	2,712.90	2,701.64	2,701.64
I-40	13.00	2,716.00	2,711.30	2,711.30
I-41	11.00	2,716.00	2,713.27	2,713.27
I-42	6.00	2,703.10	2,699.05	2,699.05
J-25	103.00	2,702.10	2,695.08	2,695.08
I-43	4.00	2,701.30	2,695.65	2,695.65
I-44	11.00	2,700.70	2,694.43	2,694.43
I-45	11.00	2,700.70	2,694.89	2,694.89
I-46	8.00	2,700.70	2,695.81	2,695.81
I-47	2.00	2,700.60	2,697.13	2,697.13

Label	Discharge	Elevations		
		Ground	Upstream HGL	Downstream HGL
I-48	1.00	2,716.05	2,712.42	2,712.42
I-49	13.00	2,694.80	2,688.10	2,688.10
I-50	7.50	2,694.90	2,691.96	2,691.96
J-26	138.00	2,695.30	2,682.58	2,682.58
I-51	4.00	2,712.90	2,701.75	2,701.75
I-52	3.00	2,712.90	2,701.64	2,701.64
I-53	6.00	2,712.90	2,701.86	2,701.86

Elapsed: 0 minute(s) 21 second(s)

VILLAGE AT QUEENSRIDGE EXCERPTS

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: April 26, 2010
TO: **Land Development Services** Department of Public Works			FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **The Village at Queensridge – Update # 5**		**COPIES TO:** G. C. Wallace, Inc.
Cross Streets:	NEC of Rampart Boulevard & Alta Drive		Great Wash Park, LLC.
File Number:	F:\Depot\DSMemos\DS4018K.doc		Bart Anderson, P.E., DevCo
Parcel Number:	138-32-601-003		CCRFCD
Zoning Action:	SDR-10770, VAR-10773 & VAC-13822		
FEMA Flood Zone	YES	NO **X**	
Proposed Storm Drain	YES **X**	NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1st Submittal & Supplement	6/6/2006 & 6/20/2006	7/11/2006	Not Approved	$400.00	47169: $400
2nd Submittal & Supplement	9/14/2006 & 10/11/2006	10/12/2006	Approved	$400.00	53862: $400
3rd Submittal & Supplement	10/5/2006 & 11/1/2006	11/7/2006	Not Approved	$400.00	55429: $400
4th Submittal & Supplement	1/4/2007 & 1/16/2007	1/18/2007	Approved	$400.00	60644: $400
5th Submittal	3/19/2007	3/22/2007	CCRFCD Concurrence	N/C	N/C
6th Submittal & Supplement	4/5/2007 & 5/29/2007	6/12/2007	Approved	$100.00	66412: $100
7th Submittal & Supplement	6/24/2009 & 7/1/2009	7/1/2009	Approved	$100.00	124167: $100
8th Submittal	11/12/2009	11/23/2009	Approved	$100.00	133423: $100
9th Submittal	12/15/2009	12/22/2009	Approved	$100.00	135174: $100
10th Submittal	4/22/2010	4/26/2010	See Comments Below	$100.00	143501: $100
			TOTAL FEES (LDDRS):	$2,100.00	----

REMARKS: 10th Submittal: Revise storm drain lateral in Alta, west of Rampart.

9th Submittal: Update #4 to add new driveways and grading at truck docks along Alta Drive

The Drainage Study for the subject project has been reviewed and:

X	is approved subject to conformance to all City standards and the following conditions:
	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.

1. Flood Control takes no exception to the revised storm drain lateral location due to existing utility conflicts.

2. The site has obtained a LOMR from FEMA therefore, the site is no longer considered within a FEMA Special Flood Hazard Area. The existing twin 12' x 12' RCB's (CLV # 107Y4889 CUL) convey the 100-year flows through the site.
3. A technical drainage study update is required prior to further development of the site.

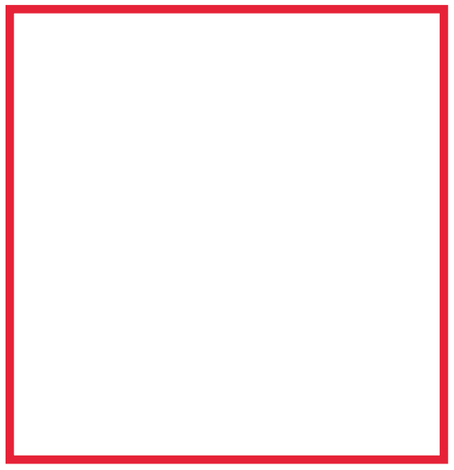
NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the *City of Las Vegas Flood Control Section.* Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the *City of Las Vegas* reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

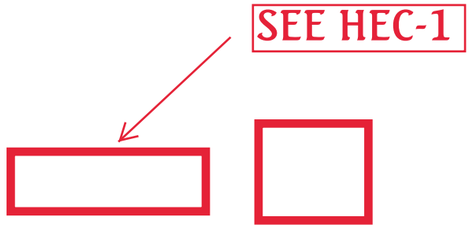
NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

END OF REMARKS
Ays/PBJ

T/R/S: T20S/R60E/32
AREA L-32

Runoff on the north side of Alta west of Rampart is intercepted by storm drains.




SEE HEC-1











Runoff on the south side of Alta west of Rampart will either be intercepted by storm drains or will overtop the curb and be routed under Alta.





QUEENS BORROUGH CULVERT EXCERPTS

R. Clark K Gremlich F.C. file
C. Miller C Luquette

RECEIVED
AUG 3 1 2005
G.C. WALLACE

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: August 30, 2005
TO: **Land Development Services** Department of Public Works			FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Technical Drainage Study for: **Queens Borrough Culvert**		**COPIES TO:** G. C. Wallace, Inc.
Cross Streets:	NEC of Alta Drive & Rampart Boulevard		JMA Architecture
File Number:	F:\Depot\DSMEMOS\DS3674D.ZNA.doc		Bart Anderson, P.E., DevCo
Parcel Number:	138-32-601-003		CCRFCD
FEMA Flood Zone	YES X	NO	
Proposed Storm Drain	YES X	NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Trn. No.
1st Submittal	10/25/2004	11/9/2004	Not Approved	$400.00	11413: $400
2nd Submittal	12/6/2004	12/20/2004	See Comments Below	$400.00	13199: $400
3rd Submittal	3/4/2005	3/18/2005	Conditionally Approved	N/C	--
4th Submittal	8/9/2005	8/23/2005	See Comments Below	$400.00	27281: $400
			TOTAL FEES (LDDRS):	**$1,200.00**	---

REMARKS: Regional Concurrence received.

The Drainage Study for the subject project has been reviewed and:

X	is approved subject to conformance to all City standards and the following conditions:
	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.

1. The proposed 48'-public drainage easement must be dedicated and recorded by final map or separate document prior to the final approval of the future technical drainage study upon onsite development. **The public drainage easement must be privately maintained both on the surface and within the box culvert.**

2. The engineer has provided a table on the grading plans that shows a quantity estimate of all drainage improvements within Public Drainage Easements. All drainage improvements within Public Drainage Easements must be bonded and inspected.

NOTE: **The engineer must submit the drainage study to FEMA for a Conditional Letter of Map Revision (CLOMR). A favorable CLOMR must be obtained prior to the issuance of any permits.** This site is located in a **FEMA Zone A**. Clark County Regional Flood Control District (CCRFCD) review and approval is required prior to recordation of final map or issuance of building/grading permits. The Engineer must send a copy of the report to the CCRFCD for review. **The developer/engineer must also obtain a Letter of Map Revision (LOMR) using the approved drainage study as technical support to inform FEMA of the modifications within the flood zone. The approved LOMR must be submitted to the City of Las Vegas prior to the release of the bond.** FEMA Elevation Certificates, showing as-built finish floor elevations, must be completed for each building in the FEMA A Zone. The certificate must be submitted to the City of Las Vegas Flood Control Section prior to scheduling a framing inspection.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the Nevada Division of Environmental Protection a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

END OF REMARKS
B&H/ays/pbj

T/R/S: T20S/R60E/32
AREA L-32

C L A R K C O U N T Y
REGIONAL FLOOD CONTROL DISTRICT



Gale Wm. Fraser, II, P.E.
General Manager/Chief Engineer

BOARD OF DIRECTORS

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Clark County

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City of Mesquite

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City of Boulder City

Bruce L. Woodbury
Clark County

February 24, 2005

Mr. Randy Fultz, P.E.
City of Las Vegas Public Works
731 Fourth Street
Las Vegas, NV 89101

DISTRICT CONCURRENCE: QUEENS BORROUGH CULVERT (CLV #DS3674) (RFCD #04-6118)

Dear Mr. Fultz:

Clark County Regional Flood Control District (District) reviewed Technical Drainage Study dated October 20, 2004, Addendum No. 1 dated December 3, 2004, for the above-mentioned project as submitted by G.C. Wallace, Inc. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Las Vegas Public Works dated December 21, 2004.

District concurs with acceptance of this Technical Drainage Study by City of Las Vegas Public Works.

District's review of this project was limited to issues of Regional Flood Control Significance as defined in *Uniform Regulations for the Control of Drainage.* As noted in study, site resides in a Special Flood Hazard Area (SFHA) designated as "Zone A" per the effective Flood Insurance Rate Map (FIRM). Therefore, consultant should be advised that this acceptance does not serve to amend the FIRM or remove the SFHA.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, information submitted by G.C. Wallace, Inc may be superseded. Compliance with regulatory elements and design standards specified in *Uniform Regulations for the Control of Drainage* does not imply a guarantee that properties will be free from flooding or flood damage. The District, its officials, or employees assume no liability for information, data, or conclusions presented by consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review.

GALE WM. FRASER, II, P.E.
General Manager/Chief Engineer

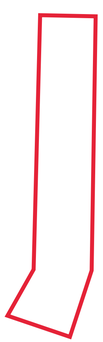
BY: _____
Andrew R. Trelease, P.E.
Senior Civil Engineer

ART:mak

c: Christopher Luquette, P.E., G.C. Wallace, Inc.

File: 20-60-32.gcw.doc

600 S. Grand Central Parkway, Suite 300 • Las Vegas, Nevada 89106-4511
(702) 455-3139 • FAX: (702) 455-3870
Website: *http://www.ccrfcd.org*




HGL = 2669

PECCOLE TOWN CENTER EXCERPTS

5334

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM	DATE: July 9, 1998
TO: Land Development Services Department of Public Works	FROM: Dennis W. Stransky, P.E. Flood Control Project Manager Department of Public Works
SUBJECT: Drainage Study for: **Peccole Town Center** Charleston and Rampart FILE NO. \\khan\flood\Depot\DSMEMOS\DS2248D.doc	**COPIES TO:** VTN Nevada Triple Five Development Cheri Edelman, P. E., DEVCO CCRFCD

FEMA Flood Zone	YES		No	X
Proposed Storm Drain	YES	X	No	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1st Submittal	3/09/98	3/23/98	Not Accepted	$250.00
2nd Submittal	6/23/98	6/29/98	Not Accepted	$250.00
3rd Submittal	7/2/98	7/2/98	Accepted	$250.00
CCRFCD	07/08/98	07/09/98	See Comments Below	N/C
			TOTAL FEES	$750.00

REMARKS:

The Drainage Study for the subject project has been reviewed and:

X	is acceptable in concept subject to conformance to all City standards and the following conditions.
	must be resubmitted or supplemented including the following:
	must have Clark County Regional Flood Control District concurrence

1. A technical update to the drainage study, once accepted, must be submitted for each phase or lot as they are developed.
2. Conditional approval is subject to inlet details, map legends, construction notes and horizontal control being provided for Phase 1 construction.

NOTE: Any future changes to the proposed design (or design assumptions) as outlined in the approved drainage study and attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the City of Las Vegas Flood Control Section. Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, the City of Las Vegas reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction.

PLANS SENT TO LAND DEVELOPMENT YES **(initial)**

END OF REMARKS
dbm

T/R/S: **20S/60E32**
AREA L-32

RECEIVED
JUL 10 1998



CONSULTING ENGINEERS • PLANNERS • SURVEYORS
PROVIDING QUALITY PROFESSIONAL
SERVICES SINCE 1960

June 19, 1998
W.O. #5334

City of Las Vegas
Department of Public Works
731 South Fourth Street
Las Vegas, Nevada 89101

Attention: Mr. Dennis W. Stransky, P.E.
Flood Control Project Manager

SUBJECT: **ADDENDUM #1 TO THE TECHNICAL HYDROLOGY STUDY FOR PECCOLE TOWN CENTER**

Mr. Stransky:

This Addendum #1 is being submitted to the City of Las Vegas Department of Public Works to address the review comments to the above mentioned study that were issued on March 23, 1998. In addition, a meeting was held with the City of Las Vegas Flood Control Department on March 26, 1998, to discuss these comments.

The subject review comments are listed and addressed as follows:

Comment #1.

> **The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final acceptance of the drainage study.**

We acknowledge that concurrence from Clark County Regional Flood Control District is required prior to final acceptance of the Drainage Study.

Comment #2.

> **Permanent public drainage easements to be privately maintained must be provided where flows or storm drains will cross property lines. These easements must be addressed prior to recording the commercial subdivision map.**

2727 SOUTH RAINBOW BOULEVARD LAS VEGAS, NEVADA 89102-5148
TEL. (702) 873-7550 FAX: 362-2597

In a phone conversation on June 9, 1998, with the City of Las Vegas, it was agreed to that there will be public easements to be privately maintained designated on the 96 acres commercial subdivision Final Map for Phase 1. City Council conditions of the design review gave four (4) years to start the second phase. Therefore, drainage easements for the interim drainage improvements in future phases will be provided to the City of Las Vegas. The City has agreed to hold off recording these easements for 5 years. They will record these easements at that time unless they are replaced by easements prepared for the permanent drainage improvements.

Comment #3.

> **The permanent drainage facilities along the east property line must be addressed in the study. The existing wall can not be used as part of the drainage design. The grading for the interim facilities showing the water being conveyed to the culvert at Alta Drive must be shown on the plans and constructed with the first phase of construction.**

The permanent drainage facilities along the east property line will be constructed with the first phase. The facilities are shown on the Grading Plans. The interim earthen swales that convey the water to the Alta Drive culvert are also shown on the Grading Plan. There will be no flow against the existing wall on the east side of the property.

Comment #4.

> **The finish floors of the existing buildings and buildings under construction along the east side of the property must be shown on the grading plans.**

The finished floors of the buildings to the east have been added to the Grading Plan, included in the Appendix.

Comment #5.

> **Top of curb elevations must be shown for both sides of the adjacent roadways.**

Top of curb elevations for both sides of roadways have been added to Rampart Boulevard, Charleston Boulevard and Merialdo Lane. For Alta Drive, no curb exists on the north side of the road. This information has been added to the Grading Plan, included in the Appendix.

Comment #6.

> **There is insufficient data on the grading plan to determine compliance with the CCRFCD Design Manual's finished floor criteria. A complete grading plan must be submitted showing the limits of the Phase 1 construction including detailed grades and physical improvements.**

Finished floors will be set at twice the ponding depth of the adjacent on-site inlets and an overflow path has been provided. A complete Grading Plan showing the limits of Phase 1 has been included in the Appendix.

Comment #7.

> **Plan and profile and hydraulic calculations must be provided for the storm drains. The hydraulic gradeline must be shown on the profile.**

In a meeting held on March 26, 1998 with the City of Las Vegas, it was agreed to that plan and profiles for the on-site storm drains will not be required. A STORM CAD analysis for the on-site storm drain has been included in the Appendix.

Comment #8.

> **The Q100 flows intercepted by the storm drain system must be shown on the Onsite Basin Map.**

In a meeting hold on March 26, 1998, with the City of Las Vegas, it was agreed that the *On-Site Basin Map* did not need to show flows being intercepted by the storm drain system. This will not be needed since a STORM CAD analysis will show how much flow will be intercepted by the storm drain system. The reviewer should have realized that the Q100 flows intercepted by the storm drain are shown on the *Pipe and Inlet Map* (Figure 6B).

Comment #9.

> **The finished floor elevations along Rampart are lower than the roadway. A cross section must be provided showing how these buildings will be protected from the Q100 flow depth of 0.62' in Rampart Boulevard. A flood wall must be provided to protect the site and landscaping along Rampart Boulevard.**

This study initially stated that there would be 85 cfs in Rampart Boulevard as surface flow. This flow did not take into consideration the drop inlets along Rampart Boulevard. Calculations were done showing the capacity of the inlets and have been included in the Appendix. A total of 38 cfs were intercepted by the inlets during the 100-year storm. With 38 cfs intercepted by the inlets, a total of 47 cfs will remain as surface flow in Rampart Boulevard. The depth of flow will be 0.51 feet. With a depth of flow below back of walk, flood walls or stem walls will not be required to protect the landscaping and site. Plans done by G.C. Wallace, Inc., showing size and type of inlets have been included in the Appendix.

*THIS IS TO SHOW THE CAPACITY OF THE DROP INLETS ALONG RAMPART BOULEVARD.

PONDING DEPTH = 0.5 FEET

INLETS #7-12

4-FOOT TYPE 'A'

FROM FIGURE 804
1 OF 3

$$\frac{2.2 \text{ CFS}}{0.80} = 2.75 \text{ CFS}$$

$2.75 \text{ CFS} * 0.5 = 1.37 \text{ CFS}$

(0.5 ↑ 50% CLOGGING FACTOR)

1.37 CFS IS THE CAPACITY OF THE 4-FOOT TYPE 'A' INLET

INLETS #1,2,3 & 6

10-FOOT TYPE 'A'

FIGURE 804
2 OF 3

$$\frac{5.5 \text{ CFS}}{0.80} = 6.87 \text{ CFS}$$

$6.87 \text{ CFS} * 0.5 = 3.43 \text{ CFS}$

(0.5 ↑ 50% CLOGGING)

3.43 CFS IS THE CAPACITY OF THE 10-FOOT TYPE 'A' INLET

50 SHEETS 22-141
100 SHEETS 22-142
200 SHEETS 22-144
AMPAD

INLETS # 4 & 5

20-FOOT TYPE 'C'

FIGURE 804
3 OF 3

$\frac{10 \text{ CFS}}{0.8} = 12.5 \text{ CFS}$

12.5 CFS * 0.5 = 6.25 CFS

50% CLOGGING

FIGURE 806

$\frac{5 \text{ CFS}}{0.70} = 7.14 \text{ CFS}$

7.14 CFS * 0.5 = 3.57 CFS

CAPACITY OF 20-FOOT TYPE 'C' = 6.25 + 3.57 = 9.82 CFS

RUNOFF IN RAMPART:

Q100 = 85 CFS - 38 CFS = 47 CFS

Q10 = 40 CFS - 38 CFS = 2 CFS

TOTAL FLOW INTERCEPTED BY DROP INLETS

6 * 1.37 CFS + 4 * 3.43 CFS + 2 * 9.82 CFS = 38.15 CFS

6 → 4-FOOT TYPE 'A'

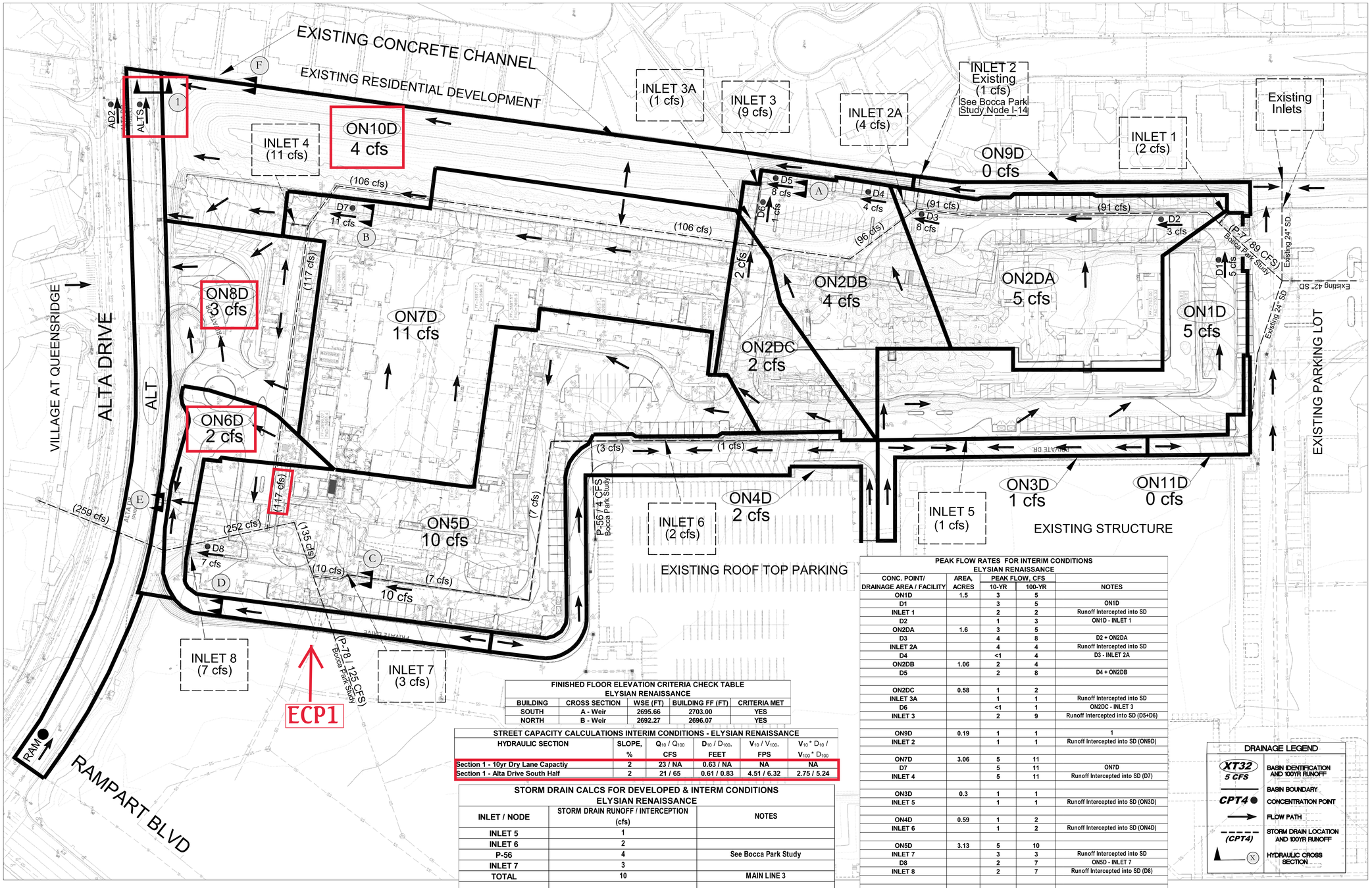
4 → 10-FOOT TYPE 'A'

2 → 20-FOOT TYPE 'C'

THIS IS THE AMOUNT OF FLOW THAT WILL BE SUBTRACTED FROM THE FLOW IN RAMPART TO GET THE TOTAL STREET FLOW.

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

ELYSIAN RENAISSANCE EXCERPTS



NORMAL DEPTH CALCULATIONS FOR EASEMENTS, CHANNELS, & SWALES ELYSIAN RENAISSANCE INTERIM CONDITIONS							
HYDRAULIC SECTION LABEL	DESCRIPTION	SLOPE, %	Q_{100} CFS	D_{100} NORMAL FEET	V_{100} NORMAL FEET/SEC	V_{h100} Vel. Head FEET	WEIR DEPTH FEET
A	Interior Parking Lot - Runoff at D5	1.06	8	0.45	3.18	0.16	NA
B	Interior Parking Lot - Runof at D7	1.34	11	0.49	3.92	0.24	NA
C	Interior Parking Lot - Runof at ON5D	1.33	10	0.46	3.61	0.20	NA
D	Interior Parking Lot - Runof at ICP1	3.60	21	0.48	5.41	0.45	NA
E	Concrete U gutter - Runoff at ICP1	6.60	21	0.47	14.83	3.42	NA
F	Concrete gutter - ON10D	1.00	4	0.53	5.02	0.39	NA
F	Concrete gutter - Overflow (D5+D6+ON10D)	1.00	13	1.27	5.19	0.42	NA

FINISHED FLOOR ELEVATION CRITERIA CHECK TABLE ELYSIAN RENAISSANCE				
BUILDING	CROSS SECTION	WSE (FT)	BUILDING FF (FT)	CRITERIA MET
SOUTH	A - Weir	2695.66	2703.00	YES
NORTH	B - Weir	2692.27	2696.07	YES

STREET CAPACITY CALCULATIONS INTERIM CONDITIONS - ELYSIAN RENAISSANCE					
HYDRAULIC SECTION	SLOPE, %	Q_{10} / Q_{100} CFS	D_{10} / D_{100}, FEET	V_{10} / V_{100}, FPS	V_{10} * D_{10} / V_{100} * D_{100}
Section 1 - 10yr Dry Lane Capactiy	2	23 / NA	0.63 / NA	NA	NA
Section 1 - Alta Drive South Half	2	21 / 65	0.61 / 0.83	4.51 / 6.32	2.75 / 5.24

STORM DRAIN CALCS FOR DEVELOPED & INTERM CONDITIONS ELYSIAN RENAISSANCE		
INLET / NODE	STORM DRAIN RUNOFF / INTERCEPTION (cfs)	NOTES
INLET 5	1	
INLET 6	2	
P-56	4	See Bocca Park Study
INLET 7	3	
TOTAL	10	MAIN LINE 3
P-7	89	See Bocca Park Study
INLET 1	2	
INLET 2	1	See Node I-14 Bocca Park Study
INLET 2A	4	
INLET 3	9	
INLET 3A	1	
INLET 4	11	
TOTAL	117	MAIN LINE 2
P-78	125	
Main Line 2	117	
Main Line 3	10	
INLET 8	7	
TOTAL	259	MAIN LINE 1

PEAK FLOW RATES FOR INTERIM CONDITIONS ELYSIAN RENAISSANCE				
CONC. POINT/ DRAINAGE AREA / FACILITY	AREA, ACRES	PEAK FLOW, CFS 10-YR	PEAK FLOW, CFS 100-YR	NOTES
ON1D	1.5	3	5	
D1		3	5	ON1D
INLET 1		2	2	Runoff Intercepted into SD
D2		1	3	ON1D - INLET 1
ON2DA	1.6	3	5	
D3		4	8	D2 + ON2DA
INLET 2A		4	4	Runoff Intercepted into SD
D4		<1	4	D3 - INLET 2A
ON2DB	1.06	2	4	
D5		2	8	D4 + ON2DB
ON2DC	0.58	1	2	
INLET 3A		1	1	Runoff Intercepted into SD
D6		<1	1	ON2DC - INLET 3
INLET 3		2	9	Runoff Intercepted into SD (D5+D6)
ON9D	0.19	1	1	
INLET 2		1	1	Runoff Intercepted into SD (ON9D)
ON7D	3.06	5	11	
D7		5	11	ON7D
INLET 4		5	11	Runoff Intercepted into SD (D7)
ON3D	0.3	1	1	
INLET 5		1	1	Runoff Intercepted into SD (ON3D)
ON4D	0.59	1	2	
INLET 6		1	2	Runoff Intercepted into SD (ON4D)
ON5D	3.13	5	10	
INLET 7		3	3	Runoff Intercepted into SD
D8		2	7	ON5D - INLET 7
INLET 8		2	7	Runoff Intercepted into SD (D8)
RAM		1	24	2
OFF3E		4	9	See Figure 3
ECP1		9	19	See Figure 3
ON6D	0.64	1	2	
ICP1		10	21	ECP1 + ON6D
ON8D	1.03	2	4	
ON10D	2	2	4	
ALT	0.94	2	3	
ALTS		21	65	3
AD2		9	15	4
ON11D	0.11	<1	<1	

1. HEC-1 results yield runoff less than 1 cfs. Use results from Bocca Park study at Node I-14 to be conservative.
2. Referenced from Peccole Town Center study. Runoff generated from eastern half of Rampart Boulevard expected to flow down the south half of Alta Drive.
3. RAM+OFF3E+ICP1+ON8D+ON10D+ALT
4. Referenced from Village at Queensridge study. Runoff on the north half of Alta Drive

DRAINAGE LEGEND

- XT32 / 5 CFS — BASIN IDENTIFICATION AND 100YR RUNOFF
- BASIN BOUNDARY
- CPT4 — CONCENTRATION POINT
- FLOW PATH
- (CPT4) — STORM DRAIN LOCATION AND 100YR RUNOFF
- X — HYDRAULIC CROSS SECTION

NORTH

GRAPHIC SCALE

60 0 30 60

(IN FEET)

1 inch = 60 ft.

PROJECT NO.

DESIGN:
DRAWN: LP
CHECK:
PLOT DATE:
PLOT TIME:

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP

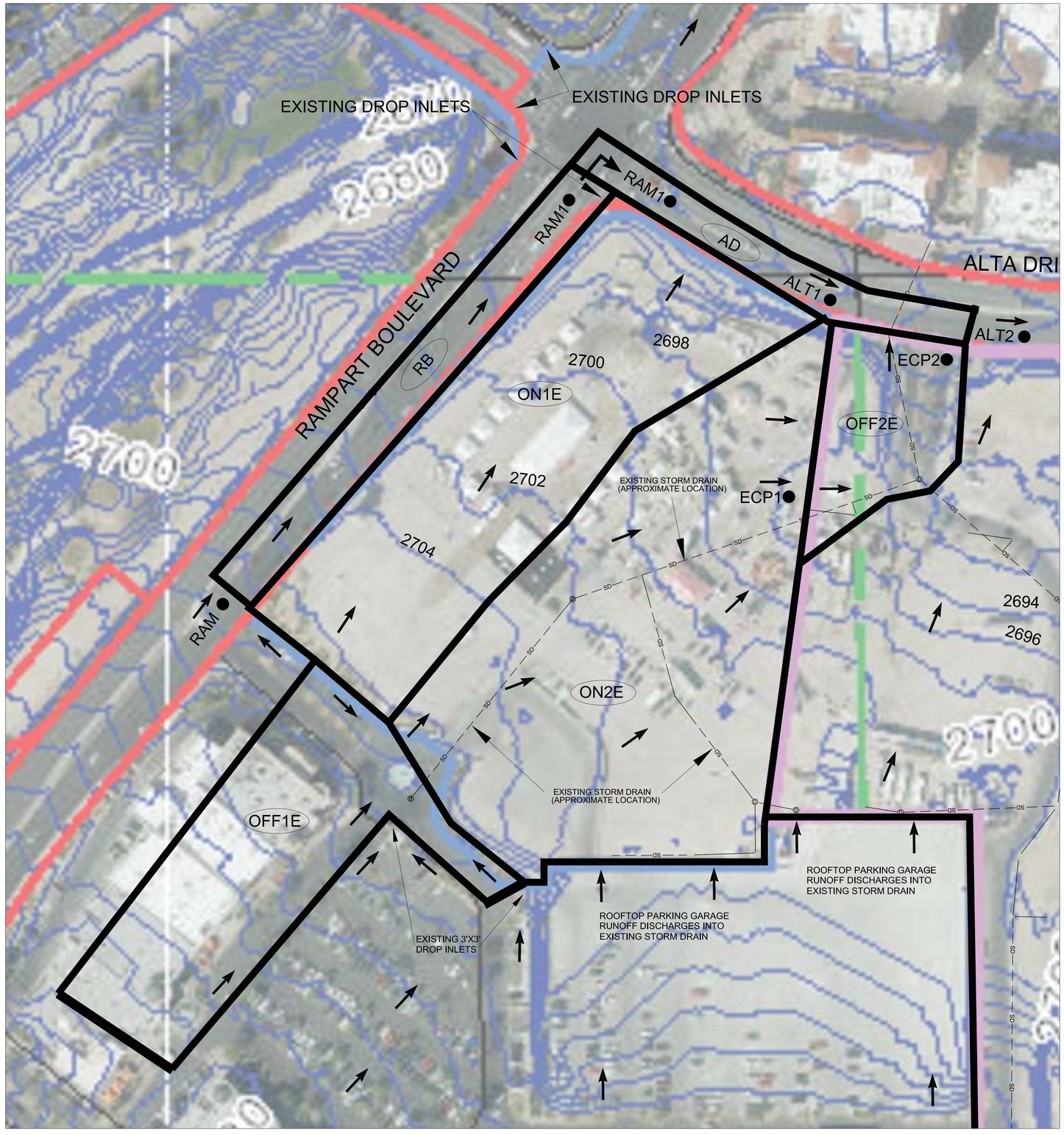
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FIGURE 4

INTERIM CONDITIONS DRAINAGE MAP

ELYSIAN RENAISSANCE

APPENDIX F PLANS AND DETAILS



NORTH

GRAPHIC SCALE

60 0 30 60

(IN FEET)

1 inch = 60 ft.

DRAINAGE LEGEND	
XT32	BASIN IDENTIFICATION
	BASIN BOUNDARY
CPT4	CONCENTRATION POINT
	FLOW PATH

PEAK FLOW RATES FOR EXISTING CONDITIONS
RENAISSANCE LOT1

CONC. POINT/ DRAINAGE AREA / FACILITY	AREA, ACRES	PEAK FLOW, CFS		NOTES
		10-YR	100-YR	
ON1E	3.12	5	9	
RAM		1	24	
RB	0.74	2	3	1
RAM1		3	27	RAM+RB
AD	0.48	1	2	
ALT1		9	38	ON1E+RAM1+AD
OFF1E	1.94	3	7	
ON2E	4.17	6	12	
ECP1		9	19	OFF1E+ON2E
OFF2E	0.75	1	2	
ECP2		10	21	ECP1+OFF2E
ALT2		19	59	ALT1+ECP2

1. Referenced from Peccole Town Center study. Runoff generated in eastern half of Rampart Boulevard expected to flow down the south half of Alta Drive.

REV.	DATE	DESCRIPTION	DATE	AGEN. APP.	DATE	CGW APP.

PROJECT NO.

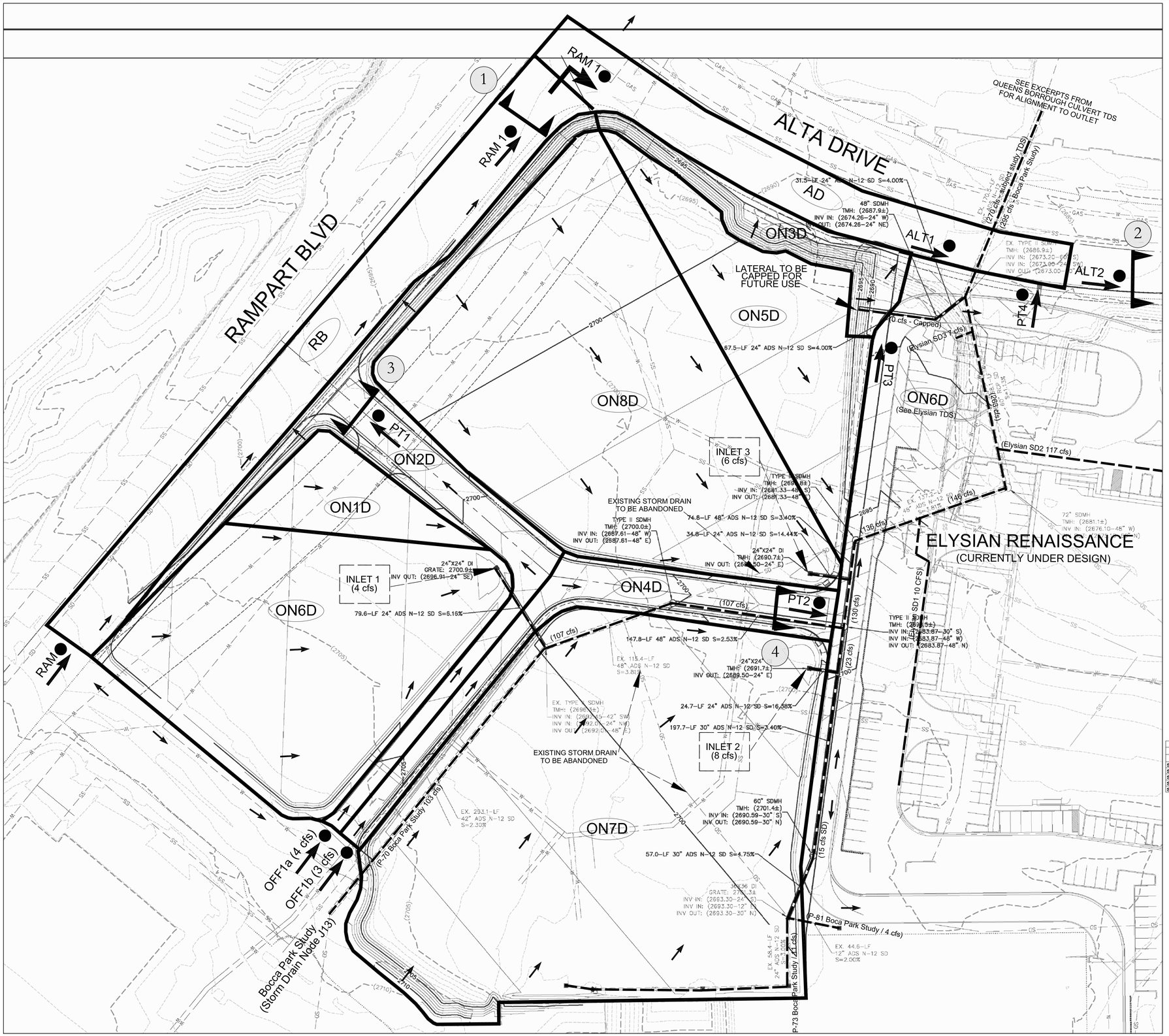
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FIGURE 3

EXISTING CONDITIONS DRAINAGE MAP

RENAISSANCE LOT 1



DRAINAGE LEGEND

XT32	BASIN IDENTIFICATION
	BASIN BOUNDARY
CPT4	CONCENTRATION POINT
	FLOW PATH
(CPT4)	STORM DRAIN LOCATION AND 100YR RUNOFF
X	HYDRAULIC CROSS SECTION

NORTH

GRAPHIC SCALE

40 0 20 40

(IN FEET)

1 inch = 40 ft.

PEAK FLOW RATES FOR DEVELOPED CONDITIONS
RENAISSANCE LOT 1

CONC. POINT/ DRAINAGE AREA / FACILITY	AREA, ACRES	PEAK FLOW, CFS 10-YR	PEAK FLOW, CFS 100-YR	NOTES
OFF1a		2	4	Half of OFF1E -See Figure 3
ON1D	0.23	<1	1	
ON2D	0.054	1	2	
PT1		3	7	OFF1a+ON1D+ON2D
RAM		1	24	1
RB	0.74	2	3	
RAM1		6	34	PT1+RAM+RB
AD	1.48	1	2	
ON3D	0.22	<1	1	
ALT1		7	37	RAM1+AD+ON3D
OFF1b		1	3	Half of OFF1E - See Figure 3
ON4D	0.37	1	1	
PT2		2	4	OFF1b+ON4D
ON5D	0.63	1	2	
PT3		3	6	PT2+ON5D
ON6D (offsite)	0.64	1	2	2
PT4		4	8	PT3+ON6D
ALT2		11	45	ALT1+PT4
ON6D	1.26	2	4	
ON7D	2.54	4	8	
ON8D	1.86	3	6	

1. Referenced from Peccole Town Center study. Runoff generated from eastern half of Rampart Boulevard expected to flow down the south half of Alta Drive.
2. Referenced from Elysian Renaisance TDS

STORM DRAIN CALCS FOR DEVELOPED CONDITIONS
RENAISSANCE LOT 1

INLET / NODE	STORM DRAIN RUNOFF / INTERCEPTION (cfs)	NOTES
P-70	103	See Bocca Park Study
INLET 1	4	
TOTAL1	107	P70+INLET1
P-81	4	See Bocca Park Study
P-73	11	See Bocca Park Study
INLET 2	8	
TOTAL2	23	P81 + P73 + INLET2
INLET 3	6	
TOTAL3	136	TOTAL1 + TOTAL2 + INLET3
Elysian SD1	10	See Elysian TDS
Elysian SD2	117	See Elysian TDS
Elysian SD3	7	See Elysian TDS
TOTAL 4	270	TOTAL 3 + Elysian

STREET CAPACITY CALCULATIONS DEVELOPED CONDITIONS - RENAISSANCE LOT1

HYDRAULIC SECTION	SLOPE, %	Q_{10} / Q_{100} CFS	D_{10} / D_{100}, FEET	V_{10} / V_{100}, FPS	V_{10},* D_{10} / V_{100},* D_{100}	Dry Lane Met Yes/No
Section 1 - Rampart East Half (MIN)	1.1	6/34	0.42/0.67	2.63/3.80	1.1/2.5	YES
Section 1 - Rampart East Half (MAX)	4.0	6/34	0.35/0.57	4.30/6.13	1.51/3.49	YES
Section 2 - Alta Drive South Half	2.1	11/45	0.48/0.73	4.41/5.81	2.1/4.24	YES
Section 3 - Interior Street	2.3	3/7	0.27/0.34	2.69/3.21	0.73/1.09	NA
Section 4 - Interior Street	1.7	2/4	0.25/0.30	2.17/2.50	0.54/0.75	NA

				DESCRIPTION
				DATE
				AGEN APP
				DATE
				GCW APP
				DATE
				REV

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FIGURE 4

DEVELOPED CONDITIONS DRAINAGE MAP

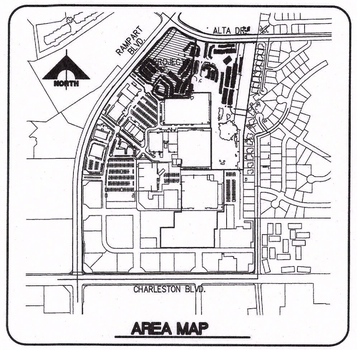
RENAISSANCE LOT 1

RENAISSANCE

CIVIL IMPROVEMENTS

APN: 138-32-312-013

300,000 SF COMMERCIAL



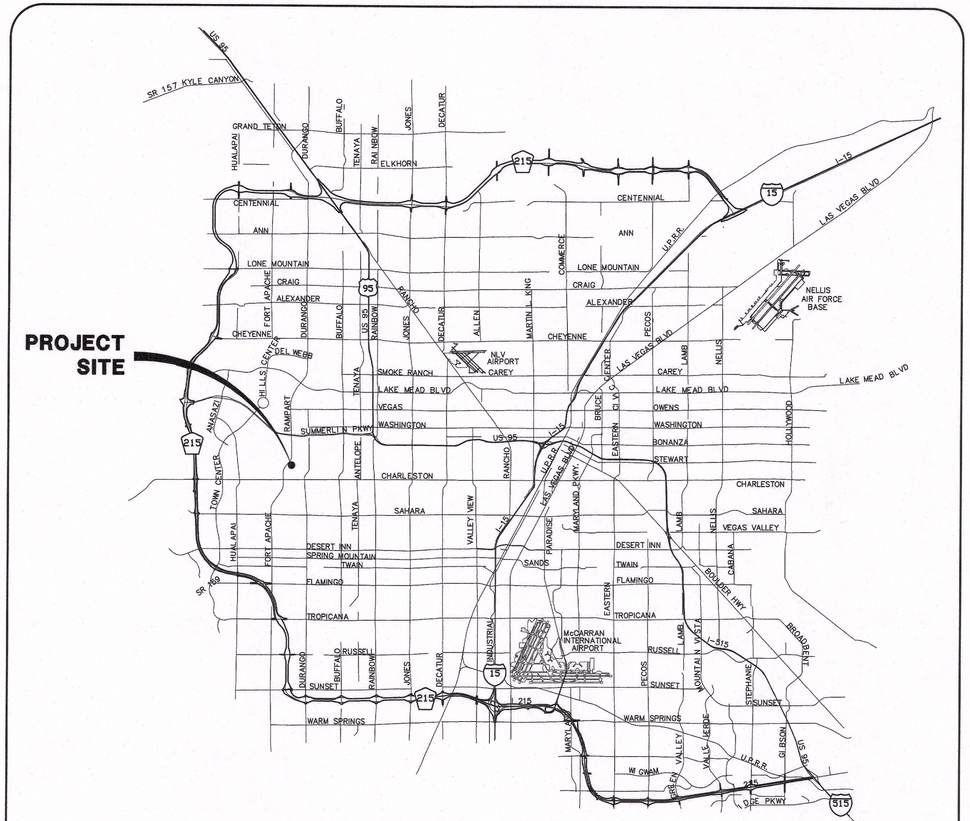
AREA MAP

LEGAL DESCRIPTION

??

DRAWING INDEX

NO.	DWG	DESCRIPTION
1	CV-1	COVER SHEET
2	CV-2	GENERAL NOTES
3	CV-3	ABBREVIATIONS, LEGEND AND QUANTITIES
4	DM-1	DEMOLITION PLAN
5	HC-1	HORIZONTAL CONTROL PLAN 1
6	HC-2	HORIZONTAL CONTROL PLAN 2
7	HC-3	HORIZONTAL CONTROL PLAN 3
8	HC-4	HORIZONTAL CONTROL PLAN 4
9	HC-5	HORIZONTAL CONTROL PLAN 5
10	GP-1	GRADING PLAN 1
11	GP-2	GRADING PLAN 2
12	GP-3	GRADING PLAN 3
13	GP-4	GRADING PLAN 4
14	GP-5	GRADING PLAN 5
15	SD-1	STORM DRAIN PROFILE 1
16	MU-1	MASTER UTILITY PLAN
17	UP-1	UTILITY PLAN 1
18	UP-2	UTILITY PLAN 2
19	UP-3	UTILITY PLAN 3
20	UP-4	UTILITY PLAN 4
21	UP-5	UTILITY PLAN 5
22	FL-1	FIRE LANE, ONSITE SIGNAGE AND STRIPING PLAN
23	DT-1	DETAIL SHEET 1
24	DT-2	DETAIL SHEET 2



VICINITY MAP

NOT TO SCALE

BASIS OF BEARINGS

SOUTH 00°32'07" EAST, BEING THE BEARING OF THE CENTERLINE OF RAMPART BOULEVARD AS SHOWN IN FILE 117, PAGE 83 OF PARCEL MAPS ON FILE AT CLARK COUNTY, NEVADA RECORDER'S OFFICE.

BENCHMARK

STATION		ELEVATION	DESCRIPTION
OLVOO 32C4	SET	820.819 (M) 2692.97 (FT.)	BEING A RIVET & PLATE TOP CURB SE CORNER OF RAMPART AND ALTA.

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED 2005-2007)
BASED UPON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD '88)

ADD 2000 TO ALL SPOT ELEVATION TAGS.

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811
OR 1-800-227-2600

FAST
Call before you UnderGround
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

UTILITY/AGENCY APPROVALS

COX COMMUNICATIONS LAS VEGAS, INC. — DATE

CENTRAL TELEPHONE CO, DBA CENTURYLINK — DATE

THE AFFIXED CENTURYLINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUTES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

NV ENERGY — DATE

NV ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

SOUTHWEST GAS CORP. — DATE

DRAINAGE CERTIFICATION

I CERTIFY THAT THE GRADING PLANS ARE IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS- ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

TODD N. KELLEY P.E. 14711 — 05-10-18 DATE

ALLEN PAVELKA, PE# 9029 — DATE
CITY ENGINEER/ACTING
CITY OF LAS VEGAS, NEVADA

APPROVAL OF THESE PLANS IS LIMITED TO THOSE IMPROVEMENTS CONSTRUCTED IN THE DEDICATED RIGHTS-OF-WAY AND/OR DEDICATED EASEMENTS. THIS APPROVAL DOES NOT AUTHORIZE THE CONSTRUCTION OF ANY IMPROVEMENTS THAT DEVIATE FROM ADOPTED STANDARDS AND/OR SPECIFICATIONS, EXCEPT THOSE SPECIFICALLY LISTED UNDER "DEVIATIONS FROM STANDARDS". THE ENGINEER SHALL RESOLVE ANY DEVIATION OTHER THAN THOSE LISTED IN "DEVIATIONS FROM STANDARDS" IN FAVOR OF THE UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS CLARK COUNTY AREA NEVADA.

CLV BUILDING AND SAFETY DEPARTMENT

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE CITY OF LAS VEGAS PLANNING DEPARTMENT

CHRIS KNIGHT, DIRECTOR BUILDING AND SAFETY — DATE

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
PROJECT NO._____ DATE: _____
SHEETS: -
LVVWD APPROVED FIRE FLOW - GPM AT 20 PSI RESIDUAL

APPROVED FOR CONSTRUCTION

LAS VEGAS FIRE AND RESCUE, FIRE FLOW GPM AT 20 PSI RESIDUAL — DATE

H# -

CLV DWG# -

ENGINEER

GCW ENGINEERS\SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

OWNER / DEVELOPER

R A SOUTHEAST LAND COMPANY, LLC
1215 S. FORT APACHE RD.; SUITE 120
LAS VEGAS, NV 89127

STATE OF NEVADA — REGISTERED PROFESSIONAL ENGINEER — TODD N. KELLEY — No. 14711 — CIVIL — Exp. 9/30/2019
DATE: 5-10-18

NOT FOR CONSTRUCTION

DESCRIPTION	DATE	AGEN. APP	DATE	GCW APP	DATE

PROJECT NO. 840-060
DESIGN:
DRAWN:
CHECK:
PLOT DATE: 05-10-18
PLOT TIME: 16:38:03

GCW ENGINEERS\SURVEYORS
1555 S. RAINBOW BLVD.
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F:\PROJECTS\800\840-060\DWG\PRODUCTION\80606C001.DWG
TODD KELLEY

EHB COMPANIES LLC
RENAISSANCE
COVER

DRAWING
CV-1
1 OF 20 SHTS

CITY OF LAS VEGAS GRADING NOTES

1. IN THE EVENT THAT ANY UNFORESEEN CONDITIONS NOT COVERED BY THESE NOTES ARE ENCOUNTERED DURING GRADING OPERATIONS, THE OWNER/ENGINEER SHALL BE IMMEDIATELY NOTIFIED FOR DIRECTION.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM ALL NECESSARY CUTS AND FILLS WITHIN THE LIMITS OF THIS PROJECT AND THE RELATED OFF-SITE WORK, SO AS TO GENERATE THE DESIRED SUBGRADE, FINISH GRADES AND SLOPES SHOWN.
3. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ALL EXCAVATION. ADEQUATE SHORING SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR TO PREVENT UNDERMINING OF ANY ADJACENT FEATURES OR FACILITIES AND/OR CAVING OF THE EXCAVATION.
4. THE CONTRACTOR IS WARNED THAT AN EARTHWORK BALANCE WAS NOT NECESSARILY THE INTENT OF THIS PROJECT. ANY ADDITIONAL MATERIAL REQUIRED OR LEFTOVER MATERIAL FOLLOWING EARTHWORK OPERATIONS BECOMES THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE GRADING CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE OWNER TO PROVIDE FOR THE REQUIREMENTS OF THE PROJECT STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND ASSOCIATED PERMIT.
6. CONTRACTOR SHALL GRADE TO THE LINES AND ELEVATIONS SHOWN ON THE PLANS WITHIN THE FOLLOWING HORIZONTAL AND VERTICAL TOLERANCES AND DEGREES OF COMPACTION, IN THE AREAS INDICATED:

	HORIZONTAL	VERTICAL	COMPACTION
A. PAVEMENT AREA SUBGRADE	0.1'±	+0.0' TO −0.1'	SEE SOILS REPORT
B. ENGINEERED FILL	0.5'±	+0.1' TO −0.1'	SEE SOILS REPORT

COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE. COMPACTION SHALL COMPLY WITH THE REQUIREMENTS OF THE ENGINEER.

7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
8. THE USE OF POTABLE WATER WITHOUT A SPECIAL PERMIT FOR BUILDING OR CONSTRUCTION PURPOSES INCLUDING CONSOLIDATION OF BACKFILL OR DUST CONTROL IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.
9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT- OF-WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. ALL ADJACENT PROPERTY, PRIVATE OR PUBLIC SHALL BE MAINTAINED IN A CLEAN, SAFE AND USABLE CONDITION.
10. IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, SUCH ITEM SHALL BE PROVIDED, AS DIRECTED BY THE CITY ENGINEER, AT NO EXPENSE TO THE CITY OF LAS VEGAS. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.

REVISED 4/15/10

STORMWATER RUNOFF MANAGEMENT

1. THE OWNER, SITE DEVELOPER, CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATE IN, THE PUBLIC RIGHTS OF WAYS OF THE CITY OF LAS VEGAS AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE CITY OF LAS VEGAS AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY ACTUAL RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

CITY OF LAS VEGAS SEWER NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION—SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE SPECIFICATIONS.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CITY ENGINEER.
3. CHISEL "S" OR "C" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.
5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.
6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" 'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.
7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.
8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.
9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.
10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

REVISED 04/15/10

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AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
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LAS VEGAS FIRE AND RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE #6325 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S – APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. [IFC SECTION 105.7.12]
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. [IFC SECTION 3310, SECTION 3312]
5. TO IDENTIFY FIRE HYDRANT LOCATIONS, CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF STREET ADJACENT TO THE FIRE HYDRANTS [IFC SECTION 507.5.7.3].
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. [IFC SECTION 106.3]
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A. APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. [IFC SECTION 507.2.1]
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. [IFC SECTION 507]
9. PRIVATE FIRE HYDRANTS SHALL BE PAINTED RED. [IFC SECTION 507]
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. [IFC SECTION 507]
11. FIRE HYDRANTS SPACING SHALL BE AS FOLLOWS: [IFC SECTION C102]
RESIDENTIAL – 500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
COMMERCIAL – 300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE NEW WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM 1,000 FOOT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FEET ON AN ALTERNATING BASIS. [IFC SECTION C102.8]
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FEET OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FEET OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [IFC SECTION C102.12]
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. [IFC SECTION C102.4]
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FEET, AS MEASURED BY AN APPROVED ROUTE. [IFC SECTION C102.7]
17. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [IFC SECTION C102.6]
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN. [IFC SECTION C104]
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. [IFC SECTION 503.2.3]
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12%. ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FEET PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. [IFC SECTION 503.2.7, SECTION 503.2.8]
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FEET OUTSIDE AND 28 FEET INSIDE TURNING RADIUS. [IFC 503.2.4]
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13 FEET 6 INCHES. [IFC SECTION 503.2.1]
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40FT FLOW LINE TO FLOW LINE WITH PARALLEL PARKING PERMITTED ON BOTH SIDES. NOT LESS THAN 32 FT WIDE, FLOW LINE TO FLOW LINE, WHERE PARKING IS PERMITTED ONLY ON ONE SIDE OF THE FIRE APPARATUS ACCESS ROAD. NOT LESS THAN 24 FT WIDE, FLOW LINE TO FLOW LINE, WHERE NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL NOT BE LESS THAN 24 FT. [IFC SECTION 503.2.1.1]
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL FO THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IIS SPRINKLERED. [IFC SECTION 503.1.1]
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 100 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD-EANDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. COMMERCIAL AND INDUSTRIAL DEVELOPMENTS WHERE BUILDINGS EXCEED 2 STORIES OR 30 FEET IN HEIGHT, OR EXCEEDING 62,000 SQUARE FEET IN AREA. [IFC SECTION 503.1.2]
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. [IFC SECTION 503.2.5]
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE IN STALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. [IFC SECTION 503.3]
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM. SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE IFC SECTION 503.6 AND IFC APPENDIX M.

LAS VEGAS FIRE DEPARTMENT — DATE

REVISED MARCH 1, 2016

FLOOD ZONE NOTE

NO PORTION OF THE SITE FALLS WITHIN A FEMA DESIGNATED SPECIAL FLOOD HAZARD AREA. SITE LOCATED ON PANEL 32003C2145F, DATED NOVEMBER 16, 2011. THIS PANEL SHOWS THAT THE PROJECT IS LOCATED WITHIN A ZONE X AND NOT LOCATED WITHIN A FEMA DESIGNATED 100-YEAR ZONE A OR SPECIAL FLOOD HAZARD AREA.

DEVIATION FROM STANDARDS

1. NONE

CITY OF LAS VEGAS TRAFFIC NOTES

1. ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.
2. THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.
3. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCED WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING CITY STREETS WHERE WARRANTED IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
4. WHEN A DESIGNATED "SAFE ROUTE TO SCHOOL" IS ENCROACHED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO BE ASSISTED IN THE SAFE CROSSING THROUGH THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A QUALIFIED "CROSSING GUARD". THE GUARD SHALL BE PRESENT FOR THE FULL DURATION OF TIME THAT CHILDREN ARE LIKELY TO BE PRESENT.
5. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW SIGNS SHALL BE FABRICATED WITH DIAMOND GRADE VIP CLASS 8 REFLECTIVE SHEETING OR APPROVED EQUAL. ALL NEW TRAFFIC SIGNS, EXCEPT STREET NAME AND SCHOOL SPEED LIMIT SIGNS, SHALL HAVE 3M SERIES 1160 OR APPROVED EQUIVALENT ANTI-GRAFFITI PROTECTIVE OVERLAY FILM; SCHOOL ZONE SIGNS SHALL HAVE 3M SERIES 1150 ANIT-GRAFFITI PROTECTIVE OVERLAY FILM. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT CITY STANDARDS.
7. WHEN A PROPOSED STREET LIGHT STANDARD IS LOCATED WITHIN FIVE (5') FEET OF ANY PROPOSED SIGN SHOWN ON THE PLANS TO BE MOUNTED ON A SIGNPOST, THE SIGN SHALL BE MOUNTED ON THE STREET LIGHT STANDARD AND THE SIGNPOST SHALL BE ELIMINATED.
8. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HERE UNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.
9. STREET SIGNS AND STOP SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF STREET NAME SIGNS.
10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND FLAGGERS TO INSURE THE SAFETY OF THE PUBLIC IN OR AROUND THE WORK AREA. THE CONTRACTOR SHALL HAVE A CERTIFIED ATSSA TRAFFIC CONTROL TECHNICIAN OR IMSA WORK ZONE SAFETY SPECIALIST SET UP, MAINTAIN AND/OR REMOVE ALL TRAFFIC CONTROL DEVICES IN THE CITY OF LAS VEGAS RIGHT-OF-WAY.
11. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE EXPEDITED TO COMPLETION SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO TO THE TRAVELING PUBLIC.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING CITIZENS AREA TRANSIT (C.A.T.) IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP OR HAS AN ADVERSE EFFECT ON BUS SERVICE ON THAT STREET TO ARRANGE FOR TEMPORARY RELOCATION OF STOP.
13. GUARDS SHALL BE OBTAINED BY CONTACTING THE METROPOLITAN POLICE DEPARTMENT SPECIAL EVENTS UNIT (PHONE # 828-3442) WHO WILL PROVIDE OFFICERS PROPERLY TRAINED IN TRAFFIC CONTROL. FEES FOR THE USE OF THESE OFFICERS SHALL BE SET BY METRO AND WILL BE PAID BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR ALL ARRANGEMENTS WITH METRO.
14. ANY WORK WITHIN 300' OF A SIGNALIZED INTERSECTION WILL BE NIGHT WORK, UNLESS DIRECTED BY THE CITY OF LAS VEGAS TRAFFIC ENGINEER.
15. CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEERING DIVISION (TRANSPORTATION SECTION) THROUGH THE PROJECT'S OFFSITE INSPECTOR PRIOR TO INITIATING PAVING TO RECEIVE DIRECTION FOR ANY PERMANENT OR TEMPORARY MODIFICATIONS TO THE APPROVED DRAWINGS REGARDING FINAL PAVEMENT TRANSITIONS, MARKINGS AND SIGNING THAT ARE REQUIRED TO MATCH ADJACENT ROADWAY SEGMENTS. THE CONTRACTOR SHALL PROVIDE A DRAWING FOR APPROVAL BY THE TRAFFIC ENGINEERING DIVISION DEPICTING ANY ADJUSTMENTS TO THE FINAL PAVEMENT MARKINGS AND SIGNAGE, WHICH MAY INCLUDE REMARKING, ADDING OR MODIFYING PAVEMENT MARKINGS AND TRAFFIC CONTROL SIGNS SUCH THAT ADEQUATE TRANSITIONS AND LANE TERMINATIONS BETWEEN ADJACENT ROADWAY SEGMENTS ARE CONSTRUCTED.

REVISED 4/15/10

CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND ANY ADOPTED SPECIAL AREA STANDARDS.
2. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF THE TRAFFIC ENGINEER AND THE CITY ENGINEER.
3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION.
4. ALL STREET LIGHTING CONDUITS STUB SHALL HAVE AT LEAST ONE GREEN #8 THW WIRE INSTALLED, AS TRACER WIRE. WHEN "EMPTY" CONDUIT IS COMPLETELY INSTALLED FROM PB TO PB, IT SHALL HAVE MINIMUM OF 2 #4 AND 1 #8 THW WIRE WITH THE ENDS TAPED OR "SAFE OFF" PRIOR TO FINAL INSPECTION.
5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN ACCORDANCE WITH THE USD NO. 320A.
6. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TEFO PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
7. SERVICE POINT SHALL BE COORDINATED WITH NV ENERGY COMPANY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE PLANS.
8. IT SHALL BE ASSUMED THAT IN THE ABSENCE OF AN EXISTING, WORKABLE CIRCUIT TO ATTACH TO, ALL INSTALLATIONS SHALL REQUIRE A NEW SERVICE FOR OPERATION OF THE CIRCUIT.
9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREET LIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED, AT NO EXPENSE TO THE CITY OF LAS VEGAS, BEFORE STREETLIGHT BASES ARE INSTALLED.
10. THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.
11. THE DEVELOPER/OWNER WILL BE REQUIRED TO SUPPLY POWER TO ALL NEW PUBLIC STREET LIGHTS INSTALLED UNDER THIS DESIGN PRIOR TO BOND RELEASE OR PROJECT COMPLETION. THE DEVELOPER/OWNER WILL BE RESPONSIBLE FOR ALL ITEMS ASSOCIATED WITH THE INSTALLATION, CONSTRUCTION, ENERGIZING, MAINTENANCE AND OPERATIONAL COST OF SAID STREET LIGHTS PRIOR TO PROJECT COMPLETION. REFER TO THE PLAN FOR ANY NEW SERVICE REQUIREMENTS. THE TRANSFER OF OWNERSHIP FROM THE DEVELOPER/OWNER TO THE CITY OF LAS VEGAS FOR ALL NEW PUBLIC STREET LIGHT/S AND/OR SERVICE/S INSTALLED UNDER THIS PLAN WILL BE IN CONJUNCTION WITH THIS PROJECT COMPLETION. COORDINATE ALL MAINTENANCE AND OPERATIONAL TRANSFERS WITH THE CITY OF LAS VEGAS TRAFFIC ENGINEERING DEPARTMENT (TEFO) AT (702) 229-6331.

REVISED 4/15/10

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

LVVWD PROJECT # ____ - ____

(Revised 01/09/2017)

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE 2010 EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). THE LATEST EDITION OF UDACS SHALL SUPERSEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED, AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01, AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE LISTED ON THE LVVWD PRE-APPROVED MAT

ABBREVIATIONS

A	AIR	DR	DRIVE	P.A.E.	PEDESTRIAN ACCESS EASEMENT	STRUCT	STRUCTURE
AB	AGGREGATE BASE	DS	DOWNSPOUT	PB	PULL BOX	SVZ	SIGHT VISIBILITY ZONE
AC	ASPHALT CONCRETE, ACRE	DTL	DETAIL	PC	POINT OF CURVE, PRESSURE CLASS	SW	SIDEWALK
ACP	ASBESTOS CEMENT PIPE	DW	DRIVEWAY			SWG	SOUTHWEST GAS
ADD'L	ADDITIONAL	DWG	DRAWING	PCC	POINT OF COMPOUND CURVE	T	TELEPHONE OR TOP
A.E.	ACCESS EASEMENT	E	EAST	P.D.E.	PUBLIC DRAINAGE EASEMENT	TAN	TANGENT
AP	ANGLE POINT	E.A.E.	EMERGENCY ACCESS EASEMENT	PE	PROJECT ENGINEER OR POLYETHYLENE	TB	TOP OF BERM
APN	ASSESSOR'S PARCEL NUMBER	EOR	END CURB RETURN			TC	TOP OF CURB
APPROX	APPROXIMATELY	ELE,ELEC	ELECTRICAL	PED	PEDESTRIAN	TCE	TEMPORARY CONSTRUCTION ESMT
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS	ELEV	ELEVATION	PGL	PROFILE GRADE LINE	TEL,TELE	TELEPHONE
		EP, EOP	EDGE OF PAVEMENT	PH	POTHOLE	TEMP	TEMPORARY
		ESMT	EASEMENT	PI	POINT OF INTERSECTION	TF	TOP OF FOOTING
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	EVC	END VERTICAL CURVE	PIV	POST INDICATOR VALVE	TG	TOP OF GRATE
		EXIST,EX	EXISTING	P/L	PROPERTY LINE	TMH	TOP OF MANHOLE
AVE	AVENUE	EXP	EXPANSION JOINT	PLCP	POLYURETHANE LINED AND COATED STEEL PIPE	TOP	TOP OF PIPE
AVAR	AIR VALVE, AIR RELEASE ASSEMBLY	FC	FACE OF CURB			TP	TELEPHONE POLE
		FF, FFE	FINISH FLOOR ELEVATION	PMF	PAVEMENT MARKING FILM	TRANS	TRANSITION
AWWA	AMERICAN WATER WORKS ASSOCIATION	FG	FINISH GRADE	POB	POINT OF BEGINNING	TS	TRAFFIC SIGNAL
		FH	FIRE HYDRANT	POC	POINT ON CURVE	TW	TOP OF RETAINING WALL
BC	BACK OF CURB	FL	FLOW LINE	P.O.C.	POINT OF CONNECTION	TYP,(TYP)	TYPICAL
BCR	BEGIN CURB RETURN	FO	FIBER OPTIC	POT	POINT ON TANGENT	UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS (LATEST EDITION)
BLM	BUREAU OF LAND MANAGEMENT	FRP	FIBERGLASS REINFORCED PLASTIC	PP	POWER POLE		
BLVD	BOULEVARD	FS	FINISH SURFACE	PROP	PROPOSED		
BM	BENCHMARK	FT	FOOT/FEET	PRC	POINT OF REVERSE CURVE		
BO	BLOW-OFF	FTG	FOOTING	P.S.E.	PUBLIC SEWER EASEMENT TO BE PRIVATELY MAINTAINED BY HOA	UG	UNDERGROUND
BVCE	BEGIN VERTICAL CURVE ELEVATION	FUT	FUTURE			ULT	ULTIMATE
BVCS	BEGIN VERTICAL CURVE STATION	G	GAS	PSI	POUNDS PER SQUARE INCH	USDCCA	UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS CLARK COUNTY AREA, NEVADA (LATEST EDITION)
BW	BACK OF SIDEWALK	GA	GAGE, GUY ANCHOR	PT	POINT OF TANGENCY		
BWV	BACK WATER VALVE	GB	GRADE BREAK	P.U.E.	PUBLIC UTILITY EASEMENT		
C, ℄	CENTERLINE	GND	GROUND	PVC	POLYVINYL CHLORIDE		
C&G	CURB AND GUTTER	GRD	GRADE, GROUND	PVI	POINT OF VERTICAL INTERSECTION		
CATV	UNDERGROUND CABLE TV	H, HGT	HEIGHT	PVMT	PAVEMENT		
CCBM	CLARK COUNTY BENCH MARK	HDWL	HEADWALL	PVT	PRIVATE	UT	UNDERGROUND TELEPHONE
CCPW	CLARK COUNTY PUBLIC WORKS	HGL	HYDRAULIC GRADE LINE	PZ	PRESSURE ZONE	VAR	VARIABLE/VARIES
CCTV	CLOSED-CIRCUIT TELEVISION	HOA	HOME OWNERS ASSOCIATION	R, RAD	RADIAL, RADIUS	VC	VERTICAL CURVE
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT	HORIZ	HORIZONTAL	R, RT	RIGHT	VCP	VITRIFIED CLAY PIPE
		HP	HIGH POINT, HIGH PRESSURE	RCB	REINFORCED CONCRETE BOX	VERT	VERTICAL
C.E.	COMMON ELEMENT	HPS	HIGH PRESSURE SODIUM	RCP	REINFORCED CONCRETE PIPE	VG	VALLEY GUTTER
CFS	CUBIC FEET PER SECOND	IBC	INTERNATIONAL BUILDING CODE	RD	ROAD	VOL	VOLUME
CIP	CAPITAL IMPROVEMENTS PROJECT, CORRUGATED IRON PIPE	INV	INVERT	RDWY	ROADWAY	W	WATER, WEST, WATT
		INT	INTERIM	REC	RECTANGULAR	W/	WITH
CIPM	CURED-IN-PLACE MANHOLE	JT	JOINT	REF	REFERENCE	W.I.	WROUGHT IRON
CIPP	CURED-IN-PLACE PIPE	L	LENGTH	REINF	REINFORCED	WS	WATER SUPPLY
CIR	CIRCLE	L, LT	LEFT	REQD	REQUIRED	WT	WEIGHT
CLR	CLEAR OR CLEARANCE	LF	LINEAR FEET	RIM	TOP OF RIM ELEVATION	WTR	WATER
CLSM	CONTROLLED LOW STRENGTH MATERIAL	LIP	LIP OF GUTTER	RND	ROUND	XING	CROSSING
		LN	LANE	ROW,R/W	RIGHT OF WAY	YD	YARD, YARD DRAIN
CLV	CITY OF LAS VEGAS	LP	LIGHT POLE	RP	RADIUS POINT	Z	PRESSURE ZONE
CMP	CORRUGATED METAL PIPE	LSCP	LANDSCAPE	RPM	RAISED PAVEMENT MARKERS		
CMU	CONCRETE MASONRY UNIT	LVVWD	LAS VEGAS VALLEY WATER DISTRICT	RPPA	REDUCED PRESSURE PRINCIPAL ASSEMBLY		
CNLV	CITY OF NORTH LAS VEGAS	MAX	MAXIMUM				
CO	CLEANOUT	MH	MANHOLE	RSGV	RESILIENT SEAT GATE VALVE		
CONC	CONCRETE	MIN	MINIMUM	S	SEWER, SOUTH		
COND	CONDUIT	MLCP	MORTAR LINED AND COATED PIPE	SCH	SCHEDULE		
CONST	CONSTRUCT OR CONSTRUCTION	MOD	MODIFY/MODIFIED	SD	STORM DRAIN		
COORD	COORDINATE	MON	MONUMENT	SDMH	STORM DRAIN MANHOLE		
COR	CORNER	MPH	MILES PER HOUR	SECT	SECTION		
CPEP	CORRUGATED POLYETHELYNE PIPE	N	NORTH	SF	SQUARE FOOT/FEET		
CT	COURT	NDOT	NEVADA DEPARTMENT OF TRANSPORTATION	SHLDR	SHOULDER		
CY	CUBIC YARD(S)			SHT	SHEET		
Δ	DELTA	NO	NUMBER	SL	STREET LIGHT		
DCS	DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEM (LATEST EDITION)	NOSHA	STATE OF NEVADA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION	SP	SERVICE POINT		
				SQ	SQUARE		
				SR	SEWER RECLAIM MAIN		
		NPC	NEVADA POWER COMPANY	SS	SANITARY SEWER		
D.E.	DRAINAGE EASEMENT	NTS	NOT TO SCALE	SSMH	SANITARY SEWER MANHOLE		
DEFL	DEFLECTION	OC	ON CENTER	STA	STATION		
DG	DESIGNED GRADE	OHC	OVERHEAD COX COMMUNICATION	ST	STREET		
D.I.	DROP INLET	OHP	OVERHEAD POWER LINE	STD	STANDARD		
DIA, ⌀	DIAMETER			STL	STEEL		
DIP	DUCTILE IRON PIPE						

LEGEND

- (1) LOT NUMBER
- (1) BLOCK NUMBER
- PAD= 00.0 / F.F.= 00.0 — PAD ELEVATION / FINISH FLOOR ELEVATION
- PAD= (00.0) / F.F.= (00.0) — EXISTING PAD ELEVATION / EXIST. FINISH FLOOR ELEV.
- SCARP
- 4510 — EXISTING CONTOUR (5' INTERVAL)
- EXISTING CONTOUR (1' INTERVAL)
- CONCRETE DRIVEWAY
- TF — TOP OF FOOTING
- TW — TOP OF RETAINING WALL
- SDMH — STORM DRAIN MANHOLE
- SVZ — SIGHT VISIBILITY ZONE, NO STRUCTURES/ LANDSCAPING TALLER THAN 24"
- [54.10] — FUTURE ELEVATION
- 59.33 — GRADE BREAK ELEVATION
- TC or FG 56.22 — PROPOSED ELEVATION
- TC or FG (56.21) — EXISTING ELEVATION
- RIGHT-OF-WAY
- PROPERTY LINE
- CENTER LINE
- RETAINING WALL
- KNEE WALL
- PERIMETER WALL
- STORM DRAIN LINE
- SIDEWALK
- DITCH OR SWALE
- CURB TRANSITION AT SIDEWALK RAMP (ROLL CURB TO "L" CURB)

QUANTITY ESTIMATE

NOTE: CONTRACTOR TO VERIFY QUANTITIES FOR BIDDING PURPOSES

STREET IMPROVEMENT - PRIVATE

DESCRIPTION	UNIT	TOTAL
2" AC PAVEMENT	SY	–
4" TYPE II AGGREGATE BASE MATERIAL	CY	–
6" TYPE II AGGREGATE BASE MATERIAL	CY	–
CONCRETE VALLEY GUTTER	SF	–
4' WIDE CONCRETE SIDEWALK	SF	–
SIDEWALK RAMP	EA	–
"L" TYPE CURB	LF	–
A CURB	LF	–
SIDEWALK DRAIN	EA	–

WATER - PUBLIC

DESCRIPTION	UNIT	TOTAL
6" PVC WATERLINE	LF	–
6" CAP AND 2" BLOW-OFF PER UDACS PLATE NO. 36	EA	–
6"-22.5° BEND PER UDACS PLATE NO. 31	EA	–
6"-90° BEND PER UDACS PLATE NO. 31	EA	–
8" PVC WATERLINE	LF	–
8"-5° BEND PER UDACS PLATE NO. 31	EA	–
8"-11.25° BEND PER UDACS PLATE NO. 31	EA	–
8"-22.5° BEND PER UDACS PLATE NO. 31	EA	–
8"-45° BEND PER UDACS PLATE NO. 31	EA	–
8"-90° BEND PER UDACS PLATE NO. 31	EA	–
8" TEE PER UDACS PLATE NO. 31	EA	–
8"X6" REDUCER PER UDACS PLATE NO. 30	EA	–
8" CAP & 2" BLOW-OFF PER UDACS PLATE NO. 36	EA	–
8" GATE VALVE, BOX, AND COVER PER UDACS PLATE NO. 30 & 39	EA	–
10"X8" REDUCER PER UDACS PLATE NO. 30	EA	–
1" WATER SERVICE WITH 3/4" WATER METER PER UDACS PLATE NO. 1	EA	–
WATER LATERAL	LF	–
3/4" IRRIGATION METER AND 1" RPPA PER UDACS PLATE NO. 4 & 8 AND DETAIL 2/D4	EA	–
FIRE HYDRANT, VALVES, TEE, & 6" WATERLINE PER UDACS PLATES NO. 40	EA	–
IRRIGATION SLEEVES 1-6" AND 2-4" SCH. 40 PVC	LF	–
PRESSURE REDUCING VALVE	EA	–
10"X8" TAPPING SLEEVE WITH 8" TAPPING VALVE PER UDACS 2.24.01.A. PLATE NO. 34 AND 39	EA	–
10"X6" TAPPING SLEEVE WITH 6" TAPPING VALVE PER UDACS 2.24.01.B. PLATE NO. 34 AND 39	EA	–
CUT-IN 10" GATE VALVE, BOX, AND COVER PER UDACS PLATE NO. 30 & 39	EA	–
DEEP FIRE HYDRANT, VALVES, TEE, & 6" WATERLINE PER UDACS PLATES NO. 41	EA	–
MARKER BALLS OVER SWEEP COPPER PER UDACS PLATE NO. 15	EA	–

SEWER - PUBLIC

DESCRIPTION	UNIT	TOTAL
8" PVC SANITARY SEWER PIPE	LF	–
8" C900 SANITARY SEWER PIPE	LF	–
4" PVC SANITARY SEWER LATERAL (PRIVATE)	LF	–
48" DIA. SANITARY SEWER MANHOLE	EA	–
BACK WATER VALVE (PRIVATE)	EA	–
PLUG AND STUB FOR FUTURE USE	EA	–

STREET SIGNS/STRIPING - PUBLIC

DESCRIPTION	UNIT	TOTAL
(2) STREET NAME SIGN (D3)	EA	–
(2) STREET NAME SIGN (D3) WITH 30" STOP SIGN (R1-1)	EA	–
NO PARKING-FIRE LANE SIGN	EA	–
TYPE III BARRICADE AND END OF ROAD MARKERS	EA	–
BLUE COLORED REFECTIVE RAISED PAVEMENT MARKERS	EA	–
PAINT CURB RED (NO PARKING) 30' WIDE CENTERED ON HYDRANT	LF	–

APPROVED FOR CONSTRUCTION

LAS VEGAS FIRE AND RESCUE, FIRE FLOW GPM AT 20 PSI RESIDUAL DATE

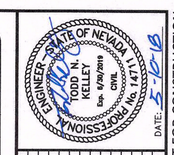
H# –

CLV DWG# –









NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	CCW APP

PROJECT NO. 840-060

DESIGN:
DRAWN:
CHECK:
PLOT DATE: 05-10-18
PLOT TIME: 16:38:14

GCW
ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

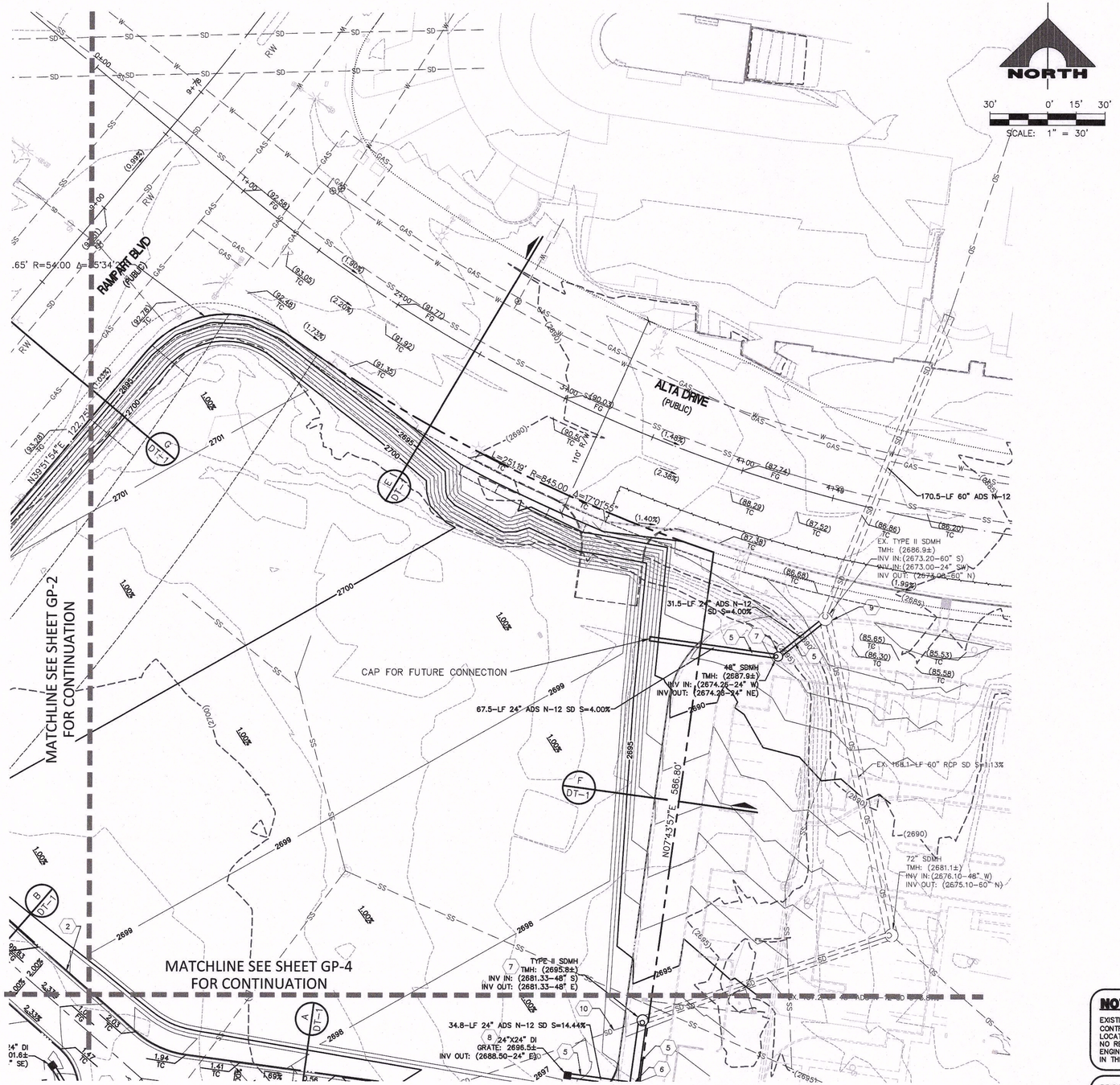
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TODD KELLEY

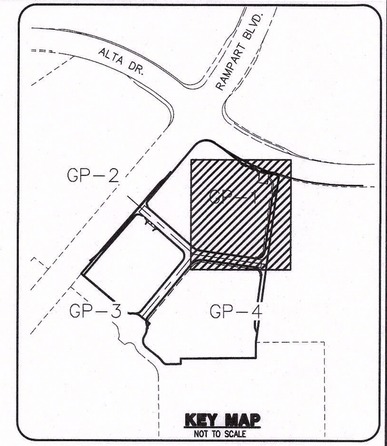
EHB COMPANIES LLC

RENAISSANCE

ABBREVIATIONS, LEGEND AND QUANTITIES

DRAWING
CV-3
3 OF 20 SHTS





CONSTRUCTION NOTES

GRADING

1. CONSTRUCT 3" AC OVER 4" TYPE II AB OVER 6" TYPE I AB 95% COMPACTION.
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6. INSTALL ADS INSERTA TEE, SEE PLAN FOR SIZE.
7. CONSTRUCT TYPE II SD MANHOLE PER USDCCA DWG NO. 405.2, SEE PLAN FOR SIZE.
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9. ADJUST TO NEW FINISH GRADE.
10. ABANDON EXISTING STORM DRAIN STRUCTURE.
11. CONSTRUCT SIDEWALK RAMP PER USDCCA DWG NO. 235.

NOTE TO CONTRACTOR

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NOTE

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AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

FAST
Call before you UnderGround.
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

BENCHMARK

STATION		ELEVATION	DESCRIPTION
OLVCO 32C4	SET	820.819 (M) 2692.97 (FT.)	BEING A RIVET & PLATE TOP CURB SE CORNER OF RAMPART AND ALTA.

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED 2005-2007) BASED UPON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD '88)

ADD 2000 TO ALL SPOT ELEVATION TAGS.

BASIS OF BEARINGS

SOUTH 00°32'07" EAST, BEING THE BEARING OF THE CENTERLINE OF RAMPART BOULEVARD AS SHOWN IN FILE 117, PAGE 83 OF PARCEL MAPS ON FILE AT CLARK COUNTY, NEVADA RECORDER'S OFFICE.

DRAINAGE CERTIFICATION

I CERTIFY THAT THE GRADING PLANS ARE IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ____ ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

TODD N. KELLEY P.E. 14711 — DATE

H# – | CLV DWG# –

STATE OF NEVADA
TODD N. KELLEY
No. 14711
PROFESSIONAL ENGINEER
DATE 5-10-18

NOT FOR CONSTRUCTION

DESCRIPTION	DATE	APP
		GCW
		AGEN

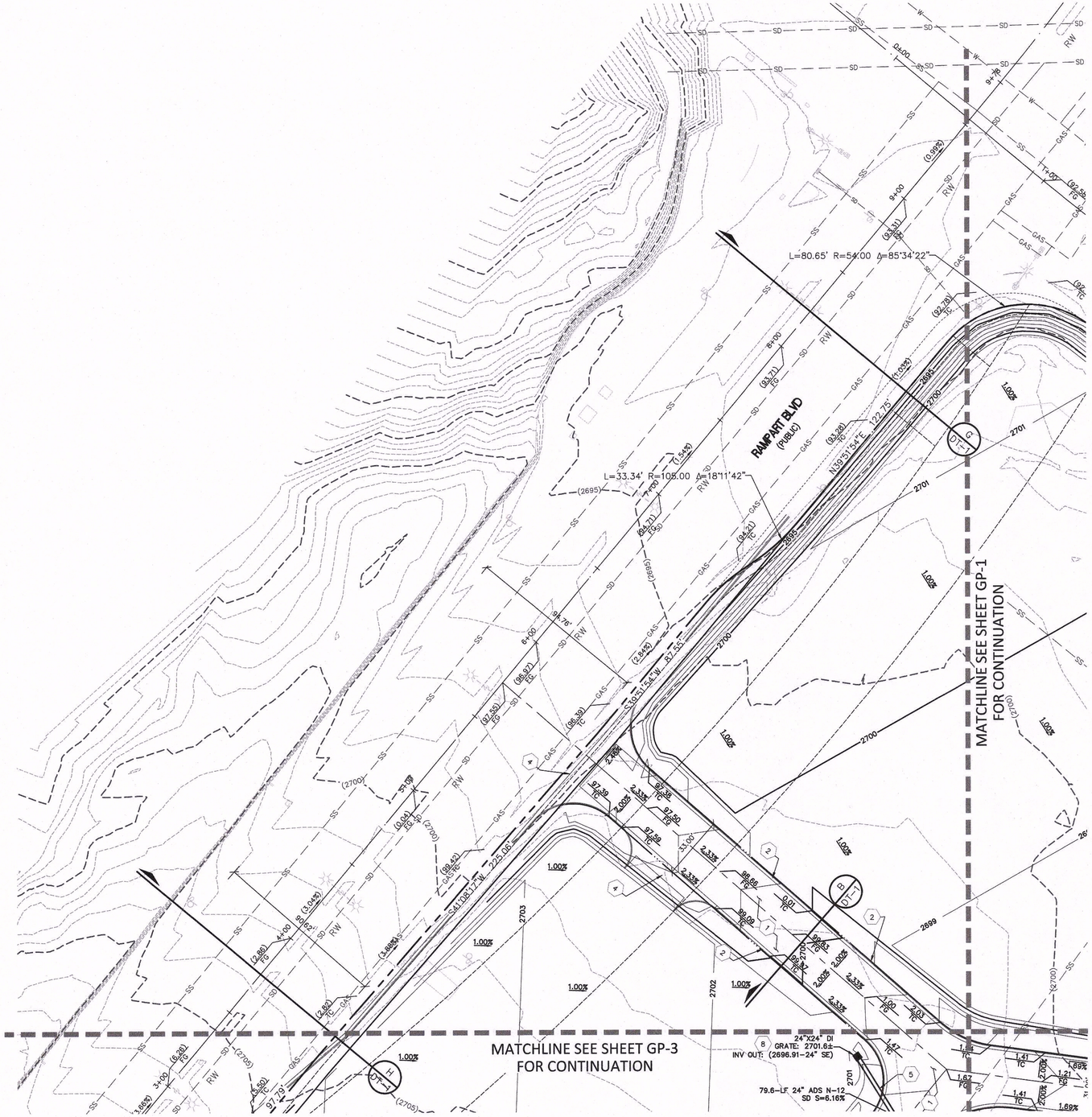
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DESIGN:
DRAWN:
CHECK: GCW
PLOT DATE: 05-10-18
PLOT TIME: 16:11:35

EHB COMPANIES LLC
RENAISSANCE
GRADING PLAN 1

DRAWING GP-1
9 OF 20 SHTS

GCW ENGINEERS\ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

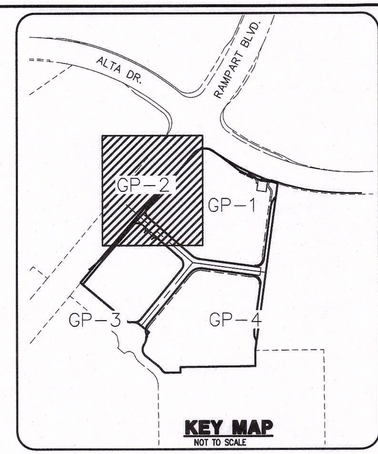
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TODD KELLEY



NORTH

30' 0' 15' 30'

SCALE: 1" = 30'



KEY MAP
NOT TO SCALE

CONSTRUCTION NOTES

GRADING

1. CONSTRUCT 3" AC OVER 4" TYPE II AB OVER 6" TYPE I AB 95% COMPACTION.
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9. ADJUST TO NEW FINISH GRADE.
10. ABANDON EXISTING STORM DRAIN STRUCTURE.
11. CONSTRUCT SIDEWALK RAMP PER USDCCA DWG NO. 235.

NOTE TO CONTRACTOR

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1-702-227-2929

FAST
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1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

BENCHMARK

STATION		ELEVATION	DESCRIPTION
OLVOO 32C4	SET	820.819 (M) 2692.97 (FT.)	BEING A RIVET & PLATE TOP CURB SE CORNER OF RAMPART AND ALTA.

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED 2005-2007) BASED UPON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD '88)

ADD 2000 TO ALL SPOT ELEVATION TAGS.

BASIS OF BEARINGS

SOUTH 00°32'07" EAST, BEING THE BEARING OF THE CENTERLINE OF RAMPART BOULEVARD AS SHOWN IN FILE 117, PAGE 83 OF PARCEL MAPS ON FILE AT CLARK COUNTY, NEVADA RECORDER'S OFFICE.

DRAINAGE CERTIFICATION

I CERTIFY THAT THE GRADING PLANS ARE IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ___ ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

TODD N. KELLEY P.E. 14711 — DATE

H# – | CLV DWG# –

STATE OF NEVADA
TODD N. KELLEY
No. 14711
PROFESSIONAL ENGINEER
DATE 5-10-18

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP

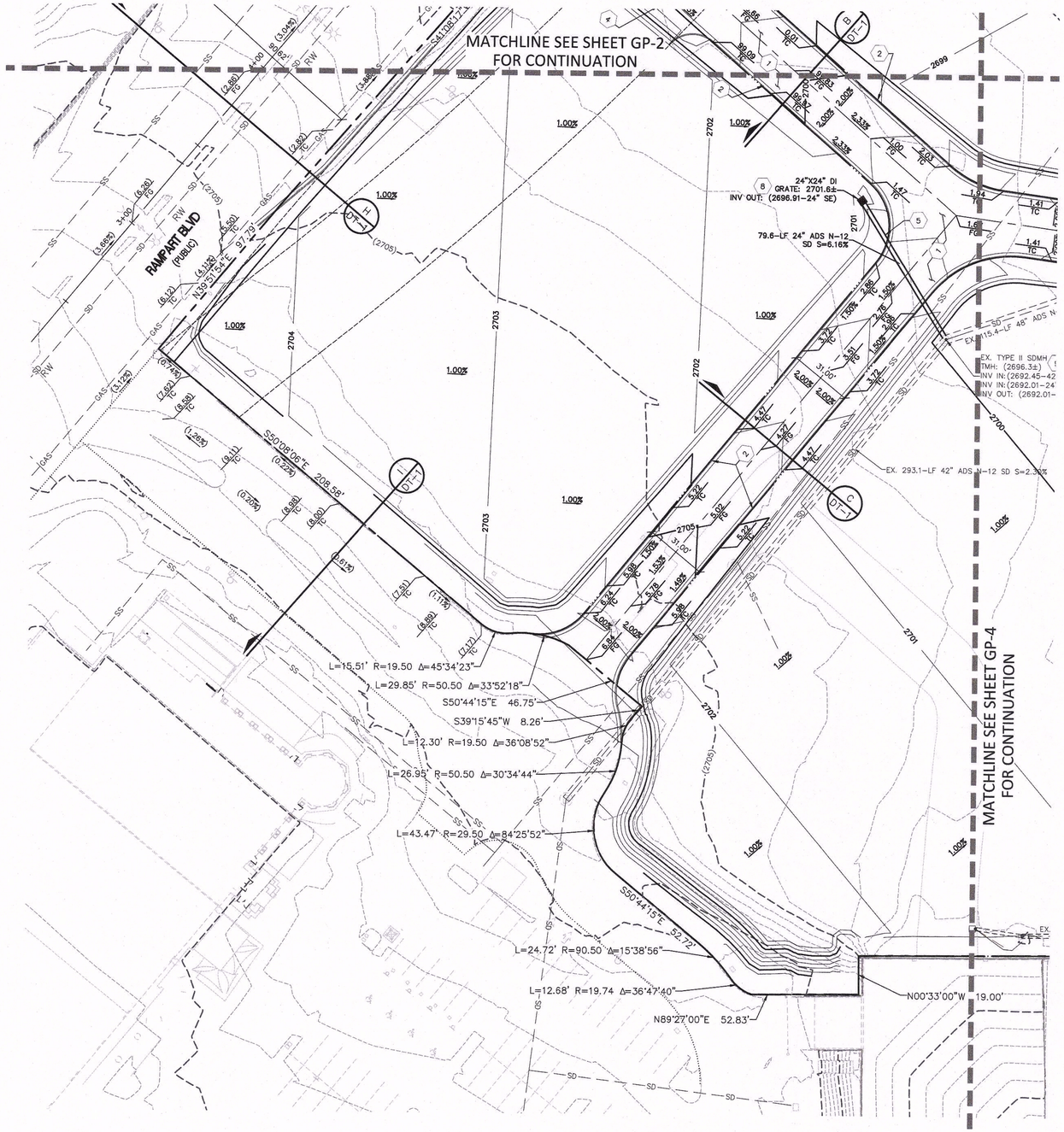
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PLOT DATE: 05-10-18
PLOT TIME: 16:11:40

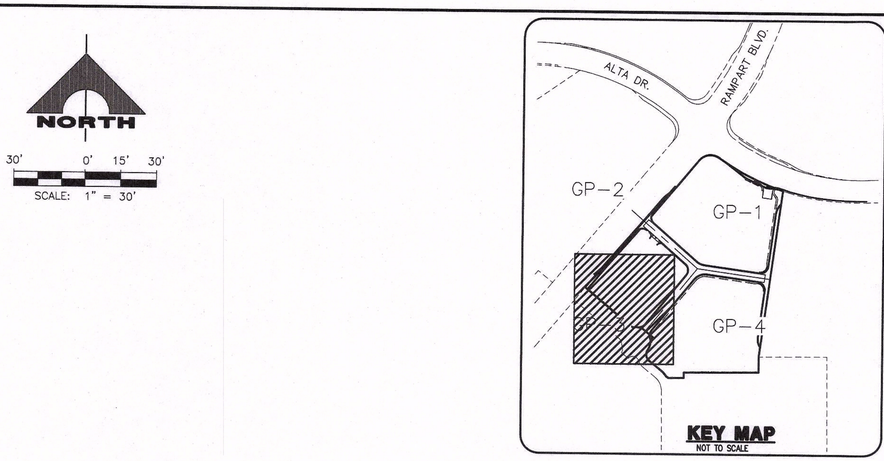
GCW
ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

F:\PROJECTS\800\840-060\DWG\PRODUCTION\A060C009-GD1.DWG
TODD KELLEY

EHB COMPANIES LLC
RENAISSANCE
GRADING PLAN 2

DRAWING
GP-2
10 OF 20 SHTS





NORTH

30' 0' 15' 30'

SCALE: 1" = 30'

CONSTRUCTION NOTES

GRADING

1. CONSTRUCT 3" AC OVER 4" TYPE II AB OVER 6" TYPE I AB 95% COMPACTION.
2. CONSTRUCT 24" L TYPE CURB AND GUTTER PER USDCCA DWG NO. 216.
3. CONSTRUCT "A" CURB PER PER USDCCA DWG NO. 219. CONSTRUCT 30" VALLEY GUTTER PER DETAIL I SHT DT-1.
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6. INSTALL ADS INSERTA TEE, SEE PLAN FOR SIZE.
7. CONSTRUCT TYPE II SD MANHOLE PER USDCCA DWG NO. 405.2, SEE PLAN FOR SIZE.
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9. ADJUST TO NEW FINISH GRADE.
10. ABANDON EXISTING STORM DRAIN STRUCTURE.
11. CONSTRUCT SIDEWALK RAMP PER USDCCA DWG NO. 235.

NOTE TO CONTRACTOR

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FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

BENCHMARK

STATION		ELEVATION	DESCRIPTION
OLVOO 32C4	SET	820.819 (M) 2692.97 (FT.)	BEING A RIVET & PLATE TOP CURB SE CORNER OF RAMPART AND ALTA.

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED 2005-2007) BASED UPON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD '88)

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BASIS OF BEARINGS

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DRAINAGE CERTIFICATION

I CERTIFY THAT THE GRADING PLANS ARE IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ____ ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

TODD N. KELLEY P.E. 14711 — DATE

H# – CLV DWG# –

STATE OF NEVADA
TODD N. KELLEY
No. 14711
PROFESSIONAL ENGINEER
CIVIL
DATE: 5-10-18

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DATE	AGEN. APP	DATE	GCW APP

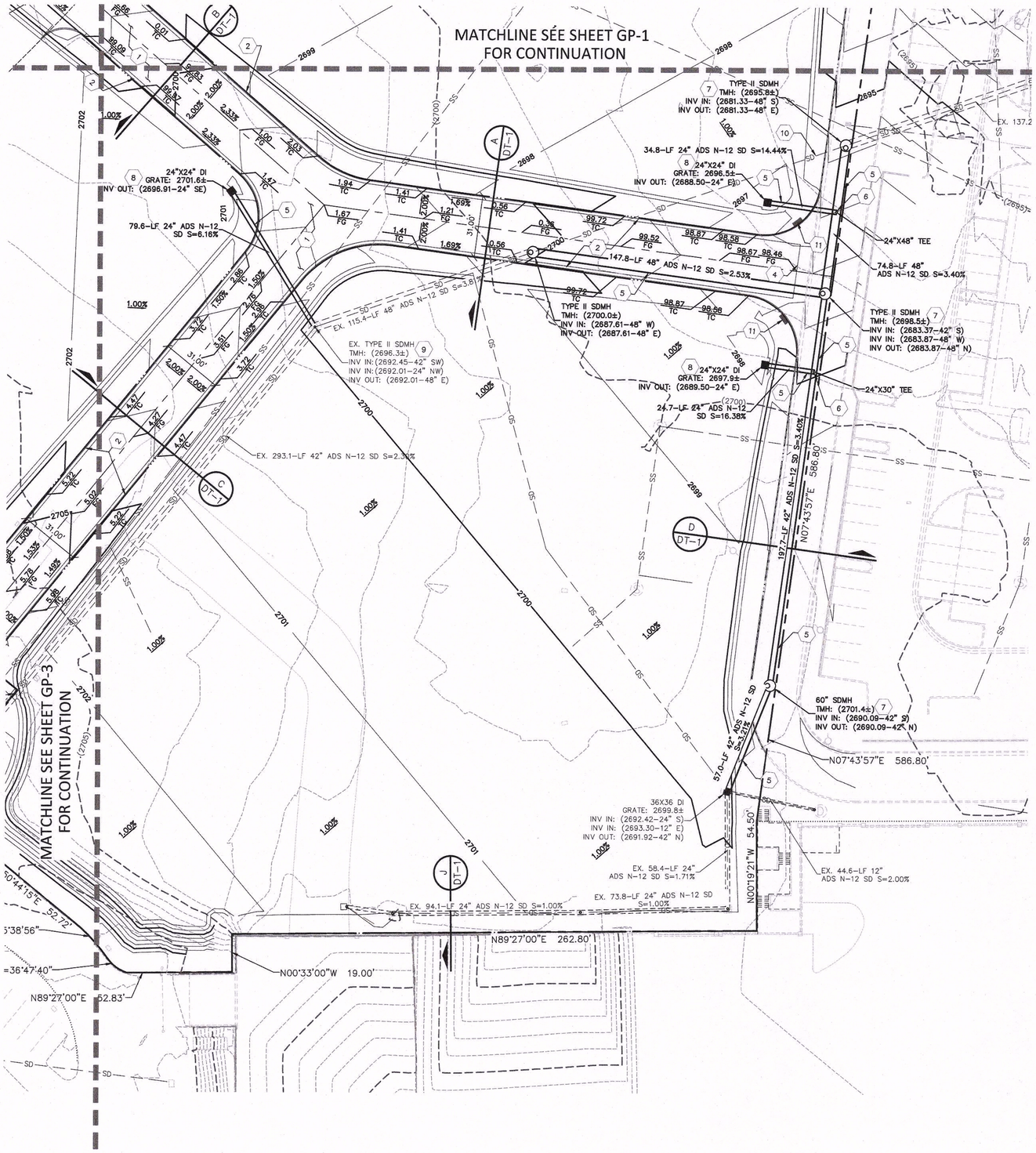
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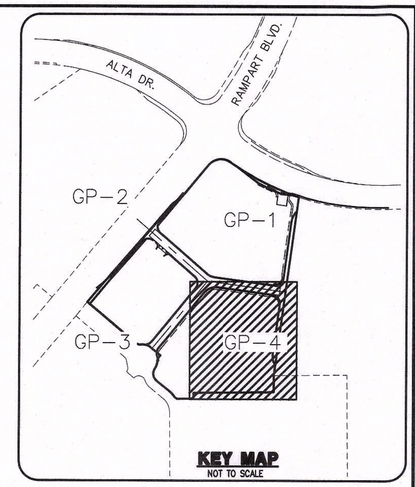
GCW
ENGINEERS \ SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
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F:\PROJECTS\800\840-060\DWG\PRODUCTION\8060C009-GD1.DWG
TODD KELLEY

EHB COMPANIES LLC
RENAISSANCE
GRADING PLAN 3

DRAWING
GP-3
12 OF 20 SHTS





CONSTRUCTION NOTES

GRADING

1. CONSTRUCT 3" AC OVER 4" TYPE II AB OVER 6" TYPE I AB 95% COMPACTION.
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BENCHMARK

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OLV00 32C4	SET	820.819 (M) 2692.97 (FT.)	BEING A RIVET & PLATE TOP CURB SE CORNER OF RAMPART AND ALTA.

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED 2005-2007) BASED UPON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD '88)

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FAST
Call before you Dig Underground.
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

DRAINAGE CERTIFICATION

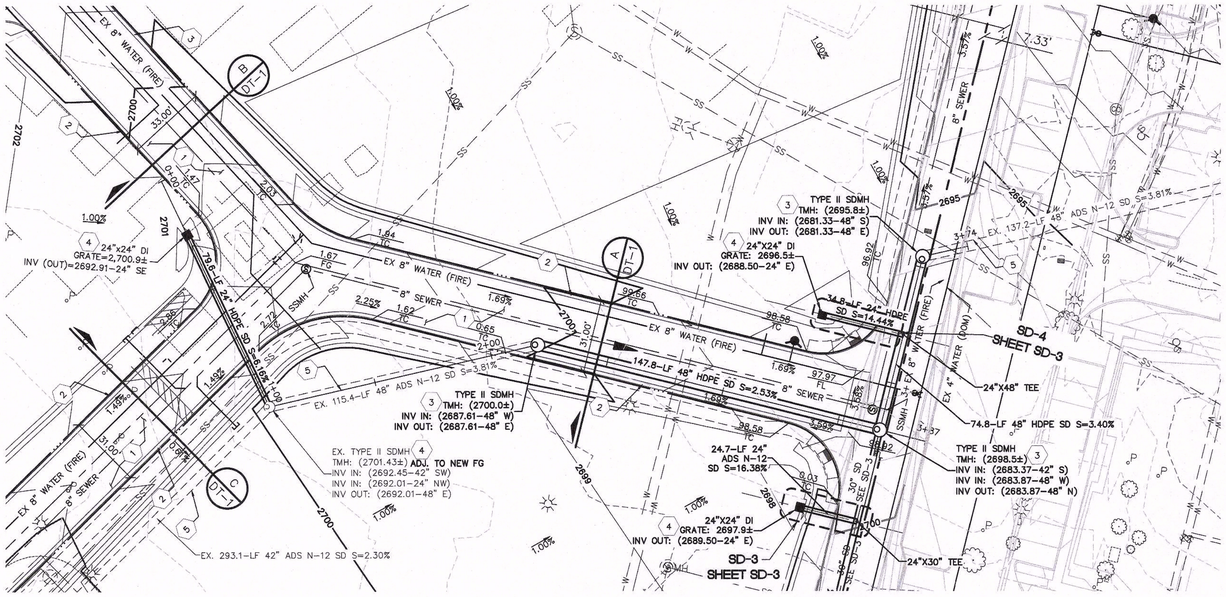
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TODD N. KELLEY P.E. 14711 — DATE

H# –

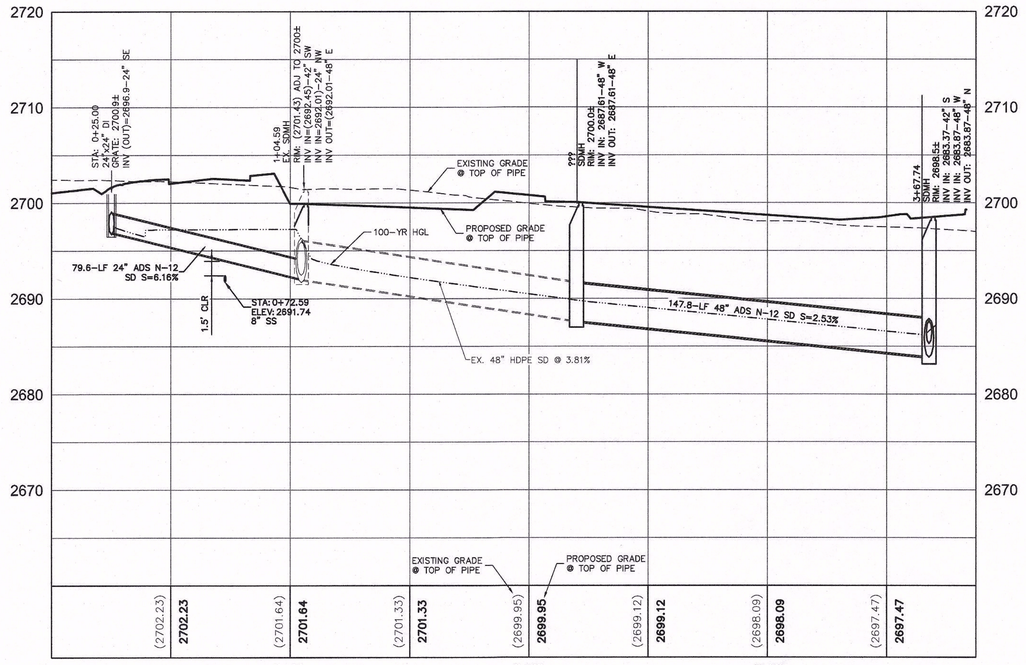
CLV DWG# –

EHB COMPANIES LLC
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
PROJECT NO. 840-060



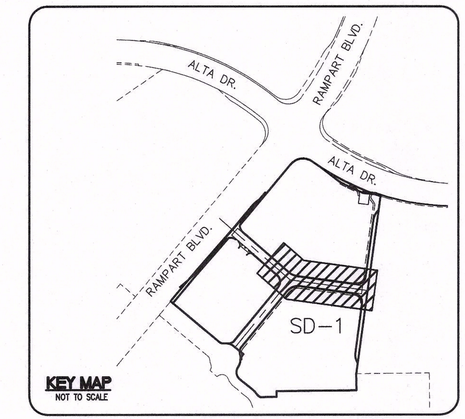
SD-1 PLAN VIEW

SCALE: 1"=30' HORIZONTAL



SD-1 PROFILE

SCALE: 1"=30' HORIZONTAL
1"=3' VERTICAL



KEY MAP
NOT TO SCALE

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CONSTRUCTION NOTES

STORM DRAIN

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2. CONSTRUCT 24" L TYPE CURB AND GUTTER PER USDCCA DWG NO. 216.
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ADD 2000 TO ALL SPOT ELEVATION TAGS.

BASIS OF BEARINGS

SOUTH 00°32'07" EAST, BEING THE BEARING OF THE CENTERLINE OF RAMPART BOULEVARD AS SHOWN IN FILE 117, PAGE 83 OF PARCEL MAPS ON FILE AT CLARK COUNTY, NEVADA RECORDER'S OFFICE.

DRAINAGE CERTIFICATION

I CERTIFY THAT THE GRADING PLANS ARE IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY ____ ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

TODD N. KELLEY P.E. 14711 — DATE

H# -

CLV DWG# -

STATE OF NEVADA — PROFESSIONAL ENGINEER — TODD N. KELLEY — No. 14711 — CIVIL — Exp. 6/30/2019 — DATE: 5-10-18

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	CCW APP

PROJECT NO. 840-060
DESIGN:
DRAWN:
CHECK: CCW
PLOT DATE: 05-10-18
PLOT TIME: 16:21:52

GCW ENGINEERS\SURVEYORS
1555 S. RAINBOW BLVD.
LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

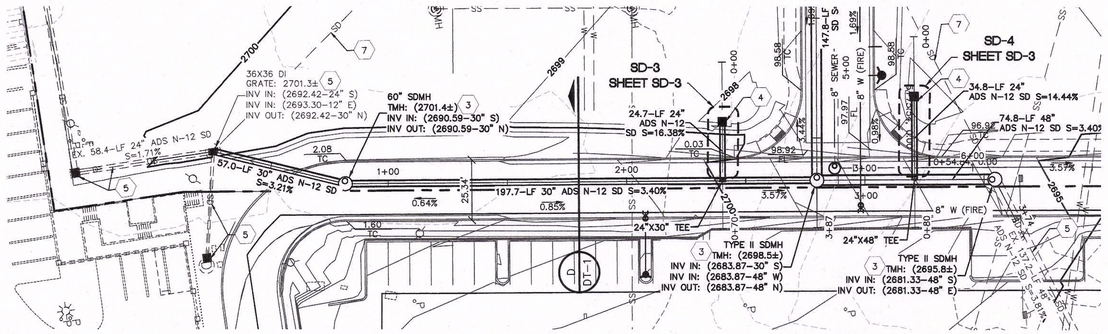
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TODD KELLEY

EHB COMPANIES LLC

RENAISSANCE

STORM DRAIN PLAN AND PROFILE 1

DRAWING
SD-1
13 OF 20 SHTS



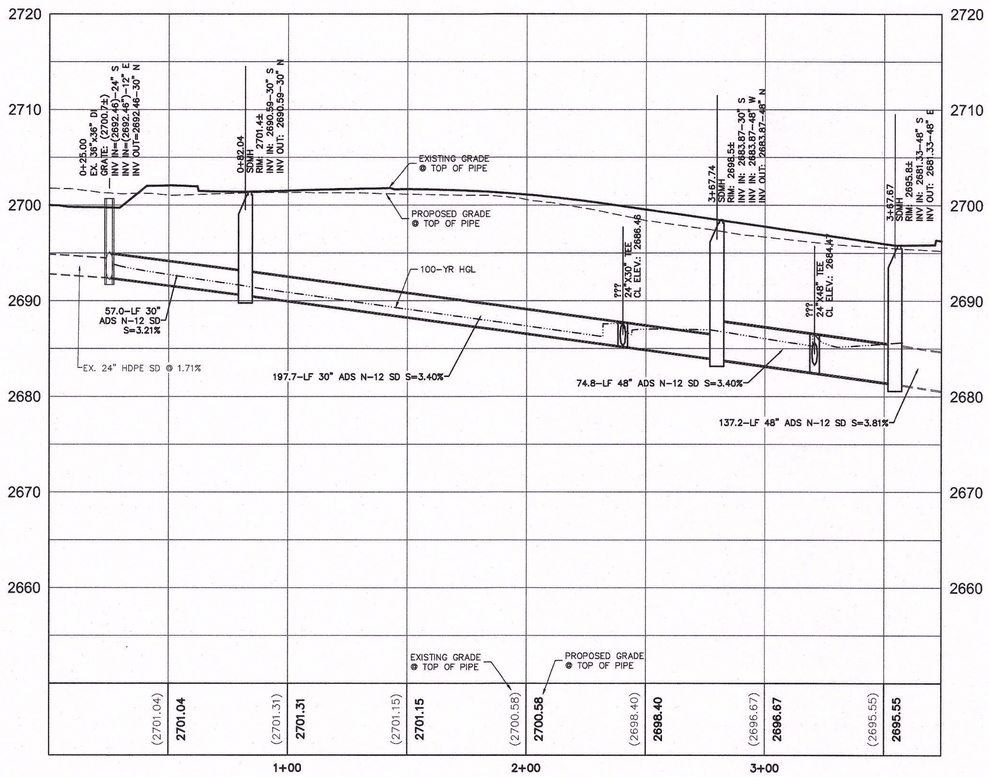
SD-2 PLAN VIEW

SCALE: 1"=30' HORIZONTAL

NORTH

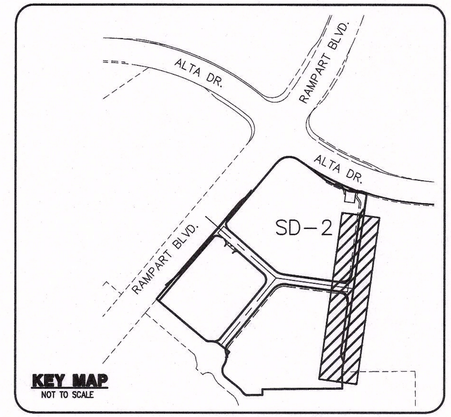
30' 0' 15' 30'

SCALE: 1" = 30'



SD-2 PROFILE

SCALE: 1"=30' HORIZONTAL
1"=3' VERTICAL



KEY MAP
NOT TO SCALE

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811
OR
1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY!
CALL BEFORE YOU DO OVERHEAD
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FAST
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FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

NOTE TO CONTRACTOR

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NOTE

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CONSTRUCTION NOTES

STORM DRAIN

1. CONSTRUCT 3" AC OVER 4" TYPE II AB OVER 6" TYPE I AB 95% COMPACTION.
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4. CONSTRUCT JENSEN PRECAST SD DRAIN INLET PER DETAIL ON SHEET DT-1 WITH TRAFFIC FRAME AND GRATE. SEE PLAN FOR SIZE, USE EXTENSIONS AS NEEDED.
5. RETAIN AND PROTECT EXISTING STORM DRAIN STRUCTURE.
6. ADJUST TO NEW FINISH GRADE.
7. ABANDON EXISTING STORM DRAIN STRUCTURE.

BENCHMARK

STATION		ELEVATION	DESCRIPTION
OLVOO 32C4	SET	820.819 (M) 2692.97 (FT.)	BEING A RIVET & PLATE TOP CURB SE CORNER OF RAMPART AND ALTA.

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED 2005-2007)
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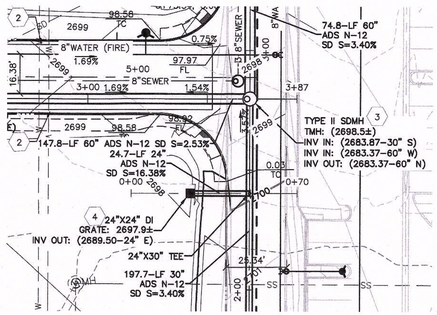
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TODD KELLEY

EHB COMPANIES LLC

RENAISSANCE

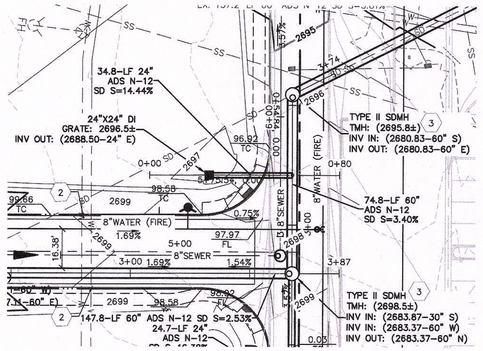
STORM DRAIN PLAN AND PROFILE 2

DRAWING
SD-2
14 OF 20 SHTS



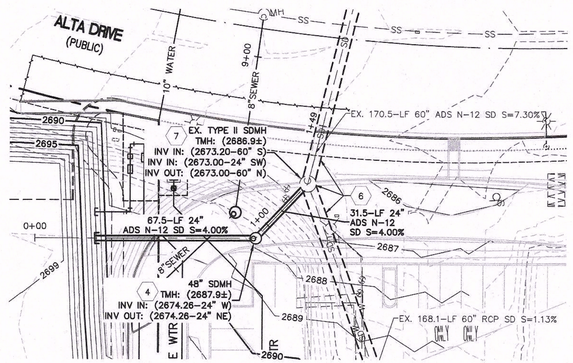
SD-3 PLAN VIEW

SCALE: 1"=30' HORIZONTAL



SD-4 PLAN VIEW

SCALE: 1"=30' HORIZONTAL



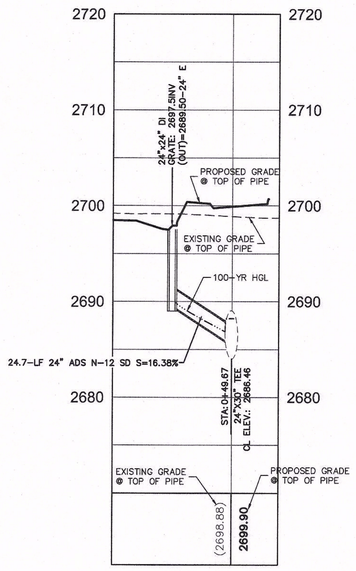
SD-5 PLAN VIEW

SCALE: 1"=30' HORIZONTAL

NORTH

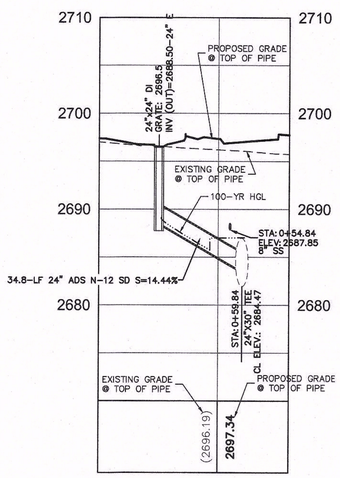
30' 0' 15' 30'

SCALE: 1" = 30'



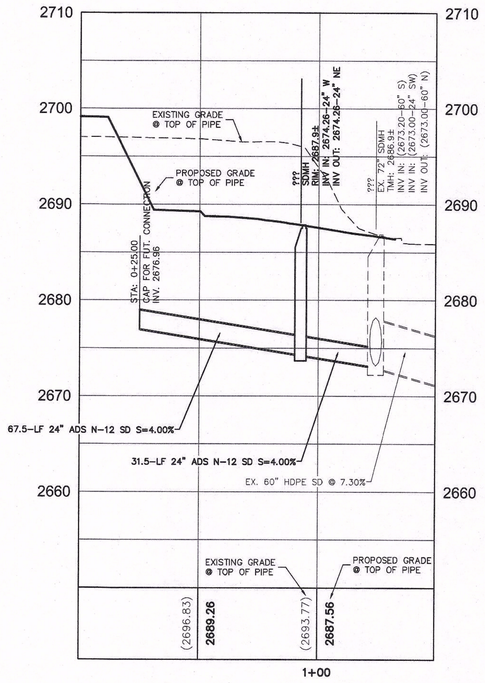
SD-3 PROFILE

SCALE: 1"=30' HORIZONTAL
1"=3' VERTICAL



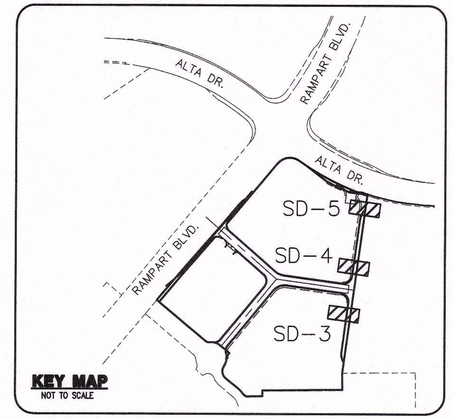
SD-4 PROFILE

SCALE: 1"=30' HORIZONTAL
1"=3' VERTICAL



SD-5 PROFILE

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DATE: 5-10-18

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PLOT TIME: 16:22:58

GCW ENGINEERS \ SURVEYORS
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LAS VEGAS, NV 89146
T: 702.804.2000
F: 702.804.2299
gcwengineering.com

F:\PROJECTS\800\840–060\DWG\PRODUCTION\G060C015–SD3.DWG
TODD KELLEY

EHB COMPANIES LLC

RENAISSANCE

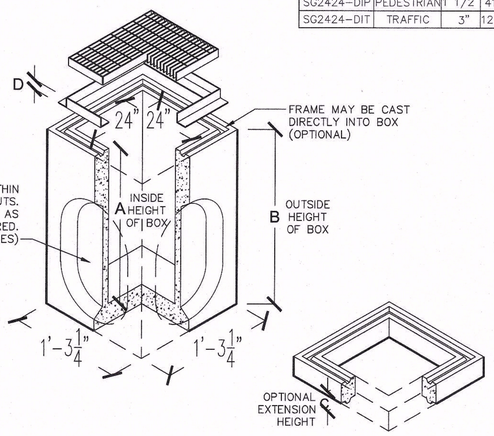
STORM DRAIN PLAN AND PROFILE 3

DRAWING
SD-3
15 OF 20 SHTS

DROP INLET			
MODEL NO.	A	B	*WEIGHT
DI242436	36"	42"	1900 LBS.
DI242448	48"	54"	2500 LBS.

*BOX ONLY

FRAME AND GRATE			
MODEL NO.	RATING	D	WEIGHT
SG2424-DIP	PEDESTRIAN	1 1/2"	41 LBS.
SG2424-DIT	TRAFFIC	3"	120 LBS.



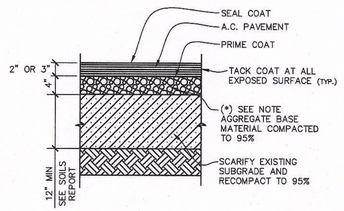
EXTENSION		
MODEL NO.	C	WEIGHT
RS242406	6"	300 LBS.
RS242412	12"	600 LBS.

- FRAME AND GRATE ASSEMBLY AVALIABLE IN TRAFFIC OR PEDESTRIAN MODELS.
- FRAME AND SOLID COVER ASSEMBLY AVALIABLE IN TRAFFIC OR PEDESTRIAN MODELS.
- DESIGN FOR H-20-44 BRIDGE LOADING.
- ASSEMBLY TO BE PLACED ON A 6" BASE OF CRUSHER RUN FOR EASE OF INSTALLATION AND EVEN LOAD DISTRIBUTION.
- FOR COMPLETE DESIGN AND PRODUCT INFORMATION, CONTACT JENSEN PRECAST.
- ILLUSTRATION IS TYPICAL ONLY OF GENERAL SERIES CONFIGURATION: FOR SPECIFIC CONFIGURATION, CALL JENSEN PRECAST.
- GRATE TO MEET ANSI A117.1 (HEAL RATED)

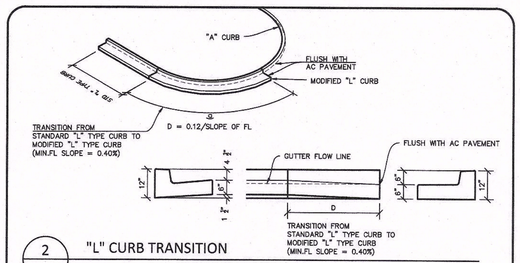
24" X 24" DRAIN INLET		JENSEN PRECAST
ORG DWG DATE: 11-28-00	REV DWG DATE:	DI2424

8.01

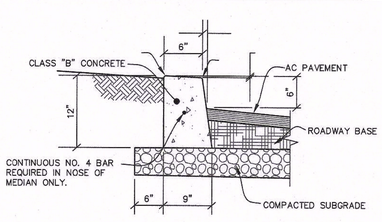
11 - 24"x24" jENSEN PRECAST DRAIN INLET
NOT TO SCALE



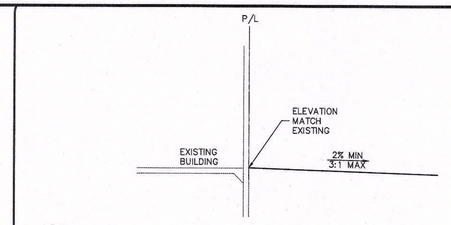
3 - PAVEMENT & CONCRETE SECTION
NOT TO SCALE



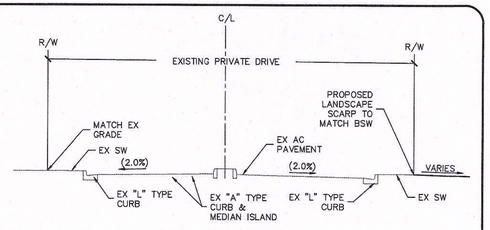
2 - "L" CURB TRANSITION
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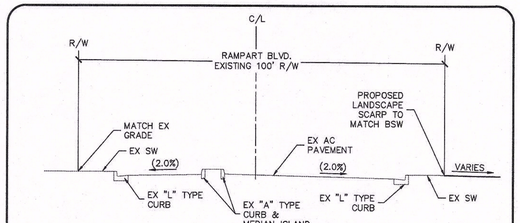
1 - MODIFIED "A" CURB DETAIL
NOT TO SCALE



J - TYPICAL SECTION
NOT TO SCALE

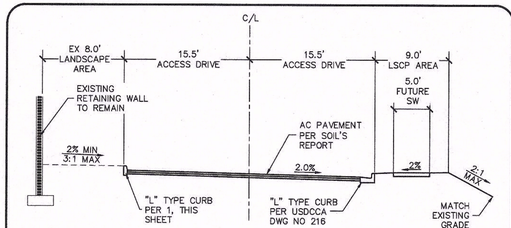


I - TYPICAL SECTION
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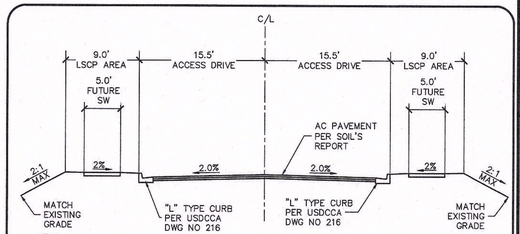


H - TYPICAL SECTION
NOT TO SCALE

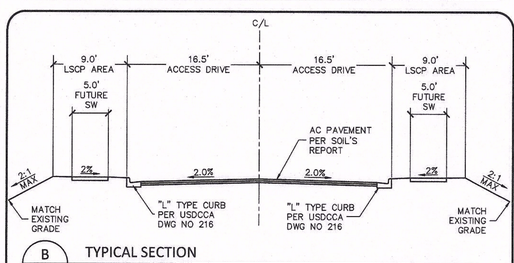
E - TYPICAL SECTION
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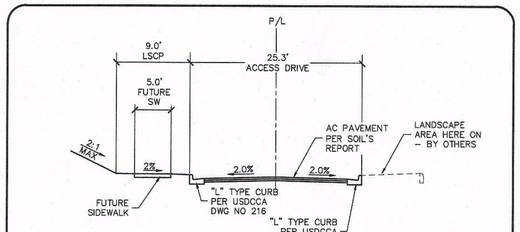
D - TYPICAL SECTION
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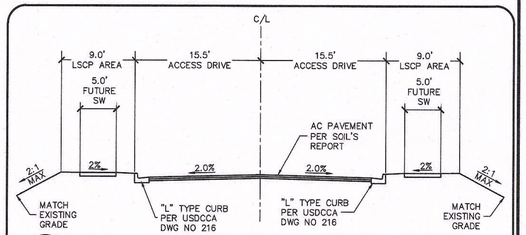
C - TYPICAL SECTION
NOT TO SCALE



B - TYPICAL SECTION
NOT TO SCALE



F - TYPICAL SECTION
NOT TO SCALE



A - TYPICAL SECTION
NOT TO SCALE

STATE OF NEVADA — PROFESSIONAL ENGINEER — TODD M. KELLY — No. 14711 — Exp. 6/30/2019 — CIVIL
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F:\PROJECTS\800\840-060\DWG\PRODUCTION\A060C015-DT1.DWG
TODD KELLEY

EHB COMPANIES LLC
RENAISSANCE
DETAIL PLAN

DRAWING
DT-1
13 OF 20 SHTS

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