

DS #: 05411

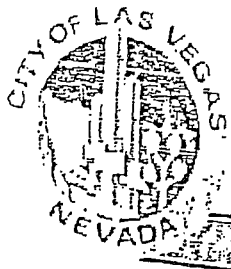
APN: 126-12-511-001 S 003

PROJECT: Skye Canyon 5.01 S 5.03

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:



CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		February 8, 2021
TO: Land Development Services Department of Building & Safety		FROM: Jennifer Shinn, P.E. Flood Control, Engr. Associate Department of Public Works
SUBJECT:	Drainage Study for:	
	Skye Canyon 5.01 & 5.03	
Cross Streets:	Shaumber Rd. & Iron Mountain Rd.	
File Number:	F:\Depot\DSMemos\DS5411A.doc	
Parcel Number:	126-12-511-001 & -003	
Zoning Action:		
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO
COPIES TO:		
		Impulse
		RCI Engineering
		Century Communities Nevada, LLC
		Bart Anderson, P.E., DevCo
		CCRFC

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	1/19/2021	2/4/2021	See Comments Below	\$400.00	4135723: \$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.

The following are comments pertaining to the subject site specific drainage study and grading plans:

1. Provide a copy of the zoning/planning conditions associated with this site 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. The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFC) master planned facility. Therefore, CCRFC concurrence is required prior to final approval of the drainage study.

Please note that effective April 6, 2020, only electronic submittals to the CCRFC will be accepted for regional concurrence. Contact cwang@regionalflood.org for direction.
3. Unclear why "Industrial" curve number is used for proposed conditions in a residential location. You also provide a reference from the 2018 Las Vegas Valley MPU Composite Curve Number Breakdown that indicates the CN value is 91.6 Table 602A HDCCM should be referenced for residential CN values per average lot size.
4. Drainage Basin Data Areas and Curve Numbers spreadsheet claims that the soil is 0% Soil Type D. However, the soil report shows that it should be 100% soil D.

5. Figure 3, the Developed Basin Map, should have proposed contours to verify basin delineation, and flow arrows to indicate drainage direction.
6. Provide all flow hydraulic information on the Developed Basin map. There is a 10/100 year flow rate call out on the legend that is not used on the map.
7. Use the hydraulic section numbers designated on the Developed Basin Map to label the hydraulic section calculations for clarification.
8. The list of Figures provided on page ii of the report does not match the figures provided. Figure 3 is listed as the Existing Condition Map however it is the Developed Condition Map. And Figure 4 is listed as the Interim/Ultimate Condition Map however it is provided as the FIRM Map. Additionally, all figures listed as provided in the "Map Pocket" were not actually provided in the map pocket.
9. Per the Master Study, Lot 5.01b (5.03 per this study) does not drain to the Canyon View wash. Provide a hydraulic analysis to demonstrate the additional flows can be conveyed be conveyed in the wash. Additionally, water surface elevations for the adjacent wash needs to be provided to verify the finished floor elevations for the lots along the wash.
10. Provide inlet calculation for grate inlet at Sump #5. This calculation must provide the ponding depth at the inlet to verify adjacent finished floor elevations.
11. Property line shown in middle of wash on grading plan does not match detail D-1/8 showing property line at the top of the bank. The detail indicates "boundary" in the center of the wash. This is unclear. Clarify where the property line is located.
12. Provide calculations to demonstrate the proposed grouted rip rap within the existing wash has no adverse impacts to existing hydraulics within the wash. In addition, verify that the existing flows in the wash will not have an erosive effect on the proposed rip rap pad. Additional mitigation for scour may be required.
13. Label Section Detail 22/D-2 as a "Public Drainage Easement to be Privately Maintained" and show the dimension of the easement. Note that Public Drainage Easements shall be constructed per CCAUSD 425.S1.
14. Label Iron Mountain Road on the Unit 2 Grading Plans.

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
HDR/JKS

T/R/S: T19S/R60E/S07
AREA G-07

TECHNICAL DRAINAGE STUDY
FOR
SKYE CANYON 5.01 & 5.03

W.O. #RCI-2002
January 6, 2021

Prepared for:

RCI Engineering
500 South Rancho Drive, Suite 17
Las Vegas, Nevada 89106
Phone: (702) 453-0800

Prepared by:

Impulse

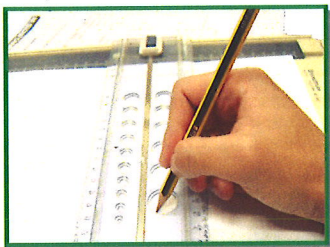
Civil Engineering & Planning

7485 West Azure Avenue, Suite 226
Las Vegas, NV 89130
Phone: 702-815-0720 · Fax: 702-478-8535

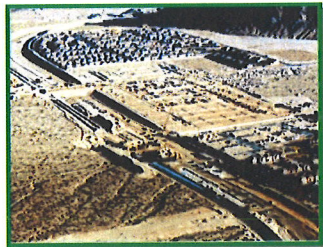


1/6/21

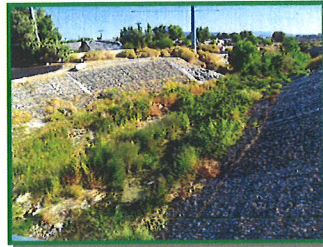
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Civil Engineering



Land Planning



Flood Control



Utilities

January 6, 2021

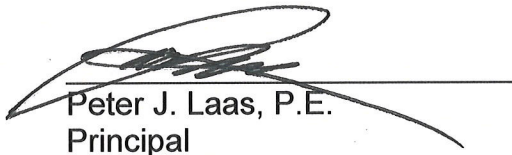
City of Las Vegas
Public Works – Flood Control
333 North Rancho Drive
Las Vegas, Nevada 89107

**Re: *Technical Drainage Study*
 *Skye Canyon 5.01 & 5.03***

Submitted for your approval is the ***Technical Drainage Study for Skye Canyon 5.01 & 5.03*** a proposed 37.63 acre single family development. The site is affected by a FEMA Special Flood Hazard Area Zone X but is adjacent to a Clark County Regional Flood Control District (CCRFCD) Master Planned Facility (MOIR-0020) according to the CCRFCD Master Plan Update, Figure F-11. CCRFCD concurrence should be required.

If you have any questions or require additional information, please call me at (702) 853-6702.

Sincerely,
IMPULSE CIVIL ENGINEERING



Peter J. Laas, P.E.
Principal

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Skye Canyon Phase 5.01 & 5.03 Date: 1/6/2020
 Location of Development: a) Descriptive (Cross Streets) North/South: Shaumber Road
 East/West: Iron Mountain Road
 b) Section: 12 Township: 19S Range: 59E
 c) APN : 126-12-511-001 & 003

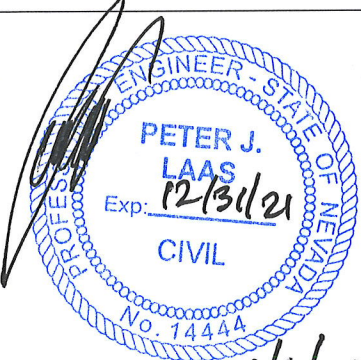
Name of Owner: Century Communities Nevada LLC c/o Toll South LV, LLC c/o RCI Engineering
 Telephone No.: 702-453-0800 Fax No.: none E-Mail Address: jland@rcinevada.com
 Address: 500 South Rancho Drive, Suite 17, Las Vegas, Nevada 89106

Contact Person-Name: Peter Laas Telephone No.: 702-815-0720
 * E-Mail Address: PLaas@ImpulseCivl.net Fax No.: 702-478-8535
 Firm: Impulse Civil Engineering
 Address: 7485 West Azure Avenue, Suite 226, Las Vegas NV 89130

Type of Land Development/Land Disturbance Process:

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

- Total Owned Land Area: At Site: 37.63 AC+- Being Developed/Disturbed: 37.63 AC+-
- Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ Yes** ☒ No
- Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ Yes** ☐ No
- Proposed type of development (Residential, Commercial, Etc.): Residential
- Approximate upstream land area which drains to the subject site: 0 acres
- Has the site drainage been evaluated in the past? ☒ YES ☐ NO If yes, please identify documentation: DS-4953 Skye Canyon Phase 3B, 3C Infrastructure
- If known, please briefly identify the proposed discharge point(s) of runoff from the site: Southeast corner to an existing wash and northeast corner to an existing storm drain system
- Briefly describe your proposed schedule for the subject project: Construction 5/2021

 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. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Revision</th> <th style="width: 40%;">Date</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> DS- Local Entity File No. _____	Revision	Date						
Revision	Date								
REFERENCE: $I = \int F \cdot dt$	STANDARD FORM 1								

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: <u>Skye Canyon 5.01 & 5.03</u>		Map ID: _____
Firm Name: <u>Impulse Civil Engineering</u>		Engineer: <u>Peter Laas, P.E.</u>
Address: <u>7485 West Azure Avenue, Suite 226</u>		
City: <u>Las Vegas</u>	State: <u>Nevada</u>	Zip: <u>89130</u>
Phone Number: <u>(702) 815-0720</u>	Fax Number: <u>(702) 478-8535</u>	
Property Owner: <u>Century Communities of Nevada c/o Toll South LV, LLC</u>		
Address: <u>500 South Rancho Drive, Suite 17</u>		
City: <u>Las Vegas</u>	State: <u>Nevada</u>	Zip: <u>89106</u>
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	
<u>X</u>	_____	Design Manual Standard Form 1 with the engineer's seal and signature.
<u>X</u>	_____	Design Manual Standard Form 4 .
<u>X</u>	_____	2 copies of the 24" x 36" Drainage Plan.
_____	<u>X</u>	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

Yes	No	
<u>X</u>	_____	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
<u>X</u>	_____	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

$$I = \int F \cdot dt$$

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:

STANDARD FORM 2

$$I = \int F \cdot dt$$

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
☐	☒	Streets with off-set crowns.
☒	☐	Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
☒	☐	Property lines.
☒	☐	Right-of-way lines and widths, existing and proposed.
☒	☐	Existing improvements and their elevations.
☒	☐	Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
☒	☐	Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
☒	☐	Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
☒	☐	Location and cross-section of street capacity calculations.
☐	☒	Cross-sectional detail for channels, including cutoff wall locations.
☒	☐	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.
☒	☐	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
☒	☐	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.
☒	☐	Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.
☒	☐	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.
☒	☐	Building and/or lot numbers.
☒	☐	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
☒	☐	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

$$I = \int F \cdot dt$$

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
☐	☒	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.
☐	☒	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.
☒	☐	Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
☐	☒	Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

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

REFERENCE:

STANDARD FORM 2

$$I = \int F \cdot dt$$

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

Yes	No	
☐	☒	Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
☒	☐	Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q ₁₀₀ and Q ₁₀ flows representing the worst case for interior and all perimeter streets. Q ₁₀₀ d x v ≤ 8. Q ₁₀ d x v ≤ 6 and 12 foot dry lane for rights-of-way ≥ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
☒	☐	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.
☒	☐	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
☒	☐	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.
☒	☐	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.
☐	☒	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.
☐	☒	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
☐	☒	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.
☒	☐	The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.
☐	☒	Provide BMP type, size and supporting calculations for parking lots and LIDs (if required).

REFERENCE:

STANDARD FORM 2

$$I = \int F \cdot dt$$



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	
	N/A	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. 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.)

$$I = \int F \cdot dt$$

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

II. GRADING PLAN INFORMATION		
Yes	No	
	N/A	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.
	N/A	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	
X		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.
X		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.
	N/A	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.

$$I = \int F \cdot dt$$

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
	N/A	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.
	N/A	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.

$$I = \int F \cdot dt$$

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1.0 GENERAL LOCATION AND DEVELOPMENT DESCRIPTION

1.1 Scope

The purpose of this report is to provide detailed hydrologic and hydraulic analyses for the proposed development of parcels 126-12-511-001 and 126-12-511-003, generally located at the southeast corner of Shaumber Road and Iron Mountain Road, and to provide appropriate drainage mitigation recommendations. This report will address the existing, interim, and ultimate conditions which affect the onsite and off-site drainage. The criteria set forth in the Clark County Regional Flood Control District "Hydrologic Criteria and Drainage Design Manual" (CCRFCD Manual), was used as the technical basis for this study.

1.2 Location

The proposed Skye Canyon 5.01 & 5.03 development is located within the City of Las Vegas, Nevada. The site is generally located at the southeast corner of Shaumber Road and Iron Mountain Road as shown in Figures 1 and 2. The site is bounded by vacant land to the north, newly graded lots to the south and east, and vacant land to the west. The site is specifically the west half (W ½) of the northwest quarter (NW ¼) of the northeast quarter (NE ¼) of Section 12, Township 19 South, Range 59 East.

1.3 Description of Property

The project site consists of approximately 37.63 acres of undeveloped desert land. The topography is relatively flat with a slope of approximately 4% to the east. The vegetation is classified as poor, with less than 50% ground cover. There are historic washes that traverse the project but they are no longer active with the construction of the adjacent streets and storm drain facilities. There is an active wash to the south of the property that we will discuss in Section 2.3 below.

SKYE CANYON 5.01 & 5.03

APN:126-12-511-001 & 003

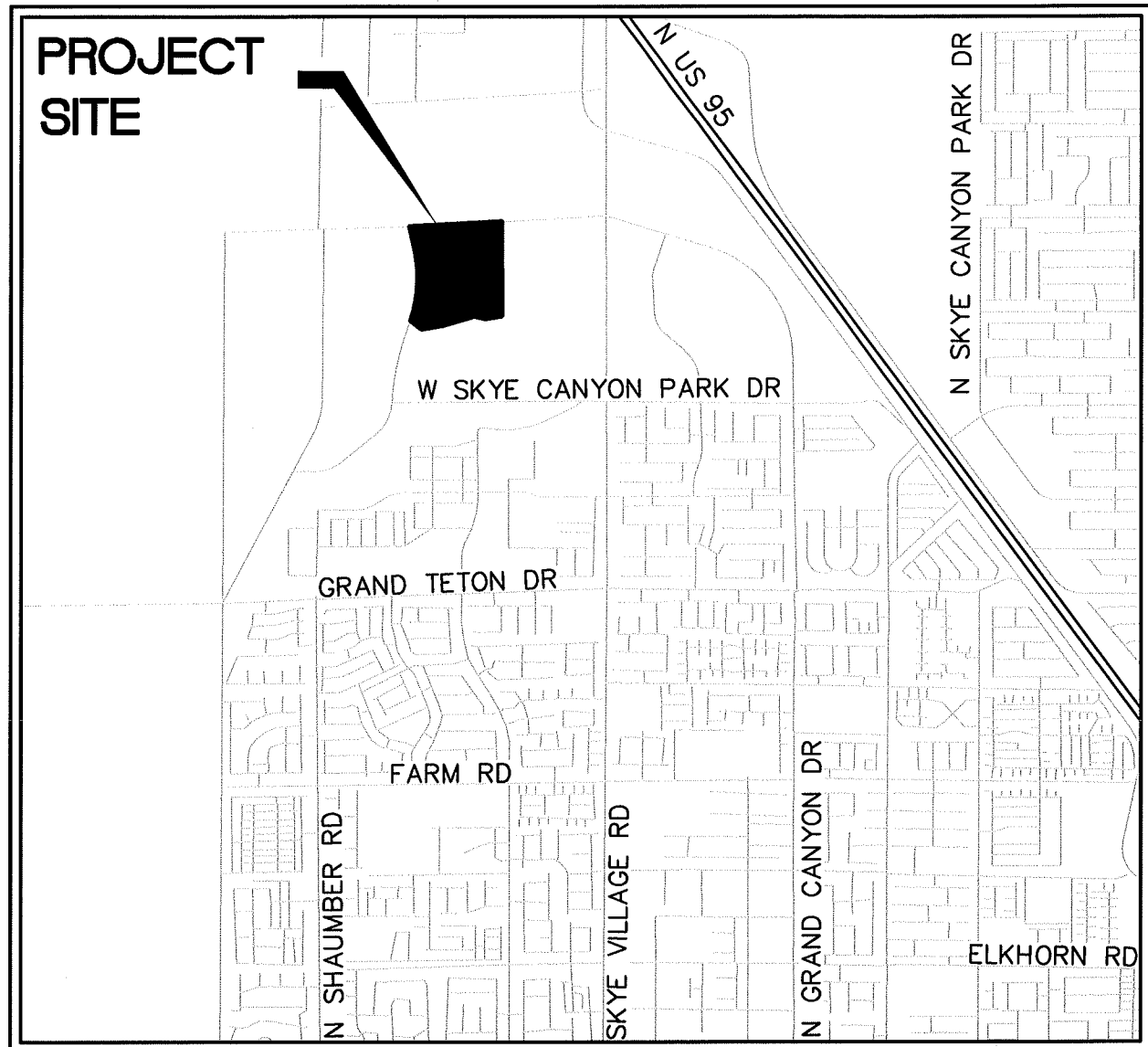


FIGURE 1

VICINITY MAP
NOT TO SCALE



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$$I = \int F \cdot dt$$

SKYE CANYON 5.01 & 5.03

APN: 126-12-511-001 & 003

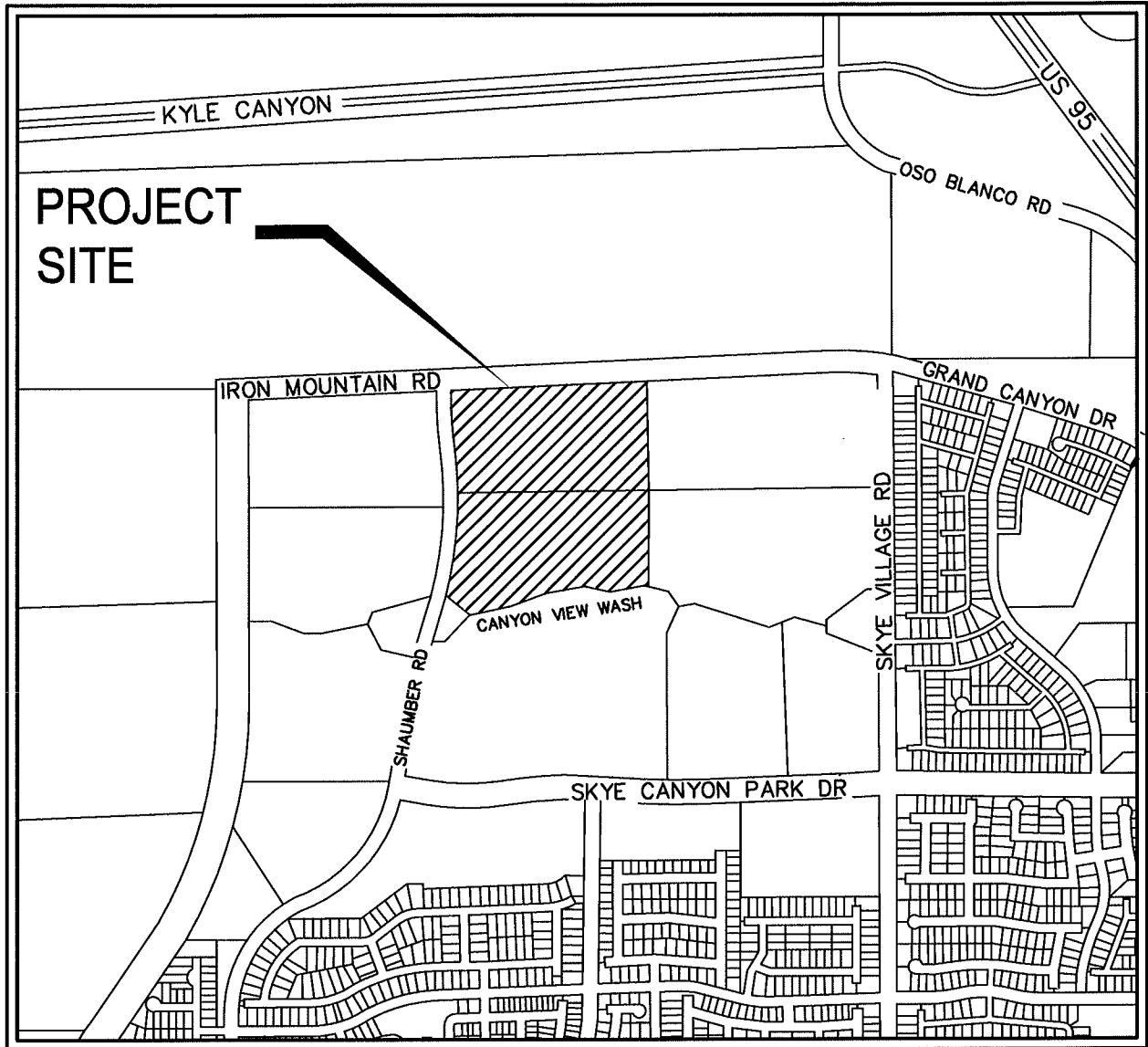


FIGURE 2
LOCATION MAP
NOT TO SCALE



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$$I = \int F \cdot dt$$

2.0 DRAINAGE BASIN DESCRIPTION

2.1 Off-site Drainage Description

The general drainage pattern for this portion of valley is to the east. The historic offsite area is non-existent with the development of the adjacent infrastructure.

NORTH There is no impact to the property from the north. Flow north of the site drains to the east.

SOUTH There is no impact to the property from the south. Flow south of the site drains to the east.

EAST There is no impact to the property from the east. Flow east of the site is intercepted by Shaumber Road and existing storm drain facilities.

WEST There is no impact to the property from the west. Flow west of the site drains to the east and away from the site.

An analysis of the full offsite area was not performed. The site is within the Upper Northern Las Vegas Wash watershed with offsite flows originating in the La Madre Range of the Spring Mountain within Kyle Canyon. The historic peak offsite flow is managed by the existing Moccasin Outfall Detention basins. The offsite areas and existing adjacent roads were analyzed in the Skye Canyon Master Drainage Study and more recently the Skye Canyon Phase 3B-3C Infrastructure.

2.2 Existing Condition Drainage Description

The general drainage pattern for the site is to the northeast. The site is traversed by three small washes that are no longer active due to the infrastructure improvements constructed around the site. There is an active wash along the south boundary of the site which will be discussed further in Section 2.3 of this report. The site was analyzed in the Technical Drainage Study for Skye Canyon Phase 3B, 3C Infrastructure, by Slater Hannifan Group, dated February 2018 (DS-4953). That study treated our site as Basin EX4 and developed existing condition flow rates of 27 / 70 cfs for the 10-year / 100-year 6-hour storm events. We have reviewed the hydrologic parameters used in that study and concur with the results so we will not be performing an existing condition analysis.

2.3 Canyon View Wash

This southern wash which we will call the Canyon View Wash (because it intersects Skye Village Road at Canyon View Lane) was looked at very closely for this development because of the evidence of scour in all of the cut banks. Looking at the soils report for the area, the soil is cemented but as is evidenced by the depth of the channel it is susceptible to erosion and sediment transport. Initial recommendations in the soils report stated a 1:1 setback from the channel bottom or base of the undercut. The proposed grading is outside the limits of the banks of the wash and the flow line is a minimum of 8-feet below the proposed grading. It should be noted that the flow in the channel has been substantially reduced with the constructed infrastructure upstream, specifically the Skye Canyon Detention Basin #2. Therefore no analysis of the wash will be performed with this study. We did express a concern about erosion and channel armoring but the master developer has informed us that channel improvements will not be part of our scope and would be performed as part of their scope. This study will assume that the channel analysis and armoring as required will be performed by the master developer.

2.4 Interim/Ultimate Condition

In the interim condition, the offsite area was treated the same as for the existing condition (nonexistent) and only the site is developed. The site was analyzed by the referenced study above as basins 5.01 and 5.01b. The areas don't match the existing condition, the CN appears to be conservative, and we have a specific layout so we will perform our own interim condition analysis. The interim condition is also the ultimate condition because this is the last property in the watershed to develop. In the interim/ultimate condition, we determined that the site will discharge 26/57 cfs to the north and 22/48 cfs to the south. These flows are less than the master planned flows (31/64 and 33/62 respectively) because of the areas, lag times, and CN values. The onsite basin map may be found after this section as Figure 3.

2.5 FEMA Flood Hazard Zone

The Special Flood Hazard Areas for Clark County, Nevada are outlined in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), dated September 27, 2002. The site is affected by a designated Special Flood Hazard Area (SFHA) Zone X as shown on Figures 4, which is a replication of Community Panel No. 32003C1750 E. Zone X is an area determined to be outside the 500-year flood plain (0.2% annual chance flood).

2.6 Regional Flood Control Master Plan Update

The site is adjacent to a regional facility (MOIR-0020) as shown on Figure 5 which is a replication of Figure F-11 in the 2018 Clark County Regional Flood Control District Flood Control Master Plan Update for the Las Vegas Valley.

2.7 Previous Drainage Studies

The site has been studied in the past. The following studies have been reviewed and are being referenced for pertinent information which may be found in Appendix D:

- *Technical Drainage Study for Skye Canyon Phase 3B, 3C Infrastructure*, by Slater Hannifan Group, dated February 2018 (DS-4953)

The site was analyzed as Basin EX4 in the existing condition (prorated basins Z1 and Z2) and Basins 5.01 and 5.01B in the interim and ultimate conditions. Please note that large portions of the referenced HEC-1 printouts are not provided because there are hundreds of pages for the detention basin modeling so we tried to limit the pages to only applicable portions.

There is an adjacent study that we also referenced which also may be found in Appendix D:

- *Technical Drainage Study for Skye Canyon 2.07 / 2.32*, by Westwood, dated December 2019 (DS-4953).

This study quantifies the flow in the Canyon View Wash 268 cfs during the interim condition and 318 cfs in the ultimate condition.



LEGEND

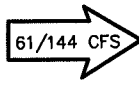
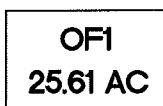
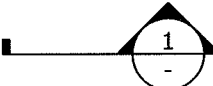
-  BASIN BOUNDARY
-  10/100 YEAR FLOW RATE
-  BASIN OR POINT OF INTEREST
ACREAGE
-  NORMAL DEPTH LOCATION
NORMAL DEPTH SECTION NUMBER

FIGURE 3

SKYE CANYON 5.01 + 5.03 DEVELOPED BASIN MAP



(IN FEET)

1 inch = 300 ft.



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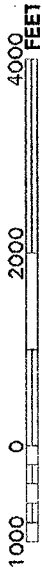
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$$I = \int F \cdot dt$$



MAP SCALE 1" = 2000'



**PROJECT
SITE**

CANYON

ROAD

CORPORATE LIMITS

**CITY OF LAS VEGAS
325276**

11

12

7

13

18

14

*Detention
Basin*

PANEL 1750 E

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

PANEL 1750 OF 4090

SEE MAP INDEX FOR FIRM PANEL LAYOUT

CONTAINS	NUMBER	PANEL	SUFFIX
LAS VEGAS CITY OF CLARK COUNTY UNINCORPORATED AREAS	325276	1750	E
	322093	1750	E

$$I = \int F \cdot dt$$

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

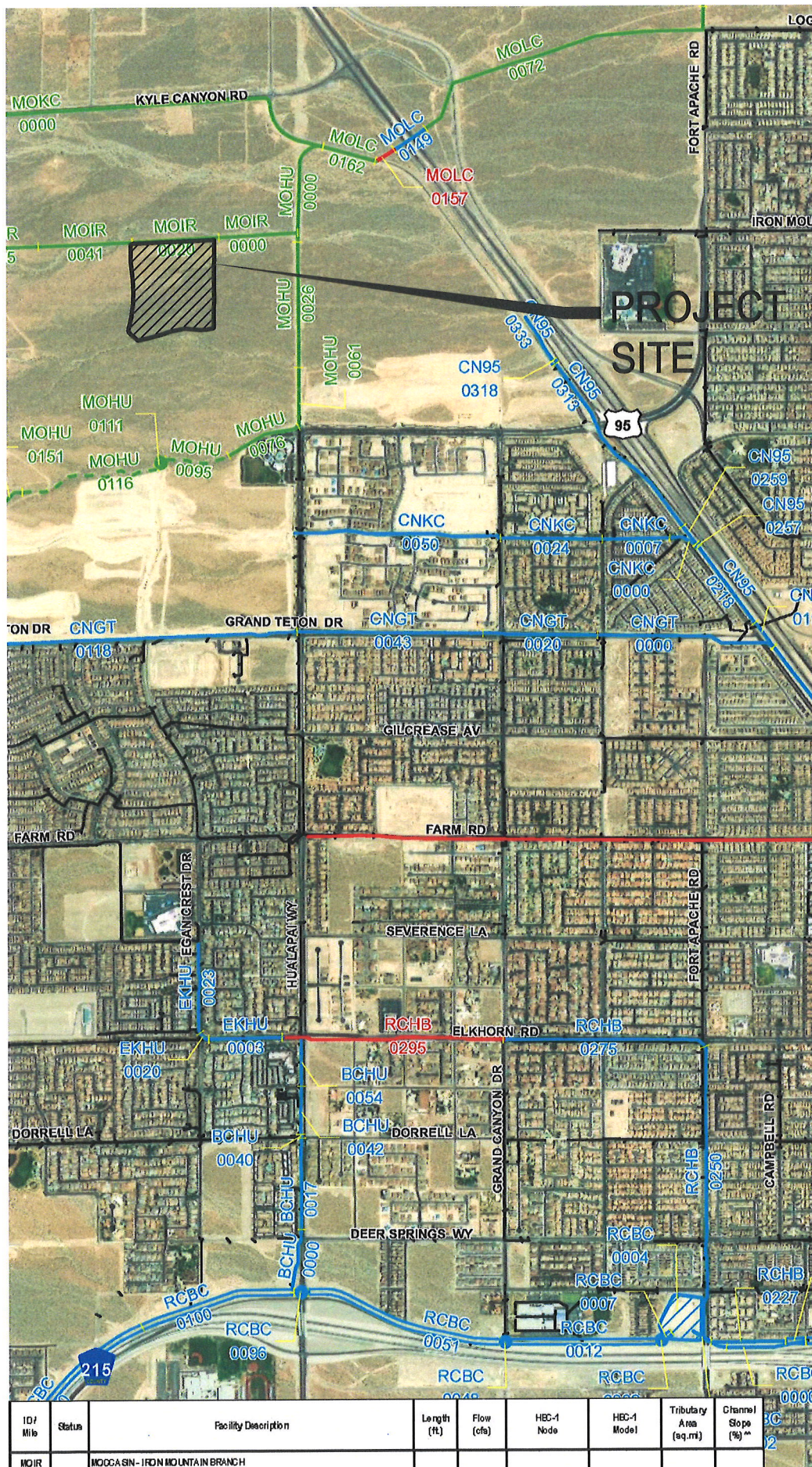


**MAP NUMBER
32003C1750 E**

**MAP REVISED:
SEPTEMBER 27, 2002**

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-11

FLOOD CONTROL FACILITIES

LEGEND

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

Remove & Replace/Parallel Facilities

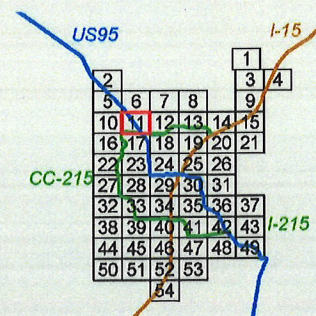
- | | |
|-------------------|-------------------|
| Category A | Category B |
| Channel | Channel |
| Stormdrain | Stormdrain |
| Crossing | Crossing |

$$I = \int F \cdot dt$$



Scale: 1 inch = 2,000 feet

AerialSource: Esri World Imagery 2017



ID/ Mile	Status	Facility Description	Length (ft)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq. mi)	Channel Slope (%)
MOIR 0000	P0	MOOGASIN - IRON MOUNTAIN BRANCH	1060	410	CNIN39-C	LOWNR3	0.83	4.50
0020	P0	54" RCP	1161	71	MODB2	LOWNR3	0.56	3.20
0041	P0	42" RCP	1236	71	MODB2	LOWNR3	0.56	5.00
0065	P0	60" RCP	1099	71	MODB2	LOWNR3	0.56	0.40

FIGURE 5

3.0 HYDROLOGIC/HYDRAULIC METHODOLOGY

3.1 General

The project site is to be developed into single family homes consisting of two hundred twenty seven (227) – 4,500 square foot lots. The grading of the site will provide positive drainage through the site without creating a negative impact to neighboring properties and the site itself. The drainage patterns established in the referenced study were maintained as close as possible.

3.2 Compliance with Regulations and Adopted Plans

The hydrologic parameter calculations for the local on-site basins are included in Appendix A. The hydrologic analyses for the existing and developed conditions are included in Appendix B. The hydraulic calculations for the proposed improvements are included in Appendix C. All calculations presented in this report are in accordance with the CCRFCD Manual.

3.3 Hydrologic Criteria

The watershed was modeled using the storm network computation capabilities of the U. S. Army Corps of Engineer's HEC-1 Flood Hydrograph computer model. The HEC-1 computer program has a wide range of capabilities in modeling gauged and un-gauged watersheds, with most of the latest techniques for simulating precipitation, rainfall distribution, runoff losses due to soil absorption, transpiration, evaporation

and surface impoundment, flood routing, flow diversions and splits. Since the study watershed is un-gauged, the analysis used to model the runoff incorporated the Soil Conservation Service (SCS) unit hydrograph method to develop a hypothetical flood hydrograph. The CCRFCD Manual was used to establish the point precipitation values, rainfall distribution (SDN 3), and depth area reduction factors. The point precipitation values were established from the NOAA precipitation Frequency Atlas (1973). The NOAA precipitation values were then adjusted by the recommended correction factors to develop point rainfall depths for storm events that best simulate the hydrologic area. The point precipitation values are shown in Table 1 for the six-hour duration storm event. The six-hour storm has been selected in accordance with the CCRFCD Manual.

TABLE 1 Depth-Duration-Frequency Values	
Return Period (year)	Precipitation (in)
10	1.3
100	2.1

The site is not within the McCarran rainfall area, so the precipitation adjustment ratios are applied. A depth area reduction factor was not applied to the rainfall values so the DARF = 1.00. Precipitation calculations are located in Appendix A.

The curve numbers were developed based on vegetation, soils group information, land use, and antecedent soil moisture conditions in accordance with the standard methods of the Soil Conservation Service (SCS). The curve numbers were adjusted accordingly to reflect the existing and developed conditions of the site.

The soils information was obtained from the United States Department of Agriculture Natural Resources Conservation Service Soil Survey dated August 22, 2014. The site is split between map unit symbols 155 and 400. Map unit symbol 155 is Cave soils and is classified as 100% hydrologic soil group (HSG) D. Map unit symbol 400 is Tencee soils and is also classified as 100% HSG D. Curve number calculations are located in Appendix A.

The time between a brief heavy rain and the maximum runoff rate is called lag time. Lag can be estimated from historical hydrographs or it can be estimated from specific watershed characteristics such as watershed length, slope and flow retardance. Based on studies of many storm events for a range of watershed conditions, the following empirical relationship between lag (L) and time of concentration (T_c) was derived:

$$L = 0.6 T_c$$

$$T_c = \frac{L_{ws}}{3600 \cdot V} + T_i$$

where: L_{ws} = Hydraulic length

V = Average velocity

T_i = Initial flow time

Average velocities for estimating travel time for surface flow were used to develop a time of concentration. Flow characteristics may be separated into three general categories: initial overland, shallow concentrated, and channelized. To determine initial flow times, the equation $T_i = 1.8 (1.1-K) L^{1/2}/S^{1/3}$ was used as outlined in the CCRFCD Manual. To determine shallow concentrated flow velocities and channelized flow velocities, the equations published in the CCRFCD Manual were utilized. The computations are included on the Standard Form 4. The results are shown on a version of Standard Form 4 and may be found in Appendix A.

3.4 Facility Design Calculations

Normal depth calculations were performed for areas of interest for the interim/ultimate conditions. All normal depth calculations may be found in Appendix C. The flows in Shaumber Road and Iron Mountain Road are referenced based on the discussion in Section 2.7 of this study.

The entrance off Shaumber Road was designed based on a pro-rated flow of 3 cfs which produced a depth of 0.36 ft.

The site discharges 57 cfs to Sump #5 as identified in the reference study. This is less than the facility was designed for so (64 cfs) so additional analysis of the inlet and storm drain system should not be required. The conveyance from the onsite street to the sump is analyzed in this report. The facility should consist of a 20-foot v ditch at least 1-foot deep with 10-inch loose rip rap, 20-inches thick.

The onsite streets were not individually analyzed but rather the last street in the conveyance. The north street has a resultant 100-year flow depth of 0.53-feet. Twice the depth of flow results in 1.06 above the flow line. All finished floor elevations are greater than 1.5-feet above high top of curb which is 1.88-feet above the flow line. All of the street upstream of this street would see less flow so they would easily meet freeboard criteria. Similarly, the south street has a resultant 100-year flow depth of 0.52-feet. Twice the depth of flow results in 1.04 above the flow line.

Analyzing the t-intersections is performed in the same manner. The steepest slope in the north portion of the site is 4.48% which results in a 100-year depth of 0.52' with a velocity head of 0.71'. The sum is 1.23' < 1.88-feet ∴ ok. Similarly the steepest slope in the south portion of the site is 5.35% which results in a 100-year depth of 0.49' with a velocity head of 0.69'. The sum is 1.18' < 1.88-feet ∴ ok.

4.0 RESULTS

The flow rates developed by this report are shown in Table 2. The development of the site does not substantially increase any of the adjacent flow rates.

TABLE 2 Summary of Flows		
BASIN	Existing (10yr/100yr) (cfs)	Developed (10 yr/100yr) (cfs)
PR1	- / -	26 / 57
PR2	- / -	22 / 48

Table 3 summarizes the normal depth sections analyzed. All sections meet the velocity-depth product requirements and dry lane requirements.

TABLE 3 Normal Depth Sections									
Street Name	Q ₁₀ (cfs)	V ₁₀ (ft/s)	d ₁₀ (ft)	V ₁₀ * d ₁₀	Q ₁₀₀ (cfs)	V ₁₀₀ (ft/s)	d ₁₀₀ (ft)	V ₁₀₀ * d ₁₀₀	Dry Lane (ft)
Discharge to Sump #5	26	4.66	0.38	1.77	57	6.34	0.55	3.49	N/A
North Streets	26	5.04	0.44	2.22	57	6.52	0.53	3.46	N/A
South Streets	22	4.49	0.43	1.93	48	5.73	0.52	2.98	N/A
Discharge to wash	22	4.45	0.35	1.56	48	6.05	0.50	3.03	N/A

5.0 CONCLUSIONS AND RECOMMENDATIONS

1. The site is located within a Special Flood Hazard Area Zone X. CCRFCD concurrence should not be required prior to final signature on the improvement plans.
2. The development of this site is has an impact on the Clark County Regional Flood Control District Flood Control Master Plan Update. The site is adjacent to a CCRFCD facility (MOIR-0020).
3. The finished floor elevations were established as follows:
 - Six inches above the highest adjacent top of curb per CCRFCD HCDDM 304.4.E.1.
 - Finished floor elevations for buildings adjacent to public drainage easements are a minimum of 18 inches above the Q-100 weir or submerged weir elevation, whichever is greater.
 - Finished floor elevation calculations include allowances for super elevations on curves and velocity head (head loss) for tee intersections.
4. The grading plan is included in the pocket in the back of this report.
5. The design of this project does not negatively impact adjacent or downstream properties.
6. The conveyance to the sump in the northeast should consist of a 20-foot wide channel, at least 1-foot deep with 10-inch loose rip rap.
7. The conveyance to the existing Canyon View Channel will consist of a 20-foot wide concrete channel.

6.0 REFERENCES

"2018 Las Vegas Valley Flood Control Master Plan Update", September 2018.
Clark County Regional Flood Control District

"Drainage of Highway Pavements," U. S. Department of Transportation, Federal
Highway Administration, March 1984.

"HEC-1 Flood Hydrograph Package" Revised January 1985. U.S.Army Corps of
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"Hydrologic Criteria and Drainage Design Manual", dated 1999. Clark County
Regional Flood Control District.

"Improvement Standards," Department of Public Works, Clark County, Nevada,
1993.

"Soil Survey of Las Vegas Valley Area, Nevada, Part of Clark County" dated July
1985. U.S. Department of Agriculture, Soil Conservation Service.

"Urban Hydrology for Small Watersheds", June 1986, U.S. Department of
Agriculture, Soil Conservation Service, Technical Release 55, TR-55.

Technical Drainage Study for Skye Canyon Phase 3B-3C, by Slater Hannifan Group,
dated February 2018 (DS-4953)

Technical Drainage Study for Skye Canyon 2.07 / 2.32, by Westwood, dated December
2019 (DS-4953).

APPENDIX A

Hydrologic Parameter Development

$$I = \int F \cdot dt$$

Skve Canyon 5.01 & 5.03

Company Name: Impulse Civil Engineering
File No.: P:\Clients\RCI\RCISkye Canyon
Project No.: RCI2002

Phase 4hydrology\Impulse-STD4 - Skye Canyon 5.01-5.03.XLSjSTD4-INT

Calc By: PJL
Date: 1/1/2021

[illegible]

Impulse
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Las Vegas, NV 89130
Phone: 702-815-0720

NOTES

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

No liability is assumed for the accuracy of the data delineated 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

ASSESSOR'S PARCELS - CLARK COUNTY, NV.
Briana Johnson - Assessor

126-12-5

N 2 NE 4

12

T19S R59E

Rev: 10/29/2020

Scale: 1" = 200'

MAP LEGEND

Parcel Boundary

Sub Boundary

PMLD Boundary

Road Easement

Match / Leader Line

Historic Lot Line

Historic Sub Boundary

Section Line

Condominium Unit

Air Space PCL

Right of Way PCL

Sub-Surface PCL

Block Number

Gov. Lot Number

089 000 087 000

098 099 100 10

127 126 125 12

136 137 138 13

007 ROAD PARCEL NUMBER

001 PARCEL NUMBER

1.00 ACREAGE

202 PARCEL SUB/SEQ NUMBER

PB 24-46 PLAT RECORDING NUMBER

5 BLOCK NUMBER

5 LOT NUMBER

GLS GOV. LOT NUMBER

000 000 000 000

000 000 000 000

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000 000 000 000

000 000 000 000

000 000 000 000



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Las Vegas, NV 89130
Phone: 702-815-0720

$$I = \int F \cdot dt$$

Rainfall Calculation - Not in McCarren Study Area			
10-year		100-year	
From Fig 503		From Fig 506	
$P_{10} =$	1.3	$P_{100} =$	2.1
From Table 501		From Table 501	
$PAR_{10} =$	1.24	$PAR_{100} =$	1.43
From Table 502		From Table 502	
$DARF =$	1	$DARF =$	1
$PB_{10} =$	1.61	$PB_{100} =$	3.00

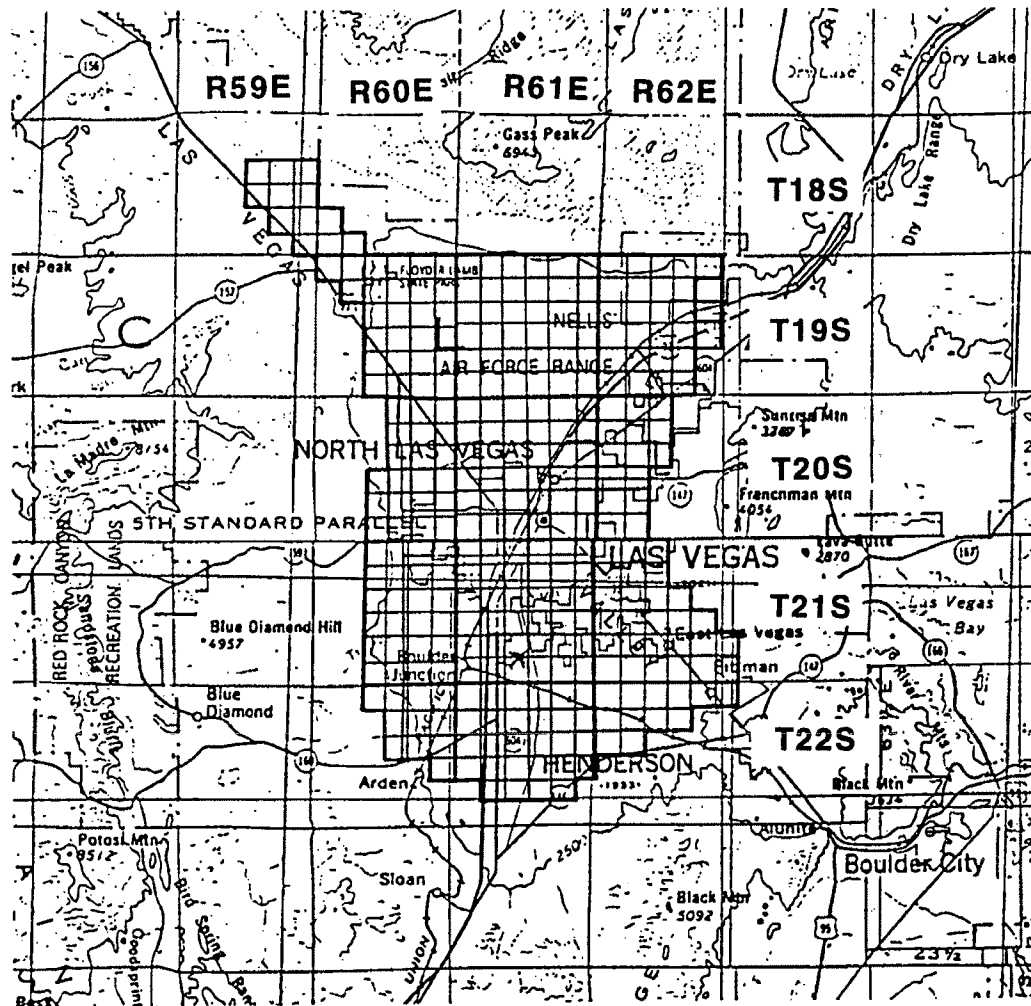
JR Card Calculaiton

JR = $PB_{10} / PB_{100} =$

0.54

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

McCARRAN AIRPORT RAINFALL AREA



T19S, R59E Sec 12 is not included

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

$$I = \int F \cdot dt$$

Notes:

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

Revision	Date

WRC
ENGINEERING

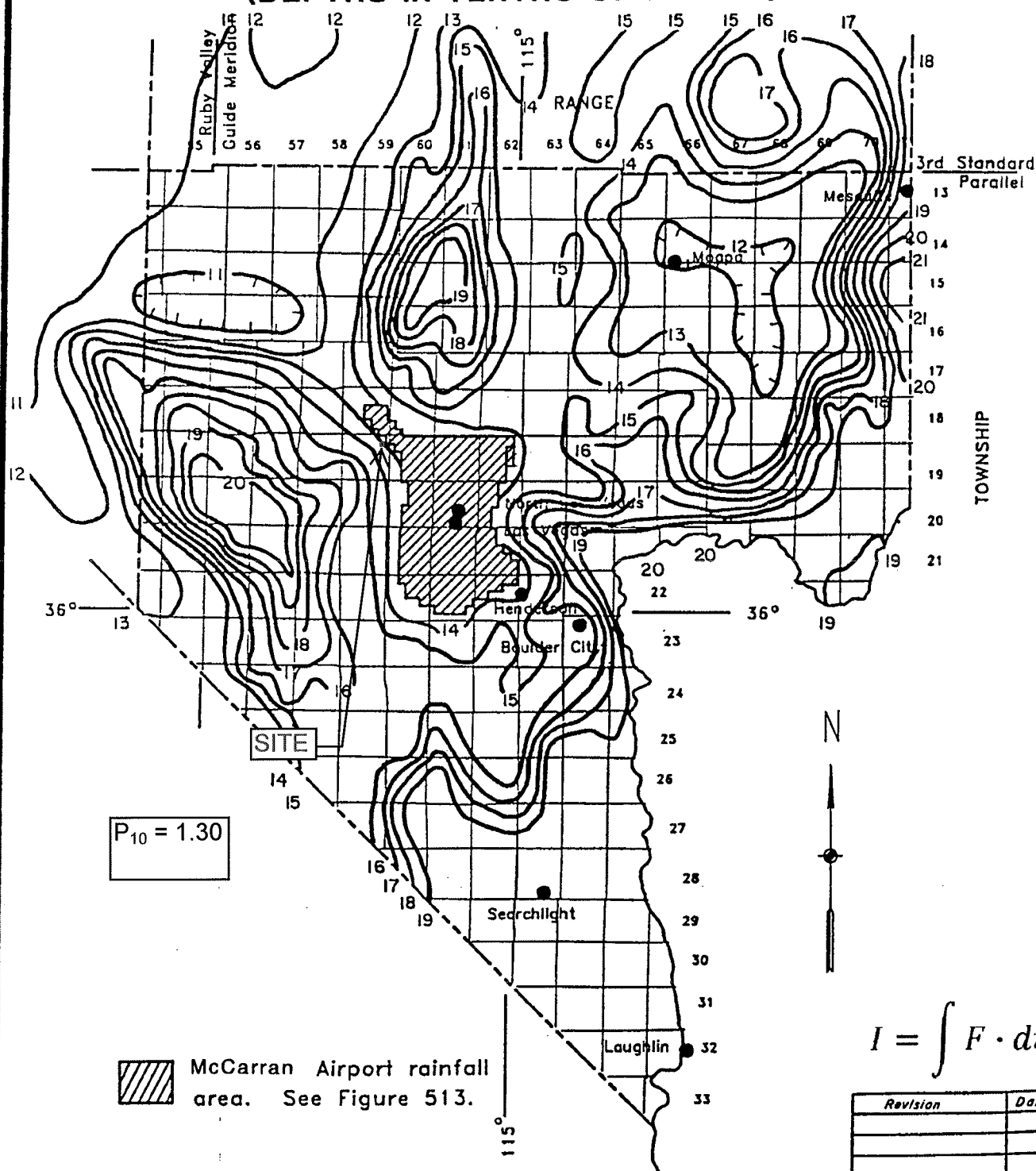
REFERENCE:

USACE, Los Angeles District, 1988

FIGURE 513

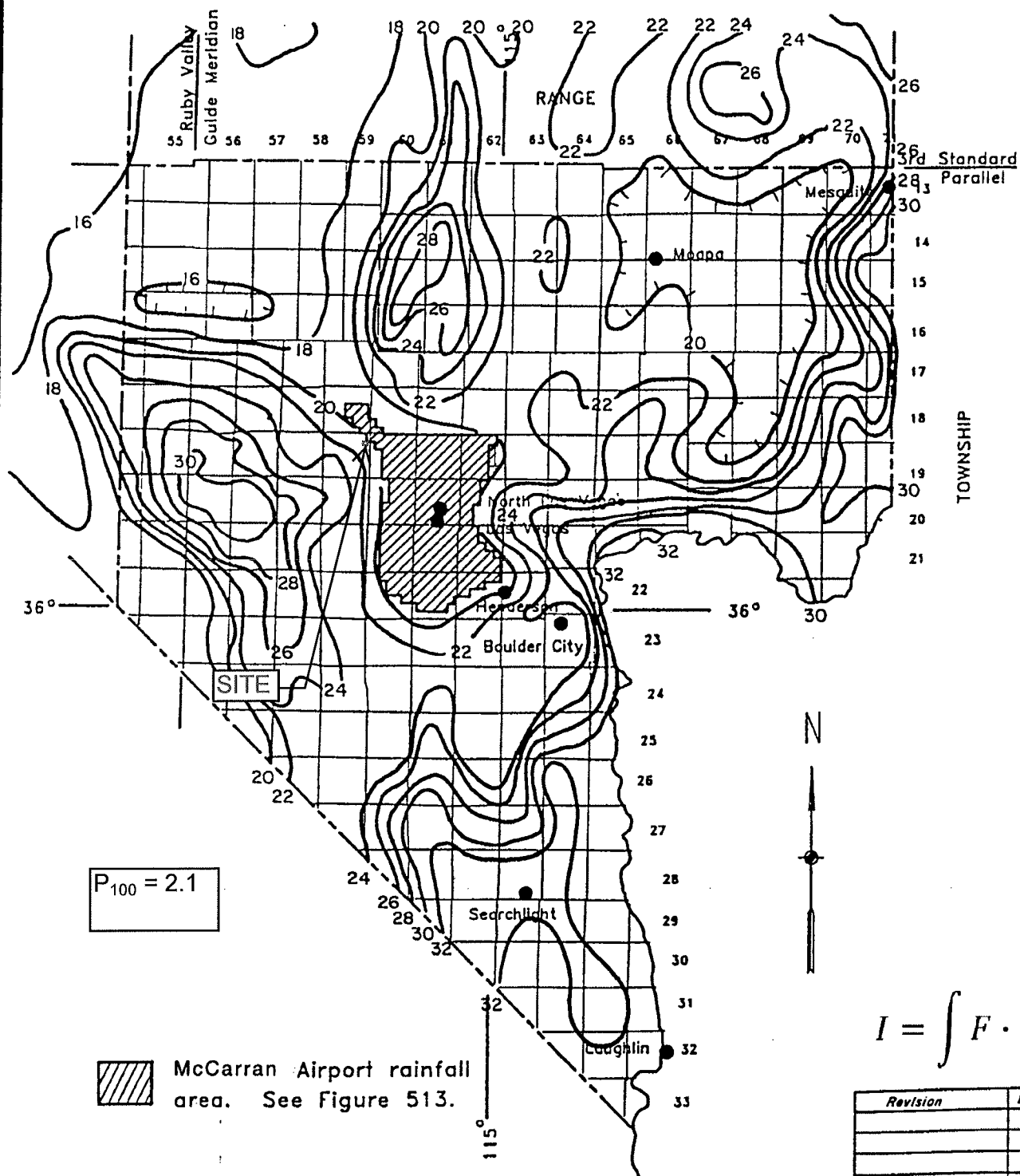
HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

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



HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

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



HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

PRECIPITATION ADJUSTMENT RATIOS

<u>Recurrence Interval</u>	<u>Ratio to NOAA Atlas 2</u>
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.

$$I = \int F \cdot dt$$

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

**WRC
ENGINEERING**

REFERENCE:
USACE, Los Angeles District, 1988

TABLE 501

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX-HOUR STORM DISTRIBUTIONS

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

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

$$I = \int F \cdot dt$$

Revision	Date

REFERENCE:

TABLE 503

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

SIX HOUR DEPTH-AREA REDUCTION FACTORS

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

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

$$I = \int F \cdot dt$$

Revision	Date

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

RUNOFF CURVE NUMBERS (URBAN AREAS¹)

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area ²	A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.):					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved: curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved: open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ⁴ ...		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					

See Table 602A

Developing urban areas

Newly graded areas (pervious areas only, no vegetation) ⁵	77	86	91	94
--	----	----	----	----

1 Average runoff condition, and $I_p = 0.2S$.

2 The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system. Impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figure 603.

3 CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

4 Composite CN's for natural desert landscaping should be computed using Figure 603 based on the impervious area percentage (CN #98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

5 Composite CN's to use for the design of temporary measures during grading and construction should be computed using Figure 603 based on the degree of development impervious area percentage) and the CN's for the newly graded pervious areas.

$$I = \int F \cdot dt$$

Revision	Date

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ENGINEERING

REFERENCE:
SCS TR-55, USDA, June 1986.

TABLE 602
1 of 4

DRAINAGE BASIN DATA

Interim/Ultimate Condition
S\Soils-INT

Calc By: PJJ
Date: 1/1/2021

10-Year Rainfall =	1.61 (in.)
Depth Area Reduction Factor =	1.00
Adjusted 10-Year Rainfall =	1.61 (in.)

* From Tbl. 505 (x1.0) or Fig. 503 (x1.24)

$$JR_{10} = 0.54$$
[illegible]

Impulse
Civil Engineering Planning

7485 West Azure Drive, Suite 226
Las Vegas, NV 89130
Phone: 702-815-0720

$$I = \int F \cdot dt$$



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Las Vegas Valley Area, Nevada, Part of Clark County

Skye Canyon 5.01 & 5.03

$$I = \int F \cdot dt$$



November 10, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

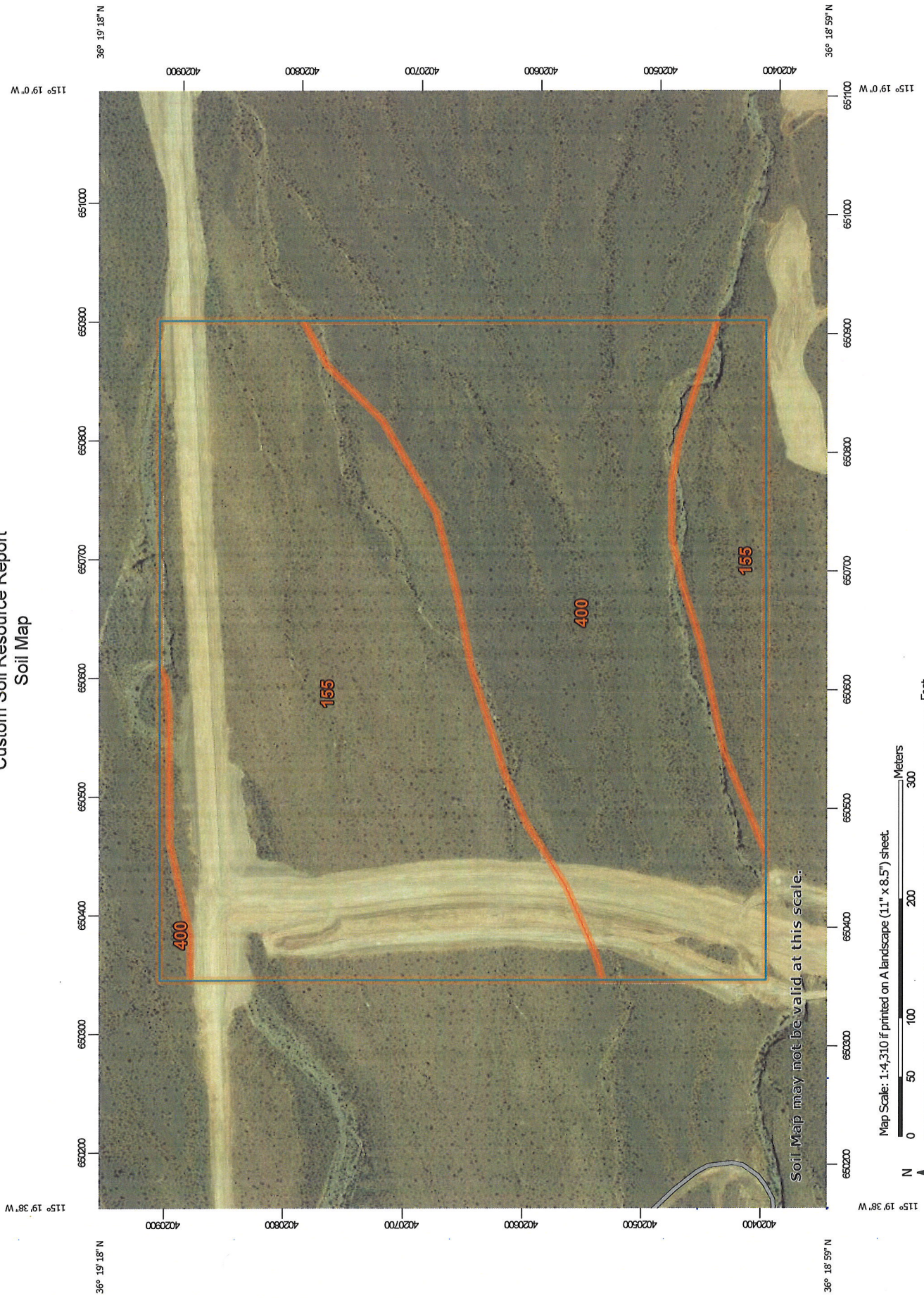
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:4,310 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this 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.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Las Vegas Valley Area, Nevada, Part of Clark County
Survey Area Data: Version 16, Aug 26, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 3, 2019—May 14, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
155	Cave gravelly fine sandy loam, 4 to 15 percent slopes	40.6	58.0%
400	Tencee very gravelly fine sandy loam, 2 to 8 percent slopes	29.4	42.0%
Totals for Area of Interest		70.0	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

Custom Soil Resource Report

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Las Vegas Valley Area, Nevada, Part of Clark County

155—Cave gravelly fine sandy loam, 4 to 15 percent slopes

Map Unit Setting

National map unit symbol: hr9w

Elevation: 2,000 to 4,800 feet

Mean annual precipitation: 4 to 12 inches

Mean annual air temperature: 57 to 70 degrees F

Frost-free period: 180 to 280 days

Farmland classification: Not prime farmland

Map Unit Composition

Cave and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cave

Setting

Landform: Fan remnants

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Mixed alluvium

Typical profile

H1 - 0 to 15 inches: gravelly fine sandy loam

H2 - 15 to 60 inches: indurated

Properties and qualities

Slope: 4 to 15 percent

Depth to restrictive feature: 4 to 20 inches to petrocalcic

Drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 40 percent

Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)

Available water capacity: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Other vegetative classification: LIMY 3-5" P.Z. (030XB019NV_3)

Hydric soil rating: No

400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hrc1
Elevation: 2,400 to 5,700 feet
Mean annual precipitation: 4 to 10 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 180 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Tencee and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tencee

Setting

Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Alluvium derived from limestone and dolomite

Typical profile

H1 - 0 to 9 inches: very gravelly fine sandy loam
H2 - 9 to 15 inches: very gravelly sandy loam
H3 - 15 to 19 inches: indurated

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 7 to 20 inches to petrocalcic
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

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industrial, heavy industrial and commercial areas (land use categories 8 through 11) are assumed 100% fair condition desert shrub for the open space distribution. Parks/golf courses and schools (land use categories 2 and 12) are assumed 70% open landscaping (grass) in good condition and 30% fair condition desert shrub for the open space distribution. This 70%-30% split was determined after reviewing the Spring 2016 aerial imagery.

4. All designated right-of-way areas were categorized as public facility (land use category 7) to be consistent throughout the Las Vegas Valley.

It should be noted that undeveloped land, open desert (land use category 1) will continue to use 100% poor condition desert shrub (<30% ground cover).

The directly connected impervious area percentages and corresponding open space distribution of each land use category is presented in **Table 2-2**:

Table 2-2 - Land Use Categories

Land Use Index	Land Use Description	Impervious* (%)	Open Landscape Good Condition Grass (%)	Open Desert Shrub Fair Condition Natural Desert Landscaping (%)
1	Undeveloped Land, Open Desert	0	0	100**
2	Parks, Golf Courses	5	66.5	28.5
3	Rural, 0.5-1 units per acre (uses 1 unit/acre)	20	40	40
4	Low-Density Residential, 1-2 units per acre (uses 2 units/acre)	25	37.5	37.5
5	Medium-Density Residential, 2-4 units per acre (uses 3 units/acre)	30	35	35
6	High-Density residential, 4-8 units per acre (uses 6 units/acre)	52	24	24
7	Public Facility and Residential, 8-12 units/acre	72	14	14
8	Very High-Density Residential, 12 units/acre or more	80	0	20
9	Commercial, Retail, Casino, High Rise Condominiums	85	0	15
10	Light Industrial	72	0	28
11	Heavy Industrial	85	0	15
12	Schools	50	35	15
13	Lakes	0	0	0

* Impervious areas are directly connected to the drainage system

** Open Desert Shrub Poor Condition is applied for Undeveloped Land, Open Desert (Land Use Index Number 1)

The land use data used with the 2018 MPU is shown on the W-Maps. **Figure 2-1** shows the geographic comparison between the 2018 and 2008 MPU land use coverages in terms of percent imperviousness. The increase or decrease in impervious area represents an increase or decrease, respectively, in the runoff potential for a given area.

Curve Number Matrix

SOIL MAP UNIT		HYDROLOGIC SOIL GROUP					LAND USE CATEGORY INDEX NUMBER												
		A	B	C	D	ROCK OUTCROP													
		CN -->	CN -->	CN -->	CN -->	CN -->	1	2	3	4	5	6	7	8	9	10	11	12	13
1100	6	0	0	0	59	35	87.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1105	55	40	0	0	5	0	70.0	56.0	65.0	67.0	69.0	78.0	86.0	91.0	93.0	88.0	93.0	76.0	30.0
1107	0	100	0	0	0	0	77.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1112	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1113	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1117	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1120	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1127	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1129	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1130	65	0	25	10	0	0	71.0	58.0	66.0	68.0	70.0	79.0	87.0	91.0	93.0	89.0	93.0	77.0	30.0
1132	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1133	70	0	10	0	0	20	71.0	58.0	67.0	68.0	70.0	79.0	87.0	91.0	93.0	89.0	93.0	77.0	30.0
1134	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1135	84	0	0	100	0	0	67.0	52.0	62.0	64.0	66.0	76.0	85.0	90.0	92.0	87.0	92.0	74.0	30.0
1140	0	0	0	0	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	89.0	30.0
1141	8	0	2	70	0	20	86.0	81.0	85.0	86.0	86.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1150	0	0	0	0	0	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1151	41	0	0	0	59	0	78.0	68.0	74.0	76.0	77.0	84.0	90.0	93.0	94.0	91.0	94.0	82.0	30.0
1152	0	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1155	0	0	0	0	100	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1156	1	10	0	0	89	0	87.0	81.0	84.0	85.0	86.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1160	0	0	100	0	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1160dn	46	1	0	53	0	0	76.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1165	32	40	15	13	0	0	75.0	64.0	71.0	73.0	74.0	82.0	88.0	92.0	94.0	90.0	94.0	80.0	30.0
1181	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1182	95	0	5	0	0	0	64.0	48.0	58.0	61.0	63.0	74.0	84.0	90.0	92.0	86.0	92.0	72.0	30.0
1183	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1184	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1187	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1190	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1191	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1192	55	35	0	0	10	0	70.0	57.0	66.0	68.0	70.0	79.0	87.0	91.0	93.0	88.0	93.0	76.0	30.0
1200	0	0	100	0	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1206	0	0	100	0	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1207	3	85	0	100	7	0	78.0	67.0	74.0	75.0	77.0	83.0	89.0	93.0	94.0	91.0	94.0	82.0	30.0
1222	0	0	100	0	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1225	9	20	50	21	0	0	82.0	73.0	79.0	80.0	81.0	86.0	91.0	94.0	95.0	92.0	95.0	85.0	30.0
1230	54	0	0	46	0	0	75.0	63.0	70.0	72.0	74.0	81.0	88.0	92.0	94.0	90.0	94.0	80.0	30.0
1235	66	25	0	9	0	0	69.0	55.0	64.0	66.0	68.0	77.0	86.0	91.0	93.0	88.0	93.0	75.0	30.0
1236	0	0	100	0	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1237	0	0	100	0	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1240	0	0	0	100	0	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1252	0	100	0	0	0	0	77.0	66.0	73.0	74.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	81.0	30.0
1255	0	100	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1260	100	0	0	0	0	0	69.0	56.0	64.0	67.0	69.0	78.0	86.0	91.0	93.0	88.0	93.0	76.0	30.0
1262	75	0	0	25	0	0	64.0	48.0	59.0	61.0	64.0	74.0	84.0	90.0	92.0	86.0	92.0	72.0	30.0
1263	95	0	0	5	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1264	100	0	0	0	0	0	63.0	47.0	57.0	60.0	62.0	74.0	84.0	89.0	92.0	86.0	92.0	71.0	30.0
1270	0	0	100	0	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1278	0	0	100	0	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1282	0	0	100	0	0	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1300	0	0	0	100	0	0	88.0	83.0	86.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0

Curve Number Matrix

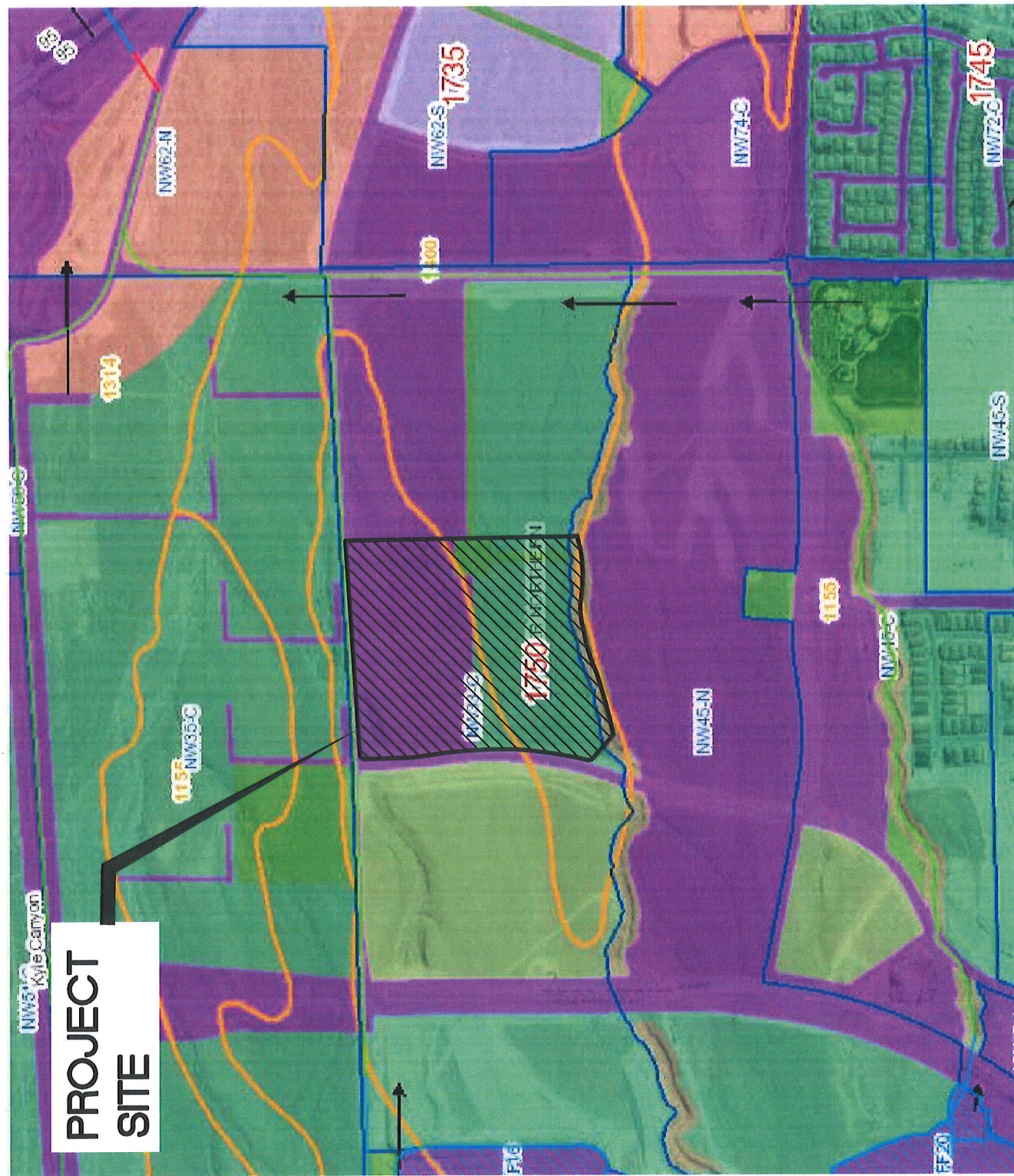
SOIL MAP UNIT	HYDROLOGIC SOIL GROUP					LAND USE CATEGORY INDEX NUMBER												
	A	B	C	D	ROCK OUTCROP	1	2	3	4	5	6	7	8	9	10	11	12	13
	CN →	CN →	CN →	CN →		63	47	57	60	62	74	84	89	92	86	92	71	30
						77	66	73	74	76	83	89	93	94	91	94	81	30
						85	77	82	83	84	88	92	95	95	93	95	87	30
						88	83	86	87	88	91	94	96	96	95	96	90	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
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						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
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						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90	92	92	92	94	96	96	97	96	97	94	30
						CN →	90											

Upper Northern Las Vegas Wash Watershed

2018 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE - COMPOSITE CURVE NUMBER BREAKDOWN											
WATERSHED	BASINID	LAND USE INDEX NUMBER	SOIL MAP UNIT #	SUBREGION CN	SUBREGION AREA (SQ FT)	SUBBASIN AREA (SQ FT)	PERCENT OF SUBBASIN	CUMULATIVE PERCENT	AREAL WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
Upper Northern	NW2C2-C	6	1305	89	2494383	6782476	36.8%	60.0%	32.73	52.52	
Upper Northern	NW2C2-C	7	1237	92	1186221	6782476	17.5%	77.5%	16.09	68.61	
Upper Northern	NW2C2-C	7	1305	93	1528200	6782476	22.5%	100.0%	20.95	89.57	89.6
Upper Northern	NW2C3-C	2	1192	57	56	6394179	0.0%	0.0%	0.00	0.00	
Upper Northern	NW2C3-C	4	1192	68	686147	6394179	10.7%	10.7%	7.30	7.30	
Upper Northern	NW2C3-C	5	1192	70	2211356	6394179	34.6%	45.3%	24.21	31.51	
Upper Northern	NW2C3-C	5	1305	85	701635	6394179	11.0%	56.3%	9.33	40.83	
Upper Northern	NW2C3-C	6	1191	74	55178	6394179	0.9%	57.2%	0.64	41.47	
Upper Northern	NW2C3-C	6	1192	79	1344974	6394179	21.0%	78.2%	16.62	58.09	
Upper Northern	NW2C3-C	7	1191	84	13623	6394179	0.2%	78.4%	0.18	58.27	
Upper Northern	NW2C3-C	7	1192	87	1209057	6394179	18.9%	97.3%	16.45	74.72	
Upper Northern	NW2C3-C	7	1305	93	172154	6394179	2.7%	100.0%	2.50	77.22	77.2
Upper Northern	NW2C4-C	4	1192	68	466539	6969288	6.7%	6.7%	4.55	4.55	
Upper Northern	NW2C4-C	4	1236	83	1277167	6969288	18.3%	25.0%	15.21	19.76	
Upper Northern	NW2C4-C	4	1237	83	1975190	6969288	28.3%	53.4%	23.52	43.29	
Upper Northern	NW2C4-C	4	1305	84	2463953	6969288	35.4%	88.7%	29.70	72.98	
Upper Northern	NW2C4-C	7	1192	87	125260	6969288	1.8%	90.5%	1.56	74.55	
Upper Northern	NW2C4-C	7	1236	92	228990	6969288	3.3%	93.8%	3.02	77.57	
Upper Northern	NW2C4-C	7	1237	92	225209	6969288	3.2%	97.0%	2.97	80.54	
Upper Northern	NW2C4-C	7	1305	93	206981	6969288	3.0%	100.0%	2.76	83.30	83.3
Upper Northern	NW2D1-C	4	1237	83	3447	6779957	0.1%	0.1%	0.04	0.04	
Upper Northern	NW2D1-C	4	1305	84	3924600	6779957	57.9%	57.9%	48.62	48.67	
Upper Northern	NW2D1-C	6	1305	89	1620072	6779957	23.9%	81.8%	21.27	69.93	
Upper Northern	NW2D1-C	7	1237	92	48827	6779957	0.7%	82.6%	0.66	70.60	
Upper Northern	NW2D1-C	7	1305	93	1147265	6779957	16.9%	99.5%	15.74	86.33	
Upper Northern	NW2D1-C	9	1305	96	35745	6779957	0.5%	100.0%	0.51	86.84	86.8
Upper Northern	NW2D2-C	4	1237	83	86511	6787745	1.3%	1.3%	1.06	1.06	
Upper Northern	NW2D2-C	4	1305	84	2859399	6787745	42.1%	43.4%	35.39	36.44	
Upper Northern	NW2D2-C	5	1305	85	320329	6787745	4.7%	48.1%	4.01	40.45	
Upper Northern	NW2D2-C	6	1305	89	1906906	6787745	28.1%	76.2%	25.00	65.46	
Upper Northern	NW2D2-C	7	1237	92	26389	6787745	0.4%	76.6%	0.36	65.82	
Upper Northern	NW2D2-C	7	1305	93	1588212	6787745	23.4%	100.0%	21.76	87.58	87.6
Upper Northern	NW2D3-C	4	1192	68	3568646	6427277	55.5%	55.5%	37.76	37.76	
Upper Northern	NW2D3-C	4	1305	84	371774	6427277	5.8%	61.3%	4.86	42.61	
Upper Northern	NW2D3-C	7	1192	87	1109578	6427277	17.3%	78.6%	15.02	57.63	
Upper Northern	NW2D3-C	7	1305	93	126568	6427277	2.0%	80.5%	1.83	59.47	
Upper Northern	NW2D3-C	9	1192	93	1185284	6427277	18.4%	99.0%	17.15	76.62	
Upper Northern	NW2D3-C	9	1305	96	65428	6427277	1.0%	100.0%	0.98	77.59	77.6
Upper Northern	NW2D4-C	4	1192	68	306803	6839031	4.5%	4.5%	3.05	3.05	
Upper Northern	NW2D4-C	4	1236	83	1537805	6839031	22.5%	27.0%	18.66	21.71	
Upper Northern	NW2D4-C	4	1237	83	1676307	6839031	24.5%	51.5%	20.34	42.06	
Upper Northern	NW2D4-C	4	1305	84	2359076	6839031	34.5%	86.0%	28.98	71.03	
Upper Northern	NW2D4-C	7	1192	87	58592	6839031	0.9%	86.8%	0.75	71.78	
Upper Northern	NW2D4-C	7	1236	92	259307	6839031	3.8%	90.6%	3.49	75.27	
Upper Northern	NW2D4-C	7	1237	92	175962	6839031	2.6%	93.2%	2.37	77.63	
Upper Northern	NW2D4-C	7	1305	93	465179	6839031	6.8%	100.0%	6.33	83.96	84.0
Upper Northern	NW33-C	1	1155	88	21	7478675	0.0%	0.0%	0.00	0.00	
Upper Northern	NW33-C	1	1400	88	48	7478675	0.0%	0.0%	0.00	0.00	
Upper Northern	NW33-C	2	1155	83	1555	7478675	0.0%	0.0%	0.02	0.02	
Upper Northern	NW33-C	2	1400	83	136449	7478675	1.8%	1.8%	1.51	1.53	
Upper Northern	NW33-C	6	1155	91	1307366	7478675	17.5%	19.3%	15.91	17.44	
Upper Northern	NW33-C	6	1400	91	1780295	7478675	23.8%	43.1%	21.66	39.10	
Upper Northern	NW33-C	7	1155	94	1615346	7478675	21.6%	64.7%	20.30	59.41	
Upper Northern	NW33-C	7	1400	94	925717	7478675	12.4%	77.1%	11.64	71.04	
Upper Northern	NW33-C	12	1155	90	1380894	7478675	18.5%	95.6%	16.62	87.66	
Upper Northern	NW33-C	12	1400	90	330984	7478675	4.4%	100.0%	3.98	91.64	91.6
Upper Northern	NW35-C	1	1400	88	419	9630837	0.0%	0.0%	0.00	0.00	
Upper Northern	NW35-C	2	1155	83	181752	9630837	1.9%	1.9%	1.57	1.57	
Upper Northern	NW35-C	2	1400	83	261066	9630837	2.7%	4.6%	2.25	3.82	
Upper Northern	NW35-C	6	1155	91	2273763	9630837	23.6%	28.2%	21.48	25.30	
Upper Northern	NW35-C	6	1314	77	2325293	9630837	24.1%	52.4%	18.59	43.90	
Upper Northern	NW35-C	6	1400	91	2639326	9630837	27.4%	79.8%	24.94	68.83	
Upper Northern	NW35-C	7	1155	94	377754	9630837	3.9%	83.7%	3.69	72.52	
Upper Northern	NW35-C	7	1314	86	899348	9630837	9.3%	93.0%	8.03	80.55	
Upper Northern	NW35-C	7	1400	94	265861	9630837	2.8%	95.8%	2.59	83.15	
Upper Northern	NW35-C	9	1314	92	406256	9630837	4.2%	100.0%	3.88	87.03	87.0
Upper Northern	NW3A1-C	2	1305	79	110815	7191943	1.5%	1.5%	1.22	1.22	
Upper Northern	NW3A1-C	6	1305	89	1669165	7191943	23.2%	24.7%	20.66	21.87	
Upper Northern	NW3A1-C	7	1305	93	4764818	7191943	66.3%	91.0%	61.61	83.49	
Upper Northern	NW3A1-C	9	1305	96	647145	7191943	9.0%	100.0%	8.64	92.13	92.1
Upper Northern	NW3A2-C	4	1192	68	551314	7021463	7.9%	7.9%	5.34	5.34	
Upper Northern	NW3A2-C	4	1236	83	1360360	7021463	19.4%	27.2%	16.08	21.42	
Upper Northern	NW3A2-C	4	1237	83	4605589	7021463	65.6%	92.8%	54.44	75.86	
Upper Northern	NW3A2-C	4	1305	84	7059	7021463	0.1%	92.9%	0.08	75.95	
Upper Northern	NW3A2-C	7	1192	87	64268	7021463	0.9%	93.8%	0.80	76.74	
Upper Northern	NW3A2-C	7	1236	92	103706	7021463	1.5%	95.3%	1.36	78.10	
Upper Northern	NW3A2-C	7	1237	92	310008	7021463	4.4%	99.7%	4.06	82.16	
Upper Northern	NW3A2-C	7	1305	93	19160	7021463	0.3%	100.0%	0.25	82.42	82.4
Upper Northern	NW3A3-C	2	1305	79	117536	7517067	1.6%	1.6%	1.24	1.24	
Upper Northern	NW3A3-C	6	1301	91	116697	7517067	1.6%	3.1%	1.41	2.65	
Upper Northern	NW3A3-C	6	1305	89	3118026	7517067	41.5%	44.6%	36.92	39.56	
Upper Northern	NW3A3-C	7	1301	94	739922	7517067	9.8%	54.4%	9.25	48.82	
Upper Northern	NW3A3-C	7	1305	93	1666271	7517067	22.2%	76.6%	20.61	69.43	
Upper Northern	NW3A3-C	9	1301	96	382969	7517067	5.1%	81.7%	4.89	74.32	
Upper Northern	NW3A3-C	9	1305	96	550864	7517067	7.3%	89.0%	7.04	81.36	
Upper Northern	NW3A3-C	12	1301	90	7863	7517067	0.1%	89.1%	0.09	81.45	

SITE

PROJECT SITE



Legend

- | Legend | Category |
|---|--|
|  | Flow Arrows |
|  | Concentration Points |
|  | Existing Facilities |
|  | Category A Proposed Facilities |
|  | Category B Proposed Facilities |
|  | Ultimate Development Boundary |
|  | Watershed |
|  | Subsides |
|  | Soils |
|  | 1: Undeveloped Land, Open desert |
|  | 2: Private Golf Courses |
|  | 3: Rural, 0.51 units per acre (Less than 1 unit/acre) |
|  | 4: Low-Density Residential, 1-2 units per acre (Less than 2 units/acre) |
|  | 5: Medium-Density Residential, 2-4 units per acre (Less than 5 units/acre) |
|  | 6: High-Density Residential, 4-8 units per acre (Less than 10 units/acre) |
|  | 7: Public Facility and Neighboring, 8-12 units/acre |
|  | 8: Very High-Density Residential, 12 units/acre or more |
|  | 9: Commercial, Retail, Casino, High-Rise Condominiums |
|  | 10: Light Industrial |
|  | 11: Heavy Industrial |
|  | 12: Seminals |
|  | 13: Lakes |
|  | SHA, Zone A |
|  | SHA, Zone B |
|  | SHA, Zone C |
|  | Zone X (Shaded) |

1 inch = 833 feet



0 430 860 Feet

REGIONAL FLOOD
CONTROL DISTRICT

WMAP

APPENDIX B

Hydrologic Analyses

$$I = \int F \cdot dt$$

Skye Canyon 5.01 & 5.03

[illegible]

```

1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* SEPTEMBER 1990
* VERSION 4.0
*
* RUN DATE 01/01/2021 TIME 11:21:21
*
*****

```

```

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

```

```

X X XXXXXXX XXXX X
X X X X X XX
X X X X X
XXXXXX XXXX X XXXX X
X X X X X
X X X X X
X X XXXXXXX XXXX XXX

```

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

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

1

HEC-1 INPUT

PAGE 1

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1	ID
2	ID %%%%%%%%%%
3	ID % SKYE CANYON 5.01 & 5.03 %
4	ID % Input = 501.HC1 %
5	ID % INTERIM/ULTIMATE CONDITIONS %
6	ID % WATERSHED ANALYSIS %
7	ID % SDN-3 6 HOUR STORM %
8	ID % %
9	ID % JR = 1.61/3.00 = 0.54 10 year %
10	ID % JR = 3.00/3.00 = 1.00 100 year %
11	ID % %
12	ID % Engineer = IMPULSE CIVIL ENGINEERING %
13	ID % Client = RCI ENGINEERING %
14	ID %%%%%%%%%%
15	ID
16	ID
	*DIAGRAM

*** FREE ***

35	KK	PR2	
36	KM	SOUTH	BASIN
37	BA	.0255	
38	LS	0	93.00
39	UD	0.1078	
	*		
40	ZZ		

```

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

```

```

%%%% SKYE CANYON 5.01 & 5.03 %%%
%% Input = 501.HC1 %%%
%% INTERIM/ULTIMATE CONDITIONS %%%
%% WATERSHED ANALYSIS %%%
%% SDN-3 6 HOUR STORM %%%
%%
%% JR = 1.61/3.00 = 0.54 10 year %%%
%% JR = 3.00/3.00 = 1.00 100 year %%%
%%
%% Engineer = IMPULSE CIVIL ENGINEERING %%%
%% Client = RCI ENGINEERING %%%
%%%%

```

18 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
.54      1.00

```

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION	
				RATIO 1	RATIO 2
				.54	1.00

HYDROGRAPH AT						
+	PR1	.03	1	FLOW	26.	57.
				TIME	3.50	3.50

HYDROGRAPH AT						
+	PR2	.03	1	FLOW	22.	48.
				TIME	3.50	3.50

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

APPENDIX C

Hydraulic Analyses

$$I = \int F \cdot dt$$

Street Flow Calculations

Interim/Ultimate Condition Street Flow Calculations

[illegible]

Shaumber Road at Entrance 100-year
Worksheet for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	Shaumber Road At Entrance
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.010000 ft/ft			
Elevation range: 0.00 ft to 1.50 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	1.50	0.00	53.50	0.016
0.00	0.90			
20.00	0.50			
20.50	0.50			
20.50	0.00			
22.00	0.13			
22.00	0.17			
47.00	0.67			
47.00	1.17			
53.50	1.30			
53.50	1.50			
Discharge	3.00	cfs		

Ref: STR 2 $Q_{10} = 7 \text{ cfs}$
 $Q_{100} = 13 \text{ cfs}$
 $A = 3.9 \text{ AC}$

REF: STR 2 $Q_{10} = 7 \text{ cfs}$
 $Q_{100} = 13 \text{ cfs}$

$A = 3.9 \text{ AC}$

$\frac{1}{2}$ STREET AREA BEFORE
ENTRANCE = 41,670 SF

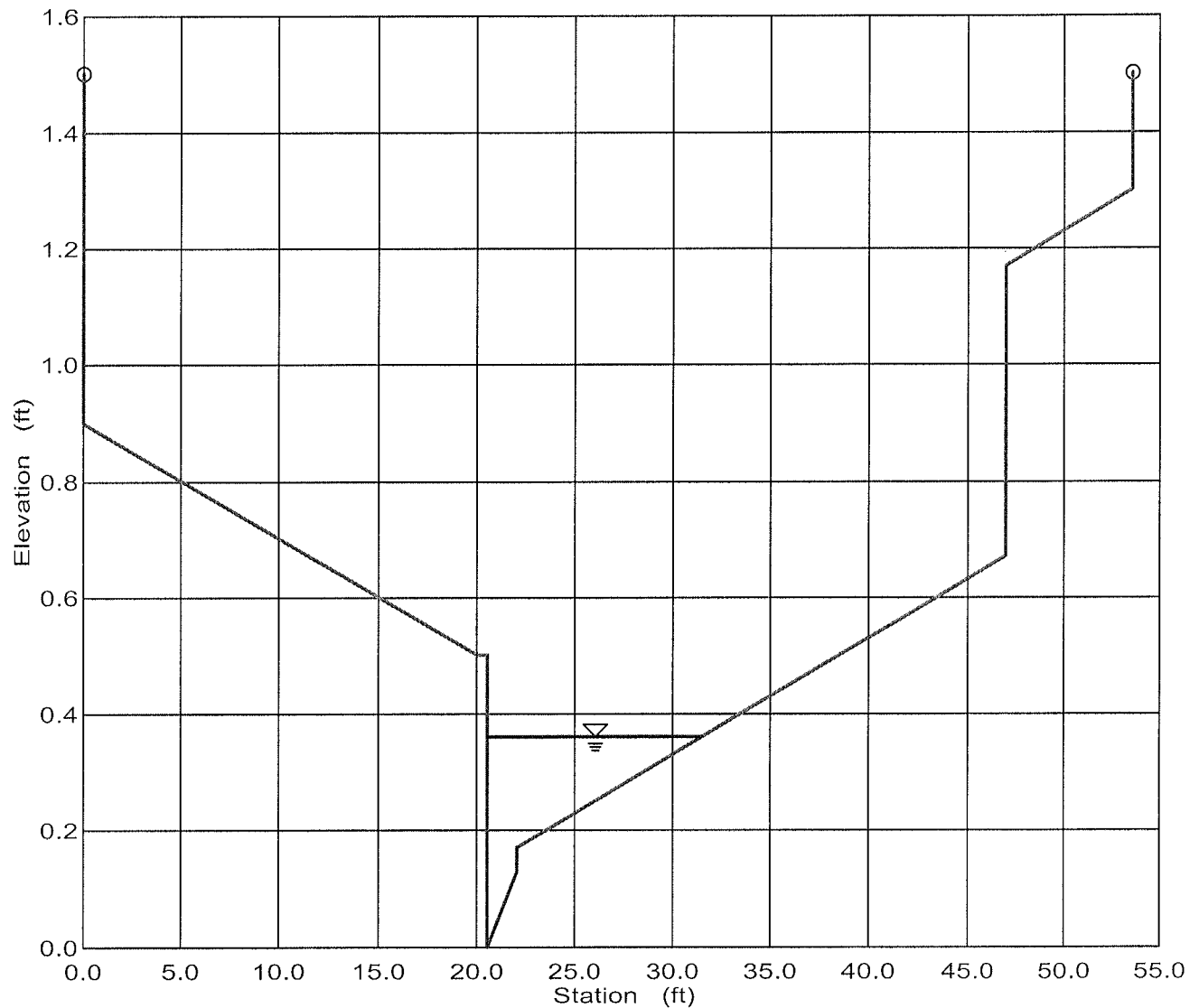
$Q_{10} = 2 \text{ cfs}$
 $Q_{100} = 3 \text{ cfs}$

Results		
Wtd. Mannings Coefficient	0.016	
Water Surface Elevation	0.36	ft
Flow Area	1.34	ft ²
Wetted Perimeter	11.40	ft
Top Width	10.99	ft
Height	0.36	ft
Critical Depth	0.37	ft
Critical Slope	0.007769	ft/ft
Velocity	2.23	ft/s
Velocity Head	0.08	ft
Specific Energy	0.44	ft
Froude Number	1.13	
Flow is supercritical.		

Cross Section
Cross Section for Irregular Channel

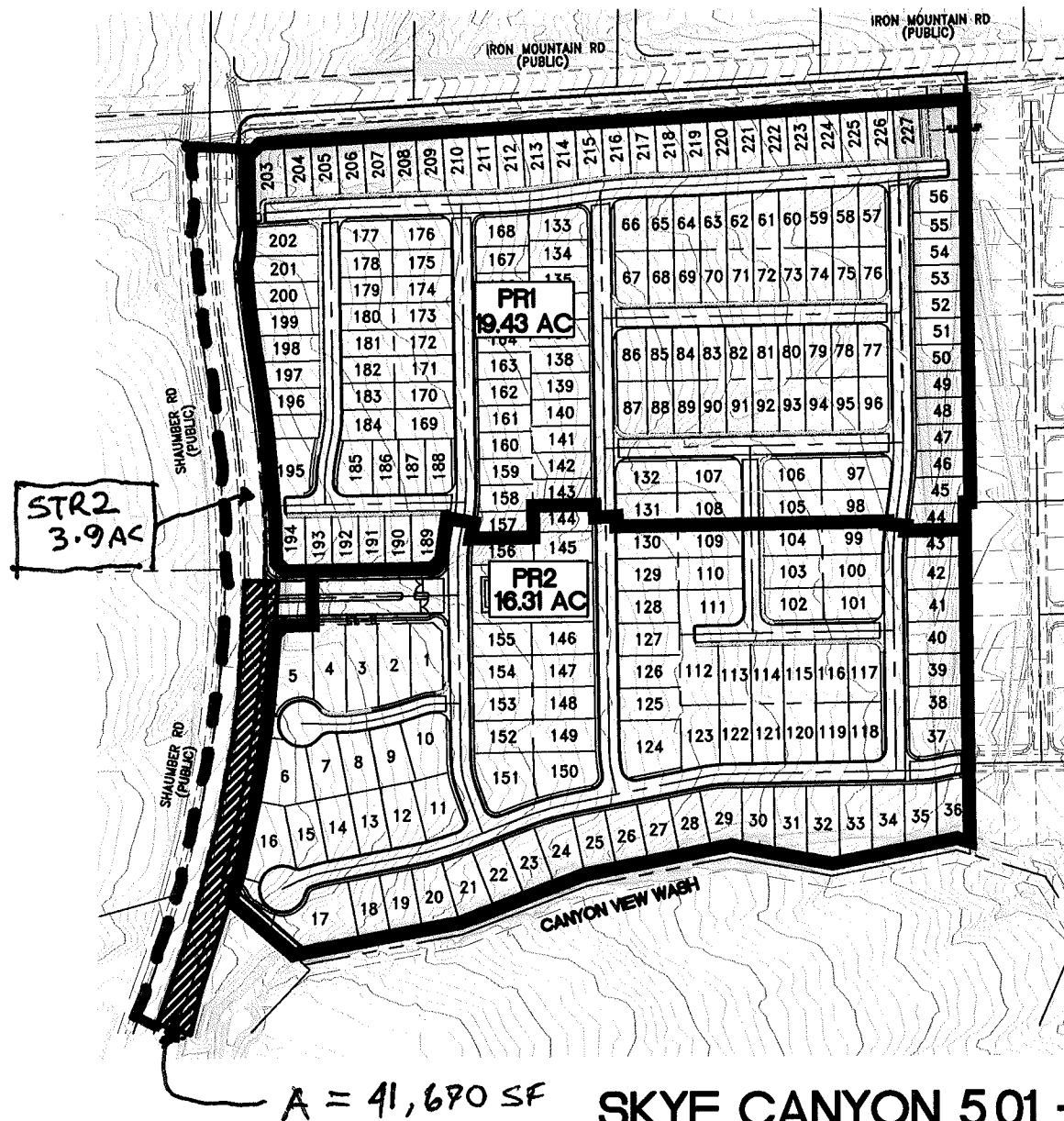
Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	Shaumber Road At Entrance
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.016
Channel Slope	0.010000 ft/ft
Water Surface Elevation	0.36 ft
Discharge	3.00 cfs



Civil Engineering Planning

$$I = \int F \cdot dt$$
[illegible]



LEGEND

- BASIN BOUNDARY
- REFERENCE BASIN BOUNDARY
- BASIN OR POINT OF INTEREST ACREAGE
- PRORATED AREA

FIGURE A

SKYE CANYON 5.01 + 5.03 PRORATED AREA



(IN FEET)

1 inch = 300 ft.



Impulse

Civil Engineering & Planning

PLANNERS • CIVIL ENGINEERS

7485 WEST AZURE AVENUE, SUITE 226 • LAS VEGAS, NEVADA 89130 • (702) 308-7115

$$I = \int F \cdot dt$$

20-foot outlet to Sump #5 10-year
Worksheet for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	20-foot OUTLET TO SUMP #5
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

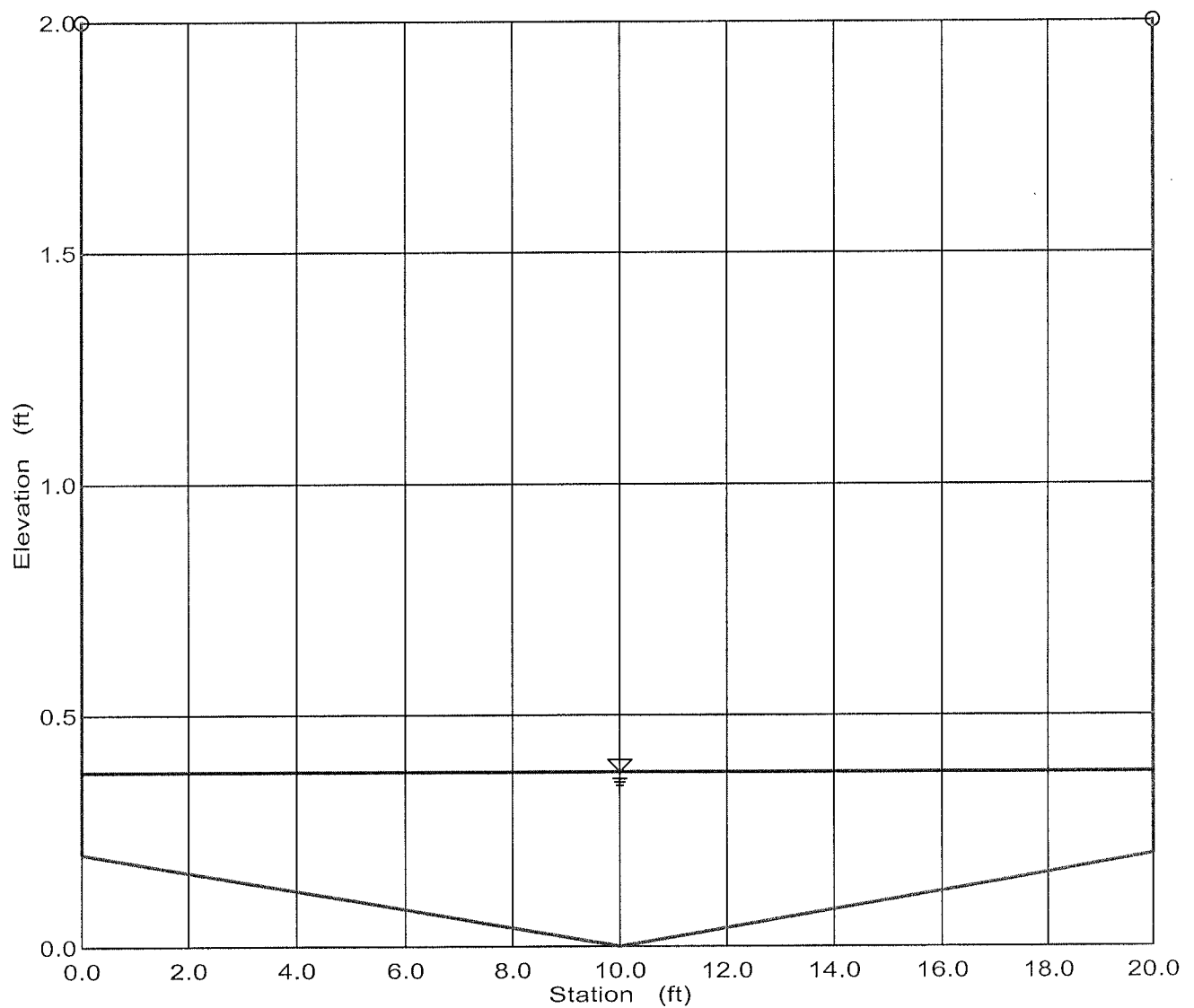
Input Data				
Channel Slope		0.080000 ft/ft		
Elevation range: 0.00 ft to 2.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	2.00	0.00	20.00	0.038
0.00	0.20			
10.00	0.00			
20.00	0.20			
20.00	2.00			
Discharge	26.00	cfs		

Results		
Wtd. Mannings Coefficient	0.038	
Water Surface Elevation	0.38	ft
Flow Area	5.58	ft ²
Wetted Perimeter	20.36	ft
Top Width	20.00	ft
Height	0.38	ft
Critical Depth	0.47	ft
Critical Slope	0.030271	ft/ft
Velocity	4.66	ft/s
Velocity Head	0.34	ft
Specific Energy	0.72	ft
Froude Number	1.56	
Flow is supercritical.		

Cross Section
Cross Section for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	20-foot OUTLET TO SUMP #5
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.038
Channel Slope	0.080000 ft/ft
Water Surface Elevation	0.38 ft
Discharge	26.00 cfs



20-foot outlet to Sump #5 100-year
Worksheet for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	20-foot OUTLET TO SUMP #5
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

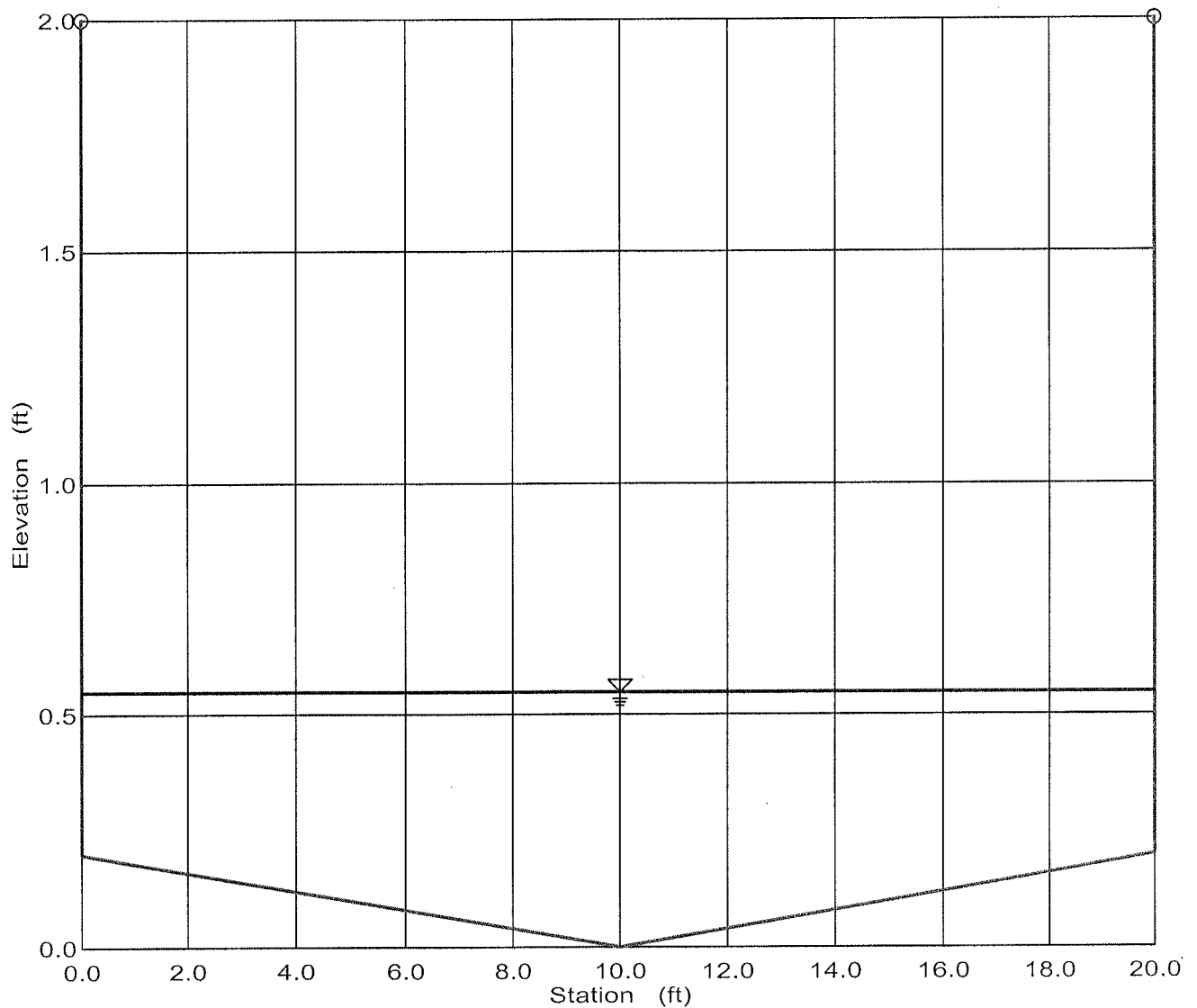
Input Data				
Channel Slope		0.080000 ft/ft		
Elevation range: 0.00 ft to 2.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	2.00	0.00	20.00	0.038
0.00	0.20			
10.00	0.00			
20.00	0.20			
20.00	2.00			
Discharge	57.00	cfs		

Results		
Wtd. Mannings Coefficient	0.038	
Water Surface Elevation	0.55	ft
Flow Area	8.99	ft ²
Wetted Perimeter	20.70	ft
Top Width	20.00	ft
Height	0.55	ft
Critical Depth	0.73	ft
Critical Slope	0.026280	ft/ft
Velocity	6.34	ft/s
Velocity Head	0.62	ft
Specific Energy	1.17	ft
Froude Number	1.67	
Flow is supercritical.		

Cross Section
Cross Section for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	20-foot OUTLET TO SUMP #5
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.038
Channel Slope	0.080000 ft/ft
Water Surface Elevation	0.55 ft
Discharge	57.00 cfs



$$I = \int F \cdot dt$$

Rip Rap Sizing Calculation - Outlet to Sump #5

$$d_{50} = \left[\frac{v \cdot S^{0.17}}{3 \cdot (S_s - 1)} \right]^2$$

$$\begin{aligned} v &= 6.34 \text{ ft/s} \\ S &= 0.08 \text{ ft/ft} \\ S_s &= 2.5 \text{ minimum} \end{aligned}$$

$$\begin{aligned} d_{50} &= 0.84 \text{ ft} \\ d_{50} &= 10.09 \text{ in} \end{aligned}$$

Thickness should be atleast 2d50 (CCRFGD-705.4.6 pg. 748)
use 10" rock, 20" THICK

Equation (732), page 747

CCRFGD Manual

$$n = 0.0395 (d_{50})^{1/6}$$

$$n = \underline{\underline{0.038}}$$

Ultimate Condition

North Onsite Streets 10-year
Worksheet for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	North 41' Roll Curb
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.039400 ft/ft			
Elevation range: 0.00 ft to 2.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	2.00	0.00	41.00	0.016
0.00	0.38			
0.35	0.38			
1.33	0.06			
1.33	0.00			
2.50	0.13			
2.50	0.17			
18.00	0.47			
33.50	0.17			
33.50	0.13			
34.67	0.00			
34.67	0.06			
35.65	0.38			
36.00	0.38			
41.00	0.48			
41.00	2.00			
Discharge	26.00	cfs		

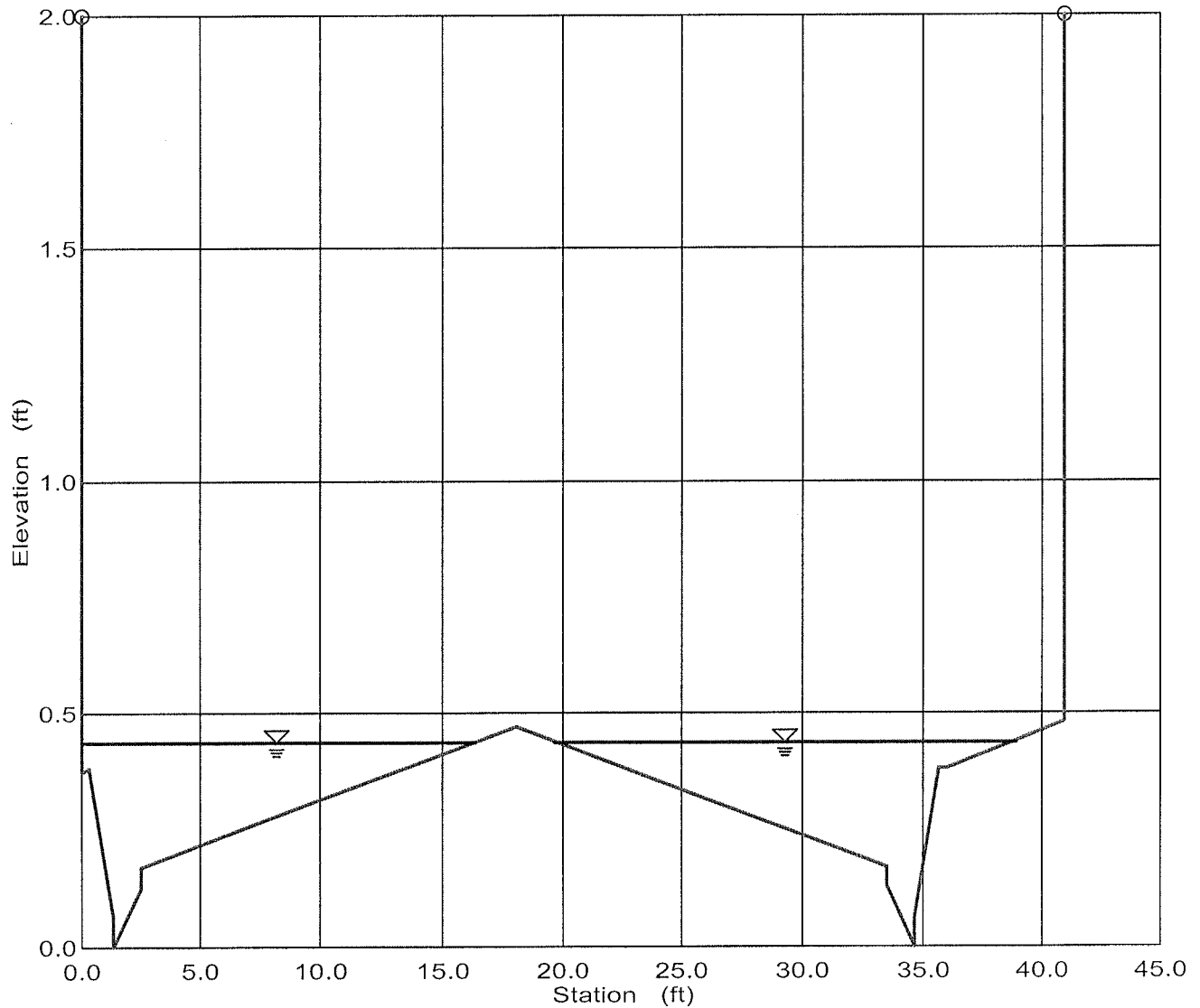
Results		
Wtd. Mannings Coefficient	0.016	
Water Surface Elevation	0.44	ft
Flow Area	5.16	ft ²
Wetted Perimeter	36.07	ft
Top Width	35.68	ft
Height	0.44	ft
Critical Depth	0.55	ft
Critical Slope	0.006183	ft/ft
Velocity	5.04	ft/s
Velocity Head	0.39	ft
Specific Energy	0.83	ft
Froude Number	2.34	
Flow is supercritical.		
Flow is divided.		

North Onsite Streets 10-year
Worksheet for Irregular Channel

Cross Section Cross Section for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	North 41' Roll Curb
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.016
Channel Slope	0.039400 ft/ft
Water Surface Elevation	0.44 ft
Discharge	26.00 cfs



North Onsite Streets 100-year
Worksheet for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	North 41' Roll Curb
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

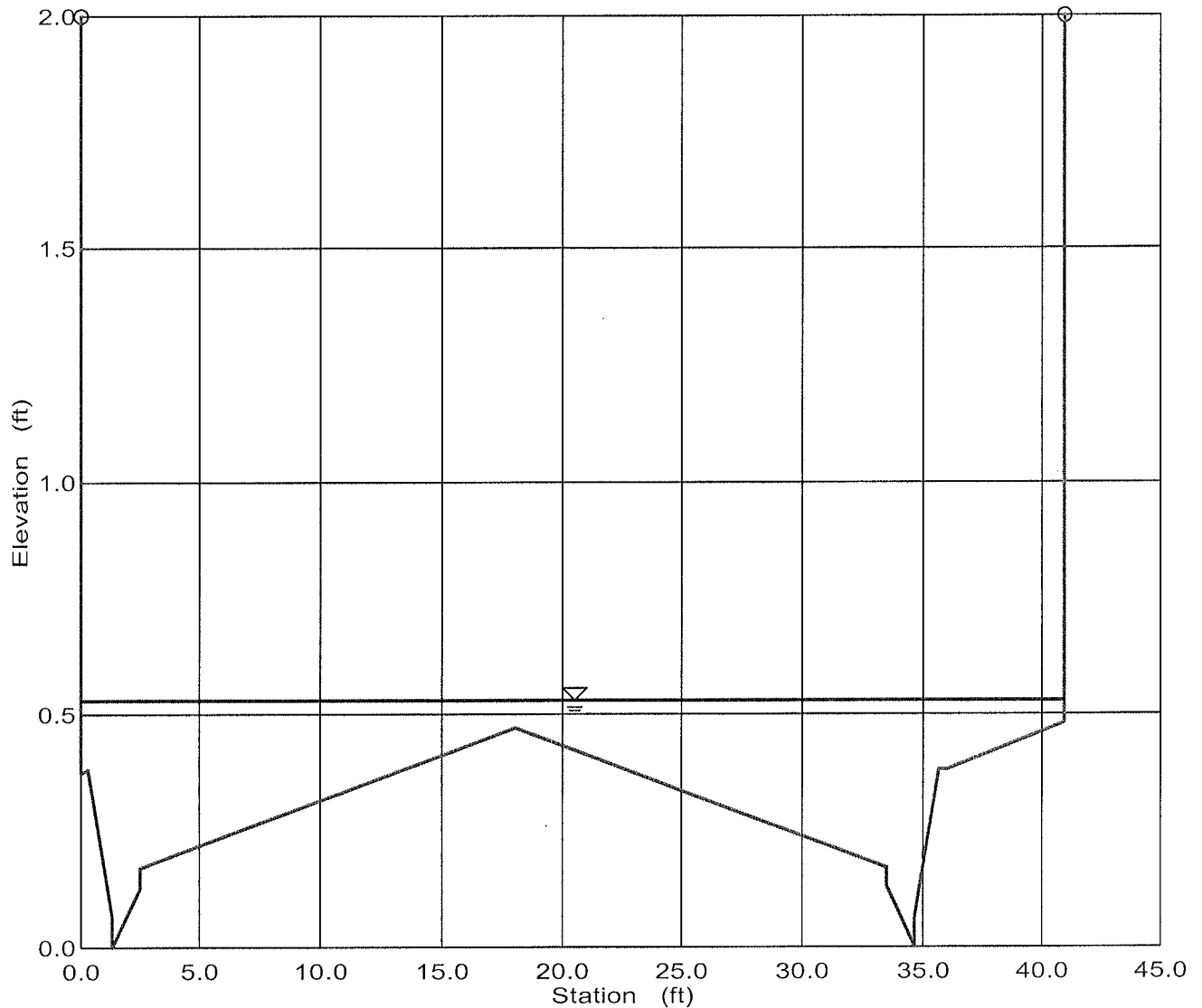
Input Data				
Channel Slope	0.039400 ft/ft			
Elevation range: 0.00 ft to 2.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	2.00	0.00	41.00	0.016
0.00	0.38			
0.35	0.38			
1.33	0.06			
1.33	0.00			
2.50	0.13			
2.50	0.17			
18.00	0.47			
33.50	0.17			
33.50	0.13			
34.67	0.00			
34.67	0.06			
35.65	0.38			
36.00	0.38			
41.00	0.48			
41.00	2.00			
Discharge	57.00	cfs		

Results		
Wtd. Mannings Coefficient	0.016	
Water Surface Elevation	0.53	ft
Flow Area	8.74	ft ²
Wetted Perimeter	41.53	ft
Top Width	41.00	ft
Height	0.53	ft
Critical Depth	0.71	ft
Critical Slope	0.005246	ft/ft
Velocity	6.52	ft/s
Velocity Head	0.66	ft
Specific Energy	1.19	ft
Froude Number	2.49	
Flow is supercritical.		

Cross Section Cross Section for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	North 41' Roll Curb
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.016
Channel Slope	0.039400 ft/ft
Water Surface Elevation	0.53 ft
Discharge	57.00 cfs



South Onsite Streets 10-year
Worksheet for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	South 41' Roll Curb
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.032100 ft/ft		
Elevation range: 0.00 ft to 2.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	2.00	0.00	41.00	0.016
0.00	0.38			
0.35	0.38			
1.33	0.06			
1.33	0.00			
2.50	0.13			
2.50	0.17			
18.00	0.47			
33.50	0.17			
33.50	0.13			
34.67	0.00			
34.67	0.06			
35.65	0.38			
36.00	0.38			
41.00	0.48			
41.00	2.00			
Discharge	22.00	cfs		

Results		
Wtd. Mannings Coefficient	0.016	
Water Surface Elevation	0.43	ft
Flow Area	4.90	ft ²
Wetted Perimeter	34.93	ft
Top Width	34.55	ft
Height	0.43	ft
Critical Depth	0.52	ft
Critical Slope	0.006407	ft/ft
Velocity	4.49	ft/s
Velocity Head	0.31	ft
Specific Energy	0.74	ft
Froude Number	2.10	
Flow is supercritical.		
Flow is divided.		

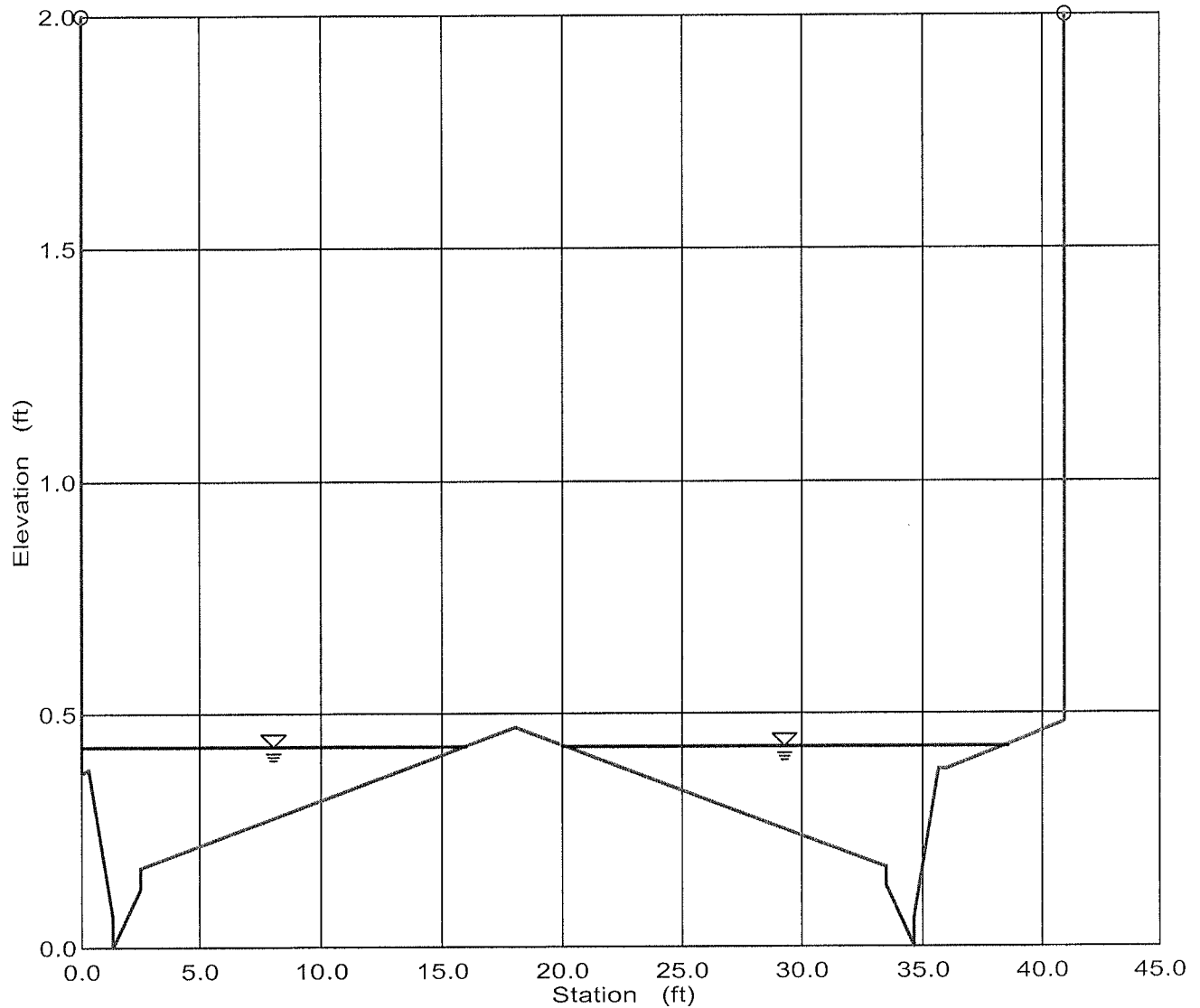
South Onsite Streets 10-year
Worksheet for Irregular Channel

Cross Section

Cross Section for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	South 41' Roll Curb
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.016
Channel Slope	0.032100 ft/ft
Water Surface Elevation	0.43 ft
Discharge	22.00 cfs



South Onsite Streets 100-year Worksheet for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	South 41' Roll Curb
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.032100 ft/ft			
Elevation range: 0.00 ft to 2.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	2.00	0.00	41.00	0.016
0.00	0.38			
0.35	0.38			
1.33	0.06			
1.33	0.00			
2.50	0.13			
2.50	0.17			
18.00	0.47			
33.50	0.17			
33.50	0.13			
34.67	0.00			
34.67	0.06			
35.65	0.38			
36.00	0.38			
41.00	0.48			
41.00	2.00			
Discharge	48.00	cfs		

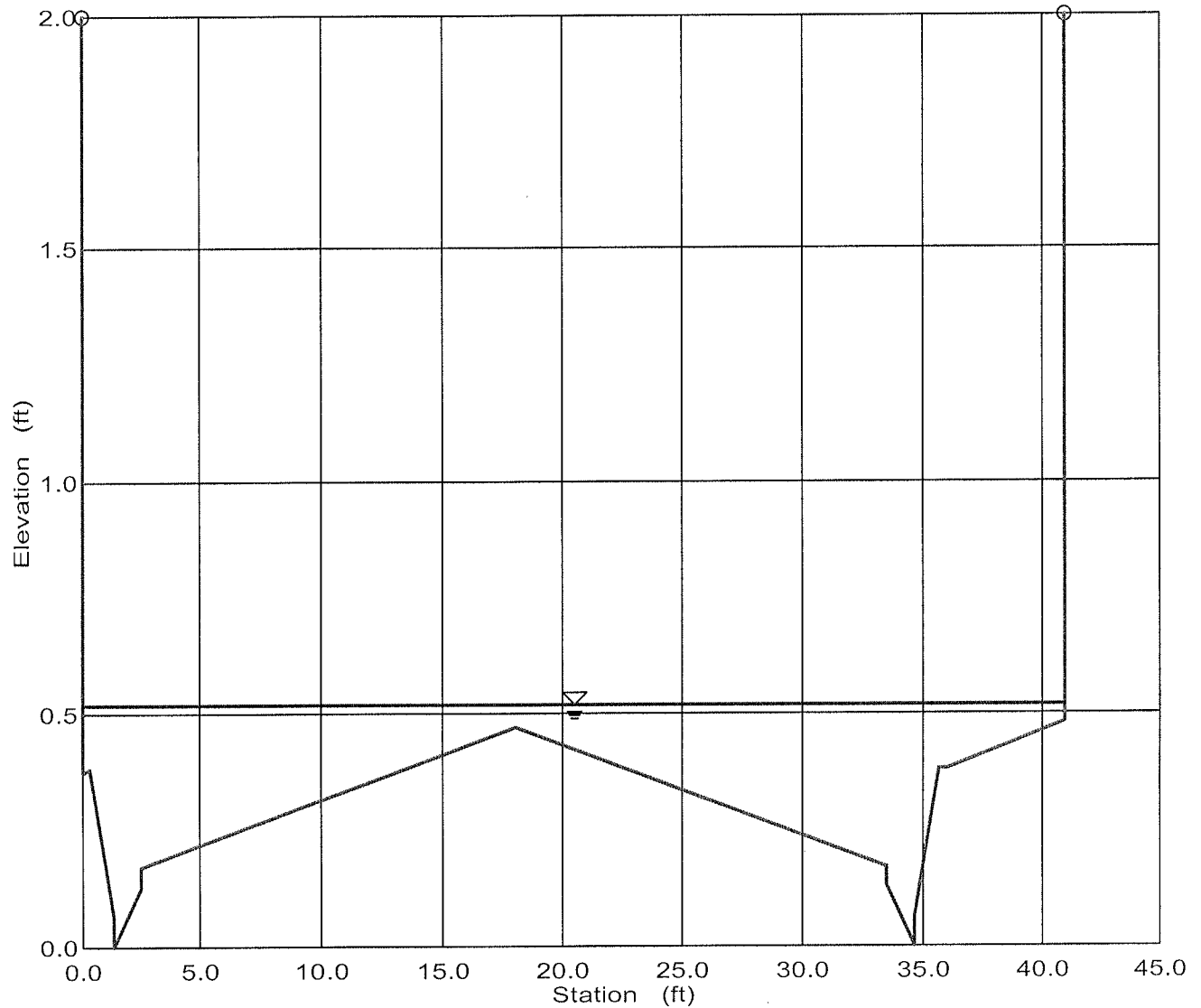
Results		
Wtd. Mannings Coefficient	0.016	
Water Surface Elevation	0.52	ft
Flow Area	8.38	ft ²
Wetted Perimeter	41.51	ft
Top Width	41.00	ft
Height	0.52	ft
Critical Depth	0.66	ft
Critical Slope	0.005436	ft/ft
Velocity	5.73	ft/s
Velocity Head	0.51	ft
Specific Energy	1.03	ft
Froude Number	2.23	
Flow is supercritical.		

Cross Section

Cross Section for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	South 41' Roll Curb
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.016
Channel Slope	0.032100 ft/ft
Water Surface Elevation	0.52 ft
Discharge	48.00 cfs



Outlet to Channel 10-year
Worksheet for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	20-FOOT OUTLET TO CHANNEL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.010000 ft/ft			
Elevation range: 0.00 ft to 2.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	2.00	0.00	20.00	0.013
0.00	0.20			
10.00	0.00			
20.00	0.20			
20.00	2.00			
Discharge	22.00	cfs		

Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.35	ft
Flow Area	4.94	ft ²
Wetted Perimeter	20.30	ft
Top Width	20.00	ft
Height	0.35	ft
Critical Depth	0.44	ft
Critical Slope	0.003658	ft/ft
Velocity	4.45	ft/s
Velocity Head	0.31	ft
Specific Energy	0.66	ft
Froude Number	1.58	
Flow is supercritical.		

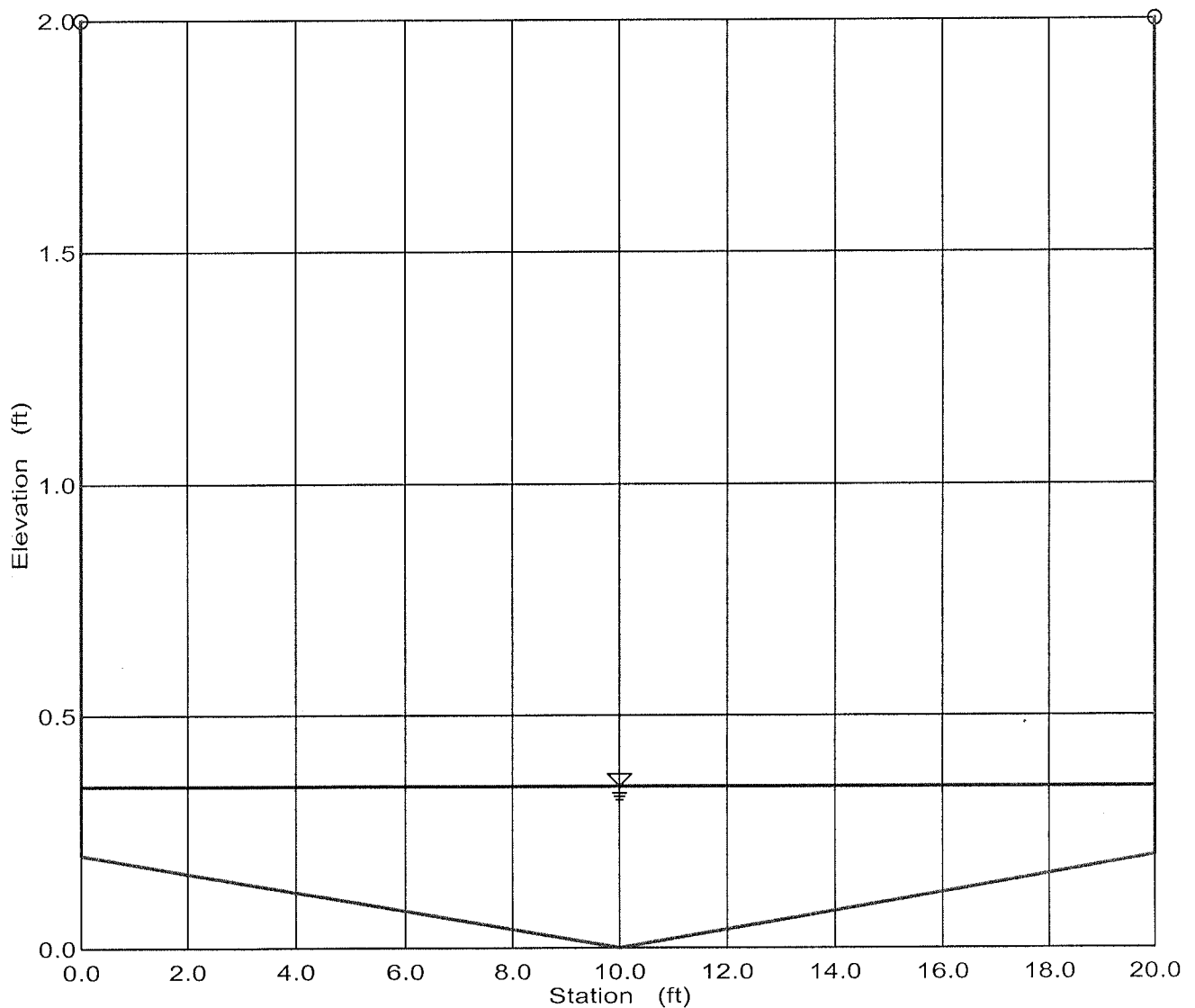
Cross Section
Cross Section for Irregular Channel

Project Description

Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	20-FOOT OUTLET TO CHANNEL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data

Wtd. Mannings Coefficient	0.013
Channel Slope	0.010000 ft/ft
Water Surface Elevation	0.35 ft
Discharge	22.00 cfs



Outlet to Channel 100-year
Worksheet for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	20-FOOT OUTLET TO CHANNEL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope		0.010000 ft/ft		
Elevation range: 0.00 ft to 2.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	2.00	0.00	20.00	0.013
0.00	0.20			
10.00	0.00			
20.00	0.20			
20.00	2.00			
Discharge	48.00	cfs		

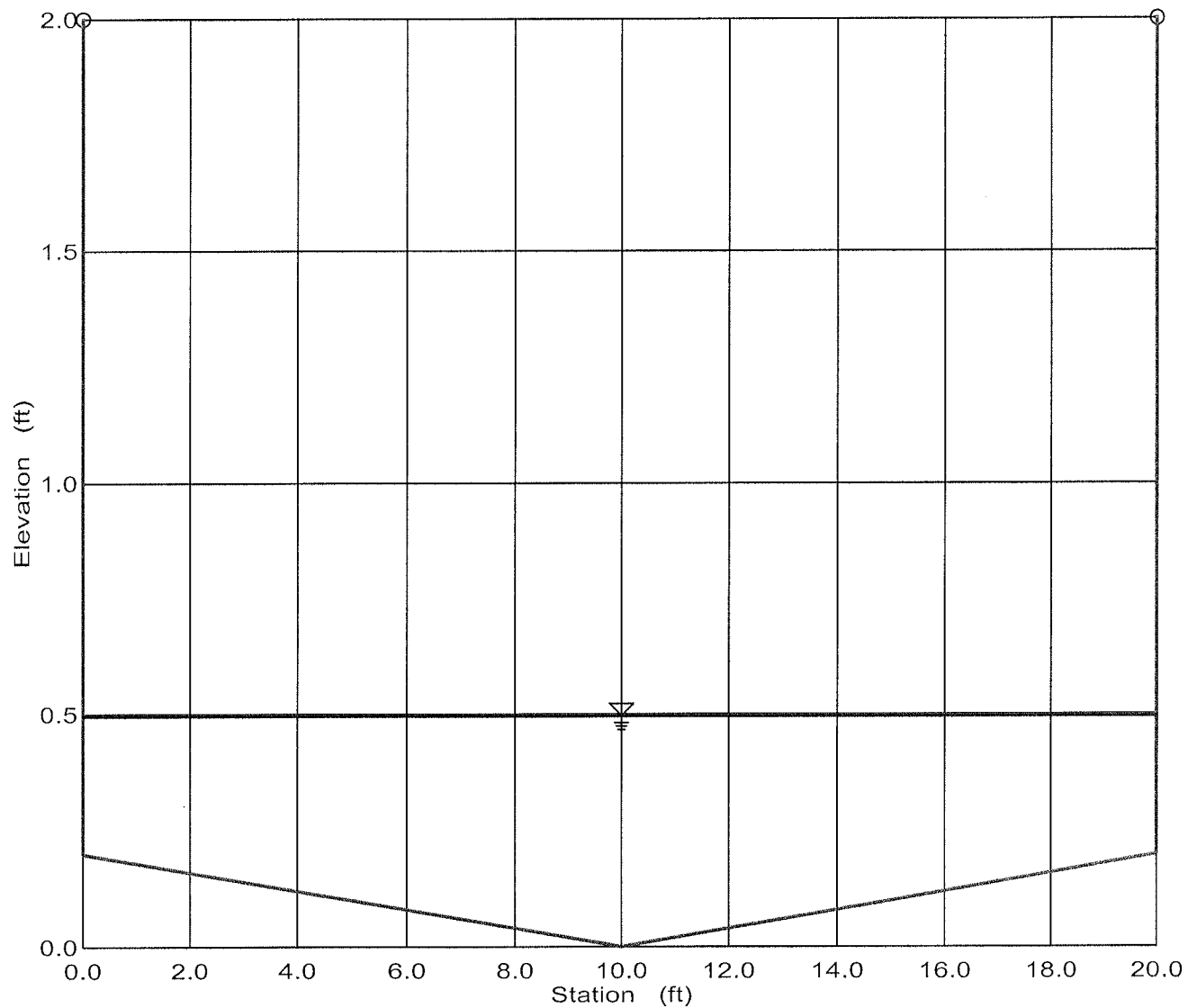
Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.50	ft
Flow Area	7.93	ft ²
Wetted Perimeter	20.60	ft
Top Width	20.00	ft
Height	0.50	ft
Critical Depth	0.66	ft
Critical Slope	0.003168	ft/ft
Velocity	6.05	ft/s
Velocity Head	0.57	ft
Specific Energy	1.07	ft
Froude Number	1.69	
Flow is supercritical.		

Cross Section

Cross Section for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	20-FOOT OUTLET TO CHANNEL
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.013
Channel Slope	0.010000 ft/ft
Water Surface Elevation	0.50 ft
Discharge	48.00 cfs



North Onsite Streets 100-year Steepest
Worksheet for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	North 41' Roll Curb Steepest
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data					
Channel Slope		0.044800 ft/ft			
Elevation range: 0.00 ft to 2.00 ft.					
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness	
0.00	2.00	0.00	41.00	0.016	
0.00	0.38				
0.35	0.38				
1.33	0.06				
1.33	0.00				
2.50	0.13				
2.50	0.17				
18.00	0.47				
33.50	0.17				
33.50	0.13				
34.67	0.00				
34.67	0.06				
35.65	0.38				
36.00	0.38				
41.00	0.48				
41.00	2.00				
Discharge	57.00	cfs			

$$d_{100} = 0.52 \text{ ft}$$
$$\frac{v^2}{2g} = 0.71 \text{ ft}$$

$$d_{100} = 0.52 \text{ ft}$$

$$\frac{v^2}{2g} = 0.71 \text{ ft}$$

$$d_{100} + \frac{v^2}{2g} = 1.23' < 1.88'$$

∴ OK

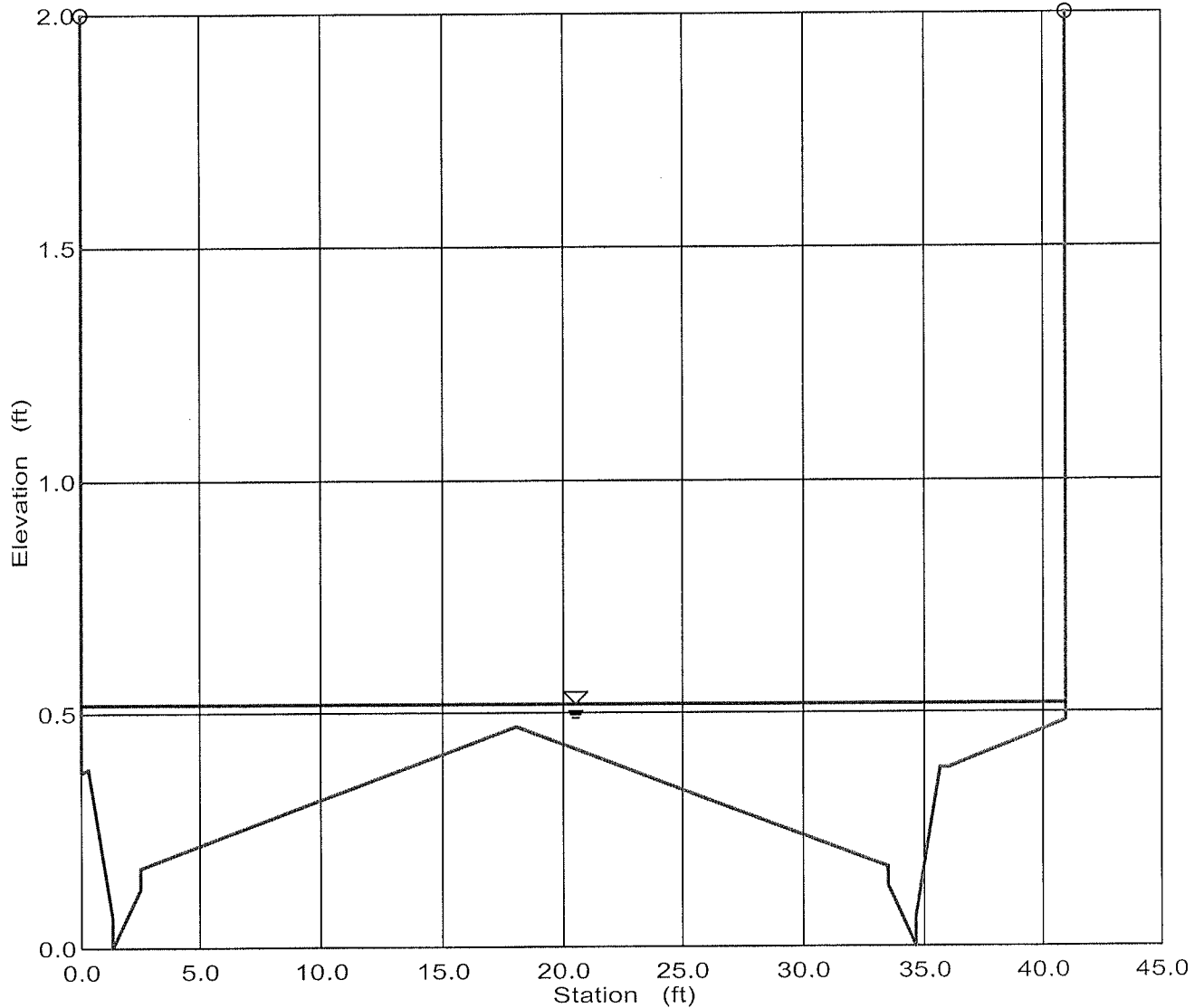
Results		
Wtd. Mannings Coefficient	0.016	
Water Surface Elevation	0.52	ft
Flow Area	8.41	ft ²
Wetted Perimeter	41.51	ft
Top Width	41.00	ft
Height	0.52	ft
Critical Depth	0.71	ft
Critical Slope	0.005247	ft/ft
Velocity	6.78	ft/s
Velocity Head	0.71	ft
Specific Energy	1.23	ft
Froude Number	2.64	
Flow is supercritical.		

Cross Section

Cross Section for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	North 41' Roll Curb Steepest
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.016
Channel Slope	0.044800 ft/ft
Water Surface Elevation	0.52 ft
Discharge	57.00 cfs



Steepest South Onsite Streets 100-year
Worksheet for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	South 41' Roll Curb Steepest
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				
Channel Slope	0.053500 ft/ft			
Elevation range: 0.00 ft to 2.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	2.00	0.00	41.00	0.016
0.00	0.38			
0.35	0.38			
1.33	0.06			
1.33	0.00			
2.50	0.13			
2.50	0.17			
18.00	0.47			
33.50	0.17			
33.50	0.13			
34.67	0.00			
34.67	0.06			
35.65	0.38			
36.00	0.38			
41.00	0.48			
41.00	2.00			
Discharge	48.00	cfs	$d_{100} = 0.49 \text{ ft}$	

Results		
Wtd. Mannings Coefficient	0.016	
Water Surface Elevation	0.49	ft
Flow Area	7.19	ft ²
Wetted Perimeter	41.46	ft
Top Width	41.00	ft
Height	0.49	ft
Critical Depth	0.66	ft
Critical Slope	0.005436	ft/ft
Velocity	6.68	ft/s
Velocity Head	0.69	ft
Specific Energy	1.18	ft
Froude Number	2.81	
Flow is supercritical.		

$$d_{100} = 0.49 \text{ ft}$$

$$\frac{v^2}{2g} = 0.69 \text{ ft}$$

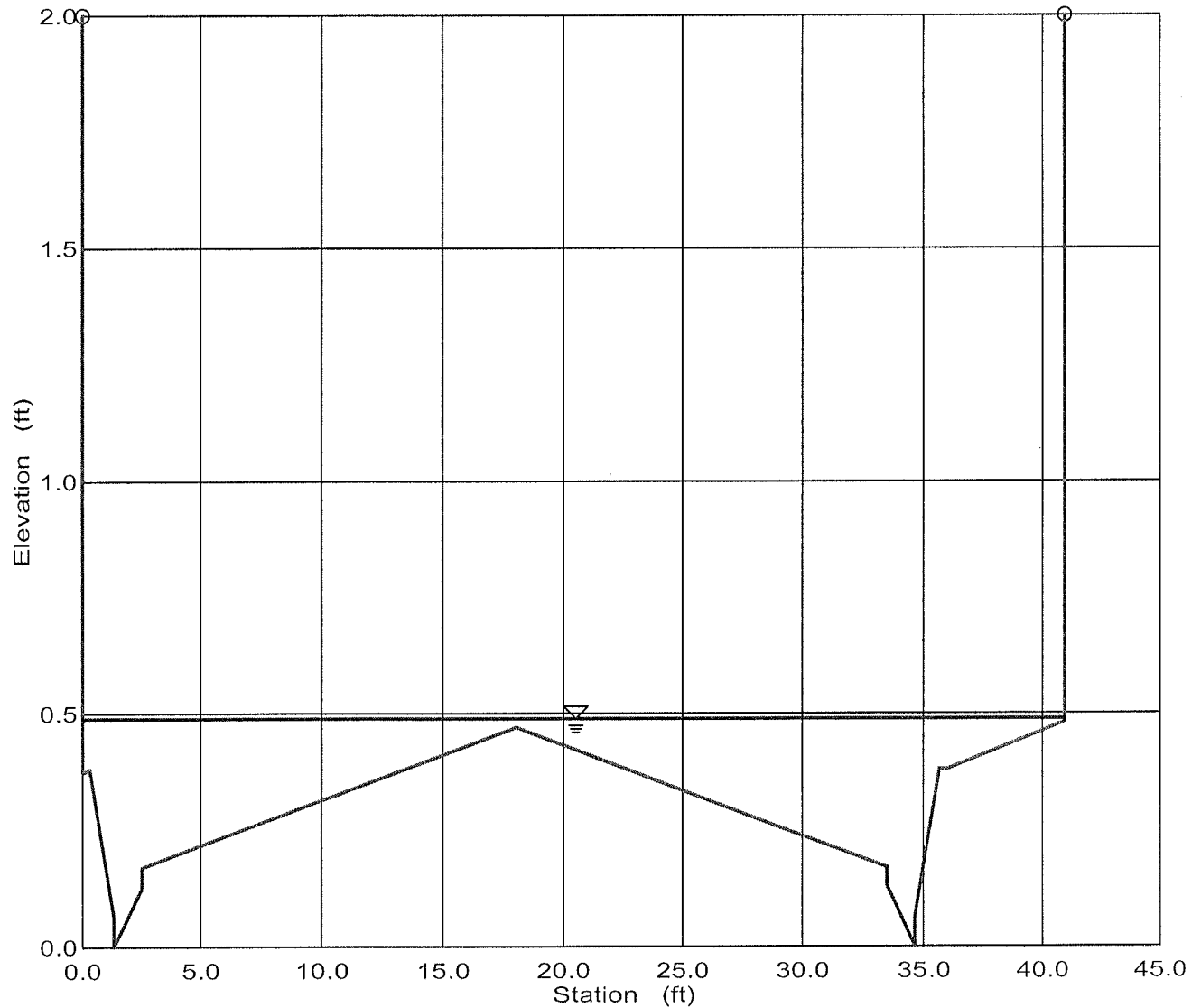
$$d_{100} + \frac{v^2}{2g} = 1.18' < 1.88'$$

∴ OK

Cross Section Cross Section for Irregular Channel

Project Description	
Project File	p:\clients\rci\skye canyon phase 4\hydrology\skye5.fm2
Worksheet	South 41' Roll Curb Steepest
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.016
Channel Slope	0.053500 ft/ft
Water Surface Elevation	0.49 ft
Discharge	48.00 cfs



APPENDIX D

References

$$I = \int F \cdot dt$$

Reference

Skye Canyon Phase 3B-3C DS4953

$$I = \int F \cdot dt$$

**TECHNICAL DRAINAGE STUDY
Skye Canyon
(Phase 3B, 3C Infrastructure)**

City of Las Vegas, Nevada

Job No.: OLY1609.000

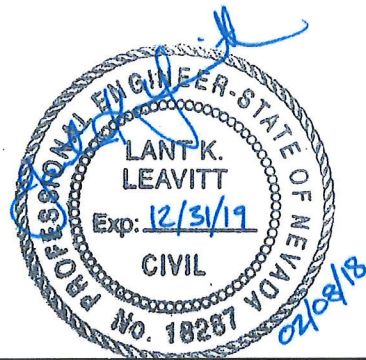
Date: February 2018

Prepared By:

Slater Hanifan Group, Inc.
5740 S. Arville Street, Suite 216
Las Vegas, Nevada 89118
Phone: 702-284-5300 • Fax: 702-284-5399

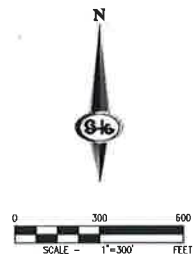
Prepared For:

Ninety-Five Management, LLC
11411 Southern Highlands Parkway, Suite 300
Las Vegas, NV 89141
Phone: 702-220-6565 • Fax: 702-220-6566



Lant Leavitt, P.E.
NV Professional Engineer No. 18287

Assisted by: Erick Mata, EI



Proposed Condition Flow Rate Summary			
Concentration Points			
Basin/Concentration Point ID	Area (sq ft)	Q _{max} (gph)	Q _u (gph)
CP1 Q = 1000 + 631 = 1631	1	217	114
CP2 Q = CP1 + 273 = 1904	1.3	389	194
Q = CP1 + 273 + 100 = 2177	0.3	206	113
CP4 Q = 532 + 273 + 100 = 905	0.1	178	80
CP5 Q = 905 + 273 = 1178	<0.1	16	8
CP6 Q = 1178 + 273 = 1451	<0.1	100	49
CP7 Q = 1451 + 273 = 1724	1.3	381	170
Q = 1724 + 273 = 2000	0.2	100	49
CP8 Q = 2000 + 273 = 2273	1.0	362	191
Q = 2273 + 273 = 2546	1.1	363	203
CP9 Q = 2546 + 273 = 2819	1.1	422	215
Revised Concentration Points			
APC0	<0.1	88	40
RCR01	0.0	71	37
RCR02	1.0	45	24
RCR03	<0.1	30	13

SEE EXHIBIT F FOR EXTENTS OF OFFSITE BASINS

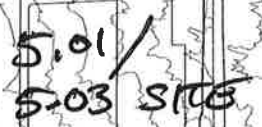
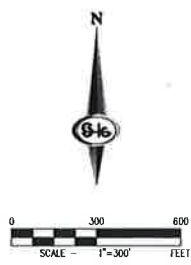
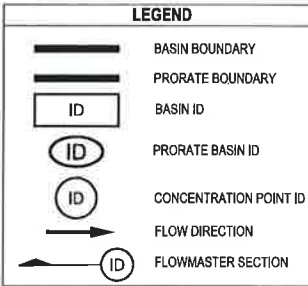
[illegible]

EXHIBIT E
SHEET 1 OF 1

NINETY-FIVE MANAGEMENT, LLC.
SKYE CANYON PHASE 3B, 3C INFRASTRUCTURE
INTERIM CONDITION DRAINAGE MAP

DATE: SEPT 2018
DRAFTER: ETM
DESIGNER: ETM
CHECKED: LL
PROJECT NO.
OLY1609.000

EXHIBIT F
SHEET 1 OF 1



Interim Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
EX1	68.0	181	63
EX2	58.1	139	53
EX3	14.3	36	13
EX4	17.1	44	17
EX5	18.9	48	18
EX6	6.3	16	6
EX7	12.9	31	10
EX8	3.9	12	4
EX9	3.9	12	4
STR1	3.9	12	4
STR2	3.9	12	4
STR3	3.9	12	4
STR4	3.9	12	4
STR5	3.9	12	4
STR6	3.9	12	4
STR7	3.9	12	4
STR8	3.9	12	4
STR9	3.9	12	4
STR10	3.9	12	4
STR11	3.9	12	4
STR12	3.9	12	4
STR13	3.9	12	4
STR14	3.9	12	4
STR15	3.9	12	4
STR16	3.9	12	4
STR17	3.9	12	4
STR18	3.9	12	4
STR19	3.9	12	4
STR20	3.9	12	4
STR21	3.9	12	4
STR22	3.9	12	4
STR23	3.9	12	4
STR24	3.9	12	4
STR25	3.9	12	4
STR26	3.9	12	4
STR27	3.9	12	4
STR28	3.9	12	4
STR29	3.9	12	4
STR30	3.9	12	4
STR31	3.9	12	4
STR32	3.9	12	4
STR33	3.9	12	4
STR34	3.9	12	4
STR35	3.9	12	4
STR36	3.9	12	4
STR37	3.9	12	4
STR38	3.9	12	4
STR39	3.9	12	4
STR40	3.9	12	4
STR41	3.9	12	4
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STR94	3.9	12	4
STR95	3.9	12	4
STR96	3.9	12	4
STR97	3.9	12	4
STR98	3.9	12	4
STR99	3.9	12	4
STR100	3.9	12	4

Interim Condition Flow Rate Summary

Basin/Concentration Point ID	Area (ac)	Q ₁₀₀ (cfs)	Q ₁₀ (cfs)
EX1	68.0	181	63
EX2	58.1	139	53
EX3	14.3	36	13
EX4	17.1	44	17
EX5	18.9	48	18
EX6	6.3	16	6
EX7	12.9	31	10
EX8	3.9	12	4
EX9	3.9	12	4
STR1	3.9	12	4
STR2	3.9	12	4
STR3	3.9	12	4
STR4	3.9	12	4
STR5	3.9	12	4
STR6	3.9	12	4
STR7	3.9	12	4
STR8	3.9	12	4
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STR14	3.9	12	4
STR15	3.9	12	4
STR16	3.9	12	4
STR17	3.9	12	4
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STR56	3.9	12	4
STR57	3.9	12	4
STR58	3.9	12	4
STR59	3.9	12	4
STR60	3.9	12	4
STR61	3.9	12	4
STR62	3.9	12	4
STR63	3.9	12	4
STR64	3.9	12	4
STR65	3.9	12	4
STR66	3.9	12	4
STR67	3.9	12	4
STR68	3.9	12	4
STR69	3.9	12	4
STR70	3.9	12	4
STR71	3.9	12	4
STR72	3.9	12	4
STR73	3.9	12	4
STR74	3.9	12	4
STR75	3.9	12	4
STR76	3.9	12	4
STR77	3.9	12	4
STR78	3.9	12	4
STR79	3.9	12	4
STR80	3.9	12	4
STR81	3.9	12	4
STR82	3.9	12	4
STR83	3.9	12	4
STR84	3.9	12	4
STR85	3.9	12	4
STR86	3.9	12	4
STR87	3.9	12	4
STR88	3.9	12	4
STR89	3.9	12	4
STR90	3.9	12	4
STR91	3.9	12	4
STR92	3.9	12	4
STR93	3.9	12	4
STR94	3.9	12	4
STR95	3.9	12	4
STR96	3.9	12	4
STR97	3.9	12	4
STR98	3.9	12	4
STR99	3.9	12	4
STR100	3.9	12	4

Prorated Flow Summary

Basin ID	Q ₁₀₀ (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)
EX1	161	68.03	2.4
EX2	139	58.09	2.4
EX3	44	17.12	2.6
EXb	20	8.31	2.4
Subbasin ID	Q ₁₀₀ (cfs)	Area (acres)	100-yr Unit Flow (cfs/acre)
A1	67	28.17	2.4
A2	34	14.25	2.4
B	61	25.61	2.4
TOTAL	781	68.09	2.4
C	101	42.36	2.4
D	38	15.73	2.4
TOTAL	729	68.09	2.4
E	13	5.23	2.6
F	31	11.89	2.6
G	10	4.05	2.4
H	8	3.51	2.4
TOTAL	44	17.12	2.4
I	14	5.76	2.4
M	8	2.55	2.4
TOTAL	20	8.31	2.4

Interim Condition 100-Year Street Flow Summary

Section ID	Q ₁₀₀ (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV
1	16	2.00	0.41	4.1	1.7
2	10	2.00	0.36	3.8	1.4
3	9	2.00	0.42	4.2	1.8
4	13	1.00	0.43	3.0	1.3
5	6.5	4.00	0.35	5.2	1.8
6	8	1.50	0.43	3.6	1.6
7	10	2.00	0.36	3.8	1.4
8	13	4.75	0.35	5.4	1.9
9	14	1.5	0.41	3.87	1.5
10	7	3.44	0.38	3.59	1.4

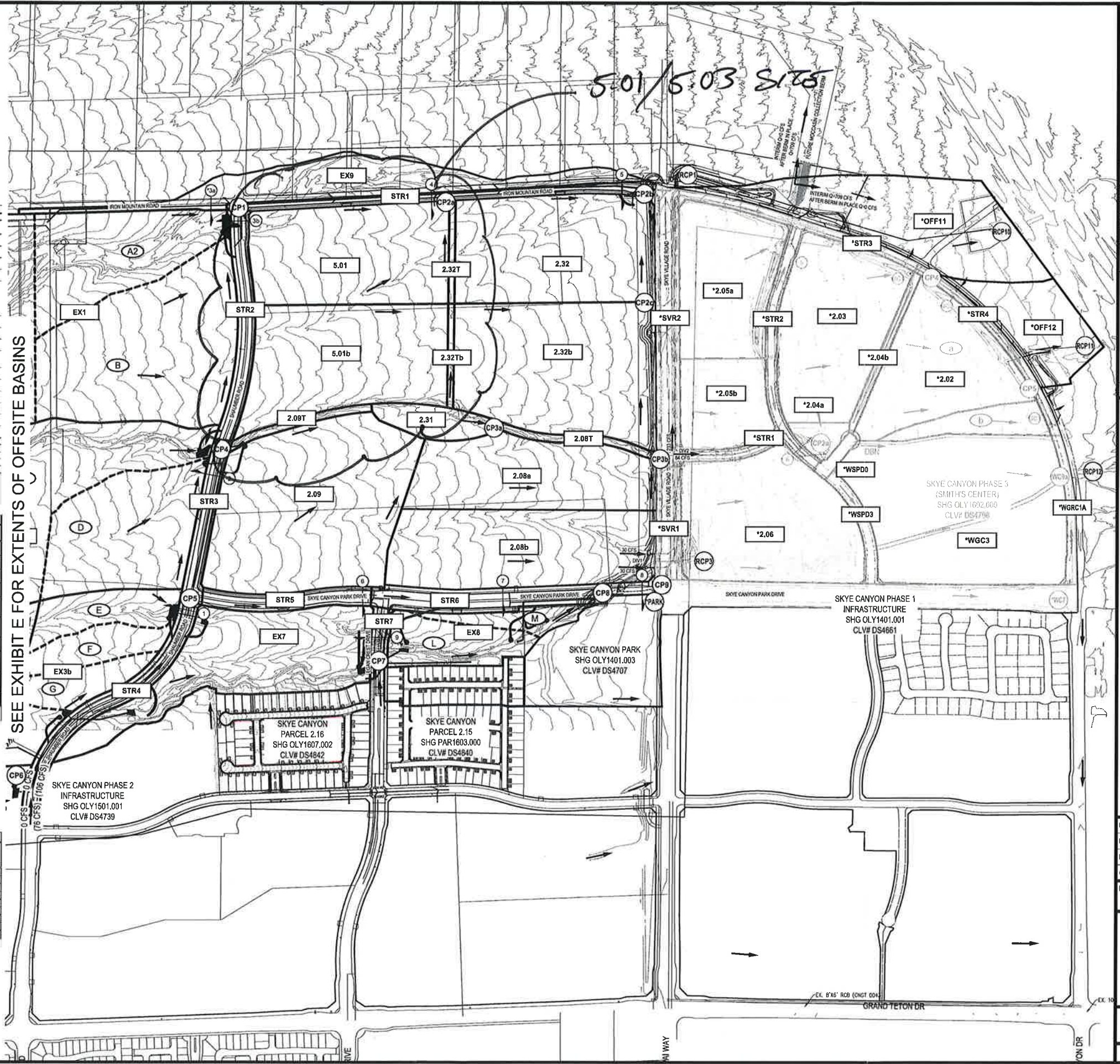
Interim Condition 10-Year Street Flow Summary

Section ID	Q ₁₀ (cfs)	Slope (%)	Depth (ft)	Velocity (fps)	DxV	Dry Lane (ft)
SH10	1.00	0.37	2.8	1.0	15.0	
SH10	3.24	0.32	4.2	1.4	17.5	
SH10	2.00	0.38	3.9	1.5	21.0	
SH10	4.00	0.35	4.8	1.7	22.5	
SC10	4.75	0.32	5.1	1.6	24.0	

Recommended Flood Control Drop Inlet Summary

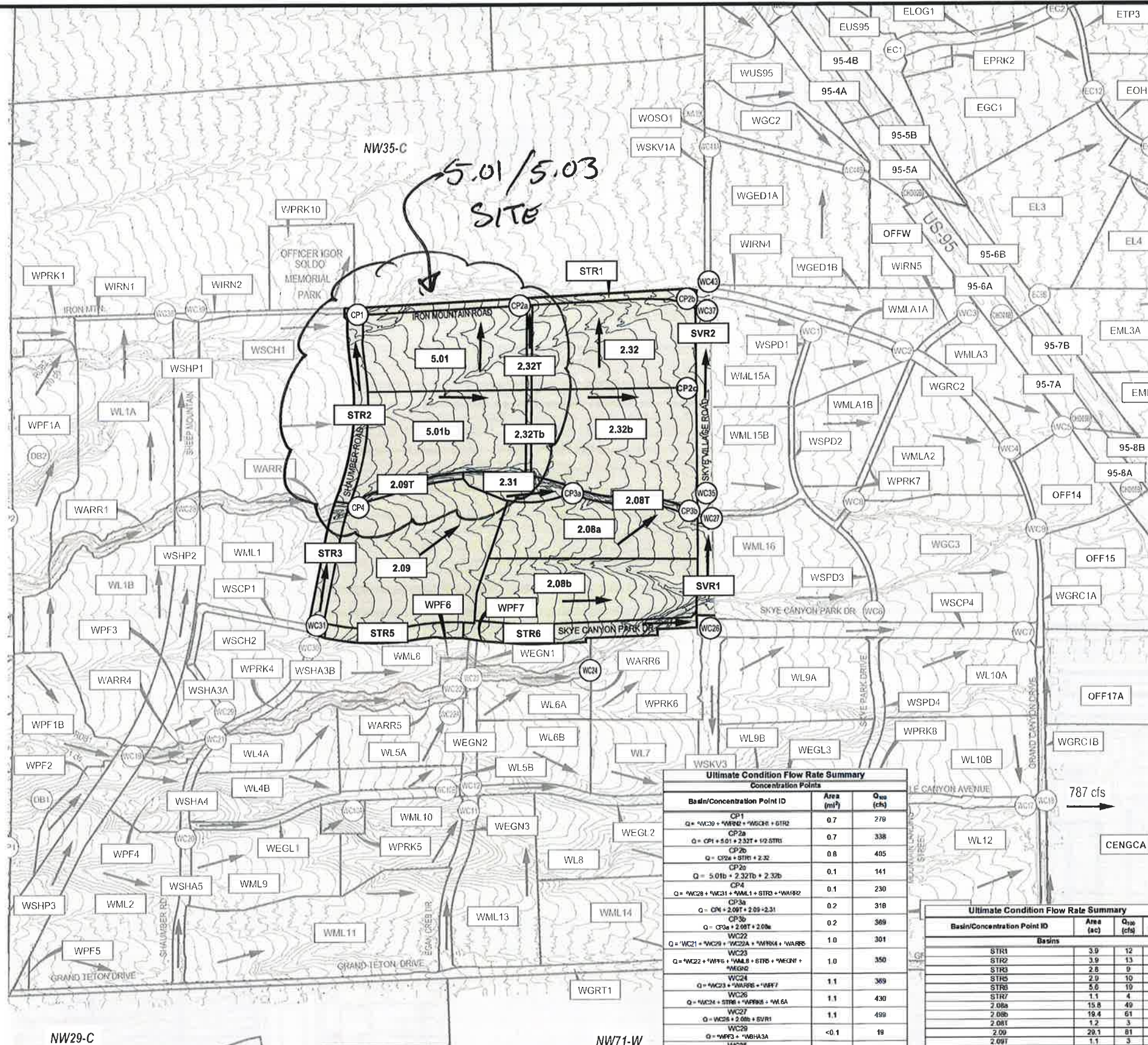
Facility ID	Facility Description	Total Approaching Flow (cfs)	Facility Flow (cfs)	Surfactant Bypass Flow (cfs)	Notes
P17	20.0" Type CM2 D.I.	18	15	1	0.5 cfs bypass per inlet
P9 & P10	17.5" Type CM2 D.I.	10	10	0	
P14	17.5" Type CM2 D.I.	13	13	0	
P17	17.5" Type CM2 D.I.	9	8	1	1 cfs bypass per inlet
P20	17.5" Type CM2 D.I.	7	6	1	1 cfs bypass per inlet
P23	20.0" Type CM2 D.I.	9	9	0	
P27	10.0" Type CM2 D.I.	10	7	3	1.5 cfs bypass per inlet
P30	10.0" Type CM2 D.I.	13	8	5	2.5 cfs bypass per inlet
P32	17.5" Type CM2 D.I.	14	13	1	0.5 cfs bypass per inlet

SEE EXHIBIT E FOR EXTENTS OF OFFSITE BASINS



\\slater\projects\95000\95000.dwg 9/25/2018 3:00 PM User: etm

SEE REFERENCED EXHIBIT E FROM THE MASTER DRAINAGE STUDY UPDATE FOR EXTENTS OF ULTIMATE BASINS



REFERENCED BASINS AND CONCENTRATION POINTS

Ultimate Condition Flow Rate Summary Skye Canyon West Basins					Ultimate Condition Flow Rate Summary Skye Canyon West Concentration Points				
Basin/Concentration Point ID	Area (ac)	Q ₁₀₀ (cfs)	Q ₅₀ (cfs)	Q ₂₅ (cfs)	Basin/Concentration Point ID	Area (ac)	Q ₁₀₀ (cfs)	Q ₅₀ (cfs)	Q ₂₅ (cfs)
WARR1	2.1	17	7	3	WC1	0.02	43	21	
WARR2	2.1	17	7	3	WC2	0.02	43	21	
WARR3	2.1	17	7	3	WC3	0.02	43	21	
WARR4	2.1	17	7	3	WC4	0.02	43	21	
WARR5	2.1	17	7	3	WC5	0.02	43	21	
WARR6	2.1	17	7	3	WC6	0.02	43	21	
WARR7	2.1	17	7	3	WC7	0.02	43	21	
WARR8	2.1	17	7	3	WC8	0.02	43	21	
WARR9	2.1	17	7	3	WC9	0.02	43	21	
WARR10	2.1	17	7	3	WC10	0.02	43	21	
WARR11	2.1	17	7	3	WC11	0.02	43	21	
WARR12	2.1	17	7	3	WC12	0.02	43	21	
WARR13	2.1	17	7	3	WC13	0.02	43	21	
WARR14	2.1	17	7	3	WC14	0.02	43	21	
WARR15	2.1	17	7	3	WC15	0.02	43	21	
WARR16	2.1	17	7	3	WC16	0.02	43	21	
WARR17	2.1	17	7	3	WC17	0.02	43	21	
WARR18	2.1	17	7	3	WC18	0.02	43	21	
WARR19	2.1	17	7	3	WC19	0.02	43	21	
WARR20	2.1	17	7	3	WC20	0.02	43	21	
WARR21	2.1	17	7	3	WC21	0.02	43	21	
WARR22	2.1	17	7	3	WC22	0.02	43	21	
WARR23	2.1	17	7	3	WC23	0.02	43	21	
WARR24	2.1	17	7	3	WC24	0.02	43	21	
WARR25	2.1	17	7	3	WC25	0.02	43	21	
WARR26	2.1	17	7	3	WC26	0.02	43	21	
WARR27	2.1	17	7	3	WC27	0.02	43	21	
WARR28	2.1	17	7	3	WC28	0.02	43	21	
WARR29	2.1	17	7	3	WC29	0.02	43	21	
WARR30	2.1	17	7	3	WC30	0.02	43	21	
WARR31	2.1	17	7	3	WC31	0.02	43	21	
WARR32	2.1	17	7	3	WC32	0.02	43	21	
WARR33	2.1	17	7	3	WC33	0.02	43	21	
WARR34	2.1	17	7	3	WC34	0.02	43	21	
WARR35	2.1	17	7	3	WC35	0.02	43	21	
WARR36	2.1	17	7	3	WC36	0.02	43	21	
WARR37	2.1	17	7	3	WC37	0.02	43	21	
WARR38	2.1	17	7	3	WC38	0.02	43	21	
WARR39	2.1	17	7	3	WC39	0.02	43	21	
WARR40	2.1	17	7	3	WC40	0.02	43	21	
WARR41	2.1	17	7	3	WC41	0.02	43	21	
WARR42	2.1	17	7	3	WC42	0.02	43	21	
WARR43	2.1	17	7	3	WC43	0.02	43	21	
WARR44	2.1	17	7	3	WC44	0.02	43	21	
WARR45	2.1	17	7	3	WC45	0.02	43	21	
WARR46	2.1	17	7	3	WC46	0.02	43	21	
WARR47	2.1	17	7	3	WC47	0.02	43	21	
WARR48	2.1	17	7	3	WC48	0.02	43	21	
WARR49	2.1	17	7	3	WC49	0.02	43	21	
WARR50	2.1	17	7	3	WC50	0.02	43	21	
WARR51	2.1	17	7	3	WC51	0.02	43	21	
WARR52	2.1	17	7	3	WC52	0.02	43	21	
WARR53	2.1	17	7	3	WC53	0.02	43	21	
WARR54	2.1	17	7	3	WC54	0.02	43	21	
WARR55	2.1	17	7	3	WC55	0.02	43	21	
WARR56	2.1	17	7	3	WC56	0.02	43	21	
WARR57	2.1	17	7	3	WC57	0.02	43	21	
WARR58	2.1	17	7	3	WC58	0.02	43	21	
WARR59	2.1	17	7	3	WC59	0.02	43	21	
WARR60	2.1	17	7	3	WC60	0.02	43	21	
WARR61	2.1	17	7	3	WC61	0.02	43	21	
WARR62	2.1	17	7	3	WC62	0.02	43	21	
WARR63	2.1	17	7	3	WC63	0.02	43	21	
WARR64	2.1	17	7	3	WC64	0.02	43	21	
WARR65	2.1	17	7	3	WC65	0.02	43	21	
WARR66	2.1	17	7	3	WC66	0.02	43	21	
WARR67	2.1	17	7	3	WC67	0.02	43	21	
WARR68	2.1	17	7	3	WC68	0.02	43	21	
WARR69	2.1	17	7	3	WC69	0.02	43	21	
WARR70	2.1	17	7	3	WC70	0.02	43	21	
WARR71	2.1	17	7	3	WC71	0.02	43	21	
WARR72	2.1	17	7	3	WC72	0.02	43	21	
WARR73	2.1	17	7	3	WC73	0.02	43	21	
WARR74	2.1	17	7	3	WC74	0.02	43	21	
WARR75	2.1	17	7	3	WC75	0.02	43	21	
WARR76	2.1	17	7	3	WC76	0.02	43	21	
WARR77	2.1	17	7	3	WC77	0.02	43	21	
WARR78	2.1	17	7	3	WC78	0.02	43	21	
WARR79	2.1	17	7	3	WC79	0.02	43	21	
WARR80	2.1	17	7	3	WC80	0.02	43	21	
WARR81	2.1	17	7	3	WC81	0.02	43	21	
WARR82	2.1	17	7	3	WC82	0.02	43	21	
WARR83	2.1	17	7	3	WC83	0.02	43	21	
WARR84	2.1	17	7	3	WC84	0.02	43	21	
WARR85	2.1	17	7	3	WC85	0.02	43	21	
WARR86	2.1	17	7	3	WC86	0.02	43	21	
WARR87	2.1	17	7	3	WC87	0.02	43	21	
WARR88	2.1	17	7	3	WC88	0.02	43	21	
WARR89	2.1	17	7	3	WC89	0.02	43	21	
WARR90	2.1	17	7	3	WC90	0.02	43	21	
WARR91	2.1	17	7	3	WC91	0.02	43	21	
WARR92	2.1	17	7	3	WC92	0.02	43	21	
WARR93	2.1	17	7	3	WC93	0.02	43	21	
WARR94	2.1	17	7	3	WC94	0.02	43	21	
WARR95	2.1	17	7	3	WC95	0.02	43	21	
WARR96	2.1	17	7	3	WC96	0.02	43	21	
WARR97	2.1	17	7	3	WC97	0.02	43	21	
WARR98	2.1	17	7	3	WC98	0.02	43	21	
WARR99	2.1	17	7	3	WC99	0.02	43	21	
WARR100	2.1	17	7	3	WC100	0.02	43	21	

- NOTE:
- THE MAP MEMPHIS HAS ONLY INCLUDED THE MOST PERTINENT BASINS TO THE PROJECT SITE.
 - BOLD CONCENTRATION POINTS HAVE BEEN UTILIZED FOR ULTIMATE CONDITION WSPW MODEL AND SIZING OF STORM DRAIN.
 - BOLD CONCENTRATION POINTS LOCATED AT THE EAST SIDE OF THE PROJECT SITE HAVE BEEN UTILIZED AS COMPARISON POINTS TO THE MOST CURRENT MASTER DRAINAGE STUDY UPDATE.
 - SEE REFERENCED ULTIMATE CONDITION EXHIBIT E FROM THE MASTER DRAINAGE STUDY UPDATE FOR THE FULL EXTENTS OF THE ULTIMATE CONDITION WATERSHED.

SLATER
HANIFAN
GROUP

CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5500 FAX (702) 284-5399

DATE: JANUARY 2018

DRAWN: ETM

DESIGNED: ETM

CHECKED: LKL

PROJECT NO. OLY1609.000

EXHIBIT G

SHEET 1 OF 1

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

Project Name & Number: Skye Canyon Infrastructure Phase 3B, 3C

Description:

By: ETM

Date: 2/6/2018

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc		Tc Check		Tlag
DESIG:	DEV./EX. (D or E)	CN	K	AREA 'Ac	AREA MI^2	INITIAL LENGTH Feet	SLOPE %	Ti Min [3]	TRAVEL LENGTH Feet	SLOPE %	VELOCITY FPS [4]	V2 VELOCITY FPS [5]	Tt Min [6]	Tc Calc. [7]	Total Length Feet [8]	Tc Check [9]	Tlag Hours [10]
PROPOSED CONDITION																	
EX1	E	88.0	0.772	68.0	0.1063	250	13.0	3.97	2615	2.9	2.50	4.97	10.42	14.39			0.144
EX2	E	88.0	0.772	58.1	0.0908	350	11.4	4.91	2491	3.1	2.61	5.18	9.61	14.52			0.145
EX3a	E	88.0	0.772	14.2	0.0222	309	1.6	8.88	700	3.6	2.80	5.55	3.58	12.46			0.125
EX3b	E	88.0	0.772	17.1	0.0268	162	9.3	3.58	749	4.0	2.96	5.89	3.52	7.10			0.100
EX4	E	88.0	0.772	33.8	0.0528	328	1.2	10.07	1016	0.7	1.24	2.46	10.23	20.30			0.203
EX5	E	88.0	0.772	42.4	0.0662	265	0.8	10.59	1145	0.7	1.24	2.46	11.10	21.69			0.217
EX6a	E	88.0	0.772	44.3	0.0693	500	1.0	13.22	2468	3.0	2.56	5.09	9.69	22.91			0.229
EX6b	E	88.0	0.772	34.5	0.0539	500	1.0	13.22	2949	3.0	2.56	5.09	11.27	24.48			0.245
EX7	E	88.0	0.772	18.9	0.0296	220	2.0	6.96	1751	3.7	2.85	5.66	6.61	13.57			0.136
EX8	E	88.0	0.772	8.3	0.0130	208	1.0	8.53	1155	2.6	2.39	4.74	5.79	14.32			0.143
EX9	E	88.0	0.772	12.0	0.0187	931	1.1	17.47	2399	1.7	1.93	3.83	12.58	30.05			0.300
STR1	E	98.0	0.904	3.9	0.0060	33	2.0	1.61	2640	3.0	2.56	5.09	10.25	11.87			0.119
STR2	E	98.0	0.904	3.9	0.0061	33	2.0	1.61	1491	1.7	1.93	3.83	8.63	10.24			0.102
STR3	E	98.0	0.904	2.8	0.0044	33	2.0	1.61	1040	2.4	2.29	4.55	5.61	7.22			0.100
STR4	E	98.0	0.904	4.7	0.0074	33	2.0	1.61	1815	2.5	2.34	4.65	8.28	9.89			0.100
STR5	E	98.0	0.904	2.9	0.0045	33	2.0	1.61	1081	3.2	2.65	5.26	4.99	6.60			0.100
STR6	E	98.0	0.904	5.6	0.0088	45	2.0	1.88	1827	3.6	2.81	5.58	6.93	8.81			0.100
STR7	E	98.0	0.904	1.1	0.0017	33	2.0	1.61	396	2.5	2.34	4.65	2.82	4.43			0.100

INTERIM CONDITION																					
2.08a	D	95.0	0.864	15.8	0.0246	100	1.0	4.25	1899	3.5	3.78	5.72	6.28	10.53	1999	21.106	0.105				
2.08b	D	95.0	0.864	19.4	0.0303	100	1.0	4.25	1899	3.5	3.78	5.72	6.28	10.53	1999	21.106	0.105				
2.08T	D	84.0	0.719	1.2	0.0018	50	2.0	3.85	998	3.2	3.61	5.47	3.82	7.67	1048	15.822	0.077				
2.09	D	92.0	0.824	29.1	0.0455	100	1.0	4.96	2037	2.7	3.32	5.03	7.61	12.57	2137	21.872	0.126				
2.09T	D	84.0	0.719	1.1	0.0017	50	2.0	3.85	925	2.2	3.00	4.54	4.34	8.19	975	15.417	0.082				
2.31	D	84.0	0.719	3.2	0.0050	152	5.0	4.95	816	4.9	4.47	6.77	2.64	7.59	968	15.378	0.076				
2.32	D	95.0	0.864	20.3	0.0317	100	1.0	4.25	1802	2.5	3.19	4.84	7.09	11.34	1902	20.567	0.113				
2.32b	D	95.0	0.864	24.8	0.0387	100	1.0	4.25	2027	2.0	2.84	4.31	8.84	13.09	2127	21.817	0.131				
2.32T	D	84.0	0.719	0.6	0.0010	50	2.0	3.85	638	0.9	1.96	2.97	5.03	8.88	688	13.822	0.089				
2.32Tb	D	84.0	0.719	0.6	0.0010	50	2.0	3.85	645	0.8	1.78	2.70	5.57	9.42	695	13.861	0.094				
5.01	D	95.0	0.864	18.7	0.0292	5.01	1.0	0.95	1836	2.9	3.44	5.21	6.70	7.65	1841.01	20.228	0.076				
5.01b	D	95.0	0.864	20.3	0.0317	5.01	1.0	0.95	1908	2.6	3.26	4.93	7.31	8.27	1913.01	20.628	0.083				
[1]	K = 0.0132 (CN) - 0.39															[5]	For Existing Conditions: $V2 = 29.4 * (S/100)^{0.5}$		[9]	$Tc = (L/180) + 10$	
[2]	A = Area/640																For Developed Conditions: $V2 = 30.6 * (S/100)^{0.5}$		[10]	Tag = $(0.6 * Tc) / 60$	
[3]	$Ti = (1.8 * (1.1 - K) * L^{0.5}) / S^{0.33}$															[6]	$Tt = L / (60 * V)$		[11]	Min Tag = 0.05	
[4]	For Existing Conditions: $V1 = 14.8 * (S/100)^{0.5}$															[7]	$Tc = Ti + Tt$		Note: For Travel Time Calcs: V1 applies to first 500 feet and V2 applies to remaining distance.		
	For Developed Conditions: $V1 = 20.2 * (S/100)^{0.5}$															[8]	Total L = Initial L + Travel L				
REFERENCE :																		STANDARD FORM 4			

APPENDIX C

HEC-1 Analyses

Proposed Condition


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1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
*   JUN 1998
*   VERSION 4.1
*
* RUN DATE 12JAN18 TIME 17:18:35
*
*****
PRO
*****
*
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*
*****

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X X XXXXXX XXXX X
X X X X X XX
X X X X X X
XXXXXX XXXX X XXXX X
X X X X X X
X X X X X X
X X XXXXXX XXXX XXX

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

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

1 HEC-1 INPUT PAGE 1

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
*** FREE ***
*DIAGRAM
1 ID SLATER HANIFAN GROUP
2 ID NINETY-FIVE MANAGEMENT, LLC
3 ID SKYE CANYON INFRASTRUCTURE PHASE 3B & 3C
4 ID TECHNICAL DRAINAGE STUDY
5 ID
6 ID DRAINAGE CONDITION -- PROPOSED CONDITION
7 ID RETURN PERIOD ----- 100 & 10-YEAR
8 ID DISTRIBUTION ----- 6-HOUR SDN3
9 ID PROJECT NO. ----- OLY1609.000
10 ID FILENAME ----- PRO.H1
11 ID DATE ----- JANUARY 2018
12 ID MODELED BY ----- ETM
13 ID
14 ID RETURN PERIOD RATIO
15 ID 100-YR 1.00
16 ID 10-YR 0.54
17 ID
18 ID SIX HOUR DEPTH-AREA REDUCTION FACTORS
19 ID DRAINAGE AREA (MI^2) DARF
20 ID 0.00-0.49 0.990
21 ID 0.50-0.99 0.975
22 ID 1.00-1.99 0.950
23 ID
24 ID
25 ID IT 5 0 0 300
26 ID IO 5 0 0
27 ID IN 5 0 0
28 ID JR PREC 1.00 0.99 0.975 0.95 0.54
29 ID *
30 ID
31 ID KK *OFF7
32 ID KM REFERENCED FROM THE "DB2" STUDY
33 ID KM DISCHARGES INTO DETENTION BASIN "DB2"
34 ID PB 3.00
35 ID PC 0 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
36 ID PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
37 ID PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
38 ID PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
39 ID PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
40 ID PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
41 ID PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
42 ID PC 0.998 0.999 1
43 ID BA .0058
44 ID LS 0 88.0
45 ID UD 0.100
46 ID *
47 ID
48 ID KK *OFF8
49 ID KM REFERENCED FROM THE "DB2" STUDY

```

1

46 KM DISCHARGES INTO DETENTION BASIN "DB2"

47 KO 3

48 BA .2122

49 LS 0 88.0

HEC-1 INPUT

PAGE 2

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

50 UD 0.299

*

51 KK *CP2

52 KM REFERENCED FROM THE "DB2" STUDY

53 KM COMBINE OFF7, AND OFF8

54 HC 2

*

55 KK *OFF9

56 KM REFERENCED FROM THE "DB2" STUDY

57 KM DISCHARGES INTO DETENTION BASIN "DB2"

58 KO 3

59 BA .1137

60 LS 0 88.0

61 UD 0.280

*

62 KK *CP2a

63 KM REFERENCED FROM THE "DB2" STUDY

64 KM COMBINE CP2, AND OFF9

65 HC 2

*

66 KK *OFF10

67 KM REFERENCED FROM THE "DB2" STUDY

68 KM DISCHARGES INTO DETENTION BASIN "DB2"

69 KO 3

70 BA .6502

71 LS 0 88.0

72 UD 0.613

*

73 KK *ON2

74 KM REFERENCED FROM THE "DB2" STUDY

75 KM DB2 BASIN

76 BA .0315

77 LS 0 94.0

78 UD 0.083

*

79 KK *DB2

80 KM REFERENCED FROM THE "DB2" STUDY

81 KM COMBINE CP2a, OFF10 AND ON2

82 KO 1

83 HC 3

*

84 KK *RDB2

85 KM REFERENCED FROM THE "DB2" STUDY

86 KM OUTLET = 25" ORIFICE @ INVERT ELEVATION = 2984.21-FT

87 KO 1

88 RS 1 ELEV 2992.0

89 SV 0.00 2.34 7.60 24.30 46.28 73.78 107.11 146.75 193.03

90 SE 2992.0 2993.0 2995.0 3000.0 3005.0 3010.0 3015.0 3020.0 3025.0

HEC-1 INPUT

1

PAGE 3

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

91 SQ 0.00 44.44 51.05 64.70 83.84 99.36 520.9 3465.5 7888.4

92 SE 2992.0 2993.0 2995.0 3000.0 3009.0 3018.0 3019.0 3022.0 3025.0

*

93 KK EX1

94 KM OFFSITE BASIN

95 BA .1063

96 PB 3.00

97 LS 0 88.0

98 UD 0.144

*

99 KK STR2

100 KM STREET BASIN

101 BA .0061

102 PB 3.00

103 LS 0 98.0

104 UD 0.102

*

105 KK CP1

106 KM COMBINES *RDB2, EX1 AND STR2

107 HC 3 PRO
 *
 108 KK EX9
 109 KM OFFSITE BASIN
 110 BA .0187
 111 PB 3.00
 112 LS 0 88.0
 113 UD 0.300
 *
 114 KK STR1
 115 KM STREET BASIN
 116 BA .0060
 117 PB 3.00
 118 LS 0 98.0
 119 UD 0.119
 *
 120 KK EX4
 121 KM OFFSITE BASIN
 122 BA .0528
 123 PB 3.00
 124 LS 0 88.0
 125 UD 0.203
 *
 126 KK EX5
 127 KM OFFSITE BASIN
 128 BA .0662
 129 PB 3.00
 130 LS 0 88.0
 131 UD 0.217
 *

SITE

1

HEC-1 INPUT

PAGE 4

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

132 KK CP2
 133 KM COMBINES CP1, EX9, STR1, EX4 AND EX5
 134 HC 5
 *
 135 KK EX6b
 136 KM OFFSITE BASIN
 137 BA .0539
 138 PB 3.00
 139 LS 0 88.0
 140 UD 0.245
 *
 141 KK D1
 142 KM DIVERT FLOW TO CONCENTRATION POINT RCP3
 143 DT DIV1
 144 DI 0 1000
 145 DQ 0 500
 *
 146 KK STR4
 147 KM STREET BASIN
 148 BA .0074
 149 PB 3.00
 150 LS 0 98.0
 151 UD 0.100
 *
 152 KK EX3a
 153 KM OFFSITE BASIN
 154 BA .0222
 155 PB 3.00
 156 LS 0 88.0
 157 UD 0.125
 *
 158 KK REX3a
 159 KM ROUTE EX3 TO CP5
 160 KM LENGTH SLOPE n-VALUE SHAPE WIDTH S-SLOPE
 161 RD 2623 .032 .040 0 TRAP 50 2
 *
 162 KK EX2
 163 KM OFFSITE BASIN
 164 BA .0908
 165 PB 3.00
 166 LS 0 88.0
 167 UD 0.145
 *

1

HEC-1 INPUT

PAGE 5

PRO

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

168 KK REX2
169 KM ROUTE EX2 TO CP4
170 KM LENGTH SLOPE n-VALUE SHAPE WIDTH S-SLOPE
171 RD 2499 .031 .040 0 TRAP 50 2
*

172 KK STR3
173 KM STREET BASIN
174 BA .0044
175 PB 3.00
176 LS 0 98.0
177 UD 0.100
*

178 KK CP4
179 KM COMBINES EX3a, STR4, EX2 AND STR3
180 HC 4
*

181 KK EX6a
182 KM OFFSITE BASIN
183 BA .0093
184 PB 3.00
185 LS 0 88.0
186 UD 0.229
*

187 KK CP3
188 KM COMBINES D1, CP4 AND EX6a
189 HC 3
*

190 KK *WPF5
191 KM WEST BASIN, WEST OF SHAUMBER RD
192 BA .0006
193 PB 3.00
194 LS 0 86.0
195 UD 0.052
*

196 KK *WML2
197 KM WEST BASIN, WEST OF SHAUMBER ROAD
198 BA .0428
199 PB 3.00
200 LS 0 93.5
201 UD 0.142
*

202 KK *WSHA5
203 KM WEST BASIN, SHAUMBER ROAD
204 BA .0037
205 PB 3.00
206 LS 0 98.0
207 UD 0.086
*

1

HEC-1 INPUT

PAGE 6

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

208 KK *WC20
209 KM S OF EAGLE CANYON/SHAUMBER INTERSECTION
210 KM COMBINE WPF5, WML2, WSHA5
211 HC 3
*

212 KK *WPF4
213 BA .0090
214 PB 3.00
215 LS 0 94.0
216 UD 0.087
*

217 KK *WSHA4
218 BA .0022
219 PB 3.00
220 LS 0 98.0
221 UD 0.051
*

222 KK RCP6
223 KM COMBINES *WC20, *WPF4 AND *WSHA4
224 HC 3
*

PRO

225	KK	RRC6					
226	KM	ROUTE CP6 TO CP7					
227	KM	LENGTH	SLOPE	n-VALUE	SHAPE	WIDTH	S-SLOPE
228	RD	1751	.037	.040	0	50	2
	*						

229	KK	*OFF1					
230	KM	REFERENCED FROM THE "DB1" STUDY					
231	KM	DISCHARGES INTO DETENTION BASIN "DB1"					
232	KO	3					
233	BA	.4291					
234	LS	0	86.8				
235	UD	0.419					
	*						

236	KK	*OFF2					
237	KM	REFERENCED FROM THE "DB1" STUDY					
238	KM	DISCHARGES INTO DETENTION BASIN "DB1"					
239	KO	3					
240	BA	.0419					
241	LS	0	81.8				
242	UD	0.154					
	*						

1

HEC-1 INPUT

PAGE 7

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

243	KK	*OFF3					
244	KM	REFERENCED FROM THE "DB1" STUDY					
245	KM	DISCHARGES INTO DETENTION BASIN "DB1"					
246	KO	3					
247	BA	.0259					
248	LS	0	88.0				
249	UD	0.110					
	*						

250	KK	*DUMMY					
251	KM	COMBINE OFF1, OFF2, AND OFF3					
252	HC	3					
	*						

253	KK	*OFF4					
254	KM	REFERENCED FROM THE "DB1" STUDY					
255	KM	DISCHARGES INTO DETENTION BASIN "DB1"					
256	KO	3					
257	BA	.0581					
258	LS	0	88.0				
259	UD	0.134					
	*						

260	KK	*OFF5					
261	KM	REFERENCED FROM THE "DB1" STUDY					
262	KM	DISCHARGES INTO DETENTION BASIN "DB1"					
263	KO	3					
264	BA	.2569					
265	LS	0	88.0				
266	UD	0.416					
	*						

267	KK	*OFF6					
268	KM	REFERENCED FROM THE "DB1" STUDY					
269	KM	DISCHARGES INTO DETENTION BASIN "DB1"					
270	KO	3					
271	BA	.0399					
272	LS	0	88.0				
273	UD	0.118					
	*						

274	KK	*ON1					
275	KM	REFERENCED FROM THE "DB1" STUDY					
276	KM	DB1 BASIN					
277	BA	.0261					
278	LS	0	94.0				
279	UD	0.115					
	*						

1

HEC-1 INPUT

PAGE 8

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

280	KK	*DB1					
281	KM	REFERENCED FROM THE "DB1" STUDY					
282	KM	COMBINE DUMMY, OFF4, OFF5, OFF6 AND ON1					
283	HC	5					
	*						

284	KK	*RDB1					
285	KM	REFERENCED FROM THE "DB1" STUDY					

PRO

286	KM	OUTLET = 24" ORIFICE @ INVERT ELEVATION = 3013.8-FT								
287	RS	1	ELEV	3025.5						
288	SA	4.58	5.63	5.81	6.00	6.19	7.17	7.61	8.31	9.00
289	SE	3025.5	3027	3028	3029	3030	3035	3037	3040	3043
290	SQ	49.7	60.6	70.8	74.5	1436.0	3920.5	7136.3		
291	SE	3025.5	3030	3035	3037	3040	3043	3046		
	*									
292	KK	*SM1								
293	KM	DISCHARGES INTO OUTLET CHANNEL								
294	BA	.0090								
295	LS	0	94.0							
296	UD	0.066								
	*									
297	KK	*SM2								
298	KM	DISCHARGES INTO OUTLET CHANNEL								
299	BA	.0077								
300	LS	0	94.0							
301	UD	0.109								
	*									
302	KK	*SM3								
303	KM	SWALE FLOW								
304	BA	.0032								
305	LS	0	94.0							
306	UD	0.077								
	*									
307	KK	DUMMY								
308	KM	COMBINES *RDB1, *SM1, *SM2 AND *SM3								
309	HC	4								
	*									
310	KK	*WL4A								
311	KM	BASIN WEST OF PARCEL 2.16								
312	BA	.0125								
313	PB	3.00								
314	LS	0	92.0							
315	UD	0.106								
	*									

1

HEC-1 INPUT

PAGE 9

LINE	ID	1.....2.....3.....4.....5.....6.....7.....8.....9.....10
316	KK	*ON1D
317	KM	PARCEL 2.16
318	BA	.0222
319	PB	3.00
320	LS	0 92.0
321	UD	0.099
	*	
322	KK	DUMMY
323	KM	COMBINES CP6, *RDB1, *WL4A AND *ON1D
324	HC	4
	*	
325	KK	EX3b
326	KM	OFFSITE BASIN
327	BA	.0268
328	PB	3.00
329	LS	0 88.0
330	UD	0.100
	*	
331	KK	EX7
332	KM	OFFSITE BASIN
333	BA	.0296
334	PB	3.00
335	LS	0 88.0
336	UD	0.136
	*	
337	KK	STR5
338	KM	STREET BASIN
339	BA	.0045
340	PB	3.00
341	LS	0 98.0
342	UD	0.100
	*	
343	KK	STR7
344	KM	STREET BASIN
345	BA	.0017
346	PB	3.00
347	LS	0 98.0
348	UD	0.100

PRO

*
349 KK CP7
350 KM COMBINES *RDB1, *WL4A, *ON1D, EX3b, EX7, STR5 AND STR7
351 HC 5
*

1

HEC-1 INPUT

PAGE 10

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

352 KK RCP7
353 KM ROUTE CP7 TO CP8
354 KM LENGTH SLOPE n-VALUE SHAPE WIDTH S-SLOPE
355 RD 1155 .026 .040 0 TRAP 50 2
*

356 KK EX8
357 KM OFFSITE BASIN
358 BA .0130
359 PB 3.00
360 LS 0 88.0
361 UD 0.143
*

362 KK STR6
363 KM STREET BASIN
364 BA .0088
365 PB 3.00
366 LS 0 98.0
367 UD 0.100
*

368 KK CP8
369 KM COMBINES CP7, EX8 AND STR6
370 HC 3
*

371 KK *OFF3
372 KM REFERENCED FROM THE "SMITH'S" STUDY
373 PB 3.00
374 BA .0012
375 LS 0 86.2
376 UD 0.100
*

377 KK *D2
378 KM REFERENCED FROM THE "SMITH'S" STUDY
379 PB 3.00
380 BA .0154
381 LS 0 86.0
382 UD 0.089
*

383 KK *IOFF4
384 KM REFERENCED FROM THE "SMITH'S" STUDY
385 PB 3.00
386 BA .0062
387 LS 0 86.2
388 UD 0.100
*

1

HEC-1 INPUT

PAGE 11

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

389 KK *PARK
390 KM REFERENCED FROM THE "SMITH'S" STUDY
391 KM COMBINES IOFF4, OFF3, D2
392 HC 3
*

393 KK CP9
394 KM COMBINES CP8 AND *PARK
395 HC 2
*

396 KK DIV1
397 KM CULVERT CROSSING FLOW INTO PARCEL 2.06
398 DR DIV1
*

399 KK RCP3
400 KM COMBINES DIV1 AND CP9
401 HC 2
*
402 ZZ

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

PRO

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW		
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW		
29	*OFF7			
	.			
44	.	*OFF8		
	.			
51	*CP2.....			
	.			
55	.	*OFF9		
	.			
62	*CP2a.....			
	.			
66	.	*OFF10		
	.			
73	.		*ON2	
	.			
79	*DB2.....			
	V			
	V			
84	*RDB2			
	.			
93	.	EX1		
	.			
99	.		STR2	
	.			
105	CP1.....			
	.			
108	.	EX9		
	.			
114	.		STR1	
	.			
120	.		EX4	
	.			
126	.		EX5	
	.			
132	CP2.....			
	.			
135	.	EX6b		
	.			
143	.	-----> DIV1		
141	D1			
	.			
146	.	STR4		
	.			
152	.		EX3a	
	.		V	
	.		V	
158	.		REX3a	
	.			
162	.		EX2	
	.		V	
	.		V	
168	.		REX2	
	.			
172	.			STR3
	.			
178	.	CP4.....		
	.			
181	.		EX6a	
	.			
187	CP3.....			
	.			

→ SITE

PRO

190 . . . *WPF5
196 . . . *WML2
202 . . . *WSHA5
208 . . . *WC20
212 . . . *WPF4
217 . . . *WSHA4
222 . . . RCP6
225 . . . V
225 . . . V
225 . . . RRCP6
229 . . . *OFF1
236 . . . *OFF2
243 . . . *OFF3
250 . . . *DUMMY
253 . . . *OFF4
260 . . . *OFF5
267 . . . *OFF6
274 . . . *ON1
280 . . . *DB1
284 . . . V
284 . . . V
284 . . . *RDB1
292 . . . *SM1
297 . . . *SM2
302 . . . *SM3
307 . . . DUMMY
310 . . . *WL4A
316 . . . *ON1D
322 . . . DUMMY
325 . . . EX3b
331 . . . EX7
337 . . . STR5
343 . . . STR7
349 . . . CP7

```

PRO
V
V
352 . . . RCP7
. . .
356 . . . EX8
. . .
362 . . . STR6
. . .
368 . . . CP8.....
. . .
371 . . . *OFF3
. . .
377 . . . *D2
. . .
383 . . . *IOFF4
. . .
389 . . . *PARK.....
. . .
393 . . . CP9.....
. . .
398 . . . <----- DIV1
396 . . . DIV1
. . .
399 . . . RCP3.....

```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

1*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 12JAN18 TIME 17:18:35 *
* *****

```

```

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

```

SLATER HANIFAN GROUP
NINETY-FIVE MANAGEMENT, LLC.
SKYE CANYON INFRASTRUCTURE PHASE 3B & 3C
TECHNICAL DRAINAGE STUDY

DRAINAGE CONDITION -- PROPOSED CONDITION
RETURN PERIOD ----- 100 & 10-YEAR
DISTRIBUTION ----- 6-HOUR SDN3
PROJECT NO. ----- DLY1609.000
FILENAME ----- PRO.H1
DATE ----- JANUARY 2018
MODELED BY ----- ETM

RETURN PERIOD	RATIO
100-YR	1.00
10-YR	0.54

SIX HOUR DEPTH-AREA REDUCTION FACTORS	
DRAINAGE AREA (MI^2)	DARF
0.00-0.49	0.990
0.50-0.99	0.975
1.00-1.99	0.950

```

26 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
      NO        300 NUMBER OF HYDROGRAPH ORDINATES
      NDDATE      2 0 ENDING DATE
      NDTIME      0055 ENDING TIME
      ICENT      19 CENTURY MARK

```


(AC-FT) 4. 4. 4. PRO
4.

CUMULATIVE AREA = .04 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION *OFF6
FOR PLAN 1, RATIO = .95

TOTAL RAINFALL = 2.85, TOTAL LOSS = 1.16, TOTAL EXCESS = 1.69

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
(CFS)	(HR)	6-HR	24-HR	72-HR	24.92-HR
+ 58.	3.58				
	(CFS)	7.	2.	2.	2.
	(INCHES)	1.685	1.685	1.685	1.685
	(AC-FT)	4.	4.	4.	4.
CUMULATIVE AREA =		.04 SQ MI			

*** *** *** *** ***

HYDROGRAPH AT STATION *OFF6
FOR PLAN 1, RATIO = .54

TOTAL RAINFALL = 1.62, TOTAL LOSS = .95, TOTAL EXCESS = .67

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
(CFS)	(HR)	6-HR	24-HR	72-HR	24.92-HR
+ 24.	3.58				
	(CFS)	3.	1.	1.	1.
	(INCHES)	.670	.670	.670	.670
	(AC-FT)	1.	1.	1.	1.
CUMULATIVE AREA =		.04 SQ MI			

1

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION					
				RATIO 1 1.00	RATIO 2 .99	RATIO 3 .98	RATIO 4 .95	RATIO 5 .54	
HYDROGRAPH AT	*OFF7	.01	1	FLOW	9.	9.	9.	9.	4.
+				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT	*OFF8	.21	1	FLOW	244.	241.	236.	227.	93.
+				TIME	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT	*CP2	.22	1	FLOW	249.	245.	240.	232.	95.
+				TIME	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT	*OFF9	.11	1	FLOW	153.	151.	148.	142.	58.
+				TIME	3.58	3.58	3.58	3.58	3.67
2 COMBINED AT	*CP2a	.33	1	FLOW	395.	390.	382.	368.	148.
+				TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT	*OFF10	.65	1	FLOW	508.	501.	490.	472.	191.
+				TIME	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT	*ON2	.03	1	FLOW	66.	65.	64.	62.	31.
+				TIME	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT	*DB2	1.01	1	FLOW	774.	763.	746.	719.	290.
+				TIME	3.83	3.83	3.83	3.83	3.83
ROUTED TO	*RDB2	1.01	1	FLOW	86.	86.	85.	84.	64.
+				TIME	5.83	5.83	5.83	5.83	5.58

** PEAK STAGES IN FEET **
1 STAGE 3010.16 3009.97 3009.63 3009.08 2999.64

				TIME	5.83	5.83	PRO 5.83	5.83	5.58
HYDROGRAPH AT +	EX1	.11	1	FLOW TIME	163. 3.58	161. 3.58	157. 3.58	152. 3.58	63. 3.58
HYDROGRAPH AT +	STR2	.01	1	FLOW TIME	13. 3.50	13. 3.50	13. 3.50	12. 3.50	7. 3.50
3 COMBINED AT +	CP1	1.13	1	FLOW TIME	230. 3.58	227. 3.58	224. 3.58	217. 3.58	114. 3.58
HYDROGRAPH AT +	EX9	.02	1	FLOW TIME	21. 3.75	21. 3.75	21. 3.75	20. 3.75	8. 3.75
HYDROGRAPH AT +	STR1	.01	1	FLOW TIME	12. 3.50	12. 3.50	12. 3.50	12. 3.50	6. 3.50
HYDROGRAPH AT +	EX4	.05	1	FLOW TIME	70. 3.58	69. 3.58	68. 3.58	65. 3.58	27. 3.67
HYDROGRAPH AT +	EX5	.07	1	FLOW TIME	87. 3.67	85. 3.67	84. 3.67	81. 3.67	33. 3.67
5 COMBINED AT +	CP2	1.27	1	FLOW TIME	415. 3.58	409. 3.58	402. 3.58	389. 3.58	184. 3.58
HYDROGRAPH AT +	EX6b	.05	1	FLOW TIME	68. 3.67	67. 3.67	66. 3.67	63. 3.67	26. 3.67
DIVERSION TO +	DIV1	.05	1	FLOW TIME	34. 3.67	34. 3.67	33. 3.67	32. 3.67	13. 3.67
HYDROGRAPH AT +	D1	.05	1	FLOW TIME	34. 3.67	34. 3.67	33. 3.67	32. 3.67	13. 3.67
HYDROGRAPH AT +	STR4	.01	1	FLOW TIME	16. 3.50	16. 3.50	16. 3.50	15. 3.50	8. 3.50
HYDROGRAPH AT +	EX3a	.02	1	FLOW TIME	35. 3.58	34. 3.58	34. 3.58	32. 3.58	13. 3.58
ROUTED TO +	REX3a	.02	1	FLOW TIME	34. 3.75	33. 3.75	32. 3.75	31. 3.75	13. 3.83
HYDROGRAPH AT +	EX2	.09	1	FLOW TIME	139. 3.58	137. 3.58	134. 3.58	129. 3.58	53. 3.58
ROUTED TO +	REX2	.09	1	FLOW TIME	134. 3.67	131. 3.67	128. 3.67	124. 3.67	51. 3.75
HYDROGRAPH AT +	STR3	.00	1	FLOW TIME	9. 3.50	9. 3.50	9. 3.50	9. 3.50	5. 3.50
4 COMBINED AT +	CP4	.12	1	FLOW TIME	180. 3.67	176. 3.67	173. 3.67	166. 3.67	69. 3.75
HYDROGRAPH AT +	EX6a	.07	1	FLOW TIME	89. 3.67	88. 3.67	86. 3.67	83. 3.67	34. 3.67
3 COMBINED AT +	CP3	.25	1	FLOW TIME	303. 3.67	298. 3.67	292. 3.67	281. 3.67	113. 3.75
HYDROGRAPH AT +	*WPF5	.00	1	FLOW TIME	1. 3.50	1. 3.50	1. 3.50	1. 3.50	0. 3.50
HYDROGRAPH AT +	*WML2	.04	1	FLOW TIME	78. 3.58	77. 3.58	76. 3.58	74. 3.58	36. 3.58

PRO

HYDROGRAPH AT +	*WSHA5	.00	1	FLOW TIME	8. 3.50	8. 3.50	8. 3.50	8. 3.50	4. 3.50
3 COMBINED AT +	*WC20	.05	1	FLOW TIME	86. 3.58	85. 3.58	83. 3.58	81. 3.58	40. 3.58
HYDROGRAPH AT +	*WPF4	.01	1	FLOW TIME	19. 3.50	18. 3.50	18. 3.50	18. 3.50	9. 3.50
HYDROGRAPH AT +	*WSHA4	.00	1	FLOW TIME	6. 3.50	5. 3.50	5. 3.50	5. 3.50	3. 3.50
3 COMBINED AT +	RCP6	.06	1	FLOW TIME	106. 3.50	105. 3.50	103. 3.50	100. 3.50	49. 3.58
ROUTED TO +	RRCP6	.06	1	FLOW TIME	102. 3.58	101. 3.58	99. 3.58	96. 3.67	48. 3.67
HYDROGRAPH AT +	*OFF1	.43	1	FLOW TIME	399. 3.83	393. 3.83	385. 3.83	370. 3.83	143. 3.92
HYDROGRAPH AT +	*OFF2	.04	1	FLOW TIME	49. 3.58	48. 3.58	47. 3.58	45. 3.58	14. 3.58
HYDROGRAPH AT +	*OFF3	.03	1	FLOW TIME	41. 3.50	40. 3.50	39. 3.50	38. 3.58	16. 3.58
3 COMBINED AT +	*DUMMY	.50	1	FLOW TIME	441. 3.83	435. 3.83	425. 3.83	409. 3.83	158. 3.83
HYDROGRAPH AT +	*OFF4	.06	1	FLOW TIME	90. 3.58	89. 3.58	87. 3.58	84. 3.58	35. 3.58
HYDROGRAPH AT +	*OFF5	.26	1	FLOW TIME	252. 3.83	248. 3.83	243. 3.83	234. 3.83	94. 3.83
HYDROGRAPH AT +	*OFF6	.04	1	FLOW TIME	62. 3.58	62. 3.58	60. 3.58	58. 3.58	24. 3.58
HYDROGRAPH AT +	*ON1	.03	1	FLOW TIME	49. 3.50	49. 3.50	48. 3.50	46. 3.50	23. 3.58
5 COMBINED AT +	*DB1	.88	1	FLOW TIME	785. 3.75	774. 3.75	757. 3.75	729. 3.75	288. 3.83
ROUTED TO +	*RDB1	.88	1	FLOW TIME	71. 5.58	71. 5.58	71. 5.58	70. 5.58	57. 5.42
** PEAK STAGES IN FEET **									
	1	STAGE			3035.28	3035.13	3034.91	3034.53	3028.62
		TIME			5.67	5.58	5.58	5.58	5.42
HYDROGRAPH AT +	*SM1	.01	1	FLOW TIME	20. 3.50	20. 3.50	19. 3.50	19. 3.50	10. 3.50
HYDROGRAPH AT +	*SM2	.01	1	FLOW TIME	15. 3.50	15. 3.50	14. 3.50	14. 3.50	7. 3.50
HYDROGRAPH AT +	*SM3	.00	1	FLOW TIME	7. 3.50	7. 3.50	7. 3.50	6. 3.50	3. 3.50
4 COMBINED AT +	DUMMY	.90	1	FLOW TIME	95. 3.50	94. 3.50	93. 3.50	92. 3.50	70. 3.50
HYDROGRAPH AT +	*WL4A	.01	1	FLOW TIME	23. 3.50	23. 3.50	22. 3.50	21. 3.50	10. 3.50

PRO									
HYDROGRAPH AT									
+	*ON1D	.02	1	FLOW	42.	41.	40.	39.	18.
				TIME	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT									
+	DUMMY	.99	1	FLOW	251.	248.	245.	239.	139.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	EX3b	.03	1	FLOW	44.	43.	42.	41.	17.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	EX7	.03	1	FLOW	46.	45.	44.	43.	18.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	STR5	.00	1	FLOW	10.	10.	9.	9.	5.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	STR7	.00	1	FLOW	4.	4.	4.	3.	2.
				TIME	3.50	3.50	3.50	3.50	3.50
5 COMBINED AT									
+	CP7	1.05	1	FLOW	350.	346.	341.	331.	179.
				TIME	3.58	3.58	3.58	3.58	3.58
ROUTED TO									
+	RCP7	1.05	1	FLOW	348.	346.	337.	329.	175.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	EX8	.01	1	FLOW	20.	20.	19.	19.	8.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	STR6	.01	1	FLOW	19.	19.	18.	18.	10.
				TIME	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT									
+	CP8	1.08	1	FLOW	385.	383.	373.	363.	191.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	*OFF3	.00	1	FLOW	2.	2.	2.	2.	1.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	*D2	.02	1	FLOW	24.	24.	23.	23.	9.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	*IOFF4	.01	1	FLOW	9.	9.	9.	9.	3.
				TIME	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT									
+	*PARK	.02	1	FLOW	36.	35.	34.	33.	13.
				TIME	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT									
+	CP9	1.10	1	FLOW	417.	414.	404.	393.	203.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	DIV1	.00	1	FLOW	34.	34.	33.	32.	13.
				TIME	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT									
+	RCP3	1.10	1	FLOW	448.	445.	434.	422.	215.
				TIME	3.58	3.58	3.58	3.58	3.58

1

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

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	INTERPOLATED TO COMPUTATION INTERVAL		
							PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1	RATIO=	.00							
REX3a	MANE	4.25	33.59	225.25	1.82	5.00	33.54	225.00	1.83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2148E+01 EXCESS= .0000E+00 OUTFLOW= .2158E+01 BASIN STORAGE= .5977E-02 PERCENT ERROR= -.7

FOR PLAN = 1 RATIO= .00

					PRO				
REX3a	MANE	4.25	33.17	225.25	1.80	5.00	33.11	225.00	1.80
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2117E+01 EXCESS= .0000E+00 OUTFLOW= .2126E+01 BASIN STORAGE= .5950E-02 PERCENT ERROR= -.7									
FOR PLAN = 1 RATIO= .00									
REX3a	MANE	4.25	32.53	225.25	1.76	5.00	32.46	225.00	1.76
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2070E+01 EXCESS= .0000E+00 OUTFLOW= .2079E+01 BASIN STORAGE= .5909E-02 PERCENT ERROR= -.7									
FOR PLAN = 1 RATIO= .00									
REX3a	MANE	4.25	31.46	225.25	1.69	5.00	31.37	225.00	1.69
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1992E+01 EXCESS= .0000E+00 OUTFLOW= .2000E+01 BASIN STORAGE= .5840E-02 PERCENT ERROR= -.7									
FOR PLAN = 1 RATIO= .00									
REX3a	MANE	4.25	12.98	225.25	.67	5.00	12.83	230.00	.68
CONTINUITY SUMMARY (AC-FT) - INFLOW= .7908E+00 EXCESS= .0000E+00 OUTFLOW= .7974E+00 BASIN STORAGE= .4816E-02 PERCENT ERROR= -1.4									
FOR PLAN = 1 RATIO= .00									
REX2	MANE	4.00	133.81	220.00	1.82	5.00	133.81	220.00	1.82
CONTINUITY SUMMARY (AC-FT) - INFLOW= .8797E+01 EXCESS= .0000E+00 OUTFLOW= .8816E+01 BASIN STORAGE= .5261E-02 PERCENT ERROR= -.3									
FOR PLAN = 1 RATIO= .00									
REX2	MANE	4.50	132.77	220.50	1.79	5.00	131.11	220.00	1.80
CONTINUITY SUMMARY (AC-FT) - INFLOW= .8670E+01 EXCESS= .0000E+00 OUTFLOW= .8692E+01 BASIN STORAGE= .6292E-02 PERCENT ERROR= -.3									
FOR PLAN = 1 RATIO= .00									
REX2	MANE	4.50	129.94	220.50	1.75	5.00	128.27	220.00	1.76
CONTINUITY SUMMARY (AC-FT) - INFLOW= .8477E+01 EXCESS= .0000E+00 OUTFLOW= .8499E+01 BASIN STORAGE= .6239E-02 PERCENT ERROR= -.3									
FOR PLAN = 1 RATIO= .00									
REX2	MANE	4.50	125.21	220.50	1.69	5.00	123.54	220.00	1.69
CONTINUITY SUMMARY (AC-FT) - INFLOW= .8157E+01 EXCESS= .0000E+00 OUTFLOW= .8178E+01 BASIN STORAGE= .6150E-02 PERCENT ERROR= -.3									
FOR PLAN = 1 RATIO= .00									
REX2	MANE	4.25	50.85	225.25	.67	5.00	50.74	225.00	.67
CONTINUITY SUMMARY (AC-FT) - INFLOW= .3236E+01 EXCESS= .0000E+00 OUTFLOW= .3245E+01 BASIN STORAGE= .4278E-02 PERCENT ERROR= -.4									
FOR PLAN = 1 RATIO= .00									
RRCP6	MANE	4.00	104.92	216.00	2.35	5.00	102.13	215.00	2.35
CONTINUITY SUMMARY (AC-FT) - INFLOW= .7297E+01 EXCESS= .0000E+00 OUTFLOW= .7311E+01 BASIN STORAGE= .3372E-02 PERCENT ERROR= -.2									
FOR PLAN = 1 RATIO= .00									
RRCP6	MANE	4.00	103.68	216.00	2.32	5.00	100.90	215.00	2.32
CONTINUITY SUMMARY (AC-FT) - INFLOW= .7207E+01 EXCESS= .0000E+00 OUTFLOW= .7221E+01 BASIN STORAGE= .3355E-02 PERCENT ERROR= -.2									
FOR PLAN = 1 RATIO= .00									
RRCP6	MANE	4.00	101.83	216.00	2.28	5.00	99.07	215.00	2.28
CONTINUITY SUMMARY (AC-FT) - INFLOW= .7072E+01 EXCESS= .0000E+00 OUTFLOW= .7086E+01 BASIN STORAGE= .3329E-02 PERCENT ERROR= -.2									
FOR PLAN = 1 RATIO= .00									
RRCP6	MANE	4.00	98.74	216.00	2.21	5.00	96.01	220.00	2.21
CONTINUITY SUMMARY (AC-FT) - INFLOW= .6848E+01 EXCESS= .0000E+00 OUTFLOW= .6862E+01 BASIN STORAGE= .3284E-02 PERCENT ERROR= -.2									

PRO

FOR PLAN = 1 RATIO= .00
 RRC6 MANE 4.75 49.57 218.50 1.05 5.00 48.27 220.00 1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3259E+01 EXCESS= .0000E+00 OUTFLOW= .3268E+01 BASIN STORAGE= .2877E-02 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .00
 RCP7 MANE 2.49 348.96 214.42 2.45 5.00 347.69 215.00 2.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1376E+03 EXCESS= .0000E+00 OUTFLOW= .1376E+03 BASIN STORAGE= .0000E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
 RCP7 MANE 2.50 346.37 215.16 2.43 5.00 345.92 215.00 2.44

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1369E+03 EXCESS= .0000E+00 OUTFLOW= .1369E+03 BASIN STORAGE= .0000E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
 RCP7 MANE 2.51 337.30 213.77 2.42 5.00 336.99 215.00 2.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1360E+03 EXCESS= .0000E+00 OUTFLOW= .1360E+03 BASIN STORAGE= .0000E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
 RCP7 MANE 2.54 329.55 215.68 2.39 5.00 328.50 215.00 2.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1345E+03 EXCESS= .0000E+00 OUTFLOW= .1345E+03 BASIN STORAGE= .0000E+00 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
 RCP7 MANE 3.06 177.37 217.04 2.01 5.00 174.66 215.00 2.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1134E+03 EXCESS= .0000E+00 OUTFLOW= .1134E+03 BASIN STORAGE= .0000E+00 PERCENT ERROR= .0

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

Interim Condition


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1*****
*                                     *
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
*   JUN 1998                       *
*   VERSION 4.1                     *
*                                     *
* RUN DATE 06FEB18 TIME 16:05:29 *
*                                     *
*****
INT
*****
*                                     *
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
*   609 SECOND STREET          *
*   DAVIS, CALIFORNIA 95616    *
*   (916) 756-1104             *
*                                     *
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X X XXXXXX XXXX XXX

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

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

1 HEC-1 INPUT PAGE 1

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

*** FREE ***

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*DIAGRAM
1 ID SLATER HANIFAN GROUP
2 ID NINETY-FIVE MANAGEMENT, LLC.
3 ID SKYE CANYON INFRASTRUCTURE PHASE 3B & 3C
4 ID TECHNICAL DRAINAGE STUDY
5 ID
6 ID DRAINAGE CONDITION -- INTERIM CONDITION
7 ID RETURN PERIOD ----- 100 & 10-YEAR
8 ID DISTRIBUTION ----- 6-HOUR SDN3
9 ID PROJECT NO. ----- OLY1609.000
10 ID FILENAME ----- INT.H1
11 ID DATE ----- JANUARY 2018
12 ID MODELED BY ----- ETM
13 ID
14 ID RETURN PERIOD RATIO
15 ID 100-YR 1.00
16 ID 10-YR 0.54
17 ID
18 ID SIX HOUR DEPTH-AREA REDUCTION FACTORS
19 ID DRAINAGE AREA (MI^2) DARF
20 ID 0.00-0.49 0.990
21 ID 0.50-0.99 0.975
22 ID 1.00-1.99 0.950
23 ID
24 ID
25 IT 5 0 0 300
26 IO 5 0 0
27 IN 5 0 0
28 JR PREC 1.00 0.99 0.975 0.95 0.54
*
29 KK *OFF7
30 KM REFERENCED FROM THE "DB2" STUDY
31 KM DISCHARGES INTO DETENTION BASIN "DB2"
32 PB 3.00
33 PC 0 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
34 PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
35 PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
36 PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
37 PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
38 PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
39 PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
40 PC 0.998 0.999 1
41 BA .0058
42 LS 0 88.0
43 UD 0.100
*
44 KK *OFF8
45 KM REFERENCED FROM THE "DB2" STUDY
46 KM DISCHARGES INTO DETENTION BASIN "DB2"
47 KO 3
48 BA .2122
49 LS 0 88.0

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1 HEC-1 INPUT

PAGE 2

INT

LINE	ID	1	2	3	4	5	6	7	8	9	10
50	UD	0.299									
	*										
51	KK	*CP2									
52	KM	REFERENCED FROM THE "DB2" STUDY									
53	KM	COMBINE OFF7, AND OFF8									
54	HC	2									
	*										
55	KK	*OFF9									
56	KM	REFERENCED FROM THE "DB2" STUDY									
57	KM	DISCHARGES INTO DETENTION BASIN "DB2"									
58	KO	3									
59	BA	.1137									
60	LS	0	88.0								
61	UD	0.200									
	*										
62	KK	*CP2a									
63	KM	REFERENCED FROM THE "DB2" STUDY									
64	KM	COMBINE CP2, AND OFF9									
65	HC	2									
	*										
66	KK	*OFF10									
67	KM	REFERENCED FROM THE "DB2" STUDY									
68	KM	DISCHARGES INTO DETENTION BASIN "DB2"									
69	KO	3									
70	BA	.6502									
71	LS	0	88.0								
72	UD	0.613									
	*										
73	KK	*ON2									
74	KM	REFERENCED FROM THE "DB2" STUDY									
75	KM	DB2 BASIN									
76	BA	.0315									
77	LS	0	94.0								
78	UD	0.083									
	*										
79	KK	*DB2									
80	KM	REFERENCED FROM THE "DB2" STUDY									
81	KM	COMBINE CP2a, OFF10 AND ON2									
82	KO	1									
83	HC	3									
	*										
84	KK	*RDB2									
85	KM	REFERENCED FROM THE "DB2" STUDY									
86	KM	OUTLET = 25" ORIFICE @ INVERT ELEVATION = 2984.21-FT									
87	KO	1									
88	RS	1 ELEV 2992.0									
89	SV	0.00 2.34 7.60 24.30 46.28 73.78 107.11 146.75 193.03									
90	SE	2992.0 2993.0 2995.0 3000.0 3005.0 3010.0 3015.0 3020.0 3025.0									
		HEC-1 INPUT									

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PAGE 3

LINE	ID	1	2	3	4	5	6	7	8	9	10
91	SQ	0.00	44.44	51.05	64.70	83.84	99.36	520.9	3465.5	7888.4	
92	SE	2992.0	2993.0	2995.0	3000.0	3005.0	3010.0	3015.0	3020.0	3025.0	
	*										
93	KK	EX1									
94	KM	OFFSITE BASIN									
95	BA	.1063									
96	PB	3.00									
97	LS	0	88.0								
98	UD	0.144									
	*										
99	KK	STR2									
100	KM	STREET BASIN									
101	BA	.0061									
102	PB	3.00									
103	LS	0	98.0								
104	UD	0.102									
	*										
105	KK	CP1									
106	KM	COMBINES *RDB2, EX1 AND STR2									
107	HC	3									
	*										
108	KK	5.01									
109	KM	ONSITE BASIN									
110	BA	.0292									
111	PB	3.00									
112	LS	0	95.0								
113	UD	0.076									
	*										

INT

114 KK 2.32T
115 KM ONSITE BASIN
116 BA .0010
117 PB 3.00
118 LS 0 84.0
119 UD 0.089
*

120 KK CP2a
121 KM COMBINES CP1, 5.01 AND 2.32T
122 HC 3
*

123 KK EX9
124 KM OFFSITE BASIN
125 BA .0187
126 PB 3.00
127 LS 0 88.0
128 UD 0.300
*

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HEC-1 INPUT

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

129 KK STR1
130 KM STREET BASIN
131 BA .0060
132 PB 3.00
133 LS 0 98.0
134 UD 0.119
*

135 KK 2.32
136 KM ONSITE BASIN
137 BA .0317
138 PB 3.00
139 LS 0 95.0
140 UD 0.113
*

141 KK CP2b
142 KM COMBINES CP2a, EX9, STR1 AND 2.32
143 HC 4
*

144 KK 2.08b
145 KM ONSITE BASIN
146 BA .0303
147 PB 3.00
148 LS 0 95.0
149 UD 0.105
*

150 KK D1
151 KM DIVERT FLOW TO CONCENTRATION POINT RCP3
152 DT DIV1
153 DI 0 1000
154 DQ 0 500
*

155 KK STR4
156 KM STREET BASIN
157 BA .0074
158 PB 3.00
159 LS 0 98.0
160 UD 0.100
*

161 KK EX3a
162 KM OFFSITE BASIN
163 BA .0222
164 PB 3.00
165 LS 0 88.0
166 UD 0.125
*

1

HEC-1 INPUT

PAGE 5

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

167 KK REX3a
168 KM ROUTE EX3 TO CP5
169 KM LENGTH SLOPE n-VALUE SHAPE WIDTH S-SLOPE
170 RD 2623 .032 .040 0 TRAP 50 2
*

171 KK EX2
172 KM OFFSITE BASIN
173 BA .0908
174 PB 3.00
175 LS 0 88.0
176 UD 0.145

INT

```

*
177 KK REX2
178 KM ROUTE EX2 TO CP4
179 KM LENGTH SLOPE n-VALUE SHAPE WIDTH S-SLOPE
180 RD 2499 .031 .040 0 TRAP 50 2
*

181 KK STR3
182 KM STREET BASIN
183 BA .0044
184 PB 3.00
185 LS 0 98.0
186 UD 0.100
*

187 KK CP4
188 KM COMBINES EX3, STR4, EX2 AND STR3
189 HC 4
*

190 KK 2.09T
191 KM ONSITE BASIN
192 BA .0017
193 PB 3.00
194 LS 0 84.0
195 UD 0.082
*

196 KK 2.09
197 KM ONSITE BASIN
198 BA .0455
199 PB 3.00
200 LS 0 92.0
201 UD 0.126
*

```

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HEC-1 INPUT

PAGE 6

```

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

202 KK 2.31
203 KM ONSITE BASIN
204 BA .0050
205 PB 3.00
206 LS 0 84.0
207 UD 0.076
*

208 KK CP3a
209 KM COMBINES CP4, 2.09T, 2.09 AND 2.31
210 HC 4
*

211 KK 2.08T
212 KM ONSITE BASIN
213 BA .0018
214 PB 3.00
215 LS 0 84.0
216 UD 0.077
*

217 KK 2.08a
218 KM ONSITE BASIN
219 BA .0246
220 PB 3.00
221 LS 0 95.0
222 UD 0.105
*

223 KK CP3b
224 KM COMBINES CP3a, 2.08T AND 2.08a
225 HC 4
*

226 KK D2
227 KM DIVERT FLOW TO CONCENTRATION POINT RCP2a
228 DT DIV2
229 DI 0 317
230 DQ 0 84
*

231 KK RD2
232 KM ROUTE D2 TO CP1
233 KM LENGTH SLOPE n-VALUE SHAPE WIDTH S-SLOPE
234 RD 1726 .004 .016 0 TRAP 10 0
*

235 KK SVR1
236 KM ONSITE STREET BASIN
237 BA .0043
238 PB 3.00
239 LS 0 98.0
240 UD 0.081

```

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

241 KK SVR2
242 KM ONSITE STREET BASIN
243 BA .0100
244 PB 3.00
245 LS 0 98.0
246 UD 0.161
*

SITE [247 KK 5.01b
248 KM ONSITE STREET BASIN
249 BA .0317
250 PB 3.00
251 LS 0 95.0
252 UD 0.083
*

253 KK 2.32Tb
254 KM ONSITE STREET BASIN
255 BA .0010
256 PB 3.00
257 LS 0 84.0
258 UD 0.094
*

259 KK 2.32b
260 KM ONSITE STREET BASIN
261 BA .0387
262 PB 3.00
263 LS 0 95.0
264 UD 0.131
*

265 KK CP2c
266 KM COMBINES 5.01b, 2.32Tb AND 2.32b
267 HC 3
*

268 KK RCP1
269 KM COMBINES CP2b, CP2c, CP3b, SVR1 AND SVR2
270 HC 5
*

271 KK RRCP1
272 KM ROUTE CP1 TO CP10
273 KM LENGTH SLOPE n-VALUE SHAPE WIDTH S-SLOPE
274 RD 2156 .030 .040 0 TRAP 45 3
*

275 KK *2.05a
276 KM ONSITE BASIN
277 BA .0212
278 PB 3.00
279 LS 0 95.0
280 UD 0.154
*

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

281 KK *OFF11
282 KM OFFSITE BASIN
283 BA .0292
284 PB 3.00
285 LS 0 88.0
286 UD 0.218
*

287 KK RCP10
288 KM COMBINES CP1, 2.05a AND OFF11
289 HC 3
*

290 KK *STR2
291 KM ONSITE STREET BASIN
292 BA .0024
293 PB 3.00
294 LS 0 98.0
295 UD 0.068
*

296 KK *STR3
297 KM ONSITE STREET BASIN
298 BA .0034
299 PB 3.00
300 LS 0 98.0
301 UD 0.074
*

INT

302 KK *2.03
 303 KM ONSITE BASIN
 304 BA .0273
 305 PB 3.00
 306 LS 0 95.0
 307 UD 0.120
 *

308 KK *2.04b
 309 KM ONSITE BASIN
 310 BA .0020
 311 PB 3.00
 312 LS 0 84.0
 313 UD 0.100
 *

314 KK *CP4
 315 KM COMBINES STR2, STR3, 2.03 AND 2.04b
 316 HC 4
 *

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HEC-1 INPUT

PAGE 9

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

317 KK *2.02
 318 KM ONSITE BASIN
 319 BA .0279
 320 PB 3.00
 321 LS 0 95.0
 322 UD 0.121
 *

323 KK *STR4
 324 KM ONSITE STREET BASIN
 325 BA .0030
 326 PB 3.00
 327 LS 0 98.0
 328 UD 0.102
 *

329 KK *CP5
 330 KM COMBINES CP4, 2.02 AND STR4
 331 HC 3
 *

332 KK *OFF12
 333 KM OFFSITE BASIN
 334 BA .0128
 335 PB 3.00
 336 LS 0 88.0
 337 UD 0.100
 *

338 KK *RCP11
 339 KM COMBINES OFF12 AND CP5
 340 HC 2
 *

341 KK *WPF5
 342 KM WEST BASIN, WEST OF SHAUMBER RD
 343 BA .0006
 344 PB 3.00
 345 LS 0 86.0
 346 UD 0.052
 *

347 KK *WML2
 348 KM WEST BASIN, WEST OF SHAUMBER ROAD
 349 BA .0428
 350 PB 3.00
 351 LS 0 93.5
 352 UD 0.142
 *

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HEC-1 INPUT

PAGE 10

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

353 KK *WSHAS
 354 KM WEST BASIN, SHAUMBER ROAD
 355 BA .0037
 356 PB 3.00
 357 LS 0 98.0
 358 UD 0.086
 *

359 KK *WC20
 360 KM S OF EAGLE CANYON/SHAUMBER INTERSECTION
 361 KM COMBINE WPF5, WML2, WSHAS
 362 HC 3
 *

INT

```

363      KK      *WPF4
364      BA      .0090
365      PB      3.00
366      LS      0      94.0
367      UD      0.087
      *

368      KK      *WSHA4
369      BA      .0022
370      PB      3.00
371      LS      0      98.0
372      UD      0.051
      *

373      KK      RCP6
374      KM      COMBINES *WC20, *WPF4 AND *WSHA4
375      HC      3
      *

376      KK      RRCP6
377      KM      ROUTE CP6 TO CP7
378      KM      LENGTH SLOPE      n-VALUE      SHAPE      WIDTH      S-SLOPE
379      RD      1751      .037      .040      0      TRAP      50      2
      *

380      KK      *OFF1
381      KM      REFERENCED FROM THE "DB1" STUDY
382      KM      DISCHARGES INTO DETENTION BASIN "DB1"
383      KO      3
384      BA      .4291
385      LS      0      86.8
386      UD      0.419
      *

387      KK      *OFF2
388      KM      REFERENCED FROM THE "DB1" STUDY
389      KM      DISCHARGES INTO DETENTION BASIN "DB1"
390      KO      3
391      BA      .0419
392      LS      0      81.8

```

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HEC-1 INPUT

PAGE 11

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

393      UD      0.154
      *

394      KK      *OFF3
395      KM      REFERENCED FROM THE "DB1" STUDY
396      KM      DISCHARGES INTO DETENTION BASIN "DB1"
397      KO      3
398      BA      .0259
399      LS      0      88.0
400      UD      0.110
      *

401      KK      *DUMMY
402      KM      COMBINE OFF1, OFF2, AND OFF3
403      HC      3
      *

404      KK      *OFF4
405      KM      REFERENCED FROM THE "DB1" STUDY
406      KM      DISCHARGES INTO DETENTION BASIN "DB1"
407      KO      3
408      BA      .0581
409      LS      0      88.0
410      UD      0.134
      *

411      KK      *OFF5
412      KM      REFERENCED FROM THE "DB1" STUDY
413      KM      DISCHARGES INTO DETENTION BASIN "DB1"
414      KO      3
415      BA      .2569
416      LS      0      88.0
417      UD      0.416
      *

418      KK      *OFF6
419      KM      REFERENCED FROM THE "DB1" STUDY
420      KM      DISCHARGES INTO DETENTION BASIN "DB1"
421      KO      3
422      BA      .0399
423      LS      0      88.0
424      UD      0.118
      *

425      KK      *ON1
426      KM      REFERENCED FROM THE "DB1" STUDY
427      KM      DB1 BASIN
428      BA      .0261
429      LS      0      94.0
430      UD      0.115

```

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HEC-1 INPUT

PAGE 12

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

431 KK *DB1
 432 KM REFERENCED FROM THE "DB1" STUDY
 433 KM COMBINE DUMMY, OFF4, OFF5, OFF6 AND ON1
 434 HC 5
 *

435 KK *RDB1
 436 KM REFERENCED FROM THE "DB1" STUDY
 437 KM OUTLET = 24" ORIFICE @ INVERT ELEVATION = 3013.8-FT
 438 RS 1 ELEV 3025.5
 439 SA 4.58 5.63 5.81 6.00 6.19 7.17 7.61 8.31 9.00 9.69
 440 SE 3025.5 3027 3028 3029 3030 3035 3037 3040 3043 3046
 441 SQ 49.7 60.6 70.8 74.5 1436.0 3920.5 7136.3
 442 SE 3025.5 3030 3035 3037 3040 3043 3046
 *

443 KK *SM1
 444 KM DISCHARGES INTO OUTLET CHANNEL
 445 BA .0090
 446 LS 0 94.0
 447 UD 0.066
 *

448 KK *SM2
 449 KM DISCHARGES INTO OUTLET CHANNEL
 450 BA .0077
 451 LS 0 94.0
 452 UD 0.109
 *

453 KK *SM3
 454 KM SWALE FLOW
 455 BA .0032
 456 LS 0 94.0
 457 UD 0.077
 *

458 KK DUMMY
 459 KM COMBINES *RDB1, *SM1, *SM2 AND *SM3
 460 HC 4
 *

461 KK *WL4A
 462 KM BASIN WEST OF PARCEL 2.16
 463 BA .0125
 464 PB 3.00
 465 LS 0 92.0
 466 UD 0.106
 *

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HEC-1 INPUT

PAGE 13

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

467 KK *ON1D
 468 KM PARCEL 2.16
 469 BA .0222
 470 PB 3.00
 471 LS 0 92.0
 472 UD 0.099
 *

473 KK DUMMY
 474 KM COMBINES CP6, *RDB1, *WL4A AND *ON1D
 475 HC 4
 *

476 KK EX3b
 477 KM OFFSITE BASIN
 478 BA .0268
 479 PB 3.00
 480 LS 0 88.0
 481 UD 0.100
 *

482 KK EX7
 483 KM OFFSITE BASIN
 484 BA .0296
 485 PB 3.00
 486 LS 0 88.0
 487 UD 0.136
 *

488 KK STR5
 489 KM STREET BASIN
 490 BA .0045
 491 PB 3.00
 492 LS 0 98.0

INT

493 UD 0.100
 *
 494 KK STR7
 495 KM STREET BASIN
 496 BA .0017
 497 PB 3.00
 498 LS 0 98.0
 499 UD 0.100
 *
 500 KK CP7
 501 KM COMBINES *RDB1, EX3b, EX7, STR5 AND STR7
 502 HC 5
 *

1 HEC-1 INPUT PAGE 14

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

503 KK RCP7
 504 KM ROUTE CP7 TO CP8
 505 KM LENGTH SLOPE n-VALUE SHAPE WIDTH S-SLOPE
 506 RD 1155 .026 .040 0 TRAP 50 2
 *

507 KK EX8
 508 KM OFFSITE BASIN
 509 BA .0130
 510 PB 3.00
 511 LS 0 88.0
 512 UD 0.143
 *

513 KK STR6
 514 KM STREET BASIN
 515 BA .0088
 516 PB 3.00
 517 LS 0 98.0
 518 UD 0.100
 *

519 KK CP8
 520 KM COMBINES CP7, EX8 AND STR6
 521 HC 3
 *

522 KK *OFF3
 523 KM REFERENCED FROM THE "SMITH'S" STUDY
 524 PB 3.00
 525 BA .0012
 526 LS 0 86.2
 527 UD 0.100
 *

528 KK *D2
 529 KM REFERENCED FROM THE "SMITH'S" STUDY
 530 PB 3.00
 531 BA .0154
 532 LS 0 86.0
 533 UD 0.089
 *

534 KK *IOFF4
 535 KM REFERENCED FROM THE "SMITH'S" STUDY
 536 PB 3.00
 537 BA .0062
 538 LS 0 86.2
 539 UD 0.100
 *

1 HEC-1 INPUT PAGE 15

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

540 KK *PARK
 541 KM REFERENCED FROM THE "SMITH'S" STUDY
 542 KM COMBINES IOFF4, OFF3, D2
 543 HC 3
 *

544 KK CP9
 545 KM COMBINES CP8 AND *PARK
 546 HC 2
 *

547 KK DIV1
 548 KM CULVERT CROSSING FLOW INTO PARCEL 2.06
 549 DR DIV1
 *

550 KK RCP3
 551 KM COMBINES DIV1 AND CP9
 552 HC 2

INT

*
 553 KK RRCP3
 554 KM ROUTE CP3 TO CP3a
 555 KM LENGTH SLOPE n-VALUE SHAPE WIDTH S-SLOPE
 556 RD 1260 .039 .040 0 TRAP 50 2
 *
 557 KK *2.06
 558 KM ONSITE BASIN
 559 BA .0310
 560 PB 3.00
 561 LS 0 95.0
 562 UD 0.108
 *
 563 KK RCP3a
 564 KM COMBINES CP3 AND 2.06
 565 HC 2
 *
 566 KK *2.05b
 567 KM ONSITE BASIN
 568 BA .0115
 569 PB 3.00
 570 LS 0 95.0
 571 UD 0.154
 *
 572 KK *STR1
 573 KM ONSITE STREET BASIN
 574 BA .0041
 575 PB 3.00
 576 LS 0 98.0
 577 UD 0.050
 *

1

HEC-1 INPUT

PAGE 16

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

578 KK *2.04a
 579 KM ONSITE BASIN
 580 BA .0022
 581 PB 3.00
 582 LS 0 84.0
 583 UD 0.100
 *
 584 KK DIV2
 585 KM CULVERT CROSSING FLOW TO CONCENTRATION POINT CP2a
 586 DR DIV2
 *
 587 KK RCP2a
 588 KM COMBINES 2.05b, STR1, DIV2 AND 2.04a
 589 HC 4
 *
 590 KK *DBN
 591 KM REFERENCED FROM THE "SMITH'S" STUDY
 592 KM OUTLET = 54" ORIFICE @ INVERT ELEVATION = 2997.3-FT
 593 KO 1
 594 RS 1 ELEV 2797.3
 595 SA 0.00 0.09 0.12 0.15 .37 0.79 0.86
 596 SE 2797.3 2798 2799 2800 2805 2812 2813
 597 SQ 0.00 54 129 193 241 268
 598 SE 2797.3 2802 2804 2807 2810 2812
 *
 599 KK *WSPD3
 600 KM REFERENCED FROM THE "SMITH'S" STUDY
 601 BA .0022
 602 PB 2.93
 603 LS 0 92.8
 604 UD 0.056
 *
 605 KK *WGC3
 606 KM REFERENCED FROM THE "SMITH'S" STUDY
 607 BA .0444
 608 PB 2.93
 609 LS 0 94.6
 610 UD 0.095
 *
 611 KK *WSPD0
 612 KM REFERENCED FROM THE "SMITH'S" STUDY
 613 BA .0010
 614 PB 2.93
 615 LS 0 93.4
 616 UD 0.050
 *

1

HEC-1 INPUT

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INT

LINE	ID	1	2	3	4	5	6	7	8	9	10
617	KK	RWC9a									
618	HC	5									
	*										
619	KK	*ON1-D									
620	KM	REFERENCED FROM THE "SMITH'S" STUDY									
621	KM	PHASE 1, NORTHWEST QUAD ONSITE BASIN									
622	BA	.0278									
623	PB	2.93									
624	LS	0	91.2								
625	UD	0.114									
	*										
626	KK	*ON2-D									
627	KM	REFERENCED FROM THE "SMITH'S" STUDY									
628	KM	PHASE 1, NORTHEAST QUAD ONSITE BASIN									
629	BA	.0301									
630	PB	2.93									
631	LS	0	88.8								
632	UD	0.152									
	*										
633	KK	*HOR									
634	KM	REFERENCED FROM THE "SMITH'S" STUDY									
635	KM	PHASE 1, STREET BASIN SKYE CANYON PARK DRIVE									
636	BA	.0163									
637	PB	2.93									
638	LS	0	93.3								
639	UD	0.108									
	*										
640	KK	*WC7									
641	KM	REFERENCED FROM THE "SMITH'S" STUDY									
642	HC	3									
	*										
643	KK	*MGRClA									
644	KM	REFERENCED FROM THE "SMITH'S" STUDY									
645	BA	.0022									
646	PB	2.93									
647	LS	0	93.2								
648	UD	0.095									
	*										
649	KK	RCP12									
650	HC	3									
	*										
651	ZZ										

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

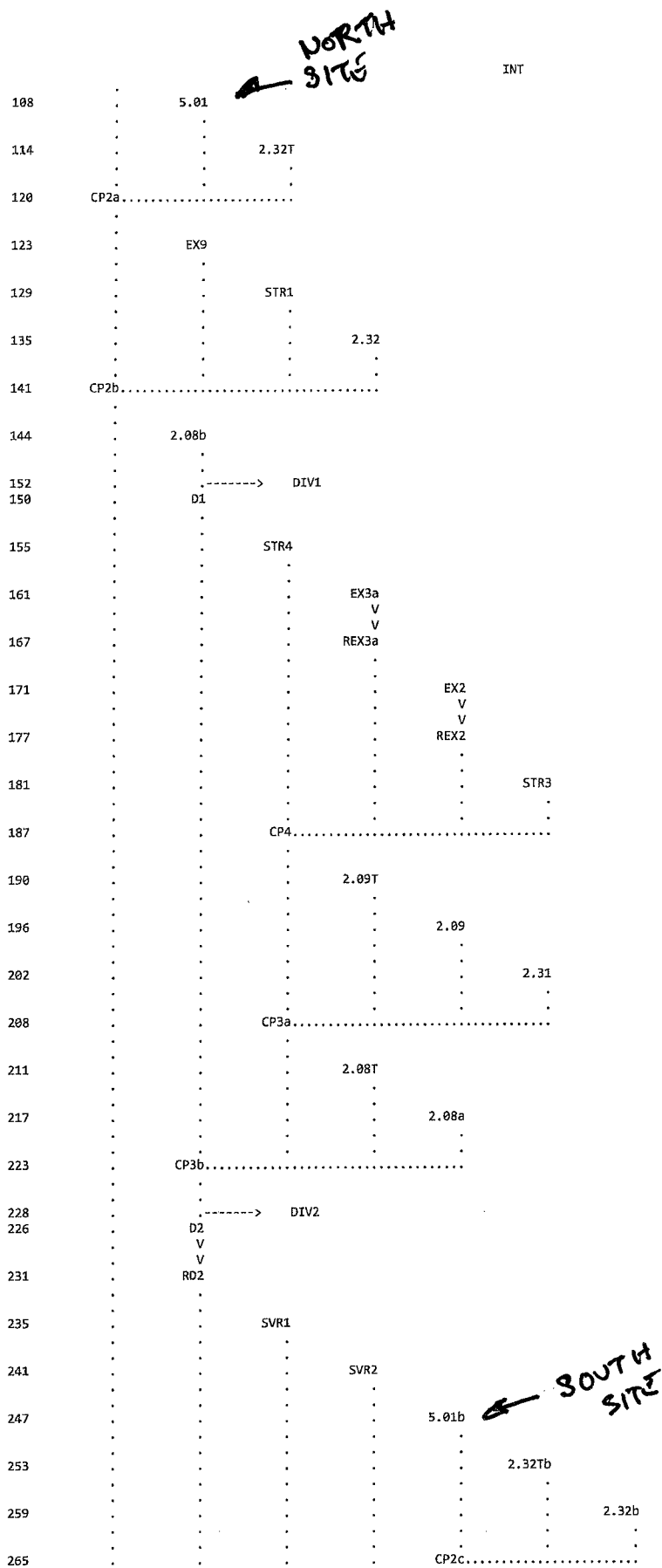
INPUT LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW

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

```

29  *OFF7
    .
44  .
    .  *OFF8
    .
51  *CP2.....
    .
55  .
    .  *OFF9
    .
62  *CP2a.....
    .
66  .
    .  *OFF10
    .
73  .
    .  *ON2
    .
79  *DB2.....
    V
84  *RDB2
    .
93  .
    .  EX1
    .
99  .
    .  STR2
    .
105 CP1.....
    .

```



INT

```
268 RCP1.....
      V
271 RRCP1
      V
275 *2.05a
      .
281 *OFF11
      .
287 RCP10.....
      .
290 *STR2
      .
296 *STR3
      .
302 *2.03
      .
308 *2.04b
      .
314 *CP4.....
      .
317 *2.02
      .
323 *STR4
      .
329 *CP5.....
      .
332 *OFF12
      .
338 *RCP11.....
      .
341 *WPF5
      .
347 *WML2
      .
353 *WSHA5
      .
359 *WC20.....
      .
363 *WPF4
      .
368 *WSHA4
      .
373 RCP6.....
      V
376 RRCP6
      V
380 *OFF1
      .
387 *OFF2
      .
394 *OFF3
      .
401 *DUMMY.....
      .
404 *OFF4
      .
411 *OFF5
      .
418 *OFF6
      .
425 *ON1
```

				INT	
431	.	.	.	*DB1	.
	.	.	.	V	.
	.	.	.	V	.
435	.	.	.	*RDB1	.
	.	.	.		.
443	.	.	.	*SM1	.
	.	.	.		.
448	.	.	.		*SM2
	.	.	.		.
453	.	.	.		*SM3
	.	.	.		.
458	.	.	.	DUMMY	.
	.	.	.		.
461	.	.	.	*WL4A	.
	.	.	.		.
467	.	.	.		*ON1D
	.	.	.		.
473	.	.	.	DUMMY	.
	.	.	.		.
476	.	.	.	EX3b	.
	.	.	.		.
482	.	.	.		EX7
	.	.	.		.
488	.	.	.		STR5
	.	.	.		.
494	.	.	.		STR7
	.	.	.		.
500	.	.	.	CP7	.
	.	.	.	V	.
	.	.	.	V	.
503	.	.	.	RCP7	.
	.	.	.		.
507	.	.	.	EX8	.
	.	.	.		.
513	.	.	.		STR6
	.	.	.		.
519	.	.	.	CP8	.
	.	.	.		.
522	.	.	.	*OFF3	.
	.	.	.		.
528	.	.	.		*D2
	.	.	.		.
534	.	.	.		*IOFF4
	.	.	.		.
540	.	.	.	*PARK	.
	.	.	.		.
544	.	.	.	CP9	.
	.	.	.		.
549	.	.	.		<----- DIV1
547	.	.	.	DIV1	.
	.	.	.		.
550	.	.	.	RCP3	.
	.	.	.	V	.
	.	.	.	V	.
553	.	.	.	RRCP3	.
	.	.	.		.
557	.	.	.	*2.06	.
	.	.	.		.
563	.	.	.	RCP3a	.
	.	.	.		.
566	.	.	.	*2.05b	.
	.	.	.		.
572	.	.	.		*STR1
	.	.	.		.
578	.	.	.		*2.04a

INT									
1	0610	75	1.	.0	2797.4	*	1	1430	175
1	0615	76	1.	.0	2797.3	*	1	1435	176
1	0620	77	0.	.0	2797.3	*	1	1440	177
1	0625	78	0.	.0	2797.3	*	1	1445	178
1	0630	79	0.	.0	2797.3	*	1	1450	179
1	0635	80	0.	.0	2797.3	*	1	1455	180
1	0640	81	0.	.0	2797.3	*	1	1500	181
1	0645	82	0.	.0	2797.3	*	1	1505	182
1	0650	83	0.	.0	2797.3	*	1	1510	183
1	0655	84	0.	.0	2797.3	*	1	1515	184
1	0700	85	0.	.0	2797.3	*	1	1520	185
1	0705	86	0.	.0	2797.3	*	1	1525	186
1	0710	87	0.	.0	2797.3	*	1	1530	187
1	0715	88	0.	.0	2797.3	*	1	1535	188
1	0720	89	0.	.0	2797.3	*	1	1540	189
1	0725	90	0.	.0	2797.3	*	1	1545	190
1	0730	91	0.	.0	2797.3	*	1	1550	191
1	0735	92	0.	.0	2797.3	*	1	1555	192
1	0740	93	0.	.0	2797.3	*	1	1600	193
1	0745	94	0.	.0	2797.3	*	1	1605	194
1	0750	95	0.	.0	2797.3	*	1	1610	195
1	0755	96	0.	.0	2797.3	*	1	1615	196
1	0800	97	0.	.0	2797.3	*	1	1620	197
1	0805	98	0.	.0	2797.3	*	1	1625	198
1	0810	99	0.	.0	2797.3	*	1	1630	199
1	0815	100	0.	.0	2797.3	*	1	1635	200

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW				
+	(CFS)	(HR)	6-HR	24-HR	72-HR	24.92-HR
		(CFS)				
+	38.	3.75	7.	2.	2.	2.
		(INCHES)	3.807	3.825	3.825	3.825
		(AC-FT)	4.	4.	4.	4.
PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE				
+	(AC-FT)	(HR)	6-HR	24-HR	72-HR	24.92-HR
	0.	3.75	0.	0.	0.	0.
PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE				
+	(FEET)	(HR)	6-HR	24-HR	72-HR	24.92-HR
	2800.64	3.75	2797.93	2797.47	2797.46	2797.46
CUMULATIVE AREA =			.02 SQ MI			

1

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION				
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5
				1.00	.99	.98	.95	.54
HYDROGRAPH AT								
+	*OFF7	.01	1 FLOW	9.	9.	9.	9.	4.
			TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT								
+	*OFF8	.21	1 FLOW	244.	241.	236.	227.	93.
			TIME	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT								
+	*CP2	.22	1 FLOW	249.	245.	240.	232.	95.
			TIME	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT								
+	*OFF9	.11	1 FLOW	153.	151.	148.	142.	58.
			TIME	3.58	3.58	3.58	3.58	3.67
2 COMBINED AT								
+	*CP2a	.33	1 FLOW	395.	390.	382.	368.	148.
			TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT								
+	*OFF10	.65	1 FLOW	508.	501.	490.	472.	191.
			TIME	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT								
+	*DN2	.03	1 FLOW	65.	65.	64.	62.	31.
			TIME	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT								
+	*DB2	1.01	1 FLOW	774.	763.	746.	719.	290.
			TIME	3.83	3.83	3.83	3.83	3.83
ROUTED TO								
+	*RDB2	1.01	1 FLOW	86.	86.	85.	84.	64.

				TIME	5.83	5.83	INT	5.83	5.83	5.58
** PEAK STAGES IN FEET **										
1	STAGE	3010.16	3009.97	3009.63	3009.08	2999.64				
	TIME	5.83	5.83	5.83	5.83	5.58				
HYDROGRAPH AT										
+	EX1	.11	1	FLOW	163.	161.	157.	152.	63.	
				TIME	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT										
+	STR2	.01	1	FLOW	13.	13.	13.	12.	7.	
				TIME	3.50	3.50	3.50	3.50	3.50	
3 COMBINED AT										
+	CP1	1.13	1	FLOW	230.	227.	224.	217.	114.	
				TIME	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT										
+	5.01	.03	1	FLOW	64.	64.	63.	61.	31.	
				TIME	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT										
+	2.32T	.00	1	FLOW	1.	1.	1.	1.	0.	
				TIME	3.50	3.50	3.50	3.50	3.50	
3 COMBINED AT										
+	CP2a	1.16	1	FLOW	281.	278.	273.	265.	139.	
				TIME	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT										
+	EX9	.02	1	FLOW	21.	21.	21.	20.	8.	
				TIME	3.75	3.75	3.75	3.75	3.75	
HYDROGRAPH AT										
+	STR1	.01	1	FLOW	12.	12.	12.	12.	6.	
				TIME	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT										
+	2.32	.03	1	FLOW	62.	61.	60.	58.	30.	
				TIME	3.50	3.50	3.50	3.50	3.50	
4 COMBINED AT										
+	CP2b	1.21	1	FLOW	371.	367.	361.	350.	182.	
				TIME	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT										
+	2.08b	.03	1	FLOW	61.	60.	59.	57.	29.	
				TIME	3.50	3.50	3.50	3.50	3.50	
DIVERSION TO										
+	DIV1	.03	1	FLOW	30.	30.	29.	29.	15.	
				TIME	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT										
+	D1	.03	1	FLOW	30.	30.	29.	29.	15.	
				TIME	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT										
+	STR4	.01	1	FLOW	16.	16.	16.	15.	8.	
				TIME	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT										
+	EX3a	.02	1	FLOW	35.	34.	34.	32.	13.	
				TIME	3.58	3.58	3.58	3.58	3.58	
ROUTED TO										
+	REX3a	.02	1	FLOW	34.	33.	32.	31.	13.	
				TIME	3.75	3.75	3.75	3.75	3.83	
HYDROGRAPH AT										
+	EX2	.09	1	FLOW	139.	137.	134.	129.	53.	
				TIME	3.58	3.58	3.58	3.58	3.58	
ROUTED TO										
+	REX2	.09	1	FLOW	134.	131.	128.	124.	51.	
				TIME	3.67	3.67	3.67	3.67	3.75	
HYDROGRAPH AT										
+	STR3	.00	1	FLOW	9.	9.	9.	9.	5.	
				TIME	3.50	3.50	3.50	3.50	3.50	
4 COMBINED AT										
+	CP4	.12	1	FLOW	180.	176.	173.	166.	69.	
				TIME	3.67	3.67	3.67	3.67	3.75	
HYDROGRAPH AT										
+	2.09T	.00	1	FLOW	3.	3.	2.	2.	1.	
				TIME	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT										
+	2.09	.05	1	FLOW	81.	80.	78.	76.	36.	
				TIME	3.58	3.58	3.58	3.58	3.58	

NORTH
SITE

INT									
HYDROGRAPH AT +	2.31	.00	1	FLOW TIME	8. 3.50	8. 3.50	7. 3.50	7. 3.50	3. 3.50
4 COMBINED AT +	CP3a	.18	1	FLOW TIME	247. 3.67	243. 3.67	238. 3.67	229. 3.67	92. 3.75
HYDROGRAPH AT +	2.08T	.00	1	FLOW TIME	3. 3.50	3. 3.50	3. 3.50	3. 3.50	1. 3.50
HYDROGRAPH AT +	2.08a	.02	1	FLOW TIME	49. 3.50	49. 3.50	48. 3.50	46. 3.50	24. 3.50
4 COMBINED AT +	CP3b	.23	1	FLOW TIME	322. 3.58	317. 3.58	310. 3.58	299. 3.58	118. 3.58
DIVERSION TO +	DIV2	.23	1	FLOW TIME	85. 3.58	84. 3.58	82. 3.58	79. 3.58	31. 3.58
HYDROGRAPH AT +	D2	.23	1	FLOW TIME	237. 3.58	233. 3.58	228. 3.58	220. 3.58	87. 3.58
ROUTED TO +	RD2	.23	1	FLOW TIME	227. 3.67	222. 3.67	218. 3.67	211. 3.67	85. 3.67
HYDROGRAPH AT +	SVR1	.00	1	FLOW TIME	10. 3.50	10. 3.50	10. 3.50	9. 3.50	5. 3.50
HYDROGRAPH AT +	SVR2	.01	1	FLOW TIME	20. 3.58	19. 3.58	19. 3.58	19. 3.58	10. 3.58
HYDROGRAPH AT +	5.01b	.03	1	FLOW TIME	68. 3.50	67. 3.50	66. 3.50	64. 3.50	33. 3.50
HYDROGRAPH AT +	2.32Tb	.00	1	FLOW TIME	1. 3.50	1. 3.50	1. 3.50	1. 3.50	0. 3.50
HYDROGRAPH AT +	2.32b	.04	1	FLOW TIME	74. 3.58	73. 3.58	72. 3.58	70. 3.58	36. 3.58
3 COMBINED AT +	CP2c	.07	1	FLOW TIME	141. 3.50	139. 3.50	137. 3.50	133. 3.50	68. 3.50
5 COMBINED AT +	RCP1	1.53	1	FLOW TIME	755. 3.58	745. 3.58	731. 3.58	709. 3.58	340. 3.58
ROUTED TO +	RRCP1	1.53	1	FLOW TIME	731. 3.58	724. 3.58	702. 3.58	689. 3.58	324. 3.67
HYDROGRAPH AT +	*2.05a	.02	1	FLOW TIME	40. 3.58	39. 3.58	38. 3.58	37. 3.58	19. 3.58
HYDROGRAPH AT +	*OFF11	.03	1	FLOW TIME	38. 3.67	38. 3.67	37. 3.67	36. 3.67	15. 3.67
3 COMBINED AT +	RCP10	1.58	1	FLOW TIME	807. 3.58	800. 3.58	776. 3.58	761. 3.58	355. 3.67
HYDROGRAPH AT +	*STR2	.00	1	FLOW TIME	6. 3.50	6. 3.50	6. 3.50	5. 3.50	3. 3.50
HYDROGRAPH AT +	*STR3	.00	1	FLOW TIME	8. 3.50	8. 3.50	8. 3.50	8. 3.50	4. 3.50
HYDROGRAPH AT +	*2.03	.03	1	FLOW TIME	52. 3.58	52. 3.58	51. 3.58	49. 3.58	26. 3.58
HYDROGRAPH AT +	*2.04b	.00	1	FLOW TIME	3. 3.50	3. 3.50	3. 3.50	3. 3.50	1. 3.58
4 COMBINED AT +	*CP4	.04	1	FLOW	68.	67.	66.	64.	33.

SOUTH
SITE

				TIME	3.50	3.50	INT 3.50	3.50	3.50
HYDROGRAPH AT									
+	*2.02	.03	1	FLOW TIME	53. 3.58	53. 3.58	52. 3.58	50. 3.58	26. 3.58
HYDROGRAPH AT									
+	*STR4	.00	1	FLOW TIME	6. 3.50	6. 3.50	6. 3.50	6. 3.50	3. 3.50
3 COMBINED AT									
+	*CP5	.07	1	FLOW TIME	127. 3.50	126. 3.50	124. 3.50	120. 3.50	62. 3.50
HYDROGRAPH AT									
+	*OFF12	.01	1	FLOW TIME	21. 3.50	21. 3.50	20. 3.50	19. 3.50	8. 3.50
2 COMBINED AT									
+	*RCP11	.08	1	FLOW TIME	148. 3.50	147. 3.50	144. 3.50	140. 3.50	70. 3.50
HYDROGRAPH AT									
+	*WPF5	.00	1	FLOW TIME	1. 3.50	1. 3.50	1. 3.50	1. 3.50	0. 3.50
HYDROGRAPH AT									
+	*WML2	.04	1	FLOW TIME	78. 3.58	77. 3.58	76. 3.58	74. 3.58	36. 3.58
HYDROGRAPH AT									
+	*WSHA5	.00	1	FLOW TIME	8. 3.50	8. 3.50	8. 3.50	8. 3.50	4. 3.50
3 COMBINED AT									
+	*WC20	.05	1	FLOW TIME	86. 3.58	85. 3.58	83. 3.58	81. 3.58	40. 3.58
HYDROGRAPH AT									
+	*WPF4	.01	1	FLOW TIME	19. 3.50	18. 3.50	18. 3.50	18. 3.50	9. 3.50
HYDROGRAPH AT									
+	*WSHA4	.00	1	FLOW TIME	6. 3.50	5. 3.50	5. 3.50	5. 3.50	3. 3.50
3 COMBINED AT									
+	RCP6	.06	1	FLOW TIME	106. 3.50	105. 3.50	103. 3.50	100. 3.50	49. 3.58
ROUTED TO									
+	RRCP6	.06	1	FLOW TIME	102. 3.58	101. 3.58	99. 3.58	96. 3.67	48. 3.67
HYDROGRAPH AT									
+	*OFF1	.43	1	FLOW TIME	399. 3.83	393. 3.83	385. 3.83	370. 3.83	143. 3.92
HYDROGRAPH AT									
+	*OFF2	.04	1	FLOW TIME	49. 3.58	48. 3.58	47. 3.58	45. 3.58	14. 3.58
HYDROGRAPH AT									
+	*OFF3	.03	1	FLOW TIME	41. 3.50	40. 3.50	39. 3.50	38. 3.58	16. 3.58
3 COMBINED AT									
+	*DUMMY	.50	1	FLOW TIME	441. 3.83	435. 3.83	425. 3.83	409. 3.83	158. 3.83
HYDROGRAPH AT									
+	*OFF4	.06	1	FLOW TIME	90. 3.58	89. 3.58	87. 3.58	84. 3.58	35. 3.58
HYDROGRAPH AT									
+	*OFF5	.26	1	FLOW TIME	252. 3.83	248. 3.83	243. 3.83	234. 3.83	94. 3.83
HYDROGRAPH AT									
+	*OFF6	.04	1	FLOW TIME	62. 3.58	62. 3.58	60. 3.58	58. 3.58	24. 3.58
HYDROGRAPH AT									
+	*ON1	.03	1	FLOW TIME	49. 3.50	49. 3.50	48. 3.50	46. 3.50	23. 3.58
5 COMBINED AT									
+	*DB1	.88	1	FLOW TIME	785. 3.75	774. 3.75	757. 3.75	729. 3.75	288. 3.83
ROUTED TO									
+	*RDB1	.88	1	FLOW TIME	71. 5.58	71. 5.58	71. 5.58	70. 5.58	57. 5.42

Ultimate Condition


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1*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 22JAN18 TIME 17:47:37
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ULT

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

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

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY, DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION

KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
*DIAGRAM
1 ID SLATER HANIFAN GROUP
2 ID NINETY-FIVE MANAGEMENT, LLC.
3 ID SKYE CANYON INFRASTRUCTURE PHASE 3B, 3C
4 ID ULTIMATE DRAINAGE CONDITION - REVISED TO ROUTE REGIONAL FLOW TO MOCCASIN RD
5 ID INCLUDES FULL WATERSHED WITH AREA UPSTREAM OF DB1, DB2 AND 157DB
6 ID
7 ID RETURN PERIOD ----- 100-YEAR
8 ID DISTRIBUTION ----- 6-HOUR SDN3
9 ID PROJECT NO. ----- OLY1609.000
10 ID FILENAME ----- ULT3.H1
11 ID DATE ----- JANUARY 2018
12 ID MODELED BY ----- SMJ, updated by LKL
13 ID
14 ID SIX HOUR DEPTH-AREA REDUCTION FACTORS
15 ID DRAINAGE AREA (MI^2) DARF
16 ID 0.0-0.49 1.00
17 ID 0.5-0.99 0.98
18 ID 1.0-1.99 0.97
19 ID 2.0-3.99 0.93
20 ID 4.0-5.99 0.91
21 ID 6.0-7.99 0.90
22 ID
23 ID 5 0 0 2000
24 ID 5 0 0
25 ID 5 0 0
26 ID JR PREC 1.00 0.98 0.97 0.93 0.91 0.90
*
27 KK WUS95
28 KM KYLE CANYON INTERCHANGE - WEST HALF
29 BA .0133
30 PB 2.77
31 PC 0 0.020 0.057 0.070 0.087 0.108 0.124 0.130 0.130 0.130
32 PC 0.130 0.130 0.130 0.133 0.140 0.142 0.148 0.158 0.172 0.181
33 PC 0.190 0.197 0.199 0.200 0.201 0.204 0.214 0.229 0.241 0.249
34 PC 0.251 0.256 0.270 0.278 0.281 0.283 0.295 0.322 0.352 0.409
35 PC 0.499 0.590 0.710 0.744 0.781 0.812 0.819 0.835 0.851 0.856
36 PC 0.860 0.868 0.876 0.888 0.910 0.926 0.937 0.950 0.970 0.976
37 PC 0.982 0.985 0.987 0.989 0.990 0.993 0.993 0.994 0.995 0.998
38 PC 0.998 0.999 1.000
39 LS 0 98.0
40 UD 0.082
*
41 KK DHD018
42 KM FACILITY E-9
43 KM FLOW SPLIT AT VTN CULVERT 1
44 KM FLOW SPLITS TO BETWEEN NB AND SB ROADS OF US-95
45 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
46 DT DCHD18

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47 DI 0 133 187 250
48 DQ 0 120 135 150
*

ULT

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HEC-1 INPUT

PAGE 2

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

49 KK DHD02B
50 KM FACILITY E-10
51 KM FLOW SPLIT AT VTN CULVERT 2
52 KM FLOW SPLITS TO BETWEEN NB AND SB ROADS OF US-95
53 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
54 DT DCHD2B
55 DI 0 100 138
56 DQ 0 99 135
*

57 KK WML15A
58 KM WEST BASIN, WEST OF SKYE PARK DRIVE
59 BA .0193
60 PB 2.93
61 LS 0 95.0
62 UD 0.084
*

63 KK WSPD1
64 KM WEST BASIN, SKYE PARK DRIVE
65 BA .0011
66 PB 2.93
67 LS 0 98.0
68 UD 0.055
*

69 KK WC1
70 KM FAR NW OF IRON MT/GRAND CANYON INTERSECTION
71 KM COMBINE WML15A, WSPD1
72 HC 2
*

73 KK WIRN4
74 KM WEST BASIN, IRN MT ROAD
75 BA .0042
76 PB 2.93
77 LS 0 98.0
78 UD 0.079
*

79 KK WMLA1A
80 KM WEST BASIN, WEST OF GRAND CANYON DRIVE
81 BA .0101
82 PB 2.93
83 LS 0 95.0
84 UD 0.093
*

85 KK WC2
86 KM NW OF IRON MT/GRAND CANYON INTERSECTION
87 KM COMBINE WC1, WIRN4, WMLA1A
88 HC 3
*

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HEC-1 INPUT

PAGE 3

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

89 KK WGED1B
90 KM WEST BASIN, WEST OF US95
91 BA .0179
92 PB 2.93
93 LS 0 94.0
94 UD 0.113
*

95 KK WIRN5
96 KM WEST BASIN, WEST OF US95
97 BA .0012
98 PB 2.93
99 LS 0 98.0
100 UD 0.050
*

101 KK WC3
102 KM W OF IRON MT/US95 INTERSECTION
103 KM COMBINE WC2, WGED1B, WIRN5
104 HC 3
*

105 KK OFFW

ULT

106 BA .0122
107 PB 2.77
108 LS 0 92.0
109 UD .089
*

110 KK CHD04B
111 HC 3
*

112 KK WPRK7
113 KM WEST BASIN, WEST OF GRAND CANYON DRIVE
114 BA .0046
115 PB 2.93
116 LS 0 84.0
117 UD 0.113
*

118 KK WMLA1B
119 KM WEST BASIN, WEST OF GRAND CANYON DRIVE
120 BA .0187
121 PB 2.93
122 LS 0 95.0
123 UD 0.103
*

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HEC-1 INPUT

PAGE 4

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

124 KK WMLA2
125 KM WEST BASIN, WEST OF GRAND CANYON DRIVE
126 BA .0476
127 PB 2.93
128 LS 0 95.0
129 UD 0.137
*

130 KK WGRC2
131 KM WEST BASIN, GRAND CANYON DRIVE
132 BA .0041
133 PB 2.93
134 LS 0 98.0
135 UD 0.075
*

136 KK WC4
137 KM W OF IRON MT/US95 INTERSECTION
138 KM COMBINE WPRK7, WMLA1B, WMLA2, WGRC2
139 HC 4
*

140 KK WMLA3
141 KM WEST BASIN, WEST OF US95
142 BA .0180
143 PB 2.93
144 LS 0 95.0
145 UD 0.104
*

146 KK WC5
147 KM W OF IRON MT/US95 INTERSECTION
148 HC 2
*

149 KK CHD05B
150 KM DISCHARGE DIRECTLY INTO EXISTING US-95 INTERIM MPU FACILITY
151 HC 2
*

152 KK WML16
153 KM WEST BASIN, WEST OF SKYE PARK DRIVE
154 BA .0346
155 PB 2.93
156 LS 0 95.0
157 UD 0.118
*

158 KK WSPD3
159 KM WEST BASIN, SKYE PARK DRIVE
160 BA .0014
161 PB 2.93
162 LS 0 98.0
163 UD 0.072
*

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HEC-1 INPUT

PAGE 5

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

ULT

164 KK WC6
165 KM N OF SKYE CANYON PARK/SKYE PARK INTERSECTION
166 KM COMBINE WML16, WSPD3
167 HC 2
*

168 KK WL9A
169 KM WEST BASIN, WEST OF SKYE PARK DRIVE
170 BA .0284
171 PB 2.93
172 LS 0 92.0
173 UD 0.118
*

174 KK WL10A
175 KM WEST BASIN, WEST OF GRAND CANYON DRIVE
176 BA .0267
177 PB 2.93
178 LS 0 92.0
179 UD 0.125
*

180 KK WSCP4
181 KM WEST BASIN, SKYE CANYON PARK DRIVE
182 BA .0122
183 PB 2.93
184 LS 0 98.0
185 UD 0.103
*

186 KK WC7
187 KM W OF SKYE CANYON PARK/GRAND CANYON INTERSECTION
188 KM COMBINE WC6, WL9A, WL10A, WSCP4
189 HC 4
*

190 KK WGC3
191 KM WEST BASIN, WEST OF GRAND CANYON DRIVE
192 BA .0476
193 PB 2.93
194 LS 0 95.0
195 UD 0.099
*

196 KK WGR1A
197 KM WEST BASIN, GRAND CANYON DRIVE
198 BA .0020
199 PB 2.93
200 LS 0 98.0
201 UD 0.111
*

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PAGE 6

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

202 KK WML15B
203 KM WEST BASIN, WEST OF SKYE PARK DRIVE
204 BA .0175
205 PB 2.93
206 LS 0 95.0
207 UD 0.102
*

208 KK WSPD2
209 KM WEST BASIN, SKYE PARK DRIVE
210 BA .0012
211 PB 2.93
212 LS 0 98.0
213 UD 0.050
*

214 KK WC8
215 KM COMBINE WML15B, WSPD2
216 HC 2
*

217 KK WC9
218 KM FAR N OF SKYE CANYON PARK/GRAND CANYON INTERSECTION
219 KM COMBINE WC7, WC8, WGR1A, WGC3
220 HC 4
*

221 KK OFF14
222 BA .0145
223 PB 2.77
224 LS 0 94.7
225 UD 0.108

ULT

*

226 KK CHD06B
227 KM ACCOUNTS FOR DIRECT CONNECTION FROM CHD05B TO US-95 INTERIM MPU FACILITY
228 HC 3
*

229 KK 95-9A
230 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
231 BA .0110
232 PB 2.77
233 LS 0 94.7
234 UD 0.095
*

235 KK CHD07B
236 KM COMBINE CHD06B, 95-9A
237 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
238 HC 2
*

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PAGE 7

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

239 KK OFF15
240 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
241 BA .0348
242 PB 2.77
243 LS 0 94.7
244 UD 0.108
*

245 KK CHD7B2
246 KM COMBINE CHD07B, OFF15
247 KM COMBINE FLOWS IN MPU FACILITY
248 KM REVISED FROM GCW MASTER DRAINAGE STUDY
249 HC 2
*

250 KK OFF17B
251 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
252 KM ADDED FROM HORSE INTERCHANGE MODEL
253 BA .0080
254 PB 2.773
255 LS 0 92.1
256 UD 0.069
*

257 KK OFF17A
258 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
259 KM ADDED FROM HORSE INTERCHANGE MODEL
260 BA .0305
261 PB 2.773
262 LS 0 92.1
263 UD 0.104
*

264 KK COFF17
265 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
266 KM ADDED FROM HORSE INTERCHANGE MODEL
267 KM COMBINE OFF17A, OFF17B
268 KM CULVERT AT BASIN OFF248
269 HC 2
*

270 KK ON1
271 KM START CENTENNIAL POINT HEC-1 DATA
272 BA .0042
273 PB 2.86
274 LS 0 91.2
275 UD 0.085
*

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PAGE 8

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

276 KK ON4A
277 BA .0045
278 LS 0 91.2
279 UD 0.077
*

280 KK C1
281 KM COMBINE ON1 AND ON4A
282 HC 2
*

ULT

283 KK D1
284 KM DIVERT FLOW INTO BASIN ON6
285 DT DIV1
286 DI 0 16
287 DQ 0 13
*

288 KK ON5
289 BA .0052
290 LS 0 91.2
291 UD 0.080
*

292 KK C2
293 KM COMBINE C1 AND ON5
294 HC 2
*

295 KK D1A
296 KM DIVERT FLOW FOR LATER USE IN HEC-1 RUN
297 DT DIV1A
298 DI 0 50
299 DQ 0 50
*

300 KK ON4B
301 BA .0031
302 LS 0 91.2
303 UD 0.085
*

304 KK RET1
305 KM RETRIEVE FLOW FROM D1
306 DR DIV1
*

307 KK ON6
308 BA .0039
309 LS 0 91.2
310 UD 0.074
*

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

311 KK C3
312 KM COMBINE RET1 AND ON6
313 HC 2
*

314 KK D1B
315 KM DIVERT FLOW FOR LATER USE IN HEC-1 RUN
316 DT DIV1B
317 DI 0 50
318 DQ 0 50
*

319 KK ON2
320 BA .0050
321 LS 0 91.2
322 UD 0.080
*

323 KK ON3
324 BA .0063
325 LS 0 91.5
326 UD 0.079
*

327 KK ON9
328 BA .0045
329 LS 0 91.4
330 UD 0.096
*

331 KK C4
332 KM COMBINE ON2, ON3 AND ON9
333 HC 3
*

334 KK D2
335 KM DIVERT FLOW INTO BASIN ON8
336 DT DIV2
337 DI 0 29
338 DQ 0 24
*

339 KK ON10

ULT

340 BA .0025
341 LS 0 91.5
342 UD 0.071
*

343 KK C5
344 KM COMBINE C4 AND ON10
345 HC 2
*

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

346 KK D3
347 KM DIVERT FLOW INTO BASIN ON7
348 DT DIV3
349 DI 0 10
350 DQ 0 8
*

351 KK ON11
352 BA .0025
353 LS 0 91.5
354 UD 0.067
*

355 KK C6
356 KM COMBINE C5 AND ON11
357 HC 2
*

358 KK D1C
359 KM DIVERT FLOW FOR LATER USE IN HEC-1 RUN
360 DT DIV1C
361 DI 0 50
362 DQ 0 50
*

363 KK CD1C
364 KM COMBINE D1A, ON4B, D1B AND D1C
365 KM PICK UP AT OFF23
366 HC 4
*

367 KK RCD1C
368 KM ROUTE CD1C TO BASIN OFF23
369 RK 2640 0.0346 0.02 TRAP 100 2
*

370 KK DRCD1C
371 KM DIVERT FLOW TO BASIN OFF23
372 DT DOFF23
373 DI 0 50 100
374 DQ 0 50 100
*

375 KK ON8
376 BA .0042
377 LS 0 83.5
378 UD 0.074
*

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

379 KK RET2
380 KM RETRIEVE FLOW FROM D2
381 DR DIV2
*

382 KK C7
383 KM COMBINE ON11 AND RET2
384 HC 2
*

385 KK RET3
386 KM RETRIEVE FLOW FROM D3
387 DR DIV3
*

388 KK ON7
389 BA .0073
390 LS 0 91.3
391 UD 0.077
*

392 KK C8

ULT

```

393      KM  COMBINE C7, RET3 AND ON7
394      HC      3
      *

395      KK  RET1A
396      KM  RETRIEVE FLOW FROM D1A IN TEE PEE
397      DR  DIV1A
      *

398      KK  RET1B
399      KM  RETRIEVE FLOW FROM D1B IN TEE PEE
400      DR  DIV1B
      *

401      KK  RET1C
402      KM  RETRIEVE FLOW FROM D1C IN TEE PEE
403      DR  DIV1C
      *

404      KK      C9
405      KM  COMBINE C8, RET1A, RET1B, RET1C IN TEE PEE
406      KM  END CENTENNIAL POINT HEC-1 DATA
407      HC      3
      *

408      KK  ON2D
409      KM  START GRAND CANYON APARTMENTS HEC-1 DATA
410      BA  .00105
411      PB  2.90
412      LS      0      95
413      UD  0.094
      *

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

```

414      KK  ON5D
415      BA  .0038
416      LS      0      95
417      UD  0.067
      *

418      KK  CP1
419      KM  COMBINE ON2D AND ON5D
420      HC      2
      *

421      KK  ON3D
422      BA  .0036
423      LS      0      95
424      UD  0.084
      *

425      KK  CP2
426      KM  COMBINE CP1 AND ON3D
427      HC      2
      *

428      KK  ON1D
429      BA  .0075
430      LS      0      95
431      UD  0.079
      *

432      KK  ON4D
433      BA  .0041
434      LS      0      95
435      UD  0.096
      *

436      KK  CP3
437      KM  COMBINE ON1D AND ON4D
438      HC      2
      *

439      KK  CP4
440      KM  COMBINE CP2 AND CP3
441      KM  END GRAND CANYON APARTMENTS HEC-1 DATA
442      HC      2
      *

443      KK  CENGCA
444      KM  COMBINE DRCD1C, C9, CP4
445      KM  CD1C IS DIVERSION OF FLOW ON TEE PEE FROM CENTENNIAL POINT
446      KM  CP4 AND C9 ARE ENDING OF THE APARTMENT COMPLEX AND DEVELOPMENT
447      HC      4
      *

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ULT

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
448	KK WML9
449	KM WEST BASIN, WEST OF EGAN CREST DRIVE
450	BA .0257
451	PB 3.00
452	LS 0 94.9
453	UD 0.083
	*
454	KK WPRK5
455	KM WEST BASIN, WEST OF EGAN CREST DRIVE
456	BA .0031
457	PB 3.00
458	LS 0 84.0
459	UD 0.064
	*
460	KK WC10A
461	KM FAR W OF EAGLE CANYON/EGAN CREST INTERSECTION
462	KM COMBINE WML9, WPRK5
463	HC 2
	*
464	KK WEGL1
465	KM WEST BASIN, EAGLE CANYON AVE
466	BA .0052
467	PB 3.00
468	LS 0 98.0
469	UD 0.083
	*
470	KK WL4B
471	BA .0140
472	PB 3.00
473	LS 0 92.0
474	UD 0.093
	*
475	KK WC10B
476	KM W OF EAGLE CANYON/EGAN CREST INTERSECTION
477	HC 3
	*
478	KK WML10
479	KM WEST BASIN, WEST OF EGAN CREST DRIVE
480	BA .0181
481	PB 3.00
482	LS 0 95.0
483	UD 0.092
	*

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LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
484	KK WEGN3
485	KM WEST BASIN, EGAN CREST DRIVE
486	BA .0051
487	PB 3.00
488	LS 0 98.0
489	UD 0.136
	*
490	KK WML11
491	KM WEST BASIN, WEST OF EGAN CREST DRIVE
492	BA .0448
493	PB 3.00
494	LS 0 92.7
495	UD 0.121
	*
496	KK WC11
497	KM W OF EAGLE CANYON/EGAN CREST INTERSECTION
498	KM COMBINE WML10, WEGN3, WML11
499	HC 3
	*
500	KK WC12
501	KM W OF EAGLE CANYON/EGAN CREST INTERSECTION
502	KM COMBINE WC10B, WC11
503	HC 2
	*
504	KK WL6B
505	KM WEST BASIN, WEST OF SKY VILLAGE ROAD
506	BA .0165

ULT

507	PB	3.00	
508	LS	0	92.0
509	UD	0.106	
	*		
510	KK	WL7	
511	KM	WEST BASIN, WEST OF SKY VILLAGE ROAD	
512	BA	.0180	
513	PB	3.00	
514	LS	0	92.0
515	UD	0.095	
	*		
516	KK	WML13	
517	KM	WEST BASIN, WEST OF SKY VILLAGE ROAD	
518	BA	.0256	
519	PB	3.00	
520	LS	0	95.0
521	UD	0.117	
	*		

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

522	KK	WEGL2	
523	KM	WEST BASIN, EAGLE CANYON AVE	
524	BA	.0051	
525	PB	3.00	
526	LS	0	98.0
527	UD	0.072	
	*		
528	KK	WC13	
529	KM	W OF EAGLE CANYON/EGAN CREST INTERSECTION	
530	KM	COMBINE WC12, WL6B, WL7, WML13, WEGL2	
531	HC	5	
	*		
532	KK	WML14	
533	KM	WEST BASIN, WEST OF SKY VILLAGE ROAD	
534	BA	.0300	
535	PB	3.00	
536	LS	0	95.0
537	UD	0.111	
	*		
538	KK	WL8	
539	KM	WEST BASIN, WEST OF SKY VILLAGE ROAD	
540	BA	.0272	
541	PB	3.00	
542	LS	0	92.0
543	UD	0.128	
	*		
544	KK	WSKV3	
545	KM	WEST BASIN, WEST OF SKY VILLAGE ROAD	
546	BA	.0066	
547	PB	2.93	
548	LS	0	98.0
549	UD	0.100	
	*		
550	KK	WSKV4	
551	KM	WEST BASIN, SKY VILLAGE ROAD	
552	BA	.0070	
553	PB	3.00	
554	LS	0	98.0
555	UD	0.099	
	*		
556	KK	WC14	
557	KM	E OF EAGLE CANYON/EGAN CREST INTERSECTION	
558	KM	COMBINE WC13, WML14, WL8, WSKV3, WSKV4	
559	HC	5	
	*		

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

560	KK	WL9B	
561	KM	WEST BASIN, WEST OF SKY PARK DRIVE	
562	BA	.0224	
563	PB	2.93	
564	LS	0	92.0
565	UD	0.116	
	*		

ULT

566 KK WSPD4
567 KM WEST BASIN, WEST OF SKY VILLAGE ROAD
568 BA .0036
569 PB 2.93
570 LS 0 98.0
571 UD 0.095
*

572 KK WC15
573 KM N OF EAGLE CANYON/SKY PARK DRIVE INTERSECTION
574 KM COMBINE WL9B, WSPD4
575 HC 2
*

576 KK WL11
577 KM WEST BASIN, WEST OF MOUNTAIN LANDING STREET
578 BA .0573
579 PB 2.93
580 LS 0 92.0
581 UD 0.131
*

582 KK WPRK8
583 KM WEST BASIN, WEST OF SKY VILLAGE ROAD
584 BA .0027
585 PB 2.93
586 LS 0 84.0
587 UD 0.077
*

588 KK WPRK9
589 KM WEST BASIN, WEST OF SKY VILLAGE ROAD
590 BA .0007
591 PB 2.93
592 LS 0 84.0
593 UD 0.069
*

594 KK WMTL1
595 KM WEST BASIN, MOUNTAIN LANDING STREET
596 BA .0020
597 PB 2.93
598 LS 0 98.0
599 UD 0.069
*

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LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
600	KK WC16
601	KM S OF EAGLE CANYON/MOUNTAIN LANDING INTERSECTION
602	KM COMBINE WL11, WPRK8, WPRK9, WMTL1
603	HC 4 *
604	KK WEG13
605	KM WEST BASIN, EAGLE CANYON AVE
606	BA .0075
607	PB 3.00
608	LS 0 98.0
609	UD 0.098 *
610	KK WL10B
611	KM WEST BASIN, WEST OF GRAND CANYON DRIVE
612	BA .0286
613	PB 2.93
614	LS 0 92.0
615	UD 0.139 *
616	KK WC17
617	KM W OF EAGLE CANYON/GRAND CANYON INTERSECTION
618	KM COMBINE WC14, WC15, WC16, WEG13, WL10B
619	HC 5 *
620	KK WL12
621	KM WEST BASIN, WEST OF GRAND CANYON DRIVE
622	BA .0490
623	PB 2.93
624	LS 0 92.0
625	UD 0.119 *
626	KK WGRC1B
627	KM WEST BASIN, GRAND CANYON DRIVE
628	BA .0050

ULT

629 PB 2.93
 630 LS 0 98.0
 631 UD 0.163
 *

632 KK WC18
 633 KM W OF EAGLE CANYON/GRAND CANYON INTERSECTION
 634 KM COMBINE WC17, WL12, WGR18
 635 HC 3
 *

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

636 KK CCP4
 637 HC 2
 *

638 KK OFF21B
 639 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
 640 KM BASIN IS DEVELOPED, CHECK FOR REFERENCE MATERIAL.
 641 BA .0414
 642 PB 2.775
 643 LS 0 95
 644 UD 0.110
 *

645 KK COF21B
 646 KM COMBINE OFF21B WITH FLOW FROM CENTENNIAL POINT AND GRAND CANYON APTS
 647 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
 648 HC 2
 *

649 KK ROFF23
 650 KM RETRIEVE FLOW FROM DIVOFF23
 651 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
 652 DR DOFF23
 *

653 KK OFF23
 654 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
 655 BA .0091
 656 PB 2.787
 657 LS 0 95
 658 UD 0.109
 *

659 KK COFF23
 660 KM COMBINE OFF23, DOFF23
 661 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
 662 HC 2
 *

663 KK OFFU
 664 BA .0398
 665 PB 2.93
 666 LS 0 94.8
 667 UD 0.118
 *

668 KK CPCULV
 669 HC 5
 *

1 HEC-1 INPUT PAGE 19

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

670 KK NW29-C
 671 KM REFERENCED FROM 2008 MPU
 672 BA 0.132
 673 PB 3.00
 674 LS 0 92.4
 675 UD 0.214
 *

676 KK RNW29C
 677 KM ROUTE NW29-C TO CNW71-W
 678 KM FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/GRAND TETON BRANCH
 679 KM FACILITY ID-MILE = CNGT 0118
 680 KM LINING = ARCH CON
 681 KM REFERENCED FROM 2008 MPU
 682 RD 2100 0.037 0.015 0 TRAP 6 0
 *

683 KK NW71-W
 684 KM REFERENCED FROM 2008 MPU
 685 BA 0.104

ULT

686	PB	2.92		
687	LS	0	92.5	
688	UD	0.206		
	*			
689	KK	CNW71W		
690	KM	COMBINE RNW29C AND NW71-W		
691	KM	CENTENNIAL PKWY CHANNEL WEST/GRAND TETON BRANCH @ HUALAPAI		
692	KM	REFERENCED FROM 2008 MPU		
693	HC	2		
	*			
694	KK	RCNW71-W		
695	KM	ROUTE CNW71-W TO CNW71-E		
696	KM	FACILITY = CENTENNIAL PARKWAY CHANNEL WEST/GRAND TETON BRANCH		
697	KM	FACILITY ID-MILE = CNGT 0000,0043		
698	KM	LINING = RCB		
699	KM	REFERENCED FROM 2008 MPU		
700	RD	6270 0.030 0.015	0	TRAP 6 0
	*			
701	KK	NW71-E		
702	KM	REFERENCED FROM 2008 MPU		
703	BA	0.238		
704	PB	2.85		
705	LS	0	88.3	
706	UD	0.293		
	*			

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

707	KK	CNW71E		
708	KM	COMBINE NW71-E AND RCNW71-W		
709	KM	CENTENNIAL PKWY CHANNEL WEST/GRAND TETON BRANCH @ US 95		
710	KM	REFERENCED FROM 2008 MPU		
711	HC	2		
	*			
712	KK	WGRT1		
713	KM	WEST BASIN, GRAND TETON DRIVE		
714	BA	.0183		
715	PB	3.00		
716	LS	0	98.0	
717	UD	0.256		
	*			
718	KK	955TH		
719	KM	FLOW CONVEYED SOUTH IN US-95 AT GRAND TETON		
720	KM	FLOW CONVEYED IN FACILITY ID = CN95 0167		
721	HC	3		
	*			
722	KK	OFF4-1		
723	KM	REFERENCED FROM 2008 MPU		
724	BA	0.301		
725	PB	3.40		
726	LS	0	86.8	
727	UD	0.295		
	*			
728	KK	ROFF41		
729	KM	ROUTE OFF4-1 TO COFF4-2		
730	KM	KYLE CANYON ROAD		
731	KM	REFERENCED FROM 2008 MPU		
732	RD	5800 0.0414 0.016	0	TRAP 0 50
	*			
733	KK	OFF4-2		
734	KM	REFERENCED FROM 2008 MPU		
735	BA	0.420		
736	PB	3.34		
737	LS	0	85.2	
738	UD	0.140		
	*			
739	KK	COFF42		
740	KM	COMBINE ROFF4-1 AND OFF4-2		
741	KM	REFERENCED FROM 2008 MPU		
742	HC	2		
	*			

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

743	KK	RCOFF4-2		
744	KM	ROUTE COFF4-2 TO COFF5-1		

ULT

745	KM	KYLE CANYON ROAD					
746	KM	REFERENCED FROM 2008 MPU					
747	RD	2800 0.0392 0.016	0	TRAP	0	50	
	*						
748	KK	OFF5-1					
749	KM	REFERENCED FROM 2008 MPU					
750	BA	0.296					
751	PB	3.26					
752	LS	0 84.1					
753	UD	0.222					
	*						
754	KK	COFF51					
755	KM	COMBINE RCOFF4-2 AND OFF5-1					
756	KM	REFERENCED FROM 2008 MPU					
757	HC	2					
	*						
758	KK	RCOFF5-1					
759	KM	ROUTE COFF5-1 TO 2CNW1-C					
760	KM	FACILITY = MOCCASIN AND KYLE CANYON ROAD					
761	KM	FACILITY ID-MILE = MOKC 0380					
762	KM	LINING = RCP					
763	KM	REFERENCED FROM 2008 MPU					
764	RD	5800 0.0373 0.013	0	CIRC	7.5	0	
	*						
765	KK	OFF5-2					
766	KM	REFERENCED FROM 2008 MPU					
767	BA	0.395					
768	PB	3.20					
769	LS	0 86.9					
770	UD	0.317					
	*						
771	KK	ROFF52					
772	KM	ROUTE OFF5-2 TO CNW1-C					
773	KM	FACILITY =KYLE CANYON ROAD AND UNKNOWN					
774	KM	FACILITY ID-MILE = KCUN 0000					
775	KM	LINING = RCP					
776	KM	REFERENCED FROM 2008 MPU					
777	RD	2300 0.022 0.013	0	CIRC	7	0	
	*						
778	KK	NW1-C					
779	KM	REFERENCED FROM 2008 MPU					
780	BA	0.293					
781	PB	3.12					
782	LS	0 84.3					
783	UD	0.263					
	*						

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

784	KK	CNW1-C					
785	KM	COMBINE ROFF5-2 AND NW1-C					
786	KM	REFERENCED FROM 2008 MPU					
787	HC	2					
	*						
788	KK	2CNW1C					
789	KM	COMBINE RCOFF5-1 AND CNW1-C					
790	KM	REFERENCED FROM 2008 MPU					
791	HC	2					
	*						
792	KK	R2CNW1-C					
793	KM	ROUTE 2CNW1-C TO CNW-7					
794	KM	FACILITY =MOCCASIN AND KYLE CANYON ROAD					
795	KM	FACILITY ID-MILE = MOKC 0325					
796	KM	LINING = RCB					
797	KM	REFERENCED FROM 2008 MPU					
798	RD	5700 0.0365 0.015	0	TRAP	9	0	
	*						
799	KK	NW7-C					
800	KM	REFERENCED FROM 2008 MPU					
801	BA	0.488					
802	PB	3.03					
803	LS	0 87.2					
804	UD	0.364					
	*						
805	KK	CNW-7					
806	KM	COMBINE NW7-C AND R2CNW1-C					
807	KM	REFERENCED FROM 2008 MPU					

808 HC 2 ULT
 *
 809 KK 157DB
 810 KM ADDED SR-157 DB
 811 RS 1 VOL -1
 812 KO 1
 813 SV 0 70 100
 814 SE 0 5 7
 815 SQ 0 626 885 1084 1252 1399
 816 SE 0 3 4 5 6 7
 *
 817 KK RCNW7C
 818 KM ROUTE CNW7-C TO CNW21-C
 819 KM FACILITY =MOCCASIN AND KYLE CANYON ROAD
 820 KM FACILITY ID-MILE = MOKC
 821 KM LINING = RCB
 822 KM REVISED FROM 2008 MPU
 823 RD 2660 0.0338 0.015 0 TRAP 20 0
 *

1

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PAGE 23

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

824 KK NW21-C
 825 KM PROPOSED ULTIMATE CONDITION MPA BASIN
 826 BA .1552
 827 PB 3.00
 828 LS 0 92.0
 829 UD 0.199
 *
 830 KK CNW21C
 831 KM COMBINE NW21-C AND CNW-7
 832 HC 2
 *
 833 KK RCNW21-C
 834 KM ROUTE CNW21-C TO CNW35-C
 835 KM FACILITY =MOCCASIN AND KYLE CANYON ROAD
 836 KM FACILITY ID-MILE = MOKC
 837 KM LINING = RCB
 838 KM REVISED FROM 2008 MPU
 839 RD 5450 0.0339 0.015 0 TRAP 20 0
 *
 840 KK NW35-C
 841 KM PROPOSED ULTIMATE CONDITION MPA BASIN
 842 BA .3447
 843 PB 2.93
 844 LS 0 90.5
 845 UD 0.291
 *
 846 KK WPRK10
 847 KM OFFICER IGOR SOLDI MEMORIAL PARK
 848 BA .0157
 849 PB 2.77
 850 LS 0 84.0
 851 UD 0.114
 *
 852 KK CNW35C
 853 KM COMBINE NW35-C AND CNW21-C
 854 HC 3
 *
 855 KK WOFF1
 856 KM DISCHARGES INTO DETENTION BASIN "DB1"
 857 PB 3.00
 858 BA .4073
 859 LS 0 86.4
 860 UD 0.356
 *

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PAGE 24

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

861 KK WOFF11
 862 KM DEVELOPED OFFSITE DRAINAGE BASIN
 863 KM DISCHARGES INTO DETENTION BASIN "DB2"
 864 BA .0281
 865 LS 0 96.0
 866 UD 0.118
 *

ULT

867 KK WOFF2
868 KM DISCHARGES INTO DETENTION BASIN "DB1"
869 BA .0355
870 LS 0 85.0
871 UD 0.148
*

872 KK WOFF3
873 KM DISCHARGES INTO DETENTION BASIN "DB1"
874 BA .0259
875 LS 0 86.2
876 UD 0.112
*

877 KK CP1
878 KM COMBINE WOFF1, WOFF2, WOFF3, WOFF11
879 HC 4
*

880 KK WOFF4
881 KM DISCHARGES INTO DETENTION BASIN "DB1"
882 BA .0581
883 LS 0 86.2
884 UD 0.136
*

885 KK WOFF5
886 KM DISCHARGES INTO DETENTION BASIN "DB1"
887 BA .2569
888 LS 0 86.5
889 UD 0.419
*

890 KK WOFF6
891 KM DISCHARGES INTO DETENTION BASIN "DB1"
892 BA .0399
893 LS 0 86.2
894 UD 0.121
*

895 KK WPF18
896 KM WEST BASIN, WEST OF SHEEP MT ROAD
897 BA .0295
898 PB 3.00
899 LS 0 94.0
900 UD 0.077
*

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PAGE 25

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

901 KK DB1
902 KM COMBINE CP1, WOFF4, WOFF5, WOFF6 AND WPF18
903 HC 5
*

904 KK RDB1
905 KM OUTLET = 24" ORIFICE @ INVERT ELEVATION = 3013.8-FT
906 KO 1
907 RS 1 ELEV 3025.5
908 SA 4.68 5.56 5.74 5.92 6.10 7.01 7.46 8.36 9.32 10.68
909 SE 3025.5 3027 3028 3029 3030 3035 3037 3040 3043 3046
910 SQ 0 13.7 31.5 48.3 60.6 70.8 74.5 1436.0 3920.5 7136.3
911 SE 3013.8 3017 3020 3025 3030 3035 3037 3040 3043 3046
*

912 KK WSHP3
913 KM WEST BASIN, SHEEP MT ROAD
914 BA .0163
915 PB 3.00
916 LS 0 94.0
917 UD 0.110
*

918 KK WPF2
919 KM WEST BASIN, WEST OF SHEEP MT
920 BA .0048
921 PB 3.00
922 LS 0 94.0
923 UD 0.074
*

924 KK WC19
925 KM FAR N OF GRAND TETON/SHEEP MT INTERSECTION
926 KM COMBINE RDB1, WSHP3, WPF2
927 HC 3
*

ULT

928 KK WPF5
929 KM WEST BASIN, WEST OF SHAUMBER RD
930 BA .0006
931 PB 3.00
932 LS 0 86.0
933 UD 0.052
*

934 KK WML2
935 KM WEST BASIN, WEST OF SHAUMBER ROAD
936 BA .0428
937 PB 3.00
938 LS 0 93.5
939 UD 0.142
*

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

940 KK WSHA5
941 KM WEST BASIN, SHAUMBER ROAD
942 BA .0037
943 PB 3.00
944 LS 0 98.0
945 UD 0.086
*
946 KK WC20
947 KM S OF EAGLE CANYON/SHAUMBER INTERSECTION
948 KM COMBINE WPF5, WML2, WSHA5
949 HC 3
*

950 KK WARR4
951 KM WEST BASIN, WEST OF SHAUMBER ROAD
952 BA .0020
953 PB 3.00
954 LS 0 88.0
955 UD 0.100
*

956 KK WPF4
957 BA .0090
958 PB 3.00
959 LS 0 94.0
960 UD 0.087
*

961 KK WSHA4
962 BA .0022
963 PB 3.00
964 LS 0 98.0
965 UD 0.051
*

966 KK WC21
967 KM S OF SHAUMBER SPLIT INTERSECTION
968 HC 5
*

969 KK WPF3
970 BA .0072
971 PB 3.00
972 LS 0 94.0
973 UD 0.050
*

974 KK WSHA3A
975 BA .0010
976 PB 3.00
977 LS 0 98.0
978 UD 0.050
*

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

979 KK WC29
980 HC 2
*
981 KK WL4A
982 KM WEST BASIN, WEST OF EGAN CREB DRIVE
983 BA .0125
984 PB 3.00
985 LS 0 92.0
986 UD 0.106

ULT

```

*
987      KK  WLSA
988      KM  WEST BASIN, WEST OF EGAN CREB DRIVE
989      BA  .0170
990      PB  3.00
991      LS   0   92.0
992      UD  0.099
*
993      KK  WLSB
994      BA  .0059
995      PB  3.00
996      LS   0   92.0
997      UD  0.085
*
998      KK  WC22A
999      HC   3
*
1000     KK  WPRK4
1001     KM  WEST BASIN, WEST OF EGAN CREB DRIVE
1002     BA  .0016
1003     PB  3.00
1004     LS   0   84.0
1005     UD  0.067
*
1006     KK  WARR5
1007     KM  WEST BASIN, WEST OF EGAN CREB DRIVE
1008     BA  .0100
1009     PB  3.00
1010     LS   0   90.0
1011     UD  0.100
*
1012     KK  WC22
1013     KM  FAR S OF SKYE CANYON PARK/EGAN CREB INTERSECTION
1014     HC   5
*

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1015      KK  WPF6
1016      KM  WEST BASIN, WEST OF EGAN CREB DRIVE
1017      BA  .0016
1018      PB  3.00
1019      LS   0   94.0
1020      UD  0.050
*
1021      KK  WML8
1022      KM  WEST BASIN, WEST OF EGAN CREB DRIVE
1023      BA  .0161
1024      PB  3.00
1025      LS   0   95.0
1026      UD  0.093
*
1027      KK  DUMMY
1028      HC   3
*
1029      KK  STR5
1030      KM  STREET BASIN
1031      BA  .0045
1032      PB  3.00
1033      LS   0   98.0
1034      UD  0.100
*
1035      KK  WEGN1
1036      KM  WEST BASIN, EGAN CREB DRIVE
1037      BA  .0007
1038      PB  3.00
1039      LS   0   98.0
1040      UD  0.050
*
1041      KK  WEGN2
1042      KM  WEST BASIN, EGAN CREB DRIVE
1043      BA  .0007
1044      PB  3.00
1045      LS   0   98.0
1046      UD  0.050
*

```

ULT

1047 KK WC23
1048 KM FAR S OF SKYE CANYON PARK/EGAN CREB INTERSECTION
1049 KM COMBINE WC22, WML8, WPF6, STR5, WEGN1, WEGN2
1050 HC 4
*

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PAGE 29

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

1051 KK WARR6
1052 KM WEST BASIN, WEST OF SKYE VILLAGE ROAD
1053 BA .0038
1054 PB 3.00
1055 LS 0 88.0
1056 UD 0.100
*

1057 KK WPF7
1058 KM WEST BASIN, WEST OF SKYE VILLAGE ROAD
1059 BA .0071
1060 PB 3.00
1061 LS 0 94.0
1062 UD 0.097
*

1063 KK WC24
1064 KM FAR E OF SKYE CANYON PARK/EGAN CREB INTERSECTION
1065 KM COMBINE WC23, WPF7, WARR6, WL6A
1066 HC 3
*

1067 KK WL6A
1068 KM WEST BASIN, WEST OF SKYE VILLAGE ROAD
1069 BA .0096
1070 PB 3.00
1071 LS 0 92.0
1072 UD 0.092
*

1073 KK STR6
1074 KM STREET BASIN
1075 BA .0088
1076 PB 3.00
1077 LS 0 98.0
1078 UD 0.100
*

1079 KK WPRK6
1080 KM WEST BASIN, WEST OF SKYE VILLAGE ROAD
1081 BA .0207
1082 PB 3.00
1083 LS 0 84.0
1084 UD 0.121
*

1085 KK WC26
1086 KM W OF SKY CANYON PARK/SKYE VILLAGE INTERSECTION
1087 KM COMBINE WC24, STR6, WPRK6
1088 HC 4
*

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

1089 KK 2.08b
1090 KM ONSITE BASIN
1091 BA .0303
1092 PB 3.00
1093 LS 0 95.0
1094 UD 0.105
*

1095 KK SVR1
1096 KM ONSITE STREET BASIN
1097 BA .0043
1098 PB 3.00
1099 LS 0 98.0
1100 UD 0.081
*

1101 KK WC27
1102 KM S OF SPD2/SKYE CANYON VILLAGE INTERSECTION
1103 KM COMBINE WC26, 2.08b, SVR1
1104 HC 3
*

ULT

1105 KK WL1B
1106 KM WEST BASIN, WEST OF SHEEP MT ROAD
1107 BA .0437
1108 PB 3.00
1109 LS 0 92.0
1110 UD 0.109
*

1111 KK WARR1
1112 KM WEST BASIN, WEST OF SHEEP MT ROAD
1113 BA .0056
1114 PB 3.00
1115 LS 0 88.0
1116 UD 0.100
*

1117 KK WSHP2
1118 KM WEST BASIN, SHEEP MT ROAD
1119 BA .0146
1120 PB 3.00
1121 LS 0 94.0
1122 UD 0.148
*

1123 KK WC28
1124 KM FAR S OF IRON MT/SHEEP MT INTERSECTION
1125 KM COMBINE WL1B, WARR1, WSHP3
1126 HC 3
*

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

1127 KK WSCH2
1128 BA .0180
1129 PB 3.00
1130 LS 0 91.0
1131 UD 0.069
*

1132 KK WSHA3B
1133 BA .0026
1134 PB 3.00
1135 LS 0 98.0
1136 UD 0.089
*

1137 KK WC30
1138 HC 2
*

1139 KK WSCP1
1140 BA .0024
1141 PB 3.00
1142 LS 0 98.0
1143 UD 0.066
*

1144 KK WC31
1145 HC 2
*

1146 KK WML1
1147 KM WEST BASIN, WEST OF SHAUMBER ROAD
1148 BA .0282
1149 PB 3.00
1150 LS 0 92.0
1151 UD 0.103
*

1152 KK STR3
1153 KM STREET BASIN
1154 BA .0044
1155 PB 3.00
1156 LS 0 98.0
1157 UD 0.100
*

1158 KK WARR2
1159 KM WEST BASIN, WEST OF SHAUMBER ROAD
1160 BA .0044
1161 PB 3.00
1162 LS 0 88.0
1163 UD 0.100
*

1

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

ULT

1164	KK	CP4	
1165	HC	5	
	*		
1166	KK	2.09T	
1167	KM	ONSITE BASIN	
1168	BA	.0017	
1169	PB	3.00	
1170	LS	0	84.0
1171	UD	0.082	
	*		
1172	KK	2.09	
1173	KM	ONSITE BASIN	
1174	BA	.0455	
1175	PB	3.00	
1176	LS	0	92.0
1177	UD	0.126	
	*		
1178	KK	2.31	
1179	KM	ONSITE BASIN	
1180	BA	.0050	
1181	PB	3.00	
1182	LS	0	84.0
1183	UD	0.076	
	*		
1184	KK	CP3a	
1185	KM	COMBINES CP4, 2.09T, 2.09 AND 2.31	
1186	HC	4	
	*		
1187	KK	2.08T	
1188	KM	ONSITE BASIN	
1189	BA	.0018	
1190	PB	3.00	
1191	LS	0	84.0
1192	UD	0.077	
	*		
1193	KK	2.08a	
1194	KM	ONSITE BASIN	
1195	BA	.0246	
1196	PB	3.00	
1197	LS	0	95.0
1198	UD	0.105	
	*		

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

1199	KK	CP3b	
1200	KM	COMBINES CP3a, 2.08T AND 2.08a	
1201	HC	3	
	*		
1202	KK	WC35	
1203	KM	N OF SPD2/SKYE CANYON VILLAGE INTERSECTION	
1204	KM	COMBINE WC27, CP3b	
1205	HC	2	
	*		
1206	KK	5.01b	
1207	KM	ONSITE STREET BASIN	
1208	BA	.0317	
1209	PB	3.00	
1210	LS	0	95.0
1211	UD	0.083	
	*		
1212	KK	2.32b	
1213	KM	ONSITE STREET BASIN	
1214	BA	.0010	
1215	PB	3.00	
1216	LS	0	84.0
1217	UD	0.094	
	*		
1218	KK	2.32b	
1219	KM	ONSITE STREET BASIN	
1220	BA	.0387	
1221	PB	3.00	
1222	LS	0	95.0
1223	UD	0.131	
	*		

ULT

1224 KK CP2c
1225 KM COMBINES 5.01b, 2.32Tb AND 2.32b
1226 HC 3
*

1227 KK SVR2
1228 KM ONSITE STREET BASIN
1229 BA .0100
1230 PB 3.00
1231 LS 0 98.0
1232 UD 0.161
*

1233 KK WC37
1234 KM S OF IRON MT/SKYE VILLAGE RD INTERSECTION
1235 KM COMBINE WC35, CP2c AND SVR2
1236 HC 3
*

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

1237 KK WOFF7
1238 KM DISCHARGES INTO DETENTION BASIN "DB2"
1239 BA .0068
1240 LS 0 86.2
1241 UD 0.100
*

1242 KK WOFF8
1243 KM DISCHARGES INTO DETENTION BASIN "DB2"
1244 BA .1663
1245 LS 0 86.2
1246 UD 0.239
*

1247 KK CP2
1248 KM COMBINE WOFF7, AND WOFF8
1249 HC 2
*

1250 KK WOFF9
1251 KM DISCHARGES INTO DETENTION BASIN "DB2"
1252 BA .1164
1253 LS 0 86.2
1254 UD 0.203
*

1255 KK WOFF10
1256 KM DISCHARGES INTO DETENTION BASIN "DB2"
1257 BA .2463
1258 LS 0 86.5
1259 UD 0.248
*

1260 KK WPF1A
1261 KM WEST BASIN, WEST OF SHEEP MT ROAD
1262 BA .0315
1263 PB 3.00
1264 LS 0 94.0
1265 UD 0.135
*

1266 KK DB2
1267 KM COMBINE CP2, WOFF9, WOFF10 AND WPF1A
1268 HC 4
*

1269 KK RDB2
1270 KM OUTLET = 25" ORIFICE @ INVERT ELEVATION = 2984.21-FT
1271 KO 1
1272 RS 1 ELEV 2992.0
1273 SV 0.00 2.34 7.60 24.30 46.28 73.78 107.11 146.75 193.03
1274 SE 2992.0 2993.0 2995.0 3000.0 3005.0 3010.0 3015.0 3020.0 3025.0
1275 SQ 0.00 44.44 51.05 64.70 83.84 99.36 520.9 3465.5 7888.4
1276 SE 2992.0 2993.0 2995.0 3000.0 3009.0 3018.0 3019.0 3022.0 3025.0
*

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

1277 KK WPRK1
1278 KM WEST BASIN, WEST OF SHEEP MT ROAD
1279 BA .0037
1280 PB 3.00
1281 LS 0 84.0

1282 UD 0.070
*
1283 KK WIRN1
1284 KM WEST BASIN, IRON MT ROAD
1285 BA .0009
1286 PB 3.00
1287 LS 0 98.0
1288 UD 0.050
*
1289 KK WL1A
1290 KM WEST BASIN, WEST OF SHEEP MT ROAD
1291 BA .0465
1292 PB 3.00
1293 LS 0 92.0
1294 UD 0.142
*
1295 KK WC38
1296 KM W OF SHEEP MT/IRON MT INTERSECTION
1297 KM COMBINE WPF1A, WPRK1, WIRN1
1298 HC 4
*
1299 KK WSHP1
1300 KM WEST BASIN, SHEEP MT ROAD
1301 BA .01000
1302 PB 3.00
1303 LS 0 94.0
1304 UD 0.125
*
1305 KK WC39
1306 KM S OF IRON MT/SHAUMBER INTERSECTION
1307 KM COMBINE WL1A, WSHP1
1308 HC 2
*
1309 KK WIRN2
1310 KM WEST BASIN, IRON MT ROAD
1311 BA .0034
1312 PB 3.00
1313 LS 0 98.0
1314 UD 0.097
*

ULT

1

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PAGE 36

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

1315 KK WSCH1
1316 KM WEST BASIN, WEST OF SHAUMBER ROAD
1317 BA .0615
1318 PB 3.00
1319 LS 0 91.0
1320 UD 0.125
*
1321 KK STR2
1322 KM STREET BASIN
1323 BA .0061
1324 PB 3.00
1325 LS 0 98.0
1326 UD 0.102
*
1327 KK CP1
1328 KM S OF IRON MT/SHAUMBER INTERSECTION
1329 KM COMBINE WC39, WIRN2, WSCH1, STR2
1330 HC 4
*
1331 KK 5.01
1332 KM ONSITE BASIN
1333 BA .0292
1334 PB 3.00
1335 LS 0 95.0
1336 UD 0.076
*
1337 KK 2.32T
1338 KM ONSITE BASIN
1339 BA .0010
1340 PB 3.00
1341 LS 0 84.0
1342 UD 0.089
*

ULT

1343 KK CP2a
1344 KM COMBINES CP1, 5.01 AND 2.32T
1345 HC 3
*

1346 KK STR1
1347 KM STREET BASIN
1348 BA .0060
1349 PB 3.00
1350 LS 0 98.0
1351 UD 0.119
*

1

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

1352 KK 2.32
1353 KM ONSITE BASIN
1354 BA .0317
1355 PB 3.00
1356 LS 0 95.0
1357 UD 0.113
*

1358 KK CP2b
1359 KM COMBINES CP2a, STR1 AND 2.32
1360 HC 3
*

1361 KK WC43
1362 KM N OF IRON MT/SKYE VILLAGE RD INTERSECTION
1363 KM COMBINE WC37, CP2b
1364 HC 2
*

1365 KK WSKV1A
1366 KM WEST BASIN, SKYE VILLAGE ROAD
1367 BA .0021
1368 PB 3.00
1369 LS 0 98.0
1370 UD 0.093
*

1371 KK WC44A
1372 KM S OF OSO BLANCA/SKYE VILLAGE RD INTERSECTION
1373 KM COMBINE WC43, SKV1A
1374 HC 2
*

1375 KK WGC2
1376 KM WEST BASIN, WEST OF US95
1377 BA .0130
1378 PB 2.93
1379 LS 0 92.0
1380 UD 0.107
*

1381 KK WOS01
1382 KM WEST BASIN, OSO BLANCA ROAD
1383 BA .0034
1384 PB 2.93
1385 LS 0 98.0
1386 UD 0.067
*

1

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

1387 KK WGED1A
1388 KM WEST BASIN, WEST OF US95
1389 BA .0444
1390 PB 2.93
1391 LS 0 92.4
1392 UD 0.133
*

1393 KK WC44B
1394 KM W OF OSO BLANCA/US95 INTERSECTION
1395 KM COMBINE CMW35C, WC44A, WGC2, WOS01, WGED1A
1396 HC 5
*

1397 KK NW50-C
1398 KM PROPOSED ULTIMATE CONDITION MPA BASIN
1399 BA .1677
1400 PB 2.92
1401 LS 0 87.8

ULT

1402	UD	0.179	
	*		
1403	KK	WGC1	
1404	KM	WEST BASIN, WEST OF US95	
1405	BA	.0130	
1406	PB	2.93	
1407	LS	0	92.0
1408	UD	0.091	
	*		
1409	KK	WC44C	
1410	HC	2	
	*		
1411	KK	RETC1B	
1412	KM	RETRIEVE FLOW FROM VTN CULVERT 1	
1413	KM	REFERENCED FROM GCW MASTER DRAINAGE STUDY	
1414	DR	DCHD1B	
	*		
1415	KK	EUS95	
1416	KM	EAST BASIN, WEST OF TEE PEE LANE	
1417	BA	.0139	
1418	PB	2.77	
1419	LS	0	98.0
1420	UD	0.066	
	*		
1421	KK	95-4A	
1422	KM	US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN	
1423	BA	.0077	
1424	PB	2.77	
1425	LS	0	92.6
1426	UD	0.083	
	*		

1

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LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1427	KK 95-4B
1428	KM US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1429	BA .0073
1430	PB 2.77
1431	LS 0 92.6
1432	UD 0.082
	*
1433	KK EC1
1434	KM E OF LOG CABIN/US95 INTERSECTION
1435	HC 6
	*
1436	KK ELOG1
1437	KM EAST BASIN, LOG CABIN WAY
1438	BA .0053
1439	PB 2.77
1440	LS 0 98.0
1441	UD 0.071
	*
1442	KK EPRK2
1443	KM EAST BASIN, WEST OF TEE PEE LANE
1444	BA .0025
1445	PB 2.77
1446	LS 0 69.0
1447	UD 0.122
	*
1448	KK EC2
1449	KM W OF LOG CABIN/TEE PEE INTERSECTION
1450	KM COMBINE EC1, ELOG1, EPRK2
1451	HC 3
	*
1452	KK EAA1B
1453	KM EAST BASIN, WEST OF US95
1454	BA .0624
1455	PB 2.93
1456	LS 0 92.0
1457	UD 0.141
	*
1458	KK ETP1B
1459	KM EAST BASIN, TEE PEE LANE
1460	BA .0015
1461	PB 2.77
1462	LS 0 98.0

1

1463 UD 0.063
*
HEC-1 INPUT PAGE 40

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

1464 KK EC3
1465 KM N OF KYLE CANYON/TEE PEE INTERSECTION
1466 KM COMBINE EAA1B, ETP1B
1467 HC 2
*

1468 KK ESKY1
1469 KM EAST BASIN, WEST OF TEE PEE LANE
1470 BA .0053
1471 PB 2.77
1472 LS 0 98.0
1473 UD 0.125
*

1474 KK EPF1
1475 KM EAST BASIN, WEST OF TEE PEE LANE
1476 BA .0067
1477 PB 2.77
1478 LS 0 86.0
1479 UD 0.115
*

1480 KK EC4
1481 KM W OF KYLE CANYON/TEE PEE INTERSECTION
1482 KM COMBINE ESKY1, EPF1
1483 HC 2
*

1484 KK ETP2
1485 KM EAST BASIN, TEE PEE LANE
1486 BA .0018
1487 PB 2.77
1488 LS 0 98.0
1489 UD 0.072
*

1490 KK EMLA1
1491 KM EAST BASIN, WEST OF TEE PEE LANE
1492 BA .0295
1493 PB 2.77
1494 LS 0 92.0
1495 UD 0.105
*

1496 KK EC5
1497 KM N OF LOG CABIN/TEE PEE INTERSECTION
1498 KM COMBINE EC3, EC4, ETP2, EMLA1
1499 HC 4
*

1

HEC-1 INPUT PAGE 41

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

1500 KK EC6
1501 KM E OF LOG CABIN/TEE PEE INTERSECTION
1502 KM COMBINE EC2, EC5
1503 HC 2
*

1504 KK EL1
1505 KM EAST BASIN, WEST OF FORT APACHE
1506 BA .0390
1507 PB 2.77
1508 LS 0 87.0
1509 UD 0.152
*

1510 KK ELOG2
1511 KM EAST BASIN, LOG CABIN
1512 BA .0055
1513 PB 2.77
1514 LS 0 98.0
1515 UD 0.079
*

1516 KK EC7
1517 KM FAR W OF LOG CABIN/FORT APACHE INTERSECTION
1518 KM COMBINE EC7B, EL1, ELOG2
1519 HC 3
*

ULT

1520 KK EL5A
1521 KM EAST BASIN, WEST OF FORT APACHE
1522 BA .0236
1523 PB 2.77
1524 LS 0 87.0
1525 UD 0.130
*

1526 KK ELOG3
1527 KM EAST BASIN, LOG CABIN WAY
1528 BA .0027
1529 PB 2.77
1530 LS 0 98.0
1531 UD 0.079
*

1532 KK EPRK1
1533 KM EAST BASIN, WEST OF TEE PEE LANE
1534 BA .0016
1535 PB 2.77
1536 LS 0 69.0
1537 UD 0.122
*

1

HEC-1 INPUT

PAGE 42

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

1538 KK EC8
1539 KM W OF LOG CABIN/FORT APACHE INTERSECTION
1540 KM COMBINE EC7, EML1A, ELOG3, EPRK1
1541 HC 4
*

1542 KK RETC2B
1543 KM RETRIEVE FLOW FROM VTN CULVERT 2
1544 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
1545 DR DCHD2B
*

1546 KK 95-5A
1547 KM US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1548 BA .0063
1549 PB 2.77
1550 LS 0 92.6
1551 UD 0.075
*

1552 KK 95-5B
1553 KM US95 BASIN BETWEEN LOG CABIN AND IRON MOUNTAIN
1554 BA .0059
1555 PB 2.77
1556 LS 0 92.6
1557 UD 0.073
*

1558 KK 95-6A
1559 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
1560 BA .0104
1561 PB 2.77
1562 LS 0 92.8
1563 UD 0.091
*

1564 KK 95-6B
1565 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
1566 BA .0074
1567 PB 2.77
1568 LS 0 89.5
1569 UD 0.082
*

1570 KK EC9A
1571 HC 5
*

1572 KK EML3A
1573 KM EAST BASIN, WEST OF TEE PEE LANE
1574 BA .0293
1575 PB 2.77
1576 LS 0 94.1
1577 UD 0.128
*

1

HEC-1 INPUT

PAGE 43

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

1578 KK ETP4

ULT

1579 KM EAST BASIN, TEE PEE LANE
 1580 BA .0013
 1581 PB 2.77
 1582 LS 0 98.0
 1583 UD 0.064
 *
 1584 KK EC9B
 1585 KM N OF IRON MT/TEE PEE INTERSECTION
 1586 HC 3
 *
 1587 KK EIRN1
 1588 KM EAST BASIN, IRON MT ROAD
 1589 BA .0016
 1590 PB 2.77
 1591 LS 0 98.0
 1592 UD 0.068
 *
 1593 KK ES1
 1594 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
 1595 BA .0173
 1596 PB 2.77
 1597 LS 0 92.7
 1598 UD 0.109
 *
 1599 KK EC10
 1600 KM N OF IRON MT/FORT APACHE INTERSECTION
 1601 KM COMBINE EC9B, EIRN1, ES1
 1602 HC 3
 *
 1603 KK FTNOR
 1604 KM FLOW SPLIT AT IRON MOUNTAIN/FORT APACHE
 1605 KM DIVERT FLOW EAST IN IRON MOUNTAIN ROAD
 1606 KM MATCH CLV MANS
 1607 DT IREAST
 1608 DI 0 98 235 500
 1609 DQ 0 98 235 235
 *
 1610 KK EL6
 1611 KM EAST BASIN, WEST OF FORT APACHE
 1612 BA .0567
 1613 PB 2.77
 1614 LS 0 87.0
 1615 UD 0.186
 *

1

HEC-1 INPUT

PAGE 44

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

1616 KK EFA4
 1617 KM EAST BASIN, FORT APACHE
 1618 BA .0030
 1619 PB 2.77
 1620 LS 0 98.0
 1621 UD 0.106
 *
 1622 KK EC11
 1623 KM S OF OHARE/FORT APACHE INTERSECTION
 1624 KM COMBINE EC10, EML2, EFA4
 1625 HC 3
 *
 1626 KK EGC1
 1627 KM EAST BASIN, WEST OF TEE PEE LANE
 1628 BA .0412
 1629 PB 2.77
 1630 LS 0 92.0
 1631 UD 0.149
 *
 1632 KK ETP3
 1633 KM EAST BASIN, TEE PEE LANE
 1634 BA .0100
 1635 PB 2.77
 1636 LS 0 90.0
 1637 UD 0.100
 *
 1638 KK EC12
 1639 KM FAR S OF LOG CABIN/TEE PEE INTERSECTION
 1640 KM COMBINE EGC1, ETP3
 1641 HC 2

ULT

*
1642 KK EL3
1643 KM EAST BASIN, WEST OF TEE PEE LANE
1644 BA .0412
1645 PB 2.77
1646 LS 0 87.0
1647 UD 0.170
*

1648 KK EOHR2
1649 KM EAST BASIN, WEST OF TEE PEE LANE
1650 BA .0010
1651 PB 2.77
1652 LS 0 98.0
1653 UD 0.083
*

1

HEC-1 INPUT

PAGE 45

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

1654 KK EPRK3
1655 KM EAST BASIN, WEST OF TEE PEE LANE
1656 BA .0031
1657 PB 2.77
1658 LS 0 69.0
1659 UD 0.125
*

1660 KK EC13
1661 KM S OF OHARE/TEE PEE INTERSECTION
1662 KM COMBINE EC12, EL3, EOHR2, EPRK3
1663 HC 4
*

1664 KK EL4
1665 KM EAST BASIN, WEST OF TEE PEE LANE
1666 BA .0335
1667 PB 2.77
1668 LS 0 87.0
1669 UD 0.142
*

1670 KK EL2
1671 KM EAST BASIN, WEST OF FORT APACHE
1672 BA .0338
1673 PB 2.77
1674 LS 0 87.0
1675 UD 0.119
*

1676 KK EOHR1
1677 KM EAST BASIN, OHARE ROAD
1678 BA .0028
1679 PB 2.77
1680 LS 0 98.0
1681 UD 0.052
*

1682 KK EC14
1683 KM W OF OHARE/FORT APACHE INTERSECTION
1684 KM COMBINE EC13, EL4, EL2, EOHR1
1685 HC 4
*

1686 KK EC15
1687 HC 2
*

1688 KK RFTLC
1689 KM DIVERT FLOW SPLIT INTO O'HARE ROAD
1690 DT OHARE
1691 DI 0 47 5000
1692 DQ 0 47 47
*

1

HEC-1 INPUT

PAGE 46

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

1693 KK EFA3
1694 KM EAST BASIN, FORT APACHE ROAD
1695 BA .0025
1696 PB 2.77
1697 LS 0 98.0
1698 UD 0.104
*

ULT

1699 KK EL5B
 1700 KM EAST BASIN, WEST OF TEE PEE LANE
 1701 BA .0132
 1702 PB 2.77
 1703 LS 0 87.0
 1704 UD 0.120
 *

1705 KK EC16
 1706 KM S OF OHARE/FORT APACHE INTERSECTION
 1707 HC 3
 *

1708 KK R2FTLC
 1709 KM DIVERT FLOW SPLIT INTO LOG CABIN WAY
 1710 DT LOGCAB
 1711 DI 0 187 5000
 1712 DQ 0 187 187
 *

1713 KK EC18
 1714 KM N OF LOG CABIN/FORT APACHE INTERSECTION
 1715 KM COMBINE EC8, EC16
 1716 HC 2
 *

1717 KK EFA2
 1718 KM EAST BASIN, WEST OF TEE PEE LANE
 1719 BA .0017
 1720 PB 2.77
 1721 LS 0 98.0
 1722 UD 0.089
 *

1723 KK EAA2
 1724 KM EAST BASIN, WEST OF FORT APACHE ROAD
 1725 BA .2776
 1726 PB 2.77
 1727 LS 0 92.0
 1728 UD 0.274
 *

1

HEC-1 INPUT

PAGE 47

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

1729 KK EC17
 1730 KM FAR N OF LOG CABIN/FORT APACHE INTERSECTION
 1731 KM COMBINE EFA2, EAA2, EC18
 1732 HC 3
 *

1733 KK OFFZ
 1734 BA .0521
 1735 PB 2.77
 1736 LS 0 87.0
 1737 UD 0.138
 *

1738 KK ESKV1
 1739 KM EAST BASIN, SKYE VILLAGE ROAD
 1740 BA .0018
 1741 PB 2.77
 1742 LS 0 98.0
 1743 UD 0.109
 *

1744 KK EC19
 1745 HC 2
 *

1746 KK EAA1A
 1747 KM EAST BASIN, WEST OF TEE PEE LANE
 1748 BA .1610
 1749 PB 2.77
 1750 LS 0 92.0
 1751 UD 0.193
 *

1752 KK ETP1A
 1753 KM EAST BASIN, TEE PEE LANE
 1754 BA .0046
 1755 PB 2.77
 1756 LS 0 98.0
 1757 UD 0.117
 *

1758 KK EC20
 1759 KM N OF MOCASSIN/TEE PEE INTERSECTION

1760 KM COMBINE EC19, EAA1A, ETP1A
 1761 HC 3
 *
 1762 KK FTAPN
 1763 KM DIVERSION TO MOCCASIN REGIONAL FACILITY LVMO
 1764 DT NATPRK
 1765 DI 0 150 5000
 1766 DQ 0 150 150
 *

HEC-1 INPUT

PAGE 48

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

1767 KK EFA1
 1768 KM EAST BASIN, FORT APACHE
 1769 BA .0028
 1770 PB 2.77
 1771 LS 0 98.0
 1772 UD 0.127
 *

1773 KK EC21
 1774 KM MOCCASIN/FORT APACHE INTERSECTION
 1775 KM COMBINE EC17, EC20, EFA1
 1776 HC 3
 *

1777 KK NW102-C
 1778 BA 0.200
 1779 PB 2.77
 1780 LS 0 94.7
 1781 UD 0.295
 *

1782 KK EC27
 1783 KM W OF MOCCASIN/EL CAPITAN INTERSECTION
 1784 KM COMBINE EC18, NW102-C
 1785 HC 2
 *

1786 KK NW130-W
 1787 BA 0.156
 1788 PB 2.77
 1789 LS 0 82.0
 1790 UD 0.314
 *

1791 KK EC28
 1792 KM COMBINE EC27, NW130-W
 1793 KM DURANGO AND MOCCASIN
 1794 HC 2
 *

1795 KK 95-7A
 1796 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
 1797 BA .0069
 1798 PB 2.77
 1799 LS 0 94.7
 1800 UD 0.073
 *

1801 KK 95-7B
 1802 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
 1803 BA .0081
 1804 PB 2.77
 1805 LS 0 94.7
 1806 UD 0.084
 *

HEC-1 INPUT

PAGE 49

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

1807 KK 95-8A
 1808 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
 1809 BA .0052
 1810 PB 2.77
 1811 LS 0 94.7
 1812 UD 0.061
 *

1813 KK 95-8B
 1814 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
 1815 BA .0031
 1816 PB 2.77
 1817 LS 0 94.7
 1818 UD 0.050

ULT

*
1819 KK C95-8B
1820 KM COMBINE 95-7A, 95-7B, 95-8A, 95-8B
1821 HC 4
*

1822 KK EML3B
1823 KM EAST BASIN, WEST OF TEE PEE LANE
1824 BA .0180
1825 PB 2.93
1826 LS 0 95.0
1827 UD 0.111
*

1828 KK ETP5
1829 KM EAST BASIN, WEST OF TEE PEE LANE
1830 BA .0014
1831 PB 2.93
1832 LS 0 98.0
1833 UD 0.068
*

1834 KK EC22
1835 KM N OF BRENT/TEE PEE INTERSECTION
1836 KM COMBINE C95-8B, EML3B, ETP5
1837 HC 3
*

1838 KK EBRT1
1839 KM EAST BASIN, BRENT LANE
1840 BA .0028
1841 PB 2.93
1842 LS 0 98.0
1843 UD 0.064
*

1

HEC-1 INPUT

PAGE 50

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

1844 KK ES2
1845 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
1846 BA .0491
1847 PB 2.77
1848 LS 0 94.7
1849 UD 0.149
*

1850 KK EC23
1851 KM N OF BRENT LANE/FORT APACHE INTERSECTION
1852 HC 3
*

1853 KK EMLA2
1854 KM EAST BASIN, WEST OF FORT APACHE ROAD
1855 BA .0261
1856 PB 2.93
1857 LS 0 95.0
1858 UD 0.090
*

1859 KK EFA6A
1860 KM EAST BASIN, WEST OF TEE PEE LANE
1861 BA .0039
1862 PB 2.93
1863 LS 0 98.0
1864 UD 0.057
*

1865 KK EC25
1866 KM S OF BRENT/FORT APACHE INTERSECTION
1867 KM COMBINE EMLA2, EFA6A, EC23
1868 HC 3
*

1869 KK SOUTH
1870 KM FLOW SPLIT AT BRENT/FT. APACHE
1871 KM DIVERT STORM DRAIN DESIGN FLOW 70 CFS SOUTH IN FORT APACHE
1872 DT BRENT
1873 DI 0 70 500
1874 DQ 0 0 430
*

1875 KK EML3C
1876 KM EAST BASIN, WEST OF FORT APACHE
1877 BA .0142
1878 PB 2.93
1879 LS 0 95.0

ULT

1880 UD 0.110
*

HEC-1 INPUT

PAGE 51

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

1881 KK EFA6B
1882 KM EAST BASIN, WEST OF FORT APACHE
1883 BA .0070
1884 PB 2.93
1885 LS 0 98.0
1886 UD 0.050
*

1887 KK 95-9B
1888 KM REFERENCED FROM GCW MASTER DRAINAGE STUDY
1889 BA .0133
1890 PB 2.77
1891 LS 0 92.6
1892 UD 0.139
*

1893 KK EC24
1894 KM S OF US95/FORT APACHE INTERSECTION
1895 HC 3
*

1896 KK EPF2
1897 KM EAST BASIN, WEST OF FORT APACHE
1898 BA .0015
1899 PB 2.93
1900 LS 0 84.0
1901 UD 0.072
*

1902 KK EFA5
1903 KM EAST BASIN, WEST OF FORT APACHE
1904 BA .0017
1905 PB 2.93
1906 LS 0 98.0
1907 UD 0.050
*

1908 KK EGC2
1909 KM EAST BASIN, WEST OF FORT APACHE
1910 BA .0050
1911 PB 2.93
1912 LS 0 95.0
1913 UD 0.082
*

1914 KK EC26
1915 KM FAR S OF US95/FORT APACHE INTERSECTION
1916 KM COMBINE SOUTH, EPF2, EFA5, EGC2, EC24
1917 HC 5
*

HEC-1 INPUT

PAGE 52

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

1918 KK HORSE
1919 KM FLOW SPLIT AT HORSE/RACEL
1920 KM DIVERT NWWS 101 CFS SOUTH IN FORT APACHE/RACEL
1921 DT RACEL
1922 DI 0 114 1000
1923 DQ 0 114 114
*
1924 ZZ

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

27 WUS95
*
*
46 -----> DCHD1B
41 DHD01B
*
*
54 -----> DCHD2B
49 DHD02B
*
*
57 WML15A

ULT

63	.	.	WSPD1	.
69	.	WC1.....	.	.
73	.	.	WIRN4	.
79	.	.	.	WMLA1A
85	.	WC2.....	.	.
89	.	.	WGED1B	.
95	.	.	.	WIRN5
101	.	WC3.....	.	.
105	.	.	OFFW	.
110	CHD04B.....	.	.	.
112	.	WPRK7	.	.
118	.	.	WMLA1B	.
124	.	.	.	WMLA2
130	.	.	.	WGRC2
136	.	WC4.....	.	.
140	.	.	WMLA3	.
146	.	WC5.....	.	.
149	CHD05B.....	.	.	.
152	.	WML16	.	.
158	.	.	WSPD3	.
164	.	WC6.....	.	.
168	.	.	WL9A	.
174	.	.	.	WL10A
180	.	.	.	WSCP4
186	.	WC7.....	.	.
190	.	.	WGC3	.
196	.	.	.	WGRC1A
202	.	.	.	WML15B
208	.	.	.	.

WSPD2

214	.	.	.	.	WC8.....	ULT
217	.	.	.	.	WC9.....	
221	.	.	.	.	OFF14	
226	.	.	.	.	CHD06B.....	
229	.	.	.	.	95-9A	
235	.	.	.	.	CHD07B.....	
239	.	.	.	.	OFF15	
245	.	.	.	.	CHD7B2.....	
250	.	.	.	.	OFF17B	
257	.	.	.	.	OFF17A	
264	.	.	.	.	COFF17.....	
270	.	.	.	.	ON1	
276	.	.	.	.	ON4A	
280	.	.	.	.	C1.....	
285	.	.	.	.	----->	DIV1
283	.	.	.	.	D1	
288	.	.	.	.	ON5	
292	.	.	.	.	C2.....	
297	.	.	.	.	----->	DIV1A
295	.	.	.	.	D1A	
300	.	.	.	.	ON4B	
306	.	.	.	.	<-----	DIV1
304	.	.	.	.	RET1	
307	.	.	.	.	ON6	
311	.	.	.	.	C3.....	
316	.	.	.	.	----->	DIV1B
314	.	.	.	.	D1B	
319	.	.	.	.	ON2	
323	.	.	.	.	ON3	
327	.	.	.	.	ON9	
331	.	.	.	.	C4.....	
336	.	.	.	.	----->	DIV2
334	.	.	.	.	D2	

339	.	.	.	.	ULT	ON10
343	.	.	.	.	C5.....	
348	.	.	.	.		
346	.	.	.	.	D3----->	DIV3
351	.	.	.	.		ON11
355	.	.	.	.	C6.....	
360	.	.	.	.		
358	.	.	.	.	D1C----->	DIV1C
363	.	.	.	.	CD1C-----	
367	.	.	.	.	V	
	.	.	.	.	V	
	.	.	.	.	RCD1C	
372	.	.	.	.		
370	.	.	.	.	DRCD1C----->	DOFF23
375	.	.	.	.		ON8
381	.	.	.	.		
379	.	.	.	.	RET2-----<	DIV2
382	.	.	.	.	C7.....	
387	.	.	.	.		
385	.	.	.	.	RET3-----<	DIV3
388	.	.	.	.		ON7
392	.	.	.	.	C8.....	
397	.	.	.	.		
395	.	.	.	.	RET1A-----<	DIV1A
400	.	.	.	.		
398	.	.	.	.	RET1B-----<	DIV1B
403	.	.	.	.		
401	.	.	.	.	RET1C-----<	DIV1C
404	.	.	.	.	C9.....	
408	.	.	.	.		ON2D
414	.	.	.	.		ON5D
418	.	.	.	.	CP1.....	
421	.	.	.	.		ON3D
425	.	.	.	.	CP2.....	
428	.	.	.	.		ON1D
432	.	.	.	.		ON4D
436	.	.	.	.	CP3.....	

439	.	.	.	.	ULT	
	.	.	.	.	CP4.....	
443	.	.	CENGCA.....	.		
448	.	.	.	WML9		
454	.	.	.	.	WPRK5	
460	.	.	.	WC10A.....		
464	.	.	.	.	WEGL1	
470	.	.	.	.	WL4B	
475	.	.	.	WC10B.....		
478	.	.	.	.	WML10	
484	.	.	.	.	WEGN3	
490	.	.	.	.	WML11	
496	.	.	.	WC11.....		
500	.	.	.	WC12.....		
504	.	.	.	.	WL6B	
510	.	.	.	.	WL7	
516	.	.	.	.	WML13	
522	.	.	.	.	WEGL2	
528	.	.	.	WC13.....		
532	.	.	.	.	WML14	
538	.	.	.	.	WL8	
544	.	.	.	.	WSKV3	
550	.	.	.	.	WSKV4	
556	.	.	.	WC14.....		
560	.	.	.	.	WL9B	
566	.	.	.	.	WSPD4	
572	.	.	.	WC15.....		
576	.	.	.	.	WL11	
582	.	.	.	.	WPRK8	
588	.	.	.	.	WPRK9	
594	.	.	.	.	WMTL1	

				ULT	
600	.	.	.	WC16.....	.
	.	.	.	.	.
604	.	.	.	WEGL3	.
	.	.	.	.	.
610	.	.	.	.	WL10B
	.	.	.	.	.
616	.	.	WC17.....	.	.
	.	.	.	.	.
620	.	.	WL12	.	.
	.	.	.	.	.
626	.	.	WGRC1B	.	.
	.	.	.	.	.
632	.	.	WC18.....	.	.
	.	.	.	.	.
636	.	CCP4.....	.	.	.
	.	.	.	.	.
638	.	.	OFF21B	.	.
	.	.	.	.	.
645	.	COF21B.....	.	.	.
	.	.	.	.	.
652	.	.	.	<----- DOFF23	.
649	.	.	ROFF23	.	.
	.	.	.	.	.
653	.	.	.	OFF23	.
	.	.	.	.	.
659	.	.	COFF23.....	.	.
	.	.	.	.	.
663	.	.	.	OFFU	.
	.	.	.	.	.
668	CPCULV.....	.	.	.	.
	.	.	.	.	.
670	.	NW29-C	.	.	.
	.	V	.	.	.
	.	V	.	.	.
676	.	RNW29C	.	.	.
	.	.	.	.	.
683	.	.	NW71-W	.	.
	.	.	.	.	.
689	.	CNW71W.....	.	.	.
	.	V	.	.	.
	.	V	.	.	.
694	.	RCNW71	.	.	.
	.	.	.	.	.
701	.	.	NW71-E	.	.
	.	.	.	.	.
707	.	CNW71E.....	.	.	.
	.	.	.	.	.
712	.	.	WGRT1	.	.
	.	.	.	.	.
718	95STH.....	.	.	.	.
	.	.	.	.	.
722	.	OFF4-1	.	.	.
	.	V	.	.	.
	.	V	.	.	.
728	.	ROFF41	.	.	.
	.	.	.	.	.
733	.	.	OFF4-2	.	.
	.	.	.	.	.
739	.	COFF42.....	.	.	.
	.	V	.	.	.
	.	V	.	.	.
743	.	RCOFF4	.	.	.
	.	.	.	.	.

748	.	.	OFF5-1	
	.	.	.	
754	.	COFF51	.....	
	.	V		
	.	V		
758	.	RCOFF5		
	.	.		
765	.	.	OFF5-2	
	.	.	V	
	.	.	V	
771	.	.	ROFF52	
	.	.	.	
778	.	.	.	NW1-C
	.	.	.	
784	.	.	CNW1-C	.....
	.	.	.	
788	.	2CNW1C	.....	
	.	V		
	.	V		
792	.	R2CNW1		
	.	.		
799	.	.	NW7-C	
	.	.	.	
805	.	CNW-7	.....	
	.	V		
	.	V		
809	.	157DB		
	.	V		
	.	V		
817	.	RCNW7C		
	.	.		
824	.	.	NW21-C	
	.	.	.	
830	.	CNW21C	.....	
	.	V		
	.	V		
833	.	RCNW21		
	.	.		
840	.	.	NW35-C	
	.	.	.	
846	.	.	WPRK10	
	.	.	.	
852	.	CNW35C	.....	
	.	.	.	
855	.	.	WOFF1	
	.	.	.	
861	.	.	WOFF11	
	.	.	.	
867	.	.	.	WOFF2
	.	.	.	.
872	.	.	.	WOFF3
	.	.	.	.
877	.	CP1	.....	
	.	.	.	
880	.	.	WOFF4	
	.	.	.	
885	.	.	WOFF5	
	.	.	.	
890	.	.	.	WOFF6
	.	.	.	.
895	.	.	.	WPF1B
	.	.	.	.
901	.	DB1	.....	
	.	V		
	.	V		
904	.	RDB1		
	.	.		

ULT

				ULT
912	.	.	WSHP3	
	.	.	.	
918	.	.	WPF2	
	.	.	.	
924	.	WC19.....		
	.	.		
928	.	.	WPF5	
	.	.	.	
934	.	.	WML2	
	.	.	.	
940	.	.	WSHA5	
	.	.	.	
946	.	WC20.....		
	.	.		
950	.	.	WARR4	
	.	.	.	
956	.	.	WPF4	
	.	.	.	
961	.	.	WSHA4	
	.	.	.	
966	.	WC21.....		
	.	.		
969	.	.	WPF3	
	.	.	.	
974	.	.	WSHA3A	
	.	.	.	
979	.	WC29.....		
	.	.		
981	.	.	WL4A	
	.	.	.	
987	.	.	WLSA	
	.	.	.	
993	.	.	WLSB	
	.	.	.	
998	.	WC22A.....		
	.	.		
1000	.	.	WPRK4	
	.	.	.	
1006	.	.	WARR5	
	.	.	.	
1012	.	WC22.....		
	.	.		
1015	.	.	WPF6	
	.	.	.	
1021	.	.	WML8	
	.	.	.	
1027	.	DUPWY.....		
	.	.		
1029	.	.	STR5	
	.	.	.	
1035	.	.	WEGN1	
	.	.	.	
1041	.	.	WEGN2	
	.	.	.	
1047	.	WC23.....		
	.	.		
1051	.	.	WARR6	
	.	.	.	
1057	.	.	WPF7	

				ULT
1063		WC24		
1067			WL6A	
1073				STR6
1079				WPRK6
1085		WC26		
1089			2.08b	
1095				SVR1
1101		WC27		
1105			WL1B	
1111				WARR1
1117				WSHP2
1123		WC28		
1127			WSCH2	
1132				WSHA3B
1137			WC30	
1139				WSCP1
1144			WC31	
1146				WML1
1152				STR3
1158				WARR2
1164		CP4		
1166			2.09T	
1172				2.09
1178				2.31
1184		CP3a		
1187			2.08T	
1193				2.08a
1199		CP3b		
1202		WC35		

1206	.	.	.	5.01b	ULT
1212	.	.	.	2.32Tb	
1218	.	.	.	2.32b	
1224	.	.	.	CP2c	
1227	.	.	.	SVR2	
1233	.	.	.	WC37	
1237	.	.	.	WOFF7	
1242	.	.	.	WOFF8	
1247	.	.	.	CP2	
1250	.	.	.	WOFF9	
1255	.	.	.	WOFF10	
1260	.	.	.	WPF1A	
1266	.	.	.	DB2	
1269	.	.	.	V	
1277	.	.	.	RD92	
1283	.	.	.	WPRK1	
1289	.	.	.	WIRN1	
1295	.	.	.	WL1A	
1299	.	.	.	WC38	
1305	.	.	.	WSHP1	
1309	.	.	.	WC39	
1315	.	.	.	WIRN2	
1321	.	.	.	WSCH1	
1327	.	.	.	STR2	
1331	.	.	.	CP1	
1337	.	.	.	5.01	
1343	.	.	.	2.32T	
1346	.	.	.	CP2a	
1352	.	.	.	STR1	
1358	.	.	.	2.32	
	.	.	.	CP2b	

				ULT
1361	.	.	WC43.....	
1365	.	.	.	WSKV1A
1371	.	.	WC44A.....	
1375	.	.	.	WGC2
1381	.	.	.	WOS01
1387	.	.	.	WGED1A
1393	.	.	WC44B.....	
1397	.	.	NW50-C	
1403	.	.	.	WGC1
1409	.	.	WC44C.....	
1414	.	.	.	<----- DCHD1B
1411	.	.	RETC1B	
1415	.	.	.	EUS95
1421	.	.	.	95-4A
1427	.	.	.	95-4B
1433	.	.	EC1.....	
1436	.	.	ELOG1	
1442	.	.	.	EPRK2
1448	.	.	EC2.....	
1452	.	.	EAA1B	
1458	.	.	.	ETP1B
1464	.	.	EC3.....	
1468	.	.	.	ESKY1
1474	.	.	.	EPF1
1480	.	.	EC4.....	
1484	.	.	.	ETP2
1490	.	.	.	ENLA1
1496	.	.	EC5.....	
1500	.	.	EC6.....	
1504	.	.	EL1	

1510	.	.	.	ELOG2	ULT
1516	.	EC7.....	.	.	
1520	.	.	EL5A	.	
1526	.	.	.	ELOG3	
1532	.	.	.	EPRK1	
1538	.	EC8.....	.	.	
1545	.	.	.	.	
1542	.	RETC2B	.	DCHD2B	
1546	.	.	95-5A	.	
1552	.	.	.	95-5B	
1558	.	.	.	95-6A	
1564	.	.	.	.	95-6B
1570	.	EC9A.....	.	.	
1572	.	.	EML3A	.	
1578	.	.	.	ETP4	
1584	.	EC9B.....	.	.	
1587	.	.	EIRN1	.	
1593	.	.	.	ES1	
1599	.	EC10.....	.	.	
1607	.	.	.	IREAST	
1603	.	FTNOR	.	.	
1610	.	.	EL6	.	
1616	.	.	.	EFA4	
1622	.	EC11.....	.	.	
1626	.	.	EGC1	.	
1632	.	.	.	ETP3	
1638	.	.	EC12.....	.	
1642	.	.	.	EL3	
1648	.	.	.	EOHR2	
1654	.	.	.	EPRK3	
1660	.	.	EC13.....	.	

1664	.	.	.	.	EL4	ULT
1670	.	.	.	.	EL2	
1676	.	.	.	.		EOHR1
1682	.	.	.	EC14	.....	
1686	.	.	.	EC15	.....	
1690	.	.	.	----->	OHARE	
1688	.	.	.	RFTLC		
1693	.	.	.	EFA3		
1699	.	.	.		EL5B	
1705	.	.	.	EC16	.....	
1710	.	.	.	----->	LOGCAB	
1708	.	.	.	R2FTLC		
1713	.	.	.	EC18	.....	
1717	.	.	.	EFA2		
1723	.	.	.		EAA2	
1729	.	.	.	EC17	.....	
1733	.	.	.	OFFZ		
1738	.	.	.		ESKV1	
1744	.	.	.	EC19	.....	
1746	.	.	.		EAA1A	
1752	.	.	.		ETP1A	
1758	.	.	.	EC20	.....	
1764	.	.	.	----->	NATPRK	
1762	.	.	.	FTAPN		
1767	.	.	.		EFA1	
1773	.	.	.	EC21	.....	
1777	.	.	.	NW102-		
1782	.	.	.	EC27	.....	
1786	.	.	.	NW130-		
1791	.	.	.	EC28	.....	
1795	.	.	.	95-7A		
1801	.	.	.		95-7B	

ULT

RETURN PERIOD ----- 100-YEAR
DISTRIBUTION ----- 6-HOUR SDN3
PROJECT NO. ----- OLY1609.000
FILENAME ----- ULT3.H1
DATE ----- JANUARY 2018
MODELED BY ----- SMJ, updated by LKL

SIX HOUR DEPTH-AREA REDUCTION FACTORS
DRAINAGE AREA (MI^2) DARF
0.0-0.49 1.00
0.5-0.99 0.98
1.0-1.99 0.97
2.0-3.99 0.93
4.0-5.99 0.91
6.0-7.99 0.90

24 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 2000 NUMBER OF HYDROGRAPH ORDINATES
 NDDATE 7 0 ENDING DATE
 NDTIME 2235 ENDING TIME
 ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 166.58 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
 1.00 .98 .97 .93 .91 .90

*** **

* *
809 KK * 157DB *
* *

812 KO OUTPUT CONTROL VARIABLES
 IPRNT 1 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

811 RS STORAGE ROUTING
 NSTPS 1 NUMBER OF SUBREACHES
 ITYP VOL TYPE OF INITIAL CONDITION
 RSVRIC -1.00 INITIAL CONDITION
 X .00 WORKING R AND D COEFFICIENT

813 SV STORAGE .0 70.0 100.0
814 SE ELEVATION .00 5.00 7.00
815 SQ DISCHARGE 0. 626. 885. 1084. 1252. 1399.
816 SE ELEVATION .00 3.00 4.00 5.00 6.00 7.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE .00 42.00 56.00 70.00 85.00 100.00
OUTFLOW .00 626.00 885.00 1084.00 1252.00 1399.00
ELEVATION .00 3.00 4.00 5.00 6.00 7.00

ULT											
3	0430	631	0.	.0	2992.0	* 5	12051298	0.	.0	2992.0	* 7
3	0435	632	0.	.0	2992.0	* 5	12101299	0.	.0	2992.0	* 7
3	0440	633	0.	.0	2992.0	* 5	12151300	0.	.0	2992.0	* 7
3	0445	634	0.	.0	2992.0	* 5	12201301	0.	.0	2992.0	* 7
3	0450	635	0.	.0	2992.0	* 5	12251302	0.	.0	2992.0	* 7
3	0455	636	0.	.0	2992.0	* 5	12301303	0.	.0	2992.0	* 7
3	0500	637	0.	.0	2992.0	* 5	12351304	0.	.0	2992.0	* 7
3	0505	638	0.	.0	2992.0	* 5	12401305	0.	.0	2992.0	* 7
3	0510	639	0.	.0	2992.0	* 5	12451306	0.	.0	2992.0	* 7
3	0515	640	0.	.0	2992.0	* 5	12501307	0.	.0	2992.0	* 7
3	0520	641	0.	.0	2992.0	* 5	12551308	0.	.0	2992.0	* 7
3	0525	642	0.	.0	2992.0	* 5	13001309	0.	.0	2992.0	* 7
3	0530	643	0.	.0	2992.0	* 5	13051310	0.	.0	2992.0	* 7
3	0535	644	0.	.0	2992.0	* 5	13101311	0.	.0	2992.0	* 7
3	0540	645	0.	.0	2992.0	* 5	13151312	0.	.0	2992.0	* 7
3	0545	646	0.	.0	2992.0	* 5	13201313	0.	.0	2992.0	* 7
3	0550	647	0.	.0	2992.0	* 5	13251314	0.	.0	2992.0	* 7
3	0555	648	0.	.0	2992.0	* 5	13301315	0.	.0	2992.0	* 7
3	0600	649	0.	.0	2992.0	* 5	13351316	0.	.0	2992.0	* 7
3	0605	650	0.	.0	2992.0	* 5	13401317	0.	.0	2992.0	* 7
3	0610	651	0.	.0	2992.0	* 5	13451318	0.	.0	2992.0	* 7
3	0615	652	0.	.0	2992.0	* 5	13501319	0.	.0	2992.0	* 7
3	0620	653	0.	.0	2992.0	* 5	13551320	0.	.0	2992.0	* 7
3	0625	654	0.	.0	2992.0	* 5	14001321	0.	.0	2992.0	* 7
3	0630	655	0.	.0	2992.0	* 5	14051322	0.	.0	2992.0	* 7
3	0635	656	0.	.0	2992.0	* 5	14101323	0.	.0	2992.0	* 7
3	0640	657	0.	.0	2992.0	* 5	14151324	0.	.0	2992.0	* 7
3	0645	658	0.	.0	2992.0	* 5	14201325	0.	.0	2992.0	* 7
3	0650	659	0.	.0	2992.0	* 5	14251326	0.	.0	2992.0	* 7
3	0655	660	0.	.0	2992.0	* 5	14301327	0.	.0	2992.0	* 7
3	0700	661	0.	.0	2992.0	* 5	14351328	0.	.0	2992.0	* 7
3	0705	662	0.	.0	2992.0	* 5	14401329	0.	.0	2992.0	* 7
3	0710	663	0.	.0	2992.0	* 5	14451330	0.	.0	2992.0	* 7
3	0715	664	0.	.0	2992.0	* 5	14501331	0.	.0	2992.0	* 7
3	0720	665	0.	.0	2992.0	* 5	14551332	0.	.0	2992.0	* 7
3	0725	666	0.	.0	2992.0	* 5	15001333	0.	.0	2992.0	* 7
3	0730	667	0.	.0	2992.0	* 5	15051334	0.	.0	2992.0	* 7

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
(CFS)	(HR)	6-HR	24-HR	72-HR	166.58-HR
+	68.	5.25	62.	22.	7.
			1.017	1.467	1.467
			31.	44.	44.
PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
(AC-FT)	(HR)	6-HR	24-HR	72-HR	166.58-HR
+	30.	5.25	22.	6.	2.
					1.
PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
(FEET)	(HR)	6-HR	24-HR	72-HR	166.58-HR
+	3001.32	5.25	2999.11	2994.05	2992.68
					2992.29
CUMULATIVE AREA =		.57 SQ MI			

1

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO PRECIPITATION					
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
				1.00	.98	.97	.93	.91	.90
HYDROGRAPH AT									
+	WUS95	.01	1 FLOW	28.	27.	27.	26.	25.	25.
			TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO									
+	DCHD1B	.01	1 FLOW	25.	25.	24.	23.	23.	23.
			TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	DHD01B	.01	1 FLOW	3.	3.	3.	3.	2.	2.
			TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO									
+	DCHD2B	.01	1 FLOW	3.	3.	3.	3.	2.	2.
			TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	DHD02B	.01	1 FLOW	0.	0.	0.	0.	0.	0.

					TIME	3.50	3.50	ULT 3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	WML15A	.02	1	FLOW	40.	39.	39.	37.	36.	36.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WSPD1	.00	1	FLOW	3.	3.	3.	2.	2.	2.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
2 COMBINED AT											
+	WC1	.02	1	FLOW	43.	42.	42.	40.	39.	38.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WIRN4	.00	1	FLOW	9.	9.	9.	9.	9.	8.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WMLA1A	.01	1	FLOW	20.	20.	20.	19.	18.	18.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
3 COMBINED AT											
+	WC2	.03	1	FLOW	73.	71.	70.	67.	66.	65.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WGED1B	.02	1	FLOW	33.	32.	32.	30.	30.	29.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WIRN5	.00	1	FLOW	3.	3.	3.	3.	3.	3.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
3 COMBINED AT											
+	WC3	.05	1	FLOW	109.	106.	105.	100.	98.	97.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	OFFW	.01	1	FLOW	22.	21.	21.	20.	19.	19.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
3 COMBINED AT											
+	CHD04B	.08	1	FLOW	130.	127.	126.	120.	117.	116.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WPRK7	.00	1	FLOW	6.	6.	6.	5.	5.	5.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT											
+	WMLA1B	.02	1	FLOW	37.	36.	35.	34.	33.	33.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WMLA2	.05	1	FLOW	88.	86.	85.	81.	79.	78.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT											
+	WGRC2	.00	1	FLOW	9.	9.	9.	9.	8.	8.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
4 COMBINED AT											
+	WC4	.08	1	FLOW	135.	132.	131.	125.	122.	120.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT											
+	WMLA3	.02	1	FLOW	35.	34.	34.	32.	32.	31.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
2 COMBINED AT											
+	WC5	.09	1	FLOW	170.	166.	164.	157.	153.	151.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
2 COMBINED AT											
+	CHD05B	.17	1	FLOW	301.	294.	290.	277.	270.	266.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WML16	.03	1	FLOW	64.	63.	62.	59.	58.	57.	
				TIME	3.50	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT											
+	WSPD3	.00	1	FLOW	3.	3.	3.	3.	3.	3.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
2 COMBINED AT											
+	WC6	.04	1	FLOW	68.	66.	65.	62.	61.	60.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	

ULT

HYDROGRAPH AT +	WL9A	.03	1	FLOW TIME	49. 3.58	48. 3.58	47. 3.58	45. 3.58	44. 3.58	43. 3.58
HYDROGRAPH AT +	WL10A	.03	1	FLOW TIME	46. 3.58	45. 3.58	44. 3.58	42. 3.58	41. 3.58	40. 3.58
HYDROGRAPH AT +	WSCP4	.01	1	FLOW TIME	25. 3.50	25. 3.50	25. 3.50	24. 3.50	23. 3.50	23. 3.50
4 COMBINED AT +	WC7	.10	1	FLOW TIME	186. 3.50	181. 3.50	179. 3.50	170. 3.50	166. 3.58	164. 3.58
HYDROGRAPH AT +	WGC3	.05	1	FLOW TIME	95. 3.50	93. 3.50	91. 3.50	87. 3.50	85. 3.50	84. 3.50
HYDROGRAPH AT +	WGRC1A	.00	1	FLOW TIME	4. 3.50	4. 3.50	4. 3.50	4. 3.50	4. 3.50	4. 3.50
HYDROGRAPH AT +	WML15B	.02	1	FLOW TIME	34. 3.50	34. 3.50	33. 3.50	32. 3.50	31. 3.50	31. 3.50
HYDROGRAPH AT +	WSPD2	.00	1	FLOW TIME	3. 3.50	3. 3.50	3. 3.50	3. 3.50	3. 3.50	3. 3.50
2 COMBINED AT +	WC8	.02	1	FLOW TIME	37. 3.50	37. 3.50	36. 3.50	34. 3.50	34. 3.50	33. 3.50
4 COMBINED AT +	WC9	.17	1	FLOW TIME	322. 3.50	314. 3.50	311. 3.50	296. 3.50	288. 3.50	285. 3.50
HYDROGRAPH AT +	OFF14	.01	1	FLOW TIME	26. 3.50	25. 3.50	25. 3.50	24. 3.50	23. 3.50	23. 3.50
3 COMBINED AT +	CHD06B	.36	1	FLOW TIME	648. 3.50	633. 3.50	626. 3.50	596. 3.50	582. 3.50	574. 3.50
HYDROGRAPH AT +	95-9A	.01	1	FLOW TIME	21. 3.50	20. 3.50	20. 3.50	19. 3.50	19. 3.50	18. 3.50
2 COMBINED AT +	CHD07B	.37	1	FLOW TIME	669. 3.50	654. 3.50	646. 3.50	615. 3.50	600. 3.50	592. 3.50
HYDROGRAPH AT +	OFF15	.03	1	FLOW TIME	62. 3.50	61. 3.50	60. 3.50	57. 3.50	56. 3.50	55. 3.50
2 COMBINED AT +	CHD7B2	.40	1	FLOW TIME	731. 3.50	715. 3.50	706. 3.50	673. 3.50	656. 3.50	648. 3.50
HYDROGRAPH AT +	OFF17B	.01	1	FLOW TIME	15. 3.50	15. 3.50	15. 3.50	14. 3.50	14. 3.50	13. 3.50
HYDROGRAPH AT +	OFF17A	.03	1	FLOW TIME	51. 3.50	50. 3.50	49. 3.50	47. 3.50	45. 3.50	45. 3.50
2 COMBINED AT +	COFF17	.04	1	FLOW TIME	66. 3.50	65. 3.50	64. 3.50	61. 3.50	59. 3.50	58. 3.50
HYDROGRAPH AT +	ON1	.00	1	FLOW TIME	8. 3.50	7. 3.50	7. 3.50	7. 3.50	7. 3.50	7. 3.50
HYDROGRAPH AT +	ON4A	.00	1	FLOW TIME	8. 3.50	8. 3.50	8. 3.50	8. 3.50	7. 3.50	7. 3.50
2 COMBINED AT +	C1	.01	1	FLOW TIME	16. 3.50	16. 3.50	15. 3.50	15. 3.50	14. 3.50	14. 3.50

						ULT				
DIVERSION TO										
+	DIV1	.01	1	FLOW	13.	13.	13.	12.	12.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	D1	.01	1	FLOW	3.	3.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ON5	.01	1	FLOW	10.	9.	9.	9.	9.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	C2	.01	1	FLOW	13.	12.	12.	12.	11.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	DIV1A	.01	1	FLOW	13.	12.	12.	12.	11.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	D1A	.01	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	ON4B	.00	1	FLOW	6.	5.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	RET1	.00	1	FLOW	13.	13.	13.	12.	12.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ON6	.00	1	FLOW	7.	7.	7.	7.	7.	6.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	C3	.00	1	FLOW	20.	20.	20.	19.	18.	18.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	DIV1B	.00	1	FLOW	20.	20.	20.	19.	18.	18.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	D1B	.00	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	ON2	.00	1	FLOW	9.	9.	9.	8.	8.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ON3	.01	1	FLOW	12.	12.	11.	11.	10.	10.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ON9	.00	1	FLOW	8.	8.	8.	7.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	C4	.02	1	FLOW	29.	28.	28.	26.	26.	25.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	DIV2	.02	1	FLOW	24.	23.	23.	22.	21.	21.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	D2	.02	1	FLOW	5.	5.	5.	5.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ON10	.00	1	FLOW	5.	5.	5.	4.	4.	4.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	C5	.02	1	FLOW	10.	10.	9.	9.	9.	9.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	DIV3	.02	1	FLOW	8.	8.	8.	7.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	D3	.02	1	FLOW	2.	2.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										

+	ON11	.00	1	FLOW TIME	ULT					
					5.	5.	5.	4.	4.	4.
					3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	C6	.02	1	FLOW TIME	7.	7.	7.	6.	6.	6.
					3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	DIV1C	.02	1	FLOW TIME	7.	7.	7.	6.	6.	6.
					3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	D1C	.02	1	FLOW TIME	0.	0.	0.	0.	0.	0.
					.00	.00	.00	.00	.00	.00
4 COMBINED AT										
+	CD1C	.04	1	FLOW TIME	6.	5.	5.	5.	5.	5.
					3.50	3.50	3.50	3.50	3.50	3.50
ROUTED TO										
+	RCD1C	.04	1	FLOW TIME	5.	5.	5.	5.	5.	4.
					3.67	3.67	3.67	3.75	3.75	3.75
DIVERSION TO										
+	DOFF23	.04	1	FLOW TIME	5.	5.	5.	5.	5.	4.
					3.67	3.67	3.67	3.75	3.75	3.75
HYDROGRAPH AT										
+	DRCD1C	.04	1	FLOW TIME	0.	0.	0.	0.	0.	0.
					.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	ON8	.00	1	FLOW TIME	6.	6.	6.	5.	5.	5.
					3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	RET2	.00	1	FLOW TIME	24.	23.	23.	22.	21.	21.
					3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	C7	.00	1	FLOW TIME	30.	29.	29.	27.	26.	26.
					3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	RET3	.00	1	FLOW TIME	8.	8.	8.	7.	7.	7.
					3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ON7	.01	1	FLOW TIME	14.	13.	13.	12.	12.	12.
					3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	C8	.01	1	FLOW TIME	51.	50.	49.	47.	45.	45.
					3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	RET1A	.00	1	FLOW TIME	13.	12.	12.	12.	11.	11.
					3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	RET1B	.00	1	FLOW TIME	20.	20.	20.	19.	18.	18.
					3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	RET1C	.00	1	FLOW TIME	7.	7.	7.	6.	6.	6.
					3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	C9	.00	1	FLOW TIME	40.	39.	38.	36.	35.	35.
					3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ON2D	.01	1	FLOW TIME	21.	21.	20.	19.	19.	19.
					3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ON5D	.00	1	FLOW TIME	8.	8.	8.	8.	7.	7.
					3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	CP1	.01	1	FLOW TIME	29.	29.	28.	27.	26.	26.
					3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ON3D	.00	1	FLOW TIME	7.	7.	7.	7.	7.	7.
					3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	CP2	.02	1	FLOW	37.	36.	36.	34.	33.	33.

				TIME	3.50	3.50	ULT 3.50	3.50	3.50	3.50
HYDROGRAPH AT +	ON1D	.01	1	FLOW TIME	16. 3.50	15. 3.50	15. 3.50	15. 3.50	14. 3.50	14. 3.50
HYDROGRAPH AT +	ON4D	.00	1	FLOW TIME	8. 3.50	8. 3.50	8. 3.50	8. 3.50	7. 3.50	7. 3.50
2 COMBINED AT +	CP3	.01	1	FLOW TIME	24. 3.50	23. 3.50	23. 3.50	22. 3.50	21. 3.50	21. 3.50
2 COMBINED AT +	CP4	.03	1	FLOW TIME	61. 3.50	59. 3.50	59. 3.50	56. 3.50	55. 3.50	54. 3.50
4 COMBINED AT +	CENGCA	.08	1	FLOW TIME	152. 3.50	148. 3.50	146. 3.50	139. 3.50	135. 3.50	134. 3.50
HYDROGRAPH AT +	WML9	.03	1	FLOW TIME	55. 3.50	54. 3.50	53. 3.50	51. 3.50	50. 3.50	49. 3.50
HYDROGRAPH AT +	WPRK5	.00	1	FLOW TIME	5. 3.50	5. 3.50	5. 3.50	4. 3.50	4. 3.50	4. 3.50
2 COMBINED AT +	WC10A	.03	1	FLOW TIME	60. 3.50	59. 3.50	58. 3.50	55. 3.50	54. 3.50	53. 3.50
HYDROGRAPH AT +	WEG11	.01	1	FLOW TIME	12. 3.50	12. 3.50	11. 3.50	11. 3.50	11. 3.50	11. 3.50
HYDROGRAPH AT +	WL4B	.01	1	FLOW TIME	27. 3.50	26. 3.50	26. 3.50	25. 3.50	24. 3.50	24. 3.50
3 COMBINED AT +	WC10B	.05	1	FLOW TIME	99. 3.50	97. 3.50	95. 3.50	91. 3.50	89. 3.50	88. 3.50
HYDROGRAPH AT +	WML10	.02	1	FLOW TIME	38. 3.50	37. 3.50	37. 3.50	35. 3.50	34. 3.50	34. 3.50
HYDROGRAPH AT +	WEGN3	.01	1	FLOW TIME	10. 3.58	10. 3.58	10. 3.58	9. 3.58	9. 3.58	9. 3.58
HYDROGRAPH AT +	WML11	.04	1	FLOW TIME	81. 3.58	79. 3.58	78. 3.58	74. 3.58	72. 3.58	71. 3.58
3 COMBINED AT +	WC11	.07	1	FLOW TIME	127. 3.50	124. 3.50	123. 3.50	117. 3.50	114. 3.50	112. 3.50
2 COMBINED AT +	WC12	.12	1	FLOW TIME	226. 3.50	221. 3.50	218. 3.50	208. 3.50	202. 3.50	200. 3.50
HYDROGRAPH AT +	WL6B	.02	1	FLOW TIME	30. 3.50	29. 3.50	29. 3.50	28. 3.50	27. 3.50	26. 3.50
HYDROGRAPH AT +	WL7	.02	1	FLOW TIME	34. 3.50	33. 3.50	33. 3.50	31. 3.50	31. 3.50	30. 3.50
HYDROGRAPH AT +	WML13	.03	1	FLOW TIME	49. 3.50	48. 3.50	47. 3.50	45. 3.50	44. 3.50	44. 3.50
HYDROGRAPH AT +	WEG12	.01	1	FLOW TIME	12. 3.50	12. 3.50	12. 3.50	11. 3.50	11. 3.50	11. 3.50
5 COMBINED AT +	WC13	.18	1	FLOW TIME	352. 3.50	343. 3.50	339. 3.50	323. 3.50	315. 3.50	311. 3.50
HYDROGRAPH AT +	WML14	.03	1	FLOW TIME	59. 3.50	57. 3.50	57. 3.50	54. 3.50	53. 3.50	52. 3.50

ULT										
HYDROGRAPH AT										
+	WL8	.03	1	FLOW TIME	48. 3.58	47. 3.58	46. 3.58	44. 3.58	43. 3.58	42. 3.58
HYDROGRAPH AT										
+	WSKV3	.01	1	FLOW TIME	14. 3.50	14. 3.50	13. 3.50	13. 3.50	13. 3.50	12. 3.50
HYDROGRAPH AT										
+	WSKV4	.01	1	FLOW TIME	15. 3.50	15. 3.50	15. 3.50	14. 3.50	14. 3.50	14. 3.50
5 COMBINED AT										
+	WC14	.25	1	FLOW TIME	485. 3.50	474. 3.50	468. 3.50	446. 3.50	435. 3.50	429. 3.50
HYDROGRAPH AT										
+	WL9B	.02	1	FLOW TIME	39. 3.58	38. 3.58	37. 3.58	35. 3.58	34. 3.58	34. 3.58
HYDROGRAPH AT										
+	WSPD4	.00	1	FLOW TIME	8. 3.50	8. 3.50	7. 3.50	7. 3.50	7. 3.50	7. 3.50
2 COMBINED AT										
+	WC15	.03	1	FLOW TIME	46. 3.50	45. 3.50	44. 3.50	42. 3.50	41. 3.50	40. 3.50
HYDROGRAPH AT										
+	WL11	.06	1	FLOW TIME	99. 3.58	96. 3.58	95. 3.58	90. 3.58	88. 3.58	87. 3.58
HYDROGRAPH AT										
+	WPRK8	.00	1	FLOW TIME	4. 3.50	4. 3.50	4. 3.50	4. 3.50	3. 3.50	3. 3.50
HYDROGRAPH AT										
+	WPRK9	.00	1	FLOW TIME	1. 3.50	1. 3.50	1. 3.50	1. 3.50	1. 3.50	1. 3.50
HYDROGRAPH AT										
+	WMTL1	.00	1	FLOW TIME	5. 3.50	5. 3.50	4. 3.50	4. 3.50	4. 3.50	4. 3.50
4 COMBINED AT										
+	WC16	.06	1	FLOW TIME	106. 3.58	103. 3.58	102. 3.58	97. 3.58	94. 3.58	93. 3.58
HYDROGRAPH AT										
+	WEGL3	.01	1	FLOW TIME	16. 3.50	16. 3.50	16. 3.50	15. 3.50	15. 3.50	15. 3.50
HYDROGRAPH AT										
+	WL10B	.03	1	FLOW TIME	49. 3.58	48. 3.58	47. 3.58	45. 3.58	43. 3.58	43. 3.58
5 COMBINED AT										
+	WC17	.38	1	FLOW TIME	695. 3.50	679. 3.50	671. 3.50	638. 3.50	622. 3.50	613. 3.50
HYDROGRAPH AT										
+	WL12	.05	1	FLOW TIME	84. 3.58	82. 3.58	81. 3.58	77. 3.58	75. 3.58	74. 3.58
HYDROGRAPH AT										
+	WGRC1B	.00	1	FLOW TIME	10. 3.58	9. 3.58	9. 3.58	9. 3.58	9. 3.58	9. 3.58
3 COMBINED AT										
+	WC18	.43	1	FLOW TIME	787. 3.50	768. 3.50	759. 3.50	722. 3.50	703. 3.50	694. 3.50
2 COMBINED AT										
+	CCP4	.51	1	FLOW TIME	939. 3.50	917. 3.50	906. 3.50	861. 3.50	838. 3.50	827. 3.50
HYDROGRAPH AT										
+	OFF21B	.04	1	FLOW TIME	75. 3.50	73. 3.50	72. 3.50	69. 3.50	67. 3.50	66. 3.50
2 COMBINED AT										
+	COF21B	.55	1	FLOW TIME	1014. 3.50	990. 3.50	978. 3.50	929. 3.50	905. 3.50	893. 3.50
HYDROGRAPH AT										
+	ROFF23	.00	1	FLOW TIME	5. 3.67	5. 3.67	5. 3.67	5. 3.75	5. 3.75	4. 3.75

ULT									
HYDROGRAPH AT									
+	OFF23	.01	1	FLOW	17.	16.	16.	15.	15.
				TIME	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT									
+	COFF23	.01	1	FLOW	19.	18.	18.	17.	16.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	OFFU	.04	1	FLOW	74.	72.	71.	68.	66.
				TIME	3.58	3.58	3.58	3.58	3.58
5 COMBINED AT									
+	CPCULV	1.05	1	FLOW	1903.	1858.	1836.	1747.	1703.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	NW29-C	.13	1	FLOW	200.	195.	193.	183.	178.
				TIME	3.67	3.67	3.67	3.67	3.67
ROUTED TO									
+	RNW29C	.13	1	FLOW	200.	195.	193.	184.	179.
				TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT									
+	NW71-W	.10	1	FLOW	156.	153.	151.	143.	139.
				TIME	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT									
+	CNW71W	.24	1	FLOW	354.	345.	341.	324.	316.
				TIME	3.67	3.67	3.67	3.67	3.67
ROUTED TO									
+	RCNW71	.24	1	FLOW	354.	344.	341.	322.	315.
				TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT									
+	NW71-E	.24	1	FLOW	259.	252.	249.	234.	227.
				TIME	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT									
+	CNW71E	.47	1	FLOW	610.	593.	585.	552.	537.
				TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT									
+	WGRT1	.02	1	FLOW	30.	30.	29.	28.	27.
				TIME	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT									
+	95STH	1.54	1	FLOW	2370.	2311.	2285.	2170.	2115.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	OFF4-1	.30	1	FLOW	397.	386.	380.	358.	347.
				TIME	3.75	3.75	3.75	3.75	3.75
ROUTED TO									
+	ROFF41	.30	1	FLOW	402.	390.	385.	362.	351.
				TIME	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT									
+	OFF4-2	.42	1	FLOW	682.	662.	652.	613.	594.
				TIME	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT									
+	COFF42	.72	1	FLOW	871.	844.	830.	777.	751.
				TIME	3.58	3.58	3.58	3.58	3.58
ROUTED TO									
+	RCOFF4	.72	1	FLOW	866.	841.	824.	772.	749.
				TIME	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT									
+	OFF5-1	.30	1	FLOW	375.	364.	358.	335.	324.
				TIME	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT									
+	COFF51	1.02	1	FLOW	1241.	1205.	1182.	1108.	1074.
				TIME	3.67	3.67	3.67	3.67	3.67
ROUTED TO									
+	RCOFF5	1.02	1	FLOW	1206.	1167.	1151.	1078.	1043.
				TIME	3.67	3.67	3.67	3.75	3.67
HYDROGRAPH AT									
+	OFF5-2	.40	1	FLOW	467.	454.	447.	421.	408.
				TIME	3.75	3.75	3.75	3.75	3.75
ROUTED TO									

+	ROFF52	.40	1	FLOW TIME	462. 3.75	449. 3.75	441. 3.75	415. 3.75	402. 3.75	396. 3.75
+	HYDROGRAPH AT NW1-C	.29	1	FLOW TIME	327. 3.67	317. 3.67	312. 3.67	291. 3.67	281. 3.67	276. 3.67
+	2 COMBINED AT CNW1-C	.69	1	FLOW TIME	780. 3.75	757. 3.75	746. 3.75	700. 3.75	677. 3.75	666. 3.75
+	2 COMBINED AT 2CNW1C	1.70	1	FLOW TIME	1985. 3.75	1914. 3.75	1895. 3.75	1778. 3.75	1716. 3.75	1691. 3.75
+	ROUTED TO R2CNW1	1.70	1	FLOW TIME	1975. 3.75	1904. 3.75	1886. 3.75	1766. 3.75	1706. 3.75	1676. 3.75
+	HYDROGRAPH AT NW7-C	.49	1	FLOW TIME	500. 3.83	486. 3.83	479. 3.83	450. 3.83	436. 3.83	429. 3.83
+	2 COMBINED AT CNW-7	2.19	1	FLOW TIME	2473. 3.75	2388. 3.75	2363. 3.75	2213. 3.75	2140. 3.75	2103. 3.75
+	ROUTED TO 157DB	2.19	1	FLOW TIME	1191. 4.17	1162. 4.17	1148. 4.17	1093. 4.17	1061. 4.17	1044. 4.17
			1	** PEAK STAGES IN FEET ** STAGE TIME	5.64 4.17	5.46 4.17	5.38 4.17	5.05 4.17	4.89 4.17	4.80 4.17
+	ROUTED TO RCNW7C	2.19	1	FLOW TIME	1188. 4.17	1159. 4.17	1146. 4.17	1090. 4.17	1058. 4.17	1042. 4.17
+	HYDROGRAPH AT NW21-C	.16	1	FLOW TIME	242. 3.58	236. 3.58	233. 3.58	221. 3.58	215. 3.58	212. 3.58
+	2 COMBINED AT CNW21C	2.35	1	FLOW TIME	1242. 4.17	1212. 4.17	1197. 4.17	1139. 4.17	1106. 4.17	1089. 4.17
+	ROUTED TO RCNW21	2.35	1	FLOW TIME	1241. 4.17	1211. 4.17	1198. 4.17	1139. 4.17	1107. 4.17	1087. 4.17
+	HYDROGRAPH AT NW35-C	.34	1	FLOW TIME	423. 3.75	413. 3.75	407. 3.75	385. 3.75	374. 3.75	369. 3.75
+	HYDROGRAPH AT WPRK10	.02	1	FLOW TIME	19. 3.58	18. 3.58	18. 3.58	17. 3.58	16. 3.58	16. 3.58
+	3 COMBINED AT CNW35C	2.71	1	FLOW TIME	1461. 4.00	1422. 4.00	1407. 4.00	1324. 4.00	1284. 4.00	1261. 4.00
+	HYDROGRAPH AT WOFF1	.41	1	FLOW TIME	403. 3.75	391. 3.75	385. 3.75	361. 3.75	349. 3.83	343. 3.83
+	HYDROGRAPH AT WOFF11	.03	1	FLOW TIME	55. 3.50	54. 3.50	53. 3.50	51. 3.50	50. 3.50	49. 3.50
+	HYDROGRAPH AT WOFF2	.04	1	FLOW TIME	48. 3.58	47. 3.58	46. 3.58	43. 3.58	42. 3.58	41. 3.58
+	HYDROGRAPH AT WOFF3	.03	1	FLOW TIME	38. 3.58	37. 3.58	36. 3.58	34. 3.58	33. 3.58	33. 3.58
+	4 COMBINED AT CP1	.50	1	FLOW TIME	485. 3.75	471. 3.75	464. 3.75	435. 3.75	421. 3.75	415. 3.75
+	HYDROGRAPH AT WOFF4	.06	1	FLOW TIME	84. 3.58	82. 3.58	81. 3.58	76. 3.58	73. 3.58	72. 3.58
+	HYDROGRAPH AT WOFF5	.26	1	FLOW	236.	229.	226.	212.	205.	201.

					TIME	3.83	3.83	ULT 3.83	3.83	3.83	3.83
HYDROGRAPH AT											
+	WOFF6	.04	1	FLOW	59.	57.	56.	53.	51.	50.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT											
+	WPF1B	.03	1	FLOW	63.	62.	61.	58.	57.	56.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
5 COMBINED AT											
+	DB1	.88	1	FLOW	817.	793.	781.	734.	710.	699.	
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	
ROUTED TO											
+	RDB1	.88	1	FLOW	71.	71.	71.	69.	69.	68.	
				TIME	5.58	5.58	5.58	5.50	5.50	5.50	
** PEAK STAGES IN FEET **											
			1	STAGE	3035.31	3035.02	3034.86	3034.24	3033.93	3033.78	
				TIME	5.58	5.58	5.58	5.50	5.50	5.50	
HYDROGRAPH AT											
+	WSHP3	.02	1	FLOW	31.	30.	30.	29.	28.	28.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WPF2	.00	1	FLOW	10.	10.	10.	10.	9.	9.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
3 COMBINED AT											
+	WC19	.90	1	FLOW	95.	94.	93.	91.	90.	89.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WPF5	.00	1	FLOW	1.	1.	1.	1.	1.	1.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WML2	.04	1	FLOW	78.	76.	75.	72.	70.	69.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT											
+	WSHA5	.00	1	FLOW	8.	8.	8.	8.	8.	7.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
3 COMBINED AT											
+	WC20	.05	1	FLOW	86.	84.	83.	79.	77.	76.	
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	
HYDROGRAPH AT											
+	WARR4	.00	1	FLOW	3.	3.	3.	3.	3.	3.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WPF4	.01	1	FLOW	19.	18.	18.	17.	17.	17.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WSHA4	.00	1	FLOW	6.	5.	5.	5.	5.	5.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
5 COMBINED AT											
+	WC21	.96	1	FLOW	204.	201.	199.	191.	188.	186.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WPF3	.01	1	FLOW	17.	17.	16.	16.	15.	15.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WSHA3A	.00	1	FLOW	3.	2.	2.	2.	2.	2.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
2 COMBINED AT											
+	WC29	.01	1	FLOW	19.	19.	19.	18.	18.	17.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WL4A	.01	1	FLOW	23.	22.	22.	21.	20.	20.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WLSA	.02	1	FLOW	32.	31.	31.	29.	28.	28.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	
HYDROGRAPH AT											
+	WLSB	.01	1	FLOW	12.	11.	11.	11.	10.	10.	
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	

ULT

3 COMBINED AT										
+	WC22A	.04	1	FLOW TIME	67. 3.50	65. 3.50	64. 3.50	61. 3.50	59. 3.50	58. 3.50
HYDROGRAPH AT										
+	WPRK4	.00	1	FLOW TIME	3. 3.50	2. 3.50	2. 3.50	2. 3.50	2. 3.50	2. 3.50
HYDROGRAPH AT										
+	WARR5	.01	1	FLOW TIME	18. 3.50	17. 3.50	17. 3.50	16. 3.50	15. 3.50	15. 3.50
5 COMBINED AT										
+	WC22	1.02	1	FLOW TIME	310. 3.50	304. 3.50	301. 3.50	288. 3.50	282. 3.50	279. 3.50
HYDROGRAPH AT										
+	WPF6	.00	1	FLOW TIME	4. 3.50	4. 3.50	4. 3.50	3. 3.50	3. 3.50	3. 3.50
HYDROGRAPH AT										
+	WML8	.02	1	FLOW TIME	34. 3.50	33. 3.50	32. 3.50	31. 3.50	30. 3.50	30. 3.50
3 COMBINED AT										
+	DUNWY	1.04	1	FLOW TIME	348. 3.50	340. 3.50	337. 3.50	323. 3.50	316. 3.50	312. 3.50
HYDROGRAPH AT										
+	STR5	.00	1	FLOW TIME	10. 3.50	9. 3.50	9. 3.50	9. 3.50	9. 3.50	9. 3.50
HYDROGRAPH AT										
+	WEGN1	.00	1	FLOW TIME	2. 3.50	2. 3.50	2. 3.50	2. 3.50	2. 3.50	2. 3.50
HYDROGRAPH AT										
+	WEGN2	.00	1	FLOW TIME	2. 3.50	2. 3.50	2. 3.50	2. 3.50	2. 3.50	2. 3.50
4 COMBINED AT										
+	WC23	1.04	1	FLOW TIME	361. 3.50	353. 3.50	350. 3.50	335. 3.50	328. 3.50	324. 3.50
HYDROGRAPH AT										
+	WARR6	.00	1	FLOW TIME	6. 3.50	6. 3.50	6. 3.50	6. 3.50	5. 3.50	5. 3.50
HYDROGRAPH AT										
+	WPF7	.01	1	FLOW TIME	14. 3.50	14. 3.50	14. 3.50	13. 3.50	13. 3.50	13. 3.50
3 COMBINED AT										
+	WC24	1.05	1	FLOW TIME	381. 3.50	373. 3.50	369. 3.50	354. 3.50	346. 3.50	342. 3.50
HYDROGRAPH AT										
+	WL6A	.01	1	FLOW TIME	19. 3.50	18. 3.50	18. 3.50	17. 3.50	16. 3.50	16. 3.50
HYDROGRAPH AT										
+	STR6	.01	1	FLOW TIME	19. 3.50	19. 3.50	18. 3.50	18. 3.50	17. 3.50	17. 3.50
HYDROGRAPH AT										
+	WPRK6	.02	1	FLOW TIME	28. 3.58	27. 3.58	27. 3.58	25. 3.58	24. 3.58	24. 3.58
4 COMBINED AT										
+	WC26	1.09	1	FLOW TIME	445. 3.50	435. 3.50	430. 3.50	411. 3.50	402. 3.50	397. 3.50
HYDROGRAPH AT										
+	2.08b	.03	1	FLOW TIME	61. 3.50	59. 3.50	59. 3.50	56. 3.50	54. 3.50	54. 3.50
HYDROGRAPH AT										
+	SVR1	.00	1	FLOW TIME	10. 3.50	10. 3.50	10. 3.50	9. 3.50	9. 3.50	9. 3.50
3 COMBINED AT										
+	WC27	1.13	1	FLOW TIME	515. 3.50	504. 3.50	499. 3.50	476. 3.50	465. 3.50	460. 3.50
HYDROGRAPH AT										
+	WL1B	.04	1	FLOW TIME	79. 3.50	77. 3.50	76. 3.50	72. 3.50	70. 3.50	69. 3.50

ULT									
HYDROGRAPH AT									
+	WARR1	.01	1	FLOW	9.	9.	9.	8.	8.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	WSHP2	.01	1	FLOW	27.	26.	26.	25.	24.
				TIME	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT									
+	WC28	.06	1	FLOW	113.	110.	109.	103.	100.
				TIME	3.50	3.50	3.50	3.58	3.58
HYDROGRAPH AT									
+	WSCH2	.02	1	FLOW	37.	36.	35.	33.	32.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	WSHA3B	.00	1	FLOW	6.	6.	6.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT									
+	WC30	.02	1	FLOW	42.	41.	41.	39.	38.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	WSCP1	.00	1	FLOW	6.	6.	6.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT									
+	WC31	.02	1	FLOW	48.	47.	46.	44.	43.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	WHL1	.03	1	FLOW	52.	51.	50.	48.	46.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	STR3	.00	1	FLOW	9.	9.	9.	9.	8.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	WARR2	.00	1	FLOW	7.	7.	7.	6.	6.
				TIME	3.50	3.50	3.50	3.50	3.50
5 COMBINED AT									
+	CP4	.12	1	FLOW	230.	224.	221.	210.	205.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	2.09T	.00	1	FLOW	3.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	2.09	.05	1	FLOW	81.	79.	78.	74.	72.
				TIME	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT									
+	2.31	.00	1	FLOW	8.	7.	7.	7.	7.
				TIME	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT									
+	CP3a	.18	1	FLOW	318.	310.	306.	290.	282.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	2.08T	.00	1	FLOW	3.	3.	3.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	2.08a	.02	1	FLOW	49.	48.	48.	45.	44.
				TIME	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT									
+	CP3b	.20	1	FLOW	369.	360.	356.	338.	329.
				TIME	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT									
+	WC35	1.33	1	FLOW	885.	864.	854.	814.	794.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	5.01b	.03	1	FLOW	68.	67.	66.	63.	61.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									
+	2.32Tb	.00	1	FLOW	1.	1.	1.	1.	1.
				TIME	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT									

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+	2.32b	.04	1	FLOW TIME	74. 3.58	72. 3.58	71. 3.58	68. 3.58	67. 3.58	66. 3.58
3 COMBINED AT										
+	CP2c	.07	1	FLOW TIME	141. 3.50	137. 3.50	136. 3.50	130. 3.50	126. 3.50	125. 3.50
HYDROGRAPH AT										
+	SVR2	.01	1	FLOW TIME	20. 3.58	19. 3.58	19. 3.58	18. 3.58	18. 3.58	18. 3.58
3 COMBINED AT										
+	WC37	1.41	1	FLOW TIME	1043. 3.50	1019. 3.50	1007. 3.50	960. 3.50	936. 3.50	924. 3.50
HYDROGRAPH AT										
+	WOFF7	.01	1	FLOW TIME	10. 3.50	10. 3.50	10. 3.50	9. 3.50	9. 3.50	9. 3.50
HYDROGRAPH AT										
+	WOFF8	.17	1	FLOW TIME	198. 3.67	192. 3.67	189. 3.67	177. 3.67	171. 3.67	169. 3.67
2 COMBINED AT										
+	CP2	.17	1	FLOW TIME	204. 3.67	198. 3.67	195. 3.67	183. 3.67	177. 3.67	174. 3.67
HYDROGRAPH AT										
+	WOFF9	.12	1	FLOW TIME	144. 3.58	140. 3.58	138. 3.58	129. 3.67	125. 3.67	123. 3.67
HYDROGRAPH AT										
+	WOFF10	.25	1	FLOW TIME	292. 3.67	283. 3.67	279. 3.67	262. 3.67	253. 3.67	249. 3.67
HYDROGRAPH AT										
+	WPF1A	.03	1	FLOW TIME	59. 3.58	57. 3.58	57. 3.58	54. 3.58	53. 3.58	52. 3.58
4 COMBINED AT										
+	DB2	.57	1	FLOW TIME	686. 3.67	667. 3.67	657. 3.67	617. 3.67	597. 3.67	588. 3.67
ROUTED TO										
+	RDB2	.57	1	FLOW TIME	71. 5.25	70. 5.25	70. 5.25	68. 5.25	68. 5.25	68. 5.25
** PEAK STAGES IN FEET **										
			1	STAGE TIME	3002.75 5.25	3002.46 5.25	3002.32 5.25	3001.75 5.25	3001.46 5.25	3001.32 5.25
HYDROGRAPH AT										
+	WPRK1	.00	1	FLOW TIME	6. 3.50	6. 3.50	6. 3.50	5. 3.50	5. 3.50	5. 3.50
HYDROGRAPH AT										
+	WIRN1	.00	1	FLOW TIME	2. 3.50	2. 3.50	2. 3.50	2. 3.50	2. 3.50	2. 3.50
HYDROGRAPH AT										
+	WL1A	.05	1	FLOW TIME	81. 3.58	80. 3.58	79. 3.58	75. 3.58	73. 3.58	72. 3.58
4 COMBINED AT										
+	WC38	.62	1	FLOW TIME	141. 3.58	139. 3.58	137. 3.58	132. 3.58	130. 3.58	129. 3.58
HYDROGRAPH AT										
+	WSHP1	.01	1	FLOW TIME	19. 3.58	18. 3.58	18. 3.58	17. 3.58	17. 3.58	17. 3.58
2 COMBINED AT										
+	WC39	.63	1	FLOW TIME	160. 3.58	157. 3.58	155. 3.58	150. 3.58	147. 3.58	145. 3.58
HYDROGRAPH AT										
+	WIRN2	.00	1	FLOW TIME	7. 3.50	7. 3.50	7. 3.50	7. 3.50	7. 3.50	7. 3.50
HYDROGRAPH AT										
+	WSCH1	.06	1	FLOW TIME	106. 3.58	103. 3.58	102. 3.58	97. 3.58	94. 3.58	93. 3.58
HYDROGRAPH AT										
+	STR2	.01	1	FLOW TIME	13. 3.50	13. 3.50	13. 3.50	12. 3.50	12. 3.50	12. 3.50
4 COMBINED AT										
+	CP1	.70	1	FLOW	284.	279.	276.	264.	258.	255.

				TIME	3.58	3.58	ULT 3.58	3.58	3.58	3.58
HYDROGRAPH AT +	5.01	.03	1	FLOW TIME	64. 3.50	63. 3.50	62. 3.50	59. 3.50	58. 3.50	57. 3.50
HYDROGRAPH AT +	2.32T	.00	1	FLOW TIME	1. 3.50	1. 3.50	1. 3.50	1. 3.50	1. 3.50	1. 3.50
3 COMBINED AT +	CP2a	.73	1	FLOW TIME	340. 3.50	332. 3.50	329. 3.50	314. 3.50	307. 3.50	303. 3.50
HYDROGRAPH AT +	STR1	.01	1	FLOW TIME	12. 3.50	12. 3.50	12. 3.50	11. 3.50	11. 3.50	11. 3.50
HYDROGRAPH AT +	2.32	.03	1	FLOW TIME	62. 3.50	60. 3.50	60. 3.50	57. 3.50	55. 3.50	55. 3.50
3 COMBINED AT +	CP2b	.77	1	FLOW TIME	414. 3.50	405. 3.50	400. 3.50	382. 3.50	373. 3.50	369. 3.50
2 COMBINED AT +	WC43	2.18	1	FLOW TIME	1456. 3.50	1424. 3.50	1407. 3.50	1342. 3.50	1309. 3.50	1293. 3.50
HYDROGRAPH AT +	WSKV1A	.00	1	FLOW TIME	5. 3.50	5. 3.50	4. 3.50	4. 3.50	4. 3.50	4. 3.50
2 COMBINED AT +	WC44A	2.18	1	FLOW TIME	1461. 3.50	1428. 3.50	1412. 3.50	1346. 3.50	1313. 3.50	1297. 3.50
HYDROGRAPH AT +	WGC2	.01	1	FLOW TIME	23. 3.50	22. 3.50	22. 3.50	21. 3.50	20. 3.50	20. 3.50
HYDROGRAPH AT +	WOS01	.00	1	FLOW TIME	8. 3.50	8. 3.50	8. 3.50	7. 3.50	7. 3.50	7. 3.50
HYDROGRAPH AT +	WGED1A	.04	1	FLOW TIME	77. 3.58	75. 3.58	74. 3.58	71. 3.58	69. 3.58	68. 3.58
5 COMBINED AT +	WC44B	4.95	1	FLOW TIME	2400. 3.58	2338. 3.58	2306. 3.58	2180. 3.58	2118. 3.58	2087. 3.58
HYDROGRAPH AT +	NW50-C	.17	1	FLOW TIME	228. 3.58	222. 3.58	218. 3.58	205. 3.58	199. 3.58	196. 3.58
HYDROGRAPH AT +	WGC1	.01	1	FLOW TIME	24. 3.50	24. 3.50	24. 3.50	22. 3.50	22. 3.50	21. 3.50
2 COMBINED AT +	WC44C	.18	1	FLOW TIME	250. 3.58	243. 3.58	239. 3.58	225. 3.58	218. 3.58	215. 3.58
HYDROGRAPH AT +	RETC1B	.00	1	FLOW TIME	25. 3.50	25. 3.50	24. 3.50	23. 3.50	23. 3.50	23. 3.50
HYDROGRAPH AT +	EUS95	.01	1	FLOW TIME	31. 3.50	30. 3.50	30. 3.50	28. 3.50	28. 3.50	28. 3.50
HYDROGRAPH AT +	95-4A	.01	1	FLOW TIME	14. 3.50	14. 3.50	14. 3.50	13. 3.50	13. 3.50	12. 3.50
HYDROGRAPH AT +	95-4B	.01	1	FLOW TIME	13. 3.50	13. 3.50	13. 3.50	12. 3.50	12. 3.50	12. 3.50
6 COMBINED AT +	EC1	5.16	1	FLOW TIME	2714. 3.58	2644. 3.58	2607. 3.58	2464. 3.58	2394. 3.58	2359. 3.58
HYDROGRAPH AT +	ELOG1	.01	1	FLOW TIME	11. 3.50	11. 3.50	11. 3.50	11. 3.50	10. 3.50	10. 3.50

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HYDROGRAPH AT +	EPRK2	.00	1	FLOW TIME	1. 3.58	1. 3.58	1. 3.58	1. 3.58	1. 3.58	1. 3.58
3 COMBINED AT +	EC2	5.17	1	FLOW TIME	2724. 3.58	2653. 3.58	2616. 3.58	2473. 3.58	2402. 3.58	2367. 3.58
HYDROGRAPH AT +	EAA1B	.06	1	FLOW TIME	106. 3.58	104. 3.58	102. 3.58	97. 3.58	95. 3.58	93. 3.58
HYDROGRAPH AT +	ETP1B	.00	1	FLOW TIME	3. 3.50	3. 3.50	3. 3.50	3. 3.50	3. 3.50	3. 3.50
2 COMBINED AT +	EC3	.06	1	FLOW TIME	109. 3.58	106. 3.58	105. 3.58	99. 3.58	97. 3.58	95. 3.58
HYDROGRAPH AT +	ESKY1	.01	1	FLOW TIME	10. 3.58	10. 3.58	10. 3.58	9. 3.58	9. 3.58	9. 3.58
HYDROGRAPH AT +	EPF1	.01	1	FLOW TIME	9. 3.58	8. 3.58	8. 3.58	8. 3.58	8. 3.58	7. 3.58
2 COMBINED AT +	EC4	.01	1	FLOW TIME	19. 3.58	18. 3.58	18. 3.58	17. 3.58	16. 3.58	16. 3.58
HYDROGRAPH AT +	ETP2	.00	1	FLOW TIME	4. 3.50	4. 3.50	4. 3.50	4. 3.50	4. 3.50	3. 3.50
HYDROGRAPH AT +	EMLA1	.03	1	FLOW TIME	49. 3.50	48. 3.50	47. 3.50	45. 3.50	44. 3.50	43. 3.50
4 COMBINED AT +	EC5	.11	1	FLOW TIME	177. 3.58	173. 3.58	170. 3.58	162. 3.58	158. 3.58	155. 3.58
2 COMBINED AT +	EC6	5.27	1	FLOW TIME	2901. 3.58	2826. 3.58	2787. 3.58	2635. 3.58	2560. 3.58	2523. 3.58
HYDROGRAPH AT +	EL1	.04	1	FLOW TIME	51. 3.58	49. 3.58	48. 3.58	45. 3.58	44. 3.58	43. 3.58
HYDROGRAPH AT +	ELOG2	.01	1	FLOW TIME	12. 3.50	11. 3.50	11. 3.50	11. 3.50	11. 3.50	10. 3.50
3 COMBINED AT +	EC7	5.32	1	FLOW TIME	2961. 3.58	2884. 3.58	2844. 3.58	2689. 3.58	2612. 3.58	2574. 3.58
HYDROGRAPH AT +	EL5A	.02	1	FLOW TIME	32. 3.58	31. 3.58	30. 3.58	28. 3.58	28. 3.58	27. 3.58
HYDROGRAPH AT +	ELOG3	.00	1	FLOW TIME	6. 3.50	6. 3.50	6. 3.50	5. 3.50	5. 3.50	5. 3.50
HYDROGRAPH AT +	EPRK1	.00	1	FLOW TIME	1. 3.58	1. 3.58	1. 3.58	1. 3.58	1. 3.58	1. 3.58
4 COMBINED AT +	EC8	5.35	1	FLOW TIME	2997. 3.58	2920. 3.58	2879. 3.58	2722. 3.58	2644. 3.58	2606. 3.58
HYDROGRAPH AT +	RETC2B	.00	1	FLOW TIME	3. 3.50	3. 3.50	3. 3.50	3. 3.50	2. 3.50	2. 3.50
HYDROGRAPH AT +	95-5A	.01	1	FLOW TIME	12. 3.50	12. 3.50	11. 3.50	11. 3.50	11. 3.50	10. 3.50
HYDROGRAPH AT +	95-5B	.01	1	FLOW TIME	11. 3.50	11. 3.50	11. 3.50	10. 3.50	10. 3.50	10. 3.50

ULT										
HYDROGRAPH AT										
+	95-6A	.01	1	FLOW	19.	18.	18.	17.	17.	16.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	95-6B	.01	1	FLOW	12.	12.	12.	11.	11.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
5 COMBINED AT										
+	EC9A	.03	1	FLOW	57.	55.	55.	52.	51.	50.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EML3A	.03	1	FLOW	50.	49.	48.	46.	45.	44.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ETP4	.00	1	FLOW	3.	3.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC9B	.06	1	FLOW	108.	105.	104.	99.	96.	95.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EIRN1	.00	1	FLOW	4.	3.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	ES1	.02	1	FLOW	29.	28.	28.	27.	26.	25.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC10	.08	1	FLOW	140.	137.	135.	129.	125.	124.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO										
+	IREAST	.08	1	FLOW	140.	137.	135.	129.	125.	124.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	FTNOR	.08	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	EL6	.06	1	FLOW	68.	66.	65.	61.	59.	58.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EFA4	.00	1	FLOW	6.	6.	6.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	EC11	.14	1	FLOW	73.	71.	70.	66.	64.	63.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EGC1	.04	1	FLOW	65.	63.	62.	59.	58.	57.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	ETP3	.01	1	FLOW	16.	15.	15.	14.	14.	14.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	EC12	.05	1	FLOW	80.	78.	77.	73.	71.	70.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EL3	.04	1	FLOW	51.	50.	49.	46.	45.	44.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EOHR2	.00	1	FLOW	2.	2.	2.	2.	2.	2.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	EPRK3	.00	1	FLOW	2.	1.	1.	1.	1.	1.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
4 COMBINED AT										
+	EC13	.10	1	FLOW	134.	131.	129.	122.	118.	116.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	EL4	.03	1	FLOW	44.	43.	42.	40.	38.	38.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										

+	EL2	.03	1	FLOW TIME	46. 3.58	44. 3.58	44. 3.58	41. 3.58	40. 3.58	39. 3.58
HYDROGRAPH AT										
+	EOHR1	.00	1	FLOW TIME	6. 3.50	6. 3.50	6. 3.50	6. 3.50	6. 3.50	6. 3.50
4 COMBINED AT										
+	EC14	.17	1	FLOW TIME	228. 3.58	221. 3.58	218. 3.58	206. 3.58	199. 3.58	196. 3.58
2 COMBINED AT										
+	EC15	.31	1	FLOW TIME	301. 3.58	293. 3.58	288. 3.58	271. 3.58	263. 3.58	259. 3.58
DIVERSION TO										
+	OHARE	.31	1	FLOW TIME	47. 3.25	47. 3.25	47. 3.25	47. 3.25	47. 3.25	47. 3.25
HYDROGRAPH AT										
+	RFTLC	.31	1	FLOW TIME	254. 3.58	246. 3.58	241. 3.58	224. 3.58	216. 3.58	212. 3.58
HYDROGRAPH AT										
+	EFA3	.00	1	FLOW TIME	5. 3.50	5. 3.50	5. 3.50	5. 3.50	4. 3.50	4. 3.50
HYDROGRAPH AT										
+	EL58	.01	1	FLOW TIME	18. 3.58	17. 3.58	17. 3.58	16. 3.58	15. 3.58	15. 3.58
3 COMBINED AT										
+	EC16	.32	1	FLOW TIME	276. 3.58	267. 3.58	263. 3.58	245. 3.58	236. 3.58	231. 3.58
DIVERSION TO										
+	LOGCAB	.32	1	FLOW TIME	187. 3.50	187. 3.50	187. 3.50	187. 3.50	187. 3.50	187. 3.50
HYDROGRAPH AT										
+	R2FTLC	.32	1	FLOW TIME	89. 3.58	80. 3.58	76. 3.58	58. 3.58	49. 3.58	44. 3.58
2 COMBINED AT										
+	EC18	5.67	1	FLOW TIME	3087. 3.58	3000. 3.58	2955. 3.58	2780. 3.58	2693. 3.58	2650. 3.58
HYDROGRAPH AT										
+	EFA2	.00	1	FLOW TIME	3. 3.50	3. 3.50	3. 3.50	3. 3.50	3. 3.50	3. 3.50
HYDROGRAPH AT										
+	EAA2	.28	1	FLOW TIME	347. 3.67	338. 3.67	334. 3.67	316. 3.67	307. 3.67	303. 3.67
3 COMBINED AT										
+	EC17	5.95	1	FLOW TIME	3397. 3.58	3302. 3.58	3253. 3.58	3062. 3.58	2967. 3.58	2920. 3.58
HYDROGRAPH AT										
+	OFFZ	.05	1	FLOW TIME	69. 3.58	67. 3.58	66. 3.58	62. 3.58	60. 3.58	59. 3.58
HYDROGRAPH AT										
+	ESKV1	.00	1	FLOW TIME	3. 3.50	3. 3.50	3. 3.50	3. 3.50	3. 3.50	3. 3.50
2 COMBINED AT										
+	EC19	.05	1	FLOW TIME	72. 3.58	70. 3.58	69. 3.58	65. 3.58	63. 3.58	62. 3.58
HYDROGRAPH AT										
+	EAA1A	.16	1	FLOW TIME	231. 3.58	225. 3.58	222. 3.58	211. 3.58	205. 3.58	202. 3.58
HYDROGRAPH AT										
+	ETP1A	.00	1	FLOW TIME	9. 3.50	8. 3.50	8. 3.50	8. 3.50	8. 3.50	8. 3.50
3 COMBINED AT										
+	EC20	.22	1	FLOW TIME	312. 3.58	304. 3.58	300. 3.58	284. 3.58	276. 3.58	271. 3.58
DIVERSION TO										
+	NATPRK	.22	1	FLOW TIME	150. 3.42	150. 3.42	150. 3.42	150. 3.42	150. 3.42	150. 3.42
HYDROGRAPH AT										
+	FTAPN	.22	1	FLOW	162.	154.	150.	134.	126.	121.

					TIME	3.58	3.58	ULT	3.58	3.58	3.58
HYDROGRAPH AT											
+	EFA1	.00	1	FLOW	5.	5.	5.	5.	5.	5.	5.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT											
+	EC21	6.17	1	FLOW	3564.	3461.	3408.	3200.	3097.	3046.	3046.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	NW102-	.20	1	FLOW	262.	255.	252.	240.	234.	231.	231.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT											
+	EC27	6.37	1	FLOW	3792.	3683.	3628.	3409.	3301.	3247.	3247.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	NW130-	.16	1	FLOW	119.	115.	113.	105.	101.	99.	99.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT											
+	EC28	6.52	1	FLOW	3881.	3769.	3712.	3486.	3375.	3320.	3320.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT											
+	95-7A	.01	1	FLOW	14.	14.	13.	13.	13.	12.	12.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	95-7B	.01	1	FLOW	16.	15.	15.	15.	14.	14.	14.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	95-8A	.01	1	FLOW	11.	11.	11.	10.	10.	10.	10.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	95-8B	.00	1	FLOW	7.	7.	7.	6.	6.	6.	6.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
4 COMBINED AT											
+	C95-8B	.02	1	FLOW	47.	46.	46.	44.	43.	42.	42.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	ENL3B	.02	1	FLOW	34.	34.	33.	32.	31.	30.	30.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	ETP5	.00	1	FLOW	3.	3.	3.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT											
+	EC22	.04	1	FLOW	85.	83.	82.	78.	76.	76.	76.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	EBRT1	.00	1	FLOW	7.	6.	6.	6.	6.	6.	6.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	ES2	.05	1	FLOW	84.	82.	81.	77.	75.	74.	74.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT											
+	EC23	.09	1	FLOW	168.	164.	162.	155.	151.	149.	149.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	EMLA2	.03	1	FLOW	53.	52.	52.	49.	48.	48.	48.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	EFA6A	.00	1	FLOW	9.	9.	9.	9.	9.	8.	8.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT											
+	EC25	.12	1	FLOW	231.	226.	223.	213.	208.	205.	205.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
DIVERSION TO											
+	BRENT	.12	1	FLOW	161.	156.	153.	143.	138.	135.	135.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT											
+	SOUTH	.12	1	FLOW	70.	70.	70.	70.	70.	70.	70.
				TIME	3.25	3.25	3.25	3.25	3.25	3.25	3.33

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HYDROGRAPH AT +	EML3C	.01	1	FLOW TIME	27. 3.50	27. 3.50	26. 3.50	25. 3.50	24. 3.50	24. 3.50
HYDROGRAPH AT +	EFA6B	.01	1	FLOW TIME	17. 3.50	17. 3.50	17. 3.50	16. 3.50	16. 3.50	15. 3.50
HYDROGRAPH AT +	95-9B	.01	1	FLOW TIME	22. 3.58	21. 3.58	21. 3.58	20. 3.58	19. 3.58	19. 3.58
3 COMBINED AT +	EC24	.03	1	FLOW TIME	64. 3.50	63. 3.50	62. 3.50	59. 3.50	58. 3.50	57. 3.50
HYDROGRAPH AT +	EPF2	.00	1	FLOW TIME	2. 3.50	2. 3.50	2. 3.50	2. 3.50	2. 3.50	2. 3.50
HYDROGRAPH AT +	EFA5	.00	1	FLOW TIME	4. 3.50	4. 3.50	4. 3.50	4. 3.50	4. 3.50	4. 3.50
HYDROGRAPH AT +	EGC2	.00	1	FLOW TIME	11. 3.50	10. 3.50	10. 3.50	10. 3.50	9. 3.50	9. 3.50
5 COMBINED AT +	EC26	.17	1	FLOW TIME	151. 3.50	150. 3.50	149. 3.50	145. 3.50	143. 3.50	142. 3.50
DIVERSION TO +	RACEL	.17	1	FLOW TIME	114. 3.33	114. 3.33	114. 3.33	114. 3.42	114. 3.42	114. 3.42
HYDROGRAPH AT +	HORSE	.17	1	FLOW TIME	37. 3.50	36. 3.50	35. 3.50	31. 3.50	29. 3.50	28. 3.50

1

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

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	DT	INTERPOLATED TO COMPUTATION INTERVAL		
							PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)

FOR PLAN = 1 RATIO= 1.00
RCD1C MANE 5.00 5.67 221.08 .16 5.00 5.16 220.00 .16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3238E+00 EXCESS= .0000E+00 OUTFLOW= .3524E+00 BASIN STORAGE= .4347E-05 PERCENT ERROR= -8.8

FOR PLAN = 1 RATIO= .98
RCD1C MANE 5.00 5.11 219.85 .15 5.00 5.11 220.00 .15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3150E+00 EXCESS= .0000E+00 OUTFLOW= .3299E+00 BASIN STORAGE= .4155E-05 PERCENT ERROR= -4.7

FOR PLAN = 1 RATIO= .97
RCD1C MANE 5.00 5.16 220.26 .15 5.00 5.04 220.00 .15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3106E+00 EXCESS= .0000E+00 OUTFLOW= .3259E+00 BASIN STORAGE= .4175E-05 PERCENT ERROR= -4.9

FOR PLAN = 1 RATIO= .93
RCD1C MANE 5.00 4.93 223.66 .14 5.00 4.64 225.00 .14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2932E+00 EXCESS= .0000E+00 OUTFLOW= .3031E+00 BASIN STORAGE= .4282E-05 PERCENT ERROR= -3.4

FOR PLAN = 1 RATIO= .91
RCD1C MANE 5.00 4.66 225.48 .13 5.00 4.59 225.00 .13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2845E+00 EXCESS= .0000E+00 OUTFLOW= .2941E+00 BASIN STORAGE= .3730E-05 PERCENT ERROR= -3.4

FOR PLAN = 1 RATIO= .90
RCD1C MANE 5.00 4.29 226.36 .13 5.00 4.22 225.00 .13

APPENDIX D

Surface Flow Hydraulic Computations

Street Hydraulics

SECTION 36 = SHAMBER DRIVE

$$Q_{100} = 13 \text{ cfs}$$

SECTION 4 = IRON MOUNTAIN ROAD

$$Q_{100} = 7 \text{ cfs}$$

Project Description

Manning Formula

Normal Depth

1.000 %

13.00 ft³/s

Elevation (ft)

0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+27.00	0.67
0+27.00	0.75
0+40.00	0.75
0+40.00	0.67
0+65.00	0.17
0+65.00	0.13
0+66.50	0.00
0+66.50	0.48
0+67.00	0.50

Roughness Coefficient

(0+00.00, 0.50)	(0+02.00, 0.17)	0.013
(0+02.00, 0.17)	(0+27.00, 0.67)	0.016
(0+27.00, 0.67)	(0+40.00, 0.67)	0.013
(0+40.00, 0.67)	(0+65.00, 0.13)	0.016
(0+65.00, 0.13)	(0+67.00, 0.50)	0.013

Section - 3b (100-Yr)

Options

Current Roughness Weighted Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results

Normal Depth	0.43	ft
Elevation Range	0.00 to 0.75	
Flow Area	4.36	ft ²
Wetted Perimeter	29.56	ft
Hydraulic Radius	0.15	ft
Top Width	28.61	ft
Normal Depth	0.43	ft
Critical Depth	0.46	ft
Critical Slope	0.00531	ft/ft
Velocity	2.98	ft/s
Velocity Head	0.14	ft
Specific Energy	0.56	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	0.43	ft
Critical Depth	0.46	ft
Channel Slope	1.000	%
Critical Slope	0.00531	ft/ft

Section - 3b (100-Yr)

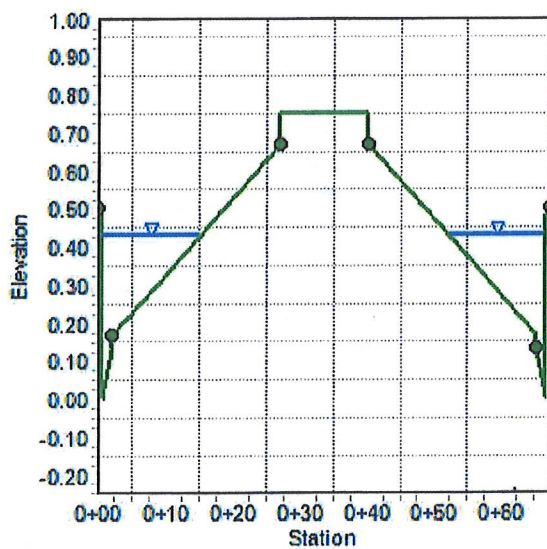
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope	1.000	%
Normal Depth	0.43	ft
Discharge	13.00	ft ³ /s

Cross Section Image



Project Description

Solve For	Normal Depth
-----------	--------------

Channel Slope	4.000	%
Discharge	7.00	ft ³ /s

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+33.50	0.80

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 0.50)	(0+02.00, 0.17)	0.013
(0+02.00, 0.17)	(0+33.50, 0.80)	0.016

Current Roughness Weighted Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Normal Depth	0.36	ft
Elevation Range	0.00 to 0.80	ft
Flow Area	1.30	ft ²
Wetted Perimeter	11.18	ft
Hydraulic Radius	0.12	ft
Top Width	10.78	ft

Section - 4 (100-Yr Half Street)

Results

Normal Depth	0.36	ft
Critical Depth	0.48	ft
Critical Slope	0.00463	ft/ft
Velocity	5.40	ft/s
Velocity Head	0.45	ft
Specific Energy	0.81	ft
Froude Number	2.74	
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	0.36	ft
Critical Depth	0.48	ft
Channel Slope	4.000	%
Critical Slope	0.00463	ft/ft

Section - 4 (100-Yr Half Street)

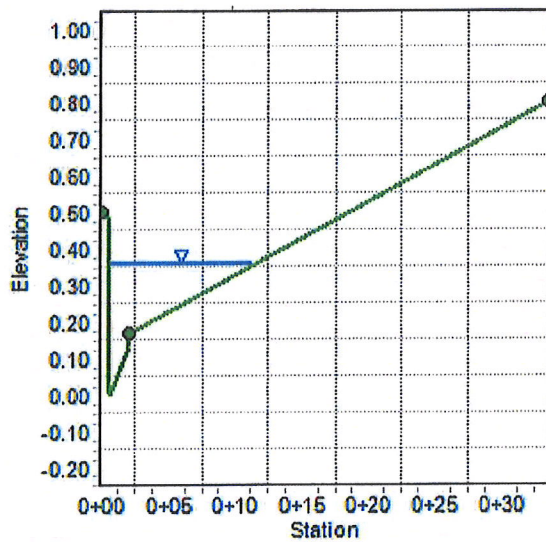
Project Description

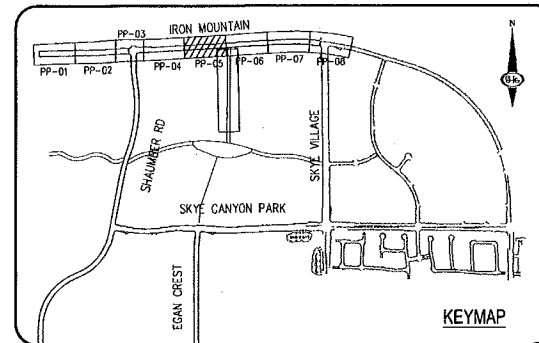
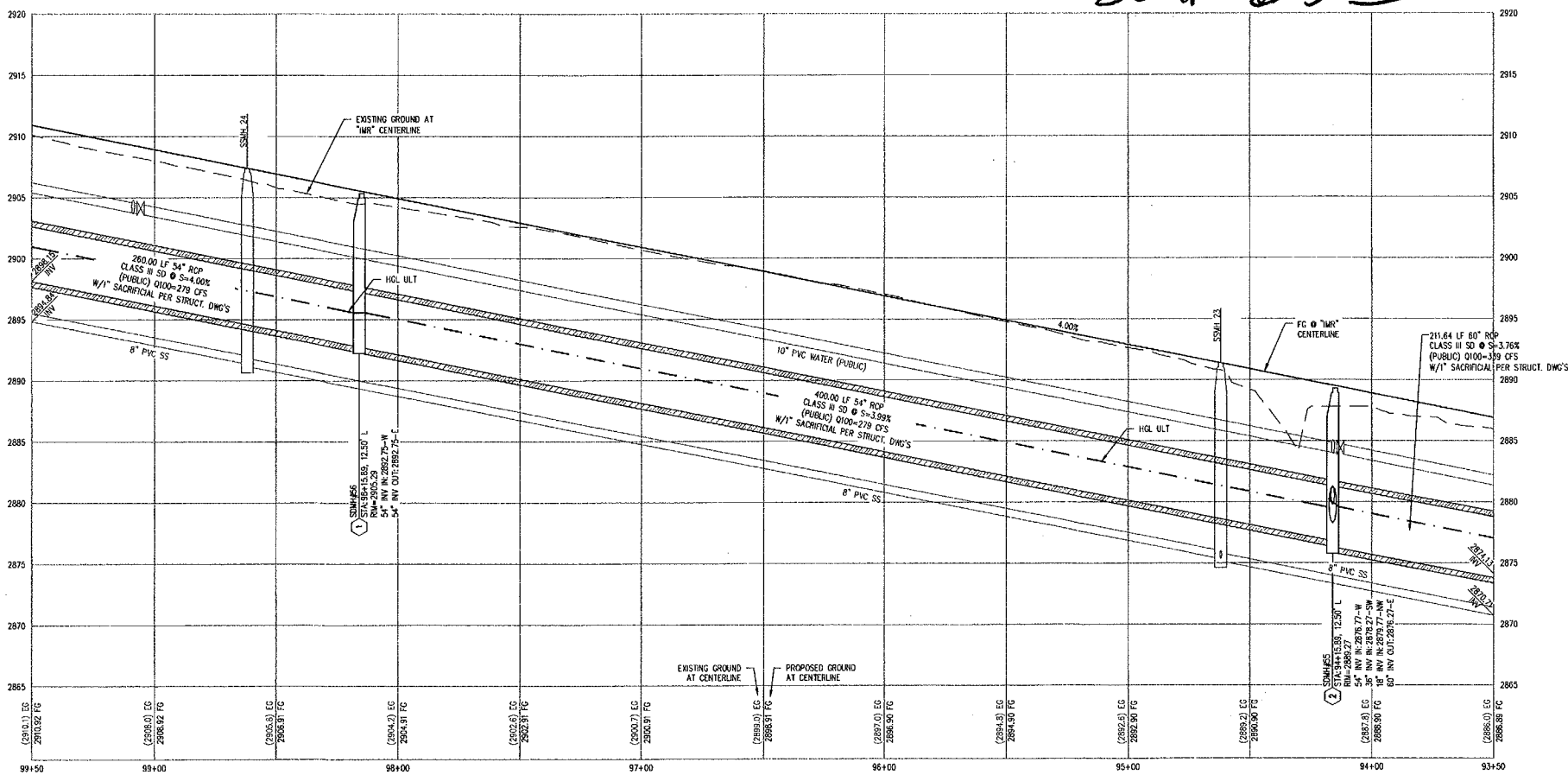
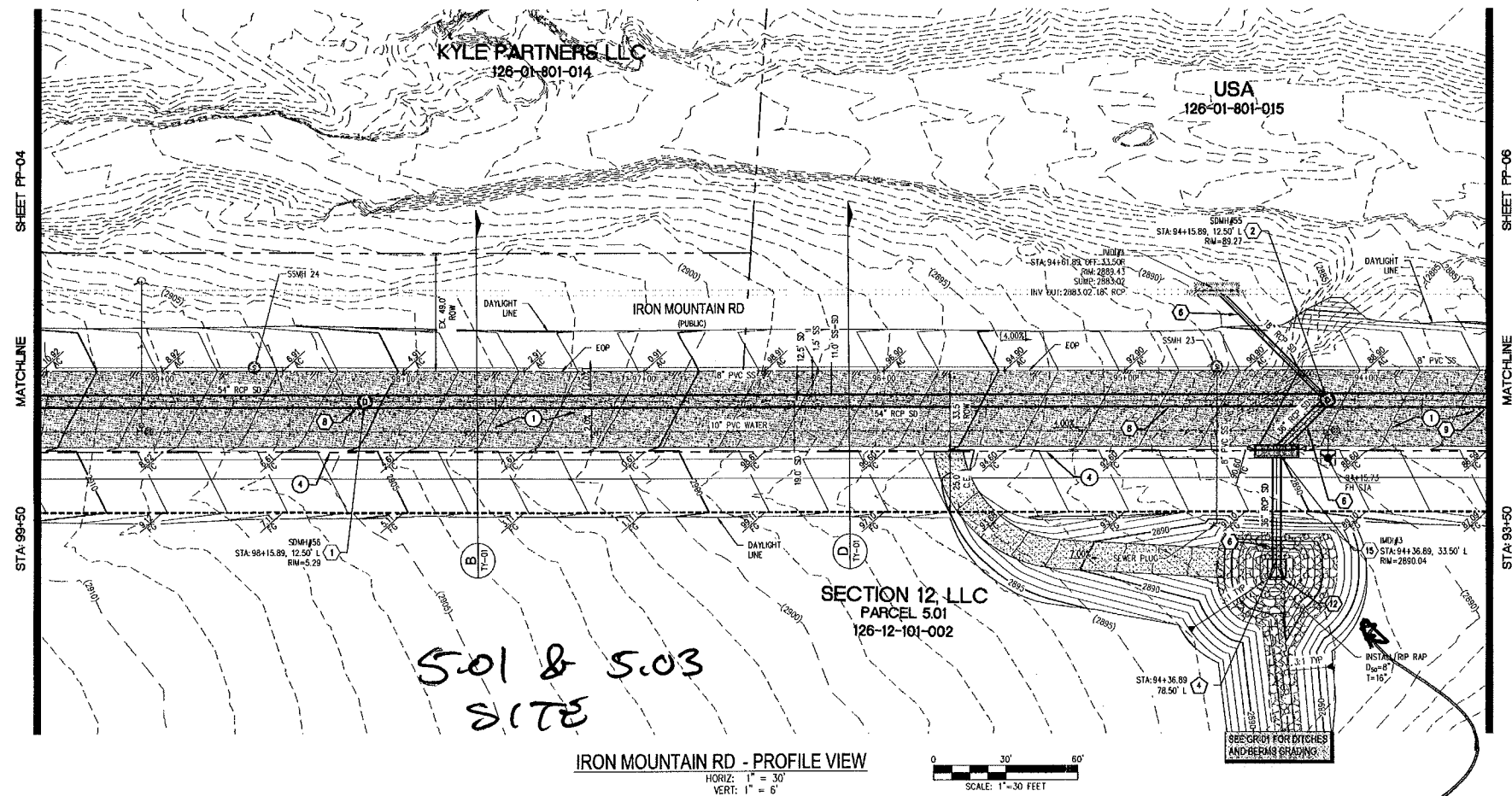
Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope	4.000	%
Normal Depth	0.36	ft
Discharge	7.00	ft ³ /s

Cross Section Image





- CONSTRUCTION NOTES
- CONSTRUCT 1" UTACS OVER 4.5" PBS OVER 4" TYPE II AGGREGATE BASE (SEE TY SHEETS)
 - CONSTRUCT 1" UTACS OVER 5.5" PBS OVER 6" TYPE II AGGREGATE BASE (SEE TY SHEETS)
 - CONSTRUCT "A" TYPE ISLAND CURB (USDOCA STD. DWG. NO. 219)
 - CONSTRUCT "L" TYPE CURB AND GUTTER (USDOCA STD. DWG. NO. 216)
 - CONSTRUCT SIDEWALK RAMP (CASE II) WITH TACTILE WARNING PANEL (USDOCA STD. DWG. NO. 235)
 - CONSTRUCT BUS TURN-OUT (USDOCA STD. DWG. NO. 234.1)
 - CONSTRUCT CONCRETE SIDEWALK (USDOCA STD. DWG. 234)
 - PROTECT IN PLACE (VERIFY LOCATION AND ELEVATION OF EX. IMPROVEMENT)

- STORM DRAIN NOTES
- CONSTRUCT 48" TYPE II SD MANHOLE (USDOCA STD. DWG. NO. 405.2)
 - CONSTRUCT 60" TYPE II SD MANHOLE (USDOCA STD. DWG. NO. 406.1)
 - INSTALL 18" RCP (USDOCA STD. DWG. NO. 503.2)
 - INSTALL 24" RCP (USDOCA STD. DWG. NO. 503.2)
 - INSTALL 30" RCP (USDOCA STD. DWG. NO. 503.2)
 - INSTALL 36" RCP (USDOCA STD. DWG. NO. 503.2)
 - INSTALL 42" RCP (USDOCA STD. DWG. NO. 503.2)
 - INSTALL 54" RCP (USDOCA STD. DWG. NO. 503.2)
 - INSTALL 60" RCP (USDOCA STD. DWG. NO. 503.2)
 - INSTALL 72" RCP (USDOCA STD. DWG. NO. 503.2)
 - INSTALL 30" RCP END SECTION (NDOT STD. PLAN R-2.3.1)
 - INSTALL 36" RCP END SECTION (NDOT STD. PLAN R-2.3.1)
 - INSTALL 42" RCP END SECTION (NDOT STD. PLAN R-2.3.1)
 - INSTALL 72" RCP END SECTION (NDOT STD. PLAN R-2.3.1)
 - CONSTRUCT TYPE "CW2" DROP INLET. SIZE PER PLAN (USDOCA STD. DWG. NO. 412.1 & 421)
 - STRUCTURAL MANHOLE
 - CONSTRUCT CONCRETE COLLAR (SEE DETAIL 3/DTL-01)
 - CONSTRUCT INTERIOR BRICK AND MORTAR PLUG SEE DETAIL 2/DTL-01
 - INSTALL 24" RCP END SECTION (NDOT STD. PLAN R-2.3.1)
 - INSTALL 54" RCP END SECTION (NDOT STD. PLAN R-2.3.1)
 - INSTALL 60" RCP END SECTION (NDOT STD. PLAN R-2.3.1) W/1" SACRIFICIAL CONCRETE PER STRUCTURAL DWGS

- NOTES
- ALL RCP SHALL BE CLASS II UNLESS OTHERWISE SHOWN.
 - ALL PIPE LENGTHS ARE MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR INSIDE EDGE OF IN OR OUTLET.
 - ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDOCA STD. DWG. NO. 421.
 - SEE STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL DETAILS AND CONNECTIONS.
 - ALL PIPES ARE PUBLICLY MAINTAINED.
 - ADD SPECIAL INSPECTION REQUIRED FOR PIPE SEGMENTS WITH SACRIFICIAL CONCRETE.
 - DIMENSIONS ARE TO BE BACK OF CURB, FACE OF CURB, OR FACE OF MEDIAN UNLESS OTHERWISE NOTED.
 - SEE TY-SHEETS FOR TYPICAL SECTIONS.
 - SEE UT-SHEETS FOR WATER AND SEWER PLAN AND PROFILES.

DROP INLET NOTE

WHERE 10 FEET PARALLEL SEPARATION IS NOT PRACTICABLE, CAST-IN-PLACE MONOLITHIC PIER WITH WATERSTOP BETWEEN SLAB AND WALLS, BASE, WALLS AND TOP TO BE CONSTRUCTED WITH WATERSTOPS, CENTER BULB, OR FLAT STRIP (VINYLEX, GREENSTREAK PLASTIC PRODUCTS OR APPROVED EQUAL).

LEGEND

STORM DRAIN LATERAL # (SEE LAT SHEETS)

FLOOD ZONE

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE "X" (OUTSIDE THE 500-YEAR FLOOD PLAIN) ON THE FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C1750E, DATED SEPTEMBER 27, 2002.

NOTE:

PROPERTY OWNER IS RESPONSIBLE TO MAINTAIN THE BEST MANAGEMENT PRACTICES, SUCH AS BUT NOT LIMITED TO, THE REMOVAL OF ACCUMULATED SEDIMENT AND DEBRIS AND CARE OF VEGETATION.

APPROVED FOR CONSTRUCTION

LIVHD ENGINEERING SERVICES MANAGER DATE

PROJECT NO. 126408

1-702-227-2829

FAST

Call before you Dig

Call before you Dig

Call before you Dig

SLATER HANIFAN GROUP

a Westwood team

5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118

PHONE (702) 284-5340 FAX (702) 284-5389

NINETY-FIVE MANAGEMENT LLC

SKYE CANYON PHASE 3BC

IRON MOUNTAIN ROAD

CONSTRUCTION PLAN - "IM" 99+50 TO "IM" 93+50

DATE: 9/10/18

DRAFTER: HF

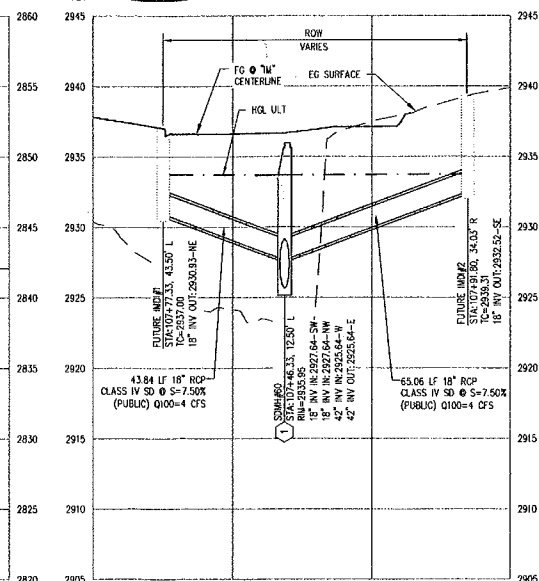
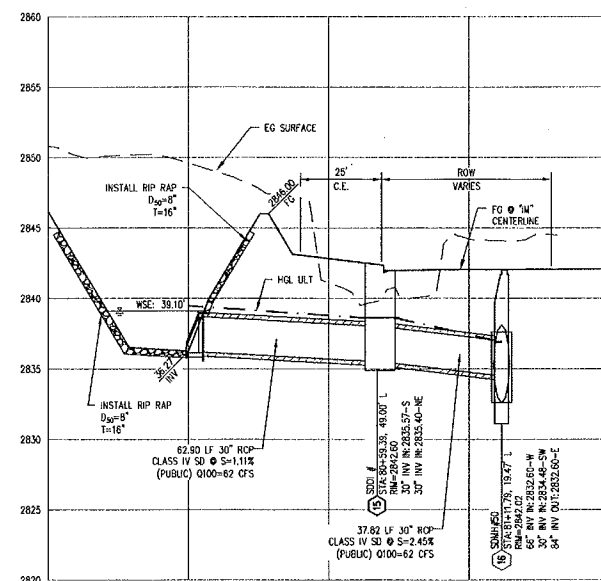
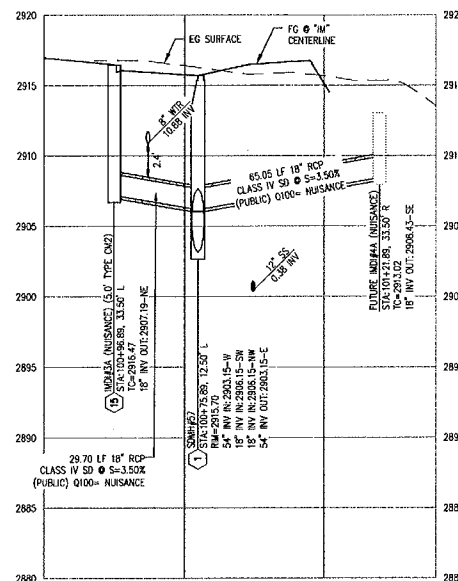
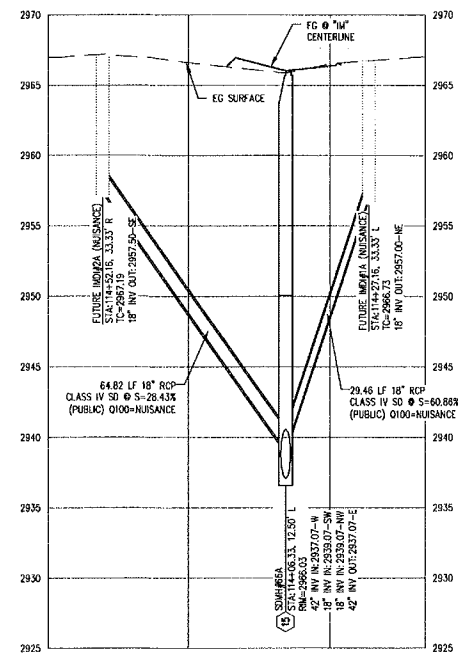
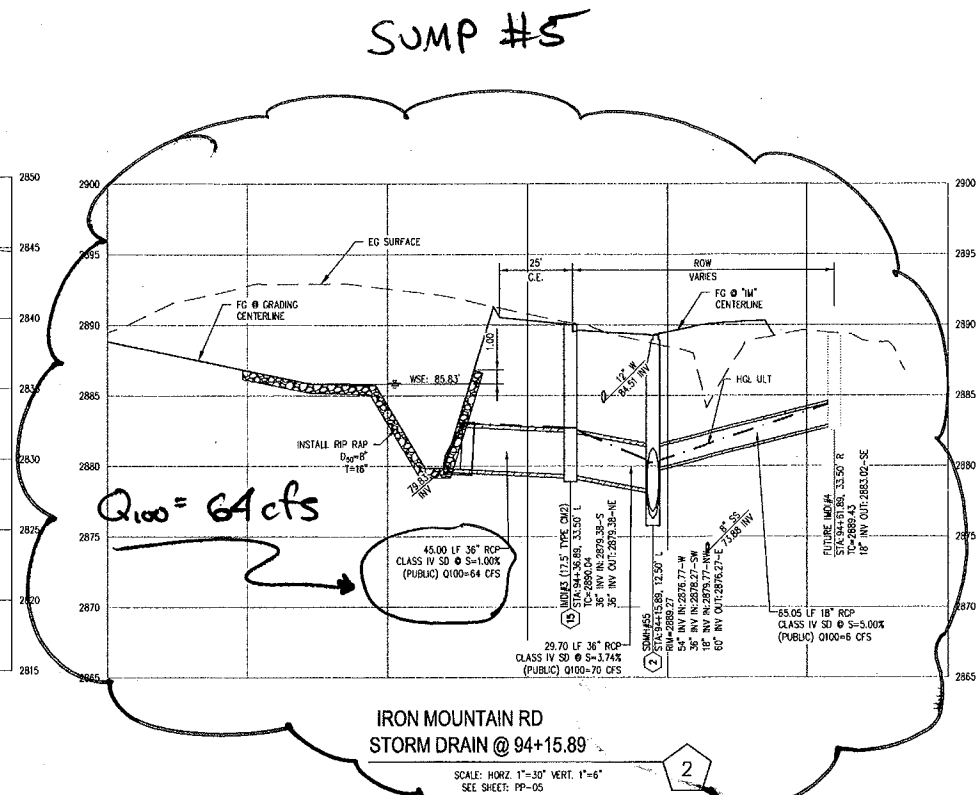
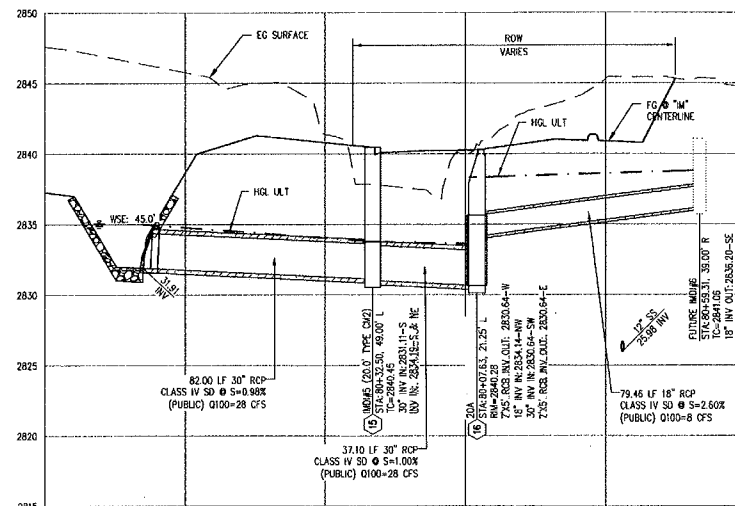
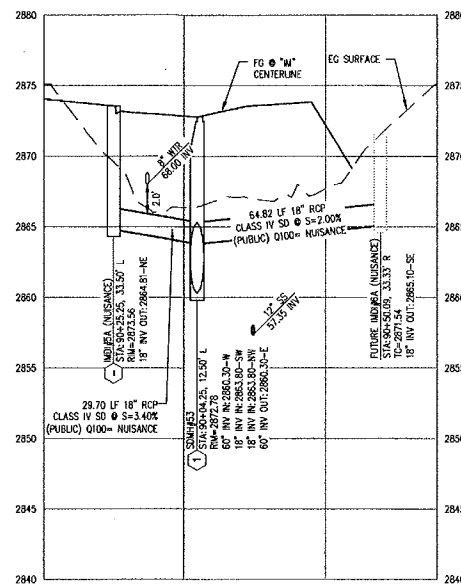
DESIGNER: HF

CHECKED: DY

PROJECT NO. OLY1609-000

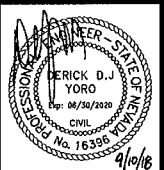
PP-05

SHEET 9 OF 27



**SKYE CANYON PHASE 3BC
IRON MOUNTAIN ROAD
STORM DRAIN LATERALS**

DATE:	9/8/18
DRAFTER:	HF
DESIGNER:	HF
CHECKED:	DY
PROJECT NO.	OLY1609-000



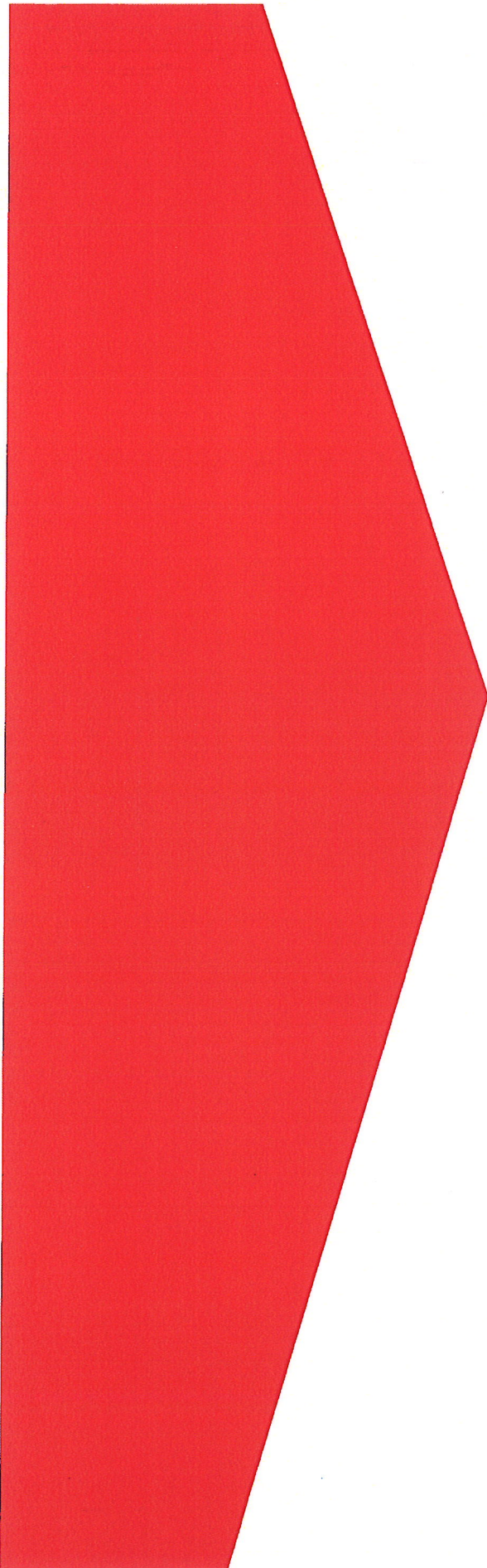
LAT-01
SHEET 13 OF 27

[illegible]

Reference

Skye Canyon 2.07 / 2.32

$$I = \int F \cdot dt$$



Westwood

TECHNICAL DRAINAGE STUDY
Skye Canyon 2.07 / 2.32

City of Las Vegas, Nevada

December 2019

Prepared For:

M E and LLC / Ninety-Five Management, LLC
11411 Southern Highlands Parkway, Suite 300
Las Vegas, NV 89141
Phone: 702-220-6565 – Fax: 702-220-6566

6 SUMMARY OF DRAINAGE FACILITIES

Existing Offsite Facilities:

Existing 60-in RCP storm drain in Iron Mountain Road was previously designed by the 3B 3C Study as CCRFCD Facility MOIR 0000, and updated with the Update #6 Study. Therefore, the WSPGW model for the Iron Mountain system has been referenced from Update #6 study (refer to Appendix H).

Existing 10-ft by 9-ft RCA storm drain in Skye Village Road was previously designed by the 3A Study as CCRFCD Facility MOHU 0026, and updated with the Update #6 Study. Therefore, the WSPGW model for the Skye Village system has been referenced from Update #6 study (refer to Appendix H).

The existing wash located south of the project site is assumed to remain unchanged in both conditions of development with project site grading proposed outside the limits of the banks of the wash. The flowline of the wash is a minimum of 10-FT below the proposed project site grading, and much of the flow in the wash has been diverted by the upstream Skye Canyon Detention Basin #2. Therefore, no analyses of the wash have been performed by this study.

Proposed Drop Inlets and Storm Drain:

Two primary storm drain systems have been proposed for the project site, one for the north half of the project site connecting into the storm drain in Iron Mountain Road and another for the south half of the project site connecting into the storm drain in Skye Village Road.

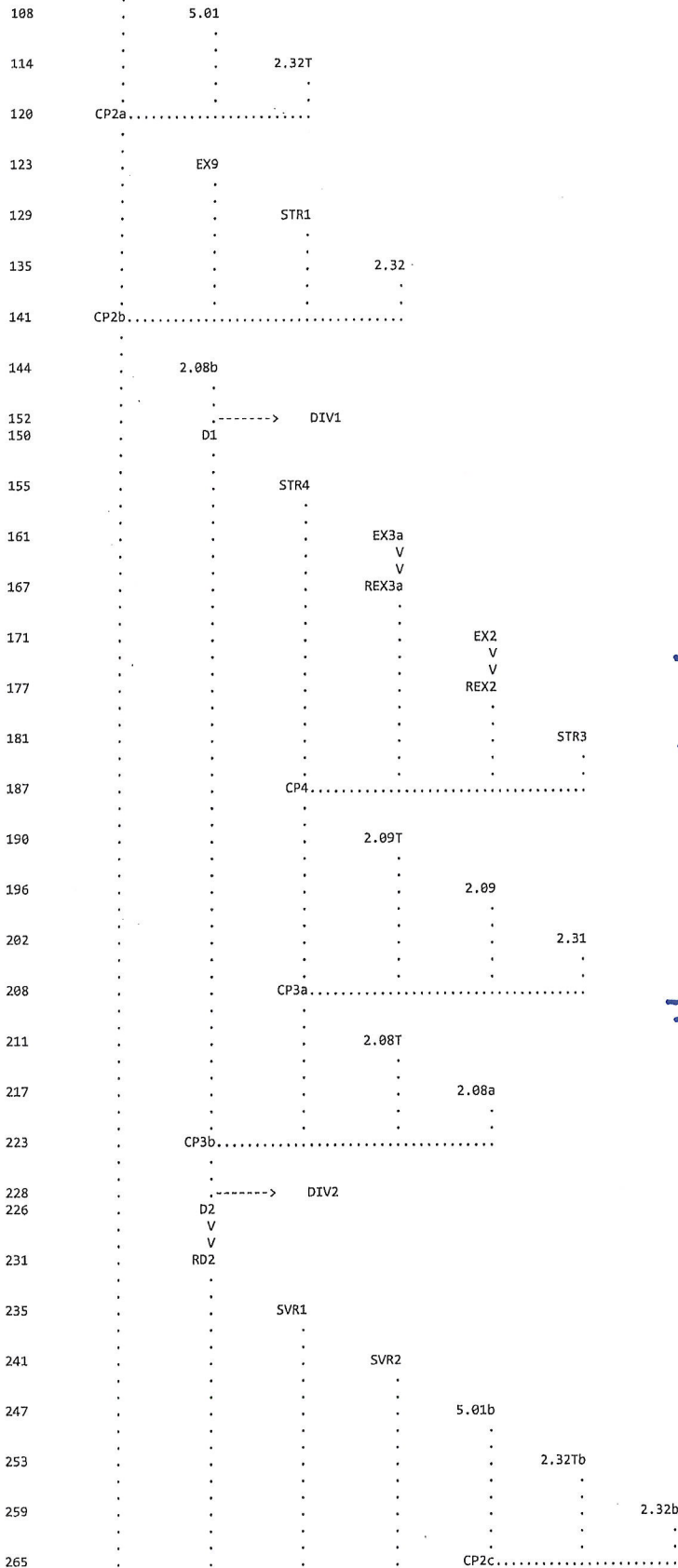
Drop inlet hydraulic sizing computations, WSPGW storm drain models, and storm drain inlet control nomographs have been performed for the storm drain infrastructure and have been included in Appendix D for reference. For a detailed illustration and summary of the storm drain facilities, please refer to Exhibit F provided in Appendix A.

North System

The north storm drain system consists of three inlets and three WSPGW models. The mainline north model is named NORTH and runs from a proposed 12.5-ft sump inlet (Facility SSDI1) through a drainage easement, with 30" RCP, to connect to an existing stub provided by the Update #6 Study. The model ends at the existing drop inlet in Iron Mountain Road. Note that the starting water surface elevation (WSE) utilized is conservatively set 1.5-ft below the top-of-curb grade of the existing drop inlet. The starting WSE is also considered conservative since less flow is impacting the existing stub than previously anticipated.

Two lateral WSPGW models have been provided for the north system, SLAT1 and SLAT2. Both lines terminate at Facility SDDI1 and consist of 18" RCP. Note that both systems utilize a starting WSE equal to the invert at SDDI1 plus the flow depth in the drop inlet as determined by the inlet control nomograph. The inlet control nomograph is considered a more accurate representation of how the drop inlet will function as 9-CFS is entering from one lateral, 13-CFS is entering from another lateral, and 28-CFS is entering from the drop inlet itself. The inlet control WSE is also higher and more conservative than the WSE provided by the NORTH.WSW model.

INT



INTERIM CONDITION
FLOW IN CHANNEL

$$CP4 + 2.09T + 2.09 + \frac{1}{2}(2.31)$$

$$= 180/69 - CP4$$

$$+ 3/1 - 2.09T$$

$$+ 81/36 - 2.09$$

$$+ \frac{1}{2}(8/3) - 2.31$$

$$= 268/108$$

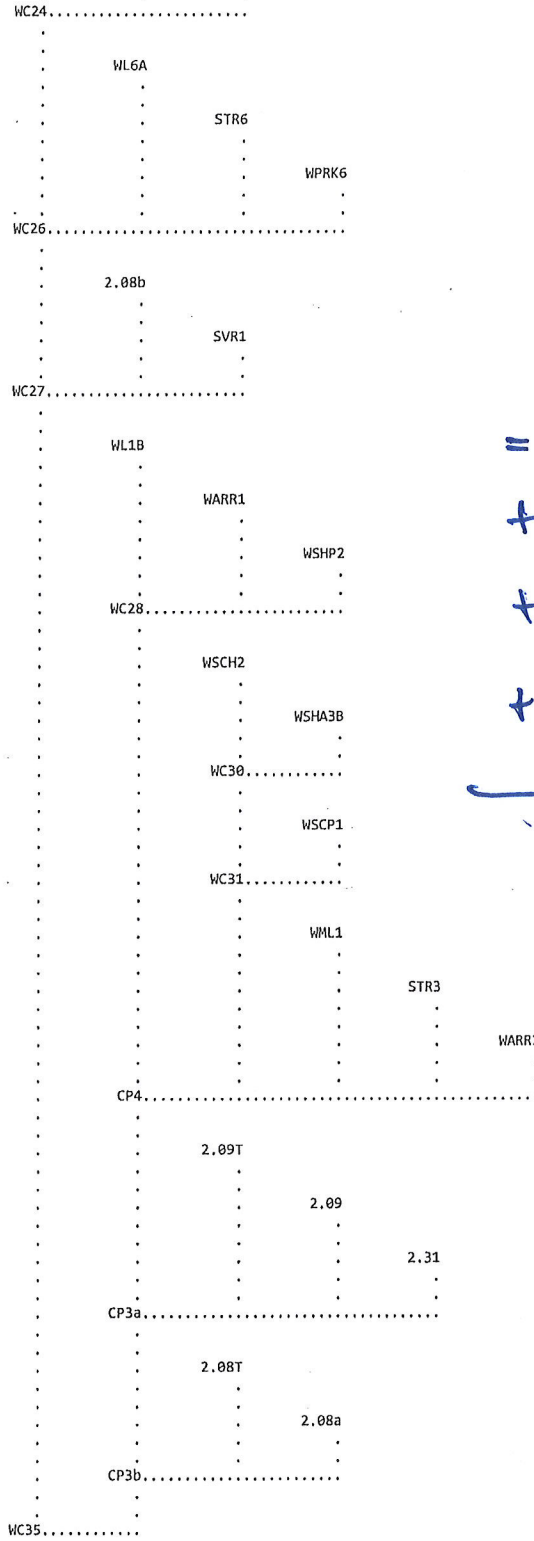
ULT

ULTIMATE CONDITION
FLOW IN CHANNEL
100-YR

$$CP4 + 2.09 + 2.09T + \frac{1}{2} (231)$$

$$\begin{array}{rcl} = 230 & - CP4 \\ + 81 & - 2.09 \\ + 3 & - 2.09T \\ + \frac{1}{2}(8) & - 231 \\ \hline 318 \end{array}$$

1063
1067
1073
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1085
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1101
1105
1111
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1123
1127
1132
1137
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1193
1199
1202



CITY OF LAS VEGAS		DATE: June 13, 2019
INTER-OFFICE MEMORANDUM		REVISED September 26, 2019
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:	
	Skye Canyon – Phases 3B & 3C Infrastructure – Update #1	
Cross Streets:	NWC of Skye Village Road & Skye Canyon Park Drive	
File Number:	F:\Depot\DSMemos\DS4953Crev.doc	
Parcel Number:	126-12-101-002	
Zoning Action:		
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO
		COPIES TO: Slater Hanifan Group M F Land LLC / Ninety-Five Management LLC Bart Anderson, P.E., DevCo CCRFCD

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	2/8/2017	3/9/2018 & 5/15/2018	Not Approved	\$400.00	493315: \$400
2 nd Submittal	9/11/2018	10/10/2018	Conditional Approval	\$400.00	498970: \$400
3 rd Submittal	5/30/2019	6/13/2019 & Revised 9/26/2019	See Comments Below	\$100.00	3151006: \$100
TOTAL FEES (LDDRS):				\$900.00	----

REMARKS: Revised 9/26/2019 to reflect improvement plans.

3rd Submittal: Update #1 to shift the storm drain alignment in Iron Mountain Road 1-ft to the north from Station "IMR" 107+46.33 to Station "IMR" 83+26.07

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

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

Flood Control understands that there is a Land Use change along the west side of Shaumber Road. A Drainage Study Update will be required to verify flow impacts and storm drain size for Shaumber Road prior to development.

The following conditions are repeated until they are complete:

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 approval of the drainage study. CCRFCD requires receipt of structural approval from the Building Department prior to concurrence.

2. *Skye Canyon Phases 3B & 3C* onsite developments are to be flood protected by *Detention Basin 2* and the *Skye Canyon Phase 3A Infrastructure*. No occupancy permits within onsite *Phases 3B & 3C* will be issued prior to the substantial completion of *Detention Basin 2 with the outfall facility (from Detention Basin 2 in Iron Mountain Road to Skye Village Road)* and the substantial completion of the *Skye Canyon Phase 3A Infrastructure*.
3. The future MPU facility within *Skye Village Road* north of the *Skye Village/Grand Canyon/Iron Mountain* intersection to the proposed MPU facility at the *Kyle Canyon interchange* area shall be substantially complete before occupancy of residential Units beyond *Phases 3A, 3B and 3C*. This includes residential development within *Phases 4 & 6* and the development of *Phase 5* as shown on the *Development Phasing Exhibit* dated 12/4/2017.
4. The implementation of the CCRFCD Master Plan for the *Skye Canyon Master Development* is being progressed with the recent 90% design submittal of the *Moccasin Rd. CCRFCD Flood Control Facility – US95/Kyle Canyon Rd Interchange to Moccasin Rd. (Skye Canyon Developer Funded)* and the *Moccasin Rd. CCRFCD Flood Control Facility – Moccasin Rd to CCRFCD Facility LVUP 1076/1077(CCRFCD Funded)*. Once building permits are released for 75% of the *Skye Canyon Development* west of *US-95* these critical facilities shall be substantially complete in accordance with the provisions of Title 19.02.130 D.
5. The implementation of the CCRFCD Master Plan is being progressed with the recent bid opening of the *NDOT US-95* facilities from the *CC-215 interchange* north to the *Kyle Canyon interchange*. Construction of the associated CCRFCD MPU facilities allows for the utilization of the existing MPU facilities constructed with the *Horse Interchange*. The development of *Phases 3A, 3B and 3C* west of *US-95* shall maximize the flow collection into this facility prior to allowing flows to cross *US-95* using the existing culvert system.
6. *Flood Control* acknowledges that the new *Skye Canyon Master Plan Amendment (MPA)* was included as a part of the 2018 MPU process. Any changes not incorporated in the 2018 MPU must be approved by *City of Las Vegas* and *Clark County Regional Flood Control District (CCRFCD)* and shall be adopted by the *City of Las Vegas City Council* prior to the final approval of the subject improvement plans.
7. The subject *Phases 3B and 3C Infrastructure Drainage Study* addresses the included street improvements of *Iron Mountain Road, Skye Canyon Park Drive, Shaumber Road*, culvert crossings and storm drain systems with the streets. Technical drainage studies will be required for the future onsite parcels as they develop.
8. Structural plans for the storm drain improvements must be submitted for review by *Flood Control* and the *Building Department*. Provide a soil report, structural calculations and specifications, wet stamped structural sets and a grading plan to the *City of Las Vegas Building Department* for processing (call *Building Department* to confirm their submittal requirements). The engineer must provide a copy of *Building Department* approval of the structures to *City Flood Control Section* prior to the final acceptance of the improvement plans.
9. *Phase 3A, 3B, and 3C* include storm drain improvements that will be abandoned in the future. These abandoned facilities will impact the adjoining *Phase 3B and 3C* development parcels. The individual parcel development shall address the impact and removal of these improvements as well as include the removal of these items in the associated improvements and Bond.
10. The project proposed to build temporary drainage facilities including drainage berms/swales over the *Phases 3B, 3C* site and along the west side of *Shaumber Road*. Prior to the final plans approval the developer must complete a **Maintenance and Liability Agreement** for the interim drainage improvements and post a minimum maintenance bond of \$50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for construction the facility and an exhibit that adequately shows the location and limits of

the drainage facilities to *City Flood Control* for approval. Once the drainage study is conditionally approved, the engineer/developer should contact the *City's Land Development Section* (702-229-6371) to begin the agreement process.

In order for the maintenance bond to be released in the future, a drainage update/letter will be required to justify that the berms/swales are no longer necessary and can be removed.

11. Provide off-site grading permission for areas outside of the Skye Canyon Development impacted by these infrastructure improvements. Provide the notarized letter of off-site grading permission prior to final approval of the improvement plans.
12. Provide drop inlets upstream of the roadway cross fall transitions to collect flow before it spills across the intersections.
13. The interim channels adjacent to the infrastructure roadways are the Maintenance responsibility of the Master Developer.
14. **Iron Mountain Road Improvement Plans:**

Sheet PP-05: Label the length of the proposed drop inlet at Sta. 94+36.89.

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: T19S/R59E/12

AREA: F-12

Reference

Canyon View Wash

$$I = \int F \cdot dt$$



GeoTek Residential, LLC
6835 South Escondido Street, Suite B
Las Vegas, Nevada 89119
(702) 897-1424 Office (702) 897-2213 Fax

July 7, 2015
Project No. 12208-LVR

OLYMPIA COMPANIES

11411 Southern Highlands Parkway, Suite 300
Las Vegas, NV 89141

Subject: Summary of Observations
Skye Canyon – Natural Drainage Alignments
Northwest Corner of Hualapai and Grand Teton Drive
Las Vegas, Nevada

Reference: "Geotechnical Evaluation for Skye Canyon – Phase 2A, A 260± Acre Residential Development, Northwest Corner of Hualapai Way and Grand Teton Drive, Las Vegas, Nevada" By GeoTek Residential, LLC, Dated February 9, 2015, Project No. 12208-LVR

In accordance with your request, GeoTek Residential, LLC (GeoTek) has completed the investigation for the proposed project. The purpose of our study was to observe approximately 0.9 miles each of two natural drainages located within the project boundaries to observe the level of cementation of soils within the drainages and to provide recommendations for site development, including appropriate setbacks for the planned improvements, identify areas of potential revetment, and provide recommendations for soil improvement as needed. This letter provides a summary of the observed conditions, identifies areas of potential revetment, and provides recommendations for site development based on our understanding of the proposed improvements. The Clark County Assessor's Parcel Number for the drainage alignments is a portion of 126-12-000-001.

Alignment Description

The alignments are located on a vacant parcel that is approximately 665± gross acres in size located northwest of Hualapai Way and Grand Teton Drive (APN 126-12-000-001). The alignments observed for this study consist of two natural drainages located centrally within the parcel. The southernmost drainage is located within the Skye Canyon Phase 2A project boundaries. The northernmost drainage is located within a future phase of development for the Skye Canyon project. The drainages are oriented generally west to east with flow being directed to the east. The drainages were observed to be up to about 25 feet in depth and up to about 60 feet wide, where observed.

Proposed Development

It is our understanding that overall site development will consist of performing typical cut and fill earthwork to attain the desired graded configuration for the construction of one-to three-story residential structures, masonry walls, and associated improvements. The improvements are anticipated to be constructed along

GEOTEK RESIDENTIAL, LLC

the alignments. It is our understanding that the subject drainages are to remain in a relatively natural state with only minor improvements.

Summary of Observations

The observed portion of the southernmost drainage begin at STA 10+50 and ended at STA 60+50. The observed portion of the northernmost drainage begin at STA 7+00 and ended at STA 75+50.

Observed soils within the drainages generally consisted of layers of sands and gravels, both cemented and not cemented. The sidewalls of the drainages were generally cemented and the bottoms generally consisted of loose sands and gravels with some areas of the bottom of the drainages being cemented. Where not cemented, the drainage sidewalls generally consisted of loose to medium dense sands, gravels, cobbles, and chunks of fractured cemented material. Undercutting of the cemented soils was prominent in the majority of the observed sidewalls. Undercutting generally did not extend more than about 7 feet into the exposed sidewall when measured vertically from the overhanging portion of the wall. Typically the eroded material was non-cemented soils. The cemented soils observed varied from moderately hard to very hard. Darker colored deposits were generally observed as having a higher level of cementation than lighter colored deposits. Native vegetation, consisting of small plants and shrubs, was observed at the bottom of the drainage as well as on portions of the sidewalls.

A review of the referenced Geotechnical Evaluation indicates the soils in the vicinity of the southernmost drainage consists primarily of cemented material overlain by a surficial layer of alluvial deposits. This is generally consistent with observations made within the drainage during this investigation. A geotechnical evaluation in the vicinity of the northern most drainage has not been completed.

RECOMMENDATIONS

The conditions observed within the drainages were consistent between both drainages and generally consisted of cemented sands and gravels overlain by varying amounts of alluvial deposits. The following recommendations for site development and soil improvement are provided to aid in site development.

Setbacks

The soil conditions observed within the drainages were consistent between both drainages and generally consisted of cemented sands and gravels and alluvial deposits within the drainages. Portions of the drainages' sidewalls were observed to consist of loose to medium dense surficial deposits of sand, gravel, cobbles, and chunks of fractured cemented material. Undercutting of the vertical portions of the sidewalls was prominent along the majority of the drainages. Planned improvements should be setback laterally from the bottom of the drainages at a minimum of 1:1 (horizontal to vertical). Where the sidewalls of the drainage are undercut, the minimum recommended setback should be measured from the base of the undercut portion of sidewall.

SETBACK RECOMMENDATION

Revetment

Revetment options are presented for areas identified in the setback exhibits in order to minimize erosion along the drainages. We understand post-construction flows within the drainages will be significantly reduced from the natural level of flow. The level of erosion will vary depending on the rainfall event and anticipated planned flows through the drainages.

GeoTek has identified areas that will be more susceptible to erosion based on visual observations made during the site visits. Our conclusions are based on the level of observed cementation, the presence of surficial alluvial deposits, and the existing geometry of the drainage. Although these areas have been identified as being more susceptible to erosion and will likely benefit from revetment, it should be expected that areas outside of the identified areas will erode with time depending on the rainfall event and the planned final geometry of the drainages.

The identified revetment areas may be stabilized by riprap, gabion baskets, or another form of acceptable protection such that erosion is limited to an acceptable level. Preparation of bedding, design, and construction of riprap and gabion lined channels should conform to the Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual specifications.

The drainages should be observed periodically, as well as following extreme rainfall events, to monitor erosion. Periodic maintenance will be required to maintain the existing drainage geometry. Riprap or gabion lined areas should be observed periodically and periodic maintenance should be performed as needed. It should be anticipated during the design life of the drainage that some erosion will occur and may consist of portions of the cemented soils, particularly the undercut portions, separating from the sidewalls and falling into the drainage bottom.

It is our understanding the drainages will not be converted to recreational areas (e.g. walking paths). The recommendations provided in this report are not suitable for the drainages if they are to be used as recreational areas, due to the previously identified dangers of erosion. Should the drainages be used for recreational areas, additional investigations and recommendations will be required.

PLAN REVIEW

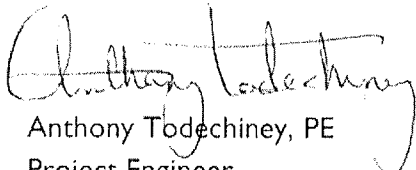
Final grading, foundation, and improvement plans should be submitted to this office for review and comment as they become available, to minimize any misunderstandings between the plans and recommendations presented herein. In addition, foundation excavations and earthwork construction performed on the site should be observed and tested by this office. If conditions are found to differ substantially from those stated, appropriate recommendations would be offered at that time.

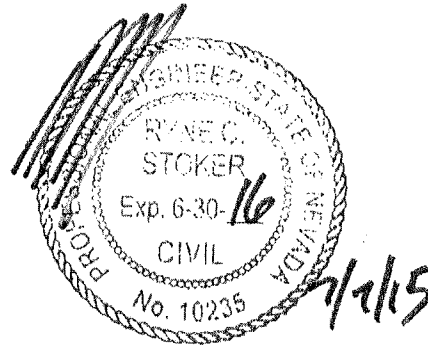
LIMITATIONS

The materials encountered on the project site are believed representative of the area; however, soil and bedrock materials vary in character across the site. Site conditions may vary due to seasonal changes or other factors. GeoTek assumes no responsibility or liability for work, testing, or recommendations performed or provided by others. Since our study is based upon the site materials observed and engineering analysis, the conclusions and recommendations are professional opinions.

These opinions have been derived in accordance with current standards of practice and no warranty is expressed or implied. If unusual or unexpected conditions are exposed in the field, they should be reviewed by this office and if warranted, modified and/or additional recommendations will be offered. If you have any questions concerning this report or if we may be of further assistance, please do not hesitate to contact the undersigned.

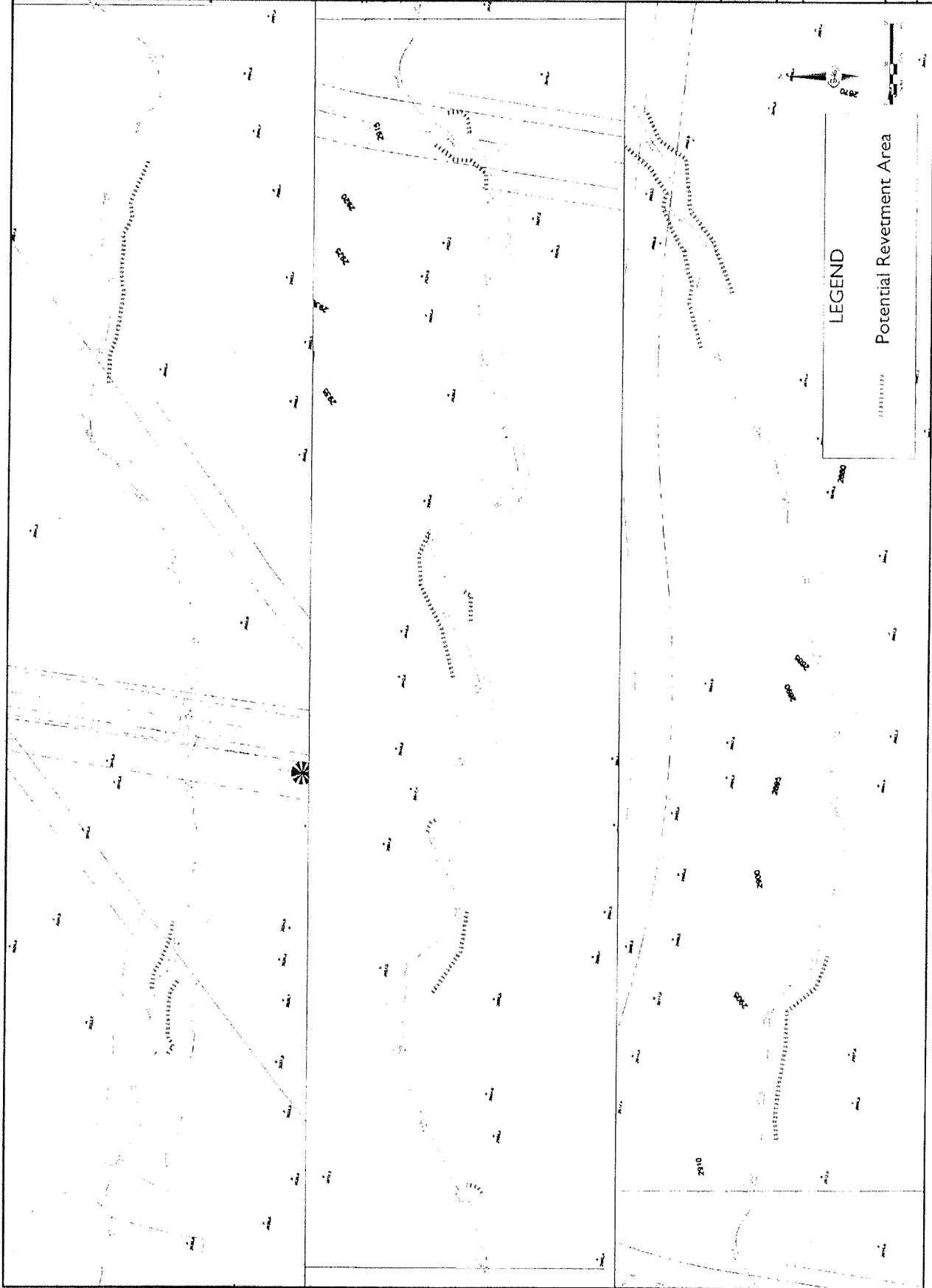
Respectfully submitted,
GeoTek Residential, LLC.


Anthony Todechney, PE
Project Engineer



Ryne C. Stoker, PE
Principal Engineer

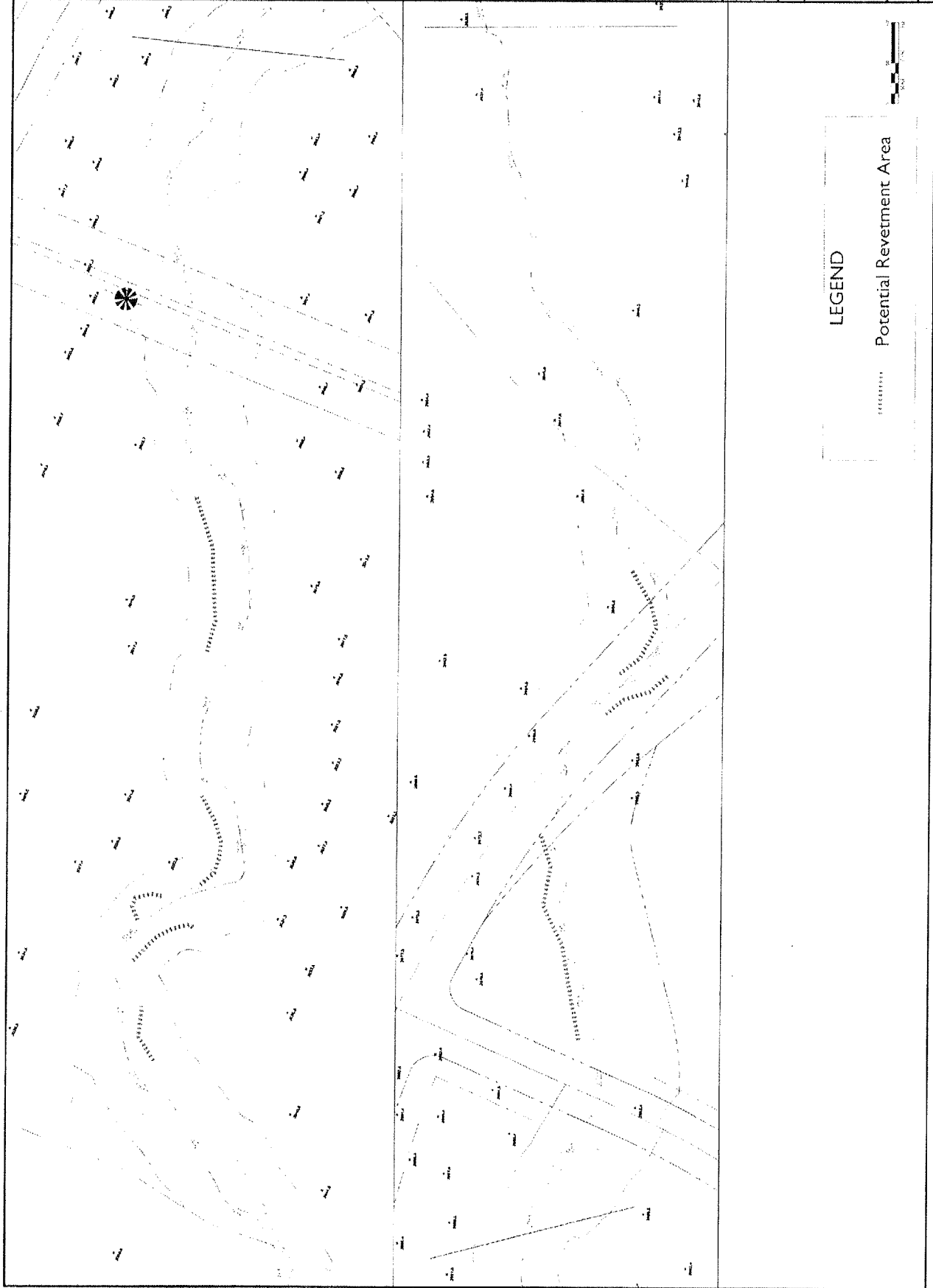
DATE	10/1/10
BY	SLG
REVISION	
NO.	
DATE	
BY	
REVISION	
NO.	
DATE	
BY	
REVISION	
NO.	



DATE	10/1/00
BY	SL
CHECKED BY	SL
APPROVED BY	SL
PROJECT NO.	00-0000
SHEET NO.	1

SKYE CANYON
SETBACK EXHIBIT 1
SKYE CANYON NORTH WASH

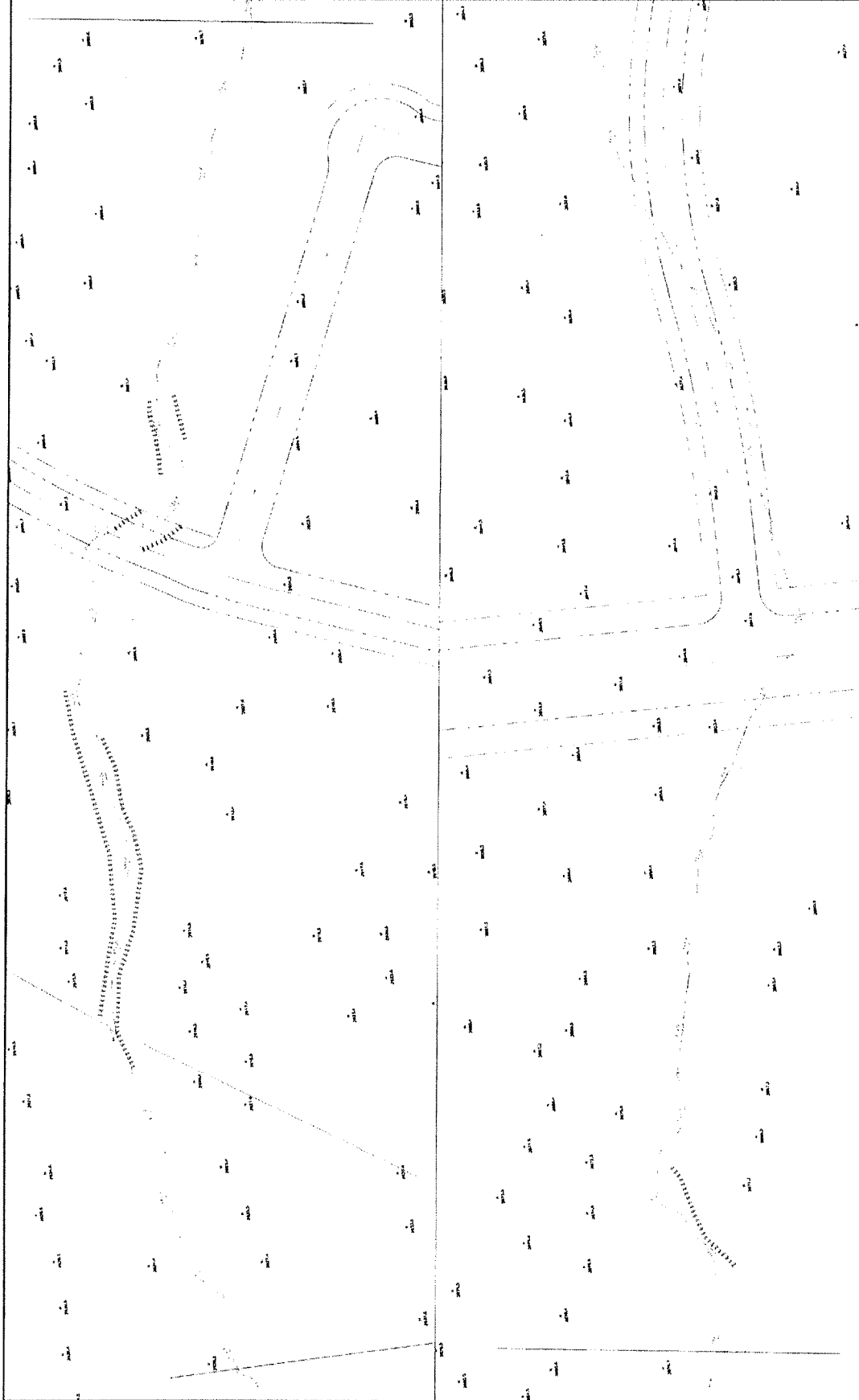
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BY	SL
CHECKED BY	SL
APPROVED BY	SL
PROJECT NO.	00-0000
SHEET NO.	1



DATE	10/1/00
BY	SLP
REVISION	



LEGEND
Potential Revetment Area



IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 1
A SINGLE FAMILY RESIDENTIAL SUBDIVISION

BY **Toll Brothers**
America's Luxury Home Builder

APN: 126-12-511-001 AND 126-12-511-003
CITY OF LAS VEGAS, NEVADA
37.63+/- ACRES
120 LOTS

APPROVED BY:
CITY OF LAS VEGAS

CITY OF LAS VEGAS PLANNING DEPARTMENT

CITY OF LAS VEGAS FIRE & RESCUE

CENTURYLINK

CENTRAL TELEPHONE COMPANY - dba CENTURYLINK
THE 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.

SOUTHWEST GAS CORPORATION

SOUTHWEST GAS CORPORATION SWG UID DATE
COX COMMUNICATIONS LAS VEGAS INC.

COX COMMUNICATIONS LAS VEGAS INC. DATE
NV ENERGY

NV ENERGY COMPANY DATE
NV ENERGY COMPANY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY COMPANY 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.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING AND ENGINEERING SERVICES
PROJECT NO. FIRST APPROVED DATE:
LVVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW 26 GPM
(SHEETS C-1, N-1, MU-1, U-1 THRU U-X AND P-1 THRU P-X)

LEGAL DESCRIPTION

LOTS 5.01 AND 5.03 OF THE SKY CANYON PHASE 4 FINAL MAP ON FILE IN THE CLARK COUNTY REDORDER'S OFFICE IN BOOK 160, PAGE 72 OF PLATS, SITUATE IN A PORTION OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

BENCHMARK

BENCHMARK NUMBER: USDA1934J

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT THE SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD.

ELEVATION = 2817.61 FEET. 858.81 METERS

N.A.V.D. 88 DATUM
PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE.

BASIS OF BEARINGS

SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 157, PAGE 41 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

OWNER/DEVELOPER:

TOLL SOUTH LV, LLC
1140 TOWN CENTER DRIVE, SUITE 250
LAS VEGAS, NEVADA 89144
PH#702.243.9800 FAX#702.243.9610

DESIGN ENGINEER:



RCI ENGINEERING

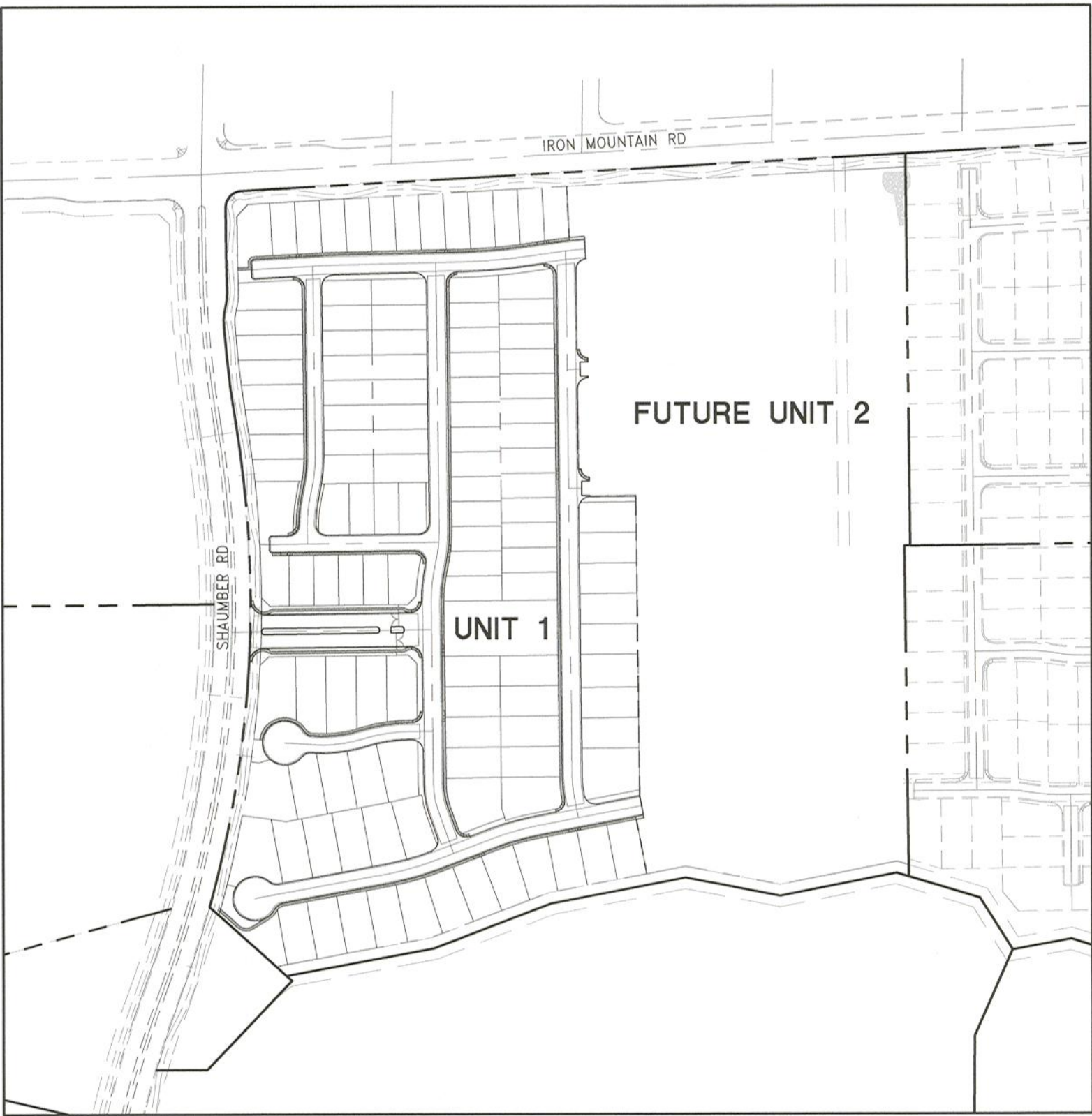
500 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89106
PH#702.453.0800 FAX#702.453.0801
www.rcinevada.com

SHEET INDEX

SHT No.	DWG ID	DRAWING DESCRIPTION
1	C-1	COVER SHEET
2	N-1	GENERAL NOTES, LEGEND, AND ABBREVIATIONS
3	G-1	GRADING PLAN (SHEET 1 OF 11)
4	G-2	GRADING PLAN (SHEET 2 OF 11)
5	G-3	GRADING PLAN (SHEET 3 OF 11)
6	G-4	GRADING PLAN (SHEET 4 OF 11)
7	G-5	GRADING PLAN (SHEET 5 OF 11)
8	G-6	GRADING PLAN (SHEET 6 OF 11)
9	G-7	GRADING PLAN (SHEET 7 OF 11)
10	G-8	GRADING PLAN (SHEET 8 OF 11)
11	G-9	GRADING PLAN (SHEET 9 OF 11)
12	G-10	GRADING PLAN (SHEET 10 OF 11)
13	G-11	GRADING PLAN (SHEET 11 OF 11)
14	D-1	GRADING DETAILS (SHEET 1 OF 3)
15	D-2	GRADING DETAILS (SHEET 2 OF 3)
16	D-3	GRADING DETAILS (SHEET 3 OF 3)
17	P-1	PLAN AND PROFILE - EX STORM DRAIN



VICINITY MAP
NOT TO SCALE



SITE PLAN
NOT TO SCALE

DISCLAIMER NOTE:

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

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
FREWAY AND ARTERIAL
SYSTEM OF TRANSPORTATION

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

FOR REVIEW ONLY

DATE: January 14, 2021
HORIZ. SCALE: N/A
VERT. SCALE: CS
DRAWN BY: DSP
DESIGNED BY: JIL
CHECKED BY: JIL
APPROVED BY: JIL
PROJECT #: 3110.0060

TOLL BROTHERS INC.
1140 TOWN CENTER DRIVE SUITE 250
LAS VEGAS, NV 89144
PHONE: 702-243-9800 FAX: 702-243-9610

RCI ENGINEERING
500 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89106
MAIN: 702.453.0800 FAX: 702.453.0801

NEVADA

IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 1
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
COVER SHEET

PROFESSIONAL ENGINEER
JOHN I. LAND
Exp. 12/31/2021
CIVIL
No. 16441

DATE: 1/14/2021
DRAWING
C-1
SHT 1 OF 17
CLV DRAWING NUMBER
CLV PROJECT #

ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".

- ## CITY OF LAS VEGAS TRAFFIC NOTES

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW TRAFFIC SIGNS SHALL BE FABRICATED WITH DIAMOND GRADE VIB CLASS 6 REFLECTIVE SHEETING OR APPROVED EQUAL. ALL NEW TRAFFIC SIGNS, EXCEPT STREETNAME 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 ANTI-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.

- 5 THE 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 EXISTING 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 OMITTING, ADDING OR MODIFYING PAVEMENT MARKINGS AND TRAFFIC CONTROL SIGNS SUCH THAT ADEQUATE TRANSITIONS AND LANE TERMINATIONS BETWEEN ADJACENT ROADWAY SEGMENTS ARE CONSTRUCTED.

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.

- CITY OF LAS VEGAS GRADING NOTES

- ## STORMWATER RUNOFF MANAGEMENT

- SOUTHWEST GAS CONSTRUCTION NOTES

IN THE EVENT OF NATURAL GAS EMERGENCIES CALL 911 AND 1-877-860-8020
MINIMUM HORIZONTAL AND VERTICAL CLEARANCES BETWEEN NATURAL GAS FACILITIES AND ANY UNDERGROUND UTILITIES AND/OR
STRUCTURES, INCLUDING BUT NOT LIMITED TO WATER, SEWER, STORM DRAIN, COMMUNICATIONS, AND ELECTRIC SHALL BE AT LEAST
12-INCHES OR GREATER. ALL DIGITING OF LOCALITY CODES SHALL BE IN ACCORDANCE WITH THE STANDARD
(a) ANY DEVIATION FROM SPECIFIED MINIMUM CLEARANCES MUST BE APPROVED BY ALL AFFECTED UTILITIES AND/OR MUNICIPALITIES
FOR VALVE ADJUSTMENT CONTACT 702-358-7881 14 DAYS PRIOR TO CONSTRUCTION
IN THE EVENT OF A NATURAL GAS CONFLICT WITH PROPOSED UTILITIES AND STRUCTURES CONTACT 702-355-2099
FOR STANDBY WHEN EXCAVATING (INCLUDING SAW CUTTING AND PAVEMENT REMOVAL) OVER OR NEAR HIGH PRESSURE GAS LINES
CONTACT 702-278-8451 48 HOURS PRIOR TO CONSTRUCTION
CAUTION: HIGH PRESSURE GAS!!
CALL SOUTHWEST GAS AT 702-278-8451 FOR STANDBY WHEN EXCAVATING
OVER OR NEAR HIGH PRESSURE GAS LINES 48 HOURS PRIOR TO CONSTRUCTION

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 OFF-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.

- LAS VEGAS VALLEY WATER DISTRICT
(LVVWD) STANDARD NOTES

LVVWD PROJECT # _____ - _____
(REVISED 08/01/2017)

15. **NO LEAD COMPLIANCE NOTE:**
TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER BRASS PRODUCTS PROPOSED TO BE RELOCATED, OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

APPROVED FOR CONSTRUCTION

PROJECT NO. _____ LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
FIRST APPROVED DATE: _____

CITY OF LAS VEGAS STREETLIGHT NOTES

- DISCLAIMER NOTE:**
- UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UNDERGROUND AND OVERHEAD UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION. CONTRACTOR TO NOTIFY ENGINEER OF ANY CHANGES OR DISCREPANCIES.

all before you Dig	
--------------------	--

AVOID CUTTING UNDERGROUND
UTILITY LINES. IT'S COSTLY.

Call



OR

800-227-2600

FAST



Call
before you
UnderGround
1-702-432-5300

FRESHWATER AND SEWAGE
SYSTEM OF TRANSPORTATION

POWER LINES. IT'S COSTLY.

**CALL BEFORE
YOU DO
OVERHEAD**



1-702-227-2929

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		ROW OR PROPERTY LINE
		EASEMENT LINE
		CENTERLINE
		CURB
		VALLEY GUTTER
		EDGE OF PAVEMENT
		SIDEWALK
		SIDEWALK RAMP
		DRIVEWAY
		SAWCUT LINE
		RETAINING WALL
		FLOOD WALL
		WROUGHT IRON VEHICULAR GATES
		WROUGHT IRON PEDESTRIAN GATES
		INDEX CONTOURS
		INTERMEDIATE CONTOURS
		ROUGH GRADE INDEX CONTOURS
		ROUGH GRADE INTERMEDIATE CONTOURS
		CUT OR FILL SLOPE
		CUT AND FILL LINE
		LOT NUMBER
		FF AND PAD ELEVATION
		GRADE SLOPE
		SPOT ELEVATION
		SWALE LINE
		LOT DIMENSION
		SIGHT VISIBILITY ZONE
		WATERLINE MAIN AND SIZE
		FIRE HYDRANT
		WATER METER AND SERVICE
		LATERAL
		WATER VALVE
		WATER FITTINGS
		WATER LINE REDUCER
		WATER CAP WITH WATER BLOW OFF ASSEMBLY
		IRRIGATION SLEEVE
		PRESSURE REDUCING VALVE
		REDUCED PRESSURE PRINCIPLE ASSEMBLY
		SEWERLINE MAIN AND SIZE
		SEWERLINE MANHOLE
		SEWERLINE CAP
		SEWER LATERAL
		BACK WATER VALVE
		100W HPS STREET LIGHT
		250W HPS STREET LIGHT
		400W HPS STREET LIGHT
		STREET LIGHT CONDUIT AND CAP
		FIBER OPTIC CONDUIT AND CAP
		PULLBOX
		REFLECTIVE FIRE HYDRANT MARKER
		STORM DRAIN MAIN AND SIZE
		ROCK RIP RAP
		STORM DRAIN MANHOLE
		STORM DRAIN DROP INLET

ABBREVIATIONS

AGG	AGGREGATE	FG	FINISH GRC
AC	ASPHALTIC CONCRETE	FL	FLOW LINE
AC	ANGLE POINT	FUT	FUTURE
BC	BACK OF CURB	PL-G	PLASTIC
BIS	BEGIN STREET IMPROVEMENTS	STG	STEEL GAGE
BIS	BEGINNING OF VERTICAL CURVE	SV	STREET VALVE
B	BENCH MARK	HP	HIGH POINT
B	BOUNDARY	HDP	HIGH DRAIN
BKRY	BORER	HSI	HALF INCH
CATV	CABLE TELEVISION	HSP	HIGH PRESSURE
CL	CENTERLINE	HPP	HIGH PUMP
CCUSD	CLARK COUNTY UNIFORM STANDARD	INT	INTERSECTION
CCUSD	DRAWINGS	INVT	INVERT
CCWRD	CLARK COUNTY WATER RECLAMATION	LV	LAS VEGAS
CDISTRICT	DISTRICT	LVWLD	LEFT
CE	CENTER OF MANHOLE	LF	LINEAR FEET
CO	CLEAN OUT, SEWER	MH	MANHOLE
COMM	COMMERCIAL	MAX	MAXIMUM
CONC, PCC	CONCRETE	MIN	MINIMUM
CONST	CONSTRUCTION OR CONSTRUCT	NIS	NOT TO
CONC	CURB V. CY	ON	ON CENTER
CU	CU, FT, CY	PVMT	PAVEMENT
CF	CURB FACE	PC	POINT OF
CF	CURB FACE	PC	POINT OF
DESIGN	DESIGN AND CONSTRUCTION	PC	POINT OF
DCSWCS	STANDARDS FOR WASTEWATER COLLECTION SYSTEMS	PC	POINT OF
DIA	DIAMETER	PCC	PORTLAND
DWY	DRIVEWAY	PUE	PUBLIC
DWY	DROP INLET	PVO	POLYVINYL
DE	DRAINAGE EASEMENT	PP	POWER PP
ESMT	EASEMENT	PL	POWER
E	END STREET IMPROVEMENTS	PROPERTY	PROPERTY
EP	EDGE OF PAVEMENT	PROP	POINT OF
E	ELECTRIC	PROG	PROPOSED
ELEV	ELEVATION	PULL BOX	PULL BOX
ECR	END OF CURB RETURN	RP	RADIUS RP
REDUCED	REDUCED	RPPA	REDUCED
EX, EXIST	EXISTING	ASSEMBLY	ASSEMBLY
FT	FEET OR FOOT	REINF	REINFORCED
FTG	FOOTING WALL	RFB	REINFORCED
FH	FIRE HYDRANT	RCP	REINFORCED

QUANTITY ESTIMATE

DESCRIPTION	PUBLIC	PRIVATE
2-INCH ASPHALTIC CONCRETE PAVING	- SY	17,173 SY
TYPE II GRAVEL	- CY	3,048 CY
CURB & GUTTER (24-INCH)	- LF	675 LF
CURB & GUTTER (30-INCH)	- LF	8,647 LF
"A" TYPE ISLAND CURB	- LF	514 LF
CONCRETE VALLEY GUTTER	- SF	5,752 SF
5-INCH CONCRETE SIDEWALK	- SF	27,143 SF
SIDEWALK UNDERDRAIN	- EA	- EA
5/4" WATER METER	- EA	- EA
5/4" IRRIGATION METER WITH 1" RPPA	- EA	- EA
CABLE/SERVICE/PHONE CABLE SERVICE TO LOTS	- EA	120 EA
SURVEY MONUMENTS	- EA	- EA
ADA RAMPS	- EA	- EA
4-INCH SEWER LATERAL	- LF	- LF
8-INCH PVC SEWER MAIN	- LF	- LF
8-INCH C-900 SEWER MAIN	- LF	- LF
48-INCH SEWER MANHOLES	- EA	- EA
BACKWATER VALVES	- EA	- EA
WATER LATERAL	- LF	- LF
5-INCH PVC WATER MAIN	- LF	- LF
8-INCH PVC WATER MAIN	- LF	- LF
12-INCH PVC WATER MAIN	- LF	- LF
12-INCH DIP WATER MAIN	- LF	- LF
FIRE HYDRANT	- EA	- EA
FIRE CRASH GATE (WROUGHT IRON)	- SF	- SF
LIGHT STANDARD (STD. BASE)	- EA	- EA
1-1/4" 14" STREET LIGHT CONDUIT	- LF	- LF
SLD 200 AMP SERVICE PEDESTAL	- EA	- EA
STREET SIGNS - STAND ALONE	- EA	- EA
#3 PULLBOX	- EA	- EA
USD 601 BARRICADE (5FT)	- EA	- EA
IRRIGATION METER WITH 1" RPPA	- EA	- EA

DRAINAGE QUANTITY ESTIMATE

18-INCH STORM DRAIN	- LF	- LF
24-INCH STORM DRAIN	- LF	- LF
30-INCH STORM DRAIN	- LF	- LF
36-INCH STORM DRAIN	- LF	- LF
60-INCH SD MANHOLE (>8')	- EA	- EA
48-INCH SD MANHOLE (>5')	- EA	- EA
5-FOOT TYPE CM2 DROP INLET	- EA	- EA
7.5-FOOT TYPE CM2 DROP INLET	- EA	- EA
10-FOOT TYPE CM2 DROP INLET	- EA	- EA
12.5-FOOT TYPE CM2 DROP INLET	- EA	- EA
15.0-FOOT TYPE CM2 DROP INLET	- EA	- EA
22.5-FOOT TYPE CM2 DROP INLET	- EA	- EA
72" x72" JENSEN PRECAST INLET	- EA	- EA
RIP RAP (050=6")	- CY	- CY
ABANDON PRIVATE RCP	- LF	- LF
DE WROUGHT IRON FENCE	- SF	- SF

NOTE:
THIS QUANTITY ESTIMATE IS FOR BONDING PURPOSES ONLY.
CONTRACTOR TO DETERMINE INDEPENDENT ESTIMATIONS.

BENCHMARK

BENCHMARK NUMBER: USDA1934J

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT THE
SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD.

ELEVATION = 2817.61 FEET. 858.81 MET
N.A.S.D. 88 DATUM

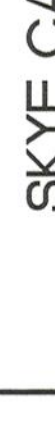
N.W. 1/4, 68 DATUM
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BASIS OF BEARINGS

SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF
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SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK
COUNTY NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 157, PAGE
41 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

DEVIATIONS FROM STANDARDS

NONE

 DATE: <u>1/14/2021</u> DRAWING N-1 SHEET <u>2</u> OF <u>17</u> CITY PROJECT #	IMPROVEMENT PLANS FOR SKYE CANYON 501 AND 503 UNIT 1 A SINGLE FAMILY RESIDENTIAL SUBDIVISION GENERAL NOTES, LEGEND, AND ABBREVIATIONS CITY OF LAS VEGAS NEVADA	 RCI ENGINEERING 1140 RAILROAD AVENUE, SUITE 250 LAS VEGAS, NV 89144 PHONE: 702-243-9800 FAX: 702-243-9810 RCI ENGINEERING 500 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89106 MAIN: 702-453-0800 FAX: 702-453-0801	DATE: January 14, 2021 WBSZ SCALE: N/A VERT. SCALE: N/A DRAWN BY: CS CHECKED BY: DSP JLL PROJECT #: 3110.00860	REV DESCRIPTION BY APPRO	FOR REVIEW ONLY
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Call before you Dig
Avoid cutting underground utility lines. It's costly.

Call
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UnderGround
1-702-432-5300
FREWAY AND ARTERIAL
SYSTEM OF TRANSPORTATION

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

AVOID HITTING OVERHEAD
POWER LINES. IT'S COSTLY.

CALL BEFORE
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OVERHEAD
1-702-227-2929

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PERMIT APPLICATION.

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EXISTS) WITHIN THE SIGHT VISIBILITY ZONES.

FLOOD ZONE NOTE

ACCORDING TO THE FEMA FLOOD INSURANCE RATE MAP
(FIRM) COMMUNITY PANEL NUMBERS 32003C1750 E DATED
SEPTEMBER 27, 2002, THE SITE IS LOCATED IN A ZONE "X".

NOTE

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ASSOCIATED FACILITIES ARE PRIVATELY
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BY THE HOA

NOTE

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30' 15' 0' 30' 60'
SCALE: 1" = 30'

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- SOIL REPORT NOTE:
GRADING SHALL BE IN ACCORDANCE
WITH SOILS REPORT PREPARED BY:
ENGINEER: GEOTEK RESIDENTIAL, LLC
PROJECT NO. 12203.3BC-LVR
DATED: JULY 1, 2020
- CUT/FILL ESTIMATES
EXISTING TO FINISH GRADE ELEVATIONS
NET CUT: 107,632 CY
NET FILL: 108,510 CY
- SEE DETAIL 19/D-2 FOR TYPICAL LOT DRAINAGE
- FOR STORMWATER RUNOFF MANAGEMENT NOTES REFER TO SHEET N-1

CONSTRUCTION NOTES

- CONSTRUCT AC PAVEMENT PER DETAILS 1 THRU 3 ON SHEET D-1
- CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
- CONSTRUCT MODIFIED "ROLL" TYPE CURB AND GUTTER PER CCAUSD #217.1
- CONSTRUCT "A" TYPE ISLAND CURB AND GUTTER PER CCAUSD #219
- CONSTRUCT 5' CURB TRANSITION PER DETAIL 20 SHEET D-2
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- CONSTRUCT SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD #235 (CASE 1)
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- CONSTRUCT STAIRS, 3 STEPS EACH WITH 5' LANDING ABOVE AND BELOW
- REMOVE EXISTING CURB AND CONSTRUCT COMMERCIAL DRIVEWAY PER CCAUSD #224

I HEREBY CERTIFY THAT THIS GRADING
PLAN IS IN CONFORMANCE WITH THE
APPROVED DRAINAGE STUDY DS #XXXXX
ON FILE WITH CITY OF LAS VEGAS FOR
THIS PROJECT.

JOHN I. LAND, PE NO. 16441 DATE

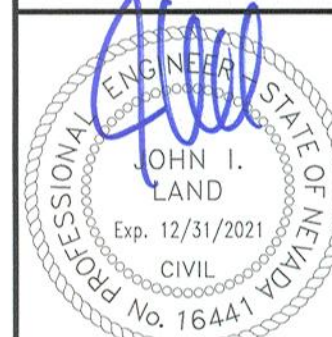
TOLL BROTHERS INC.

1140 TOLL CENTER DRIVE, SUITE 250
LAS VEGAS, NV 89169
PHONE: 702-243-9800 FAX: 702-243-9810

RCI ENGINEERING



IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 1
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
GRADING PLAN (SHEET 1 OF 11)



DATE: 1/14/2021

DRAWING
G-1
SHT 3 OF 17
CLV DRAWING NUMBER

CLV PROJECT #

G:\3110_10A\0860 Sky Canyon 5.01-5.03_Civil_LPS UNIT 1\3003_G-1_SC_501-503_U1.dwg schaw 1/14/21 1:11pm

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BENCHMARK

BENCHMARK NUMBER: USDA1934J

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT THE
SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD.
ELEVATION = 2817.61 FEET. 858.81 METERS
N.A.V.D. 88 DATUM
PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE.

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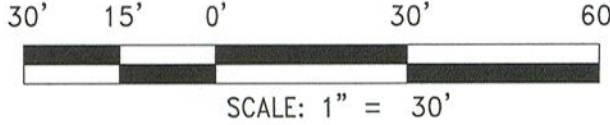
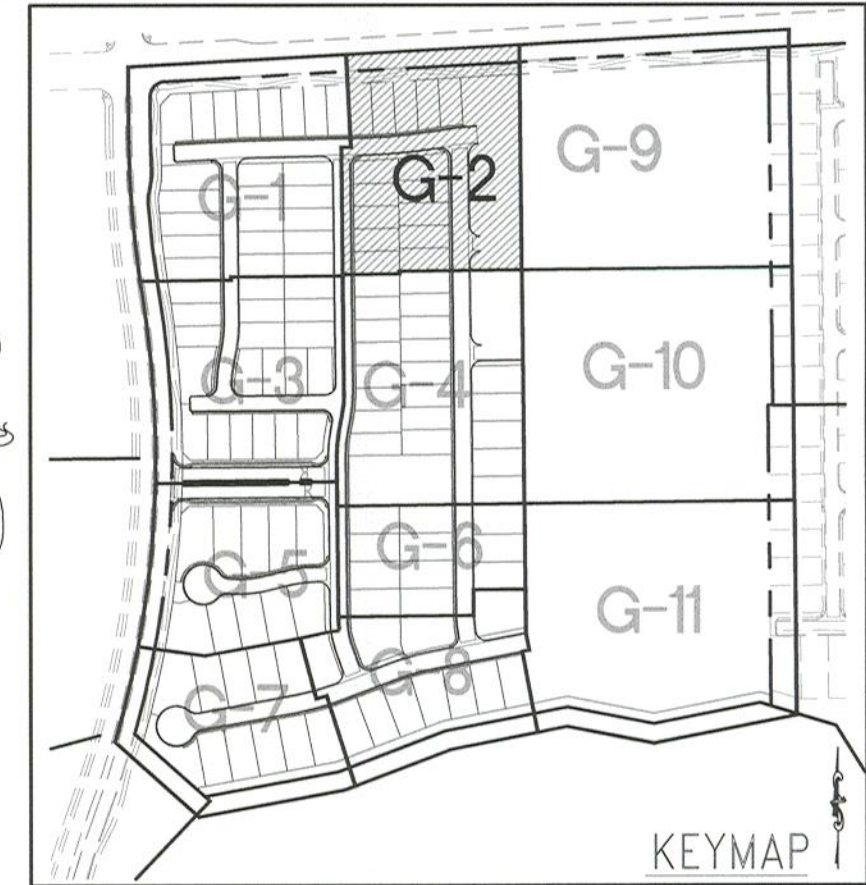
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ENGINEER: GEOTEK RESIDENTIAL, LLC
PROJECT NO. 12203.38C-LVR
DATED: JULY 1, 2020
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EXISTING TO FINISH GRADE ELEVATIONS
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JOHN I. LAND, PE. NO. 16441 DATE

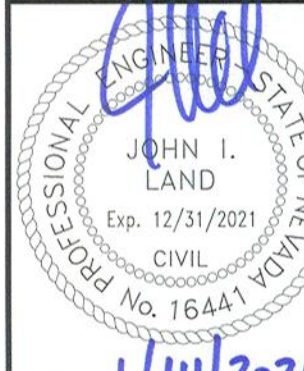
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LAS VEGAS, NV 89106
PHONE: 702-242-9800 FAX: 702-242-9810

RCI ENGINEERING

500 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89106
PHONE: 702-453-0800 FAX: 702-453-0801

IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 1
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
GRADING PLAN (SHEET 2 OF 11)



DATE: 1/14/2021

DRAWING
G-2

SHEET 4 OF 17
CLV DRAWING NUMBER

CLV PROJECT #

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**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

BENCHMARK

BENCHMARK NUMBER: USDA1934J

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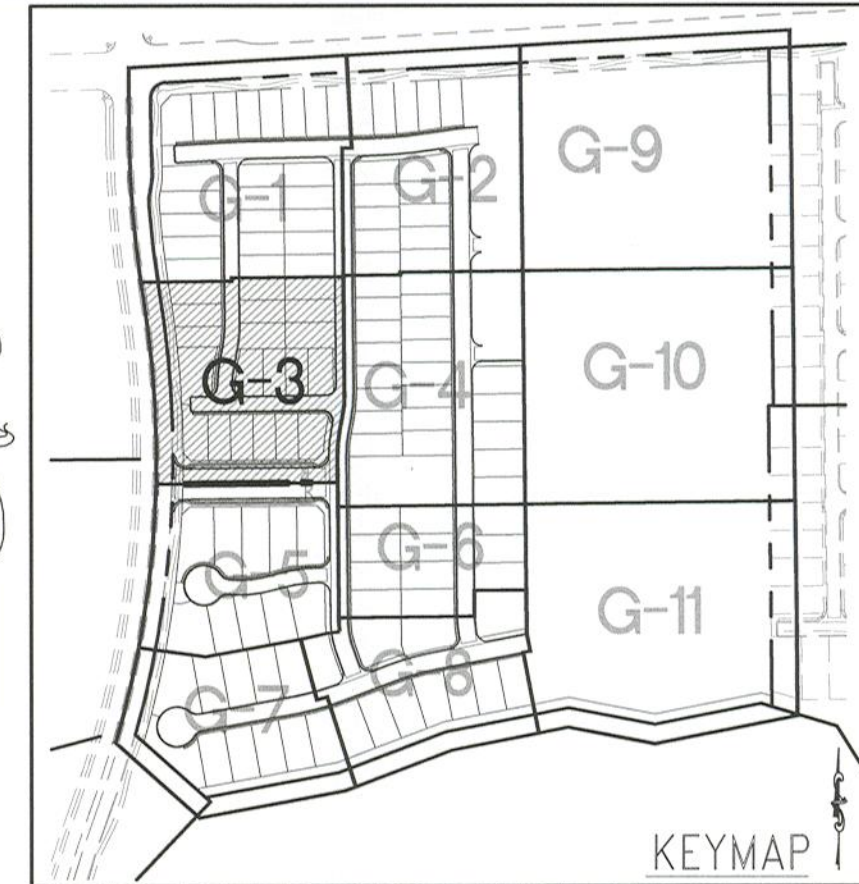
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30' 15' 0' 30' 60'
SCALE: 1" = 30'

ENGINEERS NOTES

- CONTRACTOR IS RESPONSIBLE FOR DUST AND EROSION CONTROL DURING CONSTRUCTION.
- SEE DETAIL SHEET FOR ON-SITE PAVEMENT SECTIONS. CONTRACTOR TO VERIFY WITH SOILS REPORT.
- SEE FINAL MAP FOR EXACT PROPERTY LINE DIMENSIONS.
- ENGINEER TO BE NOTIFIED OF ANY DISCREPANCIES IMMEDIATELY.
- THESE PLANS SHALL NOT, IN PART OR IN WHOLE, BE USED FOR CONSTRUCTION UNTIL APPROVED AND SIGNED BY THE GOVERNING AGENCIES.
- ALL GRADING SHALL CONFORM TO SOILS REPORT RECOMMENDATIONS.
- DURING CONSTRUCTION, SURVEYORS AND CONTRACTORS MUST VERIFY THAT ALL STREETS AND LOTS HAVE POSITIVE DRAINAGE. SAME MUST UTILIZE AT LEAST THREE GRADES ON VERTICAL TANGENTS TO VERIFY SLOPES.
- SOIL REPORT NOTE:
GRADING SHALL BE IN ACCORDANCE
WITH SOILS REPORT PREPARED BY:
ENGINEER: GOTEK RESIDENTIAL, LLC
PROJECT NO. 12203.3BC-LVR
DATED: JULY 1, 2020
- CUT/FILL ESTIMATES
EXISTING TO FINISH GRADE ELEVATIONS
NET CUT: 107,632 CY
NET FILL: 108,510 CY
- SEE DETAIL 19/D-2 FOR TYPICAL LOT DRAINAGE
- FOR STORMWATER RUNOFF MANAGEMENT NOTES REFER TO SHEET N-1

CONSTRUCTION NOTES

- CONSTRUCT AC PAVEMENT PER DETAILS 1 THRU 3 ON SHEET D-1
- CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
- CONSTRUCT MODIFIED "ROLL" TYPE CURB AND GUTTER PER CCAUSD #217.1
- CONSTRUCT "A" TYPE ISLAND CURB AND GUTTER PER CCAUSD #219
- CONSTRUCT 5' CURB TRANSITION PER DETAIL 20 SHEET D-2
- CONSTRUCT 5' SIDEWALK PER CCAUSD #234 (5-INCH THICK WHEN CONTIGUOUS TO "ROLL" TYPE CURB)
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- CONSTRUCT 5' WIDE PEDESTRIAN ACCESS GATE
- INSTALL ELECTRONICALLY CONTROLLED ACCESS GATES
- CONSTRUCT STAIRS, 3 STEPS EACH WITH 5' LANDING ABOVE AND BELOW
- REMOVE EXISTING CURB AND CONSTRUCT COMMERCIAL DRIVEWAY PER CCAUSD #224

I HEREBY CERTIFY THAT THIS GRADING
PLAN IS IN CONFORMANCE WITH THE
APPROVED DRAINAGE STUDY DS #XXXXX
ON FILE WITH CITY OF LAS VEGAS FOR
THIS PROJECT.

JOHN I. LAND, PE NO. 16441 DATE

TOLL BROTHERS INC.

1140 TOWN CENTER DRIVE SUITE 250

LAS VEGAS, NV 89144

PHONE: 702-242-9800 FAX: 702-242-9810

PROJECT NO. 12203.3BC-LVR

DATE: JANUARY 14, 2021

SCALE: 1"=30'

VERT. SCALE: N/A

DESIGNED BY: CS

CHECKED BY: DSP

APPROVED BY: JIL

PROJECT #:

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Call before you Dig
AVOID CUTTING UNDERGROUND
UTILITY LINES. IT'S COSTLY.



1-800-227-2600

FAST



Call before you
UnderGround
1-702-432-5300

AVOID HITTING OVERHEAD
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1-702-227-2929

BENCHMARK

BENCHMARK NUMBER: USDA1934J

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT THE SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD. ELEVATION = 2817.61 FEET. 858.81 METERS N.A.V.D. 88 DATUM PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE.

BASIS OF BEARINGS

SOUTH 00°54'18" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 157, PAGE 41 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

SURVEY MONUMENT NOTE

OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS REQUIRED BY CITY OF LAS VEGAS AND CLARK COUNTY UNIFORM STANDARD DRAWING NUMBER 243. OWNER IS ALSO RESPONSIBLE TO REPLACE ALL SURVEY MONUMENTATION DAMAGED, DESTROYED, OR OBSCURED DURING CONSTRUCTION.

BUILDING PERMIT NOTE

ALL STRUCTURES SHOWN OR INDICATED ON THIS SUBMITTAL WITHIN THE PROPERTY REQUIRE A BUILDING PERMIT APPLICATION AND SUBMITTAL THIS INCLUDES BUILDINGS, ABOVE GROUND TANKS, SIGNS, RETAINING WALLS, FENCES, TRASH ENCLOSURES, SHADE STRUCTURES, STAIRWAYS, RAMPS, LIGHT POLES, LIGHT BOLLARDS, ETC. THIS DOES NOT INCLUDE ANY FLOOD CONTROL STRUCTURE SUCH AS PIPES, CULVERTS, ARCH CULVERTS, HEADWALLS, ETC. THIS DOES NOT INCLUDE ANY WORK WITHIN A PUBLIC STREET RIGHT-OF-WAY. THIS DOES NOT INCLUDE PRIVATE STREETS. THE REVIEW OF CIVIL IMPROVEMENT AND/OR GRADING PLANS DOES NOT INCLUDE ANY REVIEW OF ANY STRUCTURE THAT REQUIRES A BUILDING PERMIT APPLICATION.

SIGHT VISIBILITY ZONE

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FLOOD ZONE NOTE

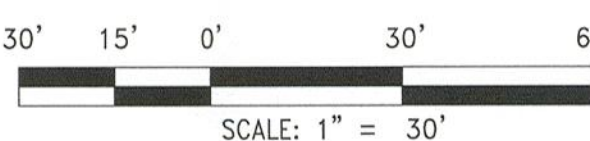
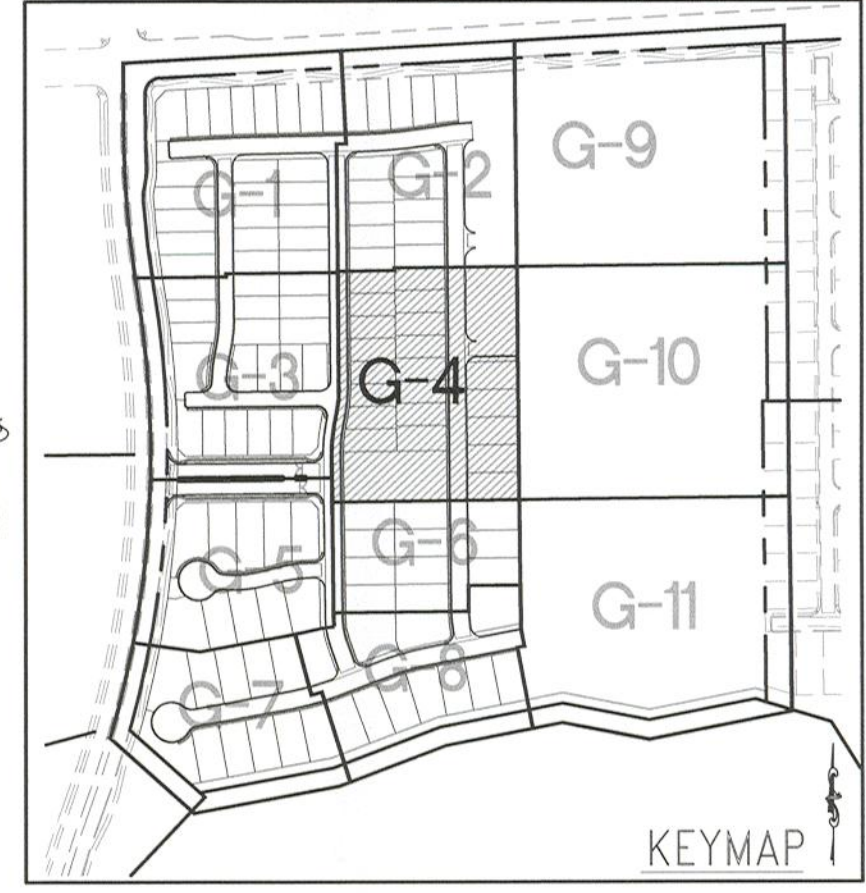
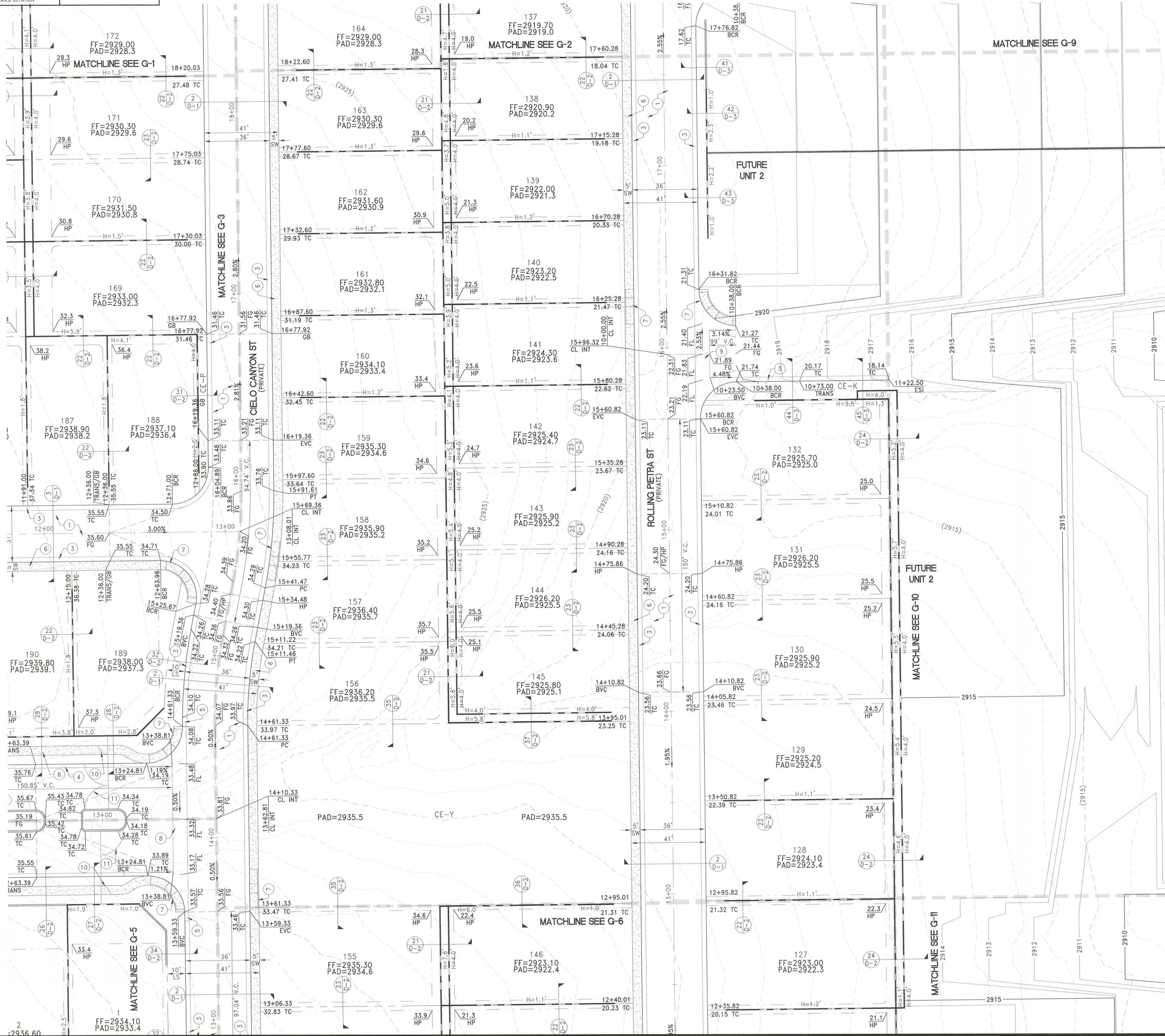
ACCORDING TO THE FEMA FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY PANEL NUMBERS 320031750 E DATED SEPTEMBER 27, 2002, THE SITE IS LOCATED IN A ZONE "X".

NOTE

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GRADING SHALL BE IN ACCORDANCE WITH SOILS REPORT PREPARED BY:
ENGINEER: GEOTEK RESIDENTIAL, LLC
PROJECT NO. 12203.3BC-LVR
DATED: JULY 1, 2020
- CUT/FILL ESTIMATES
EXISTING TO FINISH GRADE ELEVATIONS
NET CUT: 107,632 CY
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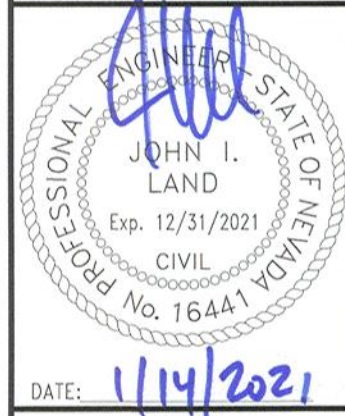
I HEREBY CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS #XXXXXX ON FILE WITH CITY OF LAS VEGAS FOR THIS PROJECT.

JOHN I. LAND, PE NO. 16441 DATE

REV	DESCRIPTION	DATE
1	1"=30'	January 14, 2021
2	N/A	1"=30'
3	CS	1"=30'
4	DSP	1"=30'
5	JUL	1"=30'
6	3110.0000	1"=30'

TOLL BROTHERS INC.
1140 TOWN CENTER DRIVE, SUITE 250
LAS VEGAS, NV 89144
PHONE: 702-243-9800 FAX: 702-243-9810
MARK: 702-453-8800 FAX: 702-453-8801

IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 1
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
GRADING PLAN (SHEET 4 OF 11)



DATE: 1/14/2021
DRAWING
G-4
SHT 6 OF 17
CLV DRAWING NUMBER
CLV PROJECT #

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

FAST

 Call
before you

UnderGround
1-702-432-5300

**FREWAY AND ARTERIAL
SYSTEM OF TRANSPORTATION**

AVOID HITTING OVERHEAD
POWER LINES. IT'S COSTLY.

CALL BEFORE
YOU DO
OVERHEAD

1-702-227-2929

BENCHMARK NUMBER: USDA1934J

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT THE
SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD.
ELEVATION = 2817.61 FEET. 858.81 METERS
N.A.V.D. 88 DATUM
PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE.

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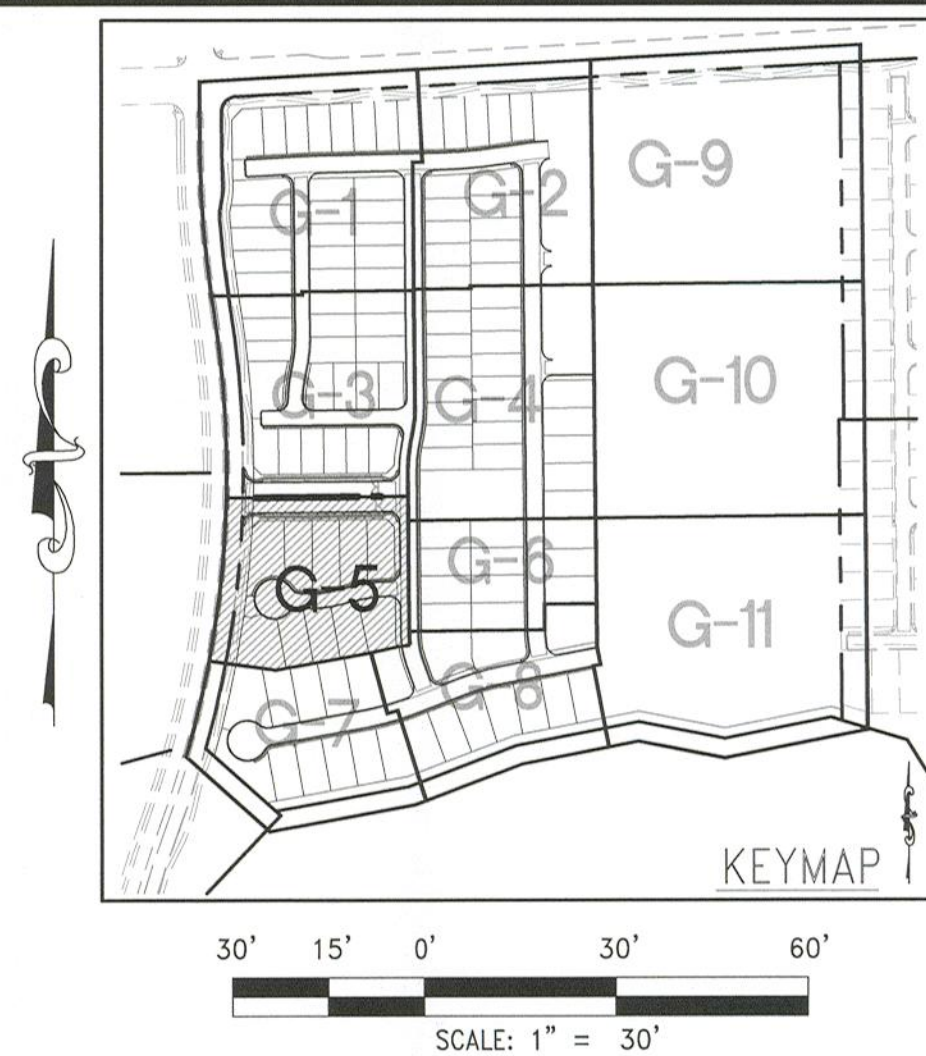
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ACCORDING TO THE FEMA FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY PANEL NUMBERS 32003C1750 E DATED SEPTEMBER 27, 2002, THE SITE IS LOCATED IN A ZONE "X"

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1. CONTRACTOR IS RESPONSIBLE FOR DUST AND EROSION CONTROL DURING CONSTRUCTION.
2. SEE ATTACHED SHEET FOR ON-SITE PAVEMENT SECTIONS. CONTRACTOR TO VERIFY WITH SOILS REPORT.
3. SEE FINAL MAP FOR EXACT PROPERTY LINE DIMENSIONS.
4. ENGINEER TO BE NOTIFIED OF ANY DISCREPANCIES IMMEDIATELY.
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8. SOIL REPORT NOTE:
GRADING SHALL BE IN ACCORDANCE
WITH SOILS REPORT PREPARED BY:
ENGINEER: GEOTEK RESIDENTIAL, LLC
PROJECT NO. 12203.38C-LVR
DATED: JULY 1, 2020
9. CUT/FILL ESTIMATES
EXISTING TO FINISH GRADE ELEVATIONS
NET CUT: 107,652 CY
NET FILL: 108,510 CY
10. SEE SHEET 19/D-2 FOR TYPICAL LOT DRAINAGE
11. FOR STORMWATER RUNOFF MANAGEMENT NOTES REFER TO SHEET N-1

- ① CONSTRUCT AC PAVEMENT PER DETAILS 1 THRU 3 ON SHEET D-1
- ② CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
- ③ CONSTRUCT MODIFIED "ROLL" TYPE CURB AND GUTTER PER CCAUSD #217.
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- ⑬ REMOVE EXISTING CURB AND CONSTRUCT COMMERCIAL DRIVEWAY PER CCAUSD #224

I HEREBY CERTIFY THAT THIS GRADING
PLAN IS IN CONFORMANCE WITH THE
APPROVED DRAINAGE STUDY DS #XXXXX
ON FILE WITH CITY OF LAS VEGAS FOR
THIS PROJECT.

JOHN I. LAND, PE NO. 16441 DAT

TOLL BROTHERS INC.

1140 TOWN CENTER DRIVE SUITE 250
LAS VEGAS, NV 89144
PHONE: 702-243-9800 FAX: 702-243-9610

RCI ENGINEERING
500 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89106
MAIN: 702.453.0860 FAX: 702.453.0801

IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 1
IGLE FAMILY RESIDENTIAL SUBDIVISION
GRADING PLAN (SHEET 5 OF 11)

DATE: 1/14/2021

DRAWING
G-5

SHT 7 OF 17

CLV DRAWING NUMBER
CLV PROJECT #

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FREIGHTWAY AND ARTERIAL
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AVOID HITTING OVERHEAD
POWER LINES. IT'S COSTLY.
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1-702-227-2929

BENCHMARK

BENCHMARK NUMBER: USDA1934J

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BUILDING PERMIT NOTE

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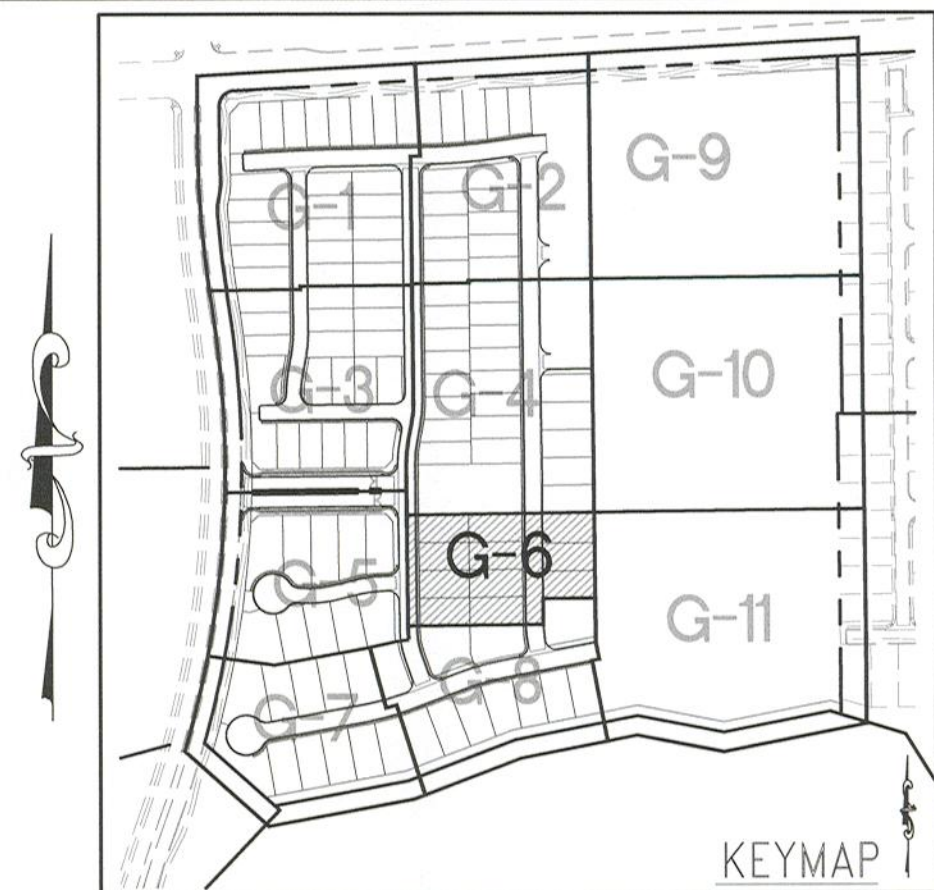
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30' 15' 0' 30' 60'
SCALE: 1" = 30'

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PROJECT NO. 12203.3BC-LVR
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TOLL BROTHERS INC.

1140 TOWN CENTER DRIVE SUITE 250
LAS VEGAS, NV 89144
PHONE: 702-243-9800 FAX: 702-243-9510

RCI ENGINEERING

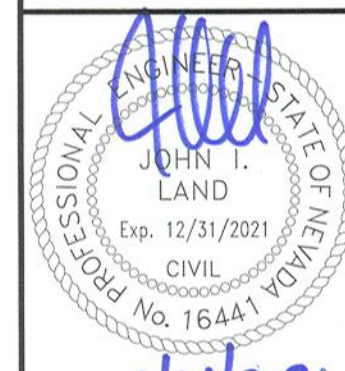
505 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89108
MARK: 702-453-6800 FAX: 702-453-0801

IMPROVEMENT PLANS FOR

SKYE CANYON 5.01 AND 5.03 UNIT 1

A SINGLE FAMILY RESIDENTIAL SUBDIVISION

GRADING PLAN (SHEET 6 OF 11)



DATE: 1/14/2021

DRAWING

G-6

SHT 8 OF 17

CLV DRAWING NUMBER

CLV PROJECT #

JOHN I. LAND, PE NO. 16441 DATE

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FREEMAN AND ARTERIAL
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BENCHMARK

BENCHMARK NUMBER: USDA1934J
U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT THE
SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD.
ELEVATION = 2817.61 FEET. 858.81 METERS
N.A.V.D. 88 DATUM
PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE.

BASIS OF BEARINGS

SOUTH 0°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF
THE NORTHEAST QUARTER (NE1/4) OF SECTION 12, TOWNSHIP 19
SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK
COUNTY NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 157, PAGE
41 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

SURVEY MONUMENT NOTE

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REQUIRED BY CITY OF LAS VEGAS AND CLARK COUNTY UNIFORM
STANDARD DRAWING NUMBER 243. OWNER IS ALSO RESPONSIBLE
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OR OBSCURED DURING CONSTRUCTION.

BUILDING PERMIT NOTE

ALL STRUCTURES SHOWN OR INDICATED ON THIS SUBMITTAL
WITHIN THE PROPERTY REQUIRE A BUILDING PERMIT
APPLICATION AND SUBMITTAL THIS INCLUDES BUILDINGS, ABOVE
GROUND TANKS, SIGNS, RETAINING WALLS, FENCES, TRASH
ENCLOSURES, SHADE STRUCTURES, STAIRWAYS, RAMPS, LIGHT
POLES, LIGHT BOLLARDS, ETC. THIS DOES NOT INCLUDE ANY
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ANY REVIEW OF ANY STRUCTURE THAT REQUIRES A BUILDING
PERMIT APPLICATION.

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ACCORDING TO THE FEMA FLOOD INSURANCE RATE MAP
(FIRM) COMMUNITY PANEL NUMBERS 32003C1750 E DATED
SEPTEMBER 27, 2002, THE SITE IS LOCATED IN A ZONE "X".

NOTE

ALL ON-SITE STORM DRAINS AND THE
ASSOCIATED FACILITIES ARE PRIVATELY
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NOTE

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30' 15' 0' 30' 60'
SCALE: 1" = 30'

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- SOIL REPORT NOTE:
GRADING SHALL BE IN ACCORDANCE
WITH SOILS REPORT PREPARED BY:
ENGINEER: GOTEK RESIDENTIAL, LLC
PROJECT NO. 12203.5BC-LVR
DATED: JULY 1, 2020
- CUT/FILL ESTIMATES
EXISTING TO FINISH GRADE ELEVATIONS
NET CUT: 107,632 CY
NET FILL: 108,510 CY
- SEE DETAIL 19/D-2 FOR TYPICAL LOT DRAINAGE
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CONSTRUCTION NOTES

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I HEREBY CERTIFY THAT THIS GRADING
PLAN IS IN CONFORMANCE WITH THE
APPROVED DRAINAGE STUDY DS #XXXXXX
ON FILE WITH CITY OF LAS VEGAS FOR
THIS PROJECT.

JOHN I. LAND, PE NO. 16441 DATE

FOR REVIEW ONLY

DATE: JANUARY 14, 2021
HORIZ. SCALE: 1"=30'
VERT. SCALE: N/A
DRAWN BY: CS
DESIGNED BY: DSP
CHECKED BY: JIL
PROJECT #: 3110.0801

TOLL BROTHERS INC.
1140 TOWN CENTER DRIVE SUITE 250
LAS VEGAS, NV 89144
PHONE: 702-243-9800 FAX: 702-243-9810
RCI ENGINEERING
500 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89108
MAIN: 702-453.0800 FAX: 702-453.0801

STATE OF NEVADA
PROFESSIONAL ENGINEER
JOHN I. LAND
Exp. 12/31/2021
CIVIL
No. 16441

IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 1
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
GRADING PLAN (SHEET 7 OF 11)

DATE: 1/14/2021
DRAWING
G-7
SHT 9 OF 17
CLV DRAWING NUMBER
CLV PROJECT #

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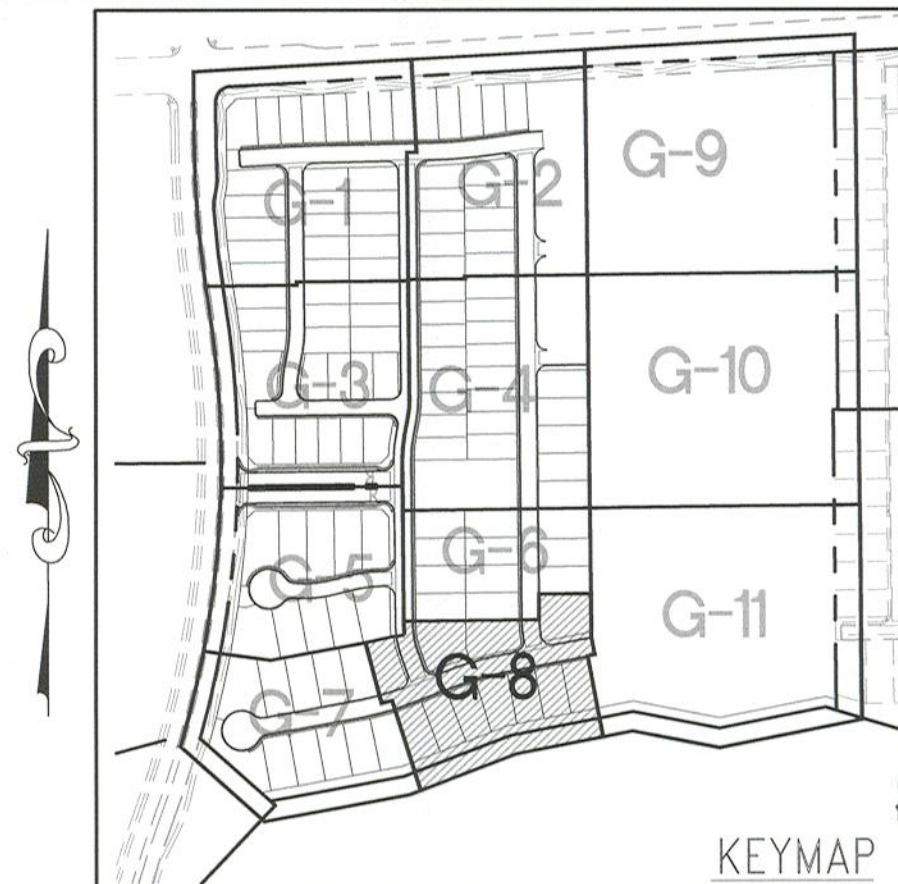
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JOHN I. LAND, PE NO. 16441 DATE

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IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 1
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
GRADING PLAN (SHEET 8 OF 11)
CITY OF LAS VEGAS

PROFESSIONAL ENGINEER
JOHN I. LAND
Exp. 12/31/2021
CIVIL
No. 16441
DATE: 11/14/2021

DRAWING
G-8
SHT 10 OF 17
CLV DRAWING NUMBER
CLV PROJECT #

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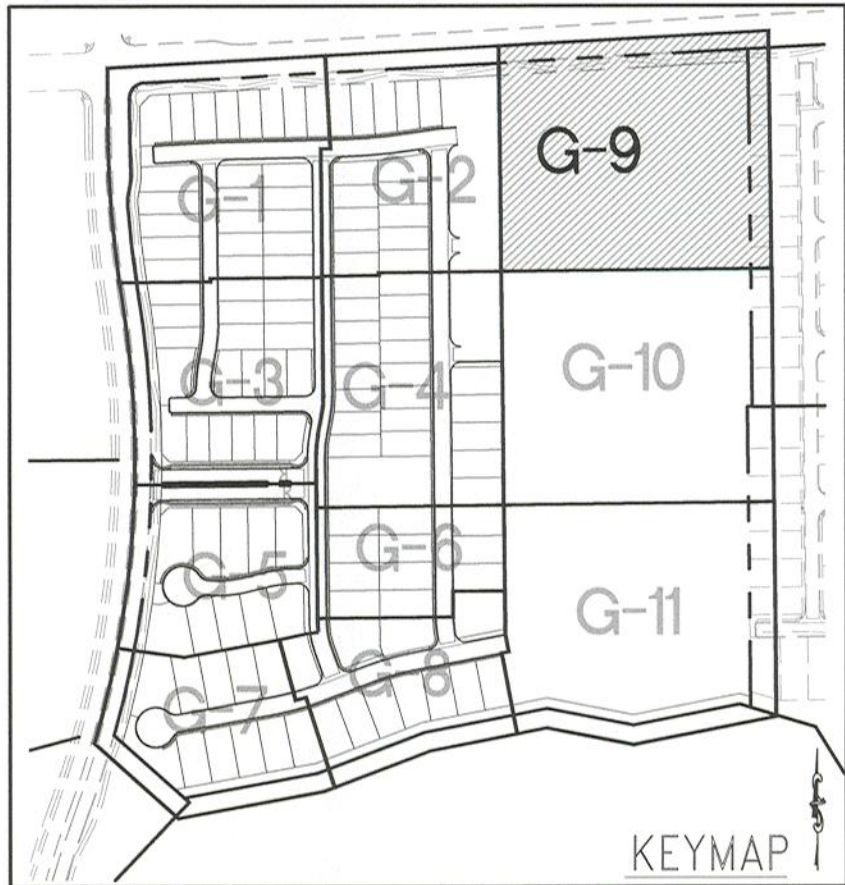
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JOHN I. LAND, PE NO. 16441 DATE

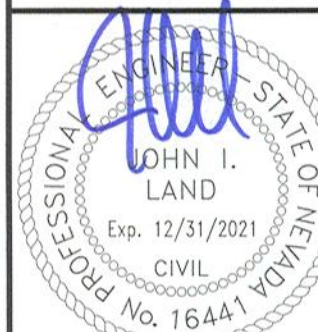
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IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 1
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
GRADING PLAN (SHEET 9 OF 11)



DATE: 1/14/2021

DRAWING
G-9

SHT 11 OF 17
CLV DRAWING NUMBER

CLV PROJECT #

NEVADA
CITY OF LAS VEGAS

REV	DESCRIPTION	DATE
BY	APPROVED	
DATE		

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FLOOD ZONE NOTE

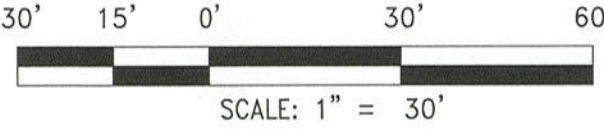
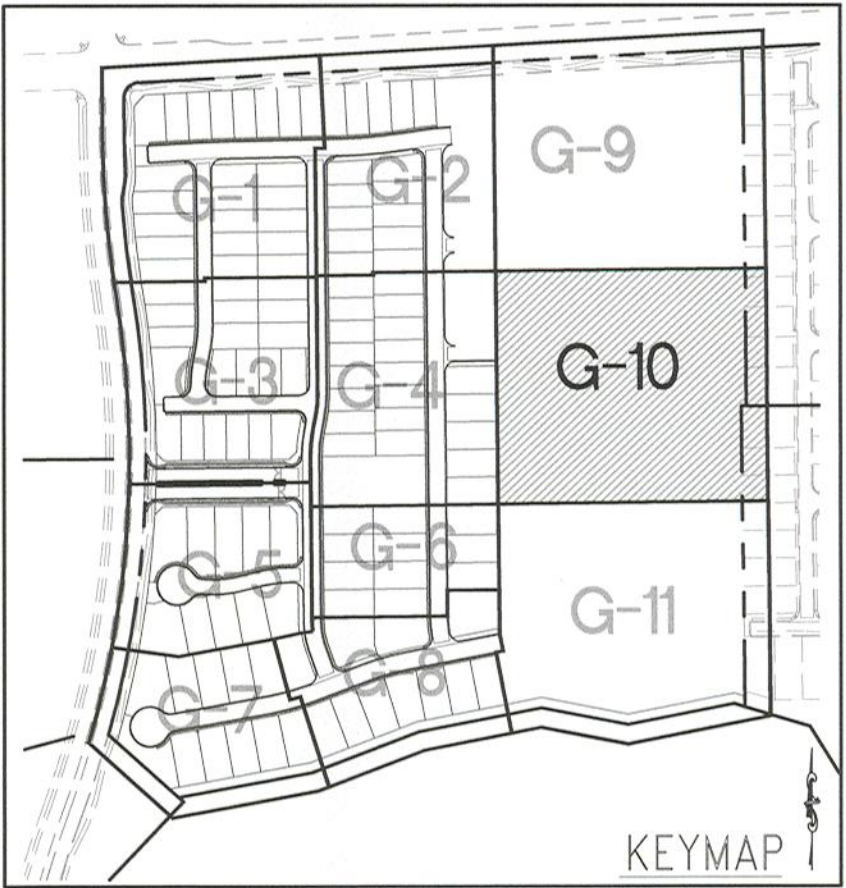
ACCORDING TO THE FEMA FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY PANEL NUMBERS 52003C1750 E DATED SEPTEMBER 27, 2002, THE SITE IS LOCATED IN A ZONE "X".

NOTE

ALL ON-SITE STORM DRAINS AND THE ASSOCIATED FACILITIES ARE PRIVATELY OWNED AND TO BE PRIVATELY MAINTAINED BY THE HOA

NOTE

ALL PRIVATE STREETS ARE P.U.E., PUBLIC SEWER EASEMENTS AND PUBLIC DRAINAGE EASEMENTS TO BE PRIVATELY MAINTAINED BY HOA.



ENGINEERS NOTES

- CONTRACTOR IS RESPONSIBLE FOR DUST AND EROSION CONTROL DURING CONSTRUCTION.
- SEE DETAIL SHEET FOR ON-SITE PAVEMENT SECTIONS. CONTRACTOR TO VERIFY WITH SOILS REPORT.
- SEE FINAL MAP FOR EXACT PROPERTY LINE DIMENSIONS.
- ENGINEER TO BE NOTIFIED OF ANY DISCREPANCIES IMMEDIATELY.
- THESE PLANS SHALL NOT, IN PART OR IN WHOLE, BE USED FOR CONSTRUCTION UNTIL APPROVED AND SIGNED BY THE GOVERNING AGENCIES.
- ALL GRADING SHALL CONFORM TO SOILS REPORT RECOMMENDATIONS.
- DURING CONSTRUCTION, SURVEYORS AND CONTRACTORS MUST VERIFY THAT ALL STREETS AND LOTS HAVE POSITIVE DRAINAGE. SAME MUST UTILIZE AT LEAST THREE GRADES ON VERTICAL TANGENTS TO VERIFY SLOPES.
- SOIL REPORT NOTES:
GRADING SHALL BE IN ACCORDANCE WITH SOILS REPORT PREPARED BY: ENGINEER: GEOTEK RESIDENTIAL, LLC PROJECT NO. 12203.38C-LVR DATED: JULY 1, 2020
- CUT/FILL ESTIMATES
EXISTING TO FINISH GRADE ELEVATIONS
NET CUT: 107,632 CY
NET FILL: 108,510 CY
- SEE DETAIL 19/D-2 FOR TYPICAL LOT DRAINAGE
- FOR STORMWATER RUNOFF MANAGEMENT NOTES REFER TO SHEET N-1

CONSTRUCTION NOTES

- CONSTRUCT AC PAVEMENT PER DETAILS 1 THRU 3 ON SHEET D-1
- CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
- CONSTRUCT MODIFIED "ROLL" TYPE CURB AND GUTTER PER CCAUSD #217.1
- CONSTRUCT "A" TYPE ISLAND CURB AND GUTTER PER CCAUSD #219
- CONSTRUCT 5' CURB TRANSITION PER DETAIL 20 SHEET D-2
- CONSTRUCT 5' SIDEWALK PER CCAUSD #234 (5-INCH THICK WHEN CONTIGUOUS TO "ROLL" TYPE CURB)
- CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD #235 (CASE 1)
- CONSTRUCT 8' CROSS GUTTER PER CCAUSD #228
- CONSTRUCT 8' MODIFIED (ROLL CURB) CROSS GUTTER PER CCAUSD #228
- CONSTRUCT 5' WIDE PEDESTRIAN ACCESS GATE
- INSTALL ELECTRONICALLY CONTROLLED ACCESS GATES
- CONSTRUCT STAIRS, 3 STEPS EACH WITH 5' LANDING ABOVE AND BELOW
- REMOVE EXISTING CURB AND CONSTRUCT COMMERCIAL DRIVEWAY PER CCAUSD #224

I HEREBY CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY DS #XXXXX ON FILE WITH CITY OF LAS VEGAS FOR THIS PROJECT.

JOHN I. LAND, PE NO. 16441 DATE

TOLL BROTHERS INC.

1140 TOWN CENTER DRIVE SUITE 250
LAS VEGAS, NV 89144
PHONE: 702-243-9800 FAX: 702-243-9810

RCI ENGINEERING

500 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89106
PHONE: 702-453-8800 FAX: 702-453-8801

IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 1
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
GRADING PLAN (SHEET 10 OF 11)

CITY OF LAS VEGAS

NEVADA



DATE: 1/14/2021

DRAWING
G-10

SHT 12 OF 17
CLV DRAWING NUMBER

CLV PROJECT #

DISCLAIMER NOTE:

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

Call before you Dig
AVOID CUTTING UNDERGROUND
UTILITY LINES. IT'S COSTLY.

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

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

AVOID HITTING OVERHEAD
POWER LINES. IT'S COSTLY.

CALL BEFORE
YOU DO
OVERHEAD
1-702-227-2929

BENCHMARK

BENCHMARK NUMBER: USDA1934J
U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT THE
SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD.
ELEVATION = 2817.61 FEET, 858.81 METERS
N.A.V.D. 88 DATUM
PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE.

BASIS OF BEARINGS

SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF
THE NORTHEAST QUARTER (NE1/4) OF SECTION 12, TOWNSHIP 19
SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK
COUNTY NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 157, PAGE
41 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

SURVEY MONUMENT NOTE

OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS
REQUIRED BY CITY OF LAS VEGAS AND CLARK COUNTY UNIFORM
STANDARD DRAWING NUMBER 243. OWNER IS ALSO RESPONSIBLE TO
REPLACE ALL SURVEY MONUMENTATION DAMAGED, DESTROYED,
OR OBLISCURED DURING CONSTRUCTION.

BUILDING PERMIT NOTE

ALL STRUCTURES SHOWN OR INDICATED ON THIS SUBMITTAL
WITHIN THE PROPERTY REQUIRE A BUILDING PERMIT
APPLICATION AND SUBMITTAL THIS INCLUDES BUILDINGS, ABOVE
GROUND TANKS, SIGNS, RETAINING WALLS, FENCES, TRASH
ENCLOSURES, SHADE STRUCTURES, STAIRWAYS, RAMPS, LIGHT
POLES, LIGHT BOLLARDS, ETC. THIS DOES NOT INCLUDE ANY
FLOOD CONTROL STRUCTURE SUCH AS PIPES, CULVERTS, ARCH
CULVERTS, HEADWALLS, ETC. THIS DOES NOT INCLUDE ANY
WORK WITHIN A PUBLIC STREET RIGHT-OF-WAY. THIS DOES
NOT INCLUDE PRIVATE STREETS. THE REVIEW OF CIVIL
IMPROVEMENT AND/OR GRADING PLANS DOES NOT INCLUDE
ANY REVIEW OF ANY STRUCTURE THAT REQUIRES A BUILDING
PERMIT APPLICATION.

SIGHT VISIBILITY ZONE

NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS
PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT
(MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB
EXISTS) WITHIN THE SIGHT VISIBILITY ZONES.

FLOOD ZONE NOTE

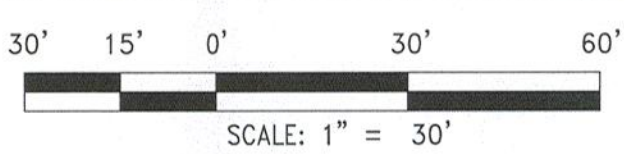
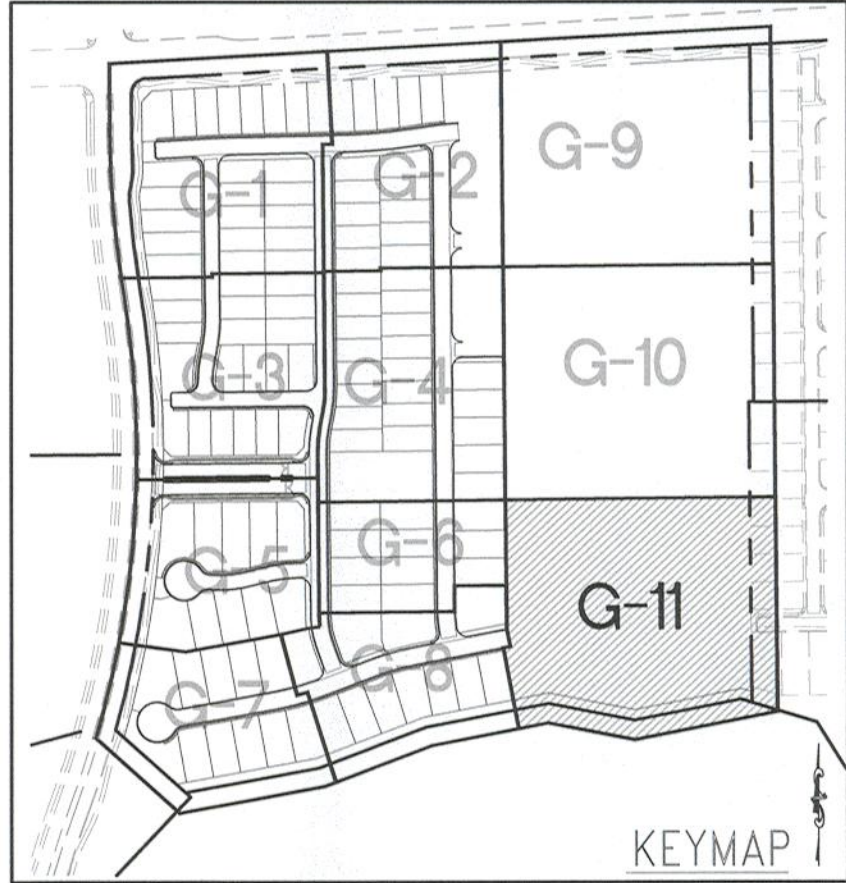
ACCORDING TO THE FEMA FLOOD INSURANCE RATE MAP
(FIRM) COMMUNITY PANEL NUMBERS 32005C1750 E DATED
SEPTEMBER 27, 2002, THE SITE IS LOCATED IN A ZONE "X".

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PROJECT NO. 12203.38C-LVR
DATED: JULY 1, 2020
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IMPROVEMENT PLANS FOR

SKYE CANYON 5.01 AND 5.03 UNIT 1

A SINGLE FAMILY RESIDENTIAL SUBDIVISION

GRADING PLAN (SHEET 11 OF 11)



DATE: 1/14/2021

DRAWING

G-11

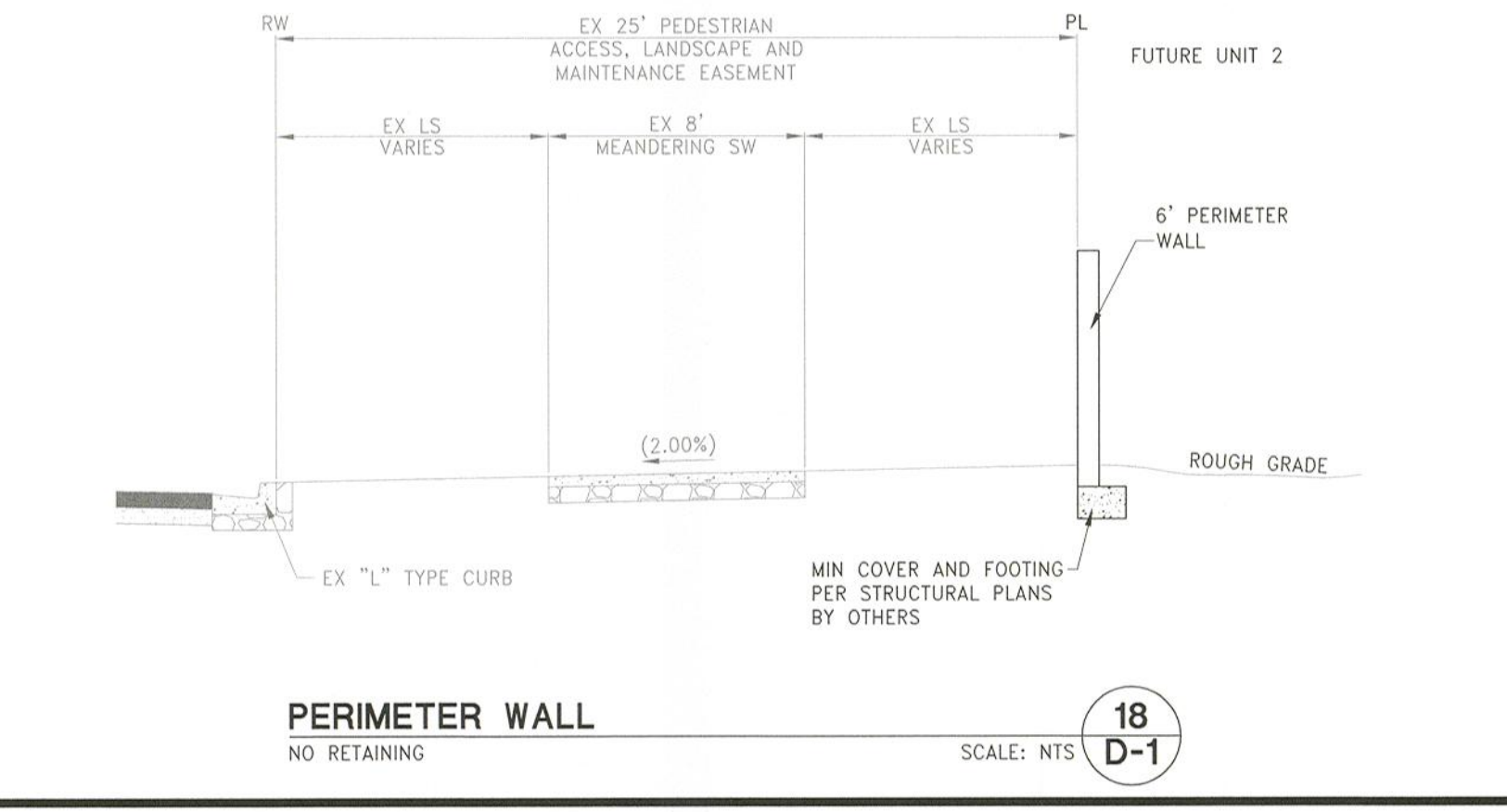
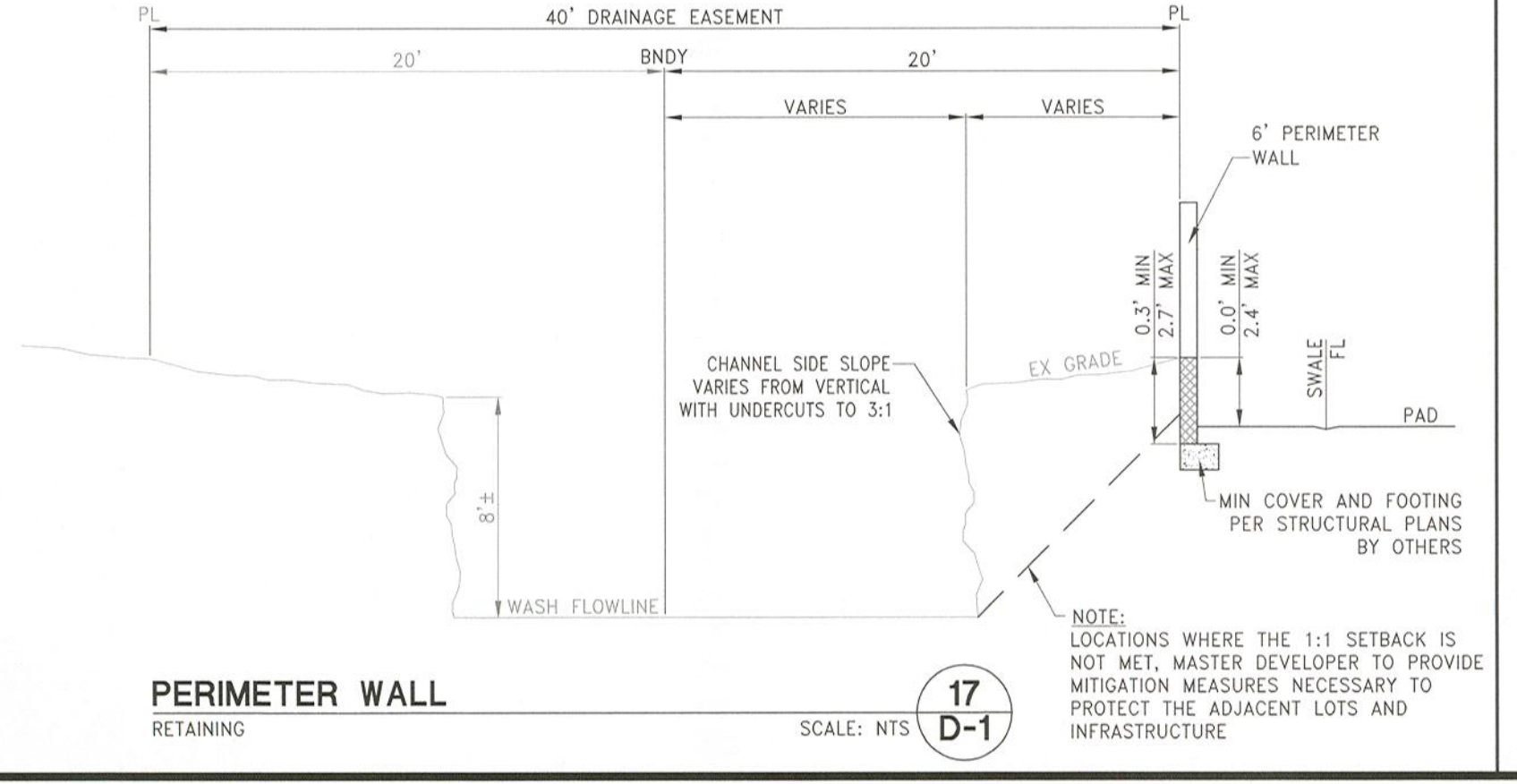
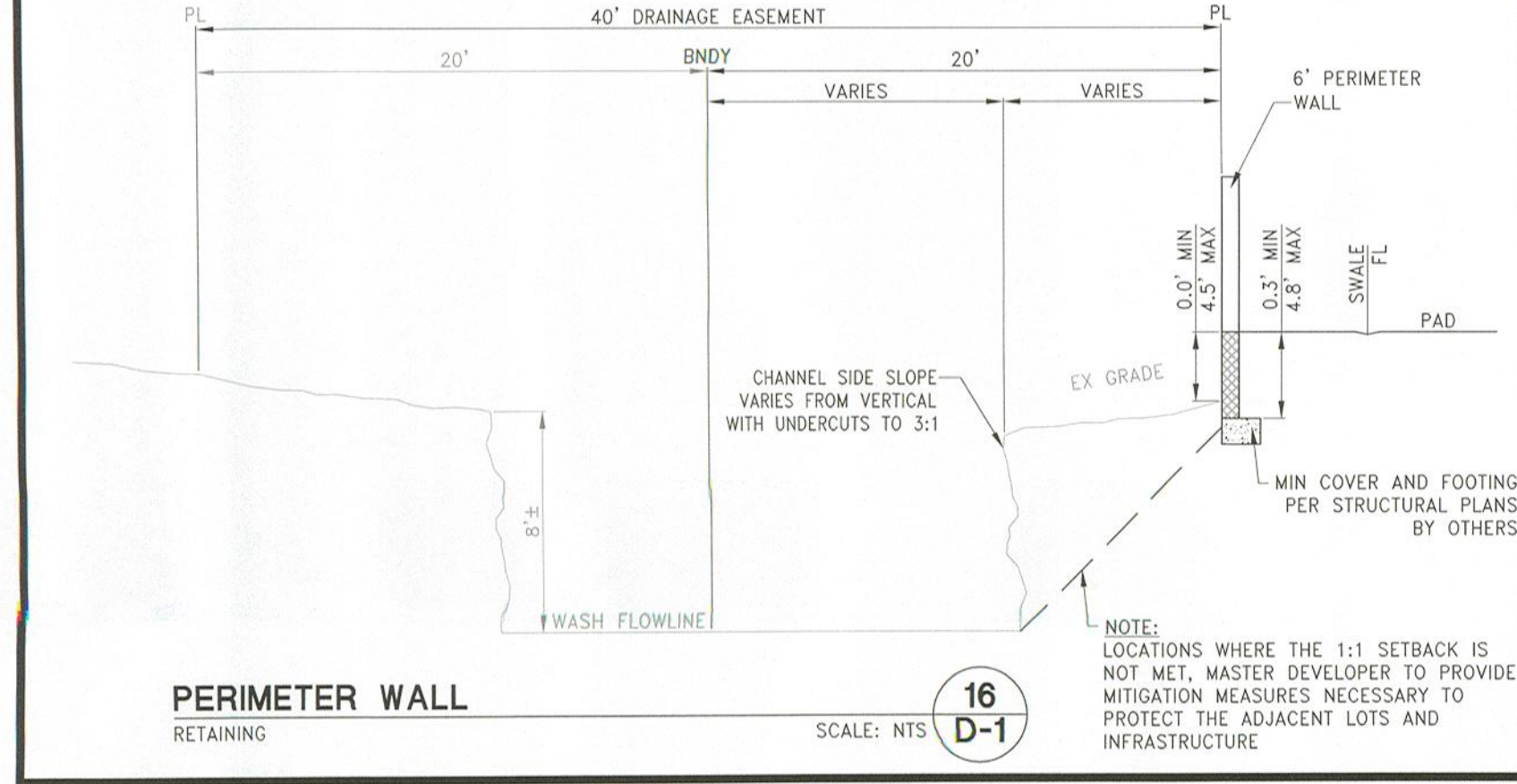
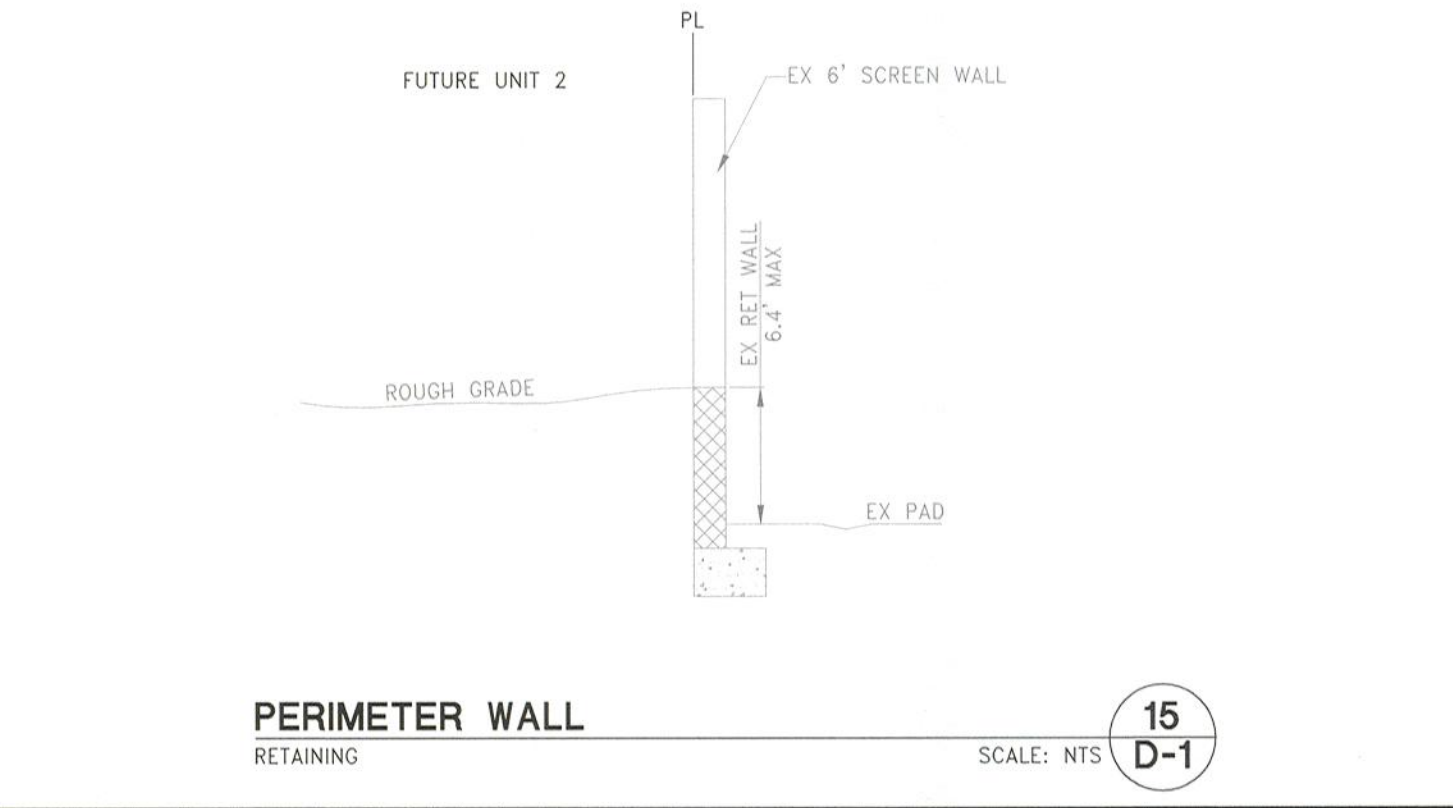
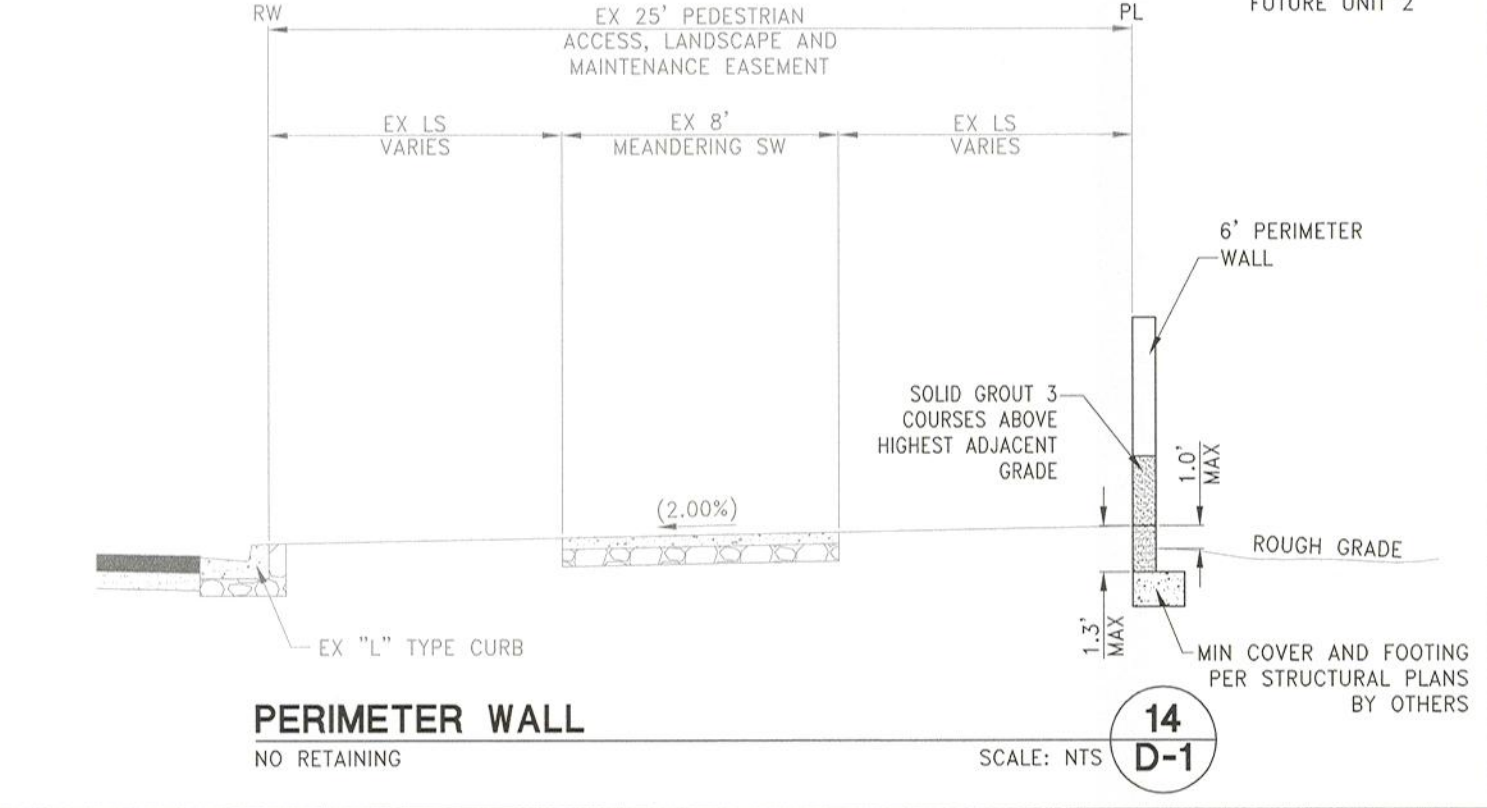
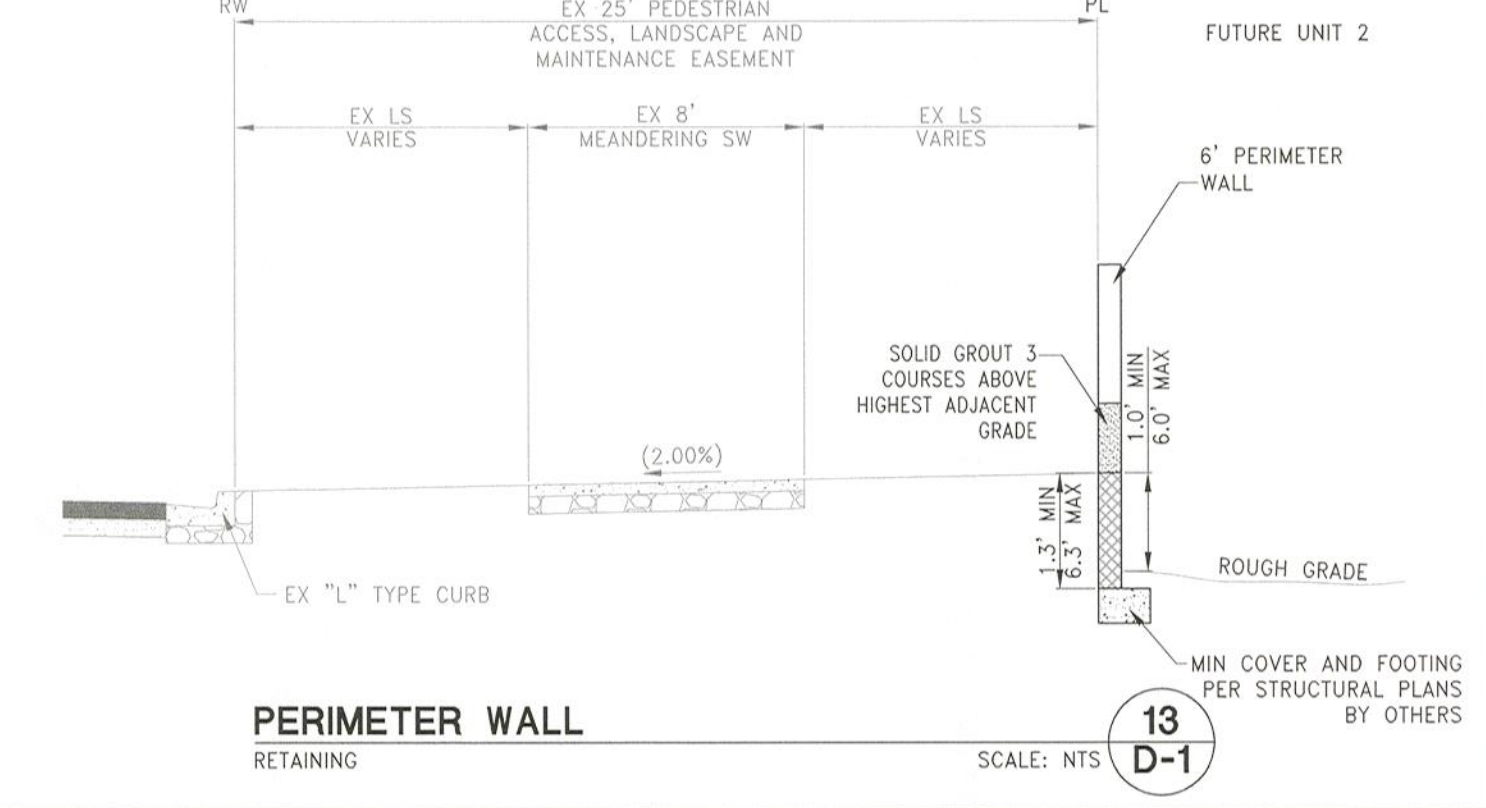
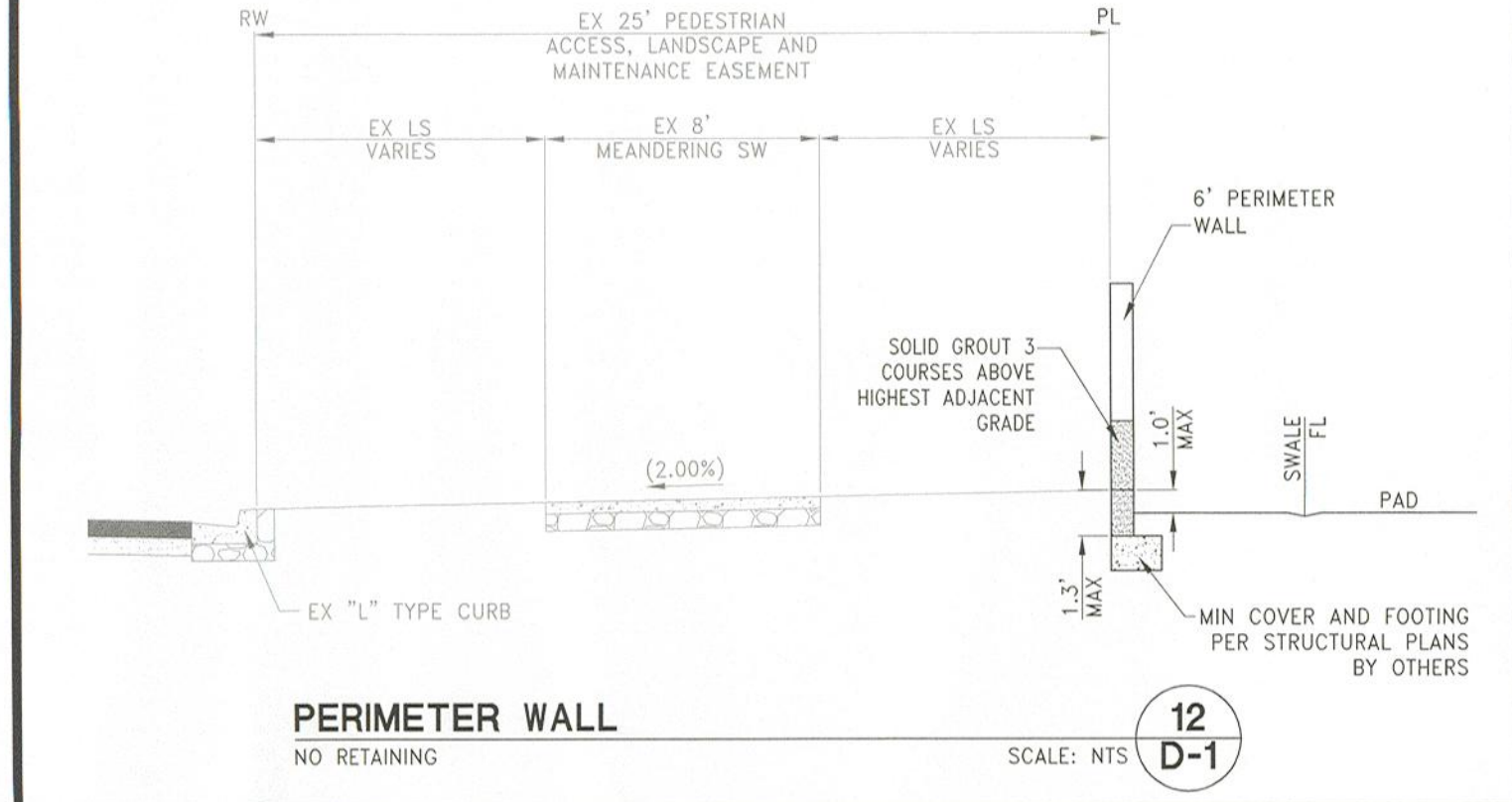
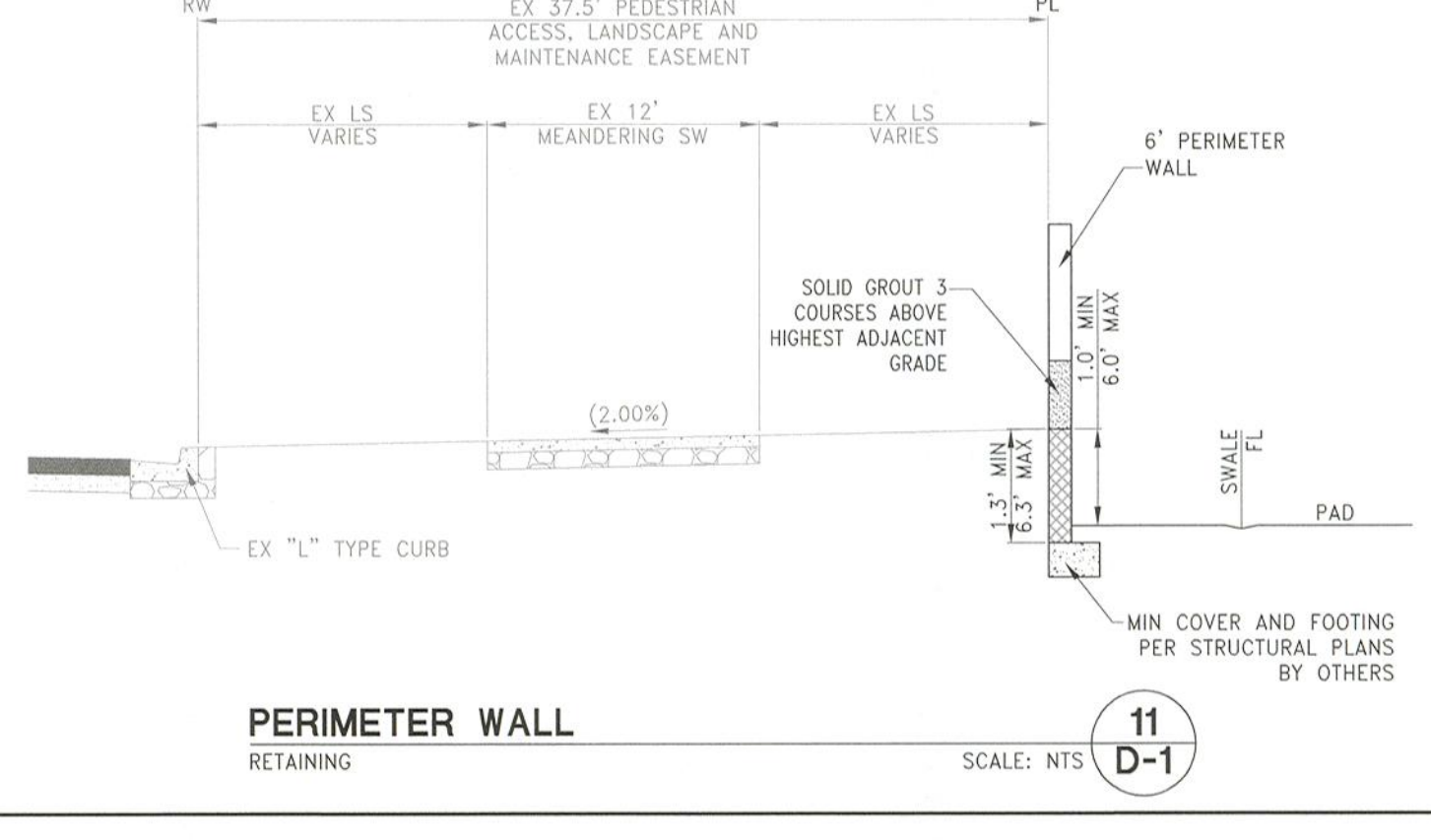
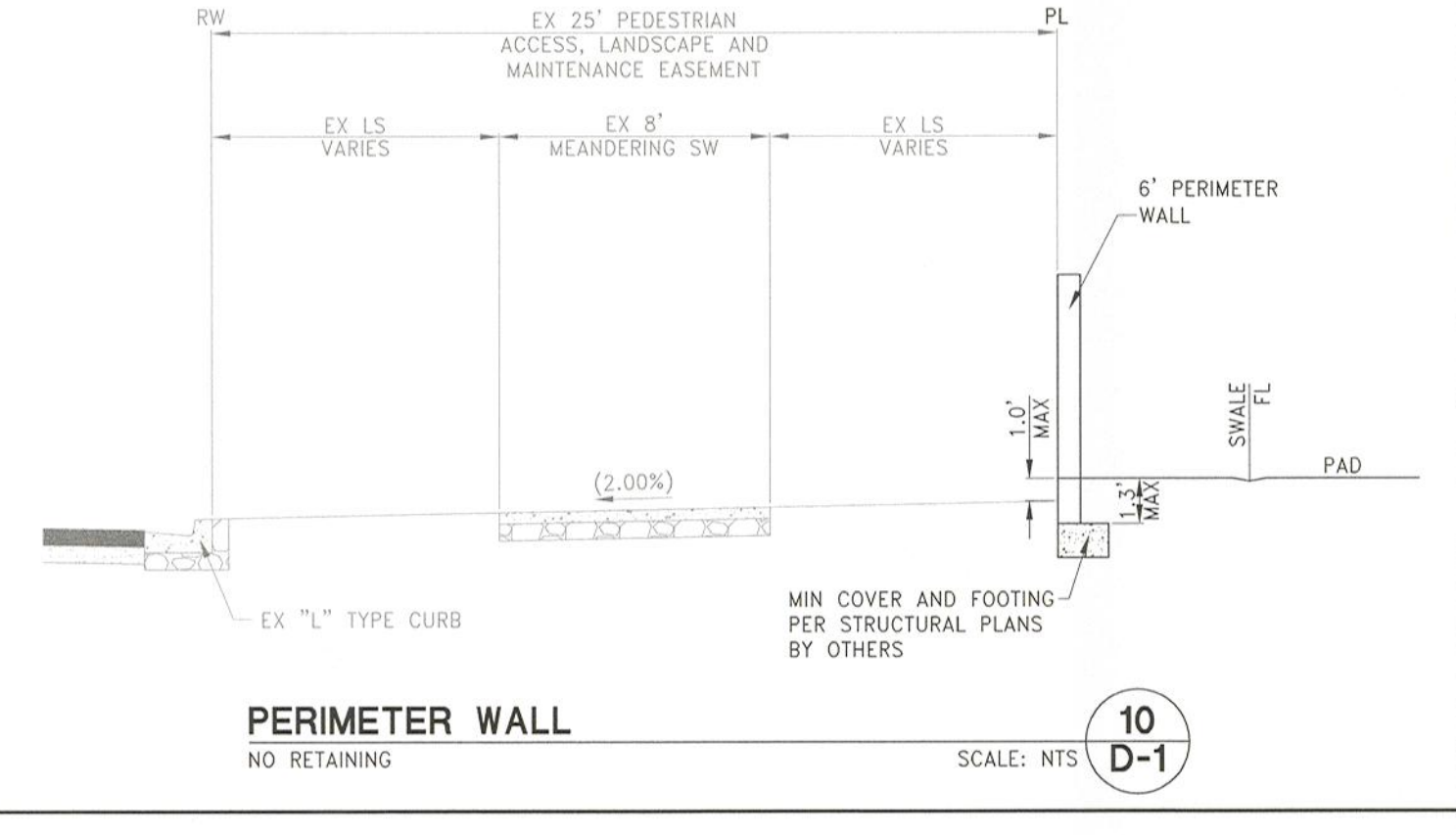
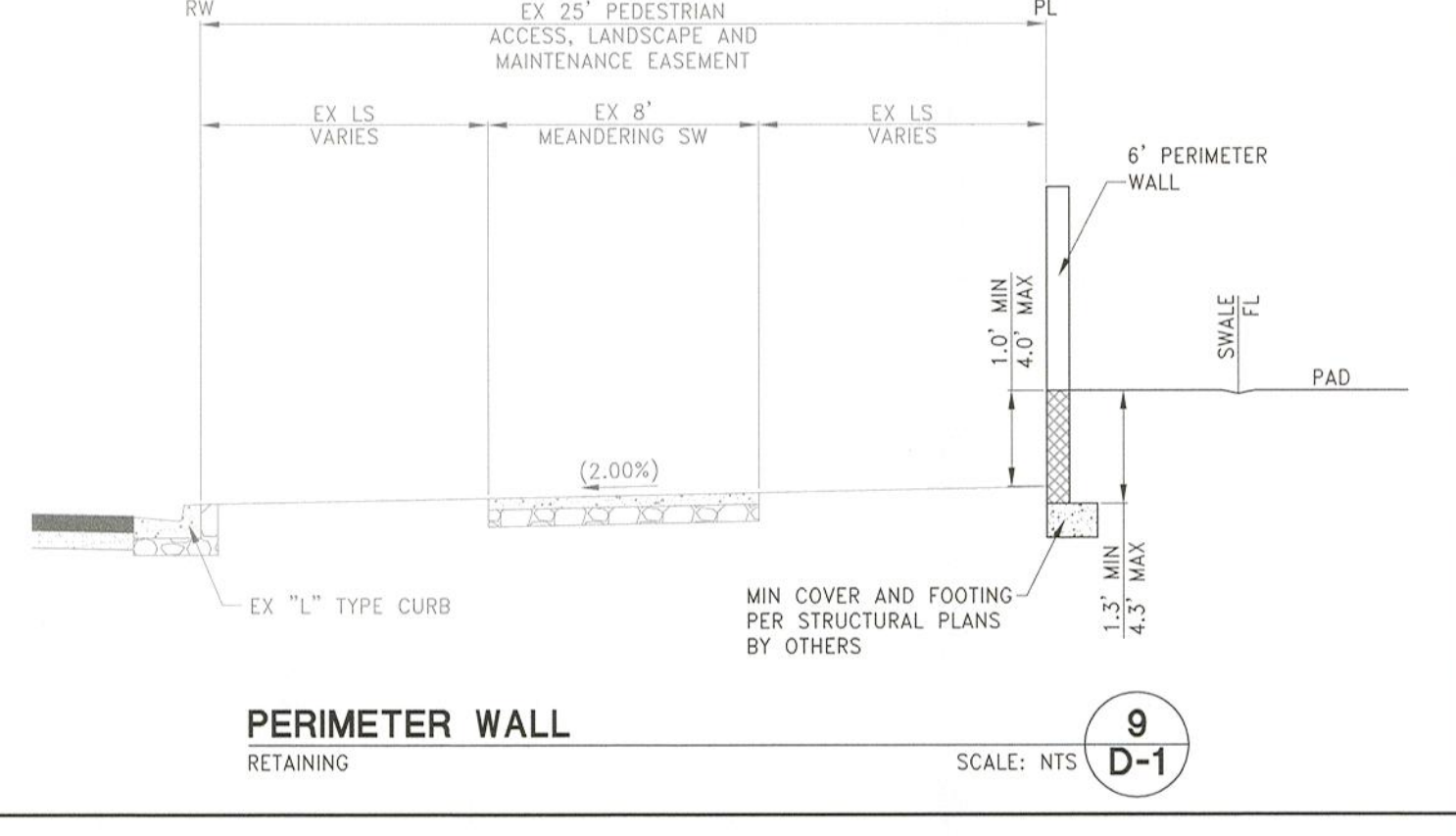
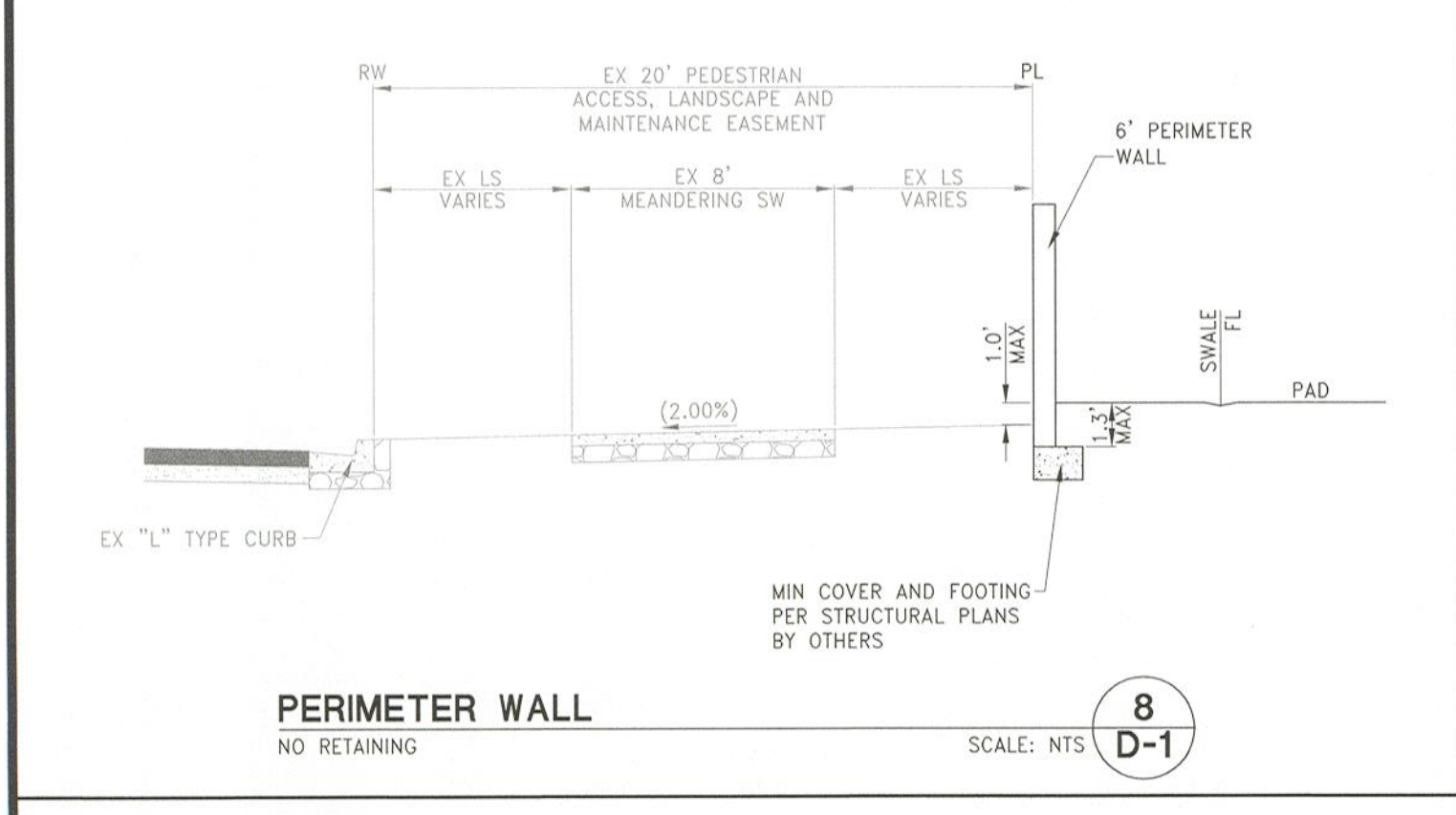
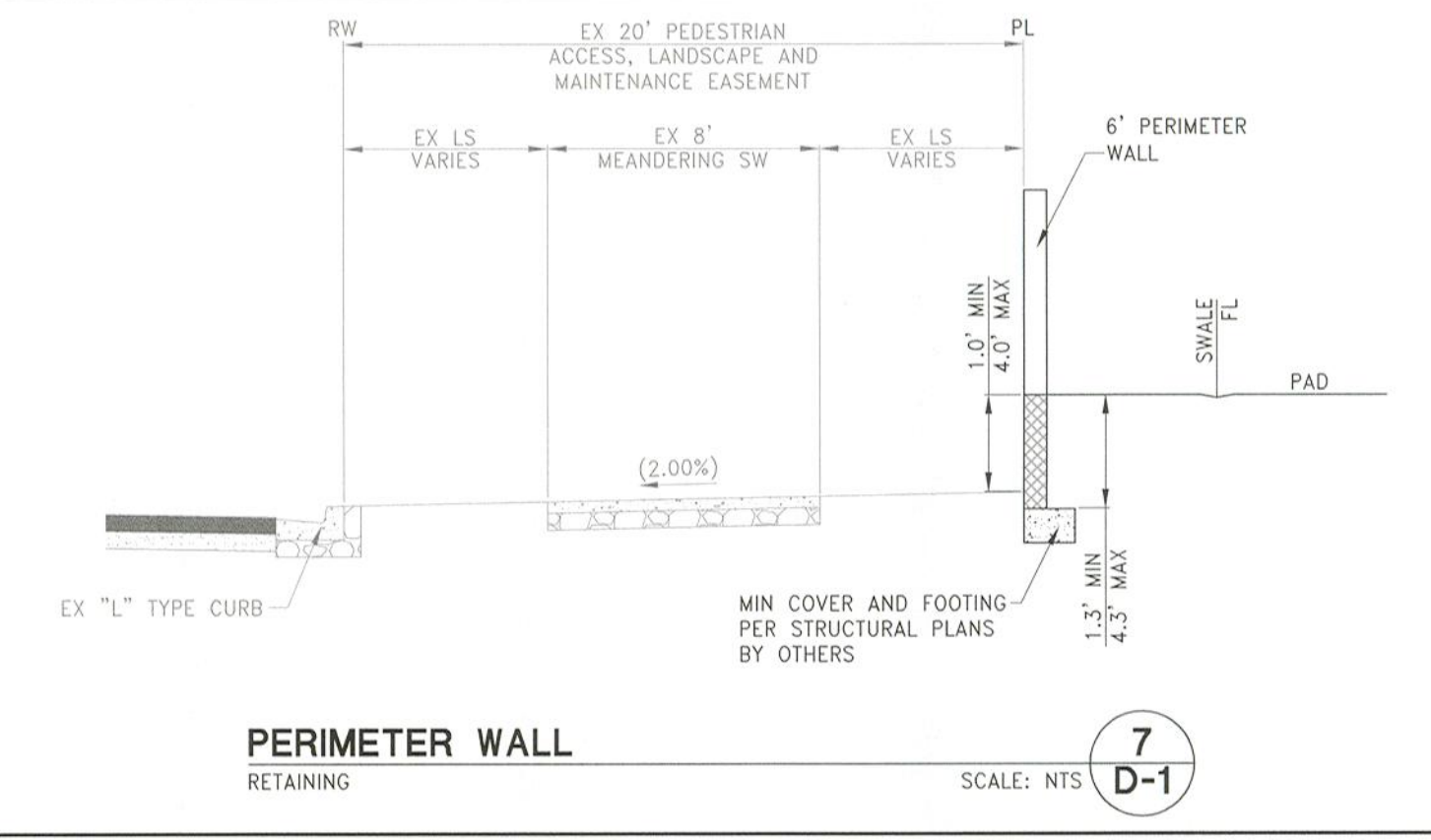
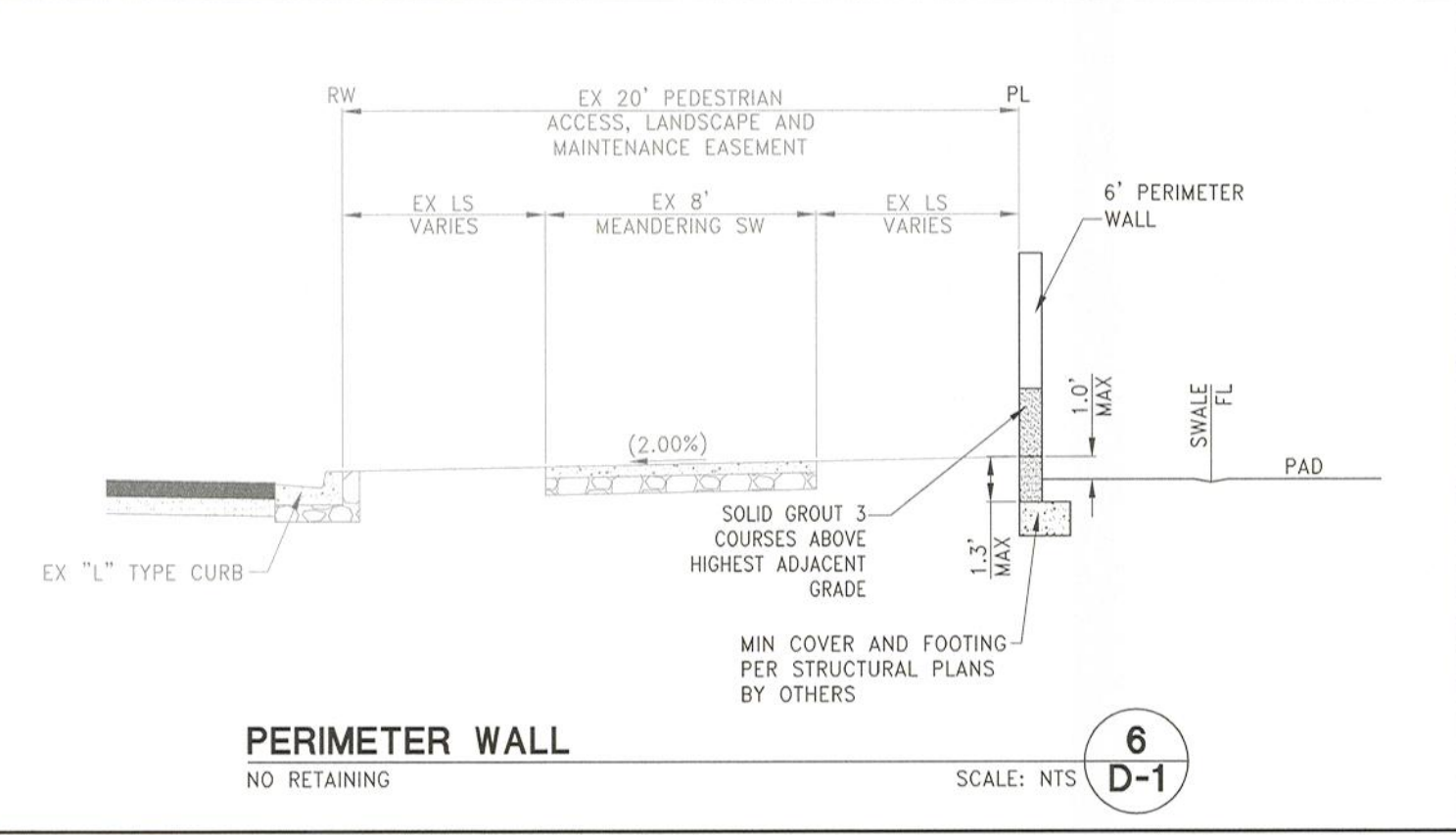
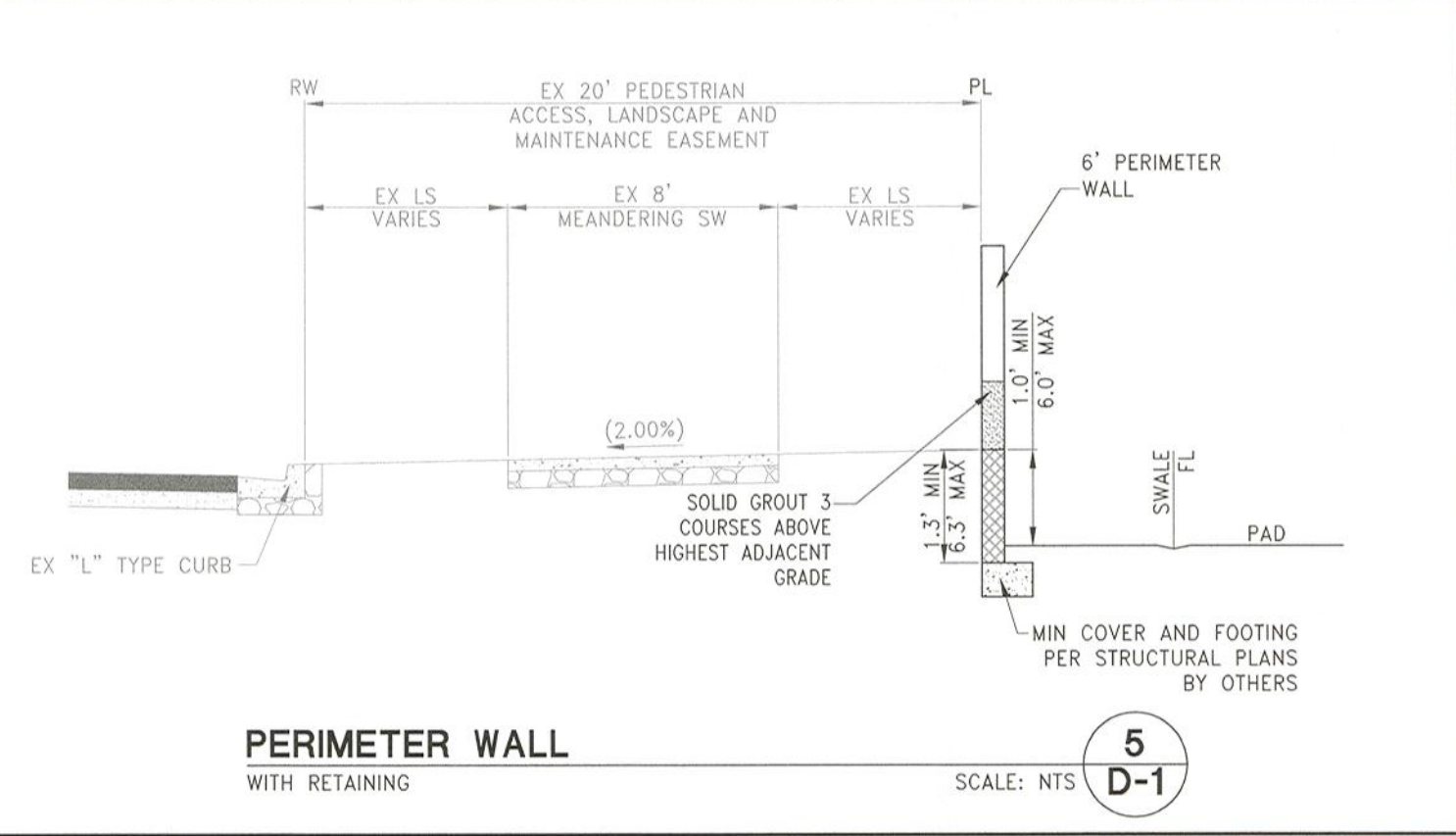
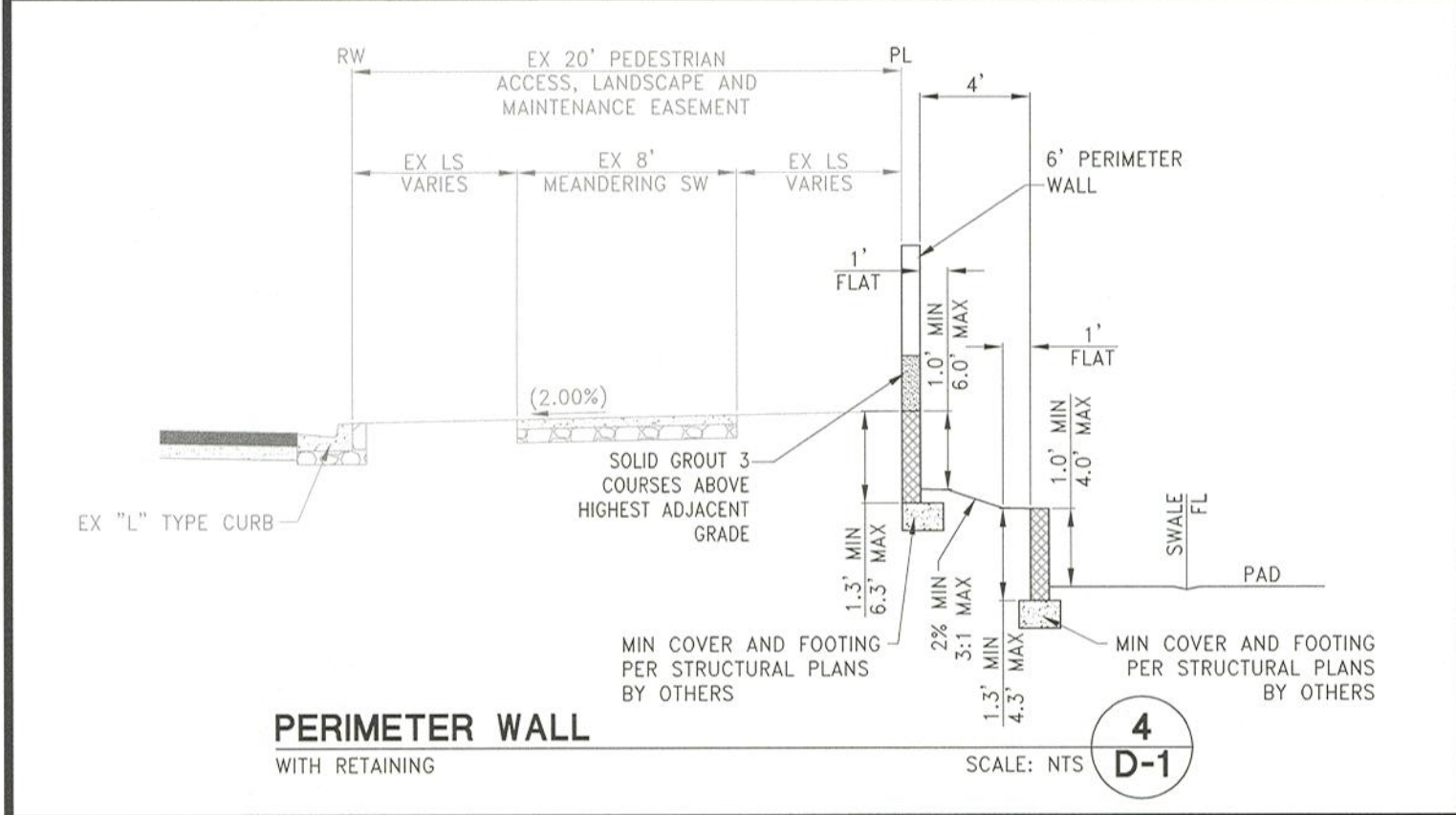
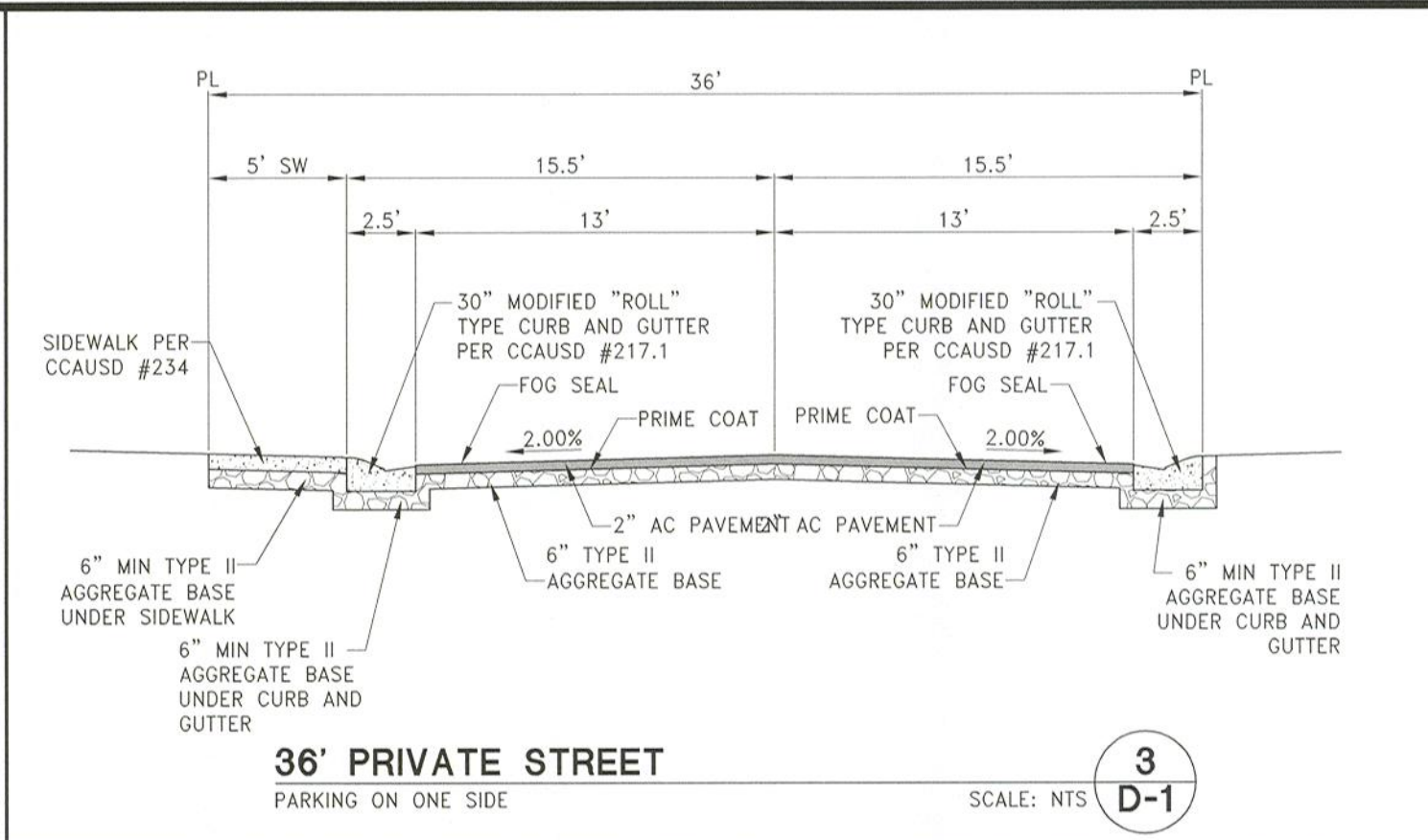
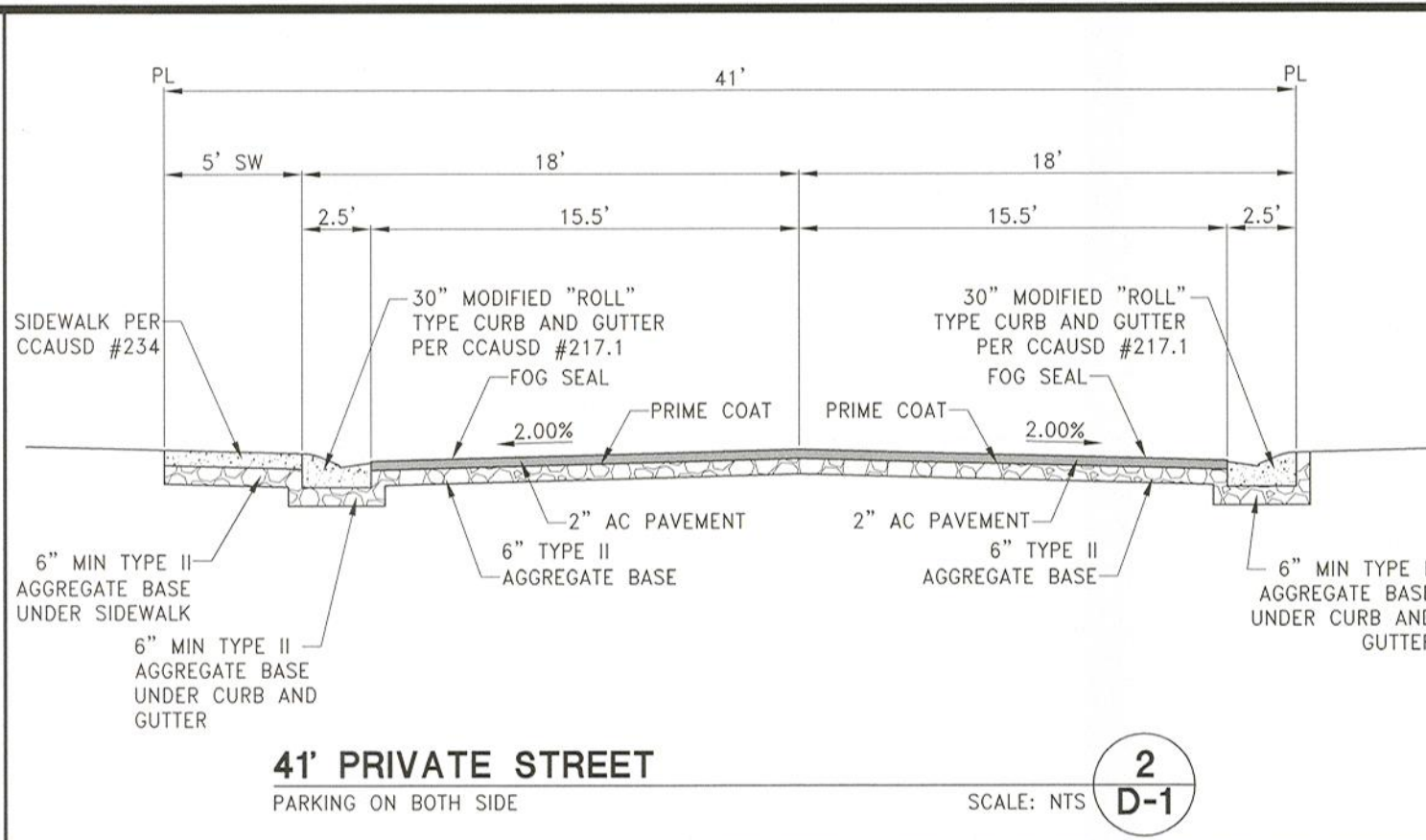
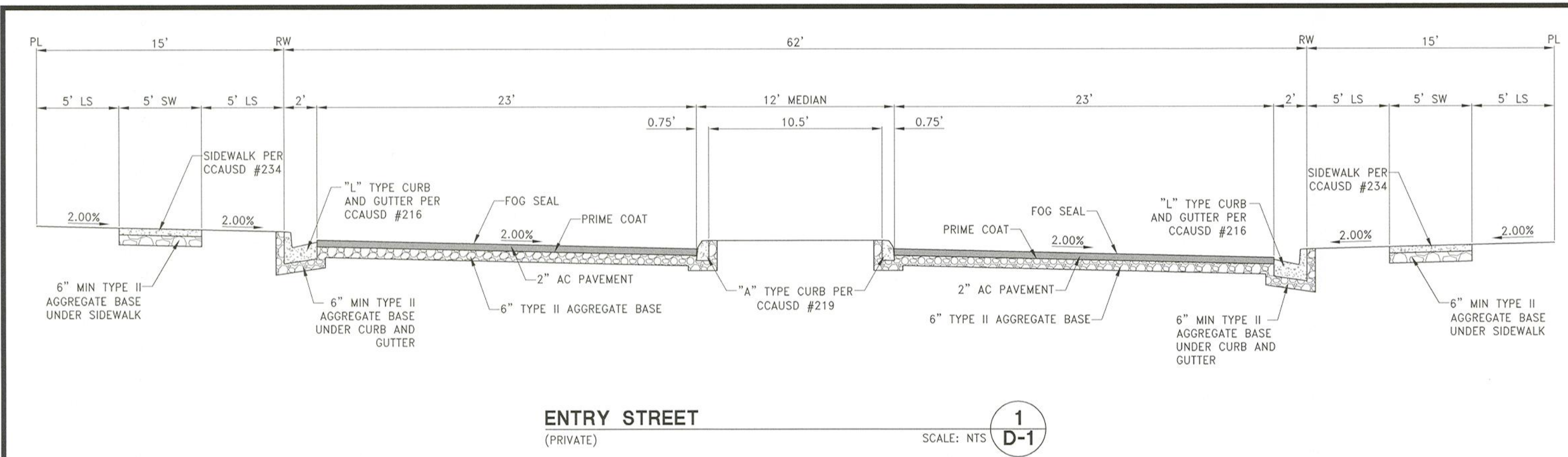
SHT 13 OF 17

CLV DRAWING NUMBER

CLV PROJECT #

I HEREBY CERTIFY THAT THIS GRADING
PLAN IS IN CONFORMANCE WITH THE
APPROVED DRAINAGE STUDY DS #XXXXXX
ON FILE WITH CITY OF LAS VEGAS FOR
THIS PROJECT.

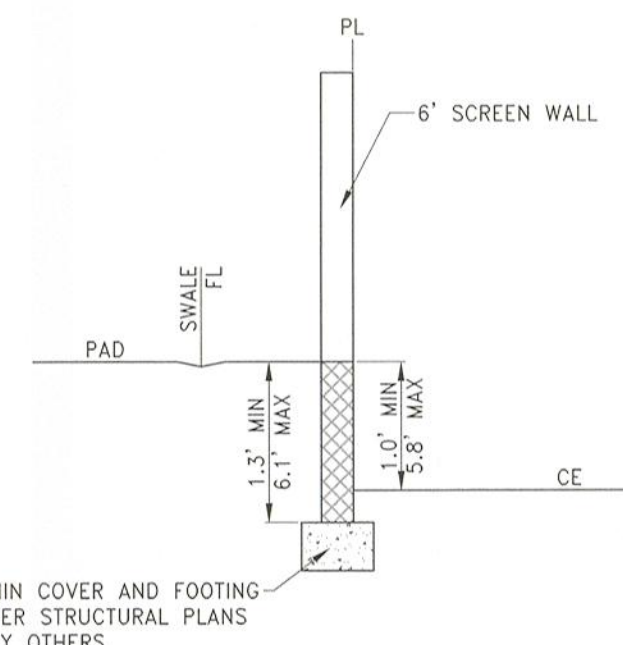
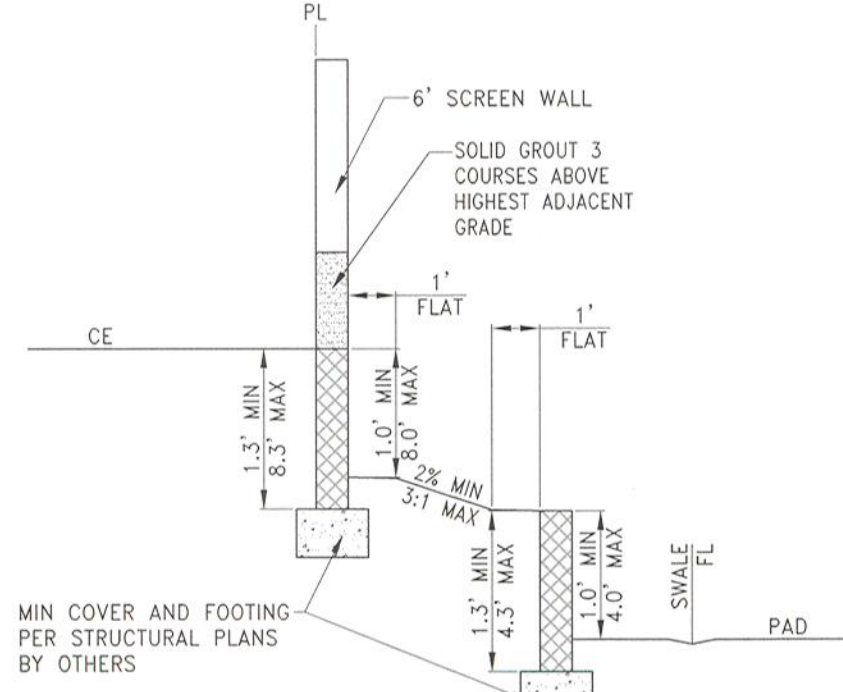
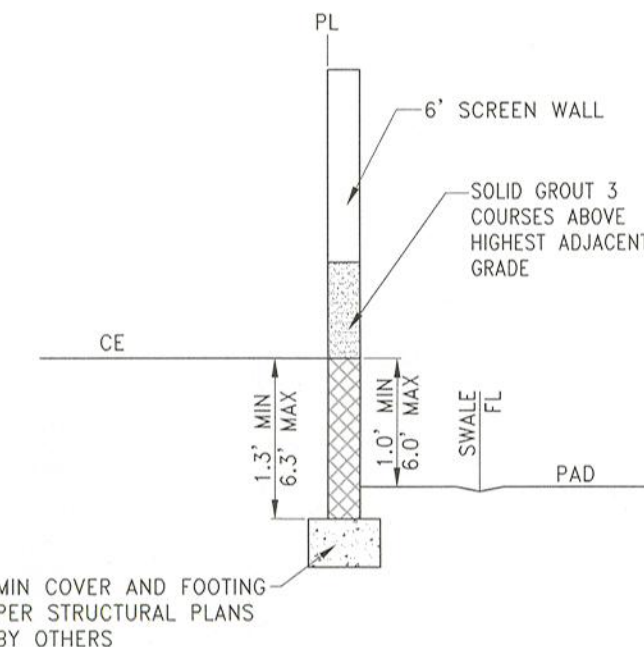
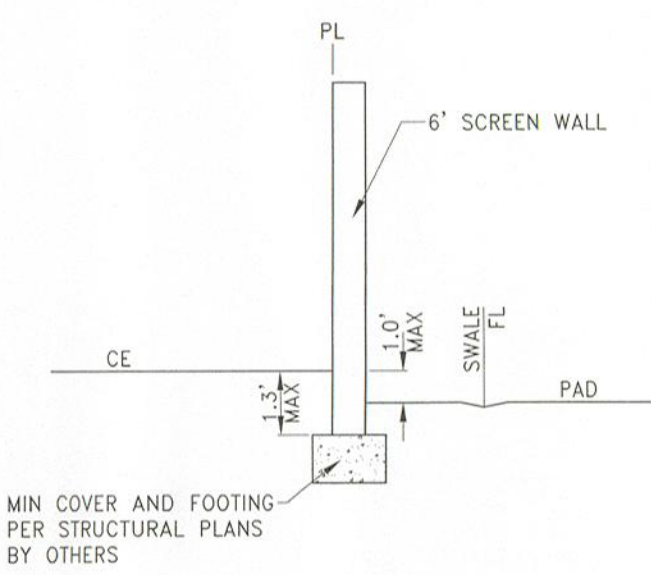
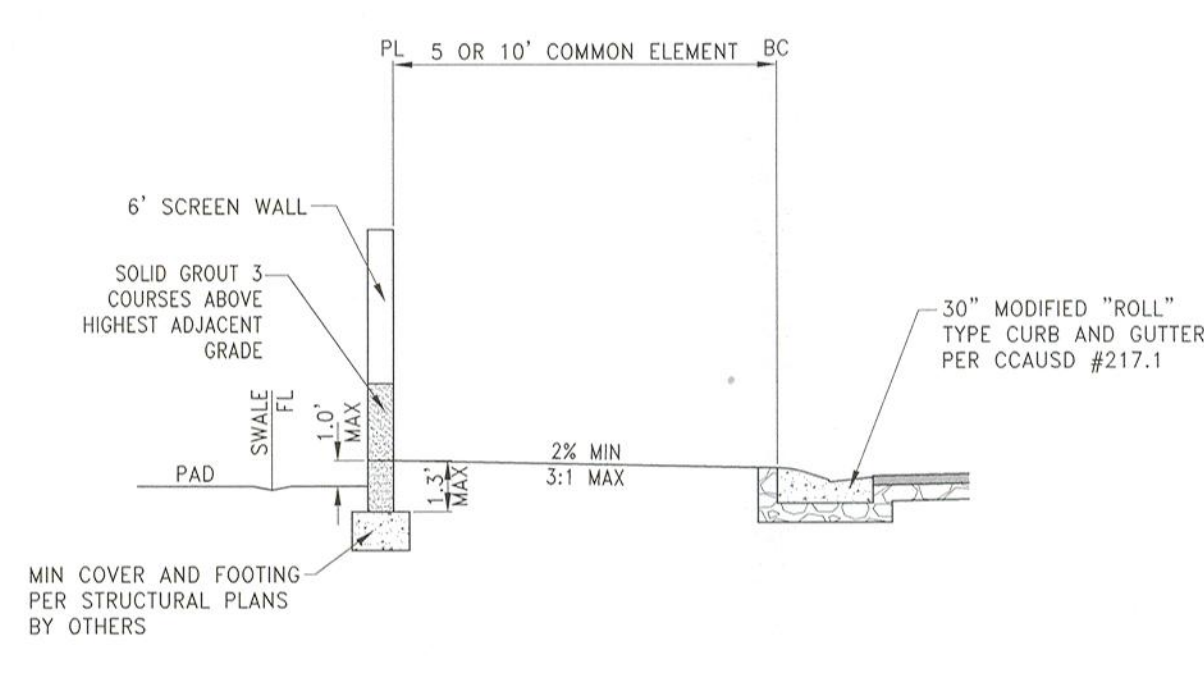
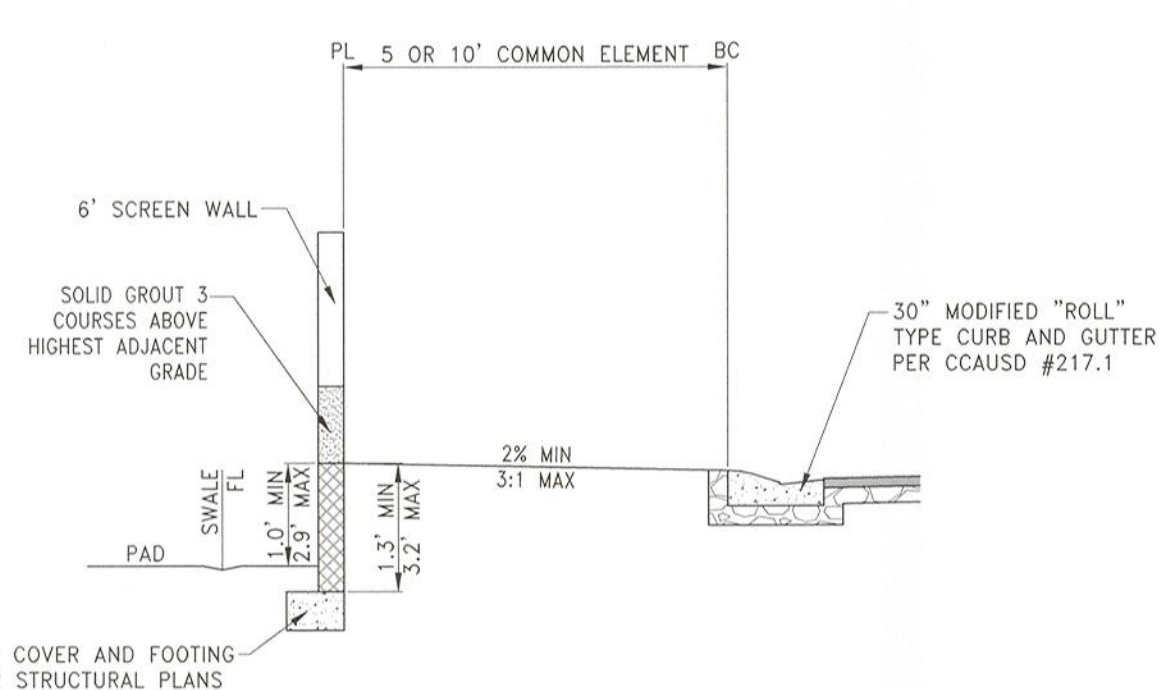
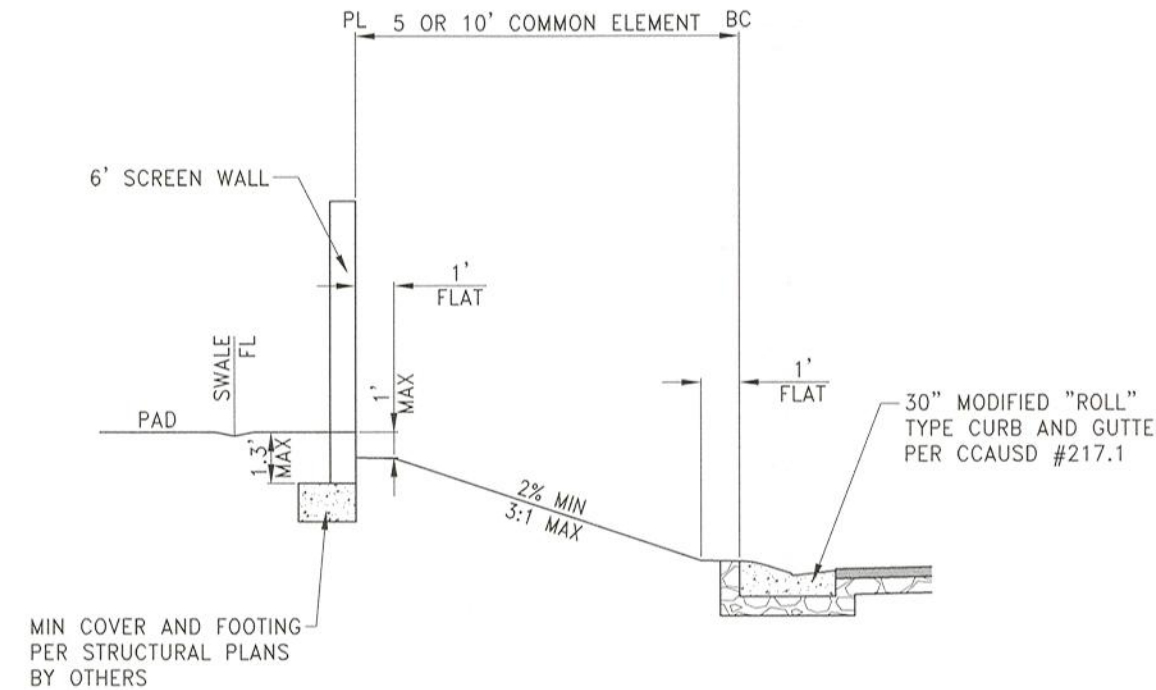
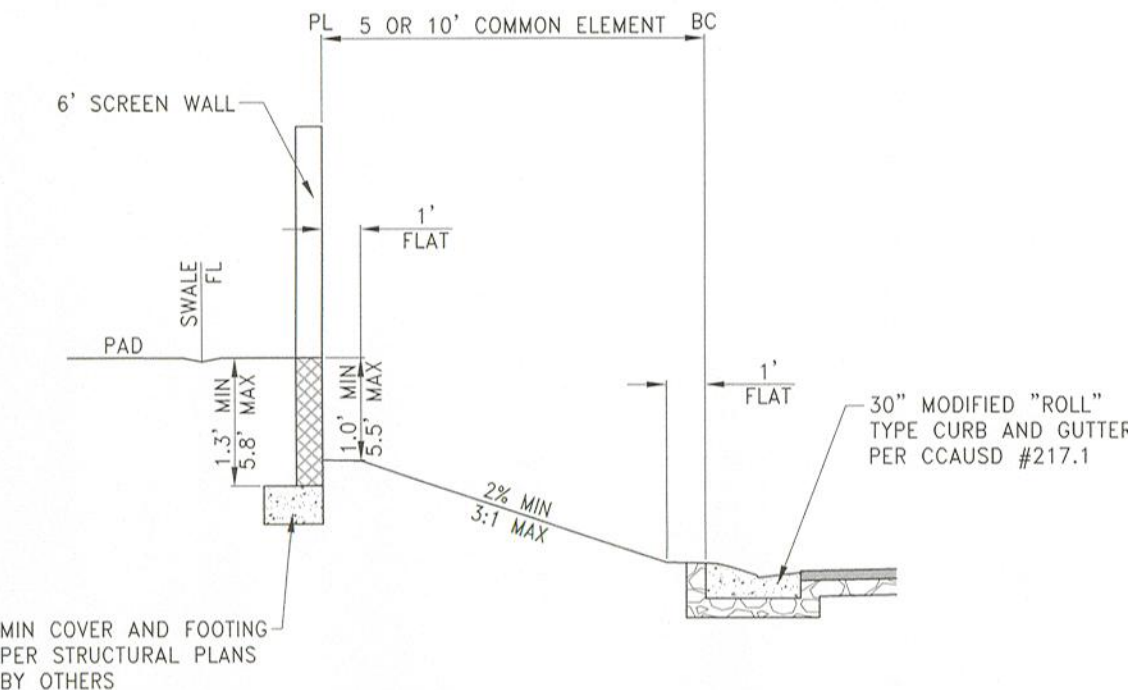
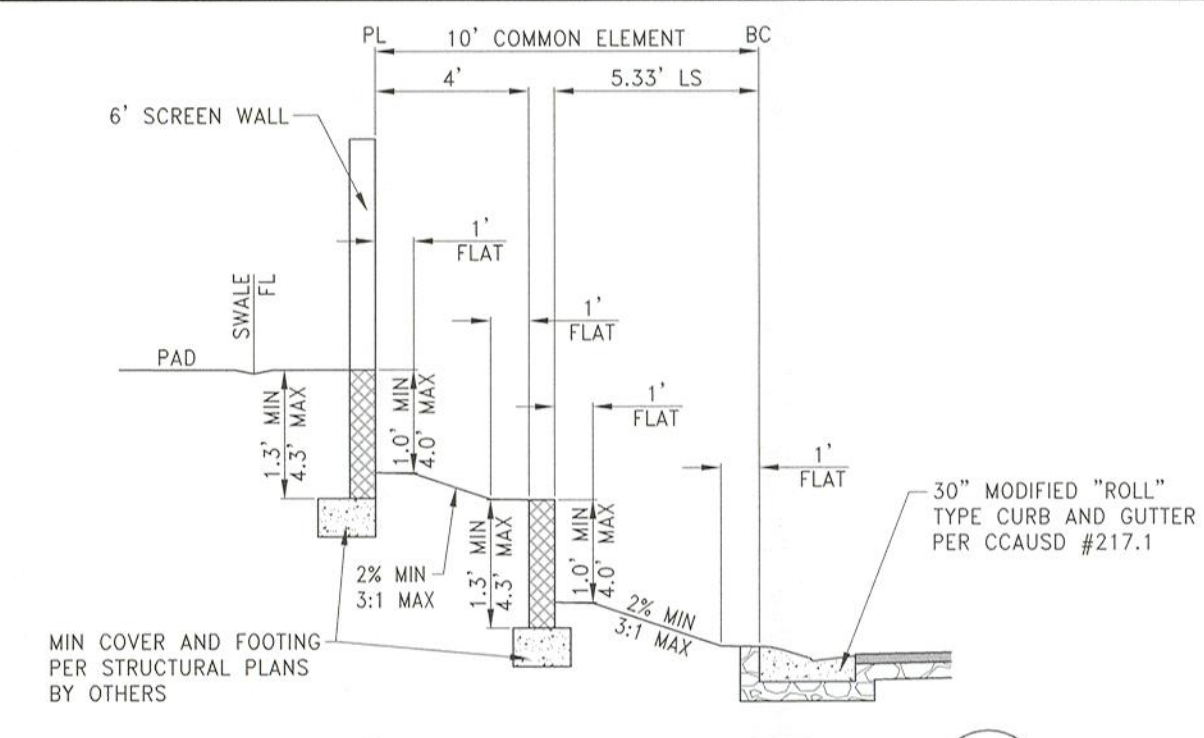
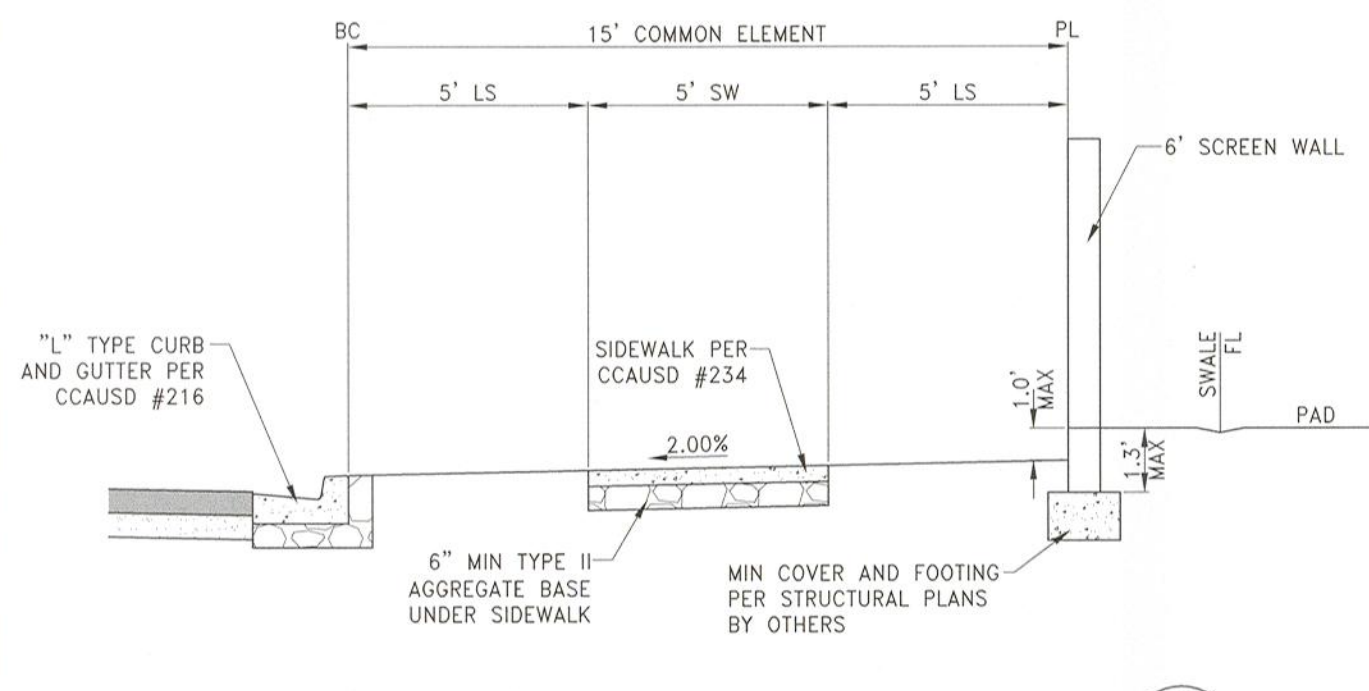
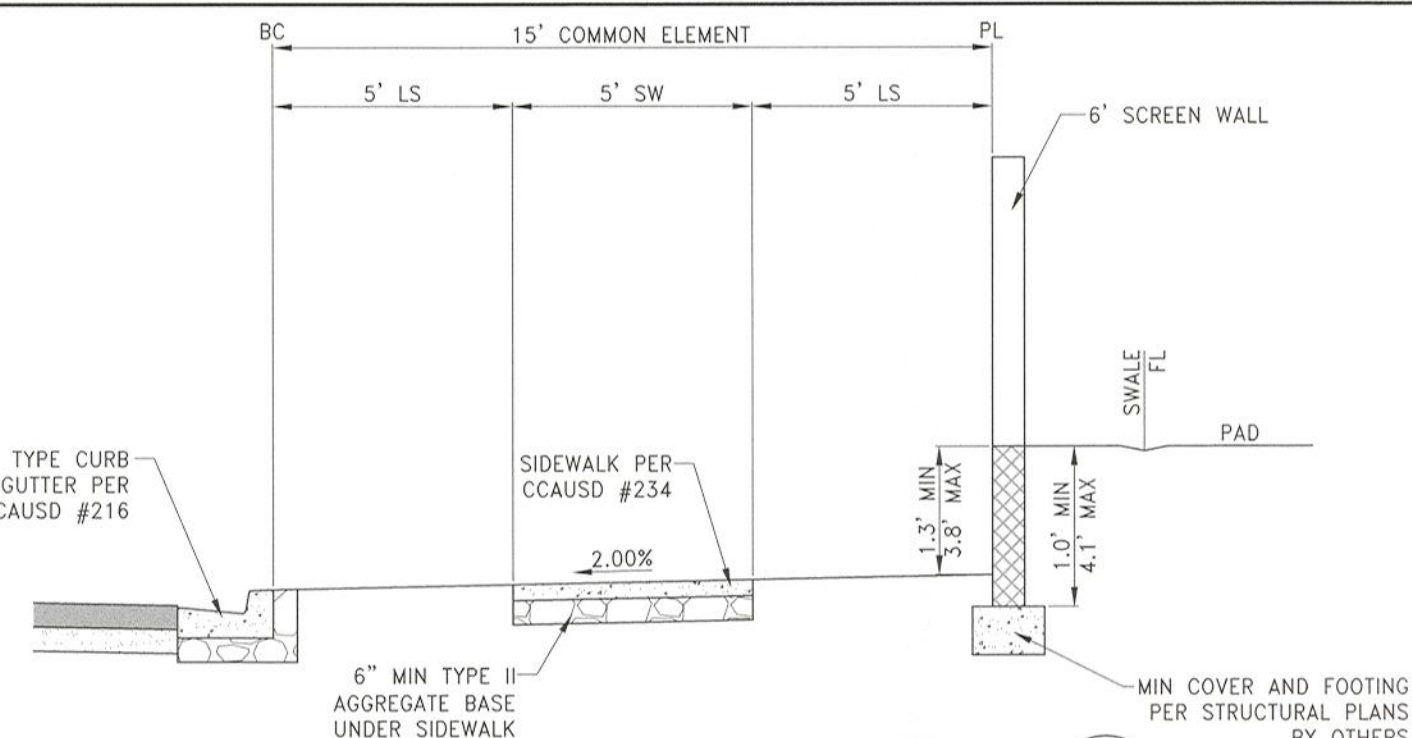
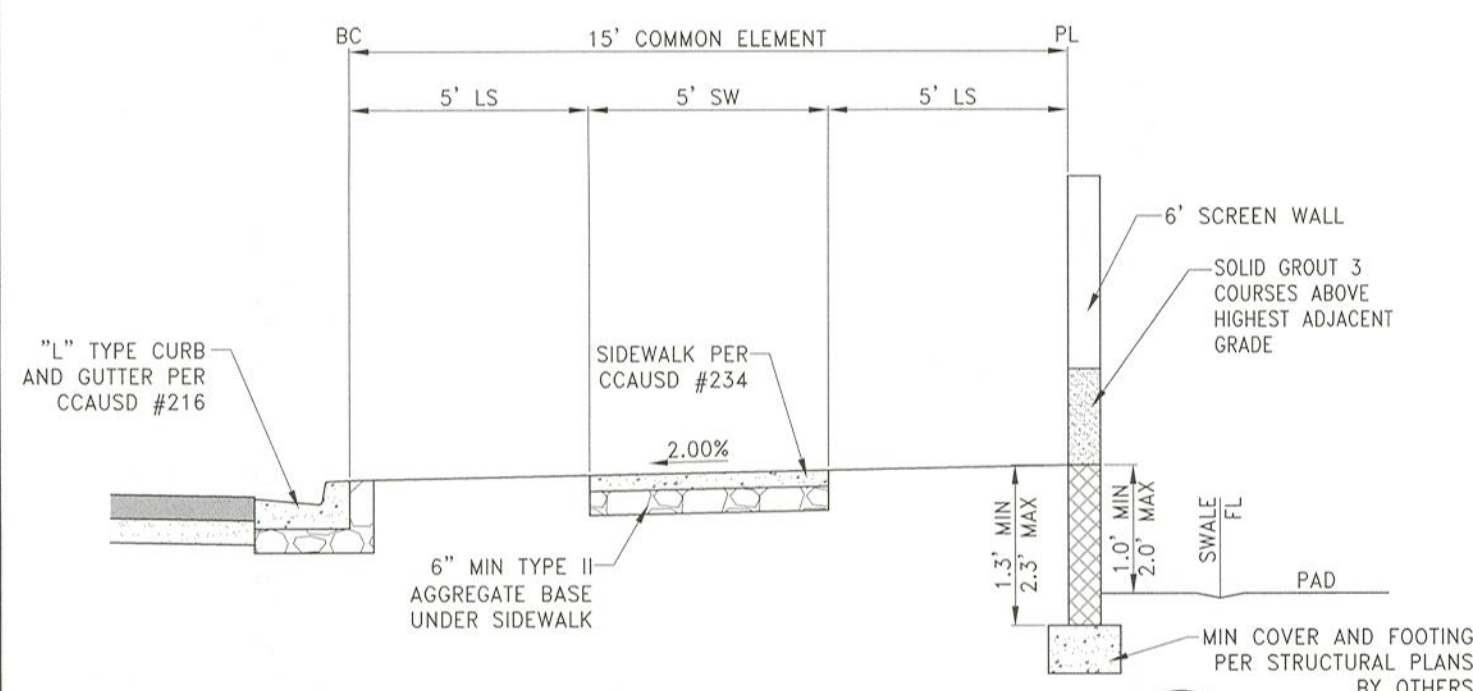
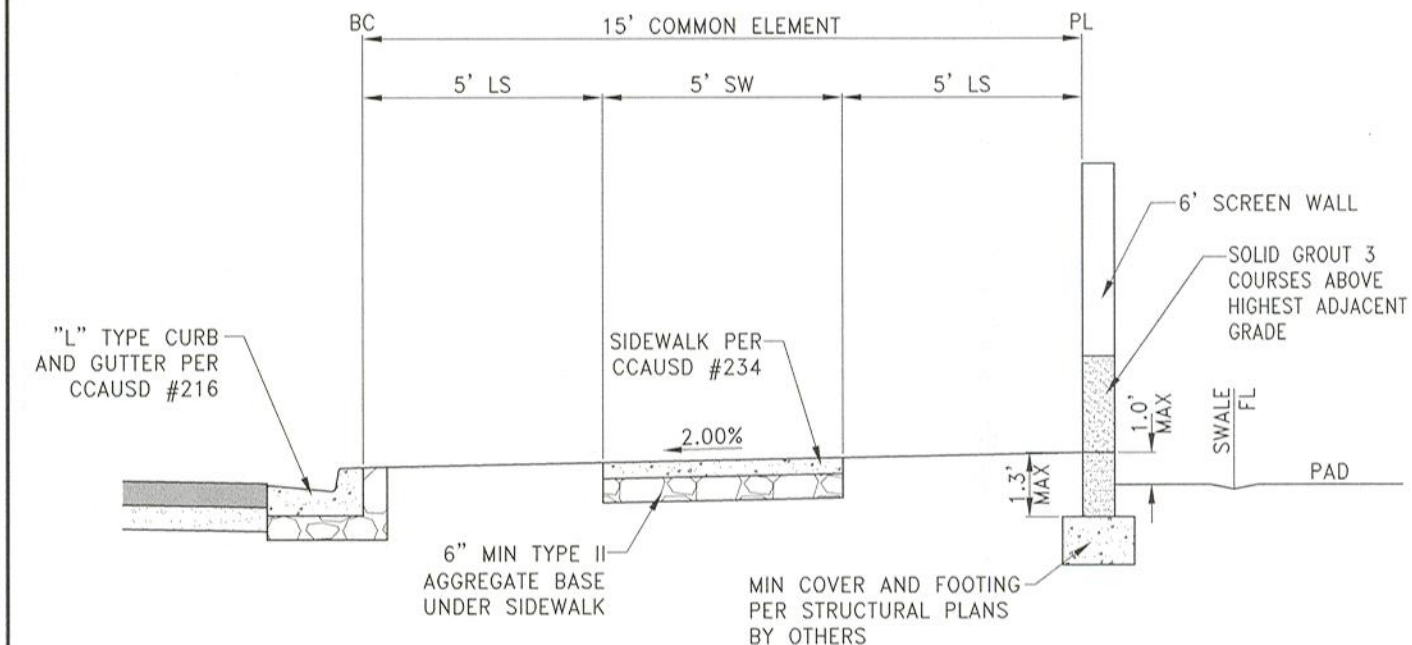
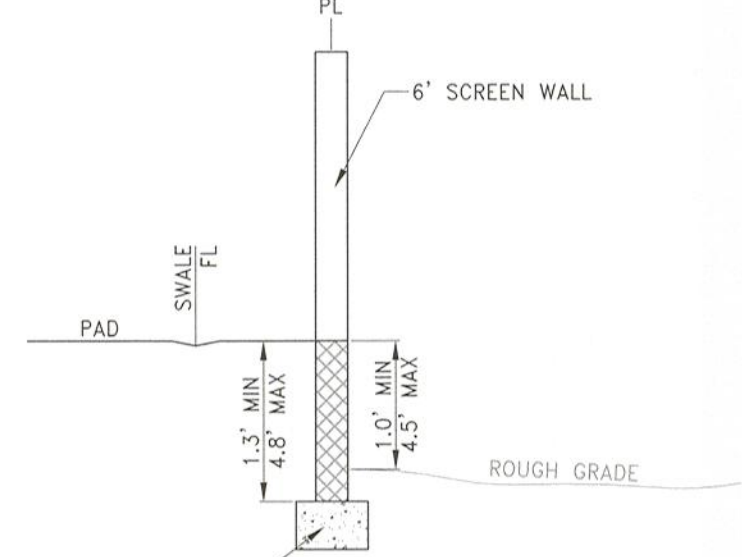
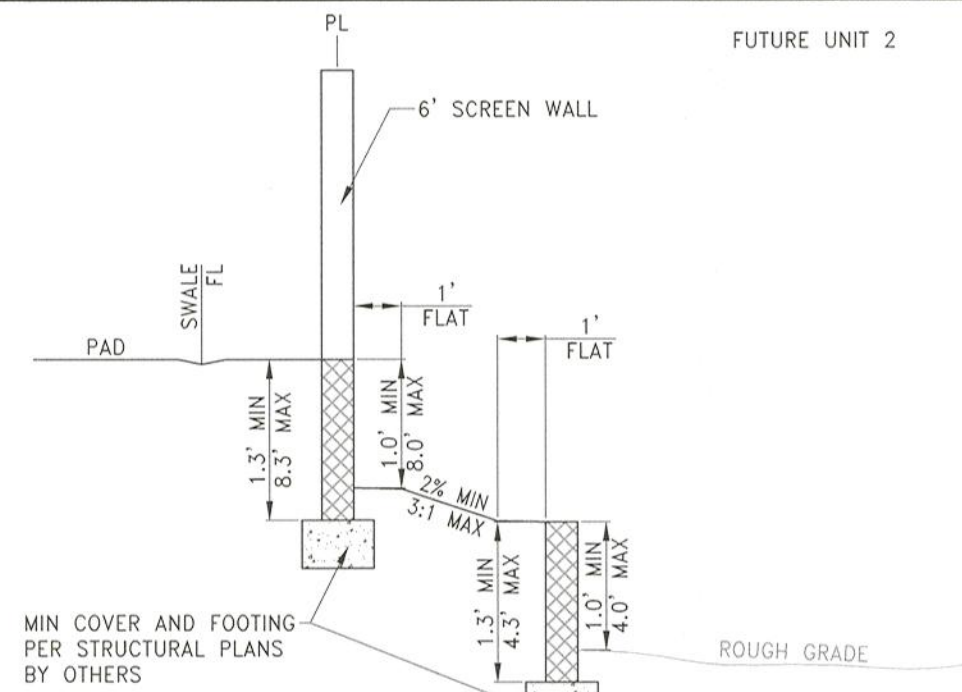
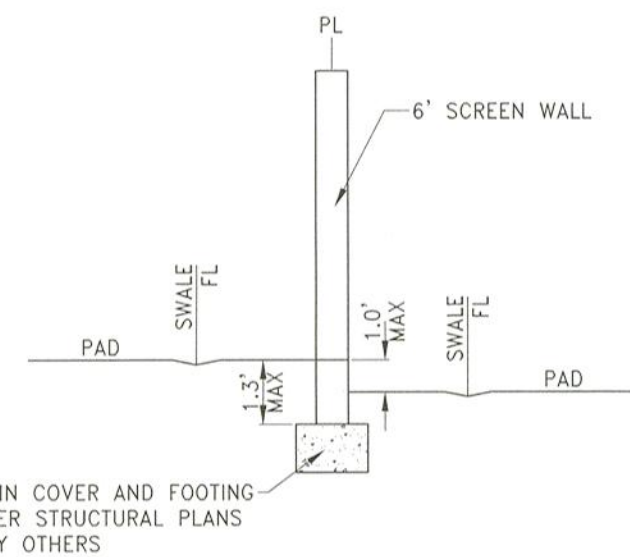
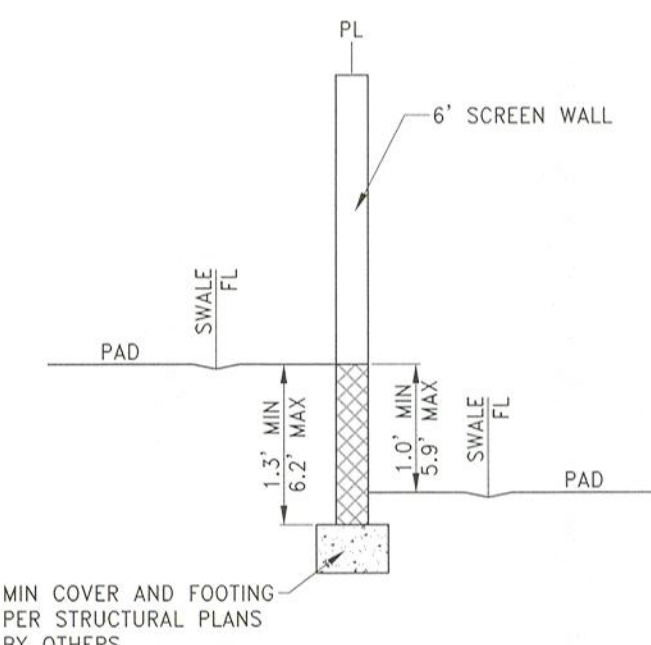
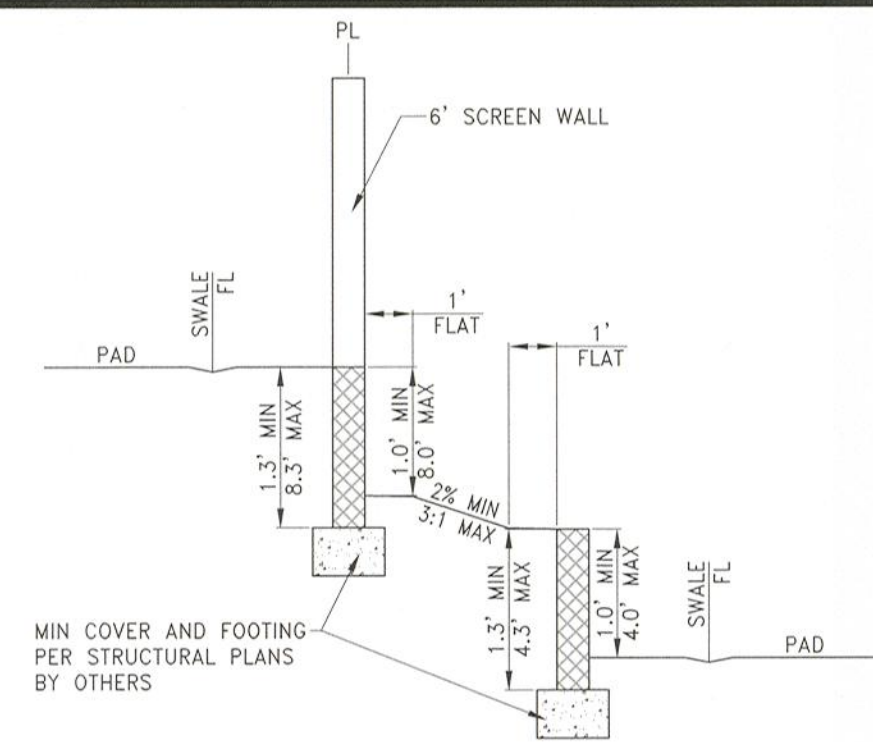
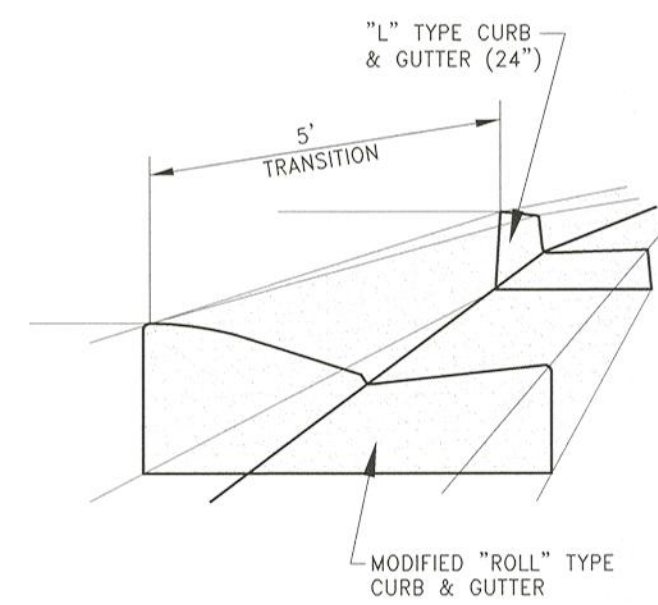
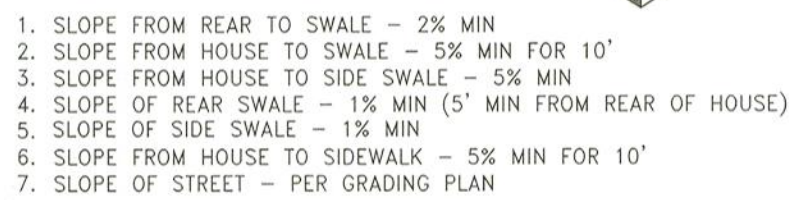
JOHN L. LAND, PE NO. 16441 DATE



GEOTECHNICAL NOTE:
A GEOLOGIST OR GEOTECHNICAL ENGINEER SHALL BE ON SITE DURING EXCAVATION AND MASS GRADING OPERATIONS TO EXAMINE THE SOIL CHARACTERISTICS AND GEOLOGICAL CONDITIONS ENCOUNTERED, AND TO PROVIDE PROFESSIONAL ADVICE TO THE OWNER IN THE EVENT THAT UNANTICIPATED SOIL PROBLEMS ARISE AND/OR SUBSURFACE SITE CONDITIONS ARE FOUND TO BE SIGNIFICANTLY DIFFERENT THAN DEFINED BY PRE EXPLORATION AND TESTING.

WALL & SCARP NOTE:
1. CONTRACTOR TO CONSTRUCT ALL SCARP AND MAINTAIN PROPER COVER OVER AND FROM ALL WALL FOOTINGS PER THE SOILS REPORT REFERRED TO ON THE GRADING PLANS, REPORT ANY PROBLEMS IN DOING SO TO THE DEVELOPER AND THE ENGINEER IMMEDIATELY.
2. SCARP LESS THAN 1' VERTICAL NOT SHOWN ON PLANS.
3. ALL WALL ALIGNMENTS SHALL FOLLOW SIGHT VISIBILITY ZONE ALIGNMENT AND REMAIN OUTSIDE OF SIGHT VISIBILITY ZONE.

FOR REVIEW ONLY	
REV	DESCRIPTION
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3	APPROVED BY: [Signature]
4	DATE: [Blank]
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7	DATE: [Blank]
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GEOTECHNICAL NOTE:

WALL & SCARP NOTE:

1. CONTRACTOR TO CONSTRUCT ALL SCARP AND MAINTAIN PROPER COVER OVER AND FROM ALL WALL FOOTINGS PER THE SOILS REPORT REFERRED TO ON THE GRADING PLANS, REPORT ANY PROBLEMS IN DOING SO TO THE DEVELOPER AND THE ENGINEER IMMEDIATELY.
2. SCARP LESS THAN 1' VERTICAL NOT SHOWN ON PLANS.
3. ALL WALL ALIGNMENTS SHALL FOLLOW SIGHT VISIBILITY ZONE ALIGNMENT AND REMAIN OUTSIDE OF SIGHT VISIBILITY ZONE.

FOR REVIEW ONLY

TOLL BROTHERS INC.

1140 TOWN CENTER DRIVE SUITE 250
LAS VEGAS, NV 89144
PHONE: 702-243-9800 FAX: 702-243-9610

LAS VEGAS, NV 89144
PHONE: 702-243-9800 FAX: 702-243-9610

RCI ENGINEERING

ENVIRONMENTAL
RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89101
PHONE: 702.451.0000 FAX: 702.451.0000

MAIN: 702.453.0800 FAX: 702.453.0801

SKYE CANYON 5.01 AND 5.03 UNIT 1
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
GRADING DETAILS (SHEET 2 OF 3)

NEVADA

CITY OF LAS VEGAS

1/14/21 11:21am



DATE: 1/19/2021

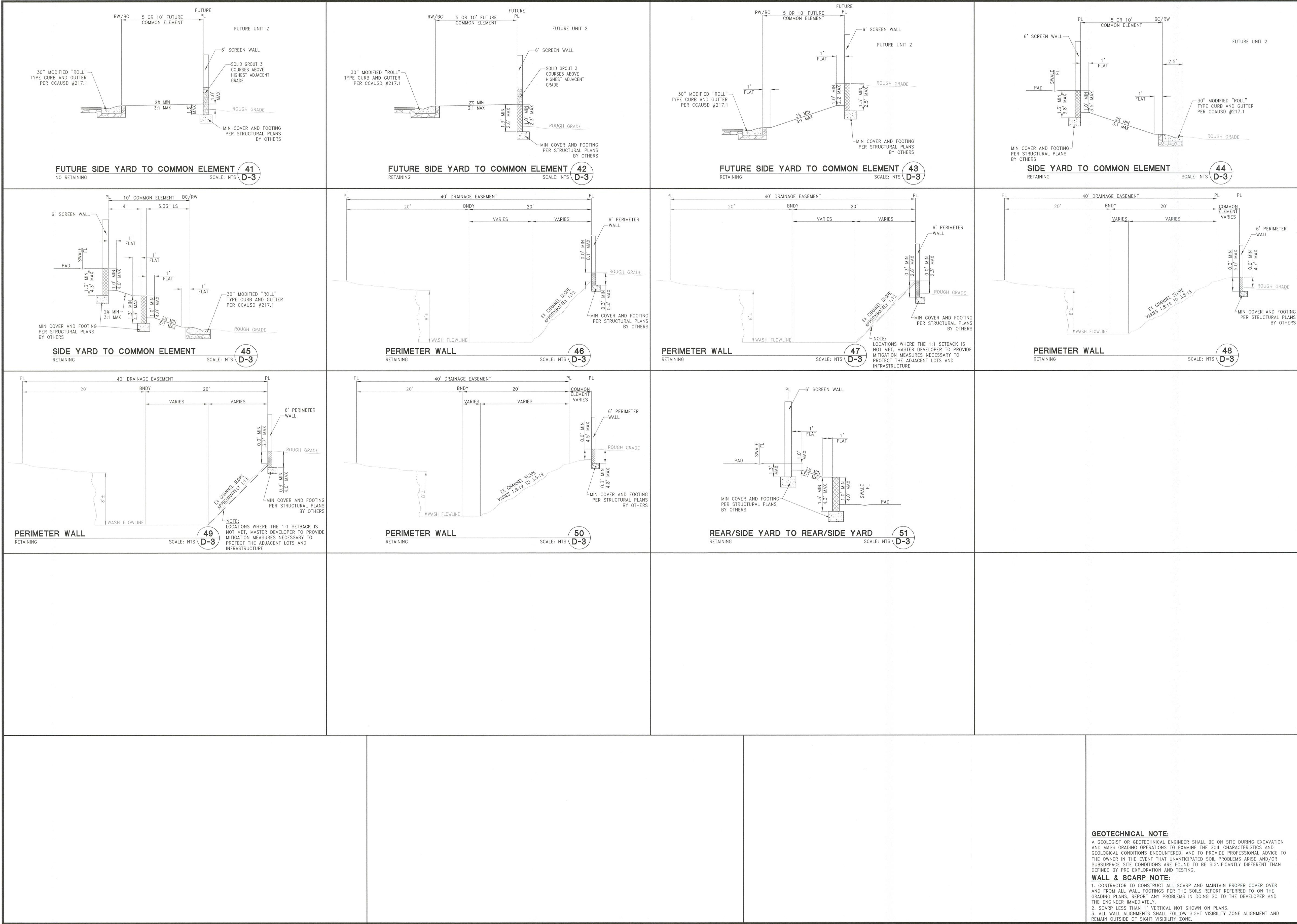
DRAWING

D-2

D 2

SHT 15 OF 17

CLV DRAWING NUMBER



DATE: 1/14/2021
HORIZ. SCALE: N/A
VERT. SCALE: N/A
DRAWN BY: CS
DESIGNED BY: DSP
CHECKED BY: JIL
APPROVED BY: JIL
PROJECT #: 3110.0060

TOLL BROTHERS INC.
1140 TOWN CENTER DRIVE SUITE 250
LAS VEGAS, NV 89144
PHONE: 702-243-9800 FAX: 702-243-9810

RCI ENGINEERING
500 SOUTH SANDY BROOK SUITE 17 LAS VEGAS, NV 89106
PHONE: 702-453-0800 FAX: 702-453-0801

IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 1
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
GRADING DETAILS (SHEET 3 OF 3)

CITY OF LAS VEGAS
CLV PROJECT #

DATE: 1/14/2021
DRAWING
D-3
SHEET 16 OF 17
CLV DRAWING NUMBER

GEOTECHNICAL NOTE:
A GEOLOGIST OR GEOTECHNICAL ENGINEER SHALL BE ON SITE DURING EXCAVATION AND MASS GRADING OPERATIONS TO EXAMINE THE SOIL CHARACTERISTICS AND GEOLOGICAL CONDITIONS ENCOUNTERED, AND TO PROVIDE PROFESSIONAL ADVICE TO THE OWNER IN THE EVENT THAT UNANTICIPATED SOIL PROBLEMS ARISE AND/OR SUBSURFACE SITE CONDITIONS ARE FOUND TO BE SIGNIFICANTLY DIFFERENT THAN DEFINED BY PRE EXPLORATION AND TESTING.
WALL & SCARP NOTE:
1. CONTRACTOR TO CONSTRUCT ALL SCARP AND MAINTAIN PROPER COVER OVER AND FROM ALL WALL FOOTINGS PER THE SOILS REPORT REFERRED TO ON THE GRADING PLANS, REPORT ANY PROBLEMS IN DOING SO TO THE DEVELOPER AND THE ENGINEER IMMEDIATELY.
2. SCARP LESS THAN 1' VERTICAL NOT SHOWN ON PLANS.
3. ALL WALL ALIGNMENTS SHALL FOLLOW SIGHT VISIBILITY ZONE ALIGNMENT AND REMAIN OUTSIDE OF SIGHT VISIBILITY ZONE.

FOR REVIEW ONLY

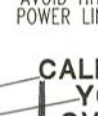
UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UNDERGROUND OR OVERHEAD UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN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

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

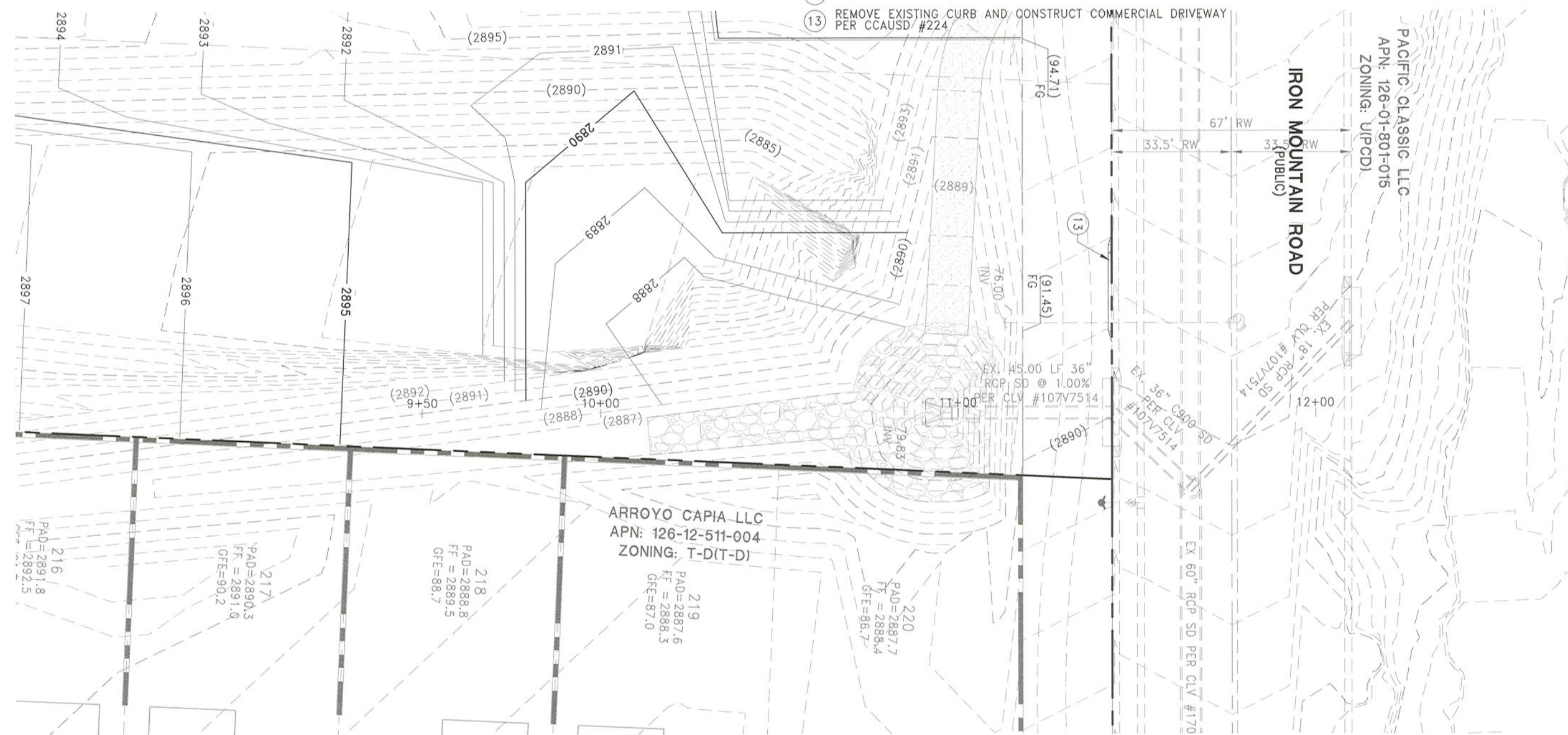
BENCHMARK NUMBER: USDA1934J

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT THE
SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD.

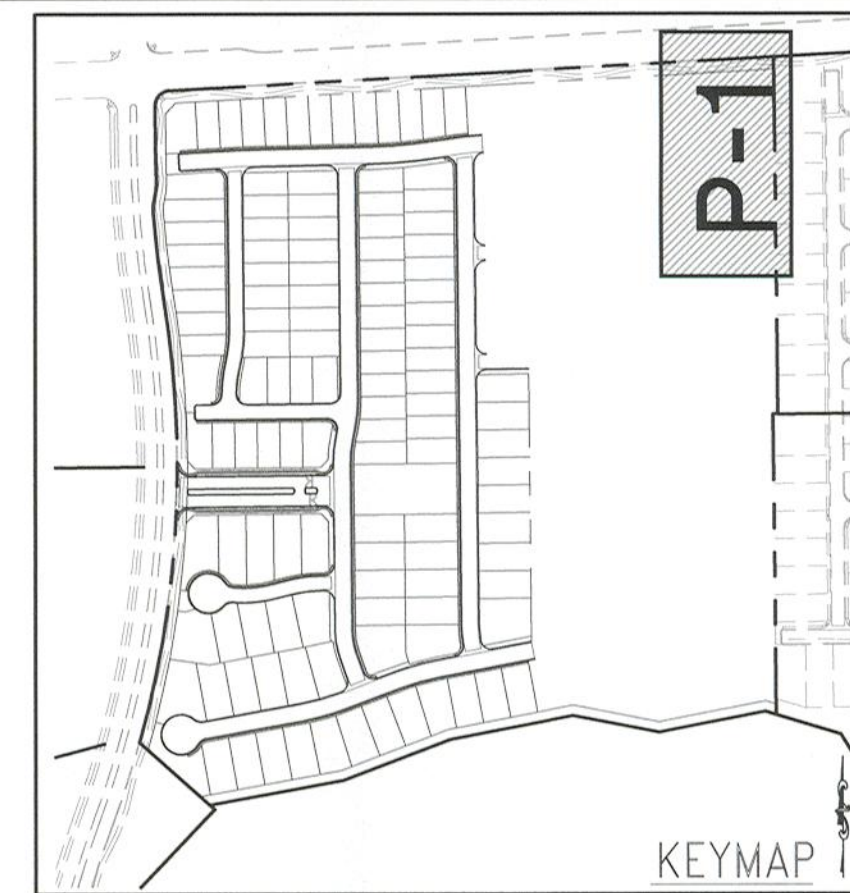
ELEVATION = 2817.61 FEET. 858.81 METERS
N.A.V.D. 88 DATUM
PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE.

SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 157, PAGE 41 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

- (1) CONSTRUCT AC PAVEMENT PER DETAILS 1 THRU 3 ON SHEET D-1
- (2) CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
- (3) CONSTRUCT MODIFIED "ROLL" TYPE CURB AND GUTTER PER CCAUSD #217.1
- (4) CONSTRUCT "A" TYPE ISLAND CURB AND GUTTER PER CCAUSD #219
- (5) CONSTRUCT 5' Curb TRANSITION PER DETAIL 20 SHEET D-2
- (6) CONSTRUCT 5' SIDEWALK PER CCAUSD #234 (5-INCH THICK WHEN CONTIGUOUS TO 10' TYPE C&G)
- (7) CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD #235 (CASE 1)
- (8) CONSTRUCT 8' CROSS GUTTER PER CCAUSD #228
- (9) CONSTRUCT 8' MODIFIED (ROLL CURB) CROSS GUTTER PER CCAUSD #228
- (10) CONSTRUCT 5' WIDE PEDESTRIAN ACCESS GATE
- (11) INSTALL ELECTRONICALLY CONTROLLED ACCESS GATES
- (12) CONSTRUCT STAIRS, 3 STEPS EACH WITH 5' LANDING ABOVE AND BELOW
- (13) REMOVE EXISTING CURB AND CONSTRUCT COMMERCIAL DRIVEWAY PER CCAUSD #224



EXISTING STORM DRAIN
(PRIVATE)



30' 15' 0' 30' 60'

HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 5'



DATE: 1/14/2021	REV	DESCRIPTION	BY	APPD	DATE
HORIZ. SCALE: 1"=50'					
VERT. SCALE: 1"=5'					
DRAWN BY: CS					
DESIGNED BY: DSP					
CHECKED BY: JLL					
APPROVED BY:					
PROJECT #:					

TOLL BROTHERS INC.
 1140 TOWN CENTER DRIVE SUITE 250
 LAS VEGAS, NV 89144
 PHONE: 702-243-9800 FAX: 702-243-9810



RCI ENGINEERING
 500 SOUTH RANCHO DRIVE SUITE 17, LAS VEGAS, NV 89106
 MAIN: 702-653-0800 FAX: 702-653-0801

IMPROVEMENT PLANS FOR
SKYE CANYON 501 AND 5.03 UNIT 1
 A SINGLE FAMILY RESIDENTIAL SUBDIVISION
PLAN AND PROFILE
EX STORM DRAIN

NEVADA
 CITY OF LAS VEGAS

DATE: 1/14/2021
 DRAWING



P-1

SHT 17 OF 17
 CLY DRAWING NUMBER

3110_Toll\0060 Sky Canyon 5.01-5.03\CIVIL\IPS\UNIT 1\S007_P-1_SC_501-503_U1.dwg	schea	1/14/21	11:21am
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IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 2
A SINGLE FAMILY RESIDENTIAL SUBDIVISION

BY **Toll Brothers**
America's Luxury Home Builder

APN: 126-12-511-001 AND 126-12-511-003
CITY OF LAS VEGAS, NEVADA
15.55+/- ACRES
107 LOTS

APPROVED BY:
CITY OF LAS VEGAS

CITY OF LAS VEGAS PLANNING DEPARTMENT

CITY OF LAS VEGAS FIRE & RESCUE

CENTURYLINK

DATE

CENTRAL TELEPHONE COMPANY - dba CENTURYLINK

THE 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.

SOUTHWEST GAS CORPORATION

SOUTHWEST GAS CORPORATION

SWG UID

DATE

COX COMMUNICATIONS LAS VEGAS INC.

COX COMMUNICATIONS LAS VEGAS INC.

DATE

NV ENERGY

NV ENERGY COMPANY

DATE

NV ENERGY COMPANY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NV ENERGY COMPANY 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.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. _____ FIRST APPROVED DATE: _____
LVVWD APPROVED FIRE FLOW _____ GPM AT 20 PSI RESIDUAL
MAXIMUM AVAILABLE FIRE SPRINKLER FLOW _____ GPM
(SHEETS C-1, N-1, MU-1, U-1 THRU U-X AND P-1 THRU P-X)

LEGAL DESCRIPTION

LOTS 5.01 AND 5.03 OF THE SKY CANYON PHASE 4 FINAL MAP ON FILE IN THE CLARK COUNTY REDORDER'S OFFICE IN BOOK 160, PAGE 72 OF PLATS, SITUATE IN A PORTION OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA.

BENCHMARK

BENCHMARK NUMBER: USDA1934J

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT THE SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD.

ELEVATION = 2817.61 FEET. 858.81 METERS

N.A.V.D. 88 DATUM

PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE.

BASIS OF BEARINGS

SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 157, PAGE 41 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

OWNER/DEVELOPER:

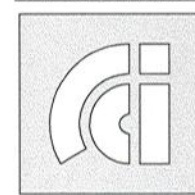
TOLL SOUTH LV, LLC

1140 TOWN CENTER DRIVE, SUITE 250

LAS VEGAS, NEVADA 89144

PH#702.243.9800 FAX#702.243.9610

DESIGN ENGINEER:



RCI ENGINEERING

500 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89106
PH#702.453.0800 FAX#702.453.0801
www.rcinevado.com

SHEET INDEX

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VICINITY MAP
NOT TO SCALE



SITE PLAN
NOT TO SCALE

DISCLAIMER NOTE:

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

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DATE: January 14, 2021
HORIZ. SCALE: N/A
VERT. SCALE: N/A
DRAWN BY: CS
DESIGNED BY: DSP
CHECKED BY: JIL
APPROVED BY: JIL
PROJECT #: 3110.0060

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LAS VEGAS, NV 89144
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RCI ENGINEERING
500 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89106
MAIN: 702-453-0800 FAX: 702-453-0801

NEVADA

IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 2
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
COVER SHEET

PROFESSIONAL SEAL
JOHN I. LAND
Exp. 12/31/2021
CIVIL
No. 16441

DATE: 1/14/2021

DRAWING
C-1
SHT 1 OF 8
CLV DRAWING NUMBER
CLV PROJECT #

CITY OF LAS VEGAS

0:\3110_Toll\0060_Sky Canyon 5.01-5.03\CLV\CLIPS\UNIT 2\3001_C-1_SC_501-503_U2.dwg edark 1/14/21 11:55am

CITY OF LAS VEGAS GENERAL NOTES

- ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA, NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARD SPECIFICATIONS FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROPRIATE STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE "UNIFORM BUILDING CODE, AND ALL LOCAL ORDINANCES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
- THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THESE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL EXISTING UNDERGROUND AND OVERHEAD INTERFERENCE'S WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
- THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORILY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
- ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
- TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
- PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
- EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
- AC PAVEMENT TO BE ONE-HALF INCH (1/2") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS.
- CURB AND GUTTER DOWNSHALL BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
- SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
- CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SUBSTRUCTURES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
- ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY GEOTEK RESIDENTIAL, LLC, PROJECT NO. 12203.3BC-LVR, DATED JULY 1, 2020, APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
- EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
- THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND RELOCATED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
- UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER, AND CITY NOTES.
- ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN ON CIVIL PLANS FOR THE PURPOSE OF REVIEWING GRADING RELATIONSHIPS; FLOOD CONTROL AND SIGHT DISTANCE AT INTERSECTIONS. NEW WALLS REQUIRE A SEPARATE PERMIT AND INSPECTION BY THE BUILDING DEPARTMENT.
- ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
- CONTRACTOR SHALL ADJUST ALL NEW AND EXISTING INLETS, VALVE BOXES, MANHOLE RIMS, AND SEWER CLEAN OUTS, ETC. TO FINISH GRADE AS APPLICABLE WHETHER OR NOT THEY ARE SHOWN ON THE PLANS.
- MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF MDOOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
- WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC., THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
- SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE CITY AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS TO THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET. THE CONNECTION OF SEWER LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, AND STORM DRAIN MAIN ALIGNMENT POINTS. THE LOCATION SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE OFFICIAL HORIZONTAL AND VERTICAL CONTROL NETWORKS OF THE CITY OF LAS VEGAS. FINAL LOCATION MAPS MUST BE SEALED AND CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIVE CERTAINITY OF ± 0.01 FEET HORIZONTALLY AND VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).
- CITY VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CITY VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARD FOR WASTEWATER COLLECTION SYSTEMS LATEST EDITION.
- A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

CITY OF LAS VEGAS TRAFFIC NOTES

- ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.
- THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.
- BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCE 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.
- 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.
- 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.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW TRAFFIC SIGNS SHALL BE FABRICATED WITH DIAMOND GRADE VPI CLASS 6 REFLECTIVE SHEETING OR APPROVED EQUIV. ALL NEW TRAFFIC SIGNS, EXCEPT STREETNAME 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 ANTI-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.
- 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.
- 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.
- STREET SIGNS AND STOPS SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF STREET NAME SIGNS.
- 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.
- WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE EXPEDITED TO COMPLETION SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.
- 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.
- 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.
- ANY WORK WITHIN 300' OF A SIGNALIZED INTERSECTION WILL BE NIGHT WORK, UNLESS OTHERWISE DIRECTED BY THE CITY OF LAS VEGAS CITY ENGINEER.
- THE 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. THE CONTRACTOR SHALL BE REQUIRED TO MATCH ADJACENT ROAD 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 OMITTING, ADDING OR MODIFYING PAVEMENT MARKINGS AND TRAFFIC CONTROL SIGNS SUCH THAT ADEQUATE TRANSITIONS AND LANE TERMINATIONS BETWEEN ADJACENT ROADWAY SEGMENTS ARE PROVIDED.

CITY OF LAS VEGAS HYDRANT AND ACCESS GENERAL NOTES

- 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.
- ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S-APPROVED PRODUCTS LISTS ARE ALLOWED TO BE INSTALLED.
- 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. [FC § 105.7.12]
- 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. [FC § 3310, § 3312]
- TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. [FC § 507.5.7.3]
- ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLOW 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. [FC § 106.3]
- 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. [FC § 507.2.1, NFPA 241]
- 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. [FC § 507]
- PRIVATE HYDRANTS SHALL BE PAINTED RED. [FC § 507.5.7.1]
- 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. [FC § 507]
- FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: [FC § C102]
 - RESIDENTIAL - 500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
 - COMMERCIAL - 300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
- WHERE THE 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 OF 1000 FT SPACING, WHERE FOR TRANSPORTATION PURPOSES 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 FT ON AN ALTERNATING BASIS. [FC § C102.8]
- NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
- NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. [FC § C102.12]
- A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. [FC § C102.4]
- THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. [FC § C102.7]
- THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. [FC § C102.6]
- THE 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. [FC § C104]
- 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. [FC § 503.2.3]
- 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 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES ADJACENT SHALL NOT EXCEED 6% [FC § 503.2.7, § 503.2.8]
- THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FT OUTSIDE AND 28 FT INSIDE TURNING RADIUS. [FC § 503.2.4]
- VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13FT 6 INS. [FC § 503.2.1]
- FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 40 FT 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, NO PARKING IS PERMITTED ON EITHER SIDE. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. [FC § 503.2.1.1]
- A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT FACILITY ACCESS. THIS DISTANCE COULD BE INCREASED TO 250 FT IF THE BUILDING IS CONFINED TO ONE SIDE OF AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEAD. 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. [FC § 503.3]
- ELECTRICALLY CONTROLLED ACCESS GATE SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER SYSTEM.SAID SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE FC § 503.6 AND IFC APPENDIX M.

CITY OF LAS VEGAS GRADING NOTES

- 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.
- 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.
- 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.
- 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.
- 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.
- 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
 - PAVEMENT AREA SUBGRADE 0.1" +0.0' TO -0.1" SEE SOILS REPORT
 - ENGINEERING CONTROLLED ACCESS GATE -0.1" TO -0.1" SEE SOILS REPORT CONSTRUCTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.
- ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
- IN 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 FROM THE CONSTRUCTION DEPARTMENT.
- 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 AND THE ADJACENT PUBLIC RIGHT-OF-WAY PROJECT. ALL ADJACENT PROPERTY, PRIVATE OR PUBLIC SHALL BE MAINTAINED IN A CLEAN, SAFE AND USABLE CONDITION.
- IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, THE OWNER/ENGINEER SHALL PROVIDE AND INSTALL SUCH ITEMS AT HIS OWN EXPENSE AND INDICATE THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERM, ROAD SIGNS AND BARRICADES, ETC.

STORMWATER RUNOFF MANAGEMENT

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

- 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.
- 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.
- TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NV100000, SECTION III.A.5.
- 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 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 SUSPENSIVE OR OBSTRUCTIVE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NV100000, SECTION III.A.12.
- 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.

SOUTHWEST GAS CONSTRUCTION NOTES

SOUTHERN NEVADA - SOUTHWEST GAS CORPORATION GENERAL NOTES

- IN THE EVENT OF NATURAL GAS EMERGENCIES CALL 911 AND 1-877-860-8020
- MINIMUM HORIZONTAL AND VERTICAL CLEARANCES BETWEEN NATURAL GAS FACILITIES AND ANY UNDERGROUND UTILITIES AND/OR STRUCTURES, INCLUDING BUT NOT LIMITED TO WATER, SEWER, STORM DRAIN, COMMUNICATIONS, AND ELECTRIC SHALL BE AT LEAST 12-INCHES OR GREATER AS DICTATED BY LOCAL CODES AND STANDARDS
 - (A) ANY DEVIATION FROM SPECIFIED MINIMUM CLEARANCES MUST BE APPROVED BY ALL AFFECTED UTILITIES AND/OR MUNICIPALITIES
- FOR VALVE ADJUSTMENT CONTACT 702-728-7881 14 HOURS PRIOR TO WORK
- IN THE EVENT OF A NATURAL GAS CONFLICT WITH PROPOSED UTILITIES AND STRUCTURES CONTACT 702-365-2099
- FOR STANDBY WHEN EXCAVATING (INCLUDING SAW CUTTING AND PAVEMENT REMOVAL) OVER OR NEAR HIGH PRESSURE GAS LINES CONTACT 702-778-8451 48 HOURS PRIOR TO CONSTRUCTION.

CAUTION: HIGH PRESSURE GAS!

CALL SOUTHWEST GAS AT 702-778-8451 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES 48 HOURS PRIOR TO CONSTRUCTION

CITY OF LAS VEGAS SEWER NOTES

- ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER SYSTEMS AND THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-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.
- 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.
- CHISEL "S" OR "G" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.
- POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BAGGILL OF TYPED TYPE 1 AGGREGATE BASE.
- 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.
- 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.
- 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.
- 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.
- 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.
- INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) STANDARD NOTES

- LVVWD PROJECT # XXXXX
(REVISED 08/01/2017)
- 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 (702-258-7171) 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.
 - ALL WORK SHALL CONFORM TO LVVWD STANDARD PLANS, 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.
 - 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 STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
 - A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
 - ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
 - ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
 - ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
 - ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE 2010 EDITION OF THE UDACS.
 - ALL WATER FACILITIES AND APPURTENANCES SHALL BE DISINFECTED, PRESSURE TESTED, AND HAVE AN ACCEPTABLE PASSING HEALTH WATER SAMPLE OBTAINED, PRIOR TO OPERATION AND USE.
 - THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 702-258-3152 OR 702-258-3802, TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
 - 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.
 - ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD APPROVED PRODUCT'S LIST FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS BY SUBMITTING SHOP DRAWINGS.
 - TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
 - THE INSTALLATION OF LVVWD MUNICIPAL WATER FACILITIES WITH ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.
 - ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF ANY DECORATIVE SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.
 - NO LEAD COMPLIANCE NOTE:
TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER BRASS PRODUCTS PROPOSED TO BE RELOCATED, OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

APPROVED FOR CONSTRUCTION

PROJECT NO. LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
FIRST APPROVED DATE:

CITY OF LAS VEGAS STREETLIGHT NOTES

- 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.
- NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF TRAFFIC ENGINEERING AND THE CITY ENGINEER.
- ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION.
- ALL STREET LIGHTING CONDUITS SUB 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.
- ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN ACCORDANCE WITH THE USD NO. 320A.
- AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TEFD PRIOR TO ANY PRE-FINAL INSPECTION. THE ASBUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
- 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.
- 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.
- THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.
- THE DEVELOPER/OWNER WILL BE REQUIRED TO SUPPLY POWER TO ALL NEW PUBLIC STREET LIGHTS INSTALLED UNDER THE DESIGN PRIOR TO PROVIDING POWER TO 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 LIGHTS AND/OR SERVICE/S INSTALLED UNDER THIS PLAN DESIGN 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) 227-6531.

DISCLAIMER NOTE:

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Call before you Dig
AVOID CUTTING UNDERGROUND UTILITIES. IT'S COSTLY.

Call before you Dig
811

Call before you Dig
UnderGround
1-702-432-5300

Call before you Dig
UnderGround
1-702-227-2929

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		ROW OR PROPERTY LINE
		EASEMENT LINE
		CENTERLINE
		CURB
		VALLEY GUTTER
		EDGE OF PAVEMENT
		SIDEWALK
		SIDEWALK RAMP
		DRIVEWAY
		SAWCUT LINE
		RETAINING WALL
		FLOOD WALL
		WROUGHT IRON VEHICULAR GATES
		WROUGHT IRON PEDESTRIAN GATES
		INDEX CONTOURS
		INTERMEDIATE CONTOURS
		ROUGH GRADE INDEX CONTOURS
		CUT OR FILL SLOPE
		CUT AND FILL LINE
		LOT NUMBER
		FF AND PAD ELEVATION
		GRADE SLOPE
		SPOT ELEVATION
		SWALE LINE
		LOT DIMENSION
		SIGHT VISIBILITY ZONE
		WATERLINE MAIN AND SIZE
		FIRE HYDRANT
		WATER METER AND SERVICE LATERAL
		WATER VALVE
		WATER FITTINGS
		WATER LINE REDUCER
		WATER CAP WITH WATER BLOW OFF ASSEMBLY
		IRRIGATION SLEEVE
		PRESSURE REDUCING VALVE
		REDUCED PRESSURE PRINCIPLE ASSEMBLY
		SEWERLINE MAIN AND SIZE
		SEWERLINE MANHOLE
		SEWERLINE CAP
		BACK WATER VALVE
		100W HPS STREET LIGHT
		250W HPS STREET LIGHT
		400W HPS STREET LIGHT
		STREET LIGHT CONDUIT AND CAP

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FREWAY AND ARTERIAL
SYSTEM OF TRANSPORTATION



1-702-227-2929

BENCHMARK

BENCHMARK NUMBER: USDA1934J

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT THE
SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD.

ELEVATION = 2817.61 FEET, 858.81 METERS
N.A.V.D. 88 DATUM
PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE.

BASIS OF BEARINGS

SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF
THE NORTHEAST QUARTER (NE1/4) OF SECTION 12, TOWNSHIP 19
SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK
COUNTY NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 157, PAGE
41 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

SURVEY MONUMENT NOTE

OWNER RESPONSIBLE TO PROVIDE SURVEY MONUMENTATION AS
REQUIRED BY CITY OF LAS VEGAS AND CLARK COUNTY UNIFORM
STANDARD DRAWING NUMBER 243. OWNER IS ALSO RESPONSIBLE TO
REPLACE ALL SURVEY MONUMENTATION DAMAGED, DESTROYED,
OR OBLISCURED DURING CONSTRUCTION.

BUILDING PERMIT NOTE

ALL STRUCTURES SHOWN OR INDICATED ON THIS SUBMITTAL
WITHIN THE PROPERTY REQUIRE A BUILDING PERMIT.
APPLICATION AND SUBMITTAL THIS INCLUDES BUILDINGS, ABOVE
GROUND TANKS, SIGNS, RETAINING WALLS, FENCES, TRASH
ENCLOSURES, SHADE STRUCTURES, STAIRWAYS, RAMPS, LIGHT
POLES, LIGHT BOLLARDS, ETC. THIS DOES NOT INCLUDE ANY
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SIGHT VISIBILITY ZONE

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(MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB
EXISTS) WITHIN THE SIGHT VISIBILITY ZONES.

FLOOD ZONE NOTE

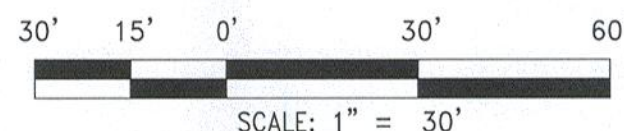
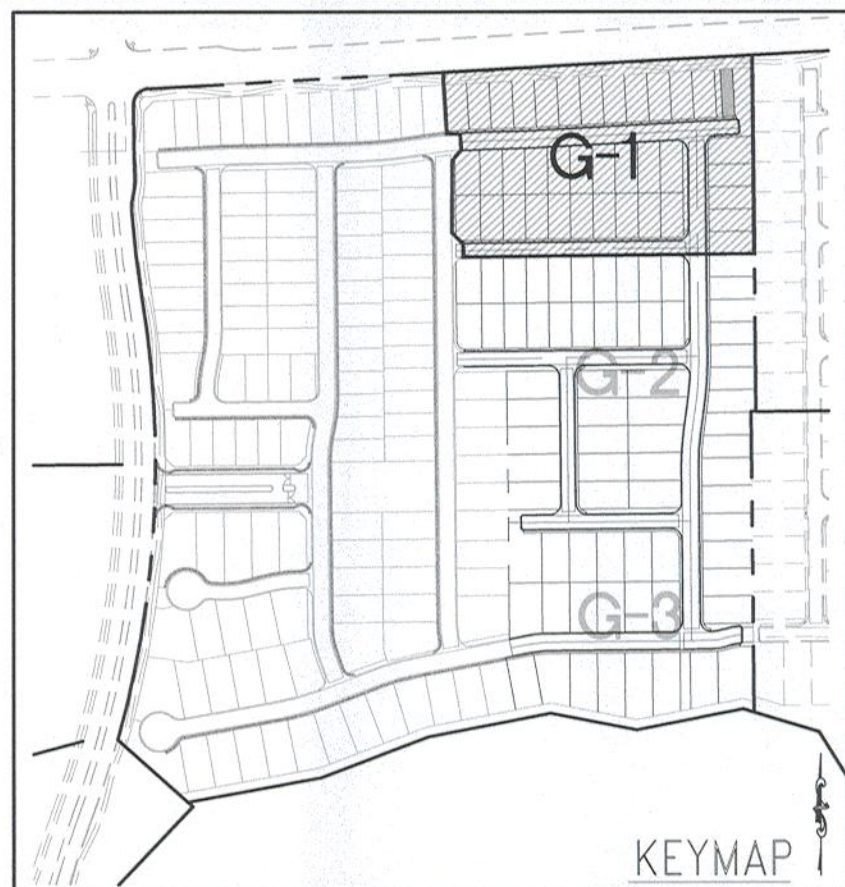
ACCORDING TO THE FEMA FLOOD INSURANCE RATE MAP
(FIRM) COMMUNITY PANEL NUMBERS 32003C1750 E DATED
SEPTEMBER 27, 2002, THE SITE IS LOCATED IN A ZONE "X".

NOTE

ALL ONSITE STORM DRAINS AND THE
ASSOCIATED FACILITIES ARE PRIVATELY
OWNED AND TO BE PRIVATELY MAINTAINED
BY THE HOA

NOTE

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- SEE FINAL MAP FOR EXACT PROPERTY LINE DIMENSIONS.
- ENGINEER TO BE NOTIFIED OF ANY DISCREPANCIES IMMEDIATELY.
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- DURING CONSTRUCTION, SURVEYORS AND CONTRACTORS MUST VERIFY THAT ALL STREETS AND LOTS HAVE POSITIVE DRAINAGE. SAME MUST UTILIZE AT LEAST THREE GRADES ON VERTICAL TANGENTS TO VERIFY SLOPES.
- SOIL REPORT NOTE:
GRADING SHALL BE IN ACCORDANCE
WITH SOILS REPORT PREPARED BY:
ENGINEER: GEOTEK RESIDENTIAL, LLC
PROJECT NO. 12-03-350-LVR
DATED: JULY 1, 2020
- CUT/FILL ESTIMATES
EXISTING TO FINISH GRADE ELEVATIONS
NET CUT: 1,000 CY
NET FILL: 1,000 CY
- SEE DETAIL 20 SHEET D-2 FOR TYPICAL LOT DRAINAGE
- FOR STORMWATER RUNOFF MANAGEMENT NOTES REFER TO SHEET N-1

CONSTRUCTION NOTES

- CONSTRUCT AC PAVEMENT PER DETAILS 1 THRU 2 ON SHEET D-1
- CONSTRUCT MODIFIED "ROLL" TYPE CURB AND GUTTER PER CCAUSD #217.1
- CONSTRUCT 5" SIDEWALK PER CCAUSD #234 (5-INCH THICK WHEN CONTIGUOUS TO "ROLL" TYPE CURB)
- CONSTRUCT SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD #235 (CASE I)
- CONSTRUCT 8" MODIFIED (ROLL CURB) CROSS GUTTER PER CCAUSD #228
- CONSTRUCT 24" SIDEWALK UNDERDRAIN PER CCAUSD #236
- CONSTRUCT 6" CONCRETE CHANNEL PER DETAIL 27 SHEET D-2
- CONSTRUCT 1'x3" CONCRETE CUT OFF WALL
- CONSTRUCT RIP RAP, D50=10", THICKNESS=20"
- CONSTRUCT GROUTED RIP RAP, D50=12", THICKNESS=24"
- CONSTRUCT 24" WIDE EMERGENCY ACCESS GATE PER DETAIL 22 SHEET D-2
- CONSTRUCT 5' WIDE PEDESTRIAN ACCESS GATE PER DETAIL 22 SHEET D-2
- CONSTRUCT 6" WROUGHT IRON FENCE PER CCAUSD 425.5.1
- CONSTRUCT 6"x6" JENSEN PRECAST DROP INLET PER DETAIL 30 SHEET D-2 AND PER CCAUSD #421

I HEREBY CERTIFY THAT THIS GRADING
PLAN IS IN CONFORMANCE WITH THE
APPROVED DRAINAGE STUDY DS #XXXXX
ON FILE WITH CITY OF LAS VEGAS FOR
THIS PROJECT.

JOHN I. LAND, PE NO. 16441 DATE

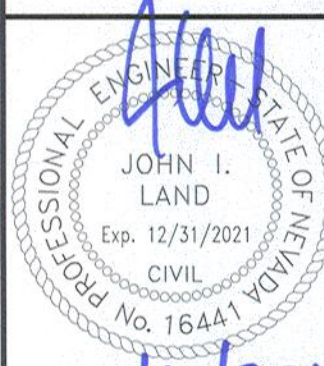
TOLL BROTHERS INC.

1140 TOWN CENTER DRIVE SUITE 250
LAS VEGAS, NV 89144
PHONE: 702-243-9800 FAX: 702-243-9610

RCI ENGINEERING

500 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89106
MAIN: 702-453-0800 FAX: 702-453-0801

IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 2
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
GRADING PLAN (SHEET 1 OF 3)



DATE: 1/14/2021

DRAWING
G-1

SHT 3 OF 8

CLV DRAWING NUMBER

CLV PROJECT #

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1-702-227-2929

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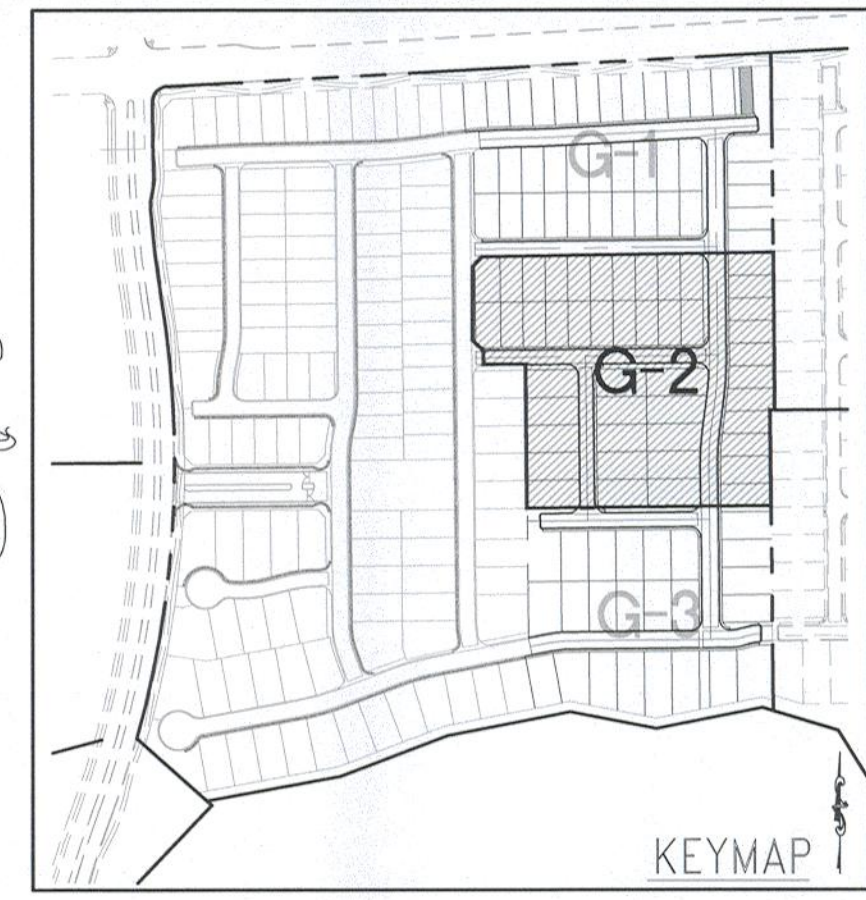
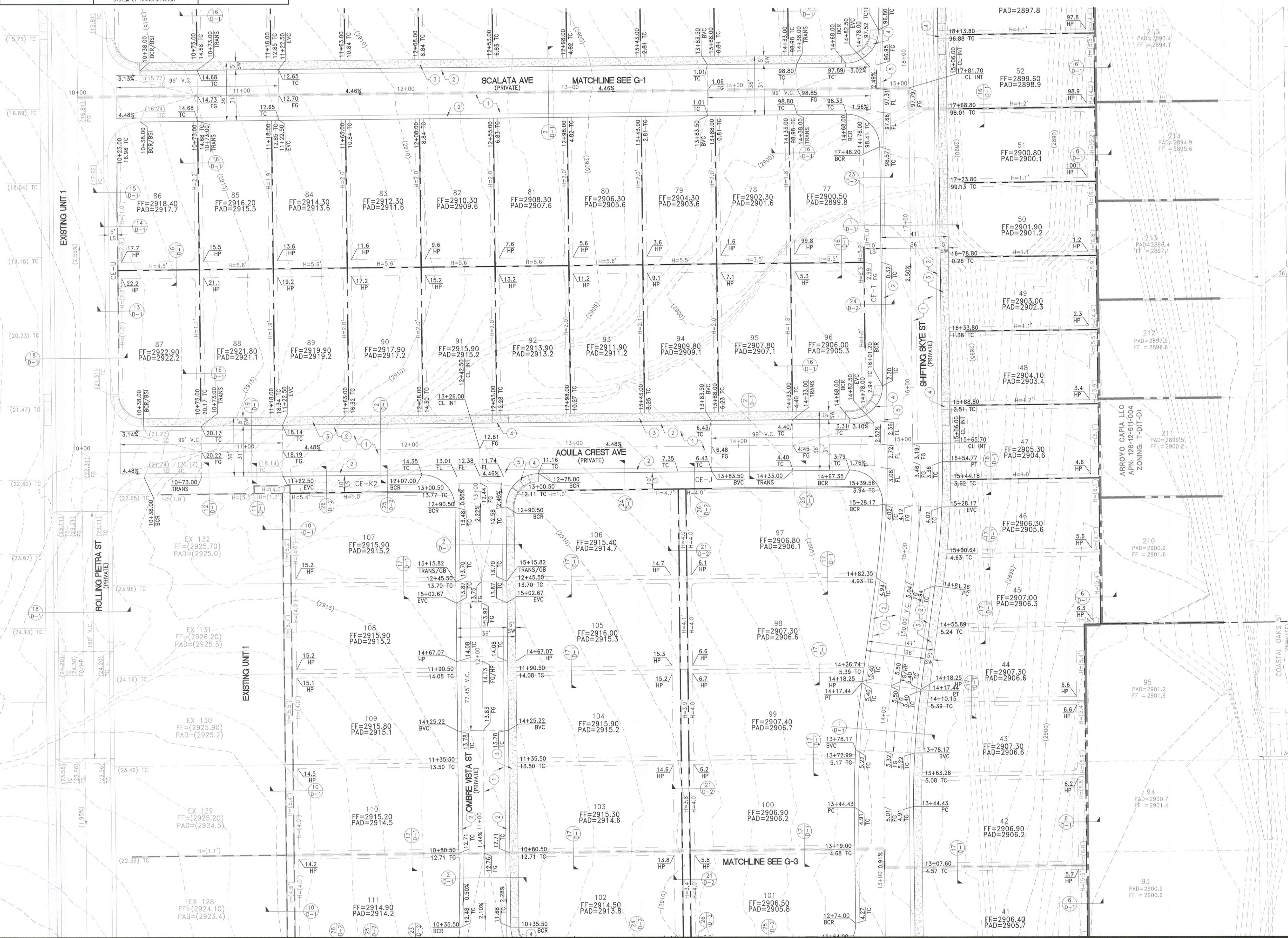
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- SOIL REPORT NOTE:
GRADING SHALL BE IN ACCORDANCE WITH SOILS REPORT PREPARED BY:
ENGINEER: GEOTEK RESIDENTIAL, LLC
PROJECT NO. 12203.38C-LVR
DATED: JULY 1, 2020
- CUT/FILL ESTIMATES
EXISTING TO FINISH GRADE ELEVATIONS
NET CUT: 1,000 CY
NET FILL: 1,000 CY
- FOR STORMWATER RUNOFF MANAGEMENT NOTES REFER TO SHEET N-1

CONSTRUCTION NOTES

- CONSTRUCT AC PAVEMENT PER DETAILS 1 THRU 2 ON SHEET D-1
- CONSTRUCT MODIFIED "ROLL" TYPE CURB AND GUTTER PER CCAUSD #217.1
- CONSTRUCT 5" SIDEWALK PER CCAUSD #234 (5-INCH THICK WHEN CONTIGUOUS TO "ROLL" TYPE CURB)
- CONSTRUCT SIDEWALK RAMP USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD #235 (CASE 1)
- CONSTRUCT 8" MODIFIED (ROLL CURB) CROSS GUTTER PER CCAUSD #228
- CONSTRUCT 24" SIDEWALK UNDERDRAIN PER CCAUSD #236
- CONSTRUCT 6" CONCRETE CHANNEL PER DETAIL 27 SHEET D-2
- CONSTRUCT 1'x3' CONCRETE CUT OFF WALL
- CONSTRUCT RIP RAP, D50=10", THICKNESS=20"
- CONSTRUCT GROUTED RIP RAP, D50=12", THICKNESS=24"
- CONSTRUCT 24" WIDE EMERGENCY ACCESS GATE PER DETAIL 22 SHEET D-2
- CONSTRUCT 5' WIDE PEDESTRIAN ACCESS GATE PER DETAIL 22 SHEET D-2
- CONSTRUCT 6" WROUGHT IRON FENCE PER CCAUSD 425.5.1
- CONSTRUCT 6'x6' JENSEN PRECAST DROP INLET PER DETAIL 30 SHEET D-2 AND PER CCAUSD #421

I HEREBY CERTIFY THAT THIS GRADING
PLAN IS IN CONFORMANCE WITH THE
APPROVED DRAINAGE STUDY DS #XXXXX
ON FILE WITH CITY OF LAS VEGAS FOR
THIS PROJECT.

TOLL BROTHERS INC.

1140 TOWN CENTER DRIVE SUITE 250

PHOENIX, AZ 85004

PHONE: 702-243-9800 FAX: 702-243-9810

RCI ENGINEERING

500 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89106

MIN: 702-453-0800 FAX: 702-453-0801

NEVADA

CITY OF LAS VEGAS

1/14/21 1:14pm

SKYE CANYON 5.01 AND 5.03 UNIT 2

A SINGLE FAMILY RESIDENTIAL SUBDIVISION

GRADING PLAN (SHEET 2 OF 3)

DATE: 1/14/2021

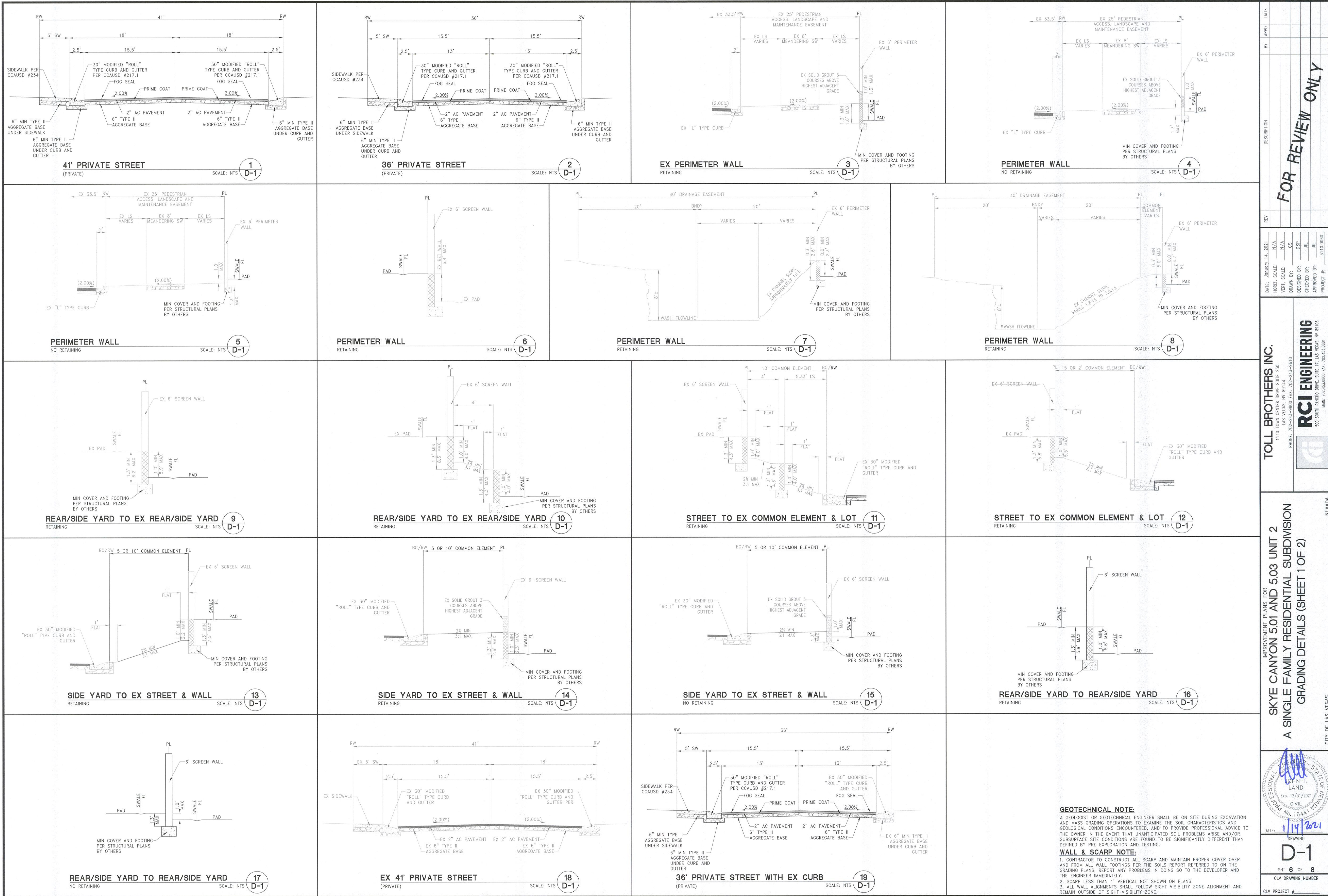
DRAWING

G-2

SHT 4 OF 8

CLV DRAWING NUMBER

CLV PROJECT #



DATE: January 14, 2021
HORIZ. SCALE: N/A
VERT. SCALE: 1/4" = 1'-0"
DRAWN BY: CS
DESIGNED BY: DSP
CHECKED BY: JIL
APPROVED BY: JIL
PROJECT #: 3110.0060

TOLL BROTHERS INC.
1140 TOWN CENTER DRIVE SUITE 250
LAS VEGAS, NV 89144
PHONE: 702-243-9800 FAX: 702-243-9510

RCI ENGINEERING
500 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89106
MIN: 702-453-0800 FAX: 702-453-0801

NEVADA

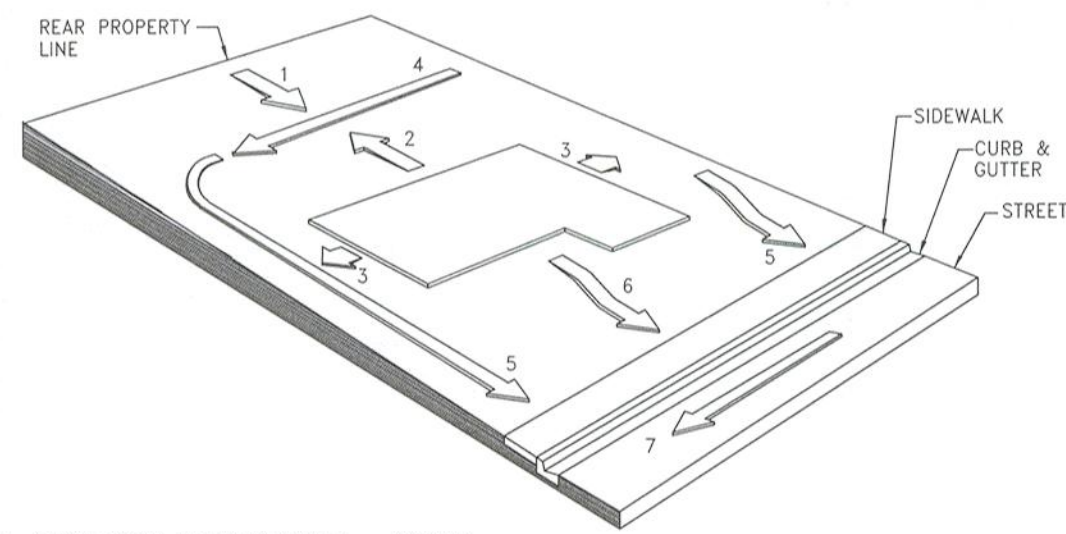
1/14/21

IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 2
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
GRADING DETAILS (SHEET 1 OF 2)

PROFESSIONAL SEAL
JOHN I. LAND
Exp. 12/31/2021
CIVIL
No. 16441

DATE: 1/14/2021

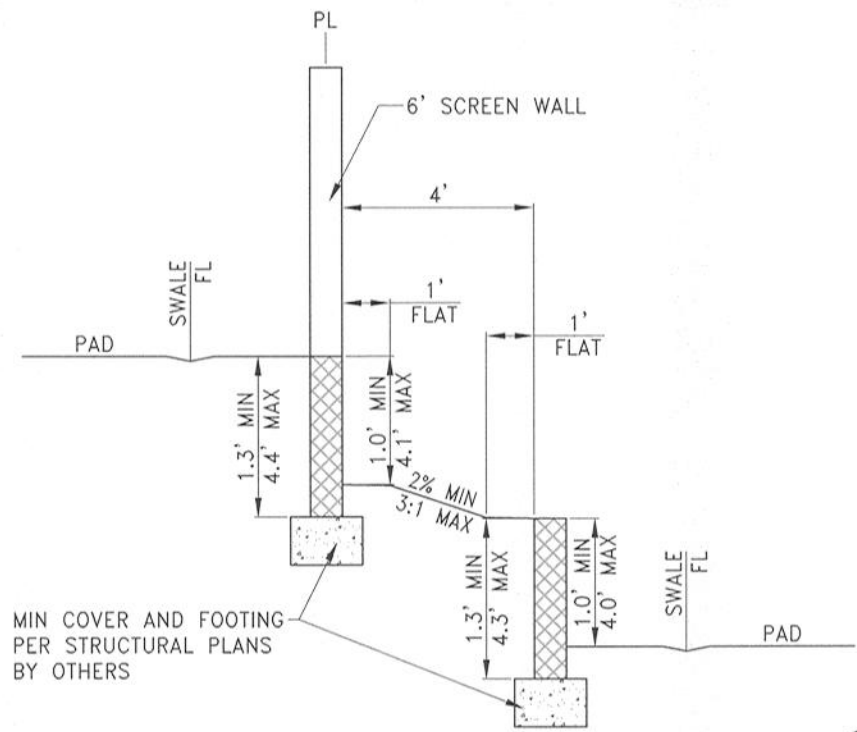
DRAWING
D-1
SHT 6 OF 8
CLV DRAWING NUMBER
CLV PROJECT #



1. SLOPE FROM REAR TO SWALE = 2% MIN
2. SLOPE FROM HOUSE TO SWALE = 5% MIN FOR 10'
3. SLOPE FROM HOUSE TO SIDE SWALE = 5% MIN
4. SLOPE OF REAR SWALE = 1% MIN (5' MIN FROM REAR OF HOUSE)
5. SLOPE OF SIDE SWALE = 1% MIN
6. SLOPE FROM HOUSE TO SIDEWALK = 5% MIN FOR 10'
7. SLOPE OF STREET = PER GRADING PLAN

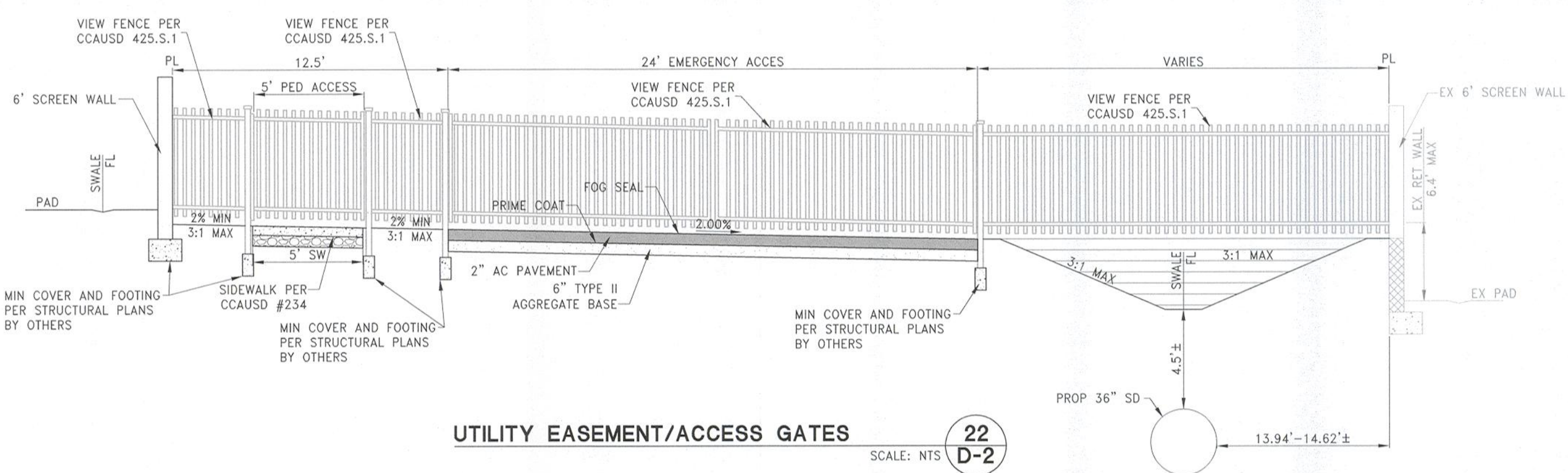
TYPICAL LOT DRAINAGE DETAIL

SCALE: NTS
20
D-2



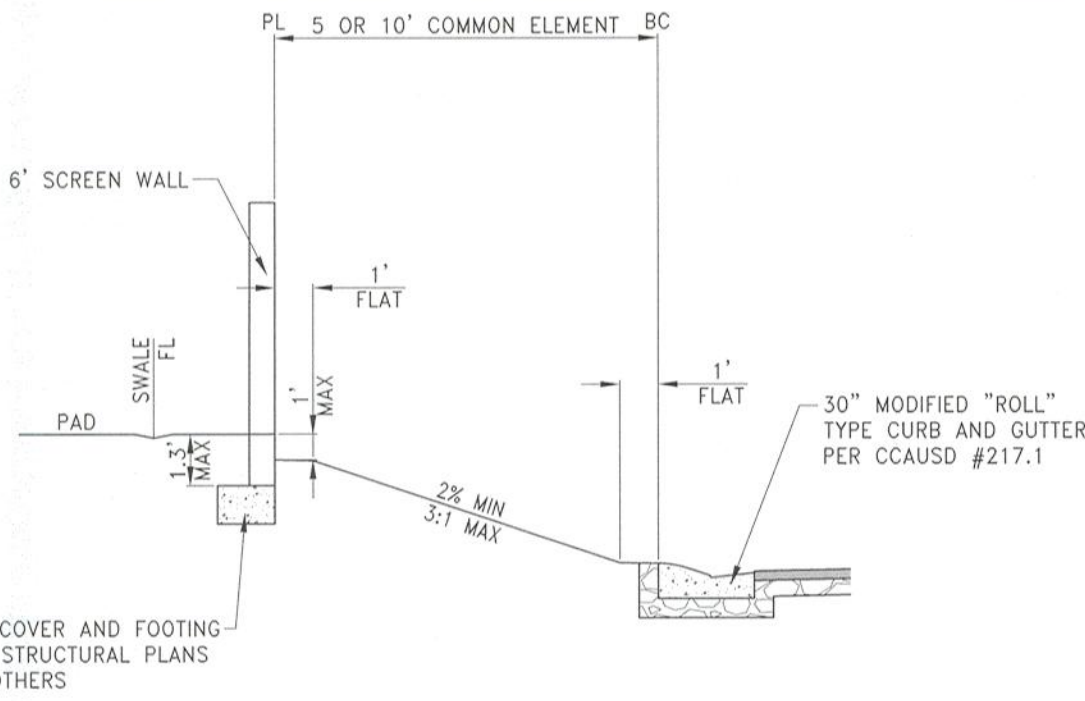
REAR/SIDE YARD TO REAR/SIDE YARD

RETAINING SCALE: NTS
21
D-2



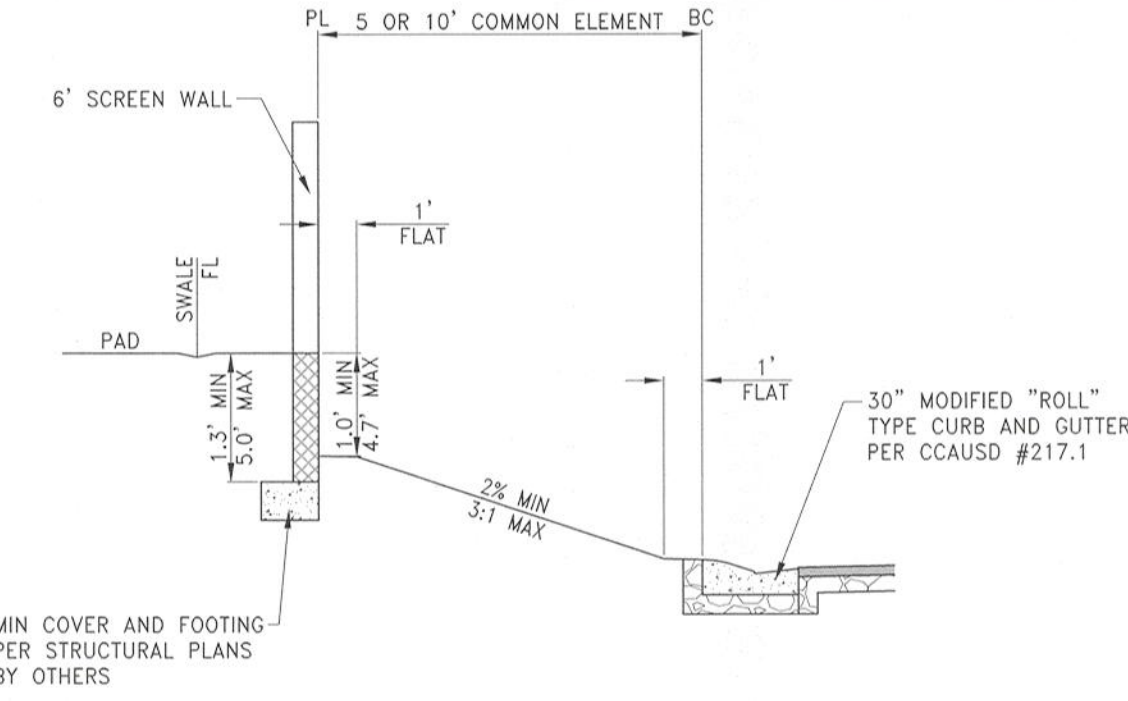
UTILITY EASEMENT/ACCESS GATES

SCALE: NTS
22
D-2



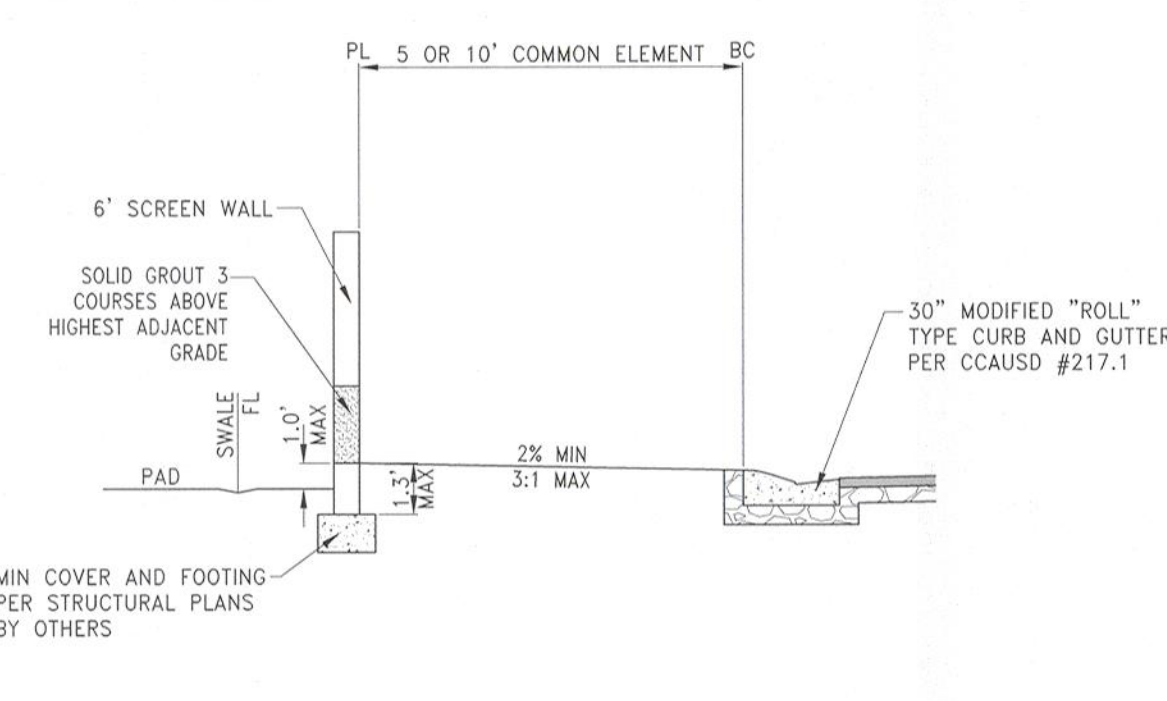
REAR/SIDE YARD TO COMMON ELEMENT

NO RETAINING SCALE: NTS
23
D-2



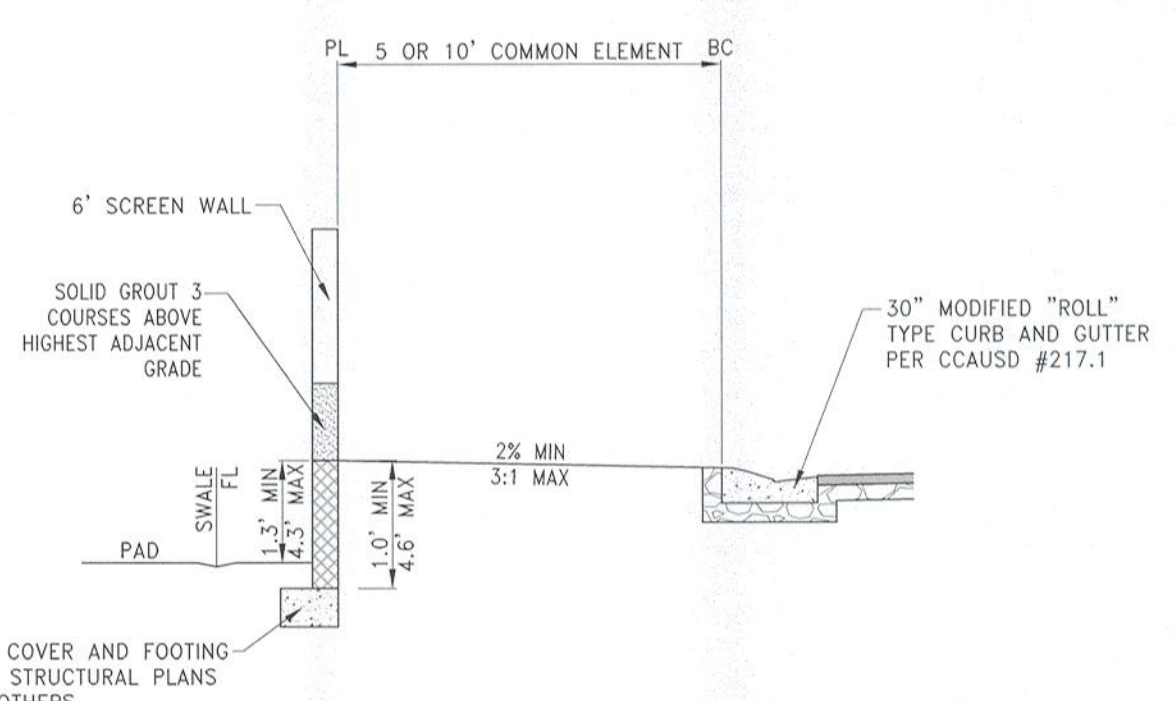
REAR/SIDE YARD TO COMMON ELEMENT

RETAINING SCALE: NTS
24
D-2



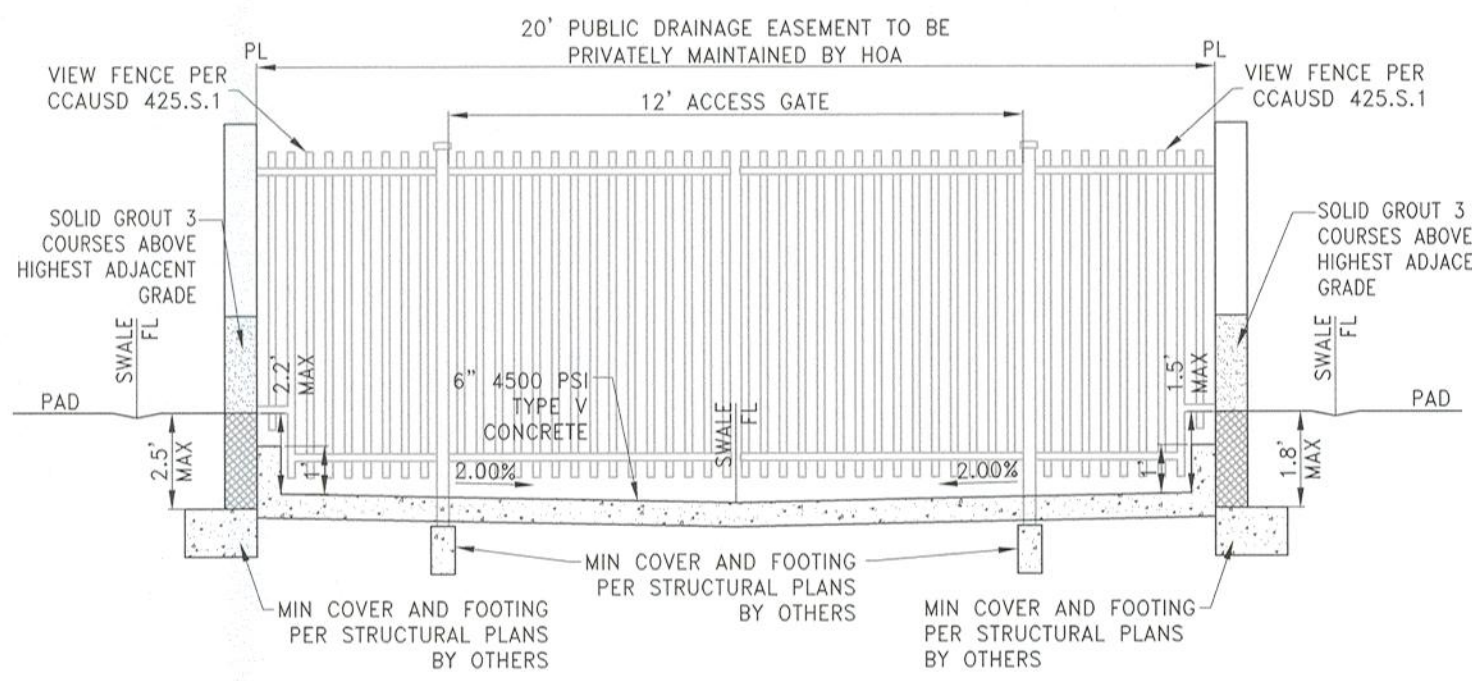
REAR/SIDE YARD TO COMMON ELEMENT

NO RETAINING SCALE: NTS
25
D-2



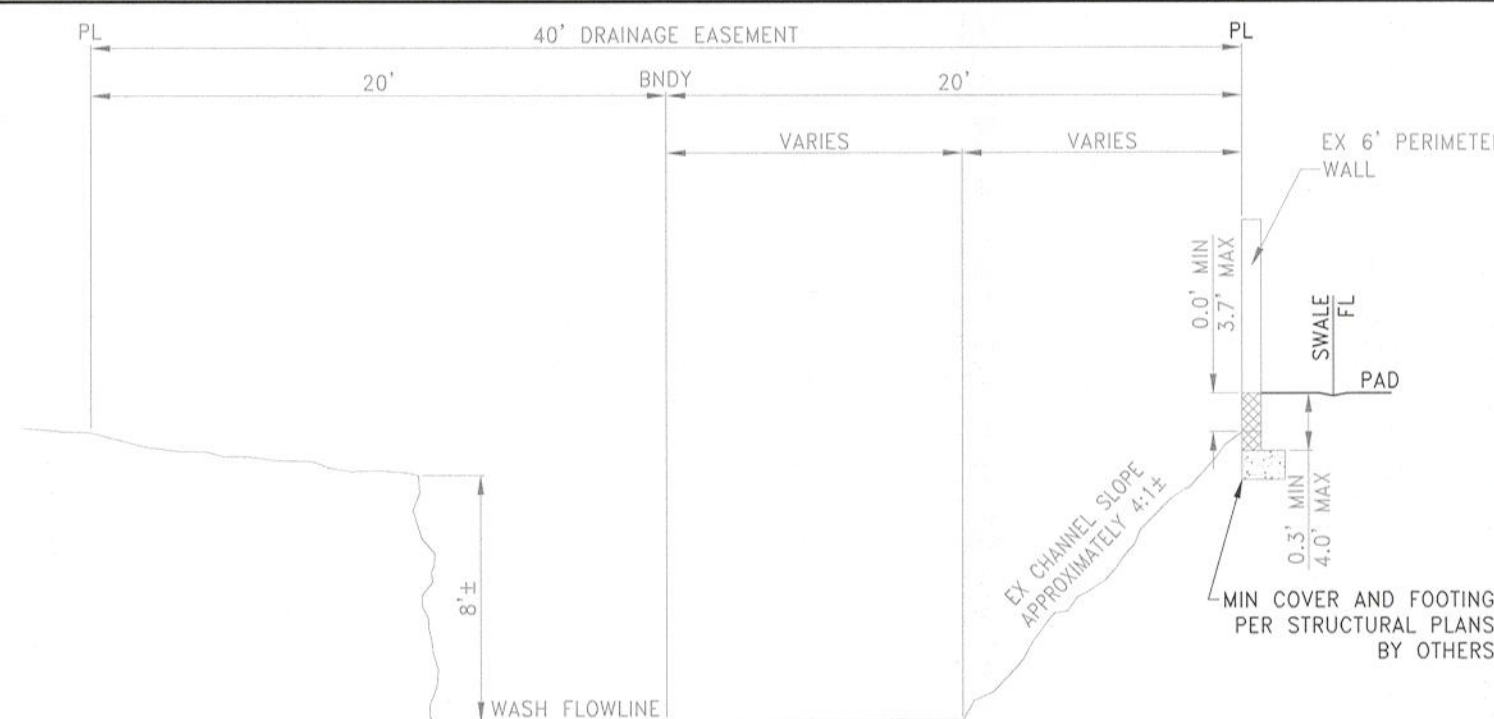
REAR/SIDE YARD TO COMMON ELEMENT

RETAINING SCALE: NTS
26
D-2



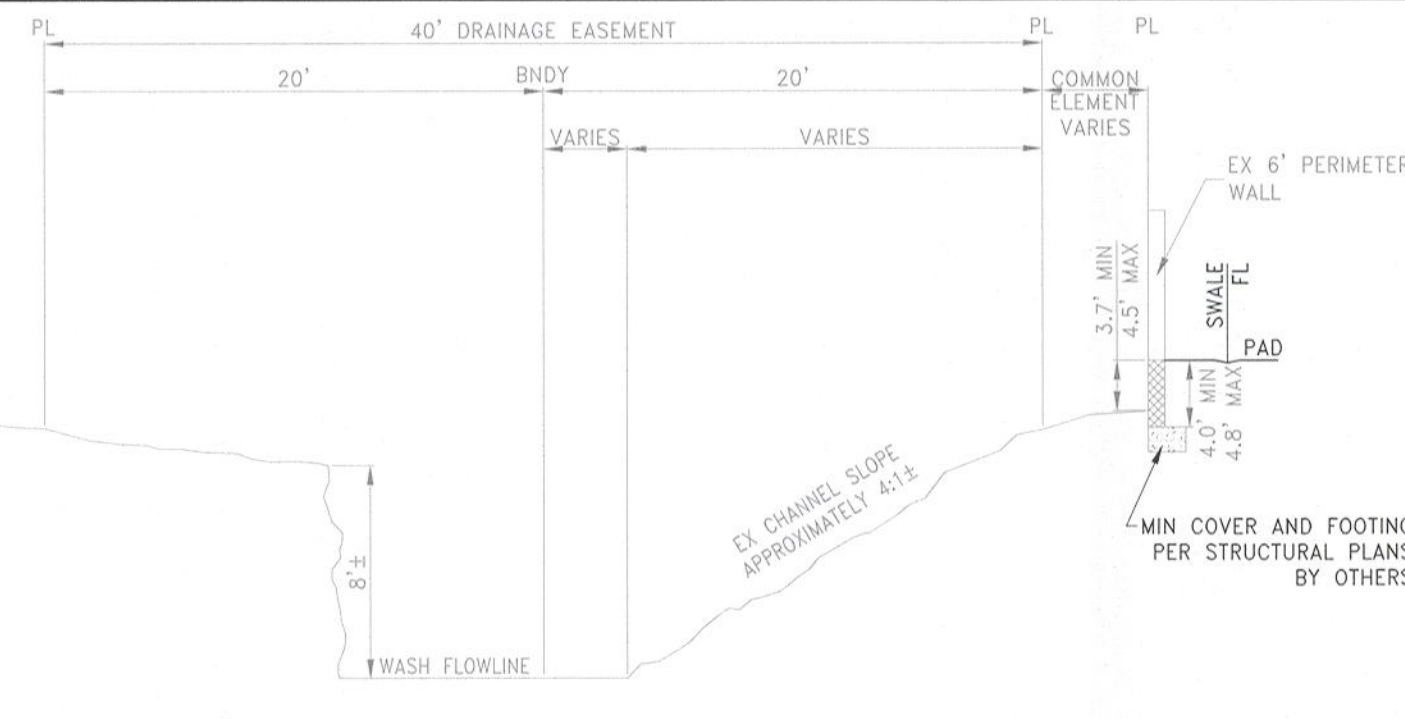
20' DRAINAGE EASEMENT

NO RETAINING SCALE: NTS
27
D-2



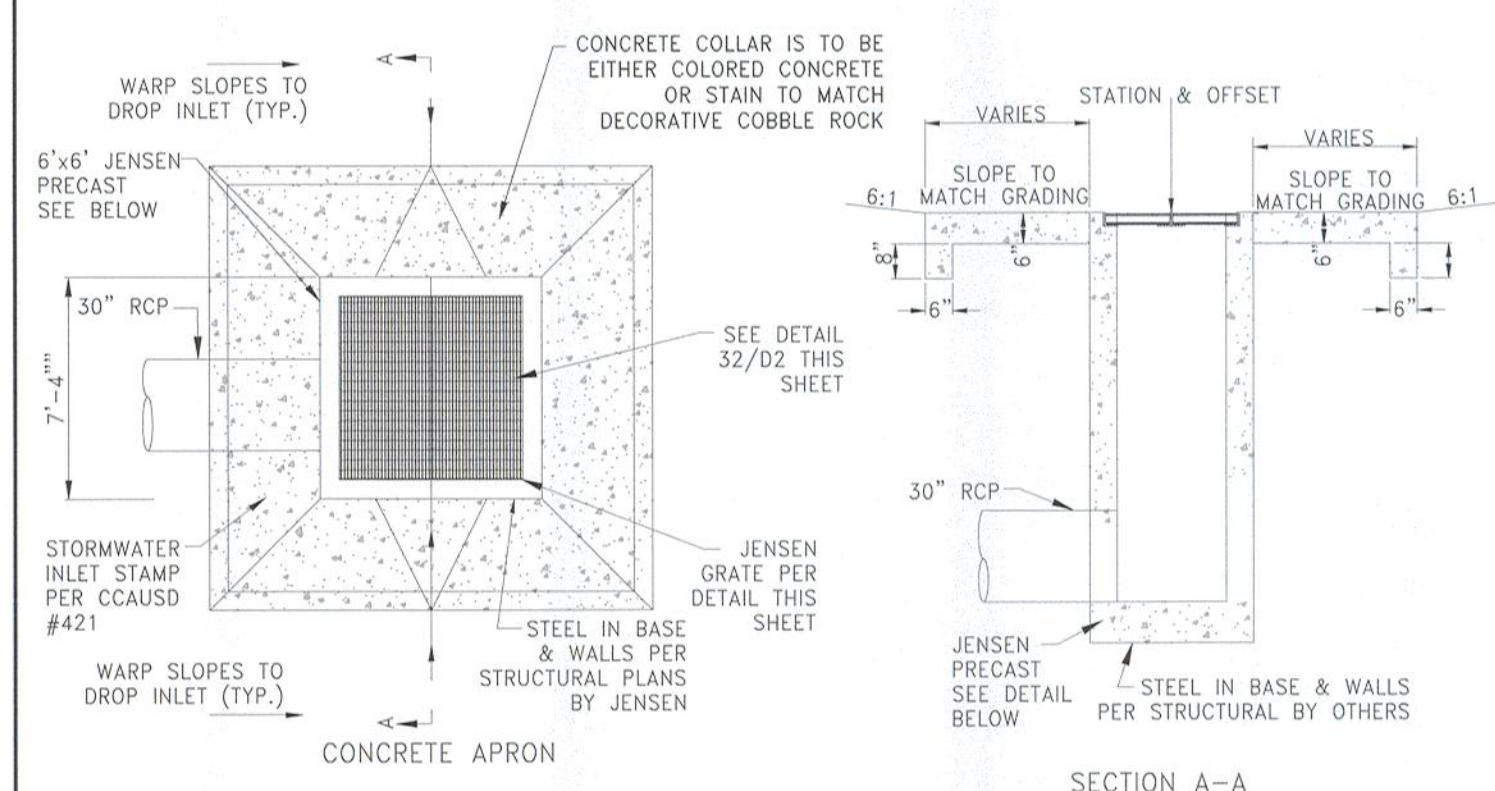
PERIMETER WALL

RETAINING SCALE: NTS
28
D-2



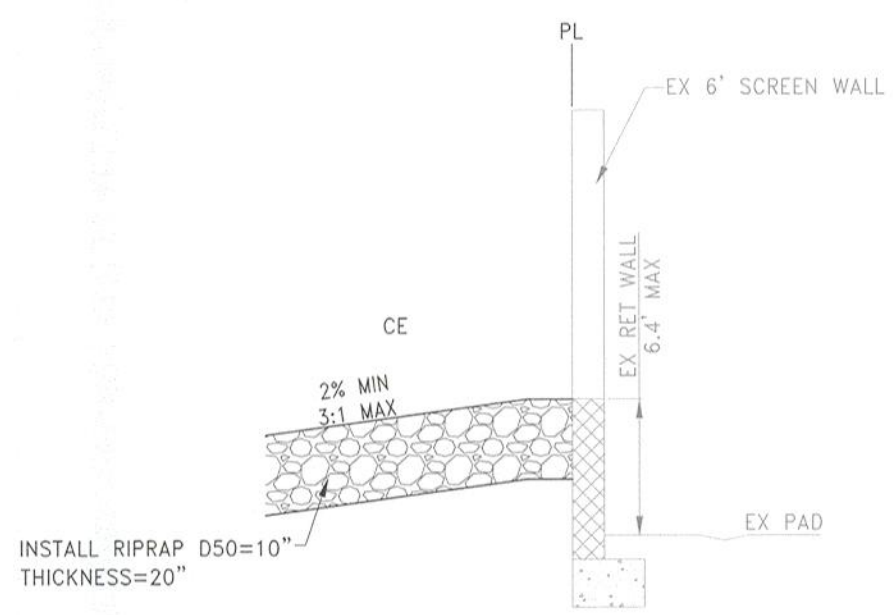
PERIMETER WALL

RETAINING SCALE: NTS
29
D-2



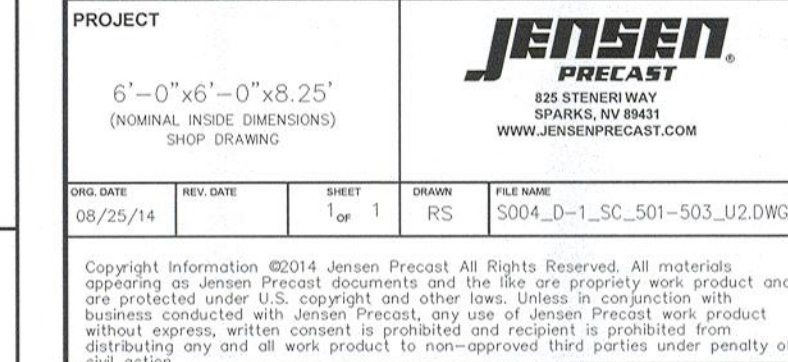
CONCRETE APRON AND JENSEN PRECAST DROP INLET STRUCTURE

SCALE: NTS
30
D-2



PERIMETER WALL

RETAINING SCALE: NTS
31
D-2



CONCRETE APRON AND JENSEN PRECAST DROP INLET STRUCTURE

SCALE: NTS
30
D-2

GEOTECHNICAL NOTE:

A GEOLOGIST OR GEOTECHNICAL ENGINEER SHALL BE ON SITE DURING EXCAVATION AND MASS GRADING OPERATIONS TO EXAMINE THE SOIL CHARACTERISTICS AND GEOLOGICAL CONDITIONS ENCOUNTERED, AND TO PROVIDE PROFESSIONAL ADVICE TO THE OWNER IN THE EVENT THAT UNANTICIPATED SOIL PROBLEMS ARISE AND/OR SUBSURFACE SITE CONDITIONS ARE FOUND TO BE SIGNIFICANTLY DIFFERENT THAN DEFINED BY PRE EXPLORATION AND TESTING.

WALL & SCARP NOTE:

1. CONTRACTOR TO CONSTRUCT ALL SCARP AND MAINTAIN PROPER COVER OVER AND FROM ALL WALL FOOTINGS PER THE SOILS REPORT REFERRED TO ON THE GRADING PLANS, REPORT ANY PROBLEMS IN DOING SO TO THE DEVELOPER AND THE ENGINEER IMMEDIATELY.
2. SCARP LESS THAN 1' VERTICAL NOT SHOWN ON PLANS.
3. ALL WALL ALIGNMENTS SHALL FOLLOW SIGHT VISIBILITY ZONE ALIGNMENT AND REMAIN OUTSIDE OF SIGHT VISIBILITY ZONE.

TOLL BROTHERS INC.
1140 TOWN CENTER DRIVE SUITE 250
LAS VEGAS, NV 89144
PHONE: 702-245-9800 FAX: 702-245-9610

RCI ENGINEERING
500 SOUTH RANCHO DRIVE, SUITE 17 LAS VEGAS, NV 89106
MIN: 702-453-0800 FAX: 702-453-0801

IMPROVEMENT PLANS FOR
SKYE CANYON 5.01 AND 5.03 UNIT 2
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
GRADING DETAILS (SHEET 2 OF 2)

PROFESSIONAL SEAL
JOHN I. LAND
Exp. 12/31/2021
CIVIL
No. 16441
DATE: 11/14/2021
DRAWING
D-2
SHT 7 OF 8
CLV DRAWING NUMBER
CLV PROJECT #

DISCLAIMER NOTE:

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

Call before you Dig
AVOID CUTTING UNDERGROUND
UTILITY LINES. IT'S COSTLY.



OR
1-800-227-2600



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

AVOID HITTING OVERHEAD
POWER LINES. IT'S COSTLY.



1-702-227-2929

CONSTRUCTION NOTES

- CONSTRUCT AC PAVEMENT PER DETAILS 1 THRU 2 ON SHEET D-1
- CONSTRUCT MODIFIED "ROLL" TYPE CURB AND GUTTER PER CCAUSD #217.1
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- CONSTRUCT 5" WIDE PEDESTRIAN ACCESS GATE PER DETAIL 22 SHEET D-2
- CONSTRUCT 6" WROUGHT IRON FENCE PER CCAUSD 425.S.1
- CONSTRUCT 6"x6" JENSEN PRECAST DROP INLET PER DETAIL 30 SHEET D-2 AND PER CCAUSD #421

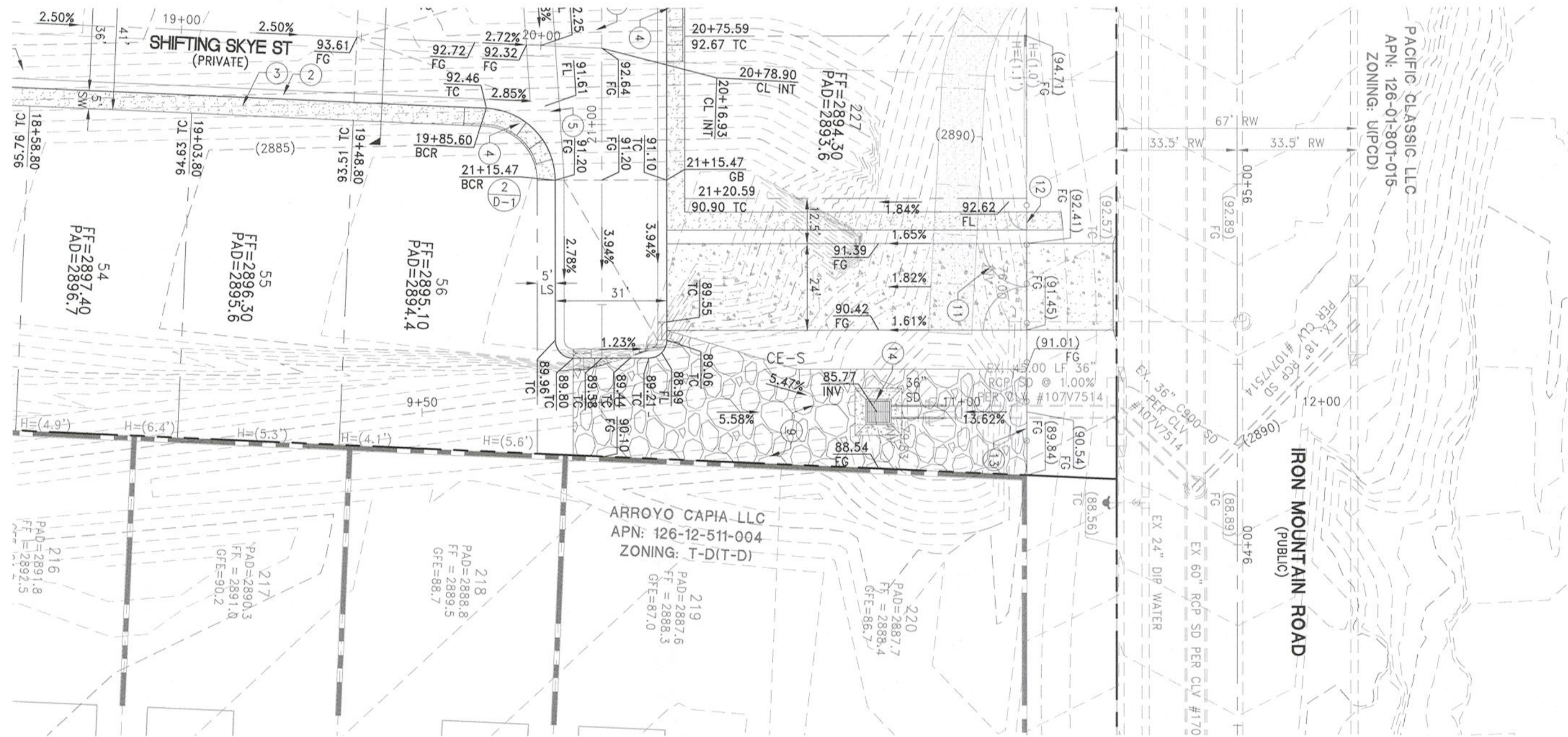
BENCHMARK
BENCHMARK NUMBER: USDA1934J

U.S. DEPARTMENT OF AGRICULTURE BRASS DISC AT THE SOUTHWEST CORNER OF U.S. 95 AND KYLE CANYON ROAD.

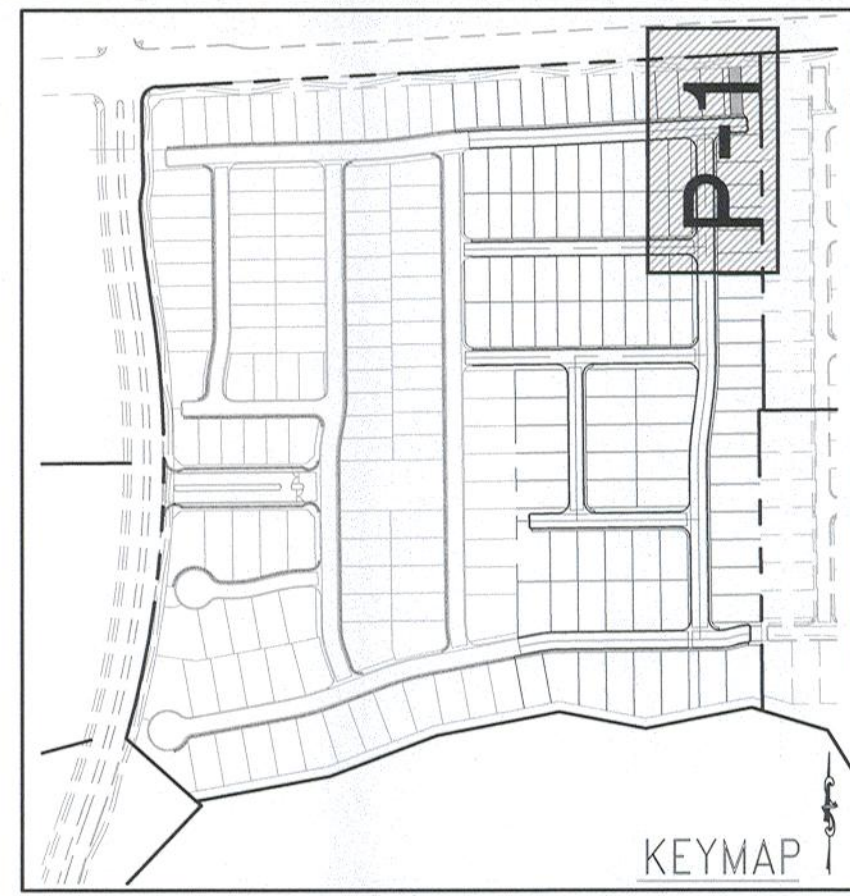
ELEVATION = 2817.61 FEET, 858.81 METERS
N.A.M.D. 88 DATUM
PER THE CITY OF LAS VEGAS VERTICAL CONTROL WEBSITE.

BASIS OF BEARINGS

SOUTH 00°34'18" EAST, BEING THE BEARING OF THE EAST LINE OF THE NORTHEAST QUARTER (NE1/4) OF SECTION 12, TOWNSHIP 19 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY NEVADA, AS SHOWN BY MAP THEREOF IN BOOK 157, PAGE 41 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.



AREA INLET
(PRIVATE)



HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 5'

FOR REVIEW ONLY

TOLL BROTHERS INC.

1140 W. LAS VEGAS BLVD. SUITE 250
LAS VEGAS, NV 89144
PHONE: 702-243-9800 FAX: 702-243-9810

RCI ENGINEERING

590 SOUTH RANCHO DRIVE, SUITE 17, LAS VEGAS, NV 89106
MAIN: 702.453.0800 FAX: 702.453.0801

IMPROVEMENT PLANS FOR
SKYE CANYON 501 AND 503 UNIT 2
A SINGLE FAMILY RESIDENTIAL SUBDIVISION
PLAN AND PROFILE
AREA INLET

NEVADA



DATE: 1/14/2021

DRAWING
P-1

SHEET 8 OF 8
CLV DRAWING NUMBER

CLV PROJECT #

C:\3110_Toll\0060_Skye Canyon 501-503\UNIT 2\5007_P-1_SC_501-503_102.dwg saved: 1/14/21 1:15pm