HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: CLV Police Park Date: 04/27/2023

Location of Development: a) Descriptive (Cross Streets) North/South: Metro Academy

East/West: between Gowan Road and Cheyenne Road

b) Section: 7 Township: 20S Range: 60E

c) APN : 13807401017 and 13807301005

Name of Owner: City of Las Vegas

Telephone No.: 702-229-2091 Fax No.: N/A E-Mail Address: stolman@lasvegasnevada.gov

Address: 495 S. Main Street, Las Vegas, NV 89101

Contact Person-Name: Roshan Poudel **Telephone No.:** (702) 586-9296

* **E-Mail Address:** roshan.poudel@actus-nv.com **Fax No.:** N/A

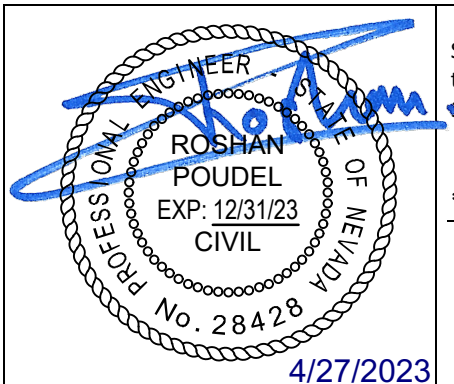
Firm: Actus

Address: 3283 E. Warm Springs Road Suite 300, Las Vegas, NV 89120

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 30.71 +/- Being Developed/Disturbed: 30.71 +/-
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ **Yes**** ■ **No**
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ■ **Yes**** ☐ **No**
4. Proposed type of development (Residential, Commercial, Etc.):
5. Approximate upstream land area which drains to the subject site: +/- 40 acres
6. Has the site drainage been evaluated in the past? ■ **YES** ☐ **NO** If yes, please identify documentation: TDS for CLV Metro Park (DS#2713)
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: North into the existing storm drains and ultimately into regional facility GOLM0146
8. Briefly describe your proposed schedule for the subject project: ASAP



4/27/2023

Engineer's Seal

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

***New Required Field**

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

Local Entity File No.

Revision	Date

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

Apr 27, 2023

3283 Warm Springs Road Suite 300
Las Vegas, NV 89120
(702) 586-9296

City of Las Vegas,
Department of Public Works, Engg. Divison,
Land Devlopment and Flood Control

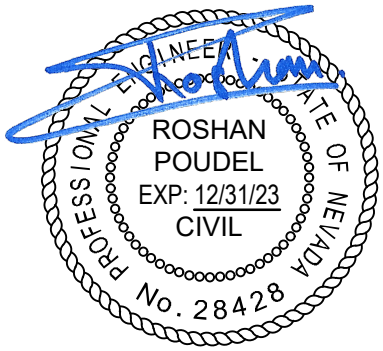
Re.: CD Certification for the TDS Update for CLV Police Park

Dear Staff,

The pdfs on the submittal package CD matches the original submittal package.

We hope the above responses satisfy any concerns. If you have any questions or need any additional information, please feel free to call our office at (702) 586-9296.

Sincerely,



Roshan Poudel, PE

4/27/2023

TECHNICAL DRAINAGE STUDY UPDATE

UPDATE #1
TO THE TDS FOR CLV METRO PARK
(APN: 138-07-401-017 & 138-07-301-005)

Metro Academy and Cheyenne Road

City of Las Vegas

Date: April 27, 2023

Prepared for:

City of Las Vegas
495 S. Main Street, 5th Floor
Las Vegas, NV 89101

Prepared by:
Roshan Poudel, PE

ACTUS
3283 E. Warm Springs Rd, Suite 300
Las Vegas, NV 89120

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: CLV Police Park	Map ID:
Firm Name: Actus	Engineer: Roshan Poudel
Address: 3283 E. Warm Springs Road, Suite 300	
City: Las Vegas	State: NV Zip: 89120
Phone Number: (702) 586-9296	Fax Number: N/A
Property Owner: City of Las Vegas	
Address: 495 S. Main Street, 5th Floor	
City: Las Vegas	State: NV Zip: 89101

Reviewed By:	Date Received:	Date Accepted for Review:

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

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

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

I. GENERAL REQUIREMENT

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

II. MAPS AND EXHIBITS

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
N/A		For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
N/A		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.
N/A		Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
N/A		Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

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

REFERENCE:	**STANDARD FORM 2**

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.)
N/A		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. ___R.P.___ 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.
N/A		Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street. Note: Proposed top of curb elevations must be provided for both sides of roadways even if only half street construction is required.
X		Label existing topography at a minimum 5 foot elevation interval including adjacent developments, finished floor elevations of existing buildings and top of existing curbs extending 100 feet* around the perimeter of the site. (*Measured from the centerline of the adjacent roadway.)

II. GRADING PLAN INFORMATION		
Yes	No	
X		Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains.
N/A		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.
N/A		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.
N/A		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.)
N/A		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	
N/A		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.
N/A		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.
N/A		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.
N/A		Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

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

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I. INTRODUCTION

A. Study Overview and Purpose

We have prepared this update to the previously approved technical drainage study for CLV Metro Park (DS2713) to highlight the proposed changes we are proposing to make within the project site with this study. The project site is located between Gowan Road and Cheyenne Road, to the east of Metro Academy Way. *See Figure 1*, *Vicinity Map*. The proposed changes include expansion of the North parking lot area and the South parking lot area, addition of a new Pickleball Court, a K9 memorial, some Shade structures at various places, and some minor other changes. As you know, we already discussed about these improvements we are proposing within the Police park in the discussions we had, during the meeting of April 13, 2023 at City of Las Vegas. We have provided grading plans showing the proposed changes that have been proposed. This study also provides the hydrological summations for the Existing, and the Interim/Ultimate conditions to meet the mandated City of Las Vegas drainage study requirements.

B. Location

The project site is a portion of the North Half (N ½) and the South Half (S ½) of the Southwest Quarter (SW ¼) of Section 7, Township 20 South, Range 60 East, M.D.M., City of Las Vegas, Nevada commonly known as APNs: 138-07-401-017 and 138-07-301-005. *See Figure 2, Assessor's Map.*

C. FEMA Flood Plain Information

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Community-Panel Number 32003C 2135F, effective November 16, 2011, the site is located within unshaded Zone 'X'. Unshaded Zone 'X' is described as an area outside of the 0.2% annual chance floodplain. Figure 3, *Flood Insurance Rate Map*, provided in the Appendix of this report depicts the FEMA flood zones within proximity of the site.

D. CCRFCD Master Plan Information

Figures F-23 of the 2018 Las Vegas Valley Flood Control Master Plan Update (Figures 4 and Figure 5 of this report) have been referenced within this study. The figures show the regional basin LMDB to the north of our project site. Regional facility GOLM0146 is adjacent to the north side of the site.

E. Reference Studies

The following studies were reviewed to prepare our study, and relevant materials from these studies have been referenced within our study.

- *TDS and Update#1 for Hualapai & Isaac Newton (DS#5297),* prepared by VTN Consulting (2021), hereinafter referred to as the *"Hualapai & Isaac Newton Study"*. The *Hualapai & Isaac Newton Study,* is the most recently approved technical drainage study in the vicinity of our site, and so, we reviewed the *Hualapai & Isaac Newton study* to get an understanding of the existing drainage pattern for parcels upstream from our site. Basin's map and hydrological parameters from this study have been referenced within our study to establish offsite runoff tributary to Isaac Newton way just to the east of the entrance of the Hualapai & Isaac Newton residential subdivision.

- *Technical Drainage study for Tiara Summit (DS#3478),* prepared by Taney Engineering (2004), herein referred to as the *"Tiara Summit Study".* This study was reviewed to get an understanding of the runoff discharged onto Isaac Newton Way from the developed Tiara Summit residential subdivision. Basin areas and hydrological parameters from this study have been referenced within our study to establish the quantity of 100-yr runoff discharged onto Isaac Newton Way from the Tiara Summit residential subdivision.

- *Technical Drainage study for the Boulders Condomiums Conversion TDS (DS#3736),* prepared by Stanley Consultants Inc. (2006), herein referred to as the *"Boulders Condomiums Study".* This study was reviewed to get an understanding of the runoff discharged onto Isaac

Newton Way from the developed Boulders Condomiums residential subdivision. Basin's map from this study have been referenced within our study to establish the runoff being discharged onto Isaac Newton Way from the Boulders Condomiums residential subdivision.

- *Technical drainage study for Conquistador Plaza (DS#2555),* prepared by LR Nelson Consulting (2001), herein referred to as the *"Conquistador Plaza study".* This study was reviewed to get an understanding of the runoff discharged onto Isaac Newton Way and Metro Academy way from the developed Conquistador Plaza residential subdivision.

- *Technical drainage study for Shiloh Christian School (DS#2555),* prepared by Alpha Engineering (2001), herein referred to as the *"Shiloh Christian School study".* This study was reviewed to get an understanding of the offsite runoff generated within the Shiloh Christian School development, tributary to our site. Basin areas and hydrological parameters from this study have been referenced within our study to establish the runoff discharged onto the park area from the Shiloh Christian School. Please note for basins referenced from Shiloh Christian school within our HEC-1, we have utilized update CN values i.e., we are utilizing CN values from 2018 LLV MPU landuse and CN values matrix in lieu of the CN values used in the referenced *Shiloh Christian school study*.

- *Technical drainage study for City of Las Vegas Metro Park (DS#2713),* prepared by PBS&J Inc. (2001), herein referred to as the *"CLV Metro Park Study".* This study was reviewed to get an understanding of the previously analyzed hydrology for our site, and also to get an understanding of the historical 100-yr runoff from which the existing storm drains in CLV Metro Park area were sized.

- *CCRFCD HEC-1 calculations for Gowan Watershed, prepared by Atkins. HEC-1 calculation for Gowan Watershed was reviewed and has been referenced within our study to establish the 100-yr water surface elevation for the regional detention basin to the north of our site.*

The Engineer has reviewed the referenced studies with addenda and concurs that the current drainage conditions are nearly the same as those anticipated in the referenced studies.

II. DRAINAGE BASIN DESCRIPTIONS

A. Site Description

The overall site consists of approximately 30.71± acres, and is surrounded by developed parcels on all sides. The western half of the site conveys runoff towards north along an existing swale, whereas the eastern half of the site generally slopes from west to east.

B. Offsite Drainage Description

Please see Figure 7a Offsite basins map in the Appendix. Runoff from existing upstream developments tributary to Isaac Newton Way, is conveyed east along Isaac Newton Way and enters the existing south parking lot. Runoff from Shiloh Christian school is conveyed into our site at multiple points along the western boundary of our site. We agree with the basin delineations for offsite basins provided in the referenced TDS, and have utilized their basin parameters in our HEC-1 to establish offsite runoff tributary to our site.

C. Existing Condition Drainage Description

Please see Figure 7 Existing Condition Basins Map in the Appendix. Runoff from the western portion of our site combines with offsite runoff conveying to our site and the combined runoff is then conveyed to the existing bee-hive inlet at the existing low-point at the end of the existing swale to the south of the existing skate park. Existing runoff tributary to the said bee-hive inlet likely ponds up in the area before overflowing towards north. Please note we ran 3 cross-sections (X1, X2 and X3) between the low point at the end of the swale and the steps for the skate park. The said calculations were utilized to get an understanding of the existing runoff depths in that area (for the peak runoff during 100-yr storm event). We assumed a 50-50 flow split at combination point CPX6A for the 10-yr runoff with 50% of runoff conveying north towards the existing low-point in basin ONX7, and 50% of runoff conveying east into the skate park. For 100-yr runoff, we are assuming all

runoff above 25 cfs to be conveyed into the skate park area because cross-section X3 has a gradient towards the skate park. Please note this assumption is highly conservative and was done because it looks like much of the runoff overflowing from the low point to the south of the existing skate park area doesn't seem to be conveying towards the 6' x 6' inlet further north from skate park, but rather towards the skate park, and discharging from the opening at the northeast corner of the skate park, ultimately conveying north running against the existing wall of Day Dawn 8 residential subdivision. This assumption is supported by the fact that when we look at the aerial imagery of the area to the east of the skate park in Google maps, we can see some distinctly visible washed off areas, as we had discussed with you in our meeting of April 13, 2023.

However, regardless of how much runoff is conveyed towards the 6' x 6' inlet and how much runoff is conveyed towards skate park, please note it has no bearing on any of the hydraulic calculations for our ultimate condition drainage design. Our storm drain design for ultimate condition runoff will be the same regardless how flow-split occurs near the skate park area in the existing condition. So, we have just assumed the worst-case scenario to determine the runoff running against the existing wall of Day Dawn 8 residential area to be conservative. Runoff from the eastern half of the site drains towards east and into the existing wrought iron fence opening at the northeast corner of the site.

D. Interim/Ultimate Condition Drainage Description

Please see Figure 8 Interim/Ultimate Condition Basins Map in the Appendix. A description of the Interim/Ultimate Condition flows is as follows:

We are proposing to replace the existing bee-hive inlet at the low-point to the west of the skate park, with three 4'x4' area-grate inlets. The proposed area-grate inlets will capture all 100-yr runoff tributary to it, and the said runoff will be conveyed to the existing 60" x 38" RCP SD underneath the proposed North Parking lot via proposed 42" RCP. Please note the proposed drainage solution will substantially mitigate the existing problem of runoff running against the western wall of Day Dawn 8 residential subdivision.

Other proposed developments within the Metro park i.e., expansion of the two parking lots, and addition of a pickleball court, a K9 memorial, and some shade structures, though will change the flow pattern locally around the said improvements, will however NOT alter the overall existing drainage pattern of the Metro Park area as a whole.

Please see the grading plans and details for the proposed grading around the proposed improvements. Also, please note, relative to the size of the project site, the areas being developed/disturbed is very small. Hence, the blended CN values for developed onsite basins will be barely different than the existing CN values, and so we have utilized the same CN values for the developed and the existing condition (CN values are conservative for existing condition and more accurately reflect the developed condition).

The ultimate condition drainage scheme due to the proposed improvements within this project will not alter the historical discharge point for the overall runoff. While we are proposing drop-inlets and storm drains to mitigate the onsite runoff to the west of the existing wall of Day Dawn 8 residential subdivision, the runoff captured and conveyed by the proposed inlets and storm drain will be conveyed to the same existing box structure below the existing 6' x 6' inlet. Previous studies for the Metro park area show bulk of the historic runoff in the park area being conveyed by the said existing swale to the beehive inlet at the low-point to the south of the skate park area, and ultimately to the 6' x 6' inlet at the low-point towards the north of the site. Drop-inlet calculation for the said 6' x 6' inlet show that the 100-yr runoff tributary to the said low-point was 121 cfs.

The ultimate condition 100-yr runoff at the same point after factoring in the increase in runoff due to our proposed improvements is around 112 cfs, which is lower than the historic 121 cfs. Hence, the project improvements within this project will not negatively impact any downstream parcels/facilities while substantially mitigating the problem of runoff running against the western wall of Day Dawn 8 residential subdivision.

III. HYDROLOGIC CRITERIA

A. Method of Analysis

The U.S. Army Corps of Engineers HEC-1 flood hydrograph package was used to determine the peak runoff generated by the 100-year, 6-hour storm event. The HEC-1 computer model can simulate the surface runoff response of a given basin and smaller sub-basins to rainfall. The computed hydrographs from each sub-basin are then combined at the appropriate locations, from which a final discharge hydrograph is obtained. The HEC-1 analysis for the Existing Condition and the Interim/Ultimate condition are provided in the Appendix.

B. Precipitation

The project site is located **outside** of the McCarran Airport Rainfall Area. The rainfall depths for the 6-hour, 10-year and 100-year storm events were obtained per the *CCRFCD Hydrologic Criteria and Drainage Design Manual (1999), Section 500, Table 505*, and are 1.72" and 3.00" respectively. Since the site encompasses less than 8 square miles, a Storm Distribution Number three (SDN #3) was used for the HEC-1 model.

C. Hydrologic Abstractions

The SCS curve number method was used to determine the infiltration rates for the drainage basins. The engineer has furnished a site-specific Custom Soil Resource Report from the FloodView Advanced – Clark County Regional Flood Control Districts website (see Appendix). The site consists of Soils Type 1152 – Cave gravelly fine sandy loam, 0 to 4 percent slopes (hydrological soils group D) and Soils Type 1502 – Canutio-Cave gravelly fine sandy loams, 2 to 8 percent slopes (hydrological soils group A).

Note that for onsite basins and basins from Christian Shiloh School, we have utilized CN values for landuse index from 2018 LVV MPU in lieu of the CN values provided in the referenced studies.

D. Basin Area

Basin areas for the offsite drainage basins were delineated based on the referenced studies.

E. SCS Lag-Time with Time of Concentration

Lag-time, T_L, is defined as the time measured from the centroid of effective rainfall to the peak of the outflow hydrograph. Lag times for this study were estimated by calculating the drainage basins' time of concentration, T_C. The time of concentration is defined as the time required for runoff to flow from the hydraulically most distant point of a subbasin to the outlet point of the subbasin. The equation for lag-time is: $T_L=0.6T_C$. Standard Form 4 as included in the CCRFCD Manual was utilized to determine the lag times for subbasins modeled. A copy of the referenced lag time computations is included in the Appendix.

IV. MODEL RESULTS

A. Peak Flows

<u>Existing Condition:</u>

TABLE 1 Flow Summary (Existing Condition)				
BASIN ID/CONCENTRATION POINT	DRAINAGE AREA (acres)	Reference	Q_{10} cfs	Q_{100} cfs
ONX1	0.55	*HEC-1*		
OND2A	1.70	*HEC-1*		
ONX2B	0.83	*HEC-1*		
OND2C	1.69	*HEC-1*		
ONX3	2.08	*HEC-1*		
OND4	1.10	*HEC-1*		
ONX5	12.45	*HEC-1*		
OND6A	0.80	*HEC-1*		
OND6B	1.05	*HEC-1*		
ONX7	0.68	*HEC-1*		
ONX8A	0.17	*HEC-1*		
OND8B	1.40	*HEC-1*		
DEV1	4.03	*HEC-1*		
DEV2	11.93	*HEC-1*		
DEV3	3.93	*HEC-1*		
DEV4	1.65	*HEC-1*		
DEV5	9.05	*HEC-1*		
CPX2A	--	*HEC-1 (CP3 + DEV1 + ONX2A)*		
CPX2B	--	*HEC-1 (CPX2A + DEV2 + ONX2B)*		
CP-DI	--	*HEC-1 (CPX2B + ONX3 + ONX4)*		
CPX6A	--	*HEC-1 (CP-DI + ONX6A)*		
CPX6B	--	*HEC-1 (FSE + ONX6B)*		
CP7	--	*HEC-1 (ONX2C + ONX7 + FSN)*		
CPX8B	--	*HEC-1 (ONX8A + ONX8B + FS-E)*		

Interim/Ultimate Condition:

TABLE 2 Flow Summary (Interim/Ultimate Condition)				
BASIN ID/CONCENTRATION POINT	DRAINAGE AREA (acres)	Reference	Q_{10} cfs	Q_{100} cfs
ONX1	0.55	*HEC-1*	0	1
OND2A	1.70	*HEC-1*	3	6
ONX2B	0.83	*HEC-1*	0	1
ONX2C	1.69	*HEC-1*	0	1
ONX3	2.08	*HEC-1*	0	2
OND4	1.10	*HEC-1*	0	1
ONX5	12.45	*HEC-1*	2	13
OND6A	0.80	*HEC-1*	0	1
OND6B	1.05	*HEC-1*	0	0
OND7	0.68	*HEC-1*	0	0
ONX8A	0.17	*HEC-1*	0	0
OND8B	1.40	*HEC-1*	2	4
DEV1	4.03	*HEC-1*	3	9
DEV2	11.93	*HEC-1*	9	26
DEV3	3.93	*HEC-1*	1	5
DEV4	1.65	*HEC-1*	0	1
DEV5	9.05	*HEC-1*	1	7
CPD2A	--	*HEC-1 (CP3 + DEV1 + ONX1 + OND2A)*	41	83
CPD2B	--	*HEC-1 (CPD2A + DEV2 + ONX2B)*	50	111
CP-DI	--	*HEC-1 (CPD2B + ONX3 + OND4)*	49	113
CPD6B	--	*HEC-1 (OND6A + OND6B + OND7)*	0	2
CPD8B	--	*HEC-1 (ONX8A + ONX8B + FS-E)*	2	5

B. Hydraulic Calculations

Swale Calculations:

We are proposing a swale 5’ away (to the west) from the existing western wall of the Day Dawn 8 residential subdivision so as to mitigate the existing problem of existing runoff in the area running against the said wall. Normal runoff depth for 100-yr runoff within the said proposed swale has been provided in the Appendix. The velocities within the said proposed swale will be non-erosive.

Drop-Inlet Calculations and WSPG Calculations:

Drop-inlet calculations for the proposed drop-inlets have been provided in the Appendix. The proposed drop-inlets were sized considering 50% clogging factor, and sized to capture 100-yr runoff tributary to the said DI's. In case the proposed drop-inlets get fully clogged, the emergency overflow will be towards the area of nearest low elevation (which happens to be towards north).

The WSPG calculations for the proposed storm-drains has been provided in the Appendix. Note the 100-yr runoff HGLs along the storm drain are all at-least 1' below the proposed manhole rim and drop-inlet grate elevations.

V. CONCLUSIONS

This Technical Drainage Study Update for CLV Metro Park has been developed in accordance with Criteria established in the Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual. The proposed development does not adversely impact any proposed or existing Clark County Regional Flood Control District Master Plan Update facilities.

VI. REFERENCES

1. *CCRFCD Hydrologic Criteria and Drainage Design Manual and Addenda*, WRC Engineering, 1999.

2. *2008 Las Vegas Valley Flood Control Master Plan Update, PBJ*.

3. *Flood Insurance Rate Map, Community Panel Number 32003C* 2135F*, Clark County, Nevada*, Federal Emergency Management Agency, November 16, 2011.

4. *TDS and Update#1 for Hualapai & Isaac Newton (DS#5297),* prepared by VTN Consulting (2021).

5. *Technical Drainage study for Tiara Summit (DS#3478),* prepared by Taney Engineering (2004).

6. *Technical Drainage study for the Boulders Condomiums Conversion TDS (DS#3736),* prepared by Stanley Consultants Inc. (2006).

7. *Technical drainage study for Conquistador Plaza (DS#2555),* prepared by LR Nelson Consulting (2001).

8. *Technical drainage study for Shiloh Christian School (DS#2555),* prepared by Alpha Engineering (2001).

9. *Technical drainage study for City of Las Vegas Metro Park (DS#2713),* prepared by PBS&J Inc. (2001).

10. *CCRFCD HEC-1 calculations for Gowan Watershed.*

APPENDIX



VICINITY MAP
NOT TO SCALE

Actus
3283 E. Warm Springs Road
Suite 300
Las Vegas, NV 89120
www. Actus-NV.com
(702) 586-9296
Consulting- Planning-
Engineering - Surveying

CLV POLICE PARK

VICINTY MAP

DATE	03/02/23
DRAWN	BP
DESIGNED	Ro.Po.
CHECKED	Ro.Po.
PROJECT #	CSD012201
SHEET NUMBER	FIGURE 1

NOTES

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

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

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

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

0 100 200 400 600 800

MAP LEGEND

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

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

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

BOOK T20S R60E

27 126	125 124	
36 137	138 139	
65 164	163 162	

Scale: 1" = 200'

SEC. 7

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

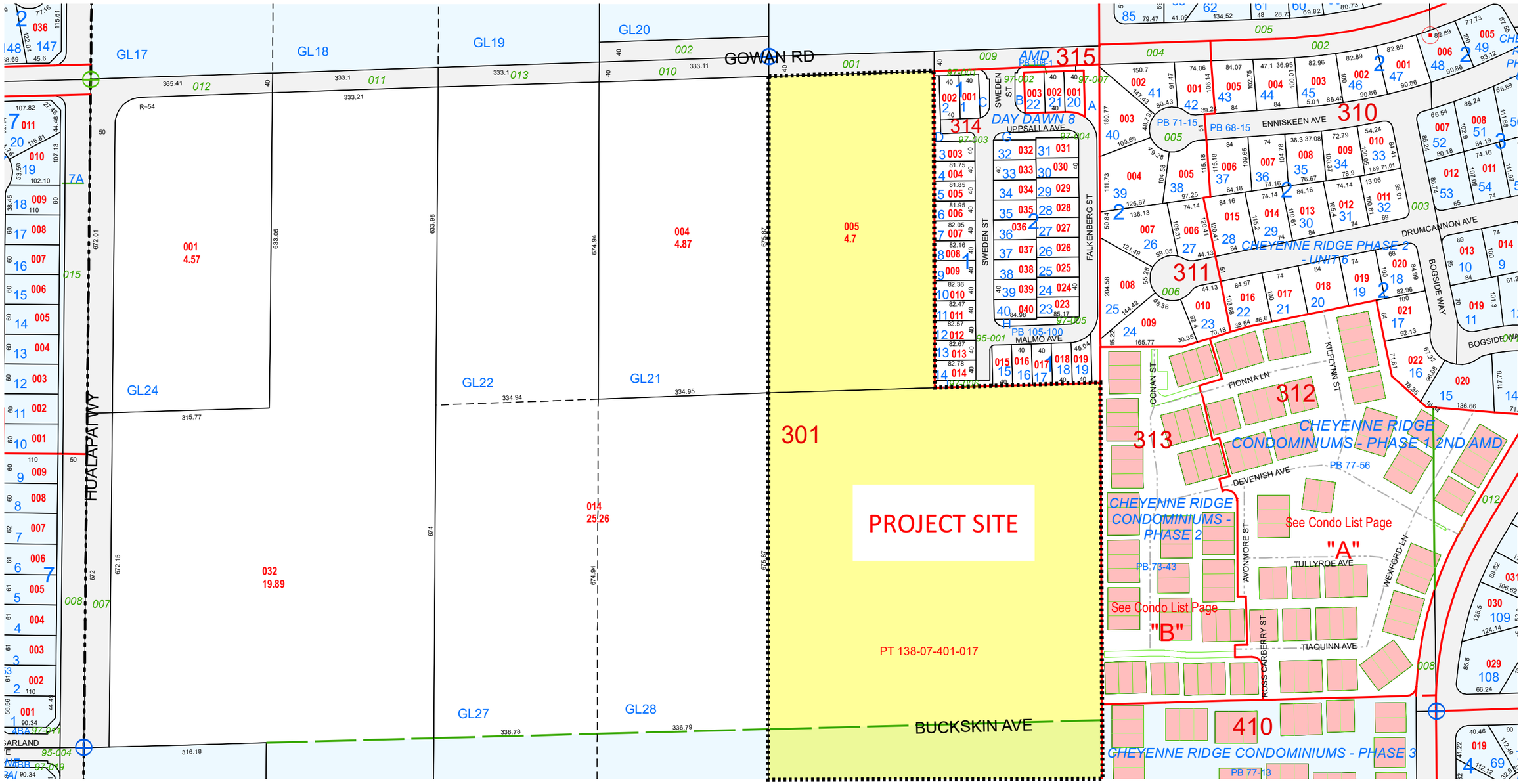
Rev: 1/8/2019

MAP N 2 SW 4

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

138-07-3

CLARK COUNTY NEVADA



TAX DIST 200

FIGURE 2a

NOTES

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

0 100 200 400 600 800

MAP LEGEND

PARCEL BOUNDARY
SUB BOUNDARY
PM/LD BOUNDARY
ROAD EASEMENT
MATCH / LEADER LINE
HISTORIC LOT LINE
HISTORIC SUB BOUNDARY
HISTORIC PM/LD BOUNDARY
SECTION LINE

CONDOMINIUM UNIT
AIR SPACE PCL
RIGHT OF WAY PCL
SUB-SURFACE PCL

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

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27 126	125 124
36 137	138 139
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Scale: 1" = 200'

SEC. 7

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Rev: 9/20/2019

MAP S 2 SW 4

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

138-07-4

CLARK COUNTY NEVADA

BUCKSKIN AVE
GL27
GL28
336.78
336.79
316.18
PT 138-07-301-032
138-07-301-014
815
401
PROJECT SITE
017
24.77
001
5.64
410
CHEYENNE RIDGE CONDOMINIUMS - PHASE 3
PB 77-13
See Condo List Page
"A"
633.2
GRAND CANYON DR
HUALAPAI WY
ISAAC NEWTON WY
GL32
GL30
GL29
338.54
366.61
298.22
323.56
R=25
Set Detail Pages for Air Pcls
024 026 020
025
0.38
PT 1
003
2.2
411
311.22
185.08
CONQUISTADOR PLAZA
015
1.18
014
2.38
016
0.46
012
0.54
PB 98-77
METRO ACADEMY WY
676.93
007
9.88
678.99
125
676.64
435.03
PM 105-97
200
201.65
013
1.33
012
2.89
018
4.02
436.50
148.23
R=54
BARENGO AVE
3RD AMD PB 133-36
TIERRA SUMMIT
PB 121-69
AHLGREN ST
ACCARDI ST
GREAT ST
BONTERRA AVE
95-002
414 AMD PB 127-6
CHEYENNE AND HUALAPAI BUSINESS CENTER
413
PB 125-12
002
0.86
004
1.65
005
0.53
006
0.48
PT 1
CHEYENNE AVE
CHEYENNE CHANNEL
96-003
97-001
97-008
PB 50-
SUN T
TOWN
MYSTIC R

TAX DIST 125,200 **FIGURE 2b**

National Flood Hazard Layer FIRMette

FEMA

115°18'55"W 36°13'34"N



115°18'17"W 36°13'5"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/2/2023 at 5:54 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

FIGURE 3

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
APMD		**ANGEL PARK - MIDDLE BRANCH**						
0000	E	NATURAL WASH	940	5058	C11A-1*	GOW4A	11.81	2.90
0027	E	1: 12' X 10' AND 2: 12' X 2' RCBC @ CANYON RUN	170	5058	C11A-1*	GOW4A	11.81	3.00
0030	E	NATURAL WASH	7000	5058	C11A-1*	GOW4A	11.81	3.00
APNO		**ANGEL PARK DETENTION BASIN**						
0001	E	1,654 AC-FT ANGEL PARK DETENTION BASIN		8677	ANGLPKIN	GOW5A	22.71	
0002	E	2: 33" & 1: 42" RCP EMERGENCY OUTLET	190	344	ANGLPKDB	GOW5A	22.71	
0004	E	14' X 12' RCB CONNECTOR PIPE UNDER SUMMERLIN PKWY	380					1.00
0005	E	NATURAL WASH	1559	7095	CSF2-C	GOW3B	7.61	2.00
0012	E	3: 12' X 10' RCBC @ RAMPART	232	7095	CSF2-C	GOW3B	7.61	1.00
0013	E	NATURAL WASH	1283	6867	CC3B-2B	GOW3B	7.22	1.40
0015	E	TWO SPAN BRIDGE 28' W 14'D @ SUMMERLIN	236	6867	CC3B-2B	GOW3B	7.22	1.00
APOF		**ANGEL PARK OUTFALL**						
0000	E	66" RCP	1297	764	CGD34AC	GOW3B	0.66	1.90
0015	E	60" RCP	5472	394	CGD34AB	GOW5A	22.98	2.20
0124	E	54" RCP OUTLET	810	344	ANGLPKDB	GOW5A	22.71	2.50
APSP		**ANGEL PARK - SUMMERLIN PARKWAY**						
0000	E	CONCRETE CHUTE DROP	103	6867	CC3B-2B	GOW3B	7.22	3.00
0001	E	UNLINED CHNL W/ GABION DROPS 20'W DEPTH VARIES 2:1 SS	3924	2725	C3B-2B	GOW3A	2.68	3.00
0002	E	UNLINED CHNL W/ GABION DROPS 50'W 3:1 SS	1424	2451	CC3B-2A	GOW3A	2.40	3.50
0066	E	5: 8' X 4' RCBC @ TOWN CENTER DR.	200	1666	C8B-2	GOW3A	1.56	2.40
0069	E	CONC CHNL 10'W 6'D 2:1 SS	3122	1666	C8B-2	GOW3A	1.56	2.40
0133	E	3: 9' X 4' RCBC @ CRESTDALE	180	1156	C8B-1	GOW3A	1.14	2.33
0135	E	CONC CHNL 10'W 6'D 2:1 SS	2030	1156	C8B-1	GOW3A	1.14	2.40
0177	E	9' X 8' RCBC @ ANASAZI	330	884	C11B-1	GOW3A	0.84	1.70
0183	E	CONC CHNL 10'W 6'D 2:1 SS	1680	884	C11B-1	GOW3A	0.84	1.70
GO02		**GOWAN SOUTH FACILITIES (CHEYENNE CHANNEL)**						
0000	E	FREE SPAN BRIDGE 34'W 9.25'D @ RONEMUS	100	4190	C16-C	GOW3A	7.29	0.50
0010	E	CONC CHNL 30'W 9'D 0:1 SS	600	4190	C16-C	GOW3A	7.29	0.50
0015	E	FREE SPAN BRIDGE 31'W 7.25'D @ BUFFALO	102	4190	C16-C	GOW3A	7.29	1.40
0018	E	CONC CHNL 30'W 9'D 0:1 SS	250	4190	C16-C	GOW3A	7.29	1.50
0020	E	CONC CHNL 10'W 7.25'D 1.5:1 SS	1000	4190	C16-C	GOW3A	7.29	1.50
0028	E	FREE SPAN BRIDGE 35'W 7'D @ SOFT BREEZES	72	4088	CC7-C	GOW3A	6.78	2.20
0029	E	CONC CHNL 10'W 7.25'D 1.5:1 SS	2700	4088	CC7-C	GOW3A	6.78	1.50
0084	E	FREE SPAN BRIDGE 35'W 7'D @ SOARING GULLS	95	3965	CCB-C	GOW3A	6.07	1.30
0085	E	CONC CHNL 10'W 7.25'D 1.5:1 SS	1240	3965	CCB-C	GOW3A	6.07	1.50
0111	E	FREE SPAN BRIDGE 35'W 7'D @ RAMPART	127	3965	CCB-C	GOW3A	6.07	2.90
0112	E	CONC CHNL 10'W 7'D 1.5:1 SS	7640	3603	CC-C	GOW3A	5.42	2.30
0257	E	CONC CHNL 10'W 6.75'D 1.5:1 SS	4293	2173	CCJ-C	GOW3A	2.97	4.10
GO95		**GOWAN OUTFALL - U.S. 95 CHANNEL**						
0000	P	CONC CHNL 12'W 4'D 2:1 SS	2640	318	GD17BG-C	GOW3A	0.36	0.30
GODU		**GOWAN NORTH - DURANGO BRANCH**						
0000	E	12' X 6' RCB	2629	905	CLV14-C	GOW3A	1.40	0.91
0050	E	9' X 6' RCB	865	681	CLV20-C	GOW3A	0.98	1.50
GOL3		**GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3**						
0010	E	CONC CHNL 20'W 10'D 0:1 SS	3037	3277	CRCLMT1R	GOW3A	7.31	2.78
0068	E	TRANSITION STRUCTURE	100	3277	CRCLMT1R	GOW3A	7.31	3.50
0070	E	20' X 6' RCBC @ CLIFF SHADOWS	350	1271	CRCSV22	GOW3A	4.99	2.44
GOL4		**GOWAN LONE MOUNTAIN SYSTEM-BRANCH 4**						
0000	E	14' X 8' RCB	554	2243	CLMT1R	GOW3A	2.33	2.50
GOLB		**GOWAN LAKE MEAD-BUFFALO**						
0000	E	12' X 6' RCB	1294	1264	CCVILL23	GOW3A	1.46	1.50
0025	E	10' X 7' RCB	145	1264	CCVILL23	GOW3A	1.46	0.50
0030	E	2: 8' X 4' RCB	408	1264	CCVILL23	GOW3A	1.46	0.85
0037	E	NATURAL WASH	9015	1264	CCVILL23	GOW3A	1.46	2.00
GOLM		**LONE MOUNTAIN DETENTION BASIN**						
0146	E	888 AC-FT LONE MOUNTAIN DETENTION BASIN		6518	LMTNIN	GOW3B	6.43	
GONO		**GOWAN NORTH SYSTEM**						
0000	E	8' X 8' RCB OUTLET	184	523	GWNNDB	GOW5A	68.55	0.51
0001	E	8' X 8' RCB OUTLET	156	523	GWNNDB	GOW5A	68.55	0.63
0006	E	30,780 CFS PMF SPILLWAY		30780	CCLV43-C*	GOW4B	11.91	
0008	E	921 AC-FT GOWAN NORTH DETENTION BASIN		2599	CCLV43-C*	GOW4B	11.91	

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
GOOF		**GOWAN OUTFALL FACILITIES**						
0511	E	8' X 5' RCB	8390	740	CPT6B-C	GOW3B	1.08	0.50
0531	E	8' X 5' RCB	1300	523	GWNNDB	GOW5A	68.55	0.50
0551	E	72" RCP	524	523	GWNNDB	GOW5A	68.55	0.62
0773	E	60" RCP	803	255	LV30-C	GOW3A	0.42	1.40
0775	E	60" RCP	1300	255	LV30-C	GOW3A	0.42	1.00
GOSO		**GOWAN SOUTH FACILITIES**						
0000	E	72" RCP OUTLET	2301	451	GWNSDB	GOW4C	11.98	0.53
0050	E	39,030 CFS PMF SPILLWAY		39030	GWNSIN	GOW4C	11.98	
0051	E	624 AC-FT GOWAN SOUTH DETENTION BASIN		6415	GWNSIN	GOW4C	11.98	
0052	P	UPGRADE TO 686 AC-FT GOWAN SOUTH DETENTION BASIN		6415	GWNSIN	GOW4C	11.98	
0068	E	CONC CHNL 15'W 7'D 2:1 SS (REPLACED W/ GOSO0069)	380	3971	CBUF01-C	GOW3B	4.89	0.40
0069	P0	CONC CHNL 50'W 7'D 0:1 SS (REPLACES GOSO0068)	380	3971	CBUF01-C	GOW3B	4.89	0.40
0076	E	2: 10' X 7' RCBC @ PEAK DR	80	2119^	CBUF01-C^	GOW3B	4.89	0.56
0077	P0	ADD 2: 14' X 7' RCBC @ PEAK DR	80	1852^	CBUF01-C^	GOW3B	4.89	0.56
0078	E	CONC CHNL 22'W 10'D 0:1 SS	60	3971	CBUF01-C	GOW3B	4.89	0.56
0080	E	CONC CHNL 12'W 7'D 2:1 SS	2078	3971	CBUF01-C	GOW3B	4.89	0.56
0119	E	CONC CHNL 22'W 10'D 0:1 SS	180	3772	CCCVIL23	GOW3B	4.53	0.95
0123	E	2: 10' X 7' RCBC @ SMOKE RANCH	100	2229^	CCCVIL23^	GOW3B	4.53	0.62
0124	P0	ADD 2: 11' X 7' RCBC @ SMOKE RANCH	100	1543^	CCCVIL23^	GOW3B	4.53	0.62
0125	E	CONC CHNL 22'W 9'D 0:1 SS	50	3772	CCCVIL23	GOW3B	4.53	0.62
0126	E	CONC CHNL 12'W 7'D 2:1 SS	2155	3772	CCCVIL23	GOW3B	4.53	0.62
0170	E	CONC CHNL 12'W 7'D 2:1 SS	220	2774	CCGD34AC	GOW3B	3.07	0.62
0173	E	CONC CHNL 22'W 7'D 0:1 SS	158	2774	CCGD34AC	GOW3B	3.07	0.62
0176	E	2: 10' X 7' RCBC @ LAKE MEAD	100	2229^	CCGD34AC^	GOW3B	3.07	0.62
0177	P0	ADD 1: 10' X 7' RCBC @ LAKE MEAD	100	545^	CCGD34AC^	GOW3B	3.07	0.62
0178	E	CONC CHNL 22'W 7'D 0:1 SS	150	2774	CCGD34AC	GOW3B	3.07	1.00
0181	E	CONC CHNL 12'W 7'D 2:1 SS	2429	2774	CCGD34AC	GOW3B	3.07	0.58
0227	E	2: 10' X 7' RCBC @ VEGAS DRIVE	100	2153	CGD34AA	GOW3A	2.41	1.36
0229	E	CONC CHNL 12'W 7'D 1:1 SS	2604	2153	CGD34AA	GOW3A	2.41	1.36
0279	E	12' X 7' RCB	80	2153	CGD34AA	GOW3A	2.41	1.36
0280	E	12' X 8' RCB	875	1261^	CGD34AA^	GOW3A	2.41	0.34
0281	P0	ADD: 12' X 8' RCB	875	892^	CGD34AA^	GOW3A	2.41	0.34
0297	E	12' X 7' RCB	2124	1987	CW1BB-C	GOW3A	2.14	1.60
0336	E	12' X 7' RCB	602	1745	C1-WESTC	GOW3A	1.84	3.40
0352	E	2: 8' X 5' RCB	2740	1513	C1-DUCHC	GOW3A	1.60	0.73
GOTE		**GOWAN -TENAYA BRANCH**						
0000	E	60" RCP	1954	233	LV29-C	GOW3A	0.28	1.30
GOWC		**GOWAN SOUTH FACILITIES - WEST CLIFF**						
0000	E	24" RCP	5400	272	1-WEST-C	GOW3A	0.24	1.67
LCCH		**LAS VEGAS CREEK CHANNEL**						
0478	E	60" RCP	1110	171	CLC01-C	SW3	1.20	0.55
0499	E	42" RCP OUTLET	660	87	RAINBWDB	SW3	1.11	1.88
0513	E	102 AC-FT RAINBOW DETENTION BASIN		1027	RAINBWIN	SW3	1.11	
0518	E	60" RCP CONNECTOR PIPE UNDER RAINBOW BLVD	670					1.85
0534	E	60" RCP	460	288	AL00A-C	SW3	0.23	5.38
0543	E	CONC CHNL 10'W 4'D 0:1 SS	700	288	AL00A-C	SW3	0.23	1.88
LCLO		**LAS VEGAS CREEK - LORENZI**						
0000	E	7' X 6' RCB	445	285	DAL00A	SW3	0.41	3.37
0008	E	7' X 6' RCB	2983	285	DAL00A	SW3	0.41	0.40
LVLM		**LAS VEGAS WASH - LAKE MEAD**						
0525	E	48" RCP	2600	565	CLM01-C	NW3	0.64	1.24
LVOW		**OWENS AVENUE SYSTEM**						
0513	P	6' X 5' RCB	2615	463	CVG02-C	NW3	0.68	1.68

**The HEC-1 node shown identifies the controlling concentration point for the associated facility and is located upstream of this facility due to decreasing peak flow with increasing tributary area caused by storm distribution transitions, depth area reduction factors, or attenuation of flow from routing.*
***As-built or design slopes were used when available. All other slopes are based on existing topography. The user should verify the facility slope listed prior to performing any facility specific analysis.*
^ For parallel facilities, the existing facility flow equals its normal depth capacity, and the proposed parallel facility flow equals the remaining flow (i.e. HEC-1 Node flow = existing facility normal depth capacity + proposed parallel facility flow).

REGIONAL FLOOD CONTROL DISTRICT

2018 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F-23

LEGEND

ID (Facility Identifier) AABB
Parent Stream Name
Stream Name
Mile 0000
Distance Above Confluence with Parent Stream (Miles)
Miles in Hundredths

Existing Facility.....E
Proposed or Modified Facility.....P
Contingency Level
Category A.....P
Category B.....P0

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

Construction Features

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

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Louis Berger

FIGURE 4

PROJECT SITE

GOWAN RD
HUALAPAI WY
CHEYENNE AV
SUN CITY BLVD
DEL WEBB BLVD
LAKE MEAD BLVD
HILLS CENTER DR
RAMPART BLVD
HARBOR ISLAND DR
MARINER DR
BUFFALO DR
CORAL SHORES DR
PEAK DR
TENAYA WY
HILLPOINTE RD
SNOW TRL
VILLAGE CENTER CIR
TRAILWOOD DR
COVINGTON CROSS DR
SUMMERLIN PKWY
CANYON RUN DR
ANASAZI DR
CIELO VISTA AV
VEGAS DR
CIMARRON RD
WASHINGTON AV
WESTCLIFF DR
THOMAS W RYAN BLVD

REGIONAL FLOOD CONTROL DISTRICT

2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-23
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

N

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

Scale: 1 inch = 2,000 feet

AerialSource:Esri World Imagery 2017

US95 I-15 CC-215 I-215

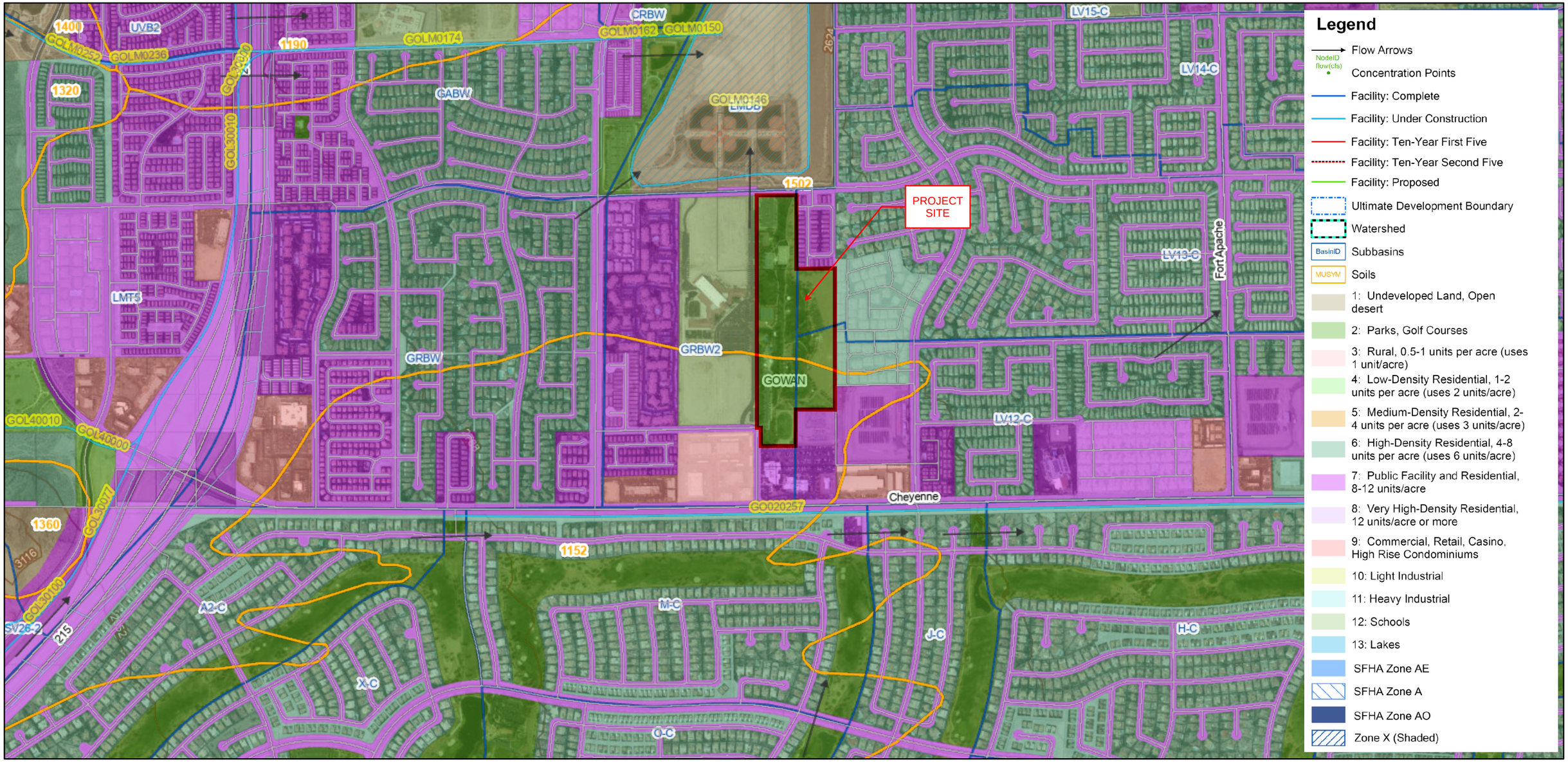
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2														
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10	11	12	13	14	15									
16	17	18	19	20	21									
22	23	24	25	26										
27	28	29	30	31										
32	33	34	35	36	37									
38	39	40	41	42	43									
44	45	46	47	48	49									
50	51	52	53											
		54												

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Louis Berger

FIGURE 5

Tabloid ANSI B Landscape



February 14, 2023

N

1:10,000

0 0.1 0.2 0.4 mi

0 0.17 0.35 0.7 km

FIGURE 6 - Hydrologic basins map.

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 --->					63	47	57	60	62	74	84	89	92	86	92	71	30
		CN --->				77	66	73	74	76	83	89	93	94	91	94	81	30
			CN --->			85	77	82	83	84	88	92	95	95	93	95	87	30
				CN --->		88	83	86	87	88	91	94	96	96	95	96	90	30
					CN --->	90	90	92	92	92	94	96	96	97	96	97	94	30
	%	%	%	%	%	SOIL TYPE COMPOSITE CN FOR LAND USE CATEGORY												
1100	6	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	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	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	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	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	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	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	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	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	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	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	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	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	16	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	100	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
1141	8	0	2	70	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	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
1151	41	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	5	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	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	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	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	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	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	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	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	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	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
1260	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
1262	75	0	0	25	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
1263	95	0	0	5	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
1264	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
1270	0	0	100	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	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	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	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 --->					63	47	57	60	62	74	84	89	92	86	92	71	30
		CN --->				77	66	73	74	76	83	89	93	94	91	94	81	30
			CN --->			85	77	82	83	84	88	92	95	95	93	95	87	30
				CN --->		88	83	86	87	88	91	94	96	96	95	96	90	30
					CN --->	90	90	92	92	92	94	96	96	97	96	97	94	30
	%	%	%	%	%	SOIL TYPE COMPOSITE CN FOR LAND USE CATEGORY												
1301	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
1302	35	20	0	45	0	77.0	67.0	73.0	75.0	76.0	83.0	89.0	93.0	94.0	91.0	94.0	82.0	30.0
1305	5	0	35	60	0	86.0	79.0	83.0	84.0	85.0	89.0	93.0	95.0	96.0	94.0	96.0	88.0	30.0
1307	10	0	30	60	0	85.0	77.0	82.0	83.0	84.0	88.0	92.0	95.0	96.0	93.0	96.0	87.0	30.0
1313	8	68	0	24	0	79.0	68.0	75.0	76.0	78.0	84.0	90.0	93.0	94.0	91.0	94.0	82.0	30.0
1314	80	5	0	15	0	67.0	53.0	62.0	65.0	67.0	77.0	86.0	91.0	92.0	88.0	92.0	74.0	30.0
1320	0	2	0	83	15	88.0	83.0	87.0	87.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1323	0	0	0	85	15	88.0	84.0	87.0	88.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	91.0	30.0
1325	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
1326	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
1340	9	0	0	71	20	86.0	81.0	85.0	85.0	86.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1341	0	100	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
1342	0	7	0	78	15	88.0	83.0	86.0	87.0	87.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1360	15	0	0	35	50	85.0	81.0	84.0	85.0	86.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1380	0	0	100	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
1390	0	0	100	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
1400	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
1415	0	0	100	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
1417	5	0	55	10	30	86.0	80.0	84.0	85.0	86.0	89.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1419	35	0	55	10	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
1440	0	0	100	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
1450	1	0	0	89	10	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
1484	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
1500	60	0	0	35	5	73.0	61.0	69.0	71.0	73.0	81.0	88.0	92.0	93.0	89.0	93.0	79.0	30.0
1501	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
1502	60	0	0	40	0	73.0	61.0	69.0	71.0	72.0	80.0	88.0	92.0	93.0	89.0	93.0	79.0	30.0
1505	55	0	0	40	5	74.0	63.0	70.0	72.0	74.0	81.0	88.0	92.0	94.0	90.0	94.0	80.0	30.0
1506	0	0	100	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
1508	0	0	100	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
1510	10	0	0	55	35	86.0	82.0	85.0	86.0	87.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1540	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
1541	4	0	0	76	20	87.0	83.0	86.0	87.0	87.0	91.0	94.0	96.0	96.0	95.0	96.0	90.0	30.0
1542	60	0	30	10	0	72.0	59.0	67.0	69.0	71.0	80.0	87.0	92.0	93.0	89.0	93.0	78.0	30.0
1545	60	0	10	30	0	73.0	60.0	68.0	70.0	72.0	80.0	88.0	92.0	93.0	89.0	93.0	78.0	30.0
1600	0	0	100	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
1605	0	0	100	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
1610	0	0	100	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
1615	0	0	100	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
1630	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
1635	7	0	5	63	25	87.0	82.0	85.0	86.0	87.0	90.0	94.0	95.0	96.0	94.0	96.0	89.0	30.0
1640	0	0	0	10	90	90.0	90.0	91.0	91.0	92.0	94.0	96.0	96.0	97.0	96.0	97.0	94.0	30.0
1645	0	0	100	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
1674	27	26	0	45	2	78.0	69.0	75.0	76.0	78.0	84.0	90.0	93.0	94.0	91.0	94.0	83.0	30.0
1700	0	0	3	93	4	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
1710	2	89	0	9	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
1731	10	2	0	88	0	85.0	79.0	83.0	84.0	85.0	89.0	93.0	95.0	96.0	94.0	96.0	88.0	30.0
1732	3	0	0	96	1	87.0	82.0	85.0	86.0	87.0	90.0	94.0	95.0	96.0	94.0	96.0	89.0	30.0
1753	0	8	0	90	2	87.0	81.0	85.0	86.0	87.0	90.0	93.0	95.0	96.0	94.0	96.0	89.0	30.0
1850	0	0	0	94	6	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
1853	0	0	0	85	15	88.0	84.0	87.0	88.0	88.0	91.0	94.0	96.0	96.0	95.0	96.0	91.0	30.0
1871	17	0	0	83	0	84.0	76.0	81.0	82.0	83.0	88.0	92.0	95.0	95.0	93.0	95.0	87.0	30.0
1999	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

FIGURE 7A: OFFSITE BASINS MAP



Plot Stamp: 3/29/2023 2:07:12 PM - Roshan Poudel
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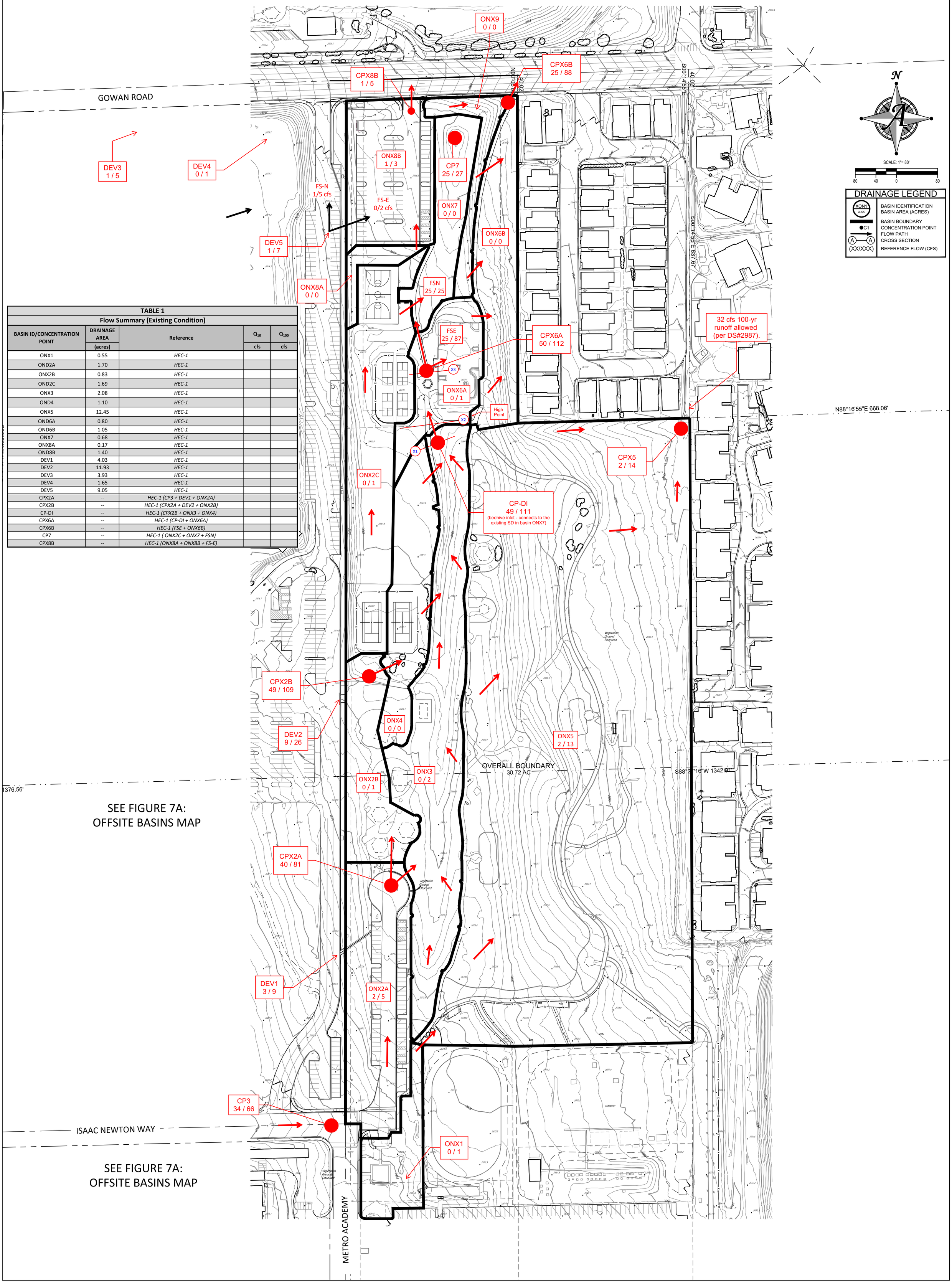


TABLE 1
Flow Summary (Existing Condition)

BASIN ID/CONCENTRATION POINT	DRAINAGE AREA (acres)	Reference	Q_{10} cfs	Q_{100} cfs
ONX1	0.55	*HEC-1*		
OND2A	1.70	*HEC-1*		
ONX2B	0.83	*HEC-1*		
OND2C	1.69	*HEC-1*		
ONX3	2.08	*HEC-1*		
OND4	1.10	*HEC-1*		
ONX5	12.45	*HEC-1*		
OND6A	0.80	*HEC-1*		
OND6B	1.05	*HEC-1*		
ONX7	0.68	*HEC-1*		
ONX8A	0.17	*HEC-1*		
OND8B	1.40	*HEC-1*		
DEV1	4.03	*HEC-1*		
DEV2	11.93	*HEC-1*		
DEV3	3.93	*HEC-1*		
DEV4	1.65	*HEC-1*		
DEV5	9.05	*HEC-1*		
CPX2A	--	*HEC-1 (CP3 + DEV1 + ONX2A)*		
CPX2B	--	*HEC-1 (CPX2A + DEV2 + ONX2B)*		
CP-DI	--	*HEC-1 (CPX2B + ONX3 + ONX4)*		
CPX6A	--	*HEC-1 (CP-DI + ONX6A)*		
CPX6B	--	*HEC-1 (FSE + ONX6B)*		
CP7	--	*HEC-1 (ONX2C + ONX7 + FSN)*		
CPX8B	--	*HEC-1 (ONX8A + ONX8B + FS-E)*		

#	DATE	DESCRIPTION	BY

DATE 3/29/2023
DRAWN RO.PO.
DESIGNED BP
CHECKED RO. PO.
PROJECT # CSD012201
SHEET GROUP FIG 7
SHEET NUMBER 1
SHEET 1 OF 1

FIGURE 7: EXISTING CONDITION BASINS MAP

CLV POLICE PARK

CARPENTER SELLERS DEL GATTO

CITY OF LAS VEGAS

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GOWAN ROAD

ISAAC NEWTON WAY

METRO ACADEMY

DEV3 1 / 5

DEV4 0 / 1

DEV5 1 / 7

FS-N 1/5 cfs

FS-E 0/2 cfs

ONX8A 0 / 0

Ex. DI

CPX8B 2 / 5

CPD6B 0 / 2

OND7 0 / 0

OND8B 1 / 3

OND6B 0 / 0

OND6A 0 / 1

Sw2

Sw1

Prop. DI

32 cfs 100-yr runoff allowed (per DS#2987).

ONX5 2 / 13

CP-DI 50 / 113
(three 4'x4' area-grate inlet connects to the existing SD underneath the north parking lot in basin OND8B)

OND2C 0 / 1

OND4 0 / 1

CPD2B 50 / 111

DEV2 9 / 26

ONX3 0 / 2

ONX2B 0 / 1

CPD2A 41 / 83

SPL

DEV1 3 / 9

OND2A 3 / 6

CP3 34 / 66

ONX1 0 / 1

SEE FIGURE 7A: OFFSITE BASINS MAP

SEE FIGURE 7A: OFFSITE BASINS MAP

N

SCALE: 1"= 80'

80 40 0 80

DRAINAGE LEGEND

XON1 / XXX	BASIN IDENTIFICATION / BASIN AREA (ACRES)
	BASIN BOUNDARY
●C1	CONCENTRATION POINT
	FLOW PATH
A — A	CROSS SECTION
(XX/XXX)	REFERENCE FLOW (CFS)

TABLE 2
Flow Summary (Interim/Ultimate Condition)

BASIN ID/CONCENTRATION POINT	DRAINAGE AREA (acres)	Reference	Q_{10} cfs	Q_{100} cfs
ONX1	0.55	*HEC-1*	0	1
OND2A	1.70	*HEC-1*	3	6
ONX2B	0.83	*HEC-1*	0	1
ONX2C	1.69	*HEC-1*	0	1
ONX3	2.08	*HEC-1*	0	2
OND4	1.10	*HEC-1*	0	1
ONX5	12.45	*HEC-1*	2	13
OND6A	0.80	*HEC-1*	0	1
OND6B	1.05	*HEC-1*	0	0
OND7	0.68	*HEC-1*	0	0
ONX8A	0.17	*HEC-1*	0	0
OND8B	1.40	*HEC-1*	2	4
DEV1	4.03	*HEC-1*	3	9
DEV2	11.93	*HEC-1*	9	26
DEV3	3.93	*HEC-1*	1	5
DEV4	1.65	*HEC-1*	0	1
DEV5	9.05	*HEC-1*	1	7
CPD2A	--	*HEC-1 (CP3 + DEV1 + ONX1 + OND2A)*	41	83
CPD2B	--	*HEC-1 (CPD2A + DEV2 + ONX2B)*	50	111
CP-DI	--	*HEC-1 (CPD2B + ONX3 + OND4)*	49	113
CPD6B	--	*HEC-1 (OND6A + OND6B + OND7)*	0	2
CPD8B	--	*HEC-1 (ONX8A + ONX8B + FS-E)*	2	5

TABLE 3
Calculations (Interim/Ultimate Condition)

Section	Slope (%)	Flow (100 year) (cfs)	Velocity (ft/s)	Flow Depth (ft)	VxD
SPL	1.77	83	5.22	0.54	2.82
Sw1	1.00	1	2.19	0.39	0.85
Sw2	1.00	2	2.62	0.50	1.31

DATE 4/24/2023
DRAWN RO.PO.
DESIGNED BP
CHECKED RO. PO.
PROJECT # CSD012201
SHEET GROUP FIG 8
SHEET NUMBER 1
SHEET 1 OF 1

#	DATE	DESCRIPTION	BY

FIGURE 8: INTERIM/ULTIMATE CONDITION BASINS MAP

CLV POLICE PARK

CARPENTER SELLERS DEL GATTO

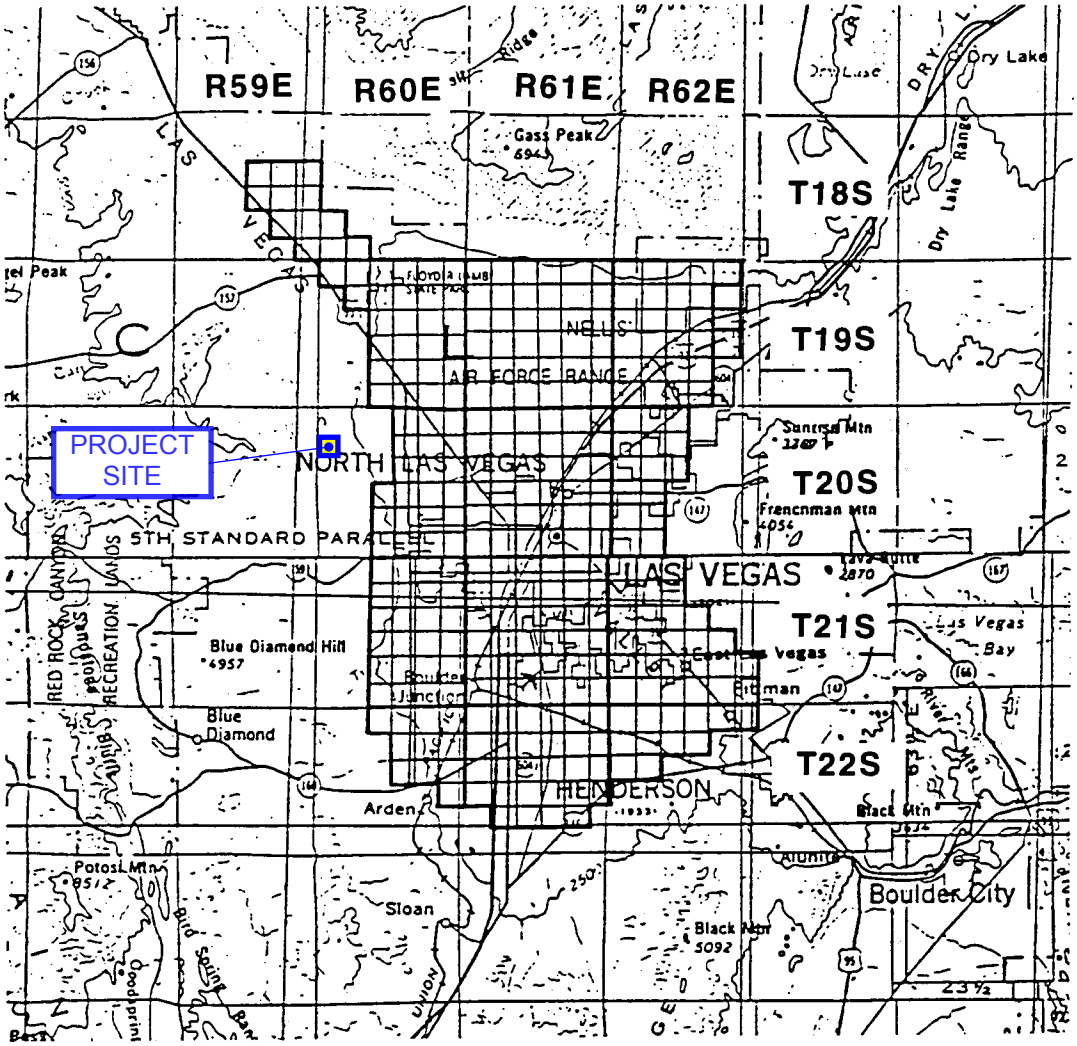
CITY OF LAS VEGAS

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3283 E. Warm Springs Rd., Suite 300
Las Vegas, NV 89120
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Engineering - Surveying - Consulting - Planning

HYDROLOGIC PARAMETERS



McCARRAN AIRPORT RAINFALL AREA



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

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

Revision	Date

WRC ENGINEERING

REFERENCE:
USACE, Los Angeles District, 1988

FIGURE 513

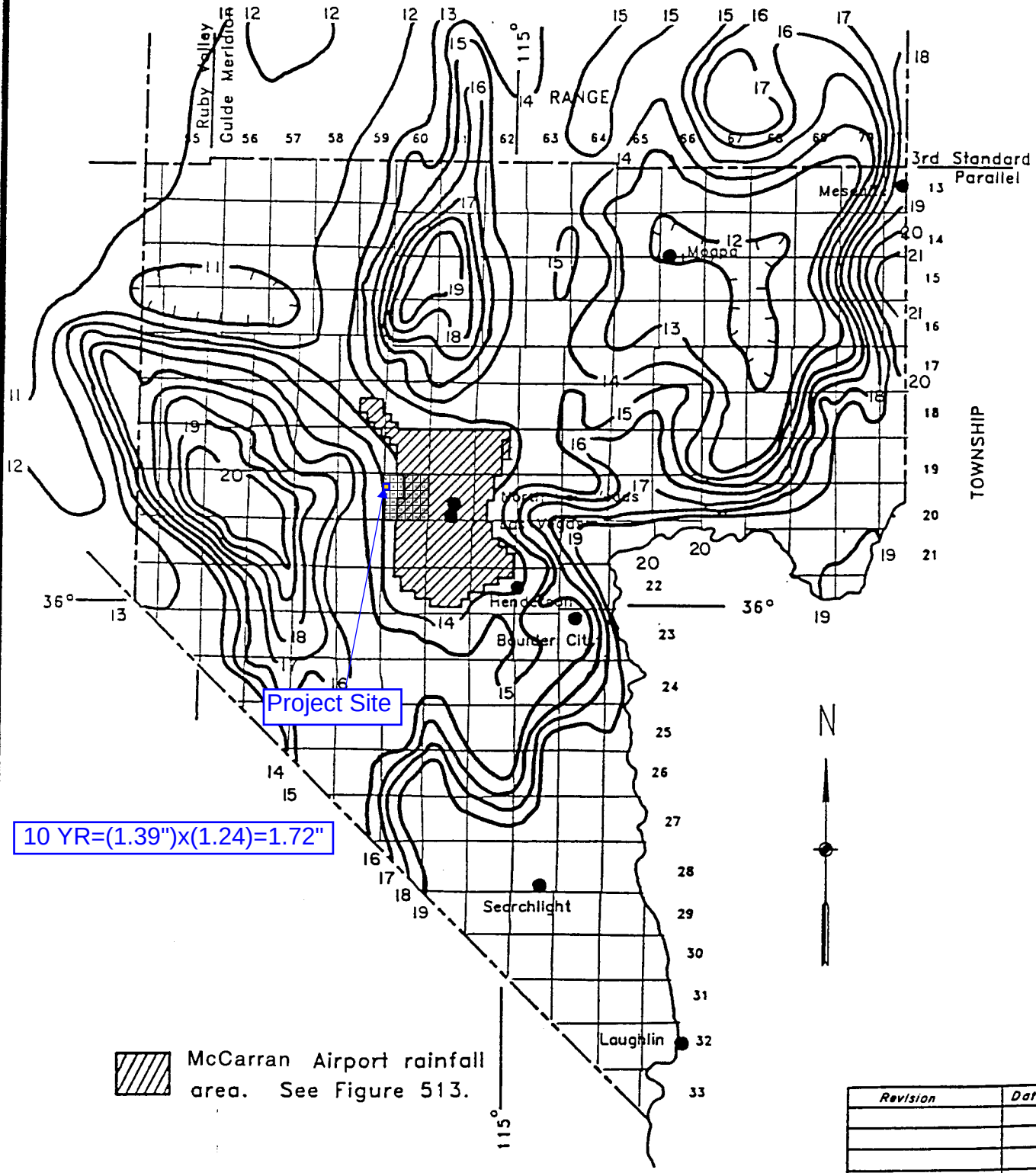
PRECIPITATION ADJUSTMENT RATIOS

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

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

Revision	Date

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



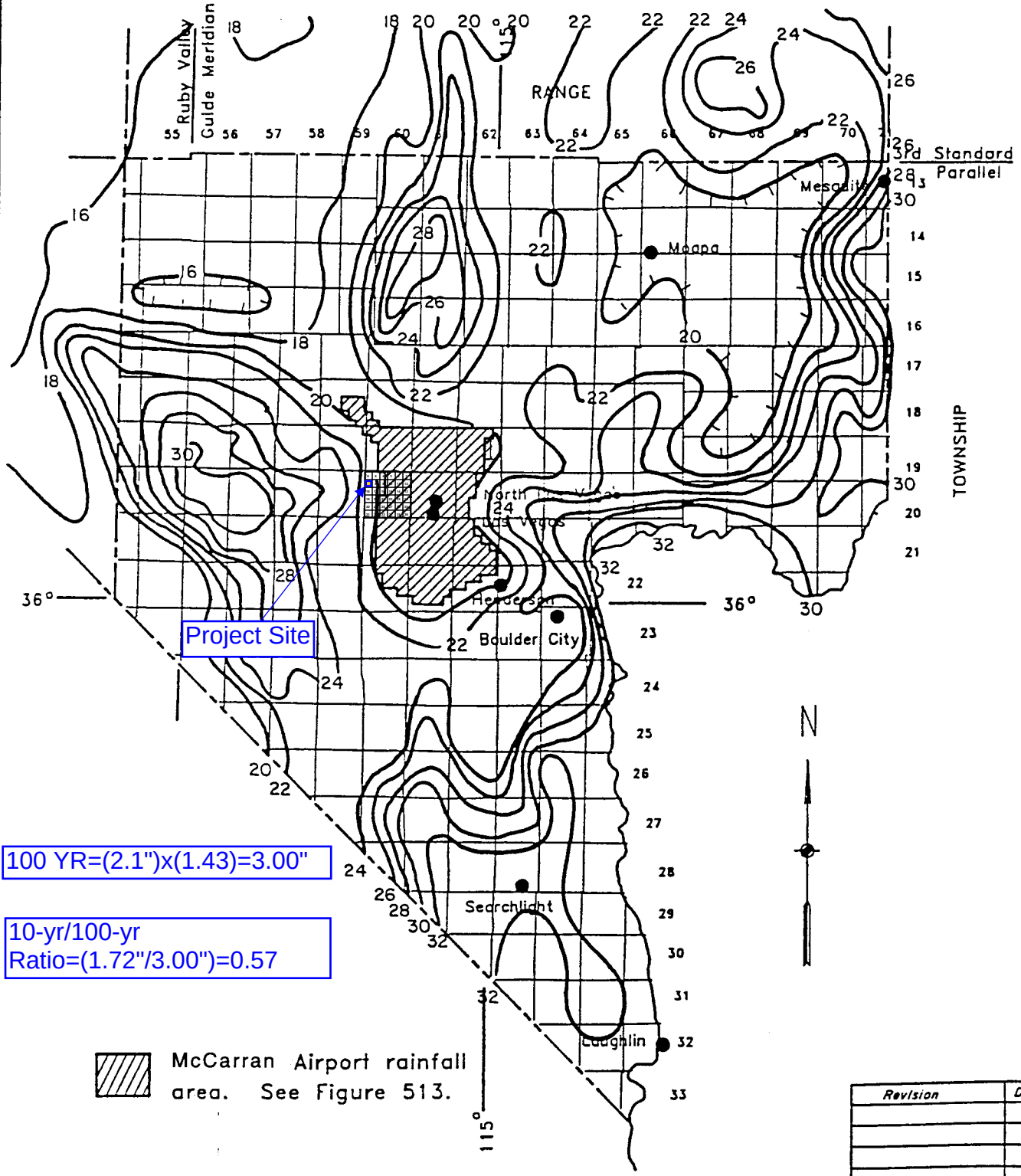
Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 503

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



Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 506

SIX-HOUR STORM DISTRIBUTIONS

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

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

Revision	Date

REFERENCE:

TABLE 503

DEPTH-DURATION-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA

(IN INCHES)

	RECURRENCE INTERVAL					
TIME	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5 min.	0.15	0.27	0.35	0.46	0.54	0.63
10 min.	0.25	0.44	0.57	0.74	0.89	1.02
15 min.	0.33	0.57	0.74	0.97	1.15	1.32
30 min.	0.44	0.78	1.01	1.31	1.55	1.79
1 hour	0.52	0.89	1.15	1.50	1.78	2.06
2 hour	0.59	1.01	1.30	1.70	2.01	2.30
3 hour	0.64	1.08	1.39	1.82	2.15	2.48
6 hour	0.72	1.22	1.58	2.05	2.41	2.77
24 hour (TR-55)	1.20	1.60	1.80	2.40	2.70	2.96

NOTE: 1. Refer to Figure 513 for a description and drawing of the area included in the McCarran Airport Rainfall Area.

2. The 24 hour values presented above are for use with TR-55 only.

3. Table 501 adjustments not required.

Revision	Date

Curve Number Calculator

Company: ACTUS
By: ACTUS
Date: 3/30/2023
Project Name: CLV POLICE PARK

EXISTING BASINS

BASIN	Percentage of Basin (%)						Composite CN
	Existing Soil # 1152	Existing Soil # 1502	Developed Soil # --	Existing Soil # --	Existing Soil # --	Existing Soil # --	
Landuse	2	2					
	CN 83.00	CN 61.00	CN 0.00	CN 0.00	CN 0.00	CN 0.00	

DEVELOPED BASINS

BASIN	Percentage of Basin (%)						Composite CN
	Developed Soil # 1152	Developed Soil # 1152	Developed Soil # 1502	Developed Soil # 1502	Developed Soil # 1152	Developed Soil # 1502	
Landuse	2	7	2	7	12	12	
	CN 83.00	CN 94.00	CN 61.00	CN 88.00	CN 90.00	CN 79.00	
ISNW		100%					94.00
ONX1	100%						83.00
ONX2A	25%	75%					91.25
ONX2B			75%			25%	65.50
ONX2C			75%			25%	65.50
ONX3	40%		60%				69.80
ONX4			100%				61.00
ONX5	40%		60%				69.80
ONX6A			30%			70%	73.60
ONX6B			100%				61.00
ONX7			100%				61.00
ONX8A			100%				61.00
ONX8B				100%			88.00
ONX9			100%				61.00
DEV1	85%	15%					84.65
DEV2	40%	10%	10%	40%			83.90
DEV3			50%	50%			74.50
DEV4			100%				61.00
DEV5			70%	30%			69.10

Note: Please refer to Figure 6 Hydrologic Basins Map for Landuse Index.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION

Company: Actus | Project Name: CLV Police Park
By: Actus | Description: Existing and Developed Basins
Date: 04/25/23 | File Name: CSD012201

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
DESIG:	DEV./EX. (D or E)	CN	K [1]	AREA Ac	AREA Mi^2 [2]	INITIAL LENGTH Feet	SLOPE %	Ti Min [3]	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY FPS [4]	V2 VELOCITY FPS [5]	Tt Min [6]	Tc Calc. [7]	Total Length Feet [8]	Tc Check [9]	Tlag Hours [10]
Existing Basins																	
ISNW	D	94.00	0.8508	1.40	**0.0022**	23	2.00	1.71	1000	3.60	3.83	5.81	3.61	5.32	1023	15.683	**0.053**
ONX1	D	83.00	0.7056	0.55	**0.0009**	150	3.00	6.03	350	2.90	3.44	5.21	1.70	7.72	500	12.778	**0.077**
ONX2A	D	91.25	0.8145	1.50	**0.0023**	50	5.00	2.13	550	2.00	2.86	4.33	3.11	5.23	600	13.333	**0.052**
ONX2B	D	65.50	0.4746	0.83	**0.0013**	50	5.00	4.66	400	1.30	2.30	3.49	2.89	7.55	450	12.500	**0.075**
ONX2C	D	65.50	0.4746	1.70	**0.0027**	50	5.00	4.66	780	1.30	2.30	3.49	4.96	9.61	830	14.611	**0.096**
ONX3	D	69.80	0.5314	2.28	**0.0036**	50	5.00	4.23	1200	1.20	2.21	3.35	7.25	11.48	1250	16.944	**0.115**
ONX4	D	61.00	0.4152	0.97	**0.0015**	50	5.00	5.10	650	1.20	2.21	3.35	4.51	9.61	700	13.889	**0.096**
ONX5	D	69.80	0.5314	12.45	**0.0195**	50	5.00	4.23	1310	2.90	3.44	5.21	5.01	9.25	1360	17.556	**0.092**
ONX6A	D	73.60	0.5815	0.90	**0.0014**	50	5.00	3.86	400	1.75	2.67	4.05	2.49	6.35	450	12.500	**0.064**
ONX6B	D	61.00	0.4152	1.05	**0.0016**	50	5.00	5.10	635	2.50	3.19	4.84	3.07	8.17	685	13.806	**0.082**
ONX7	D	61.00	0.4152	0.66	**0.0010**	50	5.00	5.10	470	2.30	3.06	4.64	2.56	7.65	520	12.889	**0.077**
ONX8A	D	61.00	0.4152	0.17	**0.0003**	50	1.00	8.72	250	1.24	2.25	3.41	1.85	10.57	300	11.667	**0.106**
ONX8B	D	88.00	0.7716	1.10	**0.0017**	100	1.00	5.91	330	1.80	2.71	4.11	2.03	7.94	430	12.389	**0.079**
ONX9	D	61.00	0.4152	0.34	**0.0005**	50	5.00	5.10	400	2.30	3.06	4.64	2.18	7.27	450	12.500	**0.073**
DEV1	D	84.65	0.7274	4.03	**0.0063**	125	1.50	6.55	770	4.00	4.04	6.12	2.80	9.35	895	14.972	**0.093**
DEV2	D	83.90	0.7175	11.93	**0.0186**	100	2.00	5.46	1170	3.90	3.99	6.04	3.94	9.40	1270	17.056	**0.094**
DEV3	D	74.50	0.5934	3.93	**0.0061**	100	1.50	7.97	1200	1.00	2.02	3.06	7.94	15.90	1300	17.222	**0.159**
DEV4	D	61.00	0.4152	1.65	**0.0026**	100	1.00	12.33	450	1.50	2.47	3.75	3.03	13.06	550	13.056	**0.131**
DEV5	D	69.10	0.5221	9.05	**0.0141**	300	2.50	13.27	900	2.00	2.86	4.33	4.46	16.67	1200	16.667	**0.167**
Developed Basins																	
ISNW	D	94.00	0.8508	1.40	**0.0022**	23	2.00	1.71	1000	3.60	3.83	5.81	3.61	5.32	1023	15.683	**0.053**
ONX1	D	83.00	0.7056	0.55	**0.0009**	150	3.00	6.03	350	2.90	3.44	5.21	1.70	7.72	500	12.778	**0.077**
OND2A	D	91.25	0.8145	1.70	**0.0027**	50	5.00	2.13	550	2.00	2.86	4.33	3.11	5.23	600	13.333	**0.052**
ONX2B	D	65.50	0.4746	0.83	**0.0013**	50	5.00	4.66	400	1.30	2.30	3.49	2.89	7.55	450	12.500	**0.075**
OND2C	D	65.50	0.4746	1.69	**0.0026**	50	5.00	4.66	780	1.30	2.30	3.49	4.96	9.61	830	14.611	**0.096**
ONX3	D	69.80	0.5314	2.08	**0.0033**	50	5.00	4.23	1200	1.20	2.21	3.35	7.25	11.48	1250	16.944	**0.115**
OND4	D	61.00	0.4152	1.10	**0.0017**	50	5.00	5.10	650	1.20	2.21	3.35	4.51	9.61	700	13.889	**0.096**
ONX5	D	69.80	0.5314	12.45	**0.0195**	50	5.00	4.23	1310	2.90	3.44	5.21	5.01	9.25	1360	17.556	**0.092**
OND6A	D	73.60	0.5815	0.80	**0.0013**	50	5.00	3.86	400	1.75	2.67	4.05	2.49	6.35	450	12.500	**0.064**

OND6B	D	61.00	0.4152	1.05	**0.0016**	50	5.00	5.10	635	2.50	3.19	4.84	3.07	8.17	685	13.806	**0.082**
OND7	D	61.00	0.4152	0.68	**0.0011**	50	5.00	5.10	470	2.30	3.06	4.64	2.56	7.65	520	12.889	**0.077**
ONX8A	D	61.00	0.4152	0.17	**0.0003**	50	1.00	8.72	250	1.24	2.25	3.41	1.85	10.57	300	11.667	**0.106**
OND8B	D	88.00	0.7716	1.40	**0.0022**	100	1.00	5.91	330	1.80	2.71	4.11	2.03	7.94	430	12.389	**0.079**
DEV1	D	84.65	0.7274	4.03	**0.0063**	125	1.50	6.55	770	4.00	4.04	6.12	2.80	9.35	895	14.972	**0.093**
DEV2	D	83.90	0.7175	11.93	**0.0186**	100	2.00	5.46	1170	3.90	3.99	6.04	3.94	9.40	1270	17.056	**0.094**
DEV3	D	74.50	0.5934	3.93	**0.0061**	100	1.50	7.97	1200	1.00	2.02	3.06	7.94	15.90	1300	17.222	**0.159**
DEV4	D	61.00	0.4152	1.65	**0.0026**	100	1.00	12.33	450	1.50	2.47	3.75	3.03	13.06	550	13.056	**0.131**
DEV5	D	69.10	0.5221	9.05	**0.0141**	300	2.50	13.27	900	2.00	2.86	4.33	4.46	16.67	1200	16.667	**0.167**

[1] K = 0.0132 (CN) - 0.39

[2] A = Area/640

[3] Ti = (1.8 (1.1-K) L^0.5)/S^0.33

[4] For Existing Conditions: V1 = 14.8 * (S/100)^0.5
For Developed Conditions: V1 = 20.2 * (S/100)^0.5

[5] For Existing Conditions: V2 = 29.4 * (S/100)^0.5
For Developed Conditions: V2 = 30.6 * (S/100)^0.5

[6] Tt = L/(60*V)

[7] Tc = Ti + Tt

[8] Total L = Initial L + Travel L

Note: For Travel Time Calcs: V1 applies to first 500 feet and V2 applies to remaining distance.

[9] Tc = (L/180) + 10

[10] Tlag = (0.6*Tc)/60

[11] Min Tlag =0.05

REFERENCE :

STANDARD FORM 4

EXISTING CONDITION

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *               JUN   1998              *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   05APR23  TIME  15:47:47   *
 *                                       *
 *****************************************
```

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

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

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

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


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

            1           ID    PREPARED FOR
            2           ID    CLV POLICE PARK
            3           ID    10-Y & 100-Y, 6 Hour Storm
            4           ID    EXISTING CONDITION
            5           ID    @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
            6           ID
            7           ID    TECHNICAL DRAINAGE STUDY FOR CLV POLICE PARK
            8           ID    file name:P:\CSD012201 - CLV Police Park\Drainage\Original\Hydrology\HEC-1\E
            9           ID
           10           ID    Actus
           11           ID    3283 E. Warm Springs Road Suite, Suite 300
           12           ID    Las Vegas, Nevada 89120
           13           ID
           14           ID    **********************
           15           ID    *    SDN 3  VALUES  *
           16           ID    **********************
           17           ID
           18           ID
           19           ID
                        *DIAGRAM
           20           IT       5       0       0     300
           21           IN       5       0       0
           22           IO       5       0       0
           23           JR    PREC    .560   1.000

           24           KK  CHEY1*
           25           KM   START REFERENCE FROM DS5297
           26           KM   REFERENCED OFFSITE BASIN
           27           BA  0.0053
           28           PB    3.00
           29           PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
           30           PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
           31           PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
           32           PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
           33           PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
           34           PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
           35           PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
           36           PC    .998    .999   1.00
           37           LS       0   98.00
           38           UD   0.0926
                        *

           39           KK  CHEY2*
           40           KM   REFERENCED OFFSITE BASIN
           41           BA  0.0027
           42           LS       0   98.00
           43           UD   0.0519
                        *

           44           KK  CHEY3*
           45           KM   REFERENCED OFFSITE BASIN
           46           BA  0.0023
           47           LS       0   98.00
           48           UD   0.0500
                        *
```



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


           49           KK  CHEY*
           50           KM   COMBINE CHEY1, CHEY2, AND CHEY3
           51           KM   REFERENCED FROM CHEYENNE STUDY
           52           HC       3
                        *

           53           KK  RCHEY
           54           KM   ROUTE CHEY* TO C1
           55           RD    1000   0.035   0.016       0    TRAP      41       0
                        *

           56           KK  OFF1
           57           KM   OFFSITE STREET BASIN
           58           BA  0.0018
           59           LS       0   98.00
           60           UD   0.0500
```

```
                *
              61          KK  OFF2
              62          KM   OFFSITE STREET BASIN
              63          BA  0.0007
              64          LS       0   98.00
              65          UD   0.0500
                          *
              66          KK  C1*
              67          KM   COMBINE CHEY*, OFF1, AND OFF2
              68          HC       3
                          *
              69          KK  C1-E
              70          KM   FLOW SPLIT
              71          KM   END REFERENCE FROM DS5297
              72          KM   FLOW FROM C1 CONVEYED TOWARDS ISAAC NEWTON WAY
              73          DT    C1-N
              74          DI      16    29
              75          DQ       2     4
                          *
              76          KK  ON1D
              77          KM   START REFERENCE FROM DS3478
              78          KM   DEVELOPED ONSITE BASIN ON1D
              79          BA  0.0036
              80          LS       0   95.00
              81          UD   0.0670
                          *
              82          KK  ON2D
              83          KM   DEVELOPED ONSITE BASIN ON2D
              84          BA  0.0032
              85          LS       0   95.00
              86          UD   0.0780
                          *
1                                        HEC-1 INPUT                                        PAGE  3

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

              87          KK  ON3D
              88          KM   END REFERENCE FROM DS3478
              89          KM   DEVELOPED ONSITE BASIN ON3D
              90          BA  0.0012
              91          LS       0   95.00
              92          UD   0.0770
                          *
              93          KK  CPTS
              94          KM   TOTAL RUNOFF FROM TIARA SUMMIT
              95          KM   COMBINE ON1D, ON2D, AND ON3D
              96          HC       3
                          *
              97          KK  C2
              98          KM   TOTAL RUNOFF IN ISAAC NEWTON TO THE EAST OF
              99          KM   ENTRANCE TO TIARA SUMMIT
             100          KM   COMBINE C1-E AND CPTS
             101          HC       2
                          *
             102          KK  TBCC
             103          KM   AREA FROM THE BOULDERS CONDOMIUM CONVERSION
             104          KM   DEVELOPED OFFSITE BASIN TBCC
             105          BA  0.0007
             106          LS       0   95.00
             107          UD   0.0770
                          *
             108          KK  ISN
             109          KM   ISAAC NEWTON WAY
             110          KM   FROM TIARA SUMMIT ENTRANCE TO METRO ACADEMY WAY
             111          BA  0.0022
             112          LS       0   94.00
             113          UD   0.053
                          *
             114          KK  FUT-1
             115          KM   START REFERENCE FROM DS2555
             116          BA  0.0031
             117          LS       0   95.00
             118          UD   0.1300
                          *
             119          KK  FUT-2
             120          KM   END REFERENCE FROM DS2555
             121          BA  0.0063
             122          LS       0   95.00
             123          UD   0.1230
                          *
1                                        HEC-1 INPUT                                        PAGE  4

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

             124          KK  CP3
             125          KM   TOTAL RUNOFF IN ISAAC NEWTON WAY
             126          KM   AT THE INTERSECTION WITH METRO ACADEMY WAY
             127          KM   COMBINE C2, TBCC, ISN, FUT-1 AND FUT-2
             128          HC       5
                          *
             129          KK  DEV1
             130          KM   SHILOH CHRISTIAN SCHOOL BASIN
             131          BA  0.0063
             132          LS       0   84.65
             133          UD   0.093
                          *
             134          KK  ONX2A
             135          KM   ONSITE EXISTING BASIN 2A
             136          BA  0.0023
```



```
 137          LS       0   91.25
 138          UD   0.052
              *

 139          KK  CPX2A
 140          KM   TOTAL RUNOFF AT NORTH CORNER OF BASIN ONX2A
 141          KM   COMBINE CP3, DEV1, AND ONX2A
 142          HC       3
              *

 143          KK  ONX2B
 144          KM   ONSITE EXISTING BASIN 2B
 145          BA  0.0029
 146          LS       0   65.50
 147          UD   0.075
              *

 148          KK  DEV2
 149          KM   SHILOH CHRISTIAN SCHOOL BASIN
 150          BA  0.0186
 151          LS       0   83.90
 152          UD   0.094
              *

 153          KK  CPX2B
 154          KM   COMBINE CP4A, DEV2, AND ONX2B
 155          HC       3
              *

 156          KK  ONX3
 157          KM   ONSITE EXISTING BASIN 3
 158          BA  0.0036
 159          LS       0   69.80
 160          UD   0.115
              *
1                                        HEC-1 INPUT                                          PAGE  5

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

 161          KK  ONX4
 162          KM   ONSITE EXISTING BASIN 4
 163          BA  0.0015
 164          LS       0   61.00
 165          UD   0.096
              *

 166          KK  CP-DI
 167          KM   TOTAL RUNOFF OVER THE EXISTING BEEHIVE INLET
 168          HC       3
              *

 169          KK  ONX6A
 170          KM   ONSITE EXISTING BASIN 6A
 171          BA  0.0014
 172          LS       0   73.60
 173          UD   0.064
              *

 174          KK  CPX6A
 175          KM   TOTAL RUNOFF
 176          HC       2
              *

 177          KK  FSE
 178          KM   FLOW-SPLIT FROM CPX6A TOWARDS SKATE PARK
 179          DT     FSN
 180          DI      50     112
 181          DQ      25      25
              *

 182          KK  ONX9
 183          KM   ONSITE EXISTING BASIN 9
 184          BA  0.0005
 185          LS       0   61.00
 186          UD   0.073
              *

 187          KK  ONX6B
 188          KM   ONSITE EXISTING BASIN 6B
 189          BA  0.0016
 190          LS       0   61.00
 191          UD   0.082
              *

 192          KK  CPX6B
 193          KM   TOTAL RUNOFF
 194          HC       3
              *
1                                        HEC-1 INPUT                                          PAGE  6

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

 195          KK  ONX2C
 196          KM   ONSITE EXISTING BASIN 2C
 197          BA  0.0027
 198          LS       0   65.50
 199          UD   0.096
              *

 200          KK  ONX7
 201          KM   ONSITE EXISTING BASIN 7
 202          BA  0.0010
 203          LS       0   61.00
 204          UD   0.077
              *

 205          KK  RTFSN
 206          KM   RETRIVE FLOW
 207          DR     FSN
              *

 208          KK  CP7
```

```
            209          KM   TOTAL RUNOFF AT NORTHEAST CORNER OF BASIN ONX7
            210          KM   COMBINE ONX2C, FSN, AND ONX7
            211          HC       3
                         *

            212          KK  ONX8A
            213          KM   ONSITE EXISTING BASIN 8A
            214          BA  0.0003
            215          LS       0   61.00
            216          UD   0.106
                         *

            217          KK  DEV5
            218          KM   SHILOH CHRISTIAN SCHOOL BASIN
            219          BA  0.0141
            220          LS       0   69.10
            221          UD   0.167
                         *

            222          KK  FS-E
            223          KM   FLOW-SPLIT FROM DEV5
            224          DT  FS-N
            225          DI       0      01      07
            226          DQ       0      01      05
                         *

            227          KK  ONX8B
            228          KM   ONSITE EXISTING BASIN 8B
            229          BA  0.0017
            230          LS       0   88.00
            231          UD   0.079
                         *
1                                          HEC-1 INPUT                                          PAGE  7

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


            232          KK  CPX8B
            233          KM   COMBINE ONX8A, FS-E AND ONX8B
            234          HC       3
                         *

            235          KK  ONX1
            236          KM   ONSITE EXISTING BASIN 1
            237          BA  0.0009
            238          LS       0   83.00
            239          UD   0.077
                         *

            240          KK  ONX5
            241          KM   ONSITE EXISTING BASIN 5
            242          BA  0.0195
            243          LS       0   69.80
            244          UD   0.092
                         *

            245          KK  CPX5
            246          KM   TOTAL RUNOFF AT NORTHEAST CORNER OF BASIN ONX5
            247          KM   COMBINE ONX1 AND ONX5
            248          HC       2
                         *

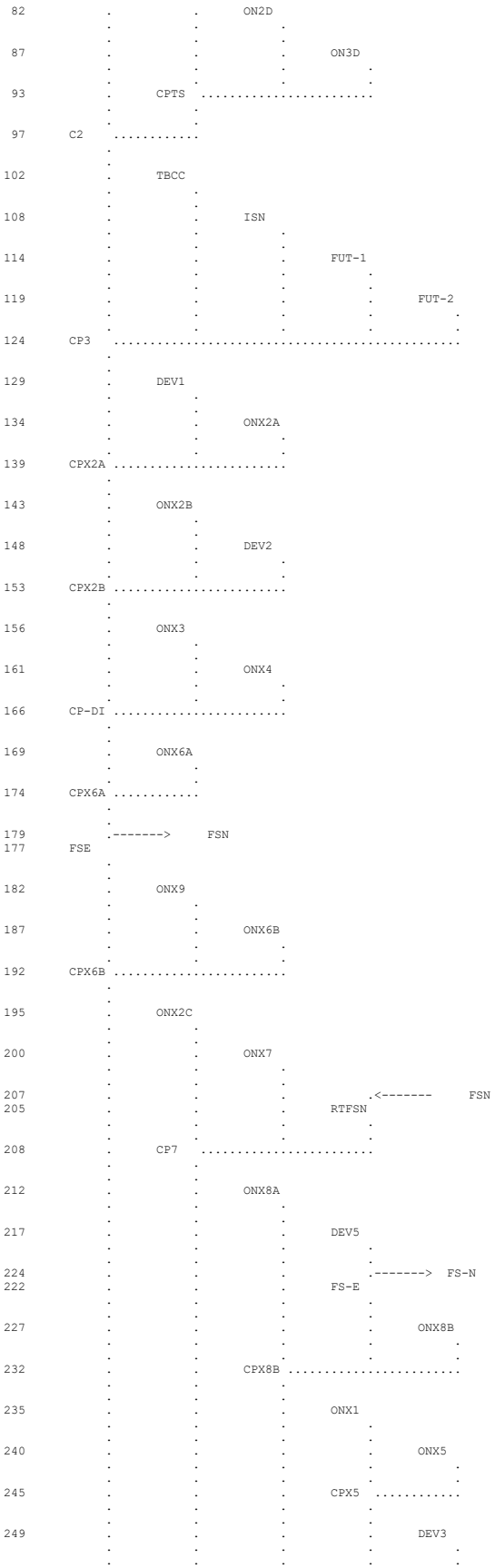
            249          KK  DEV3
            250          KM   SHILOH CHRISTIAN SCHOOL BASIN
            251          BA  0.0061
            252          LS       0   74.50
            253          UD   0.159
                         *

            254          KK  DEV4
            255          KM   SHILOH CHRISTIAN SCHOOL BASIN
            256          BA  0.0026
            257          LS       0   61.00
            258          UD   0.131
                         *
            259          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    24      CHEY1*
                 .
                 .
    39           .      CHEY2*
                 .           .
                 .           .
    44           .           .      CHEY3*
                 .           .           .
                 .           .           .
    49      CHEY* ......................
                 V
                 V
    53      RCHEY
                 .
                 .
    56           .      OFF1
                 .           .
                 .           .
    61           .           .      OFF2
                 .           .           .
                 .           .           .
    66      C1*   ......................
                 .
                 .
    73           .------->    C1-N
    69      C1-E
                 .
                 .
    76           .      ON1D
                 .           .
                 .           .
```


82
ON2D
87
ON3D
93
CPTS
97
C2
102
TBCC
108
ISN
114
FUT-1
119
FUT-2
124
CP3
129
DEV1
134
ONX2A
139
CPX2A
143
ONX2B
148
DEV2
153
CPX2B
156
ONX3
161
ONX4
166
CP-DI
169
ONX6A
174
CPX6A
179
FSN
177
FSE
182
ONX9
187
ONX6B
192
CPX6B
195
ONX2C
200
ONX7
207
FSN
205
RTFSN
208
CP7
212
ONX8A
217
DEV5
224
FS-N
222
FS-E
227
ONX8B
232
CPX8B
235
ONX1
240
ONX5
245
CPX5
249
DEV3

```
   254          .          .          .          .          .      DEV4

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                                  ****************************************
 *                                      *                                  *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                  *    U.S. ARMY CORPS OF ENGINEERS      *
 *               JUN   1998             *                                  *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                                  *          609 SECOND STREET           *
 *                                      *                                  *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   05APR23  TIME  15:47:47  *                                  *           (916) 756-1104             *
 *                                      *                                  *                                      *
 ****************************************                                  ****************************************
```

PREPARED FOR
CLV POLICE PARK
10-Y & 100-Y, 6 Hour Storm
EXISTING CONDITION
@@@

				TIME	3.17	3.50
HYDROGRAPH AT						
+	C1-E	.01	1	FLOW	13.	24.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ON1D	.00	1	FLOW	4.	8.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ON2D	.00	1	FLOW	4.	7.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ON3D	.00	1	FLOW	1.	3.
				TIME	3.50	3.50
3 COMBINED AT						
+	CPTS	.01	1	FLOW	9.	18.
				TIME	3.50	3.50
2 COMBINED AT						
+	C2	.02	1	FLOW	22.	42.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	TBCC	.00	1	FLOW	1.	2.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ISN	.00	1	FLOW	3.	5.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	FUT-1	.00	1	FLOW	3.	6.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	FUT-2	.01	1	FLOW	6.	12.
				TIME	3.58	3.58
5 COMBINED AT						
+	CP3	.03	1	FLOW	34.	66.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	DEV1	.01	1	FLOW	3.	9.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ONX2A	.00	1	FLOW	2.	5.
				TIME	3.50	3.50
3 COMBINED AT						
+	CPX2A	.04	1	FLOW	40.	81.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ONX2B	.00	1	FLOW	0.	1.
				TIME	3.75	3.50
HYDROGRAPH AT						
+	DEV2	.02	1	FLOW	9.	26.
				TIME	3.50	3.50
3 COMBINED AT						
+	CPX2B	.06	1	FLOW	49.	109.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ONX3	.00	1	FLOW	0.	2.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	ONX4	.00	1	FLOW	0.	0.
				TIME	4.83	3.58
3 COMBINED AT						
+	CP-DI	.07	1	FLOW	49.	111.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ONX6A	.00	1	FLOW	0.	1.
				TIME	3.50	3.50
2 COMBINED AT						
+	CPX6A	.07	1	FLOW	50.	112.
				TIME	3.50	3.50
DIVERSION TO						
+	FSN	.07	1	FLOW	25.	25.
				TIME	3.42	3.25
HYDROGRAPH AT						
+	FSE	.07	1	FLOW	25.	87.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ONX9	.00	1	FLOW	0.	0.
				TIME	4.83	3.50
HYDROGRAPH AT						
+	ONX6B	.00	1	FLOW	0.	0.
				TIME	4.83	3.58
3 COMBINED AT						
+	CPX6B	.07	1	FLOW	25.	88.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ONX2C	.00	1	FLOW	0.	1.
				TIME	3.75	3.58

```
 HYDROGRAPH AT
+                 ONX7          .00     1   FLOW           0.       0.
                                             TIME          4.83     3.58

 HYDROGRAPH AT
+                 RTFSN         .00     1   FLOW          25.      25.
                                             TIME          3.42     3.25

  3 COMBINED AT
+                 CP7           .00     1   FLOW          25.      27.
                                             TIME          3.67     3.58

 HYDROGRAPH AT
+                 ONX8A         .00     1   FLOW           0.       0.
                                             TIME          4.58     3.58

 HYDROGRAPH AT
+                 DEV5          .01     1   FLOW           1.       7.
                                             TIME          3.75     3.58

 DIVERSION TO
+                 FS-N          .01     1   FLOW           1.       5.
                                             TIME          3.75     3.58

 HYDROGRAPH AT
+                 FS-E          .01     1   FLOW           0.       2.
                                             TIME           .00     3.58

 HYDROGRAPH AT
+                 ONX8B         .00     1   FLOW           1.       3.
                                             TIME          3.50     3.50

  3 COMBINED AT
+                 CPX8B         .02     1   FLOW           1.       5.
                                             TIME          3.50     3.58

 HYDROGRAPH AT
+                 ONX1          .00     1   FLOW           0.       1.
                                             TIME          3.50     3.50

 HYDROGRAPH AT
+                 ONX5          .02     1   FLOW           2.      13.
                                             TIME          3.58     3.58

  2 COMBINED AT
+                 CPX5          .02     1   FLOW           2.      14.
                                             TIME          3.58     3.50

 HYDROGRAPH AT
+                 DEV3          .01     1   FLOW           1.       5.
                                             TIME          3.67     3.58

 HYDROGRAPH AT
+                 DEV4          .00     1   FLOW           0.       1.
                                             TIME          4.92     3.58
1
                                        SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                            (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                 INTERPOLATED TO
                                                                              COMPUTATION INTERVAL
           ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                     PEAK                                    PEAK

                                (MIN)     (CFS)      (MIN)     (IN)     (MIN)     (CFS)     (MIN)       (IN)

          FOR PLAN = 1  RATIO=  .00
            RCHEY   MANE         2.75     12.47    211.75      1.46      5.00     11.93    215.00        1.46

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .8003E+00 EXCESS= .0000E+00 OUTFLOW= .8020E+00 BASIN STORAGE= .1505E-02 PERCENT ERROR=   -.4


          FOR PLAN = 1  RATIO=  .00
            RCHEY   MANE         2.93     22.57    210.92      2.78      5.00     21.77    210.00        2.77

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1521E+01 EXCESS= .0000E+00 OUTFLOW= .1525E+01 BASIN STORAGE= .1197E-02 PERCENT ERROR=   -.3



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

INTERIM/ULTIMATE CONDITION

```
1****************************************
****************************************
 *                                      *                                                *
*                                                
```

```
   44          KK  CHEY3*
   45          KM   REFERENCED OFFSITE BASIN
   46          BA  0.0023
   47          LS       0   98.00
   48          UD   0.0500
               *
1                                        HEC-1 INPUT                                                    PAGE  2

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


   49          KK  CHEY*
   50          KM   COMBINE CHEY1, CHEY2, AND CHEY3
   51          KM   REFERENCED FROM CHEYENNE STUDY
   52          HC       3
               *

   53          KK  RCHEY
   54          KM   ROUTE CHEY* TO C1
   55          RD    1000   0.035   0.016       0    TRAP      41       0
               *

   56          KK  OFF1
   57          KM   OFFSITE STREET BASIN
   58          BA  0.0018
   59          LS       0   98.00
   60          UD   0.0500
               *

   61          KK  OFF2
   62          KM   OFFSITE STREET BASIN
   63          BA  0.0007
   64          LS       0   98.00
   65          UD   0.0500
               *

   66          KK  C1*
   67          KM   COMBINE CHEY*, OFF1, AND OFF2
   68          HC       3
               *

   69          KK  C1-E
   70          KM   FLOW SPLIT
   71          KM   END REFERENCE FROM DS5297
   72          KM   FLOW FROM C1 CONVEYED TOWARDS ISAAC NEWTON WAY
   73          DT    C1-N
   74          DI      16    29
   75          DQ       2     4
               *

   76          KK  ON1D
   77          KM   START REFERENCE FROM DS3478
   78          KM   DEVELOPED ONSITE BASIN ON1D
   79          BA  0.0036
   80          LS       0   95.00
   81          UD   0.0670
               *

   82          KK  ON2D
   83          KM   DEVELOPED ONSITE BASIN ON2D
   84          BA  0.0032
   85          LS       0   95.00
   86          UD   0.0780
               *
1                                        HEC-1 INPUT                                                    PAGE  3

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


   87          KK  ON3D
   88          KM   END REFERENCE FROM DS3478
   89          KM   DEVELOPED ONSITE BASIN ON3D
   90          BA  0.0012
   91          LS       0   95.00
   92          UD   0.0770
               *

   93          KK  CPTS
   94          KM   TOTAL RUNOFF FROM TIARA SUMMIT
   95          KM   COMBINE ON1D, ON2D, AND ON3D
   96          HC       3
               *

   97          KK  C2
   98          KM   TOTAL RUNOFF IN ISAAC NEWTON TO THE EAST OF
   99          KM   ENTRANCE TO TIARA SUMMIT
  100          KM   COMBINE C1-E AND CPTS
  101          HC       2
               *

  102          KK  TBCC
  103          KM   AREA FROM THE BOULDERS CONDOMIUM CONVERSION
  104          KM   DEVELOPED OFFSITE BASIN TBCC
  105          BA  0.0007
```

```
 106          LS       0   95.00
 107          UD   0.0770
              *

 108          KK  ISNW
 109          KM   ISAAC NEWTON WAY
 110          KM   FROM TIARA SUMMIT ENTRANCE TO METRO ACADEMY WAY
 111          BA  0.0022
 112          LS       0   94.00
 113          UD   0.053
              *

 114          KK  FUT-1
 115          KM   START REFERENCE FROM DS2555
 116          BA  0.0031
 117          LS       0   95.00
 118          UD   0.1300
              *

 119          KK  FUT-2
 120          KM   END REFERENCE FROM DS2555
 121          BA  0.0063
 122          LS       0   95.00
 123          UD   0.1230
              *
1                                    HEC-1 INPUT                                          PAGE  4

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


 124          KK  CP3
 125          KM   TOTAL RUNOFF IN ISAAC NEWTON WAY
 126          KM   AT THE INTERSECTION WITH METRO ACADEMY WAY
 127          KM   COMBINE C2, TBCC, ISN, FUT-1 AND FUT-2
 128          HC       5
              *

 129          KK  DEV1
 130          KM   SHILOH CHRISTIAN SCHOOL BASIN
 131          BA  0.0063
 132          LS       0   84.65
 133          UD   0.093
              *

 134          KK  ONX1
 135          KM   ONSITE EXISTING BASIN 1
 136          BA  0.0009
 137          LS       0   83.00
 138          UD   0.077
              *

 139          KK  OND2A
 140          KM   ONSITE DEVELOPED BASIN 2A
 141          BA  0.0027
 142          LS       0   91.25
 143          UD   0.052
              *

 144          KK  CPD2A
 145          KM   TOTAL RUNOFF AT NORTH CORNER OF BASIN OND2A
 146          KM   COMBINE CP3, DEV1, OND2A AND ONX1
 147          HC       4
              *

 148          KK  ONX2B
 149          KM   ONSITE EXISTING BASIN 2B
 150          BA  0.0029
 151          LS       0   65.50
 152          UD   0.075
              *

 153          KK  DEV2
 154          KM   SHILOH CHRISTIAN SCHOOL BASIN
 155          BA  0.0186
 156          LS       0   83.90
 157          UD   0.094
              *

 158          KK  CPD2B
 159          KM   COMBINE CP4A, DEV2, AND ONX2B
 160          HC       3
              *
1                                    HEC-1 INPUT                                          PAGE  5

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


 161          KK  ONX3
 162          KM   ONSITE EXISTING BASIN 3
 163          BA  0.0036
 164          LS       0   69.80
 165          UD   0.115
              *

 166          KK  OND4
```

```
 167          KM   ONSITE DEVELOPED BASIN 4
 168          BA  0.0017
 169          LS       0   61.00
 170          UD   0.096
              *

 171          KK  CP-DI
 172          KM   TOTAL RUNOFF OVER THE EXISTING BEEHIVE INLET
 173          HC       3
              *

 174          KK  OND6A
 175          KM   ONSITE DEVELOPED BASIN 6A
 176          BA  0.0013
 177          LS       0   73.60
 178          UD   0.064
              *

 179          KK  OND6B
 180          KM   ONSITE DEVELOPED BASIN 6B
 181          BA  0.0016
 182          LS       0   61.00
 183          UD   0.082
              *

 184          KK  OND7
 185          KM   ONSITE DEVELOPED BASIN 7
 186          BA  0.0010
 187          LS       0   61.00
 188          UD   0.077
              *

 189          KK  CPD6B
 190          KM   TOTAL RUNOFF
 191          HC       3
              *

 192          KK  OND2C
 193          KM   ONSITE DEVELOPED BASIN 2C
 194          BA  0.0026
 195          LS       0   65.50
 196          UD   0.096
              *
```



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

 197          KK  ONX8A
 198          KM   ONSITE EXISTING BASIN 8A
 199          BA  0.0003
 200          LS       0   61.00
 201          UD   0.106
              *

 202          KK  DEV5
 203          KM   SHILOH CHRISTIAN SCHOOL BASIN
 204          BA  0.0141
 205          LS       0   69.10
 206          UD   0.167
              *

 207          KK  FS-E
 208          KM   FLOW-SPLIT FROM DEV5
 209          DT  FS-N
 210          DI       0      01      07
 211          DQ       0      01      05
              *

 212          KK  OND8B
 213          KM   ONSITE DEVELOPED BASIN 8B
 214          BA  0.0022
 215          LS       0   88.00
 216          UD   0.079
              *

 217          KK  CPD8B
 218          KM   COMBINE ONX8A, FS-E AND ONX8B
 219          HC       3
              *

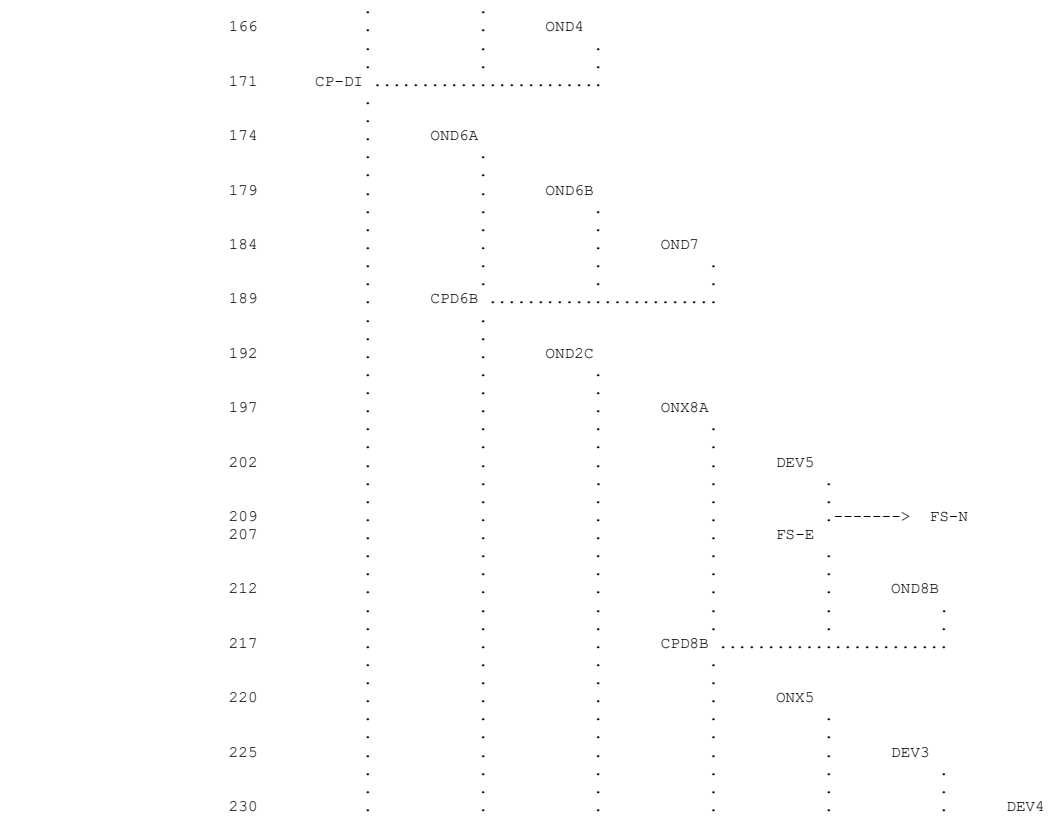
 220          KK  ONX5
 221          KM   ONSITE EXISTING BASIN 5
 222          BA  0.0195
 223          LS       0   69.80
 224          UD   0.092
              *

 225          KK  DEV3
 226          KM   SHILOH CHRISTIAN SCHOOL BASIN
 227          BA  0.0061
 228          LS       0   74.50
 229          UD   0.159
              *
```

```
           230           KK  DEV4
           231           KM   SHILOH CHRISTIAN SCHOOL BASIN
           232           BA  0.0026
           233           LS       0   61.00
           234           UD   0.131
                         *
           235           ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    24      CHEY1*
                .
                .
    39          .      CHEY2*
                .           .
                .           .
    44          .           .      CHEY3*
                .           .           .
                .           .           .
    49      CHEY* .......................
                V
                V
    53      RCHEY
                .
                .
    56          .      OFF1
                .           .
                .           .
    61          .           .      OFF2
                .           .           .
                .           .           .
    66      C1*   .......................
                .
                .
    73          .-------->    C1-N
    69      C1-E
                .
                .
    76          .      ON1D
                .           .
                .           .
    82          .           .      ON2D
                .           .           .
                .           .           .
    87          .           .           .      ON3D
                .           .           .           .
                .           .           .           .
    93          .      CPTS  .......................
                .           .
                .           .
    97      C2    ............
                .
                .
   102          .      TBCC
                .           .
                .           .
   108          .           .      ISNW
                .           .           .
                .           .           .
   114          .           .           .      FUT-1
                .           .           .           .
                .           .           .           .
   119          .           .           .           .      FUT-2
                .           .           .           .           .
                .           .           .           .           .
   124      CP3   ..............................................
                .
                .
   129          .      DEV1
                .           .
                .           .
   134          .           .      ONX1
                .           .           .
                .           .           .
   139          .           .           .      OND2A
                .           .           .           .
                .           .           .           .
   144      CPD2A .......................................
                .
                .
   148          .      ONX2B
                .           .
                .           .
   153          .           .      DEV2
                .           .           .
                .           .           .
   158      CPD2B .......................
                .
                .
   161          .      ONX3
                .           .
```



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1**********

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* *

*

* FLOOD HYDROGRAPH PACKAGE (HEC-1) * * U.S. ARMY CORPS OF ENGINEERS

*

* JUN 1998 * * HYDROLOGIC ENGINEERING CENTER

*

* VERSION 4.1 * * 609 SECOND STREET

*

* * * DAVIS, CALIFORNIA 95616

*

* RUN DATE 25APR23 TIME 08:08:07 * * (916) 756-1104

*

* * *

*

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PREPARED FOR
CLV POLICE PARK
10-Y & 100-Y, 6 Hour Storm
INTERIM/ULTIMATE CONDITION
@@@

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

                    COMPUTATION INTERVAL     .08 HOURS
                         TOTAL TIME BASE   24.92 HOURS

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

      JP          MULTI-PLAN OPTION
                       NPLAN           1  NUMBER OF PLANS

      JR          MULTI-RATIO OPTION
                      RATIOS OF PRECIPITATION
                      .56      1.00
1

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


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

 HYDROGRAPH AT
+                CHEY1*       .01     1   FLOW                    6.      12.
                                          TIME                 3.50     3.50

 HYDROGRAPH AT
+                CHEY2*       .00     1   FLOW                    4.       7.
                                          TIME                 3.50     3.50

 HYDROGRAPH AT
+                CHEY3*       .00     1   FLOW                    3.       6.
                                          TIME                 3.50     3.50

  3 COMBINED AT
+                CHEY*        .01     1   FLOW                   13.      24.
                                          TIME                 3.50     3.50

 ROUTED TO
+                RCHEY        .01     1   FLOW                   12.      22.
                                          TIME                 3.58     3.50

 HYDROGRAPH AT
+                OFF1         .00     1   FLOW                    2.       5.
                                          TIME                 3.50     3.50

 HYDROGRAPH AT
+                OFF2         .00     1   FLOW                    1.       2.
                                          TIME                 3.50     3.50

  3 COMBINED AT
+                C1*          .01     1   FLOW                   15.      28.
                                          TIME                 3.50     3.50

 DIVERSION TO
+                  C1-N       .01     1   FLOW                    2.       4.
                                          TIME                 3.17     3.50

 HYDROGRAPH AT
+                C1-E         .01     1   FLOW                   13.      24.
                                          TIME                 3.50     3.50

 HYDROGRAPH AT
+                ON1D         .00     1   FLOW                    4.       8.
                                          TIME                 3.50     3.50

 HYDROGRAPH AT
+                ON2D         .00     1   FLOW                    4.       7.
                                          TIME                 3.50     3.50

 HYDROGRAPH AT
+                ON3D         .00     1   FLOW                    1.       3.
                                          TIME                 3.50     3.50

  3 COMBINED AT
+                CPTS         .01     1   FLOW                    9.      18.
                                          TIME                 3.50     3.50

  2 COMBINED AT
```

+	C2	.02	1	FLOW	22.	42.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	TBCC	.00	1	FLOW	1.	2.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ISNW	.00	1	FLOW	3.	5.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	FUT-1	.00	1	FLOW	3.	6.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	FUT-2	.01	1	FLOW	6.	12.
				TIME	3.58	3.58
5 COMBINED AT						
+	CP3	.03	1	FLOW	34.	66.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	DEV1	.01	1	FLOW	3.	9.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ONX1	.00	1	FLOW	0.	1.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	OND2A	.00	1	FLOW	3.	6.
				TIME	3.50	3.50
4 COMBINED AT						
+	CPD2A	.04	1	FLOW	41.	83.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ONX2B	.00	1	FLOW	0.	1.
				TIME	3.75	3.50
HYDROGRAPH AT						
+	DEV2	.02	1	FLOW	9.	26.
				TIME	3.50	3.50
3 COMBINED AT						
+	CPD2B	.06	1	FLOW	50.	111.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ONX3	.00	1	FLOW	0.	2.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	OND4	.00	1	FLOW	0.	1.
				TIME	4.83	3.58
3 COMBINED AT						
+	CP-DI	.07	1	FLOW	50.	113.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	OND6A	.00	1	FLOW	0.	1.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	OND6B	.00	1	FLOW	0.	0.
				TIME	4.83	3.58
HYDROGRAPH AT						
+	OND7	.00	1	FLOW	0.	0.
				TIME	4.83	3.58
3 COMBINED AT						
+	CPD6B	.00	1	FLOW	0.	2.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	OND2C	.00	1	FLOW	0.	1.
				TIME	3.75	3.58
HYDROGRAPH AT						
+	ONX8A	.00	1	FLOW	0.	0.
				TIME	4.58	3.58
HYDROGRAPH AT						
+	DEV5	.01	1	FLOW	1.	7.
				TIME	3.75	3.58
DIVERSION TO						
+	FS-N	.01	1	FLOW	1.	5.
				TIME	3.75	3.58

```
 HYDROGRAPH AT
+                FS-E         .01     1   FLOW           0.       2.
                                          TIME          .00     3.58

 HYDROGRAPH AT
+                OND8B        .00     1   FLOW           2.       4.
                                          TIME         3.50     3.50

  3 COMBINED AT
+                CPD8B        .02     1   FLOW           2.       5.
                                          TIME         3.50     3.58

 HYDROGRAPH AT
+                ONX5         .02     1   FLOW           2.      13.
                                          TIME         3.58     3.58

 HYDROGRAPH AT
+                DEV3         .01     1   FLOW           1.       5.
                                          TIME         3.67     3.58

 HYDROGRAPH AT
+                DEV4         .00     1   FLOW           0.       1.
                                          TIME         4.92     3.58
1
                                     SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                         (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                 INTERPOLATED TO
                                                                               COMPUTATION INTERVAL
           ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                     PEAK                                    PEAK

                                (MIN)      (CFS)      (MIN)      (IN)     (MIN)      (CFS)     (MIN)       (IN)

          FOR PLAN = 1  RATIO=  .00
            RCHEY   MANE         2.75     12.47    211.75      1.46      5.00     11.93    215.00        1.46


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .8003E+00 EXCESS= .0000E+00 OUTFLOW= .8020E+00 BASIN STORAGE= .1505E-02 PERCENT ERROR=   -
.4


          FOR PLAN = 1  RATIO=  .00
            RCHEY   MANE         2.93     22.57    210.92      2.78      5.00     21.77    210.00        2.77


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1521E+01 EXCESS= .0000E+00 OUTFLOW= .1525E+01 BASIN STORAGE= .1197E-02 PERCENT ERROR=   -
.3




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

HYDRAULIC CALCULATIONS

Interior Section Flow Calculations (Existing Condition)

Worksheet for Irregular Section - X1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.50	%
Discharge	111.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2663.00
0+43.00	2662.00
0+66.00	2661.00
0+69.00	2661.00
0+81.00	2662.00
0+95.00	2663.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2663.00)	(0+95.00, 2663.00)	0.022

Options

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

Results

Normal Depth		1.26	ft
Elevation Range	2661.00 to 2663.00 ft		
Flow Area		32.30	ft²
Wetted Perimeter		52.89	ft
Hydraulic Radius		0.61	ft
Top Width		52.81	ft
Normal Depth		1.26	ft

Worksheet for Irregular Section - X1

Results

Critical Depth		1.13	ft
Critical Slope		0.00852	ft/ft
Velocity		3.44	ft/s
Velocity Head		0.18	ft
Specific Energy		1.44	ft
Froude Number		0.77	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.26	ft
Critical Depth	1.13	ft
Channel Slope	0.50	%
Critical Slope	0.00852	ft/ft

Cross Section for Irregular Section - X1

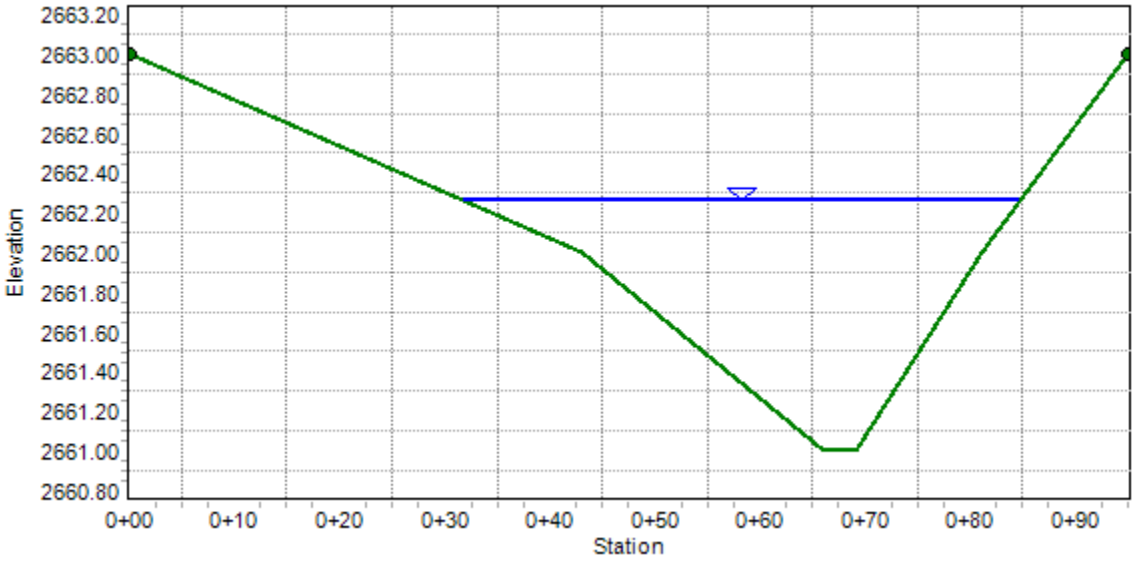
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.50	%
Normal Depth	1.26	ft
Discharge	111.00	ft³/s

Cross Section Image



Worksheet for Irregular Section - X2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00	%
Discharge	111.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2662.00
0+47.00	2661.45
0+55.00	2661.27
0+70.00	2661.45
0+83.00	2662.00
1+21.00	2662.46

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2662.00)	(1+21.00, 2662.46)	0.022

Options

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

Results

Normal Depth	0.73	ft
Elevation Range	2661.27 to 2662.46 ft	
Flow Area	31.46	ft²
Wetted Perimeter	83.26	ft
Hydraulic Radius	0.38	ft
Top Width	83.24	ft
Normal Depth	0.73	ft

Worksheet for Irregular Section - X2

Results

Critical Depth		0.74	ft
Critical Slope		0.00974	ft/ft
Velocity		3.53	ft/s
Velocity Head		0.19	ft
Specific Energy		0.93	ft
Froude Number		1.01	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth		0.00	ft
Length		0.00	ft
Number Of Steps		0	

GVF Output Data

Upstream Depth		0.00	ft
Profile Description			
Profile Headloss		0.00	ft
Downstream Velocity		Infinity	ft/s
Upstream Velocity		Infinity	ft/s
Normal Depth		0.73	ft
Critical Depth		0.74	ft
Channel Slope		1.00	%
Critical Slope		0.00974	ft/ft

Cross Section for Irregular Section - X2

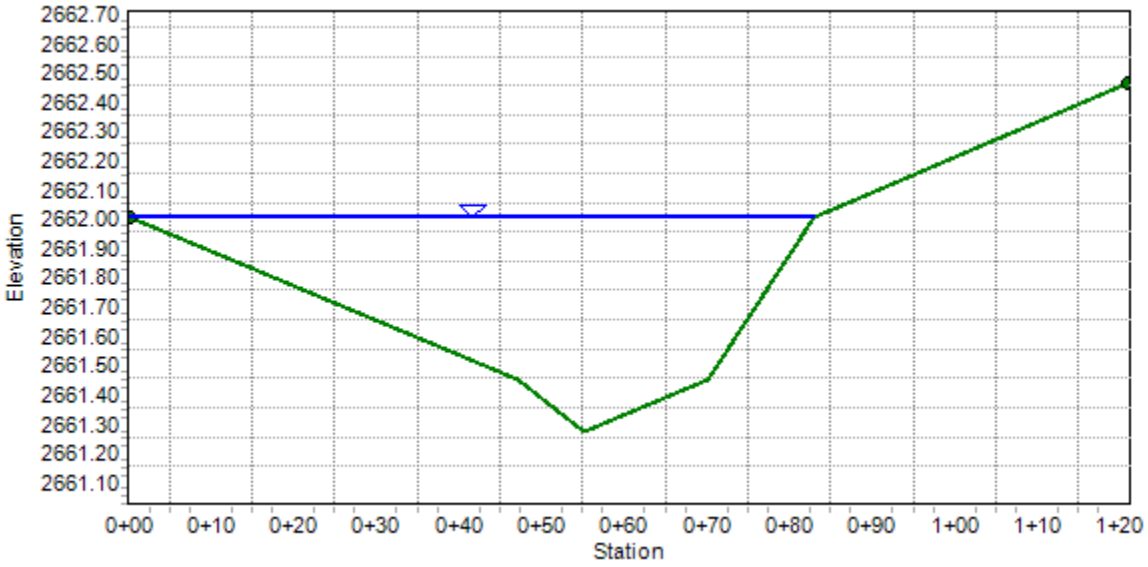
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00	%
Normal Depth	0.73	ft
Discharge	111.00	ft³/s

Cross Section Image



Worksheet for Irregular Section - X3

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.90	%
Discharge	112.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2660.83
0+05.50	2660.67
0+18.83	2660.47
0+21.10	2660.47
0+30.66	2660.49
0+36.59	2660.46
0+45.59	2660.37
0+45.59	2660.37

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2660.83)	(0+45.59, 2660.37)	0.022

Options

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

Results

Normal Depth	0.72	ft
Elevation Range	2660.37 to 2660.83 ft	
Flow Area	25.86	ft²
Wetted Perimeter	46.58	ft
Hydraulic Radius	0.56	ft

Worksheet for Irregular Section - X3

Results

Top Width		45.59	ft
Normal Depth		0.72	ft
Critical Depth		0.73	ft
Critical Slope		0.00874	ft/ft
Velocity		4.33	ft/s
Velocity Head		0.29	ft
Specific Energy		1.01	ft
Froude Number		1.01	
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	0.72	ft
Critical Depth	0.73	ft
Channel Slope	0.90	%
Critical Slope	0.00874	ft/ft

Cross Section for Irregular Section - X3

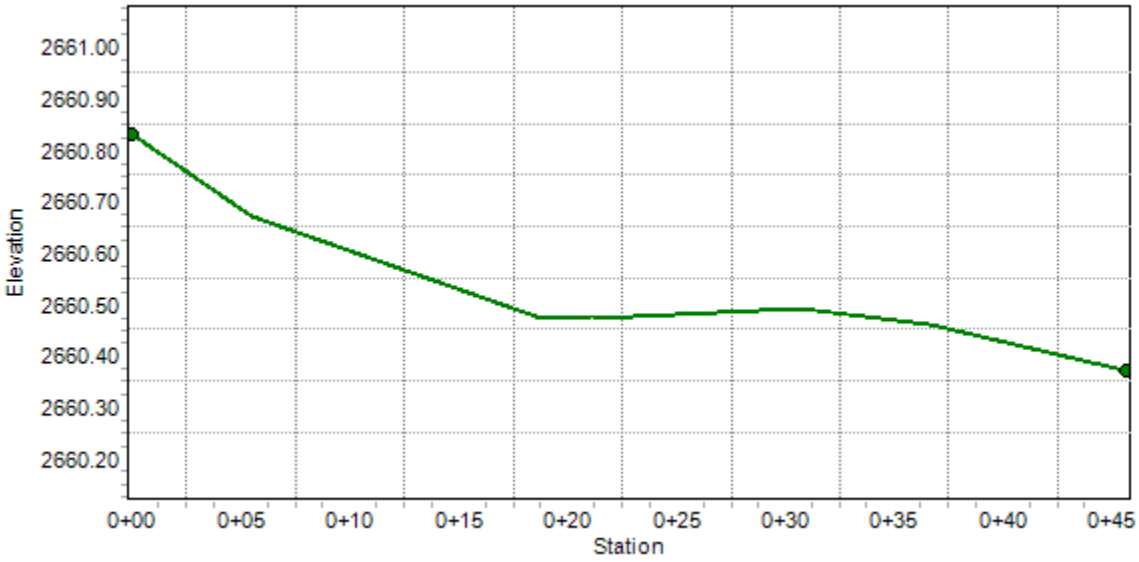
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.90	%
Normal Depth	0.72	ft
Discharge	112.00	ft³/s

Cross Section Image



HYDRAULIC CALCULATIONS

Interior Section Flow Calculations (Interim/Ultimate Condition)

Worksheet for Section SPL - South Parking lot - 100 Yr

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.77	%
Discharge	83.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2.76
0+00.50	2.75
0+00.50	2.26
0+78.50	0.08
0+80.00	0.00
0+81.50	0.08
1+20.50	0.47
1+20.50	0.97
1+21.00	0.97

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2.76)	(0+00.50, 2.26)	0.013
(0+00.50, 2.26)	(0+78.50, 0.08)	0.016
(0+78.50, 0.08)	(0+81.50, 0.08)	0.013
(0+81.50, 0.08)	(1+20.50, 0.47)	0.016
(1+20.50, 0.47)	(1+21.00, 0.97)	0.013

Options

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

Worksheet for Section SPL - South Parking lot - 100 Yr

Results

Normal Depth		0.54	ft
Elevation Range	0.00 to 2.76 ft		
Flow Area		15.90	ft²
Wetted Perimeter		58.72	ft
Hydraulic Radius		0.27	ft
Top Width		58.63	ft
Normal Depth		0.54	ft
Critical Depth		0.68	ft
Critical Slope		0.00510	ft/ft
Velocity		5.22	ft/s
Velocity Head		0.42	ft
Specific Energy		0.97	ft
Froude Number		1.77	
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	0.54	ft
Critical Depth	0.68	ft
Channel Slope	1.77	%
Critical Slope	0.00510	ft/ft

Cross Section for Section SPL - South Parking lot - 100 Yr

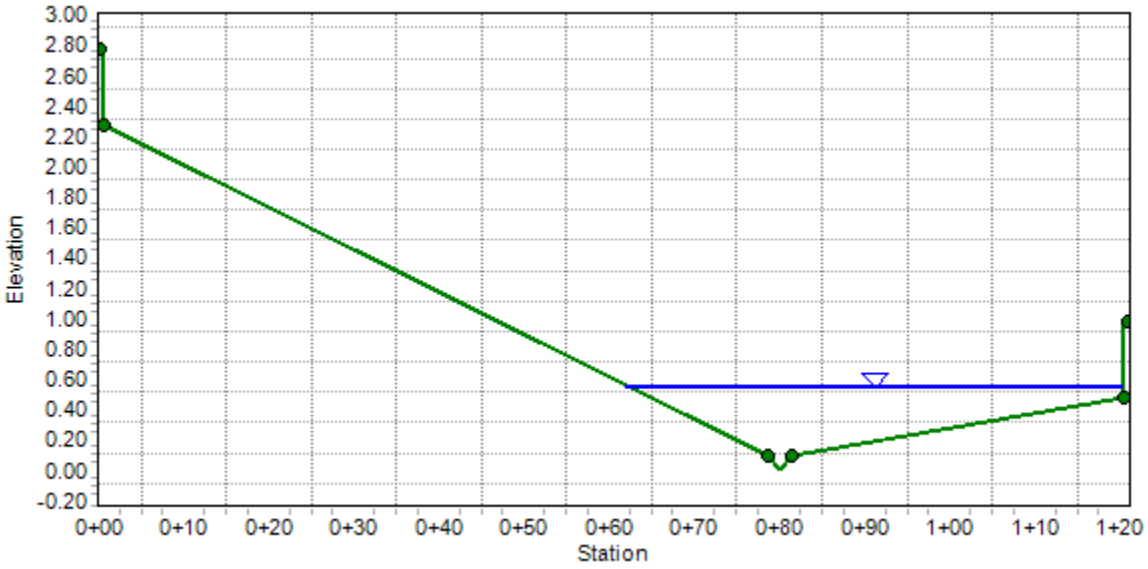
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.77	%
Normal Depth	0.54	ft
Discharge	83.00	ft³/s

Cross Section Image



Sw1

Worksheet for Section Sw - Swale - 100 yr

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00	%
Discharge	1.00	ft³/s

Even though 100-yr runoff from basin OND6B is less than 1 cfs, we are conservatively using 1 cfs.

Section Definitions

Station (ft)	Elevation (ft)
0+05.00	0.50
0+06.50	0.00
0+08.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+05.00, 0.50)	(0+08.00, 0.50)	0.022

Options

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

Results

Normal Depth	0.39	ft
Elevation Range	0.00 to 0.50 ft	
Flow Area	0.46	ft²
Wetted Perimeter	2.47	ft
Hydraulic Radius	0.18	ft
Top Width	2.34	ft
Normal Depth	0.39	ft
Critical Depth	0.37	ft
Critical Slope	0.01328	ft/ft
Velocity	2.19	ft/s

non-erosive

Worksheet for Section Sw - Swale - 100 yr

Results

Velocity Head		0.07	ft
Specific Energy		0.46	ft
Froude Number		0.87	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.39	ft
Critical Depth	0.37	ft
Channel Slope	1.00	%
Critical Slope	0.01328	ft/ft

Cross Section for Section Sw - Swale - 100 yr

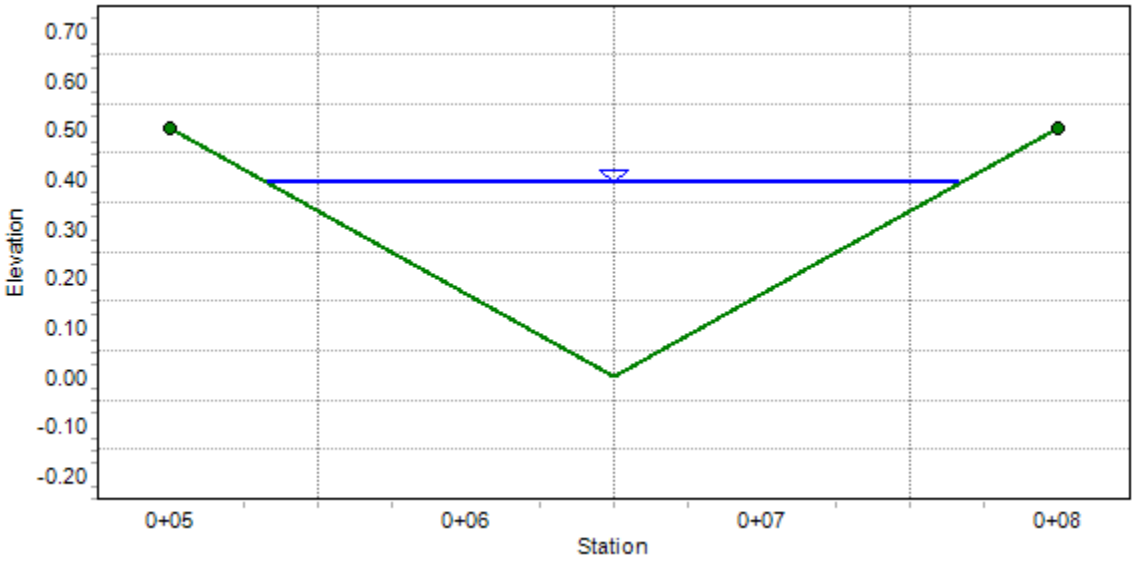
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00	%
Normal Depth	0.39	ft
Discharge	1.00	ft³/s

Cross Section Image



Worksheet for Section Sw - Swale - 100 yr

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00	%
Discharge	2.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+05.00	0.50
0+06.50	0.00
0+08.00	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+05.00, 0.50)	(0+08.00, 0.50)	0.022

Options

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

Results

Normal Depth	0.50	ft
Elevation Range	0.00 to 0.50 ft	
Flow Area	0.76	ft²
Wetted Perimeter	3.17	ft
Hydraulic Radius	0.24	ft
Top Width	3.00	ft
Normal Depth	0.50	ft
Critical Depth	0.49	ft
Critical Slope	0.01211	ft/ft
Velocity	2.62	ft/s



Worksheet for Section Sw - Swale - 100 yr

Results

Velocity Head		0.11	ft
Specific Energy		0.61	ft
Froude Number		0.91	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.49	ft
Channel Slope	1.00	%
Critical Slope	0.01211	ft/ft

Cross Section for Section Sw - Swale - 100 yr

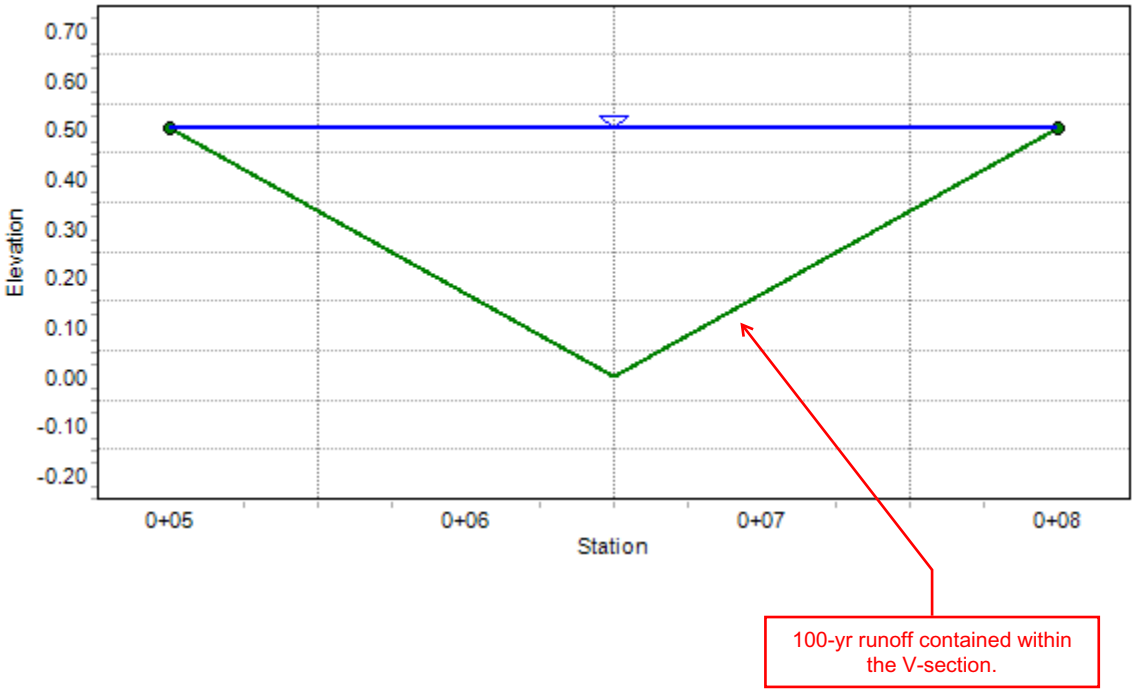
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	1.00	%
Normal Depth	0.50	ft
Discharge	2.00	ft³/s

Cross Section Image



HYDRAULIC CALCULATIONS

Drop-Inlet Calculaitons



Project Name:	CSD Police Park	
By:	Actus	
Date:	4/25/2023	
Notes:		
Facility ID:	**PROP. DI**	
Drainage Condition	**ULTIMATE**	
Source of Flow	**CP-DI**	
Design Flow (cfs)	**113 / 3 = 37.7 cfs**	
Inlet Type:	**Area Grate**	

Grate:	**Variable:**	**Input:**
Length of Opening	L	4.00 ft
Orifice Coefficient	C	0.65
Clogging factor	K	50.00 %

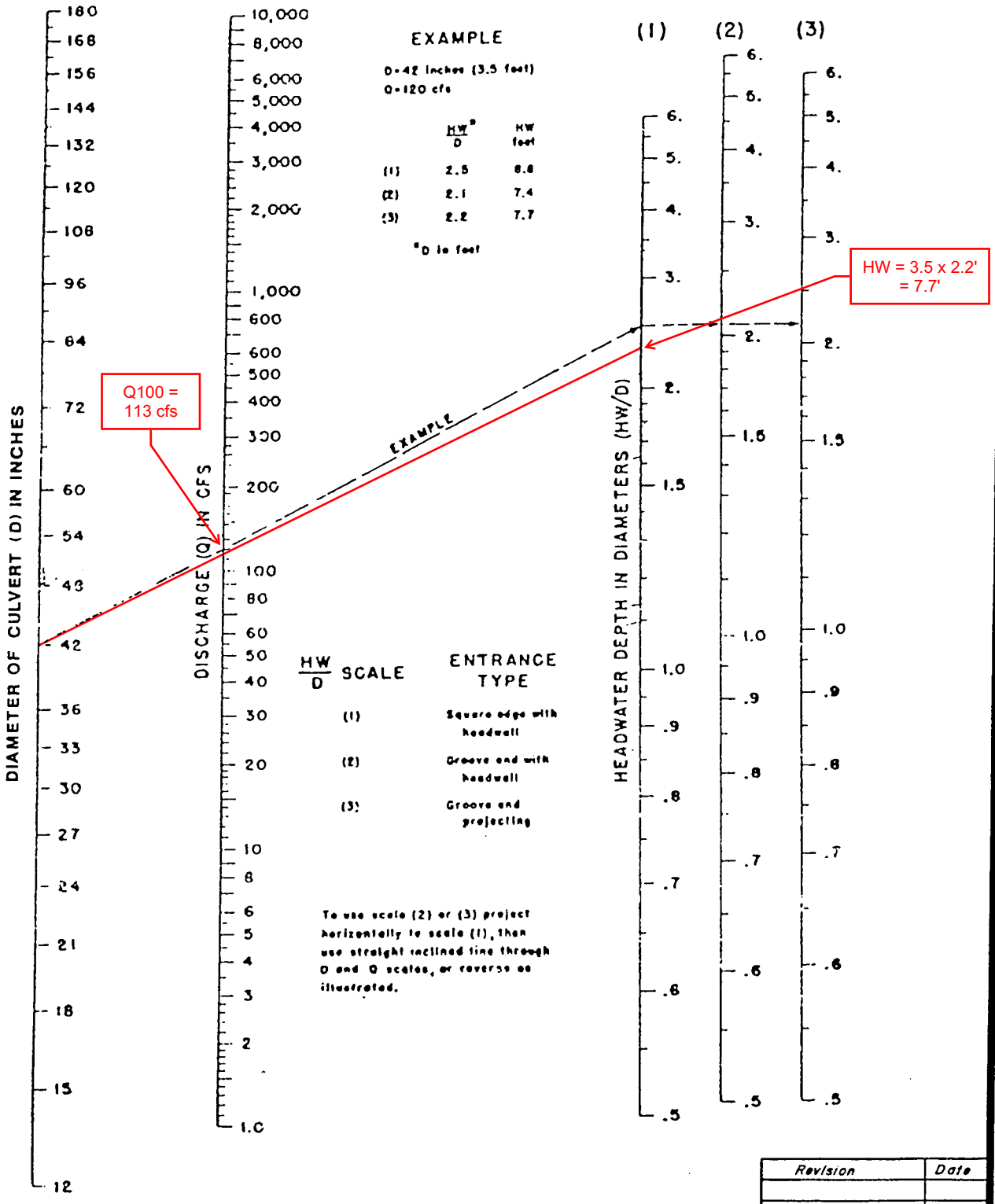
Effective Area of Grate: **A** = $0.73(L)^2$ =	11.68 sq. ft	Orifice Equation: **Q** = $KCA(2gh)^{0.5}$

Head Above Grate (h) (ft)	**Flow into Grate (Q) (cfs)**	**Head Above Grate (h) (ft)**	**Flow into Grate (Q) (cfs)**
0.1	9.6	0.2	13.6
0.3	16.7	0.4	19.3
0.5	21.5	0.6	23.6
0.7	25.5	0.8	27.2
0.9	28.9	1.0	30.5
1.1	31.9	1.2	33.4
1.3	34.7	1.4	36.0
1.5	37.3	1.6	38.5
1.7	39.7	1.8	40.9
1.9	42.0	2.0	43.1
2.1	44.1	2.2	45.2
2.3	46.2	2.4	47.2
2.5	48.2	2.6	49.1
2.7	50.1	2.8	51.0

therefore, ponding depth needed above DI (considering 50% clogging) = 1.6'

NOMOGRAPH – INLET CONTROL RCP

OPTION 1



Revision	Date

WRC ENGINEERING

REFERENCE: USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

INPUT (.WSW FILE)

```
T1 CSD - POLICE MEMORIAL PARK                                  0
T2 By ACTUS ENGINEERING
T3 SD DESIGN - OPTION 1
SO   1000.0002634.000  1                          2643.920
WX   1000.0002634.000  1      .200
R    1000.0002634.000  2      .013                                  .000    .000 0
R    1235.0002643.640  2      .013                                  .000    .000 1
JX   1237.0002643.740  2  4   .013    01.00         2649.10         -90.0   .000  .000
R    1239.0002643.840  2      .013                                  .000  15.000 0
R    1240.0002643.850  2      .013                                  .000  11.000 0
R    1278.0002644.040  2      .013                                  .000  00.000 0
JX   1280.7102644.140  2  4   .013    04.00         2649.10         -45.0   .000  .000
R    1282.0002644.240  2      .013                                  .000  00.000 0
R    1362.5002644.690  2      .013                                  .000 -15.000 0
R    1363.5002644.700  2      .013                                  .000 -15.000 0
R    1364.5002644.710  2      .013                                  .000 -15.000 0
JX   1365.5002645.280  2  2   .013    01.00         2653.85         -90.0   .000  .000
R    1366.5002645.820  3      .013                                  .000 -15.000 0
R    1367.5002645.830  3      .013                                  .000 -15.000 0
R    1368.5002645.840  3      .013                                  .000 -15.000 0
R    1369.5002645.850  3      .013                                  .000 -15.000 0
R    1490.2002646.380  3      .013                                  .000  15.000 1
R    1492.2002646.480  3      .013                                  .000  15.000 0
R    1494.2002646.580  3      .013                                  .000  09.000 0
R    1749.2002649.960  3      .013                                  .000  00.000 0
JX   1751.2002650.060  3  4   .013    01.00         2652.60         -90.0   .000  .000
R    1752.2002650.160  3      .013                                  .000  00.000 0
R    1939.2002653.810  3      .013                                  .000  15.000 1
R    1941.2002653.910  3      .013                                  .000  15.000 0
R    1943.2002654.010  3      .013                                  .000  15.000 0
R    1944.2002654.020  3      .013                                  .000  15.000 0
R    1945.2002654.030  3      .013                                  .000  15.000 0
R    2066.6002655.270  3      .013                                  .000  00.000 0
WE   2066.6002655.270  3      .200
SH   2066.6002655.270  3                          2662.970
CD   1  4   1    .000   5.000    4.000  .000  .000   .00
CD   2  4   1    .000   4.000     .000  .000  .000   .00
CD   3  4   1    .000   3.500     .000  .000  .000   .00
```

```
CD    4  4    1     .000    1.500      .000  .000  .000    .00
Q             113.000    .0
```

OUTPUT (.OUT FILE)

```
FILE: Option1.WSW                          W S P G W - CIVILDESIGN Version 14.08                                    PAGE    1
                                  Program Package Serial Number: 7156
                                                WATER SURFACE PROFILE LISTING                  Date: 4-26-2023  Time: 4:45:52
                                CSD - POLICE MEMORIAL PARK                          0
                                  By ACTUS ENGINEERING
                                    SD DESIGN - OPTION 1
 ********************************************************************************************************************** ********
         | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
  Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
  L/Elem  |Ch Slope |        |         |         |         SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
 *********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|***** |*******
         |         |        |         |         |                 |         |       |        |        |       |       |      |
 1000.000  2634.000    9.920  2643.920    120.00    6.11     .58  2644.50     .00    3.13      .00    5.000     .000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
  WALL  EXIT
         |         |        |         |         |                 |         |       |        |        |       |       |      |
 1000.000  2634.000    9.920  2643.920    120.00    9.55    1.42  2645.34     .00    3.30      .00    4.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
   143.641    .0410                                    .0070     1.00     9.92     .00    1.79     .013      .00   .00  PIPE
         |         |        |         |         |                 |         |       |        |        |       |       |      |
 1143.641  2639.892    5.072  2644.964    120.00    9.55    1.42  2646.38     .00    3.30      .00    4.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
 HYDRAULIC JUMP
         |         |        |         |         |                 |         |       |        |        |       |       |      |
 1143.641  2639.892    2.060  2641.952    120.00   18.40    5.25  2647.21     .00    3.30     4.00    4.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
    12.230    .0410                                    .0245      .30     2.06     2.54    1.79     .013      .00   .00  PIPE
         |         |        |         |         |                 |         |       |        |        |       |       |      |
 1155.872  2640.394    2.098  2642.492    120.00   17.98    5.02  2647.51     .00    3.30     4.00    4.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
    20.076    .0410                                    .0224      .45     2.10     2.45    1.79     .013      .00   .00  PIPE
         |         |        |         |         |                 |         |       |        |        |       |       |      |
 1175.948  2641.218    2.180  2643.397    120.00   17.14    4.56  2647.96     .00    3.30     3.98    4.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
    15.441    .0410                                    .0197      .30     2.18     2.28    1.79     .013      .00   .00  PIPE
         |         |        |         |         |                 |         |       |        |        |       |       |      |
 1191.389  2641.851    2.266  2644.117    120.00   16.34    4.15  2648.26     .00    3.30     3.96    4.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
    12.137    .0410                                    .0174      .21     2.27     2.12    1.79     .013      .00   .00  PIPE
         |         |        |         |         |                 |         |       |        |        |       |       |      |
 1203.526  2642.349    2.356  2644.705    120.00   15.58    3.77  2648.48     .00    3.30     3.94    4.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
     9.636    .0410                                    .0154      .15     2.36     1.96    1.79     .013      .00   .00  PIPE
         |         |        |         |         |                 |         |       |        |        |       |       |      |
 1213.162  2642.744    2.452  2645.197    120.00   14.86    3.43  2648.62     .00    3.30     3.90    4.000     .000   .00   1   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
     7.662    .0410                                    .0137      .10     2.45     1.82    1.79     .013      .00   .00  PIPE
```

Program Package Serial Number: 7156

WATER SURFACE PROFILE LISTING Date: 4-26-2023 Time: 4:45:52

CSD - POLICE MEMORIAL PARK 0

By ACTUS ENGINEERING

SD DESIGN - OPTION 1

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1220.824	2643.058	2.554	2645.613	120.00	14.16	3.12	2648.73	.00	3.30	3.84	4.000	.000	.00	1 .0
6.046	.0410					.0121	.07	2.55	1.68	1.79	.013	.00	.00	PIPE
1226.870	2643.306	2.663	2645.969	120.00	13.51	2.83	2648.80	.00	3.30	3.77	4.000	.000	.00	1 .0
4.672	.0410					.0108	.05	2.66	1.55	1.79	.013	.00	.00	PIPE
1231.542	2643.498	2.779	2646.277	120.00	12.88	2.57	2648.85	.00	3.30	3.68	4.000	.000	.00	1 .0
3.458	.0410					.0096	.03	2.78	1.43	1.79	.013	.00	.00	PIPE
1235.000	2643.640	2.904	2646.544	120.00	12.28	2.34	2648.89	.00	3.30	3.57	4.000	.000	.00	1 .0
JUNCT STR	.0500					.0090	.02	2.90	1.31		.013	.00	.00	PIPE
1237.000	2643.740	2.911	2646.651	119.00	12.15	2.29	2648.94	.00	3.29	3.56	4.000	.000	.00	1 .0
.497	.0500					.0087	.00	2.91	1.29	1.69	.013	.00	.00	PIPE
1237.497	2643.765	2.944	2646.709	119.00	12.00	2.24	2648.95	.00	3.29	3.53	4.000	.000	.00	1 .0
1.503	.0500					.0082	.01	2.94	1.26	1.69	.013	.00	.00	PIPE
1239.000	2643.840	3.084	2646.925	119.00	11.44	2.03	2648.96	.00	3.29	3.36	4.000	.000	.00	1 .0
1.000	.0100					.0077	.01	3.08	1.15	2.78	.013	.00	.00	PIPE
1240.000	2643.850	3.092	2646.942	119.00	11.42	2.02	2648.97	.00	3.29	3.35	4.000	.000	.00	1 .0
15.527	.0050					.0081	.13	3.09	1.14	4.00	.013	.00	.00	PIPE
1255.527	2643.928	2.975	2646.903	119.00	11.87	2.19	2649.09	.00	3.29	3.49	4.000	.000	.00	1 .0
22.473	.0050					.0089	.20	2.98	1.23	4.00	.013	.00	.00	PIPE

Program Package Serial Number: 7156

WATER SURFACE PROFILE LISTING Date: 4-26-2023 Time: 4:45:52

CSD - POLICE MEMORIAL PARK 0

By ACTUS ENGINEERING

SD DESIGN - OPTION 1

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1278.000	2644.040	2.844	2646.885	119.00	12.45	2.41	2649.29	.00	3.29	3.63	4.000	.000	.00	1 .0
JUNCT STR	.0368					.0103	.03	2.84	1.35		.013	.00	.00	PIPE
1280.710	2644.140	2.593	2646.733	115.00	13.34	2.76	2649.50	.00	3.24	3.82	4.000	.000	.00	1 .0
1.290	.0776					.0109	.01	2.59	1.56	1.47	.013	.00	.00	PIPE
1282.000	2644.240	2.658	2646.897	115.00	12.97	2.61	2649.51	.00	3.24	3.78	4.000	.000	.00	1 .0
1.393	.0056					.0106	.01	2.66	1.49	3.65	.013	.00	.00	PIPE
1283.393	2644.248	2.652	2646.899	115.00	13.00	2.63	2649.53	.00	3.24	3.78	4.000	.000	.00	1 .0
27.267	.0056					.0113	.31	2.65	1.50	3.65	.013	.00	.00	PIPE
1310.660	2644.400	2.544	2646.944	115.00	13.64	2.89	2649.83	.00	3.24	3.85	4.000	.000	.00	1 .0
26.411	.0056					.0127	.34	2.54	1.62	3.65	.013	.00	.00	PIPE
1337.071	2644.548	2.443	2646.990	115.00	14.30	3.18	2650.17	.00	3.24	3.90	4.000	.000	.00	1 .0
25.429	.0056					.0143	.36	2.44	1.76	3.65	.013	.00	.00	PIPE
1362.500	2644.690	2.347	2647.037	115.00	15.00	3.50	2650.53	.00	3.24	3.94	4.000	.000	.00	1 .0
1.000	.0100					.0152	.02	2.35	1.90	2.71	.013	.00	.00	PIPE
1363.500	2644.700	2.345	2647.045	115.00	15.02	3.50	2650.55	.00	3.24	3.94	4.000	.000	.00	1 .0
1.000	.0100					.0153	.02	2.35	1.90	2.71	.013	.00	.00	PIPE
1364.500	2644.710	2.343	2647.053	115.00	15.04	3.51	2650.56	.00	3.24	3.94	4.000	.000	.00	1 .0
JUNCT STR	.5701					.0134	.01	2.34	1.90		.013	.00	.00	PIPE

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El. / SE Dpth	Super Elev / Froude N	Critical Depth / Norm Dp	Flow Top Width / "N"	Height/Dia.-FT / X-Fall	Base Wt or I.D. / ZR	ZL	No Wth Prs/Pip / Type Ch
1365.500	2645.280	2.565	2647.845	114.00	15.09	3.53	2651.38	.00	3.20	3.10	3.500	.000	.00	1 .0
.079	.5400				.0161	.00	2.57	1.70	.93	.013	.00	.00		PIPE
1365.579	2645.323	2.588	2647.911	114.00	14.95	3.47	2651.38	.00	3.20	3.07	3.500	.000	.00	1 .0
.365	.5400				.0152	.01	2.59	1.67	.93	.013	.00	.00		PIPE
1365.944	2645.520	2.712	2648.231	114.00	14.25	3.15	2651.39	.00	3.20	2.92	3.500	.000	.00	1 .0
.282	.5400				.0137	.00	2.71	1.52	.93	.013	.00	.00		PIPE
1366.226	2645.672	2.850	2648.522	114.00	13.59	2.87	2651.39	.00	3.20	2.72	3.500	.000	.00	1 .0
.194	.5400				.0124	.00	2.85	1.36	.93	.013	.00	.00		PIPE
1366.420	2645.777	3.008	2648.785	114.00	12.96	2.61	2651.39	.00	3.20	2.43	3.500	.000	.00	1 .0
.080	.5400				.0115	.00	3.01	1.20	.93	.013	.00	.00		PIPE
1366.500	2645.820	3.204	2649.024	114.00	12.35	2.37	2651.39	.00	3.20	1.95	3.500	.000	.00	1 .0
1.000	.0100				.0111	.01	3.20	1.00	3.50	.013	.00	.00		PIPE
1367.500	2645.830	3.237	2649.067	114.00	12.27	2.34	2651.40	.00	3.20	1.85	3.500	.000	.00	1 .0
1.000	.0100				.0111	.01	3.24	.96	3.50	.013	.00	.00		PIPE
1368.500	2645.840	3.250	2649.090	114.00	12.24	2.33	2651.42	.00	3.20	1.80	3.500	.000	.00	1 .0
1.000	.0100				.0111	.01	3.25	.95	3.50	.013	.00	.00		PIPE
1369.500	2645.850	3.260	2649.110	114.00	12.21	2.32	2651.43	.00	3.20	1.77	3.500	.000	.00	1 .0
14.238	.0044				.0117	.17	3.26	.94	3.50	.013	.00	.00		PIPE

Program Package Serial Number: 7156

WATER SURFACE PROFILE LISTING Date: 4-26-2023 Time: 4:45:52

CSD - POLICE MEMORIAL PARK 0

By ACTUS ENGINEERING

SD DESIGN - OPTION 1

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1383.738	2645.913	3.500	2649.413	114.00	11.85	2.18	2651.59	.00	3.20	.00	3.500	.000	.00	1 .0
106.462	.0044					.0125	1.34	3.50	.00	3.50	.013	.00	.00	PIPE
1490.200	2646.380	4.496	2650.875	114.00	11.85	2.18	2653.06	.00	3.20	.00	3.500	.000	.00	1 .0
2.000	.0500					.0128	.03	4.50	.00	1.76	.013	.00	.00	PIPE
1492.200	2646.480	4.529	2651.009	114.00	11.85	2.18	2653.19	.00	3.20	.00	3.500	.000	.00	1 .0
2.000	.0500					.0128	.03	4.53	.00	1.76	.013	.00	.00	PIPE
1494.200	2646.580	4.519	2651.099	114.00	11.85	2.18	2653.28	.00	3.20	.00	3.500	.000	.00	1 .0
255.000	.0133					.0128	3.27	4.52	.00	2.82	.013	.00	.00	PIPE
1749.200	2649.960	4.413	2654.373	114.00	11.85	2.18	2656.55	.00	3.20	.00	3.500	.000	.00	1 .0
JUNCT STR	.0500					.0127	.03	4.41	.00		.013	.00	.00	PIPE
1751.200	2650.060	4.415	2654.475	113.00	11.74	2.14	2656.62	.00	3.20	.00	3.500	.000	.00	1 .0
1.000	.0999					.0126	.01	4.41	.00	1.44	.013	.00	.00	PIPE
1752.200	2650.160	4.328	2654.488	113.00	11.74	2.14	2656.63	.00	3.20	.00	3.500	.000	.00	1 .0
77.922	.0195					.0126	.98	4.33	.00	2.38	.013	.00	.00	PIPE
1830.121	2651.681	3.890	2655.571	113.00	11.74	2.14	2657.71	.00	3.20	.00	3.500	.000	.00	1 .0
HYDRAULIC JUMP														
1830.121	2651.681	2.517	2654.198	113.00	15.26	3.62	2657.81	.00	3.20	3.15	3.500	.000	.00	1 .0
40.608	.0195					.0164	.66	2.52	1.75	2.38	.013	.00	.00	PIPE

Program Package Serial Number: 7156

WATER SURFACE PROFILE LISTING Date: 4-26-2023 Time: 4:45:52

CSD - POLICE MEMORIAL PARK 0

By ACTUS ENGINEERING

SD DESIGN - OPTION 1

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1870.729	2652.474	2.573	2655.046	113.00	14.91	3.45	2658.50	.00	3.20	3.09	3.500	.000	.00	1 .0
43.264	.0195					.0151	.65	2.57	1.68	2.38	.013	.00	.00	PIPE
1913.994	2653.318	2.695	2656.013	113.00	14.21	3.14	2659.15	.00	3.20	2.95	3.500	.000	.00	1 .0
25.206	.0195					.0136	.34	2.70	1.52	2.38	.013	.00	.00	PIPE
1939.200	2653.810	2.831	2656.642	113.00	13.55	2.85	2659.49	.00	3.20	2.75	3.500	.000	.00	1 .0
2.000	.0499					.0125	.03	2.83	1.37	1.76	.013	.00	.00	PIPE
1941.200	2653.910	2.932	2656.842	113.00	13.13	2.68	2659.52	.00	3.20	2.58	3.500	.000	.00	1 .0
.940	.0500					.0119	.01	2.93	1.27	1.75	.013	.00	.00	PIPE
1942.140	2653.957	3.002	2656.958	113.00	12.87	2.57	2659.53	.00	3.20	2.45	3.500	.000	.00	1 .0
1.060	.0500					.0114	.01	3.00	1.20	1.75	.013	.00	.00	PIPE
1943.200	2654.010	3.195	2657.205	113.00	12.27	2.34	2659.54	.00	3.20	1.97	3.500	.000	.00	1 .0
1.000	.0100					.0110	.01	3.20	1.00	3.50	.013	.00	.00	PIPE
1944.200	2654.020	3.226	2657.246	113.00	12.19	2.31	2659.55	.00	3.20	1.88	3.500	.000	.00	1 .0
1.000	.0100					.0109	.01	3.23	.97	3.50	.013	.00	.00	PIPE
1945.200	2654.030	3.238	2657.268	113.00	12.16	2.30	2659.56	.00	3.20	1.84	3.500	.000	.00	1 .0
85.406	.0102					.0115	.98	3.24	.95	3.50	.013	.00	.00	PIPE
2030.606	2654.902	3.500	2658.402	113.00	11.74	2.14	2660.54	.00	3.20	.00	3.500	.000	.00	1 .0
35.994	.0102					.0123	.44	3.50	.00	3.50	.013	.00	.00	PIPE

Program Package Serial Number: 7156

WATER SURFACE PROFILE LISTING Date: 4-26-2023 Time: 4:45:52

CSD - POLICE MEMORIAL PARK 0

By ACTUS ENGINEERING

SD DESIGN - OPTION 1

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
WALL	ENTRANCE													
2066.600	2655.270	3.586	2658.856	113.00	11.74	2.14	2661.00	.00	3.20	.00	3.500	.000	.00	0 .0

HGL @ area grate-inlet

REFERENCES

Hualapai & Isaac Newton TDS and Update#1 (2021), DS#5297,
prepared by VTN Consulting.

Approval Letter
Excerpts
Figure 7 - Ultimate Condition Drainage Map
Standard Form 4
Ultimate Condition HEC-1

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: February 22, 2021
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:			**COPIES TO:**
Hualapai & Isaac Newton Single Family Residential – Update #1				VTN Nevada
Cross Streets:	NEQ of Hualapai Way & Isaac Newton Way			AMH Development West GC, LLC
File Number:	F:\Depot\DSMemos\DS5297C.doc			Bart Anderson, P.E., DevCo
Parcel Number:	138-07-401-001			
Zoning Action:	GPA-77926; MOD-77927; SDR-77928; TMP-77930 & VAR-77931			
FEMA Flood Zone	YES	NO	X	
Proposed Storm Drain	YES	NO	X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	7/21/2020 (Paid on 7/31/2020)	8/10/2020	Not Approved	$400.00	3935347: $400
2nd Submittal	9/2/2020	9/17/2020	Approved	$400.00	3980925: $400
3rd Submittal	2/2/2021 (Paid on 2/22/2021)	2/22/2021	See Comments Below	$100.00	4176798: $100
			TOTAL FEES (LDDRS):	**$900.00**	----

REMARKS:

3rd Submittal: Update #1 for minor onsite grading changes

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

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

1. All drainage easements must be public drainage easements to be privately maintained and common lots to be labeled on the grading plans and to be dedicated as such in the final map.

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.

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

END OF REMARKS
HDR/AYS

T/R/S: T20S/R60E/07
AREA L-07

PROVIDING QUALITY PROFESSIONAL SERVICE SINCE 1960

January 28, 2021
W.O. #8031
City of Las Vegas
333 N. Rancho Drive
Las Vegas, NV 89106

Attention: Albert Sung, P.E.
Flood Control Project Engineer

SUBJECT: UPDATE #1 TO THE TECHNICAL DRAINAGE STUDY FOR HUALAPAI & ISAAC NEWTON SINGLE FAMILY RESIDENTIAL (DS #5297)

Mr. Sung:

AMH NV 5 Development LLC is proposing to construct a Single-Family Residential development located northeast of the Hualapai Way and Isaac Newton Way intersection. The proposed project consists of residential unites situated on ±4.6 acres.

This *Update #1 to the Technical Drainage Study for Hualapai & Isaac Newton Single Family Residential* is being submitted to the City of Las Vegas to address revisions to the grading plans. The study was approved by the CLV on September 21st, 2020. Changes to the grading plans have resulted in finish floor elevation and adjacent top of curb elevation for lots 21 through 37 to be revised. Additionally, a portion of Blodwen Street was analyzed by normal depth cross section 6 which utilizes a worst case slope of 1.5% (Previously 1.7% was utilized). Please note, the slopes in Blodwen Street have not changed from the previous submittal. Calculations have been revised and finish floor elevations verified to still provide adequate protection from flow within Blodwen Street. Revised figures, calculations, and approved plans clouded to show proposed changes have been provided in the *Appendix* of this submittal.

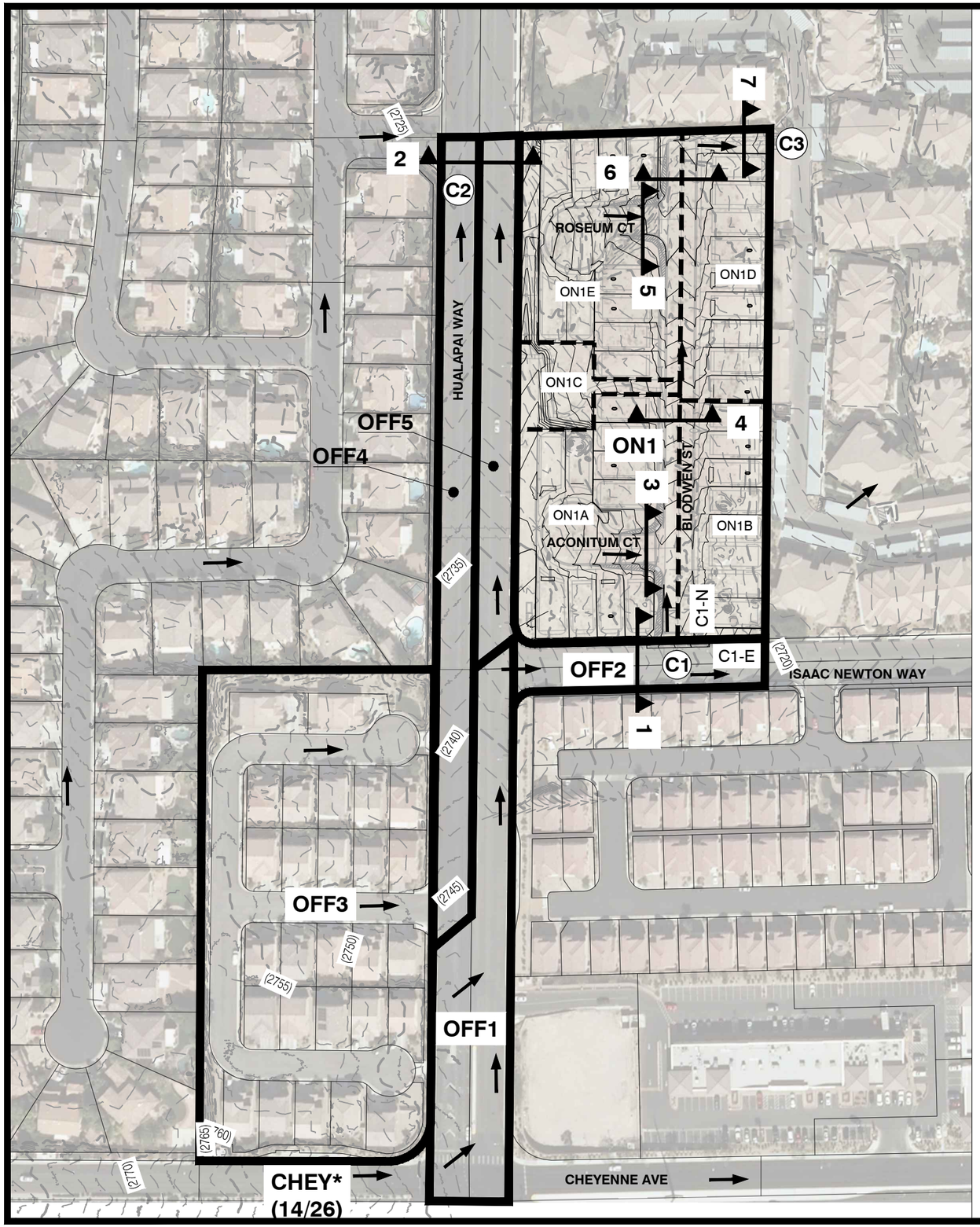
This update does not proposed any revisions to approved hydrology. It was determined that the changes included in this updated do not cause an adverse effect to this or any downstream development.

I hope this addresses your concerns regarding this project. If there are any questions or any additional information is required, please contact this office.

Respectfully Submitted,

VTN Consulting

Brain Ruiz, P.E., CFM



FROM UPDATE#1

GRAPHIC SCALE

150 0 75 150 300

1" = 150'

LEGEND

- BASIN BOUNDARY
- PRORATED SUBBASIN BOUNDARY
- ON1 — BASIN DESIGNATION
- ON1A — PRORATED SUBBASIN DESIGNATION
- FLOW ARROW
- NORMAL DEPTH SECTION
- C1 — COMBINATION POINT

ULTIMATE CONDITION HEC-1 SUMMARY TABLE

BASIN/CP	AREA (AC)	Q100 (CFS)	Q10 (CFS)
ON1	4.64	14	6
CHEY*	-	26	14
OFF1	1.17	5	2
OFF2	0.44	2	1
C1	-	29	16
C1-E	-	25	14
C1-N	-	4	2
C3	-	17	6
OFF3	4.13	13	6
OFF4	1.10	4	2
C2	-	17	8
OFF5	0.75	3	2

Flow rate in Cheyenne Avenue (CHEY) referenced from the TDS for Cheyenne/Hualapai Units 3 and 4. Basins tributary to CHEY* are not depicted on this figure or included in this table. Refer to Appendix D.

PRORATED SUBBASIN SUMMARY

BASIN	AREA (acre)		Q100
ON1	4.64		14
SUBBASIN	**AREA (acre)**	**AREA (%)**	**Q100**
ON1A	1.36	29.3%	4
ON1B	0.76	16.4%	2
ON1C	0.29	6.3%	1
ON1D	0.87	18.8%	3
ON1E	1.36	29.3%	4

PERIMETER STREET NORMAL DEPTH SUMMARY TABLE

Section	Q100 (cfs)	Slope (%)	Depth (ft)	Velocity (ft/s)	DxV	Tributary Basin/CP
1	29	4.90	0.45	6.17	2.78	C1
2 (East Half)	3	2.00	0.32	3.30	1.06	OFF5
2 (West Half)	17	2.00	0.53	4.32	2.29	C2

ONSITE STREET/EASEMENT NORMAL DEPTH SUMMARY TABLE

Section	Q100 (cfs)	Slope (%)	Depth (ft)	Velocity (ft/s)	DxV	Tributary Basin/CP
3	4	4.00	0.23	3.57	0.82	ON1A
4	10	4.00	0.29	4.34	1.26	ON1A + ON1B + C1-N
5	4	4.50	0.22	3.74	0.82	ON1E
6	17	1.50	0.39	3.37	1.31	C3
		1.70	0.39	3.52	1.37	
7	17	2.51	0.33	3.31	1.09	C3

W.O.#: 8031
DATE: FEB 21
BY:
SCALE: 1"=150'
SHEET OF

FIGURE 7: ULTIMATE CONDITION DRAINAGE MAP

HUALAPAI & ISAAC NEWTON

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NV 89146-5148

H:\8031\Drainage\TDS\3_UP1\A_Figures\Figure 7 - Ultimate Condition.dwg;paulm; Jan 21, 2021 - 4:08pm

STANDARD FORM 4

DEVELOPMENT: Hualapai & Isaac Newton

W.O. # 8031 **CALCULATED BY:** JYA

V1 applies to the first 500 feet of travel distance
V2 applies to the remaining travel distance

Non-Urbanized:		Urbanized	
$V1 = 1.48 * S^{1/2}$	$V2 = 2.94 * S^{1/2}$	$V1 = 2.02 * S^{1/2}$	$V2 = 3.06 * S^{1/2}$

$$T_i = \frac{1.8(1.1-k)L^{1/2}}{S^{1/3}} \qquad T_t = \frac{L}{60V}$$

$$k = 0.0132C_n - 0.39 \qquad T_c = T_i + T_t$$

SUB-BASIN DATA					INITIAL/OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK (URBANIZED BASINS)		FINAL Tc	LAG TIME	REMARKS
DESIG. (1)	Cn	K (2)	AREA Ac. (3)	AREA Mi^2	LENGTH Ft (4)	SLOPE % (5)	Ti Min. (6)	LENGTH Ft. (7)	SLOPE % (8)	V1 fps (9a)	V2 fps (9b)	Tt Min. (10)	TOTAL LENGTH (11)	Tc Min. (12)	Min.	TLAG Hr.	
EX1	88	0.7716	4.64	0.00725	50	3.0	2.90	830	2.9	2.5	5.0	4.39	880	14.89	7.29	0.100	
ON1	91	0.8112	4.64	0.00725	100	1.0	5.20	790	2.5	3.2	4.8	3.60	890	14.94	8.80	0.088	
OFF1	98	0.9036	1.17	0.00183	50	2.0	1.98	633	2.8	3.4	5.2	2.88	683	13.79	4.86	0.050	
OFF2	98	0.9036	0.44	0.00069	25	2.0	1.40	300	5.3	4.7	7.0	1.08	325	11.81	2.48	0.050	
OFF3	91	0.8112	4.13	0.00645	100	1.0	5.20	375	3.3	3.6	5.5	1.72	475	12.64	6.91	0.069	
OFF4	98	0.9036	1.10	0.00172	50	2.0	1.98	980	2.2	3.0	4.6	4.50	1030	15.72	6.48	0.065	
OFF5	98	0.9036	0.75	0.00117	50	2.0	1.98	660	1.9	2.8	4.2	3.61	710	13.94	5.59	0.056	

Tc Min (URB)= 5 min
Tc Min (NON-URB)= 10 min

```
1*************************************                                  *************************************
 *                                   *                                  *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                              *    U.S. ARMY CORPS OF ENGINEERS     *
 *              JUN   1998           *                                  *    HYDROLOGIC ENGINEERING CENTER    *
 *            VERSION 4.1            *                                  *          609 SECOND STREET          *
 *                                   *                                  *       DAVIS, CALIFORNIA 95616       *
 *  RUN DATE   17AUG20  TIME  07:34:59   *                              *          (916) 756-1104           *
 *                                   *                                  *                                   *
 *************************************                                  *************************************

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


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

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

1                                              HEC-1 INPUT                                                PAGE  1

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

                        *DIAGRAM
 *** FREE ***
              1         ID    ULTIMATE CONDITION HYDROLOGIC MODEL
              2         ID    INPUT FILE DATE = MAY 20, 2020
              3         ID    DESIGN STORM = 100-YEAR 6-HR STORM
              4         ID    STORM DISTRIBUTION = SDN #3
              5         ID    MODELED BY VTN (JYA)
              6         ID
              7         ID    ******************************************************
              8         ID    * TECHNICAL DRAINAGE STUDY FOR                       *
              9         ID    * HUALAPAI AND ISAAC NEWTON                          *
             10         ID    ******************************************************
             11         ID
             12         ID
             13         ID
             14         ID   10YR AND 100YR STORM EVENT FOR 6 HOUR STORM
             15         IT       5       0       0     300
             16         IN       5       0       0
             17         IO       5       0       0
             18         JR    PREC    1.00    0.56
                        *

             19         KK     ON1
             20         KM   DEVELOPED ONSITE BASIN
             21         BA  0.0073
             22         PB    3.00
             23         PC       0    0.02   0.057    0.07   0.087   0.108   0.124    0.13    0.13   0.130
             24         PC    0.13    0.13    0.13   0.133    0.14   0.142   0.148   0.158   0.172   0.181
             25         PC    0.19   0.197   0.199     0.2   0.201   0.204   0.214   0.229   0.241   0.249
             26         PC   0.251   0.256    0.27   0.278   0.281   0.283   0.295   0.322   0.352   0.409
             27         PC   0.499    0.59    0.71   0.744   0.781   0.812   0.819   0.835   0.851   0.856
             28         PC    0.86   0.868   0.876   0.888    0.91   0.926   0.937    0.95    0.97   0.976
             29         PC   0.982   0.985   0.987   0.989    0.99   0.993   0.993   0.994   0.995   0.998
             30         PC   0.998   0.999       1
             31         LS       0    91.0
             32         UD   0.088
                        *

             33         KK  CHEY1*
             34         KM   REFERENCED OFFSITE BASIN
             35         PB    3.17
             36         BA  0.0053
             37         LS       0    98.0
             38         UD  0.0926
                        *

             39         KK  CHEY2*
             40         KM   REFERENCED OFFSITE BASIN
             41         BA  0.0027
             42         LS       0    98.0
             43         UD  0.0519
                        *
1                                              HEC-1 INPUT                                                PAGE  2
```

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

  44          KK  CHEY3*
  45          KM   REFERENCED OFFSITE BASIN
  46          BA  0.0023
  47          LS       0    98.0
  48          UD   0.050
              *

  49          KK   CHEY*
  50          KM   COMBINE CHEY, CHEY2, CHEY3
  51          KM   REFERENCED FROM CHEYENNE STUDY
  52          HC       3
              *

  53          KK   RCHEY
  54          KM   ROUTE CHEY* TO C1
  55          RD    1000    .035   0.016       0    TRAP      41       0
              *

  56          KK    OFF1
  57          KM   OFFSITE STREET BASIN
  58          PB    3.00
  59          BA  0.0018
  60          LS       0    98.0
  61          UD   0.050
              *

  62          KK    OFF2
  63          KM   OFFSITE STREET BASIN
  64          BA  0.0007
  65          LS       0    98.0
  66          UD   0.050
              *

  67          KK      C1
  68          KM   COMBINE CHEY*, OFF1 AND OFF2
  69          HC       3
              *

  70          KK    C1-N
  71          KM   FLOW SPLIT
  72          KM   FLOW FROM C1 ENTERING THE PROJECT
  73          DT    C1-E
  74          DI      16      29
  75          DQ      14      25
              *

  76          KK   RC1-N
  77          KM   ROUTE C1-N TO C3
  78          RD     715    .020   0.016       0    TRAP      49       0
              *
1                                       HEC-1 INPUT                                          PAGE  3

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

  79          KK      C3
  80          KM   COMBINE ON1 AND C1-N
  81          HC       2
              *

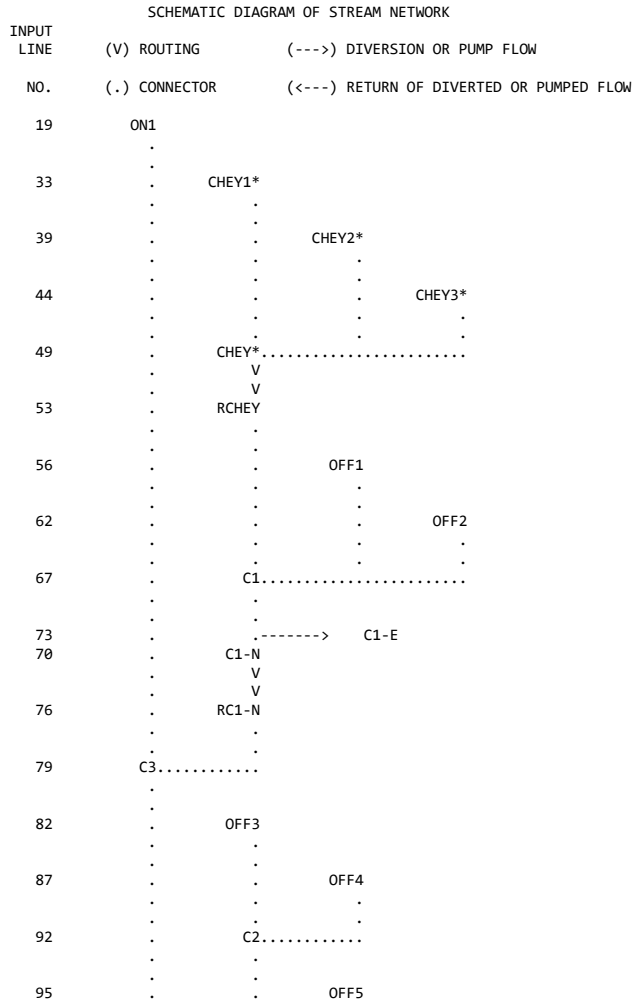
  82          KK    OFF3
  83          KM   OFFSITE DEVELOPED BASIN
  84          BA  0.0065
  85          LS       0    91.0
  86          UD   0.069
              *

  87          KK    OFF4
  88          KM   OFFSITE STREET BASIN
  89          BA  0.0017
  90          LS       0    98.0
  91          UD   0.065
              *

  92          KK      C2
  93          KM   COMBINE OFF3 AND OFF4
  94          HC       2
              *

  95          KK    OFF5
  96          KM   OFFSITE STREET BASIN
  97          BA  0.0012
  98          LS       0    98.0
  99          UD   0.056
              *
 100          ZZ
1
```

SCHEMATIC DIAGRAM OF STREAM NETWORK



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS      *
*               JUN   1998             *                    *    HYDROLOGIC ENGINEERING CENTER     *
*            VERSION 4.1               *                    *          609 SECOND STREET           *
*                                      *                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE   17AUG20  TIME  07:34:59  *                    *           (916) 756-1104             *
*                                      *                    *                                      *
****************************************                    ****************************************
```

ULTIMATE CONDITION HYDROLOGIC MODEL
INPUT FILE DATE = MAY 20, 2020
DESIGN STORM = 100-YEAR 6-HR STORM
STORM DISTRIBUTION = SDN #3
MODELED BY VTN (JYA)

```
*********************************************************
* TECHNICAL DRAINAGE STUDY FOR                          *
* HUALAPAI AND ISAAC NEWTON                             *
*********************************************************
```

10YR AND 100YR STORM EVENT FOR 6 HOUR STORM

```
  17 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
                    1.00       .56
1

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


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

 HYDROGRAPH AT
+                   ON1       .01     1   FLOW          14.       6.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                 CHEY1*      .01     1   FLOW          12.       7.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                 CHEY2*      .00     1   FLOW           7.       4.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                 CHEY3*      .00     1   FLOW           6.       3.
                                          TIME         3.50     3.50

  3 COMBINED AT
+                  CHEY*      .01     1   FLOW          26.      14.
                                          TIME         3.50     3.50

 ROUTED TO
+                 RCHEY       .01     1   FLOW          23.      13.
                                          TIME         3.50     3.58

 HYDROGRAPH AT
+                  OFF1       .00     1   FLOW           5.       2.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                  OFF2       .00     1   FLOW           2.       1.
                                          TIME         3.50     3.50

  3 COMBINED AT
+                    C1       .01     1   FLOW          29.      16.
                                          TIME         3.50     3.50

 DIVERSION TO
+                  C1-E       .01     1   FLOW          25.      14.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                  C1-N       .01     1   FLOW           4.       2.
                                          TIME         3.50     3.50

 ROUTED TO
+                 RC1-N       .01     1   FLOW           4.       1.
                                          TIME         3.58     3.67

  2 COMBINED AT
+                    C3       .02     1   FLOW          17.       6.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                  OFF3       .01     1   FLOW          13.       6.
                                          TIME         3.50     3.50
```

```
 HYDROGRAPH AT
+                    OFF4       .00     1   FLOW           4.       2.
                                            TIME         3.50     3.50

  2 COMBINED AT
+                      C2       .01     1   FLOW          17.       8.
                                            TIME         3.50     3.50

 HYDROGRAPH AT
+                    OFF5       .00     1   FLOW           3.       2.
                                            TIME         3.50     3.50
1
                                        SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                            (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                 INTERPOLATED TO
                                                                               COMPUTATION INTERVAL
             ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                       PEAK                                    PEAK

                                   (MIN)     (CFS)      (MIN)     (IN)     (MIN)     (CFS)     (MIN)       (IN)

           FOR PLAN = 1  RATIO=  .00
              RCHEY  MANE         2.87     24.57    212.10      2.94      5.00     23.06    210.00        2.94


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1612E+01 EXCESS= .0000E+00 OUTFLOW= .1615E+01 BASIN STORAGE= .1179E-02 PERCENT ERROR=   -.3


           FOR PLAN = 1  RATIO=  .00
              RCHEY  MANE         2.75     13.23    211.75      1.55      5.00     12.60    215.00        1.55


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .8520E+00 EXCESS= .0000E+00 OUTFLOW= .8537E+00 BASIN STORAGE= .1556E-02 PERCENT ERROR=   -.4


           FOR PLAN = 1  RATIO=  .00
              RC1-N  MANE          .75      4.10    214.50       .15      5.00      3.99    215.00         .15


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1049E+00 EXCESS= .0000E+00 OUTFLOW= .1058E+00 BASIN STORAGE= .1207E-02 PERCENT ERROR=  -2.0


           FOR PLAN = 1  RATIO=  .00
              RC1-N  MANE          .25      2.75    216.25       .02      5.00       .95    220.00         .02


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1547E-01 EXCESS= .0000E+00 OUTFLOW= .1642E-01 BASIN STORAGE= .1211E-02 PERCENT ERROR= -14.0



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

REFERENCES

Tiara Summit TDS (2004), DS#3478,
prepared by Taney Engineering.

Approval Letter
Figure 9 - Onsite Drainage Basins Map
Standard Form 4
Ultimate Condition HEC-1

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: REVISION May 12, 2004
TO: **Land Development Services** Department of Public Works				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **Tiara Summit**			**COPIES TO:** Taney Engineering
Cross Streets:	NEC of Hualapai Way & Cheyenne Avenue			Desert Wind Homes
File Number:	F:\Depot\DSMemos\DS3478C-REV.doc			Bart Anderson, P.E., DevCo
Parcel Number:	138-07-401-003 & -004			
Zoning Action:				
FEMA Flood Zone	YES	NO	X	
Proposed Storm Drain	YES	NO	X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID G.R. No.
1st Submittal	1/7/2004	1/22/2004	Not Approved	$400.00	117189: $400
2nd Submittal	3/4/2004	3/18/2004	Not Approved	$400.00	120632: $400
3rd Submittal	4/7/2004	4/14/2004	Approved	$400.00	122639: $400
Revision	5/12/2004	5/12/2004	See Comments Below	N/C	N/C
			TOTAL FEES (LDDRS):	**$1,200.00**	**----**

REMARKS:

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

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

1. Previous comment #7 is repeated until it is complete: *On Detail D of Sheet GD1 provide structural calculations supporting this design and provide proof of approval from the City's Building Department prior to issuance of any building permits.*

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

NOTE: All land surface area disturbances over 1 acre require a stormwater discharge permit issued by the Nevada Division of Environmental Protection (NDEP). 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. A stormwater discharge permit application and associated information may be downloaded from the web site:

http://ndep.nv.gov/bwpc/bwpc01.htm

Projects that disturb more than one acre of land must submit to NDEP a "Notice of Intent" for inclusion under Stormwater Permit No. NVR100000 along with the appropriate filling fee. Contact NDEP at (775) 687-9417 for more information."

END OF REMARKS

B&H/ays

T/R/S: T20S/R60E/07

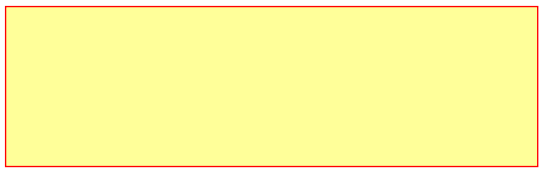
AREA L-07

FROM ADDENDUM#2

REFERENCES

The Boulders Condomium Conversion TDS (2006), DS#3736,
prepared by Stanley Consultants Inc.

Approval Letter
Figure 6 - Proposed Drainage Basins Map



REFERENCES

Conquistador Plaza TDS (2001), DS#2555,
prepared by L R Nelson Consulting.

Approval Letter
Excerpts
Future Onsite Drainage Basin Map
Standard Form 4
Ultimate Condition HEC-1



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: July 3, 2001
TO: **Land Development Services** Department of Public Works				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:			**COPIES TO:**
Conquistador Plaza				L.R. Nelson Consulting Engineers
Cross Streets:	NWC of Cheyenne Ave. & Conquistador St.			Terra West Realty & Development
FILE NO.	F:\Depot\DSMEMOS\DS2555E.doc			Cheri Edleman, P.E. DEVCO
Parcel Number:	138-07-401-008, 006			
Zoning Action:	Z-95-98 (3)			
FEMA Flood Zone	YES	No	X	
Proposed Storm Drain	YES	No	X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1st Submittal	10/8/1999	10/26/1999	Not Accepted	$250.00
2nd Submittal	2/18/2000	2/24/2000	See Comments Below	$250.00
CCRFCD	3/29/2000	3/29/2000	Concurrence	N/C
Notarized Offsite Grading Letter	8/11/2000	8/11/2000	Accepted	N/C
3rd Submittal	6/25/2001	7/3/2001	See Comments Below	$250.00
			TOTAL FEES (LDDRS):	**$750.00**

REMARKS: 3rd Submittal: Update to drainage study

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

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

1. The western portion of Building D is lower than the street. Provide a berm with six inches of freeboard above the 100-year water surface elevation along the frontage of Building D.

2. Between Buildings B and C, provide swale to clearly show the drainage is away from the buildings. This comment applies to the area between Buildings F and G also.

3. Along the driveway at Cheyenne Avenue, provide "L" Type curb and gutter instead of "A" Type for drainage because the slope is less than 1%.

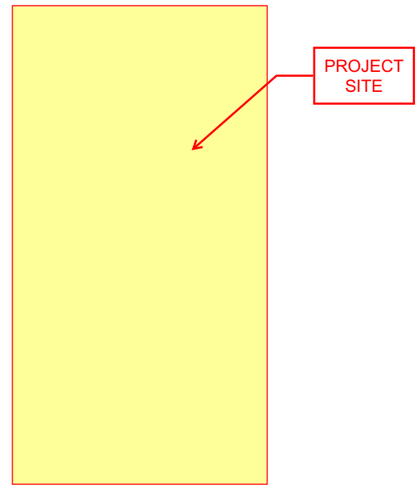
4. Some parking islands show "L" Type curb and gutter end with no discharge exit. Revise accordingly.

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

END OF REMARKS
ays

T/R/S: **T20S/R60E/07**
AREA L-07




PROJECT
SITE

REFERENCES

Shiloh Christian School TDS (2001), DS#2555,
prepared by Alpha Engineering.

Approval Letter
Figure 6 - (Revised) Developed Onsite Drainage Map
Standard Form 4

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM	DATE: REVISED MEMO: JULY 28, 1998 March 23, 1998
TO: **Land Development Services** Department of Public Works	FROM: Dennis W. Stransky, P.E. Flood Control Project Manager Department of Public Works
SUBJECT: Drainage Study for: **Shiloh Christian School** FILE NO. \\KHAN\flood\Depot\DSMEMOS\DS2128E.doc	COPIES TO: Alpha Engineering West Charleston Baptist Church Cheri Edelman, P.E. CCRFCD

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

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1st Submittal	9/22/97	10/08/97	Not Accepted	$250.00
2nd Submittal	10/17/97	10/27/97	Not Accepted	$250.00
3rd Submittal	12/04/97	12/17/97	Not Accepted	$250.00
4th Submittal	01/29/98	02/10/98	CCRFCD concurrence	$250.00
5th Submittal	03/09/98	03/23/98	Not Accepted	N/C
Revised Memo		07/28/98	See Comments Below	N/C
			TOTAL FEES	$1000.00

REMARKS:

Revised Memo (LMPD Conditions Addressed)

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

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

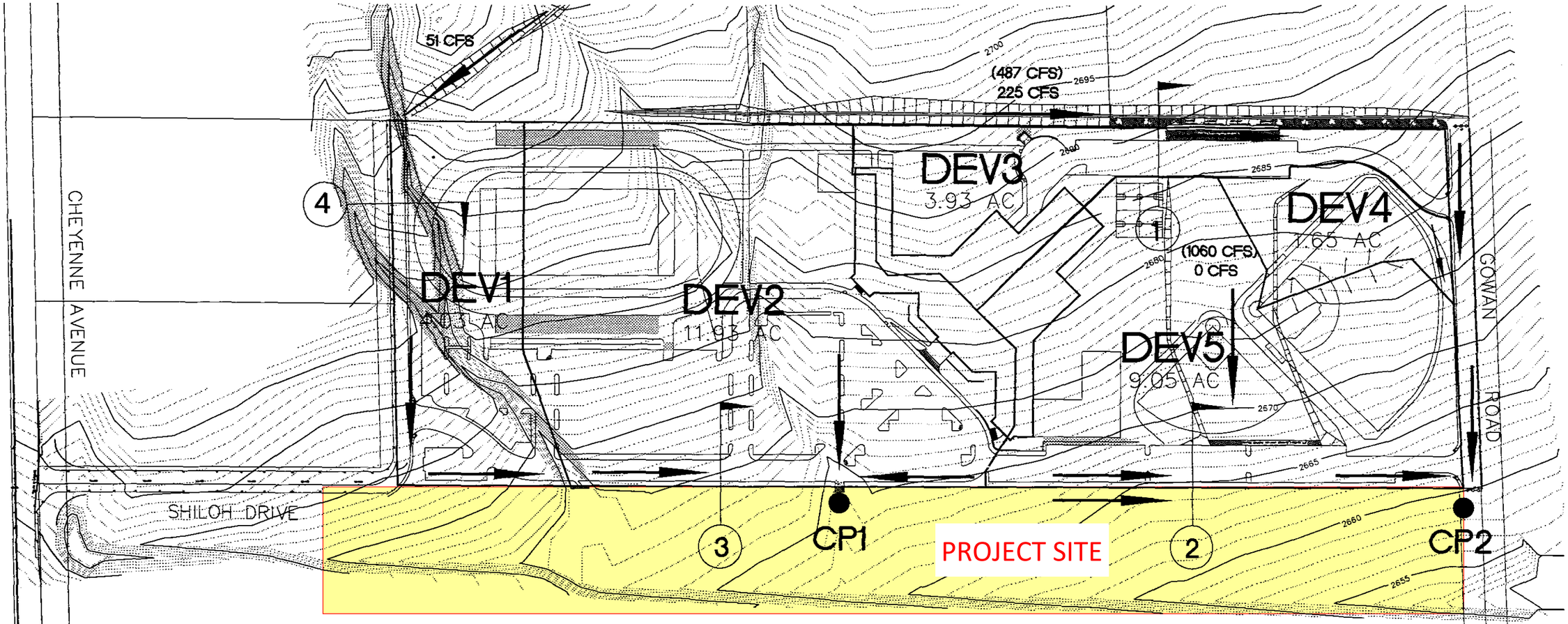
1. A letter from Diamond Construction must be submitted to the Flood Control Section that certifies the completion of the 6000 cubic yard excavation to Lone Mountain Detention Basin prior to release of the off-site bond.

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

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

END OF REMARKS
gam

T/R/S: **20 S/ 60 E/ 7**
AREA L07



BASIN ID#	10-YEAR CFS	100-YEAR CFS
DEV1	3	9
DEV2	12	29
DEV3	3	8
DEV4	0	2
DEV5	4	14
CP1	15	38
CP2 (INTERIM)	600	1608
CP2 (FUTURE)	94	286

DRAINAGE LEGEND

- BASIN BOUNDARY
- FLOW PATH
- CONCENTRATION POINT(s) (CP1)
- DEV1 — BASIN NAME(s)
- 23.07 AC — ACREAGE
- (487 CFS) — INTERIM CONDITION - 100 YEAR
- 225 CFS — FUTURE/ULTIMATE CONDITION - 100 YEAR

HYDRAULIC SECTIONS

(1) CROSS SECTION AND LOCATION
SEE CALCULATIONS

N

FIGURE 6

(REVISED)
DEVELOPED ONSITE DRAINAGE MAP

ALPHA ENGINEERING
50 S. JONES, LAS VEGAS, NEVADA 89107
Telephone: (702) 877-1300

FROM 1st Submittal

TIME OF CONCENTRATION

STANDARD FORM 4

DEVELOPMENT: SHILOH CHRISTIAN SCHOOL CALCULATED BY: JMA DATE: 9-8-97

SUB-BASIN DATA				INITIAL / OVERLAND TIME (*ti*)			TRAVEL TIME (*tt*)				*tc* CHECK (URBANIZED BASINS)		FINAL *tc*	REMARKS SHEET 1 OF 1	
DES.	K	AREA	AREA	LEN.	SLOPE	*ti*	LEN	SLOPE	VEL	*tt*	TOTAL LENGTH	tc=(L/180) +10		CN	TLAG
		Ac	Sq Mi	Ft	%	Min	Ft	%	fps	Min	Ft	Min	Min		
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
EXISTING OFFSITE/ONSITE															
OFF2	0.706	255.20	0.3988	500	3.00	11.01	7800	3.80	3.80	34.21			45.22	83	0.452
OFF3	0.745	28.00	0.0438	300	3.33	7.41	3400	4.00	4.00	14.17			21.57	86	0.216
EXON1	0.692	30.00	0.0469	300	3.33	8.51	700	3.50	3.70	3.15	1000	15.56	11.66	82	0.117
FUTURE OFFSITE/ONSITE															
OFF2	0.706	96.31	0.1505	250	2.00	8.91	4000	4.00	4.00	16.67	4250	33.61	25.58	83	0.256
OFF2A	0.706	158.89	0.2483	500	3.00	11.01	7800	3.80	3.80	34.21	8300	56.11	45.22	83	0.452
OFF3	0.745	28.00	0.0438	300	3.33	7.41	3400	4.00	4.00	14.17	3700	30.56	21.57	86	0.216
EXON1	0.692	30.00	0.0469	300	3.33	8.51	700	3.50	3.70	3.15	1000	15.56	11.66	82	0.117
DEVELOPED ONSITE															
DEV1	0.653	4.03	0.0063	125	1.50	7.86	770	4.00	4.00	3.21	895	14.97	11.07	79	0.111
DEV2	0.626	11.93	0.0186	100	2.00	6.77	1170	3.90	3.90	5.00	1270	17.06	11.77	77	0.118
DEV3	0.587	3.93	0.0061	100	1.50	8.07	1200	1.00	2.00	10.00	1300	17.22	17.22	74	0.172
DEV4	0.587	1.65	0.0026	100	1.00	9.24	450	1.50	2.50	3.00	550	13.06	12.24	74	0.122
DEV5	0.587	9.05	0.0141	300	2.50	11.79	900	2.00	2.85	5.26	1200	16.67	16.67	74	0.167

K = 0.0132*CN-0.39

ti = 1.8(1.1-K)L^1/2/S^1/3 tc = ti + tt tl = tc*0.6

Velocity obtained from Figure 602 of the CCRFCD's Hydrologic Design and Criteria Manual.

Basin parameters (except CN values) referenced in our study.

Please note we are utilizing CN values from 2018 LVV MPU for these basins in our HEC-1.

REFERENCES

Drainage study for City of Las Vegas Metro Park (2001), DS#2713, prepared by PBS&J Inc.

Approval Letter
Excerpts
Drainage Exhibit
Orifice Calculations

file copy

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: February 16, 2001
TO: **Land Development Services** Department of Public Works				FROM: Randy Fultz, P.E. for Flood Control Project Manager Department of Public Works
SUBJECT:	Drainage Study for: **City of Las Vegas Metro Park**			**COPIES TO:** Architectural Services, CLV
Cross Streets:	Jensen and Cheyenne			PBS & J Attn: Mark Sorensen
FILE NO.:	F:\depot\DSMEMOS\DS2713D.doc			Cheri Edelman, P.E., DEVCO
Parcel Number:	138-07-401-009			CCRFCD
Zoning Action:				
FEMA Flood Zone	YES	No	**X**	
Proposed Storm Drain	YES **X**	No		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES
1st Submittal	6/20/2000	7/1/2000	Not Acceptable	N/C
2nd Submittal	8/29/2000	9/12/2000	Not Acceptable	N/C
3rd Submittal	11/22/2000	11/28/2000	Conditionally Accepted	N/C
CCRFCD	02/14/2001	02/16/2001	See Comments Below	N/C
			TOTAL FEES (LDDRS):	**N/C**

REMARKS:

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

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

1. Provide an inlet and 18-inch storm drain lateral to drain nuisance flows where the swale meets the south end of the parking lot on sheet C3.01. The sidewalk under drain and valley gutter must remain as an overflow.

2. On sheet C3.02 a drainage swale ends in an inlet and 18-inch storm drain. Provide additional spot elevations along the flow line to the north to ensure an overflow path for storm water to where the channel picks up again on sheet C3.01.

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

END OF REMARKS

Rlf, ays, jwb

T/R/S: T20S/R60E/07

AREA L-07

This report is intended to serve as the *Addendum No. 2 to the Technical Drainage Study for the City of Las Vegas Metro Park prepared* by PBS&J dated June 20, 2000. The revisions in this addendum are intended to supersede the data contained in the technical study and Addendum No. 1.

The responses to comments in a letter dated September 12, 2000 from the City of Las Vegas are included below:

Comment 1: **Sheet C3.04**

- **Offsite nuisance flows from Atwood Avenue and Conquistador Street drain more or less to the center of the parking lot. Nuisance flows are anticipated to be a maintenance concern in the future and draining nuisance water over asphalt is not recommended. Nuisance flows should be conveyed in the curb and gutter along the west edge of the parking lot from Conquistador to the cul-de-sac. Use "L" type curb instead of "A" type. Provide openings (1-1/2' minimum concrete channel) at the islands as flows drain north to cul-de-sac.**

- Atwood Avenue and Conquistador Street (now Academy Way) is now a proposed T-intersection. The grading has been revised such that nuisance flow from Atwood Avenue and Academy Way will be conveyed east to a 24" cross gutter. Flow will then be conveyed north through the parking lot via the cross gutter and discharged through a 2-foot sidewalk underdrain at the low point on the east side of the cul-de-sac. From there flow is conveyed north within a graded swale to an area drain located just south of the proposed skate park. The valley gutter has been placed just east of the islands; therefore, channel openings will not be required. The "L" type curb is utilized along the nuisance flow path.. Please see Sheet C3.04 for revised plans.

- **The proposed elevations along the property line by the adjacent *Las Vegas Metropolitan Police Department Training Center* (Lochsa Engineering) must be incorporated in the grading plan.**

- Sheet C3.04 has been revised accordingly. The proposed elevations along the northern property boundary for the *Las Vegas Metropolitan Police Department Training Center* are shown in brackets. Also shown is the proposed retaining wall along the property boundary.

- **The Park must direct as much flow as possible to the Buckskin Channel. The grading contours must be revised accordingly.**

- An existing highpoint has been incorporated into the grading to direct a portion of the flow from basin ONDEV-1 to the Buckskin Channel. The original basin ONDEV-1 was divided and another onsite basin ONDEV-5 was added to determine the exact flow impacting the Buckskin Channel. The HEC-1 analysis indicates 5-cfs conveyed by ONDEV-5 to the Buckskin Channel. The revised flow for ONDEV-1 is 32-cfs to be conveyed north along the western boundary of the site in a graded swale. Please refer to Section F-F (C3.03) for swale details. The HEC-1 model and Developed Basin Map have been revised

sidewalk (see Comment 2 – 18-inch pipe). Also, nuisance flows overtop another sidewalk to the south of skateboard park where another inlet should be provided.

- The swale has been revised so that the flowline is approximately 10 feet east of the sidewalk. The sidewalk is sloped at 1.5% to the east to drain flow away from the sidewalk and into the graded swale. The swale, as previously mentioned, leads to an area drain located just south of the skate park. The inlet for the area drain utilizes a 2-foot beehive cover for safety considerations.

- **Nuisance appears to drip over the rockery retaining wall structure. This is not acceptable to the surface of the rockery structure after a prolong period of time. Provide details and revise accordingly.**

- The wall will not be "rockery" but will be a standard retaining wall. Virtually no area now drains over the wall.

- **The proposed drainage swale at the east property line must provide at least 18" of freeboard.**

- Please refer to the Comment 2

Comment 4: **<u>Sheet C3.01</u>**

- **Provide finished grades at the four corners of the skateboard park.**
- Please refer to Sheet C3.01 for finished grades and top of wall elevations at the four corners of the skateboard park.

- **Revise and relocate the flow path in the parking area to the curb face. Use "L" type curb instead of "A" type. Provide openings (1-1/2'-wide channel) through all parking islands. Install a drop inlet and an 18" nuisance drain at the last parking stall and tie into the 48"-RCP outfall structure.**
- A proposed swale has been located west of the basketball court and between the existing curb of the Shiloh Christian Academy. The swale then loops around the north end of the basketball court where flow is discharged through a sidewalk underdrain. Flow is then conveyed north through the parking lot via a 2-foot valley gutter. A 10' Modified Type C drop inlet has been placed on the south side of Gowan Road approximately 70-feet east of the parking lot exit. This drop inlet ties into the 38" x 60" HERCP.

- **A larger inlet opening should be provided to minimize the ponding depth as well as the berm height in Section D-D. Eighteen inches of freeboard will still be required using a 50% clogging factor. Revise the orifice calculation and the subsequent hydraulic calculations.**

- The dimensions of the grate opening have been revised and are now 6' x 6'. Please refer to the Appendix for the revised orifice calculation worksheet. As a result the berm height has been reduced by three feet while maintaining 1.8 feet of freeboard.

- **Section C-C must be revised to show the swale of at least 1' deep. At the end of the swale, a drop inlet and an 18" nuisance drain must be provided to tie into the 48"-RCP outfall structure.**

- The swale has been revised as noted. A beehive drop inlet has been placed at the end of the swale to intercept the flow. An 18-inch storm drain ties into the 38" by 60" HERCP. The input and output files for the revised WSPG model are included in the Appendix.

- **The proposed drop inlet in Gowan Road must be relocated to vertically above the 48"-RCP so as to eliminate the proposed 18" RCP.**

- In addition to the drop inlet on the south side of Gowan Road, a 4-foot type "A" drop inlet on the north side of Gowan Road has been positioned directly over the HERCP to intercept nuisance flow.

Comment 5: **The engineer must use a heavier line type for the proposed contours to clarify the distinction between the existing and proposed conditions.**

Response 5: The existing and proposed contour line types on the grading plans have been revised for clarification.

Comment 6: **Grading plans Sheet C3.02 and C3.03 must show matching sheet numbers on the top and bottom.**

Response 6: Grading plans Sheet C3.02 and C3.03 have been revised accordingly.

Comment 7: **The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final acceptance of the drainage study.**

Response 7: Noted.

ORIFICE CALCULATION

72-inch Square Grate Opening in ONDEV-3

$Q = 0.5*(C*A(2*g*h)^{1/2})$

$h = (Q/0.5*C*A))^2/2*g$

$g = 32.2\ ft/s^2$

$C = 0.6$

Clogging factor = 0.5

Q = 121 cfs

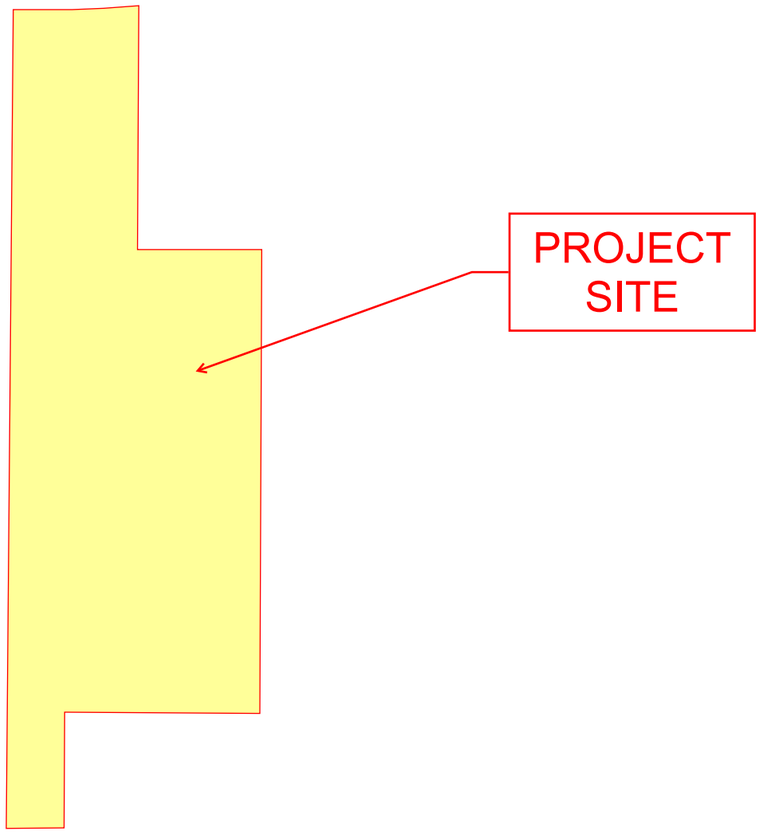
Historical Q100 at the low-point (tributary to the 6' x 6' area grate-inlet).

$Area = 36\ ft^2$

$h = (121\ cfs/(0.5*0.6*36\ ft^2))^2/(2*32.2\ ft/s^2)$

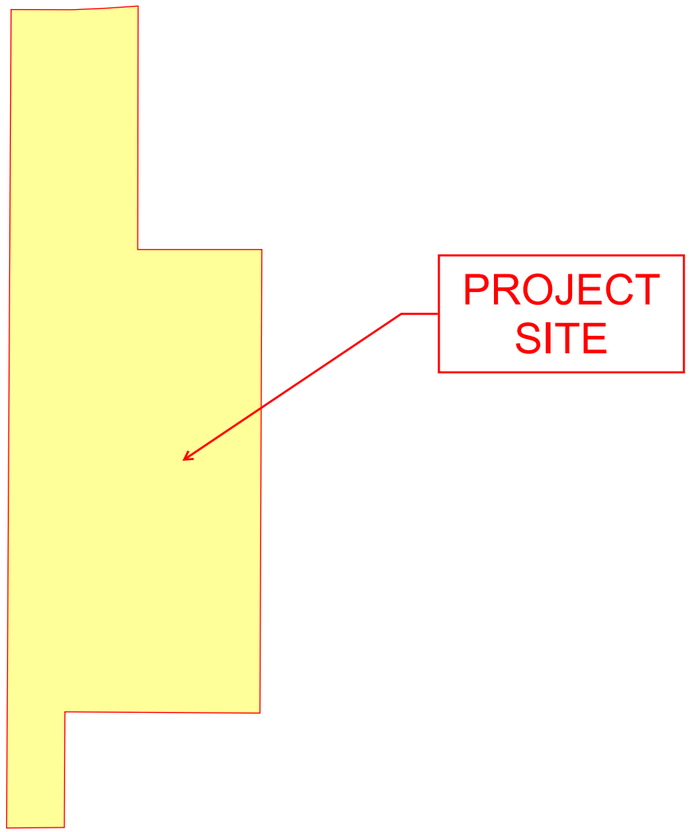
h = 1.95 ft

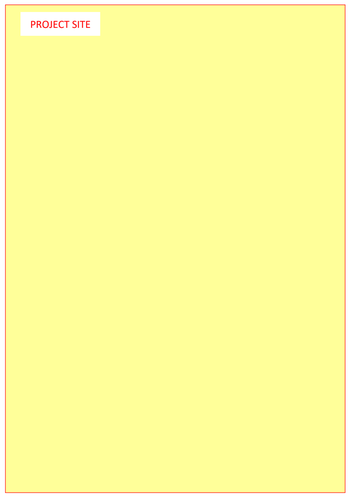
h = 23.4 inches


PROJECT
SITE

NOTE: WE COULDN'T LOCATE ONSITE
DEVELOPED BASINS MAP FOR THIS PROJECT

.




PROJECT SITE

REFERENCES

CCFRCD HEC-1 FOR BASIN LMDB



```
1****************************************
****************************************
 *                                      *                                                *
*
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                                *    U.S. ARMY CORPS OF ENGINEERS
*
 *               JUN   1998             *                                                *    HYDROLOGIC ENGINEERING CENTER
*
 *            VERSION 4.1               *                                                *          609 SECOND STREET
*
 *                                      *                                                *       DAVIS, CALIFORNIA 95616
*
 *  RUN DATE   17SEP18  TIME  17:19:40  *                                                *           (916) 756-1104
*
 *                                      *                                                *
*
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                                        X     X  XXXXXXX   XXXXX           X
                                        X     X  X        X     X         XX
                                        X     X  X        X               X
                                        XXXXXXX  XXXX     X        XXXXX  X
                                        X     X  X        X               X
                                        X     X  X        X     X         X
                                        X     X  XXXXXXX   XXXXX          XXX
```

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

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


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

                         *DIAGRAM
 *** FREE ***
              1          ID    CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT 2018 MASTER PLAN UPDATE
              2          ID    GOWAN WATERSHED
              3          ID    RECOMMENDED DRAINAGE SYSTEM WITH ULTIMATE DEVELOPMENT
              4          ID    INPUT FILE = GOW4C.DAT
              5          ID    INPUT FILE DATE = FEBRUARY 26, 2018
              6          ID    DESIGN STORM = 100-YEAR 6-HR STORM
              7          ID    STORM DISTRIBUTION = SDN #4
              8          ID    MODELED BY ATKINS (HONGYU DENG, E.I., CFM)
              9          ID    CHECKED BY ATKINS (RAUL VALDEZ, P.E., CFM)
             10          ID    STORM CENTERING = REMOVED DETENTION BASIN AND GDB OUTFLOWS (SERIES C)
             11          ID
             12          ID    REFERENCED HYDROLOGIC MODELS:
             13          ID    CITY OF LAS VEGAS CITY WIDE HYDROLOGY ANALYSIS (PBS&J 1997)
             14          ID    NORTHWEST NEIGHBORHOOD STUDY PHASE 1 (PBS&J 1997)
             15          ID    US 95/RANCHO FIS RESTUDY (PBS&J 1998)
             16          ID    SUMMERLIN VILLAGE 26 REVERENCE MASTER DRAINAGE STUDY (G.C. WALLACE 2015)
             17          ID    SUMMERLIN VILLAGE 26 REVERENCE OFFSITE IMPROVEMENTS (G.C. WALLACE 2015)
             18          ID    SUMMERLIN WEST PLANNING AREA FLOOD CONTROL MASTER PLAN UPDATE (VTN, 2017)
             19          ID    WESTERN CLARK COUNTY 215 BRUCE WOODBURY BELTWAY - CRAIG ROAD
             20          ID    TO HUALAPAI WAY REGIONAL FLOOD CONTROL IMPROVEMENTS (G.C. WALLACE 2015)
             21          ID    ANGEL PARK DETENTION BASIN EXPANSION FINAL DESIGN REPORT (G.C. WALLACE 2011)
             22          ID    GOWAN NORTH BUFFALO BRANCH LONE MOUNTAIN TO WASHBURN (WSP 2017)
             23          ID    LONE MOUNTAIN - BELTWAY DETENTION BASIN DAM SAFTTY CALCULATION WORKBOOK
             24          ID    (G.C. WALLACE FEBBRUARY 2015)
             25          ID
             26          ID          AREA    DARF
             27          ID          SQ.MI.
             28          ID                  SDN 3   SDN 4   SDN 5
             29          ID          0 - 0.5 0.99
             30          ID          0.5 - 1 0.975
             31          ID          1 - 2   0.95
             32          ID          2 - 3   0.925
             33          ID          3 - 4   0.915
             34          ID          4 - 5   0.908
             35          ID          5 - 6   0.903
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             37          ID          7 - 8   0.885
             38          ID          8 - 9           0.875
             39          ID          9 - 10          0.865
             40          ID          10 - 11         0.857
             41          ID          11 - 12         0.85
             42          ID          12 - 16                 0.832
             43          ID          16 - 20                 0.804
             44          ID          20 - 30                 0.765
             45          ID          30 - 40                 0.725
             46          ID          40 - 50                 0.695
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  47          ID          50 - 100               0.64
  48          ID
  49          IT       5       0       0     300
  50          IO       5       0       0
  51          IN       5       0       0
  52          JR    PREC   0.875   0.865   0.857    0.85
              *
1                                     HEC-1 INPUT                                          PAGE  2

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

  53          KK  LV29-C
  54          BA   0.277
  55          PB    2.80
  56          PC       0    0.02   0.058   0.075   0.099   0.126   0.137   0.145   0.149   0.151
  57          PC   0.155   0.156   0.159   0.162   0.169   0.172   0.179   0.189   0.201   0.211
  58          PC    0.22   0.228   0.232    0.24   0.246   0.252    0.26   0.269   0.276   0.283
  59          PC   0.286   0.292   0.302   0.312   0.321   0.332   0.352   0.376   0.415   0.462
  60          PC    0.53    0.61    0.71   0.732   0.756   0.782   0.799   0.813   0.823    0.83
  61          PC   0.835   0.844   0.851   0.864   0.885   0.908   0.924   0.944   0.968   0.973
  62          PC   0.978   0.982   0.984   0.986   0.988   0.991   0.992   0.993   0.994   0.997
  63          PC   0.998   0.999       1
  64          LS       0    87.1
  65          UD   0.417
              *

  66          KK RLV29-C
  67          KM  ROUTE LV29-C TO CLV30-C
  68          KM  FACILITY = GOWAN - TENAYA BRANCH
  69          KM  FACILITY # = GOTE 0000
  70          KM  LINING = RCP
  71          RD    1350   0.013   0.013       0    CIRC       5       0
              *

  72          KK  LV30-C
  73          BA   0.417
  74          PB    2.80
  75          LS       0    84.6
  76          UD   0.592
              *

  77          KK CLV30-C
  78          KM  COMBINE RLV29-C AND LV30-C
  79          HC       2
              *

  80          KK BWHW1-C
  81          BA   0.291
  82          PB    3.09
  83          LS       0    74.5
  84          UD   0.286
              *

  85          KKRBWHW1-C
  86          KM  ROUTE BWHW1-C TO CCPHW-C
  87          KM  FACILITY = GOWAN NORTH SYSTEM
  88          KM  FACILITY # = GONO 0511
  89          KM  LINING = RCB
  90          RD    1320  0.0114   0.015       0    TRAP       6       0
              *
1                                     HEC-1 INPUT                                          PAGE  3

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

  91          KK  CPHW-C
  92          BA   0.308
  93          PB    3.12
  94          LS       0    72.2
  95          UD   0.356
              *

  96          KK CCPHW-C
  97          KM  COMBINE RBWHW1-C AND CPHW-C
  98          KM  GOWAN NORTH-JENSEN @ RANCH HOUSE ROAD
  99          HC       2
              *

 100          KKRCCPHW-C
 101          KM  ROUTE CCPHW-C TO CADHW-C
 102          KM  FACILITY = GOWAN NORTH SYSTEM
 103          KM  FACILITY # = GONO 0486
 104          KM  LINING = RCB
 105          RD    1320  0.0076   0.015       0    TRAP       7       0
              *

 106          KK  ADHW-C
 107          BA   0.305
 108          PB    3.13
 109          LS       0    63.6
 110          UD   0.373
              *

 111          KK CADHW-C
```

```
 112          KM  COMBINE RCCPHW-C AND ADHW-C
 113          KM  GOWAN NORTH-JENSEN @ TROPICAL PARKWAY
 114          HC       2
              *

 115          KKRCADHW-C
 116          KM  ROUTE CADHW-C TO CTRHW-C
 117          KM  FACILITY = GOWAN NORTH SYSTEM
 118          KM  FACILITY # = GONO 0461
 119          KM  LINING = RCB
 120          RD    1320  0.0038   0.015       0    TRAP       8       0
              *

 121          KK  TRHW-C
 122          BA   0.302
 123          PB    3.14
 124          LS       0    71.3
 125          UD   0.352
              *
1                                      HEC-1 INPUT                                          PAGE  4

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

 126          KK CTRHW-C
 127          KM  COMBINE RCADHW-C AND TRHW-C
 128          KM  GOWAN NORTH-JENSEN @ EL CAMPO GRANDE
 129          HC       2
              *

 130          KKRCTRHW-C
 131          KM  ROUTE CTRHW-C TO CEAHW-C
 132          KM  FACILITY = GOWAN NORTH SYSTEM
 133          KM  FACILITY # = GONO 0436
 134          KM  LINING = RCB
 135          RD    1320  0.0114   0.015       0    TRAP       8       0
              *

 136          KK  EAHW-C
 137          BA   0.294
 138          PB    3.15
 139          LS       0    68.0
 140          UD   0.357
              *

 141          KK CEAHW-C
 142          KM  COMBINE RCTRHW-C AND EAHW-C
 143          KM  GRAND CANYON & ANN
 144          HC       2
              *

 145          KKRCEAHW-C
 146          KM  ROUTE CEAHW-C TO CARHW-C
 147          KM  FACILITY = GOWAN NORTH SYSTEM
 148          KM  FACILITY # = GONO 0411
 149          KM  LINING = RCB
 150          RD    1320  0.0076   0.015       0    TRAP      10       0
              *

 151          KK  ARHW-C
 152          BA   0.337
 153          PB    3.15
 154          LS       0    63.4
 155          UD   0.354
              *

 156          KK CARHW-C
 157          KM  COMBINE RCEAHW-C AND ARHW-C
 158          HC       2
              *

 159          KKRCARHW-C
 160          KM  ROUTE CARHW-C TO CWRHW-C
 161          KM  FACILITY = GOWAN NORTH SYSTEM
 162          KM  FACILITY # = GONO 0335, 0350
 163          KM  LINING = RCB
 164          RD    4000  0.0088   0.015       0    TRAP      10       0
              *
1                                      HEC-1 INPUT                                          PAGE  5

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

 165          KK  WRHW-C
 166          BA   0.498
 167          PB    3.12
 168          LS       0    64.8
 169          UD   0.381
              *

 170          KK CWRHW-C
 171          KM  COMBINE RCARHW-C AND WRHW-C
 172          HC       2
              *
```

```
 173          KK  CDMNA3
 174          BA   0.300
 175          PB    3.20
 176          LS       0    95.4
 177          UD   0.255
              *

 178          KK   RMNA3
 179          KM  ROUTE CDMNA3 TO CMNA2
 180          KM  FACILITY = GOWAN BELTWAY WEST
 181          KM  FACILITY ID-MILE = GOBW 0315, 0310
 182          KM  LINING = RCB
 183          RD    1226    0.04   0.013       0    CIRC     4.5       0
              *

 184          KK  CDMNA2
 185          BA   0.190
 186          PB    3.18
 187          LS       0    92.2
 188          UD   0.264
              *

 189          KK   CMNA2
 190          KM  COMBINE RMNA3 AND CDMNA2
 191          KM  RANCHO ROAD SYSTEM-BELTWAY CHANNEL @ SHAUMBER
 192          HC       2
              *

 193          KK   RMNA2
 194          KM  ROUTE CMNA2 TO CEFPOA1
 195          KM  FACILITY = GOWAN BELTWAY WEST
 196          KM  FACILITY ID-MILE = GOBW 0291, 0264
 197          KM  LINING = RCB
 198          RD    2655  0.0134   0.015       0    TRAP       8       0
              *

 199          KK  EFPOA1
 200          BA   0.291
 201          PB    3.22
 202          LS       0    91.4
 203          UD   0.211
              *
```



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

 204          KK CEFPOA1
 205          KM  COMBINE EFPOA1 AND RMNA2
 206          KM  GOWAN BELTWAY WEST @ TROPICAL
 207          HC       2
              *

 208          KK  CAMDK2
 209          BA   0.343
 210          PB    3.28
 211          LS       0    92.6
 212          UD   0.212
              *

 213          KK RCAMDK2
 214          KM  ROUTE CAMDK2 TO CAMDK3 ALONG COLLECTOR DIKE
 215          KM  FACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
 216          KM  FACILITY # = GOAN 0065, 0067, 0068, 0070
 217          KM  LINING = SOIL CEMENT
 218          RD    1860    0.03   0.025       0    TRAP      10       4
              *

 219          KK  CAMDK3
 220          BA   0.316
 221          PB    3.32
 222          LS       0    90.9
 223          UD   0.193
              *

 224          KK CCAMDK3
 225          KM  COMBINE RCAMDK2 AND CAMDK3
 226          HC       2
              *

 227          KK CAM-10A
 228          BA   1.246
 229          PB    3.41
 230          LS       0    92.6
 231          UD   0.210
              *

 232          KK CAM-10B
 233          BA   1.809
 234          PB    3.39
 235          LS       0    89.3
 236          UD   0.211
              *

 237          KKDETCAM10
```

```
 238          BA   0.046
 239          PB   3.294
 240          LS       0    87.9
 241          UD   0.140
              *
1                                    HEC-1 INPUT                                          PAGE  7

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


 242          KK CAM10IN
 243          KM  COMBINE CCAMDK3, CAM-10A, CAM-10B AND DETCAM10
 244          KM  TOTAL INFLOW TO CAM10 DETENTION BASIN
 245          KO       1
 246          HC       4
              *

 247          KK CAM10DB
 248          KM  FACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
 249          KM  FACILITY # = GOAN 0061,0062
 250          KM  CLEAR WATER STORAGE REQUIRED = 400.4 AC-FT
 251          KM  SEDIMENTATION VOLUME REQUIRED = 38.5 AC-FT
 252          KM  TOTAL VOLUME = 438.9 AC-FT
 253          KM  VOLUME TO BE INCREASE BY 74.9 AC-FT
 254          KM  OUTLET = 33" ORIFICE WITH 54" RCP
 255          KM  100-YEAR DISCHARGE = 157 CFS
 256          KM  SPILLWAY LENGTH = 1360 FT
 257          KM  SPILLWAY HEIGHT = 27.7 FT
 258          KM  SPILLWAY CREST ELEVATION = 3000'
 259          KM  SPILLWAY TYPE =
 260          KM  PMF DISCHARGE = 24,614 CFS
 261          KM  TOP OF EMBANKMENT ELEVATION = 3004.5'
 262          KM  INFORMATION TAKEN FROM "ANN ROAD (CAM-10) DETENTION BASIN PLANS"
 263          KM  BY THE LOUIS BERGER GROUP (5-05)
 264          KO       1
 265          RS       1    STOR      -1
              * 0       0       0       0.67    3.33    8.33    26.67   43.33   110     200
              * 280     347.2   364     396
 266          SV       0       0       0    0.74    3.66    9.16   29.34   47.66  121.00     220
 267          SV  308.00  381.92  400.40  435.60
 268          SE  2972.6  2973.8  2974.5  2975.0  2976.0  2976.7  2978.8  2980.0  2985.0  2990.0
 269          SE  2995.0  2999.0  3000.0  3003.4
 270          SQ    0.00    6.67   17.78   27.78   45.56   54.44   64.44   82.22   93.33  117.78
 271          SQ  138.39  156.00  160.40   24614
              *

 272          KK CAM10OT
 273          KM  ROUTE CAM10DB TO CCEFPOA1
 274          KM  FACILITY = GOWAN ANN ROAD DETENTION BASIN FACILITIES
 275          KM  FACILITY # = GOAN 0000, 0044
 276          KM  LINING = RCP
 277          RD    3442  0.0258   0.013       0    CIRC     4.5       0
              *
              * ********************************************************************
              * ********************************************************************
              * STANDARD DETENTION BASIN DIVERSION BLOCK
              *
              * THE FOLLOWING DIVERSION IS USED TO DIVERT OUT DETENTION BASIN FLOWS
              *
1                                    HEC-1 INPUT                                          PAGE  8

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


 278          KK*NO_FLOW
 279          KM  ALL FLOW REMOVED
 280          DT*REMOVED
 281          DI       0  100000
 282          DQ       0  100000
              *
              * ********************************************************************
              * ********************************************************************
              *

 283          KKCCEFPOA1
 284          KM  COMBINE CAM10OT AND CEFPOA1
 285          HC       2
              *

 286          KKRCCEFPOA1
 287          KM  ROUTE CCEFPOA1 TO CEFPOA2
 288          KM  FACILITY = GOWAN BELTWAY WEST
 289          KM  FACILITY # = GOBW 0244, 0227
 290          KM  LINING = RCB
 291          RD    1964  0.0147   0.015       0    TRAP      10       0
              *

 292          KK  EFPOA2
 293          BA   0.399
 294          PB    3.25
 295          LS       0    94.5
 296          UD   0.224
              *

 297          KK CEFPOA2
```

```
 298          KM  COMBINE RCCEFPOA1 AND EFPOA2
 299          KM  LAS VEGAS BELTWAY @ EL CAMPO GRANDE
 300          HC       2
              *
              * KK      RCEFPOA2
              * KM      CHANNEL ROUTING REMOVED FOR MODEL STABILITY
              * KM      ROUTE CEFPOA2 TO CEFPOB1
              * KM      FACILITY = GOWAN BELTWAY WEST
              * KM      FACILITY # = GOBW 0201
              * KM      LINING = RCB
              * RD      670     0.0112  0.015   0       TRAP    14      0
              *

 301          KK  EFPOB1
 302          BA   0.329
 303          PB    3.29
 304          LS       0    95.0
 305          UD   0.145
              *
1                                    HEC-1 INPUT                                    PAGE  9

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

 306          KK  CEFPOB
 307          KM  COMBINE RCEFPOA2 AND EFPOB1
 308          HC       2
              *

 309          KK RCEFPOB
 310          KM  ROUTE TO CEFPOB TO CHLBW1-C
 311          KM  FACILITY = GOWAN BELTWAY WEST
 312          KM  FACILITY # = GOBW 0201, 0183, 0156
 313          KM  LINING = RCB
 314          RD    3800   0.022   0.015       0    TRAP      14       0
              *

 315          KK HLBW1-C
 316          BA   0.564
 317          PB    3.27
 318          LS       0    92.7
 319          UD   0.224
              *

 320          KKCHLBW1-C
 321          KM  COMBINE RCEFPOB AND HLBW1-C
 322          KM  LAS VEGAS BELTWAY @ ANN ROAD
 323          HC       2
              *
              * KK      RCHLBW1C
              * KM      CHANNEL ROUTING REMOVED FOR MODEL STABILITY
              * KM      ROUTE CHLBW1-C TO CWRBW1
              * KM      FACILITY = GOWAN BELTWAY WEST
              * KM      FACILITY # = GOBW 0128, 0132
              * KM      LINING = CONCRETE
              * RD      750     0.05    0.015   0       TRAP    14      0
              *

 324          KK   WRBW1
 325          BA   0.333
 326          PB    3.25
 327          LS       0    89.5
 328          UD   0.247
              *

 329          KK  CWRBW1
 330          KM  COMBINE WRBW1 AND RCHLBW1C
 331          HC       2
              *

 332          KKBOXCANYON
 333          BA   3.410
 334          PB    3.55
 335          LS       0    88.5
 336          UD   0.327
              *
1                                    HEC-1 INPUT                                    PAGE 10

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

 337          KK  BOXDET
 338          KM  BOX CANYON DETENTION BASIN
 339          KM  FACILITY = GOWAN BOX CANYON
 340          KM  FACILITY # = GOBX 0118
 341          KM  CLEAR WATER STORAGE REQUIRED = 393 AC-FT
 342          KM  SEDIMENTATION VOLUME REQUIRED = 37.2 AC-FT
 343          KM  TOTAL VOLUME = 430.2 AC-FT
 344          KM  OUTLET = GOBX 0016: 18" RCP
 345          KM  100-YEAR DISCHARGE = 39 CFS
 346          KM  SPILLWAY LENGTH =
 347          KM  SPILLWAY HEIGHT = 20.25 FT
 348          KM  SPILLWAY CREST ELEVATION =
 349          KM  SPILLWAY TYPE =
 350          KM  PMF DISCHARGE =
```

```
 351          KM  TOP OF EMBANKMENT ELEVATION =
 352          KO       1
 353          RS       1    STOR      -1
 354          SV     0.0    35.4    71.5   108.4   146.0   184.3   223.4   263.3   304.0   345.4
 355          SV   387.6   393.0
 356          SE       0       2       4       6       8      10      12      14      16      18
 357          SE      20   20.25
 358          SQ     0.0    10.3    16.6    21.1    24.8    28.0    30.9    33.6    36.0    38.3
 359          SQ    40.4    40.7
              *

 360          KK RBOXDET
 361          KM  ROUTE BOXDET THRU LWBW1
 362          KM  FACILITY = GOWAN BOX CANYON
 363          KM  FACILITY # = GOBX 0116, 0015, 0000
 364          KM  LONE MOUNTAIN
 365          RD    7400  0.0655   0.013       0    CIRC     5.5       0
              *
              * ********************************************************************
              * ********************************************************************
              * STANDARD DETENTION BASIN DIVERSION BLOCK
              *
              * THE FOLLOWING DIVERSION IS USED TO DIVERT OUT DETENTION BASIN FLOWS
              *

 366          KK*NO_FLOW
 367          KM  ALL FLOW REMOVED
 368          DT*REMOVED
 369          DI       0  100000
 370          DQ       0  100000
              *
              * ********************************************************************
              * ********************************************************************
              *
1                                        HEC-1 INPUT                                        PAGE 11

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


 371          KK   LWBW1
 372          BA   0.465
 373          PB    3.29
 374          LS       0    92.1
 375          UD   0.285
              *

 376          KK  CLWBW1
 377          KM  COMBINE RBOXDET, LWBW1, AND CWRBW1
 378          HC       3
              *

 379          KK  UVB1-1
 380          BA   0.371
 381          PB    3.24
 382          LS       0    91.3
 383          UD   0.170
              *

 384          KK  UVB1-2
 385          BA   0.314
 386          PB    3.30
 387          LS       0    95.6
 388          UD   0.211
              *

 389          KK    CUVB
 390          KM  COMBINE CLWBW1, UVB1-1, UVB1-2,
 391          KM  LAS VEGAS BELTWAY @ LONE MOUNTAIN
 392          HC       3
              *

 393          KK   LMBW1
 394          BA   0.084
 395          PB    3.18
 396          LS       0    86.7
 397          UD   0.113
              *

 398          KK  CLMBW1
 399          KM  COMBINE CUVB AND LMBW1
 400          KM  COMBINE INFLOW INTO LONE MOUNTAIN - BELTWAY DETENTION BASIN
 401          KO       1
 402          HC       2
              *

 403          KK  LMBWDB
 404          KM  LONE MOUNTAIN BELTWAY DETENTION BASIN
 405          KM  FACILITY = GOWAN BELTWAY WEST
 406          KM  FACILITY # = GOBW 0052
 407          KM  STORAGE VOLUME = 589 AC-FT
 408          KM  OUTLET = 72" RCP
 409          KM  100-YEAR DISCHARGE =
 410          KM  SPILLWAY LENGTH = 1010' TOTAL (SOUTH BASIN 600' & NORTH BASIN 410')
1                                        HEC-1 INPUT                                        PAGE 12
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 411          KM  SPILLWAY CREST ELEVATION = 2738.27'
 412          KM  SPILLWAY TYPE = CONCRETE BROAD CRESTED WEIR
 413          KM  PMF DISCHARGE = 8300 CFS, SOUTH AND 8800 CFS, NORTH
 414          KM  TOP OF EMBANKMENT ELEVATION =
 415          KM  INFORMATION TAKEN FROM "REGIONAL FLOOD CONTROL IMPROVEMENTS
 416          KM  WESTERN CLARK COUNTY 215 BRUCE WOODBURY BELTWAY - CRAIG ROAD TO HUALAPAI WAY"
 417          KM  PLANS DATED JANUARY 26, 2015
 418          KM  PARAMETERS (LONE MOUNTAIN - BELTWAY DETENTION BASIN DAM SAFTTY CALCULATION WOR
 419          KM  BY G.C. WALLACE DATED FEBRUARY 2015
 420          KO       1
 421          RS       1    STOR      -1
 422          SV       0     7.4    29.8      81   150.8   233.1   352.9   493.7   585.4   617.3
 423          SE    2699    2705    2710    2715    2720    2725    2730    2735    2738    2739
 424          SQ       0    26.9    37.8    46.1    53.2    59.4      65     114   118.8   120.3
              *

 425          KK RLMBWDB
 426          KM  ROUTE LMBWDB TO CCWRHW-C
 427          KM  FACILITY = GOWAN BELTWAY WEST
 428          KM  FACILITY # = GOBW 0000, 0048, 0051
 429          KM  LINING = RCP
 430          RD    4165   0.029   0.013       0    CIRC       4       0
              *
              * ********************************************************************
              * ********************************************************************
              * STANDARD DETENTION BASIN DIVERSION BLOCK
              *
              * THE FOLLOWING DIVERSION IS USED TO DIVERT OUT DETENTION BASIN FLOWS
              *

 431          KK*NO_FLOW
 432          KM  ALL FLOW REMOVED
 433          DT*REMOVED
 434          DI       0  100000
 435          DQ       0  100000
              *
              * ********************************************************************
              * ********************************************************************
              *

 436          KKCCWRHW-C
 437          KM  COMBINE RLMBWDB AND CWRHW-C
 438          HC       2
              *

 439          KKRCCWRHWC
 440          KM  ROUTE CCWRHW-C TO CCLWFR-C
 441          KM  FACILITY = GOWAN NORTH SYSTEM
 442          KM  FACILITY # = GONO 0272, 0325
 443          KM  LINING = RCB
 444          RD    2550   0.033   0.015       0    TRAP      10       0
              *
1                                      HEC-1 INPUT                                          PAGE 13

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

 445          KK  LWFR-W
 446          BA   0.125
 447          PB    3.02
 448          LS       0    62.7
 449          UD   0.271
              *

 450          KK CLWFR-W
 451          KM  COMBINE RCCWRHWC AND LWFR-W
 452          HC       2
              *

 453          KKRCLWFR-W
 454          KM  ROUTE CLWFR-W TO CCLWFR-E
 455          KM  FACILITY = GOWAN NORTH SYSTEM
 456          KM  FACILITY # = GONO 0272, 0234, 0230
 457          KM  LINING = RCB
 458          RD    2800    0.02   0.015       0    TRAP      12       0
              *

 459          KK  BSFR-C
 460          BA   0.207
 461          PB    2.94
 462          LS       0    76.8
 463          UD   0.305
              *

 464          KK RBSFR-C
 465          KM  ROUTE BSFR-C TO CCPFR-C
 466          KM  FACILITY = GOWAN - EL CAPITAN BRANCH
 467          KM  FACILITY # = GOEC 0176
 468          KM  LINING = RCP
 469          RD    1320  0.0115   0.013       0    CIRC     6.5       0
              *

 470          KK  CPFR-C
```

```
 471          BA   0.251
 472          PB    2.95
 473          LS       0    64.7
 474          UD   0.362
              *

 475          KK CCPFR-C
 476          KM  COMBINE RBSFR-C AND CPFR-C
 477          KM  GOWAN-EL CAPITAN BRANCH @ RANCH HOUSE ROAD
 478          HC       2
              *

 479          KKRCCPFR-C
 480          KM  ROUTE CCPFR-C TO CARFP-C
 481          KM  FACILITY = GOWAN - EL CAPITAN BRANCH
 482          KM  FACILITY # = GOEC 0152
 483          KM  LINING = RCB
 484          RD    1320  0.0077   0.015       0    TRAP       7       0
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 485          KK  ARFP-C
 486          BA   0.246
 487          PB    2.95
 488          LS       0    64.8
 489          UD   0.362
              *

 490          KK CARFP-C
 491          KM  COMBINE CARFP-C AND ARFP-C
 492          KM  GOWAN-EL CAPITAN BRANCH @ TROPICAL PARKWAY
 493          HC       2
              *

 494          KKRCARFP-C
 495          KM  ROUTE CARFP-C TO CTRFR-C
 496          KM  FACILITY = GOWAN - EL CAPITAN BRANCH
 497          KM  FACILITY # = GOEC 0126
 498          KM  LINING = RCB
 499          RD    1320  0.0038   0.015       0    TRAP      10       0
              *

 500          KK  TRFR-C
 501          BA   0.256
 502          PB    2.96
 503          LS       0    64.0
 504          UD   0.373
              *

 505          KK CTRFR-C
 506          KM  COMBINE RCARFP-C AND TRFR-C
 507          KM  GOWAN-EL CAPITAN BRANCH @ EL CAMPO GRANDE
 508          HC       2
              *

 509          KKRCTRFR-C
 510          KM  ROUTE CTRFR-C TO CEAFR-C
 511          KM  FACILITY = GOWAN - EL CAPITAN BRANCH
 512          KM  FACILITY # = GOEC 0100
 513          KM  LINING = RCB
 514          RD    1320  0.0076   0.015       0    TRAP      10       0
              *

 515          KK  EAFR-C
 516          BA   0.249
 517          PB    2.97
 518          LS       0    64.3
 519          UD   0.372
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 520          KK CEAFR-C
 521          KM  COMBINE RCTRFR-C AND EAFR-C
 522          KM  GOWAN-EL CAPITAN BRANCH @ ANN ROAD
 523          HC       2
              *

 524          KKRCEAFR-C
 525          KM  ROUTE CEAFR-C TO CARFR-C
 526          KM  FACILITY = GOWAN - EL CAPITAN BRANCH
 527          KM  FACILITY # = GOEC 0076
 528          KM  LINING = RCB
 529          RD    1335  0.0054   0.015       0    TRAP      10       0
              *

 530          KK  ARFR-C
 531          BA   0.242
 532          PB    2.97
 533          LS       0    68.3
```

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 534          UD   0.358
              *

 535          KK CARFR-C
 536          KM  COMBINE RCEAFR-C AND ARFR-C
 537          KM  GOWAN-EL CAPITAN BRANCH @ HAMMER LANE
 538          HC       2
              *

 539          KKRCARFR-C
 540          KM  ROUTE CARFR-C TO CHLFR-C
 541          KM  FACILITY = GOWAN - EL CAPITAN BRANCH
 542          KM  FACILITY # = GOEC 0051
 543          KM  LINING = RCB
 544          RD    1290  0.0106   0.015       0    TRAP      10       0
              *

 545          KK  HLFR-C
 546          BA   0.241
 547          PB    2.97
 548          LS       0    64.2
 549          UD   0.372
              *

 550          KK CHLFR-C
 551          KM  COMBINE RCARFR-C AND HLFR-C
 552          KM  GOWAN-EL CAPITAN BRANCH @ WASHBURN ROAD
 553          HC       2
              *

 554          KK RCHLFRC
 555          KM  ROUTE CHLFR-C TO CWRJS-C
 556          KM  FACILITY = GOWAN - EL CAPITAN BRANCH
 557          KM  FACILITY # = GOEC 0026
 558          KM  LINING = RCB
 559          RD    1330  0.0082   0.015       0    TRAP      10       0
              *
1                                      HEC-1 INPUT                                          PAGE 16

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

 560          KK  WRJS-C
 561          BA   0.254
 562          PB    2.97
 563          LS       0    61.7
 564          UD   0.378
              *

 565          KK CWRJS-C
 566          KM  COMBINE RCHLFRC AND WRJS-C
 567          KM  GOWAN-EL CAPITAN BRANCH @ LA MADRE WAY
 568          HC       2
              *

 569          KKRCWRJS-C
 570          KM  ROUTE CWRJS-C TO CLWFR-E
 571          KM  FACILITY = GOWAN - EL CAPITAN BRANCH
 572          KM  FACILITY # = GOEC 0000
 573          KM  LINING = RCB
 574          RD    1436  0.0107   0.015       0    TRAP      10       0
              *

 575          KK  LWFR-E
 576          BA   0.130
 577          PB    2.92
 578          LS       0    64.3
 579          UD   0.292
              *

 580          KK CLWFR-E
 581          KM  COMBINE RCWRJS-C AND LWFR-E
 582          HC       2
              *

 583          KKCCLWFR-E
 584          KM  COMBINE RCLWFR-W AND CLWFR-E
 585          HC       2
              *

 586          KKRCCLWFRE
 587          KM  ROUTE CCLWFR-E TO CLMFR-C
 588          KM  FACILITY = GOWAN NORTH SYSTEM
 589          KM  FACILITY # = GONO 0183, 0225
 590          KM  LINING = CONCRETE
 591          RD    1350  0.0088   0.015       0    TRAP      22       0
              *

 592          KK  LMFR-C
 593          BA   0.381
 594          PB    3.00
 595          LS       0    59.0
 596          UD   0.443
              *
1                                      HEC-1 INPUT                                          PAGE 17
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 597          KK CLMFR-C
 598          KM  COMBINE LMFR-C AND RCCLWFRE
 599          HC       2
              *

 600          KKRCLMFR-C
 601          KM  ROUTE CLMFR-C TO CRSFR-C
 602          KM  FACILITY = GOWAN NORTH SYSTEM
 603          KM  FACILITY # = GONO 0183
 604          KM  LINING = CONCRETE
 605          RD    1350  0.0072   0.015       0    TRAP      22       0
              *

 606          KK  RSFR-C
 607          BA   0.270
 608          PB    2.96
 609          LS       0    61.8
 610          UD   0.411
              *

 611          KK CRSFR-C
 612          KM  COMBINE RSFR-C AND RCLMFR-C
 613          HC       2
              *

 614          KK LMBW2-C
 615          BA   0.424
 616          PB    3.11
 617          LS       0    67.6
 618          UD   0.212
              *

 619          KKRLMBW2-C
 620          KM  ROUTE LMBW2-C TO CHAJS2-C
 621          KM  CRAIG ROAD
 622          RD    2600  0.0269   0.016       0    TRAP       0      50
              *

 623          KK HAJS2-C
 624          BA   0.248
 625          PB    3.03
 626          LS       0    61.9
 627          UD   0.267
              *

 628          KKCHAJS2-C
 629          KM  COMBINE RLMBW2-C AND HAJS2-C
 630          KM  CRAIG ROAD @ FORT APACHE
 631          HC       2
              *
1                                        HEC-1 INPUT                                                PAGE 18

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

 632          KKRCHAJS2C
 633          KM  ROUTE CHAJS2-C TO CHAFR1-C
 634          KM  CRAIG ROAD
 635          RD    2640  0.0208   0.016       0    TRAP       0      50
              *

 636          KK HAFR1-C
 637          BA   0.257
 638          PB    2.93
 639          LS       0    66.1
 640          UD   0.356
              *

 641          KKCHAFR1-C
 642          KM  COMBINE RCHAJS2C AND HAFR1-C
 643          KM  CRAIG ROAD @ EL CAPITAN
 644          HC       2
              *

 645          KKRCHAFR1C
 646          KM  ROUTE CHAFR1-C TO CCRSFR-C
 647          KM  CRAIG ROAD
 648          RD     650  0.0125   0.016       0    TRAP       0      50
              *

 649          KKCCRSFR-C
 650          KM  COMBINE CRSFR-C AND RCHAFR1C
 651          HC       2
              *

 652          KKRCRSFR-C
 653          KM  ROUTE CCRSFR-C TO CHAFR2-C
 654          KM  FACILITY = GOWAN NORTH SYSTEM
 655          KM  FACILITY # = GONO 0117, 0124, 0141, 0181
 656          KM  LINING = CONCRETE
 657          RD    3516  0.0093   0.015       0    TRAP      24       0
```

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                *

 658            KK HAFR2-C
 659            BA   0.143
 660            PB    2.87
 661            LS       0    68.0
 662            UD   0.225
                *

 663            KKCHAFR2-C
 664            KM  COMBINE RCRSFR-C AND HAFR2-C
 665            HC       2
                *
1                                       HEC-1 INPUT                                                 PAGE 19

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


 666            KK  LV12-C
 667            BA   0.188
 668            PB    3.04
 669            LS       0    85.6
 670            UD   0.265
                *

 671            KK RLV12-C
 672            KM  ROUTE LV12-C TO CLV13-C
 673            KM  FORT APACHE TO GOWAN
 674            RD    5500  0.0191   0.016       0    TRAP       0      50
                *

 675            KK  LV13-C
 676            BA   0.436
 677            PB    2.99
 678            LS       0    81.7
 679            UD   0.427
                *

 680            KK CLV13-C
 681            KM  COMBINE RLV12-C AND LV13-C
 682            HC       2
                *

 683            KKRCLV13-C
 684            KM  ROUTE CLV13-C TO CLV20-C
 685            KM  FACILITY = GOWAN NORTH - DURANGO BRANCH
 686            KM  FACILITY # = GODU 0050
 687            KM  LINING = RCB
 688            RD    1200   0.015   0.015       0    TRAP       9       0
                *

 689            KK  LV20-C
 690            BA   0.358
 691            PB    2.90
 692            LS       0    76.6
 693            UD   0.452
                *

 694            KK CLV20-C
 695            KM  COMBINE RCLV13-C AND LV20-C
 696            KM  GOWAN ROAD @ DURANGO DRIVE
 697            HC       2
                *

 698            KKRCLV20-C
 699            KM  ROUTE CLV20-C TO CLV14-C
 700            KM  FACILITY = GOWAN NORTH - DURANGO BRANCH
 701            KM  FACILITY # = GODU 0000
 702            KM  LINING = RCB
 703            RD    1700  0.0091   0.015       0    TRAP      12       0
                *
1                                       HEC-1 INPUT                                                 PAGE 20

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


 704            KK  LV14-C
 705            BA   0.423
 706            PB    2.96
 707            LS       0    82.1
 708            UD   0.504
                *

 709            KK CLV14-C
 710            KM  COMBINE LV14-C AND RCLV20-C
 711            KM  GOWAN NORTH-DURANGO BRANCH @ GILMORE
 712            HC       2
                *

 713            KKRCLV14-C
 714            KM  ROUTE CLV14-C TO CCLV15-C
 715            KM  FACILITY = GOWAN NORTH - DURANGO BRANCH
 716            KM  FACILITY # = GODU 0000
 717            KM  LINING = RCB
 718            KM  ROUTE CHANGED TO KINEMATIC WAVE TO ACHIEVE STABLILITY
```

```
 719          RK     929  0.0091   0.015       0    TRAP      12       0
              *

 720          KK      30
 721          BA   2.436
 722          PB    3.66
 723          LS       0    85.9
 724          UD   0.530
              *

 725          KK     R30
 726          KM  ROUTE 30 TO CSV26-1
 727          KM  FACILITY = GOWAN/LONE MOUNTAIN SYSTEM - BRANCH 3
 728          KM  FACILITY # = GOL3 0216, 0289
 729          KM  LINING = CONCRETE
 730          RD    9975    0.07   0.015       0    TRAP      50       2
              *
              * THE FOLLOWING SECTION OF HYDROLGOY WAS DEVELOPED BASED ON G.C. WALLACE'S
              * SUMMERLIN VILLAGE 26 REVERENCE MASTER DRAINAGE STUDY (SEP 2015) AND
              * OFFSITE IMPROVEMENTS (DEC 2015)
              *

 731          KK  SV26-1
 732          BA   1.586
 733          PB    3.52
 734          LS       0    86.4
 735          UD   0.579
              *

 736          KK CSV26-1
 737          KM  COMBINE R30 AND SV26-1
 738          HC       2
              *
1                                      HEC-1 INPUT                                          PAGE 21

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


 739          KKRCSV26-1
 740          KM  ROUTE CSV26-1 TO VILLAGE 26 DETENTION BASIN
 741          KM  FACILITY = GOWAN/LONE MOUNTAIN SYSTEM - BRANCH 3
 742          KM  FACILITY # = GOL3 0137, 0188, 0197, AND 0214
 743          KM  LINING = RCB & CONC CHNL
 744          RD    4334   0.045   0.015       0    TRAP      20       0
              *

 745          KK  SV26-2
 746          BA   0.290
 747          PB    3.32
 748          LS       0    88.1
 749          UD   0.154
              *

 750          KK VIL26IN
 751          KM  COMBINE RCSV26-1 AND SV26-2
 752          KM  TOTAL INFLOW TO VILLAGE 26 DETENTION BASIN
 753          KO       1
 754          HC       2
              *

 755          KK   DET26
 756          KM  VILLAGE 26 DETENTION BASIN
 757          KM  FACILITY = GOWAN/LONE MOUNTAIN SYSTEM - BRANCH 3
 758          KM  FACILITY # = GOL3 0128
 759          KM  STORAGE VOLUME = 305 AC-FT
 760          KM  OUTLET = 96" RCP
 761          KM  100-YEAR DISCHARGE =
 762          KM  SPILLWAY LENGTH = 200'
 763          KM  SPILLWAY HEIGHT =
 764          KM  SPILLWAY CREST ELEVATION = 3022'
 765          KM  SPILLWAY TYPE =
 766          KM  PMF DISCHARGE =
 767          KM  TOP OF EMBANKMENT ELEVATION =
 768          KM  INFORMATION REFERENCED FROM DRAINAGE STUDY FOR: SUMMERLIN VILLAGE 26
 769          KM  REVERENCE - OFFSITE IMPROVEMENTS BY G.C. WALLACE INC. (9-19-16)
 770          KO       1
 771          RS       1    STOR       0
 772          SV       0    0.07     0.8   12.71   18.75   25.05   85.95   95.04  124.21  135.14
 773          SV  200.27  243.11  258.06  273.36     289  304.99
 774          SE    2990    2991    2992    2995    2996    2997    3005    3006    3009    3010
 775          SE    3015    3018    3019    3020    3021    3022
 776          SL  2992.8   22.34     0.7     0.5
 777          SS  3021.9     200     2.6     1.5
              *
              * VIL26OT ROUTING REMOVED TO ADD STABILITY TO MODEL
              * *
              * KK      VIL26OT
              * KM      ROUTE DET26 TO CRCSB3
              * KM      FACILITY = GOWAN/LONE MOUNTAIN SYSTEM - BRANCH 3
              * KM      FACILITY # = GOL3 0115
              * KM      LINING = RCP
              * RD      670     0.0029  0.013   0       CIRC    8       0
              *
              * **********************************************************************
              * **********************************************************************
```

```
                  * STANDARD DETENTION BASIN DIVERSION BLOCK
                  *
                  * THE FOLLOWING DIVERSION IS USED TO DIVERT OUT DETENTION BASIN FLOWS
                  *
1                                        HEC-1 INPUT                                                PAGE 22

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

            778   KK*NO_FLOW
            779   KM  ALL FLOW REMOVED
            780   DT*REMOVED
            781   DI       0  100000
            782   DQ       0  100000
                  *
                  * ******************************************************************
                  * ******************************************************************
                  *
            783   KK  SV22-1
            784   BA   0.181
            785   PB    3.44
            786   LS       0    88.9
            787   UD   0.138
                  *
            788   KK RSV22-1
            789   KM  ROUTE SV22-1 TO CSV22
            790   KM  FACILITY = GOWAN LONE MOUNTAIN SYST. 3 BELTWAY
            791   KM  FACILITY # = GOB3 0000
            792   KM  LINING = RCP
            793   RD    1190   0.066   0.013       0    CIRC       6       0
                  *
            794   KK  SV22-2
            795   BA   0.493
            796   PB    3.38
            797   LS       0    93.5
            798   UD   0.291
                  *
            799   KK   CSV22
            800   KM  COMBINE SV22-2 AND RSV22-1
            801   HC       2
                  *
            802   KK  RCSV22
            803   KM  ROUTE CSV22 TO CRCSV22
            804   KM  FACILITY = GOWAN/LONE MOUNTAIN SYSTEM - BELTWAY BRANCH
            805   KM  FACILITY # = GOBE 0065, 0058, 0021, 0001 AND 0000
            806   KM  LINING = CONCRETE
            807   RD    4605   0.065   0.015       0    TRAP      11       0
                  *
            808   KK CRCSV22
            809   KM  COMBINE VILL26OT AND RCSV22
            810   HC       2
                  *
                  * KK      RCRCSV22
                  * KM      ROUTE REMOVED FOR MODEL STABILITY
                  * KM      ROUTE CRCSV22 TO CRLMT1R
                  * KM      FACILITY = GOWAN/LONE MOUNTAIN SYSTEM - BRANCH 3
                  * KM      FACILITY # = GOL3 0070,0077,0100
                  * KM      LINING = CONCRETE
                  * RD      1780    0.061   0.015   0       TRAP    20      0
                  *
1                                        HEC-1 INPUT                                                PAGE 23

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

            811   KK  SV26-3
            812   BA   0.379
            813   PB    3.40
            814   LS       0    89.4
            815   UD   0.113
                  *
            816   KK RSV26-3
            817   KM  ROUTE SV26-3 TO CLMT1R
            818   KM  NATURAL WASH
            819   KM  TRAVEL LENGTH = 1,070
            820   KM  SLOPE = 3.3%
            821   KM  N = 0.040
            822   KM  HYDRAULIC RADIUS = 1.5
            823   KM  VELOCITY = 14.2
            824   RM       0   0.021    0.15
                  *
                  * END OF G.C. WALLACE'S HYDROLOGY
                  *
            825   KK   LMT1R
            826   BA   1.946
            827   PB    3.45
            828   LS       0    87.7
```

```
 829          UD   0.447
              *

 830          KK  CLMT1R
 831          KM  COMBINE RSV26-3 AND LMT1R
 832          HC       2
              *

 833          KK RCLMT1R
 834          KM  ROUTE CLMT1R TO CRCLMT1R
 835          KM  FACILITY = GOWAN/LONE MOUNTAIN SYSTEM - BRANCH 4
 836          KM  FACILITY # = GOL4 0000, 0010, 0025, AND 0026
 837          KM  LINING = RCB
 838          RD    3000   0.025   0.015       0    TRAP      16       0
              *

 839          KKCRCLMT1R
 840          KM  COMBINE RCRCSV22 AND RCLMT1R
 841          HC       2
              *

 842          KKRCRCLMT1
 843          KM  ROUTE CRCLMT1R TO CLMT5
 844          KM  FACILITY = GOWAN/LONE MOUNTAIN SYSTEM - BRANCH 3
 845          KM  FACILITY # = GOL3 0000, 0010, 0068
 846          KM  LINING = CONCRETE
 847          RD    3640   0.027   0.015       0    TRAP      20       0
              *
1                                      HEC-1 INPUT                                          PAGE 24

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

 848          KK    LMT5
 849          BA   0.521
 850          PB    3.27
 851          LS       0    85.7
 852          UD   0.163
              *

 853          KK   CLMT5
 854          KM  COMBINE LMT5 AND RCRCLMT1
 855          HC       2
              *

 856          KK    LMT2
 857          BA   0.975
 858          PB    3.41
 859          LS       0    87.3
 860          UD   0.195
              *

 861          KK   RLMT2
 862          KM  ROUTE LMT2 TO CLMT3
 863          KM  FACILITY = GOWAN/LONE MOUNTAIN SYSTEM
 864          KM  FACILITY # = GOLM 0264, 0277
 865          KM  LINING = CONCRETE
 866          RD    4430    0.05   0.015       0    TRAP      20       2
              *

 867          KK    LMT3
 868          BA   0.362
 869          PB    3.32
 870          LS       0    86.5
 871          UD   0.114
              *

 872          KK   CLMT3
 873          KM  COMBINE RLMT2 AND LMT3
 874          HC       2
              *

 875          KK  RCLMT3
 876          KM  ROUTE CLMT3 TO CUVB2
 877          KM  FACILITY = GOWAN/LONE MOUNTAIN SYSTEM
 878          KM  FACILITY # = GOLM 0226, 0230, 0233, 0236, 0252, 0260, 0262, 0264
 879          KM  LINING = CONCRETE
 880          RD    2490   0.036   0.015       0    TRAP      15       0
              *

 881          KK    UVB2
 882          BA   0.334
 883          PB    3.26
 884          LS       0    87.1
 885          UD   0.281
              *
1                                      HEC-1 INPUT                                          PAGE 25

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

 886          KK   CUVB2
 887          KM  COMBINE  RCLMT3 AND UVB2
 888          HC       2
              *
```

```
 889          KK  CCLMT5
 890          KM  COMBINE  CUVB2 AND CLMT5
 891          HC       2
              *

 892          KK RCCLMT5
 893          KM  ROUTE CCLMT5 TO CGABW
 894          KM  FACILITY = GOWAN/LONE MOUNTAIN SYSTEM
 895          KM  FACILITY # = GOLM 0150, 0162, 0174
 896          KM  LINING = CONCRETE
 897          RD    3820   0.032   0.015       0    TRAP      28       0
              *

 898          KK    GABW
 899          BA   0.293
 900          PB    3.17
 901          LS       0    81.3
 902          UD   0.246
              *

 903          KK   CGABW
 904          KM  COMBINE RCCLMT5 AND GABW
 905          HC       2
              *

 906          KK    CRBW
 907          BA   0.363
 908          PB    3.17
 909          LS       0    83.2
 910          UD   0.318
              *

 911          KK   CCRBW
 912          KM  COMBINE CRBW AND CGABW
 913          HC       2
              *

 914          KK    GRBW
 915          BA   0.301
 916          PB    3.17
 917          LS       0    87.9
 918          UD   0.235
              *
```



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

 919          KK   GRBW2
 920          BA   0.158
 921          PB    3.10
 922          LS       0    85.6
 923          UD   0.217
              *

 924          KK    LMDB
 925          BA   0.120
 926          PB    3.10
 927          LS       0    70.7
 928          UD   0.201
              *

 929          KK  LMTNIN
 930          KM  COMBINE LMDB, GRBW, GRBW2, AND CCRBW
 931          KM  TOTAL INFLOW TO LONE MOUNTAIN DETENTION BASIN
 932          KO       1
 933          HC       4
              *

 934          KK  LMTNDB
 935          KM  LONE MOUNTAIN DETENTION BASIN
 936          KM  FACILITY = GOWAN/LONE MTN. SYSTEM
 937          KM  FACILITY # = GOLM 0146
 938          KM  TYPE OF FACILITY = DETENTION BASIN
 939          KM  STORAGE VOLUME = 888.02 ACRE-FEET
 940          KM  OUTLET = 36" ORIFICE PLATE
 941          KM  100-YEAR DISCHARGE =
 942          KM  SPILLWAY LENGTH = 825'
 943          KM  SPILLWAY HEIGHT =
 944          KM  SPILLWAY CREST ELEVATION = 2652.57'
 945          KM  SPILLWAY TYPE = LABYRINTH
 946          KM  PMF DISCHARGE =
 947          KM  TOP OF EMBANKMENT ELEVATION = 2658'
 948          KM  INFORMATION REFERENCED FROM "ALEXANDER ROAD/HUALAPUI WAY ROAD IMPROVEMENTS
 949          KM  PROJECT: CHEYENE AVENUE TO CIMARRON ROAD" PLANS BY THE CITY OF LAS VEGAS
 950          KM  DEPARTMENT OF PUBLIC WORKS: ENGINEERING DESIGN SECTION (8-12-2004)
 951          KO       1
 952          RS       1    STOR      -1
 953          SV       0    1.48    6.45   32.97   130.6  238.38  377.17  558.09  769.02  888.02
 954          SV  901.46  946.59   992.2 1038.33    1085 1132.17
 955          SE    2621    2622    2623    2625    2630    2635    2640    2645    2650  2652.5
 956          SE    2653    2654    2655    2656    2657    2658
 957          SQ       0       0      24      56      96     120     144     163     182     188
 958          SQ     200     300     600     800   20000   31600
```

```
                *
 959            KK  LMTNOT
 960            KM  ROUTE LMTNDB TO CLV15-C
 961            KM  FACILITY = GOWAN - LONE MOUNTAIN SYSTEM
 962            KM  FACILITY # = GOLM 0000,0049,060,0075,0101,0115,0140,0142,0144,0145
 963            KM  LINING = RCP
 964            RD    9240  0.0308   0.015       0    CIRC       4       0
                *
                * ****************************************************************
                * ****************************************************************
                * STANDARD DETENTION BASIN DIVERSION BLOCK
                *
                * THE FOLLOWING DIVERSION IS USED TO DIVERT OUT DETENTION BASIN FLOWS
                *
1                                       HEC-1 INPUT                                                 PAGE 27

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


 965            KK*NO_FLOW
 966            KM  ALL FLOW REMOVED
 967            DT*REMOVED
 968            DI       0  100000
 969            DQ       0  100000
                *
                * ****************************************************************
                * ****************************************************************
                *

 970            KK  LV15-C
 971            BA   0.355
 972            PB    2.96
 973            LS       0    80.5
 974            UD   0.419
                *

 975            KK CLV15-C
 976            KM  COMBINE LMTNOT AND LV15-C
 977            HC       2
                *

 978            KKCCLV15-C
 979            KM  COMBINE RCLV14-C, CHAFR2-C AND CLV15-C
 980            HC       3
                *

 981            KKRCCLV15C
 982            KM  ROUTE CCLV15-C TO CCLV36-C
 983            KM  FACILITY = GOWAN NORTH SYSTEM
 984            KM  FACILITY # = GONO 0012,0062,0063
 985            KM  LINING = CONCRETE
 986            RD    5046  0.0117   0.015       0    TRAP      30       0
                *

 987            KK  LV32-C
 988            BA   0.294
 989            PB    2.81
 990            LS       0    82.2
 991            UD   0.455
                *

 992            KK RLV32-C
 993            KM  ROUTE LV32-C TO CLV36-C
 994            KM  BUFFALO DRIVE
 995            RD    1000   0.003   0.016       0    TRAP       0      50
                *

 996            KK  LV36-C
 997            BA   0.216
 998            PB    2.80
 999            LS       0    83.4
1000            UD   0.432
                *
1                                       HEC-1 INPUT                                                 PAGE 28

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


1001            KK CLV36-C
1002            KM  COMBINE RLV32-C AND LV36-C
1003            HC       2
                *

1004            KKCCLV36-C
1005            KM  COMBINE RCCLV15C AND CLV36-C
1006            HC       2
                *

1007            KKGD24AA-C
1008            BA   0.438
1009            PB    2.80
1010            LS       0    66.5
1011            UD   0.710
                *
```

```
          3680           HC       2
                         *

          3681           KKRCCPT2C2
          3682           KM  ROUTE CCPT2C-2 TO CRCPT2C2
          3683           KM  FACILITY = GOWAN OUTFALL FACILITIES
          3684           KM  FACILITY # = GOOF 0040,0074,0077
          3685           KM  LINING = CONCRETE
          3686           RD    2470   0.006   0.015       0    TRAP      20       2
                         *
1                                                HEC-1 INPUT                                                    PAGE101

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


          3687           KK  PT4D-2
          3688           BA   0.228
          3689           PB    2.77
          3690           LS       0    91.5
          3691           UD   0.334
                         *

          3692           KK RPT4D-2
          3693           KM  ROUTE RPT4D-2 TO CRCPT2C2
          3694           KM  REVERE
          3695           RD    2030   0.006   0.016       0    TRAP       0      50
                         *

          3696           KKCRCPT2C2
          3697           KM  COMBINE RCCPT2C2 AND RPT4D-2
          3698           KM  GOWAN DRAINAGE CHANNEL AND REVERE
          3699           HC       2
                         *

          3700           KKRRPT2C-2
          3701           KM  ROUTE CRCPT2C2 TO CPT2C-3
          3702           KM  FACILITY = GOWAN OUTFALL FACILITIES
          3703           KM  FACILITY # = GOOF 0000
          3704           KM  LINING = CONCRETE
          3705           RD    2500  0.0125   0.015       0    TRAP      20       2
                         *

          3706           KK  PT2C-3
          3707           BA   0.252
          3708           PB    2.77
          3709           LS       0    89.1
          3710           UD   0.298
                         *

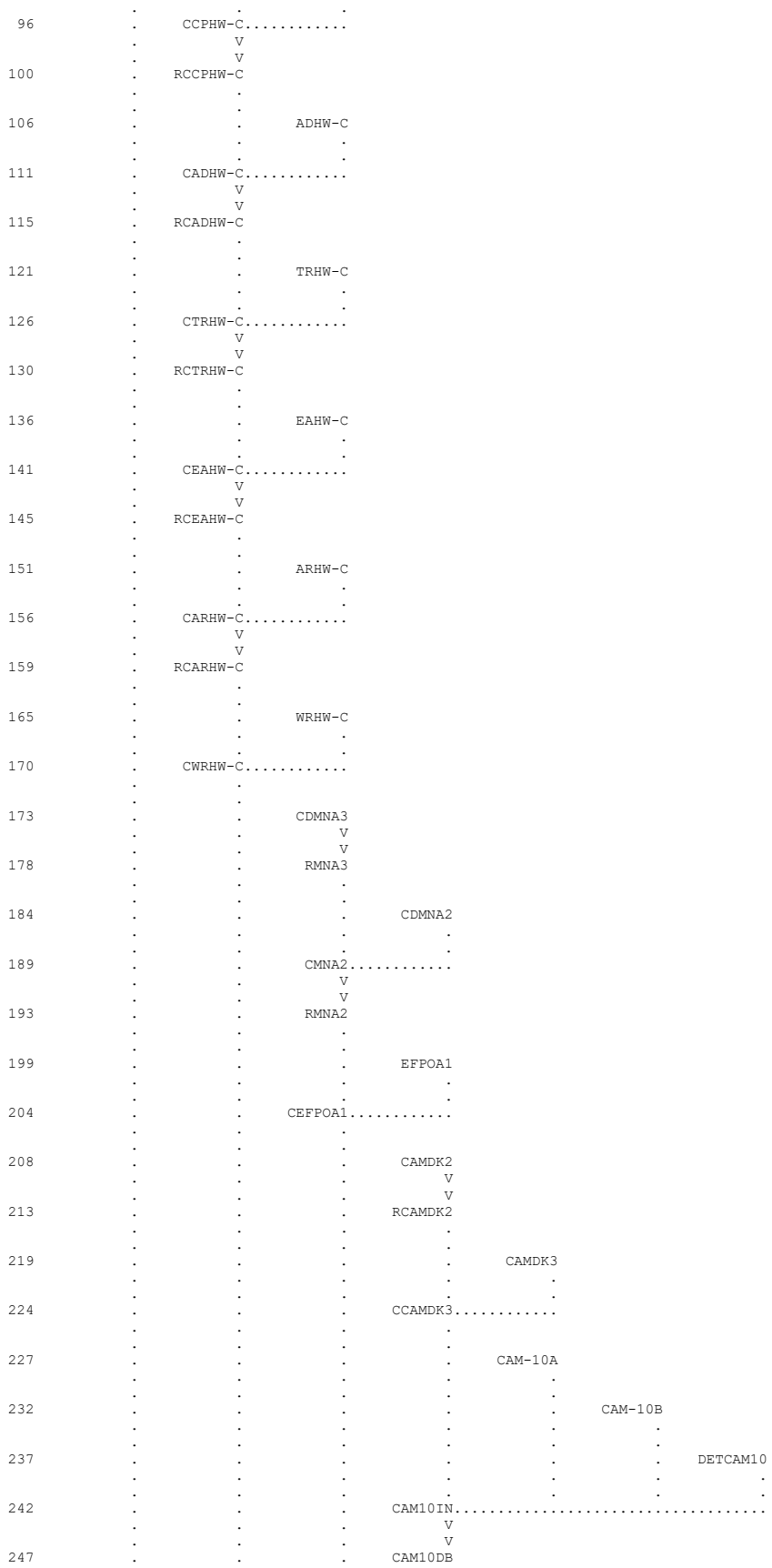
          3711           KK CPT2C-3
          3712           KM  COMBINE RRPT2C-2 AND PT2C-3
          3713           KM  CONFLUENCE WITH LAS VEGAS WASH
          3714           HC       2
                         *

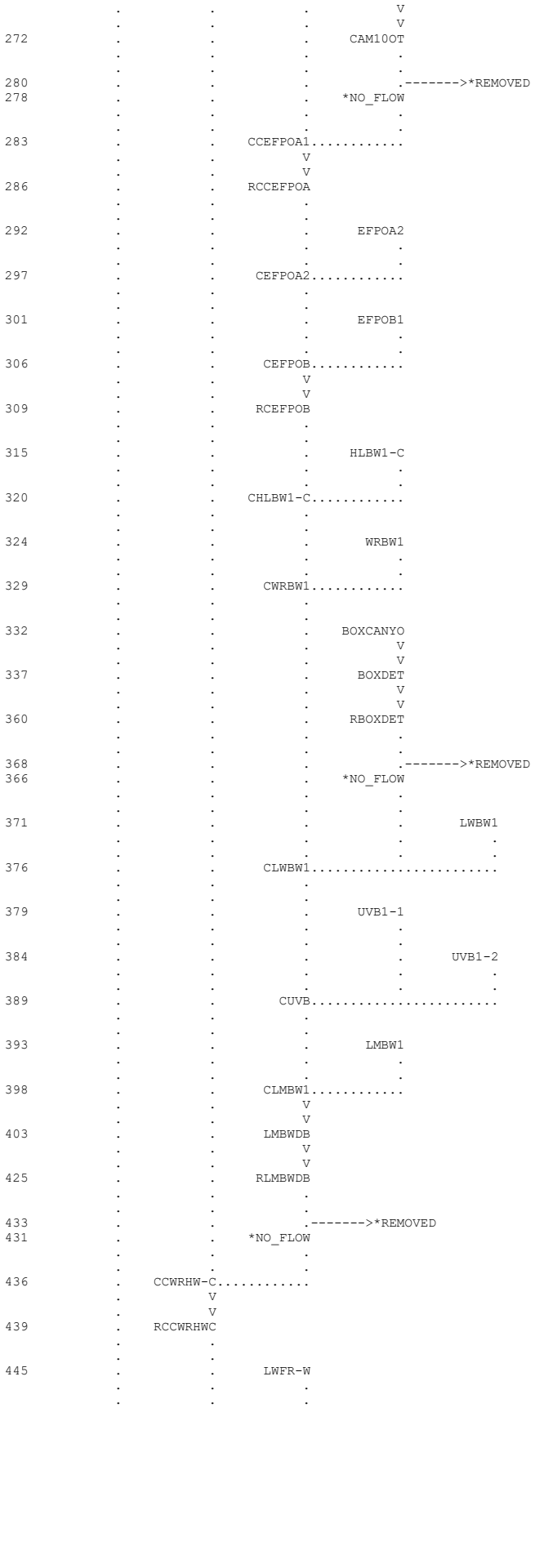
          3715           KK PT-2B-3
          3716           BA   0.262
          3717           PB    2.77
          3718           LS       0    90.8
          3719           UD   0.403
                         *

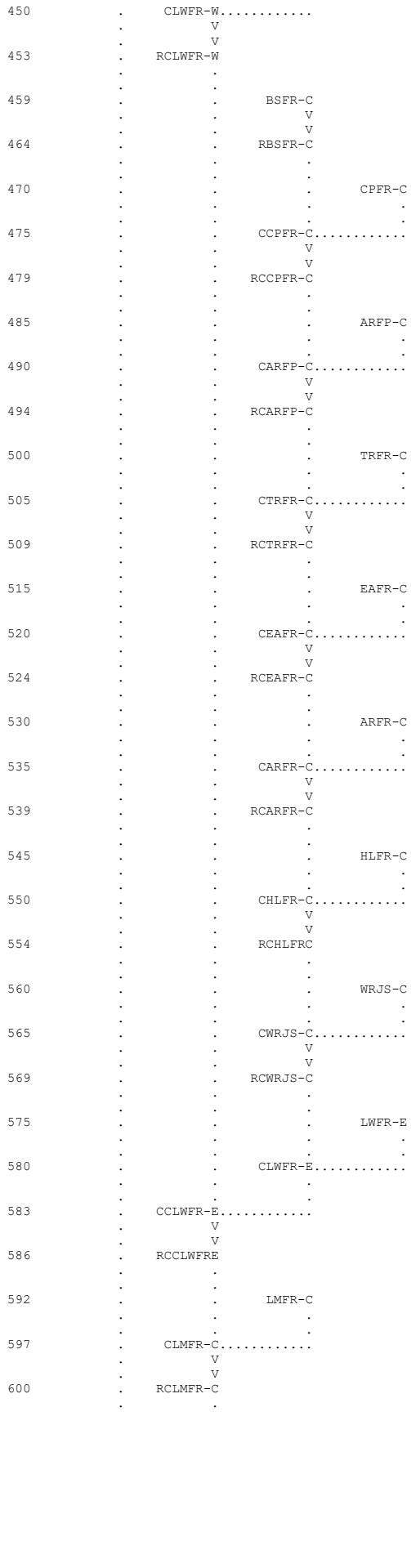
          3720           KKCPT-2B-3
          3721           KM  COMBINE PT-2B-3 AND CPT2C-3
          3722           KM  CONFLUENCE WITH LAS VEGAS WASH
          3723           HC       2
                         *
          3724           ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

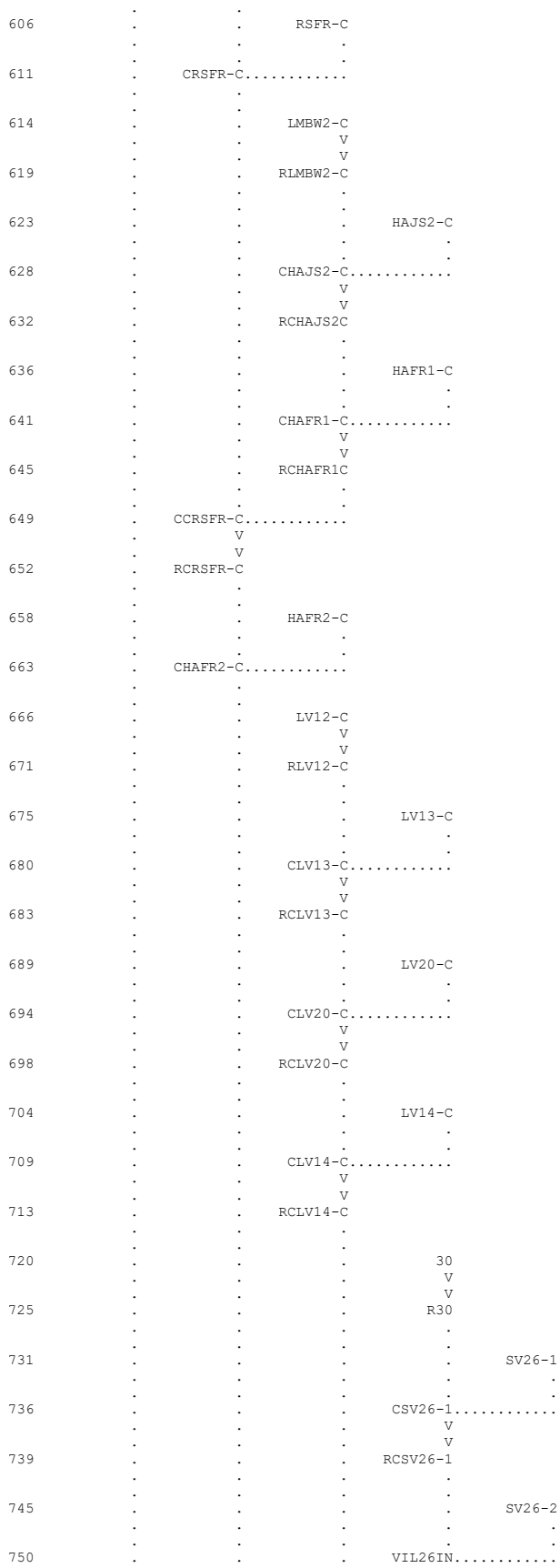
   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

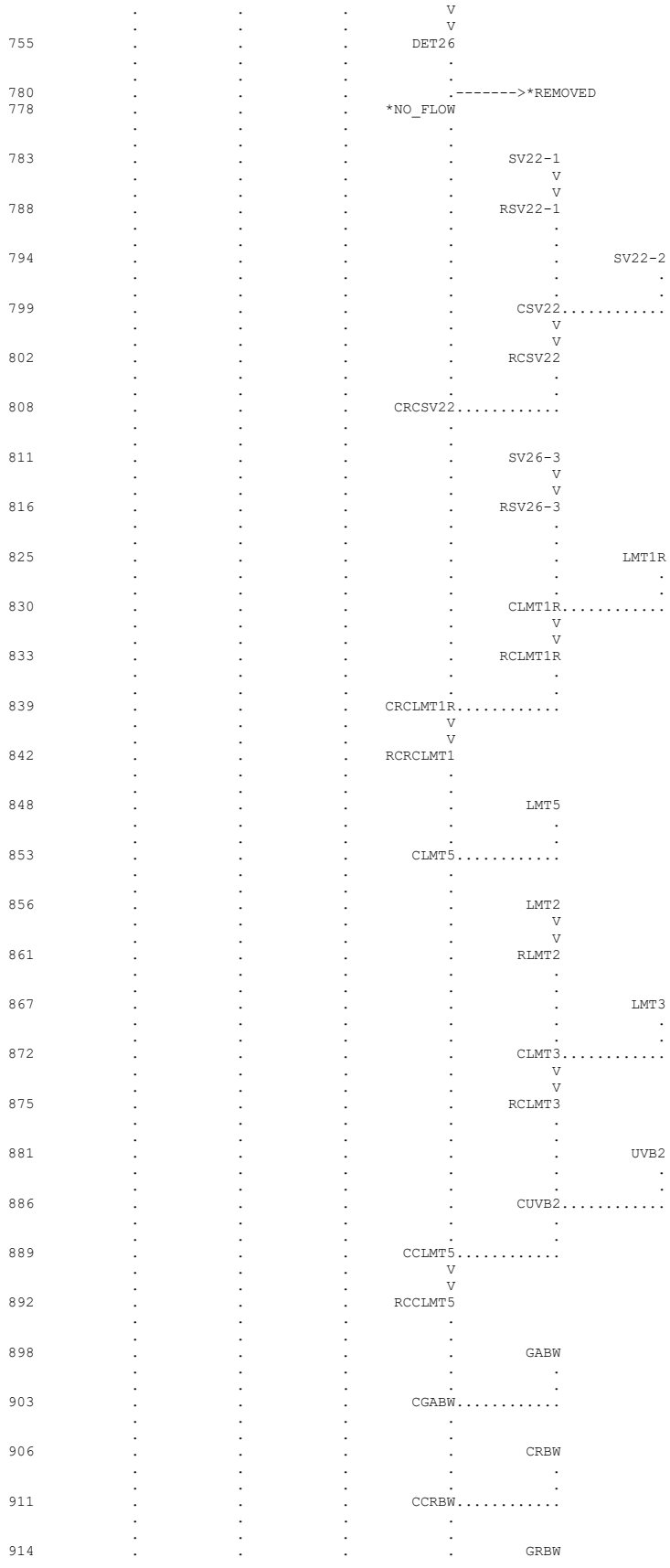
    53      LV29-C
              V
              V
    66     RLV29-C
              .
              .
    72        .      LV30-C
              .          .
              .          .
    77     CLV30-C.............
              .
              .
    80        .     BWHW1-C
              .          V
              .          V
    85        .    RBWHW1-C
              .          .
              .          .
    91        .          .      CPHW-C
              .          .          .
```

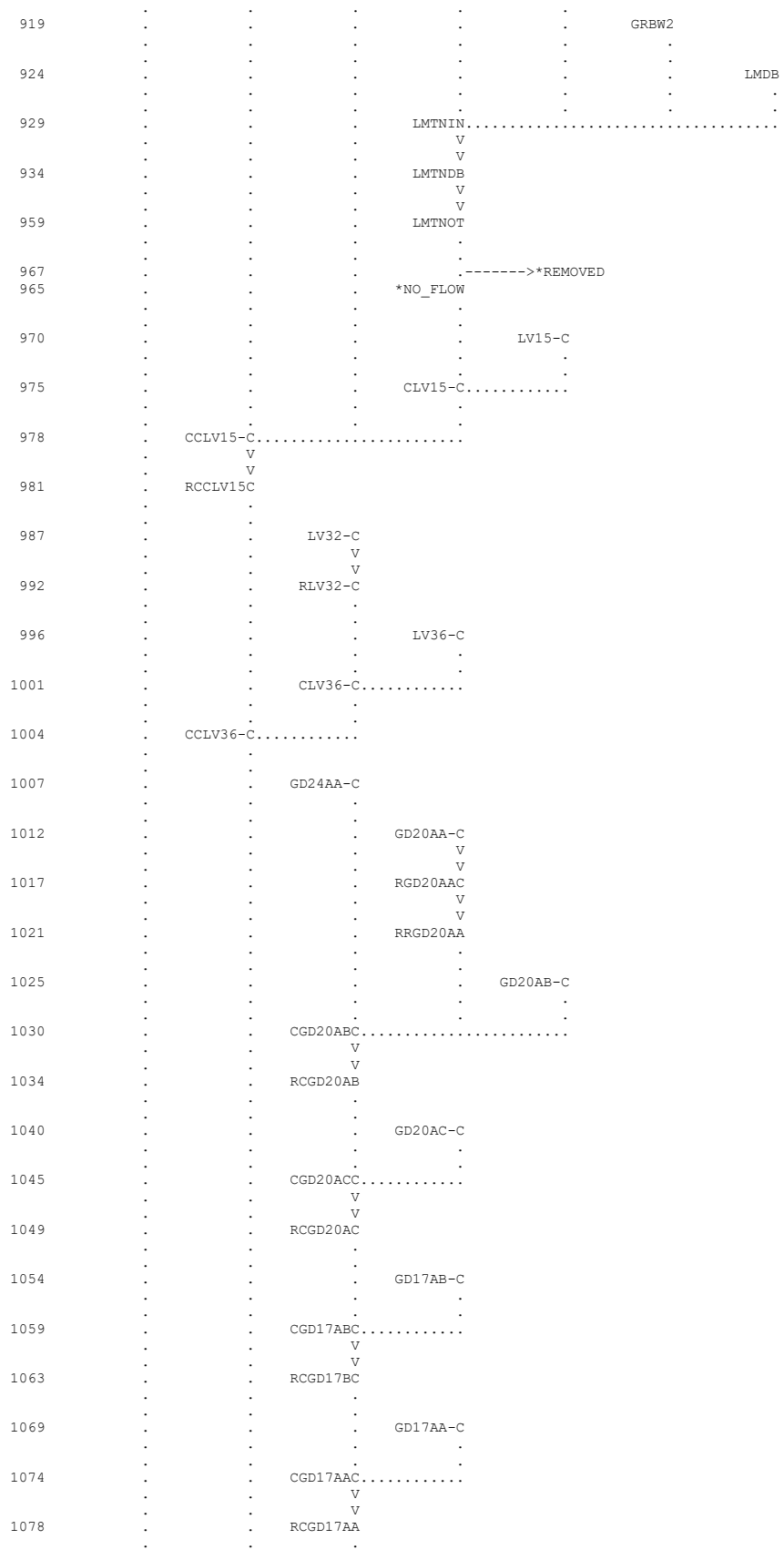

CCPHW-C
RCCPHW-C
ADHW-C
CADHW-C
RCADHW-C
TRHW-C
CTRHW-C
RCTRHW-C
EAHW-C
CEAHW-C
RCEAHW-C
ARHW-C
CARHW-C
RCARHW-C
WRHW-C
CWRHW-C
CDMNA3
RMNA3
CDMNA2
CMNA2
RMNA2
EFPOA1
CEFPOA1
CAMDK2
RCAMDK2
CAMDK3
CCAMDK3
CAM-10A
CAM-10B
DETCAM10
CAM10IN
CAM10DB


CAM10OT
*REMOVED
*NO_FLOW
CCEFPOA1
RCCEFPOA
EFPOA2
CEFPOA2
EFPOB1
CEFPOB
RCEFPOB
HLBW1-C
CHLBW1-C
WRBW1
CWRBW1
BOXCANYO
BOXDET
RBOXDET
*REMOVED
*NO_FLOW
LWBW1
CLWBW1
UVB1-1
UVB1-2
CUVB
LMBW1
CLMBW1
LMBWDB
RLMBWDB
*REMOVED
*NO_FLOW
CCWRHW-C
RCCWRHWC
LWFR-W


450 CLWFR-W
453 RCLWFR-W
459 BSFR-C
464 RBSFR-C
470 CPFR-C
475 CCPFR-C
479 RCCPFR-C
485 ARFP-C
490 CARFP-C
494 RCARFP-C
500 TRFR-C
505 CTRFR-C
509 RCTRFR-C
515 EAFR-C
520 CEAFR-C
524 RCEAFR-C
530 ARFR-C
535 CARFR-C
539 RCARFR-C
545 HLFR-C
550 CHLFR-C
554 RCHLFRC
560 WRJS-C
565 CWRJS-C
569 RCWRJS-C
575 LWFR-E
580 CLWFR-E
583 CCLWFR-E
586 RCCLWFRE
592 LMFR-C
597 CLMFR-C
600 RCLMFR-C


606 RSFR-C
611 CRSFR-C
614 LMBW2-C
619 RLMBW2-C
623 HAJS2-C
628 CHAJS2-C
632 RCHAJS2C
636 HAFR1-C
641 CHAFR1-C
645 RCHAFR1C
649 CCRSFR-C
652 RCRSFR-C
658 HAFR2-C
663 CHAFR2-C
666 LV12-C
671 RLV12-C
675 LV13-C
680 CLV13-C
683 RCLV13-C
689 LV20-C
694 CLV20-C
698 RCLV20-C
704 LV14-C
709 CLV14-C
713 RCLV14-C
720 30
725 R30
731 SV26-1
736 CSV26-1
739 RCSV26-1
745 SV26-2
750 VIL26IN


DET26
*REMOVED
*NO_FLOW
SV22-1
RSV22-1
SV22-2
CSV22
RCSV22
CRCSV22
SV26-3
RSV26-3
LMT1R
CLMT1R
RCLMT1R
CRCLMT1R
RCRCLMT1
LMT5
CLMT5
LMT2
RLMT2
LMT3
CLMT3
RCLMT3
UVB2
CUVB2
CCLMT5
RCCLMT5
GABW
CGABW
CRBW
CCRBW
GRBW


919
GRBW2
924
LMDB
929
LMTNIN
934
LMTNDB
959
LMTNOT
967
*REMOVED
965
*NO_FLOW
970
LV15-C
975
CLV15-C
978
CCLV15-C
981
RCCLV15C
987
LV32-C
992
RLV32-C
996
LV36-C
1001
CLV36-C
1004
CCLV36-C
1007
GD24AA-C
1012
GD20AA-C
1017
RGD20AAC
1021
RRGD20AA
1025
GD20AB-C
1030
CGD20ABC
1034
RCGD20AB
1040
GD20AC-C
1045
CGD20ACC
1049
RCGD20AC
1054
GD17AB-C
1059
CGD17ABC
1063
RCGD17BC
1069
GD17AA-C
1074
CGD17AAC
1078
RCGD17AA

```
                                        TIME          3.67     3.67     3.67     3.67

 HYDROGRAPH AT
+                   LMT3       .36   1  FLOW          433.     426.     420.     415.
                                        TIME          3.50     3.50     3.50     3.50

   2 COMBINED AT
+                  CLMT3      1.34   1  FLOW         1461.    1437.    1416.    1404.
                                        TIME          3.58     3.58     3.58     3.58

 ROUTED TO
+                 RCLMT3      1.34   1  FLOW         1431.    1405.    1386.    1373.
                                        TIME          3.58     3.58     3.58     3.58

 HYDROGRAPH AT
+                   UVB2       .33   1  FLOW          303.     298.     294.     290.
                                        TIME          3.67     3.67     3.67     3.67

   2 COMBINED AT
+                  CUVB2      1.67   1  FLOW         1701.    1670.    1648.    1631.
                                        TIME          3.58     3.58     3.58     3.58

   2 COMBINED AT
+                 CCLMT5      9.50   1  FLOW         4538.    4469.    4405.    4368.
                                        TIME          3.67     3.67     3.67     3.67

 ROUTED TO
+                RCCLMT5      9.50   1  FLOW         4512.    4439.    4377.    4346.
                                        TIME          3.67     3.67     3.67     3.67

 HYDROGRAPH AT
+                   GABW       .29   1  FLOW          208.     203.     200.     197.
                                        TIME          3.67     3.67     3.67     3.67

   2 COMBINED AT
+                  CGABW      9.80   1  FLOW         4720.    4643.    4577.    4544.
                                        TIME          3.67     3.67     3.67     3.67

 HYDROGRAPH AT
+                   CRBW       .36   1  FLOW          250.     246.     242.     238.
                                        TIME          3.75     3.75     3.75     3.75

   2 COMBINED AT
+                  CCRBW     10.16   1  FLOW         4962.    4880.    4811.    4774.
                                        TIME          3.67     3.67     3.67     3.67

 HYDROGRAPH AT
+                   GRBW       .30   1  FLOW          291.     286.     282.     279.
                                        TIME          3.67     3.67     3.67     3.67

 HYDROGRAPH AT
+                  GRBW2       .16   1  FLOW          136.     134.     132.     130.
                                        TIME          3.67     3.67     3.67     3.67

 HYDROGRAPH AT
+                   LMDB       .12   1  FLOW           45.      44.      43.      42.
                                        TIME          3.67     3.67     3.67     3.67

   4 COMBINED AT
+                 LMTNIN     10.74   1  FLOW         5434.    5344.    5268.    5225.
                                        TIME          3.67     3.67     3.67     3.67

 ROUTED TO
+                 LMTNDB     10.74   1  FLOW          161.     160.     159.     158.
                                        TIME          6.25     6.25     6.25     6.25

                                     ** PEAK STAGES IN FEET **
                                     1  STAGE      2644.39  2644.13  2643.92  2643.74
                                        TIME          6.25     6.25     6.25     6.25

 ROUTED TO
+                 LMTNOT     10.74   1  FLOW          161.     160.     159.     158.
                                        TIME          6.42     6.42     6.42     6.42

 DIVERSION TO
+               *REMOVED     10.74   1  FLOW          161.     160.     159.     158.
                                        TIME          6.42     6.42     6.42     6.42

 HYDROGRAPH AT
+               *NO_FLOW     10.74   1  FLOW            0.       0.       0.       0.
                                        TIME           .00      .00      .00      .00

 HYDROGRAPH AT
+                 LV15-C       .35   1  FLOW          165.     161.     158.     156.
                                        TIME          3.83     3.83     3.83     3.83

   2 COMBINED AT
+                CLV15-C     11.09   1  FLOW          165.     161.     158.     156.
                                        TIME          3.83     3.83     3.83     3.83

   3 COMBINED AT
+               CCLV15-C     29.57   1  FLOW         1912.    1861.    1816.    1775.
                                        TIME          4.00     4.00     4.00     4.00

 ROUTED TO
```

therefore, SDN4

used as the starting HGL for WSPG run.

GRADING PLANS AND DETAILS



CLV POLICE MEMORIAL PARK

PREPARED FOR:

CITY OF LAS VEGAS

APN: 138-07-401-017 & 138-07-301-005

LAS VEGAS, NEVADA

ACREAGE: - 30.71 ACRES (GROSS)

REV #	REVISION DESCRIPTION	SHEET(S)	APPD BY	DATE APPD

SHEET INDEX

SHEET NO.	SHEET TITLE
C1	COVER SHEET
C2	NOTES AND ABBREVIATIONS
C3	MASTER GRADING PLAN
C4	GRADING PLAN 1
C5	GRADING PLAN 2
C6	GRADING PLAN 3
C7	GRADING PLAN 4
C8	GRADING PLAN 5
C9	GRADING PLAN 6
C8	SECTIONS
C9	DETAILS
C10	MASTER HORIZONTAL CONTROL PLAN
C11	HORIZONTAL CONTROL PLAN 1
C12	HORIZONTAL CONTROL PLAN 2
C13	HORIZONTAL CONTROL PLAN 3
C14	HORIZONTAL CONTROL PLAN 4
C15	HORIZONTAL CONTROL PLAN 5
C16	HORIZONTAL CONTROL PLAN 6



VICINITY MAP
NOT TO SCALE

UTILITY CONTACTS:

POWER: NV ENERGY
ATTN: NEW DEVELOPMENT
7155 LINDELL ROAD
LAS VEGAS, NEVADA 89118
PHONE: 702-402-8400

WATER: LAS VEGAS VALLEY WATER DISTRICT
ATTN: ENGINEERING SERVICES
1001 S. VALLEY VIEW BOULEVARD
LAS VEGAS, NEVADA 89153
PHONE: 702-822-8518

SEWER: CITY OF LAS VEGAS PUBLIC WORKS
ATTN: ENGINEERING PLANNING
495 S. MAIN STREET
LAS VEGAS, NEVADA 89101
PHONE: 702-229-6541

GAS: SOUTHWEST GAS CORPORATION
ATTN: ENGINEERING PLANNING
6355 SHATZ STREET
NORTH LAS VEGAS, NEVADA 89115

CABLE: COX COMMUNICATIONS LAS VEGAS, INC.
1700 VEGAS DRIVE
LAS VEGAS, NEVADA 89106

PROJECT TEAM

OWNER / DEVELOPER

CITY OF LAS VEGAS
495 S. MAIN STREET, 5TH FLOOR
LAS VEGAS, NV 89101
T: (702) 229-2091
ATTN: SAM TOLMAN, AIA NCARB
EMAIL: STOLMAN@LASVEGASNEVADA.GOV

CIVIL ENGINEER

ACTUS
ATTN: DARRYL LATTIMORE, P.E.
3283 E. WARM SPRINGS ROAD, SUITE 300
LAS VEGAS, NEVADA 89120
T: 702-586-9296
DARRYL LATTIMORE
DARRYL.LATTIMORE@ACTUS-NV.COM



DISCLAIMER NOTE

THE UNDERGROUND UTILITIES AS SHOWN HEREON HAVE BEEN LOCATED FROM OBSERVED FIELD SURVEY EVIDENCE AND EXISTING DRAWINGS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING; PLANS PROVIDED BY THE CLIENT, UTILITY COMPANIES, AND MUNICIPAL AGENCIES. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: 9LV007W6
RIVET & PLATE IN TOP OF CURB AT NE CORNER OF GOWAN & JENSEN

ELEVATION: 2361.43 (FEET)
802.46 (METERS)

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED: 2008)
BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

FLOOD ZONE DESCRIPTION

THIS SITE IS LOCATED IN ZONE "X", AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 32003C2135F CLARK COUNTY, NEVADA DATED NOVEMBER 16, 2011.

FLOOD DESIGNATION PROVIDED BY FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

RTC TRANSIT NOTES

1. THE CONTRACTOR SHALL NOT BE ALLOWED TO CLOSE MORE THAN ONE CONSECUTIVE BUS STOP ON THE SAME SIDE OF THE STREET. TEMPORARY BUS STOPS AND BUS STOP AMENITIES SHALL BE AMERCANS WITH DISABILITIES ACT (ADA) COMPLIANT AT ALL TIMES. THE CONTRACTOR SHALL NOTIFY RTC TRANSIT OF PROPOSED BUS STOP CLOSURES AND/OR BUS STOP AMENITY DISRUPTIONS VIA NOTIFYRTCTRANSIT@RTCSNV.COM AT LEAST SEVEN CALENDAR DAYS PRIOR TO THE START OF WORK. NOTIFICATION OF BUS STOP CLOSURES INVOLVING REMOVAL OF EXISTING AMENITIES SHALL BE PROVIDED TO RTC TRANSIT AT LEAST 10 CALENDAR DAYS PRIOR TO THE START OF WORK.
2. THE CONTRACTOR SHALL SUBMIT A BUS STOP CLOSURE SCHEDULE TO RTC TRANSIT WITH THE APPROVED TRAFFIC CONTROL PLAN AT LEAST SEVEN CALENDAR DAYS PRIOR TO THE START OF WORK. THE BUS STOP CLOSURE SCHEDULE SHALL IDENTIFY THE DURATION OF PROPOSED BUS STOP CLOSURES AND TEMPORARY BUS STOP RELOCATIONS AND TIMES OF DAY THAT STOPS ARE EXPECTED TO BE IMPACTED BY THE WORK. ALL BUS STOP CLOSURES, TEMPORARY BUS STOPS, AND TEMPORARY BUS TURN OUTS MUST BE APPROVED BY RTC TRANSIT STAFF PRIOR TO THE START OF WORK.

RTC FAST NOTES

1. CONTRACTOR IS TO MAINTAIN AND KEEP OPERATIONAL ALL EXISTING ITS INFRASTRUCTURE WITHIN THE CONSTRUCTION LIMITS. IF ANY EXISTING ITS INFRASTRUCTURE IS DAMAGED DUE TO CONSTRUCTION, WITHIN THE PROJECT LIMITS, THE CONTRACTOR SHALL IMMEDIATELY CONTACT MR. LONNIE BROWN (RTCFAST MANAGER TRAFFIC SYSTEMS MAINTENANCE) AT 702-290-1979 CELL OR 702-432-5300 GENERAL.
2. IF ANY EXISTING FIBER OPTIC CABLE IS TO BE CUT, SPLICED AND OR PULLED, ALONG OR ADJACENT TO THE PROJECT LIMITS, THE CONTRACTOR IS TO CONTACT MR. LONNIE BROWN TWO (2) WEEKS IN ADVANCE FOR SYSTEM SHUTDOWN COORDINATION.
3. CONTRACTOR MUST NOTIFY MR. LONNIE BROWN AT 702-290-1979 CELL, 702-432-5300 GENERAL, OR AT BrownL@rtcsnv.com, ONCE ALL PROJECT ITS FIBER OPTIC WORK IS COMPLETE.

BASIS OF BEARINGS

NORTH 00 03'07" EAST, BEING THE EAST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 7, TOWNSHIP 20S, RANGE 60E, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN BOOK 98, PAGE 77 OF PLATS.

LEGAL DESRIPTION

PARCEL I:
THE WEST HALF (W ½) OF THE NORTHWEST QUARTER (NW ¼) OF THE NORTHEAST QUARTER (NE ¼) OF THE SOUTHWEST QUARTER (SW ¼) OF SECTION 7, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA.
EXCEPTING THEREFROM THAT PORTION OF SAID LAND AS DEDICATED BY THAT CERTAIN DEDICATION RECORDED SEPTEMBER 20, 1995 IN BOOK 950920 AS INSTRUMENT NO. 00980 OF OFFICIAL RECORDS.
APN: 138-07-301-005
PARCEL II:
THE SOUTHWEST QUARTER (SW ¼) OF THE NORTHEAST QUARTER (NE ¼) OF THE SOUTHWEST QUARTER (SW ¼) OF SECTION 7, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA.
AND
THE NORTHWEST QUARTER (NW ¼) OF THE SOUTHEAST QUARTER (SE ¼) OF THE SOUTHWEST QUARTER (SW ¼) OF SECTION 7, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA.
AND
THE NORTH HALF (N ½) OF THE SOUTHWEST QUARTER (SW ¼) OF THE SOUTHEAST QUARTER (SE ¼) OF THE SOUTHWEST QUARTER (SW ¼) OF SECTION 7, TOWNSHIP 20 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA.
EXCEPTING THEREFROM THAT PORTION OF SAID LAND AS DEDICATED BY THAT CERTAIN DEDICATION RECORDED JULY 28, 2008 AS INSTRUMENT NO. 20080728-0002292 OF OFFICIAL RECORDS.
APN: 138-07-401-017

APPROVALS

CITY ENGINEER - CITY OF LAS VEGAS

DEPARTMENT OF PLANNING

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE DEPARTMENT OF PLANNING

LAS VEGAS FIRE & RESCUE

COX COMMUNICATIONS LAS VEGAS, INC.

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

SOUTHWEST GAS CORPORATION SWG UID DATE

CENTRAL TELEPHONE DBA CENTURY LINK DATE

"THE AFFIXED CENTURY LINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION 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."

REVISIONS | NO. | DATE | SHEET
xxx | xxx | xxx | xxx | xxx | xxx | xxx | xxx

PREPARED BY: CARPENTER SELLERS DEL GATTO ARCHITECTS

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PROFESSIONAL ENGINEER
ROSHAN POUDEL
EXP: 12/31/23
CIVIL
No. 28428
STATE OF NEVADA
04-27-2023

TITLE: CLV POLICE MEMORIAL PARK RENOVATION

SHEET: COVER SHEET

PREPARED FOR: CITY OF LAS VEGAS

BID #:
DATE: 4/27/2023
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CP #:
SUBMITTAL STAGE: SCHEMATIC DESIGN
PL #::
CHECKED BY: Checker

SHEET C1 OF

DO NOT SCALE DRAWINGS

8/28/18 \\CD-FP01\FILES\PLOTDATA\DWGS\2025 CLV WESTSIDE EDUCATION & TRAINING CENTER\DRAWINGS\REVITLINED CAD FILES\CDC\CLV TITLES.CDC.DWG5.DWG

CITY OF LAS VEGAS GENERAL NOTES

1. 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".
2. 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 AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL 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.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. 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.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. 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.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE (COMPANY _, REPORT #, DATE) APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. 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.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.
15. 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.

WALL NOTES:

16. 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.
17. ASPHALT MIX DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF ASPHALT WITHIN CITY RIGHT OF WAY.
18. 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.
19. MATERIALS, HANDLING AND PLACEMENT OF PORTLAND CEMENT CONCRETE SHALL BE IN ACCORDANCE WITH APPLICABLE SECTIONS OF NDOT OR THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.
20. WHEN INSTALLING UNDERGROUND FACILITIES THAT REQUIRE UNDERGROUND LOCATING DEVICES SUCH AS MARKER BALLS, LOCATING RIBBON, ETC., THE CONTRACTOR SHALL PROVIDE WRITTEN DOCUMENTATION OF 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.
21. AFTER HAUNCHING AND PRIOR TO BACKFILL OPERATIONS WHICH WOULD COVER SANITARY SEWER AND STORM DRAIN FACILITIES, CONTRACTOR IS REQUIRED TO SCHEDULE CLV OPEN-TRENCH UTILITY SURVEY INSPECTION FOR DETERMINATION OF FINAL LOCATION COORDINATES. FACILITIES TO BE LOCATED BY CLV SHALL INCLUDE AT A MINIMUM THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES,AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION POINT TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A LOOP INLET, THE CONNECTION OF SEWER LATERALS TO THE SEWER MAIN AND WHERE THE SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY,SEWER AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS.
22. CCTV VIDEO INSPECTION IS REQUIRED FOR ALL SEWER AND STORM DRAINS. THE CCTV VIDEO INSPECTIONS NEED TO BE PERFORMED PER THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS LATEST EDITION.
23. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

CITY OF LAS VEGAS GRADING NOTES

1. IN THE EVENT THAT ANY UNFORESEEN CONDITIONS NOT COVERED BY THESE NOTES ARE ENCOUNTERED DURING GRADING OPERATIONS, THE OWNER/ENGINEER SHALL BE IMMEDIATELY NOTIFIED FOR DIRECTION.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM ALL NECESSARY CUTS AND FILLS WITHIN THE LIMITS OF THIS PROJECT AND THE RELATED OFF-SITE WORK, SO AS TO GENERATE THE DESIRED SUBGRADE, FINISH GRADES AND SLOPES SHOWN.
3. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ALL EXCAVATION. ADEQUATE SHORING SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR TO PREVENT UNDERMINING OF ANY ADJACENT FEATURES OR FACILITIES AND/OR CAVING OF THE EXCAVATION.
4. THE CONTRACTOR IS WARNED THAT AN EARTHWORK BALANCE WAS NOT NECESSARILY THE INTENT OF THIS PROJECT. ANY ADDITIONAL MATERIAL REQUIRED OR LEFTOVER MATERIAL FOLLOWING EARTHWORK OPERATIONS BECOME THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE GRADING CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE OWNER TO PROVIDE FOR THE REQUIREMENTS OF THE PROJECT STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND ASSOCIATED PERMIT.
6. CONTRACTOR SHALL GRADE TO THE LINES AND ELEVATIONS SHOWN ON THE PLANS WITHIN THE FOLLOWING HORIZONTAL AND VERTICAL TOLERANCES AND DEGREES OF COMPACTION. IN THE AREAS INDICATED: HORIZONTAL VERTICAL COMPACTION A PAVEMENT AREA SUBGRADE 0.1'+ +0.0' TO -0.1' SEE SOILS REPORT B. ENGINEERED FILL 0.5'+ +0.1' TO -0.1' SEE SOILS REPORT COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.
7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.
8. THE USE OF POTABLE WATER WITHOUT A SPECIAL PERMIT FOR BUILDING OR CONSTRUCTION PURPOSES INCLUDING CONSOLIDATION OF BACKFILL OR DUST CONTROL IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.
9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT-OF-WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. ALL ADJACENT PROPERTY, PRIVATE OR PUBLIC SHALL BE MAINTAINED IN A CLEAN, SAFE AND USABLE CONDITION.
10. IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.

CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION (USS), AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", (USD) LATEST REVISION, AND ANY ADOPTED SPECIAL AREA STANDARDS.
2. DESIGN PROFESSIONAL AND CONTRACTOR SHALL VERIFY CITY'S LATEST LED FIXTURE SPECIFICATIONS AND APPROVED FIXTURES PER CLV WEBSITE, UNDER BUILDING AND SAFETY FORMS, PRIOR TO ORDERING MATERIALS.
3. LUMINAIRES SHALL BE MARKED TO INDICATE INSTALLATION ORIENTATION, AND SHALL HAVE EXTERNAL LABELS PER ANSI C136 THAT INDICATE WATTAGE AND ARE CLEARLY VISIBLE FROM STREET LEVEL.
4. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF TRAFFIC ENGINEERING AND THE CITY ENGINEER.
5. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION IN ACCORDANCE WITH SECTION 623 G.03.01 OF THE USS.
6. ALL EMPTY CONDUIT SHALL HAVE AT LEAST ONE GREEN #8 AWG WIRE INSTALLED AS TRACER WIRE IN ACCORDANCE WITH SECTION263 G.02.01.
7. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN ACCORDANCE WITH THE USD NO. 320A WHEN POLE IS INSTALLED BEHIND SIDEWALK, AND SHALL AT NO TIME COMPLETELY ENCLOSE THE STREET LIGHTING POLE.
8. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TEFO PRIOR TO ANY PRE-FINAL INSPECTION. THE ASBUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
9. SERVICE POINTS SHALL BE COORDINATED WITH NV ENERGY COMPANY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE PLANS.
10. NEW STREETLIGHT SERVICES SHALL BE 200 AMP PADMOUNT AND SHALL PROVIDE CAPACITY FOR 20 OR 24 AVAILABLE CIRCUITS.
11. 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, AT NO EXPENSE TO THE CITY OF LAS VEGAS.
12. THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.

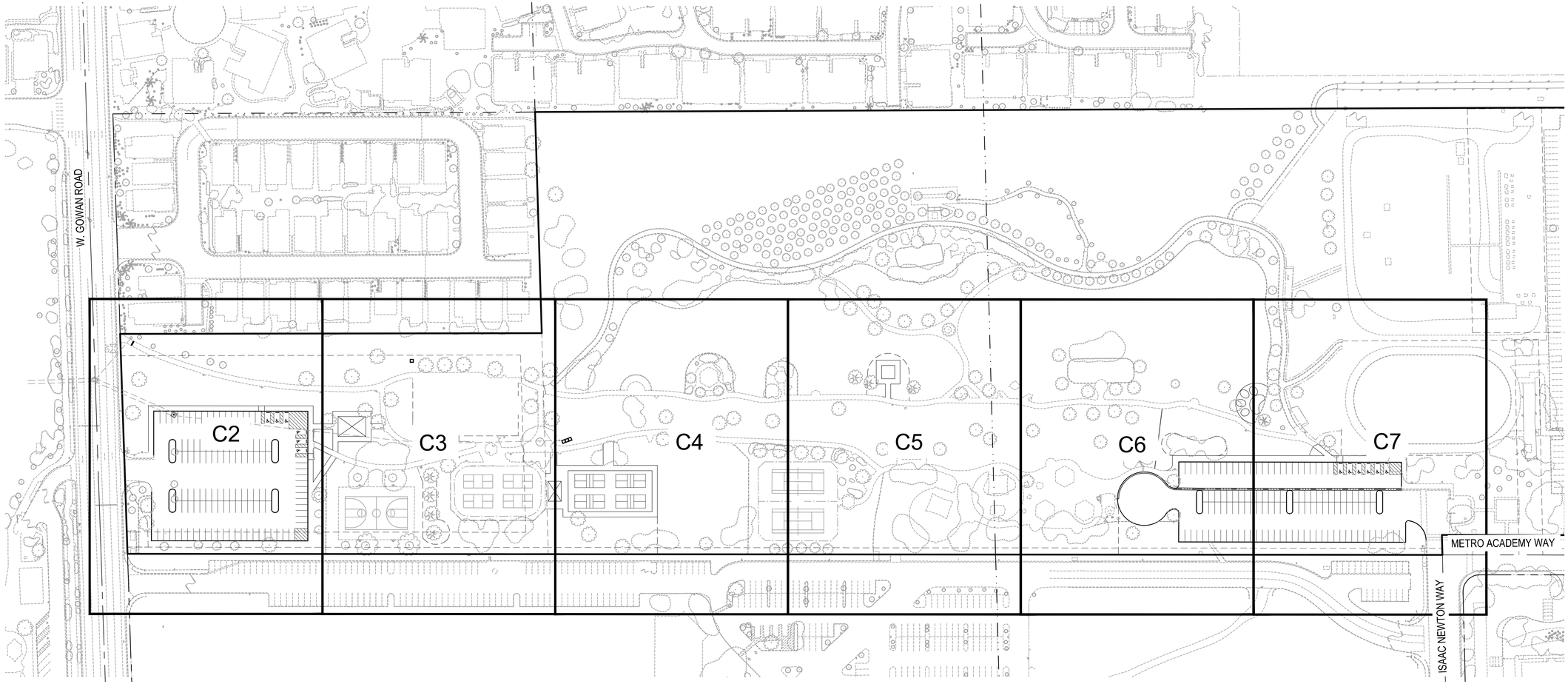
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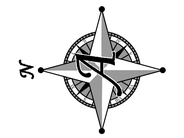
THE UNDERGROUND UTILITIES AS SHOWN HEREON HAVE BEEN LOCATED FROM OBSERVED FIELD SURVEY EVIDENCE AND EXISTING DRAWINGS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING: PLANS PROVIDED BY THE CLIENT, UTILITY COMPANIES, AND MUNICIPAL AGENCIES. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.



CITY OF LAS VEGAS TRAFFIC SIGNAL NOTES

1. ALL WORK PERFORMED ON ANY TRAFFIC SIGNAL COMPONENT MUST BE UNDER DIRECT ON-SITE SUPERVISION OF AN IMSA CERTIFIED TECHNICIAN. THE LEVEL OF CERTIFICATION REQUIRED SHALL BE LEVEL II
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO ALL EXISTING UTILITIES. THE LOCATIONS OF UNDERGROUND UTILITIES AS SHOWN ON THE PLANS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES TO VERIFY IN THE FIELD THE LOCATIONS OF THEIR INSTALLATIONS 72 HOURS PRIOR TO CONSTRUCTION.
CALL-BEFORE-YOU-OVERHEAD 1-702-227-2929
CALL-BEFORE-YOU-DIG 1-800-227-2600
STREETLIGHTS 1-702-229-6331
F.A.S.T. 1-702-432-5300
3. ALL TRAFFIC SIGNAL INSTALLATIONS SHALL CONFORM TO THE UNIFORM STANDARD DRAWINGS SPECIFICATIONS AND SPECIAL PROVISIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, VOLUMES I AND II, ADOPTED BY ALL SUBSEQUENT REVISIONS. BRACKET MOUNTED (SIDE-MOUNTED) VEHICLE SIGNAL ASSEMBLIES WITH 2 OR MORE SIGNAL HEADS SHALL HAVE AN ADDITIONAL ELBOW AS SHOWN IN UNIFORM STANDARD DRAWING NUMBER 883 AND SHALL BE AN OPTION ON IN UNIFORM STANDARD DRAWING NUMBER 844, AND SHALL HAVE A MENERALLAC SUPPORT AS SHOWN IN UNIFORM STANDARD DRAWING NUMBER 863 IF ONE OF THE SIGNAL HEADS CONTAINS 4 OR MORE SIGNAL MODULES.
4. SERVICE SHALL HAVE 1-60 AMP SINGLE POLE BREAKER FOR SIGNAL, AND ONE 40 AMP SINGLE POLE BREAKERS FOR STREET LIGHTS. SERVICE SHALL BE 200 AMP PADMOUNT AND SHALL HAVE A CAPACITY OF 20 OR 24 CIRCUITS.
5. LINE SIDE OF METER TO BE WIRED WITH THREE #3/0 AWG THW. LOAD SIDE SHALL BE WIRED WITH FOUR #4 AWG THW (2 BLACK, 2 WHITE) AND ONE #8 AWG THW (GREEN).
6. LUMINAIRES ON ALL SIGNAL POLES SHALL BE L.E.D.AS APPROVED BY THE CITY OF LAS VEGAS (CLV). DESIGN PROFESSIONAL AND CONTRACTOR SHALL VERIFY CITY'S LATEST LED FIXTURE SPECIFICATIONS AND APPROVED FIXTURES PER CLV WEBSITE, UNDER BUILDING AND SAFETY FORMS, PRIOR TO ORDERING MATERIALS. INTERSECTION LIGHTING SHALL MEET THE REQUIREMENTS OF UNIFORM STANDARD DRAWING NUMBER 300.S3. EACH LUMINAIRE SHALL HAVE AN INDIVIDUAL 1000 WATT P.E. CONTROL FOR LUMINAIRES THERE SHALL BE 2 (TWO) #4 AWG THW CONDUCTORS FROM THE SERVICE CABINET. IN THE CABINET, THE #4 AWG THW CONDUCTORS SHALL BRANCH OFF INTO #10 AWG THW CONDUCTORS INDIVIDUALLY FUSED WITH 10 AMP FUSES. THERE SHALL BE NO SPLICES BETWEEN THE CABINET AND LUMINAIRE FIXTURES
7. LUMINAIRES SHALL BE MARKED TO INDICATE INSTALLATION ORIENTATION, AND SHALL HAVE EXTERNAL LABELS PER ANSI C136.15 THAT INDICATE WATTAGE AND ARE CLEARLY VISIBLE FROM STREET LEVEL. TRAFFIC SIGNAL LUMINAIRES INSTALLED ADJACENT TO RESIDENTIAL HOUSING SHALL BE INSTALLED WITH MANUFACTURER PROVIDED HOUSE-SIDE SHIELDS.
8. THE INTERNALLY ILLUMINATED STREET NAME SIGNS SHALL BE WIRED TO THE LUMINAIRES PHOTO CELL FOR CONTROL WITH #10 AWG THW COPPER STRANDED WIRE (TYPICAL). THE SIGN SHALL BE WIRED TO THE LUMINAIRE DIRECTLY ABOVE IT. IN THE EVENT THERE IS NO LUMINAIRE ON THE TRAFFIC SIGNAL POLE, THE 1000 WAT P.E. CONTROL SHALL BE MOUNTED ON THE POLE CAP. ALL NEW LUMINATED STREET NAME SIGNS SHALL HAVE THE LIGHT EMITTING DIODE (LED) LAMPS PER SECTION 6237.02.16 OF THE SPECIAL PROVISIONS.
9. CHECK CONDUIT AND CABLE SCHEDULE FOR CONDUIT, CABLE, AND WIRE SIZE. VERIFY ALL EXISTING CONDUIT RUNS.
10. ALL PULLBOXES SHALL BE IN ACCORDANCE WITH UNIFORM STANDARD DRAWINGS NO. 705, NO. 706, AND NO. 707.
11. TRAFFIC SIGNAL CABLE SHALL BE 15 OR 25 CONDUCTOR #14 AWG SOLID (TYPICAL) CABLE AND SHALL CONFORM TO IMSA SPEC. NO. 20-1.
12. PEDESTRIAN PUSH BUTTONS SHALL BE AUDIBLE TACTILE "POLARA-NAVIGATOR" TYPE (2-WIRE PEDESTRIAN PUSHBUTTON SYSTEM WITH iN2 PUSH BUTTON STATIONS AND SELF-MOUNT BNU CONTROL UNIT WITH SDLC CABLE) IN ACCORDANCE WITH CITY OF LAS VEGAS SPECIAL PROVISIONS AND SECTION 625 OF THE CCA-USS. PUSH BUTTON SIGNS SHALL BE R10-3e PER MUTCD, 2009 EDITION, WITH FULL MOUNTING BRACKETS, AS MODIFIED BY THE MANUFACTURER TO FIT ON A 9"X12" SIGN, AND SHALL BE PORCELAIN-ENAMELED METAL. ALL PUSH BUTTONS TO BE MOUNTED 42" ABOVE SIDEWALK. THE MAXIMUM HORIZONTAL REACH DISTANCE IS TO BE 10". SIDEWALK RAMPS WILL BE ACCORDING TO U.S.D. NO. 235 (1-4) LATEST EDITION. WHEN AN EXISTING SIGNAL WITH EXISTING AUDIBLE-TACTILE PUSH BUTTONS IS MODIFIED, THE CONTRACTOR SHALL VERIFY NEW PEDESTRIAN PUSH BUTTONS OR CABINET EQUIPMENT MATCHES THE MANUFACTURE AND MODEL OF ANY EXISTING EQUIPMENT SCHEDULED TO REMAIN, TO PROVIDE A FULLY FUNCTIONING SYSTEM. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL CABINET EQUIPMENT, INCLUDING THE PEDESTRIAN PUSH BUTTON CONTROL UNIT, INTERFACE PANEL AND ANY REQUIRED HARNESSES, TO PROVIDE A FULLY FUNCTIONING SYSTEM.
13. THE ROUTING AND TERMINATION OF CONDUITS AND THE PLACING OF POLES AND CABINETS SHALL BE INDICATED ON THE PLANS. ALL CHANGES SHALL BE APPROVED BY THE ENGINEER.
14. MAST ARM R10-12 SIGNS TO BE ADJACENT (NO GAP) TO THE M-5 SIGNAL HEAD. WHERE FLASHING YELLOW ARROW LEFT TURN SIGNALS ARE USED, A MAST ARM R10-12P "LEFT TURN ON FLASHING YELLOW ARROW" SIGN SHALL BE MOUNTED ADJACENT TO THE M-4 SIGNAL HEAD.
15. TRAFFIC SIGNAL CABINET SHALL BE A TYPE VIII CABINET UNLESS OTHERWISE SPECIFIED IN THE PLANS. THIS IS COMMONLY REFERRED TO AS AN "ITERIS" CABINET. THE CABINET SHALL CONFORM TO CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS AND THE CITY OF LAS VEGAS SPECIAL PROVISIONS AND SHALL BE A NEMA TS2-TYPE 32 CABINET. INSTALL CABINET NEAR THE R.O.W. LINE OR AS SHOWN ON THE DRAWINGS. THE TRAFFIC SIGNAL CONTROLLER CABINET SHALL BE EQUIPPED WITH 16 LOAD BAY POSITIONS AND SHALL BE A 64 DETECTOR CHANNEL R CABINET WITH RACK-MOUNTED DETECTION. THE CABINET SHALL CONTAIN A 764 OPTICOM PHASE SELECTOR, WITH A 768 AUXILIARY INTERFACE PANEL MOUNTED IN THE CABINET DOOR AND FULLY WIRED FOR GREEN SENSE CAPABILITIES. CABINET SHALL BE EITHER: MODEL R-44 CAB, TS2-2, LAS VEGAS, 64CH DET, PART #M73650 FROM MCCAIN, INC.; MODEL MOBOTREX LAS VEGAS TS2-5TYPE 2 16 POS., 64 CH. DET, DRAWING #TF4216TLV01 REV 3 FROM SIERRA TRANSPORTATION AND TECHNOLOGIES; OR MODEL TS2-2 HW 16 POSITION HORIZONTAL CITY OF LAS VEGAS CABINET, PART # 4413G12 AS ORDERED FROM ECONOLITE CONTROL PRODUCTS, INC. ALL CABINETS SHALL BE PROVIDED WITH A COMPLETE SET OF FOUR BUS INTERFACE UNITS, POWER SUPPLY AND SDLC CABLES TO PROVIDE A FULLY FUNCTIONING SYSTEM. CABINET POWER SUPPLIES SHALL BE RENO A&E MODEL CPS-TS2-LED, PEEK MODEL PS101, OR ECONOLITE PS-200. BIU'S SHALL BE RENO A&E MODEL 124, PEEK MODEL BIU1, OR ECONOLITE PART #: 1886-01, OR ECONOITE PART # 160-1010-501.
16. THE CONTRACTOR SHALL SUPPLY A MALFUNCTION MANAGEMENT UNIT (MMU) AND TRAFFIC SIGNAL CONTROLER TO THE CITY OF LAS VEGAS TRAFFIC SIGNAL REPAIR SHOP A MINIMUM OF FOURTEEN DAYS PRIOR TO SIGNAL TURN-ON OR PRIOR TO CONVERTING TO A NEW PHASING SCHEME. FOR TESTING AND PROGRAMMING PURPOSES. THE CONTROLLER SHALL BE A NAZTEC 980 ATC TS2 TYPE 2 NTCIP COMPLIANT SIGNAL CONTROLLER WITH INSTALLED AND LICENSED APOGEE CONTROLLER SOFTWARE, LATEST VERSION, AND THE MMU SHALL BE A MODEL MMU-1600GE A S MANUFACTURED BY RENO A&E., OR APPROVED EQUAL. THE CONTRACTOR SHALL DELIVER THE CONTROLLER AND MMU TO AND PICKUP THE CONTROLLER AT 2295 RONEMUS DRIVE. CONTRACTOR SHALL NOTIFY TRAFFIC ENGINEERING FIELD OPERATIONS (702-229-6331) SEVEN DAYS PRIOR TO PICK UP. THE CITY, AT ITS DISCRETION, MAY PROVIDE A DIFFERENT MODEL MMU FOR INITIAL TURN-ON, IN WHICH CASE CITY PERSONNEL WILL SWAP THE MMU AFTER THE PROJECT IS ACCEPTED.
17. CONTRACTOR SHALL POTHOLE SIGNAL POLE LOCATIONS PRIOR TO ORDERING OF POLES.
18. ALL MAST ARMS TO BE HOT-DIP GALVANIZED BY THE MANUFACTURER THE MAST ARM IS TO BE FABRICATED WITH END TENON ONLY. THE END TENON SHALL BE FACTORY INSTALLED AND THE REMAINING TENONS SHALL BE FABRICATED IN THE FIELD AT THE LOCATION SHOWN ON THE PLANS OR AS DIRECTED BY THE TRAFFIC ENGINEER AND/OR HIS AUTHORIZED REPRESENTATIVE.FOR TENON FABRICATION DETAILS SEE CLARK COUNTY "SPECIFICATION FOR WELDED HIGHWAYS AND RAILWAY BRIDGES", AND TO ANY ADDITIONAL REQUIREMENTS OF SECTION 623 OF THE SPECIFICATIONS. ALL EXPOSED WELDS, SHALL BE PAINTED AS PROVIDED FOR REPAIRING DAMAGED GALVANIZED SURFACES.
19. ALL VEHICLE AND PEDESTRIAN SIGNAL INDICATIONS SHALL HAVE LIGHT EMITTING DIODE (LED) TYPE INDICATIONS, IN CONFORMANCE TO CITY OF LAS VEGAS SPECIAL PROVISIONS AND TO SECTION 623 OF THE CCA USS. ALL PEDESTRIAN SIGNAL FACES SHALL PROVIDE "WALKING PERSON", "HANS", AND "COUNTDOWN" MESSAGES AS PROVIDED BY DURALIGHT MODEL #UXM-400-VIEL OR DIALIGHT MODEL #430-6479-001X, OR APPROVED EQUAL. THE "COUNTDOWN" MESSAGE SHALL NOT FLASH. WHERE EXISTING SIGNALS ARE MODIFIED, THE CONTRACTOR SHALL VERIFY THAT LED PEDESTRIAN INDICATIONS FOR A SPECIFIC PHASE ARE THE SAME MANUFACTURER SO THAT THEY FUNCTION CORRECTLY, OR SHALL REPLACE ALL COUNTDOWN PEDESTRIAN INDICATIONS FOR THAT PHASE.
20. VIDEO DETECTION SYSTEMS SHALL BE TS2 COMPATIBLE AND SHALL INPUT DETECTOR CALLS TO THE CONTROLLER THROUGH AN SDLC CABLE. SYSTEMS WILL BE EITHER ITERIS EDGE 2-1N PROCESSORS WITH VRACKS-PS, EDGE2-TS2-IM-PAK AND EDGECONNECT PAK, (IP ADDRESSABLE); PEEK VIDEOTRAK IQ (WITH ETHERNET PORT AND SDLC); ECONOLITE AUTOSCOPE VISION SYSTEM WITH COMM MANAGER AND MINI DETECTION PROGRAMMING KIT MOUNTED IN THE CABINET; OR TRAFICON VIP WITH VIEWCOM (IP ADDRESSABLE) AND PIM (SDLC). WHEN VIDEO DETECTIONS SYSTEMS WILL BE STAND ALONE SYSTEMS TO INCLUDE ALL NECESSARY EQUIPMENT TO PROGRAM THE VIDEO DETECTION SYSTEM. A PROGRAMMING "MOUSE", KEYPAD OR LAPTOP COMPUTER (IF REQUIRED FOR PROGRAMMING THE VIDEO DETECTION SYSTEM) AND APPROPRIATE SOFTWARE WILL BE SUPPLIED WITH EACH VIDEO SYSTEM. PERSONAL COMPUTERS (PCs) MAY NOT BE SUBSTITUTED FOR LAPTOPS. A VIDEO MONITOR (COLOR FLAT SCREEN) 9" TO 13" WILL BE SUPPLIED WITH EACH VIDEO DETECTION SYSTEM. EACH VIDEO CAMERA WILL HAVE POWER AND VIDEO CABLE DIRECTLY FROM THE CABINET. COAXIAL CABLE WILL BE TYPE 8281 (SOLID CENTER CONDUCTOR). CAMERAS THAT USE A PREFABRICATED CABLE INTEGRATING POWER AND VIDEO INTO A SINGLE WEATHERPROOF CONNECTOR ARE ACCEPTABLE."BNC" ARE THE ONLY ACCEPTABLE TERMINATION OF COAXIAL CABLES. CAMERAS WILL BE MOUNTED PER MANUFACURER'S RECOMMENDATIONS AND PER CLV TRAFFIC ENGINEER APPROVAL. VIDEO CAMERAS SHALL BE COLOR AND SHALL BE MOUNTED A MINIMUM 6 FOOT RISER ON THE SIGNAL MAST ARM WITH EXTENSION BRACKETS (TYPE AG-0175-74-62 OR EQUIVALENT). THE LOCATION OF THE CAMERA ON THE MAST ARM SHALL BE APPROVED BY THE TEFO TRAFFIC SIGNAL SUPERVISOR. A VIDEO FILTER (CX06-BNYC OR EQUIVALENT) WILL BE INSTALLED IN THE SIGNAL CABINET FOR EACH CAMERA VIDEO INPUT WHEN COAX IS USED. VIDEO DETECTION PROCESSORS AND COMMUNICATIONS CARDS SHALL BE PROVIDED WITH THE LATEST VERSIONS OF THE MANUFACTURER'S SOFTWARE. THE CONTRACTOR SHALL AIM CAMERAS AND PROGRAM AND CONFIGURE THE VIDEO DETECTION PROCESSORS TO PROVIDE A FULLY FUNCTIONING SYSTEM.
21. WHERE NEW LOOPS WILL BE OVERLAID WITH NEW PAVEMENT, LOOP DETECTORS SHALL BE PREFORMED LOOPS AS MANUFACTURED BY RENO A&E LOOP SYSTEMS AND ALL LOOPS SHALL BE INSTALLED IN THE ROADWAY PRIOR TO PLACEMENT OF THE FINAL PAVEMENT LIFT. WHERE NEW LOOPS ARE INSTALLED THAT ARE NOT OVERLAID WITH NEW PAVEMENT, LOOPS SHALL BE CABLE-IN-DUCT PER SECTION 623 T.02.04.C OF THE CITY OF LAS VEGAS SPECIAL PROVISIONS. LOOP LEAD-IN CABLE SHALL BE 6-PAIR 18 AWG MULTIPLE CONDUCTOR CABLE AS SPECIFIED IN SECTION 623T.02.04 OF THE CLV SPECIAL PROVISIONS. ALL WIRING HARNESSES, RACK POSITIONS, AND LOOP LEAD-IN CABLE SHALL BE CLEARLY MARKED AS TO THE APPROPRIATE PHASE AND LETTER DESIGNATION TO WHICH IT BELONGS AS SHOWN ON THE TRAFFIC SIGNAL PLANS AND APPROVED BY THE CLV TRAFFIC ENGINEERING DIVISION PRIOR TO INSTALLATION. REFER TO SECTION 623T.02.04 OF THE CLV SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.
22. OPTICAL PREEMTION UNITS WILL BE GLOBAL TRAFFIC TECHNOLOGIES (ENCODING CAPABLE), MODEL 764 OPTICOM PHASE SELECTOR INSTALLED IN A MODEL 760 RACK WITH A MODEL 768 AUXILIARY INTERFACE PANEL (AIP) MOU





BENCHMARK

CITY OF LAS VEGAS BENCHMARK: 9LV007W6
RIVET & PLATE IN TOP OF CURB AT NE CORNER OF GOWAN & JENSEN

ELEVATION: 2361.43 (FEET)
802.46 (METERS)

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED: 2008)
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Call before you Dig
Avoid cutting underground utility lines. It's costly.
CALL
811
OR
1-800-642-2444

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

NO.	DATE	SHEET	REVISIONS
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XXX			XXX

PREPARED BY:
CARPENTER SELLERS DEL GATTO ARCHITECTS

PROFESSIONAL ENGINEER
ROSHAN POUDEL
EXP: 12/31/23
CIVIL
No. 28428
STATE OF NEVADA
04-27-2023

TITLE
CLV POLICE MEMORIAL PARK RENOVATION

SHEET
MASTER GRADING PLAN

PREPARED FOR
CITY OF LAS VEGAS

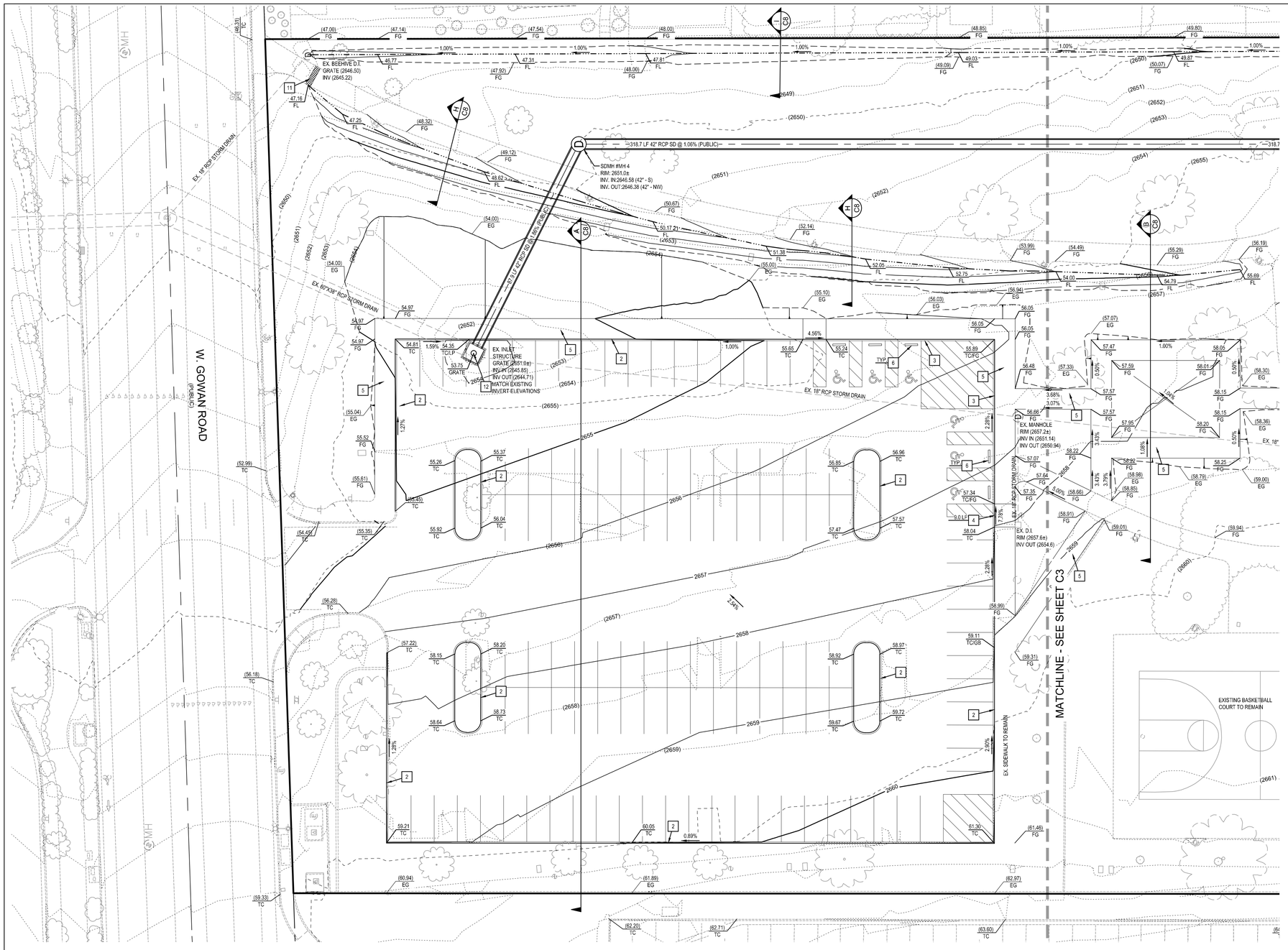
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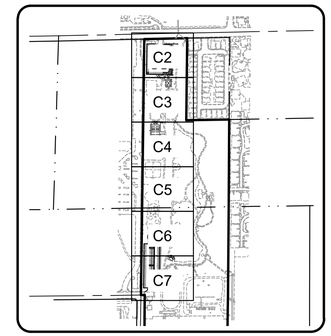
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6/26/18 V:\CSD-PROJECTS\PROJECTS\CLV WESTSIDE EDUCATION & TRAINING CENTER\DRAWINGS\REVIT\UNTITLED CAD\TITLE BLOCKS\CLV TITLE BLOCK 24X36.DWG





KEY MAP
SCALE: NTS

SCALE: 1"= 20'

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DARRYL LATTIMORE, P.E. DATE

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NORTH 00 03'07" EAST, BEING THE EAST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 7, TOWNSHIP 20S, RANGE 60E, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN BOOK 98, PAGE 77 OF PLATS.

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RIVET & PLATE IN TOP OF CURB AT NE CORNER OF GOWAN & JENSEN

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FLOOD DESIGNATION PROVIDED BY FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

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PREPARED BY: CARPENTER SELLERS DEL CASTILLO ARCHITECTS

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PROFESSIONAL ENGINEER — ROSHAN POUDEL — EXP: 12/31/23 — CIVIL — No. 28428 — STATE OF NEVADA

04-27-2023

TITLE: CLV POLICE MEMORIAL PARK RENOVATION

SHEET: GRADING PLAN 1

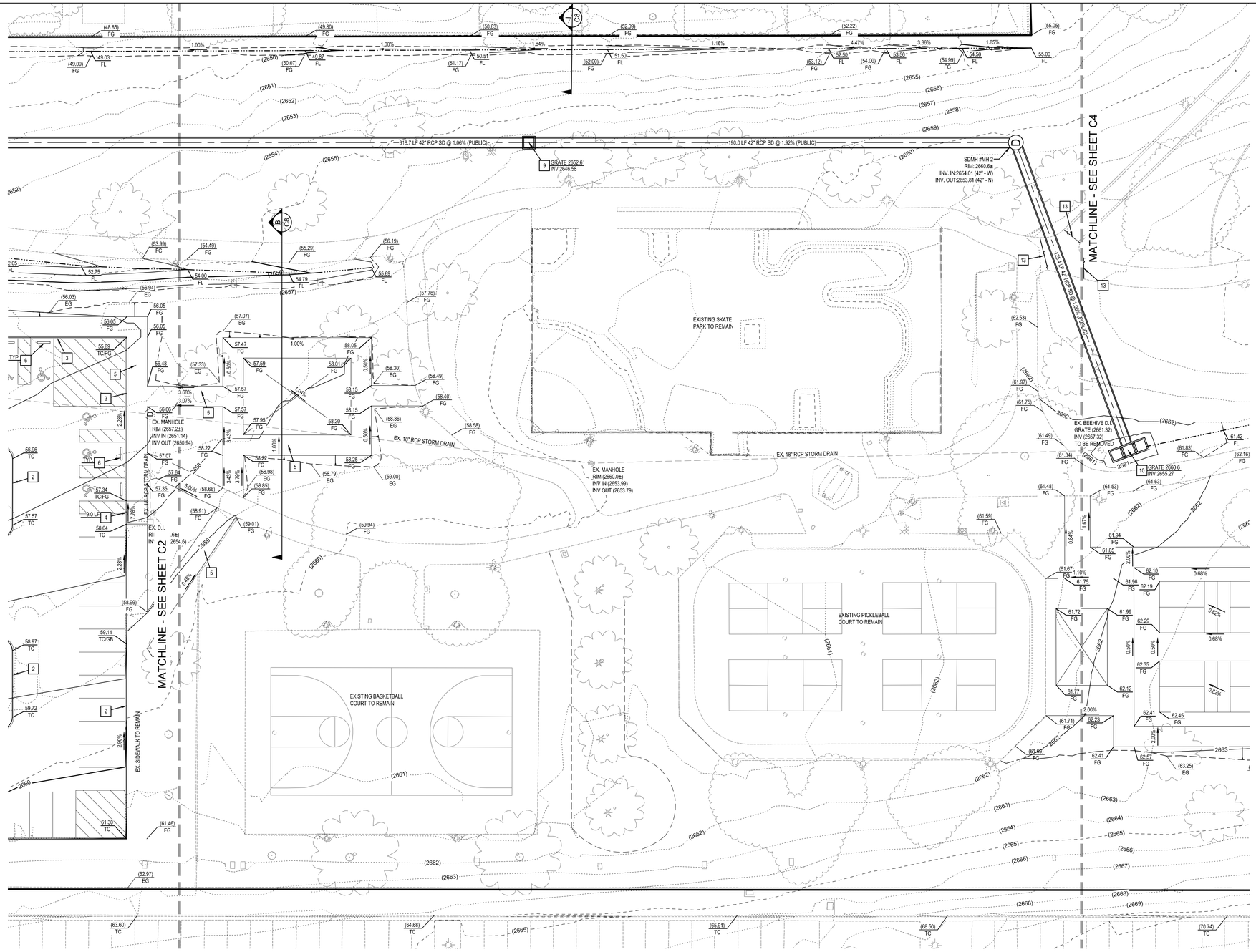
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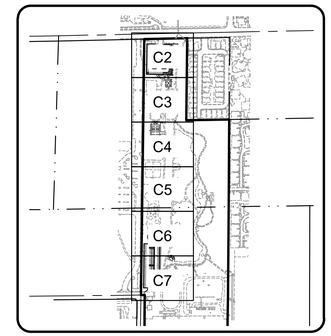
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6/28/18





KEY MAP
SCALE: NTS



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20 10 0 20

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PREPARED BY: CARPENTER SELLERS DEL CASTILLO ARCHITECTS

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STATE OF NEVADA — PROFESSIONAL ENGINEER — ROSHAN POUDEL EXP: 12/31/23 CIVIL No. 28428
04-27-2023

TITLE: CLV POLICE MEMORIAL PARK RENOVATION
SHEET: GRADING PLAN 2

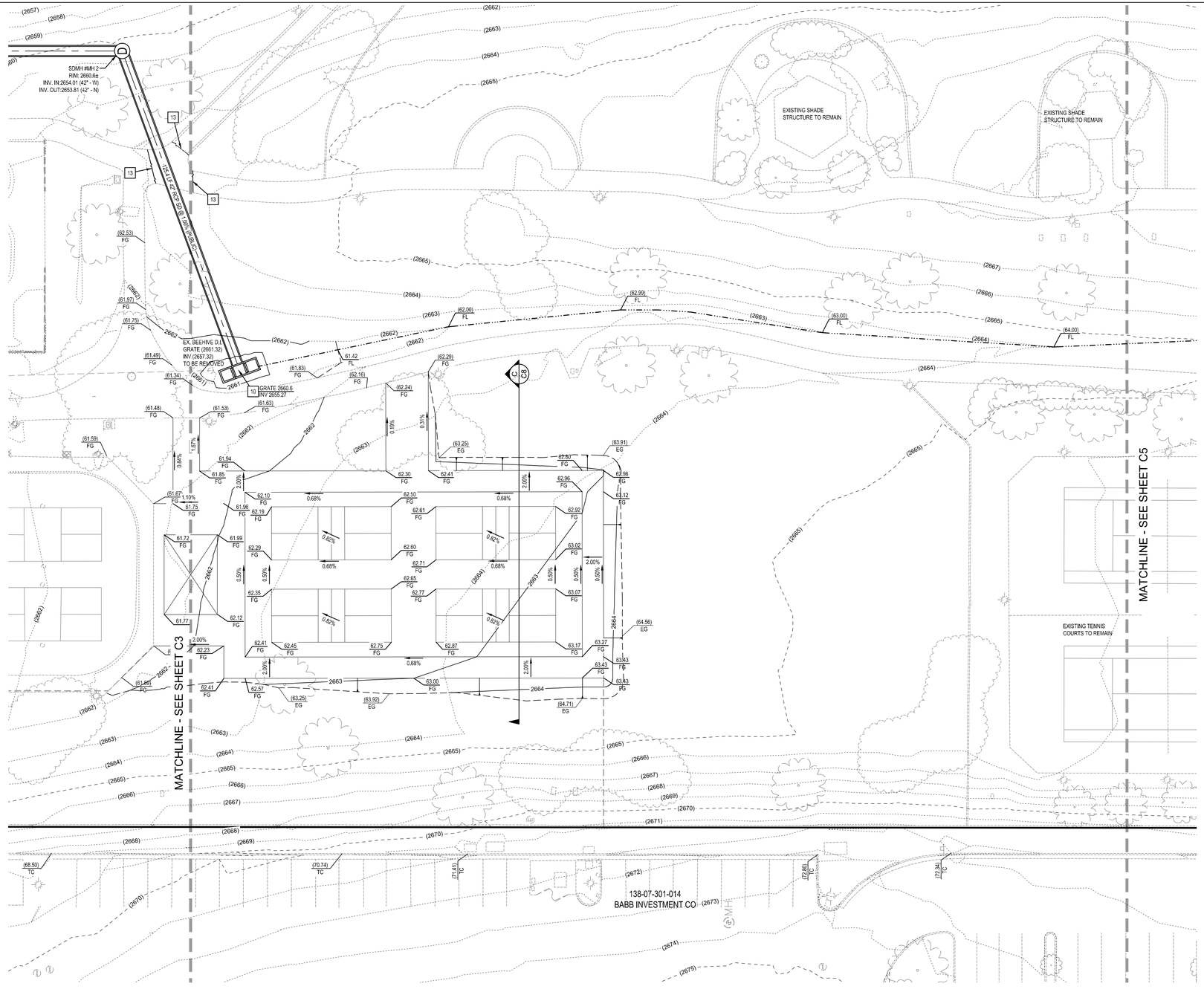
PREPARED FOR: CITY OF LAS VEGAS
BID #:
H. #:
DATE: 4/27/2023
CP #:
PL #:
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CHECKED BY: Checker

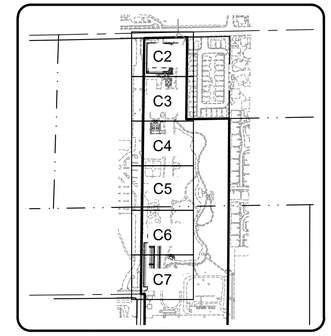
SHEET C3 OF

DO NOT SCALE DRAWINGS

V:\CD-PROJECTS\CONTRACTS\PWC\2021\CLV WEST SIDE EDUCATION, K-8 TRAINING CENTER\DRAWINGS\SITE\LINETYP.CAD\TITLEBLOCKS\CLV TITLEBLOCK-XXSIZE.DWG

6/26/18





KEY MAP
SCALE: NTS

SCALE: 1"= 20'
20 10 0 20

LEGEND

PROPOSED	EXISTING	
		RIGHT-OF-WAY LINE
		PROPERTY LINE
		EASEMENT LINE
		CENTER LINE
		CURB & GUTTER
		SAWCUT LINE
		FLOW LINE
		GRADE BREAK
2500	(2500)	MAJOR 5' CONTOUR
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CONSTRUCTION NOTES

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BASIS OF BEARINGS:

NORTH 00 03'07" EAST, BEING THE EAST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 7, TOWNSHIP 20S, RANGE 60E, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN BOOK 98, PAGE 77 OF PLATS.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: 9LV007W6
RIVET & PLATE IN TOP OF CURB AT NE CORNER OF GOWAN & JENSEN

ELEVATION: 2361.43 (FEET)
802.46 (METERS)

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED: 2008)
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FLOOD DESIGNATION PROVIDED BY FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

GRADING NOTES

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CUT:	2,086 CY
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NET:	1,327 CY (CUT)

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2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED BY 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 CLARK COUNTY TITLE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES GUIDANCE MANUAL.
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4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT AREA EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMPs WEEKLY, AND WITHIN 24HOURS AFTER A RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY; SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
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ENGINEER'S CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED UPDATED DRAINAGE STUDY CLV# N/A ON FILE WITH THE CITY OF LAS VEGAS.

DARRYL LATTIMORE, P.E. DATE

NO.	DATE	SHEET	REVISIONS
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX

PREPARED BY: CARPENTER SELLERS DEL GATTO ARCHITECTS

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PROFESSIONAL ENGINEER — ROSHAN POUDEL — EXP: 12/31/23 — CIVIL — No. 28428 — STATE OF NEVADA
04-27-2023

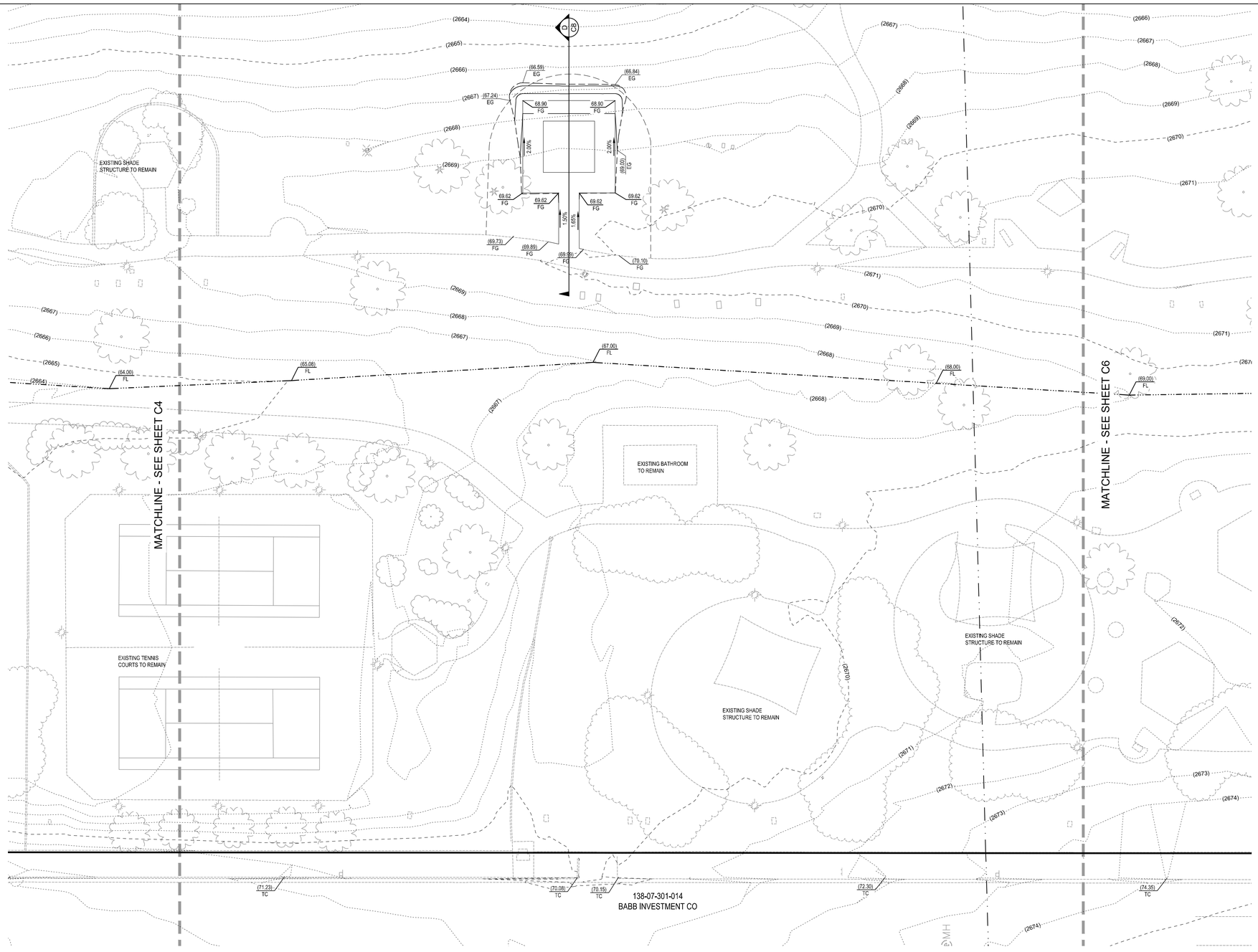
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SHEET: GRADING PLAN 3

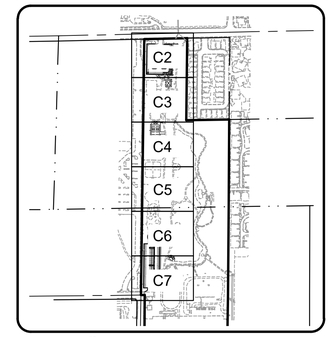
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H #:
PL #::
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CHECKED BY: Checker

SHEET C4 OF

DO NOT SCALE DRAWINGS

\\CS-FP01\Eis\RUTA\ATA\DWG\2025 CLV MYSTOR EDUCATION & TRAINING CENTER\PLANNING\SITE\PLANS\CAD FILES\CDC\CLV TITLES.DCC 5/4/26.DWG
8/25/18





KEY MAP
SCALE: NTS

SCALE: 1"= 20'
20 10 0 20

LEGEND

PROPOSED	EXISTING	
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		PROPERTY LINE
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CITY OF LAS VEGAS BENCHMARK: 9LV007W6
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DARRYL LATTIMORE, P.E. DATE

NO.	DATE	SHEET	REVISIONS
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
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XXX	XXX	XXX	XXX

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EXP: 12/31/23
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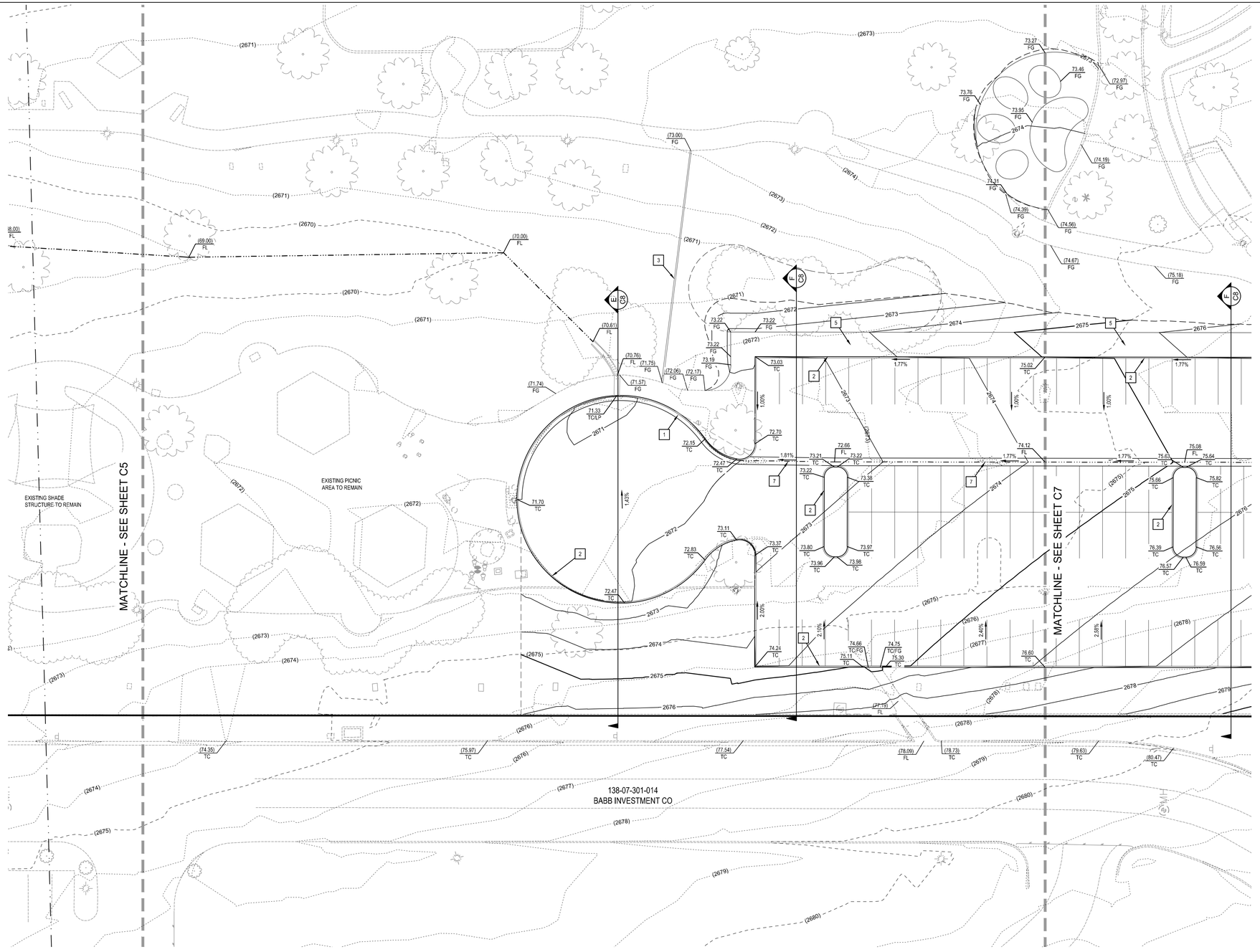
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SHEET: GRADING PLAN 4

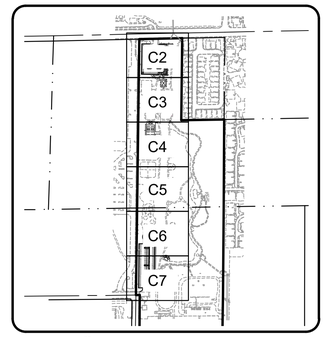
PREPARED FOR: CITY OF LAS VEGAS
DATE: 4/27/2023
CP #:
PL #:
CHECKED BY: Checker
BID #
H #
SUBMITTAL STAGE: SCHEMATIC DESIGN

SHEET
C5
OF

DO NOT SCALE DRAWINGS

V:\CSD-PROJECTS\PROJECTS\CLV WESTSIDE EDUCATION & TRAINING CENTER\DRAWINGS\RFI UTILITIES\CADD\TITLE BLOCK\CLV TITLE BLOCK_XAGS.DWG
5/26/18





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POST-CONSTRUCTION BMPS (PCBMPS) / CONTROL MEASURES NOTED ON THE GRADING PLANS ARE MANDATORY PERMANENT REGULATORY STORMWATER POLLUTION CONTROLS. THESE PCBMPS MUST BE INSTALLED PER THE APPROVED PLANS AND MUST BE PERMANENTLY MAINTAINED.

ESTIMATED QUANTITIES

NOTE: QUANTITIES SHOWN ARE RAW QUANTITIES AND APPROXIMATE. CONTRACTOR TO DETERMINE HIS OWN QUANTITIES FOR GRADING PURPOSES.

WORK UNDER THIS PLAN CONSTITUTES GRADING IN ACCORDANCE WITH 2018 IBC; ENGINEERING REPORTS AND CERTIFICATIONS IN CONFORMANCE WITH IBC SHALL BE FILED WITH THE CITY OF LAS VEGAS PRIOR TO CITY OF LAS VEGAS APPROVAL AT FINAL INSPECTION.

CUT:	2,086 CY
FILL:	759 CY
NET:	1,327 CY (CUT)

STORMWATER MANAGEMENT NOTES

1. THE OWNER, SITE DEVELOPER, CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHT OF WAYS OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FORM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED BY 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 CLARK COUNTY TITLE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN FOURTEEN (14) DAYS AFTER CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT AREA EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMP's WEEKLY, AND WITHIN 24HOURS AFTER A RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
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6. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL RESPOND TO STORMWATER INSPECTOR CORRECTIVE ACTIONS IN THE MANNER PRESCRIBED BY CLARK COUNTY, INCLUDING BUT NOT LIMITED TO PROVIDING PHOTOS AND DESCRIPTIONS OF THE CORRECTIONS COMPLETED BY THE CONTRACTOR OR HIS AGENT.

ENGINEER'S CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED UPDATED DRAINAGE STUDY CLV# N/A ON FILE WITH THE CITY OF LAS VEGAS.

DARRYL LATTIMORE, P.E. DATE

NO.	DATE	SHEET	REVISIONS
XXX	XXX	XXX	XXX
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XXX	XXX	XXX	XXX

PREPARED BY: CARPENTER SELLERS DEL GATTO ARCHITECTS

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PROFESSIONAL ENGINEER
ROSHAN POUDEL
EXP: 12/31/23
CIVIL
No. 28428
STATE OF NEVADA
04-27-2023

TITLE: CLV POLICE MEMORIAL PARK RENOVATION

SHEET: GRADING PLAN 5

PREPARED FOR: CITY OF LAS VEGAS

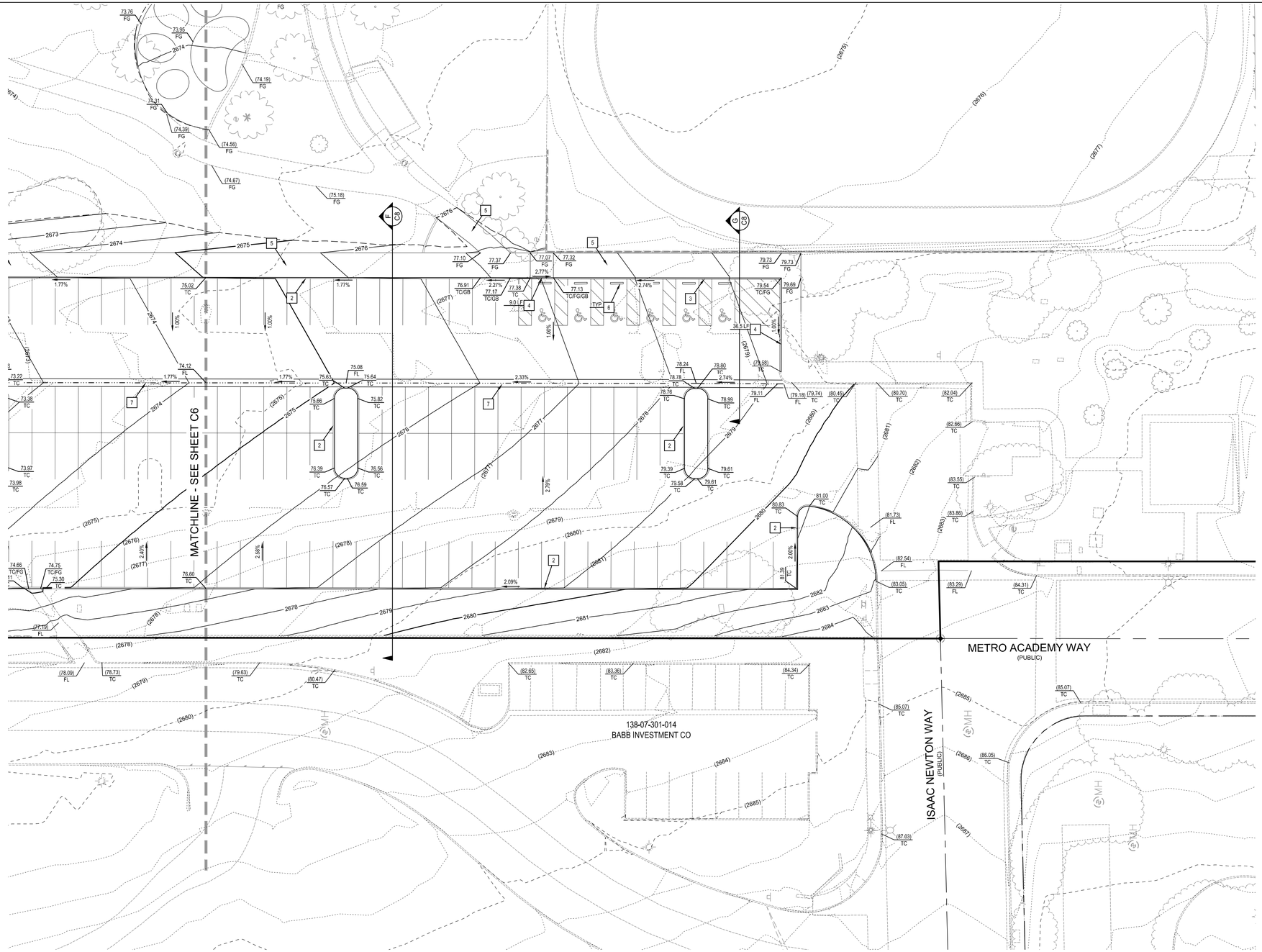
DATE: 4/27/2023 | CP #: | PL #: | CHECKED BY: Checker

BID #: | H #: | SUBMITTAL STAGE: SCHEMATIC DESIGN

SHEET C6 OF

DO NOT SCALE DRAWINGS

8/2/18 \\CS-FP01\Eng\Projects\2021\CLV WESTSIDE EDUCATION & TRAINING CENTER\DRAWINGS\ISSUE\PLANS\CLV TITLE.DCC 04/05/23



KEY MAP
SCALE: NTS

N

SCALE: 1"= 20'
20 10 0 20

LEGEND

PROPOSED	EXISTING	
		RIGHT-OF-WAY LINE
		PROPERTY LINE
		EASEMENT LINE
		CENTER LINE
		CURB & GUTTER
		SAWCUT LINE
		FLOW LINE
		GRADE BREAK
2500	(2500)	MAJOR 5' CONTOUR
2501	(2501)	MINOR 1' CONTOUR
(98.72) XX		EXISTING GRADE TAG
98.72 XX		PROPOSED GRADE TAG
FF		FINISHED FLOOR
TC		TOP OF CURB
FG		FINISHED GRADE
FL		FLOW LINE GRADE
EP		EDGE OF PAVEMENT
1.00%		GRADE SLOPE
HP		HIGH POINT
TG		TOP OF GRATE
INV		INVERT
A C8		SECTION MARKER-DETAIL NUMBER ABOVE SHEET NUMBER

CONSTRUCTION NOTES

1. CONSTRUCT "L" TYPE CURB AND GUTTER PER USDCCA #216
2. CONSTRUCT "A" CURB PER USDCCA #219
3. CONSTRUCT 0" CURB PER DETAIL SHEET C9
4. CONSTRUCT 0" TO "A" CURB PER DETAIL SHEET C9
5. CONSTRUCT 4" THICK SIDEWALK PER USDCCA #234
6. INSTALL BUMPER BLOCK PER CCAUSD #238
7. CONSTRUCT 3' WIDE VALLEY GUTTER PER DETAIL SHEET C9
8. CONSTRUCT 2' CURB OPENING PER DETAIL SHEET C9
9. CONSTRUCT 48"X48" DROP INLET PER DETAIL SHEET C9
10. CONSTRUCT 3 - 48"X48" DROP INLET PER DETAIL SHEET C9. ALL KNOCK-OUTS TO BE GROUTED AT JUNCTION
11. CONSTRUCT SIDEWALK DRAIN PER CCAUSD # 236
12. REMOVE EXISTING DROP INLET. INSTALL CAST IN PLACE DROP INLET PER DETAIL SHEET C9. STRUCTURAL DESIGN BY OTHERS
13. SAWCUT AND REMOVE EXISTING SIDEWALK AND REPLACE TO MATCH EXISTING

CONTRACTOR TO VERIFY THE LATEST EDITION OF THE USDCCA DETAILS ARE USED FOR CONSTRUCTION

DISCLAIMER NOTE

THE UNDERGROUND UTILITIES AS SHOWN HEREON HAVE BEEN LOCATED FROM OBSERVED FIELD SURVEY EVIDENCE AND EXISTING DRAWINGS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING: PLANS PROVIDED BY THE CLIENT, UTILITY COMPANIES, AND MUNICIPAL AGENCIES. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.



BASIS OF BEARINGS:

NORTH 00 03'07" EAST, BEING THE EAST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 7, TOWNSHIP 20S, RANGE 60E, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN BOOK 98, PAGE 77 OF PLATS.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: 9LV007W6
RIVET & PLATE IN TOP OF CURB AT NE CORNER OF GOWAN & JENSEN

ELEVATION: 2361.43 (FEET)
802.46 (METERS)

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED: 2008)
BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

FLOOD ZONE DESCRIPTION

THIS SITE IS LOCATED IN ZONE "X", AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN, PER THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL 32003C2135F CLARK COUNTY, NEVADA DATED NOVEMBER 16, 2011.

FLOOD DESIGNATION PROVIDED BY FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

GRADING NOTES

1. ADD 2600' TO ALL EXISTING AND PROPOSED DESIGN GRADES. DO NOT ADD 2600' TO CONTOUR ELEVATIONS.
2. ACTUS SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES IN THE PLANS OR CONDITIONS IN THE FIELD .

BMP NOTE

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DARRYL LATTIMORE, P.E. DATE

NO.	DATE	SHEET	REVISIONS
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
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PREPARED BY: CARPENTER SELLERS DEL GATTO ARCHITECTS

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PROFESSIONAL ENGINEER — ROSHAN POUDEL — EXP: 12/31/23 — CIVIL — No. 28428 — STATE OF NEVADA
04-27-2023

TITLE: CLV POLICE MEMORIAL PARK RENOVATION
SHEET: GRADING PLAN 6

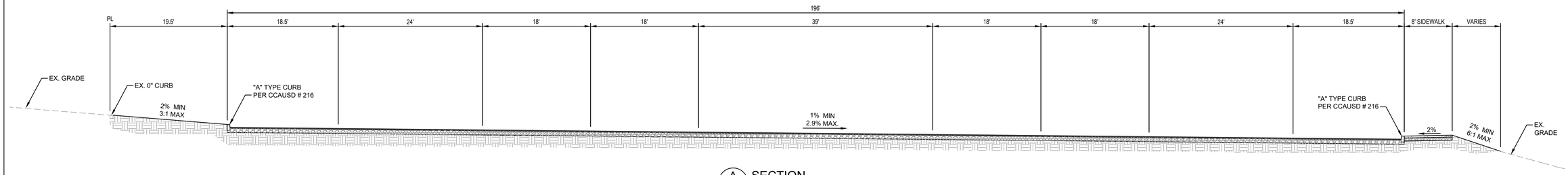
PREPARED FOR: CITY OF LAS VEGAS
DATE: 4/27/2023
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SUBMITTAL STAGE: SCHEMATIC DESIGN
CHECKED BY: Checker

SHEET C7 OF

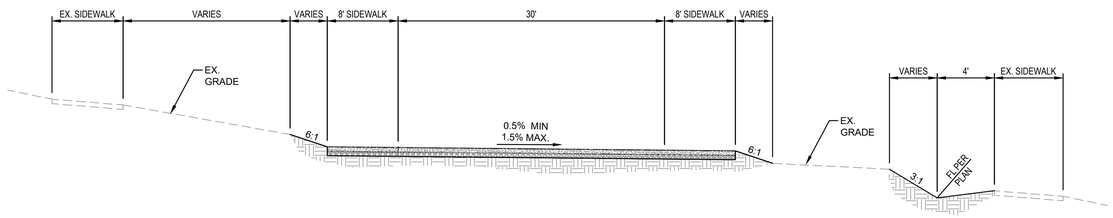
DO NOT SCALE DRAWINGS

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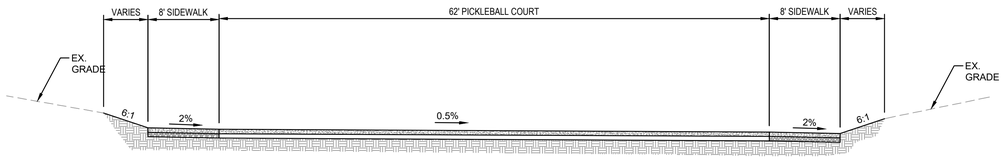
6/26/18



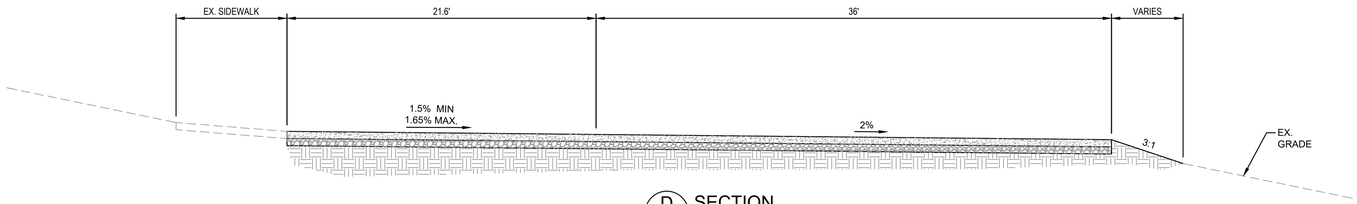
A C8 SECTION
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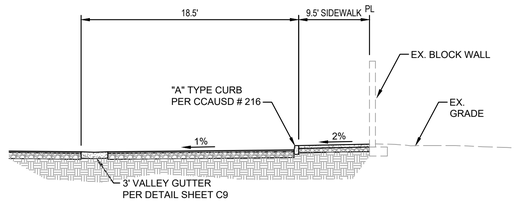
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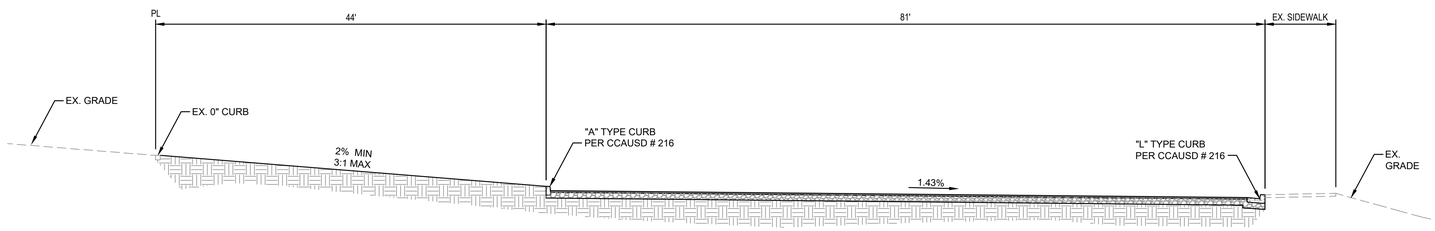
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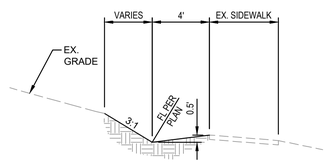
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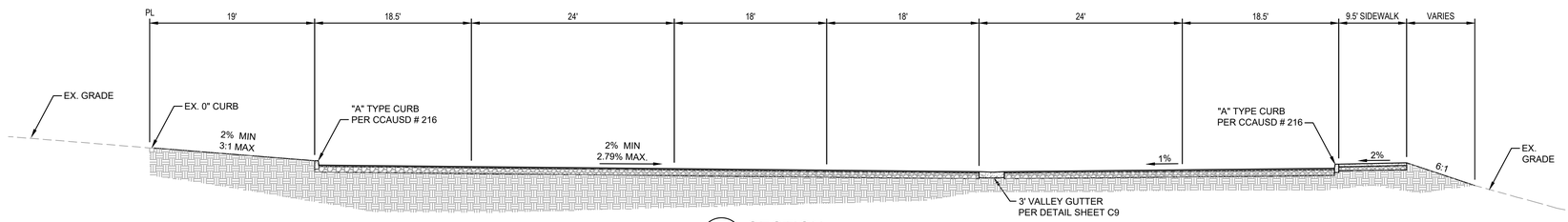
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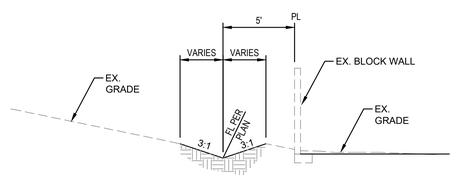
E C8 SECTION
NOT TO SCALE



H C8 SECTION
NOT TO SCALE



F C8 SECTION
NOT TO SCALE



I C8 SECTION
NOT TO SCALE

NO.	DATE	SHEET	REVISIONS
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PREPARED BY
CARPENTER SELLERS DEL GATTO ARCHITECTS

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PROFESSIONAL ENGINEER
ROSHAN POUDEL
EXP: 12/31/23
CIVIL
No. 28428
STATE OF NEVADA
04-27-2023

TITLE
CLV POLICE MEMORIAL PARK RENOVATION

SHEET
SECTIONS

PREPARED FOR
CITY OF LAS VEGAS

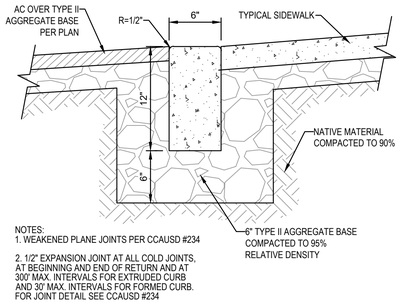
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DO NOT SCALE DRAWINGS

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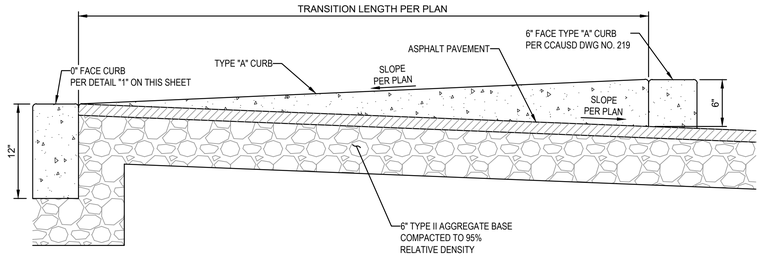
8/26/18



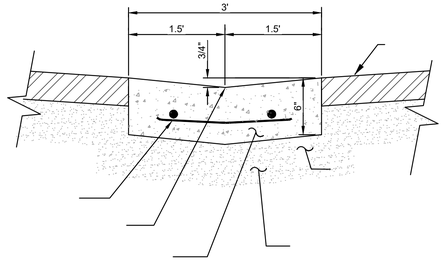
NOTES:
1. WEAKENED PLANE JOINTS PER CCAUSD #234

2. 1/2" EXPANSION JOINT AT ALL COLD JOINTS, AT BEGINNING AND END OF RETURN AND AT 300' MAX. INTERVALS FOR EXTRUDED CURB AND 30' MAX. INTERVALS FOR FORMED CURB. FOR JOINT DETAIL SEE CCAUSD #234

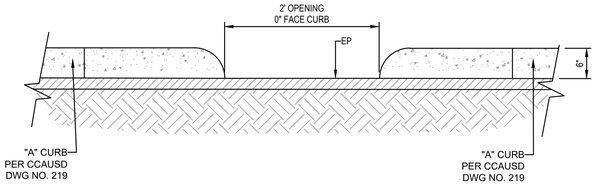
1 C9 DEPRESSED/0" FACE CURB
NOT TO SCALE



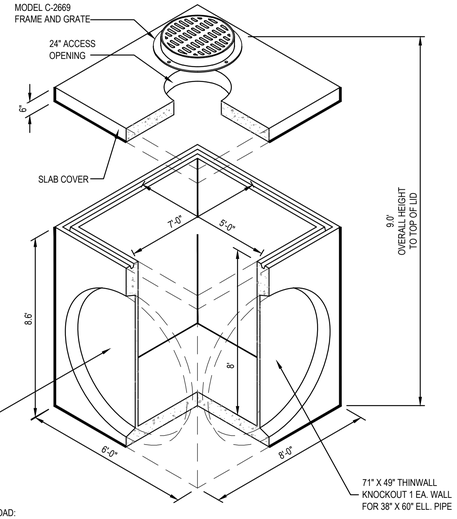
2 C9 0" FACE CURB TRANSITION
NOT TO SCALE



4 C9 3' VALLEY GUTTER
NOT TO SCALE



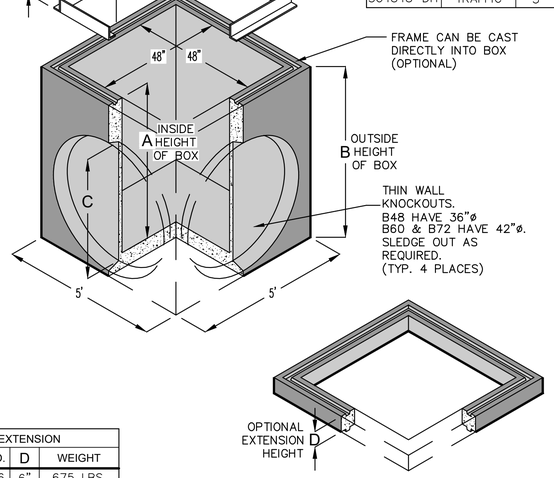
4 C9 2' INLINE CURB OPENING
NOT TO SCALE



BOX DESIGN LOAD:
H20 TRAFFIC

FOR COMPLETE DESIGN
SEE STRUCTURAL DESIGN (BY OTHERS)

5 C9 CAST IN PLACE DROP INLET
NOT TO SCALE



DROP INLET				
MODEL NO.	A	B	C	∗WEIGHT
DI484848	48"	54"	36"	4995 LBS.
DI484860	60"	66"	42"	6433 LBS.
DI484872	72"	78"	42"	7872 LBS.

∗BOX ONLY

FRAME AND GRATE			
MODEL NO.	RATING	E	WEIGHT
SG4848-DIP	PEDESTRIAN	1 1/2"	242 LBS.
SG4848-DIT	TRAFFIC	5"	1000 LBS.

EXTENSION		
MODEL NO.	D	WEIGHT
RS484806	6"	675 LBS.
RS484812	12"	1350 LBS.

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

48" X 48" DRAIN INLET

ORIG. DWG. DATE: 11-28-00
REV. DWG. DATE:

JENSEN PRECAST

DI4848

8.07

REVISIONS	SHEET	DATE	NO.
XXX	XXX	XXX	XXX
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XXX	XXX	XXX	XXX

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PROFESSIONAL ENGINEER — STATE OF NEVADA
ROSHAN POUDEL
EXP. 12/31/23
CIVIL
No. 28428
04-27-2023

TITLE: CLV POLICE MEMORIAL PARK RENOVATION

SHEET: DETAILS

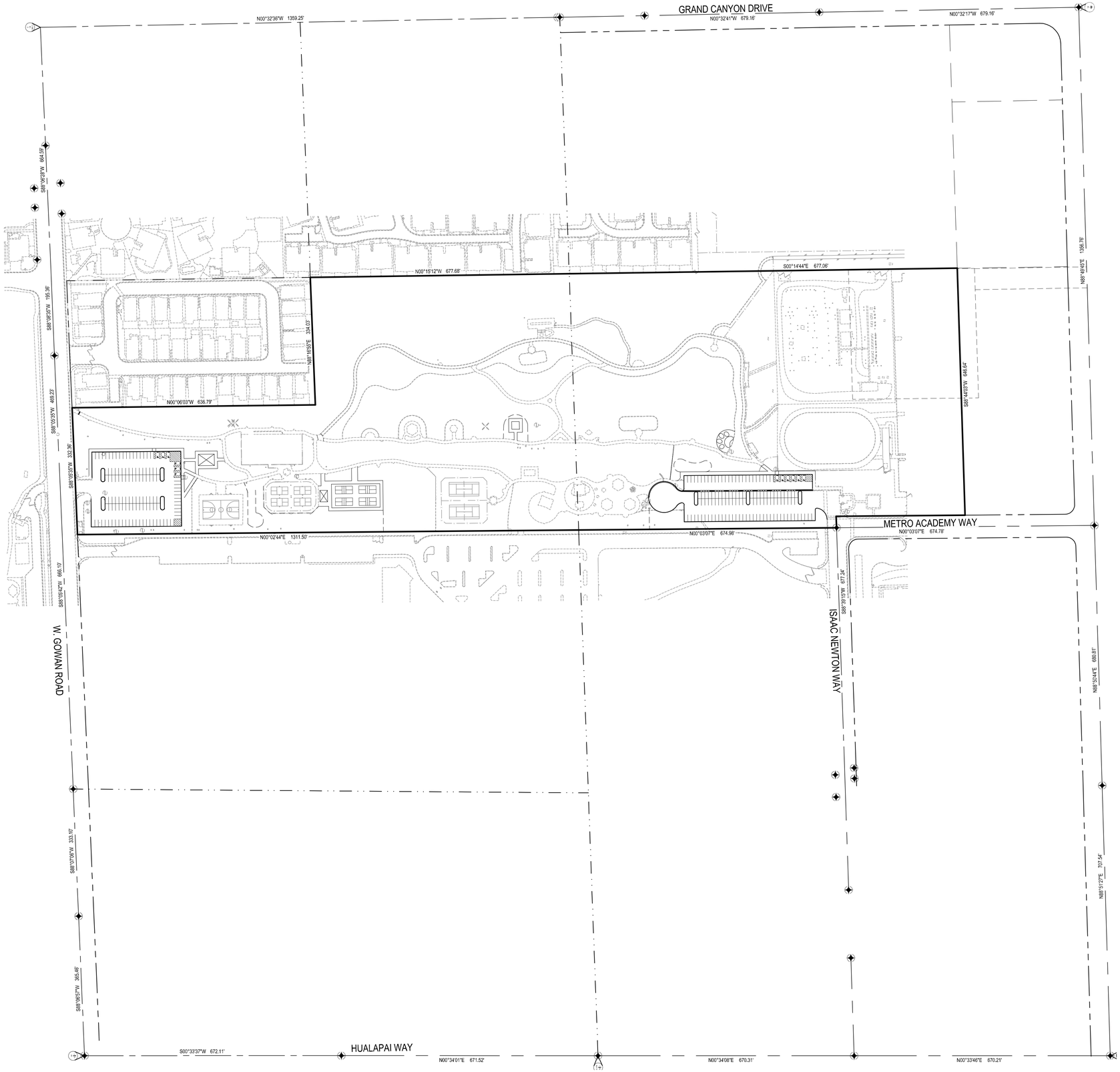
PREPARED FOR: CITY OF LAS VEGAS

BID #:
DATE: 4/27/2023
CP #:
H #:
PL #:
SUBMITTAL STAGE: SCHEMATIC DESIGN
CHECKED BY: Checker

SHEET
C9
OF

DO NOT SCALE DRAWINGS

\\CS-HHFILES\RVT\DATA\DWGS\2025 CLV WEST SIDE EDUCATION & TRAINING CENTER\DRAWINGS\RVT\UNUSED CAD FILES\DCS\CLV TITLEBLOCK 24X36.DWG
8/28/18



BENCHMARK

CITY OF LAS VEGAS BENCHMARK: 9LV007W6
RIVET & PLATE IN TOP OF CURB AT NE CORNER OF GOWAN & JENSEN

ELEVATION: 2361.43 (FEET)
802.46 (METERS)

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED: 2008)
BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

Call before you Dig
Avoid cutting underground utility lines. It's costly.
CALL 811 OR 1-800-642-2444

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

NO.	DATE	SHEET	REVISIONS
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX

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PROFESSIONAL ENGINEER
ROSHAN POUDEL
EXP: 12/31/23
CIVIL
STATE OF NEVADA
No. 28428
04-27-2023

TITLE: CLV POLICE MEMORIAL PARK RENOVATION

SHEET: MASTER HORIZONTAL CONTROL PLAN

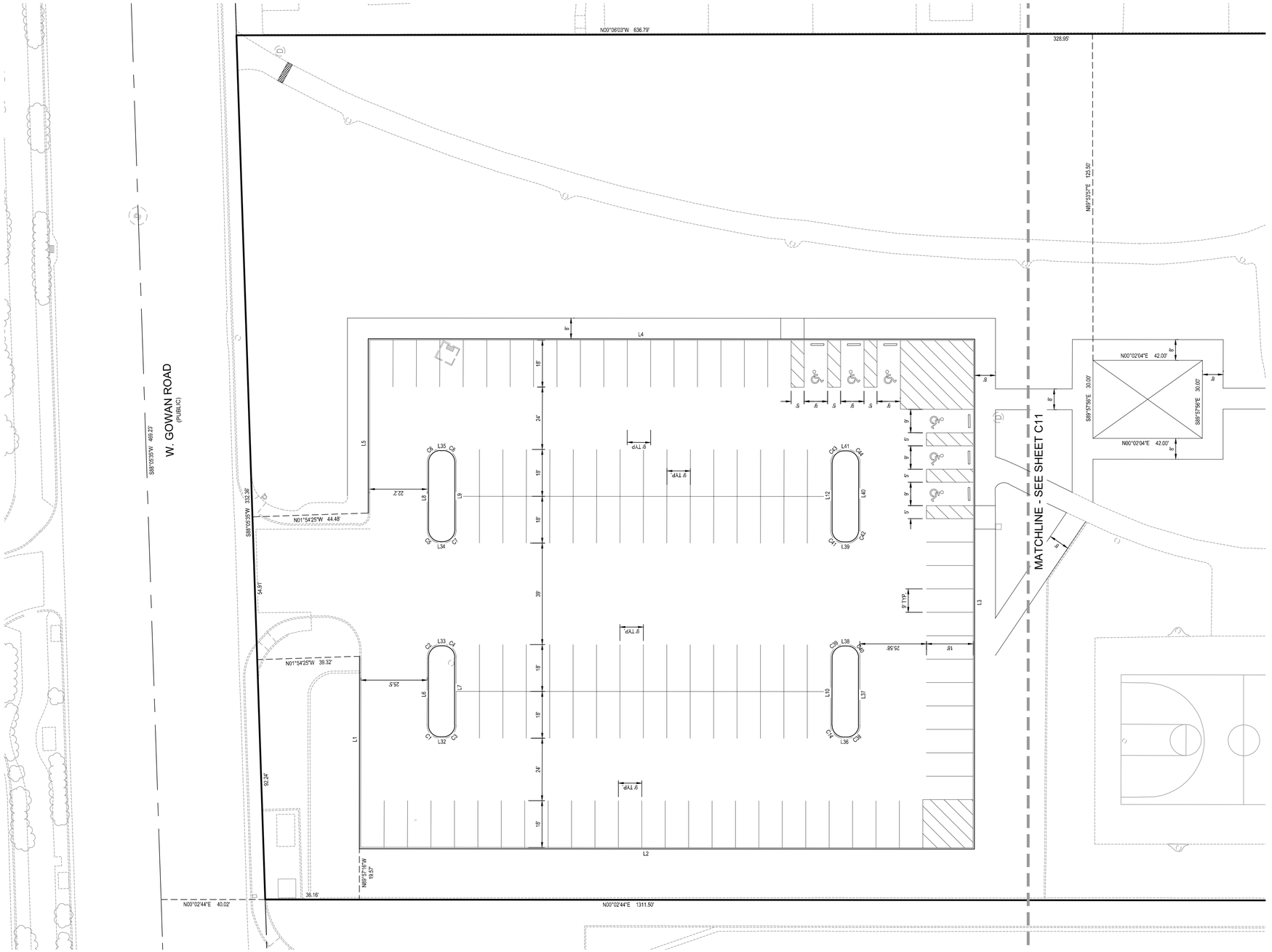
PREPARED FOR: CITY OF LAS VEGAS

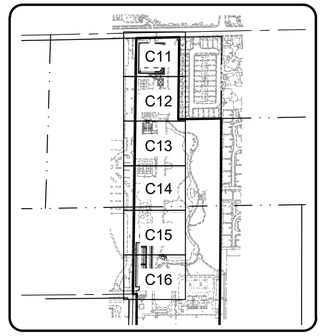
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4/27/2023			
BID #	H #	SUBMITTAL STAGE:	SCHEMATIC DESIGN

SHEET
C10
OF

DO NOT SCALE DRAWINGS

8/26/18
\\CDS-FP01\ES-JOBS\DATA\DWG\2023 CLV WES\SCE EDUCATION & TRAINING CENTER\DRAWINGS\SET-UP\LINGED-CAD-TITLE\ES_CDC_SCE_XXXSLT.DWG





KEY MAP
SCALE: NTS

SCALE: 1"= 20'
20 10 0 20

LEGEND

PROPOSED	EXISTING
	RIGHT-OF-WAY LINE
	PROPERTY LINE
	EASEMENT LINE
	CENTER LINE
	CURB & GUTTER

LINE TABLE

LINE	BEARING	LENGTH
L1	S89°57'56"E	73.95'
L2	N00°02'04"E	236.33'
L3	S89°57'56"E	196.00'
L4	N00°02'04"E	233.03'
L5	S89°57'56"E	66.99'
L6	S89°57'56"E	26.00'
L7	S89°57'56"E	26.00'
L8	S89°57'56"E	26.00'
L9	S89°57'56"E	26.00'
L10	S89°57'56"E	26.00'
L12	S89°57'56"E	26.00'
L14	S89°56'03"E	43.58'
L15	S89°56'03"E	33.98'
L16	S89°56'03"E	27.00'
L17	S89°56'03"E	27.00'
L18	N00°03'57"E	1.00'
L19	N00°03'57"E	1.00'
L20	S89°56'03"E	27.00'
L21	S89°56'03"E	27.00'
L22	N00°03'57"E	1.00'
L23	N00°03'57"E	1.00'
L24	N00°03'57"E	343.00'
L25	N00°03'57"E	336.50'
L26	S89°56'03"E	27.00'
L27	S89°56'03"E	27.00'
L28	N00°03'57"E	1.00'
L29	N00°03'57"E	1.00'
L30	S89°56'03"E	28.36'
L31	S89°56'03"E	36.49'
L32	S00°00'00"E	1.08'
L33	S00°00'00"E	1.08'
L34	S00°00'00"E	1.08'
L35	S00°00'00"E	1.08'
L36	S00°00'00"E	1.17'
L37	S89°57'56"E	26.00'
L38	S00°00'00"E	1.17'
L39	S00°00'00"E	1.17'
L40	S89°57'56"E	26.00'
L41	S00°00'00"E	1.17'

CURVE TABLE

CURVE	LENGTH	RADIUS	DELTA	TANGENT
C1	7.07'	4.50'	090°02'04"	4.50'
C2	7.07'	4.50'	089°57'56"	4.50'
C3	7.07'	4.50'	089°57'56"	4.50'
C4	7.07'	4.50'	090°02'04"	4.50'
C5	7.07'	4.50'	090°02'04"	4.50'
C6	7.07'	4.50'	089°57'56"	4.50'
C7	7.07'	4.50'	089°57'56"	4.50'
C8	7.07'	4.50'	090°02'04"	4.50'
C9	204.02'	40.50'	288°37'46"	29.09'
C10	14.96'	19.50'	043°56'32"	7.87'
C11	10.51'	6.00'	100°22'20"	7.20'
C12	14.96'	19.50'	043°56'32"	7.87'
C13	10.51'	6.00'	100°22'20"	7.20'
C14	7.07'	4.50'	090°02'04"	4.50'
C15	6.28'	4.00'	090°00'00"	4.00'
C16	6.28'	4.00'	090°00'00"	4.00'
C17	6.28'	4.00'	090°00'00"	4.00'
C18	6.28'	4.00'	090°00'00"	4.00'
C19	6.28'	4.00'	090°00'00"	4.00'
C20	6.28'	4.00'	090°00'00"	4.00'
C21	6.28'	4.00'	090°00'00"	4.00'
C22	6.28'	4.00'	090°00'00"	4.00'
C23	6.28'	4.00'	090°00'00"	4.00'
C24	6.28'	4.00'	090°00'00"	4.00'
C25	6.28'	4.00'	090°00'00"	4.00'
C26	6.28'	4.00'	090°00'00"	4.00'
C27	6.82'	4.00'	097°45'13"	4.58'
C28	42.46'	30.00'	081°05'11"	25.66'
C38	7.07'	4.50'	089°57'56"	4.50'
C39	7.07'	4.50'	089°57'56"	4.50'
C40	7.07'	4.50'	090°02'04"	4.50'
C41	7.07'	4.50'	090°02'04"	4.50'
C42	7.07'	4.50'	089°57'56"	4.50'
C43	7.07'	4.50'	089°57'56"	4.50'
C44	7.07'	4.50'	090°02'04"	4.50'

DISCLAIMER NOTE

THE UNDERGROUND UTILITIES AS SHOWN HEREON HAVE BEEN LOCATED FROM OBSERVED FIELD SURVEY EVIDENCE AND EXISTING DRAWINGS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING: PLANS PROVIDED BY THE CLIENT, UTILITY COMPANIES, AND MUNICIPAL AGENCIES. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

BASIS OF BEARINGS:

NORTH 00 03'07" EAST, BEING THE EAST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 7, TOWNSHIP 20S, RANGE 60E, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN BOOK 98, PAGE 77 OF PLATS.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: 9LV007W6
RIVET & PLATE IN TOP OF CURB AT NE CORNER OF GOWAN & JENSEN

ELEVATION: 2361.43 (FEET)
802.46 (METERS)

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED: 2008)
BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).



NO.	DATE	SHEET	REVISIONS
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX

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ROSHAN POUDEL
EXP: 12/31/23
CIVIL
No. 28428
STATE OF NEVADA
PROFESSIONAL ENGINEER
04-27-2023

TITLE
CLV POLICE MEMORIAL PARK RENOVATION

SHEET
HORIZONTAL CONTROL PLAN 1

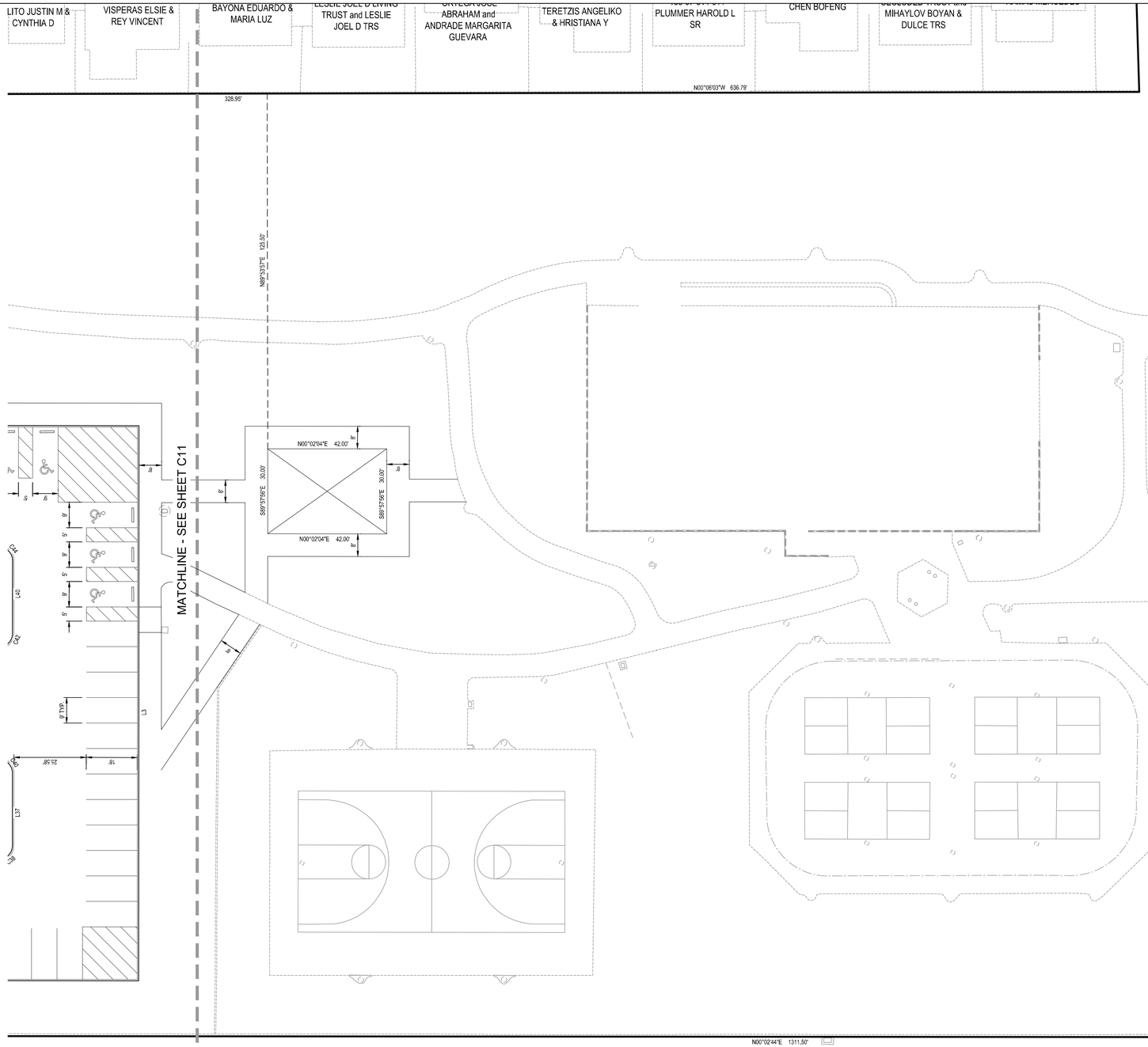
PREPARED FOR
CITY OF LAS VEGAS

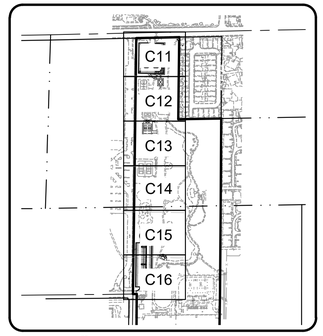
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DATE: 4/27/2023
CP #:
PL #::
SUBMITTAL STAGE: SCHEMATIC DESIGN
CHECKED BY: Checker

SHEET
C11
OF

DO NOT SCALE DRAWINGS

8.0.0.18 \\CLD-FP01\Files\Projects\2021 CLV WEST SIDE EDUCATION & TRAINING CENTER\Drawings\03 Revit\Plans\03 Civil\CLV TITLE05.CCX.DWG5.DWG





KEY MAP
SCALE: NTS

SCALE: 1"= 20'
20 10 0 20

LEGEND

PROPOSED	EXISTING
	RIGHT-OF-WAY LINE
	PROPERTY LINE
	EASEMENT LINE
	CENTER LINE
	CURB & GUTTER

LINE TABLE

LINE	BEARING	LENGTH
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L29	N00°03'57"E	1.00'
L30	S89°56'03"E	28.36'
L31	S89°56'03"E	36.45'
L32	S00°00'00"E	1.08'
L33	S00°00'00"E	1.08'
L34	S00°00'00"E	1.08'
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L36	S00°00'00"E	1.17'
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L39	S00°00'00"E	1.17'
L40	S89°57'56"E	26.00'
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CURVE TABLE

CURVE	LENGTH	RADIUS	DELTA	TANGENT
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C7	7.07'	4.50'	089°57'56"	4.50'
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C23	6.28'	4.00'	090°00'00"	4.00'
C24	6.28'	4.00'	090°00'00"	4.00'
C25	6.28'	4.00'	090°00'00"	4.00'
C26	6.28'	4.00'	090°00'00"	4.00'
C27	6.82'	4.00'	097°45'13"	4.58'
C28	42.46'	30.00'	081°05'11"	25.66'
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C41	7.07'	4.50'	090°02'04"	4.50'
C42	7.07'	4.50'	089°57'56"	4.50'
C43	7.07'	4.50'	089°57'56"	4.50'
C44	7.07'	4.50'	090°02'04"	4.50'

DISCLAIMER NOTE

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BASIS OF BEARINGS:

NORTH 00 03'07" EAST, BEING THE EAST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 7, TOWNSHIP 20S, RANGE 60E, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN BOOK 98, PAGE 77 OF PLATS.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: 9LV007W6
RIVET & PLATE IN TOP OF CURB AT NE CORNER OF GOWAN & JENSEN

ELEVATION: 2361.43 (FEET)
802.46 (METERS)

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED: 2008)
BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).



NO.	DATE	SHEET	REVISIONS
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX

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ROSHAN POUDEL
EXP: 12/31/23
CIVIL
No. 28428
PROFESSIONAL ENGINEER
STATE OF NEVADA
04-27-2023

TITLE
CLV POLICE MEMORIAL PARK RENOVATION

SHEET
HORIZONTAL CONTROL PLAN 2

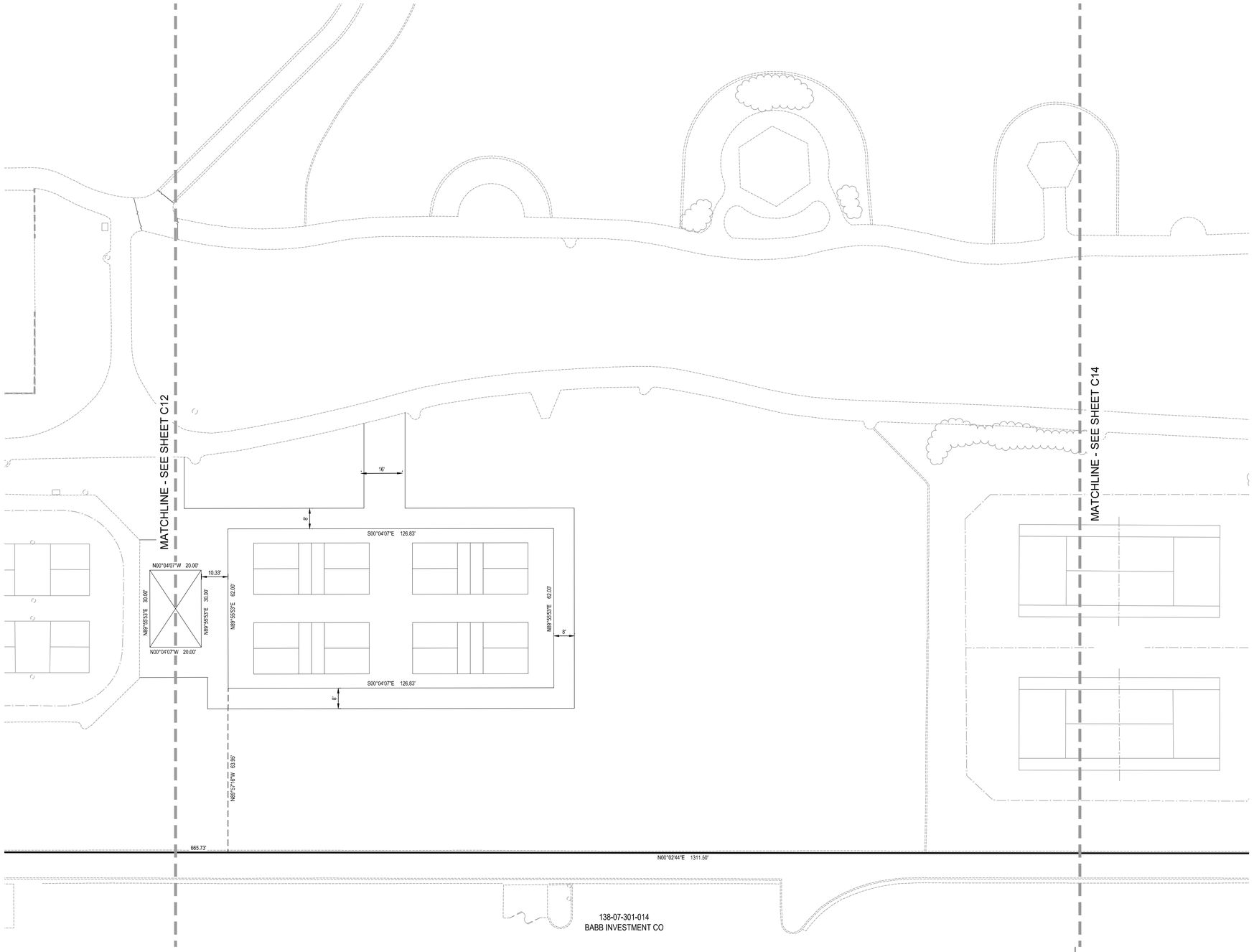
PREPARED FOR
CITY OF LAS VEGAS

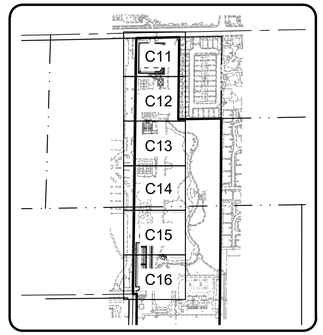
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H: #		SUBMITTAL STAGE:		SCHEMATIC DESIGN

SHEET
C12
OF

DO NOT SCALE DRAWINGS

W:\CS-PROJECTS\CLV\DATA\DWG\7003 CLV WESTSIDE EDUCATION & TRAINING CENTER\DRAWINGS\BID SET\UNUSED CAD FILES\CLOCKS CLV TITLES.DWG 6/26/18





KEY MAP
SCALE: NTS

SCALE: 1"= 20'
20 10 0 20

LEGEND

PROPOSED	EXISTING	
		RIGHT-OF-WAY LINE
		PROPERTY LINE
		EASEMENT LINE
		CENTER LINE
		CURB & GUTTER

DISCLAIMER NOTE

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BASIS OF BEARINGS:

NORTH 00-03'07" EAST, BEING THE EAST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 7, TOWNSHIP 20S, RANGE 60E, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN BOOK 98, PAGE 77 OF PLATS.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: 9LV007W6
RIVET & PLATE IN TOP OF CURB AT NE CORNER OF GOWAN & JENSEN

ELEVATION: 2361.43 (FEET)
802.46 (METERS)

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED: 2008)
BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

LINE TABLE		
LINE	BEARING	LENGTH
L1	S89°57'56"E	73.95'
L2	N00°02'04"E	236.33'
L3	S89°57'56"E	196.00'
L4	N00°02'04"E	233.03'
L5	S89°57'56"E	66.99'
L6	S89°57'56"E	26.00'
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L8	S89°57'56"E	26.00'
L9	S89°57'56"E	26.00'
L10	S89°57'56"E	26.00'
L12	S89°57'56"E	26.00'
L14	S89°56'03"E	43.58'
L15	S89°56'03"E	33.98'
L16	S89°56'03"E	27.00'
L17	S89°56'03"E	27.00'
L18	N00°03'57"E	1.00'
L19	N00°03'57"E	1.00'
L20	S89°56'03"E	27.00'
L21	S89°56'03"E	27.00'
L22	N00°03'57"E	1.00'
L23	N00°03'57"E	1.00'
L24	N00°03'57"E	343.00'
L25	N00°03'57"E	336.50'
L26	S89°56'03"E	27.00'
L27	S89°56'03"E	27.00'
L28	N00°03'57"E	1.00'
L29	N00°03'57"E	1.00'
L30	S89°56'03"E	28.36'
L31	S89°56'03"E	36.49'
L32	S00°00'00"E	1.08'
L33	S00°00'00"E	1.08'
L34	S00°00'00"E	1.08'
L35	S00°00'00"E	1.08'
L36	S00°00'00"E	1.17'
L37	S89°57'56"E	26.00'
L38	S00°00'00"E	1.17'
L39	S00°00'00"E	1.17'
L40	S89°57'56"E	26.00'
L41	S00°00'00"E	1.17'

CURVE TABLE				
CURVE	LENGTH	RADIUS	DELTA	TANGENT
C1	7.07'	4.50'	090°02'04"	4.50'
C2	7.07'	4.50'	089°57'56"	4.50'
C3	7.07'	4.50'	089°57'56"	4.50'
C4	7.07'	4.50'	090°02'04"	4.50'
C5	7.07'	4.50'	090°02'04"	4.50'
C6	7.07'	4.50'	089°57'56"	4.50'
C7	7.07'	4.50'	089°57'56"	4.50'
C8	7.07'	4.50'	090°02'04"	4.50'
C9	204.02'	40.50'	288°37'46"	29.09'
C10	14.96'	19.50'	043°56'32"	7.87'
C11	10.51'	6.00'	100°22'20"	7.20'
C12	14.96'	19.50'	043°56'32"	7.87'
C13	10.51'	6.00'	100°22'20"	7.20'
C14	7.07'	4.50'	090°02'04"	4.50'
C15	6.28'	4.00'	090°00'00"	4.00'
C16	6.28'	4.00'	090°00'00"	4.00'
C17	6.28'	4.00'	090°00'00"	4.00'
C18	6.28'	4.00'	090°00'00"	4.00'
C19	6.28'	4.00'	090°00'00"	4.00'
C20	6.28'	4.00'	090°00'00"	4.00'
C21	6.28'	4.00'	090°00'00"	4.00'
C22	6.28'	4.00'	090°00'00"	4.00'
C23	6.28'	4.00'	090°00'00"	4.00'
C24	6.28'	4.00'	090°00'00"	4.00'
C25	6.28'	4.00'	090°00'00"	4.00'
C26	6.28'	4.00'	090°00'00"	4.00'
C27	6.82'	4.00'	097°45'13"	4.58'
C28	42.46'	30.00'	081°05'11"	25.66'
C38	7.07'	4.50'	089°57'56"	4.50'
C39	7.07'	4.50'	089°57'56"	4.50'
C40	7.07'	4.50'	090°02'04"	4.50'
C41	7.07'	4.50'	090°02'04"	4.50'
C42	7.07'	4.50'	089°57'56"	4.50'
C43	7.07'	4.50'	089°57'56"	4.50'
C44	7.07'	4.50'	090°02'04"	4.50'

NO.	DATE	SHEET	REVISIONS
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX

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PROFESSIONAL ENGINEER
ROSHAN POUDEL
EXP: 12/31/23
CIVIL
STATE OF NEVADA
No. 28428
04-27-2023

TITLE
CLV POLICE MEMORIAL PARK RENOVATION

SHEET
HORIZONTAL CONTROL PLAN 3

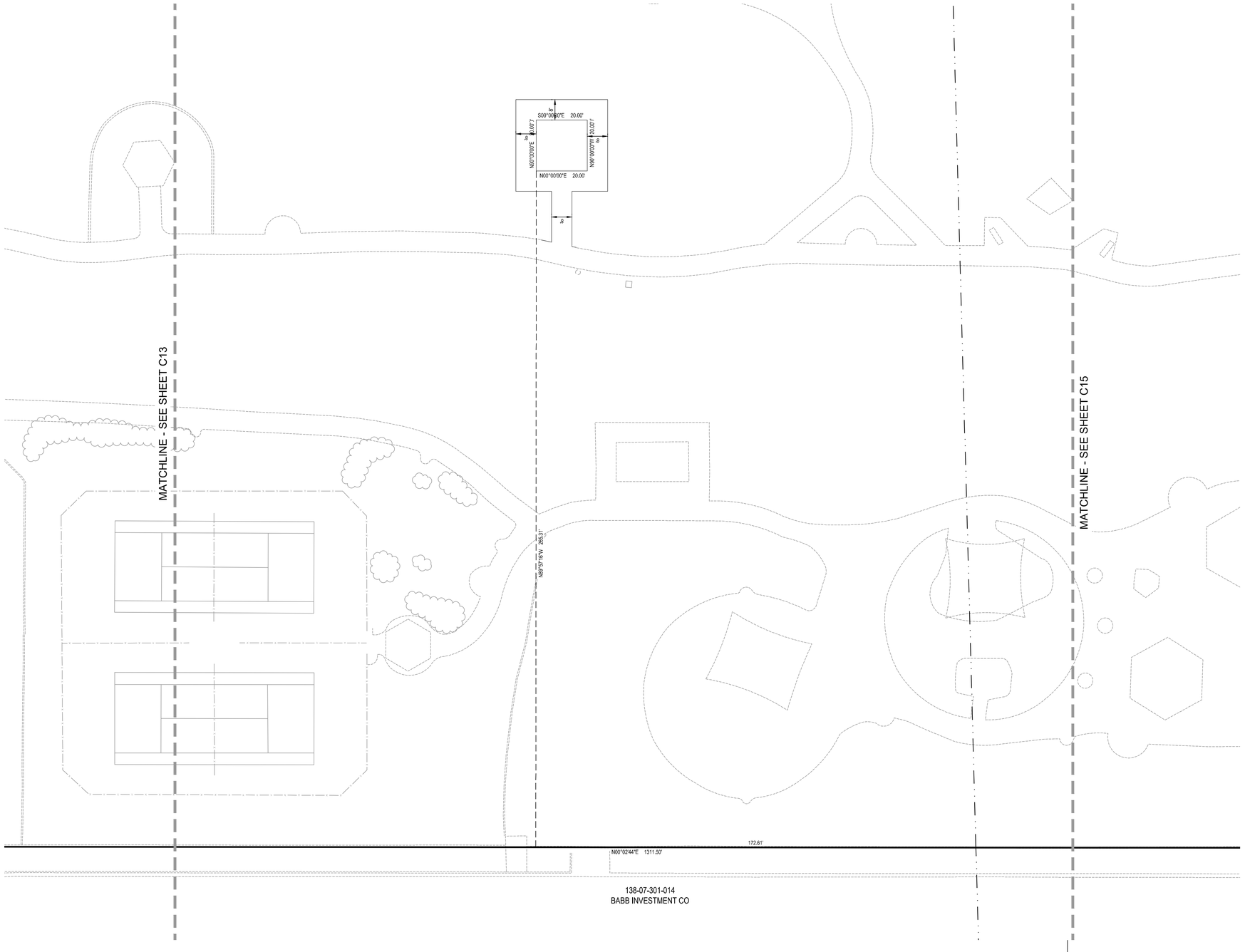
PREPARED FOR
CITY OF LAS VEGAS

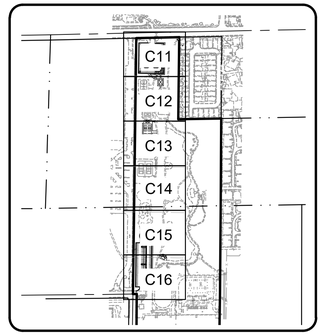
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H #			SUBMITTAL STAGE:	SCHEMATIC DESIGN

SHEET
C13
OF

DO NOT SCALE DRAWINGS

6/2/18 \\CSD-FILES\RVDATA\DWGS\2025 CLV MYSTORE EDUCATION & TRAINING CENTER\DRAWINGS\SET UP\UNITED CAD\TITLE BLOCKS\CLV TITLE BLOCK-JAKOB.DWG





KEY MAP
SCALE: NTS

N

SCALE: 1"= 20'
20 10 0 20

LEGEND

PROPOSED	EXISTING
	RIGHT-OF-WAY LINE
	PROPERTY LINE
	EASEMENT LINE
	CENTER LINE
	CURB & GUTTER

LINE TABLE

LINE	BEARING	LENGTH
L1	S89°57'56"E	73.95'
L2	N00°02'04"E	236.33'
L3	S89°57'56"E	196.00'
L4	N00°02'04"E	233.03'
L5	S89°57'56"E	66.99'
L6	S89°57'56"E	26.00'
L7	S89°57'56"E	26.00'
L8	S89°57'56"E	26.00'
L9	S89°57'56"E	26.00'
L10	S89°57'56"E	26.00'
L12	S89°57'56"E	26.00'
L14	S89°56'03"E	43.58'
L15	S89°56'03"E	33.98'
L16	S89°56'03"E	27.00'
L17	S89°56'03"E	27.00'
L18	N00°03'57"E	1.00'
L19	N00°03'57"E	1.00'
L20	S89°56'03"E	27.00'
L21	S89°56'03"E	27.00'
L22	N00°03'57"E	1.00'
L23	N00°03'57"E	1.00'
L24	N00°03'57"E	343.00'
L25	N00°03'57"E	336.50'
L26	S89°56'03"E	27.00'
L27	S89°56'03"E	27.00'
L28	N00°03'57"E	1.00'
L29	N00°03'57"E	1.00'
L30	S89°56'03"E	28.36'
L31	S89°56'03"E	36.49'
L32	S00°00'00"E	1.08'
L33	S00°00'00"E	1.08'
L34	S00°00'00"E	1.08'
L35	S00°00'00"E	1.08'
L36	S00°00'00"E	1.17'
L37	S89°57'56"E	26.00'
L38	S00°00'00"E	1.17'
L39	S00°00'00"E	1.17'
L40	S89°57'56"E	26.00'
L41	S00°00'00"E	1.17'

CURVE TABLE

CURVE	LENGTH	RADIUS	DELTA	TANGENT
C1	7.07'	4.50'	090°02'04"	4.50'
C2	7.07'	4.50'	089°57'56"	4.50'
C3	7.07'	4.50'	089°57'56"	4.50'
C4	7.07'	4.50'	090°02'04"	4.50'
C5	7.07'	4.50'	090°02'04"	4.50'
C6	7.07'	4.50'	089°57'56"	4.50'
C7	7.07'	4.50'	089°57'56"	4.50'
C8	7.07'	4.50'	090°02'04"	4.50'
C9	204.02'	40.50'	288°37'46"	29.09'
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C11	10.51'	6.00'	100°22'20"	7.20'
C12	14.96'	19.50'	043°56'32"	7.87'
C13	10.51'	6.00'	100°22'20"	7.20'
C14	7.07'	4.50'	090°02'04"	4.50'
C15	6.28'	4.00'	090°00'00"	4.00'
C16	6.28'	4.00'	090°00'00"	4.00'
C17	6.28'	4.00'	090°00'00"	4.00'
C18	6.28'	4.00'	090°00'00"	4.00'
C19	6.28'	4.00'	090°00'00"	4.00'
C20	6.28'	4.00'	090°00'00"	4.00'
C21	6.28'	4.00'	090°00'00"	4.00'
C22	6.28'	4.00'	090°00'00"	4.00'
C23	6.28'	4.00'	090°00'00"	4.00'
C24	6.28'	4.00'	090°00'00"	4.00'
C25	6.28'	4.00'	090°00'00"	4.00'
C26	6.28'	4.00'	090°00'00"	4.00'
C27	6.82'	4.00'	097°45'13"	4.58'
C28	42.46'	30.00'	081°05'11"	25.66'
C38	7.07'	4.50'	089°57'56"	4.50'
C39	7.07'	4.50'	089°57'56"	4.50'
C40	7.07'	4.50'	090°02'04"	4.50'
C41	7.07'	4.50'	090°02'04"	4.50'
C42	7.07'	4.50'	089°57'56"	4.50'
C43	7.07'	4.50'	089°57'56"	4.50'
C44	7.07'	4.50'	090°02'04"	4.50'

DISCLAIMER NOTE

THE UNDERGROUND UTILITIES AS SHOWN HEREON HAVE BEEN LOCATED FROM OBSERVED FIELD SURVEY EVIDENCE AND EXISTING DRAWINGS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING; PLANS PROVIDED BY THE CLIENT, UTILITY COMPANIES, AND MUNICIPAL AGENCIES. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.



BASIS OF BEARINGS:

NORTH 00 03'07" EAST, BEING THE EAST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 7, TOWNSHIP 20S, RANGE 60E, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN BOOK 98, PAGE 77 OF PLATS.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: 9LV007W6
RIVET & PLATE IN TOP OF CURB AT NE CORNER OF GOWAN & JENSEN

ELEVATION: 2361.43 (FEET)
802.46 (METERS)

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED: 2008)
BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

NO.	DATE	SHEET	REVISIONS
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX

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PROFESSIONAL ENGINEER
ROSHAN POUDEL
EXP: 12/31/23
CIVIL
No. 28428
STATE OF NEVADA
04-27-2023

TITLE
CLV POLICE MEMORIAL PARK RENOVATION

SHEET
HORIZONTAL CONTROL PLAN 4

PREPARED FOR
CITY OF LAS VEGAS

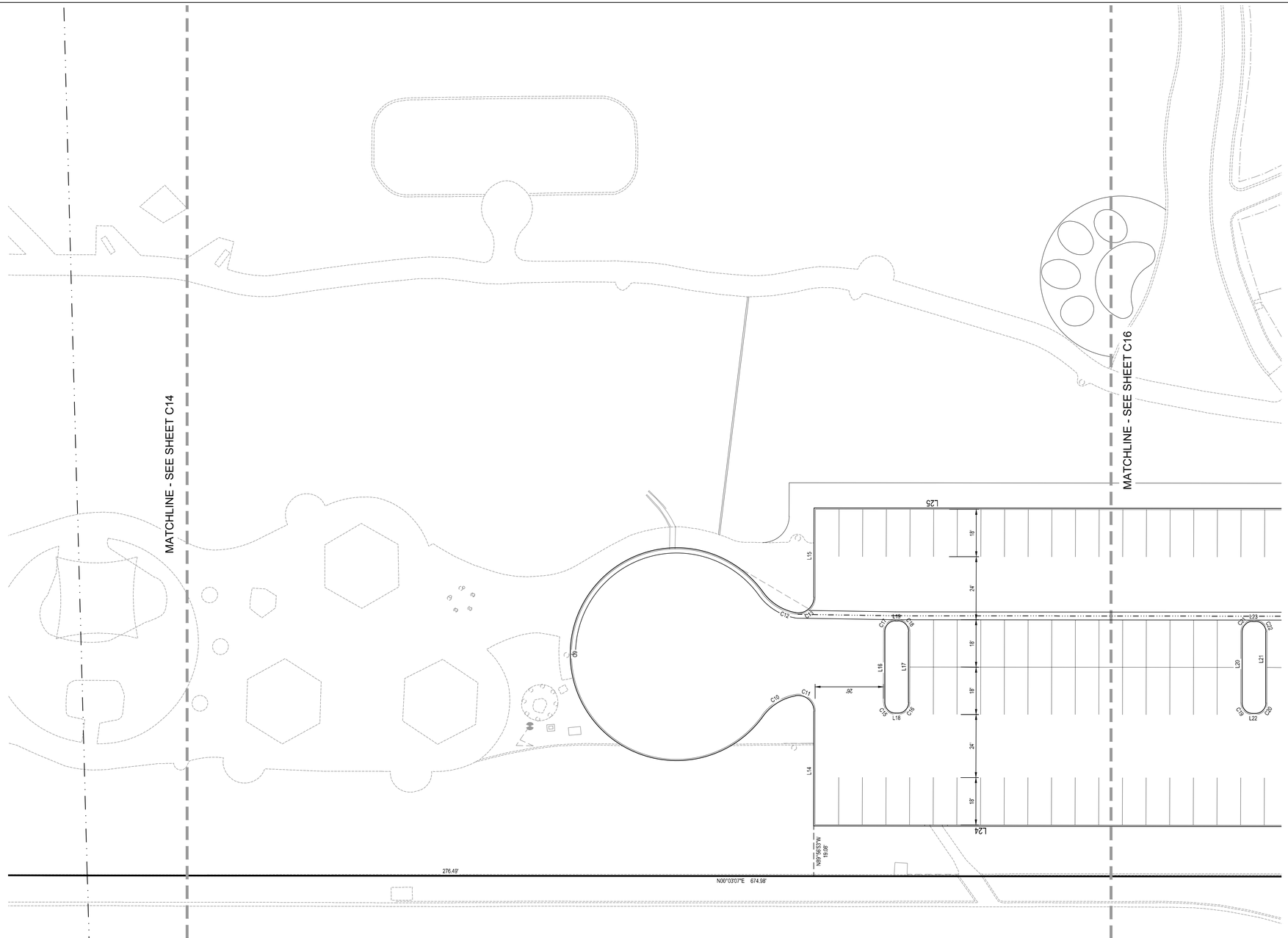
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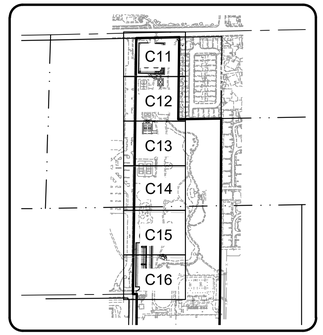
SHEET
C14
OF

DO NOT SCALE DRAWINGS

\\CDS-FP01\ES-JB\TADEWG\72025 CLV WEST\SHEETS\CLV_TITLE.DCC 5/4/2023 8:18:17 AM

8/26/18





KEY MAP
SCALE: NTS

SCALE: 1"= 20'
20 10 0 20

LEGEND

PROPOSED	EXISTING
	RIGHT-OF-WAY LINE
	PROPERTY LINE
	EASEMENT LINE
	CENTER LINE
	CURB & GUTTER

138-07-301-014
BABB INVESTMENT CO

DISCLAIMER NOTE

THE UNDERGROUND UTILITIES AS SHOWN HEREON HAVE BEEN LOCATED FROM OBSERVED FIELD SURVEY EVIDENCE AND EXISTING DRAWINGS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING; PLANS PROVIDED BY THE CLIENT, UTILITY COMPANIES, AND MUNICIPAL AGENCIES. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.



BASIS OF BEARINGS:

NORTH 00 03'07" EAST, BEING THE EAST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 7, TOWNSHIP 20S, RANGE 60E, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN BOOK 98, PAGE 77 OF PLATS.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: 9LV007W6
RIVET & PLATE IN TOP OF CURB AT NE CORNER OF GOWAN & JENSEN

ELEVATION: 2361.43 (FEET)
802.46 (METERS)

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED: 2008)
BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).

LINE TABLE

LINE	BEARING	LENGTH
L1	S89°57'56"E	73.95'
L2	N00°02'04"E	236.33'
L3	S89°57'56"E	196.00'
L4	N00°02'04"E	233.03'
L5	S89°57'56"E	66.99'
L6	S89°57'56"E	26.00'
L7	S89°57'56"E	26.00'
L8	S89°57'56"E	26.00'
L9	S89°57'56"E	26.00'
L10	S89°57'56"E	26.00'
L12	S89°57'56"E	26.00'
L14	S89°56'03"E	43.58'
L15	S89°56'03"E	33.98'
L16	S89°56'03"E	27.00'
L17	S89°56'03"E	27.00'
L18	N00°03'57"E	1.00'
L19	N00°03'57"E	1.00'
L20	S89°56'03"E	27.00'
L21	S89°56'03"E	27.00'
L22	N00°03'57"E	1.00'
L23	N00°03'57"E	1.00'
L24	N00°03'57"E	343.00'
L25	N00°03'57"E	336.50'
L26	S89°56'03"E	27.00'
L27	S89°56'03"E	27.00'
L28	N00°03'57"E	1.00'
L29	N00°03'57"E	1.00'
L30	S89°56'03"E	28.36'
L31	S89°56'03"E	36.49'
L32	S00°00'00"E	1.08'
L33	S00°00'00"E	1.08'
L34	S00°00'00"E	1.08'
L35	S00°00'00"E	1.08'
L36	S00°00'00"E	1.17'
L37	S89°57'56"E	26.00'
L38	S00°00'00"E	1.17'
L39	S00°00'00"E	1.17'
L40	S89°57'56"E	26.00'
L41	S00°00'00"E	1.17'

CURVE TABLE

CURVE	LENGTH	RADIUS	DELTA	TANGENT
C1	7.07'	4.50'	090°02'04"	4.50'
C2	7.07'	4.50'	089°57'56"	4.50'
C3	7.07'	4.50'	089°57'56"	4.50'
C4	7.07'	4.50'	090°02'04"	4.50'
C5	7.07'	4.50'	090°02'04"	4.50'
C6	7.07'	4.50'	089°57'56"	4.50'
C7	7.07'	4.50'	089°57'56"	4.50'
C8	7.07'	4.50'	090°02'04"	4.50'
C9	204.02'	40.50'	288°37'46"	29.09'
C10	14.96'	19.50'	043°56'32"	7.87'
C11	10.51'	6.00'	100°22'20"	7.20'
C12	14.96'	19.50'	043°56'32"	7.87'
C13	10.51'	6.00'	100°22'20"	7.20'
C14	7.07'	4.50'	090°02'04"	4.50'
C15	6.28'	4.00'	090°00'00"	4.00'
C16	6.28'	4.00'	090°00'00"	4.00'
C17	6.28'	4.00'	090°00'00"	4.00'
C18	6.28'	4.00'	090°00'00"	4.00'
C19	6.28'	4.00'	090°00'00"	4.00'
C20	6.28'	4.00'	090°00'00"	4.00'
C21	6.28'	4.00'	090°00'00"	4.00'
C22	6.28'	4.00'	090°00'00"	4.00'
C23	6.28'	4.00'	090°00'00"	4.00'
C24	6.28'	4.00'	090°00'00"	4.00'
C25	6.28'	4.00'	090°00'00"	4.00'
C26	6.28'	4.00'	090°00'00"	4.00'
C27	6.82'	4.00'	097°45'13"	4.58'
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C40	7.07'	4.50'	090°02'04"	4.50'
C41	7.07'	4.50'	090°02'04"	4.50'
C42	7.07'	4.50'	089°57'56"	4.50'
C43	7.07'	4.50'	089°57'56"	4.50'
C44	7.07'	4.50'	090°02'04"	4.50'

NO.	DATE	SHEET	REVISIONS
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX

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ROSHAN POUDEL
EXP: 12/31/23
CIVIL
No. 28428
STATE OF NEVADA
PROFESSIONAL ENGINEER
04-27-2023

TITLE
CLV POLICE MEMORIAL PARK RENOVATION

SHEET
HORIZONTAL CONTROL PLAN 5

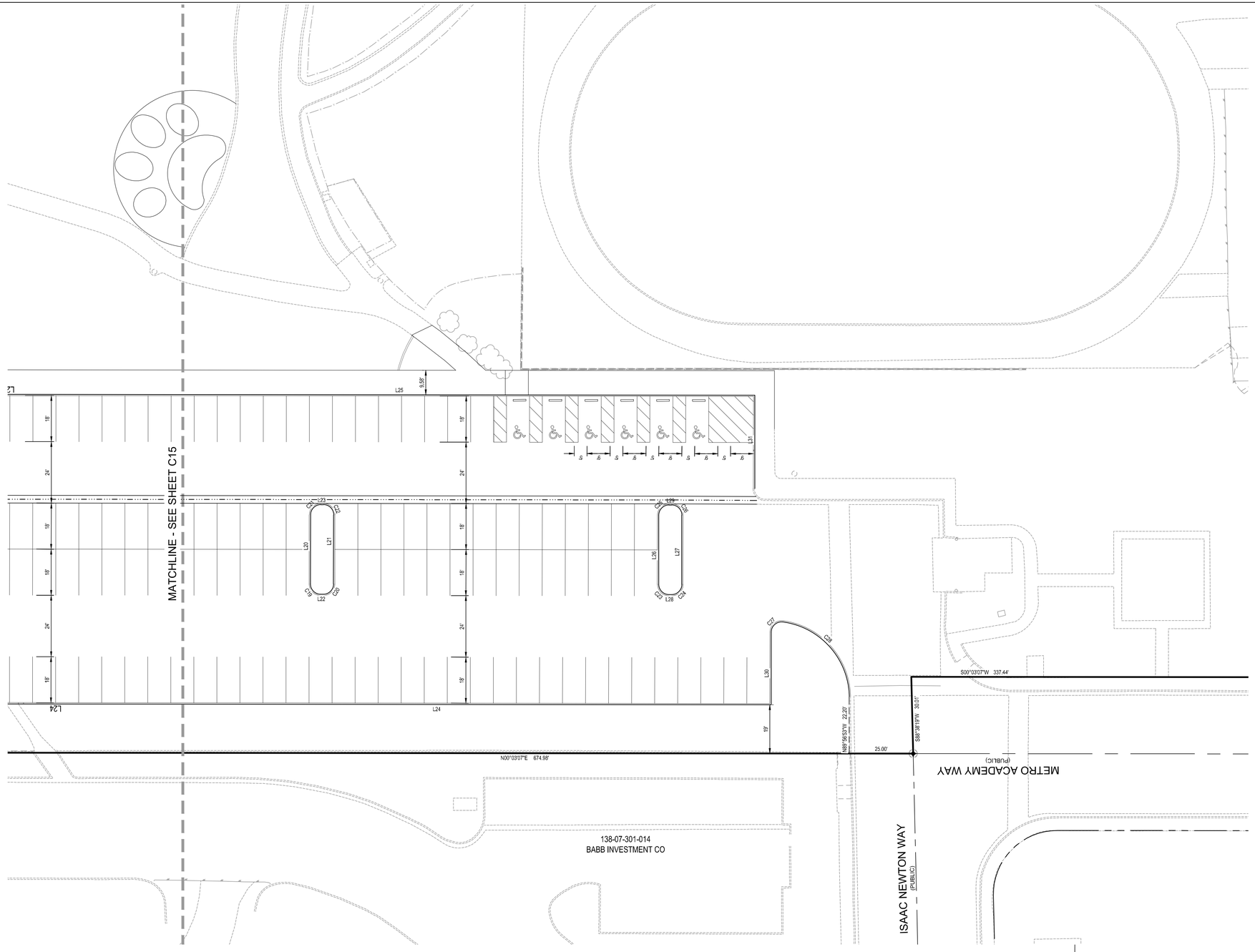
PREPARED FOR
CITY OF LAS VEGAS

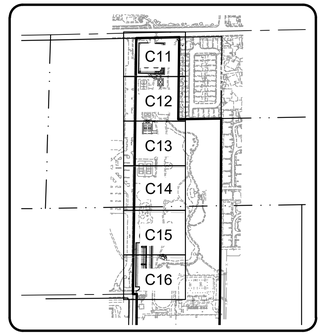
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H #		SUBMITTAL STAGE:	SCHEMATIC DESIGN	

SHEET
C15
OF

DO NOT SCALE DRAWINGS

W:\CSD-PROJECTS\DATA\DWG\7007 CLV WESTSIDE EDUCATION & TRAINING CENTER\DRAWINGS\BT-IT\UNITED CAD\TITLE BLOCKS\CLV TITLE BLOCK 2ND.DWG
6/26/18





KEY MAP
SCALE: NTS

SCALE: 1"= 20'
20 10 0 20

LEGEND

PROPOSED	EXISTING
	RIGHT-OF-WAY LINE
	PROPERTY LINE
	EASEMENT LINE
	CENTER LINE
	CURB & GUTTER

LINE TABLE

LINE	BEARING	LENGTH
L1	S89°57'56"E	73.95'
L2	N00°02'04"E	236.33'
L3	S89°57'56"E	196.00'
L4	N00°02'04"E	233.03'
L5	S89°57'56"E	66.99'
L6	S89°57'56"E	26.00'
L7	S89°57'56"E	26.00'
L8	S89°57'56"E	26.00'
L9	S89°57'56"E	26.00'
L10	S89°57'56"E	26.00'
L12	S89°57'56"E	26.00'
L14	S89°56'03"E	43.58'
L15	S89°56'03"E	33.98'
L16	S89°56'03"E	27.00'
L17	S89°56'03"E	27.00'
L18	N00°03'57"E	1.00'
L19	N00°03'57"E	1.00'
L20	S89°56'03"E	27.00'
L21	S89°56'03"E	27.00'
L22	N00°03'57"E	1.00'
L23	N00°03'57"E	1.00'
L24	N00°03'57"E	343.00'
L25	N00°03'57"E	336.50'
L26	S89°56'03"E	27.00'
L27	S89°56'03"E	27.00'
L28	N00°03'57"E	1.00'
L29	N00°03'57"E	1.00'
L30	S89°56'03"E	28.36'
L31	S89°56'03"E	36.49'
L32	S00°00'00"E	1.08'
L33	S00°00'00"E	1.08'
L34	S00°00'00"E	1.08'
L35	S00°00'00"E	1.08'
L36	S00°00'00"E	1.17'
L37	S89°57'56"E	26.00'
L38	S00°00'00"E	1.17'
L39	S00°00'00"E	1.17'
L40	S89°57'56"E	26.00'
L41	S00°00'00"E	1.17'

CURVE TABLE

CURVE	LENGTH	RADIUS	DELTA	TANGENT
C1	7.07'	4.50'	090°02'04"	4.50'
C2	7.07'	4.50'	089°57'56"	4.50'
C3	7.07'	4.50'	089°57'56"	4.50'
C4	7.07'	4.50'	090°02'04"	4.50'
C5	7.07'	4.50'	090°02'04"	4.50'
C6	7.07'	4.50'	089°57'56"	4.50'
C7	7.07'	4.50'	089°57'56"	4.50'
C8	7.07'	4.50'	090°02'04"	4.50'
C9	204.02'	40.50'	288°37'46"	29.09'
C10	14.96'	19.50'	043°56'32"	7.87'
C11	10.51'	6.00'	100°22'20"	7.20'
C12	14.96'	19.50'	043°56'32"	7.87'
C13	10.51'	6.00'	100°22'20"	7.20'
C14	7.07'	4.50'	090°02'04"	4.50'
C15	6.28'	4.00'	090°00'00"	4.00'
C16	6.28'	4.00'	090°00'00"	4.00'
C17	6.28'	4.00'	090°00'00"	4.00'
C18	6.28'	4.00'	090°00'00"	4.00'
C19	6.28'	4.00'	090°00'00"	4.00'
C20	6.28'	4.00'	090°00'00"	4.00'
C21	6.28'	4.00'	090°00'00"	4.00'
C22	6.28'	4.00'	090°00'00"	4.00'
C23	6.28'	4.00'	090°00'00"	4.00'
C24	6.28'	4.00'	090°00'00"	4.00'
C25	6.28'	4.00'	090°00'00"	4.00'
C26	6.28'	4.00'	090°00'00"	4.00'
C27	6.82'	4.00'	097°45'13"	4.58'
C28	42.46'	30.00'	081°05'11"	25.66'
C38	7.07'	4.50'	089°57'56"	4.50'
C39	7.07'	4.50'	089°57'56"	4.50'
C40	7.07'	4.50'	090°02'04"	4.50'
C41	7.07'	4.50'	090°02'04"	4.50'
C42	7.07'	4.50'	089°57'56"	4.50'
C43	7.07'	4.50'	089°57'56"	4.50'
C44	7.07'	4.50'	090°02'04"	4.50'

DISCLAIMER NOTE

THE UNDERGROUND UTILITIES AS SHOWN HEREON HAVE BEEN LOCATED FROM OBSERVED FIELD SURVEY EVIDENCE AND EXISTING DRAWINGS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING: PLANS PROVIDED BY THE CLIENT, UTILITY COMPANIES, AND MUNICIPAL AGENCIES. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

BASIS OF BEARINGS:

NORTH 00 03'07" EAST, BEING THE EAST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 7, TOWNSHIP 20S, RANGE 60E, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN IN BOOK 98, PAGE 77 OF PLATS.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: 9LV007W6
RIVET & PLATE IN TOP OF CURB AT NE CORNER OF GOWAN & JENSEN

ELEVATION: 2361.43 (FEET)
802.46 (METERS)

CITY OF LAS VEGAS VERTICAL CONTROL (DATE RE-OBSERVED: 2008)
BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD'88).



NO.	DATE	SHEET	REVISIONS
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX
XXX	XXX	XXX	XXX

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ROSHAN POUDEL
EXP: 12/31/23
CIVIL
No. 28428
PROFESSIONAL ENGINEER
STATE OF NEVADA
04-27-2023

TITLE
CLV POLICE MEMORIAL PARK RENOVATION

SHEET
HORIZONTAL CONTROL PLAN 6

PREPARED FOR
CITY OF LAS VEGAS

BID #
DATE: 4/27/2023
H #
CP #
SUBMITTAL STAGE: SCHEMATIC DESIGN
PL #:
CHECKED BY: Checker

SHEET
C16
OF

DO NOT SCALE DRAWINGS

6/2/18 \\CSD-FILES\PROJDATA\PROJ\7025 CLV MYSTORE EDUCATION & TRAINING CENTER\DRAWINGS\SET\TUNNER\CAD\TITLE\TITLE BLOCK-7A06.DWG