DS #: 5421

APN: 137-15-801-002 & More

PROJECT: Summerlin West V/25 - Scurry Bend Drive Improvements

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:

CITY OF LAS VEGAS NEVADA

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: April 1, 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:**
Summerlin West V25 - Scurry Bend Drive Improvements (from Sunset Run Dr. to Lake Mead Blvd.)			Atkins
Cross Streets:	Scurry Bend Drive. & Lake Mead Boulevard		Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5427A.doc		Bart Anderson, P.E., DevCo
Parcel Number:	137-15-801-002 & more		
Zoning Action:	N/A		
FEMA Flood Zone	YES	NO **X**	
Proposed Storm Drain	YES **X**	NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	3/11/2021	3/31/2021	See Comments Below	$400.00	4198949: $400
			TOTAL FEES (LDDRS):	**$400.00**	----

REMARKS:

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

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

1. The subject project is based on the premise that the downstream *Fleet Wing Avenue* and *Flight Range Avenue* and the associated storm drain facilities are in place for flood flow perpetuation. The subject drainage study will not be finally approved prior to the posting of the construction bonds of the *Summerlin West Village 22 – Fleet Wing Avenue (Kettle Ridge to Scurry Bend) and Summerlin West Village 22- Flight Range Avenue (Scurry Bend to Kettle Ridge)* street improvements project.
2. The interim condition of the study and project appears to include offsite basin to the west of *Lake Mead Boulevard* alignment, ie, *Lake Mead Boulevard* is not considered as improved or a cut-off for basins to the west. If this is the case, provide interim berms or swales along the west side of *Scurry Bend Drive* for interim flood protection for the improved AC roadway.

   Provide a master grading plan to show the berms/swales accordingly in the next submittal. Maintenance bond and liability agreement will be required.
3. The ultimate condition hydrology table provided on *Figure 3: Interim Hydrology Workmap* is unclear. How are these derived? Only a few of them are noted to be reference flows however an ultimate condition HEC-1 is not provided.
4. Provide basin flow arrows for all proposed roadway basins.

5. Show combination points on all the hydrologic condition basin maps.
6. Basin area for SN-1AE is 0.00135 on the Tc calculations but 0.00134 in the HEC-1. Basin area for SN-1BW is 0.00136 on the Tc calculations but 0.00135 on the HEC-1 model. Revise the discrepancy.
7. Drop Inlet SDDI#5 & #6 receive 4.0 cfs, intercept 3.6 cfs and bypass 0.5 cfs which totals 4.1 cfs. Address and resolve in the next submittal.
8. *Hydraulic Section SN-1BS* should be SN-1BW (4cfs)+SN-1BE (4cfs)+ SDDI#5 bypass (0.5cfs) + SDDI#6 bypass (0.5 cfs) = 9.0 cfs instead of 8.9 cfs as shown in the *Summary Table*. Resolve in the next submittal.
9. Provide *City of Las Vegas* recorded drawing numbers for all existing storm drains on the grading plans.
10. Roadway plan and profile *Sheet 12/42* and *Sheet 13/42* inlet SDDI#1 curb transition is located in the pedestrian curb ramp. Revise so that these do not overlap.
11. Show the HGL for the lateral pipe for SDMH#1 on plan / profile *Sheet 13/42*.
12. Provide one nominal inlet on the east curb of *Scurry Bend Drive* from SDMH #1.
13. *Sheet 14/42 and Sheet 15/42*: The proposed 30"-RCP mainline is too close to the street curb. Maintain a minimum of 3'-clearance between the edge of the storm drain and the lip of the concrete gutter. Review and revise accordingly.
14. The WSPG model for SDMH#3 elevations do not match the profile elevations presented on plan and profile *Sheet 15/42*.
15. *Sheet 16/42 and Sheet 17/42*: The proposed SDDI #4 is at a local low point. Address what is the maximum ponding depth in case the inlet is totally clogged and describe the emergency overflow path in the next submittal.
16. The inlets shown on the roadway grading plan *Sheet 18/42* are missing the SDDI number labels. Should show SDDI#5 and SDDI #6.
17. *Sheet 22/42 and Sheet 23/42*: Discuss about whether there will be any inlets in the future *Lake Mead Boulevard* upstream of the intersection with *Scurry Bend Drive*. If there are none and to meet the 600'-maximum spacing requirement for inlets, the storm drain may need to be extended from SDMH #7 and two nominal inlets be provided in the vicinity of the intersection of the two roadways. Address and resolve in the next submittal.
18. Indicate the length and depth of the inlets on all pertinent plans. Any inlets deeper than 10' require *City Building & Safety Department* review and approval of the structural design and calculations. Clarify in the next submittal.

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

END OF REMARKS
HDR/AYS

T/R/S: T20S/R59E/15
AREA K-15

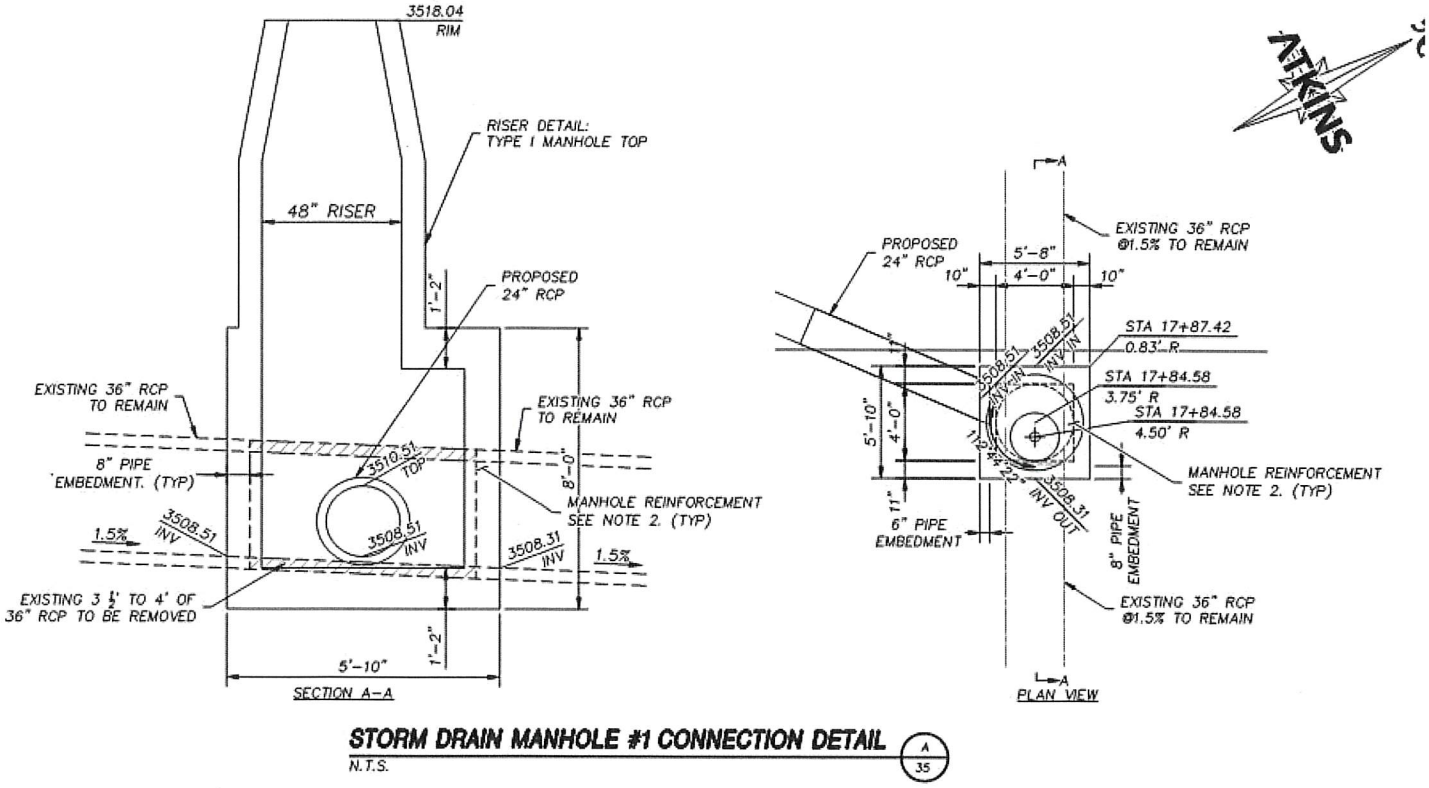
Albert Sung

From: Quiroz, Brooklyn <Brooklyn.Quiroz@hdrinc.com>
Sent: Tuesday, March 23, 2021 9:56 AM
To: Albert Sung
Cc: LaBounty, Catherine
Subject: DS 05427 Comments
Attachments: DS 05427.doc

CAUTION: This email originated from an **External Source**. Please **use caution** before opening attachments, clicking links, or responding to this email. **Do not sign-in with your City of Las Vegas account credentials.**

Albert,
See attached for the comments from our discussion today. I have updated them slightly to reflect our conversation.

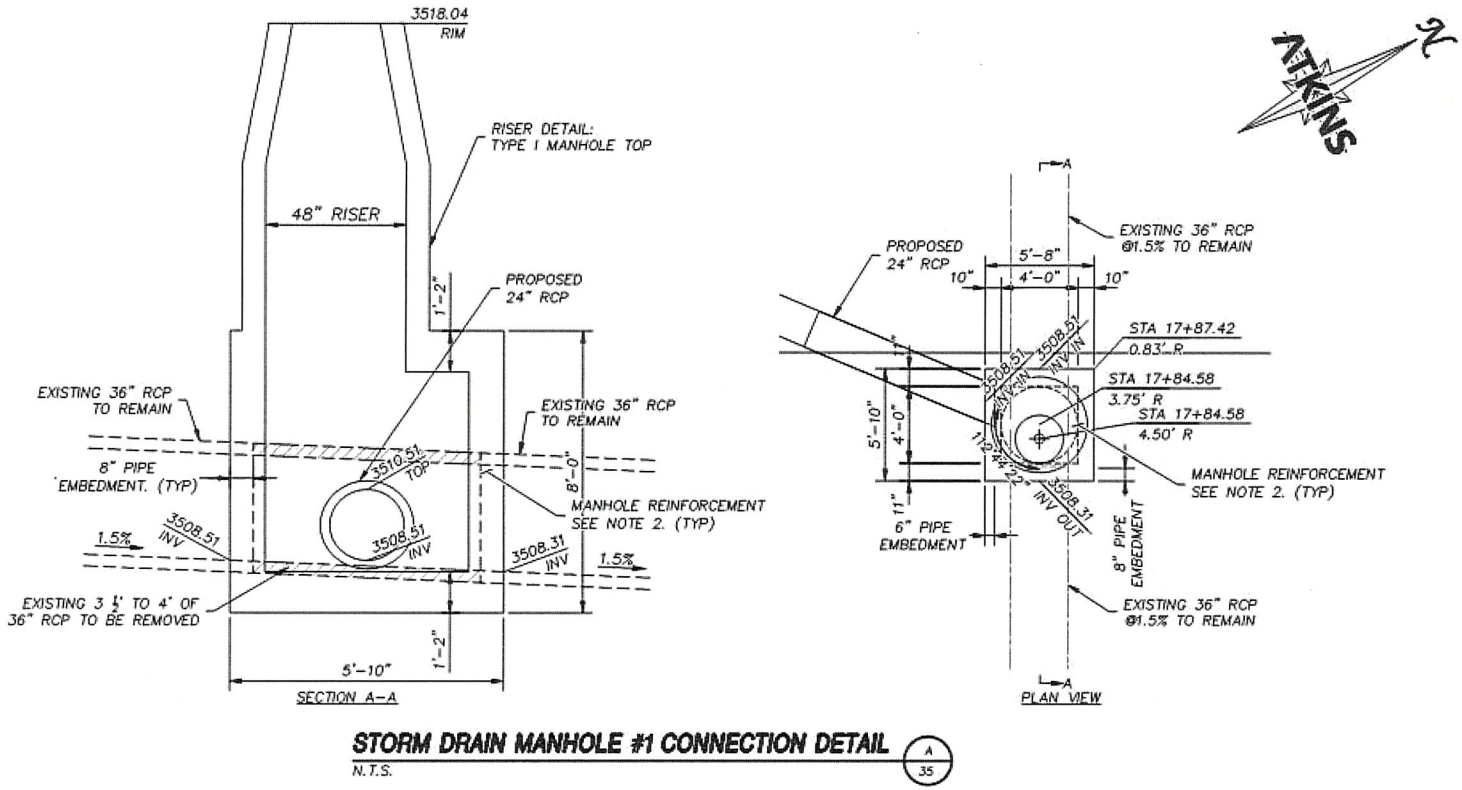
I looked deeper into the manhole size and they do provide manhole connection details that indicate the manhole sizes on sheet 35/42. See below.



Thanks Albert!

Brooklyn Quiroz, PE
Water Resources Engineer

HDR
6750 Via Austi Pkwy #350
Las Vegas, NV 89119
D 702.938.6049 **M** 775.813.5359
brooklyn.quiroz@hdrinc.com



STORM DRAIN MANHOLE #1 CONNECTION DETAIL (A / 35)

N.T.S.

Thanks Albert!

Brooklyn Quiroz, PE
Water Resources Engineer

HDR
6750 Via Austi Pkwy #350
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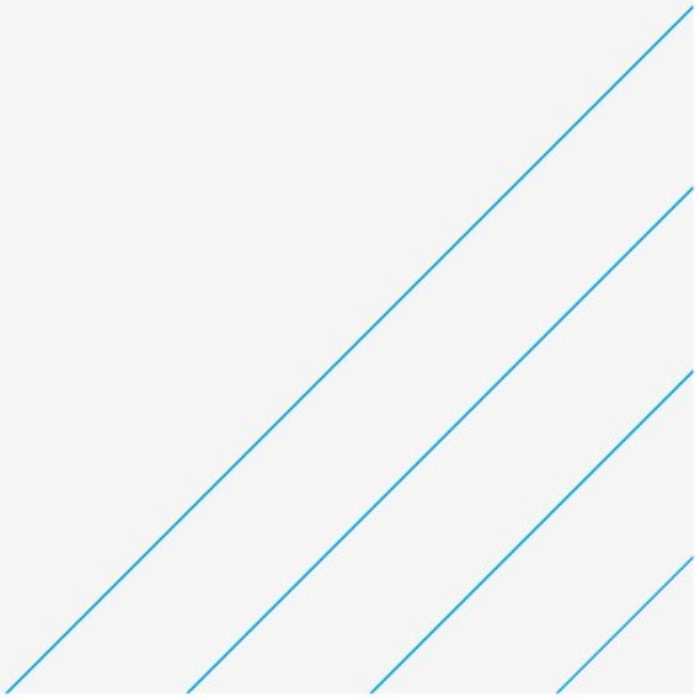
SUMMERLIN®

Summerlin West Village 25

Scurry Bend Drive: Sunset Run Drive to Lake Mead Boulevard

Prepared for Howard Hughes Company, LLC

March, 2021



HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Summerlin West Village 25 Scurry Bend Drive: Sunset Run Dr to Lake Mead Blvd Date: March 5, 2021

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

East/West: Lake Mead Boulevard

b) Section: 23 and 14 Township: 20S Range: 59E

c) APN : 137-15-801-002, 137-15-811-001, 137-22-301-006, 137-23-211-001

Name of Owner: Howard Hughes Company, LLC

Telephone No.: (702) 791-4000 Fax No.: (702) 791-4450 E-Mail Address: april.chapman@howardhughes.com

Address: 10845 Griffith Peak Dr. Suite 160, Las Vegas, NV 89135

Contact Person-Name: Janelle Klein, PE **Telephone No.:** (702) 551-0365

* **E-Mail Address:** janelle.klein@atkinsglobal.com **Fax No.:** (702) 263-7200

Firm: Atkins

Address: 2270 Corporate Circle, Ste 200, Henderson, NV 89074

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: +/- 446 acres Being Developed/Disturbed: +/- 4.74 acres
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.): Rough Grade
5. Approximate upstream land area which drains to the subject site: 225.54 acres
6. Has the site drainage been evaluated in the past? ✔ **YES** **NO** If yes, please identify documentation: Overall Master Conceptual Drainage Study for Summerlin West, Scurry Bend Rough Grade DS 5253
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Existing CC-215 Western Beltway Channel
8. Briefly describe your proposed schedule for the subject project: ASAP



3/5/2021

Engineer's Seal

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

***New Required Field**

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

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Scurry Bend Drive Rough Grade	Map ID: 137-22-301-006, 137-23-211-001
Firm Name: Atkins	Engineer: Janelle Klein, PE
Address: 2270 Corporate Circle, Ste 200 City: Henderson	State: NV Zip: 89074
Phone Number: (702) 551-0330	Fax Number: (702) 263-7200
Property Owner: Howard Hughes Company, LLC	
Address: 10801 West Charleston Blvd, Ste 300 City: Las Vegas	State: NV Zip: 89135

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.
	N/A	Design Manual **Standard Form 4**.
	N/A	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	
	N/A	A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
	N/A	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.
	N/A	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.
	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.
X		Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.
	N/A	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.
	N/A	Right-of-way lines and widths, existing and proposed.
X		Existing improvements and their elevations.
X		Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
X		Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X		Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
X		Location and cross-section of street capacity calculations.
X		Cross-sectional detail for channels, including cutoff wall locations.
X		Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
X		Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
	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	
	N/A	Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
	N/A	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.
	N/A	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.
X		A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
	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.
	N/A	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. JLK 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	
	N/A	Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains.
	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.
	N/A	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.
X		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.

Engineer's Certification

Atkins certifies that the information contained herein has been prepared in accordance with generally accepted engineering principles and practices, and to the best of our knowledge, is true and correct.

This letter certifies that all items in the **Technical Drainage Study for Scurry Bend Drive: Sunset Run Drive to Lake Mead Boulevard** electronic submittal matches the paper version bound into the study.



Janelle L. Klein, PE (NV, #17313)
Senior Engineer

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1.3. Ultimate Condition 9

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Appendix A. Drainage Study Reference Information
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A.2. Flight Range Avenue Drainage Study Reference Information
A.3. Fleet Wing Avenue Drainage Study Reference Information
A.4. Update #1 to the Summerlin West Village 25 Master Conceptual Drainage Study Reference Material and 2018 MPU Soil and CN Information
A.5. High School Staging Stockpile Drainage Study Reference Information

Appendix B. Hydrology Appendix
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B.2. Interim HEC-1 Model

Appendix C. Hydraulics Appendix
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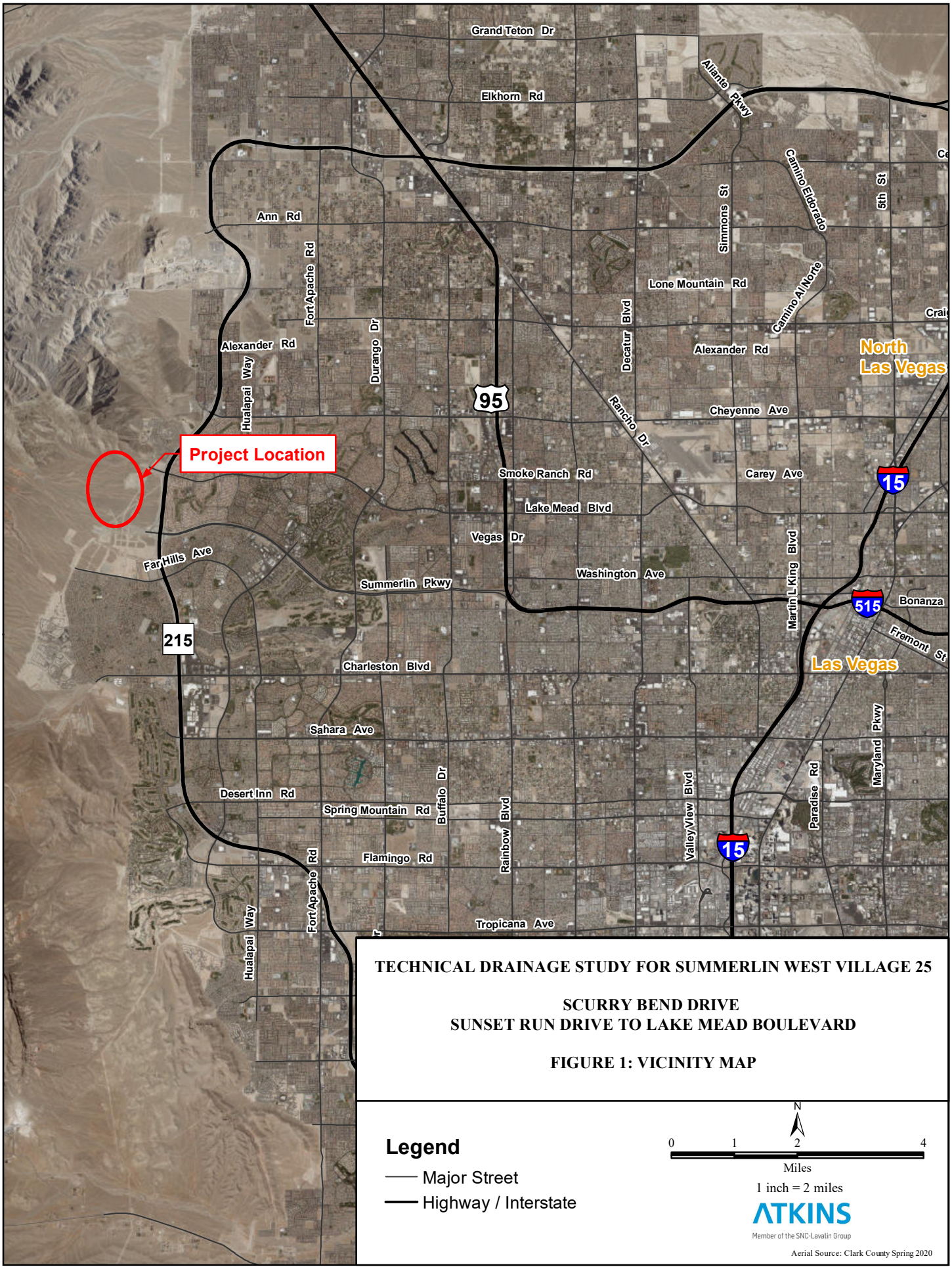
Figure 4 Hydraulic Workmap 13

Executive Summary

This Technical Drainage Study (TDS), prepared on behalf of Howard Hughes Company, LLC represents the hydrologic and hydraulic analysis for the Scurry Bend Drive roadway improvements of the Summerlin West Village 25 development. Scurry Bend Drive roadway is on the boundary of both Village 25 and Village 22, dividing the two. Summerlin West Village 25 is located in the northwest Las Vegas Valley west of the I-215 beltway and is bounded by Lake Mead Boulevard and Far Hills Avenue. A vicinity map is provided in Figure 1. The Scurry Bend Drive development is located between Sunset Run Drive (Summerlin Parkway Westbound) and Lake Mead Boulevard and is shown on the site map on Figure 2.

A Master Conceptual Drainage Study (MCDS) for Summerlin West Village 22 (W.O. 7861-3A) was approved November 28, 2018. Update #2 of the MCDS was approved January 23, 2020. A Master Conceptual Drainage Study (MCDS) Update #1 for Summerlin West Village 25 (W.O. 7919) was approved April 14, 2020. Portions of the TDS are directly referenced from the two Master Conceptual Drainage Studies, and the relevant information is included in Appendix A.



TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 25

SCURRY BEND DRIVE
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

FIGURE 1: VICINITY MAP

Legend

- Major Street
- Highway / Interstate

N

0 1 2 4

Miles

1 inch = 2 miles

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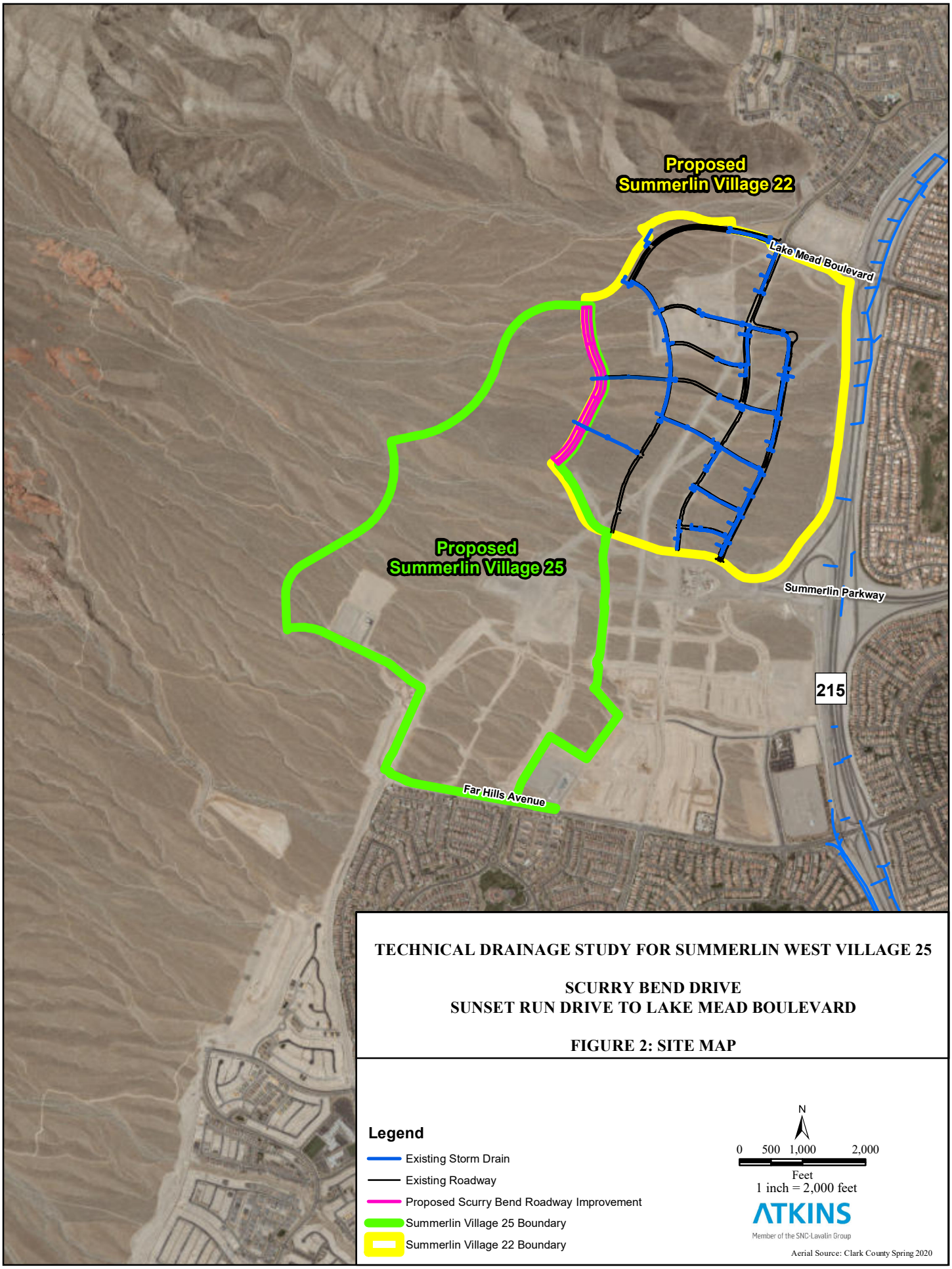
Aerial Source: Clark County Spring 2020



TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 25

SCURRY BEND DRIVE
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

FIGURE 2: SITE MAP

Legend

- Existing Storm Drain
- Existing Roadway
- Proposed Scurry Bend Roadway Improvement
- Summerlin Village 25 Boundary
- Summerlin Village 22 Boundary

N

0 500 1,000 2,000

Feet

1 inch = 2,000 feet

ATKINS

Member of the SNC-Lavalin Group

Aerial Source: Clark County Spring 2020

1. Hydrologic Analysis

1.1. Existing Condition

The existing site condition is undeveloped desert land. As established in the Master Conceptual Drainage Study (MCDS), there is one existing downstream storm drain facility that collects runoff from the proposed street improvements and adjacent basins. The Western Beltway Channel (Angel Park Branch) to the east of the project is fully developed and includes a 10-ft wide concrete channel that conveys flow south to the Angel Park Detention Basin.

In the existing condition, runoff generated by the project street improvements and the undeveloped tributary area west of the project drains east as sheet flow to the Western Beltway Channel. According to the 2002 Conceptual Drainage Study and Western Beltway Study, the existing channel has been designed to accept both the existing and ultimate condition flows from proposed Village 25. The Village 25 site was included in the area previously analyzed in the Western Beltway Study. In addition, the allowable discharge flow rates for the project have been established in the 2017 Summerlin West Planning Area (SWPA) MPU study. Therefore, an additional existing condition hydrologic model was not required as part of this study.

1.2. Interim Condition

In the interim condition, Fleet Wing Avenue and Flight Range Avenue improvements east of the proposed Scurry Bend Drive alignment will be constructed prior to the development of adjacent onsite parcels and Scurry Bend Drive. The flow from the portion of Scurry Bend Drive from Sunset Run Drive to Flight Range Avenue and subbasin INT-HS-1C will be routed to the Flight Range Avenue storm drain; the flow from the portion of Scurry Bend Drive from north of Flight Range Avenue to Lake Mead Boulevard and subbasins INT-HS-1A and INT-HS-1B will be routed to the Fleet Wing Avenue storm drain. The two storm drain systems are routed east and discharge to the existing Western Beltway Channel (see Figure 3, Interim Hydrology Workmap).

The proposed street improvements and interim grading have been designed to ensure that the existing drainage patterns are maintained in the interim condition. Interim flows mimic existing flows by continuing to drain surface flows easterly towards the Western Beltway Channel. This ensures that the existing downstream facilities are not adversely affected by the proposed interim improvements. The interim adjacent subbasins, Subbasins INT-HS-1C, INT-HS-1A, and INT-HS-1B, were modeled using HEC-1 in the High School Staging Stockpile TDS (see Figure 3: Hydrology for the High School Staging Area found in Appendix A) (Atkins, 2020). Results for all the interim subbasins are summarized in Table 1 and on Figure 3. See Appendix B for detailed calculations in HEC-1.

The Curve Numbers and Soil information for the interim basins is referenced from the High School Staging Stockpile Technical Drainage Study found in Appendix A (Atkins, 2020).

Interim condition flows are summarized in Table 1 below.

Table 1 – Interim Condition HEC-1 Model Results

HEC-1 Node	Tributary Area (sq mi)	Tributary Area (ac)	100-year Flow (cfs)
SN-2AE	0.00148	0.95	4
SN-2AW	0.00148	0.95	4
INT-HS-1C	0.00003	0.02	24
CP-FRA	SN-2AE + SN-2AW + INT-HS-1C		32
SN-2BE	0.00126	0.81	4
SN-2BW	0.00126	0.81	4
CP-DMH3	SN-2BE + SN2BW		7
SN-2CE	0.00073	0.47	2
SN-2CW	0.00073	0.47	2
CP-STMH5	SN-2CE + SN-2CW + CP-DMH3		11
SN-1AE	0.00135	0.86	4
SN-1AW	0.00135	0.86	4
CP-SBD-NA	SN-1AE + SN-1AW		8
SN-1BE	0.00136	0.87	4
SN-1BW	0.00136	0.87	4
CP-SBD-NB	SN-1BE + SN-1BW		8
INT-HS-1A	0.00018	0.11	214
INT-HS-1B	0.00004	0.03	55
CP-INT-HSAB	INT-HS-1A + INT-HS-1B		265
CP-SBD	SBD-NA + SBD-NB + CP-INT-HSAB		274

1.3. Ultimate Condition

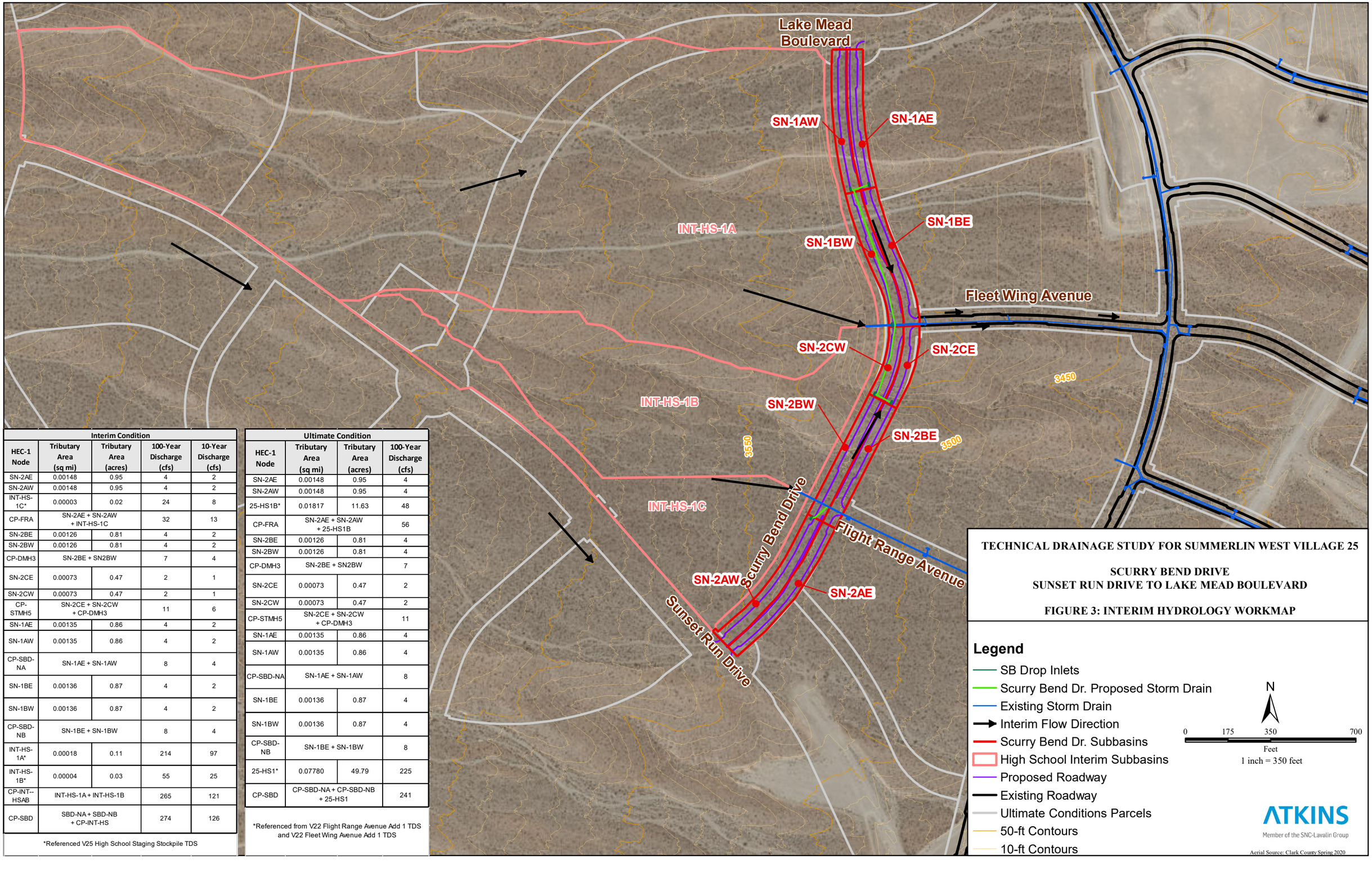
The ultimate condition subbasins are developable upon construction of Scurry Bend Drive and labeled 25-HS1B and 25-HS1. 25-HS1B's area and 100-year discharge is referenced from Addendum #1 to the Technical Drainage Study for the Flight Range Avenue (Scurry Bend Drive to Kettle Ridge Drive) DS5385 found in Appendix A (Atkins, 2021). 25-HS1's area and 100-year discharge is referenced from Addendum #1 to the Technical Drainage Study for the Fleet Wing Avenue (Kettle Ridge Drive to Scurry Bend Drive) DS5367 found in Appendix A (Atkins, 2020). The 100-year discharge values for the two ultimate condition subbasins from the Fleet Wing Avenue Addendum #1 Technical Drainage Study and Flight Range Avenue Addendum #1 Technical Drainage Study have been compared to Update #1 to the Village 25 MCDS Ultimate Conditions Basin Map in Appendix A (VTN, 2019). Based on the comparison the two technical drainage studies, Flight Range Avenue and Fleet Wing Avenue, have the more conservative flow values compared to the Update #1 to the Village 25 MCDS. These conservative flow values were chosen in this study as the ultimate condition 100-year discharge flows.

Table 2 below summarizes calculations for basins tributary to the proposed improvements along Scurry Bend.

Table 2 – Ultimate Condition HEC-1 Results

HEC-1 Node	Tributary Area (sq mi)	Tributary Area (ac)	100-year Flow (cfs)
SN-2AE	0.00148	0.95	4
SN-2AW	0.00148	0.95	4
HS-1A*	0.01828	11.70	48
CP-FRA	SN-2AE + SN-2AW + 25-HS1B		56
SN-2BE	0.00126	0.81	4
SN-2BW	0.00126	0.81	4
CP-DMH3	SN-2BE + SN2BW		7
SN-2CE	0.00073	0.47	2
SN-2CW	0.00073	0.47	2
CP-STMH5	SN-2CE + SN-2CW + CP-DMH3		11
SN-1AE	0.00135	0.86	4
SN-1AW	0.00135	0.86	4
CP-SBD-NA	SN-1AE + SN-1AW		8
SN-1BE	0.00136	0.87	4
SN-1BW	0.00136	0.87	4
CP-SBD-NB	SN-1BE + SN-1BW		8
25-HS1*	0.07780	49.79	225
CP-SBD	SBD-NA + SBD-NB + 25-HS1		241

***Referenced from V22 Flight Range Avenue Add #1 TDS and Fleet Wing Avenue Add #1 TDS**



Interim Condition				
HEC-1 Node	Tributary Area (sq mi)	Tributary Area (acres)	100-Year Discharge (cfs)	10-Year Discharge (cfs)
SN-2AE	0.00148	0.95	4	2
SN-2AW	0.00148	0.95	4	2
INT-HS-1C*	0.00003	0.02	24	8
CP-FRA	SN-2AE + SN-2AW + INT-HS-1C		32	13
SN-2BE	0.00126	0.81	4	2
SN-2BW	0.00126	0.81	4	2
CP-DMH3	SN-2BE + SN2BW		7	4
SN-2CE	0.00073	0.47	2	1
SN-2CW	0.00073	0.47	2	1
CP-STMH5	SN-2CE + SN-2CW + CP-DMH3		11	6
SN-1AE	0.00135	0.86	4	2
SN-1AW	0.00135	0.86	4	2
CP-SBD-NA	SN-1AE + SN-1AW		8	4
SN-1BE	0.00136	0.87	4	2
SN-1BW	0.00136	0.87	4	2
CP-SBD-NB	SN-1BE + SN-1BW		8	4
INT-HS-1A*	0.00018	0.11	214	97
INT-HS-1B*	0.00004	0.03	55	25
CP-INT--HSAB	INT-HS-1A + INT-HS-1B		265	121
CP-SBD	SBD-NA + SBD-NB + CP-INT-HS		274	126

*Referenced V25 High School Staging Stockpile TDS

Ultimate Condition			
HEC-1 Node	Tributary Area (sq mi)	Tributary Area (acres)	100-Year Discharge (cfs)
SN-2AE	0.00148	0.95	4
SN-2AW	0.00148	0.95	4
25-HS1B*	0.01817	11.63	48
CP-FRA	SN-2AE + SN-2AW + 25-HS1B		56
SN-2BE	0.00126	0.81	4
SN-2BW	0.00126	0.81	4
CP-DMH3	SN-2BE + SN2BW		7
SN-2CE	0.00073	0.47	2
SN-2CW	0.00073	0.47	2
CP-STMH5	SN-2CE + SN-2CW + CP-DMH3		11
SN-1AE	0.00135	0.86	4
SN-1AW	0.00135	0.86	4
CP-SBD-NA	SN-1AE + SN-1AW		8
SN-1BE	0.00136	0.87	4
SN-1BW	0.00136	0.87	4
CP-SBD-NB	SN-1BE + SN-1BW		8
25-HS1*	0.07780	49.79	225
CP-SBD	CP-SBD-NA + CP-SBD-NB + 25-HS1		241

*Referenced from V22 Flight Range Avenue Add 1 TDS and V22 Fleet Wing Avenue Add 1 TDS

TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 25

SCURRY BEND DRIVE
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

FIGURE 3: INTERIM HYDROLOGY WORKMAP

Legend

- SB Drop Inlets
- Scurry Bend Dr. Proposed Storm Drain
- Existing Storm Drain
- Interim Flow Direction
- Scurry Bend Dr. Subbasins
- High School Interim Subbasins
- Proposed Roadway
- Existing Roadway
- Ultimate Conditions Parcels
- 50-ft Contours
- 10-ft Contours

N

0 175 350 700
Feet
1 inch = 350 feet

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Aerial Source: Clark County Spring 2020

2. Hydraulic Analysis

2.1. Drop Inlet Calculations

The computer program Bentley FlowMaster 10.02 was utilized to perform calculations for proposed drop inlets along Scurry Bend Drive. Proposed storm drain inlets #1, #2, #3, #5, and #6 are drop inlets collect flow along the proposed roadway. Proposed storm drain inlet #4 collects flows along the proposed roadway from the north and south in a sag. Drop inlet calculations are provided in Appendix C. Table 3 provides a summary of the drop inlets.

Table 3 – Drop Inlet Calculations

ID	Station (ft)	Total Flow (cfs)	Discharge Source (Controlling Flow Condition)	Intercepted Flow (cfs)	Bypass Flow (cfs)
100-year					
SDDI #1	17+14.17	4	SN-2AW	3.5	0.5
SDDI #2	22+86.34	4.5	SN-2BW + Bypass SDDI#1	3.8	0.7
SDDI #3	22+86.34	4	SN-2BE	3.5	0.5
SDDI #4	25+99.28	7.1	SN-2C W + Bypass SDDI#2 + SN-1BW+ Bypass SDDI#5	7.1	0
SDDI #5	31+92.85	4	SN-1AW	3.6	0.5
SDDI #6	31+92.85	4	SN-1AE	3.6	0.5

2.2. Normal Depth Calculations

The computer program Bentley FlowMaster 10.02 was utilized to perform normal depth calculations for the proposed roadway. These normal depth calculations were utilized to ensure that the proposed storm drain facility is adequately designed and that all local street flow criteria is met.

Five cross-sections were analyzed. The cross-section locations were specified based on flow patterns and utilized the worst-case slope or roadway width when applicable for the calculations.

Table 4 summarizes the normal depth calculations for the 100-year storm event. Depth*Velocity must be less than 8 for the 100-year and less than 6 for the 10-year. Since the highest 100-year Depth*Velocity calculations shown in Table 4 is less than 2 it can be assumed that the 10-year Depth*Velocity calculations meet the criteria of being less than 6. Therefore, to minimize redundancy the 10-year normal depth calculations are not included in this study. Figure 4 summarizes surface flows along proposed Scurry Bend Drive and FlowMaster calculations. Print-outs of all normal depth calculations for the ultimate condition are provided in Appendix C.

Table 4 – Normal Depth Calculations

ID	Total Flow (cfs)	Discharge Source	Slope (%)	Flow Depth (ft)	Velocity (ft/s)	D* V
100-year						
SN-2B	8.0	SN-2A	4.6	0.3	4.6	1.3
SN-2C	8.5	SN-2B + Bypass SDDI#1	3.2	0.3	4.0	1.2
SN-1B	8.0	SN-1A	2.3	0.3	3.5	1.1
SN-1BS	8.9	SN-1B + Bypass SDDI#5 +SDDI#6	2.3	0.3	3.6	1.2
SN-2CN	5.2	SN-2C + Bypass SDDI #2 + SDDI #3	3.2	0.3	3.6	1.0

Interim/Ultimate Condition (100-Year) Drop Inlet Calculations Summary Table					
Drop Inlet	Total Discharge (CFS)	Discharge Source	Drop Inlet Type	Intercepted Flow (CFS)	Bypass Flow (CFS)
Interim/Ultimate 100-Year					
SDDI#1	4.0	SN-2AW	CM2, L=7.5'	3.5	0.5
SDDI#2	4.5	SN-2BW + Bypass SDDI#1	CM2, L=7.5'	3.8	0.7
SDDI#3	4.0	SN-2BE	CM2, L=7.5'	3.5	0.5
SDDI#4	7.1	SN-2C W + Bypass SDDI#2 + SN-1BW+ Bypass SDDI#5	CM2, L=7.5'	7.1	0.0
SDDI#5	4.0	SN-1AW	CM2, L=7.5'	3.6	0.5
SDDI#6	4.0	SN-1AE	CM2, L=7.5'	3.6	0.5

Int/Ult Condition (100-Year) Street Flow Calculations Summary Table						
Section ID	Plan Station	Total Discharge (CFS)	Discharge Source	Flow Depth (FT)	Flow Velocity (FPS)	Depth * Velocity
Interim/Ultimate 100-Year						
SN-2B	17+14.17	8.0	SN-2A	0.3	4.6	1.3
SN-2C	22+86.34	8.5	SN-2B + Bypass SDDI#1	0.3	4.0	1.2
SN-1B	31+92.85	8.0	SN-1A	0.3	3.5	1.1
SN-1BS	26+49.28	8.9	SN-1B + Bypass SDDI#5 +SDDI#6	0.3	3.6	1.2
SN-2CN	25+49.28	5.2	SN-2C + Bypass SDDI #2 + SDDI #3	0.3	3.6	1.0

The 100-year D*V for all street-sections is less than 6. Consecquently, the 10-year D*V is also less than 6. To minimize redundancy, the 10-year street flow calculations are not included on this figure

Lake Mead Boulevard

SDMH #7
∑Q100=7.1
∑Q100=7.1

SDDI #6
3.6 cfs
(0.5 cfs)

SDDI #5
3.6 cfs
(0.5 cfs)

SN-1B

SDMH #6
∑Q100=7.1
∑Q100=7.1

SDMH #5
∑Q100=286.6
∑Q100=246.6

SN-1BS

High School Stockpile
48 cfs
225 cfs

Fleet Wing Avenue
(Street G)

SDDI #4
7.1 cfs
(0 cfs)

SN-2CN

SDDI #2
3.8 cfs
(0.7 cfs)

SDMH #4
∑Q100=7.4
∑Q100=7.4

SN-2C

High School Stockpile
24 cfs
265 cfs

SDMH #2
∑Q100=27.5
∑Q100=51.5

SDDI #3
3.5 cfs
(0.5 cfs)

SDMH #3
∑Q100=7.4
∑Q100=7.4

SDMH #1
∑Q100=3.5
∑Q100=3.5

Scurry Bend Drive
(Street N)

Flight Range Avenue
(Street E)

SN-2B

Sunset Run Drive
(Street Q)

SDDI #1
3.5 cfs
(0.5 cfs)

TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 25

SCURRY BEND DRIVE
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

FIGURE 4: HYDRAULIC WORKMAP

Legend

- SB Drop Inlets
- Scurry Bend Dr. Proposed Storm Drain
- Existing Storm Drain
- Interim Flow Direction
- Existing Roadway
- Proposed Roadway
- Ultimate Conditions Parcels

High School Stockpile
Interim Q100
Ultimate Q100

Drop Inlet #
Intercepted Flow
(Bypass Flow)

Manhole #
Interim Q100
Ultimate Q100

N

0 150 300 600

Feet
1 inch = 300 feet

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Aerial Source: Clark County Spring 2020

2.3. Storm Drain System Modeling

The proposed storm drain within Scurry Bend was modeled as three systems using Water Surface Pressure Gradient (WSPG-W) Software. Two conditions were analyzed for each storm drain mainline, the interim condition and the ultimate condition. Mainlines have been appropriately sized to safely convey flow from the interim to the ultimate condition and handle the worst-case scenario triggered by phases in parcel development.

The first storm drain system begins approximately 720-feet northeasterly from the intersection of Scurry Bend Drive and Sunset Run Drive. The storm drain flows northerly along Scurry Bend Drive before being conveyed easterly along Flight Range Avenue. The interim downstream HGL is modeled in the "FRA-INT" output file found in Appendix C. The "FRA-INT" model is based on the interim model for Flight Range Avenue Addendum #1 TDS with a new calculated interim flow value based on the High School Stockpile TDS (Atkins, 2020). The first proposed system is modeled in "SCURRY-BEND-FRA" in Appendix C.The second proposed storm drain mainline begins approximately 1,185-feet northeasterly from the intersection of Scurry Bend Drive and Sunset Run Drive. The interim downstream HGL is modeled in the "FWW-INT" output file found in Appendix C. The "FWW-INT" model is based on the interim model for Fleet Wing Avenue Addendum #1 TDS with a new calculated interim flow value based on the High School Stockpile TDS (Atkins, 2020). The second proposed system is modeled in "SCURRY-BEND-SOUTH_INT" in Appendix C. The third proposed storm drain mainline begins approximately 710-feet southwesterly from the intersection of Scurry Bend Drive and Lake Mead Boulevard. The interim downstream HGL uses the same model as "SCURRY-BEND-SOUTH_INT." The third proposed system is modeled in "SCURRY-BEND-NORTH_INT" in Appendix C. The proposed storm drains convey flow northerly and southerly along Scurry Bend Drive before connecting into an existing 48" storm drain within Fleet Wing Avenue and an existing 48" storm drain within Flight Range Avenue.

Tables 5, 6 & 7 below summarizes flows and HGLs for each condition.

Table 5 – SBD – FRA: Sunset Run Drive to Flight Range Avenue WSPGW Flow Conditions

SDMH#	WSPG-W Station	Ultimate Condition			Interim Condition		
		Q_{100}	ΣQ_{100}	HGL (ft)	Q_{100}	ΣQ_{100}	HGL
SDMH#2	0	48	52	3508.9	24	28	3508.9
SDMH#1	63.81	4	4	3511.2	4	4	3511.2

Table 6 - SBD – South: Flight Range Avenue to Fleet Wing Avenue WSPGW Flow Conditions

SDMH#	WSPG-W Station	Ultimate Condition			Interim Condition		
		Q_{100}	ΣQ_{100}	HGL (ft)	Q_{100}	ΣQ_{100}	HGL
SDMH#5	0	225.0	233.5	3486.0	265.0	273.5	3487.2
SDMH#4	131.41	0	8.5	3488.8	0	8.5	3488.8
SDMH#3	299.51	8.5	8.5	3495.7	8.5	8.5	3495.7

Table 7 - SBD – North: Fleet Wing Avenue to Lake Mead Boulevard WSPGW Flow Conditions

SDMH#	WSPG-W Station	Ultimate Condition			Interim Condition		
		Q_{100}	ΣQ_{100}	HGL (ft)	Q_{100}	ΣQ_{100}	HGL
SDMH#5	0	225.0	233.0	3486.0	265.0	273.0	3487.2
SDMH#6	175.72	0	8.0	3489.8	0	8.0	3489.8
SDMH#7	587.39	8.0	8.0	3501.4	8.0	8.0	3501.4

Proposed storm drain laterals were designed to account for the highest HGL tailwater condition experienced from either the ultimate or interim condition. Based off the analysis, the interim and ultimate conditions for the laterals were the same. Detailed WSPG-W models and results of the ultimate HGL along the proposed mainline are shown in Appendix C. The downstream ultimate HGL at Fleet Wing Avenue is referenced from Addendum #1 to the Technical Drainage Study for the Fleet Wing Avenue (Kettle Ridge Drive to Scurry Bend Drive) DS5367 section C.2 WSPG-W output model "FWW-ULT" output model found in Appendix A (Atkins, 2020). The downstream ultimate HGL at Flight Range Avenue is referenced from Addendum #1 to the Technical Drainage Study for the Flight Range Avenue (Scurry Bend Drive to Kettle Ridge Drive) DS5385 section C.3 WSPG-W ouput model "FRA-ULT" output found in Appendix A (Atkins, 2021).

3. Bibliography

Atkins. (2020). *Summerlin West Village 22 Fleet Wing Avenue (Street G): Kettle Ridge Drive to Scurry Bend Drive Addendum #1 CLV DS5367.* Las Vegas.

Atkins. (2020). *Summerlin West Village 25 High School Staging Stockpile CLV DS5402.* Las Vegas.

Atkins. (2021). *Summelin West Village 22 Flight Range Avenue (Street E): Scurry Bend Drive (Street N) to Kettle Ridge Drive (Street J) Addendum #1 CLV DS5385.* Las Vegas.

VTN. (2019). *Update #1 to the Master Conceptual Drainage Study for Summerlin West Village 25 CLV DS5104.* Las Vegas.

VTN. (2019). *Update #2 to the Master Conceptual Drainage Study for Summerlin West Village 22 CLV DS5005.* Las Vegas.

Appendices

Appendix A. Drainage Study Reference Information

A.1. Update #2 to the Summerlin West Village 22 Master Conceptual Drainage Study Reference Material and 2018 MPU Soil and CN Information

A.2. Flight Range Avenue Drainage Study Reference Information

A.3. Fleet Wing Avenue Drainage Study Reference Information

A.4. Update #1 to the Summerlin West Village 25 Master Conceptual Drainage Study Reference Material and 2018 MPU Soil and CN Information

A.5. High School Staging Stockpile Drainage Study Reference Information

A.1 Update #2 to the Summerlin West Village 22 Master Conceptual Drainage Study Reference Material and 2018 MPU Soil and CN Information

Update #2 to the Master Conceptual Drainage Study for

Summerlin West Village 22

Las Vegas, Nevada

W.O. # 7861-3A

Prepared for:
Howard Hughes Company, LLC

Submitted to:
City of Las Vegas
Public Works

CITY OF LAS VEGAS
INTER-OFFICE MEMORANDUM

DATE: January 23, 2020

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:
Master Conceptual Drainage Study for – Update #2
Summerlin West Village 22

COPIES TO:
VTN Nevada
Howard Hughes Company, LLC
Bart Anderson, P.E., DevCo
CCRFCD
CCPW

Cross Streets:	I-215 Western Beltway & Summerlin Parkway	
File Number:	F:\Depot\DSMemos\DS5005H.doc	
Parcel Number:	137-14-401-006, 137-23-101-002	
Zoning Action:	MDR-73901	
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	6/12/2018	6/28/2018 & 7/13/2018	Not Approved	$400.00	49696: $400
2nd Submittal	7/31/2018	8/22/2018	Not Approved	$400.00	497790: $400
3rd Submittal	11/5/2018	11/27/2018	Conditional Approval	$400.00	500639: $400
Memo Revision	12/3/2018	12/3/2018	Conditional Approval	N/C	N/C
CCRFCD	1/10/2019	1/10/2019	Concurrence Recv'd	N/C	N/C
4th Submittal	2/12/2019	3/6/2019	Not Approved	$100.00	503164: $100
5th Submittal	3/21/2019	4/4/2019	Conditional Approval	$400.00	3057847: $400
CCPW & CCRFCD	4/25/2019 & 5/23/2019	5/29/2019	Concurrence Received	N/C	N/C
6th Submittal	11/13/2019	12/10/2019	Conditional Approval	$100.00	3644006: $100
Memo Revision	12/12/2019	12/12/2019	Conditional Approval	N/C	N/C
CCPW & CCRFCD	1/13/2020 & 1/16/2020	1/23/2020	Concurrence Recv'd	N/C	N/C
			TOTAL FEES (LDDRS):	**$1,800.00**	----

REMARKS:

6th Submittal: Update #2 to address Village 22 Overall Development Plan changes

4th & 5th Submittals: Update #1 & Addendum #1 to revise Village 22 in accordance to the Update of the latest overall Summerlin West Master Plan Drainage Study

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. The *Grand Park Detention Basin* is proposed to regulate and meter outflow to match the previously approved downstream flow conditions at the junction of *Far Hills* storm drain and the *Beltway Channel*. Without the *Grand Park Detention Basin*, there will be a net increase in flows at the *Beltway Channel* downstream of *Far Hills* intersection exceeding the previously approved flow.

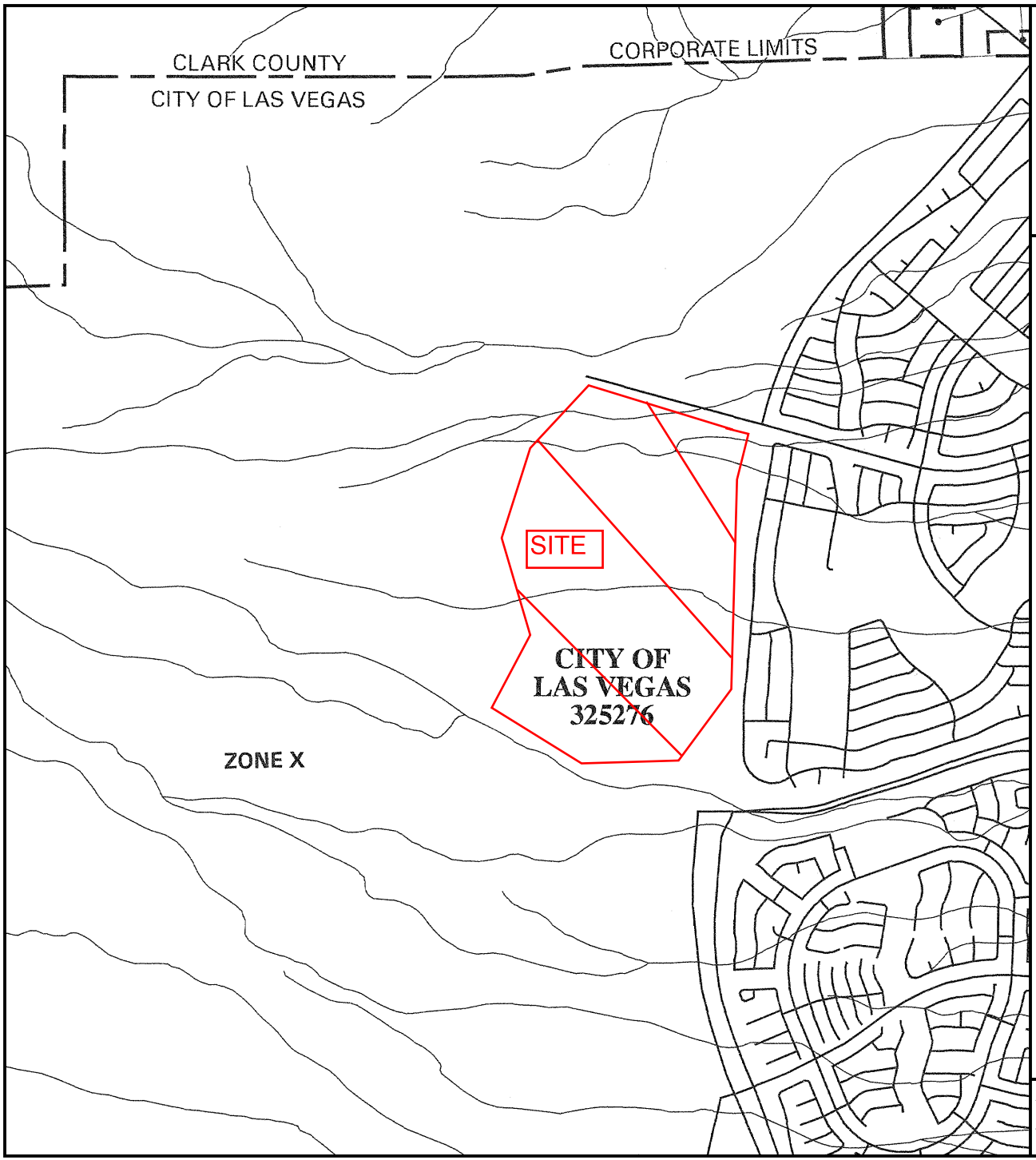
   A technical drainage study for the analysis, design and construction plans for the *Grand Park Detention Basin* must be submitted and approved by the City prior to the individual onsite parcel developments.

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.

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

END OF REMARKS
WSP/AYS

T/R/S: T20S/R59E/14
AREA K-14



MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

PANEL 2150 E

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 2150 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAS VEGAS, CITY OF	325276	2150	E
CLARK COUNTY, UNINCORPORATED AREAS	320003	2150	E

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

MAP NUMBER
32003C2150 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

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

FIGURE 3

REGIONAL FLOOD CONTROL DISTRICT

2018 Las Vegas Valley Master Plan Update

Figure W-4
Gowan Watershed

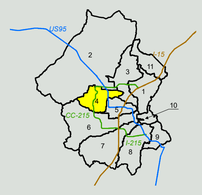
UPPER NORTHERN WATERSHED
GOWAN WATERSHED
TROPICANA/FLAMINGO WATERSHED
CENTRAL WATERSHED
LOWER NORTHERN WATERSHED

MOCCASIN OUTFALL DETENTION BASIN #2
MOCCASIN OUTFALL DETENTION BASIN #1
KYLE CANYON DETENTION BASIN
SOUTH ENVIRONMENTAL ENHANCEMENT AREA
PARK HIGHLANDS WEST DETENTION BASIN
EEKHORN SPRINGS DETENTION BASIN
FORT APACHE DETENTION BASIN
ANN ROAD DETENTION BASIN
RANCHO ROAD DETENTION BASIN
LOWER LAS VEGAS DETENTION BASIN
BOX CANYON DETENTION BASIN
LONE MOUNTAIN-BELTWAY DETENTION BASIN
LONE MOUNTAIN DETENTION BASIN
GOWAN NORTH DETENTION BASIN
VILLAGE 26 DETENTION BASIN
GOWAN SOUTH DETENTION BASIN
CAREY-LAKE MEAD DETENTION BASIN
GRAND PARK DETENTION BASIN
ANGEL PARK DETENTION BASIN
DETENTION BASIN #5
RAINBOW DETENTION BASIN
MEADOWS DETENTION BASIN
RED ROCK DETENTION BASIN
OKEY DETENTION BASIN
DESERT INN DETENTION BASIN
FAKE DETENTION BASIN
R4 DETENTION BASIN

Kyle Canyon
Elkhorn
Ann
Craig
Cheyenne
Summerlin
Spring Mountain
Flamingo
Las Vegas

Legend

- Flow Arrows
- NodeID flow(cfs) — Concentration Points
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Ultimate Development Boundary
- Watershed
- BasinID — Subbasins
- MUSYM — Soils
- 1: Undeveloped Land, Open desert
- 2: Parks, Golf Courses
- 3: Rural, 0.5-1 units per acre (uses 1 unit/acre)
- 4: Low-Density Residential, 1-2 units per acre (uses 2 units/acre)
- 5: Medium-Density Residential, 2-4 units per acre (uses 3 units/acre)
- 6: High-Density Residential, 4-8 units per acre (uses 6 units/acre)
- 7: Public Facility and Residential, 8-12 units/acre
- 8: Very High-Density Residential, 12 units/acre or more
- 9: Commercial, Retail, Casino, High Rise Condominiums
- 10: Light Industrial
- 11: Heavy Industrial
- 12: Schools
- 13: Lakes



1 Range
2 Upper Northern Las Vegas Wash
3 Lower Northern Las Vegas Wash
4 Gowan
5 Central
6 Flamingo/Tropicana
7 Duck Creek/Blue Diamond
8 Pittman
9 C-1
10 Lower Las Vegas Wash
11 Apex

N

Scale: 1 inch = 0.65 mile

0 0.325 0.65 1.3

Miles

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ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
APAD		**ANGEL PARK - ALTA DRIVE BRANCH**						
0203	E	2: 7' X 5.5' RCB	1104	2200	CSWAA-1	GOW3A	6.95	5.28
0225	E	2: 7' X 5.5' RCB OUTLET	360	2137	SUM5DB	GOW3A	6.73	3.40
APBE		**ANGEL PARK - BELTWAY BRANCH**						
0022	E	CONC CHNL 20'W 7'D 2:1 SS	1556	3366	CCSWFH15	GOW3A	3.39	1.81
0051	E	CONC CHNL 20'W 7'D 2:1 SS	1583	3366	CCSWFH15	GOW3A	3.39	2.77
0081	E	8' X 8' RCBC @ FAR HILLS	777	1048	CSWFH-15	GOW3A	0.59	2.32
0094	E	CONC CHNL 10'W 5'D 2:1 SS	1465	1048	CSWFH-15	GOW3A	0.59	1.88
0122	E	CONC CHNL 10'W 4'D 2:1 SS	1685	1048	CSWFH-15	GOW3A	0.59	0.80
0154	P0	8' X 6' RCB	5012	781	CSWFH-12	GOW3A	0.41	1.30
0249	P0	6' X 5' RCB	2858	606	CSWFH-11	GOW3A	0.31	3.00
APCH		**ANGEL PARK - CARRIAGE HILL BRANCH**						
0000	E	8' X 6' RCB	152	399	CSWFH-14	GOW3A	0.21	0.87
0003	P0	72" RCP	1685	399	CSWFH-14	GOW3A	0.21	2.00
0031	P0	60" RCP	2008	206	SWFH-13	GOW3A	0.10	1.38
APD2		**ANGEL PARK - DESERT FOOTHILLS 2 BRANCH**						
0002	E	7' X 6' RCB	883	674	SWAA-2	GOW3A	0.68	1.08
APDF		**ANGEL PARK - DESERT FOOTHILLS BRANCH**						
0000	P0	10' X 6' RCB	1788	1428	CSWFH-9	GOW3B	0.80	3.55
0026	P0	8' X 6' RCB	1813	968	CSWFH-8	GOW3A	1.80	2.00
0073	P0	6' X 4' RCB	1922	486	CSWFH-4	GOW3A	1.52	4.40
0123	P0	42" RCP	1076	141	GPDB	GOW3A	1.29	6.00
0125	P0	130 AC-FT GRAND PARK DETENTION BASIN		1543	CSWFH-3	GOW3A	1.29	
0127	P0	6' X 6' RCB	2977	853	SWFH-1	GOW3A	0.69	3.80
0128	P0	5' X 4' RCB	2197	509	SWFH-2	GOW3A	0.37	5.70
APFH		**ANGEL PARK - FAR HILLS BRANCH**						
0000	E	2: 8' X 8' RCB	1070	2494	CCSWFH14	GOW3B	1.51	3.50
0019	E	2: 8' X 8' RCB	250	2149	CCSWFH-9	GOW3B	1.30	4.19
0024	E	16' X 8' RCAP	1951	2149	CCSWFH-9	GOW3B	1.30	5.10
0061	E	8' X 6' RCB	1435	839	CSWFH-7	GOW3A	0.50	2.00
0089	E	8' X 6' RCB	2946	839	CSWFH-7	GOW3A	0.50	2.00
0144	P0	5' X 4' RCB	2497	456	SWFH-6	GOW3A	0.28	5.50
APM5		**DETENTION BASIN #5**						
0000	E	384 AC-FT DETENTION BASIN #5		6856	SUM5IN	GOW3A	6.73	
0008	P0	CONC CHNL 50'W 4.5'D 2:1 SS	2102	3634	CCDB54-7	GOW3A	4.13	5.20
0009	P0	CONC CHNL 50'W 4'D 2:1 SS	4180	3495	CDB55-7	GOW3A	2.60	5.80
0047	E	DIVERSION BERM WITH GABION BANK PROTECTION	1000	3634	CCDB54-7	GOW3A	4.13	1.30
0056	P0	CONC CHNL 80'W 4'D 2:1 SS	264	3634	CCDB54-7	GOW3A	4.13	1.30
0057	P0	CONC CHNL 50'W 3'D 2:1 SS	9922	1664	CDB54-4	GOW3A	0.81	6.80
0059	P0	CONC CHNL 100'W 3'D 2:1 SS	9075	2606	CDB54-7	GOW3A	3.31	7.00
0212	P0	CONC CHNL 30'W 3'D 2:1 SS	6695	1092	DB55-1	GOW3A	0.64	7.50
0213	P0	CONC CHNL 50'W 3'D 2:1 SS	6522	1729	CDB55-5	GOW3A	1.30	7.30
APSP		**ANGEL PARK - SUMMERLIN PARKWAY**						
0183	E	CONC CHNL 10'W 6'D 2:1 SS	1680	884	C11B-1	GOW3A	0.84	1.70
GOB3		**GOWAN LONE MOUNTAIN SYST. 3 BELTWAY**						
0000	E	66" RCP	1370	341	SV22-1	GOW3A	0.18	4.50
GOBE		**GOWAN LONE MOUNTAIN SYST. BELTWAY**						
0000	E	20' X 10' RCBC @ ACCESS RD	30	1044	CSV22	GOW3A	0.67	5.67
0001	E	CONC CHNL 20'W 5'D 2:1 SS	1100	1044	CSV22	GOW3A	0.67	6.50
0021	E	CONC CHNL 11'W 6.8'D 0:1 SS	2143	1044	CSV22	GOW3A	0.67	6.50
0058	E	CONC CHNL 15'W 7.5'D 0:1 SS	487	1044	CSV22	GOW3A	0.67	3.93
0065	E	CONC CHNL 17'W 7.5'D 0:1 SS	844	1044	CSV22	GOW3A	0.67	0.76
0088	E	2: 10' X 9' RCBC @ LAKE MEAD	400	782	SV22-2	GOW3A	0.49	0.50
0096	E	CONC CHNL 20'W 9'D 2:1 SS	627	782	SV22-2	GOW3A	0.49	0.50
0108	E	CONC CHNL 20'W 6'D 2:1 SS	1021	782	SV22-2	GOW3A	0.49	0.50
0127	E	CONC CHNL 20'W 6'D 2:1 SS	638	782	SV22-2	GOW3A	0.49	0.50
0139	E	CONC CHNL 10'W 5.5'D 2:1 SS	1500	782	SV22-2	GOW3A	0.49	1.02
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
0077	E	CONC CHNL 20'W 6'D 0:1 SS	1229	1271	CRCSV22	GOW3A	4.99	6.11

ID / Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
GOL3		**GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3**						
0100	E	CONC CHNL 20'W 10'D 0:1 SS	200	1271	CRCSV22	GOW3A	4.99	5.67
0115	E	96" RCP OUTLET	670	666	DET26	GOW3A	4.31	0.29
0128	E	305 AC-FT VILLAGE 26 DETENTION BASIN		3615	VIL26IN	GOW3A	4.31	
0137	E	CONC CHNL 20'W 7.5'D 0:1 SS	2720	3615	VIL26IN	GOW3A	4.31	6.50
0188	E	CONC CHNL 20'W 8'D 0:1 SS	563	3615	VIL26IN	GOW3A	4.31	3.91
0197	E	14' X 14' RCB	890	3615	VIL26IN	GOW3A	4.31	0.88
0214	E	Dual 10' X 14' RCB	124	3615	VIL26IN	GOW3A	4.31	0.57
0216	P0	CONC CHNL 50'W 4'D 2:1 SS	4060	3524	CSV26-1	GOW3A	4.02	6.08
0289	P0	CONC CHNL 50'W 3.5'D 2:1 SS	6215	2281	30	GOW3A	2.44	7.95
0290	E	NATURAL WASH 363'W	4850	1410	SV26-1	GOW3A	1.59	22.50
0370	E	NATURAL WASH 450'W	7000	2281	30	GOW3A	2.44	8.50
GOL4		**GOWAN LONE MOUNTAIN SYSTEM-BRANCH 4**						
0000	E	14' X 8' RCB	554	2243	CLMT1R	GOW3A	2.33	2.50
0010	E	2: 9' X 8' RCB	820	2243	CLMT1R	GOW3A	2.33	4.74
0025	E	SOIL CEMENT CHNL 60'W 8'D 3-4:1 SS	320	2243	CLMT1R	GOW3A	2.33	2.00
0026	E	SOIL CEMENT CHNL 42'W 6'D 3-4:1 SS	700	2243	CLMT1R	GOW3A	2.33	1.00

*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-22

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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2018
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-22
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

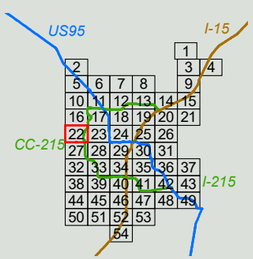
Category A	Category B
Channel	Channel
Stormdrain	Stormdrain
Crossing	Crossing

N

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

Scale: 1 inch = 2,000 feet

AerialSource:Esri World Imagery 2017



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REGIONAL FLOOD CONTROL DISTRICT

2013
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F- 24
FLOOD CONTROL FACILITIES

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Detention Basin

- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

Category A	Category B
Channel	Channel
Stormdrain	Stormdrain

N

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

Scale: 1 inch = 2,000 feet

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

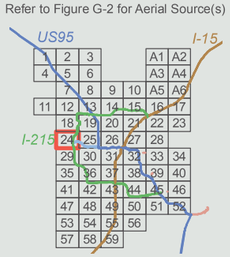


FIGURE 4A - MPU Facilities

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
APAD		**ANGEL PARK - ALTA DRIVE BRANCH**						
0044	E	11' X 8' RCAP	1565	3140	CSWAA-3	ALLGOW4	8.26	4.24
0073	E	11' X 8' RCAP	2220	2917	CSWAA-2	ALLGOW3	7.68	3.50
0146	E	10' X 8' RCB	3010	2220	CSWAA-1	ALLGOW3	6.98	4.40
0203	E	2: 7' X 5.5' RCB	1136	2220	CSWAA-1	ALLGOW3	6.98	5.28
0225	E	2: 7' X 5.5' RCB Outlet	360	2149	SUM5DB	ALLGOW3	6.74	3.40
APBE		**ANGEL PARK - BELTWAY BRANCH**						
0013	E	3: 12' X 8' RCB	489	4060	CSWFH-9	ALLGOW3	2.65	6.50
0022	E	Conc Chnl 20'W 7'D 2:1 SS	1556	4060	CSWFH-9	ALLGOW3	2.65	1.81
0051	E	Conc Chnl 20'W 7'D 2:1 SS	1583	4060	CSWFH-9	ALLGOW3	2.65	2.77
0081	E	8' X 8' RCBC @ Far Hills	777	423	SWFH-9	ALLGOW3	0.17	2.32
0094	E	Conc Chnl 10'W 5'D 2:1 SS	1465	423	SWFH-9	ALLGOW3	0.17	1.88
0122	E	Conc Chnl 10'W 4'D 2:1 SS	1409	423	SWFH-9	ALLGOW3	0.17	0.80
APCH		**ANGEL PARK - CARRIAGE HILL BRANCH**						
0000	E	8' X 6' RCB	152	585	SWFH-8	ALLGOW3	0.29	0.87
0003	P0	8' X 7' RCB	1461	585	SWFH-8	ALLGOW3	0.29	2.39
0031	P0	8' X 5' RCB	896	585	SWFH-8	ALLGOW3	0.29	0.60
APD2		**ANGEL PARK - DESERT FOOTHILLS 2 BRANCH**						
0002	P0	7' X 7' RCB	964	948	SWAA-2	ALLGOW3	0.70	2.00
APD5		**ANGEL PARK - DESERT FOOTHILLS 5 BRANCH**						
0000	P0	8' X 6' RCB	685	1701	CSWFH-2	ALLGOW3	1.09	1.89
0013	P0	72" RCP	1436	1701	CSWFH-2	ALLGOW3	1.09	4.18
APD6		**ANGEL PARK - DESERT FOOTHILLS 6 BRANCH**						
0000	P0	6' X 6' RCB	2604	1076	CSWFH-6	ALLGOW3	0.56	6.15
APDF		**ANGEL PARK - DESERT FOOTHILLS BRANCH**						
0000	P0	12' X 10' RCB	1356	2897	CSWFH-7	ALLGOW3	1.81	2.20
0026	P0	12' X 10' RCB	2463	1962	CSWFH-3	ALLGOW3	1.25	1.62
0073	P0	10' X 8' RCB	2679	1962	CSWFH-3	ALLGOW3	1.25	4.10
0123	P0	6' X 5' RCB	5355	1701	CSWFH-2	ALLGOW3	1.09	6.53
APF2		**ANGEL PARK - FAR HILLS 2 BRANCH**						
0000	P0	8' X 6' RCB	1046	669	CSWFH-5	ALLGOW3	0.38	1.00
APFH		**ANGEL PARK - FAR HILLS BRANCH**						
0000	E	2: 8' X 8' RCB	995	3862	CSWFH-8	ALLGOW3	2.48	3.50
0019	E	2: 8' X 8' RCB	250	3392	CCSWFH-7	ALLGOW3	2.18	4.19
0024	E	16' X 8' RCAP	1943	3392	CCSWFH-7	ALLGOW3	2.18	5.10
0061	P0	8' X 6' RCB	1492	669	CSWFH-5	ALLGOW3	0.38	2.00
0089	P0	8' X 6' RCB	2902	669	CSWFH-5	ALLGOW3	0.38	2.00
0144	P0	7' X 6' RCB	1556	669	CSWFH-5	ALLGOW3	0.38	5.50
APM5		**ANGEL PARK - MIDDLE 5 BRANCH**						
0000	E	384 ac-ft Detention Basin #5		7001	SUM5IN	ALLGOW3	6.74	
0001	E	12,153 cfs PMF Spillway		12153	SUM5IN	ALLGOW3	6.74	
0008	P0	Conc Chnl 50'W 4.5'D 2:1 SS	2102	3725	CDB54-6R	ALLGOW3	4.30	5.20
0009	P0	Conc Chnl 50'W 4.5'D 2:1 SS	4180	3624	CDB55-8	ALLGOW3	2.45	5.80
0047	E	Diversion Berm with Gabion Bank Protection	1000	3725	CDB54-6R	ALLGOW3	4.30	1.30
0056	P0	Conc Chnl 80'W 4'D 2:1 SS	264	3725	CDB54-6R	ALLGOW3	4.30	1.30
0057	P0	Conc Chnl 50'W 3'D 2:1 SS	9922	1821	CDB54-4	ALLGOW3	1.01	6.80
0059	P0	Conc Chnl 100'W 3'D 2:1 SS	8923	2358	CDB54-5	ALLGOW3	2.45	7.00
0212	P0	Conc Chnl 30'W 3.5'D 2:1 SS	6695	1238	CDB55-2	ALLGOW3	0.74	7.50
0213	P0	Conc Chnl 50'W 2.5'D 2:1 SS	6522	1125	CDB55-5	ALLGOW3	0.62	7.30
APSP		**ANGEL PARK - SUMMERLIN PARKWAY**						
0135	E	Conc Chnl 10'W 6'D 2:1 SS	2030	1173	C8B-1	ALLGOW3	1.14	2.40
0177	E	9' X 8' RCBC @ Anasazi	330	867	C11B-1	ALLGOW3	0.84	1.70
0183	E	Conc Chnl 10'W 6'D 2:1 SS	1680	867	C11B-1	ALLGOW3	0.84	1.70
GO02		**GOWAN SOUTH FACILITIES (CHEYENNE CHANNEL)**						
0257	E	Conc Chnl 10'W 6.75'D 1.5:1 SS	4293	2577	CCJ-C	ALLGOW3	2.97	4.10
GOB2		**GOWAN LONE MOUNTAIN SYST. 2 BELTWAY**						
0000	P0	36" RCP Outlet	118	75	DET22	ALLGOW3	0.76	6.76
0001	P0	123 ac-ft Village 22 Detention Basin		1344	CSV22-DB	ALLGOW3	0.76	
0020	P0	8' X 7' RCB	657	1247	SV22-2	ALLGOW3	0.70	8.30
0033	P0	8' X 6' RCB	3359	1247	SV22-2	ALLGOW3	0.70	6.90
0096	P0	6' X 5' RCB	1332	1247	SV22-2	ALLGOW3	0.70	6.00

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
GOB3		**GOWAN LONE MOUNTAIN SYST. 3 BELTWAY**						
0000	P0	66" RCP	1877	530	SV22-3	ALLGOW3	0.28	6.60
0035	P0	54" RCP	965	530	SV22-3	ALLGOW3	0.28	6.40
GOBE		**GOWAN LONE MOUNTAIN SYST. BELTWAY**						
0000	E	20' X 10' RCBC @ Access Rd	30	958	CSV22-3	GW3SC	0.28	5.67
0001	E	Conc Chnl 20'W 5'D 2:1 SS	3355	958	CSV22-3	GW3SC	0.28	6.50
0065	E	Conc Chnl 20'W 6'D 2:1 SS	1220	958	CSV22-3	GW3SC	0.28	1.90
0088	E	2: 10'X9' RCBC @ Lake Mead	400	471	CDET22	ALLGOW3	0.96	0.50
0096	E	Conc Chnl 20'W 9'D 2:1 SS	627	471	CDET22	ALLGOW3	0.96	0.50
0108	E	Conc Chnl 20'W 6'D 2:1 SS	1021	471	CDET22	ALLGOW3	0.96	0.50
0127	E	Conc Chnl 20'W 6'D 2:1 SS	638	442	SV22-1	ALLGOW3	0.20	0.50
0139	E	Conc Chnl 10'W 5.5'D 2:1 SS	1500	442	SV22-1	ALLGOW3	0.20	1.02
GOL3		**GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3**						
0010	E	Conc Chnl 20'W 10'D 0:1 SS	3037	2946	CRCLMT1R	GW3SC	2.61	2.78
0068	E	Transition Structure	100	2946	CRCLMT1R	GW3SC	2.61	3.50
0070	E	20' X 6' RCBC @ Cliff Shadows	350	1162	CRCSV223	ALLGOW3	5.68	2.44
0077	E	Conc Chnl 20'W 6'D 0:1 SS	1229	1162	CRCSV223	ALLGOW3	5.68	6.11
0100	E	Conc Chnl 20'W 10'D 0:1 SS	200	1162	CRCSV223	ALLGOW3	5.68	5.67
0115	E	66" RCP Outlet	670	679	DET26	ALLGOW3	4.43	
0128	E	333 ac-ft Village 26 Detention Basin		3767	VIL26IN	ALLGOW3	4.43	
0137	P0	14' X 14' RCB	4335	3767	VIL26IN	ALLGOW3	4.43	0.50
0216	P0	Conc Chnl 50'W 4.5'D 2:1 SS	3761	3693	CSV26-1	ALLGOW3	4.15	6.08
0289	P0	Conc Chnl 50'W 3.5'D 2:1 SS	6215	2396	30	ALLGOW3	2.51	7.95
0290	E	Natural Wash 363'W	4850	1465	SV26-1	ALLGOW3	1.64	22.50
0370	E	Natural Wash 450'W	7000	2396	30	ALLGOW3	2.51	8.50
GOL4		**GOWAN LONE MOUNTAIN SYSTEM-BRANCH 4**						
0000	E	14' X 8' RCB	554	2257	CLMT1R	ALLGOW3	2.33	2.50
0010	E	2: 9' X 8' RCB	820	2257	CLMT1R	ALLGOW3	2.33	4.74
0025	E	Soil Cement Chnl 60'W 8'D 3-4:1 SS	320	2257	CLMT1R	ALLGOW3	2.33	2.00
0026	E	Soil Cement Chnl 42'W 6'D 3-4:1 SS	700	2257	CLMT1R	ALLGOW3	2.33	1.00

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

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

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

REGIONAL FLOOD CONTROL DISTRICT

2013 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F - 24

LEGEND

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

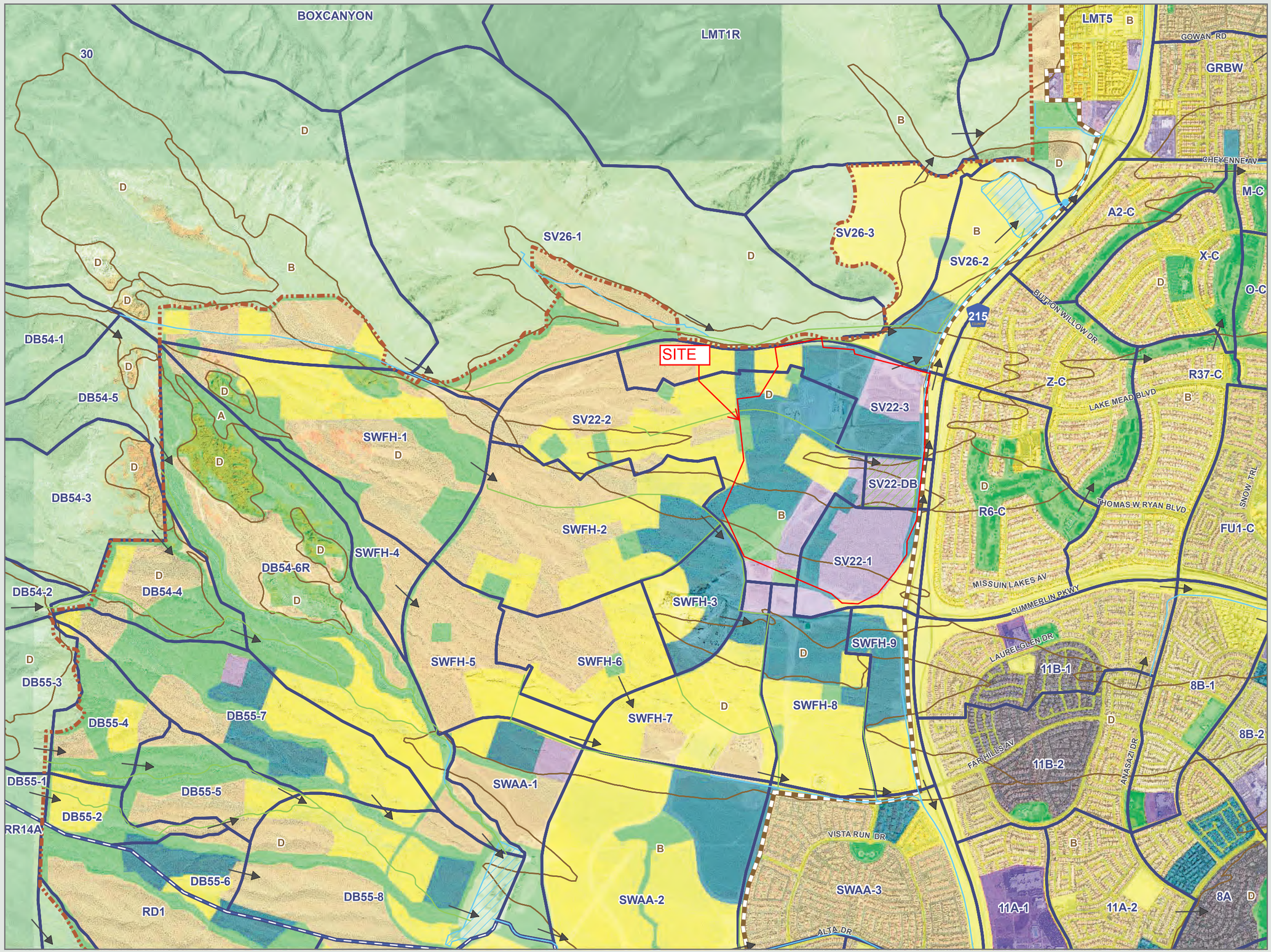
River Mile 0000
- Distance Above Confluence with Parent Stream (Miles)
- Miles in Hundredths

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

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

Construction Features

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



REGIONAL FLOOD CONTROL DISTRICT

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE H- 24
HYDROLOGIC SUMMARY

LEGEND

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

Flood Control Facilities

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

Type Hydrologic Soil Groups

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

Typical Land Use

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

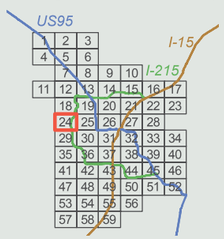
* Drought Ordinance Applied

N

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

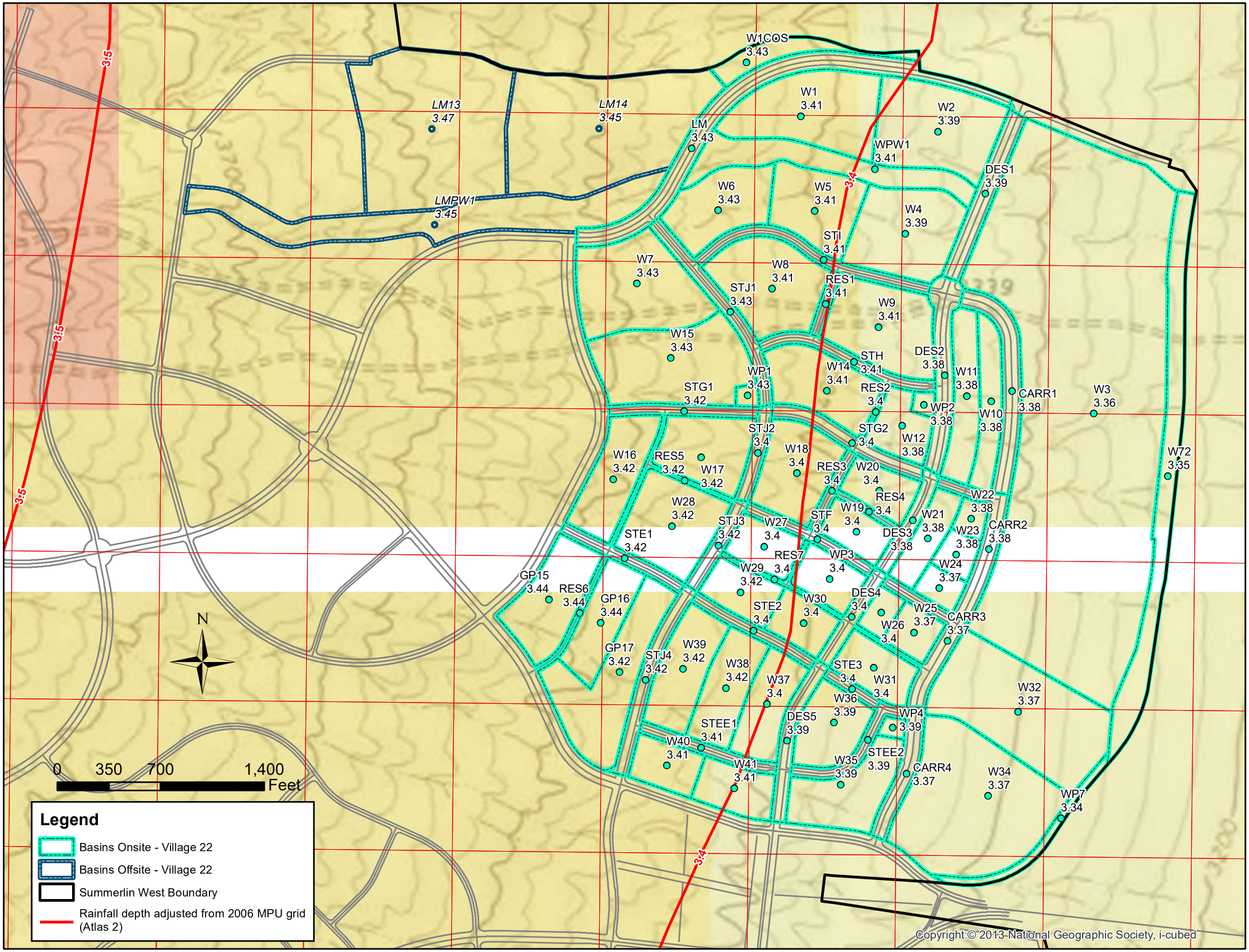
Scale: 1 inch = 2,000 feet

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

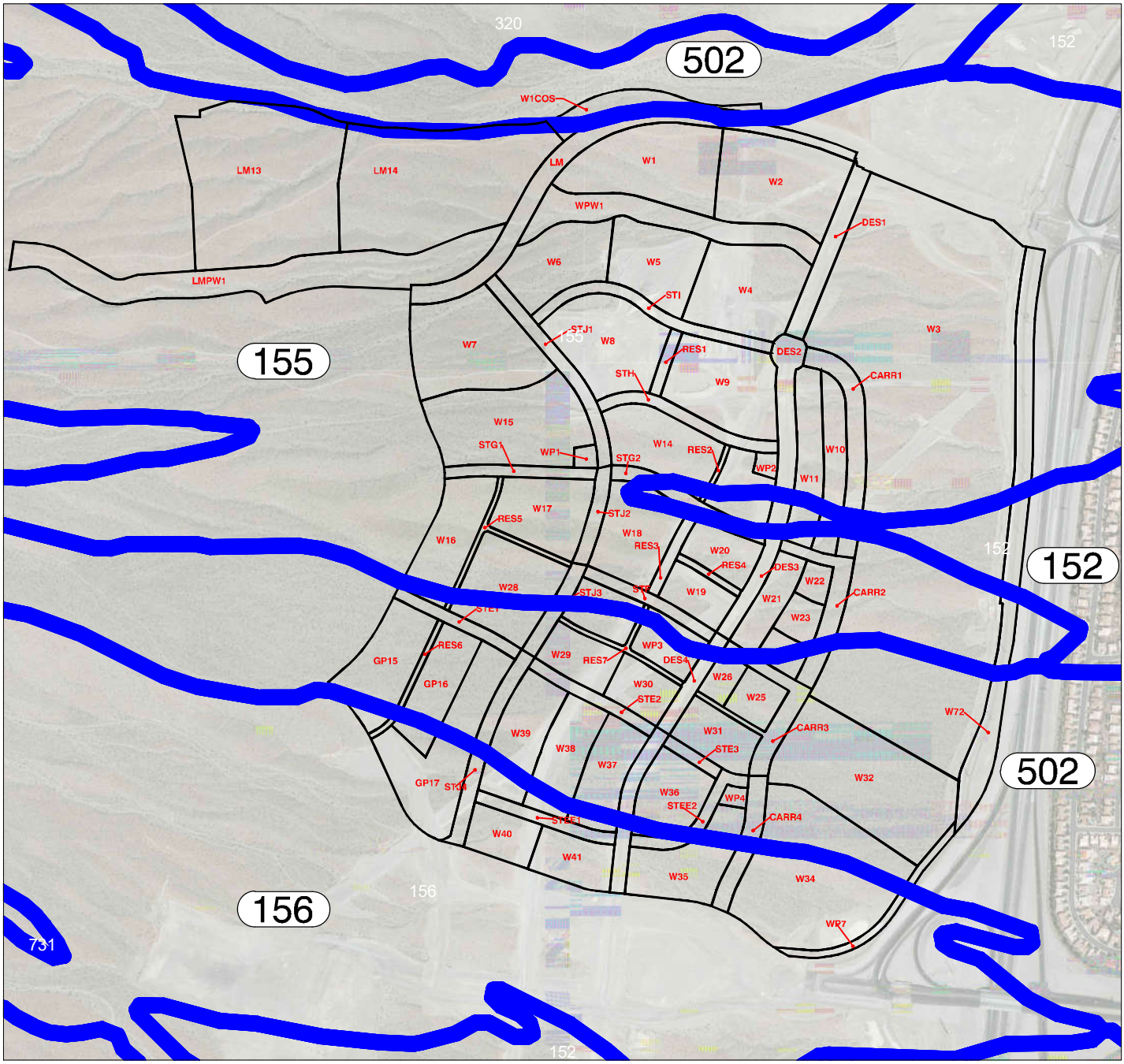


PBS&J
PB

FIGURE 4B - MPU HYDROLOGIC SUMMARY



H:\7861\Village 22 Master\GIS\Rainfall\mxd\Village22-2006MPU-Precipitation.mxd Date: 6/11/2018



LEGEND

SITE BOUNDARY

300 SOIL NUMBER

SOIL BOUNDARY

NOTE:
1. This data was taken from the following website: http://soildatamart.nrcs.usda.gov
2. This data is in state plane coordinates

NORTH

GRAPHIC SCALE

1000 0 500 1000 2000

1" = 1000'

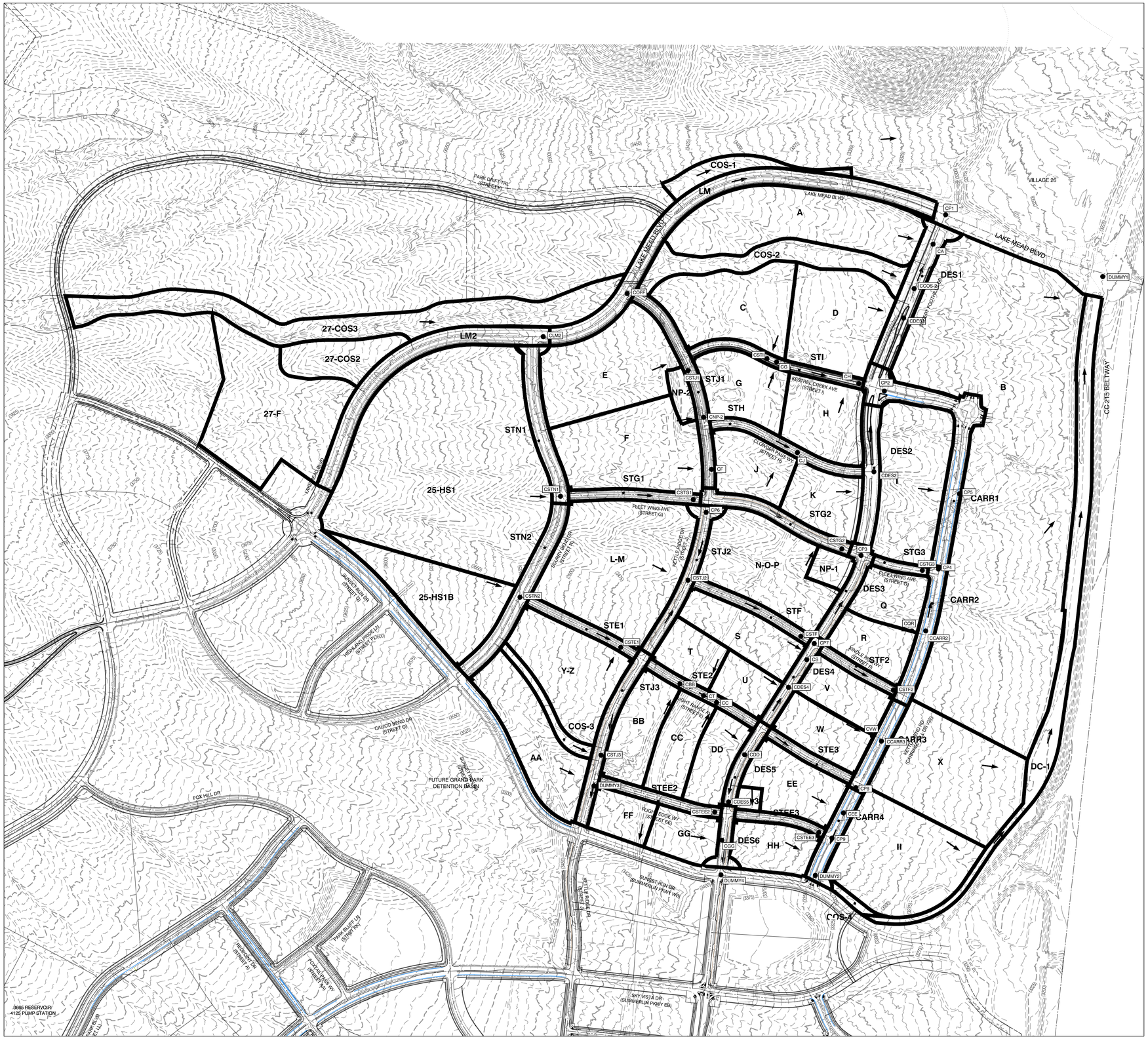
H:\7861\Village 22 Master\Drainage\A Figures\Figure 5A - Village 22 Soils Map.dwg

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NV 89146-5148

FIGURE 5: SOILS MAP

SUMMERLIN WEST VILLAGE 22

SCALE	HORZ. 1"=1000'
	VERT. n/a
W.O. NO.	7861
DRAWN BY:	AH
DATE:	MAY 2018
SHEET	OF



GRAPHIC SCALE

350 0 175 350 700

1" = 350'

LEGEND

- BASIN BOUNDARY
- A — BASIN DESIGNATION
- CONCENTRATION POINT
- FLOW ARROW

ULTIMATE CONDITION HEC-1 SUMMARY TABLE

BASIN ID	AREA (ac)	Q100 (CFS)	BASIN ID	AREA (ac)	Q100 (CFS)
LM	10.04	36	STN1	3.61	13
D	11.96	50	CSTN1	-	244
DES1	4.46	20	STG1	1.85	8
CDES1	-	70	CSTG1	-	229
COS-2	7.51	22	CP6	-	532
CCOS-2	-	89	L-M	21.14	81
A	17.39	68	STJ2	3.10	13
CA	-	156	CSTJ2	-	612
CP1	-	191	STF	1.84	8
STI	2.42	11	CSTF	-	610
C	12.05	51	U	3.49	11
CSTI	-	62	DES4	1.77	8
G	7.05	30	CDES4	-	19
CG	-	92	S	3.01	10
H	7.64	33	CS	-	29
CH	-	124	CP7	-	639
STH	2.29	10	STF2	1.21	5
J	5.93	24	CSTF2	-	637
CJ	-	34	V	5.01	17
K	5.28	22	W	5.28	19
DES2	3.09	13	CVW	-	36
CDES2	-	68	CARR3	2.14	8
CP2	-	189	CCARR3	-	667
CARR1	6.95	29	STE3	1.36	6
I	13.44	38	CP8	-	673
N-O-P	14.52	49	EE	6.80	25
NP-1	1.73	6	CEE	-	689
STG2	2.86	13	NP3	0.70	2
CSTG2	-	68	STEE3	1.23	5
DES3	2.00	9	CSTEE3	-	7
CP3	-	77	CP9	-	205
STG3	0.72	3	HH	4.85	20
CSTG3	-	79	CARR4		10
Q	4.58	17	25-HS1B		48
R	4.97	20	STN2		19
CQR	-	37	CSTN2	-	67
CARR2	3.58	15	Y-Z	11.28	42
CCARR2	-	52	STE1	1.75	8
CP4	-	131	CSTE1	-	115
CP5	-	379	COS-3	1.70	4
II	16.03	61	STJ3	3.22	14
X	17.45	60	CSTJ3	-	126
B	80.77	304	AA	10.13	33
DC-1	12.59	36	STE2		8
COS-4	0.57	2	BB	6.29	23
COS-1	2.87	6	CBB	-	31
V27-F	19.13	83	T	4.02	13
V27-COS2	5.25	20	CT	-	44
LM2	7.23	28	CC	5.34	19
CLM2	-	132	CCC	-	63
27-COS3	17.46	53	DD	4.76	17
COFF	-	185	CDD	-	77
E	13.91	58	DES5	1.57	7
STJ1	3.52	15	CDES5	-	81
CSTJ1	-	255	STEE2	1.79	8
NP-2	1.34	5	CSTEE2	-	88
CNP-2	-	255	GG	4.98	21
F	14.22	59	CGG	-	109
CF	-	309	FF	3.49	15
25-HS1	49.49	211			

REVISION

REV	DATE	BY

THE HOWARD HUGHES COMPANY, LLC
10801 WEST CHARLESTON BLVD, 3RD FLOOR
LAS VEGAS, NEVADA 89135

VTN NEVADA
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PH. (702) 873-7550 FAX (702) 362-2597 WEB WWW.VTNNV.COM
CONSULTING ENGINEERS ● PLANNERS ● LAND SURVEYORS

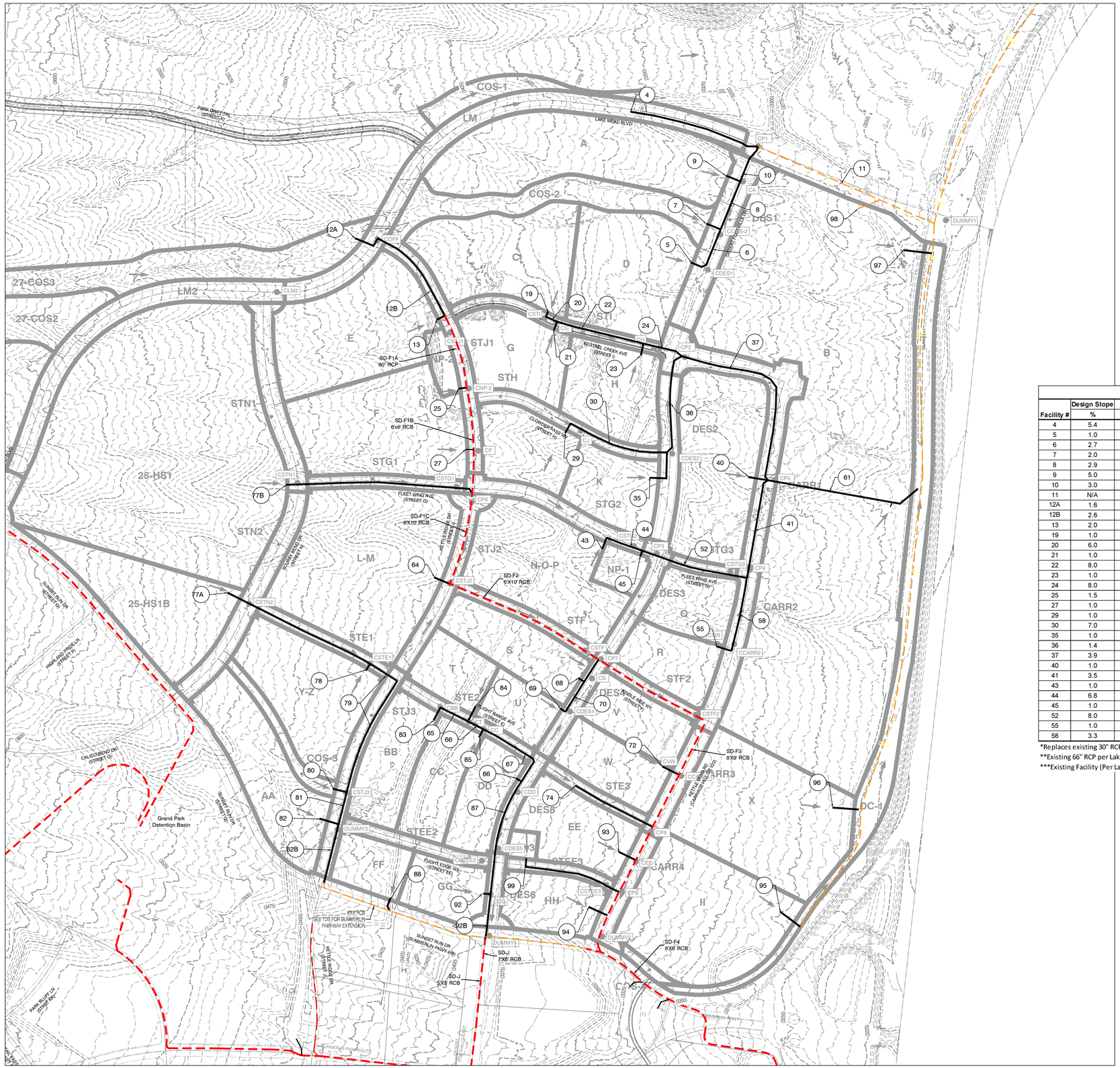
FIGURE 6
ULTIMATE CONDITION BASIN MAP

SUMMERLIN WEST VILLAGE 22

DRAWN BY: JTA
DESIGNED BY:
CHECKED BY:
OCT 2019
SCALE: 1" = 350' HORIZ. N/A VERT.
PROJECT NO: 7861

SHEET
OF SHEETS
DRAWING NO.

H:\7861\Village 22 Master\Drainage\5_LIP2\A_Figures\Figure 6 - Village 22 Drainage Basin Map.dwg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COS-2
B
C
D
CDES1
CCOS-2
CCOS-1
CP1
CA
DUMMY1
CCC
CT
CDES2
CP2
CDES3
CP3
CDES4
CP4
CDES5
CP5
CDES6
CP6
CDES7
CP7
CDES8
CP8
CDES9
CP9
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CARR2
CARR3
CARR4
CCARR2
DC-1
LM2
CLM2
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27-COS2
25-HS1
25-HS1B
E
F
G
STJ1
STH
STI
H
STN1
STG1
STN2
STG2
STG3
L-M
N-O-P
NP-1
STJ2
STE1
STE2
STE3
STF
STF1
STF2
Y-Z
T
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R
U
V
W
X
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BB
CC
DD
EE
FF
GG
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STEE3
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CSTN2
CSTG1
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CSTG3
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CSTJJJJJJJJJJJJJ
CSTKKKKKKKKKKKKK
CSTLLLLLLLLLLLLL
CSTMMMMMMMMMMMMM
CSTNNNNNNNNNNNNN
CSTOOOOOOOOOOOOO
CSTPPPPPPPPPPPPP
CSTQQQQQQQQQQQQQ
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CSTUUUUUUUUUUUUU
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CSTEEEEEEEEEEEEEEE
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CSTUUUUUUUUUUUUUUU
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CSTCCCCCCCCCCCCCCCC
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CSTEEEEEEEEEEEEEEEE
CSTFFFFFFFFFFFFFFFF
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CSTOOOOOOOOOOOOOOOO
CSTPPPPPPPPPPPPPPPP
CSTQQQQQQQQQQQQQQQQ
CSTRRRRRRRRRRRRRRRR
CSTSSSSSSSSSSSSSSSS
CSTTTTTTTTTTTTTTTTT
CSTUUUUUUUUUUUUUUUU
CSTV

```
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   23OCT19  TIME  13:10:22  *                                                  *           (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 = OCTOBER 2019
            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    * UPDATE #2 - SUMMERLIN WEST VILLAGE 22                *
            9          ID    ********************************************************
           10          ID
           11          ID
           12          ID
           13          ID
           14          ID  JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
           15          ID
           16          ID  100-YEAR,  6-HOUR STORM,  SDN3
           17          ID
           18          IT       5       0       0     100
           19          IO       5       0       0
           20          IN       5       0       0
           21          JR    PREC    1.00
                       *

           22          KK      LM
           23          BA  0.0157
           24          PB    3.41
           25          PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
           26          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
           27          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
           28          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
           29          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
           30          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
           31          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
           32          PC   0.998   0.999       1
           33          LS       0    98.0
           34          UD   0.118
                       *

           35          KK       D
           36          BA  0.0187
           37          PB    3.39
           38          LS       0    95.0
           39          UD   0.058
                       *

           40          KK    DES1
           41          BA  0.0070
           42          PB    3.39
           43          LS       0    98.0
           44          UD   0.058
                       *
```

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

  45          KK   CDES1
  46          KM   COMBINE D AND DES1
  47          HC       2
              *

  48          KK  RCDES1
  49          KM   ROUTE CDES1 TO CCOS-2
  50          RD     241   0.027   0.013       0    CIRC     2.5
              *

  51          KK   COS-2
  52          BA  0.0117
  53          PB    3.41
  54          LS       0    89.0
  55          UD   0.142
              *

  56          KK  CCOS-2
  57          KM   COMBINE CDES1 AND COS-2
  58          HC       2
              *

  59          KK RCCOS-2
  60          KM   ROUTE CCOS-2 TO CA
  61          RD     325   0.007   0.013       0    CIRC     3.0
              *

  62          KK       A
  63          BA  0.0272
  64          PB    3.41
  65          LS       0    95.0
  66          UD   0.078
              *

  67          KK      CA
  68          KM   COMBINE CCOS-2 AND A
  69          HC       2
              *

  70          KK     RCA
  71          KM   ROUTE CA TO CP1
  72          RD     325   0.050   0.013       0    CIRC     3.5
              *

  73          KK     CP1
  74          KM   COMBINE LM AND CA
  75          HC       2
              *
```



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

  76          KK     STI
  77          KM   KESTREL CREEK AVE
  78          BA  0.0038
  79          PB    3.41
  80          LS       0    98.0
  81          UD   0.050
              *

  82          KK       C
  83          BA  0.0188
  84          PB    3.41
  85          LS       0    95.0
  86          UD   0.054
              *

  87          KK    CSTI
  88          KM   COMBINE C AND STI
  89          HC       2
              *

  90          KK       G
  91          BA  0.0110
  92          PB    3.41
  93          LS       0    95.0
  94          UD   0.056
              *

  95          KK      CG
  96          KM   COMBINE CSTI AND CG
  97          HC       2
              *

  98          KK     RCG
```

```
             99          KM   ROUTE CG TO CH
            100          RD     556   0.081   0.013       0    CIRC     3.5
                         *

            101          KK       H
            102          BA  0.0119
            103          PB    3.41
            104          LS       0    95.0
            105          UD   0.053
                         *

            106          KK      CH
            107          KM   COMBINE CG AND CH
            108          HC       2
                         *
1                                      HEC-1 INPUT                                          PAGE  4

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


            109          KK     RCH
            110          KM   ROUTE CH TO CP2
            111          RD     255   0.093   0.013       0    CIRC     3.5
                         *

            112          KK     STH
            113          KM   CLOWDER PASS WAY
            114          BA  0.0036
            115          PB    3.41
            116          LS       0    98.0
            117          UD   0.050
                         *

            118          KK       J
            119          BA  0.0093
            120          PB    3.41
            121          LS       0    92.0
            122          UD   0.058
                         *

            123          KK      CJ
            124          KM   COMBINE J AND STH
            125          HC       2
                         *

            126          KK     RCJ
            127          KM   ROUTE CJ TO CDES2
            128          RD     637   0.080   0.013       0    CIRC     2.5
                         *

            129          KK       K
            130          BA  0.0081
            131          PB    3.40
            132          LS       0    95.0
            133          UD   0.050
                         *

            134          KK    DES2
            135          BA  0.0048
            136          PB    3.38
            137          LS       0    98.0
            138          UD   0.071
                         *

            139          KK   CDES2
            140          KM   COMBINE DES2, CJ, AND K
            141          HC       3
                         *
1                                      HEC-1 INPUT                                          PAGE  5

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


            142          KK  RCDES2
            143          KM   ROUTE CDES2 TO CP2
            144          RD     643   0.014   0.013       0    CIRC     3.5
                         *

            145          KK     CP2
            146          KM   COMBINE CDES2 & CH
            147          HC       2
                         *

            148          KK    RCP2
            149          KM   ROUTE CP2 TO CP5
            150          RD    1226   0.039   0.013       0    CIRC     4.5
                         *

            151          KK   CARR1
            152          BA  0.0109
            153          PB    3.38
```

```
             154          LS       0    98.0
             155          UD   0.070
                          *

             156          KK       I
             157          BA  0.0165
             158          PB    3.38
             159          LS       0    92.0
             160          UD   0.083
                          *

             161          KK   N-O-P
             162          BA  0.0227
             163          PB    3.40
             164          LS       0    90.3
             165          UD   0.090
                          *

             166          KK    NP-1
             167          BA  0.0027
             168          PB    3.40
             169          LS       0    89.0
             170          UD   0.059
                          *

             171          KK    STG2
             172          KM   FLEET WING AVE
             173          BA  0.0045
             174          PB    3.40
             175          LS       0    98.0
             176          UD   0.050
                          *
1                                        HEC-1 INPUT                                        PAGE  6

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

             177          KK   CSTG2
             178          KM   COMBINE N-O-P, NP-1 AND STG2
             179          HC       3
                          *

             180          KK    DES3
             181          BA  0.0031
             182          PB    3.38
             183          LS       0    98.0
             184          UD   0.050
                          *

             185          KK     CP3
             186          KM   COMBINES CSTG2 & DES3
             187          HC       2
                          *

             188          KK    RCP3
             189          KM   ROUTE CP3 TO CSTG3
             190          RD     513   0.080   0.013       0    CIRC     3.0
                          *

             191          KK    STG3
             192          BA  0.0011
             193          PB    3.38
             194          LS       0    98.0
             195          UD   0.050
                          *

             196          KK   CSTG3
             197          KM   COMBINES CP3 AND STG
             198          HC       2
                          *

             199          KK       Q
             200          BA  0.0072
             201          PB    3.38
             202          LS       0    92.2
             203          UD   0.069
                          *

             204          KK       R
             205          BA  0.0078
             206          PB    3.37
             207          LS       0    93.2
             208          UD   0.065
                          *

             209          KK     CQR
             210          KM   COMBINE R AND Q
             211          HC       2
                          *
1                                        HEC-1 INPUT                                        PAGE  7
```

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

 212          KK   CARR2
 213          BA  0.0056
 214          PB    3.37
 215          LS       0    98.0
 216          UD   0.064
              *

 217          KK  CCARR2
 218          KM   COMBINE CQR AND CARR2
 219          HC       2
              *

 220          KK RCCARR2
 221          KM   ROUTE CCARR2 TO CP4
 222          RD     414   0.033   0.013       0    CIRC     2.5
              *

 223          KK     CP4
 224          KM   COMBINE CP3 AND CCARR2
 225          HC       2
              *

 226          KK    RCP4
 227          KM   ROUTE CP4 TO CP5
 228          RD     582   0.010   0.013       0    CIRC     3.5
              *

 229          KK     CP5
 230          KM   COMBINE CARR1, I, CP2 AND CP4
 231          HC       4
              *

 232          KK      II
 233          BA  0.0250
 234          PB    3.37
 235          LS       0    93.2
 236          UD   0.072
              *

 237          KK       X
 238          BA  0.0273
 239          PB    3.37
 240          LS       0    90.0
 241          UD   0.080
              *

 242          KK       B
 243          BA  0.1262
 244          PB    3.36
 245          LS       0    93.5
 246          UD   0.077
              *
1                                    HEC-1 INPUT                                        PAGE  8

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

 247          KK    DC-1
 248          BA  0.0197
 249          PB    3.35
 250          LS       0      98
 251          UD   0.257
              *

 252          KK   COS-4
 253          BA  0.0009
 254          PB    3.35
 255          LS       0    88.0
 256          UD   0.077
              *

 257          KK DUMMY1A
 258          KM   REGIONAL FACILITY - BELTWAY CHANNEL NORTH
 259          KM   COMBINE II, X, B, DC1, AND COS-4
 260          HC       5
              *

 261          KK   COS-1
 262          BA  0.0045
 263          PB    3.41
 264          LS       0    79.8
 265          UD   0.118
              *

 266          KK  DUMMY1
 267          KM   REGIONAL FACILITY - BELTWAY CHANNEL NORTH
 268          KM   COMBINE CP1, CP5, DUMMY1A, AND COS-1
 269          HC       4
```

```
                *

 270            KK    27-F
 271            BA  0.0299
 272            PB    3.48
 273            LS       0    94.2
 274            UD   0.050
                *

 275            KK 27-COS2
 276            BA  0.0082
 277            PB    3.46
 278            LS       0    89.0
 279            UD   0.052
                *

 280            KK     LM2
 281            BA  0.0113
 282            PB    3.41
 283            LS       0    98.0
 284            UD   0.093
                *
1                                       HEC-1 INPUT                                             PAGE  9

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


 285            KK    CLM2
 286            KM   COMBINES OFFSITE V27 BASINS 27-F, V27-COS2, AND LM2
 287            HC       3
                *

 288            KK 27-COS3
 289            BA  0.0273
 290            PB    3.47
 291            LS       0    89.0
 292            UD   0.113
                *

 293            KK    COFF
 294            KM   COMBINES OFFSITE V27 BASINS
 295            KM   COMBINE CLM2 AND V27-COS3
 296            HC       2
                *

 297            KK   RCOFF
 298            KM   ROUTE COFF TO CSTJ1
 299            RD     744   0.058   0.013       0    CIRC     4.5
                *

 300            KK       E
 301            BA  0.0217
 302            PB    3.43
 303            LS       0    95.0
 304            UD   0.062
                *

 305            KK    STJ1
 306            KM   KETTLE RIDGE
 307            BA  0.0055
 308            PB    3.43
 309            LS       0    98.0
 310            UD   0.069
                *

 311            KK   CSTJ1
 312            KM   COMBINE COFF, E, AND STJ1
 313            HC       3
                *

 314            KK  RCSTJ1
 315            KM   ROUTE COFF TO CSTJ1
 316            RD     380   0.005   0.013       0    CIRC       5
                *

 317            KK    NP-2
 318            BA  0.0021
 319            PB    3.43
 320            LS       0    89.0
 321            UD   0.058
                *
1                                       HEC-1 INPUT                                             PAGE 10

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


 322            KK   CNP-2
 323            KM   COMBINE CSTJ1 AND CNP-2
 324            HC       2
                *
```

```
 325          KK  RCNP-2
 326          KM   ROUTE CNP-2 TO CF
 327          RD     390   0.005   0.013       0    DEEP       6
              *

 328          KK       F
 329          BA  0.0222
 330          PB    3.43
 331          LS       0    95.0
 332          UD   0.063
              *

 333          KK      CF
 334          KM   COMBINE CNP-1 AND CF
 335          HC       2
              *

 336          KK     RCF
 337          KM   ROUTE CF  TO CP6
 338          RD     320   0.005   0.013       0    DEEP       6
              *

 339          KK  25-HS1
 340          BA  0.0773
 341          PB    3.44
 342          LS       0    94.8
 343          UD   0.056
              *

 344          KK    STN1
 345          KM   SCURRY BEND
 346          BA  0.0056
 347          PB    3.44
 348          LS       0    98.0
 349          UD   0.125
              *

 350          KK   CSTN1
 351          KM   COMBINE 25-HS1 AND STN1
 352          HC       2
              *

 353          KK  RCSTN1
 354          KM   ROUTE CSTN1 TO CSTG1
 355          RD    1010   0.090   0.013       0    CIRC     4.5
              *
1                                          HEC-1 INPUT                                                PAGE 11

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


 356          KK    STG1
 357          BA  0.0029
 358          PB    3.42
 359          LS       0    98.0
 360          UD   0.050
              *

 361          KK   CSTG1
 362          KM   COMBINE CSTN1 AND STG1
 363          HC       2
              *

 364          KK     CP6
 365          KM   COMBINE CF AND CSTG1
 366          HC       2
              *

 367          KK    RCP6
 368          KM   ROUTE CP6 TO CSTJ2
 369          RD     530   0.005   0.013       0    DEEP       6       0
              *

 370          KK     L-M
 371          BA  0.0330
 372          PB    3.42
 373          LS       0    94.4
 374          UD   0.084
              *

 375          KK    STJ2
 376          BA  0.0048
 377          PB    3.42
 378          LS       0    98.0
 379          UD   0.058
              *

 380          KK   CSTJ2
 381          KM   COMBINE CP6, L-M AND STJ2
 382          HC       3
              *
```

```
          383          KK  RCSTJ2
          384          KM   ROUTE CSTJ2 TO CSTF
          385          RD    1000   0.069   0.015       0    DEEP       6       0
                       *

          386          KK     STF
          387          BA  0.0029
          388          PB    3.40
          389          LS       0    98.0
          390          UD   0.050
                       *
1                                        HEC-1 INPUT                                        PAGE 12

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


          391          KK    CSTF
          392          KM   COMBINE CSTJ2 AND CSTF
          393          HC       2
                       *

          394          KK       U
          395          BA  0.0055
          396          PB    3.40
          397          LS       0    86.3
          398          UD   0.069
                       *

          399          KK    DES4
          400          BA  0.0028
          401          PB    3.40
          402          LS       0    98.0
          403          UD   0.050
                       *

          404          KK   CDES4
          405          KM   COMBINE U AND DES4
          406          HC       2
                       *

          407          KK       S
          408          BA  0.0047
          409          PB    3.40
          410          LS       0    87.9
          411          UD   0.088
                       *

          412          KK      CS
          413          KM   CDES4 AND S
          414          HC       2
                       *

          415          KK     CP7
          416          KM   COMBINE CSTF AND CS
          417          HC       2
                       *

          418          KK    RCP7
          419          KM   ROUTE CP7 TO CSTF2
          420          RD     710   0.066   0.015       0    DEEP       6       0
                       *

          421          KK    STF2
          422          BA  0.0019
          423          PB    3.37
          424          LS       0    98.0
          425          UD   0.050
                       *
1                                        HEC-1 INPUT                                        PAGE 13

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


          426          KK   CSTF2
          427          KM   COMBINE CP7 AND STF2
          428          HC       2
                       *

          429          KK  RCSTF2
          430          KM   ROUTE CSTF2 TO CCARR3
          431          RD     420   0.005   0.015       0    DEEP       8       0
                       *

          432          KK       V
          433          BA  0.0078
          434          PB    3.37
          435          LS       0    90.0
          436          UD   0.075
                       *
```

```
 437          KK       W
 438          BA  0.0083
 439          PB    3.40
 440          LS       0    90.0
 441          UD   0.074
              *

 442          KK     CVW
 443          KM   COMBINE W AND V
 444          HC       2
              *

 445          KK   CARR3
 446          BA  0.0033
 447          PB    3.37
 448          LS       0    98.0
 449          UD   0.101
              *

 450          KK  RCARR3
 451          KM   ROUTE CCARR3 TO CP8
 452          RD     360   0.005   0.015       0    DEEP       8       0
              *

 453          KK  CCARR3
 454          KM   COMBINE STF2, CVW AND CARR3
 455          HC       3
              *

 456          KK    STE3
 457          BA  0.0021
 458          PB    3.40
 459          LS       0    98.0
 460          UD   0.050
              *
```



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


 461          KK     CP8
 462          KM   COMBINE STE3 AND CCARR3
 463          HC       2
              *

 464          KK    RCP8
 465          KM   ROUTE CP8 TO CEE
 466          RD     240   0.005   0.015       0    DEEP       8       0
              *

 467          KK      EE
 468          BA  0.0106
 469          PB    3.39
 470          LS       0    90.2
 471          UD   0.068
              *

 472          KK     CEE
 473          KM   COMBINES CP8 AND EE
 474          HC       2
              *

 475          KK    RCP8
 476          KM   ROUTE CEE TO CP9
 477          RD     220   0.005   0.015       0    DEEP       8       0
              *

 478          KK    NP-3
 479          BA  0.0011
 480          PB    3.39
 481          LS       0    80.5
 482          UD   0.080
              *

 483          KK   STEE3
 484          BA  0.0019
 485          PB    3.39
 486          LS       0    98.0
 487          UD   0.050
              *

 488          KK  CSTEE3
 489          KM   COMBINES NP-3 AND CSTEE3
 490          HC       2
              *

 491          KK     CP9
 492          KM   COMBINES CSTEE3 AND CEE
 493          HC       2
              *
```

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

 494          KK    RCP9
 495          KM   ROUTE CP9 TO DUMMY2
 496          RD     281   0.005   0.015       0    DEEP       8       0
              *

 497          KK      HH
 498          BA  0.0076
 499          PB    3.39
 500          LS       0    94.2
 501          UD   0.058
              *

 502          KK   CARR4
 503          BA  0.0036
 504          PB    3.37
 505          LS       0    98.0
 506          UD   0.059
              *

 507          KK  DUMMY2
 508          KM   REGIONAL FACILITY - BELTWAY CHANNEL SOUTH
 509          HC       3
              *

 510          KK 25-HS1B
 511          BA  0.0182
 512          PB    3.44
 513          LS       0    92.2
 514          UD   0.050
              *

 515          KK    STN2
 516          BA  0.0068
 517          PB    3.44
 518          LS       0    98.0
 519          UD   0.065
              *

 520          KK   CSTN2
 521          KM   COMBINE 25-HS1B AND STN2
 522          HC       2
              *

 523          KK  RCSTN2
 524          KM   ROUTE CSTN2 TO CSTE1
 525          RD    1000   0.067   0.015       0    CIRC       3
              *

 526          KK     Y-Z
 527          BA  0.0176
 528          PB    3.42
 529          LS       0    92.2
 530          UD   0.075
              *
1                                      HEC-1 INPUT                                          PAGE 16

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

 531          KK    STE1
 532          BA  0.0027
 533          PB    3.42
 534          LS       0    98.0
 535          UD   0.050
              *

 536          KK   CSTE1
 537          KM   COMBINE CSTN2, Y-Z AND STE1
 538          HC       3
              *

 539          KK  RCSTE1
 540          KM   ROUTE CSTE1 TO CSTJ3
 541          RD     980   0.005   0.015       0    DEEP       5       0
              *

 542          KK   COS-3
 543          BA  0.0027
 544          PB    3.42
 545          LS       0    83.2
 546          UD   0.105
              *

 547          KK    STJ3
 548          BA  0.0050
 549          PB    3.42
 550          LS       0    98.0
```

```
 551          UD   0.059
              *

 552          KK   CSTJ3
 553          KM   COMBINE CSTE1, COS-3 AND STJ3
 554          HC       3
              *

 555          KK      AA
 556          BA  0.0158
 557          PB    3.44
 558          LS       0    88.4
 559          UD   0.088
              *

 560          KK  DUMMY3
 561          KM   COMBINE CSTJ3 AND AA
 562          HC       2
              *

 563          KK    STE2
 564          BA  0.0028
 565          PB    3.40
 566          LS       0    98.0
 567          UD   0.050
              *
1                                          HEC-1 INPUT                                          PAGE 17

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


 568          KK      BB
 569          BA  0.0098
 570          PB    3.42
 571          LS       0    91.1
 572          UD   0.074
              *

 573          KK     CBB
 574          HC       2
              *

 575          KK       T
 576          BA  0.0063
 577          PB    3.42
 578          LS       0    86.3
 579          UD   0.069
              *

 580          KK      CT
 581          HC       2
              *

 582          KK      CC
 583          BA  0.0083
 584          PB    3.42
 585          LS       0    90.7
 586          UD   0.079
              *

 587          KK     CCC
 588          HC       2
              *

 589          KK    RCCC
 590          KM   ROUTE CCC TO CDD
 591          RD     570   0.005   0.015       0    CIRC       3
              *

 592          KK      DD
 593          BA  0.0074
 594          PB    3.40
 595          LS       0    90.5
 596          UD   0.075
              *

 597          KK     CDD
 598          HC       2
              *
1                                          HEC-1 INPUT                                          PAGE 18

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


 599          KK    RCDD
 600          KM   ROUTE CCDD TO CDES5
 601          RD     390   0.005   0.015       0    CIRC     3.5
              *

 602          KK    DES5
 603          BA  0.0025
```

```
            604          PB    3.40
            605          LS       0    98.0
            606          UD   0.053
                         *

            607          KK   CDES5
            608          HC       2
                         *

            609          KK  RCDES5
            610          KM   ROUTE CDES5 TO CGG
            611          RD     280   0.005   0.015       0    CIRC     3.5
                         *

            612          KK   STEE2
            613          BA  0.0028
            614          PB    3.41
            615          LS       0    98.0
            616          UD   0.050
                         *

            617          KK  CSTEE2
            618          HC       2
                         *

            619          KK      GG
            620          BA  0.0078
            621          PB    3.41
            622          LS       0    94.2
            623          UD   0.055
                         *

            624          KK     CGG
            625          HC       2
                         *

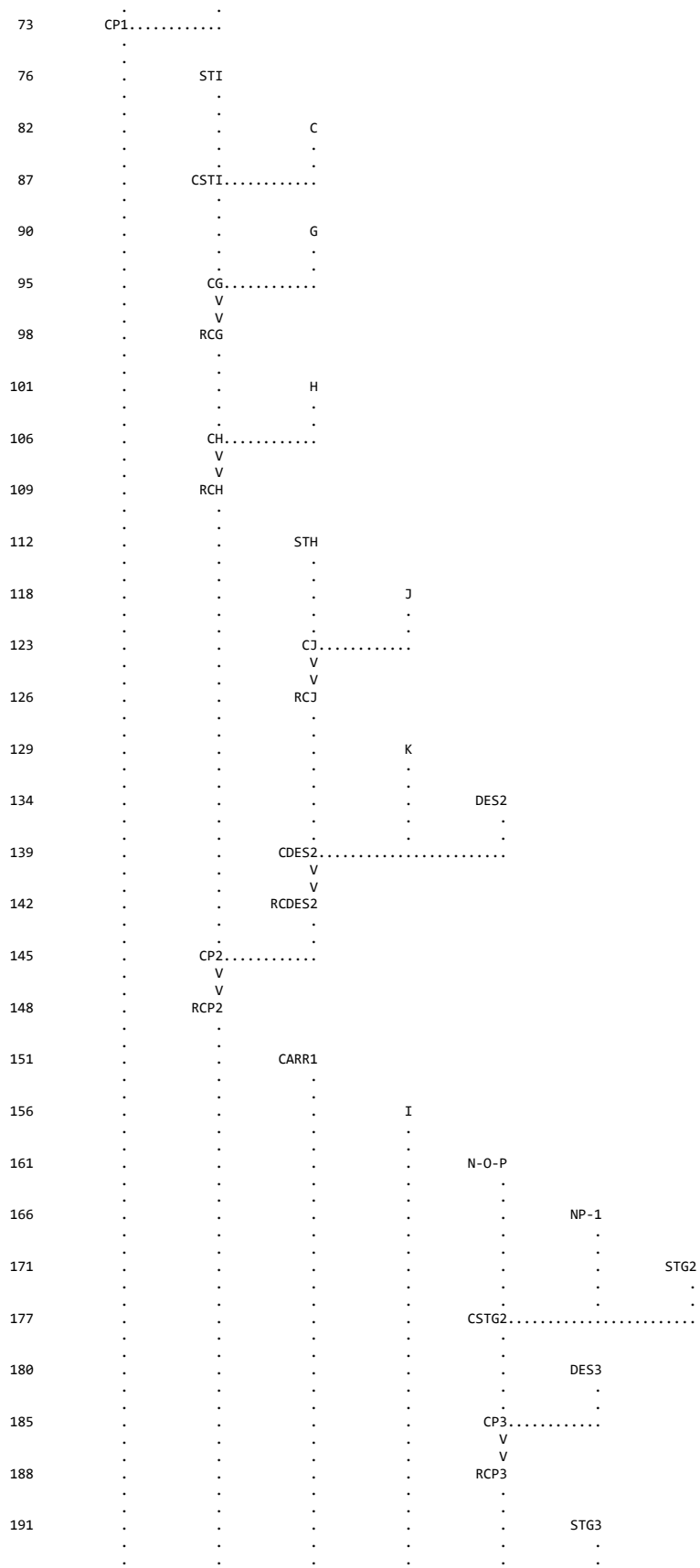
            626          KK      FF
            627          BA  0.0055
            628          PB    3.41
            629          LS       0    94.2
            630          UD   0.050
                         *
1                                              HEC-1 INPUT                                          PAGE 19

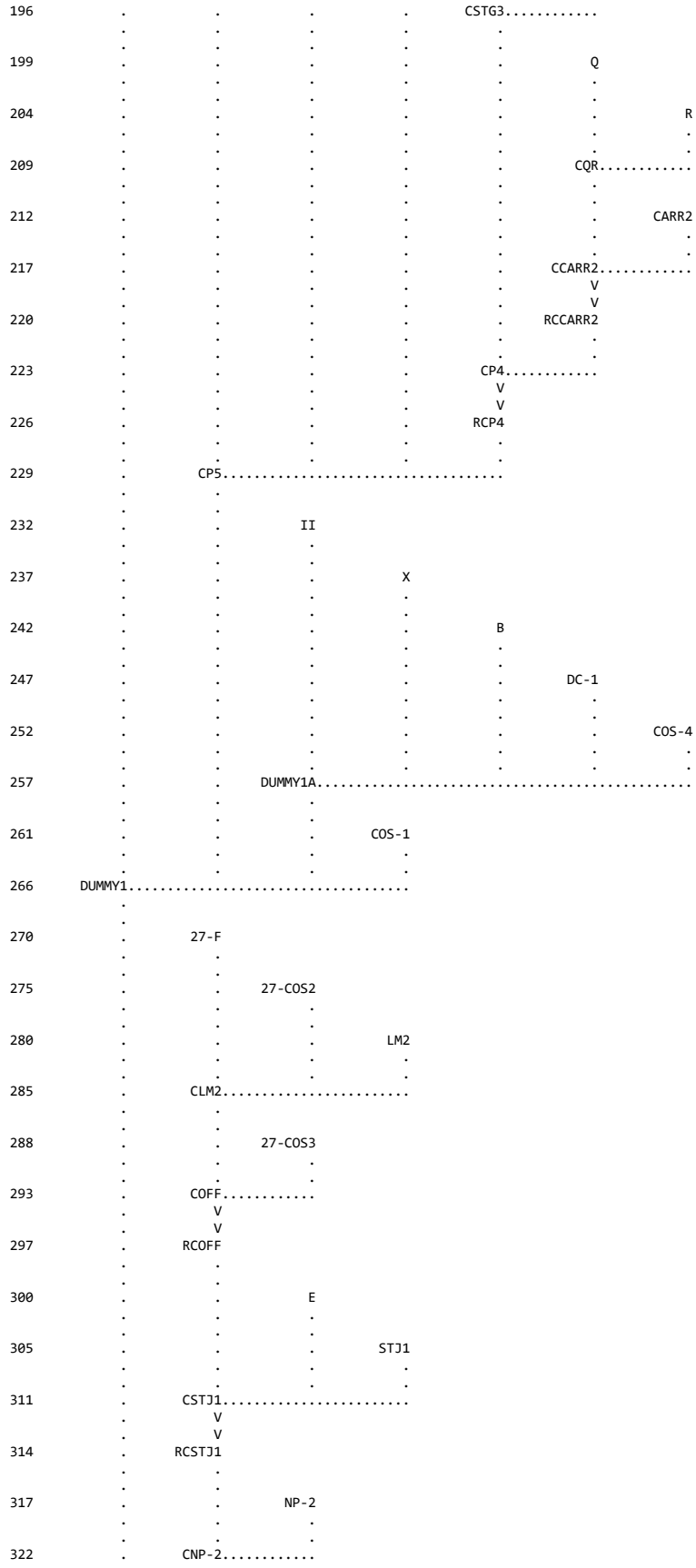
          LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

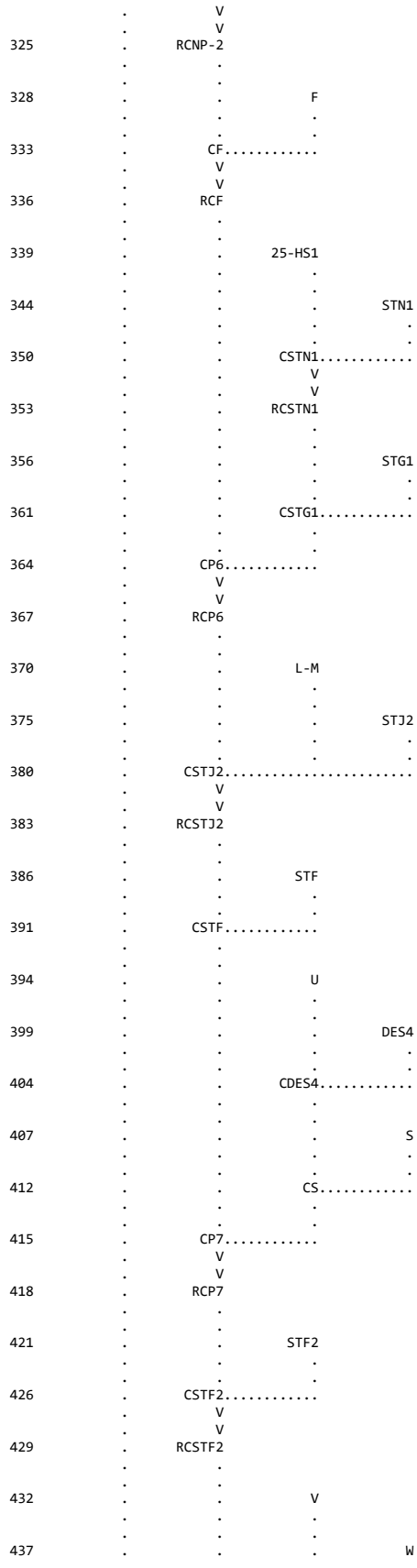

            631          KK  DUMMY4
            632          KM   COMBINE DUMMY3, FF, AND CGG
            633          HC       3
                         *
            634          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

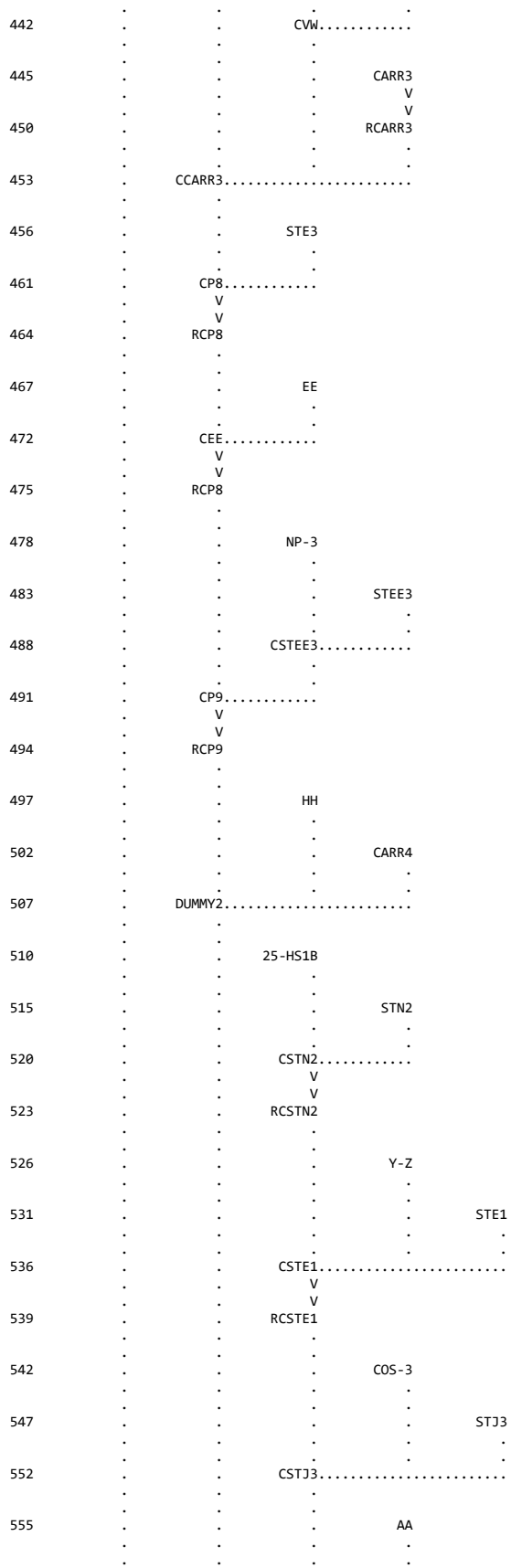
   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

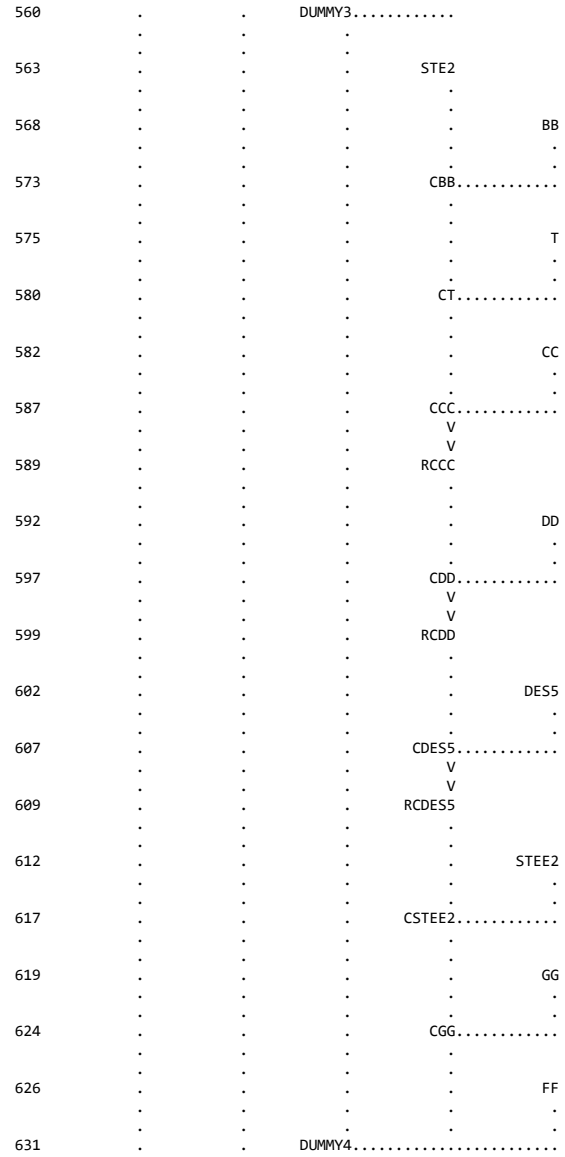
    22          LM
                 .
                 .
    35           .           D
                 .           .
                 .           .
    40           .           .       DES1
                 .           .          .
                 .           .          .
    45           .      CDES1............
                 .           V
                 .           V
    48           .     RCDES1
                 .           .
                 .           .
    51           .           .      COS-2
                 .           .          .
                 .           .          .
    56           .     CCOS-2............
                 .           V
                 .           V
    59           .    RCCOS-2
                 .           .
                 .           .
    62           .           .          A
                 .           .          .
                 .           .          .
    67           .          CA............
                 .           V
                 .           V
    70           .         RCA
                 .           .
```


73
CP1
76
STI
82
C
87
CSTI
90
G
95
CG
98
RCG
101
H
106
CH
109
RCH
112
STH
118
J
123
CJ
126
RCJ
129
K
134
DES2
139
CDES2
142
RCDES2
145
CP2
148
RCP2
151
CARR1
156
I
161
N-O-P
166
NP-1
171
STG2
177
CSTG2
180
DES3
185
CP3
188
RCP3
191
STG3


CSTG3
Q
R
CQR
CARR2
CCARR2
V
V
RCCARR2
CP4
V
V
RCP4
CP5
II
X
B
DC-1
COS-4
DUMMY1A
COS-1
DUMMY1
27-F
27-COS2
LM2
CLM2
27-COS3
COFF
V
V
RCOFF
E
STJ1
CSTJ1
V
V
RCSTJ1
NP-2
CNP-2


V
V
325 RCNP-2
328 F
333 CF
V
V
336 RCF
339 25-HS1
344 STN1
350 CSTN1
V
V
353 RCSTN1
356 STG1
361 CSTG1
364 CP6
V
V
367 RCP6
370 L-M
375 STJ2
380 CSTJ2
V
V
383 RCSTJ2
386 STF
391 CSTF
394 U
399 DES4
404 CDES4
407 S
412 CS
415 CP7
V
V
418 RCP7
421 STF2
426 CSTF2
V
V
429 RCSTF2
432 V
437 W


CVW
CARR3
RCARR3
CCARR3
STE3
CP8
RCP8
EE
CEE
RCP8
NP-3
STEE3
CSTEE3
CP9
RCP9
HH
CARR4
DUMMY2
25-HS1B
STN2
CSTN2
RCSTN2
Y-Z
STE1
CSTE1
RCSTE1
COS-3
STJ3
CSTJ3
AA



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *              JUN   1998              *
 *           VERSION 4.1                *
 *                                      *
 *  RUN DATE   23OCT19  TIME  13:10:22  *
 *                                      *
 ****************************************
```

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

ULTIMATE CONDITION HYDROLOGIC MODEL
INPUT FILE DATE = OCTOBER 2019
DESIGN STORM = 100-YEAR 6-HR STORM
STORM DISTRIBUTION = SDN #3
MODELED BY VTN (JYA)

```
*******************************************************
* UPDATE #2 - SUMMERLIN WEST VILLAGE 22                *
*******************************************************
```

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

100-YEAR, 6-HOUR STORM, SDN3

```
   19 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          100  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      1    0  ENDING DATE
                      NDTIME         0815  ENDING TIME
                       ICENT           19  CENTURY MARK

                    COMPUTATION INTERVAL     .08 HOURS
                         TOTAL TIME BASE    8.25 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
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
                                                                     1.00

 HYDROGRAPH AT
+                     LM       .02     1   FLOW                    36.
                                            TIME                   3.50

 HYDROGRAPH AT
+                      D       .02     1   FLOW                    50.
                                            TIME                   3.50

 HYDROGRAPH AT
+                   DES1       .01     1   FLOW                    20.
                                            TIME                   3.50

  2 COMBINED AT
+                  CDES1       .03     1   FLOW                    70.
                                            TIME                   3.50

 ROUTED TO
+                 RCDES1       .03     1   FLOW                    69.
                                            TIME                   3.50

 HYDROGRAPH AT
+                  COS-2       .01     1   FLOW                    22.
                                            TIME                   3.58

  2 COMBINED AT
+                 CCOS-2       .04     1   FLOW                    89.
                                            TIME                   3.50

 ROUTED TO
+                RCCOS-2       .04     1   FLOW                    87.
                                            TIME                   3.50

 HYDROGRAPH AT
+                      A       .03     1   FLOW                    68.
                                            TIME                   3.50

  2 COMBINED AT
+                     CA       .06     1   FLOW                   156.
                                            TIME                   3.50

 ROUTED TO
+                    RCA       .06     1   FLOW                   155.
                                            TIME                   3.50
```

```
  2 COMBINED AT
+                    CP1       .08     1   FLOW         191.
                                           TIME        3.50

 HYDROGRAPH AT
+                    STI       .00     1   FLOW          11.
                                           TIME        3.50

 HYDROGRAPH AT
+                      C       .02     1   FLOW          51.
                                           TIME        3.50

  2 COMBINED AT
+                   CSTI       .02     1   FLOW          62.
                                           TIME        3.50

 HYDROGRAPH AT
+                      G       .01     1   FLOW          30.
                                           TIME        3.50

  2 COMBINED AT
+                     CG       .03     1   FLOW          92.
                                           TIME        3.50

 ROUTED TO
+                    RCG       .03     1   FLOW          91.
                                           TIME        3.50

 HYDROGRAPH AT
+                      H       .01     1   FLOW          33.
                                           TIME        3.50

  2 COMBINED AT
+                     CH       .05     1   FLOW         124.
                                           TIME        3.50

 ROUTED TO
+                    RCH       .05     1   FLOW         123.
                                           TIME        3.50

 HYDROGRAPH AT
+                    STH       .00     1   FLOW          10.
                                           TIME        3.50

 HYDROGRAPH AT
+                      J       .01     1   FLOW          24.
                                           TIME        3.50

  2 COMBINED AT
+                     CJ       .01     1   FLOW          34.
                                           TIME        3.50

 ROUTED TO
+                    RCJ       .01     1   FLOW          33.
                                           TIME        3.50

 HYDROGRAPH AT
+                      K       .01     1   FLOW          22.
                                           TIME        3.50

 HYDROGRAPH AT
+                   DES2       .00     1   FLOW          13.
                                           TIME        3.50

  3 COMBINED AT
+                  CDES2       .03     1   FLOW          68.
                                           TIME        3.50

 ROUTED TO
+                 RCDES2       .03     1   FLOW          66.
                                           TIME        3.50

  2 COMBINED AT
+                    CP2       .07     1   FLOW         189.
                                           TIME        3.50

 ROUTED TO
+                   RCP2       .07     1   FLOW         184.
                                           TIME        3.50

 HYDROGRAPH AT
+                  CARR1       .01     1   FLOW          29.
                                           TIME        3.50

 HYDROGRAPH AT
+                      I       .02     1   FLOW          38.
                                           TIME        3.50

 HYDROGRAPH AT
+                  N-O-P       .02     1   FLOW          49.
                                           TIME        3.50
```

```
 HYDROGRAPH AT
+                   NP-1       .00     1   FLOW          6.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STG2       .00     1   FLOW         13.
                                           TIME         3.50

  3 COMBINED AT
+                  CSTG2       .03     1   FLOW         68.
                                           TIME         3.50

 HYDROGRAPH AT
+                   DES3       .00     1   FLOW          9.
                                           TIME         3.50

  2 COMBINED AT
+                    CP3       .03     1   FLOW         77.
                                           TIME         3.50

 ROUTED TO
+                   RCP3       .03     1   FLOW         76.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STG3       .00     1   FLOW          3.
                                           TIME         3.50

  2 COMBINED AT
+                  CSTG3       .03     1   FLOW         79.
                                           TIME         3.50

 HYDROGRAPH AT
+                      Q       .01     1   FLOW         17.
                                           TIME         3.50

 HYDROGRAPH AT
+                      R       .01     1   FLOW         20.
                                           TIME         3.50

  2 COMBINED AT
+                    CQR       .01     1   FLOW         37.
                                           TIME         3.50

 HYDROGRAPH AT
+                  CARR2       .01     1   FLOW         15.
                                           TIME         3.50

  2 COMBINED AT
+                 CCARR2       .02     1   FLOW         52.
                                           TIME         3.50

 ROUTED TO
+                RCCARR2       .02     1   FLOW         51.
                                           TIME         3.50

  2 COMBINED AT
+                    CP4       .05     1   FLOW        131.
                                           TIME         3.50

 ROUTED TO
+                   RCP4       .05     1   FLOW        127.
                                           TIME         3.50

  4 COMBINED AT
+                    CP5       .15     1   FLOW        379.
                                           TIME         3.50

 HYDROGRAPH AT
+                     II       .03     1   FLOW         61.
                                           TIME         3.50

 HYDROGRAPH AT
+                      X       .03     1   FLOW         60.
                                           TIME         3.50

 HYDROGRAPH AT
+                      B       .13     1   FLOW        304.
                                           TIME         3.50

 HYDROGRAPH AT
+                   DC-1       .02     1   FLOW         36.
                                           TIME         3.67

 HYDROGRAPH AT
+                  COS-4       .00     1   FLOW          2.
                                           TIME         3.50

  5 COMBINED AT
+                DUMMY1A       .20     1   FLOW        454.
```

```
                                        TIME         3.50

 HYDROGRAPH AT
+                  COS-1       .00     1   FLOW          6.
                                        TIME         3.58

  4 COMBINED AT
+                 DUMMY1       .44     1   FLOW       1030.
                                        TIME         3.50

 HYDROGRAPH AT
+                    27-F       .03     1   FLOW         83.
                                        TIME         3.50

 HYDROGRAPH AT
+                 27-COS2       .01     1   FLOW         20.
                                        TIME         3.50

 HYDROGRAPH AT
+                    LM2       .01     1   FLOW         28.
                                        TIME         3.50

  3 COMBINED AT
+                    CLM2      .05     1   FLOW        132.
                                        TIME         3.50

 HYDROGRAPH AT
+                 27-COS3       .03     1   FLOW         53.
                                        TIME         3.50

  2 COMBINED AT
+                    COFF      .08     1   FLOW        185.
                                        TIME         3.50

 ROUTED TO
+                   RCOFF       .08     1   FLOW        182.
                                        TIME         3.50

 HYDROGRAPH AT
+                       E       .02     1   FLOW         58.
                                        TIME         3.50

 HYDROGRAPH AT
+                    STJ1       .01     1   FLOW         15.
                                        TIME         3.50

  3 COMBINED AT
+                   CSTJ1       .10     1   FLOW        255.
                                        TIME         3.50

 ROUTED TO
+                  RCSTJ1       .10     1   FLOW        250.
                                        TIME         3.50

 HYDROGRAPH AT
+                    NP-2       .00     1   FLOW          5.
                                        TIME         3.50

  2 COMBINED AT
+                   CNP-2       .11     1   FLOW        255.
                                        TIME         3.50

 ROUTED TO
+                  RCNP-2       .11     1   FLOW        250.
                                        TIME         3.50

 HYDROGRAPH AT
+                       F       .02     1   FLOW         59.
                                        TIME         3.50

  2 COMBINED AT
+                      CF       .13     1   FLOW        309.
                                        TIME         3.50

 ROUTED TO
+                     RCF       .13     1   FLOW        303.
                                        TIME         3.50

 HYDROGRAPH AT
+                  25-HS1       .08     1   FLOW        211.
                                        TIME         3.50

 HYDROGRAPH AT
+                    STN1       .01     1   FLOW         13.
                                        TIME         3.58

  2 COMBINED AT
+                   CSTN1       .08     1   FLOW        224.
                                        TIME         3.50

 ROUTED TO
```

```
+                RCSTN1       .08     1   FLOW         220.
                                             TIME         3.50

 HYDROGRAPH AT
+                 STG1       .00     1   FLOW           8.
                                             TIME         3.50

  2 COMBINED AT
+                 CSTG1       .09     1   FLOW         229.
                                             TIME         3.50

  2 COMBINED AT
+                  CP6       .21     1   FLOW         532.
                                             TIME         3.50

 ROUTED TO
+                 RCP6       .21     1   FLOW         518.
                                             TIME         3.50

 HYDROGRAPH AT
+                  L-M       .03     1   FLOW          81.
                                             TIME         3.50

 HYDROGRAPH AT
+                 STJ2       .00     1   FLOW          13.
                                             TIME         3.50

  3 COMBINED AT
+                 CSTJ2       .25     1   FLOW         612.
                                             TIME         3.50

 ROUTED TO
+                RCSTJ2       .25     1   FLOW         602.
                                             TIME         3.50

 HYDROGRAPH AT
+                  STF       .00     1   FLOW           8.
                                             TIME         3.50

  2 COMBINED AT
+                  CSTF       .25     1   FLOW         610.
                                             TIME         3.50

 HYDROGRAPH AT
+                    U       .01     1   FLOW          11.
                                             TIME         3.50

 HYDROGRAPH AT
+                  DES4       .00     1   FLOW           8.
                                             TIME         3.50

  2 COMBINED AT
+                 CDES4       .01     1   FLOW          19.
                                             TIME         3.50

 HYDROGRAPH AT
+                    S       .00     1   FLOW          10.
                                             TIME         3.50

  2 COMBINED AT
+                   CS       .01     1   FLOW          29.
                                             TIME         3.50

  2 COMBINED AT
+                  CP7       .27     1   FLOW         639.
                                             TIME         3.50

 ROUTED TO
+                 RCP7       .27     1   FLOW         632.
                                             TIME         3.50

 HYDROGRAPH AT
+                 STF2       .00     1   FLOW           5.
                                             TIME         3.50

  2 COMBINED AT
+                 CSTF2       .27     1   FLOW         637.
                                             TIME         3.50

 ROUTED TO
+                RCSTF2       .27     1   FLOW         623.
                                             TIME         3.50

 HYDROGRAPH AT
+                    V       .01     1   FLOW          17.
                                             TIME         3.50

 HYDROGRAPH AT
+                    W       .01     1   FLOW          19.
                                             TIME         3.50
```

```
  2 COMBINED AT
+                    CVW       .02     1   FLOW          36.
                                           TIME         3.50

 HYDROGRAPH AT
+                   CARR3       .00     1   FLOW           8.
                                           TIME         3.50

 ROUTED TO
+                  RCARR3       .00     1   FLOW           8.
                                           TIME         3.50

  3 COMBINED AT
+                  CCARR3       .29     1   FLOW         667.
                                           TIME         3.50

 HYDROGRAPH AT
+                    STE3       .00     1   FLOW           6.
                                           TIME         3.50

  2 COMBINED AT
+                     CP8       .29     1   FLOW         673.
                                           TIME         3.50

 ROUTED TO
+                    RCP8       .29     1   FLOW         664.
                                           TIME         3.50

 HYDROGRAPH AT
+                      EE       .01     1   FLOW          25.
                                           TIME         3.50

  2 COMBINED AT
+                     CEE       .30     1   FLOW         689.
                                           TIME         3.50

 ROUTED TO
+                    RCP8       .30     1   FLOW         680.
                                           TIME         3.50

 HYDROGRAPH AT
+                    NP-3       .00     1   FLOW           2.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STEE3       .00     1   FLOW           5.
                                           TIME         3.50

  2 COMBINED AT
+                  CSTEE3       .00     1   FLOW           7.
                                           TIME         3.50

  2 COMBINED AT
+                     CP9       .30     1   FLOW         688.
                                           TIME         3.50

 ROUTED TO
+                    RCP9       .30     1   FLOW         678.
                                           TIME         3.50

 HYDROGRAPH AT
+                      HH       .01     1   FLOW          20.
                                           TIME         3.50

 HYDROGRAPH AT
+                   CARR4       .00     1   FLOW          10.
                                           TIME         3.50

  3 COMBINED AT
+                  DUMMY2       .32     1   FLOW         708.
                                           TIME         3.50

 HYDROGRAPH AT
+                25-HS1B       .02     1   FLOW          48.
                                           TIME         3.50

 HYDROGRAPH AT
+                    STN2       .01     1   FLOW          19.
                                           TIME         3.50

  2 COMBINED AT
+                   CSTN2       .03     1   FLOW          67.
                                           TIME         3.50

 ROUTED TO
+                  RCSTN2       .03     1   FLOW          65.
                                           TIME         3.50

 HYDROGRAPH AT
+                     Y-Z       .02     1   FLOW          42.
                                           TIME         3.50
```

```
 HYDROGRAPH AT
+                   STE1       .00     1   FLOW          8.
                                           TIME         3.50

  3 COMBINED AT
+                  CSTE1       .05     1   FLOW        115.
                                           TIME         3.50

 ROUTED TO
+                 RCSTE1       .05     1   FLOW        107.
                                           TIME         3.50

 HYDROGRAPH AT
+                   COS-3      .00     1   FLOW          4.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STJ3       .00     1   FLOW         14.
                                           TIME         3.50

  3 COMBINED AT
+                  CSTJ3       .05     1   FLOW        126.
                                           TIME         3.50

 HYDROGRAPH AT
+                     AA       .02     1   FLOW         33.
                                           TIME         3.50

  2 COMBINED AT
+                 DUMMY3       .07     1   FLOW        159.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STE2       .00     1   FLOW          8.
                                           TIME         3.50

 HYDROGRAPH AT
+                     BB       .01     1   FLOW         23.
                                           TIME         3.50

  2 COMBINED AT
+                    CBB       .01     1   FLOW         31.
                                           TIME         3.50

 HYDROGRAPH AT
+                      T       .01     1   FLOW         13.
                                           TIME         3.50

  2 COMBINED AT
+                     CT       .02     1   FLOW         44.
                                           TIME         3.50

 HYDROGRAPH AT
+                     CC       .01     1   FLOW         19.
                                           TIME         3.50

  2 COMBINED AT
+                    CCC       .03     1   FLOW         63.
                                           TIME         3.50

 ROUTED TO
+                   RCCC       .03     1   FLOW         60.
                                           TIME         3.50

 HYDROGRAPH AT
+                     DD       .01     1   FLOW         17.
                                           TIME         3.50

  2 COMBINED AT
+                    CDD       .03     1   FLOW         77.
                                           TIME         3.50

 ROUTED TO
+                   RCDD       .03     1   FLOW         74.
                                           TIME         3.50

 HYDROGRAPH AT
+                   DES5       .00     1   FLOW          7.
                                           TIME         3.50

  2 COMBINED AT
+                  CDES5       .04     1   FLOW         81.
                                           TIME         3.50

 ROUTED TO
+                 RCDES5       .04     1   FLOW         80.
                                           TIME         3.50

 HYDROGRAPH AT
+                  STEE2       .00     1   FLOW          8.
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                                        TIME         3.50

  2 COMBINED AT
+                 CSTEE2       .04     1   FLOW          88.
                                        TIME         3.50

 HYDROGRAPH AT
+                    GG        .01     1   FLOW          21.
                                        TIME         3.50

  2 COMBINED AT
+                    CGG       .05     1   FLOW         109.
                                        TIME         3.50

 HYDROGRAPH AT
+                     FF       .01     1   FLOW          15.
                                        TIME         3.50

  3 COMBINED AT
+                 DUMMY4       .12     1   FLOW         282.
                                        TIME         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
            RCDES1  MANE          .22     69.31    210.22      2.92      5.00     69.07    210.00        2.92


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .4002E+01 EXCESS= .0000E+00 OUTFLOW= .4002E+01 BASIN STORAGE= .1969E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
             RCCOS-2  MANE          .47     87.71    210.20      2.72      5.00     87.19    210.00        2.72


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .5425E+01 EXCESS= .0000E+00 OUTFLOW= .5424E+01 BASIN STORAGE= .4464E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
               RCA  MANE          .19    155.37    210.19      2.77      5.00    154.65    210.00        2.78


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .9561E+01 EXCESS= .0000E+00 OUTFLOW= .9561E+01 BASIN STORAGE= .1942E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
               RCG  MANE          .29     91.58    210.20      2.89      5.00     91.06    210.00        2.89


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .5175E+01 EXCESS= .0000E+00 OUTFLOW= .5175E+01 BASIN STORAGE= .2873E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
               RCH  MANE          .12    123.23    210.04      2.88      5.00    123.08    210.00        2.88


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .6989E+01 EXCESS= .0000E+00 OUTFLOW= .6989E+01 BASIN STORAGE= .1204E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
               RCJ  MANE          .43     33.61    210.51      2.73      5.00     33.37    210.00        2.73


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1875E+01 EXCESS= .0000E+00 OUTFLOW= .1875E+01 BASIN STORAGE= .3567E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCDES2  MANE          .73     67.25    210.43      2.84      5.00     66.40    210.00        2.85


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .3910E+01 EXCESS= .0000E+00 OUTFLOW= .3910E+01 BASIN STORAGE= .7532E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
              RCP2  MANE          .73    186.67    210.84      2.87      5.00    184.26    210.00        2.87


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1091E+02 EXCESS= .0000E+00 OUTFLOW= .1091E+02 BASIN STORAGE= .8878E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
              RCP3  MANE          .29     76.78    210.29      2.55      5.00     76.14    210.00        2.55
```

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4490E+01 EXCESS= .0000E+00 OUTFLOW= .4490E+01 BASIN STORAGE= .2690E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCCARR2	MANE	.37	51.68	210.13	2.74	5.00	51.44	210.00	2.74	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3006E+01 EXCESS= .0000E+00 OUTFLOW= .3006E+01 BASIN STORAGE= .3196E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP4	MANE	.66	129.07	210.69	2.64	5.00	127.48	210.00	2.64	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7688E+01 EXCESS= .0000E+00 OUTFLOW= .7688E+01 BASIN STORAGE= .6725E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCOFF	MANE	.38	183.88	210.27	2.65	5.00	182.24	210.00	2.65	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1084E+02 EXCESS= .0000E+00 OUTFLOW= .1084E+02 BASIN STORAGE= .4273E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCSTJ1	MANE	.48	250.37	210.43	2.73	5.00	250.31	210.00	2.73	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1511E+02 EXCESS= .0000E+00 OUTFLOW= .1511E+02 BASIN STORAGE= .5607E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCNP-2	MANE	.52	250.86	210.48	2.72	5.00	250.12	210.00	2.72	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1538E+02 EXCESS= .0000E+00 OUTFLOW= .1538E+02 BASIN STORAGE= .1047E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCF	MANE	.41	304.65	210.23	2.75	5.00	303.48	210.00	2.75	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1879E+02 EXCESS= .0000E+00 OUTFLOW= .1878E+02 BASIN STORAGE= .8389E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCSTN1	MANE	.41	221.54	210.18	2.88	5.00	220.20	210.00	2.89	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1275E+02 EXCESS= .0000E+00 OUTFLOW= .1275E+02 BASIN STORAGE= .5014E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP6	MANE	.59	520.09	210.36	2.81	5.00	517.62	210.00	2.81	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3204E+02 EXCESS= .0000E+00 OUTFLOW= .3203E+02 BASIN STORAGE= .1553E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCSTJ2	MANE	.45	608.79	210.39	2.81	5.00	602.17	210.00	2.82	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3779E+02 EXCESS= .0000E+00 OUTFLOW= .3779E+02 BASIN STORAGE= .1206E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP7	MANE	.32	635.65	210.19	2.80	5.00	631.67	210.00	2.80	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3994E+02 EXCESS= .0000E+00 OUTFLOW= .3994E+02 BASIN STORAGE= .8070E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCSTF2	MANE	.50	626.08	210.22	2.80	5.00	622.83	210.00	2.80	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4028E+02 EXCESS= .0000E+00 OUTFLOW= .4027E+02 BASIN STORAGE= .1270E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCARR3	MANE	1.27	7.90	211.47	3.14	5.00	7.63	210.00	3.14	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5521E+00 EXCESS= .0000E+00 OUTFLOW= .5521E+00 BASIN STORAGE= .1050E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP8	MANE	.28	665.68	210.11	2.78	5.00	664.00	210.00	2.78	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4321E+02 EXCESS= .0000E+00 OUTFLOW= .4320E+02 BASIN STORAGE= .7574E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP8	MANE	.26	681.97	210.12	2.77	5.00	680.39	210.00	2.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4455E+02 EXCESS= .0000E+00 OUTFLOW= .4454E+02 BASIN STORAGE= .6454E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP9	MANE	.33	679.63	210.08	2.77	5.00	677.90	210.00	2.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4497E+02 EXCESS= .0000E+00 OUTFLOW= .4496E+02 BASIN STORAGE= .8376E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCSTN2	MANE	.70	65.57	210.88	2.76	5.00	65.03	210.00	2.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3685E+01 EXCESS= .0000E+00 OUTFLOW= .3685E+01 BASIN STORAGE= .6612E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCSTE1	MANE	1.78	110.49	211.63	2.72	5.00	107.44	210.00	2.72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6575E+01 EXCESS= .0000E+00 OUTFLOW= .6571E+01 BASIN STORAGE= .3348E-03 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .00

RCCC	MANE	1.13	61.16	210.84	2.44	5.00	59.99	210.00	2.44

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3534E+01 EXCESS= .0000E+00 OUTFLOW= .3533E+01 BASIN STORAGE= .1137E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCDD	MANE	.73	75.16	210.34	2.43	5.00	74.39	210.00	2.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4482E+01 EXCESS= .0000E+00 OUTFLOW= .4481E+01 BASIN STORAGE= .7532E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCDES5	MANE	.52	80.22	210.45	2.48	5.00	79.73	210.00	2.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4905E+01 EXCESS= .0000E+00 OUTFLOW= .4903E+01 BASIN STORAGE= .5246E-04 PERCENT ERROR= .0

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

A.2 Flight Range Avenue Drainage Study Reference Information



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SUMMERLIN®

Summerlin West Village 22

Flight Range Avenue (Street E): Scurry Bend Drive (Street N) to Kettle Ridge Drive (Street J)

Addendum #1

January 2021

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: February 1, 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:**
Summerlin West Village 22 - Flight Range Ave (Street E) **<Scurry Bend Dr. (St. N) to Kettle Ridge Dr. (St. J)>**				Atkins
Cross Streets:	Flight Range Avenue & Kettle Ridge Drive			Howard Hughes Company LLC
File Number:	F:\Depot\DSMemos\DS5385B.doc			Bart Anderson, P.E., DevCo
Parcel Number:	137-23-210-001			
Zoning Action:	N/A			
FEMA Flood Zone	YES	NO **X**		
Proposed Storm Drain	YES **X**	NO		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	11/10/2020	12/2/2020	Not Approved	$400.00	4063681: $400
2nd Submittal	1/19/2021	2/1/2021	See Comments Below	$400.00	4138066: $400
			TOTAL FEES (LDDRS):	**$800.00**	**----**

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.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. The project proposes to build temporary drainage facilities, ie, berms/swales along the south side of *Flight Range Avenue (Street E)* for interim flood protection. Prior to final plan approval the developer must complete a maintenance and liability agreement for the interim drainage improvements (berms or channels) and post a minimum maintenance bond of $50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for constructing the facility and an exhibit that adequately shows the location and limits of the drainage facility to *City of Las Vegas Flood Control* for approval. Once the drainage study is conditionally approved, the engineer should contact the *City's Land Development Section* (229-6371) to begin the agreement process.

   In order for the maintenance bond to be released in the future, a drainage update / letter will be required to justify that the offsite berms / channels are no longer necessary and can be removed.

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/R59E/23
AREA K-23

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Addendum #1: Flight Range Avenue (Street E): Scurry Bend (Street N) to Kettle Ridge (Street J) Date: January 2021

Location of Development: a) Descriptive (Cross Streets) North/South: Kindle Rise Way/Flight Edge Way

East/West: Desert Foothills Drive/Scurry Bend Drive

b) Section: 23 and 14 Township: 20S Range: 59E

c) APN : 137-23-210-001

Name of Owner: Howard Hughes Company, LLC

Telephone No.: (702) 791-4000 Fax No.: (702) 791-4450 E-Mail Address: april.chapman@howardhughes.com

Address: 10801 West Charleston Blvd, Ste 300, Las Vegas, NV 89135

Contact Person-Name: Molly Anderson, PE **Telephone No.:** (702) 551-0330

* **E-Mail Address:** molly.anderson@atkinsglobal.com **Fax No.:** (702) 263-7200

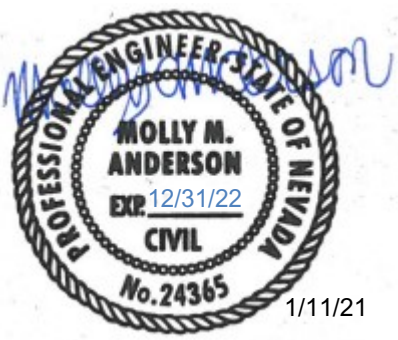
Firm: Atkins

Address: 2270 Corporate Circle, Ste 200, Henderson, NV 89074

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: +/- 446 acres Being Developed/Disturbed: 2.57 acres
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.): Public - Roadway Improvements
5. Approximate upstream land area which drains to the subject site: 0 acres
6. Has the site drainage been evaluated in the past? ✔ **YES** **NO** If yes, please identify documentation: Master Conceptual Drainage Study for Summerlin West Village 22 Update #2
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Existing CC-215 Western Beltway Channel
8. Briefly describe your proposed schedule for the subject project: ASAP



1/11/21

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.**

DS#5385

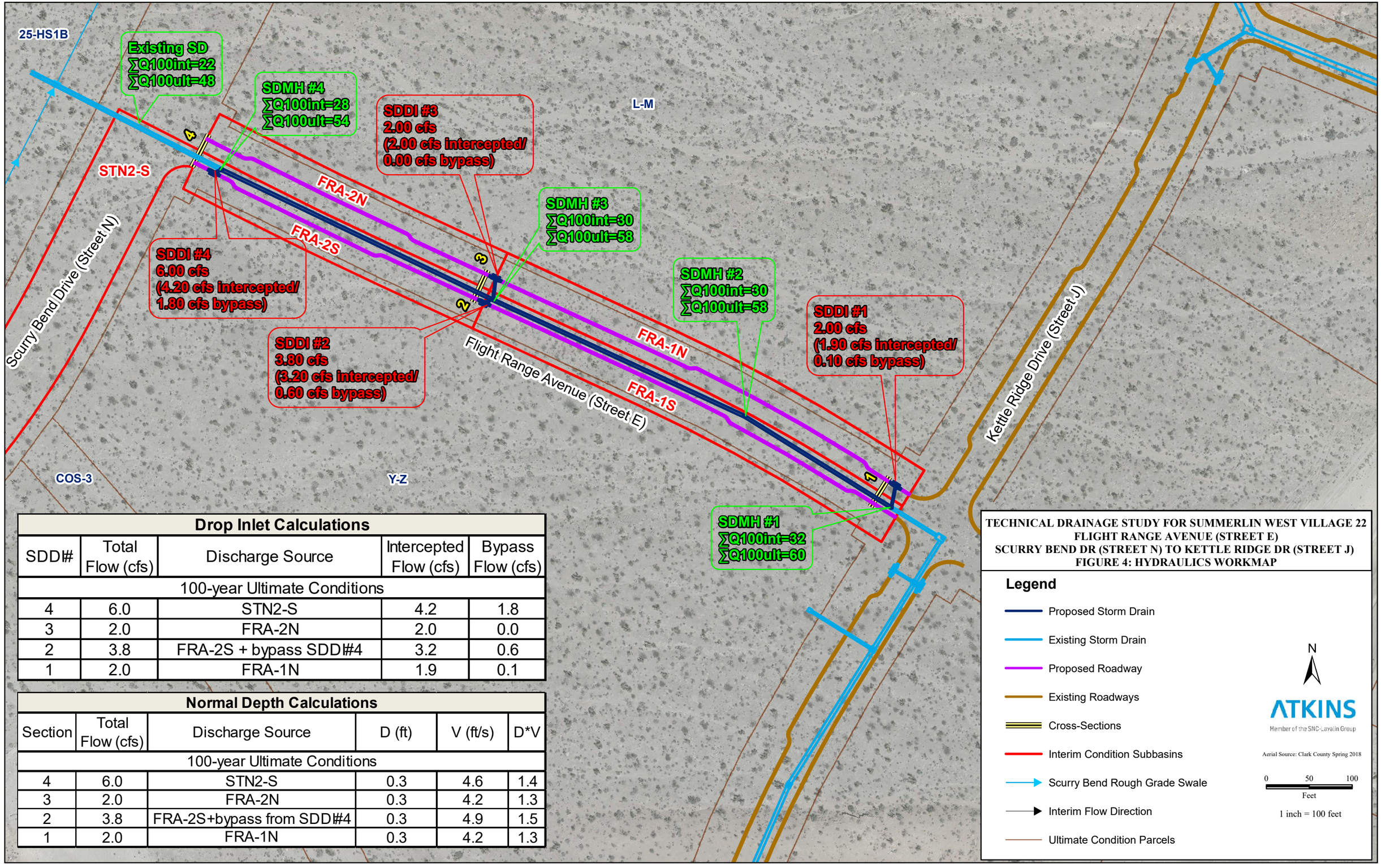
Local Entity File No.

Revision	Date

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008



Drop Inlet Calculations

SDD#	Total Flow (cfs)	Discharge Source	Intercepted Flow (cfs)	Bypass Flow (cfs)
100-year Ultimate Conditions				
4	6.0	STN2-S	4.2	1.8
3	2.0	FRA-2N	2.0	0.0
2	3.8	FRA-2S + bypass SDD#4	3.2	0.6
1	2.0	FRA-1N	1.9	0.1

Normal Depth Calculations

Section	Total Flow (cfs)	Discharge Source	D (ft)	V (ft/s)	D*V
100-year Ultimate Conditions					
4	6.0	STN2-S	0.3	4.6	1.4
3	2.0	FRA-2N	0.3	4.2	1.3
2	3.8	FRA-2S+bypass from SDD#4	0.3	4.9	1.5
1	2.0	FRA-1N	0.3	4.2	1.3

TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 22
FLIGHT RANGE AVENUE (STREET E)
SCURRY BEND DR (STREET N) TO KETTLE RIDGE DR (STREET J)
FIGURE 4: HYDRAULICS WORKMAP

Legend

- Proposed Storm Drain
- Existing Storm Drain
- Proposed Roadway
- Existing Roadways
- Cross-Sections
- Interim Condition Subbasins
- Scurry Bend Rough Grade Swale
- Interim Flow Direction
- Ultimate Condition Parcels

N

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Aerial Source: Clark County Spring 2018

0 50 100
Feet

1 inch = 100 feet

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLIGHT RANGE AVENUE (SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE)
T3 100-YEAR ULTIMATE CONDITION
SO    000.00 3447.52  36                          3458.20
REM***** CONNECTON TO KETTLE RIDGE DRIVE MAINLINE 36"
JX      2.50 3447.62  36 24   .013     2.0          3447.62         -69.0         .000
REM***** SDMH#1 TO DOWNSTREAM SDMH#2
R     198.96 3458.14  36      .013                                  .000    .000 0
R     203.96 3458.34  36      .013                                  .000    .000 0
REM***** UPSTREAM SDMH#2 TO DOWNSTREAM SDMH#3
R     523.59 3481.60  36      .013                                  .000    .000 0
JX    526.09 3481.70  36 24 24.013     2.0     2.0  3481.80 3481.80 -69.0-80.0    .000
REM***** JUNCTION WITH SDDI#2&3
R     528.59 3481.80  36      .013                                  .000    .000 0
REM***** UPSTREAM SDMH#3 TO SDMH#4
R     875.39 3507.05  36      .013                                  .000    .000 0
SH    875.39 3507.05  36                          3507.05
CD  24  4   1    .000   2.000     .000  .000  .000   .00
CD  36  4   1    .000   3.000     .000  .000  .000   .00
Q          54.000   .0
```

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WATER SURFACE PROFILE LISTING Date:11- 3-2020 Time: 9:29:36

SUMMERLIN WEST VILLAGE 22
FLIGHT RANGE AVENUE (SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE)
100-YEAR ULTIMATE CONDITION

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	
.000	3447.520	10.680	3458.200	60.00	8.49	1.12	3459.32	.00	2.50	.00	3.000	.000	.00	1 .0
JUNCT STR	.0400					.0078	.02	10.68	.00		.013	.00	.00	PIPE
2.500	3447.620	10.744	3458.364	58.00	8.21	1.05	3459.41	.00	2.47	.00	3.000	.000	.00	1 .0
124.405	.0535					.0076	.94	10.74	.00	1.27	.013	.00	.00	PIPE
126.905	3454.281	5.022	3459.303	58.00	8.21	1.05	3460.35	.00	2.47	.00	3.000	.000	.00	1 .0
HYDRAULIC JUMP														
126.905	3454.281	1.228	3455.510	58.00	21.29	7.04	3462.55	.00	2.47	2.95	3.000	.000	.00	1 .0
19.880	.0535					.0616	1.22	1.23	3.90	1.27	.013	.00	.00	PIPE
146.786	3455.346	1.224	3456.570	58.00	21.41	7.12	3463.68	.00	2.47	2.95	3.000	.000	.00	1 .0
52.174	.0535					.0664	3.46	1.22	3.94	1.27	.013	.00	.00	PIPE
198.960	3458.140	1.181	3459.321	58.00	22.45	7.83	3467.15	.00	2.47	2.93	3.000	.000	.00	1 .0
5.000	.0400					.0717	.36	1.18	4.21	1.38	.013	.00	.00	PIPE
203.960	3458.340	1.171	3459.511	58.00	22.69	7.99	3467.51	.00	2.47	2.93	3.000	.000	.00	1 .0
38.591	.0728					.0728	2.81	1.17	4.28	1.17	.013	.00	.00	PIPE
242.551	3461.148	1.171	3462.320	58.00	22.69	7.99	3470.31	.00	2.47	2.93	3.000	.000	.00	1 .0
152.184	.0728					.0712	10.84	1.17	4.28	1.17	.013	.00	.00	PIPE
394.735	3472.223	1.185	3473.408	58.00	22.34	7.75	3481.15	.00	2.47	2.93	3.000	.000	.00	1 .0
90.031	.0728					.0654	5.89	1.19	4.18	1.17	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date:11- 3-2020 Time: 9:29:36

SUMMERLIN WEST VILLAGE 22
FLIGHT RANGE AVENUE (SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE)
100-YEAR ULTIMATE CONDITION

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	
484.766	3478.775	1.228	3480.003	58.00	21.30	7.04	3487.05	.00	2.47	2.95	3.000	.000	.00	1 .0
38.824	.0728					.0574	2.23	1.23	3.91	1.17	.013	.00	.00	PIPE
523.590	3481.600	1.273	3482.873	58.00	20.30	6.40	3489.28	.00	2.47	2.97	3.000	.000	.00	1 .0
JUNCT STR	.0399					.0625	.16	1.27	3.65		.013	.00	.00	PIPE
526.090	3481.700	1.133	3482.833	54.00	22.09	7.58	3490.41	.00	2.39	2.91	3.000	.000	.00	1 .0
2.500	.0400					.0719	.18	1.13	4.25	1.33	.013	.00	.00	PIPE
528.590	3481.800	1.128	3482.928	54.00	22.22	7.67	3490.59	.00	2.39	2.91	3.000	.000	.00	1 .0
73.019	.0728					.0722	5.27	1.13	4.28	1.13	.013	.00	.00	PIPE
601.609	3487.116	1.130	3488.247	54.00	22.16	7.63	3495.87	.00	2.39	2.91	3.000	.000	.00	1 .0
123.632	.0728					.0675	8.35	1.13	4.27	1.13	.013	.00	.00	PIPE
725.241	3496.118	1.171	3497.289	54.00	21.13	6.93	3504.22	.00	2.39	2.93	3.000	.000	.00	1 .0
43.362	.0728					.0593	2.57	1.17	3.99	1.13	.013	.00	.00	PIPE
768.603	3499.275	1.214	3500.489	54.00	20.15	6.30	3506.79	.00	2.39	2.94	3.000	.000	.00	1 .0
25.420	.0728					.0520	1.32	1.21	3.72	1.13	.013	.00	.00	PIPE
794.023	3501.126	1.258	3502.384	54.00	19.21	5.73	3508.11	.00	2.39	2.96	3.000	.000	.00	1 .0
17.493	.0728					.0457	.80	1.26	3.47	1.13	.013	.00	.00	PIPE
811.516	3502.399	1.304	3503.704	54.00	18.32	5.21	3508.91	.00	2.39	2.97	3.000	.000	.00	1 .0
13.011	.0728					.0401	.52	1.30	3.24	1.13	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date:11- 3-2020 Time: 9:29:36

SUMMERLIN WEST VILLAGE 22
FLIGHT RANGE AVENUE (SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE)
100-YEAR ULTIMATE CONDITION

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
824.528	3503.347	1.352	3504.699	54.00	17.46	4.74	3509.43	.00	2.39	2.99	3.000	.000	.00	1 .0
10.124	.0728					.0353	.36	1.35	3.02	1.13	.013	.00	.00	PIPE
834.651	3504.084	1.403	3505.487	54.00	16.65	4.30	3509.79	.00	2.39	2.99	3.000	.000	.00	1 .0
8.103	.0728					.0310	.25	1.40	2.82	1.13	.013	.00	.00	PIPE
842.754	3504.674	1.456	3506.129	54.00	15.88	3.91	3510.04	.00	2.39	3.00	3.000	.000	.00	1 .0
6.603	.0728					.0273	.18	1.46	2.63	1.13	.013	.00	.00	PIPE
849.357	3505.154	1.511	3506.665	54.00	15.14	3.56	3510.22	.00	2.39	3.00	3.000	.000	.00	1 .0
5.442	.0728					.0241	.13	1.51	2.45	1.13	.013	.00	.00	PIPE
854.799	3505.551	1.569	3507.120	54.00	14.43	3.23	3510.35	.00	2.39	3.00	3.000	.000	.00	1 .0
4.515	.0728					.0212	.10	1.57	2.28	1.13	.013	.00	.00	PIPE
859.314	3505.879	1.630	3507.510	54.00	13.76	2.94	3510.45	.00	2.39	2.99	3.000	.000	.00	1 .0
3.752	.0728					.0187	.07	1.63	2.12	1.13	.013	.00	.00	PIPE
863.066	3506.153	1.694	3507.847	54.00	13.12	2.67	3510.52	.00	2.39	2.97	3.000	.000	.00	1 .0
3.114	.0728					.0165	.05	1.69	1.97	1.13	.013	.00	.00	PIPE
866.181	3506.379	1.762	3508.142	54.00	12.51	2.43	3510.57	.00	2.39	2.95	3.000	.000	.00	1 .0
2.564	.0728					.0146	.04	1.76	1.82	1.13	.013	.00	.00	PIPE
868.744	3506.566	1.834	3508.400	54.00	11.93	2.21	3510.61	.00	2.39	2.92	3.000	.000	.00	1 .0
2.085	.0728					.0129	.03	1.83	1.69	1.13	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date:11- 3-2020 Time: 9:29:36

SUMMERLIN WEST VILLAGE 22
FLIGHT RANGE AVENUE (SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE)
100-YEAR ULTIMATE CONDITION

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	
870.829	3506.718	1.910	3508.628	54.00	11.37	2.01	3510.64	.00	2.39	2.89	3.000	.000	.00	1 .0
1.656	.0728				.0115	.02	1.91	1.56	1.13	.013	.00	.00	PIPE	
872.485	3506.839	1.991	3508.829	54.00	10.84	1.83	3510.66	.00	2.39	2.83	3.000	.000	.00	1 .0
1.265	.0728				.0102	.01	1.99	1.44	1.13	.013	.00	.00	PIPE	
873.750	3506.931	2.078	3509.008	54.00	10.34	1.66	3510.67	.00	2.39	2.77	3.000	.000	.00	1 .0
.902	.0728				.0091	.01	2.08	1.33	1.13	.013	.00	.00	PIPE	
874.652	3506.996	2.171	3509.167	54.00	9.86	1.51	3510.68	.00	2.39	2.68	3.000	.000	.00	1 .0
.548	.0728				.0081	.00	2.17	1.22	1.13	.013	.00	.00	PIPE	
875.201	3507.036	2.273	3509.309	54.00	9.40	1.37	3510.68	.00	2.39	2.57	3.000	.000	.00	1 .0
.189	.0728				.0073	.00	2.27	1.11	1.13	.013	.00	.00	PIPE	
875.390	3507.050	2.386	3509.436	54.00	8.96	1.25	3510.68	.00	2.39	2.42	3.000	.000	.00	1 .0

A.3 Fleet Wing Avenue Drainage Study Reference Information

SNC·LAVALIN

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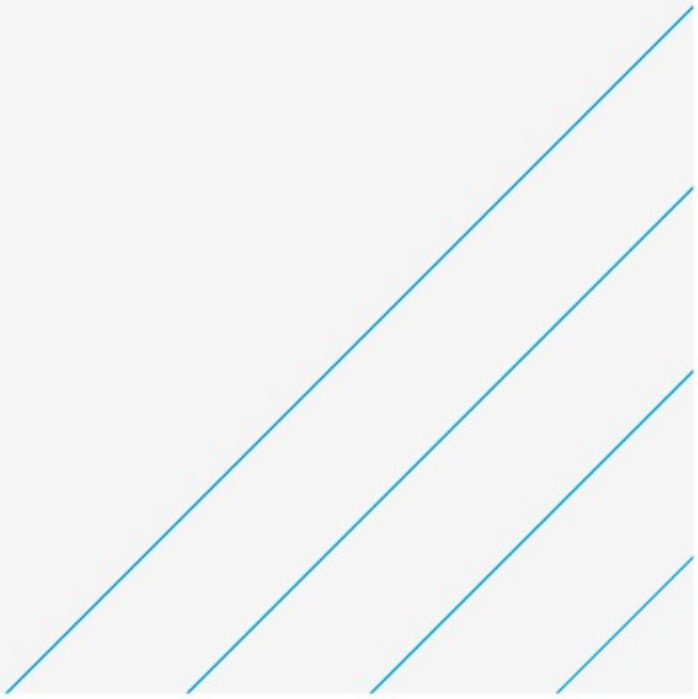
SUMMERLIN®

Summerlin West Village 22

Fleet Wing Avenue (Street G): Kettle Ridge Drive to Scurry Bend Drive

Prepared for Howard Hughes Company, LLC

October 2020



CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: November 19, 2020
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: **Summerlin West Village 22 - Fleet Wing Avenue (Street G)** **(Kettle Ridge Drive to Scurry Bend Drive)**			**COPIES TO:** Atkins Global
Cross Streets:	Kettle Bend Road and Sunset Run Drive			Howard Hughes Company, LLC.
File Number:	F:\Depot\DSMemos\DS5367B.doc			Bart Anderson, P.E., DevCo
Parcel Number:	137-23-210-001			CCRFCD
Zoning Action:	N/A			
FEMA Flood Zone	YES	NO **X**		
Proposed Storm Drain	YES **X**	NO		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	9/22/2020 & 10/7/2020	10/13/2020	Not Approved	$400.00	3999164: $400
2nd Submittal Paid on 11/18/2020	10/29/2020 & 11/18/2020	11/19/2020	See Comments Below	$400.00	4072796: $400
			TOTAL FEES (LDDRS):	**$800.00**	**----**

REMARKS:

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

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

1. The subject project is based on the premise that the downstream *Kettle Ridge Drive* and *Kindle Rise Way* and the associated storm drain facilities are in place for flood flow perpetuation. The subject drainage study will not be finally approved prior to the posting of the construction bonds of the *Summerlin West Village 22 – Kettle Ridge Drive (Fleet Wing to Kindle Rise) and Kindle Rise Way (Kettle Ridge to Desert Foothill)* street improvements project.
2. The project proposed to construct temporary drainage facilities including drainage berms/ditches along both sides of the proposed roadway. Prior to the final plans approval, the developer must complete a ***Maintenance & Liability Agreement*** for the interim drainage improvements and post a minimum maintenance bond of $50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for constructing the facilities and an exhibit that adequately shows the location and limits of the drainage facilities to *City Flood Control* for approval. Once the drainage study is conditionally approved, the engineer/developer should contact the *City's Land Development Section* (702-229-6371) to begin the agreement process.

   In order for the maintenance bond to be released in the future, a drainage update/letter will be required to justify that the berm/swale are no longer necessary and can be removed.

3. **This drainage study is acceptable in concept;** however, *City of Las Vegas* will not formally accept the study until the *Clark County Regional Flood Control District (CCRFCD)* has issued a letter of concurrence. The engineer should contact the CCRFCD to confirm that they have begun their review.

   Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

   http://gustfront.ccrfcd.org/LandDev/LandDev.aspx

4. Specify clearly all 2”-sacrificial concrete to have minimum strength of 6,000 psi on all pertinent plans & profiles.

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

END OF REMARKS
HDR/AYS

T/R/S: T20S/R59E/23
AREA K-23

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Fleet Wing Avenue (Street G): Kettle Bend Drive to Scurry Bend Drive Date: October 29, 2020

Location of Development: a) Descriptive (Cross Streets) North/South: Kettle Bend Road

East/West: Lake Mead Boulevard

b) Section: 23 Township: 20S Range: 59E

c) APN : 137-23-210-001

Name of Owner: Howard Hughes Company, LLC

Telephone No.: (702) 791-4000 Fax No.: (702) 791-4450 E-Mail Address: april.chapman@howardhughes.com

Address: 10845 Griffith Peak Drive, Suite 160, Las Vegas, NV 89135

Contact Person-Name: Janelle Klein, PE **Telephone No.:** (702) 551-0365

* **E-Mail Address:** janelle.klein@atkinsglobal.com **Fax No.:** (702) 263-7200

Firm: Atkins

Address: 2270 Corporate Circle, Ste 200, Henderson, NV 89074

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: +/- 446 acres Being Developed/Disturbed: 3.56 acres
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.): Public - Roadway Improvements
5. Approximate upstream land area which drains to the subject site:
6. Has the site drainage been evaluated in the past? ✔ **YES** **NO** If yes, please identify documentation: Update #2 to the Master Conceptual Drainage Study for Summerlin West Village 22
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Existing CC-215 Western Beltway Channel
8. Briefly describe your proposed schedule for the subject project: ASAP



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.**

CLV DS5367

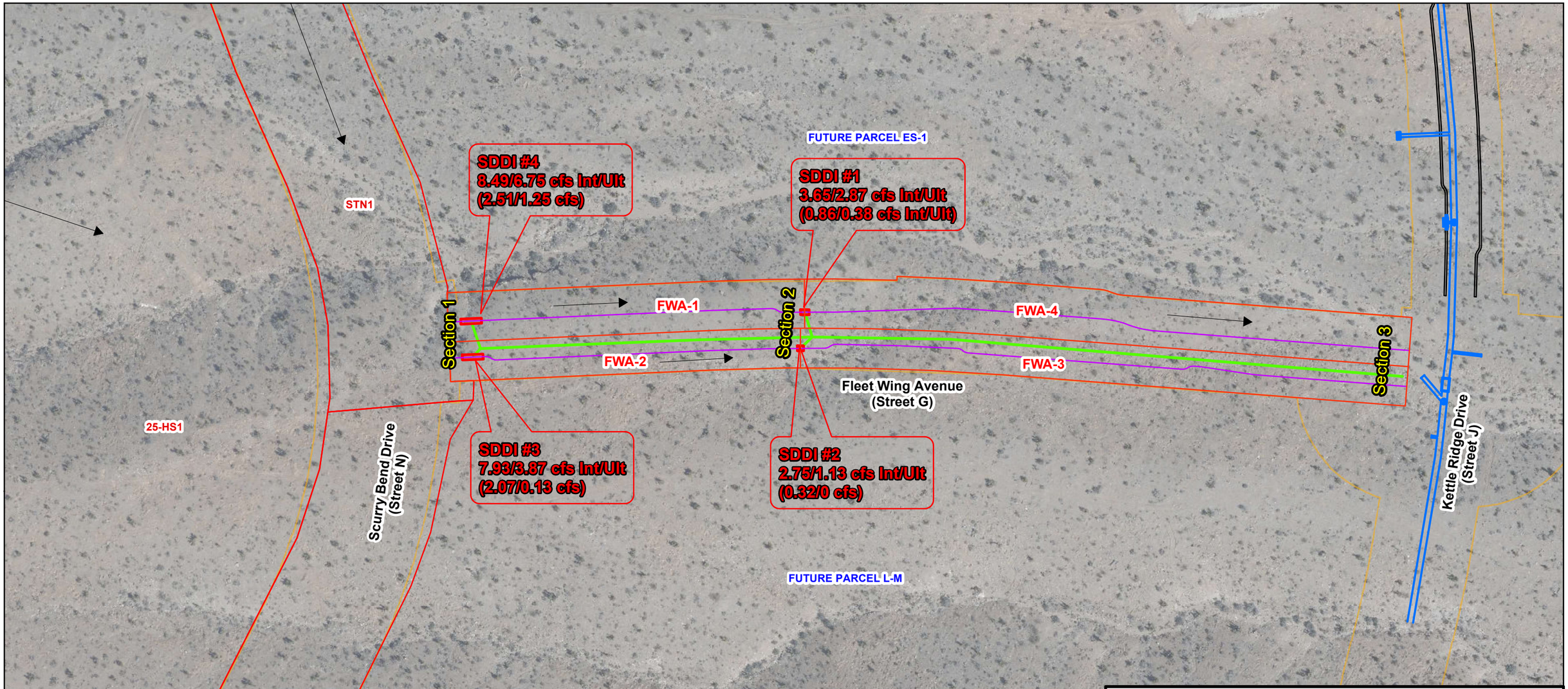
Local Entity File No.

Revision	Date

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008



Drop Inlet Calculations (100-YEAR)

Drop Inlet	Plan Station	Total Discharge (CFS)	Discharge Source	Drop Inlet Type	Intercepted Flow (CFS)	Bypass Flow (CFS)
Interim 100-yer						
SDDI#1	34+90	4.51	FWA-1 + Bypass SDDI#4	CM2, L=7.5'	3.65	0.86
SDDI#2	34+90	3.07	FWA-2 + Bypass SDDI#3	CM2, L=5'	2.75	0.32
SDDI#3	38+00	10	StN-2	CM2, L=15'	7.93	2.07
SDDI#4	38+00	11	StN-1	CM2, L=15'	8.49	2.51
Ultimate 100-year						
SDDI#1	34+90	3.25	FWA-1 + Bypass SDDI#4	CM2, L=7.5'	2.87	0.38
SDDI#2	34+90	1.13	FWA-2 + Bypass SDDI#3	CM2, L=5'	1.13	0
SDDI#3	38+00	4	StN-2c	CM2, L=15'	3.87	0.13
SDDI#4	38+00	8	StN-1b	CM2, L=15'	6.75	1.25

Normal Depth Calculation Summary Table

Section ID	Plan Station	Total Discharge (CFS)	Discharge Source	Flow Depth (FT)	Flow Velocity (FPS)	Depth * Velocity
Interim 100-yer						
STG-1	38+50	21	STN1+STN2	0.39	5.43	2.12
STG-2	35+00	7.58	FWA1+FWA2+bypass SDDI#3 & SDDI#4	0.23	5.52	1.27
STG-3	28+70	8.18	FWA3+FWA4+bypass SDDI#1 & SDDI#2	0.30	4.37	1.31
Ultimate 100-year						
STG-1	38+50	12	STN1b+STN2c	0.33	4.76	1.57
STG-2	35+00	4.38	FWA1+FWA2+bypass SDDI#3 & SDDI#4	0.20	4.90	0.98
STG-3	28+70	7.38	FWA3+FWA4+bypass SDDI#1 & SDDI#2	0.29	4.27	1.24

TECHNICAL DRAINAGE STUDY FOR SUMMERLIN VILLAGE 22
FLEET WING AVE. (STREET G)
SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE (STREET J)
FIGURE 4: HYDRAULICS WORKMAP

Fleet Wing Ave (FWA) Basins
Proposed FWA Roadway
FWA Drop Inlets
FWA Storm Drain
Existing Storm Drain
Flow Paths
Existing Roadways
Ultimate Condition Parcels
Intercepted Flow (Bypass Flow)

N

1 inch = 100 feet

ATKINS
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Aerial Source: Clark County Spring 2018

0 50 100 200 300 400 Feet

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
T3 100-YEAR ULTIMATE CONTDITION
SO       .0003405.720  1                          3406.715
REM*****CONNECTON TO KETTLE RIDGE DRIVE MAINLINE 6'X10' RCB
R      26.9003410.630  1      .013                                  .000 -13.655 0
R      27.9003410.746  1      .013                                  .000 -13.500 0
R      29.9003410.862  1      .013                                  .000 -13.500 0
R      31.9003410.920  1      .013                                  .000    .000 1
REM*****FLEET WING DRIVE (DFD-KRD) SDMH#8
R      48.5003411.840  1      .013                                  .000    .000 0
REM*****POINT OF CONNECTION TO STUB
R     148.1903416.760  1      .013                                  .000    .000 0
R     154.1903416.960  1      .013                                  .000    .000 1
REM*****FLEET WING AVENUE SDMH#1
R     511.5203444.910  1      .013                                  .000  -3.709 0
R     516.5203445.110  1      .013                                  .000    .000 1
REM*****FLEET WING AVENUE SDMH#2
R     653.6403456.500  1      .013                                  .000    .000 0
JX    656.1403456.600  1  2  2.013    2.870    1.13 3456.70 3456.70  72.7-45.2    .000
REM*****FLEET WING AVENUE SDDI#1 & SDDI#2
R     658.6403456.700  1      .013                                  .000  -2.413 1
REM*****FLEET WING AVENUE SDMH#3
R     769.1903465.550  1      .013                                  .000    .000 0
R     774.1903465.750  1      .013                                  .000    .843 1
REM*****FLEET WING AVENUE SDMH#4
R     995.9803480.950  1      .013                                  .000    .000 0
JX    998.4803481.050  1  2  2.013    3.870    6.75 3481.15 3481.15  72.1-45.2    .000
REM*****FLEET WING AVENUE SDDI#3 & SDDI#4
R    1000.9803481.150  1      .013                                  .000    .000 1
REM*****FLEET WING AVENUE SDMH#5
SH   1000.9803481.380  1                          3481.380
CD   1  4   1    .000   4.000     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
Q           225.000   .0
```

FILE: FWW-ULT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date:10-27-2020 Time:10:26:47

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
100-YEAR ULTIMATE CONTDITION

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	
.000	3405.720	2.200	3407.919	239.62	33.84	17.79	3425.71	.00	3.92	3.98	4.000	.000	.00	1 .0
.689	.1825					.0810	.06	2.20	4.47	1.74	.013	.00	.00	PIPE
.689	3405.846	2.203	3408.049	239.62	33.78	17.72	3425.77	.00	3.92	3.98	4.000	.000	.00	1 .0
14.311	.1825					.0761	1.09	2.20	4.46	1.74	.013	.00	.00	PIPE
15.000	3408.458	2.290	3410.748	239.62	32.21	16.11	3426.86	.00	3.92	3.96	4.000	.000	.00	1 .0
11.900	.1825					.0672	.80	2.29	4.14	1.74	.013	.00	.00	PIPE
26.900	3410.630	2.382	3413.012	239.62	30.71	14.64	3427.66	.00	3.92	3.93	4.000	.000	.00	1 .0
1.000	.1162					.0629	.06	2.38	3.84	1.97	.013	.00	.00	PIPE
27.900	3410.746	2.386	3413.132	239.62	30.65	14.59	3427.72	.00	3.92	3.92	4.000	.000	.00	1 .0
2.000	.0580					.0628	.13	2.39	3.83	2.45	.013	.00	.00	PIPE
29.900	3410.862	2.385	3413.247	239.62	30.67	14.61	3427.86	.00	3.92	3.93	4.000	.000	.00	1 .0
2.000	.0289					.0631	.13	2.38	3.83	3.21	.013	.00	.00	PIPE
31.900	3410.920	2.380	3413.300	239.62	30.75	14.68	3427.98	.00	3.92	3.93	4.000	.000	.00	1 .0
16.600	.0554					.0637	1.06	2.38	3.85	2.49	.013	.00	.00	PIPE
48.500	3411.840	2.370	3414.210	239.62	30.90	14.83	3429.04	.00	3.92	3.93	4.000	.000	.00	1 .0
35.668	.0494					.0659	2.35	2.37	3.88	2.59	.013	.00	.00	PIPE
84.168	3413.600	2.329	3415.929	239.62	31.56	15.46	3431.39	.00	3.92	3.95	4.000	.000	.00	1 .0
64.022	.0494					.0721	4.62	2.33	4.01	2.59	.013	.00	.00	PIPE

FILE: FWW-ULT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 2

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date:10-27-2020 Time:10:26:47

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
100-YEAR ULTIMATE CONTDITION

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	
148.190	3416.760	2.240	3419.000	239.62	33.10	17.01	3436.01	.00	3.92	3.97	4.000	.000	.00	1 .0
6.000	.0333					.0774	.46	2.24	4.32	3.01	.013	.00	.00	PIPE
154.190	3416.960	2.225	3419.185	239.62	33.37	17.29	3436.47	.00	3.92	3.97	4.000	.000	.00	1 .0
34.022	.0782					.0782	2.66	2.22	4.37	2.22	.013	.00	.00	PIPE
188.212	3419.621	2.225	3421.846	239.62	33.37	17.29	3439.14	.00	3.92	3.97	4.000	.000	.00	1 .0
323.308	.0782					.0756	24.46	2.22	4.37	2.22	.013	.00	.00	PIPE
511.520	3444.910	2.273	3447.183	239.62	32.51	16.41	3463.59	.00	3.92	3.96	4.000	.000	.00	1 .0
5.000	.0400					.0736	.37	2.27	4.20	2.79	.013	.00	.00	PIPE
516.520	3445.110	2.263	3447.373	239.62	32.68	16.59	3463.96	.00	3.92	3.97	4.000	.000	.00	1 .0
56.059	.0831					.0723	4.05	2.26	4.24	2.18	.013	.00	.00	PIPE
572.579	3449.767	2.300	3452.066	239.62	32.05	15.95	3468.01	.00	3.92	3.95	4.000	.000	.00	1 .0
81.061	.0831					.0663	5.38	2.30	4.11	2.18	.013	.00	.00	PIPE
653.640	3456.500	2.392	3458.892	239.62	30.55	14.50	3473.39	.00	3.92	3.92	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0643	.16	2.39	3.81		.013	.00	.00	PIPE
656.140	3456.600	2.318	3458.918	235.62	31.21	15.12	3474.04	.00	3.92	3.95	4.000	.000	.00	1 .0
2.500	.0399					.0666	.17	2.32	3.98	2.76	.013	.00	.00	PIPE
658.640	3456.700	2.313	3459.013	235.62	31.29	15.20	3474.21	.00	3.92	3.95	4.000	.000	.00	1 .0
56.535	.0801					.0641	3.62	2.31	3.99	2.19	.013	.00	.00	PIPE

FILE: FWW-ULT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 3

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date:10-27-2020 Time:10:26:47

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
100-YEAR ULTIMATE CONTDITION

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	
715.175	3461.226	2.377	3463.603	235.62	30.28	14.24	3477.84	.00	3.92	3.93	4.000	.000	.00	1 .0
54.015	.0801					.0579	3.13	2.38	3.79	2.19	.013	.00	.00	PIPE
769.190	3465.550	2.474	3468.024	235.62	28.87	12.94	3480.97	.00	3.92	3.89	4.000	.000	.00	1 .0
5.000	.0400					.0546	.27	2.47	3.51	2.76	.013	.00	.00	PIPE
774.190	3465.750	2.467	3468.217	235.62	28.96	13.02	3481.24	.00	3.92	3.89	4.000	.000	.00	1 .0
1.553	.0685					.0548	.09	2.47	3.53	2.29	.013	.00	.00	PIPE
775.744	3465.856	2.469	3468.325	235.62	28.94	13.00	3481.33	.00	3.92	3.89	4.000	.000	.00	1 .0
63.727	.0685					.0516	3.29	2.47	3.52	2.29	.013	.00	.00	PIPE
839.471	3470.224	2.572	3472.796	235.62	27.59	11.82	3484.62	.00	3.92	3.83	4.000	.000	.00	1 .0
42.447	.0685					.0458	1.94	2.57	3.26	2.29	.013	.00	.00	PIPE
881.918	3473.133	2.682	3475.815	235.62	26.31	10.75	3486.56	.00	3.92	3.76	4.000	.000	.00	1 .0
30.927	.0685					.0408	1.26	2.68	3.00	2.29	.013	.00	.00	PIPE
912.845	3475.252	2.800	3478.052	235.62	25.08	9.77	3487.82	.00	3.92	3.67	4.000	.000	.00	1 .0
23.654	.0685					.0364	.86	2.80	2.76	2.29	.013	.00	.00	PIPE
936.499	3476.874	2.927	3479.800	235.62	23.91	8.88	3488.68	.00	3.92	3.54	4.000	.000	.00	1 .0
18.591	.0685					.0326	.61	2.93	2.53	2.29	.013	.00	.00	PIPE
955.090	3478.148	3.065	3481.213	235.62	22.80	8.07	3489.29	.00	3.92	3.39	4.000	.000	.00	1 .0
14.802	.0685					.0293	.43	3.07	2.30	2.29	.013	.00	.00	PIPE

FILE: FWW-ULT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 4

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date:10-27-2020 Time:10:26:47

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
100-YEAR ULTIMATE CONTDITION

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	
969.892	3479.162	3.219	3482.381	235.62	21.74	7.34	3489.72	.00	3.92	3.17	4.000	.000	.00	1 .0
11.747	.0685					.0266	.31	3.22	2.07	2.29	.013	.00	.00	PIPE
981.640	3479.967	3.394	3483.361	235.62	20.73	6.67	3490.03	.00	3.92	2.87	4.000	.000	.00	1 .0
9.014	.0685					.0245	.22	3.39	1.84	2.29	.013	.00	.00	PIPE
990.654	3480.585	3.604	3484.189	235.62	19.76	6.07	3490.25	.00	3.92	2.39	4.000	.000	.00	1 .0
5.326	.0685					.0239	.13	3.60	1.56	2.29	.013	.00	.00	PIPE
995.980	3480.950	3.918	3484.868	235.62	18.84	5.51	3490.38	.00	3.92	1.13	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0243	.06	3.92	1.00		.013	.00	.00	PIPE
998.480	3481.050	4.869	3485.919	225.00	17.90	4.98	3490.90	.00	3.90	.00	4.000	.000	.00	1 .0
2.500	.0399					.0245	.06	4.87	.00	2.67	.013	.00	.00	PIPE
1000.980	3481.150	5.079	3486.229	225.00	17.90	4.98	3491.21	.00	3.90	.00	4.000	.000	.00	1 .0

A.4 Update #1 to the Summerlin West Village 25 Master Conceptual Drainage Study Reference Material and 2018 MPU Soil and CN Information

Update #1 to the Master Conceptual Drainage Study for

Summerlin West Village 25

Las Vegas, Nevada

W.O. # 7919

Prepared for:

Howard Hughes Company, LLC

Submitted to:

City of Las Vegas
Public Works

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: April 14, 2020
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: **Master Conceptual Drainage Study – Update #1** **For Summerlin West Village 25**		**COPIES TO:** VTN Nevada
Cross Streets:	Sky Vista Drive and Far Hills Avenue		Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5104F.doc		Bart Anderson, P.E., DevCo
Parcel Number:	137-22-101-001, 137-21-000-002		CCRFCD
Zoning Action:	MDR-75107 & PMP-74780		
FEMA Flood Zone	YES	NO X	
Proposed Storm Drain	YES X	NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	2/20/2019	2/27/2019 & 3/20/2019	Not Approved	$400.00	503292: $400
2nd Submittal	4/4/2019	4/17/2019	Not Approved	$400.00	3081574: $400
3rd Submittal	4/25/2019	5/9/2019	Conditional Approval	$400.00	3105175: $400
CCRFCD	6/10/2019	6/18/2019	Concurrence Recv'd	N/C	N/C
4th Submittal	12/26/2019	1/23/2020	Conditional Approval	$100.00	3686588: $100
CCRFCD	3/23/2020	4/14/2020	Concurrence Recv'd	N/C	N/C
			TOTAL FEES (LDDRS):	**$1,300.00**	----

REMARKS:

4th Submittal: Update to revise the layout of V25 to match the changes to the overall Summerlin West Planning Area land plan

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. The *Grand Park Detention Basin* is proposed to regulate and meter outflow to match the previously approved downstream flow conditions at the junction of *Far Hills* storm drain and the *Beltway Channel*. Without the *Grand Park Detention Basin*, there will be a net increase in flows at the *Beltway Channel* downstream of *Far Hills* intersection exceeding the previously approved flow.

   A technical drainage study for the analysis, design and construction plans for the *Grand Park Detention Basin* must be submitted and approved by the City prior to the individual onsite parcel developments.

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.

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

END OF REMARKS
WSP/AYS

T/R/S: T20S/R59E/22
AREA K-22

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Summerlin West Village 25 Date: December 26, 2019

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

East/West: Far Hills Avenue

b) Section: 21 and 22 Township: 20S Range: 59E

c) APN : 137-22-101-001; 137-21-000-002

Name of Owner: The Howard Hughes Company, LLC

Telephone No.: (702) 791-4336 Fax No.: (702) 791-4453 E-Mail Address: chris.anderson@howardhughes.com

Address: 10801 W. Charleston Blvd. LV, NV, 89135

Contact Person-Name: Joanna Ayson **Telephone No.:** (702)-873-7550

* **E-Mail Address:** jayson@vtnnv.com **Fax No.:** (702)-362-2597

Firm: VTN Nevada

Address: 2727 S. Rainbow Blvd, LV, NV, 89146

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: +/-548 Acres Being Developed/Disturbed: +/-548 Acres
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.): Mixed-use master plan
5. Approximate upstream land area which drains to the subject site: +/- 819 acres
6. Has the site drainage been evaluated in the past? ☒ **YES** ☐ **NO** If yes, please identify documentation: SWPA MPU (DS4926), TDS for Summerlin West Desert Foothills Drive (Far Hills to Street A) (DS5013
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: 10'X10' RCB storm drain in Desert Foothills Drive (CCRFCD Master Planned Facility)
8. Briefly describe your proposed schedule for the subject project: As soon as possible

PROFESSIONAL ENGINEER - STATE OF NEVADA
BRIAN TROY RUIZ
EXP: 12/31/19
CIVIL
No. 15967

Engineer's Seal 12/23/19

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

*New Required Field

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

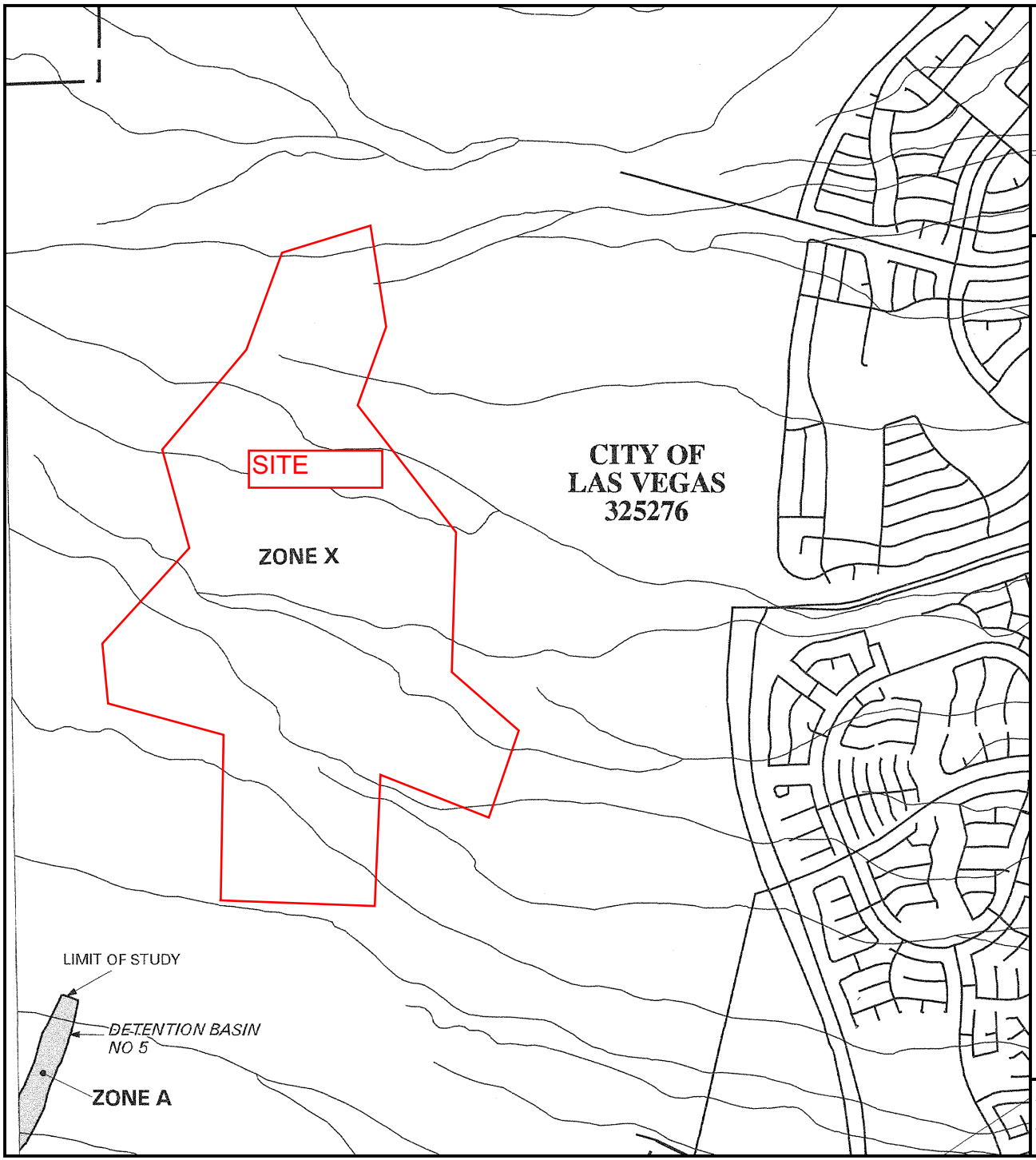
Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008



MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

PANEL 2150 E

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 2150 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAS VEGAS, CITY OF	325276	2150	E
CLARK COUNTY, UNINCORPORATED AREAS	320003	2150	E

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

MAP NUMBER
32003C2150 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

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

FIGURE 3

REGIONAL FLOOD CONTROL DISTRICT

2013
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F- 24
FLOOD CONTROL FACILITIES

LEGEND

- Ultimate Development Boundary
- Existing Facilities
- Category A Proposed Facilities
- Category B Proposed Facilities
- Local Existing Facilities
- Local Proposed Facilities
- Detention Basin

- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway
- ID-Mile Separator

Remove & Replace/Parallel Facilities

Category A	Category B
Channel	Channel
Stormdrain	Stormdrain

N

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

Scale: 1 inch = 2,000 feet

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

US95 I-15 I-215

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

SITE

GOWAN RD
CHEYENNE AV
BUTTON WILLOW DR
LAKE MEAD BLVD
THOMAS W RYAN BLVD
SNOW TRL
MISSUIN LAKES AV
SUMMERLIN PKWY
LAURELGLEN DR
FAR HILLS AV
ANASAZI DR
VISTA RUN DR
ALTA DR
215

GOLM 0260
GOLM 0252
GOLM 0230
GOL3 0010
GOL3 0000
GOL4 0026
GOL4 0025
GOL4 0000
GOL4 0010
GOL3 0068
GOL3 0077
GOL3 0070
GOL3 0123
GOL3 0116
GOL3 0100
GOBE 0000
GOBE 0001
GOL3 0137
GOL3 0290
GOL3 0870
GOL3 0299
GOL3 0216
GOB3 0035
GOB3 0000
GOBE 0065
GOBE 0066
GOBE 0108
GOBE 0068
GOB2 0098
GOB2 0033
GOB2 0020
GOB2 0000
GOB2 0001
GOBE 0127
GOBE 0139
APDF 0123
APD3 0000
APD3 0013
APDF 0073
APDF 0026
APDF 0000
APD6 0000
APM5 0039
APM5 0057
APM5 0213
APM5 0212
APM5 0009
APM5 0056
APM5 0047
APM5 0008
APM5 0000
APF2 0000
APFH 0144
APFH 0089
APFH 0061
APFH 0024
APFH 0019
APFH 0000
APCH 0000
APCH 0037
APCH 0003
APBE 0122
APBE 0094
APBE 0081
APBE 0061
APBE 0022
APBE 0013
APBE 0000
APSP 0177
APSP 0135
APSP 0183
APAD 0225
APAD 0203
APAD 0000
APD2 0000
APD2 0002
APMD 0233

FIGURE 4A - MPU Facilities

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
APAD		**ANGEL PARK - ALTA DRIVE BRANCH**						
0044	E	11' X 8' RCAP	1565	3140	CSWAA-3	ALLGOW4	8.26	4.24
0073	E	11' X 8' RCAP	2220	2917	CSWAA-2	ALLGOW3	7.68	3.50
0146	E	10' X 8' RCB	3010	2220	CSWAA-1	ALLGOW3	6.98	4.40
0203	E	2: 7' X 5.5' RCB	1136	2220	CSWAA-1	ALLGOW3	6.98	5.28
0225	E	2: 7' X 5.5' RCB Outlet	360	2149	SUM5DB	ALLGOW3	6.74	3.40
APBE		**ANGEL PARK - BELTWAY BRANCH**						
0013	E	3: 12' X 8' RCB	489	4060	CSWFH-9	ALLGOW3	2.65	6.50
0022	E	Conc Chnl 20'W 7'D 2:1 SS	1556	4060	CSWFH-9	ALLGOW3	2.65	1.81
0051	E	Conc Chnl 20'W 7'D 2:1 SS	1583	4060	CSWFH-9	ALLGOW3	2.65	2.77
0081	E	8' X 8' RCBC @ Far Hills	777	423	SWFH-9	ALLGOW3	0.17	2.32
0094	E	Conc Chnl 10'W 5'D 2:1 SS	1465	423	SWFH-9	ALLGOW3	0.17	1.88
0122	E	Conc Chnl 10'W 4'D 2:1 SS	1409	423	SWFH-9	ALLGOW3	0.17	0.80
APCH		**ANGEL PARK - CARRIAGE HILL BRANCH**						
0000	E	8' X 6' RCB	152	585	SWFH-8	ALLGOW3	0.29	0.87
0003	P0	8' X 7' RCB	1461	585	SWFH-8	ALLGOW3	0.29	2.39
0031	P0	8' X 5' RCB	896	585	SWFH-8	ALLGOW3	0.29	0.60
APD2		**ANGEL PARK - DESERT FOOTHILLS 2 BRANCH**						
0002	P0	7' X 7' RCB	964	948	SWAA-2	ALLGOW3	0.70	2.00
APD5		**ANGEL PARK - DESERT FOOTHILLS 5 BRANCH**						
0000	P0	8' X 6' RCB	685	1701	CSWFH-2	ALLGOW3	1.09	1.89
0013	P0	72" RCP	1436	1701	CSWFH-2	ALLGOW3	1.09	4.18
APD6		**ANGEL PARK - DESERT FOOTHILLS 6 BRANCH**						
0000	P0	6' X 6' RCB	2604	1076	CSWFH-6	ALLGOW3	0.56	6.15
APDF		**ANGEL PARK - DESERT FOOTHILLS BRANCH**						
0000	P0	12' X 10' RCB	1356	2897	CSWFH-7	ALLGOW3	1.81	2.20
0026	P0	12' X 10' RCB	2463	1962	CSWFH-3	ALLGOW3	1.25	1.62
0073	P0	10' X 8' RCB	2679	1962	CSWFH-3	ALLGOW3	1.25	4.10
0123	P0	6' X 5' RCB	5355	1701	CSWFH-2	ALLGOW3	1.09	6.53
APF2		**ANGEL PARK - FAR HILLS 2 BRANCH**						
0000	P0	8' X 6' RCB	1046	669	CSWFH-5	ALLGOW3	0.38	1.00
APFH		**ANGEL PARK - FAR HILLS BRANCH**						
0000	E	2: 8' X 8' RCB	995	3862	CSWFH-8	ALLGOW3	2.48	3.50
0019	E	2: 8' X 8' RCB	250	3392	CCSWFH-7	ALLGOW3	2.18	4.19
0024	E	16' X 8' RCAP	1943	3392	CCSWFH-7	ALLGOW3	2.18	5.10
0061	P0	8' X 6' RCB	1492	669	CSWFH-5	ALLGOW3	0.38	2.00
0089	P0	8' X 6' RCB	2902	669	CSWFH-5	ALLGOW3	0.38	2.00
0144	P0	7' X 6' RCB	1556	669	CSWFH-5	ALLGOW3	0.38	5.50
APM5		**ANGEL PARK - MIDDLE 5 BRANCH**						
0000	E	384 ac-ft Detention Basin #5		7001	SUM5IN	ALLGOW3	6.74	
0001	E	12,153 cfs PMF Spillway		12153	SUM5IN	ALLGOW3	6.74	
0008	P0	Conc Chnl 50'W 4.5'D 2:1 SS	2102	3725	CDB54-6R	ALLGOW3	4.30	5.20
0009	P0	Conc Chnl 50'W 4.5'D 2:1 SS	4180	3624	CDB55-8	ALLGOW3	2.45	5.80
0047	E	Diversion Berm with Gabion Bank Protection	1000	3725	CDB54-6R	ALLGOW3	4.30	1.30
0056	P0	Conc Chnl 80'W 4'D 2:1 SS	264	3725	CDB54-6R	ALLGOW3	4.30	1.30
0057	P0	Conc Chnl 50'W 3'D 2:1 SS	9922	1821	CDB54-4	ALLGOW3	1.01	6.80
0059	P0	Conc Chnl 100'W 3'D 2:1 SS	8923	2358	CDB54-5	ALLGOW3	2.45	7.00
0212	P0	Conc Chnl 30'W 3.5'D 2:1 SS	6695	1238	CDB55-2	ALLGOW3	0.74	7.50
0213	P0	Conc Chnl 50'W 2.5'D 2:1 SS	6522	1125	CDB55-5	ALLGOW3	0.62	7.30
APSP		**ANGEL PARK - SUMMERLIN PARKWAY**						
0135	E	Conc Chnl 10'W 6'D 2:1 SS	2030	1173	C8B-1	ALLGOW3	1.14	2.40
0177	E	9' X 8' RCBC @ Anasazi	330	867	C11B-1	ALLGOW3	0.84	1.70
0183	E	Conc Chnl 10'W 6'D 2:1 SS	1680	867	C11B-1	ALLGOW3	0.84	1.70
GO02		**GOWAN SOUTH FACILITIES (CHEYENNE CHANNEL)**						
0257	E	Conc Chnl 10'W 6.75'D 1.5:1 SS	4293	2577	CCJ-C	ALLGOW3	2.97	4.10
GOB2		**GOWAN LONE MOUNTAIN SYST. 2 BELTWAY**						
0000	P0	36" RCP Outlet	118	75	DET22	ALLGOW3	0.76	6.76
0001	P0	123 ac-ft Village 22 Detention Basin		1344	CSV22-DB	ALLGOW3	0.76	
0020	P0	8' X 7' RCB	657	1247	SV22-2	ALLGOW3	0.70	8.30
0033	P0	8' X 6' RCB	3359	1247	SV22-2	ALLGOW3	0.70	6.90
0096	P0	6' X 5' RCB	1332	1247	SV22-2	ALLGOW3	0.70	6.00

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
GOB3		**GOWAN LONE MOUNTAIN SYST. 3 BELTWAY**						
0000	P0	66" RCP	1877	530	SV22-3	ALLGOW3	0.28	6.60
0035	P0	54" RCP	965	530	SV22-3	ALLGOW3	0.28	6.40
GOBE		**GOWAN LONE MOUNTAIN SYST. BELTWAY**						
0000	E	20' X 10' RCBC @ Access Rd	30	958	CSV22-3	GW3SC	0.28	5.67
0001	E	Conc Chnl 20'W 5'D 2:1 SS	3355	958	CSV22-3	GW3SC	0.28	6.50
0065	E	Conc Chnl 20'W 6'D 2:1 SS	1220	958	CSV22-3	GW3SC	0.28	1.90
0088	E	2: 10'X9' RCBC @ Lake Mead	400	471	CDET22	ALLGOW3	0.96	0.50
0096	E	Conc Chnl 20'W 9'D 2:1 SS	627	471	CDET22	ALLGOW3	0.96	0.50
0108	E	Conc Chnl 20'W 6'D 2:1 SS	1021	471	CDET22	ALLGOW3	0.96	0.50
0127	E	Conc Chnl 20'W 6'D 2:1 SS	638	442	SV22-1	ALLGOW3	0.20	0.50
0139	E	Conc Chnl 10'W 5.5'D 2:1 SS	1500	442	SV22-1	ALLGOW3	0.20	1.02
GOL3		**GOWAN LONE MOUNTAIN SYSTEM-BRANCH 3**						
0010	E	Conc Chnl 20'W 10'D 0:1 SS	3037	2946	CRCLMT1R	GW3SC	2.61	2.78
0068	E	Transition Structure	100	2946	CRCLMT1R	GW3SC	2.61	3.50
0070	E	20' X 6' RCBC @ Cliff Shadows	350	1162	CRCSV223	ALLGOW3	5.68	2.44
0077	E	Conc Chnl 20'W 6'D 0:1 SS	1229	1162	CRCSV223	ALLGOW3	5.68	6.11
0100	E	Conc Chnl 20'W 10'D 0:1 SS	200	1162	CRCSV223	ALLGOW3	5.68	5.67
0115	E	66" RCP Outlet	670	679	DET26	ALLGOW3	4.43	
0128	E	333 ac-ft Village 26 Detention Basin		3767	VIL26IN	ALLGOW3	4.43	
0137	P0	14' X 14' RCB	4335	3767	VIL26IN	ALLGOW3	4.43	0.50
0216	P0	Conc Chnl 50'W 4.5'D 2:1 SS	3761	3693	CSV26-1	ALLGOW3	4.15	6.08
0289	P0	Conc Chnl 50'W 3.5'D 2:1 SS	6215	2396	30	ALLGOW3	2.51	7.95
0290	E	Natural Wash 363'W	4850	1465	SV26-1	ALLGOW3	1.64	22.50
0370	E	Natural Wash 450'W	7000	2396	30	ALLGOW3	2.51	8.50
GOL4		**GOWAN LONE MOUNTAIN SYSTEM-BRANCH 4**						
0000	E	14' X 8' RCB	554	2257	CLMT1R	ALLGOW3	2.33	2.50
0010	E	2: 9' X 8' RCB	820	2257	CLMT1R	ALLGOW3	2.33	4.74
0025	E	Soil Cement Chnl 60'W 8'D 3-4:1 SS	320	2257	CLMT1R	ALLGOW3	2.33	2.00
0026	E	Soil Cement Chnl 42'W 6'D 3-4:1 SS	700	2257	CLMT1R	ALLGOW3	2.33	1.00

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

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

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

REGIONAL FLOOD CONTROL DISTRICT

2013 LAS VEGAS VALLEY FLOOD CONTROL MASTER PLAN UPDATE

FACILITY INVENTORY FIGURE F - 24

LEGEND

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

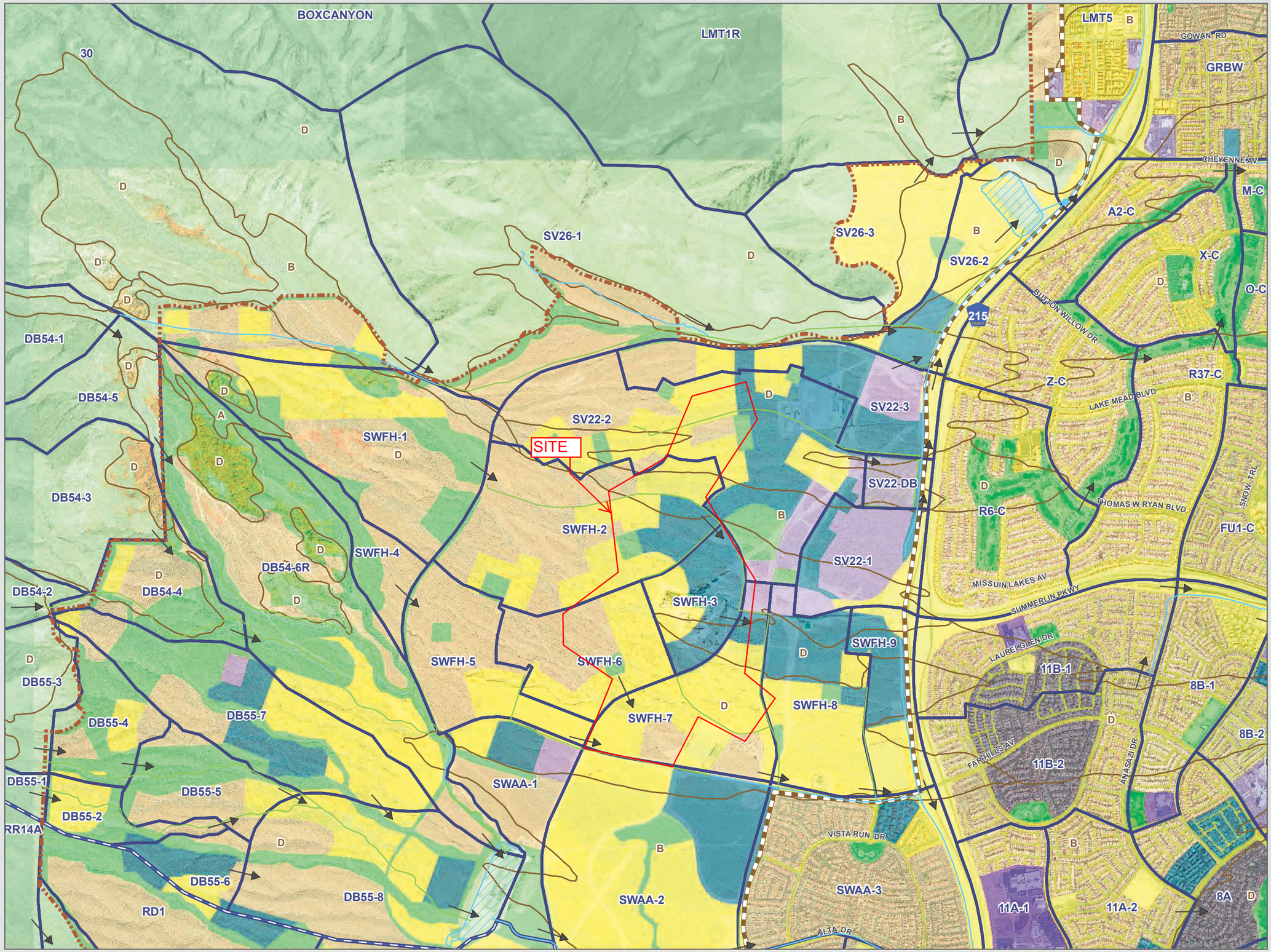
River Mile 0000
- Distance Above Confluence with Parent Stream (Miles)
- Miles in Hundredths

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

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

Construction Features

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



REGIONAL FLOOD CONTROL DISTRICT

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE H- 24
HYDROLOGIC SUMMARY

LEGEND

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

Flood Control Facilities

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

Type Hydrologic Soil Groups

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

Typical Land Use

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

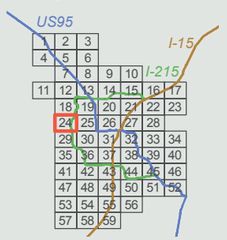
* Drought Ordinance Applied

N

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

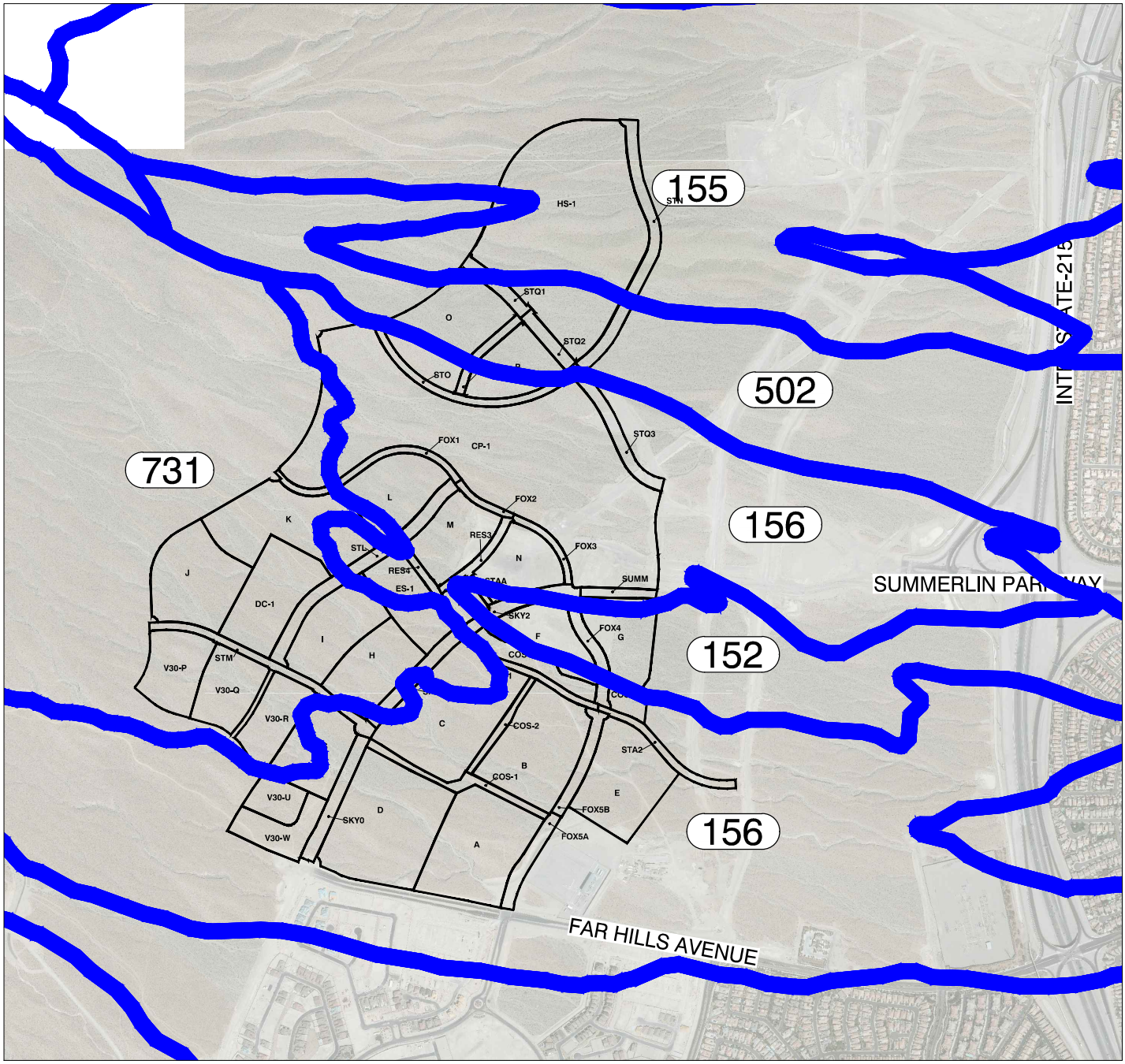
Scale: 1 inch = 2,000 feet

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



PBS&J PB

FIGURE 4B - MPU HYDROLOGIC SUMMARY



LEGEND

SITE BOUNDARY

300 SOIL NUMBER

SOIL BOUNDARY

NOTE:
1. This data was taken from the following website: http://soildatamart.nrcs.usda.gov
2. This data is in state plane coordinates

NORTH

GRAPHIC SCALE

1500 0 750 1500 3000

1" = 1500'

H:\7919\Drainage\1_TDS\A Figures\Figure 5 - Soils Map.dwg

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NV 89146-5148

FIGURE 5A
SOILS MAP

SUMMERLIN WEST
VILLAGE 25

SCALE	HORZ. 1"=1500'
	VERT. n/a
W.O. NO.	7919
DRAWN BY:	AH
DATE:	JUNE 2018
SHEET	OF

RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved: curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved: open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					

See Table 602A

Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94

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

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

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

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

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

Revision	Date

RUNOFF CURVE NUMBERS - RESIDENTIAL DISTRICTS

Average Lot Size or Usage[1]	Percent Impervious[2]	Curve Number for Hydrologic Soil Groups			
		A	B	C	D
Apartments/Condos	72	81	88	91	93
Townhouses/6,000 sq ft lots or less[3]	69	80	87	90	92
7,000 sq ft lots	63	76	84	89	91
8,000 sq ft lots	58	73	82	88	90
10,000 sq ft lots	38	61	75	83	87
14,000 sq ft lots	30	57	72	81	86
20,000 sq ft lots	25	54	70	80	85
40,000 sq ft lots	20	51	68	79	84
80,000 sq ft lots	12	46	65	77	82

1 Lot size should represent the size of the average lot and not the gross acreage divided by the number of lots.

2 Actual percent impervious value should be compared to selected land use type.

3 In cases where average residential lots are smaller than 6,000 sq ft, commercial/business/industrial land use should be used.

Revision	Date

REFERENCE:

TABLE 602A

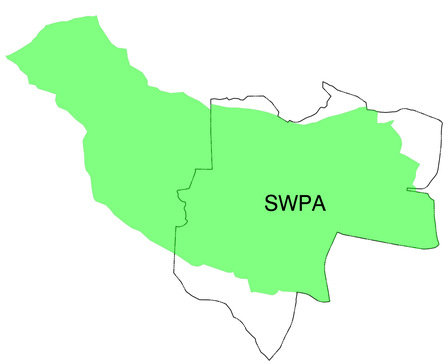
HEC-1 SUMMARY TABLE
DB5/ALTA TRIBUTARY
ULTIMATE CONDITION

Basin / Concentration Point	Area (Acre)			Q_{100} (cfs)			SDN	Basin / Concentration Point	Area (Acre)			Q_{100} (cfs)			SDN
	Update	Previous	Difference	Update	Previous	Difference			Update	Previous	Difference	Update	Previous	Difference	
3-1	1422.67	1422.67	0	2117	2117	0	SDN3	3-G2	119.24	82.23	37.01	432	286	146	SDN3
3-2	144.58	144.58	0	429	429	0	SDN3	3-L2	57.71	59.53	-1.82	186	178	8	SDN3
CP3.1	-	-	-	2172	2172	0	SDN3	CP3.8	-	-	-	602	896	-294	SDN3
3-D	213.04	213.07	-0.03	614	488	126	SDN3	3-A	616.53	233.21	383.32	1255	458	797	SDN3
CP3.3	-	-	-	2332	2319	13	SDN3	3-B	100.29	446.26	-345.97	332	853	-521	SDN3
3-3	111.16	111.16	0	392	392	0	SDN3	3-C	141.55	184.83	-43.28	389	363	26	SDN3
3-4	221.26	221.26	0	757	757	0	SDN3	CPDBA-B	858.37	864.3	-5.93	1785	1561	224	SDN3
3-5	187.91	187.91	0	625	625	0	SDN3	GPDB	858.37	864.3	-5.93	184	142	42	SDN3
CP3.2	520.33	520.33	0	1666	1666	0	SDN3	3-G1	117.56	110.4	7.16	407	476	-69	SDN3
3-E	362.34	348.31	14.03	855	792	63	SDN3	CP3-G1	-	-	-	529	529	0	SDN3
3-F	138.17	180.16	-41.99	476	472	4	SDN3	3-Q2	95.51	95.5	0.01	204	341	-137	SDN3
CP3.4	-	-	-	4139	3596	543	SDN3	CP3-Q2	-	-	-	713	796	-83	SDN3
3-6	56.74	56.74	0	203	203	0	SDN3	3-H1	77.17	80.61	-3.44	257	295	-38	SDN3
3-7	109.69	109.69	0	423	423	0	SDN3	CP3-H1	-	-	-	958	1053	-95	SDN3
3-J	157.02	97.87	59.15	414	200	214	SDN3	3-I1	192.91	187.75	5.16	538	501	37	SDN3
CP3.5	-	-	-	872	689	183	SDN3	CP3.9	-	-	-	1950	2269	-319	SDN3
3-8	408.73	408.73	0	1113	1113	0	SDN3	3-H2	64.21	64.21	0	197	209	-12	SDN3
3-K	537.27	568.98	-31.71	1378	1226	152	SDN3	3-I2	74.15	75.83	-1.68	211	201	10	SDN3
CP3.6	-	-	-	3168	2804	364	SDN3	CP3.10A	-	-	-	398	406	-8	SDN3
3-N	290.9	290.04	0.86	747	681	66	SDN3	CP3.10	-	-	-	2301	2626	-325	SDN3
3-M	149.46	123.16	26.3	485	362	123	SDN3	3-O	51.51	55.79	-4.28	187	182	5	SDN3
CPDB5	-	-	-	7787	6857	930	SDN3	3-P2	0	55.73	-55.73	0	155	-155	SDN3
DB5	4510.94	4484.33	26.61	2148	2137	11	SDN3	3-P1	119.43	85.52	33.91	419	283	136	SDN3
3-L	150.92	152.22	-1.3	486	396	90	SDN3	CP3-P	-	-	-	596	612	-16	SDN3
CP3-L	-	-	-	2221	2206	15	SDN3	3-Q	65.66	65.66	0	202	197	5	SDN3
RCSWAA-1	4661.86	4636.55	25.31	2220	2205	15	SDN3	CP3-Q	-	-	-	779	804	-25	SDN3
SWAA-2	448	449	-1	948	948	0	SDN3	3-H3	89.8	89.8	0	252	256	-4	SDN3
CSWAA-2	5109.86	5085.55	24.31	2884	2838	46	SDN3	CP3.11	-	-	-	3191	3515	-324	SDN3
SWAA-3	371.2	372.2	-1	668	668	0	SDN3	ANGLPKIN	14553.6	14451.2	102.4	8949	8875	74	SDN5
CSWAA-3	5481.06	5457.75	23.31	3121	3074	47	SDN4	ANGLPKDB	14553.6	14451.2	102.4	877	405	472	SDN5

LEGEND

- CONCENTRATION POINT
- BASIN BOUNDARY
- LOT BOUNDARY
- 3-A ONSITE BASIN ID
- 3-3 OFFSITE BASIN ID
- LM3 LOT ID
- FLOW ARROW

KEY MAP



EX 12X8' RCAP (RFCD FACILITY APFH 0024)
EX (2) 6'X8' RCB (RFCD FACILITY APFH 0019)
EX 6'X8' RCB (RFCD FACILITY APCH 0000)
EX BELTWAY CHANNEL (RFCD FACILITY APBE 0051)
EX BELTWAY CHANNEL (RFCD FACILITY 5/122.19/64)
EX DB5 DETENTION BASIN

GRAPHIC SCALE
1000 0 500 1000 2000
1" = 1000'

NORTH

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LAS VEGAS, NV 89135

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CONSULTING ENGINEERS ● PLANNERS ● LAND SURVEYORS

REVISION	DATE	BY
ADDENDUM #1	10/17	JVA

2018 UPDATE TO SUMMERLIN WEST PLANNING AREA

A.6.3
DB5/Alta Tributary

DRAWN BY: PLM
DESIGNED BY:
CHECKED BY:
PROJECT NO: 7809
SCALE: 1"=1000' HORIZ. VERT.
DATE: 11/2018

SHEET
A.6.3
OF SHEETS
DRAWING NO.

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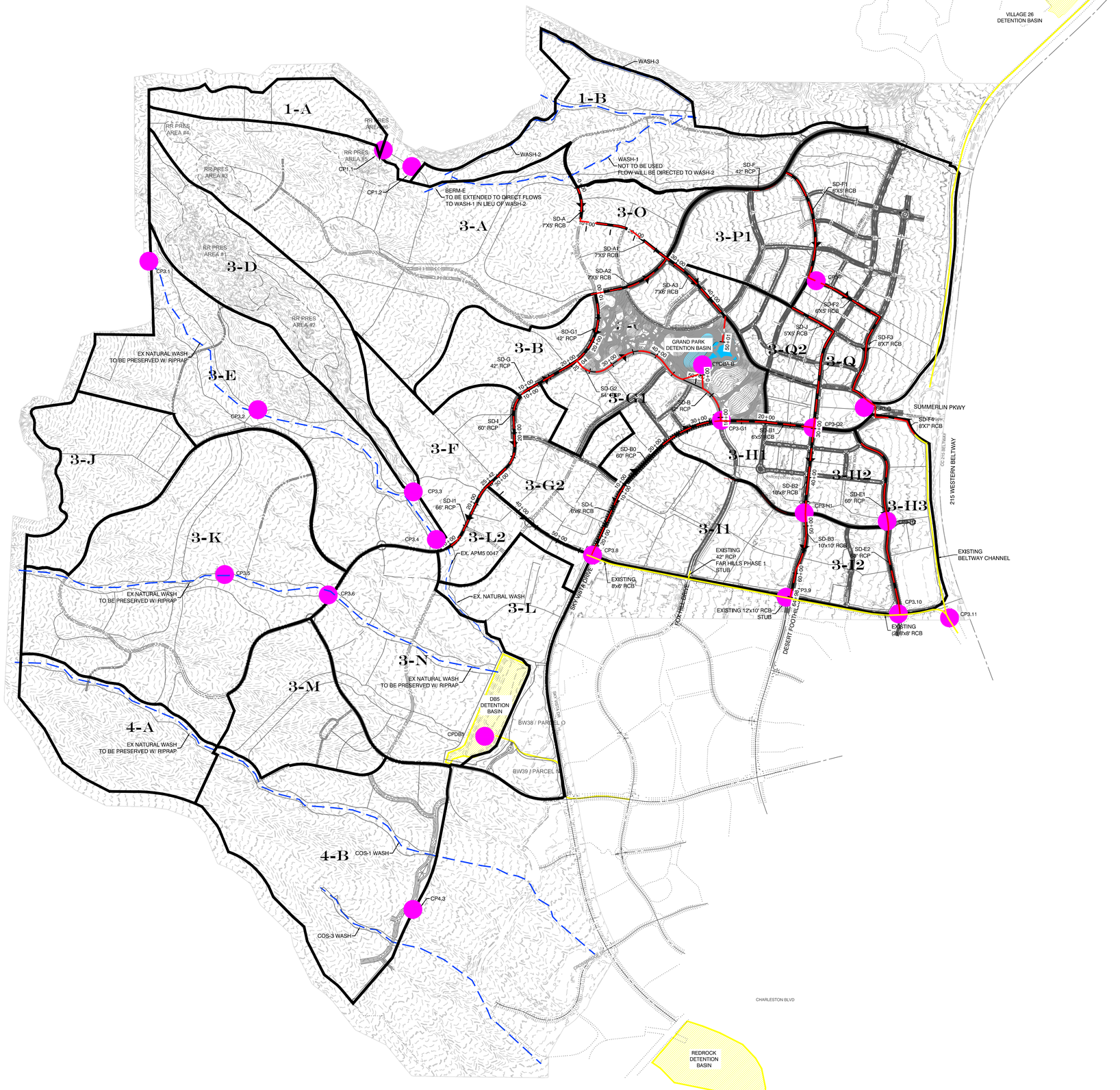



GRAPHIC SCALE

1000 0 500 1000 2000

1" = 1000'

REGIONAL FLOOD CONTROL FACILITY SUMMARY TABLE

Designation	Q (cfs)	Basin/CP	Size	Type	Velocity	Remarks
SD-A	627.5	1/2 3-A	7'x5'	RCB	19.93	
SD-A1	627.5	1/2 3-A	7'x5'	RCB	29.18	
SD-A2	627.5	1/2 3-A	7'x5'	RCB	29.18	
SD-A3	1255	3-A	7'x6'	RCB	37.73	
SD-B	184	GPDB	42"	RCP	24.97	
SD-B0	407	3-G1	60"	RCP	29.34	
SD-B1	529	CP3-G1	6'x5'	RCB	27.31	
SD-B2	958	CP3-H1	10'x8'	RCB	23.88	Reference 2
SD-B3	1496	CP3-H1, 3-I1	10'x10'	RCB	23.97	Reference 1
SD-J	204	3-Q2	5'x5'	RCB	9.50	
SD-E1	197	3-H2	60"	RCP	16.31	Reference 4
SD-E2	408	3-H2, 3-I2	60"	RCP	22.47	Reference 3
SD-F	187	3-O	42"	RCP	26.25	
SD-F1	596	CP3-P	6'x5'	RCB	24.63	
SD-F2	779	CP3-Q	6'x5'	RCB	30.60	
SD-F3	779	CP3-Q	8'x7'	RCB	17.42	
SD-F4	779	CP3-Q	8'x7'	RCB	19.74	
SD-G	166	1/2 3-B	42"	RCP	23.36	
SD-G1	166	1/2 3-B	42"	RCP	20.45	
SD-G2	332	3-B	54"	RCP	27.13	
SD-I	238	1/2 3-F	60"	RCP	21.05	
SD-I1	238	1/2 3-F	66"	RCP	15.33	
SD-L	432	3-G2	7'x6'	RCB	11.54	

References:

1- TDS for Desert Foothills Drive (Far Hills to Street A)

2- TDS for Desert Foothills Drive (Redpoint to Summerlin Pkwy)

3- TDS for Carriage Hill Drive (Far Hills to Street A)

4- TDS for Carriage Hill Drive (Redpoint to Summerlin Pkwy)

LEGEND

- STORM DRAIN FACILITY ALIGNMENT
- EXISTING FACILITY ALIGNMENT
- EXISTING WASHES TO BE DESIGNATED AS CCRFCD MPU FACILITIES
- CONCENTRATION POINT
- BASIN BOUNDARY
- 3-A ONSITE BASIN
- 3-1 OFFSITE BASIN

REV	DATE	BY	REVISION

THE HOWARD HUGHES CORPORATION
1980 FESTIVAL PLAZA DRIVE, SUITE 300
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2018 UPDATE TO SUMMERLIN WEST PLANNING AREA

A.6.5 REGIONAL FLOOD CONTROL FACILITIES MAP

DRAWN BY: JYA 11/2018

DESIGNED BY: JAN 201

CHECKED BY: WJ

PROJECT NO: 7809

SCALE: HORZ. VERT.

SHEET A.6.5 OF SHEETS

DRAWING NO.

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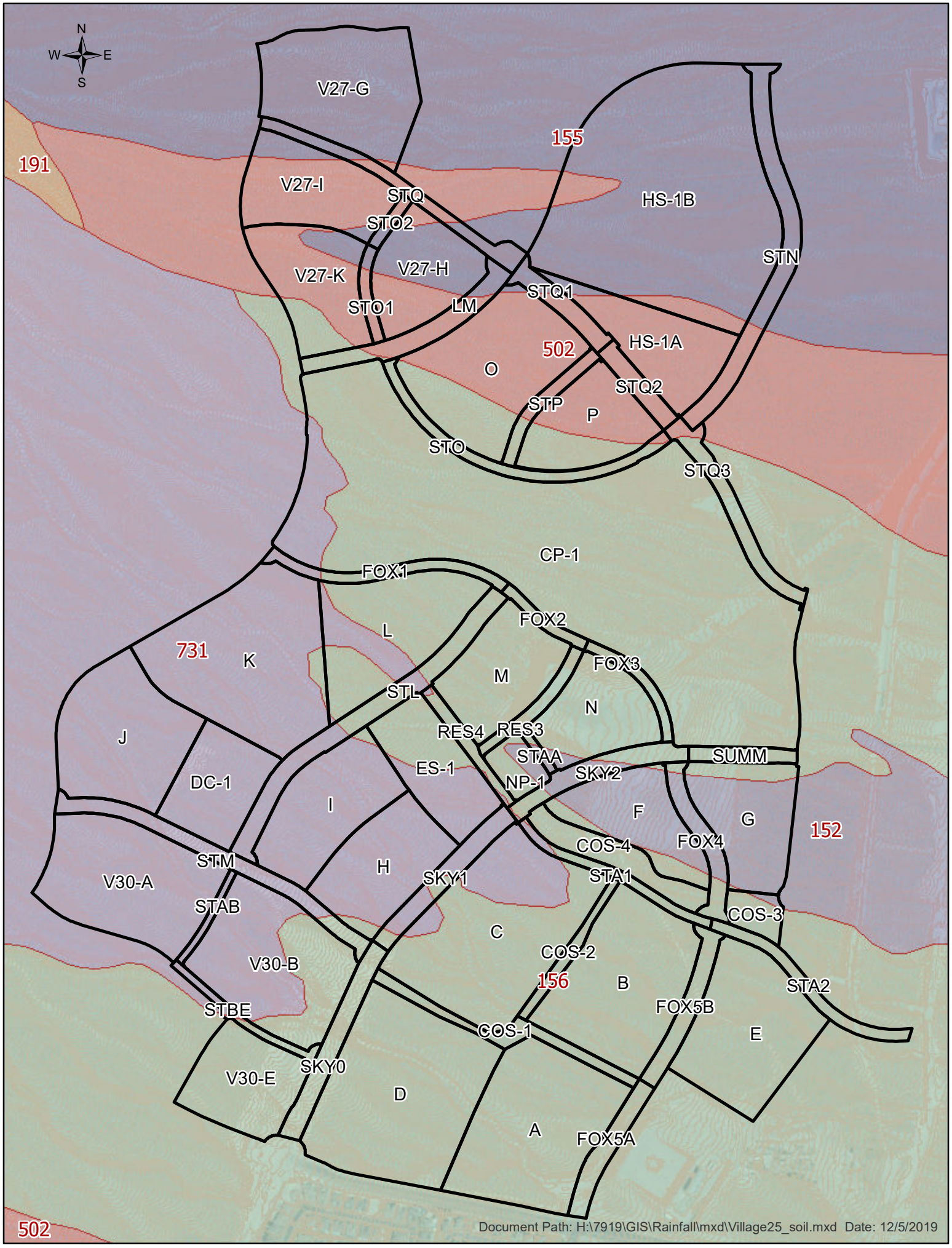
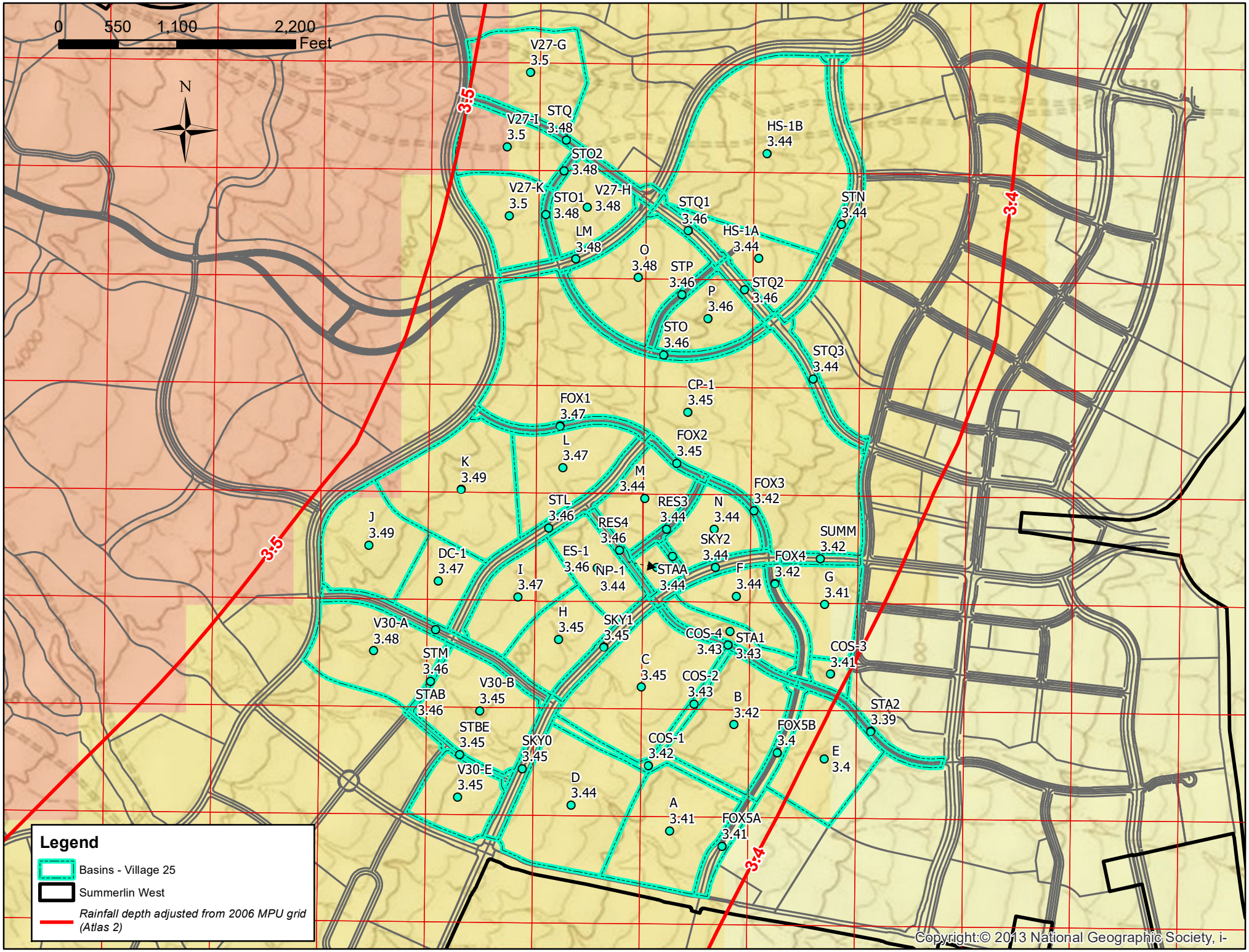
APPENDIX

APPENDIX A
FIGURES


N
W
E
S
V27-G
155
191
V27-I
STQ
HS-1B
STO2
STN
V27-K
V27-H
STQ1
STO1
LM
502
HS-1A
O
STQ2
STP
P
STO
STQ3
CP-1
FOX1
FOX2
L
731
K
FOX3
M
STL
N
RES4
RES3
J
STAA
SUMM
ES-1
SKY2
DC-1
NP-1
F
G
I
152
COS-4
FOX4
STM
H
SKY1
STA1
V30-A
STAB
COS-3
C
COS-2
V30-B
156
B
STA2
STBE
FOX5B
COS-1
E
SKY0
V30-E
D
A
FOX5A
502
Document Path: H:\7919\GIS\Rainfall\mxd\Village25_soil.mxd Date: 12/5/2019



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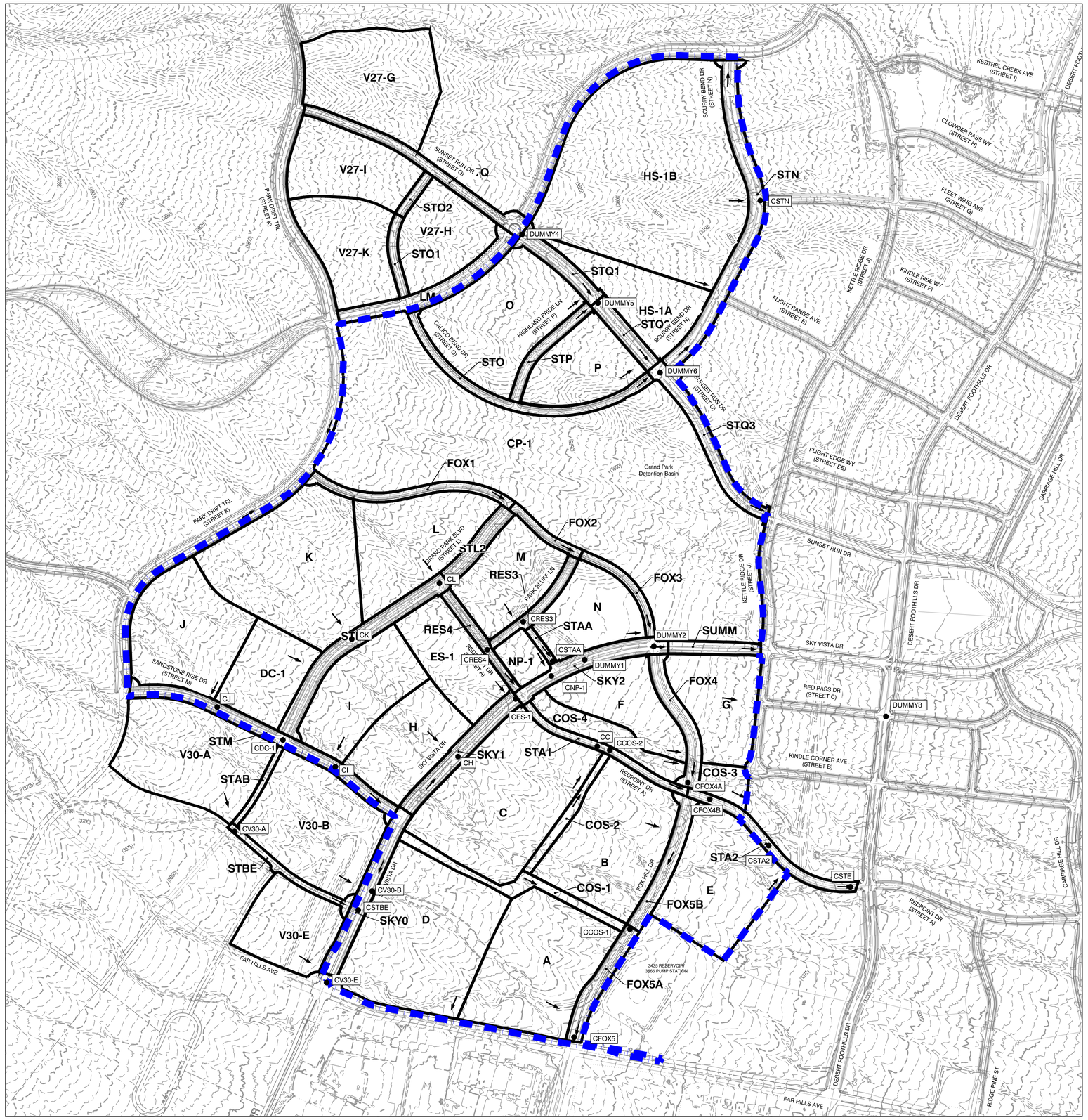

LEGEND

- VILLAGE 25 BOUNDARY
- BASIN BOUNDARY
- W51 BASIN DESIGNATION
- CW51 ● CONCENTRATION POINT
- FLOW ARROW

GRAPHIC SCALE
400 0 200 400 800
1" = 400'

NORTH

ULTIMATE CONDITION HEC-1 SUMMARY TABLE

BASIN ID	Area (a.c.)			Q100 (cfs)		
	Update #1	Previous	Difference	Update #1	Previous	Difference
J	16.90	16.90	0.00	69	69	0.00
STM	4.76	4.76	0.00	20	20	0.00
CJ	-	-	N/A	89	-	N/A
DC-1	9.42	15.02	-5.60	35	56	-21.00
CDC-1	-	-	N/A	124	184	-60.00
I	13.23	13.23	0.00	53	53	0.00
CI	-	-	N/A	176	274	-98.00
SKY0	4.15	4.15	0.00	15	14	1.00
V30-B	20.53	N/A	N/A	83	N/A	N/A
CV30B	-	N/A	N/A	273	N/A	N/A
V30-A	19.05	N/A	N/A	80	N/A	N/A
STAB	0.80	N/A	N/A	3	N/A	N/A
CV30-A	-	N/A	N/A	83	N/A	N/A
STBE	1.67	N/A	N/A	8	N/A	N/A
CSTBE	-	N/A	N/A	364	N/A	N/A
V30-E	10.36	N/A	N/A	44	N/A	N/A
CV30-E	-	N/A	N/A	408	N/A	N/A
SKY1	3.91	3.91	0.00	16	16	0.00
H	12.11	12.11	0.00	48	48	0.00
CH	-	-	N/A	64	64	0.00
ES-1	10.20	10.20	0.00	42	42	0.00
CES-1	-	-	N/A	105	106	-1.00
SKY2	3.78	3.78	0.00	17	17	0.00
NP-1	2.70	2.70	0.00	9	9	0.00
CNP-1	-	-	N/A	129	132	-3.00
STL1	5.60	7.86	-2.26	21	28	-7.00
K	25.71	21.91	3.80	101	86	15.00
CK	-	-	N/A	123	113	10.00
L	16.19	12.79	3.40	68	53	15.00
CL	-	-	N/A	187	167	20.00
RES4	1.60	1.60	0.00	7	7	0.00
CRES4	-	-	N/A	194	174	20.00
RES3	1.97	1.97	0.00	9	9	0.00
M	11.09	10.88	0.21	47	46	1.00
CRES3	-	-	N/A	248	229	19.00
STAA	0.44	0.44	0.00	2	2	0.00
CSTAA	-	-	N/A	248	231	17.00
N	9.91	9.91	0.00	40	40	0.00
CP-1	93.32	94.28	-0.96	270	282	-12.00
STL2	2.26	N/A	N/A	9	N/A	N/A
FOX1	2.91	3.39	-0.48	12	14	-2.00
FOX2	1.67	1.06	0.61	8	5	3.00
FOX3	1.51	1.51	0.00	7	7	0.00
SUMM	1.65	1.65	0.00	7	7	0.00
G	11.44	11.44	0.00	45	45	0.00
D	27.15	27.15	0.00	105	105	0.00
FOX5B	3.19	3.19	0.00	12	12	0.00
COS-1	3.48	3.48	0.00	9	9	0.00
CCOS-1	-	-	N/A	20	20	0.00
FOX5A	3.15	3.15	0.00	11	11	0.00
A	21.35	21.35	0.00	81	81	0.00
CFOX5	-	-	N/A	111	111	0.00
C	26.54	26.54	0.00	99	99	0.00
STA1	2.29	2.29	0.00	10	10	0.00
CC	-	-	N/A	109	109	0.00
COS-2	1.72	1.72	0.00	5	5	0.00
CCOS-2	-	-	N/A	114	114	0.00
FOX4	3.20	3.20	0.00	14	14	0.00
F	10.44	10.44	0.00	43	43	0.00
COS-4	5.04	5.04	0.00	16	16	0.00
CFOX4A	-	-	N/A	73	73	0.00
B	19.86	19.86	0.00	76	76	0.00
CFOX4B	-	-	N/A	263	263	0.00
STA2	2.84	2.84	0.00	12	12	0.00
CSTA2	-	-	N/A	275	275	0.00
COS-3	2.40	2.40	0.00	8	8	0.00
E	17.14	17.14	0.00	65	65	0.00
CSTE	-	-	N/A	348	348	0.00
V27-G	18.08	N/A	N/A	71	N/A	N/A
V27-I	11.97	N/A	N/A	39	N/A	N/A
STO2	0.76	N/A	N/A	3	N/A	N/A
STQ	4.13	N/A	N/A	19	N/A	N/A
CSTQ	-	N/A	N/A	132	N/A	N/A
V27-K	11.98	N/A	N/A	49	N/A	N/A
STO1	1.24	N/A	N/A	6	N/A	N/A
CSTO1	-	N/A	N/A	54	N/A	N/A
LM	4.65	N/A	N/A	21	N/A	N/A
V27-H	10.40	N/A	N/A	38	N/A	N/A
STQ1	2.49	2.49	0.00	11	11	0.00
O	19.18	19.18	0.00	46	46	0.00
STP	2.05	2.05	0.00	9	9	0.00
STQ2	2.11	2.11	0.00	10	10	0.00
P	10.31	10.31	0.00	42	42	0.00
STO	4.10	4.10	0.00	17	17	0.00
STQ3	4.22	4.22	0.00	18	18	0.00
STN	7.67	7.67	0.00	27	27	0.00
HS-1A	11.70	11.70	0.00	47	47	0.00
HS-1B	49.79	49.79	0.00	198	195	3.00
CSTN	-	-	N/A	269	266	3.00

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FIGURE 6
ULTIMATE CONDITION BASIN MAP

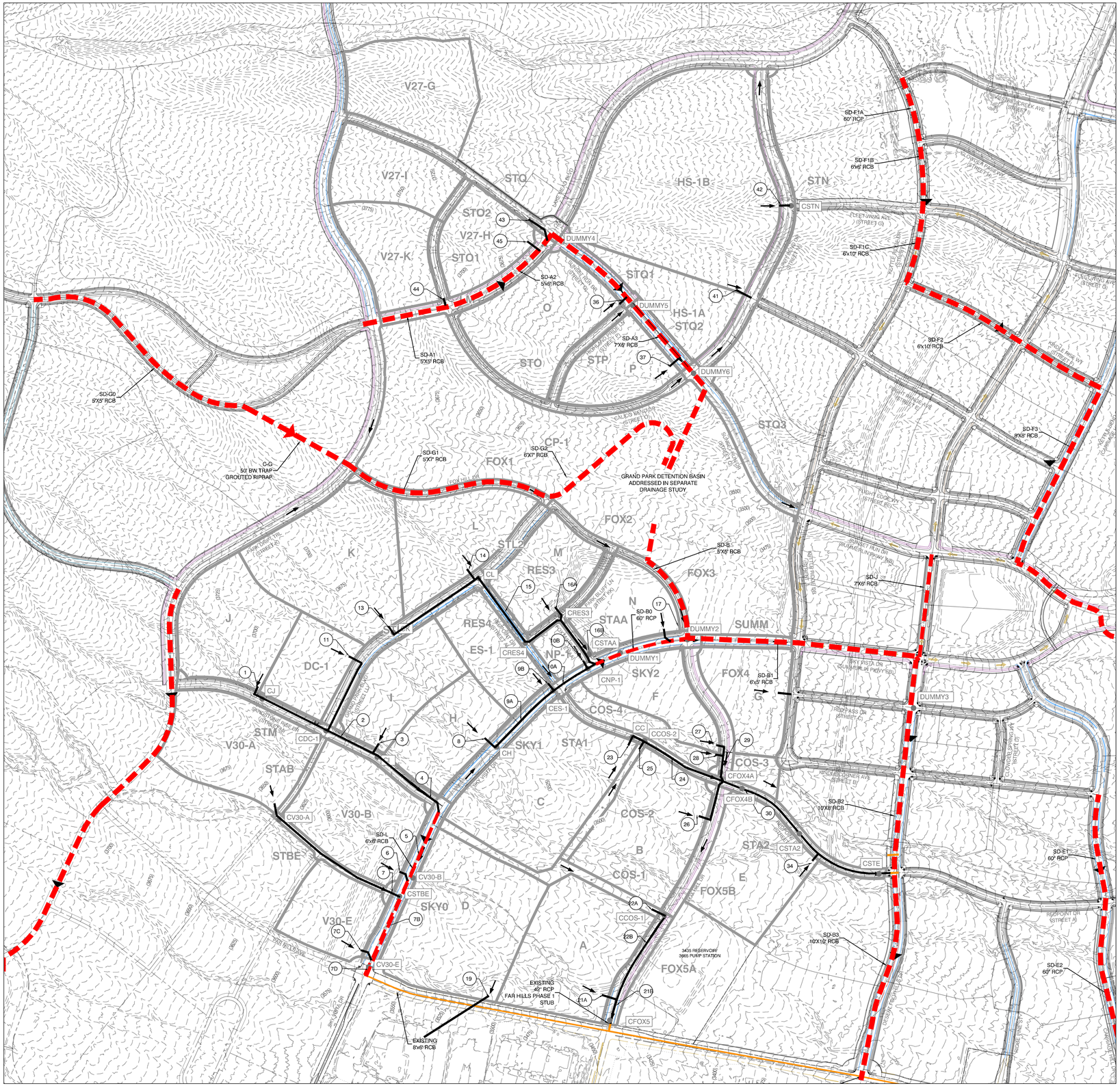
SUMMERLIN WEST VILLAGE 25

REV	DATE	BY	REVISION

DRAWN BY: JYA — DECEMBER 2019
DESIGNED BY: JYA — DECEMBER 2019
CHECKED BY: JYA — DECEMBER 2019
PROJECT NO: 7919
SCALE: 1" = 400' HORIZ, N/A VERT.

SHEET
OF SHEETS
DRAWING NO.
FIG 6

H:\7919\Drainage\5_UP11A_Figures\Figure 6 - Village 25 Drainage Basin Map.dwg



GRAPHIC SCALE

400 0 200 400 800

1" = 400'

NORTH

LEGEND

- CCRFCD STORM DRAIN ALIGNMENT
- EXISTING FACILITY
- VILLAGE 25 LOCAL STORM DRAIN
- W51 BASIN DESIGNATION
- CONCENTRATION POINT
- (1) LOCAL FACILITY DESIGNATION
- DEVELOPED CONDITION FLOW ARROW

VILLAGE 25 LOCAL FLOOD PROTECTION FACILITIES

Facility #	Design Slope	Q100	Tributary Basin/CP	Facility	Velocity
	%	cfs			fps
1	1.00%	39	J	30" RCP	9.51
2	6.00%	89	CJ	48" RCP	23.35
3	0.70%	53	I	36" RCP	8.98
4	6.00%	176	CI	48" RCP	28.00
5	0.50%	176	CI	6'X6' RCB	10.38
6	1.00%	83	V30-B	42" RCP	11.68
7	1.00%	83	CV30-A	42" RCP	11.68
7B	0.50%	364	CSTBE	6'X6' RCB	12.26
7C	1.00%	44	V30-E	36" RCP	10.08
7D	0.50%	408	CV30-E	6'X6' RCB	12.54
8	6.00%	48	H	36" RCP	20.09
9A	0.50%	64	CH	42" RCP	8.37
9B	0.99%	42	ES-1	36" RCP	9.93
10A	6.00%	105	CES-1	42" RCP	24.59
10B	5.78%	9	NP-1	24" RCP	12.81
11	1.00%	35	DC-1	30" RCP	9.38
13	0.90%	101	K	42" RCP	11.20
14	1.00%	68	L	42" RCP	11.23
15	5.98%	187	CL	42" RCP	28.14
16A	6.00%	47	M	24" RCP	19.79
16B	4.05%	248	CSTAA	48" RCP	25.86
17	2.55%	40	N	30" RCP	14.00
19	0.50%	105	D	36" RCP	24.04
21A	1.00%	81	A	42" RCP	11.63
21B	2.02%	111	CFOX5	42" RCP	16.42
22A	4.00%	9	COS-1	24" RCP	11.23
22B	1.00%	20	CCOS-1	24" RCP	8.13
23	0.50%	99	C	48" RCP	9.21
24	5.13%	114	CCOS-2	48" RCP	23.60
25	0.50%	5	COS-2	24" RCP	4.50
26	1.00%	76	B	48" RCP	11.59
27	1.33%	43	F	30" RCP	10.92
29	1.50%	73	CFOX4A	36" RCP	13.07
30	5.50%	263	CFOX4B	54" RCP	29.95
31	4.27%	8	COS-3	24" RCP	11.12
34	0.50%	65	E	42" RCP	8.38
36	1.00%	46	O	36" RCP	10.18
37	1.00%	42	P	36" RCP	9.97
41	1.00%	47	HS-1A	36" RCP	10.22
42	1.00%	198	HS-1B	54" RCP	14.09
43	1.00%	132	CSTQ	48" RCP	12.97
44	1.00%	49	V27-K	36" RCP	10.31
45	1.00%	38	V27-H	30" RCP	9.49

REV	DATE	BY	REVISION

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FIGURE 7
LOCAL STORM DRAIN FACILITIES MAP

SUMMERLIN WEST VILLAGE 25

DRAWN BY: JYA	DECEMBER 2019	SCALE:	1"=400'
DESIGNED BY: JYA	DECEMBER 2019		HORIZ.
CHECKED BY: JYA	DECEMBER 2019		VERT. NA
PROJECT NO: 7919			

SHEET

OF SHEETS

DRAWING NO.

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APPENDIX B
HYDROLOGIC CALCULATIONS

CURVE NUMBERS FOR SOILS - W.O. #7919

Soil # 152 Cave gravelly fine sandy loam, 0 to 4 percent slopes									
Soil	Percent	Group	Residential$_{1}$ (Apartment/Condo)	Residential$_{2}$ (7,000 ft^2)	Open Space $_{3}$(Poor Condition)	Urban Districts $_{4}$(Commercial)	Impervious $_{5}$(Streets and roads(Paved)	Urban Districts $_{6}$(Industrial)	Residential$_{7}$ (Townhomes)
Cave	100%	D	93	91	89	95	98	93	92
Total	**100%**		**93**	**91**	**89**	**95**	**98**	**93**	**92**

Soil # 155 Cave gravelly fine sandy loam, 4 to 15 percent slopes									
Soil	Percent	Group	Residential$_{1}$ (Apartment/Condo)	Residential$_{2}$ (7,000 ft^2)	Open Space $_{3}$(Poor Condition)	Urban Districts $_{4}$(Commercial)	Impervious $_{5}$(Streets and roads(Paved)	Urban Districts $_{6}$(Industrial)	Residential$_{7}$ (Townhomes)
Cave	100%	D	93	91	89	95	98	93	92
Total	**100%**		**93**	**91**	**89**	**95**	**98**	**93**	**92**

Soil # 156 Vace - Wechech association									
Soil	Percent	Group	Residential$_{1}$ (Apartment/Condo)	Residential$_{2}$ (7,000 ft^2)	Open Space $_{3}$(Poor Condition)	Urban Districts $_{4}$(Commercial)	Impervious $_{5}$(Streets and roads(Paved)	Urban Districts $_{6}$(Industrial)	Residential$_{7}$ (Townhomes)
Vace and Similar	45%	D	93	91	89	95	98	93	92
Wechech and Similar	25%	D	93	91	89	95	98	93	92
Wechech, steep, and similar	15%	D	93	91	89	95	98	93	92
Weiser	8%	B	88	84	79	92	98	88	87
Irongold	4%	D	93	91	89	95	98	93	92
Commski	2%	B	88	84	79	92	98	88	87
Threelakes	1%	A	81	76	68	89	98	81	80
Total	**100%**		**93**	**91**	**88**	**95**	**98**	**93**	**92**

Soil # 502 Canutio-Cave gravelly fine sandy loams, 2 to 8 percent slopes									
Soil	Percent	Group	Residential$_{1}$ (Apartment/Condo)	Residential$_{2}$ (7,000 ft^2)	Open Space $_{3}$(Poor Condition)	Urban Districts $_{4}$(Commercial)	Impervious $_{5}$(Streets and roads(Paved)	Urban Districts $_{6}$(Industrial)	Residential$_{7}$ (Townhomes)
Canutio	55%	A	81	76	68	89	98	81	80
Cave	40%	D	93	91	89	95	98	93	92
Arizo	5%	D	93	91	89	95	98	93	92
Total	**100%**		**87**	**83**	**78**	**92**	**98**	**87**	**86**

Soil # 731 Purob-Irongold association									
Soil	Percent	Group	Residential$_{1}$ (Apartment/Condo)	Residential$_{2}$ (7,000 ft^2)	Open Space $_{3}$(Poor Condition)	Urban Districts $_{4}$(Commercial)	Impervious $_{5}$(Streets and roads(Paved)	Urban Districts $_{6}$(Industrial)	Residential$_{7}$ (Townhomes)
Purob	60%	D	93	91	89	95	98	93	92
Irongold	25%	D	93	91	89	95	98	93	92
Typic torriorthents	5%	A	81	76	68	89	98	81	80
Arizo	3%	A	81	76	68	89	98	81	80
Purob	3%	D	93	91	89	95	98	93	92
Typic haplocalcids	2%	B	88	84	79	92	98	88	87
Xeric haplocambids	1%	A	81	76	68	89	98	81	80
Aridic calcixerolls	1%	A	81	76	68	89	98	81	80
Total	**100%**		**92**	**90**	**87**	**95**	**98**	**92**	**91**

1-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602A
* Residential (Apartments / Condos)

2-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602A
* Residential (7,000 sq ft lots)

3-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602 page 1 of 4
* Open spaces in poor condition (grass cover < 50%)

4-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602 page 1 of 4
* Urban Districts (Commercial / Business & Residential with average lot size <6000 sqft)

5-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602 page 1 of 4
*Impervious (Paved Streets)

6-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602 page 1 of 4
*Urban Districts (Industrial)

7-Referenced Clark County's Hydrologic Criteria and Drainage Design Manual Table 602 page 1 of 4
*Residential (Townhomes)

Curve Number calculations for basins										
Basin Name	Type	Soil Percentage	1	2	3	4	5	6	7	CN Value
A	156	100%				100%				95.0
B	156	100%				100%				95.0
C	156	74%				100%				95.0
	731	26%				100%				
D	156	100%				100%				95.0
DC-1	731	100%						100%		92.0
E	156	100%				100%				95.0
ES-1	156	48%				100%				95.0
	731	52%				100%				
F	152	79%				100%				95.0
	156	21%				100%				
G	152	84%	100%							93.0
	156	16%	100%							
H	156	5%				100%				95.0
	731	95%				100%				
HS-1A	155	6%				100%				95.0
	502	94%				100%				
HS-1B	155	93%				100%				94.8
	502	7%				100%				
I	156	2%				100%				95.0
	731	98%				100%				
J	731	100%				100%				95.0
K	156	3%				100%				95.0
	731	97%				100%				
L	156	80%				100%				95.0
	731	20%				100%				
M	156	100%				100%				95.0
N	152	5%				100%				95.0
	156	95%				100%				
O	155	1%				100%				81.3
	156	32%				100%				
	502	67%				100%				
P	156	40%				100%				93.2
	502	60%				100%				
COS-1	156	100%			100%					88.0
COS-2	156	100%			100%					88.0
COS-3	152	9%			100%					88.1
	156	91%			100%					
COS-4	156	100%			100%					88.0
	731	0%			100%					
CP-1	156	94%			100%					87.1
	731	5%			100%					
NP-1	152	37%			100%					88.4
	156	63%			100%					
FOX1	156	75%					100%			98.0
	731	25%					100%			
FOX2	156	100%					100%			98.0
FOX3	156	100%					100%			98.0
FOX4	152	67%					100%			98.0
	156	33%					100%			
FOX5A	156	100%					100%			98.0
FOX5B	156	100%					100%			98.0
LM	155	12%					100%			98.0
	156	58%								
	502	30%								
RES3	156	100%					100%			98.0
RES4	156	90%					100%			98.0
	731	10%					100%			
SKY0	156	100%					100%			98.0
SKY1	156	22%					100%			98.0
	731	78%					100%			
SKY2	152	43%					100%			98.0
	156	55%					100%			
	731	2%					100%			
STAA	152	72%					100%			98.0
	156	28%					100%			
STAB	731	100%					100%			98.0
STA1	156	82%					100%			98.0
	731	18%					100%			
STA2	156	100%					100%			98.0
STBE	156	72%					100%			98.0
	731	28%					100%			

STL1	156	80%					100%			**98.0**
	731	20%					100%			
STL2	156	100%					100%			**98.0**
STM	731	17%					100%			**98.0**
	156	83%					100%			
STN	155	68%					100%			**98.0**
	502	32%					100%			
STO	156	97%					100%			**98.0**
	502	3%					100%			
STO1	155	25%					100%			**98.0**
	502	75%					100%			
STO2	155	45%					100%			**98.0**
	502	55%					100%			
STP	156	35%					100%			**98.0**
	502	65%					100%			
STQ	155	66%					100%			**98.0**
	502	34%					100%			
STQ1	155	33%					100%			**98.0**
	502	67%					100%			
STQ2	502	100%					100%			**98.0**
STQ3	156	87%					100%			**98.0**
	502	13%					100%			
SUMM	156	100%					100%			**98.0**
V30-A	731	100%				100%				**95.0**
V30-B	731	40%				100%				**95.0**
	156	60%				100%				
V30-E	156	100%				100%				**95.0**
V27-G	155	99%				100%				**95.0**
	502	1%				100%				
V27-H	155	58%							100%	**89.5**
	502	42%							100%	
V27-I	155	16%							100%	**87.0**
	502	84%							100%	
V27-K	155	13%				100%				**93.0**
	156	20%				100%				
	502	67%				100%				

TRAVEL TIME CALCULATIONS

DEVELOPMENT: Summerlin West Village 25

W.O. # 7919 **CALCULATED BY:** AH

$$Velocity = CS^{1/2}$$

C1 applies to the first 500 feet of travel distance
C2 applies to the remaining travel distance

Existing:		Urbanized	
C1=14.8	C2=29.4	C1=20.2	C2=30.6

					First 500 feet		Remaining Travel Distance	
Basin	**Length** (ft)	**High Elev** (ft)	**Low Elev** (ft)	**Slope** (ft/ft)	**C1**	**V1** (fps)	**C2**	**V2** (fps)
DEVELOPED CONDITION								
A	1409	3502	3452	0.036	20.2	3.8	30.6	5.8
B	1311	3499	3452	0.036	20.2	3.8	30.6	5.8
C	1465	3537	3497	0.027	20.2	3.3	30.6	5.1
COS-1	1898	3564	3550	0.008	20.2	1.8	30.6	2.7
COS-2	1036	3507	3496	0.010	20.2	2.1	30.6	3.1
COS-3	390	3453	3422	0.079	20.2	5.7	30.6	8.6
COS-4	1205	3538	3451	0.072	20.2	5.4	30.6	8.2
CP-1	2646	3737	3440	0.112	20.2	6.8	30.6	10.3
D	1417	3562	3497	0.045	20.2	4.3	30.6	6.5
DC-1	917	3680	3638	0.045	20.2	4.3	30.6	6.5
E	1250	3447	3406	0.033	20.2	3.7	30.6	5.5
ES-1	1032	3623	3545	0.075	20.2	5.5	30.6	8.4
F	1030	3538	3455	0.081	20.2	5.7	30.6	8.7
G	879	3491	3422	0.078	20.2	5.7	30.6	8.6
H	999	3602	3564	0.038	20.2	3.9	30.6	6.0
HS-1A	1494	3643	3531	0.075	20.2	5.5	30.6	8.4
HS-1B	1541	3648	3523	0.081	20.2	5.8	30.6	8.7
I	1122	3637	3593	0.039	20.2	4.0	30.6	6.0
J	1097	3740	3680	0.055	20.2	4.7	30.6	7.2
K	1721	3729	3618	0.064	20.2	5.1	30.6	7.7
L	846	3661	3604	0.067	20.2	5.2	30.6	7.9
M	743	3601	3530	0.095	20.2	6.2	30.6	9.4
N	877	3550	3505	0.052	20.2	4.6	30.6	7.0
NP-1	442	3569	3540	0.066	20.2	5.2	30.6	7.9
O	1301	3696	3610	0.066	20.2	5.2	30.6	7.8
P	656	3616	3562	0.083	20.2	5.8	30.6	8.8
FOX1	2115	3711	3599	0.053	20.2	4.6	30.6	7.0
FOX2	641	3589	3546	0.067	20.2	5.2	30.6	7.9
FOX3	907	3544	3504	0.044	20.2	4.2	30.6	6.4
FOX4	1230	3502	3452	0.041	20.2	4.1	30.6	6.2
FOX5A	1182	n/a	n/a	0.005	20.2	1.4	30.6	2.2
FOX5B	1004	3451	3444	0.007	20.2	1.7	30.6	2.6
LM	1577	3741	3655	0.055	20.2	4.7	30.6	7.1
RES3	978	3571	3528	0.045	20.2	4.3	30.6	6.5
RES4	909	3603	3548	0.060	20.2	5.0	30.6	7.5
SKY0	1325	3565	3559	0.005	20.2	1.4	30.6	2.1
SKY1	1241	3565	3544	0.017	20.2	2.6	30.6	4.0
SKY2	1114	3543	3500	0.038	20.2	4.0	30.6	6.0
STAA	314	3555	3538	0.052	20.2	4.6	30.6	7.0
STAB	722	3634	3631	0.004	20.2	1.3	30.6	2.0
STA1	1455	3537	3456	0.056	20.2	4.8	30.6	7.2

TRAVEL TIME CALCULATIONS

DEVELOPMENT: Summerlin West Village 25

W.O. # 7919 **CALCULATED BY:** AH

$$Velocity = CS^{1/2}$$

C1 applies to the first 500 feet of travel distance
C2 applies to the remaining travel distance

Existing:		Urbanized	
C1=14.8	C2=29.4	C1=20.2	C2=30.6

					First 500 feet		Remaining Travel Distance	
Basin	**Length** (ft)	**High Elev** (ft)	**Low Elev** (ft)	**Slope** (ft/ft)	**C1**	**V1** (fps)	**C2**	**V2** (fps)
STA2	1555	3450	3360	0.058	20.2	4.9	30.6	7.4
STBE	1169	3635	3566	0.059	20.2	4.9	30.6	7.4
STL1	1750	3635	3606	0.017	20.2	2.6	30.6	3.9
STL2	780	3606	3597	0.012	20.2	2.2	30.6	3.3
STM	2493	3711	3568	0.057	20.2	4.8	30.6	7.3
STN	2716	3551	3514	0.014	20.2	2.4	30.6	3.6
STO	2302	3701	3557	0.062	20.2	5.0	30.6	7.6
STO1	667	3722	3706	0.024	20.2	3.1	30.6	4.7
STO2	408	3722	3703	0.047	20.2	4.4	30.6	6.6
STP	995	3635	3603	0.032	20.2	3.6	30.6	5.5
STQ	2010	3798	3650	0.074	20.2	5.5	30.6	8.3
STQ1	804	3648	3603	0.056	20.2	4.8	30.6	7.3
STQ2	691	3599	3563	0.052	20.2	4.6	30.6	7.0
STQ3	1530	3555	3465	0.059	20.2	4.9	30.6	7.4
SUMM	753	3492	3448	0.058	20.2	4.9	30.6	7.4
V30-A	834	3715	3665	0.060	20.2	5.0	30.6	7.5
V30-B	876	3629	3594	0.040	20.2	4.1	30.6	6.1
V30-E	472	3594	3565	0.061	20.2	5.0	30.6	7.6
V27-G	1390	3769	3715	0.039	20.2	4.0	30.6	6.0
V27-H	622	3719	3661	0.093	20.2	6.2	30.6	9.3
V27-I	947	3782	3707	0.079	20.2	5.7	30.6	8.6
V27-K	655	3756	3710	0.070	20.2	5.4	30.6	8.1

STANDARD FORM 4

DEVELOPMENT: Summerlin West Village 25

W.O. # 7919 **CALCULATED BY:** JYA/ RBR

V1 applies to the first 500 feet of travel distance applies to the remaining travel distance		V2
Existing:		**Developed**
$V1 = 148 * S^{1/2}$	$V2 = 294 * S^{1/2}$	$V1 = 202 * S^{1/2}$ $V2 = 306 * S^{1/2}$

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

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

SUB-BASIN					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.	
DEVELOPED CONDITION																	
A	95.0	0.864	21.35	0.0334	100	1.0	4.25	1409	3.6	3.8	5.8	4.81	1509	18.38	9.06	0.091	
B	95.0	0.864	19.86	0.0310	100	1.0	4.25	1311	3.6	3.8	5.8	4.51	1411	17.84	8.76	0.088	
C	95.0	0.864	26.54	0.0415	100	1.0	4.25	1465	2.7	3.3	5.1	5.68	1565	18.69	9.93	0.099	
COS-1	88.0	0.772	3.48	0.0054	100	1.0	5.91	1898	0.8	1.8	2.7	13.49	1998	21.10	19.40	0.194	
COS-2	88.0	0.772	1.72	0.0027	100	1.0	5.91	1036	1.0	2.1	3.1	6.94	1136	16.31	12.85	0.128	
COS-3	88.1	0.773	2.40	0.0038	100	1.0	5.89	390	7.9	5.7	8.6	1.14	490	12.72	7.03	0.070	
COS-4	88.0	0.772	5.04	0.0079	100	1.0	5.91	1205	7.2	5.4	8.2	2.96	1305	17.25	8.88	0.089	
CP-1	87.1	0.759	93.32	0.1458	100	1.0	6.13	2646	11.2	6.8	10.3	4.72	2746	25.26	10.85	0.109	
D	95.0	0.864	27.15	0.0424	100	1.0	4.25	1417	4.5	4.3	6.5	4.28	1517	18.43	8.53	0.085	
DC-1	92.0	0.824	9.42	0.0147	100	1.0	4.96	917	4.5	4.3	6.5	3.00	1017	15.65	7.96	0.080	
E	95.0	0.864	17.14	0.0268	100	1.0	4.25	1250	3.3	3.7	5.5	4.53	1350	17.50	8.78	0.088	
ES-1	95.0	0.864	10.20	0.0159	100	1.0	4.25	1032	7.5	5.5	8.4	2.57	1132	16.29	6.81	0.068	
F	95.0	0.864	10.44	0.0163	100	1.0	4.25	1030	8.1	5.7	8.7	2.47	1130	16.28	6.72	0.067	
G	93.0	0.838	11.44	0.0179	100	1.0	4.72	879	7.8	5.7	8.6	2.21	979	15.44	6.93	0.069	
H	95.0	0.864	12.11	0.0189	100	1.0	4.25	999	3.8	3.9	6.0	3.51	1099	16.11	7.76	0.078	
HS-1A	95.0	0.864	11.70	0.0183	100	1.0	4.25	1494	7.5	5.8	8.7	3.35	1594	18.86	7.60	0.076	
HS-1B	94.8	0.861	49.79	0.0778	100	1.0	4.30	1541	8.1	5.8	8.7	3.44	1641	19.12	7.74	0.077	
I	95.0	0.864	13.23	0.0207	100	1.0	4.25	1122	3.9	4.0	6.0	3.82	1222	16.79	8.07	0.081	
J	95.0	0.864	16.90	0.0264	100	1.0	4.25	1097	5.5	4.7	7.2	3.15	1197	16.65	7.40	0.074	
K	95.0	0.864	25.71	0.0402	100	1.0	4.25	1721	6.4	5.1	7.7	4.26	1821	20.12	8.51	0.085	
L	95.0	0.864	16.19	0.0253	100	1.0	4.25	846	6.7	5.2	7.9	2.33	946	15.25	6.58	0.066	
M	95.0	0.864	11.09	0.0173	100	1.0	4.25	743	9.5	6.2	9.4	1.77	843	14.69	6.01	0.060	
N	95.0	0.864	9.91	0.0155	100	1.0	4.25	877	5.2	4.6	7.0	2.72	977	15.43	6.97	0.070	
NP-1	88.4	0.776	2.70	0.0042	100	1.0	5.82	442	6.6	5.2	7.9	1.42	542	13.01	7.24	0.072	
O	81.3	0.683	19.18	0.0300	100	1.0	7.50	1301	6.6	5.2	7.8	3.31	1401	17.79	10.81	0.108	
P	93.2	0.840	10.31	0.0161	100	1.0	4.67	656	8.3	5.8	8.8	1.73	756	14.20	6.40	0.064	
FOX1	98.0	0.904	2.91	0.0045	26	2.0	1.44	2115	5.3	4.6	7.0	5.62	2141	21.90	7.06	0.071	
FOX2	98.0	0.904	1.67	0.0026	27	2.0	1.45	641	6.7	5.2	7.9	1.89	667	13.71	3.35	0.033	Use Min TLAG = 0.050 per HCDDM
FOX3	98.0	0.904	1.51	0.0024	36	2.0	1.69	907	4.4	4.2	6.4	3.03	943	15.24	4.72	0.047	Use Min TLAG = 0.050 per HCDDM
FOX4	98.0	0.904	3.20	0.0050	60	2.0	2.17	1230	4.1	4.1	6.2	4.02	1290	17.17	6.19	0.062	
FOX5A	98.0	0.904	3.15	0.0049	60	2.0	2.17	1182	0.5	1.4	2.2	11.09	1242	16.90	13.26	0.133	
FOX5B	98.0	0.904	3.19	0.0050	60	2.0	2.17	1004	0.7	1.7	2.6	8.22	1064	15.91	10.39	0.104	
LM	98.0	0.904	4.65	0.0073	30	2.0	1.54	1577	5.5	4.7	7.1	4.28	1607	18.93	5.82	0.058	
RES3	98.0	0.904	1.97	0.0031	44	2.0	1.87	978	4.5	4.3	6.5	3.19	1022	15.68	5.05	0.051	Use Min TLAG = 0.050 per HCDDM
RES4	98.0	0.904	1.60	0.0025	33	2.0	1.62	909	6.0	5.0	7.5	2.59	942	15.23	4.20	0.042	
SKY0	98.0	0.904	4.15	0.0065	60	2.0	2.17	1325	0.5	1.4	2.1	12.81	1385	17.69	14.98	0.150	
SKY1	98.0	0.904	3.91	0.0061	61	2.0	2.18	1241	1.7	2.6	4.0	6.32	1301	17.23	8.50	0.085	

STANDARD FORM 4

DEVELOPMENT: Summerlin West Village 25

W.O. # 7919 **CALCULATED BY:** JYA/ RBR

V1 applies to the first 500 feet of travel distance applies to the remaining travel distance		V2	
Existing:		**Developed**	
$V1 = 148 * S^{1/2}$	$V2 = 294 * S^{1/2}$	$V1 = 202 * S^{1/2}$	$V2 = 306 * S^{1/2}$

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

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

SUB-BASIN					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.	
SKY2	98.0	0.904	3.78	0.0059	65	2.0	2.27	1114	3.8	4.0	6.0	3.81	1179	16.55	6.07	0.061	Use Min TLAG = 0.050 per HCDDM
STAA	98.0	0.904	0.44	0.0007	32	2.0	1.59	314	5.2	4.6	7.0	1.13	347	11.93	2.73	0.027	
STAB	98.0	0.904	0.80	0.0013	24	2.0	1.37	722	0.4	1.3	2.0	8.28	746	14.14	9.65	0.097	
STA1	98.0	0.904	2.29	0.0036	32	2.0	1.59	1455	5.6	4.8	7.2	3.95	1487	18.26	5.54	0.055	
STA2	98.0	0.904	2.84	0.0044	35	2.0	1.67	1555	5.8	4.9	7.4	4.10	1590	18.84	5.77	0.058	
STBE	98.0	0.904	1.67	0.0026	27	2.0	1.46	1169	5.9	4.9	7.4	3.20	1196	16.64	4.66	0.047	
STL1	98.0	0.904	5.60	0.0088	62	2.0	2.22	1750	1.7	2.6	3.9	8.49	1812	20.07	10.71	0.107	
STL2	98.0	0.904	2.26	0.0035	62	2.0	2.21	780	1.2	2.2	3.3	5.26	842	14.68	7.47	0.075	
STM	98.0	0.904	4.76	0.0074	38	2.0	1.74	2493	5.7	4.8	7.3	6.26	2531	24.06	7.99	0.080	
STN	98.0	0.904	7.67	0.0120	57	2.0	2.13	2716	1.4	2.4	3.6	13.83	2773	25.41	15.95	0.160	
STO	98.0	0.904	4.10	0.0064	36	2.0	1.67	2302	6.2	5.0	7.6	5.58	2338	22.99	7.26	0.073	
STO1	98.0	0.904	1.24	0.0019	20	2.0	1.25	995	3.2	3.6	5.5	3.81	1015	15.64	5.06	0.051	
STO2	98.0	0.904	0.76	0.0012	20	2.0	1.25	2010	7.4	5.5	8.3	4.55	2030	21.28	5.81	0.058	
STP	98.0	0.904	2.05	0.0032	37	2.0	1.72	995	3.2	3.6	5.5	3.81	1033	15.74	5.52	0.055	Use Min TLAG = 0.050 per HCDDM
STQ	98.0	0.904	4.13	0.0065	20	2.0	1.25	2010	7.4	5.5	8.3	4.55	2030	21.28	5.81	0.058	Use Min TLAG = 0.050 per HCDDM
STQ1	98.0	0.904	2.49	0.0039	61	2.0	2.19	804	5.6	4.8	7.3	2.44	865	14.81	4.63	0.046	Use Min TLAG = 0.050 per HCDDM
STQ2	98.0	0.904	2.11	0.0033	65	2.0	2.27	691	5.2	4.6	7.0	2.26	757	14.20	4.53	0.045	
STQ3	98.0	0.904	4.22	0.0066	60	2.0	2.18	1530	5.9	4.9	7.4	4.02	1590	18.83	6.19	0.062	Use Min TLAG = 0.050 per HCDDM
SUMM	98.0	0.904	1.65	0.0026	41	1.0	2.26	753	5.8	4.9	7.4	2.28	793	14.41	4.54	0.045	
V30-A	95.0	0.864	19.05	0.0298	100	1.0	4.25	834	6.0	5.0	7.5	2.42	934	15.19	6.67	0.067	
V30-B	95.0	0.864	20.53	0.0321	100	1.0	4.25	876	4.0	4.1	6.1	3.07	976	15.42	7.32	0.073	
V30-E	95.0	0.864	10.36	0.0162	100	1.0	4.25	472	6.1	5.0	7.6	1.57	572	13.18	5.82	0.058	
V27-G	95.0	0.864	18.08	0.0283	100	1.0	4.26	1390	3.9	4.0	6.0	4.55	1490	18.28	8.81	0.088	
V27-H	89.5	0.791	10.40	0.0163	100	1.0	5.56	622	9.3	6.2	9.3	1.57	722	14.01	7.13	0.071	
V27-I	87.0	0.758	11.97	0.0187	100	1.0	6.16	947	7.9	5.7	8.6	2.33	1047	15.82	8.49	0.085	
V27-K	93.0	0.837	11.98	0.0187	100	1.0	4.73	655	7.0	5.4	8.1	1.88	755	14.19	6.60	0.066	
																	Tc Min (Urban)= 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   18DEC19  TIME  17:42:07  *                                                  *           (916) 756-1104             *
 *                                      *                                                  *                                      *
 ****************************************                                                  ****************************************
```

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

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

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


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

                        *DIAGRAM
 *** FREE ***
             1          ID    ULTIMATE CONDITION HYDROLOGIC MODEL
             2          ID    OFFSITE BASINS DRAINING TO STUB AT STREET A
             3          ID    INPUT FILE DATE = JUNE 27, 2018
             4          ID    DESIGN STORM = 100-YEAR 6-HR STORM
             5          ID    STORM DISTRIBUTION = SDN #3
             6          ID    MODELED BY VTN (AH)
             7          ID
             8          ID    ********************************************************
             9          ID    * SUMMERLIN WEST VILLAGE 25                            *
            10          ID    ********************************************************
            11          ID
            12          ID
            13          ID  JR CARD RATIOS REPRESENT DEPTH-AREA REDUCTION FACTORS (DARF'S)
            14          ID
            15          ID  100-YEAR,  6-HOUR STORM,  SDN3
            16          ID
            17          IT       5       0       0     300
            18          IO       5       0       0
            19          IN       5       0       0
            20          JR    PREC    1.00
                        *

            21          KK       J
            22          KM   ONSITE BASIN
            23          BA  0.0264
            24          PB    3.49
            25          PC       0    0.02   0.057    0.07   0.087   0.108   0.124    0.13    0.13   0.130
            26          PC    0.13    0.13    0.13   0.133    0.14   0.142   0.148   0.158   0.172   0.181
            27          PC    0.19   0.197   0.199     0.2   0.201   0.204   0.214   0.229   0.241   0.249
            28          PC   0.251   0.256    0.27   0.278   0.281   0.283   0.295   0.322   0.352   0.409
            29          PC   0.499    0.59    0.71   0.744   0.781   0.812   0.819   0.835   0.851   0.856
            30          PC    0.86   0.868   0.876   0.888    0.91   0.926   0.937    0.95    0.97   0.976
            31          PC   0.982   0.985   0.987   0.989    0.99   0.993   0.993   0.994   0.995   0.998
            32          PC   0.998   0.999       1
            33          LS       0    95.0
            34          UD   0.074
                        *

            35          KK     STM
            36          KM   ONSITE BASIN
            37          BA  0.0074
            38          PB    3.46
            39          LS       0    98.0
            40          UD   0.080
                        *

            41          KK      CJ
            42          KM   COMBINE J AND STM
            43          HC       2
                        *
```

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

  44          KK    DC-1
  45          KM   ONSITE BASIN
  46          BA  0.0147
  47          PB    3.47
  48          LS       0    92.0
  49          UD   0.080
              *

  50          KK   CDC-1
  51          KM   COMBINE CJ AND DC-1
  52          HC       2
              *

  53          KK       I
  54          KM   ONSITE BASIN
  55          BA  0.0207
  56          PB    3.47
  57          LS       0    95.0
  58          UD   0.081
              *

  59          KK      CI
  60          KM   COMBINE I AND CJ
  61          HC       2
              *

  62          KK    SKY0
  63          KM   ONSITE BASIN
  64          BA  0.0065
  65          PB    3.45
  66          LS       0    98.0
  67          UD   0.150
              *

  68          KK   V30-B
  69          KM   OFFSITE BASIN
  70          BA  0.0321
  71          PB    3.45
  72          LS       0    95.0
  73          UD   0.073
              *

  74          KK   CV30B
  75          KM   COMBINE CI, SKY0, AND V30-B
  76          HC       3
              *

  77          KK   V30-A
  78          BA  0.0298
  79          PB    3.48
  80          LS       0    95.0
  81          UD   0.067
              *
1                                      HEC-1 INPUT                                        PAGE  3

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

  82          KK    STAB
  83          BA  0.0013
  84          PB    3.46
  85          LS       0    98.0
  86          UD   0.097
              *

  87          KK  CV30-A
  88          KM   COMBINE CR AND V30-S
  89          HC       2
              *

  90          KK    STBE
  91          BA  0.0026
  92          PB    3.45
  93          LS       0    98.0
  94          UD   0.050
              *

  95          KK   CSTBE
  96          KM   COMBINE CV30-A, STBE, AND CV30-B
  97          HC       3
              *

  98          KK   V30-E
  99          KM   ONSITE BASIN
 100          BA  0.0162
 101          PB    3.45
 102          LS       0    95.0
```

```
 103          UD   0.058
              *

 104          KK  CV30-E
 105          KM   COMBINE V30-E AND CSTBE
 106          HC       2
              *

 107          KK    SKY1
 108          KM   STREET BASIN
 109          BA  0.0061
 110          PB    3.45
 111          LS       0    98.0
 112          UD   0.085
              *

 113          KK       H
 114          KM   ONSITE BASIN
 115          BA  0.0189
 116          PB    3.45
 117          LS       0    95.0
 118          UD   0.078
              *
1                                          HEC-1 INPUT                                          PAGE  4

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


 119          KK      CH
 120          KM   COMBINE SKY1 AND H
 121          HC       2
              *

 122          KK     RCH
 123          KM   ROUTE CH TO CES-1
 124          RD     670   0.028   0.013       0    CIRC     3.5
              *

 125          KK    ES-1
 126          KM   ONSITE BASIN
 127          BA  0.0159
 128          PB    3.46
 129          LS       0    95.0
 130          UD   0.068
              *

 131          KK   CES-1
 132          KM   COMBINE CH AND ES-1
 133          HC       2
              *

 134          KK  RCES-1
 135          KM   ROUTE CES-1 TO CNP-1
 136          RD     330   0.018   0.013       0    CIRC     3.5
              *

 137          KK    SKY2
 138          KM   STREET BASIN
 139          BA  0.0059
 140          PB    3.44
 141          LS       0    98.0
 142          UD   0.061
              *

 143          KK    NP-1
 144          KM   ONSITE BASIN
 145          BA  0.0042
 146          PB    3.44
 147          LS       0    88.4
 148          UD   0.072
              *

 149          KK   CNP-1
 150          KM   COMBINE CES-1, SKY2, AND NP-1
 151          HC       3
              *
1                                          HEC-1 INPUT                                          PAGE  5

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


 152          KK    STL1
 153          KM   STREET BASIN
 154          BA  0.0088
 155          PB    3.46
 156          LS       0    98.0
 157          UD   0.107
              *

 158          KK       K
 159          KM   ONSITE BASIN
```

```
 160          BA  0.0402
 161          PB    3.49
 162          LS       0    95.0
 163          UD   0.085
              *

 164          KK      CK
 165          KM   COMBINE K AND STL1
 166          HC       2
              *

 167          KK     RCK
 168          KM   ROUTE CK TO CL
 169          RD     825   0.032   0.013       0    CIRC     3.5
              *

 170          KK       L
 171          KM   ONSITE BASIN
 172          BA  0.0253
 173          PB    3.47
 174          LS       0    95.0
 175          UD   0.066
              *

 176          KK     RCL
 177          KM   ROUTE CL TO CRES4
 178          RD     650   0.059   0.013       0    CIRC     3.5
              *

 179          KK      CL
 180          KM   COMBINE CK AND L
 181          HC       2
              *

 182          KK    RES4
 183          KM   STREET BASIN
 184          BA  0.0025
 185          PB    3.46
 186          LS       0    98.0
 187          UD   0.050
              *
1                                          HEC-1 INPUT                                                  PAGE  6

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


 188          KK   CRES4
 189          KM   COMBINE CL AND RES4
 190          HC       2
              *

 191          KK   CRES4
 192          KM   ROUTE CRES4 TO CRES3
 193          RD     340   0.033   0.013       0    CIRC     3.5
              *

 194          KK    RES3
 195          KM   STREET BASIN
 196          BA  0.0031
 197          PB    3.44
 198          LS       0    98.0
 199          UD   0.051
              *

 200          KK       M
 201          KM   ONSITE BASIN
 202          BA  0.0173
 203          PB    3.44
 204          LS       0    95.0
 205          UD   0.060
              *

 206          KK   CRES3
 207          KM   COMBINE CRES4, RES3, AND M
 208          HC       3
              *

 209          KK  RCRES3
 210          KM   ROUTE CRES3 TO CSTAA
 211          RD     450   0.046   0.013       0    CIRC       4
              *

 212          KK    STAA
 213          KM   ONSITE BASIN
 214          BA  0.0007
 215          PB    3.44
 216          LS       0    98.0
 217          UD   0.050
              *

 218          KK   CSTAA
```

```
 219          KM   COMBINE CRES3 AND STAA
 220          HC       2
              *
1                                    HEC-1 INPUT                                          PAGE  7

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


 221          KK  DUMMY1
 222          KM   COMBINE CNP-1 AND CSTAA
 223          HC       2
              *

 224          KK       N
 225          KM   ONSITE BASIN
 226          BA  0.0155
 227          PB    3.44
 228          LS       0    95.0
 229          UD   0.070
              *

 230          KK  DUMMY2
 231          KM   COMBINE DUMMY1, N
 232          HC       2
              *

 233          KK    CP-1
 234          KM   ONSITE BASIN
 235          BA  0.1458
 236          PB    3.45
 237          LS       0    87.1
 238          UD   0.109
              *

 239          KK    STL2
 240          KM   STREET BASIN
 241          BA  0.0035
 242          PB    3.46
 243          LS       0    98.0
 244          UD   0.075
              *

 245          KK    FOX1
 246          KM   STREET BASIN
 247          BA  0.0045
 248          PB    3.47
 249          LS       0    98.0
 250          UD   0.071
              *

 251          KK    FOX2
 252          KM   STREET BASIN
 253          BA  0.0026
 254          PB    3.45
 255          LS       0    98.0
 256          UD   0.050
              *
1                                    HEC-1 INPUT                                          PAGE  8

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


 257          KK    FOX3
 258          KM   STREET BASIN
 259          BA  0.0024
 260          PB    3.42
 261          LS       0    98.0
 262          UD   0.050
              *

 263          KK DUMMY2B
 264          KM   COMBINE DUMMY2, FOX1, FOX2, FOX3
 265          HC       5
              *

 266          KK    SUMM
 267          KM   SUMMERLIN PARKWAY STREET BASIN
 268          BA  0.0026
 269          PB    3.42
 270          LS       0    98.0
 271          UD   0.050
              *

 272          KK       G
 273          KM   ONSITE BASIN
 274          BA  0.0179
 275          PB    3.41
 276          LS       0    93.0
 277          UD   0.069
              *
```

```
 278          KK  DUMMY3
 279          KM   COMBINE DUMMY2, SUMM, AND G
 280          HC       3
              *

 281          KK       D
 282          KM   ONSITE BASIN
 283          BA  0.0424
 284          PB    3.44
 285          LS       0    95.0
 286          UD   0.085
              *

 287          KK   FOX5B
 288          KM   1/2 FOX5 STREET BASIN
 289          BA  0.0050
 290          PB    3.40
 291          LS       0    98.0
 292          UD   0.104
              *
1                                          HEC-1 INPUT                                          PAGE  9

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


 293          KK   COS-1
 294          KM   ONSITE BASIN
 295          BA  0.0054
 296          PB    3.42
 297          LS       0    88.0
 298          UD   0.194
              *

 299          KK  CCOS-1
 300          KM   COMBINE FOX5B AND COS-1
 301          HC       2
              *

 302          KK   FOX5A
 303          KM   1/2 FOX5 STREET BASIN
 304          BA  0.0049
 305          PB    3.41
 306          LS       0    98.0
 307          UD   0.133
              *

 308          KK       A
 309          KM   ONSITE BASIN
 310          BA  0.0334
 311          PB    3.41
 312          LS       0    95.0
 313          UD   0.091
              *

 314          KK   CFOX5
 315          KM   COMBINE FOX5A,CCOS-1, AND A
 316          HC       3
              *

 317          KK DUMMY3B
 318          KM   COMBINE COMBINE CFOX5 AND D
 319          HC       2
              *

 320          KK       C
 321          KM   ONSITE BASIN
 322          BA  0.0415
 323          PB    3.45
 324          LS       0    95.0
 325          UD   0.099
              *

 326          KK    STA1
 327          KM   STREET BASIN
 328          BA  0.0036
 329          PB    3.43
 330          LS       0    98.0
 331          UD   0.055
              *
1                                          HEC-1 INPUT                                          PAGE 10

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


 332          KK      CC
 333          KM   COMBINE STA1, AND C
 334          HC       2
              *

 335          KK   COS-2
 336          KM   ONSITE BASIN
```

```
337          BA  0.0027
338          PB    3.43
339          LS       0    88.0
340          UD   0.128
             *

341          KK  CCOS-2
342          KM   COMBINE CC AND COS-2
343          HC       2
             *

344          KK    FOX4
345          KM   STREET BASIN
346          BA  0.0050
347          PB    3.42
348          LS       0    98.0
349          UD   0.062
             *

350          KK       F
351          KM   ONSITE BASIN
352          BA  0.0163
353          PB    3.44
354          LS       0    95.0
355          UD   0.067
             *

356          KK   COS-4
357          KM   ONSITE BASIN
358          BA  0.0079
359          PB    3.43
360          LS       0    88.0
361          UD   0.089
             *

362          KK  CFOX4A
363          KM   COMBINE F, COS-4, AND FOX4
364          HC       3
             *

365          KK       B
366          KM   ONSITE BASIN
367          BA  0.0310
368          PB    3.42
369          LS       0    95.0
370          UD   0.088
             *
```



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

371          KK  CFOX4B
372          KM   COMBINE CCOS-2, B AND CFOX4A
373          HC       3
             *

374          KK    STA2
375          KM   STREET BASIN
376          BA  0.0044
377          PB    3.39
378          LS       0    98.0
379          UD   0.058
             *

380          KK   CSTA2
381          KM   COMBINE CFOX4B AND STA2
382          HC       2
             *

383          KK   COS-3
384          KM   STREET  BASIN
385          BA  0.0038
386          PB    3.41
387          LS       0    88.1
388          UD   0.070
             *

389          KK       E
390          KM   ONSITE BASIN
391          BA  0.0268
392          PB    3.40
393          LS       0    95.0
394          UD   0.088
             *

395          KK    CSTE
396          KM   COMBINE CSTA2, COS-3 AND E
397          HC       3
             *
```

```
 398          KK   V27-G
 399          BA  0.0283
 400          PB    3.50
 401          LS       0    95.0
 402          UD   0.088
              *

 403          KK   V27-I
 404          BA  0.0187
 405          PB    3.50
 406          LS       0    87.0
 407          UD   0.085
              *
1                                        HEC-1 INPUT                                          PAGE 12

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


 408          KK    STO2
 409          KM   STREET BASIN
 410          BA  0.0012
 411          PB    3.48
 412          LS       0    98.0
 413          UD   0.058
              *

 414          KK     STQ
 415          KM   STREET BASIN
 416          BA  0.0065
 417          PB    3.48
 418          LS       0    98.0
 419          UD   0.058
              *

 420          KK    CSTQ
 421          KM   COMBINE V27-G, V27-I, STO2, AND STQ
 422          HC       4
              *

 423          KK   V27-K
 424          BA  0.0187
 425          PB    3.50
 426          LS       0    93.0
 427          UD   0.066
              *

 428          KK    STO1
 429          BA  0.0019
 430          PB    3.48
 431          LS       0    98.0
 432          UD   0.051
              *

 433          KK   CSTO1
 434          KM   COMBINE V27K AND STO1
 435          HC       2
              *

 436          KK      LM
 437          KM   STREET BASIN
 438          BA  0.0073
 439          PB    3.48
 440          LS       0    98.0
 441          UD   0.058
              *

 442          KK   V27-H
 443          BA  0.0163
 444          PB    3.48
 445          LS       0    89.5
 446          UD   0.071
              *
1                                        HEC-1 INPUT                                          PAGE 13

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


 447          KK  DUMMY4
 448          KM   COMBINE CSTO3, CSTQ, LM, V27-H
 449          HC       4
              *

 450          KK    STQ1
 451          KM   STREET BASIN
 452          BA  0.0039
 453          PB    3.46
 454          LS       0    98.0
 455          UD   0.050
              *

 456          KK       O
```

```
 457          KM   ONSITE BASIN
 458          BA  0.0300
 459          PB    3.48
 460          LS       0    81.3
 461          UD   0.108
              *

 462          KK     STP
 463          KM   STREET BASIN
 464          BA  0.0032
 465          PB    3.46
 466          LS       0    98.0
 467          UD   0.055
              *

 468          KK    STQ2
 469          KM   STREET BASIN
 470          BA  0.0033
 471          PB    3.46
 472          LS       0    98.0
 473          UD   0.050
              *

 474          KK  DUMMY5
 475          KM   COMBINE DUMMY4, STQ1, O, STP, STQ2
 476          HC       5
              *

 477          KK       P
 478          KM   ONSITE BASIN
 479          BA  0.0161
 480          PB    3.46
 481          LS       0    93.2
 482          UD   0.064
              *
1                                        HEC-1 INPUT                                        PAGE 14

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

 483          KK     STO
 484          KM   STREET BASIN
 485          BA  0.0064
 486          PB    3.46
 487          LS       0    98.0
 488          UD   0.073
              *

 489          KK  DUMMY6
 490          KM   COMBINE P, STO, AND DUMMY5
 491          HC       3
              *

 492          KK    STQ3
 493          KM   STREET BASIN
 494          BA  0.0066
 495          PB    3.44
 496          LS       0    98.0
 497          UD   0.062
              *

 498          KK     STN
 499          KM   ONSITE BASIN
 500          BA  0.0120
 501          PB    3.44
 502          LS       0    98.0
 503          UD   0.160
              *

 504          KK   HS-1A
 505          KM   ONSITE BASIN
 506          BA  0.0183
 507          PB    3.44
 508          LS       0    95.0
 509          UD   0.076
              *

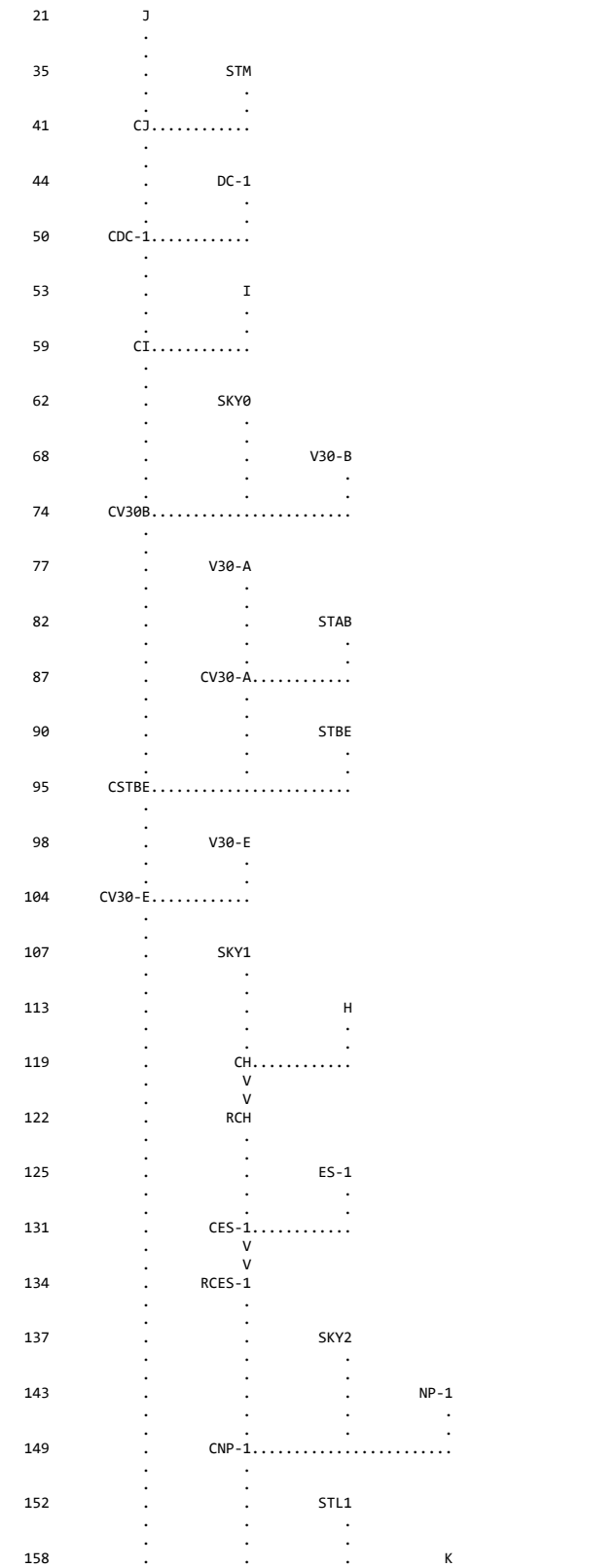
 510          KK   HS-1B
 511          KM   ONSITE BASIN
 512          BA  0.0778
 513          PB    3.44
 514          LS       0    94.8
 515          UD   0.077
              *

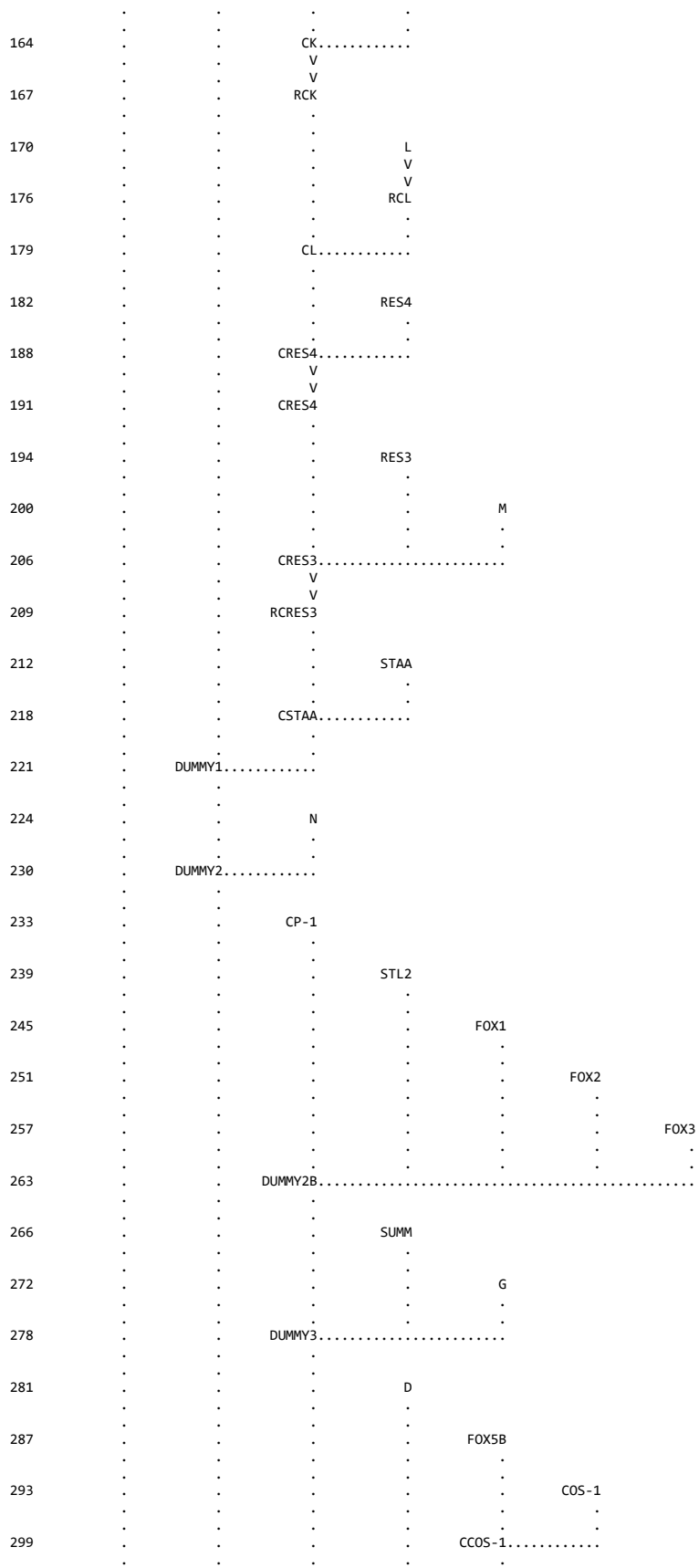
 516          KK    CSTN
 517          KM   COMBINE STN AND HS-1A AND HS-1B
 518          HC       3
              *
 519          ZZ
1
```

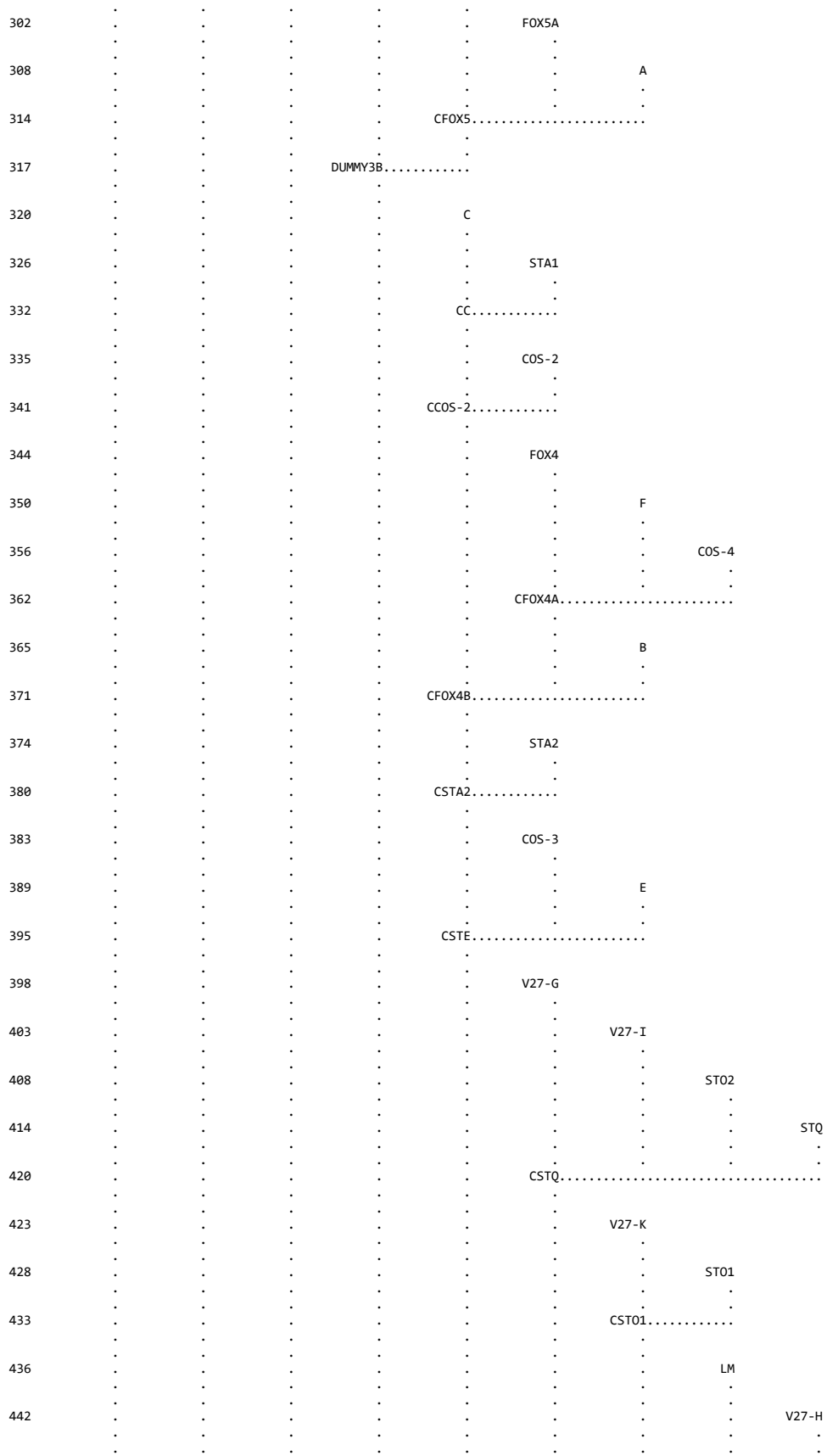
SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (.) CONNECTOR (--->) DIVERSION OR PUMP FLOW (<---) RETURN OF DIVERTED OR PUMPED FLOW




164
CK
167
RCK
170
L
176
RCL
179
CL
182
RES4
188
CRES4
191
CRES4
194
RES3
200
M
206
CRES3
209
RCRES3
212
STAA
218
CSTAA
221
DUMMY1
224
N
230
DUMMY2
233
CP-1
239
STL2
245
FOX1
251
FOX2
257
FOX3
263
DUMMY2B
266
SUMM
272
G
278
DUMMY3
281
D
287
FOX5B
293
COS-1
299
CCOS-1


302 FOX5A
308 A
314 CFOX5
317 DUMMY3B
320 C
326 STA1
332 CC
335 COS-2
341 CCOS-2
344 FOX4
350 F
356 COS-4
362 CFOX4A
365 B
371 CFOX4B
374 STA2
380 CSTA2
383 COS-3
389 E
395 CSTE
398 V27-G
403 V27-I
408 STO2
414 STQ
420 CSTQ
423 V27-K
428 STO1
433 CSTO1
436 LM
442 V27-H

```
  447          .          .          .          .          .      DUMMY4.................................
               .          .          .          .          .          .
               .          .          .          .          .          .
  450          .          .          .          .          .          .        STQ1
               .          .          .          .          .          .          .
               .          .          .          .          .          .          .
  456          .          .          .          .          .          .          .          O
               .          .          .          .          .          .          .          .
               .          .          .          .          .          .          .          .
  462          .          .          .          .          .          .          .          .         STP
*** HEC1 ERROR 5 *** TOO MANY HYDROGRAPHS. COMBINE MORE OFTEN.
               .          .          .          .          .          .          .          .
               .          .          .          .          .          .          .          .
  468          .          .          .          .          .          .          .          .        STQ2
               .          .          .          .          .          .          .          .          .
               .          .          .          .          .          .          .          .          .
  474          .          .          .          .      DUMMY5.............................................
               .          .          .          .          .
               .          .          .          .          .
  477          .          .          .          .          .          P
               .          .          .          .          .          .
               .          .          .          .          .          .
  483          .          .          .          .          .          .         STO
               .          .          .          .          .          .          .
               .          .          .          .          .          .          .
  489          .          .          .          .      DUMMY6.......................
               .          .          .          .          .
               .          .          .          .          .
  492          .          .          .          .          .        STQ3
               .          .          .          .          .          .
               .          .          .          .          .          .
  498          .          .          .          .          .          .         STN
               .          .          .          .          .          .          .
               .          .          .          .          .          .          .
  504          .          .          .          .          .          .          .       HS-1A
               .          .          .          .          .          .          .          .
               .          .          .          .          .          .          .          .
  510          .          .          .          .          .          .          .          .       HS-1B
               .          .          .          .          .          .          .          .          .
               .          .          .          .          .          .          .          .          .
  516          .          .          .          .          .          .        CSTN.......................

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

        1 ERRORS IN STREAM SYSTEM
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   18DEC19  TIME  17:42:07  *                                                  *           (916) 756-1104            *
 *                                      *                                                  *                                      *
 ****************************************                                                  ****************************************



                          ULTIMATE CONDITION HYDROLOGIC MODEL
                          OFFSITE BASINS DRAINING TO STUB AT STREET A
                          INPUT FILE DATE = JUNE 27, 2018
                          DESIGN STORM = 100-YEAR 6-HR STORM
                          STORM DISTRIBUTION = SDN #3
                          MODELED BY VTN (AH)

                          ********************************************************
                          * SUMMERLIN WEST VILLAGE 25                            *
                          ********************************************************


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

                        100-YEAR,  6-HOUR STORM,  SDN3


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

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

                  COMPUTATION INTERVAL     .08 HOURS
```

TOTAL TIME BASE 24.92 HOURS

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

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF PRECIPITATION
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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1
					1.00
HYDROGRAPH AT					
+	J	.03	1	FLOW	69.
				TIME	3.50
HYDROGRAPH AT					
+	STM	.01	1	FLOW	20.
				TIME	3.50
2 COMBINED AT					
+	CJ	.03	1	FLOW	89.
				TIME	3.50
HYDROGRAPH AT					
+	DC-1	.01	1	FLOW	35.
				TIME	3.50
2 COMBINED AT					
+	CDC-1	.05	1	FLOW	124.
				TIME	3.50
HYDROGRAPH AT					
+	I	.02	1	FLOW	53.
				TIME	3.50
2 COMBINED AT					
+	CI	.07	1	FLOW	176.
				TIME	3.50
HYDROGRAPH AT					
+	SKY0	.01	1	FLOW	15.
				TIME	3.58
HYDROGRAPH AT					
+	V30-B	.03	1	FLOW	83.
				TIME	3.50
3 COMBINED AT					
+	CV30B	.11	1	FLOW	273.
				TIME	3.50
HYDROGRAPH AT					
+	V30-A	.03	1	FLOW	80.
				TIME	3.50
HYDROGRAPH AT					
+	STAB	.00	1	FLOW	3.
				TIME	3.50
2 COMBINED AT					
+	CV30-A	.03	1	FLOW	83.
				TIME	3.50
HYDROGRAPH AT					
+	STBE	.00	1	FLOW	8.
				TIME	3.50
3 COMBINED AT					
+	CSTBE	.14	1	FLOW	364.
				TIME	3.50
HYDROGRAPH AT					
+	V30-E	.02	1	FLOW	44.
				TIME	3.50

```
  2 COMBINED AT
+                 CV30-E       .16     1   FLOW         408.
                                              TIME        3.50

 HYDROGRAPH AT
+                   SKY1       .01     1   FLOW          16.
                                              TIME        3.50

 HYDROGRAPH AT
+                      H       .02     1   FLOW          48.
                                              TIME        3.50

  2 COMBINED AT
+                     CH       .02     1   FLOW          64.
                                              TIME        3.50

 ROUTED TO
+                    RCH       .02     1   FLOW          63.
                                              TIME        3.50

 HYDROGRAPH AT
+                   ES-1       .02     1   FLOW          42.
                                              TIME        3.50

  2 COMBINED AT
+                  CES-1       .04     1   FLOW         105.
                                              TIME        3.50

 ROUTED TO
+                 RCES-1       .04     1   FLOW         103.
                                              TIME        3.50

 HYDROGRAPH AT
+                   SKY2       .01     1   FLOW          17.
                                              TIME        3.50

 HYDROGRAPH AT
+                   NP-1       .00     1   FLOW           9.
                                              TIME        3.50

  3 COMBINED AT
+                  CNP-1       .05     1   FLOW         129.
                                              TIME        3.50

 HYDROGRAPH AT
+                   STL1       .01     1   FLOW          21.
                                              TIME        3.50

 HYDROGRAPH AT
+                      K       .04     1   FLOW         101.
                                              TIME        3.50

  2 COMBINED AT
+                     CK       .05     1   FLOW         123.
                                              TIME        3.50

 ROUTED TO
+                    RCK       .05     1   FLOW         120.
                                              TIME        3.50

 HYDROGRAPH AT
+                      L       .03     1   FLOW          68.
                                              TIME        3.50

 ROUTED TO
+                    RCL       .03     1   FLOW          67.
                                              TIME        3.50

  2 COMBINED AT
+                     CL       .07     1   FLOW         187.
                                              TIME        3.50

 HYDROGRAPH AT
+                   RES4       .00     1   FLOW           7.
                                              TIME        3.50

  2 COMBINED AT
+                  CRES4       .08     1   FLOW         194.
                                              TIME        3.50

 ROUTED TO
+                  CRES4       .08     1   FLOW         192.
                                              TIME        3.50

 HYDROGRAPH AT
+                   RES3       .00     1   FLOW           9.
                                              TIME        3.50

 HYDROGRAPH AT
+                      M       .02     1   FLOW          47.
```

```
                                        TIME         3.50

  3 COMBINED AT
+                  CRES3       .10     1   FLOW         248.
                                         TIME         3.50

 ROUTED TO
+                 RCRES3       .10     1   FLOW         246.
                                         TIME         3.50

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

  2 COMBINED AT
+                  CSTAA       .10     1   FLOW         248.
                                         TIME         3.50

  2 COMBINED AT
+                 DUMMY1       .15     1   FLOW         377.
                                         TIME         3.50

 HYDROGRAPH AT
+                      N       .02     1   FLOW          40.
                                         TIME         3.50

  2 COMBINED AT
+                 DUMMY2       .16     1   FLOW         418.
                                         TIME         3.50

 HYDROGRAPH AT
+                   CP-1       .15     1   FLOW         270.
                                         TIME         3.50

 HYDROGRAPH AT
+                   STL2       .00     1   FLOW           9.
                                         TIME         3.50

 HYDROGRAPH AT
+                   FOX1       .00     1   FLOW          12.
                                         TIME         3.50

 HYDROGRAPH AT
+                   FOX2       .00     1   FLOW           8.
                                         TIME         3.50

 HYDROGRAPH AT
+                   FOX3       .00     1   FLOW           7.
                                         TIME         3.50

  5 COMBINED AT
+                DUMMY2B       .16     1   FLOW         306.
                                         TIME         3.50

 HYDROGRAPH AT
+                   SUMM       .00     1   FLOW           7.
                                         TIME         3.50

 HYDROGRAPH AT
+                      G       .02     1   FLOW          45.
                                         TIME         3.50

  3 COMBINED AT
+                 DUMMY3       .18     1   FLOW         358.
                                         TIME         3.50

 HYDROGRAPH AT
+                      D       .04     1   FLOW         105.
                                         TIME         3.50

 HYDROGRAPH AT
+                  FOX5B       .00     1   FLOW          12.
                                         TIME         3.50

 HYDROGRAPH AT
+                  COS-1       .01     1   FLOW           9.
                                         TIME         3.58

  2 COMBINED AT
+                 CCOS-1       .01     1   FLOW          20.
                                         TIME         3.58

 HYDROGRAPH AT
+                  FOX5A       .00     1   FLOW          11.
                                         TIME         3.58

 HYDROGRAPH AT
+                      A       .03     1   FLOW          81.
                                         TIME         3.50

  3 COMBINED AT
```

```
+                 CFOX5       .05     1   FLOW         111.
                                          TIME         3.50

  2 COMBINED AT
+               DUMMY3B       .09     1   FLOW         216.
                                          TIME         3.50

 HYDROGRAPH AT
+                    C        .04     1   FLOW          99.
                                          TIME         3.50

 HYDROGRAPH AT
+                  STA1       .00     1   FLOW          10.
                                          TIME         3.50

  2 COMBINED AT
+                   CC        .05     1   FLOW         109.
                                          TIME         3.50

 HYDROGRAPH AT
+                 COS-2       .00     1   FLOW           5.
                                          TIME         3.58

  2 COMBINED AT
+                CCOS-2       .05     1   FLOW         114.
                                          TIME         3.50

 HYDROGRAPH AT
+                  FOX4       .00     1   FLOW          14.
                                          TIME         3.50

 HYDROGRAPH AT
+                    F        .02     1   FLOW          43.
                                          TIME         3.50

 HYDROGRAPH AT
+                 COS-4       .01     1   FLOW          16.
                                          TIME         3.50

  3 COMBINED AT
+                CFOX4A       .03     1   FLOW          73.
                                          TIME         3.50

 HYDROGRAPH AT
+                    B        .03     1   FLOW          76.
                                          TIME         3.50

  3 COMBINED AT
+                CFOX4B       .11     1   FLOW         263.
                                          TIME         3.50

 HYDROGRAPH AT
+                  STA2       .00     1   FLOW          12.
                                          TIME         3.50

  2 COMBINED AT
+                 CSTA2       .11     1   FLOW         275.
                                          TIME         3.50

 HYDROGRAPH AT
+                 COS-3       .00     1   FLOW           8.
                                          TIME         3.50

 HYDROGRAPH AT
+                    E        .03     1   FLOW          65.
                                          TIME         3.50

  3 COMBINED AT
+                  CSTE       .14     1   FLOW         348.
                                          TIME         3.50

 HYDROGRAPH AT
+                 V27-G       .03     1   FLOW          71.
                                          TIME         3.50

 HYDROGRAPH AT
+                 V27-I       .02     1   FLOW          39.
                                          TIME         3.50

 HYDROGRAPH AT
+                  STO2       .00     1   FLOW           3.
                                          TIME         3.50

 HYDROGRAPH AT
+                   STQ       .01     1   FLOW          19.
                                          TIME         3.50

  4 COMBINED AT
+                  CSTQ       .05     1   FLOW         132.
                                          TIME         3.50
```

```
 HYDROGRAPH AT
+                  V27-K       .02     1   FLOW          49.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STO1       .00     1   FLOW           6.
                                           TIME         3.50

  2 COMBINED AT
+                  CSTO1       .02     1   FLOW          54.
                                           TIME         3.50

 HYDROGRAPH AT
+                     LM       .01     1   FLOW          21.
                                           TIME         3.50

 HYDROGRAPH AT
+                  V27-H       .02     1   FLOW          38.
                                           TIME         3.50

  4 COMBINED AT
+                 DUMMY4       .10     1   FLOW         245.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STQ1       .00     1   FLOW          11.
                                           TIME         3.50

 HYDROGRAPH AT
+                      O       .03     1   FLOW          46.
                                           TIME         3.58

 HYDROGRAPH AT
+                    STP       .00     1   FLOW           9.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STQ2       .00     1   FLOW          10.
                                           TIME         3.50

  5 COMBINED AT
+                 DUMMY5       .14     1   FLOW         320.
                                           TIME         3.50

 HYDROGRAPH AT
+                      P       .02     1   FLOW          42.
                                           TIME         3.50

 HYDROGRAPH AT
+                    STO       .01     1   FLOW          17.
                                           TIME         3.50

  3 COMBINED AT
+                 DUMMY6       .16     1   FLOW         379.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STQ3       .01     1   FLOW          18.
                                           TIME         3.50

 HYDROGRAPH AT
+                    STN       .01     1   FLOW          27.
                                           TIME         3.58

 HYDROGRAPH AT
+                  HS-1A       .02     1   FLOW          47.
                                           TIME         3.50

 HYDROGRAPH AT
+                  HS-1B       .08     1   FLOW         198.
                                           TIME         3.50

  3 COMBINED AT
+                   CSTN       .11     1   FLOW         269.
                                           TIME         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
               RCH  MANE          .58     63.39    210.36      2.97      5.00     62.71    210.00        2.97


 CONTINUITY SUMMARY (AC-FT) - INFLOW= .3960E+01 EXCESS= .0000E+00 OUTFLOW= .3960E+01 BASIN STORAGE= .5449E-04 PERCENT ERROR=    .0
```

```
          FOR PLAN = 1  RATIO=  .00
            RCES-1  MANE          .31    103.96    210.14      2.94      5.00    103.50    210.00        2.95


CONTINUITY SUMMARY (AC-FT) - INFLOW= .6424E+01 EXCESS= .0000E+00 OUTFLOW= .6424E+01 BASIN STORAGE= .3174E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
               RCK  MANE          .60    121.94    210.79      2.98      5.00    120.24    210.00        2.99


CONTINUITY SUMMARY (AC-FT) - INFLOW= .7795E+01 EXCESS= .0000E+00 OUTFLOW= .7795E+01 BASIN STORAGE= .6238E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
               RCL  MANE          .42     67.10    210.47      2.91      5.00     66.55    210.00        2.91


CONTINUITY SUMMARY (AC-FT) - INFLOW= .3926E+01 EXCESS= .0000E+00 OUTFLOW= .3926E+01 BASIN STORAGE= .3668E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
             CRES4  MANE          .22    193.27    210.30      2.97      5.00    192.47    210.00        2.97


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1216E+02 EXCESS= .0000E+00 OUTFLOW= .1216E+02 BASIN STORAGE= .2537E-04 PERCENT ERROR=    .0


          FOR PLAN = 1  RATIO=  .00
            RCRES3  MANE          .24    246.91    210.13      2.96      5.00    245.91    210.00        2.96


CONTINUITY SUMMARY (AC-FT) - INFLOW= .1536E+02 EXCESS= .0000E+00 OUTFLOW= .1536E+02 BASIN STORAGE= .2944E-04 PERCENT ERROR=    .0



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

A.5 High School Staging Stockpile Drainage Study Reference Information



SNC·LAVALIN

ATKINS
Member of the SNC-Lavalin Group

SUMMERLIN®

Summerlin West Village 25

High School Staging Stockpile

December 2020

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: March 4, 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:**
Summerlin Village 25 – High School Staging Stockpile				GCW, Inc.
Cross Streets:	East of Lake Mead Blvd. & Sunset Run Dr.			Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5402B.doc			Bart Anderson, P.E., DevCo
Parcel Number:	137-22-301-006 & 137-15-801-002			CCRFCD
Zoning Action:	N/A			
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	1/5/2021	1/19/2021	Not Approved	$400.00	4121984: $400
2nd Submittal	2/22/2021	3/4/2021	See Comments Below	N/C	N/C
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS:

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

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

The following comments from the first review had not been addressed at all in the *Addendum #1*.

1. *Provide a copy of the approved Clark County Dust Mitigation Plan with the BMPs prior to the final approval of the subject drainage study.*
2. *Provide a note on the grading plans that states "Stockpile to comply with the approved Dust Mitigation Plan #_____".*
3. *Provide a note on the plans indicating the time limit of the proposed stockpile as outlined in the approved Dust Mitigation Plan.*

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

END OF REMARKS
AYS

T/R/S: T20S/R59E/20
AREA K-22

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Summerlin West Village 25 High School Staging Stockpile Date: December 2020

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

East/West: Sunset Run Drive

b) Section: 20 Township: 22 Range: 59

c) APN : 137-22-301-006, 137-15-801-002

Name of Owner: Howard Hughes Company, LLC

Telephone No.: (702) 791-4000 Fax No.: (702) 791-4450 E-Mail Address: april.chapman@howardhughes.com

Address: 10845 Griffith Peak Drive, Suite 160, Las Vegas, NV 89135

Contact Person-Name: Molly Anderson, PE **Telephone No.:** (702) 551-0330

* **E-Mail Address:** molly.anderson@atkinsglobal.com **Fax No.:** (702) 263-7200

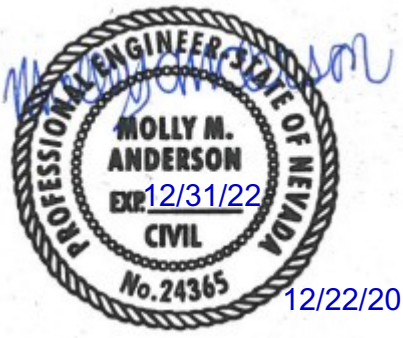
Firm: Atkins

Address: 2270 Corporate Circle, Ste 200, Henderson, NV 89074

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: +/- 340 acres Being Developed/Disturbed: 39.44 acres
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.): Stockpile Area
5. Approximate upstream land area which drains to the subject site:
6. Has the site drainage been evaluated in the past? ✔ **YES** **NO** If yes, please identify documentation: Update #1 to the Master Conceptual Drainage Study for Summerlin West Village 25
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Existing CC-215 Western Beltway Channel
8. Briefly describe your proposed schedule for the subject project: ASAP



12/22/20

Engineer's Seal

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

***New Required Field**

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

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

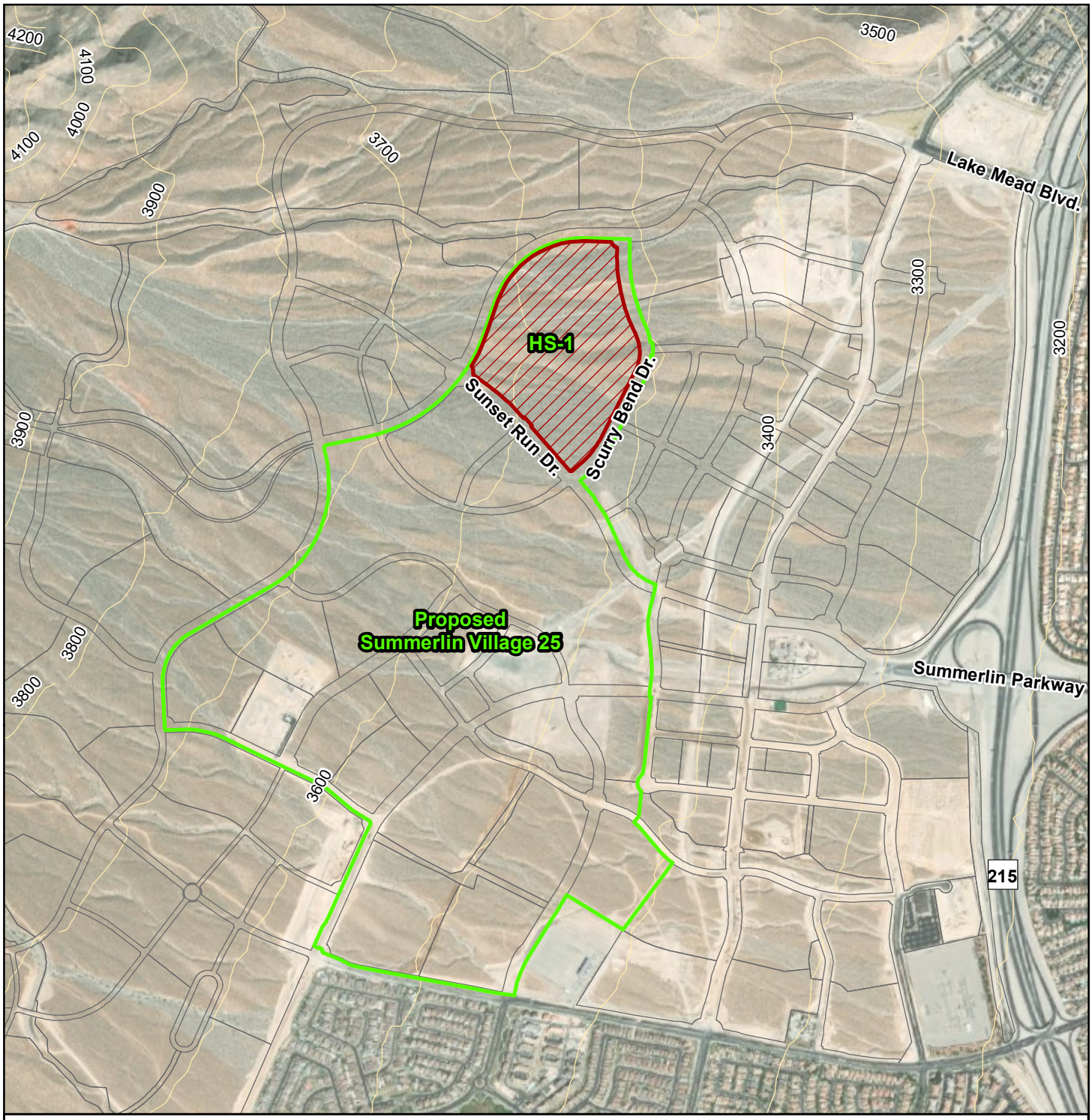


Figure 2: Site Map

TDS for Summerlin West Village 25
High School Staging Stockpile

Legend

- Project Area
- V25 Boundary
- Ultimate Parcels
- 100 ft Contours

1,500 750 0 1,500 Feet

1 inch = 1,500 feet

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N
W E
S

Aerial Source: ESRI 2020

Figure 3: Hydrology

TDS for Summerlin West Village 25
High School Staging Stockpile

Legend

- Flows
- HEC-1 Combination Points
- Existing Storm Drain Facilities
- Subbasins
- Stockpile Boundary
- 50-ft Contours
- 10-ft Contours
- Master Plan Linework

0 500 1,000 Feet

1 inch = 500 feet

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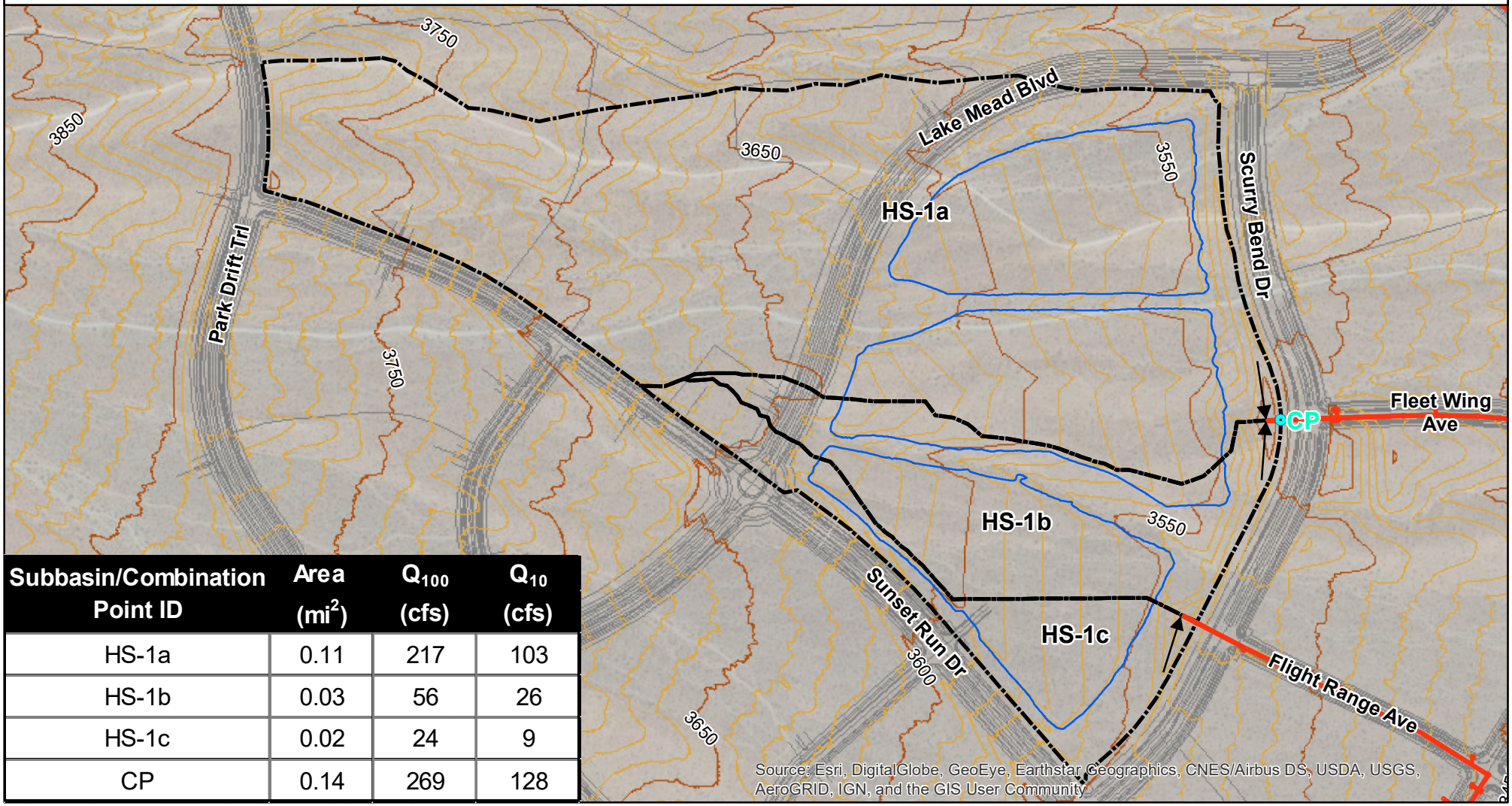
N W E S

Projection: State Plane, Nevada East, NAD83 2011, US Feet



Subbasin/Combination Point ID	Area (mi^2)	Q_{100} (cfs)	Q_{10} (cfs)
HS-1a	0.11	217	103
HS-1b	0.03	56	26
HS-1c	0.02	24	9
CP	0.14	269	128

RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved: curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved: open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					

See Table 602A

Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94

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

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

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

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

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

Revision	Date

CN CALCULATIONS FOR SUMMERLIN WEST VILLAGE 25

TDS FOR H.S. STAGING AREA

Condition: Interim (Rough Grading With Stockpile)

BASIN ID	LAND USE INDEX NUMBER	LAND USE DESCRIPTION	SOIL MAP UNIT #	SUBREGION CN	SUBREGION AREA (SQ FT)	SUBBASIN AREA (SQ FT)	PERCENT OF SUBBASIN	CUMULATIVE PERCENT	AREAL WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
HS-1a	0	Newly Graded Area (HCDDM)	1155	94	1159242	3199248	36.2%	36.2%	34.06	34.06	
HS-1a	0	Newly Graded Area (HCDDM)	1502	77	39004	3199248	1.2%	37.5%	0.94	35.00	
HS-1a	1	Undeveloped Land, Open Desert (MPU)	1155	88	1706538	3199248	53.3%	90.8%	46.94	81.94	
HS-1a	1	Undeveloped Land, Open Desert (MPU)	1502	73	295103	3199248	9.2%	100.0%	6.73	88.67	**88.7**
HS-1c	0	Newly Graded Area (HCDDM)	1155	94	34001	473976	7.2%	7.2%	6.74	6.74	
HS-1c	0	Newly Graded Area (HCDDM)	1502	77	241150	473976	50.9%	58.1%	39.18	45.92	
HS-1c	1	Undeveloped Land, Open Desert (MPU)	1155	88	85579	473976	18.1%	76.1%	15.89	61.81	
HS-1c	1	Undeveloped Land, Open Desert (MPU)	1502	73	113190	473976	23.9%	100.0%	17.43	79.24	**79.2**
HS-1b	0	Newly Graded Area (HCDDM)	1155	94	386632	776196	49.8%	49.8%	46.82	46.82	
HS-1b	0	Newly Graded Area (HCDDM)	1502	77	149603	776196	19.3%	69.1%	14.84	61.66	
HS-1b	1	Undeveloped Land, Open Desert (MPU)	1155	88	226162	776196	29.1%	98.2%	25.64	87.30	
HS-1b	1	Undeveloped Land, Open Desert (MPU)	1502	73	13799	776196	1.8%	100.0%	1.30	88.60	**88.6**

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION

ATKINS
Member of the SNC-Lavalin Group

TDS for Summerlin West Village 25
High School Staging Stockpile
CONDITION: INTERIM (ROUGH GRADING WITH STOCKPILE)

BY: MEE
DATE: 11/11/20

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag	
						INITIAL			TRAVEL		V1	V2				Tlag=	RAINFALL
DESIG:	DEV./EX.	CN	K	AREA	AREA	LENGTH	SLOPE	Ti	LENGTH	SLOPE	VELOCITY	VELOCITY	Tt			0.6Tc/60	Q100
	(D or E)			Ac	Mi^2	Feet	%	Min	Feet	%	FPS	FPS	Min	Min	Min	Hours	Inches
(1)			(2)	(3)		(4)	(5)	(6)	(7)	(8)	(9a)	(9b)	(10)	(13)	(14)		
HS-1a	E	88.7	0.781	73.44	0.1148	235	17.0	3.4	4490	6.0	3.6	7.2	11.5	15.0	N/A	**0.150**	3.47
HS-1b	E	88.6	0.780	17.82	0.0278	115	7.9	3.1	2415	7.4	4.0	8.0	6.1	9.2	N/A	**0.10****	3.45
HS-1c	E	79.2	0.655	10.88	0.0170	45	34.0	1.7	2665	6.0	3.6	7.2	7.3	9.0	N/A	**0.10****	3.46

Tc = Ti + Tt Tlag = 0.6 Tc
Ti = 1.8 (1.1 - K) L^1/2 / S^1/3
K = 0.0132 (CN) - 0.39
Tc Check = L/180+10

For the travel time (Tt) calculations,
V1 applies to the first 500 feet of travel distance;
V2 applies to the remaining travel distance.

V1 = 14.8*(S/100)^1/2 Developed
V2 = 29.4*(S/100)^1/2 Developed

V1 = 20.2*(S/100)^1/2
V2 = 30.6*(S/100)^1/2

REFERENCE : STANDARD FORM 4

*Minimum recommended Tc for developed subbasins is 5 mins. A value of 0.05 was use for the Tlag where the calculated Tc was less than 5 mins.

**Minimum recommended Tc for undeveloped subbasins is 10 mins. A value of 0.10 was use for the Tlag where the calculated Tc was less than 10 mins.

```
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   12NOV20  TIME  07:47:44  *                                                  *           (916) 756-1104             *
 *                                      *                                                  *                                      *
 ****************************************                                                  ****************************************
```

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

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

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


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

                        *DIAGRAM
 *** FREE ***
             1          ID  TECHNICAL DRAINAGE STUDY
             2          ID  SUMMERLIN VILLAGE 25
             3          ID  HIGH SCHOOL STAGING STOCKPILE
             4          ID  INTERIM CONDITION (ROUGH GRADING WITH STOCKPILE)
             5          ID  100-YEAR 6-HR STORM
             6          ID  SDN #3 STORM DISTRIBUTION
             7          ID  ATKINS NOVEMBER 2020
             8          ID  HS_Int.DAT
             9          ID  JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES
            10          ID
            11          ID    AREA (SQUARE MILES)       DARF
            12          ID
            13          ID         0 - 0.5             1.00
            14          ID         Estimated 10-year    0.59
            15          ID
            16          IT       5       0       0     300
            17          IO       5       0       0
            18          IN       5       0       0
            19          JR    PREC    1.00    0.59
                        *

            20          KK   HS-1a
            21          KM  PART OF BASIN HS-1 FROM VTN VILLAGE 25 MCDS AND CONTRIBUTORY OFFSITE
            22          BA  0.1148
            23          PB    3.47
            24          PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
            25          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
            26          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
            27          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
            28          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
            29          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
            30          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
            31          PC   0.998   0.999   1.000
            32          LS       0    88.7
            33          UD   0.150
                        *

            34          KK   HS-1b
            35          KM  PART OF BASIN HS-1 FROM VTN VILLAGE 25 MCDS AND CONTRIBUTORY OFFSITE
            36          BA  0.0278
            37          PB    3.45
            38          LS       0    88.6
            39          UD   0.100
                        *

            40          KK      CP
            41          KM   COMBINE SUBBASINS HS-1a AND HS-1b
            42          HC       2
                        *
```

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


            43          KK   HS-1c
            44          KM  PART OF BASIN HS-1 FROM VTN VILLAGE 25 MCDS AND CONTRIBUTORY OFFSITE
            45          BA  0.0170
            46          PB    3.46
            47          LS       0    79.2
            48          UD   0.100
                        *
            49          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    20       HS-1a
                .
                .
    34          .       HS-1b
                .           .
                .           .
    40         CP............
                .
                .
    43          .       HS-1c

 (***) 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   12NOV20  TIME  07:47:44  *                                                  *           (916) 756-1104            *
 *                                      *                                                  *                                     *
 ****************************************                                                  ***************************************



                          TECHNICAL DRAINAGE STUDYSUMMERLIN VILLAGE 25HIGH
                          SCHOOL STAGING STOCKPILE
                          INTERIM CONDITION (ROUGH GRADING WITH STOCKPILE)
                          100-YEAR 6-HR STORM
                          SDN #3 STORM DISTRIBUTION
                          ATKINS NOVEMBER 2020
                          HS_Int.DAT
                          JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES

                            AREA (SQUARE MILES)       DARF

                                 0 - 0.5              1.00
                                 Estimated 10-year    0.59



   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       .59
1
```

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1	RATIO 2
					1.00	.59
HYDROGRAPH AT						
+	HS-1a	.11	1	FLOW	217.	103.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	HS-1b	.03	1	FLOW	56.	26.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP	.14	1	FLOW	269.	128.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	HS-1c	.02	1	FLOW	24.	9.
				TIME	3.50	3.58

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

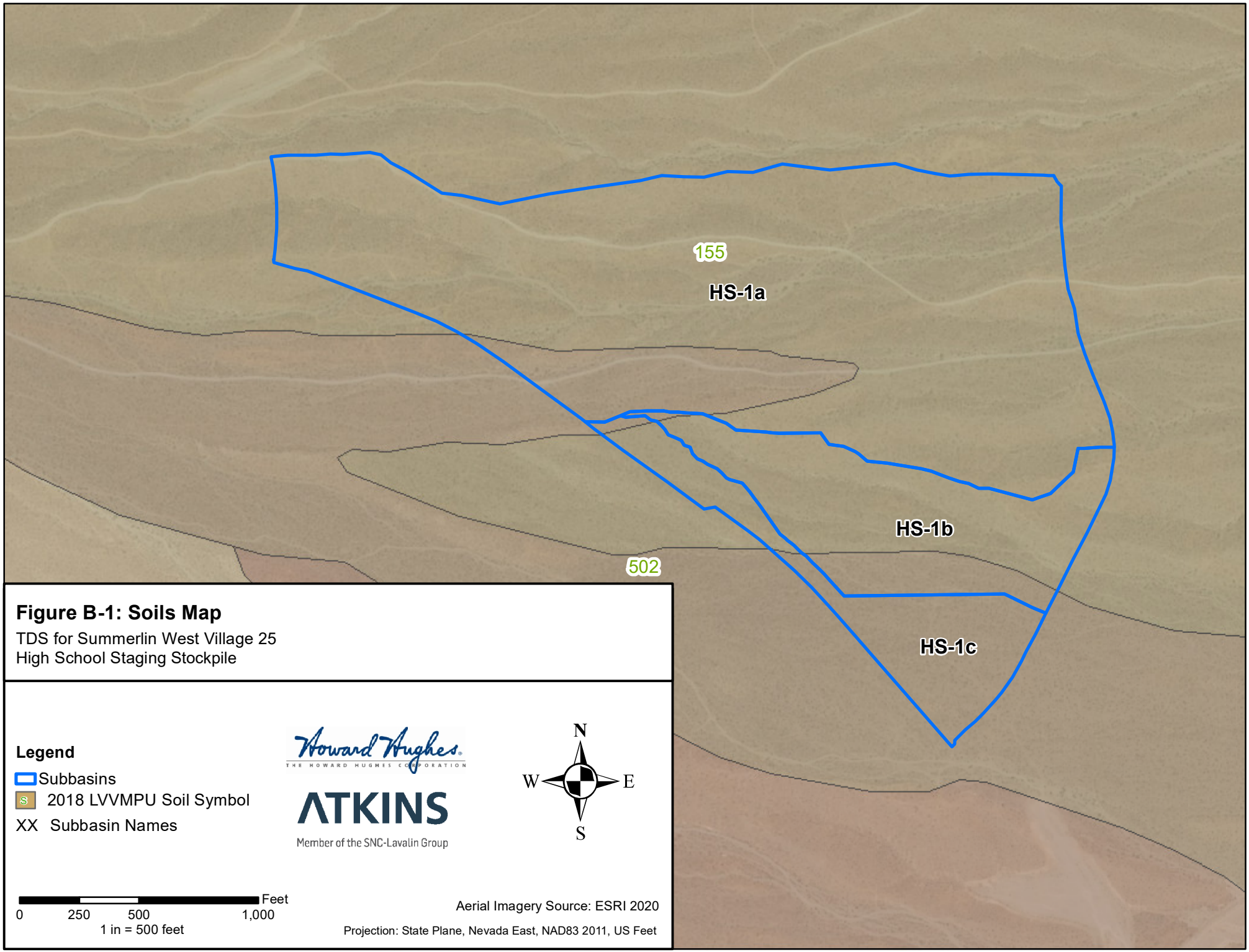


Figure B-1: Soils Map

TDS for Summerlin West Village 25
High School Staging Stockpile

Legend

- Subbasins
- 2018 LVVMPU Soil Symbol
- XX Subbasin Names

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N
W E
S

0 250 500 1,000 Feet
1 in = 500 feet

Aerial Imagery Source: ESRI 2020

Projection: State Plane, Nevada East, NAD83 2011, US Feet

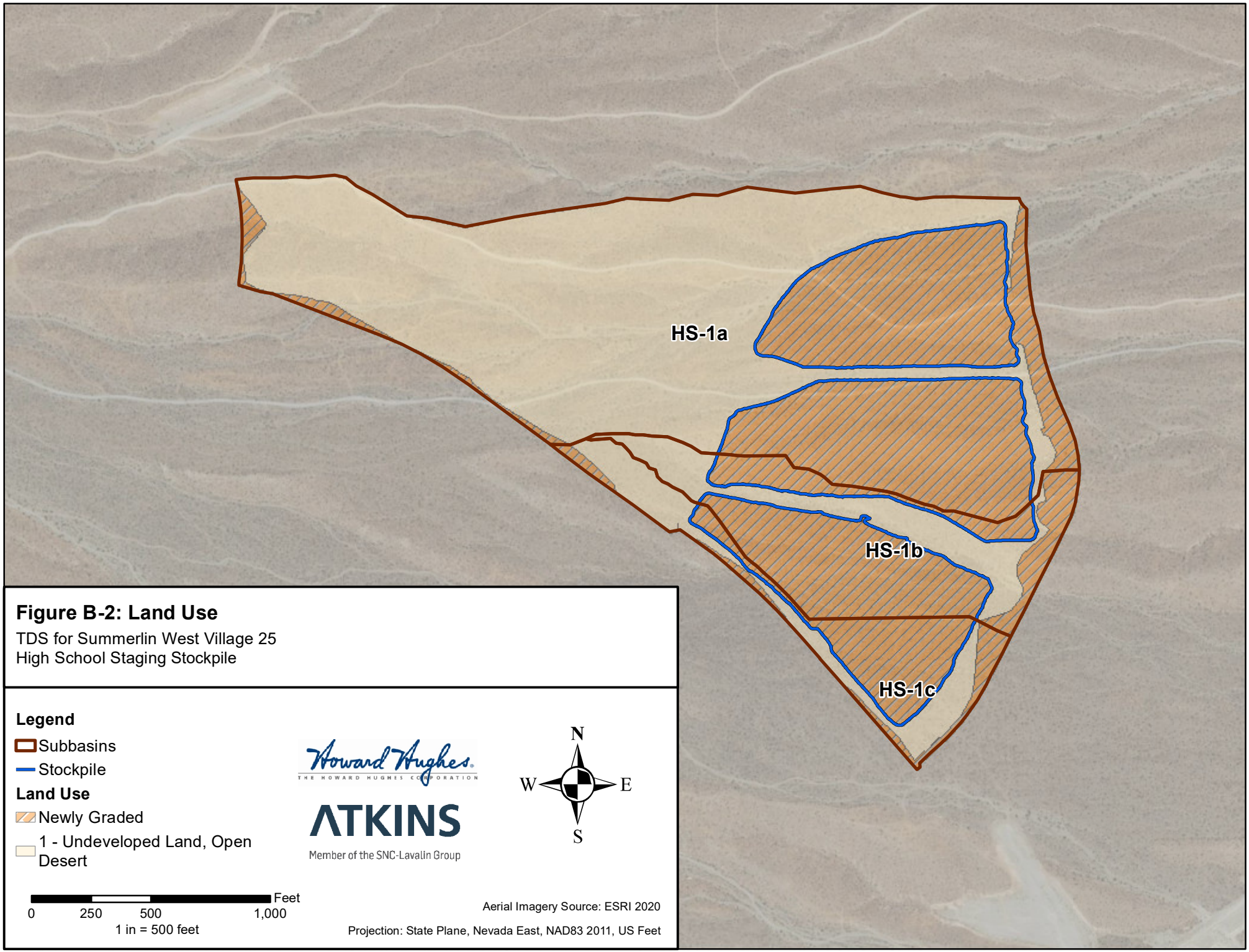

Figure B-2: Land Use

TDS for Summerlin West Village 25
High School Staging Stockpile

Legend

- Subbasins
- Stockpile

Land Use

- Newly Graded
- 1 - Undeveloped Land, Open Desert

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N
W E
S

0 250 500 1,000 Feet
1 in = 500 feet

Aerial Imagery Source: ESRI 2020

Projection: State Plane, Nevada East, NAD83 2011, US Feet



Figure B-3: Precipitation Coverage Map

TDS for Summerlin West Village 25
High School Staging Stockpile

Legend

Subbasins

100-yr 6 hr Rainfall (in)

3.8

3.0

XX (XX) Subbasin Name (Rainfall)

0 500 1,000 Feet

1 in = 500 feet

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N W E S

Aerial Imagery Source: ESRI 2020

Projection: State Plane, Nevada East, NAD83 2011, US Feet

Appendix B. Hydrology Appendix

B.1. Interim Hydrology Parameters

B.2. Interim HEC-1 Model

B.1 Interim Hydrology Parameters

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION
TDS for Summerlin Village 25 West

ATKINS

Scurry Bend Drive
Sunset Run Drive to Lake Mead Boulevard

BY: MYG
QC:
DATE: 2/2/2021

INTERIM CONDITION

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag
DESIG:	DEV./EX.	CN	K	AREA	AREA	INITIAL LENGTH	SLOPE	Ti	TRAVEL LENGTH	SLOPE	V1 VELOCITY	V2 VELOCITY	Tt			Tlag= 0.6Tc/60
	(D or E)			Ac	Mi^2	Feet	%	Min	Feet	%	FPS	FPS	Min	Min	Min	Hours
(1)			(2)	(3)		(4)	(5)	(6)	(7)	(8)	(9a)	(9b)	(10)	(13)	(14)	
SN-1AE	D	98.0	0.904	0.86	0.00135	30	2.0	1.5	577	2.3	3.0	4.6	3.0	4.6	13.4	**0.05***
SN-1AW	D	98.0	0.904	0.86	0.00135	30	2.0	1.5	577	2.3	3.0	4.6	3.0	4.6	13.4	**0.05***
SN-1BE	D	98.0	0.904	0.87	0.00136	30	2.0	1.5	637	2.3	3.0	4.6	3.2	4.8	13.7	**0.05***
SN-1BW	D	98.0	0.904	0.87	0.00136	30	2.0	1.5	637	2.3	3.0	4.6	3.2	4.8	13.7	**0.05***
HS-1A***	E	88.7	0.781	73.44	0.1148	235	17.0	3.4	4490	6.0	3.6	7.2	11.5	15.0	N/A	**0.150**
HS-1B***	E	88.6	0.780	17.82	0.0278	115	7.9	3.1	2415	7.4	4.0	8.0	6.1	9.2	N/A	**0.10****
HS-1C***	E	79.2	0.655	10.88	0.0170	45	34.0	1.7	2665	6.0	3.6	7.2	7.3	9.0	N/A	**0.10****
SN-2AE	D	98.0	0.904	0.95	0.00148	30	2.0	1.5	645	4.2	4.1	6.3	2.4	3.9	13.8	**0.05***
SN-2AW	D	98.0	0.904	0.95	0.00148	30	2.0	1.5	645	4.2	4.1	6.3	2.4	3.9	13.8	**0.05***
SN-2BE	D	98.0	0.904	0.81	0.00126	30	2.0	1.5	576	3.2	3.6	5.5	2.5	4.1	13.4	**0.05***
SN-2BW	D	98.0	0.904	0.81	0.00126	30	2.0	1.5	576	3.2	3.6	5.5	2.5	4.1	13.4	**0.05***
SN-2CE	D	98.0	0.904	0.47	0.00073	30	2.0	1.5	330	3.2	3.6	5.5	1.5	3.1	12.0	**0.05***
SN-2CW	D	98.0	0.904	0.47	0.00073	30	2.0	1.5	330	3.2	3.6	5.5	1.5	3.1	12.0	**0.05***

Tc = Ti + Tt Tlag = 0.6 Tc
Ti = 1.8 (1.1 - K) L^1/2 / S^1/3
K = 0.0132 (CN) - 0.39
Tc Check = L/180+10

For the travel time (Tt) calculations,
V1 applies to the first 500 feet of travel distance;
V2 applies to the remaining travel distance.

V1 = 14.8*(S/100)^1/2 Developed V1 = 20.2*(S/100)^1/2
V2 = 29.4*(S/100)^1/2 Developed V2 = 30.6*(S/100)^1/2

REFERENCE : **STANDARD FORM 4**

*Minimum recommended Tc for developed subbasins is 5 mins. A value of 0.05 was use for the Tlag where the calculated Tc was less than 5 mins.

**Minimum recommended Tc for undeveloped subbasins is 10 mins. A value of 0.10 was use for the Tlag where the calculated Tc was less than 10 mins.

***Referenced from High School Staging Stockpile TDS

B.2 Interim HEC-1 Model

```
*DIAGRAM
*FREE
IDTECHNICAL DRAINAGE STUDY
IDSUMMERLIN VILLAGE 25 West
IDSCURRY BEND DRIVE(STREET N): SUNSET RUN DRIVE (STREET Q) TO LAKE MEAD BOULEVARD
IDDESIGN STORM 100-YEAR 6 HOUR
ID
IDJR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES
ID
ID  AREA (SQUARE MILES)           DARF
ID
ID        0 - 0.5                 0.99
ID        Estimated 10-year       0.57
ID
IT5       0       0       300
IO5       0       0
IN5       0       0
JRPREC    0.99    0.57
*
KKSN2AW
BA0.00148
PB3.44
PC0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
PC0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
PC0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
PC0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
PC0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
PC0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
PC0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
PC0.998   0.999   1.000
LS0       98.0
UD0.050
*
KKSN2AE
BA0.00148
PB3.44
LS0       98.0
UD0.050
*
KKINT-HS1-C
BA0.0170
PB3.46
LS0       79.2
UD0.100
*
KKCP-FRA
KO       1
HC       3
*
KKSN2BW
BA0.00126
PB3.44
LS0       98.0
UD0.050
*
KKSN2BE
BA0.00126
PB3.44
LS0       98.0
UD0.050
*
KKCP-DMH3
KO       1
HC       2
*
KKSN2CW
BA0.00073
PB3.44
LS0       98.0
```

```
UD0.050
*
KKSN2CE
BA0.00073
PB3.44
LS0       98.0
UD0.050
*
KKCP-STMH5
KO       1
HC       3
*
KKSN1AW
BA0.00135
PB3.44
LS0       98.0
UD0.050
*
KKSN1AE
BA0.00134
PB3.44
LS0       98.0
UD0.050
*
KKCP-SBD-NA
KO       1
HC       2
*
KKSN1BW
BA0.00135
PB3.44
LS0       98.0
UD0.050
*
KKSN1BE
BA0.00136
PB3.44
LS0       98.0
UD0.050
*
KKCP-SBD-NB
HC       2
*
KKINT-HS-1A
BA0.1148
PB3.47
LS0       88.7
UD0.150
*
KKINTHS-1B
KMPART OF BASIN HS-1 FROM VTN VILLAGE 25 MCDS AND CONTRIBUTORY OFFSITE
BA0.0278
PB3.45
LS0      88.6
UD0.100
*
KKCP-INT-HSAB
KM COMBINE SUBBASINS HS-1a AND HS-1b
HC     2
*
KKCP-SBD
HC       3
*
ZZ
```

```
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   02MAR21  TIME  16:04:07   *                                                    *           (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  TECHNICAL DRAINAGE STUDY
             2          ID  SUMMERLIN VILLAGE 25 West
             3          ID  SCURRY BEND DRIVE(STREET N): SUNSET RUN DRIVE (STREET Q) TO LAKE MEAD BOULEVAR
             4          ID  DESIGN STORM 100-YEAR 6 HOUR
             5          ID
             6          ID  JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES
             7          ID
             8          ID    AREA (SQUARE MILES)           DARF
             9          ID
            10          ID          0 - 0.5                 0.99
            11          ID          Estimated 10-year       0.57
            12          ID
            13          IT       5       0       0     300
            14          IO       5       0       0
            15          IN       5       0       0
            16          JR    PREC    0.99    0.57
                        *
```

```
   17          KK   SN2AW
   18          BA 0.00148
   19          PB    3.44
   20          PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
   21          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
   22          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
   23          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
   24          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
   25          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
   26          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
   27          PC   0.998   0.999   1.000
   28          LS       0    98.0
   29          UD   0.050
               *

   30          KK   SN2AE
   31          BA 0.00148
   32          PB    3.44
   33          LS       0    98.0
   34          UD   0.050
               *

   35          KKINT-HS1-C
   36          BA  0.0170
   37          PB    3.46
   38          LS       0    79.2
   39          UD   0.100
               *

   40          KK  CP-FRA
   41          KO       1
   42          HC       3
               *
1                                                HEC-1 INPUT                                                PAGE
 2

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


   43          KK   SN2BW
   44          BA 0.00126
   45          PB    3.44
   46          LS       0    98.0
   47          UD   0.050
               *

   48          KK   SN2BE
   49          BA 0.00126
   50          PB    3.44
   51          LS       0    98.0
   52          UD   0.050
               *

   53          KK CP-DMH3
   54          KO       1
   55          HC       2
               *

   56          KK   SN2CW
   57          BA 0.00073
   58          PB    3.44
   59          LS       0    98.0
   60          UD   0.050
               *

   61          KK   SN2CE
   62          BA 0.00073
   63          PB    3.44
```

```
  64          LS       0    98.0
  65          UD   0.050
              *

  66          KKCP-STMH5
  67          KO       1
  68          HC       3
              *

  69          KK   SN1AW
  70          BA 0.00135
  71          PB    3.44
  72          LS       0    98.0
  73          UD   0.050
              *

  74          KK   SN1AE
  75          BA 0.00134
  76          PB    3.44
  77          LS       0    98.0
  78          UD   0.050
              *
```



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

  79          KKCP-SBD-NA
  80          KO       1
  81          HC       2
              *

  82          KK   SN1BW
  83          BA 0.00135
  84          PB    3.44
  85          LS       0    98.0
  86          UD   0.050
              *

  87          KK   SN1BE
  88          BA 0.00136
  89          PB    3.44
  90          LS       0    98.0
  91          UD   0.050
              *

  92          KKCP-SBD-NB
  93          HC       2
              *

  94          KKINT-HS-1A
  95          BA  0.1148
  96          PB    3.47
  97          LS       0    88.7
  98          UD   0.150
              *

  99          KKINTHS-1B
 100          KM  PART OF BASIN HS-1 FROM VTN VILLAGE 25 MCDS AND CONTRIBUTORY OFFSITE
 101          BA  0.0278
 102          PB    3.45
 103          LS       0    88.6
 104          UD   0.100
              *

 105          KKCP-INT-HSAB
 106          KM   COMBINE SUBBASINS HS-1a AND HS-1b
 107          HC       2
```

```
                    *
          108       KK  CP-SBD
          109       HC       3
                    *
          110       ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    17       SN2AW
                .
                .
    30          .       SN2AE
                .           .
                .           .
    35          .           .    INT-HS1-
                .           .           .
                .           .           .
    40      CP-FRA.......................
                .
                .
    43          .       SN2BW
                .           .
                .           .
    48          .           .       SN2BE
                .           .           .
                .           .           .
    53          .     CP-DMH3............
                .           .
                .           .
    56          .           .       SN2CW
                .           .           .
                .           .           .
    61          .           .           .       SN2CE
                .           .           .           .
                .           .           .           .
    66          .    CP-STMH5........................
                .           .
                .           .
    69          .           .       SN1AW
                .           .           .
                .           .           .
    74          .           .           .       SN1AE
                .           .           .           .
                .           .           .           .
    79          .           .    CP-SBD-N............
                .           .           .
                .           .           .
    82          .           .           .       SN1BW
                .           .           .           .
                .           .           .           .
    87          .           .           .           .       SN1BE
                .           .           .           .           .
                .           .           .           .           .
    92          .           .           .    CP-SBD-N............
                .           .           .           .
                .           .           .           .
    94          .           .           .           .    INT-HS-1
                .           .           .           .           .
                .           .           .           .           .
    99          .           .           .           .           .    INTHS-1B
                .           .           .           .           .           .
                .           .           .           .           .           .
   105          .           .           .           .    CP-INT-H............
                .           .           .           .           .
```

```
              .          .          .          .          .
   108        .          .      CP-SBD.....................

 (***) 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   02MAR21  TIME  16:04:07  *                                                    *           (916)
756-1104            *
 *                                      *                                                    *
            *
 ****************************************
****************************************
```

TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 25 West
SCURRY BEND DRIVE(STREET N): SUNSET RUN DRIVE (STREET Q) TO LAKE MEAD BOULEVAR
DESIGN STORM 100-YEAR 6 HOUR

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES

AREA (SQUARE MILES)	DARF
0 - 0.5	0.99
Estimated 10-year	0.57

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

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

                    COMPUTATION INTERVAL     .08 HOURS
                         TOTAL TIME BASE   24.92 HOURS

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

      JP          MULTI-PLAN OPTION
                       NPLAN           1  NUMBER OF PLANS
```

```
     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                     .99       .57


 *** *** ***
```

```
    1    0110   15        0.   *    1    0725   90        0.   *    1    1340  165        0.   *    1    1955
240         0.
    1    0115   16        0.   *    1    0730   91        0.   *    1    1345  166        0.   *    1    2000
241         0.
    1    0120   17        0.   *    1    0735   92        0.   *    1    1350  167        0.   *    1    2005
242         0.
    1    0125   18        1.   *    1    0740   93        0.   *    1    1355  168        0.   *    1    2010
243         0.
    1    0130   19        1.   *    1    0745   94        0.   *    1    1400  169        0.   *    1    2015
244         0.
    1    0135   20        1.   *    1    0750   95        0.   *    1    1405  170        0.   *    1    2020
245         0.
    1    0140   21        1.   *    1    0755   96        0.   *    1    1410  171        0.   *    1    2025
246         0.
    1    0145   22        1.   *    1    0800   97        0.   *    1    1415  172        0.   *    1    2030
247         0.
    1    0150   23        1.   *    1    0805   98        0.   *    1    1420  173        0.   *    1    2035
248         0.
    1    0155   24        0.   *    1    0810   99        0.   *    1    1425  174        0.   *    1    2040
249         0.
    1    0200   25        0.   *    1    0815  100        0.   *    1    1430  175        0.   *    1    2045
250         0.
    1    0205   26        0.   *    1    0820  101        0.   *    1    1435  176        0.   *    1    2050
251         0.
    1    0210   27        1.   *    1    0825  102        0.   *    1    1440  177        0.   *    1    2055
252         0.
    1    0215   28        2.   *    1    0830  103        0.   *    1    1445  178        0.   *    1    2100
253         0.
    1    0220   29        2.   *    1    0835  104        0.   *    1    1450  179        0.   *    1    2105
254         0.
    1    0225   30        2.   *    1    0840  105        0.   *    1    1455  180        0.   *    1    2110
255         0.
    1    0230   31        1.   *    1    0845  106        0.   *    1    1500  181        0.   *    1    2115
256         0.
    1    0235   32        1.   *    1    0850  107        0.   *    1    1505  182        0.   *    1    2120
257         0.
    1    0240   33        2.   *    1    0855  108        0.   *    1    1510  183        0.   *    1    2125
258         0.
    1    0245   34        2.   *    1    0900  109        0.   *    1    1515  184        0.   *    1    2130
259         0.
    1    0250   35        1.   *    1    0905  110        0.   *    1    1520  185        0.   *    1    2135
260         0.
    1    0255   36        1.   *    1    0910  111        0.   *    1    1525  186        0.   *    1    2140
261         0.
    1    0300   37        1.   *    1    0915  112        0.   *    1    1530  187        0.   *    1    2145
262         0.
    1    0305   38        3.   *    1    0920  113        0.   *    1    1535  188        0.   *    1    2150
263         0.
    1    0310   39        5.   *    1    0925  114        0.   *    1    1540  189        0.   *    1    2155
264         0.
    1    0315   40        9.   *    1    0930  115        0.   *    1    1545  190        0.   *    1    2200
265         0.
    1    0320   41       17.   *    1    0935  116        0.   *    1    1550  191        0.   *    1    2205
266         0.
    1    0325   42       24.   *    1    0940  117        0.   *    1    1555  192        0.   *    1    2210
267         0.
    1    0330   43       32.   *    1    0945  118        0.   *    1    1600  193        0.   *    1    2215
268         0.
    1    0335   44       28.   *    1    0950  119        0.   *    1    1605  194        0.   *    1    2220
269         0.
    1    0340   45       19.   *    1    0955  120        0.   *    1    1610  195        0.   *    1    2225
270         0.
    1    0345   46       15.   *    1    1000  121        0.   *    1    1615  196        0.   *    1    2230
271         0.
    1    0350   47       10.   *    1    1005  122        0.   *    1    1620  197        0.   *    1    2235
272         0.
    1    0355   48        7.   *    1    1010  123        0.   *    1    1625  198        0.   *    1    2240
273         0.
    1    0400   49        7.   *    1    1015  124        0.   *    1    1630  199        0.   *    1    2245
```

```
274       0.
     1    0405   50        5.   *    1     1020  125        0.   *    1     1635  200        0.   *    1     2250
275       0.
     1    0410   51        3.   *    1     1025  126        0.   *    1     1640  201        0.   *    1     2255
276       0.
     1    0415   52        3.   *    1     1030  127        0.   *    1     1645  202        0.   *    1     2300
277       0.
     1    0420   53        3.   *    1     1035  128        0.   *    1     1650  203        0.   *    1     2305
278       0.
     1    0425   54        4.   *    1     1040  129        0.   *    1     1655  204        0.   *    1     2310
279       0.
     1    0430   55        6.   *    1     1045  130        0.   *    1     1700  205        0.   *    1     2315
280       0.
     1    0435   56        7.   *    1     1050  131        0.   *    1     1705  206        0.   *    1     2320
281       0.
     1    0440   57        6.   *    1     1055  132        0.   *    1     1710  207        0.   *    1     2325
282       0.
     1    0445   58        5.   *    1     1100  133        0.   *    1     1715  208        0.   *    1     2330
283       0.
     1    0450   59        7.   *    1     1105  134        0.   *    1     1720  209        0.   *    1     2335
284       0.
     1    0455   60        6.   *    1     1110  135        0.   *    1     1725  210        0.   *    1     2340
285       0.
     1    0500   61        4.   *    1     1115  136        0.   *    1     1730  211        0.   *    1     2345
286       0.
     1    0505   62        3.   *    1     1120  137        0.   *    1     1735  212        0.   *    1     2350
287       0.
     1    0510   63        2.   *    1     1125  138        0.   *    1     1740  213        0.   *    1     2355
288       0.
     1    0515   64        1.   *    1     1130  139        0.   *    1     1745  214        0.   *    2     0000
289       0.
     1    0520   65        1.   *    1     1135  140        0.   *    1     1750  215        0.   *    2     0005
290       0.
     1    0525   66        1.   *    1     1140  141        0.   *    1     1755  216        0.   *    2     0010
291       0.
     1    0530   67        1.   *    1     1145  142        0.   *    1     1800  217        0.   *    2     0015
292       0.
     1    0535   68        0.   *    1     1150  143        0.   *    1     1805  218        0.   *    2     0020
293       0.
     1    0540   69        0.   *    1     1155  144        0.   *    1     1810  219        0.   *    2     0025
294       0.
     1    0545   70        1.   *    1     1200  145        0.   *    1     1815  220        0.   *    2     0030
295       0.
     1    0550   71        1.   *    1     1205  146        0.   *    1     1820  221        0.   *    2     0035
296       0.
     1    0555   72        0.   *    1     1210  147        0.   *    1     1825  222        0.   *    2     0040
297       0.
     1    0600   73        0.   *    1     1215  148        0.   *    1     1830  223        0.   *    2     0045
298       0.
     1    0605   74        0.   *    1     1220  149        0.   *    1     1835  224        0.   *    2     0050
299       0.
     1    0610   75        0.   *    1     1225  150        0.   *    1     1840  225        0.   *    2     0055
300       0.
                              *                                  *                                  *
```

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**********************************************************************************************************************
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```

```
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR     24.92-HR
+   (CFS)       (HR)
                          (CFS)
+      32.      3.50                    4.          1.          1.          1.
                         (INCHES)     1.765       1.767       1.767       1.767
                          (AC-FT)       2.          2.          2.          2.

                          CUMULATIVE AREA =     .02 SQ MI
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****

HYDROGRAPH AT STATION CP-FRA
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .57

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	0.	*	1		1230	151	0.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	0.	*	1		1235	152	0.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	0.	*	1		1240	153	0.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	0.	*	1		1245	154	0.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	0.	*	1		1250	155	0.	*	1		1905	230	0.
1		0025	6	1.	*	1		0640	81	0.	*	1		1255	156	0.	*	1		1910	231	0.
1		0030	7	1.	*	1		0645	82	0.	*	1		1300	157	0.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	0.	*	1		1305	158	0.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	0.	*	1		1310	159	0.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	0.	*	1		1315	160	0.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	0.	*	1		1320	161	0.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	0.	*	1		1325	162	0.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	0.	*	1		1330	163	0.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	0.	*	1		1335	164	0.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	0.	*	1		1340	165	0.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	0.	*	1		1345	166	0.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	0.	*	1		1350	167	0.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	0.	*	1		1355	168	0.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	0.	*	1		1400	169	0.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	0.	*	1		1405	170	0.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	0.	*	1		1410	171	0.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	0.	*	1		1415	172	0.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	0.	*	1		1420	173	0.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	0.	*	1		1425	174	0.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	0.	*	1		1430	175	0.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	0.	*	1		1435	176	0.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	0.	*	1		1440	177	0.	*	1		2055	252	0.

```
     1     0215   28        1.   *    1     0830  103        0.   *    1     1445  178        0.   *    1     2100
253        0.
     1     0220   29        0.   *    1     0835  104        0.   *    1     1450  179        0.   *    1     2105
254        0.
     1     0225   30        0.   *    1     0840  105        0.   *    1     1455  180        0.   *    1     2110
255        0.
     1     0230   31        0.   *    1     0845  106        0.   *    1     1500  181        0.   *    1     2115
256        0.
     1     0235   32        0.   *    1     0850  107        0.   *    1     1505  182        0.   *    1     2120
257        0.
     1     0240   33        0.   *    1     0855  108        0.   *    1     1510  183        0.   *    1     2125
258        0.
     1     0245   34        0.   *    1     0900  109        0.   *    1     1515  184        0.   *    1     2130
259        0.
     1     0250   35        0.   *    1     0905  110        0.   *    1     1520  185        0.   *    1     2135
260        0.
     1     0255   36        0.   *    1     0910  111        0.   *    1     1525  186        0.   *    1     2140
261        0.
     1     0300   37        0.   *    1     0915  112        0.   *    1     1530  187        0.   *    1     2145
262        0.
     1     0305   38        1.   *    1     0920  113        0.   *    1     1535  188        0.   *    1     2150
263        0.
     1     0310   39        2.   *    1     0925  114        0.   *    1     1540  189        0.   *    1     2155
264        0.
     1     0315   40        3.   *    1     0930  115        0.   *    1     1545  190        0.   *    1     2200
265        0.
     1     0320   41        6.   *    1     0935  116        0.   *    1     1550  191        0.   *    1     2205
266        0.
     1     0325   42        9.   *    1     0940  117        0.   *    1     1555  192        0.   *    1     2210
267        0.
     1     0330   43       13.   *    1     0945  118        0.   *    1     1600  193        0.   *    1     2215
268        0.
     1     0335   44       11.   *    1     0950  119        0.   *    1     1605  194        0.   *    1     2220
269        0.
     1     0340   45        8.   *    1     0955  120        0.   *    1     1610  195        0.   *    1     2225
270        0.
     1     0345   46        6.   *    1     1000  121        0.   *    1     1615  196        0.   *    1     2230
271        0.
     1     0350   47        4.   *    1     1005  122        0.   *    1     1620  197        0.   *    1     2235
272        0.
     1     0355   48        3.   *    1     1010  123        0.   *    1     1625  198        0.   *    1     2240
273        0.
     1     0400   49        3.   *    1     1015  124        0.   *    1     1630  199        0.   *    1     2245
274        0.
     1     0405   50        2.   *    1     1020  125        0.   *    1     1635  200        0.   *    1     2250
275        0.
     1     0410   51        1.   *    1     1025  126        0.   *    1     1640  201        0.   *    1     2255
276        0.
     1     0415   52        1.   *    1     1030  127        0.   *    1     1645  202        0.   *    1     2300
277        0.
     1     0420   53        1.   *    1     1035  128        0.   *    1     1650  203        0.   *    1     2305
278        0.
     1     0425   54        2.   *    1     1040  129        0.   *    1     1655  204        0.   *    1     2310
279        0.
     1     0430   55        3.   *    1     1045  130        0.   *    1     1700  205        0.   *    1     2315
280        0.
     1     0435   56        3.   *    1     1050  131        0.   *    1     1705  206        0.   *    1     2320
281        0.
     1     0440   57        3.   *    1     1055  132        0.   *    1     1710  207        0.   *    1     2325
282        0.
     1     0445   58        2.   *    1     1100  133        0.   *    1     1715  208        0.   *    1     2330
283        0.
     1     0450   59        3.   *    1     1105  134        0.   *    1     1720  209        0.   *    1     2335
284        0.
     1     0455   60        3.   *    1     1110  135        0.   *    1     1725  210        0.   *    1     2340
285        0.
     1     0500   61        2.   *    1     1115  136        0.   *    1     1730  211        0.   *    1     2345
286        0.
     1     0505   62        1.   *    1     1120  137        0.   *    1     1735  212        0.   *    1     2350
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287        0.
     1     0510   63        1.   *    1     1125  138        0.   *    1     1740  213        0.   *    1     2355
288        0.
     1     0515   64        1.   *    1     1130  139        0.   *    1     1745  214        0.   *    2     0000
289        0.
     1     0520   65        0.   *    1     1135  140        0.   *    1     1750  215        0.   *    2     0005
290        0.
     1     0525   66        0.   *    1     1140  141        0.   *    1     1755  216        0.   *    2     0010
291        0.
     1     0530   67        0.   *    1     1145  142        0.   *    1     1800  217        0.   *    2     0015
292        0.
     1     0535   68        0.   *    1     1150  143        0.   *    1     1805  218        0.   *    2     0020
293        0.
     1     0540   69        0.   *    1     1155  144        0.   *    1     1810  219        0.   *    2     0025
294        0.
     1     0545   70        0.   *    1     1200  145        0.   *    1     1815  220        0.   *    2     0030
295        0.
     1     0550   71        0.   *    1     1205  146        0.   *    1     1820  221        0.   *    2     0035
296        0.
     1     0555   72        0.   *    1     1210  147        0.   *    1     1825  222        0.   *    2     0040
297        0.
     1     0600   73        0.   *    1     1215  148        0.   *    1     1830  223        0.   *    2     0045
298        0.
     1     0605   74        0.   *    1     1220  149        0.   *    1     1835  224        0.   *    2     0050
299        0.
     1     0610   75        0.   *    1     1225  150        0.   *    1     1840  225        0.   *    2     0055
300        0.
                                   *                                   *                                   *

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  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     24.92-HR
+   (CFS)       (HR)
                          (CFS)
+      13.      3.50                     1.          0.          0.           0.
                        (INCHES)      .694        .695        .695         .695
                         (AC-FT)        1.          1.          1.           1.

                         CUMULATIVE AREA =     .02 SQ MI



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


            **************
            *            *
   53 KK    *   CP-DMH3  *
            *            *
            **************

   54 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           1  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

   55 HC          HYDROGRAPH COMBINATION
                        ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                    ***


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HYDROGRAPH AT STATION CP-DMH3
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .99

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	0.	*	1		1230	151	0.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	0.	*	1		1235	152	0.	*	1		1850	227	0.
1		0010	3	1.	*	1		0625	78	0.	*	1		1240	153	0.	*	1		1855	228	0.
1		0015	4	1.	*	1		0630	79	0.	*	1		1245	154	0.	*	1		1900	229	0.
1		0020	5	1.	*	1		0635	80	0.	*	1		1250	155	0.	*	1		1905	230	0.
1		0025	6	1.	*	1		0640	81	0.	*	1		1255	156	0.	*	1		1910	231	0.
1		0030	7	1.	*	1		0645	82	0.	*	1		1300	157	0.	*	1		1915	232	0.
1		0035	8	1.	*	1		0650	83	0.	*	1		1305	158	0.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	0.	*	1		1310	159	0.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	0.	*	1		1315	160	0.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	0.	*	1		1320	161	0.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	0.	*	1		1325	162	0.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	0.	*	1		1330	163	0.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	0.	*	1		1335	164	0.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	0.	*	1		1340	165	0.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	0.	*	1		1345	166	0.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	0.	*	1		1350	167	0.	*	1		2005	242	0.
1		0125	18	1.	*	1		0740	93	0.	*	1		1355	168	0.	*	1		2010	243	0.
1		0130	19	1.	*	1		0745	94	0.	*	1		1400	169	0.	*	1		2015	244	0.
1		0135	20	1.	*	1		0750	95	0.	*	1		1405	170	0.	*	1		2020	245	0.
1		0140	21	1.	*	1		0755	96	0.	*	1		1410	171	0.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	0.	*	1		1415	172	0.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	0.	*	1		1420	173	0.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	0.	*	1		1425	174	0.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	0.	*	1		1430	175	0.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	0.	*	1		1435	176	0.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	0.	*	1		1440	177	0.	*	1		2055	252	0.
1		0215	28	1.	*	1		0830	103	0.	*	1		1445	178	0.	*	1		2100	253	0.
1		0220	29	1.	*	1		0835	104	0.	*	1		1450	179	0.	*	1		2105	254	0.

```
    1    0225   30        1.   *    1     0840  105        0.   *    1     1455  180        0.   *    1     2110
255         0.
    1    0230   31        0.   *    1     0845  106        0.   *    1     1500  181        0.   *    1     2115
256         0.
    1    0235   32        0.   *    1     0850  107        0.   *    1     1505  182        0.   *    1     2120
257         0.
    1    0240   33        1.   *    1     0855  108        0.   *    1     1510  183        0.   *    1     2125
258         0.
    1    0245   34        1.   *    1     0900  109        0.   *    1     1515  184        0.   *    1     2130
259         0.
    1    0250   35        0.   *    1     0905  110        0.   *    1     1520  185        0.   *    1     2135
260         0.
    1    0255   36        0.   *    1     0910  111        0.   *    1     1525  186        0.   *    1     2140
261         0.
    1    0300   37        1.   *    1     0915  112        0.   *    1     1530  187        0.   *    1     2145
262         0.
    1    0305   38        1.   *    1     0920  113        0.   *    1     1535  188        0.   *    1     2150
263         0.
    1    0310   39        2.   *    1     0925  114        0.   *    1     1540  189        0.   *    1     2155
264         0.
    1    0315   40        3.   *    1     0930  115        0.   *    1     1545  190        0.   *    1     2200
265         0.
    1    0320   41        5.   *    1     0935  116        0.   *    1     1550  191        0.   *    1     2205
266         0.
    1    0325   42        6.   *    1     0940  117        0.   *    1     1555  192        0.   *    1     2210
267         0.
    1    0330   43        7.   *    1     0945  118        0.   *    1     1600  193        0.   *    1     2215
268         0.
    1    0335   44        4.   *    1     0950  119        0.   *    1     1605  194        0.   *    1     2220
269         0.
    1    0340   45        3.   *    1     0955  120        0.   *    1     1610  195        0.   *    1     2225
270         0.
    1    0345   46        2.   *    1     1000  121        0.   *    1     1615  196        0.   *    1     2230
271         0.
    1    0350   47        1.   *    1     1005  122        0.   *    1     1620  197        0.   *    1     2235
272         0.
    1    0355   48        1.   *    1     1010  123        0.   *    1     1625  198        0.   *    1     2240
273         0.
    1    0400   49        1.   *    1     1015  124        0.   *    1     1630  199        0.   *    1     2245
274         0.
    1    0405   50        1.   *    1     1020  125        0.   *    1     1635  200        0.   *    1     2250
275         0.
    1    0410   51        0.   *    1     1025  126        0.   *    1     1640  201        0.   *    1     2255
276         0.
    1    0415   52        0.   *    1     1030  127        0.   *    1     1645  202        0.   *    1     2300
277         0.
    1    0420   53        1.   *    1     1035  128        0.   *    1     1650  203        0.   *    1     2305
278         0.
    1    0425   54        1.   *    1     1040  129        0.   *    1     1655  204        0.   *    1     2310
279         0.
    1    0430   55        1.   *    1     1045  130        0.   *    1     1700  205        0.   *    1     2315
280         0.
    1    0435   56        1.   *    1     1050  131        0.   *    1     1705  206        0.   *    1     2320
281         0.
    1    0440   57        1.   *    1     1055  132        0.   *    1     1710  207        0.   *    1     2325
282         0.
    1    0445   58        1.   *    1     1100  133        0.   *    1     1715  208        0.   *    1     2330
283         0.
    1    0450   59        1.   *    1     1105  134        0.   *    1     1720  209        0.   *    1     2335
284         0.
    1    0455   60        1.   *    1     1110  135        0.   *    1     1725  210        0.   *    1     2340
285         0.
    1    0500   61        0.   *    1     1115  136        0.   *    1     1730  211        0.   *    1     2345
286         0.
    1    0505   62        0.   *    1     1120  137        0.   *    1     1735  212        0.   *    1     2350
287         0.
    1    0510   63        0.   *    1     1125  138        0.   *    1     1740  213        0.   *    1     2355
288         0.
    1    0515   64        0.   *    1     1130  139        0.   *    1     1745  214        0.   *    2     0000
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289        0.
     1     0520   65        0.   *    1     1135  140        0.   *    1     1750  215        0.   *    2     0005
290        0.
     1     0525   66        0.   *    1     1140  141        0.   *    1     1755  216        0.   *    2     0010
291        0.
     1     0530   67        0.   *    1     1145  142        0.   *    1     1800  217        0.   *    2     0015
292        0.
     1     0535   68        0.   *    1     1150  143        0.   *    1     1805  218        0.   *    2     0020
293        0.
     1     0540   69        0.   *    1     1155  144        0.   *    1     1810  219        0.   *    2     0025
294        0.
     1     0545   70        0.   *    1     1200  145        0.   *    1     1815  220        0.   *    2     0030
295        0.
     1     0550   71        0.   *    1     1205  146        0.   *    1     1820  221        0.   *    2     0035
296        0.
     1     0555   72        0.   *    1     1210  147        0.   *    1     1825  222        0.   *    2     0040
297        0.
     1     0600   73        0.   *    1     1215  148        0.   *    1     1830  223        0.   *    2     0045
298        0.
     1     0605   74        0.   *    1     1220  149        0.   *    1     1835  224        0.   *    2     0050
299        0.
     1     0610   75        0.   *    1     1225  150        0.   *    1     1840  225        0.   *    2     0055
300        0.
                                 *                                *                                *

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

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.92-HR
+   (CFS)       (HR)
                          (CFS)
+       7.      3.50                    1.          0.          0.           0.
                        (INCHES)     3.170       3.172       3.172        3.172
                         (AC-FT)       0.          0.          0.           0.

                         CUMULATIVE AREA =     .00 SQ MI


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                                                  HYDROGRAPH AT STATION  CP-DMH3
                                                       SUM OF  2 HYDROGRAPHS
                                                      PLAN 1,   RATIO =   .57


*****************************************************************************************************************
***************
                                 *                                *                                *
    DA MON HRMN  ORD      FLOW   *   DA MON HRMN  ORD      FLOW   *   DA MON HRMN  ORD      FLOW   *   DA MON HRMN
ORD      FLOW
                                 *                                *                                *
     1     0000    1        0.   *    1     0615   76        0.   *    1     1230  151        0.   *    1     1845
226        0.
     1     0005    2        0.   *    1     0620   77        0.   *    1     1235  152        0.   *    1     1850
227        0.
     1     0010    3        0.   *    1     0625   78        0.   *    1     1240  153        0.   *    1     1855
228        0.
     1     0015    4        0.   *    1     0630   79        0.   *    1     1245  154        0.   *    1     1900
229        0.
     1     0020    5        0.   *    1     0635   80        0.   *    1     1250  155        0.   *    1     1905
230        0.
     1     0025    6        0.   *    1     0640   81        0.   *    1     1255  156        0.   *    1     1910
231        0.
     1     0030    7        0.   *    1     0645   82        0.   *    1     1300  157        0.   *    1     1915
232        0.
     1     0035    8        0.   *    1     0650   83        0.   *    1     1305  158        0.   *    1     1920
```

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233       0.
      1   0040    9       0.   *    1    0655   84       0.   *    1    1310  159       0.   *    1    1925
234       0.
      1   0045   10       0.   *    1    0700   85       0.   *    1    1315  160       0.   *    1    1930
235       0.
      1   0050   11       0.   *    1    0705   86       0.   *    1    1320  161       0.   *    1    1935
236       0.
      1   0055   12       0.   *    1    0710   87       0.   *    1    1325  162       0.   *    1    1940
237       0.
      1   0100   13       0.   *    1    0715   88       0.   *    1    1330  163       0.   *    1    1945
238       0.
      1   0105   14       0.   *    1    0720   89       0.   *    1    1335  164       0.   *    1    1950
239       0.
      1   0110   15       0.   *    1    0725   90       0.   *    1    1340  165       0.   *    1    1955
240       0.
      1   0115   16       0.   *    1    0730   91       0.   *    1    1345  166       0.   *    1    2000
241       0.
      1   0120   17       0.   *    1    0735   92       0.   *    1    1350  167       0.   *    1    2005
242       0.
      1   0125   18       0.   *    1    0740   93       0.   *    1    1355  168       0.   *    1    2010
243       0.
      1   0130   19       0.   *    1    0745   94       0.   *    1    1400  169       0.   *    1    2015
244       0.
      1   0135   20       0.   *    1    0750   95       0.   *    1    1405  170       0.   *    1    2020
245       0.
      1   0140   21       0.   *    1    0755   96       0.   *    1    1410  171       0.   *    1    2025
246       0.
      1   0145   22       0.   *    1    0800   97       0.   *    1    1415  172       0.   *    1    2030
247       0.
      1   0150   23       0.   *    1    0805   98       0.   *    1    1420  173       0.   *    1    2035
248       0.
      1   0155   24       0.   *    1    0810   99       0.   *    1    1425  174       0.   *    1    2040
249       0.
      1   0200   25       0.   *    1    0815  100       0.   *    1    1430  175       0.   *    1    2045
250       0.
      1   0205   26       0.   *    1    0820  101       0.   *    1    1435  176       0.   *    1    2050
251       0.
      1   0210   27       0.   *    1    0825  102       0.   *    1    1440  177       0.   *    1    2055
252       0.
      1   0215   28       0.   *    1    0830  103       0.   *    1    1445  178       0.   *    1    2100
253       0.
      1   0220   29       0.   *    1    0835  104       0.   *    1    1450  179       0.   *    1    2105
254       0.
      1   0225   30       0.   *    1    0840  105       0.   *    1    1455  180       0.   *    1    2110
255       0.
      1   0230   31       0.   *    1    0845  106       0.   *    1    1500  181       0.   *    1    2115
256       0.
      1   0235   32       0.   *    1    0850  107       0.   *    1    1505  182       0.   *    1    2120
257       0.
      1   0240   33       0.   *    1    0855  108       0.   *    1    1510  183       0.   *    1    2125
258       0.
      1   0245   34       0.   *    1    0900  109       0.   *    1    1515  184       0.   *    1    2130
259       0.
      1   0250   35       0.   *    1    0905  110       0.   *    1    1520  185       0.   *    1    2135
260       0.
      1   0255   36       0.   *    1    0910  111       0.   *    1    1525  186       0.   *    1    2140
261       0.
      1   0300   37       0.   *    1    0915  112       0.   *    1    1530  187       0.   *    1    2145
262       0.
      1   0305   38       1.   *    1    0920  113       0.   *    1    1535  188       0.   *    1    2150
263       0.
      1   0310   39       1.   *    1    0925  114       0.   *    1    1540  189       0.   *    1    2155
264       0.
      1   0315   40       2.   *    1    0930  115       0.   *    1    1545  190       0.   *    1    2200
265       0.
      1   0320   41       3.   *    1    0935  116       0.   *    1    1550  191       0.   *    1    2205
266       0.
      1   0325   42       3.   *    1    0940  117       0.   *    1    1555  192       0.   *    1    2210
267       0.
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     1     0330   43        4.   *    1     0945  118        0.   *    1     1600  193        0.   *    1     2215
268        0.
     1     0335   44        2.   *    1     0950  119        0.   *    1     1605  194        0.   *    1     2220
269        0.
     1     0340   45        2.   *    1     0955  120        0.   *    1     1610  195        0.   *    1     2225
270        0.
     1     0345   46        1.   *    1     1000  121        0.   *    1     1615  196        0.   *    1     2230
271        0.
     1     0350   47        1.   *    1     1005  122        0.   *    1     1620  197        0.   *    1     2235
272        0.
     1     0355   48        1.   *    1     1010  123        0.   *    1     1625  198        0.   *    1     2240
273        0.
     1     0400   49        1.   *    1     1015  124        0.   *    1     1630  199        0.   *    1     2245
274        0.
     1     0405   50        0.   *    1     1020  125        0.   *    1     1635  200        0.   *    1     2250
275        0.
     1     0410   51        0.   *    1     1025  126        0.   *    1     1640  201        0.   *    1     2255
276        0.
     1     0415   52        0.   *    1     1030  127        0.   *    1     1645  202        0.   *    1     2300
277        0.
     1     0420   53        0.   *    1     1035  128        0.   *    1     1650  203        0.   *    1     2305
278        0.
     1     0425   54        0.   *    1     1040  129        0.   *    1     1655  204        0.   *    1     2310
279        0.
     1     0430   55        1.   *    1     1045  130        0.   *    1     1700  205        0.   *    1     2315
280        0.
     1     0435   56        1.   *    1     1050  131        0.   *    1     1705  206        0.   *    1     2320
281        0.
     1     0440   57        0.   *    1     1055  132        0.   *    1     1710  207        0.   *    1     2325
282        0.
     1     0445   58        0.   *    1     1100  133        0.   *    1     1715  208        0.   *    1     2330
283        0.
     1     0450   59        1.   *    1     1105  134        0.   *    1     1720  209        0.   *    1     2335
284        0.
     1     0455   60        0.   *    1     1110  135        0.   *    1     1725  210        0.   *    1     2340
285        0.
     1     0500   61        0.   *    1     1115  136        0.   *    1     1730  211        0.   *    1     2345
286        0.
     1     0505   62        0.   *    1     1120  137        0.   *    1     1735  212        0.   *    1     2350
287        0.
     1     0510   63        0.   *    1     1125  138        0.   *    1     1740  213        0.   *    1     2355
288        0.
     1     0515   64        0.   *    1     1130  139        0.   *    1     1745  214        0.   *    2     0000
289        0.
     1     0520   65        0.   *    1     1135  140        0.   *    1     1750  215        0.   *    2     0005
290        0.
     1     0525   66        0.   *    1     1140  141        0.   *    1     1755  216        0.   *    2     0010
291        0.
     1     0530   67        0.   *    1     1145  142        0.   *    1     1800  217        0.   *    2     0015
292        0.
     1     0535   68        0.   *    1     1150  143        0.   *    1     1805  218        0.   *    2     0020
293        0.
     1     0540   69        0.   *    1     1155  144        0.   *    1     1810  219        0.   *    2     0025
294        0.
     1     0545   70        0.   *    1     1200  145        0.   *    1     1815  220        0.   *    2     0030
295        0.
     1     0550   71        0.   *    1     1205  146        0.   *    1     1820  221        0.   *    2     0035
296        0.
     1     0555   72        0.   *    1     1210  147        0.   *    1     1825  222        0.   *    2     0040
297        0.
     1     0600   73        0.   *    1     1215  148        0.   *    1     1830  223        0.   *    2     0045
298        0.
     1     0605   74        0.   *    1     1220  149        0.   *    1     1835  224        0.   *    2     0050
299        0.
     1     0610   75        0.   *    1     1225  150        0.   *    1     1840  225        0.   *    2     0055
300        0.
                                *                              *                              *

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)				
		(CFS)			
4.	3.50	0.	0.	0.	0.
		(INCHES) 1.735	1.736	1.736	1.736
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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            **************
            *            *
   66 KK    *  CP-STMH5  *
            *            *
            **************

   67 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           1  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

   68 HC          HYDROGRAPH COMBINATION
                        ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                          ***
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HYDROGRAPH AT STATION CP-STMH5
SUM OF 3 HYDROGRAPHS
PLAN 1, RATIO = .99

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	0.	*	1		1230	151	0.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	0.	*	1		1235	152	0.	*	1		1850	227	0.
1		0010	3	1.	*	1		0625	78	0.	*	1		1240	153	0.	*	1		1855	228	0.
1		0015	4	1.	*	1		0630	79	0.	*	1		1245	154	0.	*	1		1900	229	0.
1		0020	5	1.	*	1		0635	80	0.	*	1		1250	155	0.	*	1		1905	230	0.
1		0025	6	2.	*	1		0640	81	0.	*	1		1255	156	0.	*	1		1910	231	0.
1		0030	7	2.	*	1		0645	82	0.	*	1		1300	157	0.	*	1		1915	232	0.
1		0035	8	1.	*	1		0650	83	0.	*	1		1305	158	0.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	0.	*	1		1310	159	0.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	0.	*	1		1315	160	0.	*	1		1930		

```
235       0.
      1   0050   11        0.   *    1     0705   86        0.   *    1     1320  161        0.   *    1     1935
236       0.
      1   0055   12        0.   *    1     0710   87        0.   *    1     1325  162        0.   *    1     1940
237       0.
      1   0100   13        0.   *    1     0715   88        0.   *    1     1330  163        0.   *    1     1945
238       0.
      1   0105   14        0.   *    1     0720   89        0.   *    1     1335  164        0.   *    1     1950
239       0.
      1   0110   15        1.   *    1     0725   90        0.   *    1     1340  165        0.   *    1     1955
240       0.
      1   0115   16        0.   *    1     0730   91        0.   *    1     1345  166        0.   *    1     2000
241       0.
      1   0120   17        0.   *    1     0735   92        0.   *    1     1350  167        0.   *    1     2005
242       0.
      1   0125   18        1.   *    1     0740   93        0.   *    1     1355  168        0.   *    1     2010
243       0.
      1   0130   19        1.   *    1     0745   94        0.   *    1     1400  169        0.   *    1     2015
244       0.
      1   0135   20        1.   *    1     0750   95        0.   *    1     1405  170        0.   *    1     2020
245       0.
      1   0140   21        1.   *    1     0755   96        0.   *    1     1410  171        0.   *    1     2025
246       0.
      1   0145   22        1.   *    1     0800   97        0.   *    1     1415  172        0.   *    1     2030
247       0.
      1   0150   23        0.   *    1     0805   98        0.   *    1     1420  173        0.   *    1     2035
248       0.
      1   0155   24        0.   *    1     0810   99        0.   *    1     1425  174        0.   *    1     2040
249       0.
      1   0200   25        0.   *    1     0815  100        0.   *    1     1430  175        0.   *    1     2045
250       0.
      1   0205   26        0.   *    1     0820  101        0.   *    1     1435  176        0.   *    1     2050
251       0.
      1   0210   27        1.   *    1     0825  102        0.   *    1     1440  177        0.   *    1     2055
252       0.
      1   0215   28        1.   *    1     0830  103        0.   *    1     1445  178        0.   *    1     2100
253       0.
      1   0220   29        1.   *    1     0835  104        0.   *    1     1450  179        0.   *    1     2105
254       0.
      1   0225   30        1.   *    1     0840  105        0.   *    1     1455  180        0.   *    1     2110
255       0.
      1   0230   31        0.   *    1     0845  106        0.   *    1     1500  181        0.   *    1     2115
256       0.
      1   0235   32        0.   *    1     0850  107        0.   *    1     1505  182        0.   *    1     2120
257       0.
      1   0240   33        1.   *    1     0855  108        0.   *    1     1510  183        0.   *    1     2125
258       0.
      1   0245   34        1.   *    1     0900  109        0.   *    1     1515  184        0.   *    1     2130
259       0.
      1   0250   35        1.   *    1     0905  110        0.   *    1     1520  185        0.   *    1     2135
260       0.
      1   0255   36        0.   *    1     0910  111        0.   *    1     1525  186        0.   *    1     2140
261       0.
      1   0300   37        1.   *    1     0915  112        0.   *    1     1530  187        0.   *    1     2145
262       0.
      1   0305   38        2.   *    1     0920  113        0.   *    1     1535  188        0.   *    1     2150
263       0.
      1   0310   39        3.   *    1     0925  114        0.   *    1     1540  189        0.   *    1     2155
264       0.
      1   0315   40        5.   *    1     0930  115        0.   *    1     1545  190        0.   *    1     2200
265       0.
      1   0320   41        8.   *    1     0935  116        0.   *    1     1550  191        0.   *    1     2205
266       0.
      1   0325   42        9.   *    1     0940  117        0.   *    1     1555  192        0.   *    1     2210
267       0.
      1   0330   43       11.   *    1     0945  118        0.   *    1     1600  193        0.   *    1     2215
268       0.
      1   0335   44        6.   *    1     0950  119        0.   *    1     1605  194        0.   *    1     2220
269       0.
```

```
     1     0340   45        4.   *    1     0955  120        0.   *    1     1610  195        0.   *    1     2225
270        0.
     1     0345   46        4.   *    1     1000  121        0.   *    1     1615  196        0.   *    1     2230
271        0.
     1     0350   47        2.   *    1     1005  122        0.   *    1     1620  197        0.   *    1     2235
272        0.
     1     0355   48        2.   *    1     1010  123        0.   *    1     1625  198        0.   *    1     2240
273        0.
     1     0400   49        2.   *    1     1015  124        0.   *    1     1630  199        0.   *    1     2245
274        0.
     1     0405   50        1.   *    1     1020  125        0.   *    1     1635  200        0.   *    1     2250
275        0.
     1     0410   51        1.   *    1     1025  126        0.   *    1     1640  201        0.   *    1     2255
276        0.
     1     0415   52        1.   *    1     1030  127        0.   *    1     1645  202        0.   *    1     2300
277        0.
     1     0420   53        1.   *    1     1035  128        0.   *    1     1650  203        0.   *    1     2305
278        0.
     1     0425   54        1.   *    1     1040  129        0.   *    1     1655  204        0.   *    1     2310
279        0.
     1     0430   55        2.   *    1     1045  130        0.   *    1     1700  205        0.   *    1     2315
280        0.
     1     0435   56        2.   *    1     1050  131        0.   *    1     1705  206        0.   *    1     2320
281        0.
     1     0440   57        1.   *    1     1055  132        0.   *    1     1710  207        0.   *    1     2325
282        0.
     1     0445   58        1.   *    1     1100  133        0.   *    1     1715  208        0.   *    1     2330
283        0.
     1     0450   59        2.   *    1     1105  134        0.   *    1     1720  209        0.   *    1     2335
284        0.
     1     0455   60        1.   *    1     1110  135        0.   *    1     1725  210        0.   *    1     2340
285        0.
     1     0500   61        1.   *    1     1115  136        0.   *    1     1730  211        0.   *    1     2345
286        0.
     1     0505   62        0.   *    1     1120  137        0.   *    1     1735  212        0.   *    1     2350
287        0.
     1     0510   63        0.   *    1     1125  138        0.   *    1     1740  213        0.   *    1     2355
288        0.
     1     0515   64        0.   *    1     1130  139        0.   *    1     1745  214        0.   *    2     0000
289        0.
     1     0520   65        0.   *    1     1135  140        0.   *    1     1750  215        0.   *    2     0005
290        0.
     1     0525   66        0.   *    1     1140  141        0.   *    1     1755  216        0.   *    2     0010
291        0.
     1     0530   67        0.   *    1     1145  142        0.   *    1     1800  217        0.   *    2     0015
292        0.
     1     0535   68        0.   *    1     1150  143        0.   *    1     1805  218        0.   *    2     0020
293        0.
     1     0540   69        0.   *    1     1155  144        0.   *    1     1810  219        0.   *    2     0025
294        0.
     1     0545   70        0.   *    1     1200  145        0.   *    1     1815  220        0.   *    2     0030
295        0.
     1     0550   71        0.   *    1     1205  146        0.   *    1     1820  221        0.   *    2     0035
296        0.
     1     0555   72        0.   *    1     1210  147        0.   *    1     1825  222        0.   *    2     0040
297        0.
     1     0600   73        0.   *    1     1215  148        0.   *    1     1830  223        0.   *    2     0045
298        0.
     1     0605   74        0.   *    1     1220  149        0.   *    1     1835  224        0.   *    2     0050
299        0.
     1     0610   75        0.   *    1     1225  150        0.   *    1     1840  225        0.   *    2     0055
300        0.
                                *                             *                             *

*****************************************************************************************************************
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  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.92-HR
```

```
+   (CFS)       (HR)
                          (CFS)
+      11.      3.50                    1.          0.          0.          0.
                        (INCHES)     3.170       3.172       3.172       3.172
                         (AC-FT)       1.          1.          1.          1.

                       CUMULATIVE AREA =     .00 SQ MI


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

                                                HYDROGRAPH AT STATION CP-STMH5
                                                     SUM OF  3 HYDROGRAPHS
                                                   PLAN 1,   RATIO =   .57


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***************
                                    *                                   *                                   *
    DA MON HRMN  ORD      FLOW    *   DA MON HRMN  ORD      FLOW    *   DA MON HRMN  ORD      FLOW    *   DA MON HRMN
ORD      FLOW
                                    *                                   *                                   *
     1     0000    1        0.    *    1     0615   76        0.    *    1     1230  151        0.    *    1     1845
226        0.
     1     0005    2        0.    *    1     0620   77        0.    *    1     1235  152        0.    *    1     1850
227        0.
     1     0010    3        0.    *    1     0625   78        0.    *    1     1240  153        0.    *    1     1855
228        0.
     1     0015    4        0.    *    1     0630   79        0.    *    1     1245  154        0.    *    1     1900
229        0.
     1     0020    5        1.    *    1     0635   80        0.    *    1     1250  155        0.    *    1     1905
230        0.
     1     0025    6        1.    *    1     0640   81        0.    *    1     1255  156        0.    *    1     1910
231        0.
     1     0030    7        1.    *    1     0645   82        0.    *    1     1300  157        0.    *    1     1915
232        0.
     1     0035    8        0.    *    1     0650   83        0.    *    1     1305  158        0.    *    1     1920
233        0.
     1     0040    9        0.    *    1     0655   84        0.    *    1     1310  159        0.    *    1     1925
234        0.
     1     0045   10        0.    *    1     0700   85        0.    *    1     1315  160        0.    *    1     1930
235        0.
     1     0050   11        0.    *    1     0705   86        0.    *    1     1320  161        0.    *    1     1935
236        0.
     1     0055   12        0.    *    1     0710   87        0.    *    1     1325  162        0.    *    1     1940
237        0.
     1     0100   13        0.    *    1     0715   88        0.    *    1     1330  163        0.    *    1     1945
238        0.
     1     0105   14        0.    *    1     0720   89        0.    *    1     1335  164        0.    *    1     1950
239        0.
     1     0110   15        0.    *    1     0725   90        0.    *    1     1340  165        0.    *    1     1955
240        0.
     1     0115   16        0.    *    1     0730   91        0.    *    1     1345  166        0.    *    1     2000
241        0.
     1     0120   17        0.    *    1     0735   92        0.    *    1     1350  167        0.    *    1     2005
242        0.
     1     0125   18        0.    *    1     0740   93        0.    *    1     1355  168        0.    *    1     2010
243        0.
     1     0130   19        1.    *    1     0745   94        0.    *    1     1400  169        0.    *    1     2015
244        0.
     1     0135   20        1.    *    1     0750   95        0.    *    1     1405  170        0.    *    1     2020
245        0.
     1     0140   21        0.    *    1     0755   96        0.    *    1     1410  171        0.    *    1     2025
246        0.
     1     0145   22        0.    *    1     0800   97        0.    *    1     1415  172        0.    *    1     2030
247        0.
     1     0150   23        0.    *    1     0805   98        0.    *    1     1420  173        0.    *    1     2035
```

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248       0.
     1    0155   24        0.   *    1     0810   99        0.   *    1     1425  174        0.   *    1     2040
249       0.
     1    0200   25        0.   *    1     0815  100        0.   *    1     1430  175        0.   *    1     2045
250       0.
     1    0205   26        0.   *    1     0820  101        0.   *    1     1435  176        0.   *    1     2050
251       0.
     1    0210   27        0.   *    1     0825  102        0.   *    1     1440  177        0.   *    1     2055
252       0.
     1    0215   28        1.   *    1     0830  103        0.   *    1     1445  178        0.   *    1     2100
253       0.
     1    0220   29        1.   *    1     0835  104        0.   *    1     1450  179        0.   *    1     2105
254       0.
     1    0225   30        1.   *    1     0840  105        0.   *    1     1455  180        0.   *    1     2110
255       0.
     1    0230   31        0.   *    1     0845  106        0.   *    1     1500  181        0.   *    1     2115
256       0.
     1    0235   32        0.   *    1     0850  107        0.   *    1     1505  182        0.   *    1     2120
257       0.
     1    0240   33        1.   *    1     0855  108        0.   *    1     1510  183        0.   *    1     2125
258       0.
     1    0245   34        1.   *    1     0900  109        0.   *    1     1515  184        0.   *    1     2130
259       0.
     1    0250   35        0.   *    1     0905  110        0.   *    1     1520  185        0.   *    1     2135
260       0.
     1    0255   36        0.   *    1     0910  111        0.   *    1     1525  186        0.   *    1     2140
261       0.
     1    0300   37        0.   *    1     0915  112        0.   *    1     1530  187        0.   *    1     2145
262       0.
     1    0305   38        1.   *    1     0920  113        0.   *    1     1535  188        0.   *    1     2150
263       0.
     1    0310   39        2.   *    1     0925  114        0.   *    1     1540  189        0.   *    1     2155
264       0.
     1    0315   40        3.   *    1     0930  115        0.   *    1     1545  190        0.   *    1     2200
265       0.
     1    0320   41        4.   *    1     0935  116        0.   *    1     1550  191        0.   *    1     2205
266       0.
     1    0325   42        5.   *    1     0940  117        0.   *    1     1555  192        0.   *    1     2210
267       0.
     1    0330   43        6.   *    1     0945  118        0.   *    1     1600  193        0.   *    1     2215
268       0.
     1    0335   44        4.   *    1     0950  119        0.   *    1     1605  194        0.   *    1     2220
269       0.
     1    0340   45        2.   *    1     0955  120        0.   *    1     1610  195        0.   *    1     2225
270       0.
     1    0345   46        2.   *    1     1000  121        0.   *    1     1615  196        0.   *    1     2230
271       0.
     1    0350   47        1.   *    1     1005  122        0.   *    1     1620  197        0.   *    1     2235
272       0.
     1    0355   48        1.   *    1     1010  123        0.   *    1     1625  198        0.   *    1     2240
273       0.
     1    0400   49        1.   *    1     1015  124        0.   *    1     1630  199        0.   *    1     2245
274       0.
     1    0405   50        1.   *    1     1020  125        0.   *    1     1635  200        0.   *    1     2250
275       0.
     1    0410   51        0.   *    1     1025  126        0.   *    1     1640  201        0.   *    1     2255
276       0.
     1    0415   52        0.   *    1     1030  127        0.   *    1     1645  202        0.   *    1     2300
277       0.
     1    0420   53        0.   *    1     1035  128        0.   *    1     1650  203        0.   *    1     2305
278       0.
     1    0425   54        1.   *    1     1040  129        0.   *    1     1655  204        0.   *    1     2310
279       0.
     1    0430   55        1.   *    1     1045  130        0.   *    1     1700  205        0.   *    1     2315
280       0.
     1    0435   56        1.   *    1     1050  131        0.   *    1     1705  206        0.   *    1     2320
281       0.
     1    0440   57        1.   *    1     1055  132        0.   *    1     1710  207        0.   *    1     2325
282       0.
```

```
     1     0445   58        1.   *    1     1100  133        0.   *    1     1715  208        0.   *    1     2330
283        0.
     1     0450   59        1.   *    1     1105  134        0.   *    1     1720  209        0.   *    1     2335
284        0.
     1     0455   60        1.   *    1     1110  135        0.   *    1     1725  210        0.   *    1     2340
285        0.
     1     0500   61        0.   *    1     1115  136        0.   *    1     1730  211        0.   *    1     2345
286        0.
     1     0505   62        0.   *    1     1120  137        0.   *    1     1735  212        0.   *    1     2350
287        0.
     1     0510   63        0.   *    1     1125  138        0.   *    1     1740  213        0.   *    1     2355
288        0.
     1     0515   64        0.   *    1     1130  139        0.   *    1     1745  214        0.   *    2     0000
289        0.
     1     0520   65        0.   *    1     1135  140        0.   *    1     1750  215        0.   *    2     0005
290        0.
     1     0525   66        0.   *    1     1140  141        0.   *    1     1755  216        0.   *    2     0010
291        0.
     1     0530   67        0.   *    1     1145  142        0.   *    1     1800  217        0.   *    2     0015
292        0.
     1     0535   68        0.   *    1     1150  143        0.   *    1     1805  218        0.   *    2     0020
293        0.
     1     0540   69        0.   *    1     1155  144        0.   *    1     1810  219        0.   *    2     0025
294        0.
     1     0545   70        0.   *    1     1200  145        0.   *    1     1815  220        0.   *    2     0030
295        0.
     1     0550   71        0.   *    1     1205  146        0.   *    1     1820  221        0.   *    2     0035
296        0.
     1     0555   72        0.   *    1     1210  147        0.   *    1     1825  222        0.   *    2     0040
297        0.
     1     0600   73        0.   *    1     1215  148        0.   *    1     1830  223        0.   *    2     0045
298        0.
     1     0605   74        0.   *    1     1220  149        0.   *    1     1835  224        0.   *    2     0050
299        0.
     1     0610   75        0.   *    1     1225  150        0.   *    1     1840  225        0.   *    2     0055
300        0.
                                *                              *                              *

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  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.92-HR
+   (CFS)       (HR)
                          (CFS)
+       6.      3.50                   1.          0.          0.           0.
                       (INCHES)     1.735       1.736       1.736        1.736
                        (AC-FT)        0.          0.          0.           0.

                        CUMULATIVE AREA =     .00 SQ MI



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


            **************
            *            *
   79 KK    *  CP-SBD-N  *     A
            *            *
            **************

   80 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           1  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
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81 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CP-SBD-N
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .99

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	0.	*	1		1230	151	0.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	0.	*	1		1235	152	0.	*	1		1850	227	0.
1		0010	3	1.	*	1		0625	78	0.	*	1		1240	153	0.	*	1		1855	228	0.
1		0015	4	1.	*	1		0630	79	0.	*	1		1245	154	0.	*	1		1900	229	0.
1		0020	5	1.	*	1		0635	80	0.	*	1		1250	155	0.	*	1		1905	230	0.
1		0025	6	1.	*	1		0640	81	0.	*	1		1255	156	0.	*	1		1910	231	0.
1		0030	7	1.	*	1		0645	82	0.	*	1		1300	157	0.	*	1		1915	232	0.
1		0035	8	1.	*	1		0650	83	0.	*	1		1305	158	0.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	0.	*	1		1310	159	0.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	0.	*	1		1315	160	0.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	0.	*	1		1320	161	0.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	0.	*	1		1325	162	0.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	0.	*	1		1330	163	0.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	0.	*	1		1335	164	0.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	0.	*	1		1340	165	0.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	0.	*	1		1345	166	0.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	0.	*	1		1350	167	0.	*	1		2005	242	0.
1		0125	18	1.	*	1		0740	93	0.	*	1		1355	168	0.	*	1		2010	243	0.
1		0130	19	1.	*	1		0745	94	0.	*	1		1400	169	0.	*	1		2015	244	0.
1		0135	20	1.	*	1		0750	95	0.	*	1		1405	170	0.	*	1		2020	245	0.
1		0140	21	1.	*	1		0755	96	0.	*	1		1410	171	0.	*	1		2025	246	0.
1		0145	22	1.	*	1		0800	97	0.	*	1		1415	172	0.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	0.	*	1		1420	173	0.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	0.	*	1		1425	174	0.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	0.	*	1		1430	175	0.	*	1		2045		

```
250       0.
     1    0205   26        0.   *    1     0820  101       0.   *    1     1435  176       0.   *    1     2050
251       0.
     1    0210   27        1.   *    1     0825  102       0.   *    1     1440  177       0.   *    1     2055
252       0.
     1    0215   28        1.   *    1     0830  103       0.   *    1     1445  178       0.   *    1     2100
253       0.
     1    0220   29        1.   *    1     0835  104       0.   *    1     1450  179       0.   *    1     2105
254       0.
     1    0225   30        1.   *    1     0840  105       0.   *    1     1455  180       0.   *    1     2110
255       0.
     1    0230   31        0.   *    1     0845  106       0.   *    1     1500  181       0.   *    1     2115
256       0.
     1    0235   32        0.   *    1     0850  107       0.   *    1     1505  182       0.   *    1     2120
257       0.
     1    0240   33        1.   *    1     0855  108       0.   *    1     1510  183       0.   *    1     2125
258       0.
     1    0245   34        1.   *    1     0900  109       0.   *    1     1515  184       0.   *    1     2130
259       0.
     1    0250   35        0.   *    1     0905  110       0.   *    1     1520  185       0.   *    1     2135
260       0.
     1    0255   36        0.   *    1     0910  111       0.   *    1     1525  186       0.   *    1     2140
261       0.
     1    0300   37        1.   *    1     0915  112       0.   *    1     1530  187       0.   *    1     2145
262       0.
     1    0305   38        1.   *    1     0920  113       0.   *    1     1535  188       0.   *    1     2150
263       0.
     1    0310   39        2.   *    1     0925  114       0.   *    1     1540  189       0.   *    1     2155
264       0.
     1    0315   40        3.   *    1     0930  115       0.   *    1     1545  190       0.   *    1     2200
265       0.
     1    0320   41        5.   *    1     0935  116       0.   *    1     1550  191       0.   *    1     2205
266       0.
     1    0325   42        6.   *    1     0940  117       0.   *    1     1555  192       0.   *    1     2210
267       0.
     1    0330   43        8.   *    1     0945  118       0.   *    1     1600  193       0.   *    1     2215
268       0.
     1    0335   44        4.   *    1     0950  119       0.   *    1     1605  194       0.   *    1     2220
269       0.
     1    0340   45        3.   *    1     0955  120       0.   *    1     1610  195       0.   *    1     2225
270       0.
     1    0345   46        2.   *    1     1000  121       0.   *    1     1615  196       0.   *    1     2230
271       0.
     1    0350   47        1.   *    1     1005  122       0.   *    1     1620  197       0.   *    1     2235
272       0.
     1    0355   48        1.   *    1     1010  123       0.   *    1     1625  198       0.   *    1     2240
273       0.
     1    0400   49        1.   *    1     1015  124       0.   *    1     1630  199       0.   *    1     2245
274       0.
     1    0405   50        1.   *    1     1020  125       0.   *    1     1635  200       0.   *    1     2250
275       0.
     1    0410   51        0.   *    1     1025  126       0.   *    1     1640  201       0.   *    1     2255
276       0.
     1    0415   52        0.   *    1     1030  127       0.   *    1     1645  202       0.   *    1     2300
277       0.
     1    0420   53        1.   *    1     1035  128       0.   *    1     1650  203       0.   *    1     2305
278       0.
     1    0425   54        1.   *    1     1040  129       0.   *    1     1655  204       0.   *    1     2310
279       0.
     1    0430   55        1.   *    1     1045  130       0.   *    1     1700  205       0.   *    1     2315
280       0.
     1    0435   56        1.   *    1     1050  131       0.   *    1     1705  206       0.   *    1     2320
281       0.
     1    0440   57        1.   *    1     1055  132       0.   *    1     1710  207       0.   *    1     2325
282       0.
     1    0445   58        1.   *    1     1100  133       0.   *    1     1715  208       0.   *    1     2330
283       0.
     1    0450   59        1.   *    1     1105  134       0.   *    1     1720  209       0.   *    1     2335
284       0.
```

```
     1     0455   60        1.   *    1     1110  135        0.   *    1     1725  210        0.   *    1     2340
285        0.
     1     0500   61        0.   *    1     1115  136        0.   *    1     1730  211        0.   *    1     2345
286        0.
     1     0505   62        0.   *    1     1120  137        0.   *    1     1735  212        0.   *    1     2350
287        0.
     1     0510   63        0.   *    1     1125  138        0.   *    1     1740  213        0.   *    1     2355
288        0.
     1     0515   64        0.   *    1     1130  139        0.   *    1     1745  214        0.   *    2     0000
289        0.
     1     0520   65        0.   *    1     1135  140        0.   *    1     1750  215        0.   *    2     0005
290        0.
     1     0525   66        0.   *    1     1140  141        0.   *    1     1755  216        0.   *    2     0010
291        0.
     1     0530   67        0.   *    1     1145  142        0.   *    1     1800  217        0.   *    2     0015
292        0.
     1     0535   68        0.   *    1     1150  143        0.   *    1     1805  218        0.   *    2     0020
293        0.
     1     0540   69        0.   *    1     1155  144        0.   *    1     1810  219        0.   *    2     0025
294        0.
     1     0545   70        0.   *    1     1200  145        0.   *    1     1815  220        0.   *    2     0030
295        0.
     1     0550   71        0.   *    1     1205  146        0.   *    1     1820  221        0.   *    2     0035
296        0.
     1     0555   72        0.   *    1     1210  147        0.   *    1     1825  222        0.   *    2     0040
297        0.
     1     0600   73        0.   *    1     1215  148        0.   *    1     1830  223        0.   *    2     0045
298        0.
     1     0605   74        0.   *    1     1220  149        0.   *    1     1835  224        0.   *    2     0050
299        0.
     1     0610   75        0.   *    1     1225  150        0.   *    1     1840  225        0.   *    2     0055
300        0.
                              *                              *                              *

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

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR       72-HR     24.92-HR
+   (CFS)       (HR)
                        (CFS)
+       8.      3.50                1.          0.          0.          0.
                       (INCHES)   3.170       3.172       3.172       3.172
                        (AC-FT)     0.          0.          0.          0.

                      CUMULATIVE AREA =     .00 SQ MI


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

                                              HYDROGRAPH AT STATION CP-SBD-N
                                                   SUM OF  2 HYDROGRAPHS
                                                 PLAN 1,   RATIO =   .57

********************************************************************************************************************
***************
                              *                              *                              *
    DA MON HRMN  ORD      FLOW   *   DA MON HRMN  ORD      FLOW   *   DA MON HRMN  ORD      FLOW   *   DA MON HRMN
ORD      FLOW
                              *                              *                              *
     1     0000    1        0.   *    1     0615   76        0.   *    1     1230  151        0.   *    1     1845
226        0.
     1     0005    2        0.   *    1     0620   77        0.   *    1     1235  152        0.   *    1     1850
227        0.
     1     0010    3        0.   *    1     0625   78        0.   *    1     1240  153        0.   *    1     1855
228        0.
```

```
    1    0015    4        0.   *    1    0630   79        0.   *    1    1245  154        0.   *    1    1900
229         0.
    1    0020    5        0.   *    1    0635   80        0.   *    1    1250  155        0.   *    1    1905
230         0.
    1    0025    6        1.   *    1    0640   81        0.   *    1    1255  156        0.   *    1    1910
231         0.
    1    0030    7        0.   *    1    0645   82        0.   *    1    1300  157        0.   *    1    1915
232         0.
    1    0035    8        0.   *    1    0650   83        0.   *    1    1305  158        0.   *    1    1920
233         0.
    1    0040    9        0.   *    1    0655   84        0.   *    1    1310  159        0.   *    1    1925
234         0.
    1    0045   10        0.   *    1    0700   85        0.   *    1    1315  160        0.   *    1    1930
235         0.
    1    0050   11        0.   *    1    0705   86        0.   *    1    1320  161        0.   *    1    1935
236         0.
    1    0055   12        0.   *    1    0710   87        0.   *    1    1325  162        0.   *    1    1940
237         0.
    1    0100   13        0.   *    1    0715   88        0.   *    1    1330  163        0.   *    1    1945
238         0.
    1    0105   14        0.   *    1    0720   89        0.   *    1    1335  164        0.   *    1    1950
239         0.
    1    0110   15        0.   *    1    0725   90        0.   *    1    1340  165        0.   *    1    1955
240         0.
    1    0115   16        0.   *    1    0730   91        0.   *    1    1345  166        0.   *    1    2000
241         0.
    1    0120   17        0.   *    1    0735   92        0.   *    1    1350  167        0.   *    1    2005
242         0.
    1    0125   18        0.   *    1    0740   93        0.   *    1    1355  168        0.   *    1    2010
243         0.
    1    0130   19        0.   *    1    0745   94        0.   *    1    1400  169        0.   *    1    2015
244         0.
    1    0135   20        0.   *    1    0750   95        0.   *    1    1405  170        0.   *    1    2020
245         0.
    1    0140   21        0.   *    1    0755   96        0.   *    1    1410  171        0.   *    1    2025
246         0.
    1    0145   22        0.   *    1    0800   97        0.   *    1    1415  172        0.   *    1    2030
247         0.
    1    0150   23        0.   *    1    0805   98        0.   *    1    1420  173        0.   *    1    2035
248         0.
    1    0155   24        0.   *    1    0810   99        0.   *    1    1425  174        0.   *    1    2040
249         0.
    1    0200   25        0.   *    1    0815  100        0.   *    1    1430  175        0.   *    1    2045
250         0.
    1    0205   26        0.   *    1    0820  101        0.   *    1    1435  176        0.   *    1    2050
251         0.
    1    0210   27        0.   *    1    0825  102        0.   *    1    1440  177        0.   *    1    2055
252         0.
    1    0215   28        0.   *    1    0830  103        0.   *    1    1445  178        0.   *    1    2100
253         0.
    1    0220   29        0.   *    1    0835  104        0.   *    1    1450  179        0.   *    1    2105
254         0.
    1    0225   30        0.   *    1    0840  105        0.   *    1    1455  180        0.   *    1    2110
255         0.
    1    0230   31        0.   *    1    0845  106        0.   *    1    1500  181        0.   *    1    2115
256         0.
    1    0235   32        0.   *    1    0850  107        0.   *    1    1505  182        0.   *    1    2120
257         0.
    1    0240   33        0.   *    1    0855  108        0.   *    1    1510  183        0.   *    1    2125
258         0.
    1    0245   34        0.   *    1    0900  109        0.   *    1    1515  184        0.   *    1    2130
259         0.
    1    0250   35        0.   *    1    0905  110        0.   *    1    1520  185        0.   *    1    2135
260         0.
    1    0255   36        0.   *    1    0910  111        0.   *    1    1525  186        0.   *    1    2140
261         0.
    1    0300   37        0.   *    1    0915  112        0.   *    1    1530  187        0.   *    1    2145
262         0.
    1    0305   38        1.   *    1    0920  113        0.   *    1    1535  188        0.   *    1    2150
```

```
263       0.
      1   0310   39        1.   *    1     0925  114       0.   *    1     1540  189       0.   *    1     2155
264       0.
      1   0315   40        2.   *    1     0930  115       0.   *    1     1545  190       0.   *    1     2200
265       0.
      1   0320   41        3.   *    1     0935  116       0.   *    1     1550  191       0.   *    1     2205
266       0.
      1   0325   42        3.   *    1     0940  117       0.   *    1     1555  192       0.   *    1     2210
267       0.
      1   0330   43        4.   *    1     0945  118       0.   *    1     1600  193       0.   *    1     2215
268       0.
      1   0335   44        2.   *    1     0950  119       0.   *    1     1605  194       0.   *    1     2220
269       0.
      1   0340   45        2.   *    1     0955  120       0.   *    1     1610  195       0.   *    1     2225
270       0.
      1   0345   46        1.   *    1     1000  121       0.   *    1     1615  196       0.   *    1     2230
271       0.
      1   0350   47        1.   *    1     1005  122       0.   *    1     1620  197       0.   *    1     2235
272       0.
      1   0355   48        1.   *    1     1010  123       0.   *    1     1625  198       0.   *    1     2240
273       0.
      1   0400   49        1.   *    1     1015  124       0.   *    1     1630  199       0.   *    1     2245
274       0.
      1   0405   50        0.   *    1     1020  125       0.   *    1     1635  200       0.   *    1     2250
275       0.
      1   0410   51        0.   *    1     1025  126       0.   *    1     1640  201       0.   *    1     2255
276       0.
      1   0415   52        0.   *    1     1030  127       0.   *    1     1645  202       0.   *    1     2300
277       0.
      1   0420   53        0.   *    1     1035  128       0.   *    1     1650  203       0.   *    1     2305
278       0.
      1   0425   54        0.   *    1     1040  129       0.   *    1     1655  204       0.   *    1     2310
279       0.
      1   0430   55        1.   *    1     1045  130       0.   *    1     1700  205       0.   *    1     2315
280       0.
      1   0435   56        1.   *    1     1050  131       0.   *    1     1705  206       0.   *    1     2320
281       0.
      1   0440   57        1.   *    1     1055  132       0.   *    1     1710  207       0.   *    1     2325
282       0.
      1   0445   58        1.   *    1     1100  133       0.   *    1     1715  208       0.   *    1     2330
283       0.
      1   0450   59        1.   *    1     1105  134       0.   *    1     1720  209       0.   *    1     2335
284       0.
      1   0455   60        0.   *    1     1110  135       0.   *    1     1725  210       0.   *    1     2340
285       0.
      1   0500   61        0.   *    1     1115  136       0.   *    1     1730  211       0.   *    1     2345
286       0.
      1   0505   62        0.   *    1     1120  137       0.   *    1     1735  212       0.   *    1     2350
287       0.
      1   0510   63        0.   *    1     1125  138       0.   *    1     1740  213       0.   *    1     2355
288       0.
      1   0515   64        0.   *    1     1130  139       0.   *    1     1745  214       0.   *    2     0000
289       0.
      1   0520   65        0.   *    1     1135  140       0.   *    1     1750  215       0.   *    2     0005
290       0.
      1   0525   66        0.   *    1     1140  141       0.   *    1     1755  216       0.   *    2     0010
291       0.
      1   0530   67        0.   *    1     1145  142       0.   *    1     1800  217       0.   *    2     0015
292       0.
      1   0535   68        0.   *    1     1150  143       0.   *    1     1805  218       0.   *    2     0020
293       0.
      1   0540   69        0.   *    1     1155  144       0.   *    1     1810  219       0.   *    2     0025
294       0.
      1   0545   70        0.   *    1     1200  145       0.   *    1     1815  220       0.   *    2     0030
295       0.
      1   0550   71        0.   *    1     1205  146       0.   *    1     1820  221       0.   *    2     0035
296       0.
      1   0555   72        0.   *    1     1210  147       0.   *    1     1825  222       0.   *    2     0040
297       0.
```

```
     1     0600   73        0.   *    1     1215  148        0.   *    1     1830  223        0.   *    2     0045
298        0.
     1     0605   74        0.   *    1     1220  149        0.   *    1     1835  224        0.   *    2     0050
299        0.
     1     0610   75        0.   *    1     1225  150        0.   *    1     1840  225        0.   *    2     0055
300        0.
                                 *                                *                                *

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

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.92-HR
+   (CFS)       (HR)
                          (CFS)
+       4.      3.50                    1.          0.          0.           0.
                        (INCHES)     1.735       1.736       1.736        1.736
                         (AC-FT)        0.          0.          0.           0.

                         CUMULATIVE AREA =     .00 SQ MI

1

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


                                                          RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN            RATIO 1  RATIO 2
                                                        .99      .57

 HYDROGRAPH AT
+                 SN2AW       .00     1   FLOW           4.       2.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                 SN2AE       .00     1   FLOW           4.       2.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+              INT-HS1-       .02     1   FLOW          24.       8.
                                          TIME         3.50     3.58

  3 COMBINED AT
+                CP-FRA       .02     1   FLOW          32.      13.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                 SN2BW       .00     1   FLOW           4.       2.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                 SN2BE       .00     1   FLOW           4.       2.
                                          TIME         3.50     3.50

  2 COMBINED AT
+               CP-DMH3       .00     1   FLOW           7.       4.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                 SN2CW       .00     1   FLOW           2.       1.
                                          TIME         3.50     3.50

 HYDROGRAPH AT
+                 SN2CE       .00     1   FLOW           2.       1.
                                          TIME         3.50     3.50

  3 COMBINED AT
```

+	CP-STMH5	.00	1	FLOW	11.	6.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	SN1AW	.00	1	FLOW	4.	2.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	SN1AE	.00	1	FLOW	4.	2.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP-SBD-N	.00	1	FLOW	8.	4.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	SN1BW	.00	1	FLOW	4.	2.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	SN1BE	.00	1	FLOW	4.	2.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP-SBD-N	.00	1	FLOW	8.	4.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	INT-HS-1	.11	1	FLOW	214.	97.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	INTHS-1B	.03	1	FLOW	55.	25.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP-INT-H	.14	1	FLOW	265.	121.
				TIME	3.58	3.58
3 COMBINED AT						
+	CP-SBD	.15	1	FLOW	274.	126.
				TIME	3.58	3.58

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

Appendix C. Hydraulics Appendix

C.1. Drop Inlet Calculations

C.2. Normal Depth Calculations

C.3. WSPG-W Models

C.1 Drop Inlet Calculations

Worksheet for Combination Inlet On Grade - DI#1

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.00 cfs
Slope	0.046 ft/ft
Gutter Width	2.00 ft
Gutter Cross Slope	0.055 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	7.5000 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Curb Opening Length	10.0000 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	87.14 %
Intercepted Flow	3.49 cfs
Bypass Flow	0.51 cfs
Spread	7.6980 ft
Depth	2.7 in
Flow Area	0.7 ft²
Gutter Depression	0.8 in
Total Depression	4.8 in
Velocity	6.04 ft/s
Splash Over Velocity	11.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.099
Grate Flow Ratio	0.525
Equivalent Cross Slope	0.151 ft/ft
Active Grate Length	3.7500 ft
Length Factor	0.347
Total Interception Length	18.0225 ft

Messages

Worksheet for Combination Inlet On Grade - DI#1

Messages		
Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).	

Worksheet for Combination Inlet On Grade - DI#2

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.51 cfs
Slope	0.032 ft/ft
Gutter Width	2.00 ft
Gutter Cross Slope	0.055 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	7.5000 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Curb Opening Length	10.0000 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	85.12 %
Intercepted Flow	3.84 cfs
Bypass Flow	0.67 cfs
Spread	8.7986 ft
Depth	3.0 in
Flow Area	0.8 ft²
Gutter Depression	0.8 in
Total Depression	4.8 in
Velocity	5.34 ft/s
Splash Over Velocity	11.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.120
Grate Flow Ratio	0.469
Equivalent Cross Slope	0.138 ft/ft
Active Grate Length	3.7500 ft
Length Factor	0.349
Total Interception Length	17.9078 ft

Messages

Worksheet for Combination Inlet On Grade - DI#2

Messages	
Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Combination Inlet On Grade - DI#3

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.00 cfs
Slope	0.032 ft/ft
Gutter Width	2.00 ft
Gutter Cross Slope	0.055 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	7.5000 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Curb Opening Length	10.0000 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	87.79 %
Intercepted Flow	3.51 cfs
Bypass Flow	0.49 cfs
Spread	8.3519 ft
Depth	2.8 in
Flow Area	0.8 ft²
Gutter Depression	0.8 in
Total Depression	4.8 in
Velocity	5.21 ft/s
Splash Over Velocity	11.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.125
Grate Flow Ratio	0.491
Equivalent Cross Slope	0.143 ft/ft
Active Grate Length	3.7500 ft
Length Factor	0.375
Total Interception Length	16.6675 ft

Messages

Worksheet for Combination Inlet On Grade - DI#3

Messages		
Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).	

Worksheet for Combination Inlet In Sag - 1

Project Description	
Solve For	Spread

Input Data		
Discharge	7.12	cfs
Gutter Width	2.00	ft
Gutter Cross Slope	0.055	ft/ft
Road Cross Slope	0.020	ft/ft
Local Depression	4.0	in
Local Depression Width	24.0	in
Grate Width	1.50	ft
Grate Length	7.5000	ft
Grate Type	P-50 mm (P-1 -7/8")	
Clogging	50.0	%
Curb Opening Length	10.0000	ft
Opening Height	0.5000	ft
Curb Throat Type	Inclined	
Throat Incline Angle	90.00	degrees

Options	
Calculation Option	Use Both

Results		
Spread	10.8188	ft
Depth	3.4	in
Gutter Depression	0.8	in
Total Depression	4.8	in
Open Grate Area	5.1	ft^2
Active Grate Weir Length	9.0000	ft

Worksheet for Combination Inlet On Grade - DI#5

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.00 cfs
Slope	0.023 ft/ft
Gutter Width	2.00 ft
Gutter Cross Slope	0.055 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	7.5000 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Curb Opening Length	10.0000 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	88.73 %
Intercepted Flow	3.55 cfs
Bypass Flow	0.45 cfs
Spread	9.0024 ft
Depth	3.0 in
Flow Area	0.9 ft²
Gutter Depression	0.8 in
Total Depression	4.8 in
Velocity	4.54 ft/s
Splash Over Velocity	11.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.155
Grate Flow Ratio	0.460
Equivalent Cross Slope	0.136 ft/ft
Active Grate Length	3.7500 ft
Length Factor	0.403
Total Interception Length	15.4936 ft

Messages

Worksheet for Combination Inlet On Grade - DI#5

Messages		
Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).	

Worksheet for Combination Inlet On Grade - DI#6

Project Description	
Solve For	Efficiency

Input Data	
Discharge	4.00 cfs
Slope	0.023 ft/ft
Gutter Width	2.00 ft
Gutter Cross Slope	0.055 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.013
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	7.5000 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %
Curb Opening Length	10.0000 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	88.73 %
Intercepted Flow	3.55 cfs
Bypass Flow	0.45 cfs
Spread	9.0024 ft
Depth	3.0 in
Flow Area	0.9 ft²
Gutter Depression	0.8 in
Total Depression	4.8 in
Velocity	4.54 ft/s
Splash Over Velocity	11.14 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.155
Grate Flow Ratio	0.460
Equivalent Cross Slope	0.136 ft/ft
Active Grate Length	3.7500 ft
Length Factor	0.403
Total Interception Length	15.4936 ft

Messages

Worksheet for Combination Inlet On Grade - DI#6

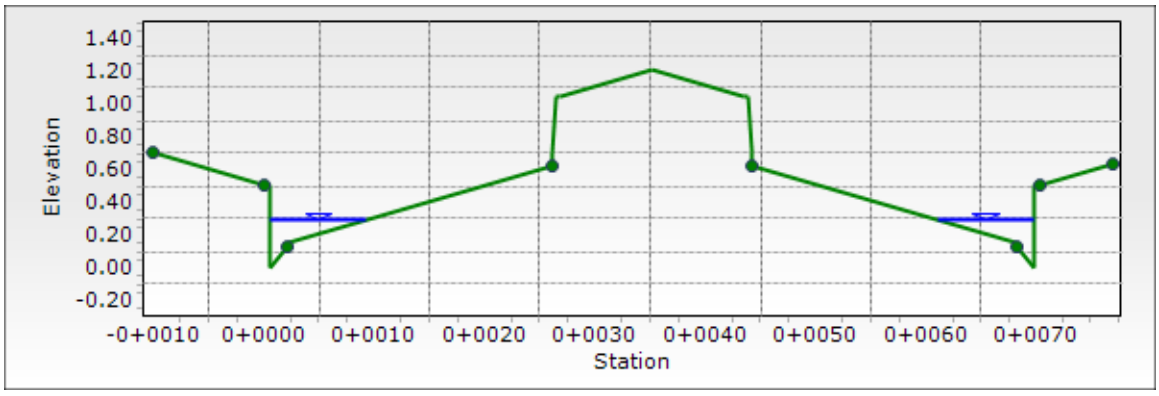
Messages		
Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).	

C.2 Normal Depth Calculations

Cross Section for Irregular Section - SN-2B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.046 ft/ft
Normal Depth	3.5 in
Discharge	8.00 cfs



Worksheet for Irregular Section - SN-2B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.046 ft/ft
Discharge	8.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
-0+0010.0000	0.70
0+0000.0000	0.50
0+0000.5000	0.50
0+0000.5833	0.00
0+0002.0833	0.13
0+0002.0833	0.15
0+0026.0833	0.63
0+0026.1666	0.71
0+0026.4166	1.04
0+0026.8333	1.04
0+0035.1633	1.21
0+0043.4933	1.04
0+0043.9100	1.04
0+0044.1600	0.71
0+0044.2433	0.63
0+0068.2433	0.15
0+0068.2433	0.13
0+0069.7433	0.00
0+0069.8266	0.50
0+0070.3266	0.50
0+0076.8266	0.63

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+0010.0000, 0.70)	(0+0000.0000, 0.50)	0.025
(0+0000.0000, 0.50)	(0+0002.0833, 0.13)	0.013
(0+0002.0833, 0.13)	(0+0026.0833, 0.63)	0.015
(0+0026.0833, 0.63)	(0+0044.2433, 0.63)	0.013
(0+0044.2433, 0.63)	(0+0068.2433, 0.13)	0.015
(0+0068.2433, 0.13)	(0+0070.3266, 0.50)	0.013
(0+0070.3266, 0.50)	(0+0076.8266, 0.63)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method

Worksheet for Irregular Section - SN-2B

Options	
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	3.5 in
Elevation Range	0.0000 to 1.2090 ft
Flow Area	1.7 ft²
Wetted Perimeter	18.1178 ft
Hydraulic Radius	1.2 in
Top Width	17.57 ft
Normal Depth	3.5 in
Critical Depth	4.6 in
Critical Slope	0.006 ft/ft
Velocity	4.58 ft/s
Velocity Head	0.33 ft
Specific Energy	0.62 ft
Froude Number	2.563
Flow Type	Supercritical

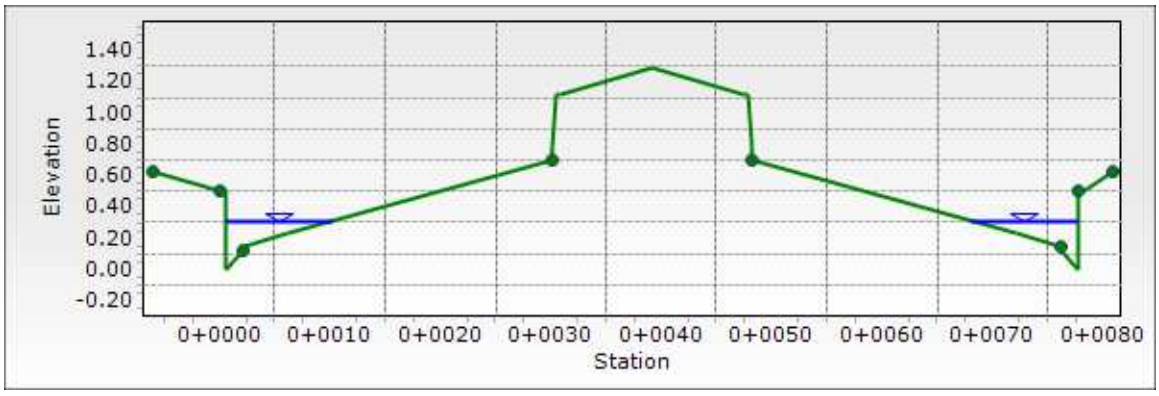
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0000 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.5 in
Critical Depth	4.6 in
Channel Slope	0.046 ft/ft
Critical Slope	0.006 ft/ft

Cross Section for Irregular Section - SN-2C

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.032 ft/ft
Normal Depth	3.7 in
Discharge	8.51 cfs



Worksheet for Irregular Section - SN-2C

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.032 ft/ft
Discharge	8.51 cfs

Section Definitions

Station (ft)	Elevation (ft)
-0+0006.0000	0.62
0+0000.0000	0.50
0+0000.5000	0.50
0+0000.5833	0.00
0+0002.0833	0.13
0+0002.0833	0.15
0+0006.0833	0.23
0+0030.0833	0.71
0+0030.1666	0.79
0+0030.4166	1.12
0+0030.8333	1.12
0+0039.1633	1.29
0+0047.4933	1.12
0+0047.9100	1.12
0+0048.1600	0.79
0+0048.2433	0.71
0+0072.2433	0.23
0+0076.2433	0.15
0+0076.2433	0.13
0+0077.7433	0.00
0+0077.8266	0.50
0+0078.3266	0.50
0+0080.8266	0.63

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+0006.0000, 0.62)	(0+0000.0000, 0.50)	0.025
(0+0000.0000, 0.50)	(0+0002.0833, 0.13)	0.013
(0+0002.0833, 0.13)	(0+0030.0833, 0.71)	0.015
(0+0030.0833, 0.71)	(0+0048.2433, 0.71)	0.013
(0+0048.2433, 0.71)	(0+0076.2433, 0.15)	0.015
(0+0076.2433, 0.15)	(0+0077.8266, 0.50)	0.013
(0+0077.8266, 0.50)	(0+0080.8266, 0.63)	0.025

Options

Worksheet for Irregular Section - SN-2C

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	3.7	in
Elevation Range	0.0000 to 1.2890	ft
Flow Area	2.1	ft²
Wetted Perimeter	20.1039	ft
Hydraulic Radius	1.3	in
Top Width	19.52	ft
Normal Depth	3.7	in
Critical Depth	4.7	in
Critical Slope	0.006	ft/ft
Velocity	4.04	ft/s
Velocity Head	0.25	ft
Specific Energy	0.56	ft
Froude Number	2.168	
Flow Type	Supercritical	

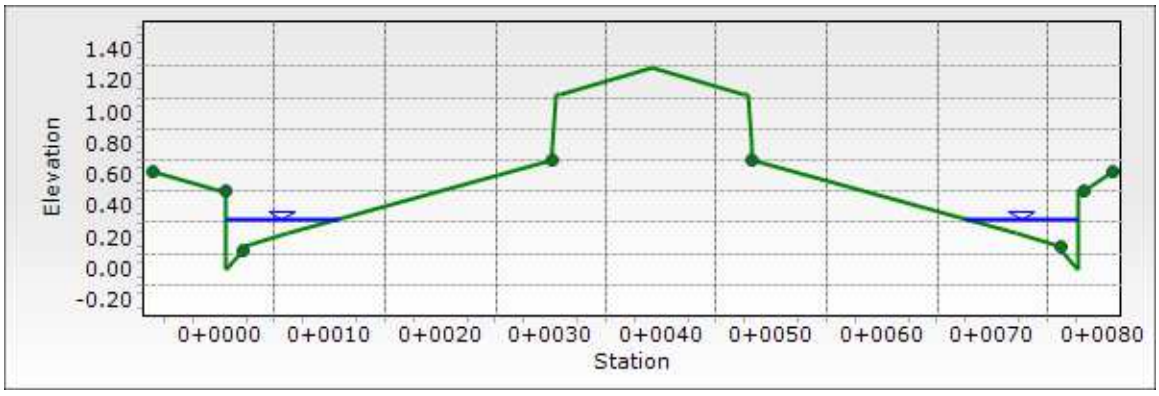
GVF Input Data		
Downstream Depth	0.0	in
Length	0.0000	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.7	in
Critical Depth	4.7	in
Channel Slope	0.032	ft/ft
Critical Slope	0.006	ft/ft

Cross Section for Irregular Section - SN-1B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.023 ft/ft
Normal Depth	3.8 in
Discharge	8.00 cfs



Worksheet for Irregular Section - SN-1B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.023 ft/ft
Discharge	8.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
-0+0006.0000	0.62
0+0000.0000	0.50
0+0000.5000	0.50
0+0000.5833	0.00
0+0002.0833	0.13
0+0002.0833	0.15
0+0006.0833	0.23
0+0030.0833	0.71
0+0030.1666	0.79
0+0030.4166	1.12
0+0030.8333	1.12
0+0039.1633	1.29
0+0047.4933	1.12
0+0047.9100	1.12
0+0048.1600	0.79
0+0048.2433	0.71
0+0072.2433	0.23
0+0076.2433	0.15
0+0076.2433	0.13
0+0077.7433	0.00
0+0077.8266	0.50
0+0078.3266	0.50
0+0080.8266	0.63

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+0006.0000, 0.62)	(0+0000.5000, 0.50)	0.025
(0+0000.5000, 0.50)	(0+0002.0833, 0.13)	0.013
(0+0002.0833, 0.13)	(0+0030.0833, 0.71)	0.015
(0+0030.0833, 0.71)	(0+0048.2433, 0.71)	0.013
(0+0048.2433, 0.71)	(0+0076.2433, 0.15)	0.015
(0+0076.2433, 0.15)	(0+0078.3266, 0.50)	0.013
(0+0078.3266, 0.50)	(0+0080.8266, 0.63)	0.025

Options

Worksheet for Irregular Section - SN-1B

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	3.8 in
Elevation Range	0.0000 to 1.2890 ft
Flow Area	2.3 ft²
Wetted Perimeter	21.0942 ft
Hydraulic Radius	1.3 in
Top Width	20.50 ft
Normal Depth	3.8 in
Critical Depth	4.6 in
Critical Slope	0.006 ft/ft
Velocity	3.48 ft/s
Velocity Head	0.19 ft
Specific Energy	0.51 ft
Froude Number	1.830
Flow Type	Supercritical

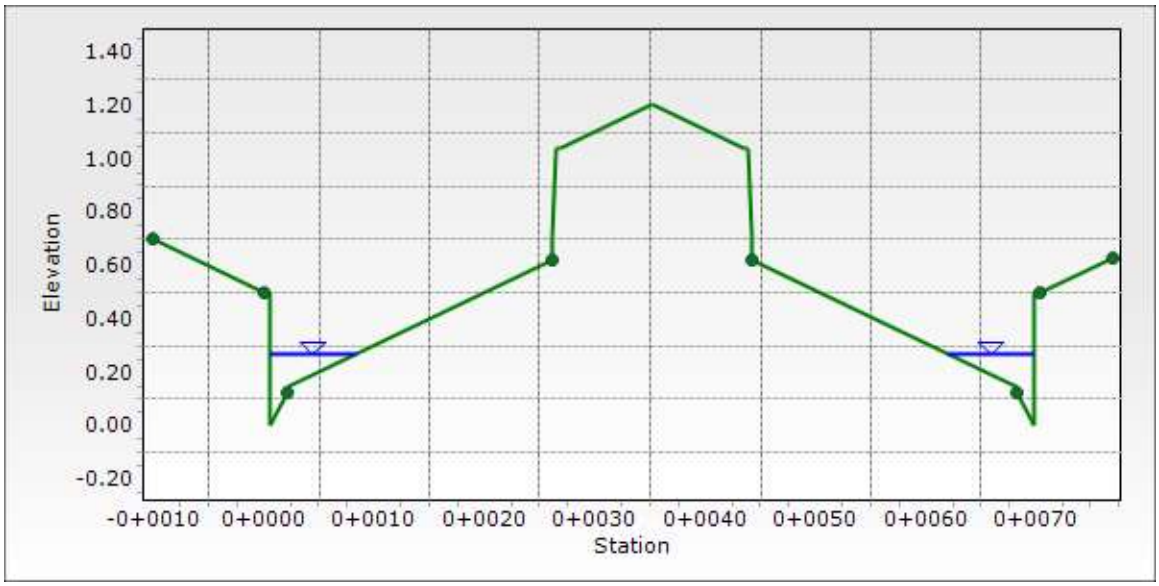
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0000 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.8 in
Critical Depth	4.6 in
Channel Slope	0.023 ft/ft
Critical Slope	0.006 ft/ft

Cross Section for Irregular Section - SN-2CN

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.032 ft/ft
Normal Depth	0.27 ft
Discharge	5.16 cfs



Worksheet for Irregular Section - SN-2CN

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.032 ft/ft
Discharge	5.16 cfs

Section Definitions

Station (ft)	Elevation (ft)
-0+0010.0000	0.70
0+0000.0000	0.50
0+0000.5000	0.50
0+0000.5833	0.00
0+0002.0833	0.13
0+0002.0833	0.15
0+0026.0833	0.63
0+0026.1666	0.71
0+0026.4166	1.04
0+0026.8333	1.04
0+0035.1633	1.21
0+0043.4933	1.04
0+0043.9100	1.04
0+0044.1600	0.71
0+0044.2433	0.63
0+0068.2433	0.15
0+0068.2433	0.13
0+0069.7433	0.00
0+0069.8266	0.50
0+0070.3266	0.50
0+0076.8266	0.63

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+0010.0000, 0.70)	(0+0000.0000, 0.50)	0.025
(0+0000.0000, 0.50)	(0+0002.0833, 0.13)	0.013
(0+0002.0833, 0.13)	(0+0026.0833, 0.63)	0.015
(0+0026.0833, 0.63)	(0+0044.2433, 0.63)	0.013
(0+0044.2433, 0.63)	(0+0068.2433, 0.13)	0.015
(0+0068.2433, 0.13)	(0+0070.3266, 0.50)	0.013
(0+0070.3266, 0.50)	(0+0076.8266, 0.63)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method

Worksheet for Irregular Section - SN-2CN

Options	
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.27 ft
Elevation Range	0.0000 to 1.2090 ft
Flow Area	1.4 ft²
Wetted Perimeter	16.1391 ft
Hydraulic Radius	0.09 ft
Top Width	15.63 ft
Normal Depth	0.27 ft
Critical Depth	0.34 ft
Critical Slope	0.007 ft/ft
Velocity	3.62 ft/s
Velocity Head	0.20 ft
Specific Energy	0.48 ft
Froude Number	2.117
Flow Type	Supercritical

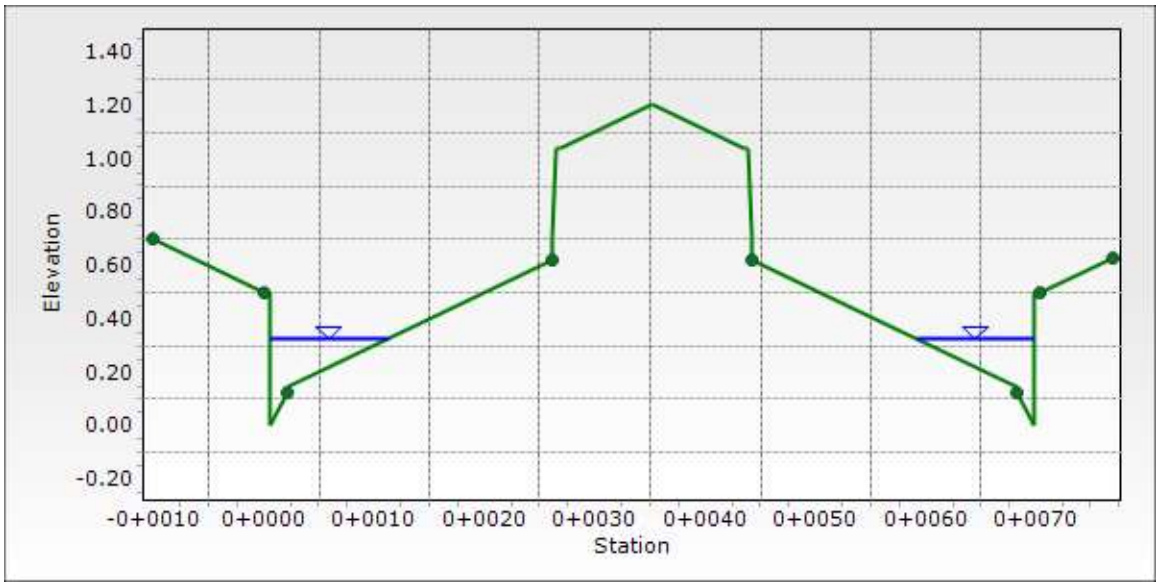
GVF Input Data	
Downstream Depth	0.00 ft
Length	0.0000 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.27 ft
Critical Depth	0.34 ft
Channel Slope	0.032 ft/ft
Critical Slope	0.007 ft/ft

Cross Section for Irregular Section - SN-1BS

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.023 ft/ft
Normal Depth	0.33 ft
Discharge	8.90 cfs



Worksheet for Irregular Section - SN-1BS

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.023 ft/ft
Discharge	8.90 cfs

Section Definitions

Station (ft)	Elevation (ft)
-0+0010.0000	0.70
0+0000.0000	0.50
0+0000.5000	0.50
0+0000.5833	0.00
0+0002.0833	0.13
0+0002.0833	0.15
0+0026.0833	0.63
0+0026.1666	0.71
0+0026.4166	1.04
0+0026.8333	1.04
0+0035.1633	1.21
0+0043.4933	1.04
0+0043.9100	1.04
0+0044.1600	0.71
0+0044.2433	0.63
0+0068.2433	0.15
0+0068.2433	0.13
0+0069.7433	0.00
0+0069.8266	0.50
0+0070.3266	0.50
0+0076.8266	0.63

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+0010.0000, 0.70)	(0+0000.0000, 0.50)	0.025
(0+0000.0000, 0.50)	(0+0002.0833, 0.13)	0.013
(0+0002.0833, 0.13)	(0+0026.0833, 0.63)	0.015
(0+0026.0833, 0.63)	(0+0044.2433, 0.63)	0.013
(0+0044.2433, 0.63)	(0+0068.2433, 0.13)	0.015
(0+0068.2433, 0.13)	(0+0070.3266, 0.50)	0.013
(0+0070.3266, 0.50)	(0+0076.8266, 0.63)	0.025

Options	
Current Roughness Weighted Method	Pavlovskii's Method

Worksheet for Irregular Section - SN-1BS

Options	
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	0.33 ft
Elevation Range	0.0000 to 1.2090 ft
Flow Area	2.5 ft²
Wetted Perimeter	22.0517 ft
Hydraulic Radius	0.11 ft
Top Width	21.44 ft
Normal Depth	0.33 ft
Critical Depth	0.39 ft
Critical Slope	0.006 ft/ft
Velocity	3.56 ft/s
Velocity Head	0.20 ft
Specific Energy	0.53 ft
Froude Number	1.841
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.00 ft
Length	0.0000 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	0.33 ft
Critical Depth	0.39 ft
Channel Slope	0.023 ft/ft
Critical Slope	0.006 ft/ft

C.3 WSPG-W Models

C.3.1 Sunset Run Drive to Flight Range Avenue Models

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLIGHT RANGE AVENUE (SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE)
T3 100-YEAR ULTIMATE CONDITION
SO    000.00 3447.52  36                          3458.20
REM***** CONNECTON TO KETTLE RIDGE DRIVE MAINLINE 36"
JX      2.50 3447.62  36 24   .013     2.0          3447.62         -69.0         .000
REM***** SDMH#1 TO DOWNSTREAM SDMH#2
R     198.96 3458.14  36      .013                                  .000    .000 0
R     203.96 3458.34  36      .013                                  .000    .000 0
REM***** UPSTREAM SDMH#2 TO DOWNSTREAM SDMH#3
R     523.59 3481.60  36      .013                                  .000    .000 0
JX    526.09 3481.70  36 24 24.013     2.0     2.0  3481.80 3481.80 -69.0-80.0    .000
REM***** JUNCTION WITH SDDI#2&3
R     528.59 3481.80  36      .013                                  .000    .000 0
REM***** UPSTREAM SDMH#3 TO SDMH#4
R     875.39 3507.05  36      .013                                  .000    .000 0
SH    875.39 3507.05  36                          3507.05
CD  24  4   1    .000   2.000     .000  .000  .000   .00
CD  36  4   1    .000   3.000     .000  .000  .000   .00
Q          24.000   .0
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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 1-2021 Time: 6:25:42

SUMMERLIN WEST VILLAGE 22

FLIGHT RANGE AVENUE (SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE)

100-YEAR ULTIMATE CONDITION

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	
.000	3447.520	10.680	3458.200	30.00	4.24	.28	3458.48	.00	1.77	.00	3.000	.000	.00	1 .0
JUNCT STR	.0400					.0019	.00	10.68	.00		.013	.00	.00	PIPE
2.500	3447.620	10.655	3458.275	28.00	3.96	.24	3458.52	.00	1.71	.00	3.000	.000	.00	1 .0
143.681	.0535					.0018	.25	10.65	.00	.87	.013	.00	.00	PIPE
146.181	3455.314	3.207	3458.521	28.00	3.96	.24	3458.76	.00	1.71	.00	3.000	.000	.00	1 .0
HYDRAULIC JUMP														
146.181	3455.314	.840	3456.154	28.00	17.27	4.63	3460.79	.00	1.71	2.69	3.000	.000	.00	1 .0
15.145	.0535					.0605	.92	.84	3.92	.87	.013	.00	.00	PIPE
161.326	3456.125	.837	3456.962	28.00	17.36	4.68	3461.64	.00	1.71	2.69	3.000	.000	.00	1 .0
37.634	.0535					.0652	2.46	.84	3.95	.87	.013	.00	.00	PIPE
198.960	3458.140	.809	3458.949	28.00	18.21	5.15	3464.10	.00	1.71	2.66	3.000	.000	.00	1 .0
5.000	.0400					.0712	.36	.81	4.22	.93	.013	.00	.00	PIPE
203.960	3458.340	.800	3459.140	28.00	18.50	5.32	3464.46	.00	1.71	2.65	3.000	.000	.00	1 .0
143.504	.0728					.0728	10.44	.80	4.32	.80	.013	.00	.00	PIPE
347.464	3468.783	.800	3469.583	28.00	18.50	5.32	3474.90	.00	1.71	2.65	3.000	.000	.00	1 .0
99.950	.0728					.0688	6.88	.80	4.32	.80	.013	.00	.00	PIPE
447.414	3476.057	.824	3476.881	28.00	17.76	4.90	3481.78	.00	1.71	2.68	3.000	.000	.00	1 .0
34.726	.0728					.0608	2.11	.82	4.08	.80	.013	.00	.00	PIPE

FILE: FRA-INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 2

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 1-2021 Time: 6:25:42

SUMMERLIN WEST VILLAGE 22

FLIGHT RANGE AVENUE (SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE)

100-YEAR ULTIMATE CONDITION

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	
482.140	3478.584	.853	3479.436	28.00	16.93	4.45	3483.89	.00	1.71	2.71	3.000	.000	.00	1 .0
19.150	.0728					.0532	1.02	.85	3.82	.80	.013	.00	.00	PIPE
501.290	3479.977	.882	3480.859	28.00	16.14	4.05	3484.91	.00	1.71	2.73	3.000	.000	.00	1 .0
12.853	.0728					.0466	.60	.88	3.57	.80	.013	.00	.00	PIPE
514.143	3480.913	.913	3481.826	28.00	15.39	3.68	3485.50	.00	1.71	2.76	3.000	.000	.00	1 .0
9.447	.0728					.0408	.39	.91	3.34	.80	.013	.00	.00	PIPE
523.590	3481.600	.945	3482.545	28.00	14.67	3.34	3485.89	.00	1.71	2.79	3.000	.000	.00	1 .0
JUNCT STR	.0399					.0546	.14	.95	3.13		.013	.00	.00	PIPE
526.090	3481.700	.745	3482.445	24.00	17.55	4.78	3487.23	.00	1.58	2.59	3.000	.000	.00	1 .0
2.500	.0400					.0719	.18	.74	4.26	.86	.013	.00	.00	PIPE
528.590	3481.800	.740	3482.540	24.00	17.70	4.87	3487.41	.00	1.58	2.59	3.000	.000	.00	1 .0
126.099	.0728					.0728	9.18	.74	4.31	.74	.013	.00	.00	PIPE
654.689	3490.981	.740	3491.721	24.00	17.70	4.87	3496.59	.00	1.58	2.59	3.000	.000	.00	1 .0
90.509	.0728					.0707	6.40	.74	4.31	.74	.013	.00	.00	PIPE
745.198	3497.571	.751	3498.322	24.00	17.33	4.66	3502.99	.00	1.58	2.60	3.000	.000	.00	1 .0
46.725	.0728					.0643	3.00	.75	4.18	.74	.013	.00	.00	PIPE
791.923	3500.973	.777	3501.750	24.00	16.52	4.24	3505.99	.00	1.58	2.63	3.000	.000	.00	1 .0
21.631	.0728					.0562	1.22	.78	3.92	.74	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 1-2021 Time: 6:25:42

SUMMERLIN WEST VILLAGE 22
FLIGHT RANGE AVENUE (SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE)
100-YEAR ULTIMATE CONDITION

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
813.554	3502.548	.804	3503.351	24.00	15.75	3.85	3507.21	.00	1.58	2.66	3.000	.000	.00	1 .0
13.664	.0728					.0492	.67	.80	3.67	.74	.013	.00	.00	PIPE
827.218	3503.542	.832	3504.374	24.00	15.02	3.50	3507.88	.00	1.58	2.69	3.000	.000	.00	1 .0
9.733	.0728					.0431	.42	.83	3.43	.74	.013	.00	.00	PIPE
836.951	3504.251	.861	3505.112	24.00	14.32	3.19	3508.30	.00	1.58	2.71	3.000	.000	.00	1 .0
7.389	.0728					.0377	.28	.86	3.21	.74	.013	.00	.00	PIPE
844.341	3504.789	.891	3505.680	24.00	13.66	2.90	3508.58	.00	1.58	2.74	3.000	.000	.00	1 .0
5.829	.0728					.0330	.19	.89	3.01	.74	.013	.00	.00	PIPE
850.170	3505.214	.922	3506.135	24.00	13.02	2.63	3508.77	.00	1.58	2.77	3.000	.000	.00	1 .0
4.711	.0728					.0289	.14	.92	2.81	.74	.013	.00	.00	PIPE
854.881	3505.557	.954	3506.511	24.00	12.41	2.39	3508.90	.00	1.58	2.79	3.000	.000	.00	1 .0
3.872	.0728					.0253	.10	.95	2.63	.74	.013	.00	.00	PIPE
858.753	3505.839	.988	3506.826	24.00	11.84	2.18	3509.00	.00	1.58	2.82	3.000	.000	.00	1 .0
3.216	.0728					.0222	.07	.99	2.46	.74	.013	.00	.00	PIPE
861.969	3506.073	1.023	3507.095	24.00	11.29	1.98	3509.07	.00	1.58	2.84	3.000	.000	.00	1 .0
2.686	.0728					.0194	.05	1.02	2.30	.74	.013	.00	.00	PIPE
864.654	3506.268	1.059	3507.327	24.00	10.76	1.80	3509.13	.00	1.58	2.87	3.000	.000	.00	1 .0
2.252	.0728					.0170	.04	1.06	2.15	.74	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 1-2021 Time: 6:25:42

SUMMERLIN WEST VILLAGE 22
FLIGHT RANGE AVENUE (SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE)
100-YEAR ULTIMATE CONDITION

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	
866.907	3506.432	1.097	3507.529	24.00	10.26	1.63	3509.16	.00	1.58	2.89	3.000	.000	.00	1 .0
1.888	.0728					.0149	.03	1.10	2.01	.74	.013	.00	.00	PIPE
868.795	3506.570	1.136	3507.706	24.00	9.78	1.49	3509.19	.00	1.58	2.91	3.000	.000	.00	1 .0
1.574	.0728					.0131	.02	1.14	1.88	.74	.013	.00	.00	PIPE
870.369	3506.684	1.177	3507.861	24.00	9.33	1.35	3509.21	.00	1.58	2.93	3.000	.000	.00	1 .0
1.306	.0728					.0115	.02	1.18	1.75	.74	.013	.00	.00	PIPE
871.675	3506.780	1.220	3507.999	24.00	8.89	1.23	3509.23	.00	1.58	2.95	3.000	.000	.00	1 .0
1.069	.0728					.0101	.01	1.22	1.64	.74	.013	.00	.00	PIPE
872.744	3506.857	1.264	3508.122	24.00	8.48	1.12	3509.24	.00	1.58	2.96	3.000	.000	.00	1 .0
.860	.0728					.0089	.01	1.26	1.53	.74	.013	.00	.00	PIPE
873.604	3506.920	1.311	3508.231	24.00	8.08	1.01	3509.25	.00	1.58	2.98	3.000	.000	.00	1 .0
.672	.0728					.0078	.01	1.31	1.43	.74	.013	.00	.00	PIPE
874.275	3506.969	1.360	3508.328	24.00	7.71	.92	3509.25	.00	1.58	2.99	3.000	.000	.00	1 .0
.501	.0728					.0068	.00	1.36	1.33	.74	.013	.00	.00	PIPE
874.777	3507.005	1.410	3508.416	24.00	7.35	.84	3509.25	.00	1.58	2.99	3.000	.000	.00	1 .0
.345	.0728					.0060	.00	1.41	1.24	.74	.013	.00	.00	PIPE
875.122	3507.031	1.464	3508.494	24.00	7.01	.76	3509.26	.00	1.58	3.00	3.000	.000	.00	1 .0
.202	.0728					.0053	.00	1.46	1.16	.74	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 1-2021 Time: 6:25:42

SUMMERLIN WEST VILLAGE 22

FLIGHT RANGE AVENUE (SCURRY BEND DRIVE TO KETTLE RIDGE DRIVE)

100-YEAR ULTIMATE CONDITION

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
875.324	3507.045	1.519	3508.564	24.00	6.68	.69	3509.26	.00	1.58	3.00	3.000	.000	.00	1 .0
.066	.0728					.0047	.00	1.52	1.08	.74	.013	.00	.00	PIPE
875.390	3507.050	1.579	3508.629	24.00	6.37	.63	3509.26	.00	1.58	3.00	3.000	.000	.00	1 .0

```
T1 SUMMERLIN WEST VILLAGE 25                                                0
T2 SCURRY BEND DR (FUTURE CALICO BEND DRIVE TO FLIGHT RANGE AVENUE)
T3 100-YEAR INTERIM CONTDITION
SO       .0003508.510  2                         3508.629
REM*****SCURRY BEND DRIVE SDMH#2
R      58.8103511.000  2      .013                                  .000    .000 0
JX     61.3103511.100  2  2   .013    4.000    0.0003511.10 0000.00 -27.9 00.0   .000
REM*****SCURRY BEND DRIVE SDMH#1
R      63.8103511.200  2      .013                                  .000    .000 0
SH     63.8103511.200  2                         3511.200
CD   1  4   1    .000   2.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
Q            0.001   .0
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WATER SURFACE PROFILE LISTING Date: 3- 2-2021 Time: 9:54: 3

SUMMERLIN WEST VILLAGE 25

SCURRY BEND DR (FUTURE CALICO BEND DRIVE TO FLIGHT RANGE AVENUE)

100-YEAR INTERIM CONTDITION

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	
.000	3508.510	.400	3508.910	4.00	8.93	1.24	3510.15	.00	.70	1.60	2.000	.000	.00	1 .0
16.492	.0423					.0395	.65	.40	2.98	.40	.013	.00	.00	PIPE
16.492	3509.208	.406	3509.615	4.00	8.74	1.19	3510.80	.00	.70	1.61	2.000	.000	.00	1 .0
14.483	.0423					.0358	.52	.41	2.89	.40	.013	.00	.00	PIPE
30.975	3509.822	.420	3510.242	4.00	8.34	1.08	3511.32	.00	.70	1.63	2.000	.000	.00	1 .0
7.609	.0423					.0313	.24	.42	2.71	.40	.013	.00	.00	PIPE
38.584	3510.144	.434	3510.578	4.00	7.95	.98	3511.56	.00	.70	1.65	2.000	.000	.00	1 .0
4.973	.0423					.0274	.14	.43	2.54	.40	.013	.00	.00	PIPE
43.558	3510.354	.449	3510.803	4.00	7.58	.89	3511.70	.00	.70	1.67	2.000	.000	.00	1 .0
3.570	.0423					.0239	.09	.45	2.38	.40	.013	.00	.00	PIPE
47.127	3510.505	.465	3510.970	4.00	7.23	.81	3511.78	.00	.70	1.69	2.000	.000	.00	1 .0
2.701	.0423					.0209	.06	.46	2.22	.40	.013	.00	.00	PIPE
49.828	3510.620	.481	3511.100	4.00	6.89	.74	3511.84	.00	.70	1.71	2.000	.000	.00	1 .0
2.106	.0423					.0183	.04	.48	2.08	.40	.013	.00	.00	PIPE
51.933	3510.709	.497	3511.206	4.00	6.57	.67	3511.88	.00	.70	1.73	2.000	.000	.00	1 .0
1.664	.0423					.0160	.03	.50	1.95	.40	.013	.00	.00	PIPE
53.598	3510.779	.514	3511.293	4.00	6.26	.61	3511.90	.00	.70	1.75	2.000	.000	.00	1 .0
1.326	.0423					.0140	.02	.51	1.83	.40	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 2-2021 Time: 9:54: 3

SUMMERLIN WEST VILLAGE 25

SCURRY BEND DR (FUTURE CALICO BEND DRIVE TO FLIGHT RANGE AVENUE)

100-YEAR INTERIM CONTDITION

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	
54.924	3510.835	.532	3511.367	4.00	5.97	.55	3511.92	.00	.70	1.77	2.000	.000	.00	1 .0
1.062	.0423					.0122	.01	.53	1.71	.40	.013	.00	.00	PIPE
55.986	3510.880	.550	3511.431	4.00	5.69	.50	3511.93	.00	.70	1.79	2.000	.000	.00	1 .0
.844	.0423					.0107	.01	.55	1.60	.40	.013	.00	.00	PIPE
56.829	3510.916	.569	3511.485	4.00	5.43	.46	3511.94	.00	.70	1.80	2.000	.000	.00	1 .0
.662	.0423					.0094	.01	.57	1.50	.40	.013	.00	.00	PIPE
57.491	3510.944	.589	3511.533	4.00	5.18	.42	3511.95	.00	.70	1.82	2.000	.000	.00	1 .0
.505	.0423					.0082	.00	.59	1.40	.40	.013	.00	.00	PIPE
57.996	3510.966	.610	3511.575	4.00	4.94	.38	3511.95	.00	.70	1.84	2.000	.000	.00	1 .0
.370	.0423					.0072	.00	.61	1.31	.40	.013	.00	.00	PIPE
58.366	3510.981	.631	3511.612	4.00	4.71	.34	3511.96	.00	.70	1.86	2.000	.000	.00	1 .0
.252	.0423					.0063	.00	.63	1.23	.40	.013	.00	.00	PIPE
58.617	3510.992	.653	3511.645	4.00	4.49	.31	3511.96	.00	.70	1.88	2.000	.000	.00	1 .0
.145	.0423					.0055	.00	.65	1.15	.40	.013	.00	.00	PIPE
58.762	3510.998	.676	3511.675	4.00	4.28	.28	3511.96	.00	.70	1.89	2.000	.000	.00	1 .0
.048	.0423					.0048	.00	.68	1.07	.40	.013	.00	.00	PIPE
58.810	3511.000	.701	3511.701	4.00	4.07	.26	3511.96	.00	.70	1.91	2.000	.000	.00	1 .0
JUNCT STR	.0400							.70	1.00		.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date: 3- 2-2021 Time: 9:54: 3

SUMMERLIN WEST VILLAGE 25

SCURRY BEND DR (FUTURE CALICO BEND DRIVE TO FLIGHT RANGE AVENUE)

100-YEAR INTERIM CONTDITION

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	
61.310	3511.100	.008	3511.108	.00	.71	.01	3511.12	.00	.01	.26	2.000	.000	.00	1 .0
1.473	.0399					.0405	.06	.01	1.70	.01	.013	.00	.00	PIPE
62.783	3511.159	.008	3511.167	.00	.71	.01	3511.17	.00	.01	.26	2.000	.000	.00	1 .0
.824	.0399					.0397	.03	.01	1.70	.01	.013	.00	.00	PIPE
63.607	3511.192	.008	3511.200	.00	.70	.01	3511.21	.00	.01	.26	2.000	.000	.00	1 .0
.114	.0399					.0364	.00	.01	1.67	.01	.013	.00	.00	PIPE
63.721	3511.196	.009	3511.205	.00	.67	.01	3511.21	.00	.01	.26	2.000	.000	.00	1 .0
.042	.0399					.0318	.00	.01	1.57	.01	.013	.00	.00	PIPE
63.763	3511.198	.009	3511.207	.00	.64	.01	3511.21	.00	.01	.26	2.000	.000	.00	1 .0
.023	.0399					.0278	.00	.01	1.47	.01	.013	.00	.00	PIPE
63.786	3511.199	.009	3511.208	.00	.61	.01	3511.21	.00	.01	.27	2.000	.000	.00	1 .0
.014	.0399					.0242	.00	.01	1.38	.01	.013	.00	.00	PIPE
63.810	3511.200	.011	3511.211	.00	.48	.00	3511.21	.00	.01	.29	2.000	.000	.00	1 .0

```
T1 SUMMERLIN WEST VILLAGE 25                                                0
T2 SCURRY BEND DRIVE LATERAL FROM SDMH1 WEST TO SDDI#1
T3 ATKINS / INTERIM CONDITIONS
SO     63.8103511.200  2                          3511.211
R      84.0303512.170  2      .013                                .000   0.000 0
REM     LATERAL FROM SDDI#1
SH     84.0303512.170  2                          3512.170
CD   1  4   1    .000   2.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
Q             4.000   .0
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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 2-2021 Time:11:46:41

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE LATERAL FROM SDMH1 WEST TO SDDI#1
ATKINS / INTERIM CONDITIONS

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	
63.810	3511.199	.422	3511.622	4.00	8.27	1.06	3512.68	.00	.70	1.63	2.000	.000	.00	1 .0
4.247	.0480					.0310	.13	.42	2.68	.38	.013	.00	.00	PIPE
68.057	3511.403	.434	3511.837	4.00	7.95	.98	3512.82	.00	.70	1.65	2.000	.000	.00	1 .0
3.611	.0480					.0274	.10	.43	2.54	.38	.013	.00	.00	PIPE
71.668	3511.576	.449	3512.026	4.00	7.58	.89	3512.92	.00	.70	1.67	2.000	.000	.00	1 .0
2.736	.0480					.0239	.07	.45	2.38	.38	.013	.00	.00	PIPE
74.404	3511.708	.465	3512.172	4.00	7.23	.81	3512.98	.00	.70	1.69	2.000	.000	.00	1 .0
2.137	.0480					.0209	.04	.46	2.22	.38	.013	.00	.00	PIPE
76.541	3511.810	.480	3512.291	4.00	6.89	.74	3513.03	.00	.70	1.71	2.000	.000	.00	1 .0
1.702	.0480					.0183	.03	.48	2.08	.38	.013	.00	.00	PIPE
78.242	3511.892	.497	3512.389	4.00	6.57	.67	3513.06	.00	.70	1.73	2.000	.000	.00	1 .0
1.370	.0480					.0160	.02	.50	1.95	.38	.013	.00	.00	PIPE
79.612	3511.958	.514	3512.471	4.00	6.26	.61	3513.08	.00	.70	1.75	2.000	.000	.00	1 .0
1.109	.0480					.0140	.02	.51	1.83	.38	.013	.00	.00	PIPE
80.721	3512.011	.532	3512.542	4.00	5.97	.55	3513.10	.00	.70	1.77	2.000	.000	.00	1 .0
.894	.0480					.0122	.01	.53	1.71	.38	.013	.00	.00	PIPE
81.615	3512.054	.550	3512.604	4.00	5.69	.50	3513.11	.00	.70	1.79	2.000	.000	.00	1 .0
.716	.0480					.0107	.01	.55	1.60	.38	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 2-2021 Time:11:46:41

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE LATERAL FROM SDMH1 WEST TO SDDI#1
ATKINS / INTERIM CONDITIONS

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	
82.331	3512.088	.569	3512.657	4.00	5.43	.46	3513.11	.00	.70	1.80	2.000	.000	.00	1 .0
.562	.0480					.0094	.01	.57	1.50	.38	.013	.00	.00	PIPE
82.893	3512.115	.589	3512.704	4.00	5.18	.42	3513.12	.00	.70	1.82	2.000	.000	.00	1 .0
.436	.0480					.0082	.00	.59	1.40	.38	.013	.00	.00	PIPE
83.329	3512.136	.610	3512.746	4.00	4.94	.38	3513.12	.00	.70	1.84	2.000	.000	.00	1 .0
.318	.0480					.0072	.00	.61	1.31	.38	.013	.00	.00	PIPE
83.647	3512.151	.631	3512.782	4.00	4.71	.34	3513.13	.00	.70	1.86	2.000	.000	.00	1 .0
.217	.0480					.0063	.00	.63	1.23	.38	.013	.00	.00	PIPE
83.864	3512.162	.653	3512.815	4.00	4.49	.31	3513.13	.00	.70	1.88	2.000	.000	.00	1 .0
.125	.0480					.0055	.00	.65	1.15	.38	.013	.00	.00	PIPE
83.990	3512.168	.676	3512.844	4.00	4.28	.28	3513.13	.00	.70	1.89	2.000	.000	.00	1 .0
.040	.0480					.0048	.00	.68	1.07	.38	.013	.00	.00	PIPE
84.030	3512.170	.701	3512.871	4.00	4.07	.26	3513.13	.00	.70	1.91	2.000	.000	.00	1 .0

C.3.2 Flight Range Avenue to Fleet Wing Avenue Models

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
T3 100-YEAR INTERIM CONTDITION
SO       .0003405.720  1                          3406.715
REM*****CONNECTON TO KETTLE RIDGE DRIVE MAINLINE 6'X10' RCB
R      26.9003410.630  1      .013                                  .000 -13.655 0
R      27.9003410.746  1      .013                                  .000 -13.500 0
R      29.9003410.862  1      .013                                  .000 -13.500 0
R      31.9003410.920  1      .013                                  .000    .000 1
REM*****FLEET WING DRIVE (DFD-KRD) SDMH#8
R      48.5003411.840  1      .013                                  .000    .000 0
REM*****POINT OF CONNECTION TO STUB
R     148.1903416.760  1      .013                                  .000    .000 0
R     154.1903416.960  1      .013                                  .000    .000 1
REM*****FLEET WING AVENUE SDMH#1
R     511.5203444.910  1      .013                                  .000  -3.709 0
R     516.5203445.110  1      .013                                  .000    .000 1
REM*****FLEET WING AVENUE SDMH#2
R     653.6403456.500  1      .013                                  .000    .000 0
JX    656.1403456.600  1  2  2.013    3.65     2.75 3456.70 3456.70  72.7-45.2    .000
REM*****FLEET WING AVENUE SDDI#1 & SDDI#2
R     658.6403456.700  1      .013                                  .000  -2.413 1
REM*****FLEET WING AVENUE SDMH#3
R     769.1903465.550  1      .013                                  .000    .000 0
R     774.1903465.750  1      .013                                  .000    .843 1
REM*****FLEET WING AVENUE SDMH#4
R     995.9803480.950  1      .013                                  .000    .000 0
JX    998.4803481.050  1  2  2.013    8.49     7.93 3481.15 3481.15  72.1-45.2    .000
REM*****FLEET WING AVENUE SDDI#3 & SDDI#4
R    1000.9803481.150  1      .013                                  .000    .000 1
REM*****FLEET WING AVENUE SDMH#5
SH   1000.9803481.150  1                          3481.150
CD   1  4   1    .000   4.000     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
Q           265.000   .0
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SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
100-YEAR INTERIM CONTDITION

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	
.000	3405.720	2.483	3408.203	287.82	35.12	19.16	3427.36	.00	3.96	3.88	4.000	.000	.00	1 .0
13.874	.1825					.0762	1.06	2.48	4.26	1.93	.013	.00	.00	PIPE
13.874	3408.252	2.575	3410.827	287.82	33.66	17.60	3428.42	.00	3.96	3.83	4.000	.000	.00	1 .0
13.026	.1825					.0682	.89	2.57	3.97	1.93	.013	.00	.00	PIPE
26.900	3410.630	2.685	3413.314	287.82	32.10	16.00	3429.31	.00	3.96	3.76	4.000	.000	.00	1 .0
1.000	.1162					.0640	.06	2.68	3.66	2.20	.013	.00	.00	PIPE
27.900	3410.746	2.688	3413.435	287.82	32.05	15.95	3429.38	.00	3.96	3.76	4.000	.000	.00	1 .0
2.000	.0580					.0639	.13	2.69	3.65	2.79	.013	.00	.00	PIPE
29.900	3410.862	2.687	3413.550	287.82	32.06	15.96	3429.51	.00	3.96	3.76	4.000	.000	.00	1 .0
2.000	.0289					.0641	.13	2.69	3.65	4.00	.013	.00	.00	PIPE
31.900	3410.920	2.682	3413.602	287.82	32.14	16.04	3429.64	.00	3.96	3.76	4.000	.000	.00	1 .0
16.600	.0554					.0647	1.07	2.68	3.67	2.84	.013	.00	.00	PIPE
48.500	3411.840	2.669	3414.510	287.82	32.30	16.20	3430.71	.00	3.96	3.77	4.000	.000	.00	1 .0
31.358	.0494					.0666	2.09	2.67	3.70	2.97	.013	.00	.00	PIPE
79.858	3413.388	2.628	3416.016	287.82	32.88	16.79	3432.80	.00	3.96	3.80	4.000	.000	.00	1 .0
68.332	.0494					.0724	4.94	2.63	3.82	2.97	.013	.00	.00	PIPE
148.190	3416.760	2.522	3419.282	287.82	34.48	18.47	3437.75	.00	3.96	3.86	4.000	.000	.00	1 .0
6.000	.0333					.0774	.46	2.52	4.13	4.00	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date: 3- 1-2021 Time: 6:26:41

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
100-YEAR INTERIM CONTDITION

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	
154.190	3416.960	2.505	3419.465	287.82	34.75	18.75	3438.21	.00	3.96	3.87	4.000	.000	.00	1 .0
357.330	.0782					.0749	26.77	2.51	4.19	2.50	.013	.00	.00	PIPE
511.520	3444.910	2.581	3447.491	287.82	33.57	17.50	3464.99	.00	3.96	3.83	4.000	.000	.00	1 .0
5.000	.0400					.0721	.36	2.58	3.95	3.28	.013	.00	.00	PIPE
516.520	3445.110	2.569	3447.679	287.82	33.75	17.68	3465.36	.00	3.96	3.83	4.000	.000	.00	1 .0
59.088	.0831					.0706	4.17	2.57	3.99	2.45	.013	.00	.00	PIPE
575.608	3450.018	2.621	3452.639	287.82	32.99	16.90	3469.54	.00	3.96	3.80	4.000	.000	.00	1 .0
78.032	.0831					.0648	5.06	2.62	3.84	2.45	.013	.00	.00	PIPE
653.640	3456.500	2.734	3459.234	287.82	31.45	15.36	3474.60	.00	3.96	3.72	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0635	.16	2.73	3.53		.013	.00	.00	PIPE
656.140	3456.600	2.615	3459.215	281.42	32.34	16.24	3475.45	.00	3.96	3.81	4.000	.000	.00	1 .0
2.500	.0399					.0662	.17	2.61	3.77	3.21	.013	.00	.00	PIPE
658.640	3456.700	2.609	3459.309	281.42	32.42	16.32	3475.63	.00	3.96	3.81	4.000	.000	.00	1 .0
49.989	.0801					.0643	3.21	2.61	3.78	2.45	.013	.00	.00	PIPE
708.629	3460.702	2.671	3463.373	281.42	31.56	15.47	3478.84	.00	3.96	3.77	4.000	.000	.00	1 .0
60.561	.0801					.0588	3.56	2.67	3.62	2.45	.013	.00	.00	PIPE
769.190	3465.550	2.788	3468.338	281.42	30.09	14.06	3482.40	.00	3.96	3.68	4.000	.000	.00	1 .0
5.000	.0400					.0556	.28	2.79	3.32	3.21	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
100-YEAR INTERIM CONTDITION

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	
774.190	3465.750	2.780	3468.530	281.42	30.19	14.15	3482.68	.00	3.96	3.68	4.000	.000	.00	1 .0
20.615	.0685					.0551	1.14	2.78	3.34	2.58	.013	.00	.00	PIPE
794.805	3467.163	2.808	3469.970	281.42	29.86	13.85	3483.82	.00	3.96	3.66	4.000	.000	.00	1 .0
66.328	.0685					.0515	3.41	2.81	3.28	2.58	.013	.00	.00	PIPE
861.132	3471.708	2.936	3474.644	281.42	28.47	12.59	3487.23	.00	3.96	3.54	4.000	.000	.00	1 .0
44.838	.0685					.0461	2.07	2.94	3.00	2.58	.013	.00	.00	PIPE
905.970	3474.781	3.075	3477.856	281.42	27.15	11.44	3489.30	.00	3.96	3.37	4.000	.000	.00	1 .0
32.816	.0685					.0416	1.36	3.08	2.73	2.58	.013	.00	.00	PIPE
938.786	3477.030	3.230	3480.260	281.42	25.88	10.40	3490.66	.00	3.96	3.15	4.000	.000	.00	1 .0
24.989	.0685					.0377	.94	3.23	2.46	2.58	.013	.00	.00	PIPE
963.775	3478.743	3.407	3482.149	281.42	24.68	9.46	3491.61	.00	3.96	2.84	4.000	.000	.00	1 .0
19.186	.0685					.0348	.67	3.41	2.17	2.58	.013	.00	.00	PIPE
982.961	3480.058	3.620	3483.677	281.42	23.53	8.60	3492.28	.00	3.96	2.35	4.000	.000	.00	1 .0
13.019	.0685					.0345	.45	3.62	1.84	2.58	.013	.00	.00	PIPE
995.980	3480.950	3.959	3484.909	281.42	22.43	7.82	3492.72	.00	3.96	.81	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0347	.09	3.96	1.00		.013	.00	.00	PIPE
998.480	3481.050	5.687	3486.737	265.00	21.09	6.91	3493.64	.00	3.95	.00	4.000	.000	.00	1 .0
2.500	.0399					.0340	.09	5.69	.00	3.03	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22

FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)

100-YEAR INTERIM CONTDITION

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
1000.980	3481.150	6.017	3487.167	265.00	21.09	6.91	3494.07	.00	3.95	.00	4.000	.000	.00	1 .0

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T1 SUMMERLIN WEST VILLAGE 25                                                0
T2 SCURRY BEND DR (FLIGHT RANGE AVENUE TO FLEET WING AVENUE)
T3 100-YEAR INTERIM CONTDITION
SO       .0003485.360  1                         3487.167
REM*****SCURRY BEND DRIVE SDMH#5
R     126.4103488.000  1      .013                                  .000    .000 0
R     131.4103488.200  1      .013                                  .000 -12.13  1
REM*****SCURRY BEND DRIVE SDMH#4
R     294.5103494.210  1      .013                                  .000    .000 0
JX    297.0103494.310  1  2  2.013    4.000    4.5103494.41 3494.41  81.0-90.0   .000
REM*****SCURRY BEND DRIVE SDMH#3
R     299.5103494.410  1      .013                                  .000    .000 0
SH    299.5103494.410  1                         3494.410
CD   1  4   1    .000   2.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
Q            0.001   .0
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SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLIGHT RANGE AVENUE TO FLEET WING AVENUE)
100-YEAR INTERIM CONTDITION

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	
.000	3485.360	1.807	3487.167	8.51	2.24	.08	3487.24	.00	.97	2.24	2.500	.000	.00	1 .0
3.450	.0209					.0006	.00	1.81	.30	.64	.013	.00	.00	PIPE
3.450	3485.432	1.729	3487.161	8.51	2.35	.09	3487.25	.00	.97	2.31	2.500	.000	.00	1 .0
3.143	.0209					.0007	.00	1.73	.33	.64	.013	.00	.00	PIPE
6.593	3485.498	1.657	3487.155	8.51	2.46	.09	3487.25	.00	.97	2.36	2.500	.000	.00	1 .0
2.880	.0209					.0008	.00	1.66	.36	.64	.013	.00	.00	PIPE
9.474	3485.558	1.590	3487.147	8.51	2.58	.10	3487.25	.00	.97	2.41	2.500	.000	.00	1 .0
2.637	.0209					.0009	.00	1.59	.39	.64	.013	.00	.00	PIPE
12.111	3485.613	1.526	3487.139	8.51	2.71	.11	3487.25	.00	.97	2.44	2.500	.000	.00	1 .0
2.424	.0209					.0010	.00	1.53	.42	.64	.013	.00	.00	PIPE
14.535	3485.664	1.467	3487.130	8.51	2.84	.13	3487.26	.00	.97	2.46	2.500	.000	.00	1 .0
1.804	.0209					.0011	.00	1.47	.45	.64	.013	.00	.00	PIPE
16.339	3485.701	1.410	3487.112	8.51	2.98	.14	3487.25	.00	.97	2.48	2.500	.000	.00	1 .0
HYDRAULIC JUMP														
16.339	3485.701	.633	3486.334	8.51	8.71	1.18	3487.51	.00	.97	2.17	2.500	.000	.00	1 .0
30.180	.0209					.0218	.66	.63	2.29	.64	.013	.00	.00	PIPE
46.519	3486.332	.633	3486.964	8.51	8.71	1.18	3488.14	.00	.97	2.17	2.500	.000	.00	1 .0
38.743	.0209					.0234	.91	.63	2.29	.64	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLIGHT RANGE AVENUE TO FLEET WING AVENUE)
100-YEAR INTERIM CONTDITION

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	
85.262	3487.141	.612	3487.752	8.51	9.14	1.30	3489.05	.00	.97	2.15	2.500	.000	.00	1 .0
18.671	.0209					.0267	.50	.61	2.45	.64	.013	.00	.00	PIPE
103.932	3487.531	.592	3488.122	8.51	9.58	1.43	3489.55	.00	.97	2.13	2.500	.000	.00	1 .0
12.691	.0209					.0306	.39	.59	2.61	.64	.013	.00	.00	PIPE
116.624	3487.796	.572	3488.368	8.51	10.05	1.57	3489.94	.00	.97	2.10	2.500	.000	.00	1 .0
9.786	.0209					.0350	.34	.57	2.79	.64	.013	.00	.00	PIPE
126.410	3488.000	.553	3488.553	8.51	10.54	1.73	3490.28	.00	.97	2.08	2.500	.000	.00	1 .0
5.000	.0400					.0371	.19	.55	2.98	.54	.013	.00	.00	PIPE
131.410	3488.201	.555	3488.756	8.51	10.49	1.71	3490.47	.00	.97	2.08	2.500	.000	.00	1 .0
16.744	.0368					.0369	.62	.56	2.96	.56	.013	.00	.00	PIPE
148.154	3488.818	.555	3489.373	8.51	10.49	1.71	3491.08	.00	.97	2.08	2.500	.000	.00	1 .0
58.523	.0368					.0362	2.12	.56	2.96	.56	.013	.00	.00	PIPE
206.678	3490.974	.560	3491.534	8.51	10.36	1.67	3493.20	.00	.97	2.08	2.500	.000	.00	1 .0
37.321	.0368					.0333	1.24	.56	2.91	.56	.013	.00	.00	PIPE
243.999	3492.349	.579	3492.928	8.51	9.88	1.51	3494.44	.00	.97	2.11	2.500	.000	.00	1 .0
15.235	.0368					.0291	.44	.58	2.72	.56	.013	.00	.00	PIPE
259.234	3492.911	.599	3493.510	8.51	9.42	1.38	3494.89	.00	.97	2.13	2.500	.000	.00	1 .0
9.192	.0368					.0255	.23	.60	2.55	.56	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date: 3- 2-2021 Time: 9:51:43

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLIGHT RANGE AVENUE TO FLEET WING AVENUE)
100-YEAR INTERIM CONTDITION

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
268.426	3493.249	.620	3493.869	8.51	8.98	1.25	3495.12	.00	.97	2.16	2.500	.000	.00	1 .0
6.343	.0368					.0223	.14	.62	2.39	.56	.013	.00	.00	PIPE
274.769	3493.483	.641	3494.124	8.51	8.56	1.14	3495.26	.00	.97	2.18	2.500	.000	.00	1 .0
4.683	.0368					.0195	.09	.64	2.24	.56	.013	.00	.00	PIPE
279.452	3493.656	.663	3494.318	8.51	8.16	1.03	3495.35	.00	.97	2.21	2.500	.000	.00	1 .0
3.587	.0368					.0170	.06	.66	2.09	.56	.013	.00	.00	PIPE
283.038	3493.788	.686	3494.473	8.51	7.78	.94	3495.41	.00	.97	2.23	2.500	.000	.00	1 .0
2.812	.0368					.0149	.04	.69	1.96	.56	.013	.00	.00	PIPE
285.851	3493.891	.710	3494.601	8.51	7.42	.86	3495.46	.00	.97	2.25	2.500	.000	.00	1 .0
2.228	.0368					.0130	.03	.71	1.83	.56	.013	.00	.00	PIPE
288.079	3493.973	.734	3494.708	8.51	7.08	.78	3495.48	.00	.97	2.28	2.500	.000	.00	1 .0
1.772	.0368					.0114	.02	.73	1.72	.56	.013	.00	.00	PIPE
289.851	3494.038	.760	3494.798	8.51	6.75	.71	3495.50	.00	.97	2.30	2.500	.000	.00	1 .0
1.398	.0368					.0100	.01	.76	1.61	.56	.013	.00	.00	PIPE
291.249	3494.090	.787	3494.876	8.51	6.43	.64	3495.52	.00	.97	2.32	2.500	.000	.00	1 .0
1.096	.0368					.0088	.01	.79	1.50	.56	.013	.00	.00	PIPE
292.346	3494.130	.814	3494.944	8.51	6.13	.58	3495.53	.00	.97	2.34	2.500	.000	.00	1 .0
.832	.0368					.0077	.01	.81	1.40	.56	.013	.00	.00	PIPE

FILE: SCURRY-BEND-SOUTH_INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 4

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 2-2021 Time: 9:51:43

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLIGHT RANGE AVENUE TO FLEET WING AVENUE)
100-YEAR INTERIM CONTDITION

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	
293.178	3494.161	.843	3495.004	8.51	5.85	.53	3495.53	.00	.97	2.36	2.500	.000	.00	1 .0
.606	.0368					.0067	.00	.84	1.31	.56	.013	.00	.00	PIPE
293.784	3494.183	.873	3495.056	8.51	5.58	.48	3495.54	.00	.97	2.38	2.500	.000	.00	1 .0
.413	.0368					.0059	.00	.87	1.23	.56	.013	.00	.00	PIPE
294.197	3494.198	.904	3495.103	8.51	5.32	.44	3495.54	.00	.97	2.40	2.500	.000	.00	1 .0
.236	.0368					.0052	.00	.90	1.15	.56	.013	.00	.00	PIPE
294.433	3494.207	.937	3495.144	8.51	5.07	.40	3495.54	.00	.97	2.42	2.500	.000	.00	1 .0
.077	.0368					.0045	.00	.94	1.07	.56	.013	.00	.00	PIPE
294.510	3494.210	.971	3495.181	8.51	4.83	.36	3495.54	.00	.97	2.44	2.500	.000	.00	1 .0
JUNCT STR	.0400					.0021	.01	.97	1.00		.013	.00	.00	PIPE
297.010	3494.310	1.409	3495.719	.00	.00	.00	3495.72	.00	.01	2.48	2.500	.000	.00	1 .0
1.338	.0399					.0000	.00	1.41	.00	.01	.013	.00	.00	PIPE
298.348	3494.364	1.356	3495.719	.00	.00	.00	3495.72	.00	.01	2.49	2.500	.000	.00	1 .0
1.162	.0399					.0000	.00	1.36	.00	.01	.013	.00	.00	PIPE
299.510	3494.410	1.309	3495.719	.00	.00	.00	3495.72	.00	.01	2.50	2.500	.000	.00	1 .0

```
T1 SUMMERLIN WEST VILLAGE 25                                                0
T2 SCURRY BEND DR (FLIGHT RANGE AVENUE TO FLEET WING AVENUE)
T3 100-YEAR INTERIM CONTDITION
SO       .0003485.360  1                         3486.229
REM*****SCURRY BEND DRIVE SDMH#5
R     126.4103488.000  1      .013                                  .000    .000 0
R     131.4103488.200  1      .013                                  .000 -12.13  1
REM*****SCURRY BEND DRIVE SDMH#4
R     294.5103494.210  1      .013                                  .000    .000 0
JX    297.0103494.310  1  2  2.013    4.000    4.5103494.41 3494.41  81.0-90.0   .000
REM*****SCURRY BEND DRIVE SDMH#3
R     299.5103494.410  1      .013                                  .000    .000 0
SH    299.5103494.410  1                         3494.410
CD   1  4   1    .000   2.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
Q            0.001   .0
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FILE: SCURRY-BEND-SOUTH_ULT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-18-2021 Time: 4:57:53

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLIGHT RANGE AVENUE TO FLEET WING AVENUE)
100-YEAR INTERIM CONTDITION

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
.000	3485.360	.639	3486.000	8.51	8.59	1.15	3487.15	.00	.97	2.18	2.500	.000	.00	1 .0
46.519	.0209					.0214	1.00	.64	2.25	.64	.013	.00	.00	PIPE
46.519	3486.332	.633	3486.964	8.51	8.71	1.18	3488.14	.00	.97	2.17	2.500	.000	.00	1 .0
38.743	.0209					.0234	.91	.63	2.29	.64	.013	.00	.00	PIPE
85.262	3487.141	.612	3487.752	8.51	9.14	1.30	3489.05	.00	.97	2.15	2.500	.000	.00	1 .0
18.671	.0209					.0267	.50	.61	2.45	.64	.013	.00	.00	PIPE
103.932	3487.531	.592	3488.122	8.51	9.58	1.43	3489.55	.00	.97	2.13	2.500	.000	.00	1 .0
12.691	.0209					.0306	.39	.59	2.61	.64	.013	.00	.00	PIPE
116.624	3487.796	.572	3488.368	8.51	10.05	1.57	3489.94	.00	.97	2.10	2.500	.000	.00	1 .0
9.786	.0209					.0350	.34	.57	2.79	.64	.013	.00	.00	PIPE
126.410	3488.000	.553	3488.553	8.51	10.54	1.73	3490.28	.00	.97	2.08	2.500	.000	.00	1 .0
5.000	.0400					.0371	.19	.55	2.98	.54	.013	.00	.00	PIPE
131.410	3488.201	.555	3488.756	8.51	10.49	1.71	3490.47	.00	.97	2.08	2.500	.000	.00	1 .0
16.744	.0368					.0369	.62	.56	2.96	.56	.013	.00	.00	PIPE
148.154	3488.818	.555	3489.373	8.51	10.49	1.71	3491.08	.00	.97	2.08	2.500	.000	.00	1 .0
58.523	.0368					.0362	2.12	.56	2.96	.56	.013	.00	.00	PIPE
206.678	3490.974	.560	3491.534	8.51	10.36	1.67	3493.20	.00	.97	2.08	2.500	.000	.00	1 .0
37.321	.0368					.0333	1.24	.56	2.91	.56	.013	.00	.00	PIPE

FILE: SCURRY-BEND-SOUTH_ULT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 2

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-18-2021 Time: 4:57:53

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLIGHT RANGE AVENUE TO FLEET WING AVENUE)
100-YEAR INTERIM CONTDITION

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
243.999	3492.349	.579	3492.928	8.51	9.88	1.51	3494.44	.00	.97	2.11	2.500	.000	.00	1 .0
15.235	.0368					.0291	.44	.58	2.72	.56	.013	.00	.00	PIPE
259.234	3492.911	.599	3493.510	8.51	9.42	1.38	3494.89	.00	.97	2.13	2.500	.000	.00	1 .0
9.192	.0368					.0255	.23	.60	2.55	.56	.013	.00	.00	PIPE
268.426	3493.249	.620	3493.869	8.51	8.98	1.25	3495.12	.00	.97	2.16	2.500	.000	.00	1 .0
6.343	.0368					.0223	.14	.62	2.39	.56	.013	.00	.00	PIPE
274.769	3493.483	.641	3494.124	8.51	8.56	1.14	3495.26	.00	.97	2.18	2.500	.000	.00	1 .0
4.683	.0368					.0195	.09	.64	2.24	.56	.013	.00	.00	PIPE
279.452	3493.656	.663	3494.318	8.51	8.16	1.03	3495.35	.00	.97	2.21	2.500	.000	.00	1 .0
3.587	.0368					.0170	.06	.66	2.09	.56	.013	.00	.00	PIPE
283.038	3493.788	.686	3494.473	8.51	7.78	.94	3495.41	.00	.97	2.23	2.500	.000	.00	1 .0
2.812	.0368					.0149	.04	.69	1.96	.56	.013	.00	.00	PIPE
285.851	3493.891	.710	3494.601	8.51	7.42	.86	3495.46	.00	.97	2.25	2.500	.000	.00	1 .0
2.228	.0368					.0130	.03	.71	1.83	.56	.013	.00	.00	PIPE
288.079	3493.973	.734	3494.708	8.51	7.08	.78	3495.48	.00	.97	2.28	2.500	.000	.00	1 .0
1.772	.0368					.0114	.02	.73	1.72	.56	.013	.00	.00	PIPE
289.851	3494.038	.760	3494.798	8.51	6.75	.71	3495.50	.00	.97	2.30	2.500	.000	.00	1 .0
1.398	.0368					.0100	.01	.76	1.61	.56	.013	.00	.00	PIPE

FILE: SCURRY-BEND-SOUTH_ULT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 3

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-18-2021 Time: 4:57:53

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLIGHT RANGE AVENUE TO FLEET WING AVENUE)
100-YEAR INTERIM CONTDITION

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	
291.249	3494.090	.787	3494.876	8.51	6.43	.64	3495.52	.00	.97	2.32	2.500	.000	.00	1 .0
1.096	.0368					.0088	.01	.79	1.50	.56	.013	.00	.00	PIPE
292.346	3494.130	.814	3494.944	8.51	6.13	.58	3495.53	.00	.97	2.34	2.500	.000	.00	1 .0
.832	.0368					.0077	.01	.81	1.40	.56	.013	.00	.00	PIPE
293.178	3494.161	.843	3495.004	8.51	5.85	.53	3495.53	.00	.97	2.36	2.500	.000	.00	1 .0
.606	.0368					.0067	.00	.84	1.31	.56	.013	.00	.00	PIPE
293.784	3494.183	.873	3495.056	8.51	5.58	.48	3495.54	.00	.97	2.38	2.500	.000	.00	1 .0
.413	.0368					.0059	.00	.87	1.23	.56	.013	.00	.00	PIPE
294.197	3494.198	.904	3495.103	8.51	5.32	.44	3495.54	.00	.97	2.40	2.500	.000	.00	1 .0
.236	.0368					.0052	.00	.90	1.15	.56	.013	.00	.00	PIPE
294.433	3494.207	.937	3495.144	8.51	5.07	.40	3495.54	.00	.97	2.42	2.500	.000	.00	1 .0
.077	.0368					.0045	.00	.94	1.07	.56	.013	.00	.00	PIPE
294.510	3494.210	.971	3495.181	8.51	4.83	.36	3495.54	.00	.97	2.44	2.500	.000	.00	1 .0
JUNCT STR	.0400					.0021	.01	.97	1.00		.013	.00	.00	PIPE
297.010	3494.310	1.409	3495.719	.00	.00	.00	3495.72	.00	.01	2.48	2.500	.000	.00	1 .0
1.338	.0399					.0000	.00	1.41	.00	.01	.013	.00	.00	PIPE
298.348	3494.364	1.356	3495.719	.00	.00	.00	3495.72	.00	.01	2.49	2.500	.000	.00	1 .0
1.162	.0399					.0000	.00	1.36	.00	.01	.013	.00	.00	PIPE

FILE: SCURRY-BEND-SOUTH_ULT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 4

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-18-2021 Time: 4:57:53

SUMMERLIN WEST VILLAGE 25

SCURRY BEND DR (FLIGHT RANGE AVENUE TO FLEET WING AVENUE)

100-YEAR INTERIM CONTDITION

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
299.510	3494.410	1.309	3495.719	.00	.00	.00	3495.72	.00	.01	2.50	2.500	.000	.00	1 .0

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T1 SUMMERLIN WEST VILLAGE 25                                                0
T2 SCURRY BEND DRIVE LATERAL FROM SDMH3 EAST TO SDDI#3
T3 ATKINS / INTERIM CONDITIONS
SO    299.5103494.410  1                          3495.719
R     365.7803495.180  2      .013                                .000   0.000 0
REM     LATERAL FROM SDDI#3
SH    365.7803495.180  2                          3495.180
CD   1  4   1    .000   2.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
Q             4.000   .0
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FILE: SCURRY-BEND-LATERAL-MH3E-INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-17-2021 Time: 5:23:15

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE LATERAL FROM SDMH3 EAST TO SDDI#3
ATKINS / INTERIM CONDITIONS

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	
299.510	3494.410	1.309	3495.719	4.00	1.84	.05	3495.77	.00	.70	1.90	2.000	.000	.00	1 .0
4.311	.0116					.0006	.00	1.31	.30	.55	.013	.00	.00	PIPE
303.821	3494.460	1.256	3495.716	4.00	1.93	.06	3495.77	.00	.70	1.93	2.000	.000	.00	1 .0
4.003	.0116					.0006	.00	1.26	.33	.55	.013	.00	.00	PIPE
307.825	3494.507	1.207	3495.713	4.00	2.02	.06	3495.78	.00	.70	1.96	2.000	.000	.00	1 .0
3.724	.0116					.0007	.00	1.21	.35	.55	.013	.00	.00	PIPE
311.549	3494.550	1.160	3495.709	4.00	2.12	.07	3495.78	.00	.70	1.97	2.000	.000	.00	1 .0
3.467	.0116					.0008	.00	1.16	.38	.55	.013	.00	.00	PIPE
315.015	3494.590	1.115	3495.705	4.00	2.22	.08	3495.78	.00	.70	1.99	2.000	.000	.00	1 .0
3.222	.0116					.0009	.00	1.12	.41	.55	.013	.00	.00	PIPE
318.237	3494.627	1.073	3495.700	4.00	2.33	.08	3495.78	.00	.70	1.99	2.000	.000	.00	1 .0
2.988	.0116					.0011	.00	1.07	.44	.55	.013	.00	.00	PIPE
321.225	3494.662	1.033	3495.695	4.00	2.44	.09	3495.79	.00	.70	2.00	2.000	.000	.00	1 .0
2.766	.0116					.0012	.00	1.03	.48	.55	.013	.00	.00	PIPE
323.991	3494.694	.995	3495.689	4.00	2.56	.10	3495.79	.00	.70	2.00	2.000	.000	.00	1 .0
2.544	.0116					.0014	.00	1.00	.51	.55	.013	.00	.00	PIPE
326.535	3494.724	.959	3495.683	4.00	2.69	.11	3495.79	.00	.70	2.00	2.000	.000	.00	1 .0
2.331	.0116					.0015	.00	.96	.55	.55	.013	.00	.00	PIPE

FILE: SCURRY-BEND-LATERAL-MH3E-INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 2

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-17-2021 Time: 5:23:15

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE LATERAL FROM SDMH3 EAST TO SDDI#3
ATKINS / INTERIM CONDITIONS

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
328.866	3494.751	.924	3495.675	4.00	2.82	.12	3495.80	.00	.70	1.99	2.000	.000	.00	1 .0
2.115	.0116					.0018	.00	.92	.59	.55	.013	.00	.00	PIPE
330.980	3494.776	.891	3495.667	4.00	2.96	.14	3495.80	.00	.70	1.99	2.000	.000	.00	1 .0
1.478	.0116					.0020	.00	.89	.63	.55	.013	.00	.00	PIPE
332.459	3494.793	.859	3495.652	4.00	3.10	.15	3495.80	.00	.70	1.98	2.000	.000	.00	1 .0
HYDRAULIC JUMP														
332.459	3494.793	.550	3495.343	4.00	5.70	.50	3495.85	.00	.70	1.79	2.000	.000	.00	1 .0
12.820	.0116					.0107	.14	.55	1.60	.55	.013	.00	.00	PIPE
345.279	3494.942	.569	3495.511	4.00	5.43	.46	3495.97	.00	.70	1.80	2.000	.000	.00	1 .0
9.670	.0116					.0094	.09	.57	1.50	.55	.013	.00	.00	PIPE
354.949	3495.054	.589	3495.643	4.00	5.18	.42	3496.06	.00	.70	1.82	2.000	.000	.00	1 .0
5.076	.0116					.0082	.04	.59	1.40	.55	.013	.00	.00	PIPE
360.025	3495.113	.610	3495.723	4.00	4.94	.38	3496.10	.00	.70	1.84	2.000	.000	.00	1 .0
2.928	.0116					.0072	.02	.61	1.31	.55	.013	.00	.00	PIPE
362.953	3495.147	.631	3495.778	4.00	4.71	.34	3496.12	.00	.70	1.86	2.000	.000	.00	1 .0
1.700	.0116					.0063	.01	.63	1.23	.55	.013	.00	.00	PIPE
364.653	3495.167	.653	3495.820	4.00	4.49	.31	3496.13	.00	.70	1.88	2.000	.000	.00	1 .0
.870	.0116					.0055	.00	.65	1.15	.55	.013	.00	.00	PIPE

FILE: SCURRY-BEND-LATERAL-MH3E-INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 3

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-17-2021 Time: 5:23:15

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE LATERAL FROM SDMH3 EAST TO SDDI#3
ATKINS / INTERIM CONDITIONS

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	
365.524	3495.177	.676	3495.853	4.00	4.28	.28	3496.14	.00	.70	1.89	2.000	.000	.00	1 .0
.256	.0116					.0048	.00	.68	1.07	.55	.013	.00	.00	PIPE
365.780	3495.180	.701	3495.881	4.00	4.07	.26	3496.14	.00	.70	1.91	2.000	.000	.00	1 .0

```
T1 SUMMERLIN WEST VILLAGE 25                                                0
T2 SCURRY BEND DRIVE LATERAL FROM SDMH3 WEST TO SDDI#2
T3 ATKINS / INTERIM CONDITIONS
SO    299.5103494.410  1                          3495.719
R     311.3703494.600  2      .013                                .000   0.000 0
REM     LATERAL FROM SDDI#2
SH    311.3703494.600  2                          3494.600
CD   1  4   1    .000   2.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
Q             4.510   .0
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FILE: SCURRY-BEND-LATERAL-MH3W-INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-17-2021 Time: 5:23:30

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE LATERAL FROM SDMH3 WEST TO SDDI#2
ATKINS / INTERIM CONDITIONS

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	
299.510	3494.410	1.309	3495.719	4.51	2.07	.07	3495.79	.00	.75	1.90	2.000	.000	.00	1 .0
3.019	.0160					.0007	.00	1.31	.34	.54	.013	.00	.00	PIPE
302.529	3494.458	1.256	3495.714	4.51	2.17	.07	3495.79	.00	.75	1.93	2.000	.000	.00	1 .0
2.785	.0160					.0008	.00	1.26	.37	.54	.013	.00	.00	PIPE
305.313	3494.503	1.207	3495.709	4.51	2.28	.08	3495.79	.00	.75	1.96	2.000	.000	.00	1 .0
2.571	.0160					.0009	.00	1.21	.40	.54	.013	.00	.00	PIPE
307.884	3494.544	1.160	3495.704	4.51	2.39	.09	3495.79	.00	.75	1.97	2.000	.000	.00	1 .0
2.371	.0160					.0010	.00	1.16	.43	.54	.013	.00	.00	PIPE
310.255	3494.582	1.115	3495.698	4.51	2.50	.10	3495.79	.00	.75	1.99	2.000	.000	.00	1 .0
1.115	.0160					.0011	.00	1.12	.46	.54	.013	.00	.00	PIPE
311.370	3494.600	1.094	3495.694	4.51	2.56	.10	3495.80	.00	.75	1.99	2.000	.000	.00	1 .0

C.3.3 Fleet Wing Avenue to Lake Mead Boulevard Models

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
T3 100-YEAR INTERIM CONTDITION
SO       .0003405.720  1                          3406.715
REM*****CONNECTON TO KETTLE RIDGE DRIVE MAINLINE 6'X10' RCB
R      26.9003410.630  1      .013                                  .000 -13.655 0
R      27.9003410.746  1      .013                                  .000 -13.500 0
R      29.9003410.862  1      .013                                  .000 -13.500 0
R      31.9003410.920  1      .013                                  .000    .000 1
REM*****FLEET WING DRIVE (DFD-KRD) SDMH#8
R      48.5003411.840  1      .013                                  .000    .000 0
REM*****POINT OF CONNECTION TO STUB
R     148.1903416.760  1      .013                                  .000    .000 0
R     154.1903416.960  1      .013                                  .000    .000 1
REM*****FLEET WING AVENUE SDMH#1
R     511.5203444.910  1      .013                                  .000  -3.709 0
R     516.5203445.110  1      .013                                  .000    .000 1
REM*****FLEET WING AVENUE SDMH#2
R     653.6403456.500  1      .013                                  .000    .000 0
JX    656.1403456.600  1  2  2.013    3.65     2.75 3456.70 3456.70  72.7-45.2    .000
REM*****FLEET WING AVENUE SDDI#1 & SDDI#2
R     658.6403456.700  1      .013                                  .000  -2.413 1
REM*****FLEET WING AVENUE SDMH#3
R     769.1903465.550  1      .013                                  .000    .000 0
R     774.1903465.750  1      .013                                  .000    .843 1
REM*****FLEET WING AVENUE SDMH#4
R     995.9803480.950  1      .013                                  .000    .000 0
JX    998.4803481.050  1  2  2.013    8.49     7.93 3481.15 3481.15  72.1-45.2    .000
REM*****FLEET WING AVENUE SDDI#3 & SDDI#4
R    1000.9803481.150  1      .013                                  .000    .000 1
REM*****FLEET WING AVENUE SDMH#5
SH   1000.9803481.150  1                          3481.150
CD   1  4   1    .000   4.000     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
Q           265.000   .0
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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 1-2021 Time: 6:26:41

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
100-YEAR INTERIM CONTDITION

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	
.000	3405.720	2.483	3408.203	287.82	35.12	19.16	3427.36	.00	3.96	3.88	4.000	.000	.00	1 .0
13.874	.1825					.0762	1.06	2.48	4.26	1.93	.013	.00	.00	PIPE
13.874	3408.252	2.575	3410.827	287.82	33.66	17.60	3428.42	.00	3.96	3.83	4.000	.000	.00	1 .0
13.026	.1825					.0682	.89	2.57	3.97	1.93	.013	.00	.00	PIPE
26.900	3410.630	2.685	3413.314	287.82	32.10	16.00	3429.31	.00	3.96	3.76	4.000	.000	.00	1 .0
1.000	.1162					.0640	.06	2.68	3.66	2.20	.013	.00	.00	PIPE
27.900	3410.746	2.688	3413.435	287.82	32.05	15.95	3429.38	.00	3.96	3.76	4.000	.000	.00	1 .0
2.000	.0580					.0639	.13	2.69	3.65	2.79	.013	.00	.00	PIPE
29.900	3410.862	2.687	3413.550	287.82	32.06	15.96	3429.51	.00	3.96	3.76	4.000	.000	.00	1 .0
2.000	.0289					.0641	.13	2.69	3.65	4.00	.013	.00	.00	PIPE
31.900	3410.920	2.682	3413.602	287.82	32.14	16.04	3429.64	.00	3.96	3.76	4.000	.000	.00	1 .0
16.600	.0554					.0647	1.07	2.68	3.67	2.84	.013	.00	.00	PIPE
48.500	3411.840	2.669	3414.510	287.82	32.30	16.20	3430.71	.00	3.96	3.77	4.000	.000	.00	1 .0
31.358	.0494					.0666	2.09	2.67	3.70	2.97	.013	.00	.00	PIPE
79.858	3413.388	2.628	3416.016	287.82	32.88	16.79	3432.80	.00	3.96	3.80	4.000	.000	.00	1 .0
68.332	.0494					.0724	4.94	2.63	3.82	2.97	.013	.00	.00	PIPE
148.190	3416.760	2.522	3419.282	287.82	34.48	18.47	3437.75	.00	3.96	3.86	4.000	.000	.00	1 .0
6.000	.0333					.0774	.46	2.52	4.13	4.00	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 1-2021 Time: 6:26:41

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
100-YEAR INTERIM CONTDITION

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	
154.190	3416.960	2.505	3419.465	287.82	34.75	18.75	3438.21	.00	3.96	3.87	4.000	.000	.00	1 .0
357.330	.0782					.0749	26.77	2.51	4.19	2.50	.013	.00	.00	PIPE
511.520	3444.910	2.581	3447.491	287.82	33.57	17.50	3464.99	.00	3.96	3.83	4.000	.000	.00	1 .0
5.000	.0400					.0721	.36	2.58	3.95	3.28	.013	.00	.00	PIPE
516.520	3445.110	2.569	3447.679	287.82	33.75	17.68	3465.36	.00	3.96	3.83	4.000	.000	.00	1 .0
59.088	.0831					.0706	4.17	2.57	3.99	2.45	.013	.00	.00	PIPE
575.608	3450.018	2.621	3452.639	287.82	32.99	16.90	3469.54	.00	3.96	3.80	4.000	.000	.00	1 .0
78.032	.0831					.0648	5.06	2.62	3.84	2.45	.013	.00	.00	PIPE
653.640	3456.500	2.734	3459.234	287.82	31.45	15.36	3474.60	.00	3.96	3.72	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0635	.16	2.73	3.53		.013	.00	.00	PIPE
656.140	3456.600	2.615	3459.215	281.42	32.34	16.24	3475.45	.00	3.96	3.81	4.000	.000	.00	1 .0
2.500	.0399					.0662	.17	2.61	3.77	3.21	.013	.00	.00	PIPE
658.640	3456.700	2.609	3459.309	281.42	32.42	16.32	3475.63	.00	3.96	3.81	4.000	.000	.00	1 .0
49.989	.0801					.0643	3.21	2.61	3.78	2.45	.013	.00	.00	PIPE
708.629	3460.702	2.671	3463.373	281.42	31.56	15.47	3478.84	.00	3.96	3.77	4.000	.000	.00	1 .0
60.561	.0801					.0588	3.56	2.67	3.62	2.45	.013	.00	.00	PIPE
769.190	3465.550	2.788	3468.338	281.42	30.09	14.06	3482.40	.00	3.96	3.68	4.000	.000	.00	1 .0
5.000	.0400					.0556	.28	2.79	3.32	3.21	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 1-2021 Time: 6:26:41

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
100-YEAR INTERIM CONTDITION

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	
774.190	3465.750	2.780	3468.530	281.42	30.19	14.15	3482.68	.00	3.96	3.68	4.000	.000	.00	1 .0
20.615	.0685					.0551	1.14	2.78	3.34	2.58	.013	.00	.00	PIPE
794.805	3467.163	2.808	3469.970	281.42	29.86	13.85	3483.82	.00	3.96	3.66	4.000	.000	.00	1 .0
66.328	.0685					.0515	3.41	2.81	3.28	2.58	.013	.00	.00	PIPE
861.132	3471.708	2.936	3474.644	281.42	28.47	12.59	3487.23	.00	3.96	3.54	4.000	.000	.00	1 .0
44.838	.0685					.0461	2.07	2.94	3.00	2.58	.013	.00	.00	PIPE
905.970	3474.781	3.075	3477.856	281.42	27.15	11.44	3489.30	.00	3.96	3.37	4.000	.000	.00	1 .0
32.816	.0685					.0416	1.36	3.08	2.73	2.58	.013	.00	.00	PIPE
938.786	3477.030	3.230	3480.260	281.42	25.88	10.40	3490.66	.00	3.96	3.15	4.000	.000	.00	1 .0
24.989	.0685					.0377	.94	3.23	2.46	2.58	.013	.00	.00	PIPE
963.775	3478.743	3.407	3482.149	281.42	24.68	9.46	3491.61	.00	3.96	2.84	4.000	.000	.00	1 .0
19.186	.0685					.0348	.67	3.41	2.17	2.58	.013	.00	.00	PIPE
982.961	3480.058	3.620	3483.677	281.42	23.53	8.60	3492.28	.00	3.96	2.35	4.000	.000	.00	1 .0
13.019	.0685					.0345	.45	3.62	1.84	2.58	.013	.00	.00	PIPE
995.980	3480.950	3.959	3484.909	281.42	22.43	7.82	3492.72	.00	3.96	.81	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0347	.09	3.96	1.00		.013	.00	.00	PIPE
998.480	3481.050	5.687	3486.737	265.00	21.09	6.91	3493.64	.00	3.95	.00	4.000	.000	.00	1 .0
2.500	.0399					.0340	.09	5.69	.00	3.03	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 1-2021 Time: 6:26:41

SUMMERLIN WEST VILLAGE 22
FLEET WING AVENUE (KETTLE RIDGE DRIVE TO SCURRY BEND DRIVE)
100-YEAR INTERIM CONTDITION

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
1000.980	3481.150	6.017	3487.167	265.00	21.09	6.91	3494.07	.00	3.95	.00	4.000	.000	.00	1 .0

```
T1 SUMMERLIN WEST VILLAGE 25                                                0
T2 SCURRY BEND DR (FLEETWING AVENUE TO LAKE MEAD)
T3 100-YEAR INTERIM CONTDITION
SO       .0003485.360  1                          3487.167
REM*****SCURRY BEND DRIVE SDMH#5
R     170.7203489.000  1      .013                                  .000    .000 0
R     175.7203489.200  1      .013                                  .000   7.43 1
REM*****SCURRY BEND DRIVE SDMH#6
R     582.3903500.020  1      .013                                  .000    .000 0
JX    584.8903500.120  1  2  2.013    4.000    4.0003500.22 3500.22  56.2-90.0   .000
REM*****SCURRY BEND DRIVE SDMH#7
R     587.3903500.220  1      .013                                  .000    .000 0
SH    587.3903500.220  1                          3500.000
CD   1  4   1    .000   2.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
Q            0.001   .0
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FILE: SCURRY-BEND-NORTH_INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 2-2021 Time: 9:52:42

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLEETWING AVENUE TO LAKE MEAD)
100-YEAR INTERIM CONTDITION

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	
.000	3485.360	1.807	3487.167	8.00	2.11	.07	3487.24	.00	.94	2.24	2.500	.000	.00	1 .0
3.410	.0213					.0005	.00	1.81	.28	.62	.013	.00	.00	PIPE
3.410	3485.433	1.729	3487.162	8.00	2.21	.08	3487.24	.00	.94	2.31	2.500	.000	.00	1 .0
3.113	.0213					.0006	.00	1.73	.31	.62	.013	.00	.00	PIPE
6.523	3485.499	1.657	3487.156	8.00	2.32	.08	3487.24	.00	.94	2.36	2.500	.000	.00	1 .0
2.860	.0213					.0007	.00	1.66	.34	.62	.013	.00	.00	PIPE
9.383	3485.560	1.590	3487.150	8.00	2.43	.09	3487.24	.00	.94	2.41	2.500	.000	.00	1 .0
2.627	.0213					.0008	.00	1.59	.37	.62	.013	.00	.00	PIPE
12.010	3485.616	1.526	3487.143	8.00	2.55	.10	3487.24	.00	.94	2.44	2.500	.000	.00	1 .0
2.424	.0213					.0009	.00	1.53	.40	.62	.013	.00	.00	PIPE
14.434	3485.668	1.467	3487.135	8.00	2.67	.11	3487.25	.00	.94	2.46	2.500	.000	.00	1 .0
2.221	.0213					.0010	.00	1.47	.43	.62	.013	.00	.00	PIPE
16.655	3485.715	1.410	3487.126	8.00	2.80	.12	3487.25	.00	.94	2.48	2.500	.000	.00	1 .0
1.366	.0213					.0011	.00	1.41	.46	.62	.013	.00	.00	PIPE
18.021	3485.744	1.357	3487.101	8.00	2.94	.13	3487.24	.00	.94	2.49	2.500	.000	.00	1 .0
HYDRAULIC JUMP														
18.021	3485.744	.617	3486.362	8.00	8.49	1.12	3487.48	.00	.94	2.16	2.500	.000	.00	1 .0
30.177	.0213					.0213	.64	.62	2.26	.62	.013	.00	.00	PIPE

FILE: SCURRY-BEND-NORTH_INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 2

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 2-2021 Time: 9:52:42

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLEETWING AVENUE TO LAKE MEAD)
100-YEAR INTERIM CONTDITION

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	
48.198	3486.388	.617	3487.005	8.00	8.49	1.12	3488.12	.00	.94	2.16	2.500	.000	.00	1 .0
59.890	.0213				.0216	1.29	.62	2.26	.62	.013	.00	.00	PIPE	
108.088	3487.665	.613	3488.277	8.00	8.57	1.14	3489.42	.00	.94	2.15	2.500	.000	.00	1 .0
43.485	.0213				.0235	1.02	.61	2.29	.62	.013	.00	.00	PIPE	
151.573	3488.592	.593	3489.184	8.00	8.99	1.25	3490.44	.00	.94	2.13	2.500	.000	.00	1 .0
19.147	.0213				.0269	.51	.59	2.45	.62	.013	.00	.00	PIPE	
170.720	3489.000	.573	3489.573	8.00	9.43	1.38	3490.95	.00	.94	2.10	2.500	.000	.00	1 .0
5.000	.0400				.0276	.14	.57	2.61	.53	.013	.00	.00	PIPE	
175.720	3489.200	.584	3489.784	8.00	9.18	1.31	3491.09	.00	.94	2.12	2.500	.000	.00	1 .0
290.335	.0266				.0266	7.73	.58	2.52	.58	.013	.00	.00	PIPE	
466.055	3496.925	.584	3497.509	8.00	9.18	1.31	3498.82	.00	.94	2.12	2.500	.000	.00	1 .0
59.248	.0266				.0252	1.49	.58	2.52	.58	.013	.00	.00	PIPE	
525.303	3498.501	.601	3499.102	8.00	8.82	1.21	3500.31	.00	.94	2.14	2.500	.000	.00	1 .0
20.365	.0266				.0222	.45	.60	2.38	.58	.013	.00	.00	PIPE	
545.668	3499.043	.621	3499.665	8.00	8.40	1.10	3500.76	.00	.94	2.16	2.500	.000	.00	1 .0
10.933	.0266				.0194	.21	.62	2.23	.58	.013	.00	.00	PIPE	
556.601	3499.334	.643	3499.977	8.00	8.01	1.00	3500.97	.00	.94	2.19	2.500	.000	.00	1 .0
7.141	.0266				.0170	.12	.64	2.09	.58	.013	.00	.00	PIPE	

FILE: SCURRY-BEND-NORTH_INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 3

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 2-2021 Time: 9:52:42

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLEETWING AVENUE TO LAKE MEAD)
100-YEAR INTERIM CONTDITION

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	
563.742	3499.524	.665	3500.189	8.00	7.64	.91	3501.10	.00	.94	2.21	2.500	.000	.00	1 .0
5.057	.0266					.0149	.08	.66	1.96	.58	.013	.00	.00	PIPE
568.799	3499.658	.688	3500.346	8.00	7.29	.82	3501.17	.00	.94	2.23	2.500	.000	.00	1 .0
3.762	.0266					.0130	.05	.69	1.83	.58	.013	.00	.00	PIPE
572.562	3499.759	.712	3500.470	8.00	6.95	.75	3501.22	.00	.94	2.26	2.500	.000	.00	1 .0
2.847	.0266					.0114	.03	.71	1.71	.58	.013	.00	.00	PIPE
575.408	3499.834	.737	3500.571	8.00	6.62	.68	3501.25	.00	.94	2.28	2.500	.000	.00	1 .0
2.172	.0266					.0100	.02	.74	1.60	.58	.013	.00	.00	PIPE
577.580	3499.892	.762	3500.655	8.00	6.31	.62	3501.27	.00	.94	2.30	2.500	.000	.00	1 .0
1.655	.0266					.0087	.01	.76	1.50	.58	.013	.00	.00	PIPE
579.235	3499.936	.789	3500.725	8.00	6.02	.56	3501.29	.00	.94	2.32	2.500	.000	.00	1 .0
1.233	.0266					.0076	.01	.79	1.40	.58	.013	.00	.00	PIPE
580.468	3499.969	.817	3500.786	8.00	5.74	.51	3501.30	.00	.94	2.35	2.500	.000	.00	1 .0
.885	.0266					.0067	.01	.82	1.31	.58	.013	.00	.00	PIPE
581.353	3499.992	.846	3500.838	8.00	5.47	.47	3501.30	.00	.94	2.37	2.500	.000	.00	1 .0
.593	.0266					.0059	.00	.85	1.23	.58	.013	.00	.00	PIPE
581.946	3500.008	.876	3500.884	8.00	5.22	.42	3501.31	.00	.94	2.39	2.500	.000	.00	1 .0
.338	.0266					.0051	.00	.88	1.15	.58	.013	.00	.00	PIPE

FILE: SCURRY-BEND-NORTH_INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 4

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 3- 2-2021 Time: 9:52:42

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLEETWING AVENUE TO LAKE MEAD)
100-YEAR INTERIM CONTDITION

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	
582.284	3500.017	.907	3500.924	8.00	4.98	.38	3501.31	.00	.94	2.40	2.500	.000	.00	1 .0
.106	.0266					.0045	.00	.91	1.07	.58	.013	.00	.00	PIPE
582.390	3500.020	.941	3500.961	8.00	4.74	.35	3501.31	.00	.94	2.42	2.500	.000	.00	1 .0
JUNCT STR	.0400					.0021	.01	.94	1.00		.013	.00	.00	PIPE
584.890	3500.120	1.310	3501.430	.00	.00	.00	3501.43	.00	.01	2.50	2.500	.000	.00	1 .0
1.214	.0399					.0000	.00	1.31	.00	.01	.013	.00	.00	PIPE
586.104	3500.169	1.261	3501.430	.00	.00	.00	3501.43	.00	.01	2.50	2.500	.000	.00	1 .0
1.159	.0399					.0000	.00	1.26	.00	.01	.013	.00	.00	PIPE
587.263	3500.215	1.215	3501.430	.00	.00	.00	3501.43	.00	.01	2.50	2.500	.000	.00	1 .0
.127	.0399					.0000	.00	1.21	.00	.01	.013	.00	.00	PIPE
587.390	3500.220	1.210	3501.430	.00	.00	.00	3501.43	.00	.01	2.50	2.500	.000	.00	1 .0

```
T1 SUMMERLIN WEST VILLAGE 25                                                0
T2 SCURRY BEND DR (FLEETWING AVENUE TO LAKE MEAD)
T3 100-YEAR INTERIM CONTDITION
SO       .0003485.360  1                         3486.229
REM*****SCURRY BEND DRIVE SDMH#5
R     170.7203489.000  1      .013                                  .000    .000 0
R     175.7203489.200  1      .013                                  .000   7.43 1
REM*****SCURRY BEND DRIVE SDMH#6
R     582.3903500.020  1      .013                                  .000    .000 0
JX    584.8903500.120  1  2  2.013    4.000    4.0003500.22 3500.22  56.2-90.0   .000
REM*****SCURRY BEND DRIVE SDMH#7
R     587.3903500.220  1      .013                                  .000    .000 0
SH    587.3903500.220  1                         3500.000
CD   1  4   1    .000   2.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
Q            0.001   .0
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FILE: SCURRY-BEND-NORTH_ULT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-18-2021 Time: 4:57: 7

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLEETWING AVENUE TO LAKE MEAD)
100-YEAR INTERIM CONTDITION

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	
.000	3485.360	.617	3485.977	8.00	8.49	1.12	3487.10	.00	.94	2.16	2.500	.000	.00	1 .0
48.198	.0213				.0213	1.03	.62	2.26	.62	.013	.00	.00	PIPE	
48.198	3486.388	.617	3487.005	8.00	8.49	1.12	3488.12	.00	.94	2.16	2.500	.000	.00	1 .0
59.890	.0213				.0216	1.29	.62	2.26	.62	.013	.00	.00	PIPE	
108.088	3487.665	.613	3488.277	8.00	8.57	1.14	3489.42	.00	.94	2.15	2.500	.000	.00	1 .0
43.485	.0213				.0235	1.02	.61	2.29	.62	.013	.00	.00	PIPE	
151.573	3488.592	.593	3489.184	8.00	8.99	1.25	3490.44	.00	.94	2.13	2.500	.000	.00	1 .0
19.147	.0213				.0269	.51	.59	2.45	.62	.013	.00	.00	PIPE	
170.720	3489.000	.573	3489.573	8.00	9.43	1.38	3490.95	.00	.94	2.10	2.500	.000	.00	1 .0
5.000	.0400				.0276	.14	.57	2.61	.53	.013	.00	.00	PIPE	
175.720	3489.200	.584	3489.784	8.00	9.18	1.31	3491.09	.00	.94	2.12	2.500	.000	.00	1 .0
290.335	.0266				.0266	7.73	.58	2.52	.58	.013	.00	.00	PIPE	
466.055	3496.925	.584	3497.509	8.00	9.18	1.31	3498.82	.00	.94	2.12	2.500	.000	.00	1 .0
59.248	.0266				.0252	1.49	.58	2.52	.58	.013	.00	.00	PIPE	
525.303	3498.501	.601	3499.102	8.00	8.82	1.21	3500.31	.00	.94	2.14	2.500	.000	.00	1 .0
20.365	.0266				.0222	.45	.60	2.38	.58	.013	.00	.00	PIPE	
545.668	3499.043	.621	3499.665	8.00	8.40	1.10	3500.76	.00	.94	2.16	2.500	.000	.00	1 .0
10.933	.0266				.0194	.21	.62	2.23	.58	.013	.00	.00	PIPE	

FILE: SCURRY-BEND-NORTH_ULT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 2

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-18-2021 Time: 4:57: 7

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLEETWING AVENUE TO LAKE MEAD)
100-YEAR INTERIM CONTDITION

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	
556.601	3499.334	.643	3499.977	8.00	8.01	1.00	3500.97	.00	.94	2.19	2.500	.000	.00	1 .0
7.141	.0266					.0170	.12	.64	2.09	.58	.013	.00	.00	PIPE
563.742	3499.524	.665	3500.189	8.00	7.64	.91	3501.10	.00	.94	2.21	2.500	.000	.00	1 .0
5.057	.0266					.0149	.08	.66	1.96	.58	.013	.00	.00	PIPE
568.799	3499.658	.688	3500.346	8.00	7.29	.82	3501.17	.00	.94	2.23	2.500	.000	.00	1 .0
3.762	.0266					.0130	.05	.69	1.83	.58	.013	.00	.00	PIPE
572.562	3499.759	.712	3500.470	8.00	6.95	.75	3501.22	.00	.94	2.26	2.500	.000	.00	1 .0
2.847	.0266					.0114	.03	.71	1.71	.58	.013	.00	.00	PIPE
575.408	3499.834	.737	3500.571	8.00	6.62	.68	3501.25	.00	.94	2.28	2.500	.000	.00	1 .0
2.172	.0266					.0100	.02	.74	1.60	.58	.013	.00	.00	PIPE
577.580	3499.892	.762	3500.655	8.00	6.31	.62	3501.27	.00	.94	2.30	2.500	.000	.00	1 .0
1.655	.0266					.0087	.01	.76	1.50	.58	.013	.00	.00	PIPE
579.235	3499.936	.789	3500.725	8.00	6.02	.56	3501.29	.00	.94	2.32	2.500	.000	.00	1 .0
1.233	.0266					.0076	.01	.79	1.40	.58	.013	.00	.00	PIPE
580.468	3499.969	.817	3500.786	8.00	5.74	.51	3501.30	.00	.94	2.35	2.500	.000	.00	1 .0
.885	.0266					.0067	.01	.82	1.31	.58	.013	.00	.00	PIPE
581.353	3499.992	.846	3500.838	8.00	5.47	.47	3501.30	.00	.94	2.37	2.500	.000	.00	1 .0
.593	.0266					.0059	.00	.85	1.23	.58	.013	.00	.00	PIPE

FILE: SCURRY-BEND-NORTH_ULT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 3

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-18-2021 Time: 4:57: 7

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DR (FLEETWING AVENUE TO LAKE MEAD)
100-YEAR INTERIM CONTDITION

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	
581.946	3500.008	.876	3500.884	8.00	5.22	.42	3501.31	.00	.94	2.39	2.500	.000	.00	1 .0
.338	.0266					.0051	.00	.88	1.15	.58	.013	.00	.00	PIPE
582.284	3500.017	.907	3500.924	8.00	4.98	.38	3501.31	.00	.94	2.40	2.500	.000	.00	1 .0
.106	.0266					.0045	.00	.91	1.07	.58	.013	.00	.00	PIPE
582.390	3500.020	.941	3500.961	8.00	4.74	.35	3501.31	.00	.94	2.42	2.500	.000	.00	1 .0
JUNCT STR	.0400					.0021	.01	.94	1.00		.013	.00	.00	PIPE
584.890	3500.120	1.310	3501.430	.00	.00	.00	3501.43	.00	.01	2.50	2.500	.000	.00	1 .0
1.214	.0399					.0000	.00	1.31	.00	.01	.013	.00	.00	PIPE
586.104	3500.169	1.261	3501.430	.00	.00	.00	3501.43	.00	.01	2.50	2.500	.000	.00	1 .0
1.159	.0399					.0000	.00	1.26	.00	.01	.013	.00	.00	PIPE
587.263	3500.215	1.215	3501.430	.00	.00	.00	3501.43	.00	.01	2.50	2.500	.000	.00	1 .0
.127	.0399					.0000	.00	1.21	.00	.01	.013	.00	.00	PIPE
587.390	3500.220	1.210	3501.430	.00	.00	.00	3501.43	.00	.01	2.50	2.500	.000	.00	1 .0

SCURRY-BEND-LATERAL-MH7E-INT.WSW

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T1 SUMMERLIN WEST VILLAGE 25                                                0
T2 SCURRY BEND DRIVE LATERAL FROM SDMH7 EAST TO SDDI#6
T3 ATKINS / INTERIM CONDITIONS
SO    587.3903500.220  1                          3501.430
R     653.0403501.110  2      .013                                .000   0.000 0
REM     LATERAL FROM SDDI#6
SH    653.0403501.110  2                          3501.110
CD   1  4   1    .000   2.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
Q             4.000   .0
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FILE: SCURRY-BEND-LATERAL-MH7E-INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-17-2021 Time: 5:22:33

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE LATERAL FROM SDMH7 EAST TO SDDI#6
ATKINS / INTERIM CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
587.390	3500.220	1.210	3501.430	4.00	2.01	.06	3501.49	.00	.70	1.96	2.000	.000	.00	1 .0
3.182	.0136					.0007	.00	1.21	.35	.53	.013	.00	.00	PIPE
590.573	3500.263	1.163	3501.426	4.00	2.11	.07	3501.50	.00	.70	1.97	2.000	.000	.00	1 .0
2.949	.0136					.0008	.00	1.16	.38	.53	.013	.00	.00	PIPE
593.521	3500.303	1.118	3501.422	4.00	2.21	.08	3501.50	.00	.70	1.99	2.000	.000	.00	1 .0
2.745	.0136					.0009	.00	1.12	.41	.53	.013	.00	.00	PIPE
596.266	3500.340	1.076	3501.416	4.00	2.32	.08	3501.50	.00	.70	1.99	2.000	.000	.00	1 .0
2.535	.0136					.0010	.00	1.08	.44	.53	.013	.00	.00	PIPE
598.802	3500.375	1.036	3501.411	4.00	2.44	.09	3501.50	.00	.70	2.00	2.000	.000	.00	1 .0
2.343	.0136					.0012	.00	1.04	.47	.53	.013	.00	.00	PIPE
601.145	3500.406	.998	3501.404	4.00	2.55	.10	3501.51	.00	.70	2.00	2.000	.000	.00	1 .0
2.159	.0136					.0013	.00	1.00	.51	.53	.013	.00	.00	PIPE
603.304	3500.436	.961	3501.397	4.00	2.68	.11	3501.51	.00	.70	2.00	2.000	.000	.00	1 .0
1.967	.0136					.0015	.00	.96	.55	.53	.013	.00	.00	PIPE
605.271	3500.462	.926	3501.389	4.00	2.81	.12	3501.51	.00	.70	1.99	2.000	.000	.00	1 .0
1.041	.0136					.0017	.00	.93	.59	.53	.013	.00	.00	PIPE
606.313	3500.477	.893	3501.370	4.00	2.95	.13	3501.50	.00	.70	1.99	2.000	.000	.00	1 .0

HYDRAULIC JUMP

FILE: SCURRY-BEND-LATERAL-MH7E-INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 2
Program Package Serial Number: 7271
WATER SURFACE PROFILE LISTING Date: 2-17-2021 Time: 5:22:33

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE LATERAL FROM SDMH7 EAST TO SDDI#6
ATKINS / INTERIM CONDITIONS

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	
606.313	3500.477	.529	3501.005	4.00	6.02	.56	3501.57	.00	.70	1.76	2.000	.000	.00	1 .0
.548	.0136					.0132	.01	.53	1.73	.53	.013	.00	.00	PIPE
606.861	3500.484	.532	3501.016	4.00	5.97	.55	3501.57	.00	.70	1.77	2.000	.000	.00	1 .0
24.247	.0136					.0122	.30	.53	1.71	.53	.013	.00	.00	PIPE
631.108	3500.813	.550	3501.363	4.00	5.69	.50	3501.87	.00	.70	1.79	2.000	.000	.00	1 .0
9.365	.0136					.0107	.10	.55	1.60	.53	.013	.00	.00	PIPE
640.472	3500.940	.569	3501.509	4.00	5.43	.46	3501.97	.00	.70	1.80	2.000	.000	.00	1 .0
5.188	.0136					.0094	.05	.57	1.50	.53	.013	.00	.00	PIPE
645.660	3501.010	.589	3501.599	4.00	5.18	.42	3502.02	.00	.70	1.82	2.000	.000	.00	1 .0
3.236	.0136					.0082	.03	.59	1.40	.53	.013	.00	.00	PIPE
648.896	3501.054	.610	3501.664	4.00	4.94	.38	3502.04	.00	.70	1.84	2.000	.000	.00	1 .0
2.037	.0136					.0072	.01	.61	1.31	.53	.013	.00	.00	PIPE
650.934	3501.082	.631	3501.713	4.00	4.71	.34	3502.06	.00	.70	1.86	2.000	.000	.00	1 .0
1.247	.0136					.0063	.01	.63	1.23	.53	.013	.00	.00	PIPE
652.180	3501.098	.653	3501.752	4.00	4.49	.31	3502.06	.00	.70	1.88	2.000	.000	.00	1 .0
.661	.0136					.0055	.00	.65	1.15	.53	.013	.00	.00	PIPE
652.841	3501.107	.676	3501.784	4.00	4.28	.28	3502.07	.00	.70	1.89	2.000	.000	.00	1 .0
.199	.0136					.0048	.00	.68	1.07	.53	.013	.00	.00	PIPE

FILE: SCURRY-BEND-LATERAL-MH7E-INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 3

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-17-2021 Time: 5:22:33

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE LATERAL FROM SDMH7 EAST TO SDDI#6
ATKINS / INTERIM CONDITIONS

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
653.040	3501.110	.701	3501.812	4.00	4.07	.26	3502.07	.00	.70	1.91	2.000	.000	.00	1 .0

```
T1 SUMMERLIN WEST VILLAGE 25                                                0
T2 SCURRY BEND DRIVE LATERAL FROM SDMH7 WEST TO SDDI#5
T3 ATKINS / INTERIM CONDITIONS
SO    587.3903500.220  1                          3501.430
R     601.7603500.550  2      .013                                .000   0.000 0
REM     LATERAL FROM SDDI#5
SH    601.7603500.550  2                          3500.550
CD   1  4   1    .000   2.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
Q             4.000   .0
```

FILE: SCURRY-BEND-LATERAL-MH7W-INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-17-2021 Time: 5:22:56

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE LATERAL FROM SDMH7 WEST TO SDDI#5
ATKINS / INTERIM CONDITIONS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch	
587.390	3500.220	1.210	3501.430	4.00	2.01	.06	3501.49	.00	.70	1.96	2.000	.000	.00	1 .0
1.836	.0230					.0007	.00	1.21	.35	.46	.013	.00	.00	PIPE
589.226	3500.262	1.163	3501.425	4.00	2.11	.07	3501.49	.00	.70	1.97	2.000	.000	.00	1 .0
1.696	.0230					.0008	.00	1.16	.38	.46	.013	.00	.00	PIPE
590.923	3500.301	1.118	3501.420	4.00	2.21	.08	3501.50	.00	.70	1.99	2.000	.000	.00	1 .0
1.573	.0230					.0009	.00	1.12	.41	.46	.013	.00	.00	PIPE
592.496	3500.337	1.076	3501.413	4.00	2.32	.08	3501.50	.00	.70	1.99	2.000	.000	.00	1 .0
1.447	.0230					.0010	.00	1.08	.44	.46	.013	.00	.00	PIPE
593.943	3500.371	1.036	3501.406	4.00	2.44	.09	3501.50	.00	.70	2.00	2.000	.000	.00	1 .0
1.331	.0230					.0012	.00	1.04	.47	.46	.013	.00	.00	PIPE
595.274	3500.401	.998	3501.399	4.00	2.55	.10	3501.50	.00	.70	2.00	2.000	.000	.00	1 .0
1.220	.0230					.0013	.00	1.00	.51	.46	.013	.00	.00	PIPE
596.494	3500.429	.961	3501.390	4.00	2.68	.11	3501.50	.00	.70	2.00	2.000	.000	.00	1 .0
1.103	.0230					.0015	.00	.96	.55	.46	.013	.00	.00	PIPE
597.597	3500.455	.926	3501.381	4.00	2.81	.12	3501.50	.00	.70	1.99	2.000	.000	.00	1 .0
.991	.0230					.0017	.00	.93	.59	.46	.013	.00	.00	PIPE
598.588	3500.477	.893	3501.370	4.00	2.95	.13	3501.51	.00	.70	1.99	2.000	.000	.00	1 .0
.873	.0230					.0020	.00	.89	.63	.46	.013	.00	.00	PIPE

FILE: SCURRY-BEND-LATERAL-MH7W-INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 2

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 2-17-2021 Time: 5:22:56

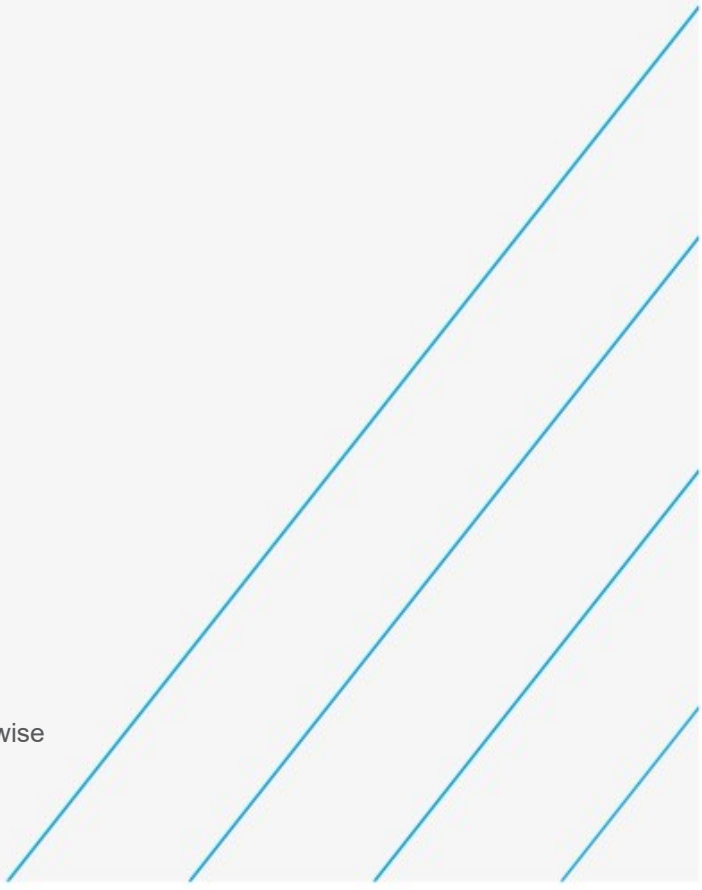
SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE LATERAL FROM SDMH7 WEST TO SDDI#5
ATKINS / INTERIM CONDITIONS

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	
599.461	3500.497	.861	3501.359	4.00	3.09	.15	3501.51	.00	.70	1.98	2.000	.000	.00	1 .0
.756	.0230					.0023	.00	.86	.67	.46	.013	.00	.00	PIPE
600.217	3500.515	.831	3501.345	4.00	3.24	.16	3501.51	.00	.70	1.97	2.000	.000	.00	1 .0
.632	.0230					.0026	.00	.83	.72	.46	.013	.00	.00	PIPE
600.849	3500.529	.802	3501.331	4.00	3.40	.18	3501.51	.00	.70	1.96	2.000	.000	.00	1 .0
.502	.0230					.0029	.00	.80	.77	.46	.013	.00	.00	PIPE
601.351	3500.541	.774	3501.314	4.00	3.57	.20	3501.51	.00	.70	1.95	2.000	.000	.00	1 .0
.365	.0230					.0033	.00	.77	.83	.46	.013	.00	.00	PIPE
601.716	3500.549	.747	3501.296	4.00	3.74	.22	3501.51	.00	.70	1.93	2.000	.000	.00	1 .0
.044	.0230					.0036	.00	.75	.89	.46	.013	.00	.00	PIPE
601.760	3500.550	.743	3501.292	4.00	3.77	.22	3501.51	.00	.70	1.93	2.000	.000	.00	1 .0

Appendix D. CD-ROM

Atkins
2270 Corporate Circle
Suite 200
Henderson, NV 89074-7755

Tel: +1 702 263 7275/+1 800 483 6244
Fax: +1 702 263 7200
Direct: 702 551 0365
Janelle.Klein@atkinsglobal.com



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SUMMERLIN WEST VILLAGE 25
IMPROVEMENT PLANS FOR:

SCURRY BEND DRIVE (STREET N)

SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD
FUTURE SID PROJECT
APN: 137-15-801-002, 137-15-810-008, 137-22-301-006 AND 137-23-210-001

SHEET INDEX

1	COVER SHEET	
2	LEGEND AND ABBREVIATIONS	
3	GENERAL NOTES	
4	HORIZONTAL CONTROL PLAN	
5	MASTER DRAINAGE PLAN	
6	MASTER WATER PLAN	
7	MASTER SEWER PLAN	
8	ROADWAY GRADING PLAN	BEGIN TO STA 13+00
9	ROADWAY PLAN & PROFILE	BEGIN TO STA 13+00
10	ROADWAY GRADING PLAN	STA 13+00 TO STA 17+00
11	ROADWAY PLAN & PROFILE	STA 13+00 TO STA 17+00
12	ROADWAY GRADING PLAN	STA 17+00 TO STA 21+00
13	ROADWAY PLAN & PROFILE	STA 17+00 TO STA 21+00
14	ROADWAY GRADING PLAN	STA 21+00 TO STA 25+00
15	ROADWAY PLAN & PROFILE	STA 21+00 TO STA 25+00
16	ROADWAY GRADING PLAN	STA 25+00 TO STA 29+00
17	ROADWAY PLAN & PROFILE	STA 25+00 TO STA 29+00
18	ROADWAY GRAADING PLAN	STA 29+00 TO STA 33+00
19	ROADWAY PLAN & PROFILE	STA 29+00 TO STA 33+00
20	ROADWAY GRADING PLAN	STA 33+00 TO STA 37+00
21	ROADWAY PLAN & PROFILE	STA 33+00 TO STA 37+00
22	ROADWAY GRADING PLAN	STA 37+00 TO END
23	ROADWAY PLAN & PROFILE	STA 37+00 TO END
24	STORM DRAIN LATERAL PROFILES	
25	WATER LATERAL PROFILES	
26	WATER LATERAL PROFILES	
27	SEWER LATERAL PROFILES	
28	STREETLIGHT PLAN	
29	STREETLIGHT PLAN	
30	STREETLIGHT PLAN	
31	TRAFFIC CONTROL PLAN	
32	TRAFFIC CONTROL PLAN	
33	TRAFFIC CONTROL PLAN	
34	TYPICAL SECTIONS	
35	STORM DRAIN DETAILS	
36	STREET LIGHT DETAILS	
37	WATER DETAILS	
38	FRA INTERSECTION DETAILS	
39	FWA INTERSECTION DETAILS	
40	HANDICAP PARKING DETAILS	
41	HANDICAP PARKING DETAILS	
42	HANDICAP PARKING DETAILS	
43	HANDICAP PARKING DETAILS	
44	HANDICAP PARKING DETAILS	
45	HANDICAP PARKING DETAILS	

UTILITY NOTE

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

CALL BEFORE YOU DIG: 1-800-642-2444

THIS PROPERTY MAY HAVE STATIC WATER PRESSURE IN EXCESS OF 80 PSI. THE UNIFORM PLUMBING CODE REQUIRES THAT INDIVIDUAL, ON-SITE (PRIVATE) PRESSURE REDUCING VALVES BE INSTALLED WHENEVER THE PRESSURE EXCEEDS 80 PSI. PRV'S ARE THE DEVELOPER'S RESPONSIBILITY AND WILL NOTE BE INSPECTED OR INCLUDED IN THE ACCEPTANCE OF THE LAS VEGAS VALLEY WATER DISTRICT FACILITIES.

SUMMERLIN®

OWNER /DEVELOPER

OWNER

CONTACT: KEVIN ORROCK
HOWARD HUGHES COMPANY LLC, A DELAWARE LIMITED LIABILITY COMPANY
10801 W. CHARLESTON BLVD., 3rd FLOOR
LAS VEGAS, NEVADA 89135

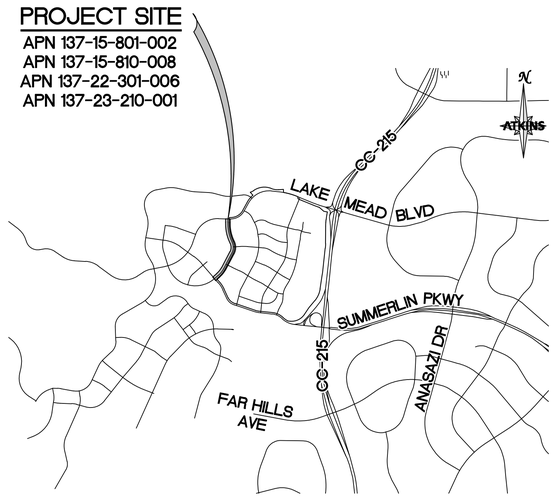
KEVIN T. ORROCK, VICE PRESIDENT — DATE

ENGINEER / CONSULTANT

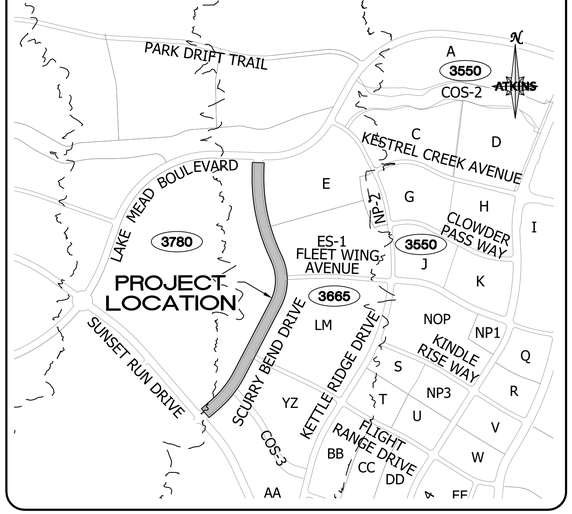
CIVIL

CONTACT: DAVID WILSON P.E.
ATKINS
2270 CORPORATE CIRCLE SUITE 200
HENDERSON, NEVADA 89074
(702) 263-7275

LOCATION MAP



VICINITY MAP



NOTICE OF INTENT NOTE

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 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://WWW.STATE.NV.US/BWPC/STORM01.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 APPROPRIATE FILLING FEE.

NPDES PERMIT NOTE

THE ENGINEER SHOULD CONTACT THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION (NDEP) TO OBTAIN A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT PRIOR TO CONSTRUCTION. ALL CONSTRUCTION PROJECTS ONE ACRE OR LARGER MUST APPLY FOR THE PERMIT THROUGH NDEP. ALL QUESTIONS REGARDING THE NPDES PERMIT REQUIREMENTS SHOULD BE DIRECTED TO THE NDEP AT (775) 687-9429.

DISCLAIMER NOTE

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

FEMA FLOOD ZONE INFORMATION

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (UNSHADED) AS DEPICTED ON FLOOD INSURANCE RATE MAP (FIRM) PANEL 32003C2150E, DATED 9/27/2002. A ZONE X (UNSHADED) IS DESCRIBED AS AN AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN.

PROPOSED RIGHT-OF-WAY ACREAGE
5.42 AC.

PROPOSED DISTURBED AREA ACREAGE
4.74 AC.

GEOTECHNICAL ENGINEER
PREPARED BY: NOVA GEOTECHNICAL & INSPECTION SERVICES
4480 W. HACIENDA AVENUE, SUITE 104, LAS VEGAS, NV 89118
PHONE: 702-873-3478
PROJECT NO.: G-19-026
DATED: JUNE 18, 2020

APPROVALS

ENGINEERING APPROVAL STAMP

ALLEN PAVELKA, P.E. #9029 — DATE
CITY ENGINEER

DEPARTMENT OF PLANNING

CITY OF LAS VEGAS PLANNING DEVELOPMENT — DATE

NOTE:
THIS PLAN CONFORMS TO THE APPLICABLE STANDARDS OF THE PLANNING DEPARTMENT.

LAS VEGAS FIRE AND RESCUE — DATE

CENTRAL TELEPHONE COMPANY d/b/a CENTURYLINK — DATE

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

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT PLANNING & ENGINEERING SERVICES
PROJECT NO. _____ FIRST APPROVED DATE: _____
LVVWD APPROVED FIRE FLOW 1,500 GPM AT 20 PSI RESIDUAL
SHEETS: _____

NV ENERGY — DATE

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

SOUTHWEST GAS CORPORATION — DATE

COX COMMUNICATIONS OF LAS VEGAS, INC — DATE

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

LINEAR UNIT: US SURVEY FOOT (FTUS)
DATUM (REFERENCE FRAME): NAD 83 (2011) EPOCH 2010.00
SYSTEM: NEVADA COORDINATE REFERENCE SYSTEM (NCRS)
ZONE: LAS VEGAS HIGH ELEVATION ZONE
PROJECTION: TRANSVERSE MERCATOR
STANDARD PARALLEL (AND LATITUDE OF GRID ORIGIN): 36°15'00"N
LONGITUDE OF CENTRAL MERIDIAN: 114°58'00"W
NORTHING AT GRID ORIGIN: 400,000.00 M (1,312,333.3333 FTUS)
EASTING AT CENTRAL MERIDIAN: 300,000 M (984,250.0000 FTUS)
SCALE FACTOR ON CENTRAL MERIDIAN: 1.000135 (EXACT)
NOTES:
1. ALL DISTANCES AND BEARINGS SHOWN HEREON ARE PROJECTED (GRID) VALUES BASED ON THE PRECEDING PROJECTION DEFINITION. THE PROJECTION WAS DEFINED SUCH THAT PROJECTED (GRID) DISTANCES ARE EQUIVALENT TO "GROUND" DISTANCES IN THE PROJECT AREA
2. GRID BEARINGS SHOWN HEREON (OR IMPLIED BY GRID COORDINATES) DO NOT EQUAL GEODETIC BEARINGS DUE TO MERIDIAN CONVERGENCE.

BENCHMARK

PROJECT DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

LEGAL DESCRIPTION

BEING A PORTION OF LOT 1 AS SHOWN ON THE MAP THEREOF IN BOOK 161 OF PLATS, PAGE 68, OFFICIAL RECORDS, CITY OF LAS VEGAS CLARK COUNTY, NEVADA

FAST Call before you UnderGround 1-702-432-5300 FEDERAL AVIATION SYSTEM OF TRANSPORTATION

Call before you Dig AVOID OUTAGES, UNDERGROUND UTILITY LINES MAY BE CONNECTED. Call 811 or 1-800-642-2444

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

PROFESSIONAL ENGINEER STATE OF NEVADA NICOLAS A. BARCOS EXP. 12-31-20 CIVIL No. 25673

3/8/2021

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

COVER SHEET

DESIGNED BY:	B. MIGHTYAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
DATE:	MARCH, 2021
DRAWING NO.	1/42
HORIZ.:	NONE
VERT.:	NONE
XXXVXXXX	
LXX-XXXXX	
JOB NO.	100069098

C:\pw_work\atkinsv01\dms08864\dms5632616908-01-171L-C1.dwg LAYOUT: 1 COVER SHEET Mar 08, 2021 - 2:39PM

@	AT
#	NUMBER
AB	ABANDONED
AC	ASPHALTIC CONCRETE
ACP	ASBESTOS CEMENT PIPE
AGG	AGGREGATE
AIP	ABANDON IN PLACE
ALT	ALTERNATE
AP	ANGLE POINT
APPROX	APPROXIMATE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS INTERNATIONAL
AV/AR	AIR VACUUM AIR RELIEF VALVE
BC	BACK OF CURB
BCR	BACK OF CURB RETURN
BLK	BLOCK
BLVD	BOULEVARD
BM	BENCHMARK
BO	BLOW OFF
BP	BOTTOM OF PIPE
BSW	BACK OF SIDEWALK
BVC	BEGIN VERTICAL CURVE
BVCE	BEGINNING OF VERTICAL CURVE ELEVATION
BVCS	BEGINNING OF VERTICAL CURVE STATION
BW	BOTTOM WIDTH
C&G	CURB AND GUTTER
C–C	CENTER TO CENTER
CATV	CABLE TELEVISION
CCAUSD	CLARK COUNTY AREA UNIFORM STANDARD DRAWING
CCRFCD	CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
CCWRD	CLARK COUNTY WATER RECLAMATION DISTRICT
CF	CUBIC FOOT
CIP	CAST IRON PIPE OR CAST IN PLACE
CL	CENTERLINE
CLR	CLEAR
CLV	CITY OF LAS VEGAS
CM	CONSTRUCTION MANAGER
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CNDT	CONDUIT
CNLV	CITY OF NORTH LAS VEGAS
CO	CLEANOUT
COH	CITY OF HENDERSON
COL	COLUMN
COS	COMMUNITY OPEN SPACE
CON'T	CONTINUATION
CONC	CONCRETE
CONST	CONSTRUCT OR CONSTRUCTION
COR	CORNER
COS	COMMUNITY OPEN SPACE
CPP	CORRUGATED PLASTIC PIPE
CSP	CORRUGATED STEEL PIPE
CU	CUBIC
CULV	CULVERT
CY	CUBIC YARD
D	DEPTH
DCSWCS	DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS
DET, DTL	DETAIL
DEPT	DEPARTMENT
DG	DESIGN GRADE
DI	DROP INLET
DIA	DIAMETER
DIAG	DIAGONAL
DIP	DUCTILE IRON PIPE
DOC	DOCUMENT
DW	DRIVEWAY
DWG	DRAWING
E	EAST
EA	EACH
EB	EASTBOUND
EC	END OF CURVE
ECR	END CURB RETURN
EF	EACH FACE
EG	EXISTING GROUND
ELEC	ELECTRICAL
ELEV	ELEVATION
EMBK	EMBANKMENT
EOP	EDGE OF PAVEMENT
EP	EDGE OF PAVEMENT ALIGNMENT END
EQ	EQUAL
ESMT	EASEMENT
EVC	END VERTICAL CURVE
EVCS	END VERTICAL CURVE STATION
EW	EACH WAY
EX, EXST	EXISTING
EXP, JT	EXPANSION JOINT
FA	FIRE ALARM
FC	FACE OF CURB
FF	FINISHED FLOOR ELEVATION
FH	FIRE HYDRANT
FL	FLOW LINE
FO	FIBER OPTIC
FT	FOOT OR FEET
G	GAS LINE
GALV	GALVANIZED
GB	GRADE BREAK
GL	GRATE LENGTH
GM	GAS METER
GUT	GUTTER
GV	GATE VALVE
H	HEIGHT
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HDWL	HEADWALL
HE	HORIZONTAL ELLIPTICAL
HGL	HYDRAULIC GRADE LINE
HOA	HOMEOWNER'S ASSOCIATION
HOR	HORIZONTAL
HP	HIGH POINT
ID	INSIDE DIAMETER
IN	INCH(ES)
INT	INTERSECTION/INTERIM
INV	INVERT
IQAC	INTERAGENCY QUALITY ASSURANCE COMMITTEE
IRR	IRRIGATION
ISL	ISLAND
JB	JUNCTION BOX
JCT	JUNCTION
JT	JOINT
K	VERTICAL CURVE K VALUE
L	LENGTH
LB	POUND(S)
LF	LINEAR FEET
LIN	LINEAR
LIN #	CCWRD MANHOLE NUMBER
LOC	LENGTH OF CURVE
LOL	LAYOUT LINE
LP	LOW POINT
LS	LANDSCAPE
LT	LEFT
LVC	LENGTH OF VERTICAL CURVE
LVVWD	LAS VEGAS VALLEY WATER DISTRICT
MAS	MASONRY
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MON	MONOLITHIC, MONUMENT
MTL	MATERIAL
ME	MATCH EXISTING
MUE	MUNICIPAL UTILITY EASEMENT
N	NORTH
NAP	NOT A PART
NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
NF	NEAR FACE
NG	NUMBER OF GRATES, NATURAL GRADE
NIC	NOT IN CONTRACT
No.	NUMBER
NTS	NOT TO SCALE
NVE	NV ENERGY
OC	ON CENTER
OD	OUTSIDE DIAMETER
OG	OPEN GRADE
OH	OVERHEAD
OHP	OVERHEAD POWER
OS	OFFSET
P	POWER
PB	PULL BOX
PBS	PLANTMIX BITUMINOUS SURFACE
PC	POINT OF CURVATURE
PCC	PORTLAND CEMENT CONCRETE OR POINT OF COMPOUND CURVATURE
PE	POLYETHYLENE
PG	PROPOSED GRADE
PGL	PROFILE GRADE LINE
PH	POT HOLE
PI	POINT OF INTERSECTION
PIP	PROTECT IN PLACE
PL	PROPERTY LINE
PLCS	PLACES
PMF	PAVEMENT MARKING FILM
POC	POINT OF CONNECTION
PP	POWER POLE
PRC	POINT OF REVERSE CURVATURE
PROP	PROPOSED
PSI	POUNDS PER SQUARE INCH
PT	POINT, POINT OF TANGENCY
PUE	PUBLIC UTILITY EASEMENT
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
QTY	QUANTITY
(R)	RADIAL
R/W,ROW	RIGHT OF WAY
R	RADIUS
RC	REINFORCED CONCRETE
RCB	REINFORCED CONCRETE BOX
RCC	ROLLER COMPACTED CONCRETE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
REINF	REINFORCED OR REINFORCEMENT
RELOC	RELOCATE
REV	REVISION
RG	ROUGH GRADE
RP	RADIUS POINT
RPM	RAISED PAVEMENT MARKER
RR	RAILROAD
RT	RIGHT
SCHED	SCHEDULE
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SF	SQUARE FOOT/SQUARE FEET
SHLD	SHOULDER
SHT	SHEET
SHP	STEEL HIGH PRESSURE PIPE
SMFO	SINGLE MODE FIBER OPTIC
SNWA	SOUTHERN NEVADA WATER AUTHORITY
SQ	SQUARE
SS	SANITARY SEWER OR SIDE SLOPE
SSD	SUMMERLIN STANDARD DRAWING
SST	STAINLESS STEEL
ST	STREET
STA	STATION
STD	STANDARD
STL	STEEL
STLT	STREETLIGHT
SDHW	STORM DRAIN HEADWALL
STRUCT	STRUCTURAL OR STRUCTURE
SUM #	CCWRD MANHOLE NUMBER
SURV	SURVEY
SVZ	SIGHT VISIBILITY ZONE
SW	SIDEWALK
SY	SQUARE YARD
T	TELEPHONE LINE
TAN	TANGENT
TB	TOP OF BOX
TBA	TO BE ADJUSTED
TBC	TOP OF BACK OF CURB
TBR	TO BE REMOVED
TC	TOP OF CURB
TCD	TRAFFIC CONTROL DEVICE
TDS	TECHNICAL DRAINAGE STUDY
TEL	TELEPHONE
TEMP	TEMPORARY
TF	TOP OF FOOTING
THK	THICK
THR	THRUST
THW	TOP OF HEADWALL
TOF	TOP OF FACE
TW/TOW	TOP OF WALL
TP	TOP OF PIPE
TRANS	TRANSITION
TS	TRAFFIC SIGNAL
TSI	TRAFFIC SIGNAL INTERCONNECT
TW	TOP OF WALL
TYP	TYPICAL
UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS
UG	UNDERGROUND
UGP	UNDERGROUND POWER
UIE	UPPER INVERT ELEVATION
ULT	ULTIMATE
UNO	UNLESS NOTED OTHERWISE
UPRR	UNION PACIFIC RAILROAD
USD	UNIFORM STANDARD DRAWING
UTACS	ULTRA THIN ASPHALT CONCRETE SURFACE
USTCDE	UTILITY, STREETLIGHT, TRAFFIC CONTROL DEVICE EASEMENT
V	VOLT
VAR	VARIABLE
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
VG	VALLEY GUTTER
W	WEST, WATER
W/	WITH
WB	WEST BOUND
WL	WATER LINE
WM	WATER METER
W/O	WITHOUT
WPJ	WEAKENED PLANE JOINT
WV	WATER VALVE
WW	WING WALL
YD	YARD(S)

	EXISTING	PROPOSED
DAYLIGHT LINE		
FLOWLINE		
CENTERLINE		
PARCEL LINE		
RIGHT OF WAY		
PAVEMENT STRIPING		
OVERHEAD POWER	—OHP—	—OHP—
UNDERGROUND POWER	—UGP—	—UGP—
SANITARY SEWER	—S—	15" SS
WATER		24"W (3550)
STORM DRAIN		
GAS	—G—	—G—
CABLE T.V.	—CATV—	—CATV—
TELEPHONE	—T—	—T—
STREETLIGHT CONDUIT	—STLT—	STLT
STOP BAR		
CONCRETE ENCASEMENT		
FENCE		
BLOCK WALL		
RETAINING WALL		
SAWCUT PAVEMENT		
CONTOUR	(3000)	3005
CURB AND GUTTER		
EDGE OF PAVEMENT		
EASEMENT		
MATCHLINE		
SIGN		
DOUBLE POST SIGN		
STORM DRAIN MANHOLE	SD	
STORM DRAIN STRUCTURE		
DROP INLET		
BEEHIVE INLET		
SEWER MANHOLE	S	S
FIRE HYDRANT		
CAP AND BLOWOFF		
GATE VALVE		
REDUCER		
STREETLIGHT	OR	
PULLBOX		
SIGNAL POLE		
ELEVATION	(0000.0) FG	0000.0 FG
WATER PRESSURE ZONE BOUNDARY		
WATER PRESSURE ZONE		3550
RIP–RAP		
		FUTURE
HARDSCAPE		

NOTE TO CONTRACTOR

- QUANTITIES SHOWN ARE ESTIMATES ONLY AND ARE INTENDED TO ILLUSTRATE SCOPE OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXACT QUANTITIES INVOLVED.

ROADWAY ALIGNMENT DESIGNATIONS

"LMB" = LAKE MEAD BOULEVARD
"SBD" = SCURRY BEND DRIVE
"SRD" = SUNSET RUN DRIVE
"FWA" = FLEET WING AVENUE
"FRA" = FLIGHT RANGE AVENUE

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT
PLANNING AND ENGINEERING SERVICES
PROJECT NO. 0000 FIRST APPROVED DATE: _____
LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368
(REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS
(3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 NEVADA AND ARIZONA SYSTEMS OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. DIAL SHORTLY. Call 811 OR 1-800-642-2444

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

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

PROFESSIONAL ENGINEER – STATE OF NEVADA – NICOLAS A BARCOS – EXP. 12-31-20 – CIVIL – No. 25673 – 3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

LEGEND AND ABBREVIATIONS

DESIGNED BY: B. MOCHTYAK
DRAWN BY: K. HENRY
CHECKED BY: N. BARCOS
HORIZ.: NONE
VERT.: NONE

XXXVXXXX
LXX–XXXXX
DATE: MARCH, 2021
DRAWING NO. 2/42

JOB NO. 100069098

C:\pw_work\atkinsn01\sim8864\dms563226\69088-02-LGND-G2.dwg LAYOUT: 2 LEGEND AND ABBREVIATIONS Mar 08, 2021 – 2:39PM

CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE 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 (NOVA, G-18-176, 12/03/18) 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 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 TO OFFSITE INSPECTION AND TESTING CERTIFYING THAT ALL DEVICES HAVE BEEN PLACED AND VERIFIED TO BE IN GOOD WORKING CONDITION PRIOR TO THE CONSTRUCTION OF ANY ROAD BASE.
21. SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S) SHALL BE PROVIDED TO THE CITY AND APPROVED PRIOR TO ACCEPTANCE OF FACILITY VIDEO INSPECTION. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXIT THE PUBLIC RIGHT-OF-WAY, SEWER AND STORM DRAIN MAIN ALIGNMENT, INCLUDING DEFLECTION POINTS. THE LOCATION SHALL BE DESCRIBED BY COORDINATES WHICH SHALL BE BASED ON THE OFFICIAL HORIZONTAL AND VERTICAL CONTROL NETWORKS OF THE CITY OF LAS VEGAS. FINAL LOCATION MAPS MUST BE SEALED AND CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINTIES OF ± 0.09 METERS (± 0.3 FEET) HORIZONTALLY AND VERTICALLY. A SEPARATE ELECTRONIC COMMA DELIMITED FILE FOR THE SANITARY SEWER AND STORM DRAIN COORDINATES SHALL ALSO ACCOMPANY THE SANITARY SEWER AND STORM DRAIN FINAL LOCATION MAP(S).
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.

REVISED 06/04/2018

CITY OF LAS VEGAS TRAFFIC NOTES

1. ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.
2. THE STREET SIGN CONTRACTOR SHALL OBTAIN DESERT FOOTHILLS DRIVE NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.
3. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL ADVANCE WARNING SIGNS FOR THE CONSTRUCTION ZONE. THE CONTRACTOR SHALL INSTALL TEMPORARY STOP SIGNS AT ALL NEW STREET ENCROACHMENTS INTO EXISTING CITY STREETS WHERE WARRANTED IMMEDIATELY AFTER FIRST GRADING WORK IS ACCOMPLISHED, AND SHALL MAINTAIN SAID SIGNS UNTIL PERMANENT SIGNS ARE INSTALLED.
4. WHEN A DESIGNATED "SUGGESTED ROUTE TO SCHOOL" IS ENCROACHED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO BE ASSISTED IN THE SAFE CROSSING THROUGH THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A QUALIFIED "CROSSING GUARD". THE GUARD SHALL BE PRESENT FOR THE FULL DURATION OF TIME THAT CHILDREN ARE LIKELY TO BE PRESENT.
5. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW TRAFFIC SIGNS SHALL UTILIZE TYPE XI RETROREFLECTIVE SHEETING IN ACCORDANCE WITH CCAUSS 627 AND 716 AND SHALL HAVE AN ANTI-GRAFFITI PROTECTIVE OVERLAY FILM THAT IS A MATCHING COMPONENT TO, AND OF THE SAME MANUFACTURER AS THE RETROREFLECTIVE SHEETING TO WHICH IT IS APPLIED. DESERT FOOTHILLS DRIVE NAMES SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT CITY STANDARDS.
7. WHEN A PROPOSED STREET LIGHT STANDARD IS LOCATED WITHIN FIVE (5') FEET OF ANY PROPOSED SIGN SHOWN ON THE PLANS TO BE MOUNTED ON A SIGNPOST, THE SIGN SHALL BE MOUNTED ON THE STREET LIGHT STANDARD AND THE SIGNPOST SHALL BE ELIMINATED.
8. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HERE UNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.
9. STREET SIGNS AND STOP SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF DESERT FOOTHILLS DRIVE NAMES SIGNS.
10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND FLAGGERS TO INSURE THE SAFETY OF THE PUBLIC IN OR AROUND THE WORK THE CONTRACTOR SHALL HAVE A CERTIFIED ATSSA TRAFFIC CONTROL TECHNICIAN OR IMSA WORK ZONE SAFETY SPECIALIST SET UP, MAINTAIN AND/OR REMOVE ALL TRAFFIC CONTROL DEVICES IN THE CITY OF LAS VEGAS RIGHT OF WAY.
11. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE EXPEDITED TO COMPLETION SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA (RTC). IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP OR HAS AN ADVERSE EFFECT ON BUS SERVICE ON THAT STREET TO ARRANGE FOR TEMPORARY RELOCATION OF STOP.
13. GUARDS SHALL BE OBTAINED BY CONTACTING THE METROPOLITAN POLICE DEPARTMENT SPECIAL EVENTS UNIT (PHONE # 828-3442) WHO WILL PROVIDE OFFICERS PROPERLY TRAINED IN TRAFFIC CONTROL. FEES FOR THE USE OF THESE OFFICERS SHALL BE SET BY METRO AND WILL BE PAID BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR ALL ARRANGEMENTS WITH METRO.
14. ANY WORK WITHIN 300' OF A SIGNALIZED INTERSECTION WILL BE NIGHT WORK, UNLESS DIRECTED BY THE CITY OF LAS VEGAS TRAFFIC ENGINEER.
15. THE CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEERING DIVISION (TRANSPORTATION SECTION) THROUGH THE PROJECT'S OFFSITE INSPECTOR PRIOR TO INITIATING PAVING TO RECEIVE DIRECTION FOR ANY PERMANENT OR TEMPORARY MODIFICATIONS TO THE APPROVED DRAWINGS REGARDING FINAL PAVEMENT TRANSITIONS, MARKINGS AND SIGNING THAT ARE REQUIRED TO MATCH ADJACENT ROADWAY SEGMENTS. THE CONTRACTOR SHALL PROVIDE A DRAWING FOR APPROVAL BY THE TRAFFIC ENGINEERING DIVISION DEPICTING ANY ADJUSTMENTS TO THE FINAL PAVEMENT MARKINGS AND SIGNAGE, WHICH MAY INCLUDE OMITTING, ADDING OR MODIFYING PAVEMENT MARKINGS AND TRAFFIC CONTROL SIGNS SUCH THAT ADEQUATE TRANSITIONS AND LANE TERMINATIONS BETWEEN ADJACENT ROADWAY SEGMENTS ARE CONSTRUCTED.

REVISED JUNE 4, 2018

CITY OF LAS VEGAS FIRE DEPARTMENT NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE LAS VEGAS FIRE AND RESCUE ADOPTED FIRE CODE ORDINANCE # 6631 FOR HYDRANT SPECIFICATIONS AND HYDRANT INSTALLATION SPECIFICATIONS.
2. ONLY FIRE HYDRANTS THAT ARE ON THE LAS VEGAS VALLEY WATER DISTRICT'S -APPROVED PRODUCTS LIST ARE ALLOWED TO BE INSTALLED.
3. A PERMIT IS REQUIRED FROM LAS VEGAS FIRE AND RESCUE FOR THE INSTALLATION OF ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTORS MATERIAL TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK. IFC § 105.6.15
4. ON ANY RESIDENTIAL OR COMMERCIAL INSTALLATIONS, FIRE HYDRANTS SHALL BE INSTALLED AND FIRE APPARATUS ACCESS ROADS SHALL BE MAINTAINED BEFORE COMMENCEMENT OF ANY COMBUSTIBLE CONSTRUCTION. ALL FIRE HYDRANTS SHALL BE IN GOOD WORKING ORDER AND SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW. IFC § 3310, § 3312
5. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, THE CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF THE STREET ADJACENT TO THE FIRE HYDRANTS. IFC § 507.5.7.3
6. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CENTER LOADING IS ACCEPTABLE FOR THE HYDRO TESTS WITH PRIOR FIRE PREVENTION APPROVAL. IFC § 106.3
7. ALL ON-SITE UNDERGROUND WATER MAINS AND MATERIALS SHALL BE U.L. LISTED, A.W.W.A APPROVED AND SHALL BE RATED FOR THE APPROPRIATE WORKING PRESSURE. IFC § 507.2.1, NFPA 24
8. PAINTING OF CURBS, FIRE HYDRANTS, PADS, PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, AND ALL OTHER WORK NECESSARY PER PLANS SHALL BE COMPLETED BEFORE APPROVAL BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION. IFC § 507
9. PRIVATE HYDRANTS SHALL BE PAINTED RED. IFC § 507.5.7.1
10. PRIOR TO THE FINAL OCCUPANCY, A FIRE FLOW TEST SHALL BE WITNESSED BY LAS VEGAS FIRE AND RESCUE, FIRE PREVENTION DIVISION TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW. IFC § 507
11. FIRE HYDRANT SPACING SHALL BE AS FOLLOWS: IFC § C102
    * RESIDENTIAL -500 FT UNSPRINKLERED; 600 FT SPRINKLERED.
    * COMMERCIAL -300 FT UNSPRINKLERED; 400 FT SPRINKLERED.
12. WHERE THE WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT A MAXIMUM OF 1000 FT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR (4) OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FT ON AN ALTERNATING BASIS. IFC § C102.8
13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE RADIUS OF A CUL-DE-SAC OR WITHIN 20 FT OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.
14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FT OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION. IFC § C102.10
15. A MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FT, AS MEASURED BY AN APPROVED ROUTE. IFC § C102.4
16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FT, AS MEASURED BY AN APPROVED ROUTE. IFC § C102.7
17. THE MAXIMUM DISTANCE FROM A HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FT. IFC § C102.6
18. TWO (2) SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE IS 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. FOR SYSTEMS REQUIRED TO HAVE TWO (2) SOURCES OF WATER SUPPLY, SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD-INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION. FOR SYSTEMS PERMITTED TO HAVE ONE SOURCE OF WATER SUPPLY, SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 3 FIRE HYDRANTS AND/OR FIRE SPRINKLER LEAD-INS CAN BE OUT OF SERVICE DUE TO A SERVICE INTERRUPTION. IFC § C104
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS. IFC § 503.2.3
20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12% ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FT PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%. IFC § 503.2.7, § 503.2.8
21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FT OUTSIDE AND 28 FT INSIDE TURNING IFC § 503.2.4
22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL NOT BE LESS THAN 13FT 6 INS. IFC § 503.2.1
23. FIRE DEPARTMENT ACCESS ROADS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 33 FT WITH PARKING ON BOTH SIDES MEASURED TO FACE OF CURB. NOT LESS THAN 28 FT WIDE WITH PARKING RESTRICTED TO ONE SIDE MEASURED TO FACE OF CURB. NOT LESS THAN 24 FT WIDE WITH NO PARKING ON EITHER SIDE MEASURED TO FACE OF CURB. FIRE LANES THROUGH PARKING LOTS SHALL BE NOT LESS THAN 24 FT. IFC § 503.2.1.1
24. A FIRE APPARATUS ACCESS ROAD SHALL BE REQUIRED WHEN ANY PORTION OF AN EXTERIOR WALL OF THE FIRST STORY IS LOCATED MORE THAN 150 FT FROM A FIRE DEPARTMENT VEHICLE ACCESS. IFC § 503.1.1
25. APPROVED SECONDARY FIRE APPARATUS ACCESS SHALL BE PROVIDED FOR 200 OR MORE DWELLING UNITS, ROAD(S) WITH DEADENDS OR A SINGLE POINT OF ACCESS IN EXCESS OF 600 FT. CLV REGULATION AND MOU
26. ALL DEAD-END FIRE APPARATUS ROADS AND/OR FIRE LANES, PUBLIC OR PRIVATE, IN EXCESS OF 150 FT IN LENGTH SHALL BE PROVIDED WITH AN APPROVED TURN AROUND HAVING A MINIMUM DIAMETER OF 81 FT. CLV REGULATION
27. ALL FIRE APPARATUS ACCESS ROADS SHALL BE MARKED BY PLACING APPROVED SIGNS AT THE START OF THE DESIGNATED FIRE LANE, ONE SIGN AT THE END OF THE FIRE LANE AND WITH SIGNS AT INTERVALS OF 100 FT ALONG THE DESIGNATED FIRE LANES. SIGNS TO BE PLACED ON BOTH SIDES OF ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY LEVEL. THE CURB ALONG OR ON THE PAVEMENT OR CEMENT (IF NO CURB IS PROVIDED) SHALL BE PAINTED WITH A RED WEATHER RESISTANT PAINT IN ADDITION TO THE SIGNS. IFC § 503.3
28. ELECTRICALLY CONTROLLED ACCESS GATES SHALL BE PROVIDED WITH AN APPROVED EMERGENCY VEHICLE DETECTOR/RECEIVER IFC § 503.6
29. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS, OR HAVING FOUR OR MORE TRAVEL LANES AND A TRAFFIC COUNT OF MORE THAN 30,000 VEHICLES PER DAY, ALL HYDRANTS BEING UTILIZED TO DELIVER FIRE FLOW TO THE PROPOSED LOCATION SHALL BE LOCATED ON THE SAME SIDE OF THE STREET AS THE PROPOSED DEVELOPMENT. CLV REGULATION

CITY OF LAS VEGAS GRADING NOTES

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

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

COMPACTION TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.

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.

REVISED 04/15/10

DEVIATIONS FROM STANDARDS

NONE.

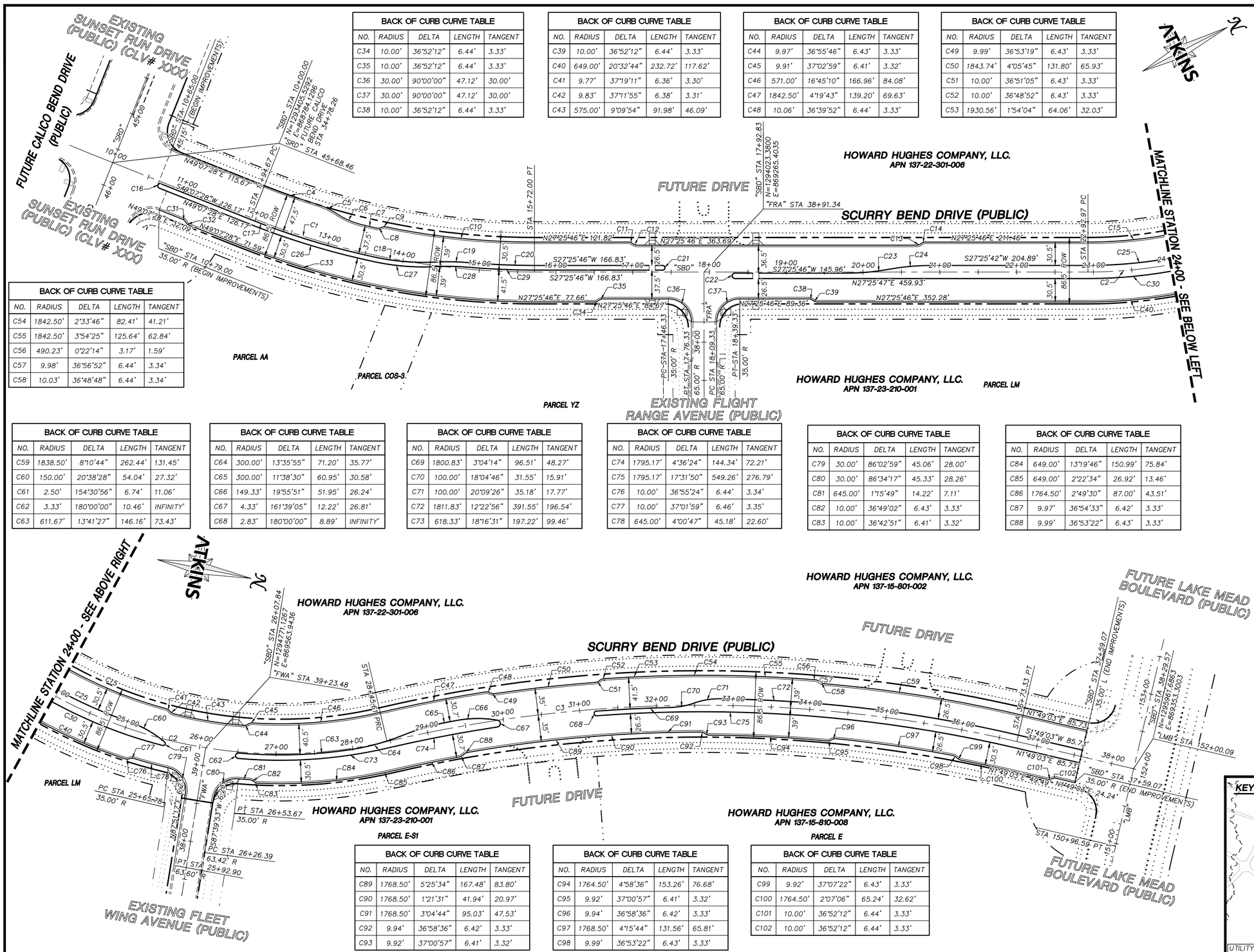
CITY OF LAS VEGAS SEWER NOTES

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

REVISED 04/15/10

CITY OF LAS VEGAS STREET LIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATION 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.
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. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS, ETC., LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF THE TRAFFIC AND CITY ENGINEER. ANY DEVIATION FROM THE PLAN LOCATION WILL REQUIRE COMPLIANCE WITH SECTION 623 OF THE USS.
4. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION IN ACCORDANCE WITH SECTION 623 G.03.01 OF THE USS.
5. ALL EMPTY CONDUIT SHALL HAVE AT LEAST ONE GREEN NO. #8 AWG WIRE INSTALLED AS TRACER WIRE IN ACCORDANCE WITH SECTION 623 G.02.01 OF THE USS PRIOR TO BACKFILLING AND FINAL INSPECTION.
6. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, SHALL LEAVE A MINIMUM CLEARANCE IN COMPLIANCE WITH USD NO. 320A



BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C34	10.00'	36°52'12"	6.44'	3.33'
C35	10.00'	36°52'12"	6.44'	3.33'
C36	30.00'	90°00'00"	47.12'	30.00'
C37	30.00'	90°00'00"	47.12'	30.00'
C38	10.00'	36°52'12"	6.44'	3.33'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C39	10.00'	36°52'12"	6.44'	3.33'
C40	649.00'	20°32'44"	232.72'	117.62'
C41	9.77'	37°19'11"	6.36'	3.30'
C42	9.83'	37°11'55"	6.38'	3.31'
C43	575.00'	9°09'54"	91.98'	46.09'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C44	9.97'	36°55'46"	6.43'	3.33'
C45	9.91'	37°02'59"	6.41'	3.32'
C46	571.00'	16°45'10"	166.96'	84.08'
C47	1842.50'	4°19'43"	139.20'	69.63'
C48	10.06'	36°39'52"	6.44'	3.33'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C49	9.99'	36°53'19"	6.43'	3.33'
C50	1843.74'	4°05'45"	131.80'	65.93'
C51	10.00'	36°51'05"	6.43'	3.33'
C52	10.00'	36°48'52"	6.43'	3.33'
C53	1930.56'	1°54'04"	64.06'	32.03'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C54	1842.50'	2°33'46"	82.41'	41.21'
C55	1842.50'	3°54'25"	125.64'	62.84'
C56	490.23'	0°22'14"	3.17'	1.59'
C57	9.98'	36°56'52"	6.44'	3.34'
C58	10.03'	36°48'48"	6.44'	3.34'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C59	1838.50'	8°10'44"	262.44'	131.45'
C60	150.00'	20°38'28"	54.04'	27.32'
C61	2.50'	154°30'56"	6.74'	11.06'
C62	3.33'	180°00'00"	10.46'	INFINITY'
C63	611.67'	13°41'27"	146.16'	73.43'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C64	300.00'	13°35'55"	71.20'	35.77'
C65	300.00'	11°38'30"	60.95'	30.58'
C66	149.33'	19°55'51"	51.95'	26.24'
C67	4.33'	161°39'05"	12.22'	26.81'
C68	2.83'	180°00'00"	8.89'	INFINITY'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C69	1800.83'	3°04'14"	96.51'	48.27'
C70	100.00'	18°04'46"	31.55'	15.91'
C71	100.00'	20°09'26"	35.18'	17.77'
C72	1811.83'	12°22'56"	391.55'	196.54'
C73	618.33'	18°16'31"	197.22'	99.46'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C74	1795.17'	4°36'24"	144.34'	72.21'
C75	1795.17'	17°31'50"	549.26'	276.79'
C76	10.00'	36°55'24"	6.44'	3.34'
C77	10.00'	37°01'59"	6.46'	3.35'
C78	645.00'	4°00'47"	45.18'	22.60'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C79	30.00'	86°02'59"	45.06'	28.00'
C80	30.00'	86°34'17"	45.33'	28.26'
C81	645.00'	1°15'49"	14.22'	7.11'
C82	10.00'	36°49'02"	6.43'	3.33'
C83	10.00'	36°42'51"	6.41'	3.32'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C84	649.00'	13°19'46"	150.99'	75.84'
C85	649.00'	2°22'34"	26.92'	13.46'
C86	1764.50'	2°49'30"	87.00'	43.51'
C87	9.97'	36°54'33"	6.42'	3.33'
C88	9.99'	36°53'22"	6.43'	3.33'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C89	1768.50'	5°25'34"	167.48'	83.80'
C90	1768.50'	1°21'31"	41.94'	20.97'
C91	1768.50'	3°04'44"	95.03'	47.53'
C92	9.94'	36°58'36"	6.42'	3.33'
C93	9.92'	37°00'57"	6.41'	3.32'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C94	1764.50'	4°58'36"	153.26'	76.68'
C95	9.92'	37°00'57"	6.41'	3.32'
C96	9.94'	36°58'36"	6.42'	3.33'
C97	1768.50'	4°15'44"	131.56'	65.81'
C98	9.99'	36°53'22"	6.43'	3.33'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C99	9.92'	37°07'22"	6.43'	3.33'
C100	1764.50'	2°07'06"	65.24'	32.62'
C101	10.00'	36°52'12"	6.44'	3.33'
C102	10.00'	36°52'12"	6.44'	3.33'

GRAPHIC SCALE
60 0 30 60 120
HORIZONTAL: 1"= 60'

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008) NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET) FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN. 1215,R59E,S03

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

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

SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
ROADWAY		
4" AGGREGATE BASE, TYPE II	6,509	CY
4.5" PLANTMIX BITUMINOUS PAVEMENT	19,528	SY
STANDARD "L" TYPE CURB & GUTTER W/ TYPE II AGGREGATE BASE	5,414	LF
STANDARD "A" TYPE ISLAND CURB	4,869	LF

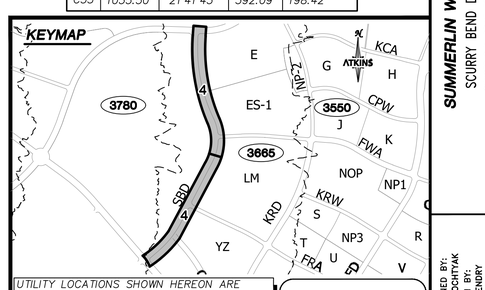
ROADWAY NOTES

1. SEE SHEET 34 FOR TYPICAL SECTIONS, DETAILS
2. SEE SHEET 2 FOR ROADWAY ALIGNMENT ABBREVIATIONS

CENTERLINE CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C1	996.50'	21°41'43"	377.33'	190.95'
C2	610.00'	51°54'28"	552.64'	296.91'
C3	1803.50'	26°17'46"	827.72'	421.28'

BACK OF CURB CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C4	951.50'	4°23'34"	72.95'	36.49'
C5	100.00'	16°24'30"	28.64'	14.42'
C6	100.00'	20°10'07"	35.20'	17.78'
C7	961.50'	1°10'54"	19.83'	9.92'
C8	10.86'	33°31'35"	6.36'	3.27'
C9	9.85'	37°09'46"	6.39'	3.31'
C10	957.50'	11°39'02"	194.70'	97.69'
C11	10.00'	36°52'12"	6.44'	3.33'
C12	10.00'	36°52'12"	6.44'	3.33'
C13	10.00'	36°52'11"	6.43'	3.33'
C14	10.00'	36°52'12"	6.44'	3.33'
C15	571.00'	23°36'29"	235.27'	119.33'
C16	2.83'	180°00'04"	8.89'	328262.98'
C17	999.17'	9°47'09"	170.65'	85.53'
C18	300.00'	14°57'59"	78.36'	39.41'
C19	300.00'	8°03'27"	42.19'	21.13'
C20	988.17'	5°00'03"	86.25'	43.15'
C21	2.83'	180°00'00"	8.89'	INFINITY'
C22	3.33'	179°59'59"	10.46'	1101540.91'
C23	300.00'	10°28'31"	54.85'	27.50'
C24	300.00'	10°28'27"	54.84'	27.50'
C25	601.67'	19°33'13"	205.33'	103.68'
C26	1004.83'	9°47'09"	171.62'	86.02'
C27	305.66'	14°57'59"	79.84'	40.15'
C28	294.34'	8°03'27"	41.39'	20.73'
C29	993.83'	5°00'03"	86.74'	43.40'
C30	618.33'	24°23'49"	263.29'	133.67'
C31	10.00'	36°52'12"	6.44'	3.33'
C32	10.00'	36°52'12"	6.44'	3.33'
C33	1035.50'	21°41'43"	392.09'	198.42'

KEYMAP



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

PROFESSIONAL ENGINEER - STATE OF NEVADA - NICOLAS A. BARCOS - EXP. 12-31-20 - CIVIL - No. 25975

3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

HORIZONTAL CONTROL PLAN

DESIGNED BY: B. MOSHTAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=60'
VERT.: NONE
DATE: MARCH, 2021
DRAWING NO. 4/42
JOB NO. 100069098

XXXVXXXX.
LXX-XXXXX

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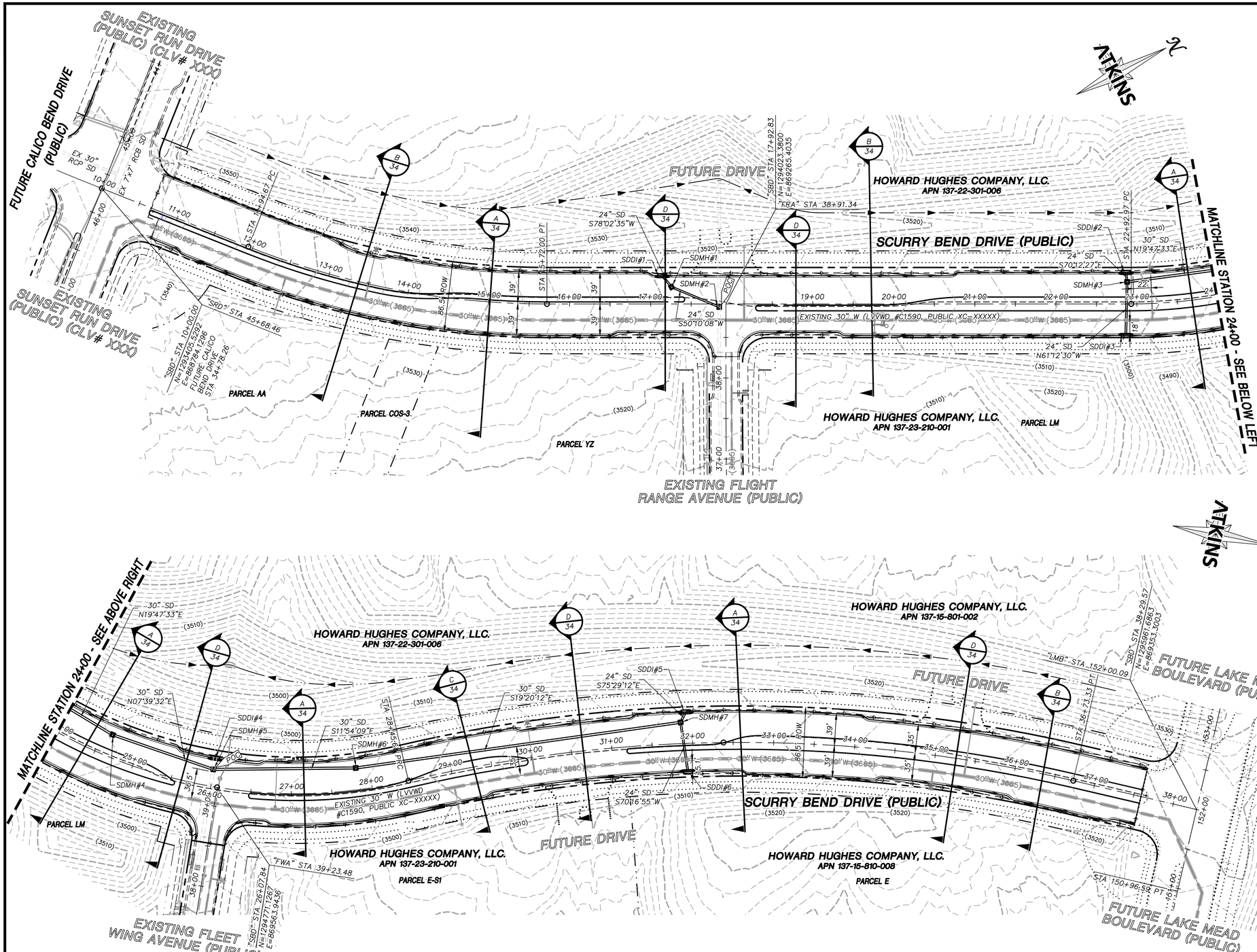

SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
DRAINAGE		
24" CLASS III RCP	246	LF
30" CLASS III RCP	887	LF
48" TYPE III SD MANHOLE	7	EA
7.5' TYPE CM2 DROP INLET	6	EA

STORM DRAIN NOTES

1. SEE PROFILE SHEETS FOR CONSTRUCTION NOTES AND INFORMATION RELATED TO PIPE SIZE (INNER DIAMETER), MANHOLE BASE SIZE (INSIDE DIMENSIONS), AND DROP INLET LENGTHS (CURB OPENING).
2. ALL STORM DRAIN MATERIAL TO BE CLASS III REINFORCED CONCRETE PIPE, UNLESS OTHERWISE NOTED IN PROFILES.
3. CONTRACTOR TO PROVIDE 6" MINIMUM OF CLEARANCE BETWEEN OUTSIDE OF PIPE TO INSIDE WALL OF STORM DRAIN STRUCTURES.

GRAPHIC SCALE
60 0 30 60 120
HORIZONTAL: 1"= 60'

SOILS REPORT

BY NOVA GEOTECHNICAL
PROJECT NO. G-19-026
DATED 6/18/2020
EARTHWORK QUANTITIES (RAW):
CUT= 100 CU YDS
FILL= 5,200 CU YDS

GRADING PLAN CERTIFICATION

NICOLAS BARCOS PE#25673 DATE

CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

DS#XXX-0000

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

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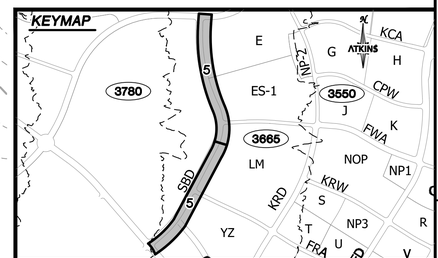
AVOID HITTING OVERHEAD POWER LINES, IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

KEYMAP



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PROFESSIONAL ENGINEER-STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

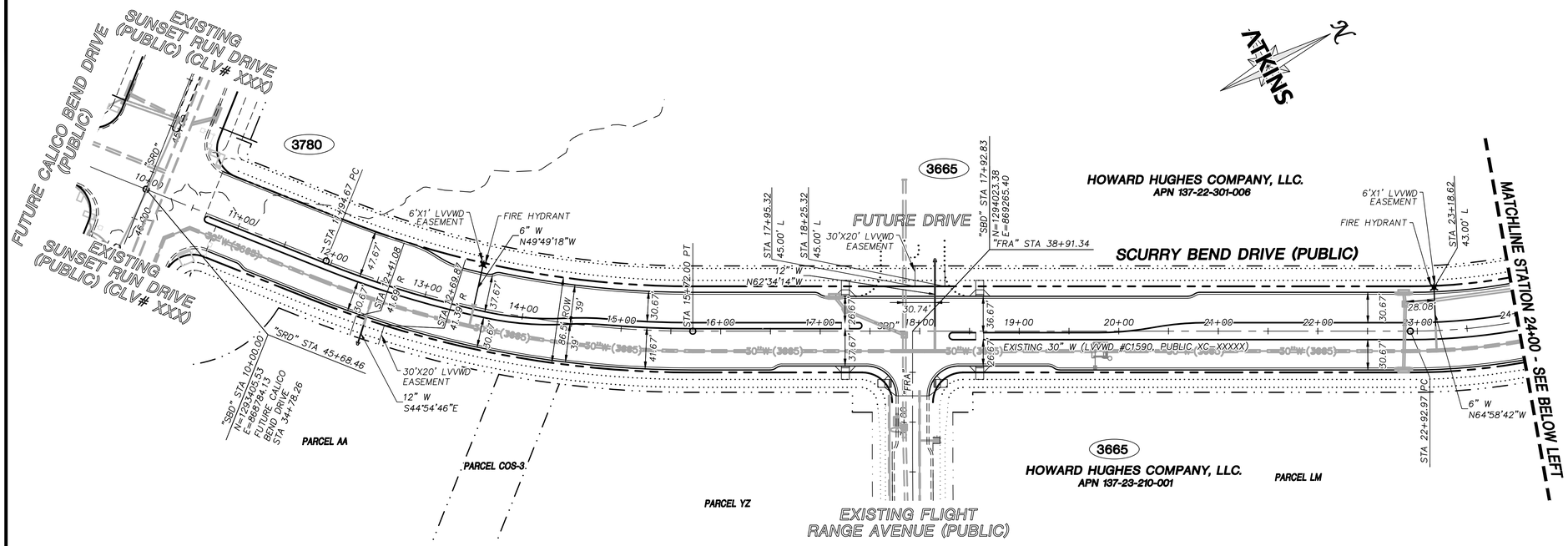
SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

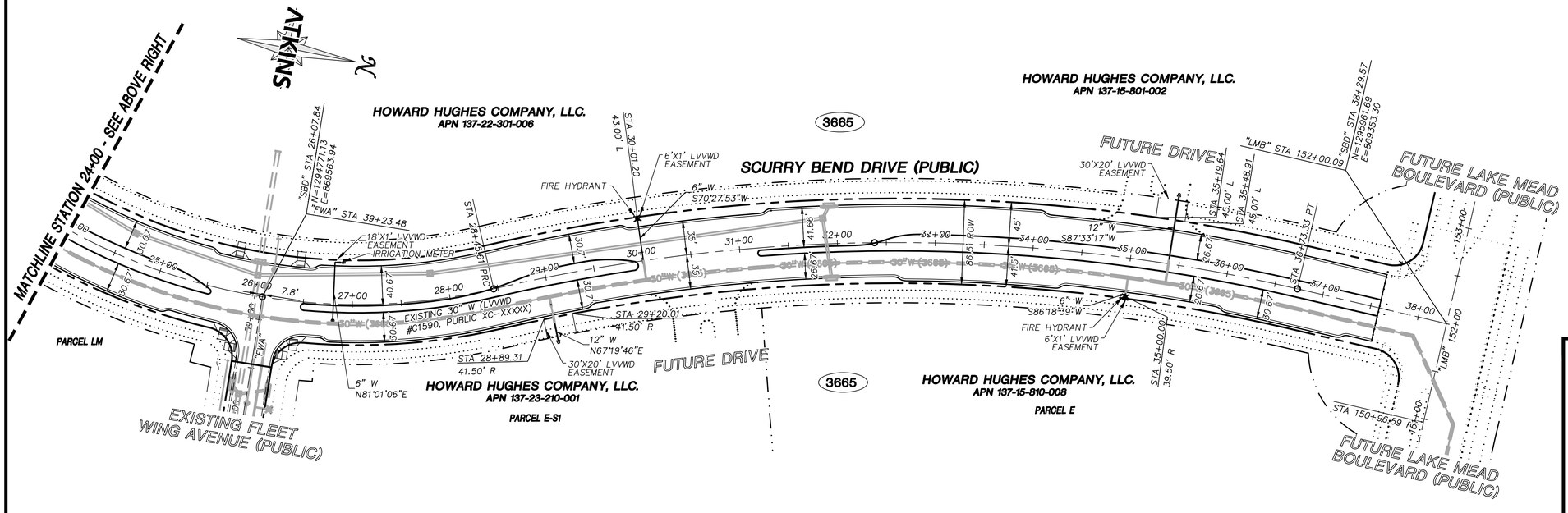
MASTER DRAINAGE PLAN

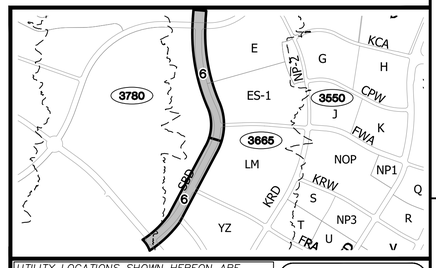
DESIGNED BY: B. WOOTYAK
DRAWN BY: K. HENORY
CHECKED BY: N. BARCOS
HORIZ.: 1"=60'
VERT.: NONE

XXXVXXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 5/42
JOB NO. 100069098

C:\pw_work\atkinsnv01\dms08864\dms56326\69098-05-STRM-SD1.dwg LAYOUT: 5 MASTER DRAINAGE PLAN Mar 08, 2021 - 2:41PM







SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
WATER		
12" DIP WATER PIPE	174	LF
6" DIP WATER PIPE	138	LF
6" C-900 WATER PIPE	63	LF
12" CAP W/ 2" BLOWIFF	5	EA
6" FIRE HYDRANT ASSEMBLY	4	EA
IRRIGATION METER	1	EA

MASTER PLAN NOTE

THIS SHEET IS FOR INFORMATIONAL PURPOSES ONLY. IT IS AN OVERALL REPRESENTATION OF THE UTILITY FOR REVIEW AND COORDINATION WITH OTHER PROJECT DETAILS WITHIN THIS PLAN SET.

WATER NOTES

1. SEE ROAD PLAN AND PROFILE SHEETS FOR CONSTRUCTION NOTES AND INFORMATION RELATED TO PIPE SIZE, LENGTH, AND SIZE OF FITTINGS.
2. ALL WATER PIPE MATERIAL TO BE WATER QUALITY RATED C-900 PVC, UNLESS OTHERWISE NOTED IN PROFILES.
3. INSTALL PIPELINE MARKER BALLS IN TRENCH ABOVE EACH HORIZONTAL ELBOW FITTING PER UDACS PLATE #15.
4. PROTECT IN PLACE AND ADJUST LVVWD EXISTING FACILITIES TO FINISHED GRADE. ALL LVVWD FACILITIES SHALL BE ACCESSIBLE AT ALL TIMES.
5. SEE SHEET 37 FOR WATER DETAILS.
6. CONTRACTOR TO INSTALL PIPE BENDS AS NECESSARY IN ORDER TO ACHIEVE EQUIVALENT PIPE CENTERLINE RADIUS PER UDACS SECTION 2.07 WATER MAIN JOINT DEFLECTION.
7. ALL MEASUREMENTS ARE FROM CENTER OF FITTING TO CENTER OF FITTING.
8. THIS PROJECT PROVIDES FOR THE INSTALLATION OF OFF-SITE WATER MAINS ONLY, AND DOES NOT PROVIDE OR IMPLY ANY WATER COMMITMENT.
9. ALL SEWER AND STORM DRAIN UTILITY CROSSINGS TO COMPLY WITH UDACS SECTION 2.22.
10. IN ROUGH GRADING AREAS, RIM ELEVATIONS FOR STRUCTURES IS SET AT 8.5" ABOVE ROUGH GRADE.

GRAPHIC SCALE
60 0 30 60 120
HORIZONTAL: 1" = 60'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES
LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL
PROJECT NO. LVVWD FIRST APPROVED DATE: _____

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

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

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

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PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

MASTER WATER PLAN

DESIGNED BY: B. WICHTYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=60'
VERT.: NONE

XXXVXXXX
LXX-YXXXXX
DATE: MARCH, 2021
DRAWING NO. 6/42

JOB NO. 100069098

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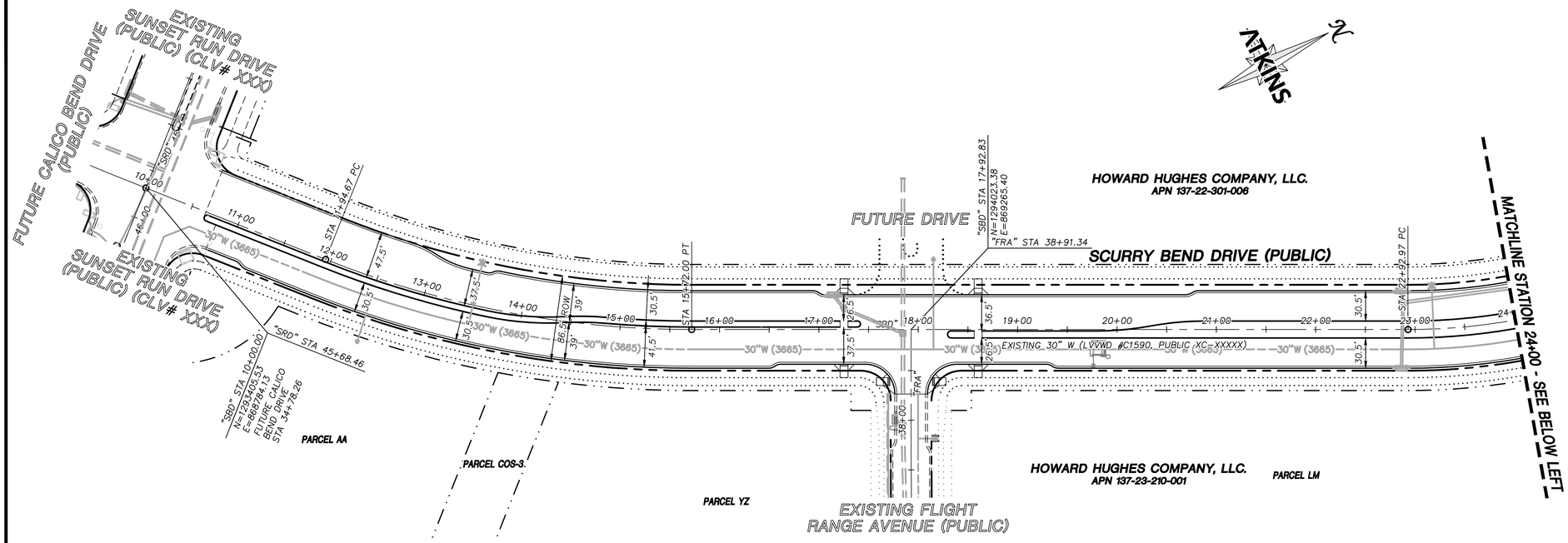

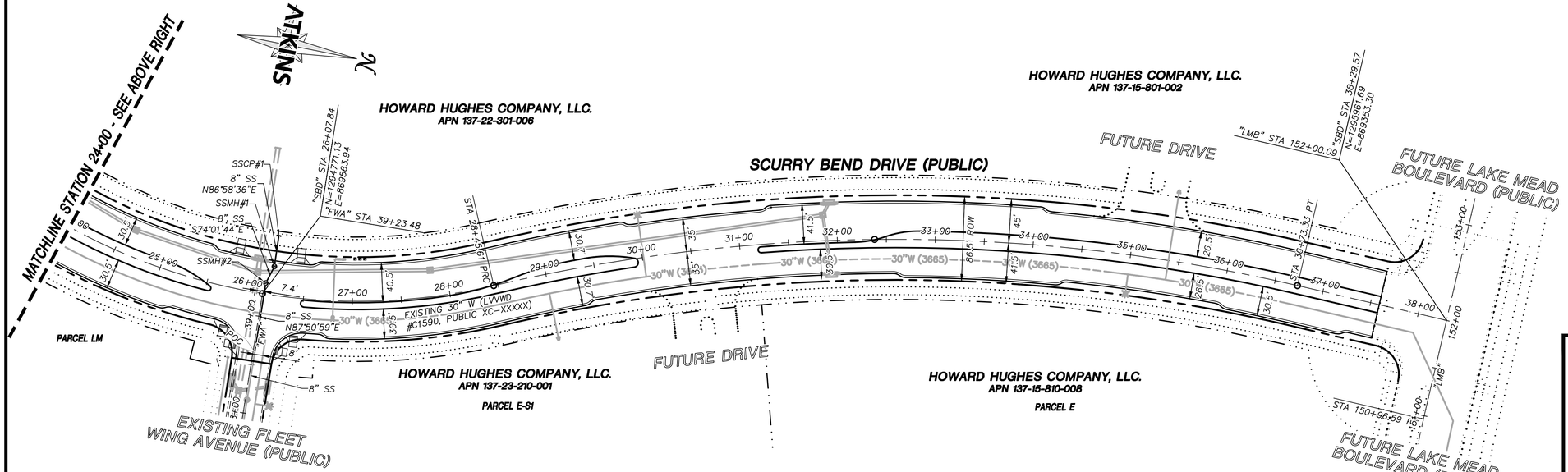

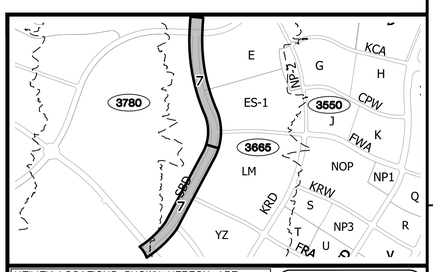

SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
SEWER		
8" C-900 SEWER PIPE	121	LF
48" SEWER MANHOLE	2	EA
SEWER CAP	1	EA

MASTER PLAN NOTE

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SEWER NOTES

1. SEE ROADWAY PLAN AND PROFILE SHEETS FOR CONSTRUCTION NOTES AND INFORMATION RELATED TO PIPE SIZE, SLOPE, INVERT, RIM INFORMATION, AND MANHOLE BASE SIZE.
2. ALL SEWER PIPE MATERIAL TO BE WATER QUALITY RATED AWWA C-900, UNLESS OTHERWISE NOTED IN PROFILES.
3. ALL SEWER MANHOLES TO BE POLYMER LINED AND ALL JOINTS TO HAVE SIKAFLEX 2C NS SEALANT BETWEEN COMPONENTS.
4. ALL SEWER MANHOLES GREATER THAN 20' DEEP TO BE LINED WITH CORROSION PROTECTION PER DCSCWS STANDARD PLATE SD-1.

GRAPHIC SCALE
60 0 30 60 120
HORIZONTAL: 1"= 60'

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

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T21S,R59E,S03

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

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PROFESSIONAL ENGINEER, STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

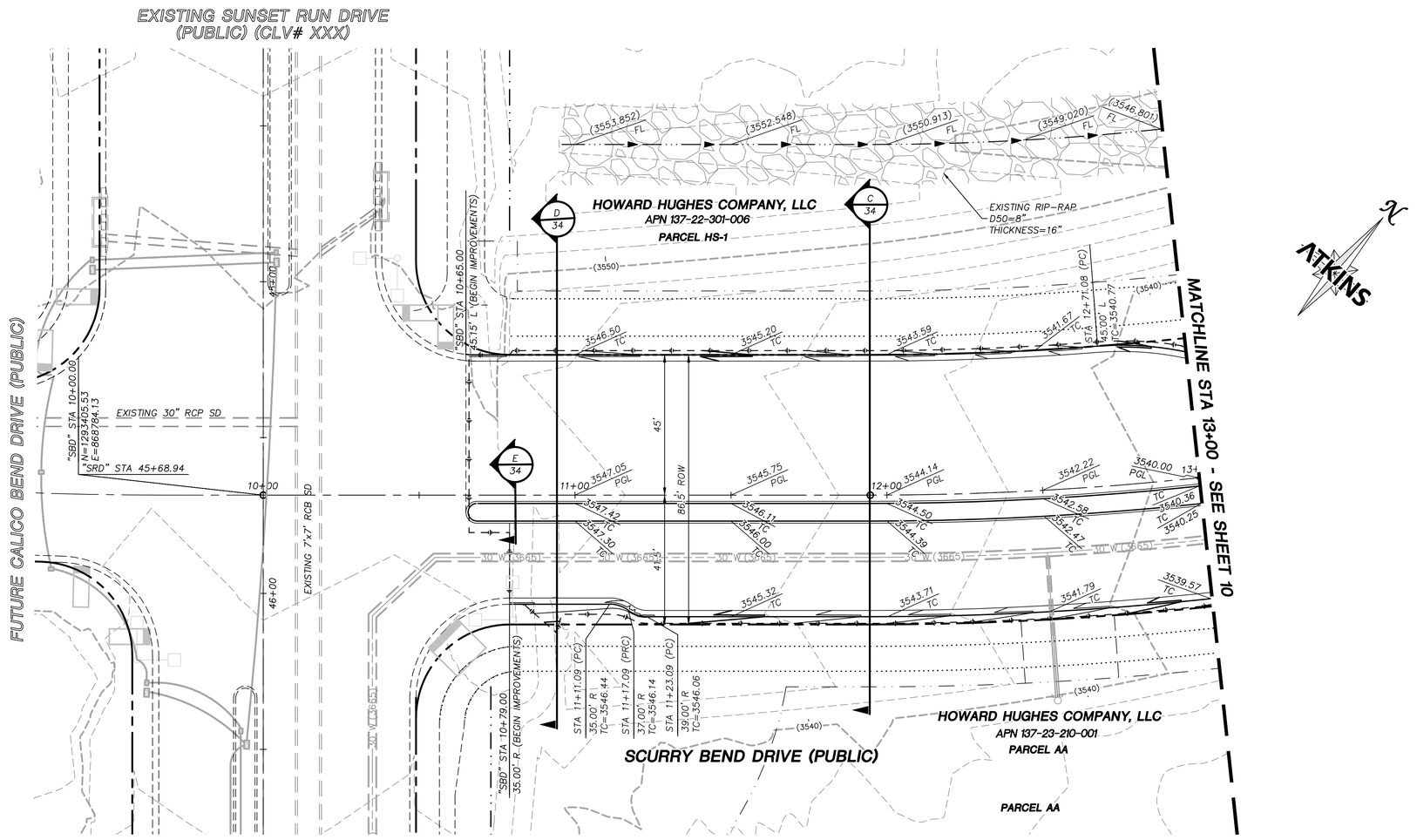
SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

MASTER SEWER PLAN

DESIGNED BY: B. MOHTYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=60'
VERT.: NONE

XXXVXXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 7/42
JOB NO. 100069098

C:\pw_work\atkinsnv01\dms8864\dms56326\69098-07-SSMR-SS1.dwg LAYOUT: 7 MASTER SEWER PLAN Mar 08, 2021 - 2:43PM



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

NICOLAS BARCOS PE#25673 DATE

CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

DS#XXX-0000

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

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T21S,R59E,S03

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

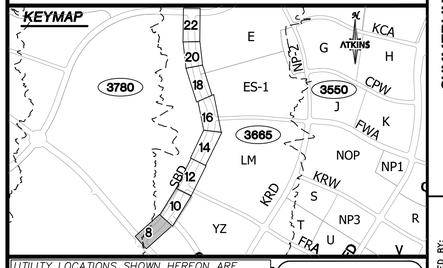
STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET 3 FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
3. INSTALL TYPE II SD MANHOLE PER CCAUSD #405.2
4. INSTALL TYPE III SD MANHOLE PER CCAUSD #406
5. INSTALL NDOT TYPE 2 DROP INLET PER NDOT R-4.2.1 (SEE SHEET 29)
6. STUB & PLUG STORM DRAIN FOR FUTURE CONNECTION PER MANUFACTURER'S PLUG, OR APPROVED EQUAL (SEE SHEET 35)
7. NOT USED
8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 35 FOR DETAIL
10. INSTALL TYPE I SD RISER PER CCAUSD #403.1
11. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
12. INSTALL PRECAST REINFORCED CONCRETE BOX PER NDOT STANDARD 502 AND 503 SEE SHEET 35 FOR RCB INFORMATION

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

KEYMAP



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PROFESSIONAL ENGINEER-STATE OF NEVADA NICOLAS A. BARCOS EXP. 12-31-20 CIVIL No. 25673
3/8/2021

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN
BEGIN TO STA 13+00

DESIGNED BY: B. MOSHTYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=20'
VERT.: NONE

XXVVXXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 8.42
JOB NO. 100069098

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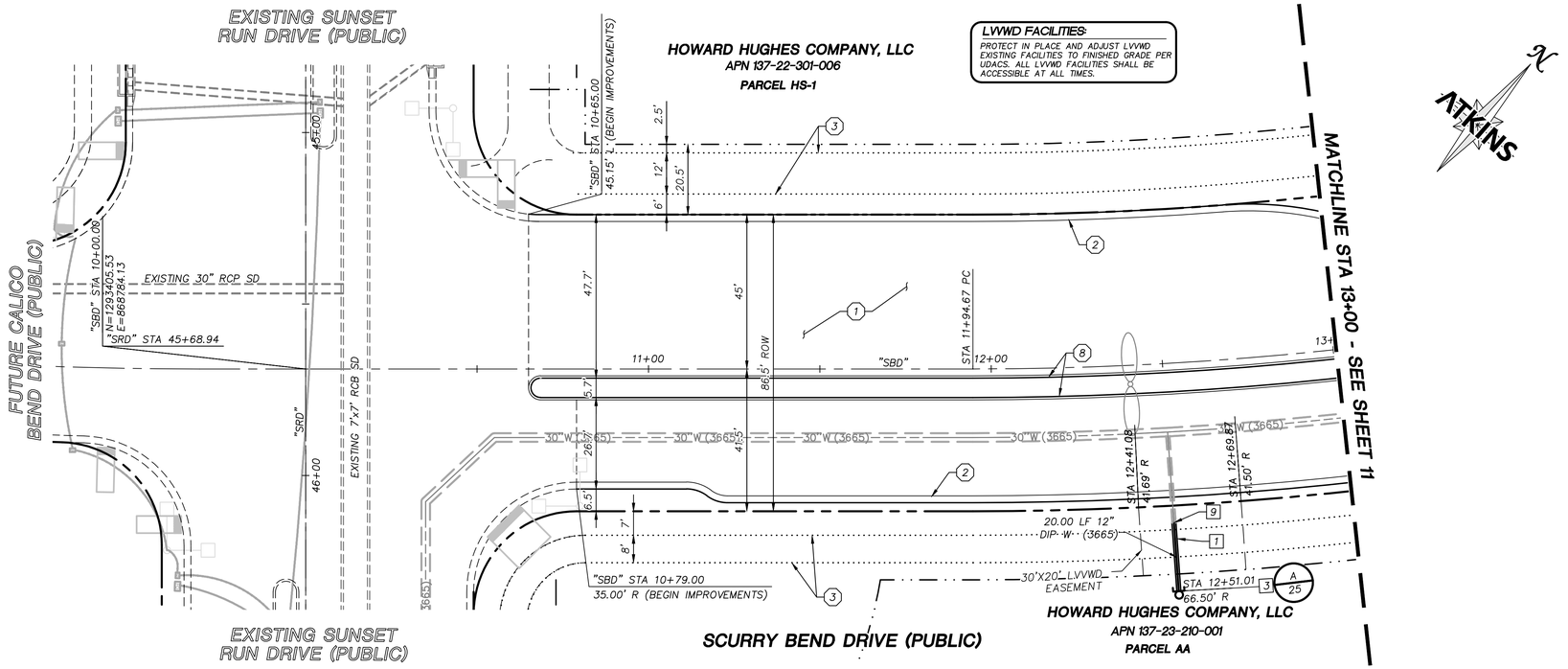

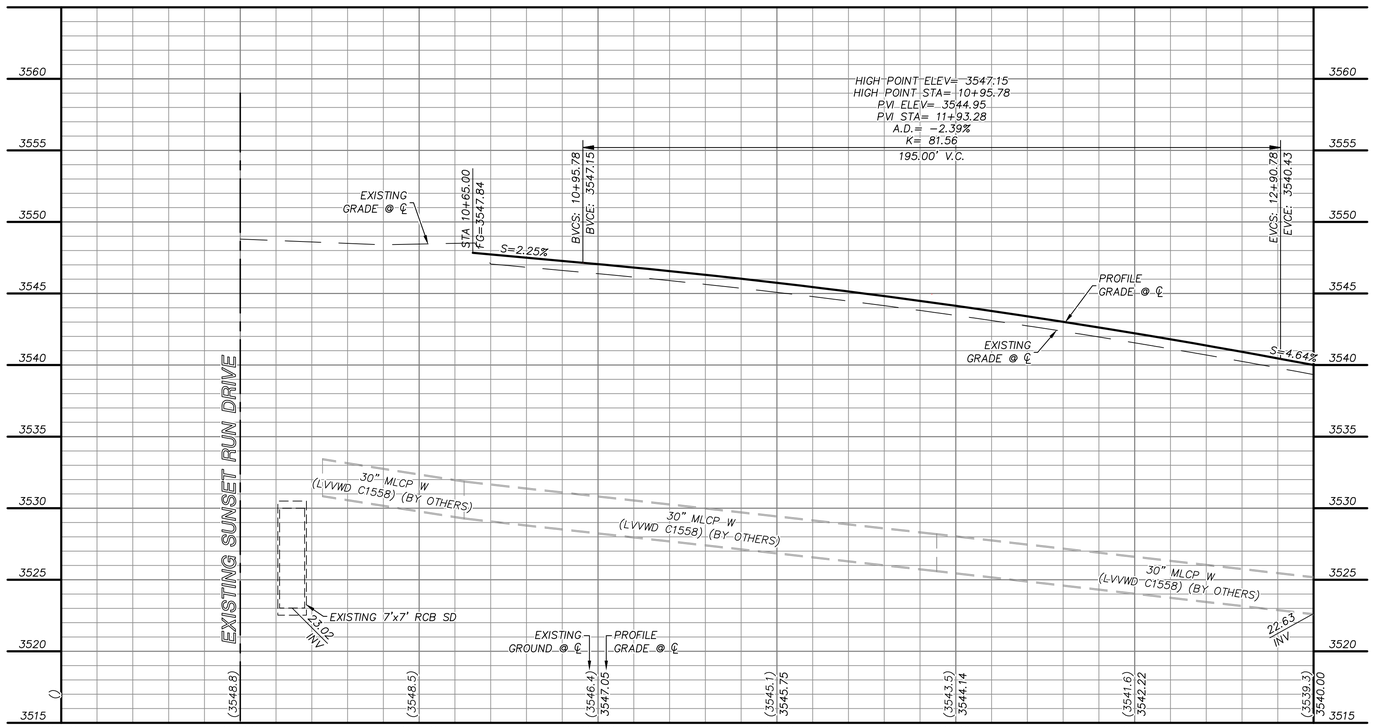

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

5 0 2.5 5 10

VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING AND PLANNING SERVICES

PROJECT NO. 000000 FIRST APPROVED DATE: _____

LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

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NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

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

STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET 3 FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
3. INSTALL TYPE II SD MANHOLE PER CCAUSD #405.2
4. INSTALL TYPE III SD MANHOLE PER CCAUSD #406
5. INSTALL NDOT TYPE 2 DROP INLET PER NDOT R-4.2.1 (SEE SHEET 29)
6. STUB & PLUG STORM DRAIN FOR FUTURE CONNECTION PER MANUFACTURER'S PLUG, OR APPROVED EQUAL (SEE SHEET 35)
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8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 35 FOR DETAIL
10. INSTALL TYPE I SD RISER PER CCAUSD #403.1
11. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
12. INSTALL PRECAST REINFORCED CONCRETE BOX PER NDOT STANDARD 502 AND 503 SEE SHEET 35 FOR RCB INFORMATION

SEWER CONSTRUCTION NOTES

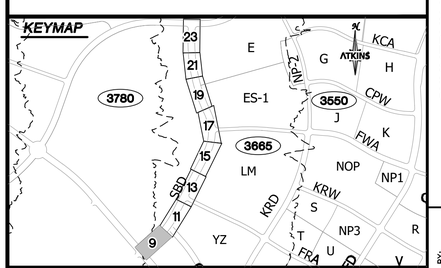
1. INSTALL SEWER MANHOLE PER DCSWCS SD-1A, SD-1B, AND SD-4
2. INSTALL SEWER MAIN PER DCSWCS SD-17
3. STUB AND CAP SEWER PIPE. PLACE MARKER BALL AND 4"X4" POST, DOUGLAS FIR, OVER END OF PIPE AND INSTALL THRUST BLOCK (1 CUBIC FT. MINIMUM).
4. CONNECT TO EXISTING SEWER MAIN

WATERLINE CONSTRUCTION NOTES

1. INSTALL WATER MAIN PER UDACS PLATES #17 AND PLATE #19
2. INSTALL GATE VALVE PER UDACS PLATES #30 AND #39
3. INSTALL CAP AND 2" MANUAL BLOWOFF ASSEMBLY PER UDACS PLATE #36
4. INSTALL TEE W/ VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31 AND #39
5. INSTALL FIRE HYDRANT WITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40.
6. INSTALL DEFLECTION AT PIPE JOINTS (MAXIMUM OF 1°)
7. INSTALL 1.5" METER WITH 1.5" RPPA PER UDACS PLATES #4 AND #8
8. INSTALL 1.5" SERVICE SADDLE PER UDACS PLATE #4
9. REMOVE CAP AND 2" BLOWOFF AND CONNECT TO EXISTING WATERLINE STUB
10. INSTALL VERTICAL BEND PER UDACS PLATE #31

ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 34 FOR TYPICAL PAVEMENT SECTION.
2. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
3. FUTURE SIDEWALK BY OTHERS
4. CONSTRUCT CURB RAMP, TYPE A, PER NDOT STANDARD PLAN R-5.2.1.
5. CONSTRUCT 0" FLUSH CURB
6. TRANSITION CURB FROM FULL HEIGHT (6") TO FLUSH (0")
7. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4",1-6") PER DETAIL C ON SHEET 37.
8. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD #219



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PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25870
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY PLAN + PROFILE BEGIN TO STA 13+00

DESIGNED BY: B. MOHTAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=20'
VERT.: NONE

XXVVXXXX.
LXX-XXXXX.

DATE: MARCH, 2021
DRAWING NO. 9/42

JOB NO. 100069098

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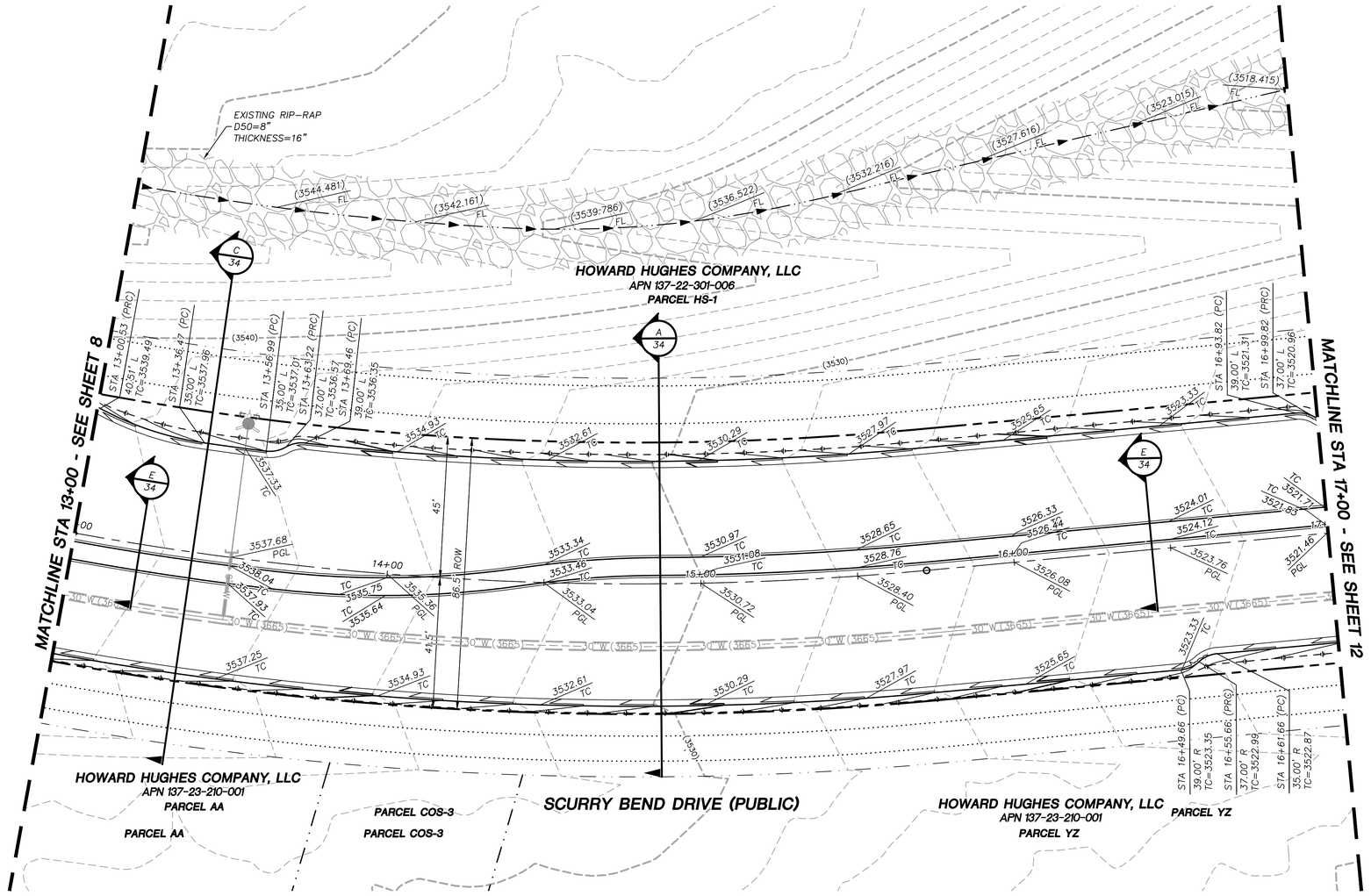

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

NICOLAS BARCOS PE#25673 DATE

CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

DS#XXX-0000

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

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T21S,R59E,S03

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

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COMPLY. Call 811 OR 1-800-642-2444

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

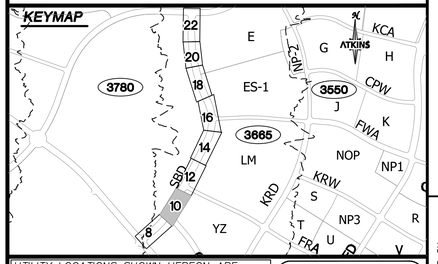
STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET 3 FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
3. INSTALL TYPE II SD MANHOLE PER CCAUSD #405.2
4. INSTALL TYPE III SD MANHOLE PER CCAUSD #406
5. INSTALL NDOT TYPE 2 DROP INLET PER NDOT R-4.2.1 (SEE SHEET 29)
6. STUB & PLUG STORM DRAIN FOR FUTURE CONNECTION PER MANUFACTURER'S PLUG, OR APPROVED EQUAL (SEE SHEET 35)
7. NOT USED
8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 35 FOR DETAIL
10. INSTALL TYPE I SD RISER PER CCAUSD #403.1
11. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
12. INSTALL PRECAST REINFORCED CONCRETE BOX PER NDOT STANDARD 502 AND 503 SEE SHEET 35 FOR RCB INFORMATION

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

KEYMAP



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NICOLAS A. BARCOS EXP. 12-31-20 NEVADA CIVIL No. 25673 STATE OF NEVADA

3/8/2021

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN
STA 13+00 TO STA 17+00

DESIGNED BY: B. WICHTYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=20'
VERT.: NONE

XXXVXXXX
LXX-YXXXX
DATE: MARCH, 2021
DRAWING NO. 10/42

JOB NO. 100069098

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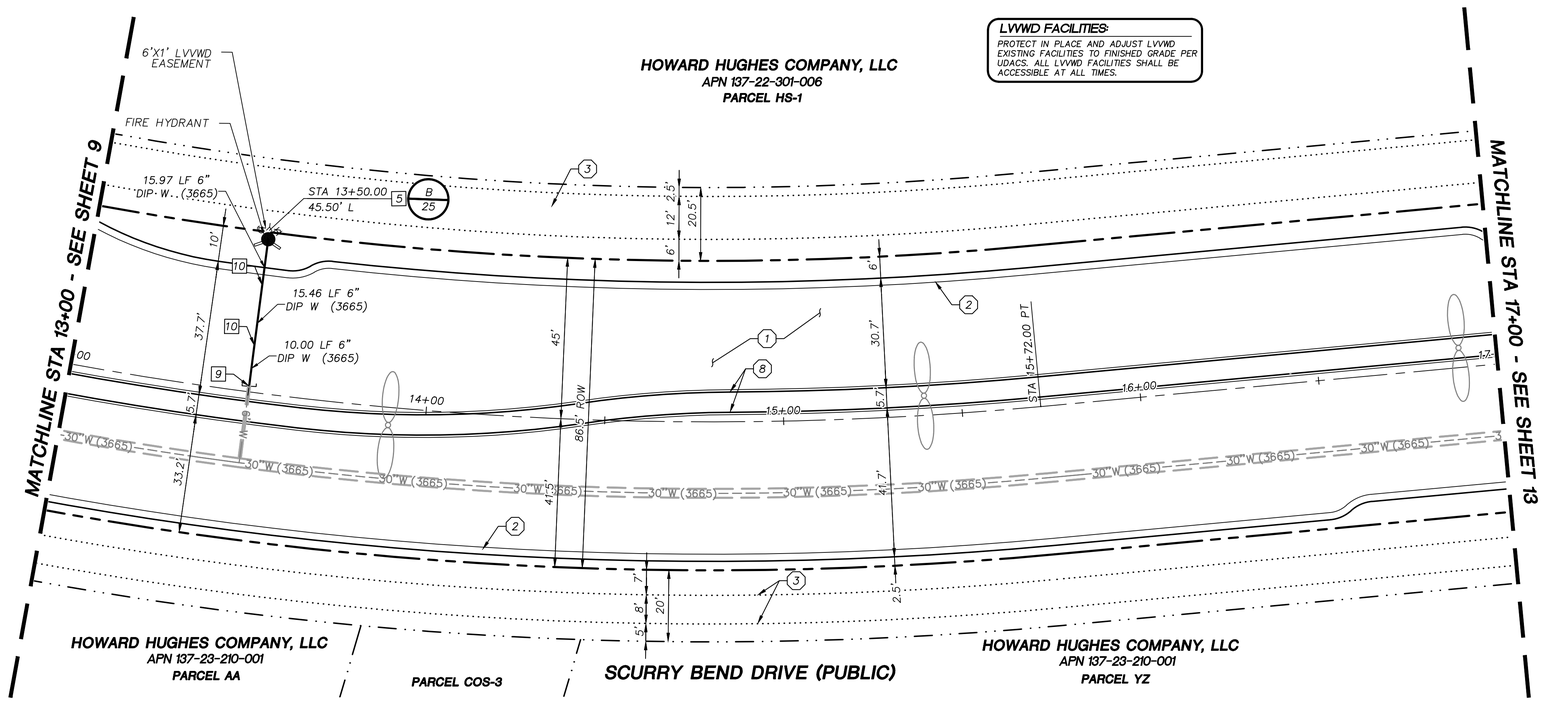

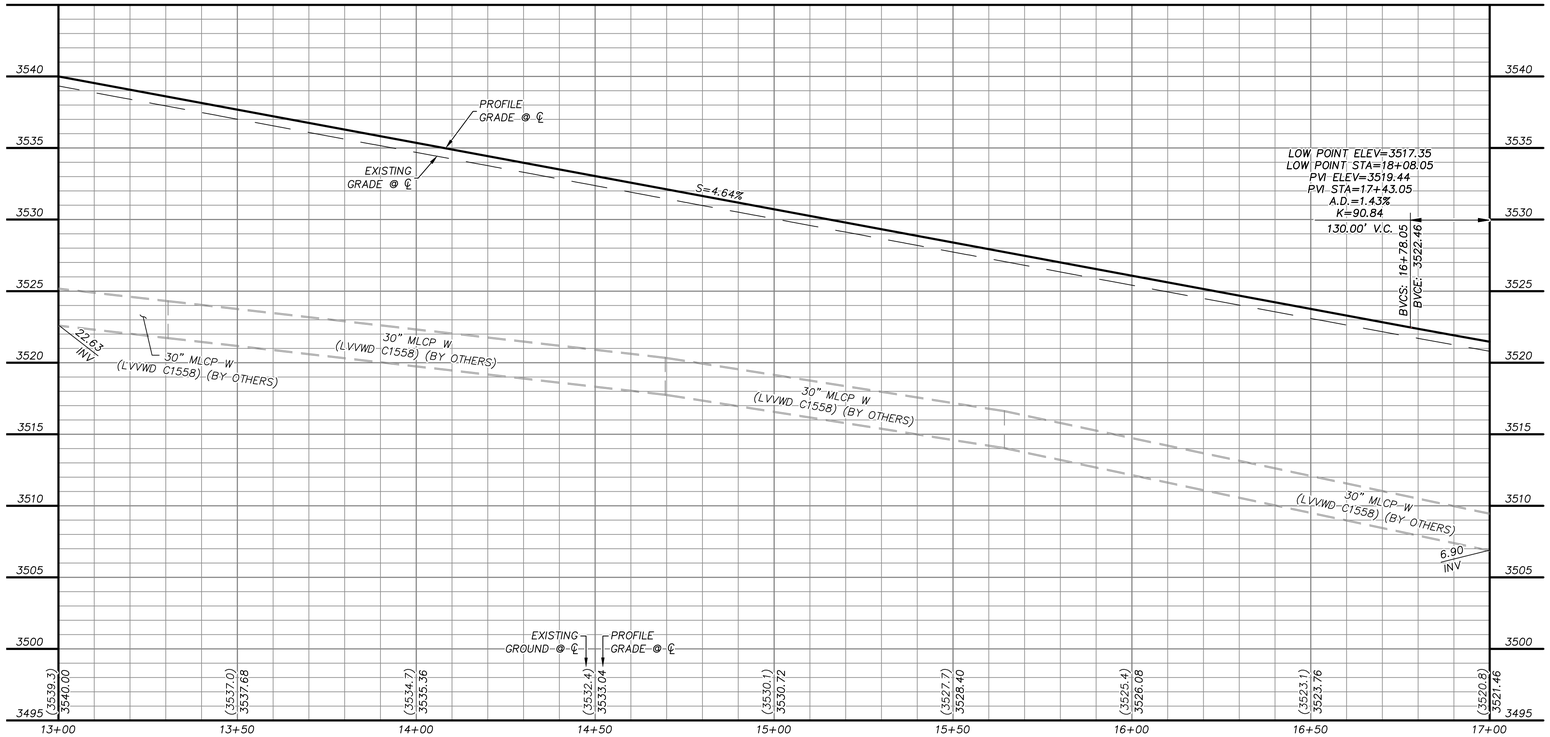

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2. INSTALL SEWER MAIN PER DCSWCS SD-17
3. STUB AND CAP SEWER PIPE. PLACE MARKER BALL AND 4"X4" POST, DOUGLAS FIR, OVER END OF PIPE AND INSTALL THRUST BLOCK (1 CUBIC FT. MINIMUM).
4. CONNECT TO EXISTING SEWER MAIN

WATERLINE CONSTRUCTION NOTES

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2. INSTALL GATE VALVE PER UDACS PLATES #30 AND #39
3. INSTALL CAP AND 2" MANUAL BLOWOFF ASSEMBLY PER UDACS PLATE #36
4. INSTALL TEE W/ VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31 AND #39
5. INSTALL FIRE HYDRANT WITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40.
6. INSTALL DEFLECTION AT PIPE JOINTS (MAXIMUM OF 1°)
7. INSTALL 1.5" METER WITH 1.5" RPPA PER UDACS PLATES #4 AND #8
8. INSTALL 1.5" SERVICE SADDLE PER UDACS PLATE #4
9. REMOVE CAP AND 2" BLOWOFF AND CONNECT TO EXISTING WATERLINE STUB
10. INSTALL VERTICAL BEND PER UDACS PLATE #31

ROADWAY CONSTRUCTION NOTES

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3. FUTURE SIDEWALK BY OTHERS
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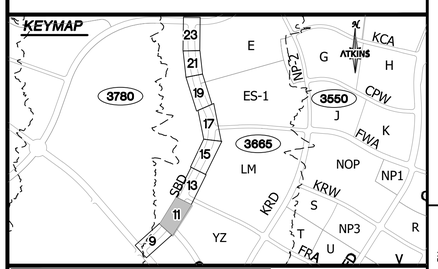
8. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD #219



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'
5 0 2.5 5 10
VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING AND PLANNING SERVICES

PROJECT NO. 000000 FIRST APPROVED DATE: _____

LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368
(REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS
(3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 COOPERATIVE AND INTERNATIONAL SYSTEMS OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES WITH YOU DIGGING. Call 811 OR 1-800-642-2444

AVOID HITTING OVERHEAD POWER LINES WITH YOU DIGGING. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

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PROFESSIONAL ENGINEER-STATE OF NEVADA
NICOLAS A BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY PLAN + PROFILE
STA 13+00 TO STA 17+00

DESIGNED BY:	B. MOCHTYAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
HORIZ.:	1"=20'
VERT.:	NONE
XXXVXXXX	
LXX-XXXXX	
DATE:	MARCH, 2021
DRAWING NO.	11/42
JOB NO.	100069098

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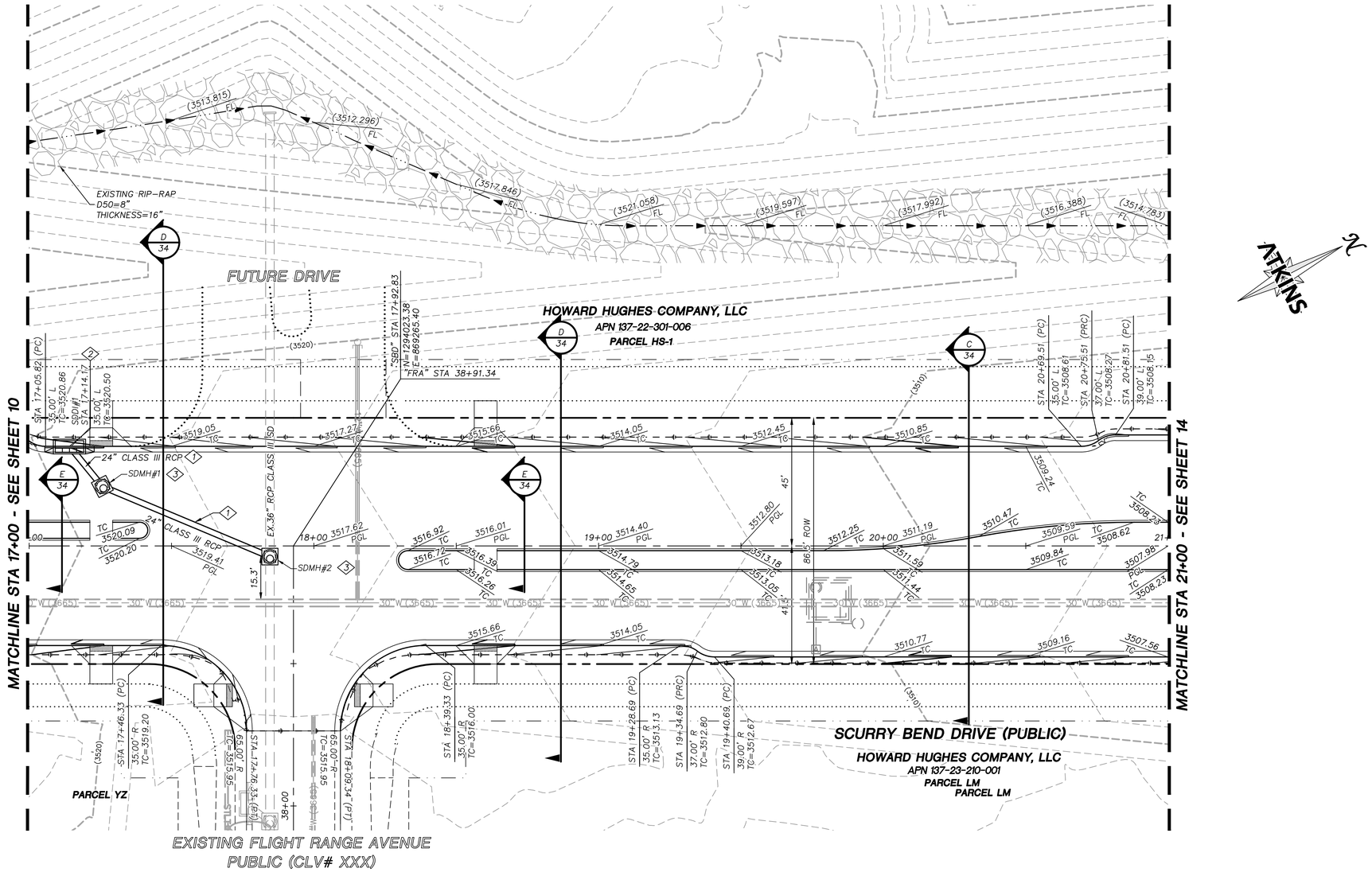

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12. INSTALL PRECAST REINFORCED CONCRETE BOX PER NDOT STANDARD 502 AND 503 SEE SHEET 35 FOR RCB INFORMATION

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

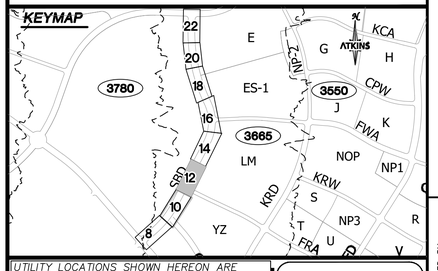
ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN
STA 17+00 TO STA 21+00

KEYMAP



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

NICOLAS BARCOS PE#25673 DATE

CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

DS#XXX-0000

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368
(REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 NEVADA 811 SYSTEM OF TRANSPORTATION

Call before you Dig AVOID OUTAGE & EXCAVATION UTILITY LINES. IT'S COURTLY. Call 811 or 1-800-642-2444

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

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PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

DESIGNED BY:	B. MOCHTAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
HORIZ.: 1"=20'	
VERT.: NONE	
XXXVXXXX	
LXX-XXXXXX	
DATE:	MARCH, 2021
DRAWING NO.	12/42

JOB NO. 100069098

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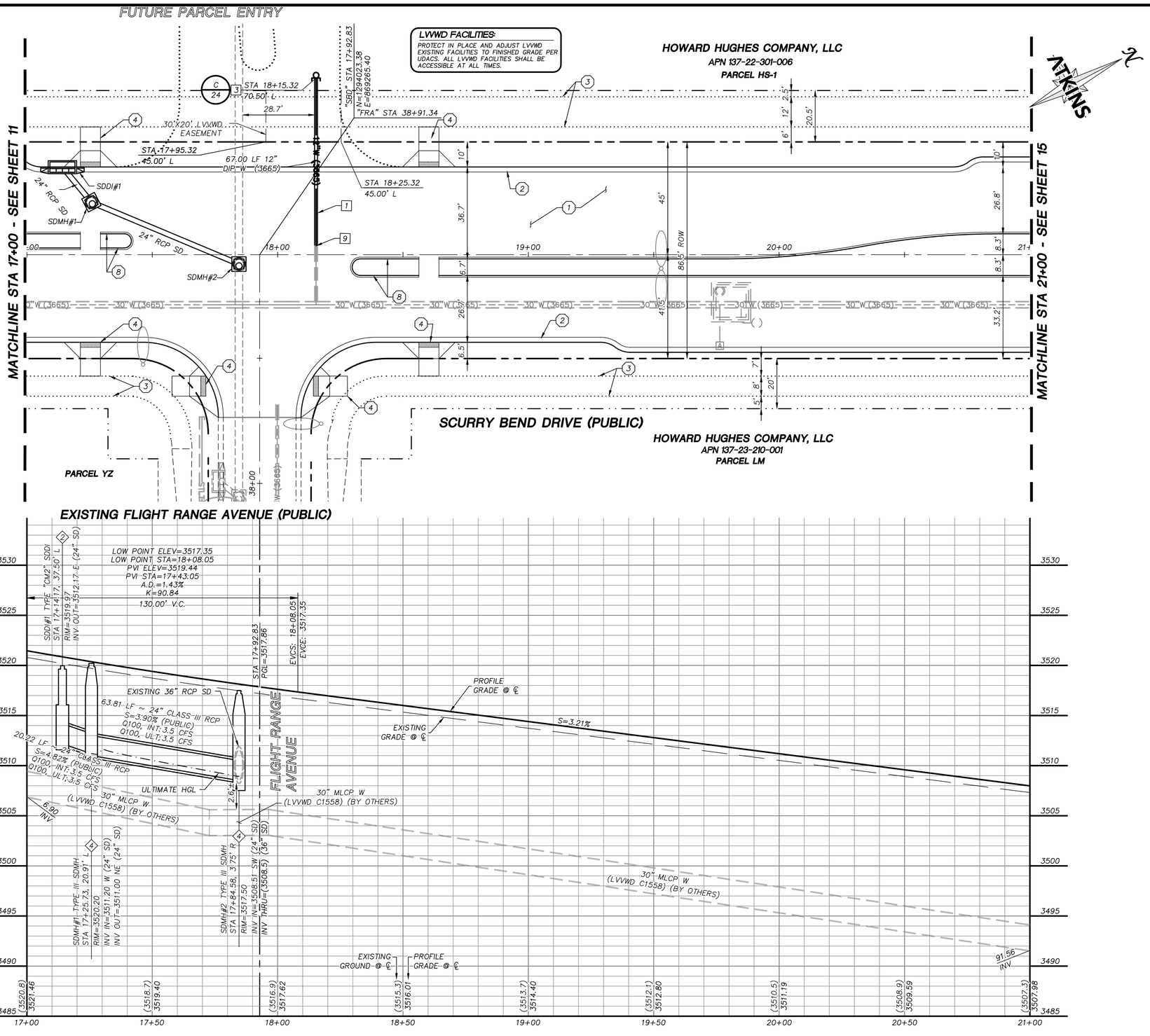

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

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VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING AND PLANNING SERVICES

PROJECT NO. 000000 FIRST APPROVED DATE: _____

LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL

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BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
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T21S,R59E,S03

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5. CONSTRUCT 0" FLUSH CURB
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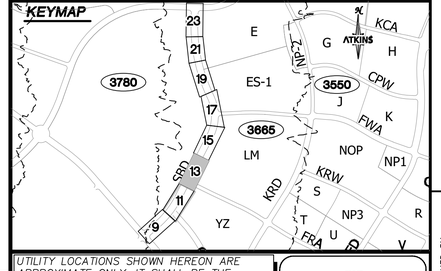

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PROFESSIONAL ENGINEER - STATE OF NEVADA - NICOLAS A BARCOS - EXP. 12-31-20 - CIVIL - No. 25673

3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 26
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY PLAN + PROFILE
STA 17+00 TO STA 21+00

DESIGNED BY:	B. WICHTJAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
HORIZ.:	1"=20'
VERT.:	NONE
XXXVXXXX LXX-XXXXXX	
DATE:	MARCH, 2021
DRAWING NO.	13/42
JOB NO.	100069098

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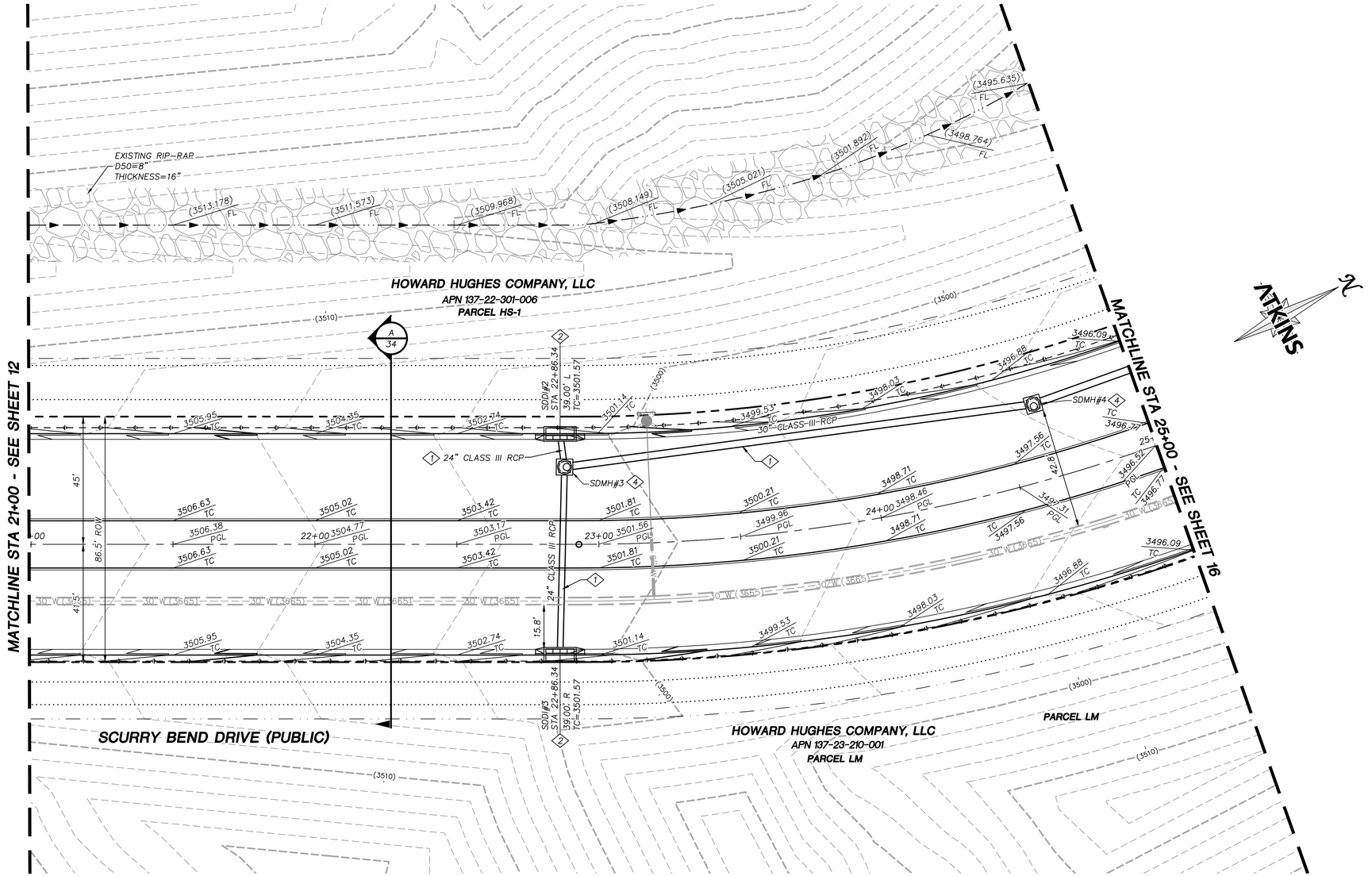

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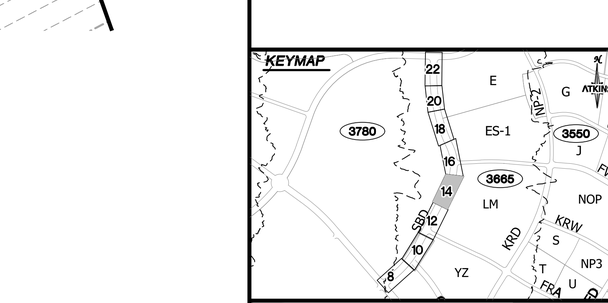

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

NICOLAS BARCOS PE#25673 DATE

CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

DS#XXX-0000

BASIS OF BEARING

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PROFESSIONAL ENGINEER STATE OF NEVADA NICOLAS A. BARCOS EXP. 12-31-20 CIVIL No. 25673 3/8/2021

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SUMMERLIN

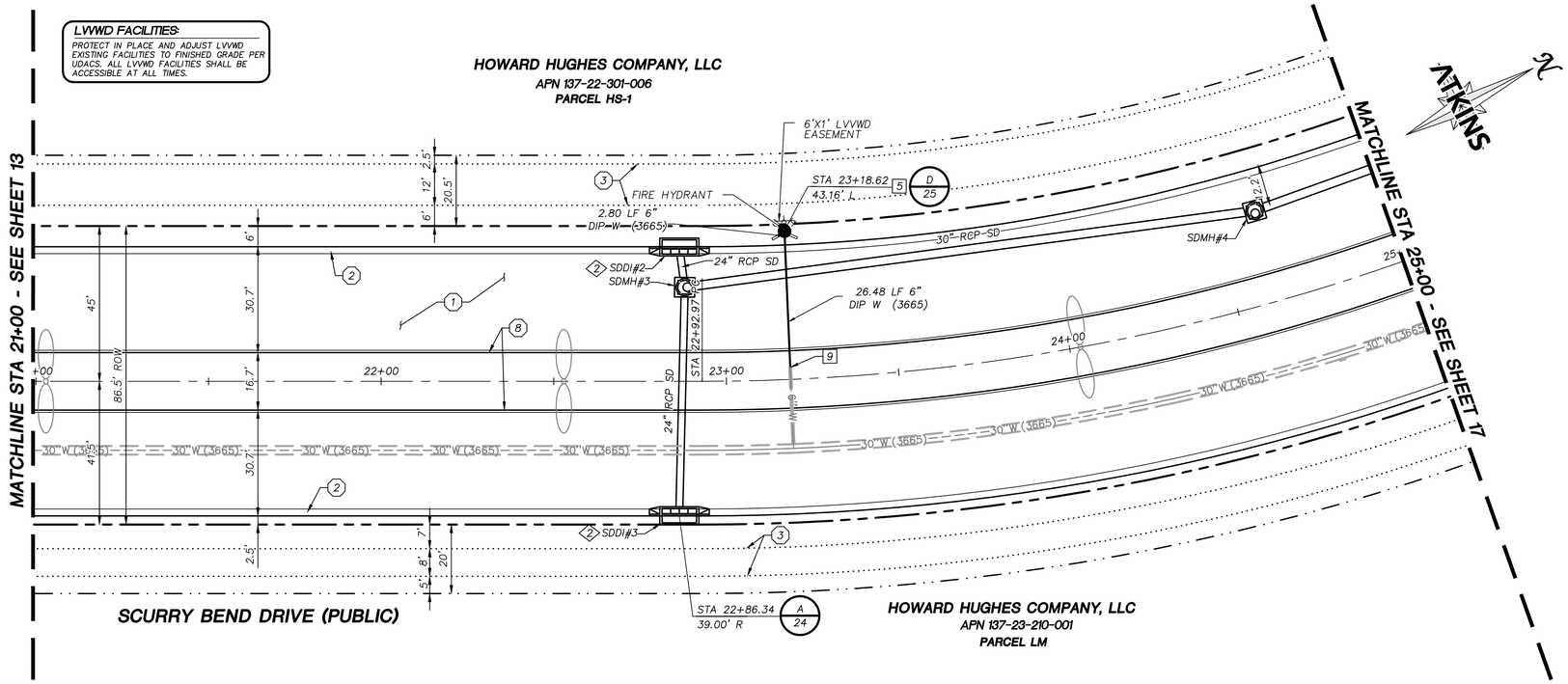
SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

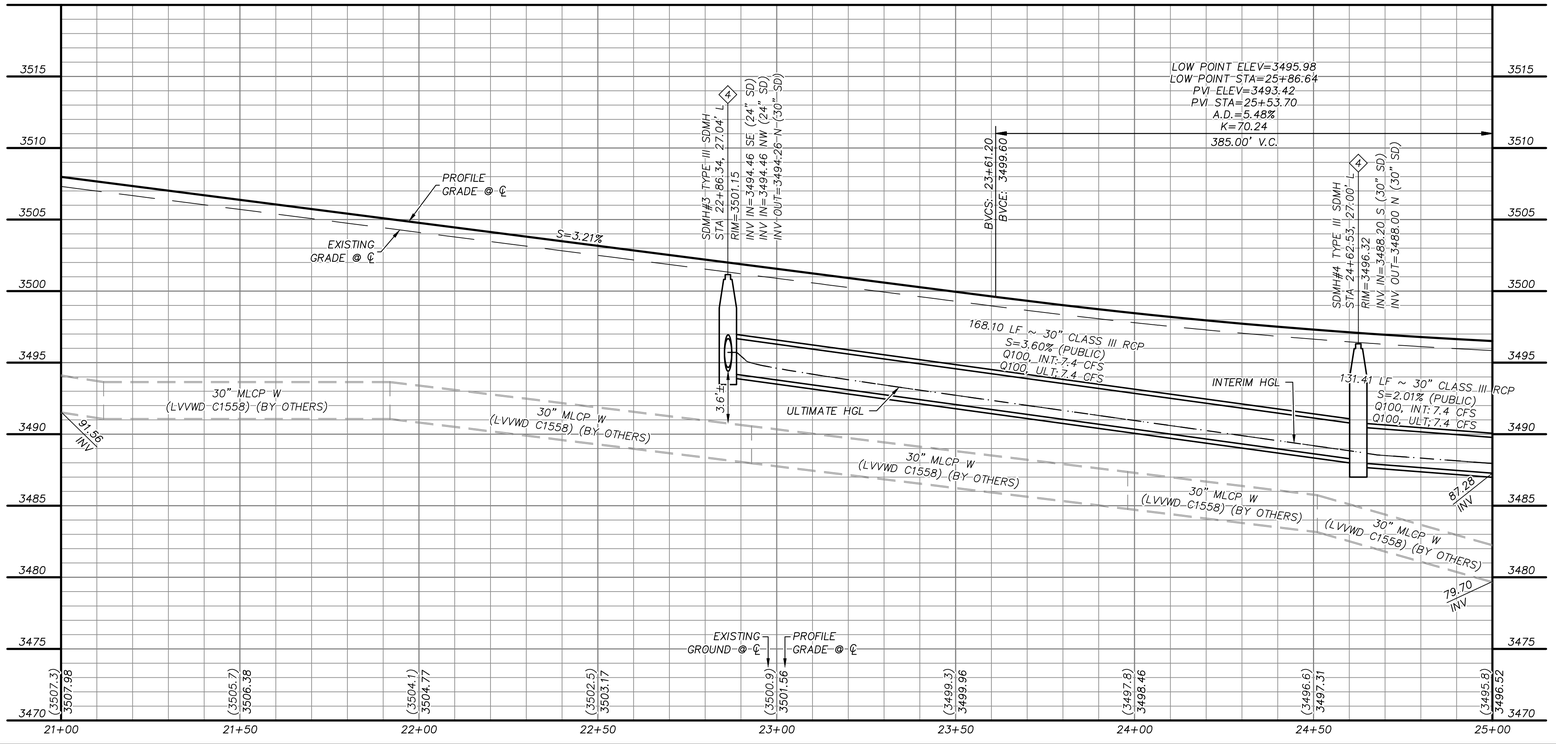
ROADWAY GRADING PLAN
STA 21+00 TO STA 25+00

DESIGNED BY: B. MCINTYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=20'
VERT.: NONE

XXXVXXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 14/42
JOB NO. 100069098

C:\pw_work\atkronyO1\simo8864\dms56328\69098-08-GRAD-G1.dwg LAYOUT: 14 ROADWAY GRADING PLAN Mar 08, 2021 - 3:03PM





GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

5 0 2.5 5 10

VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING AND PLANNING SERVICES

PROJECT NO. 000000 FIRST APPROVED DATE: _____

LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

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

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

STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET 3 FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
3. INSTALL TYPE II SD MANHOLE PER CCAUSD #405.2
4. INSTALL TYPE III SD MANHOLE PER CCAUSD #406
5. INSTALL NDOT TYPE 2 DROP INLET PER NDOT R-4.2.1 (SEE SHEET 29)
6. STUB & PLUG STORM DRAIN FOR FUTURE CONNECTION PER MANUFACTURER'S PLUG, OR APPROVED EQUAL (SEE SHEET 35)
7. NOT USED
8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 35 FOR DETAIL
10. INSTALL TYPE I SD RISER PER CCAUSD #403.1
11. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
12. INSTALL PRECAST REINFORCED CONCRETE BOX PER NDOT STANDARD 502 AND 503 SEE SHEET 35 FOR RCB INFORMATION

SEWER CONSTRUCTION NOTES

1. INSTALL SEWER MANHOLE PER DCSWCS SD-1A, SD-1B, AND SD-4
2. INSTALL SEWER MAIN PER DCSWCS SD-17
3. STUB AND CAP SEWER PIPE. PLACE MARKER BALL AND 4"X4" POST, DOUGLAS FIR, OVER END OF PIPE AND INSTALL THRUST BLOCK (1 CUBIC FT. MINIMUM).
4. CONNECT TO EXISTING SEWER MAIN

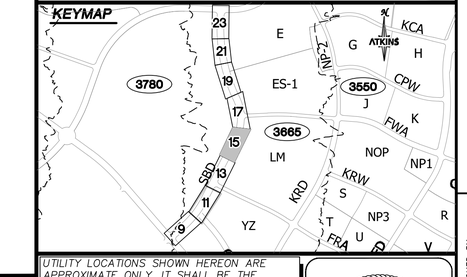
WATERLINE CONSTRUCTION NOTES

1. INSTALL WATER MAIN PER UDACS PLATES #17 AND PLATE #19
2. INSTALL GATE VALVE PER UDACS PLATES #30 AND #39
3. INSTALL CAP AND 2" MANUAL BLOWOFF ASSEMBLY PER UDACS PLATE #36
4. INSTALL TEE W/ VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31 AND #39
5. INSTALL FIRE HYDRANT WITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40.
6. INSTALL DEFLECTION AT PIPE JOINTS (MAXIMUM OF 1°)
7. INSTALL 1.5" METER WITH 1.5" RPPA PER UDACS PLATES #4 AND #8
8. INSTALL 1.5" SERVICE SADDLE PER UDACS PLATE #4
9. REMOVE CAP AND 2" BLOWOFF AND CONNECT TO EXISTING WATERLINE STUB
10. INSTALL VERTICAL BEND PER UDACS PLATE #31

ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 34 FOR TYPICAL PAVEMENT SECTION.
2. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
3. FUTURE SIDEWALK BY OTHERS
4. CONSTRUCT CURB RAMP, TYPE A, PER NDOT STANDARD PLAN R-5.2.1.
5. CONSTRUCT 0" FLUSH CURB
6. TRANSITION CURB FROM FULL HEIGHT (6") TO FLUSH (0")
7. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4",1-6") PER DETAIL C ON SHEET 37.
8. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD #219

KEYMAP



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PROFESSIONAL ENGINEER - STATE OF NEVADA - NICOLAS A. BARCOS - No. 25013 - EXP. 12-31-20 - CIVIL

3/8/2021

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY PLAN + PROFILE
STA 21+00 TO STA 25+00

DESIGNED BY:	B. MCINTYAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
HORIZ.:	1"=20'
VERT.:	NONE
XXVVXXXX. LXX-XXXXX	
DATE:	MARCH, 2021
DRAWING NO.	15/42
JOB NO.	100069098

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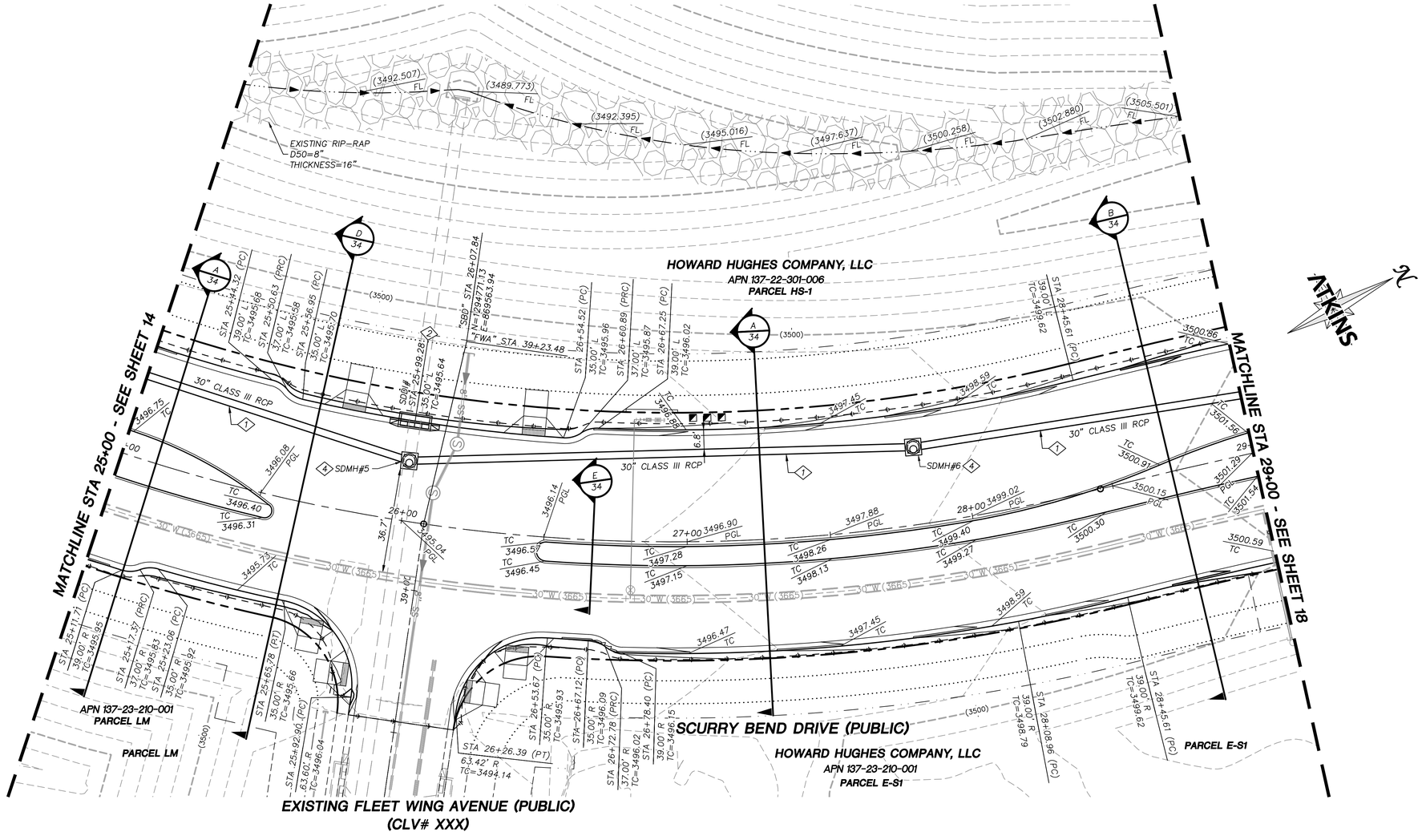

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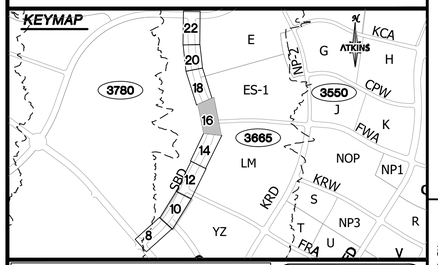
REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

KEYMAP



GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

NICOLAS BARCOS PE#25673 DATE

CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

DS#XXX-0000

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

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FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 TRANSIT AND INTERMODAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING TELECOMMUNICATION UTILITY CABLES. CONTACT. Call 811 OR 1-800-642-2444

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

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PROFESSIONAL ENGINEER - STATE OF NEVADA - NICOLAS A. BARCOS - EXP. 12-31-20 - CIVIL - No. 25673

3/8/2021

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN
STA 25+00 TO STA 29+00

DESIGNED BY: B. MCCHTYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=20'
VERT.: NONE

XXXVXXXX
LXX-XXXXXX
DATE: MARCH, 2021
DRAWING NO. 16/42

JOB NO. 100069098

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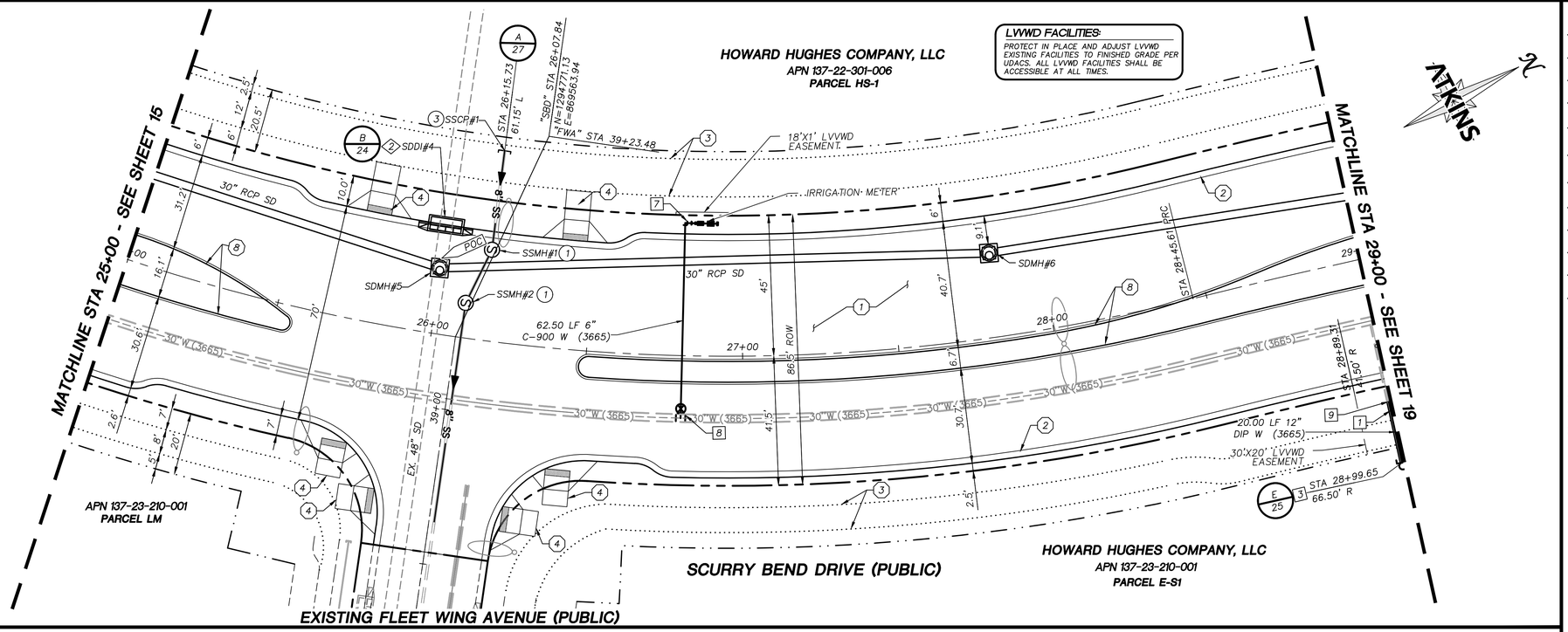

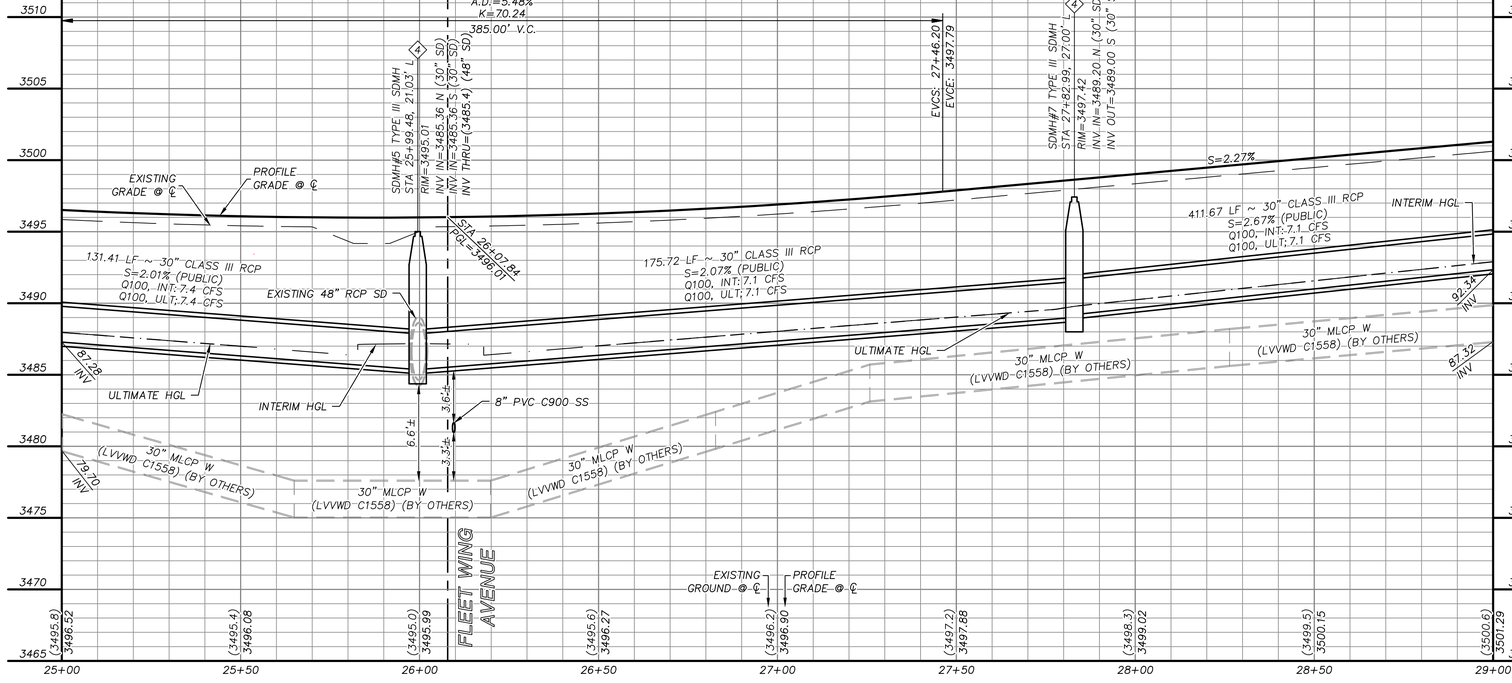

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ROADWAY CONSTRUCTION NOTES

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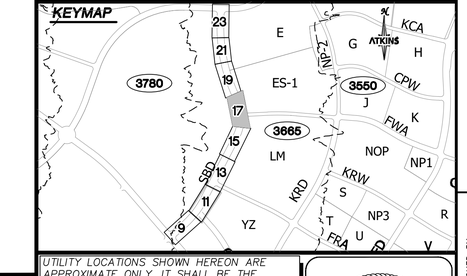
8. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD #219



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'
5 0 2.5 5 10
VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING AND PLANNING SERVICES

PROJECT NO. 000000 FIRST APPROVED DATE: _____

LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
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FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

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

Call before you Dig AVOID CUTTING ELECTRIC CABLE UTILITY LINES IN YOUR CNTY. Call 811 OR 1-800-642-2444

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

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

NICOLAS A. BARCOS EXP. 12-31-20 CIVIL No. 25673 PROFESSIONAL ENGINEER-STATE OF NEVADA
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY PLAN + PROFILE
STA 25+00 TO STA 29+00

DESIGNED BY: B. WOJTYLAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=20'
VERT.: NONE

DATE: MARCH, 2021
DRAWING NO. 17/42
JOB NO. 100069098

XXVVXXXX
LXX-XXXXX

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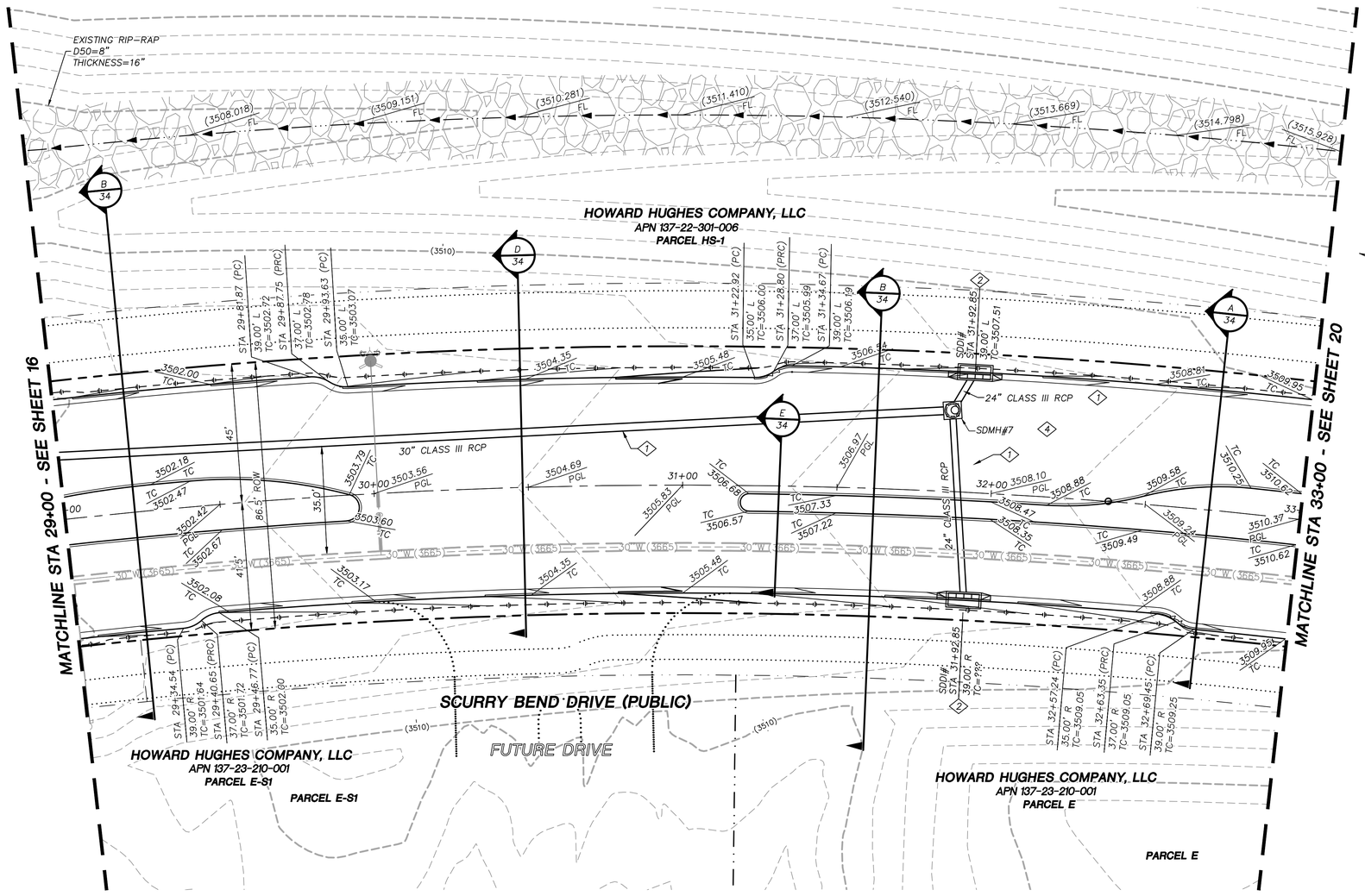

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REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

NICOLAS BARCOS PE#25673 DATE

CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

DS#XXX-0000

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

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(REVISED 2008)
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(3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

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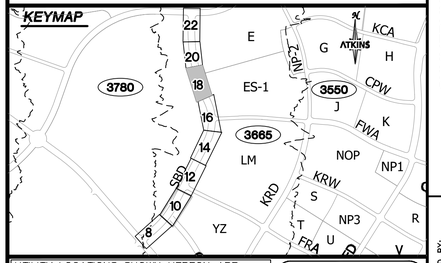
KEYMAP



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PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

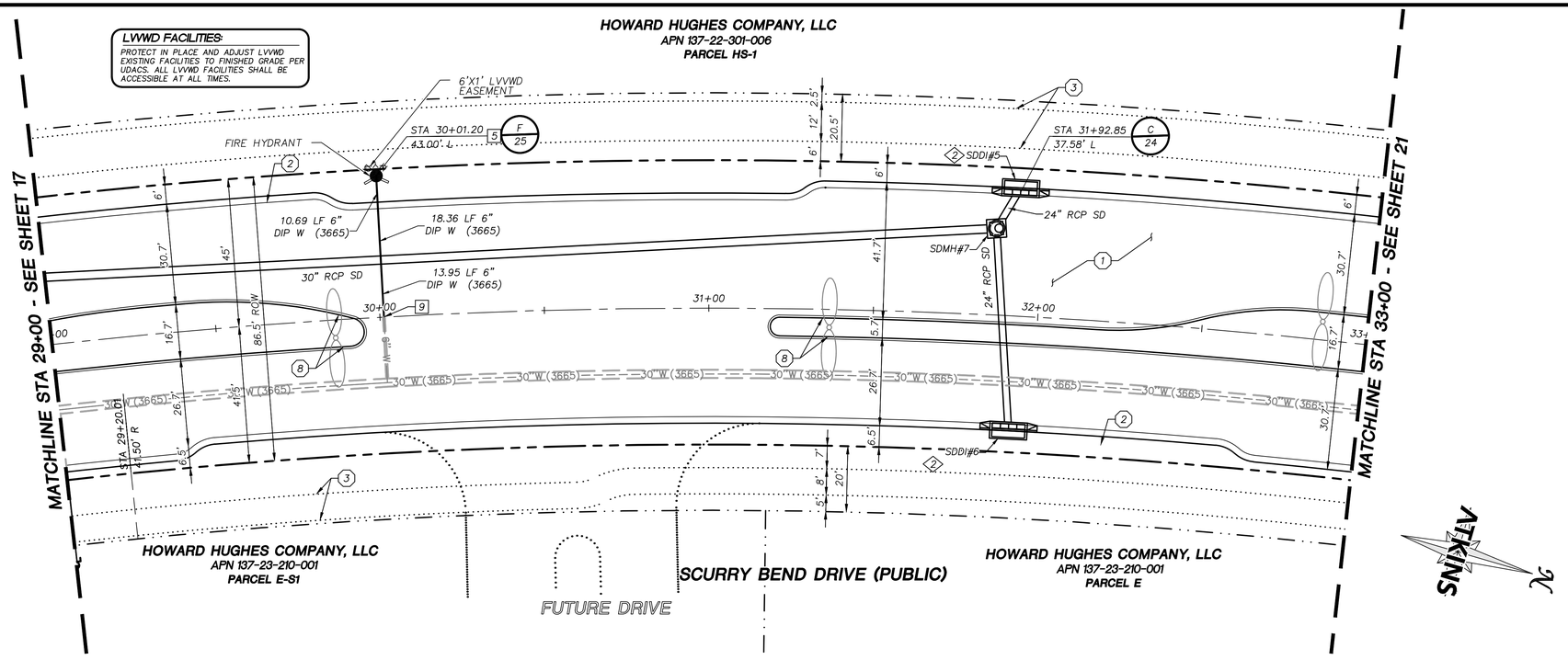
ROADWAY GRADING PLAN
STA 29+00 TO STA 33+00

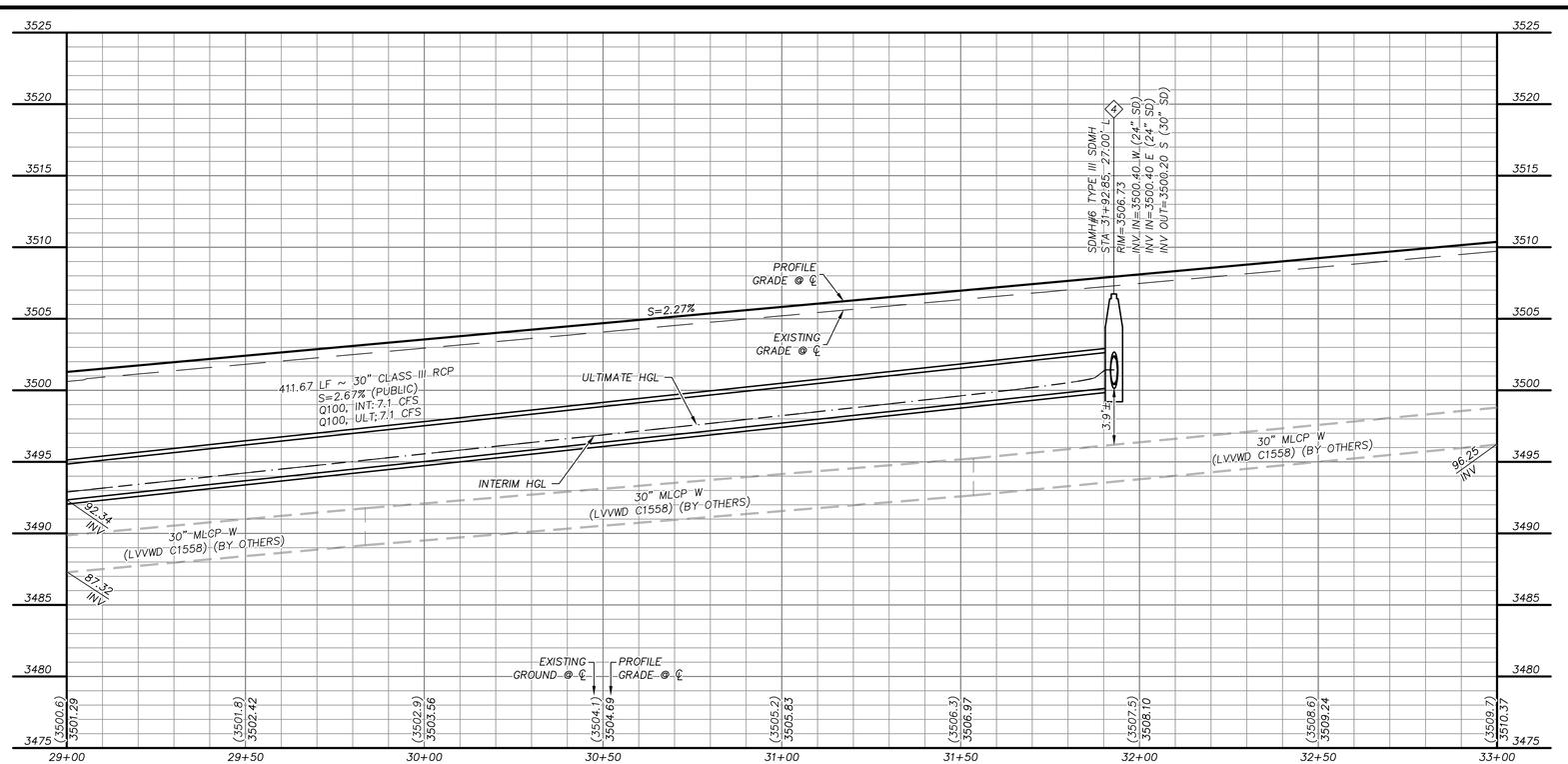
DESIGNED BY: B. WOCHTAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=20'
VERT.: NONE

XXXVXXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 18.42

JOB NO. 100069098

C:\pw_work\atkinsna01\simo8864\dms5632\6\69098-08-GRAD-G1.dwg LAYOUT: 18 ROADWAY GRADING PLAN Mar 08, 2021 - 3:15PM





GRAPHIC SCALE

HORIZONTAL: 1"=20'

VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING AND PLANNING SERVICES

PROJECT NO. 000000 FIRST APPROVED DATE: _____

LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL

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CITY OF LAS VEGAS BENCHMARK: D368
(REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS
(3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 EMERGENCY AND NOTIFICATION SYSTEM OF UNDERGROUND FACILITIES

Call before you Dig AVOID CUTTING OR DAMAGING 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

STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET 3 FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
3. INSTALL TYPE II SD MANHOLE PER CCAUSD #405.2
4. INSTALL TYPE III SD MANHOLE PER CCAUSD #406
5. INSTALL NDOT TYPE 2 DROP INLET PER NDOT R-4.2.1 (SEE SHEET 29)
6. STUB & PLUG STORM DRAIN FOR FUTURE CONNECTION PER MANUFACTURER'S PLUG, OR APPROVED EQUAL (SEE SHEET 35)
7. NOT USED
8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 35 FOR DETAIL
10. INSTALL TYPE I SD RISER PER CCAUSD #403.1
11. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
12. INSTALL PRECAST REINFORCED CONCRETE BOX PER NDOT STANDARD 502 AND 503 SEE SHEET 35 FOR RCB INFORMATION

SEWER CONSTRUCTION NOTES

1. INSTALL SEWER MANHOLE PER DCSWCS SD-1A, SD-1B, AND SD-4
2. INSTALL SEWER MAIN PER DCSWCS SD-17
3. STUB AND CAP SEWER PIPE. PLACE MARKER BALL AND 4"X4" POST, DOUGLAS FIR, OVER END OF PIPE AND INSTALL THRUST BLOCK (1 CUBIC FT. MINIMUM).
4. CONNECT TO EXISTING SEWER MAIN

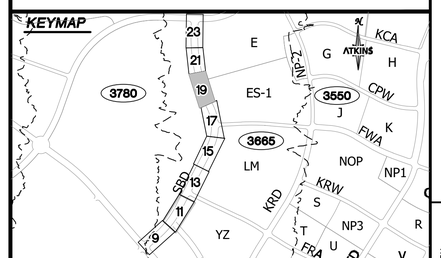
WATERLINE CONSTRUCTION NOTES

1. INSTALL WATER MAIN PER UDACS PLATES #17 AND PLATE #19
2. INSTALL GATE VALVE PER UDACS PLATES #30 AND #39
3. INSTALL CAP AND 2" MANUAL BLOWOFF ASSEMBLY PER UDACS PLATE #36
4. INSTALL TEE W/ VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31 AND #39
5. INSTALL FIRE HYDRANT WITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40.
6. INSTALL DEFLECTION AT PIPE JOINTS (MAXIMUM OF 1°)
7. INSTALL 1.5" METER WITH 1.5" RPPA PER UDACS PLATES #4 AND #8
8. INSTALL 1.5" SERVICE SADDLE PER UDACS PLATE #4
9. REMOVE CAP AND 2" BLOWOFF AND CONNECT TO EXISTING WATERLINE STUB
10. INSTALL VERTICAL BEND PER UDACS PLATE #31

ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 34 FOR TYPICAL PAVEMENT SECTION.
2. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
3. FUTURE SIDEWALK BY OTHERS
4. CONSTRUCT CURB RAMP, TYPE A, PER NDOT STANDARD PLAN R-5.2.1.
5. CONSTRUCT 0" FLUSH CURB
6. TRANSITION CURB FROM FULL HEIGHT (6") TO FLUSH (0")
7. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4",1-6") PER DETAIL C ON SHEET 37.
8. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD #219

KEYMAP



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

PROFESSIONAL ENGINEER - STATE OF NEVADA - NICOLAS A. BARCOS - EXP. 12-31-20 - CIVIL - No. 25673 - 3/8/2021

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY PLAN + PROFILE
STA 29+00 TO STA 33+00

DESIGNED BY:	B. MOCHTAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
HORIZ.: 1"=20'	VERT.: NONE
XXXVXXXX	
LXX-XXXXXX	
DATE: MARCH, 2021	
DRAWING NO.	19/42
JOB NO. 100069098	

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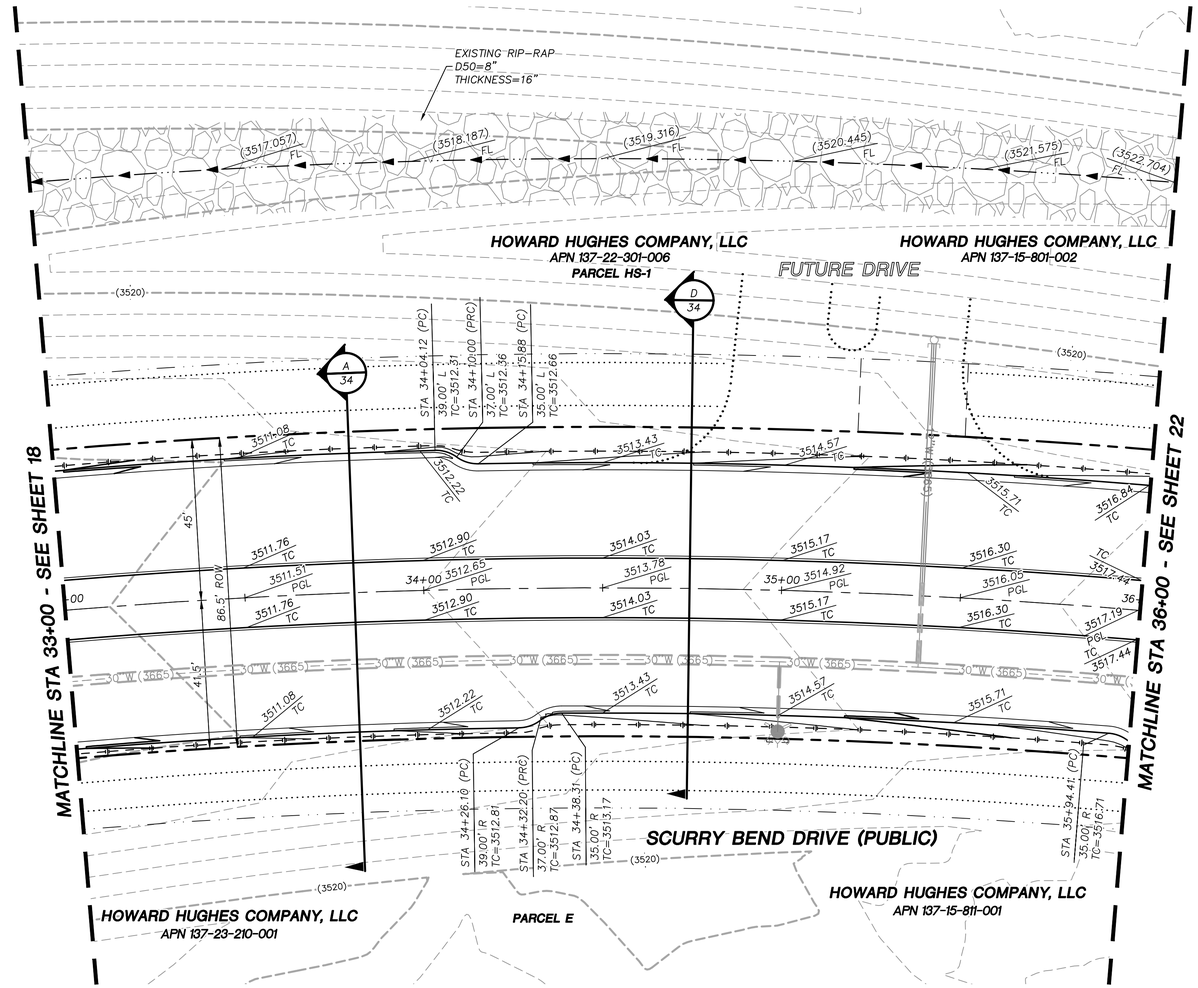

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REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

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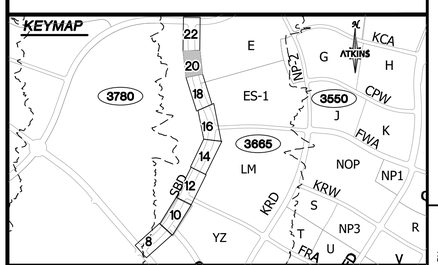
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN
STA 33+00 TO STA 37+00

KEYMAP



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

NICOLAS BARCOS PE#25673 DATE

CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

DS#XXX-0000

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368
(REVISED 2008)
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FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 TRANSIT AND HIGHWAY SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING TELEPHONE OR UTILITY LINES IN YOUR COUNTY. Call 811 OR 1-800-642-2444

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

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PROFESSIONAL ENGINEER-STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

DESIGNED BY:	B. MOCHTYAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
HORIZ.:	1"=20'
VERT.:	NONE
XXVVXXXX	
LXX-XXXXX	
DATE:	MARCH, 2021
DRAWING NO.	20/42
JOB NO.	100069098

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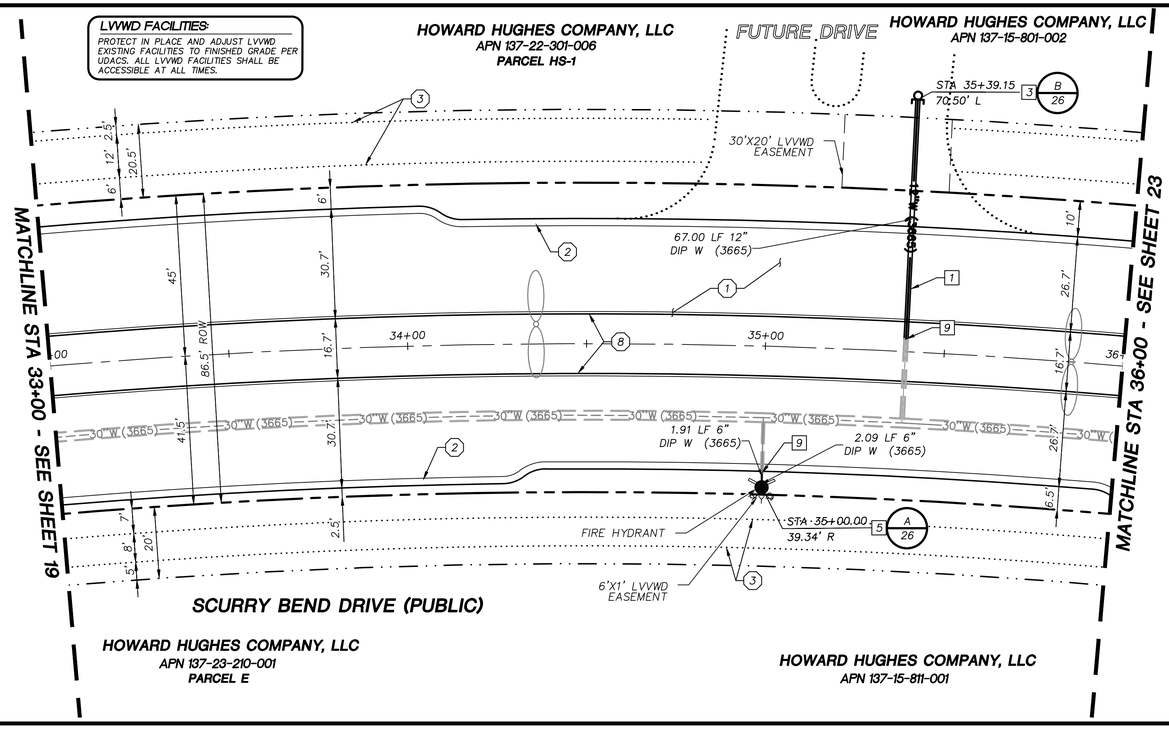

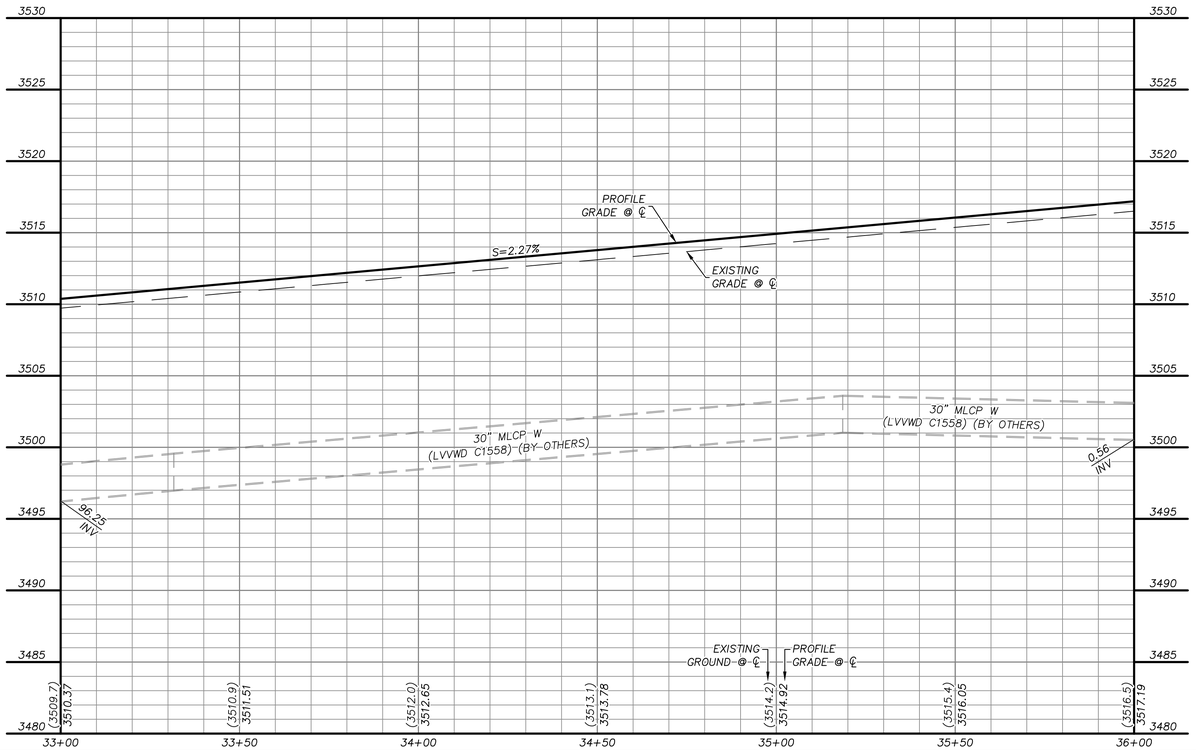

GRAPHIC SCALE

HORIZONTAL: 1"=20'

VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING AND PLANNING SERVICES

PROJECT NO. 000000 FIRST APPROVED DATE: _____

LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

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T21S,R59E,S03

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Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. Call 811 or 1-800-642-2444

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10. INSTALL VERTICAL BEND PER UDACS PLATE #31

ROADWAY CONSTRUCTION NOTES

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3. FUTURE SIDEWALK BY OTHERS
4. CONSTRUCT CURB RAMP, TYPE A, PER NDOT STANDARD PLAN R-5.2.1.
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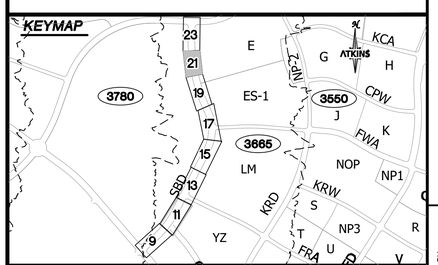
8. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD #219

KEYMAP



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PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY PLAN + PROFILE
STA 33+00 TO STA 37+00

DESIGNED BY:	B. MOCHITAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
HORIZ.:	1"=20'
VERT.:	NONE
DATE:	MARCH, 2021
DRAWING NO.	21/42
JOB NO.	100069098

XXVXVXXX
LXX-XXXXX

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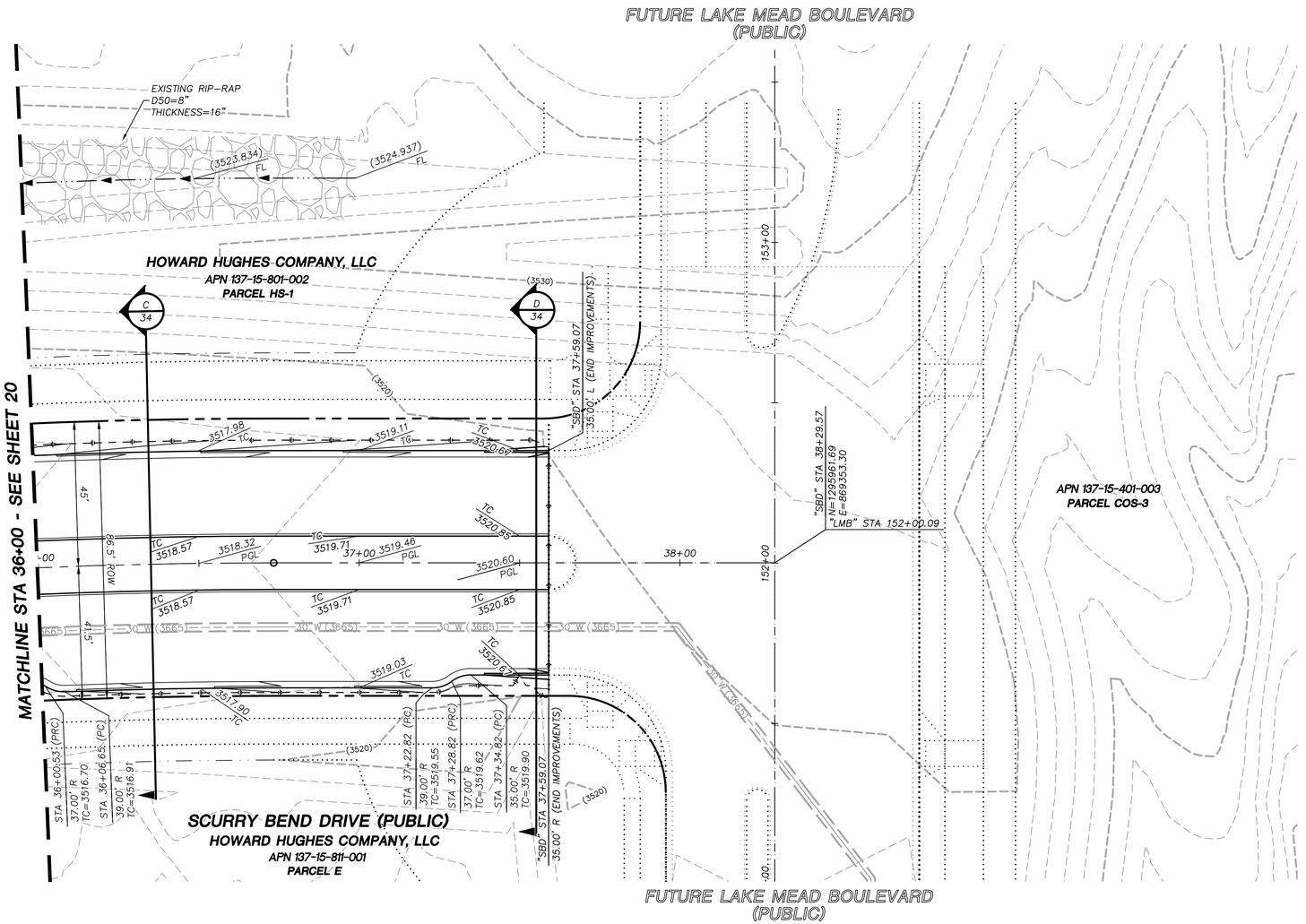

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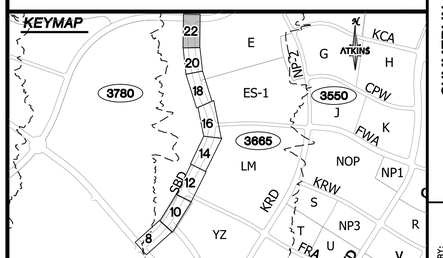
REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

NICOLAS BARCOS PE#25673 DATE

CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF LAS VEGAS FOR THIS PROJECT.

DS#XXX-0000

BASIS OF BEARING

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PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

ATKINS
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SUMMERLIN

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SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN
STA 37+00 TO END

DESIGNED BY: B. MOCHTAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=20'
VERT.: NONE
DATE: MARCH, 2021
DRAWING NO. 22/42
JOB NO. 100069098

XXXVXXXX
LXX-XXXXX

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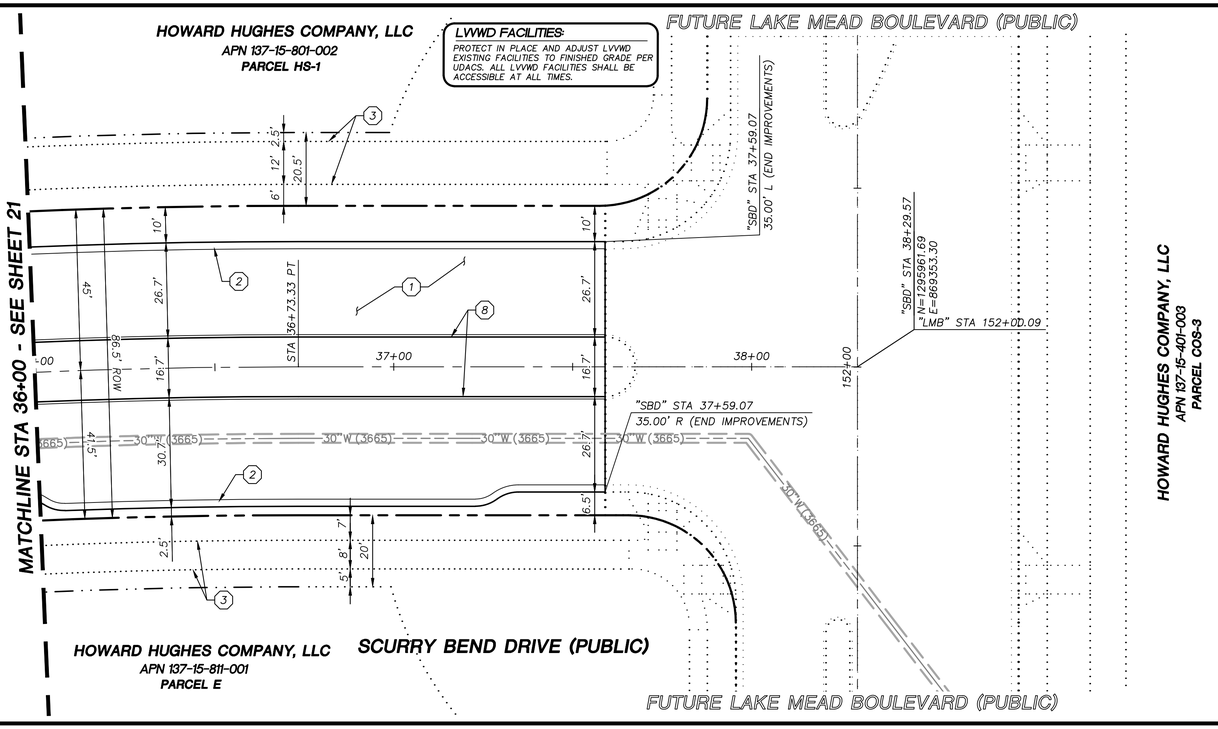

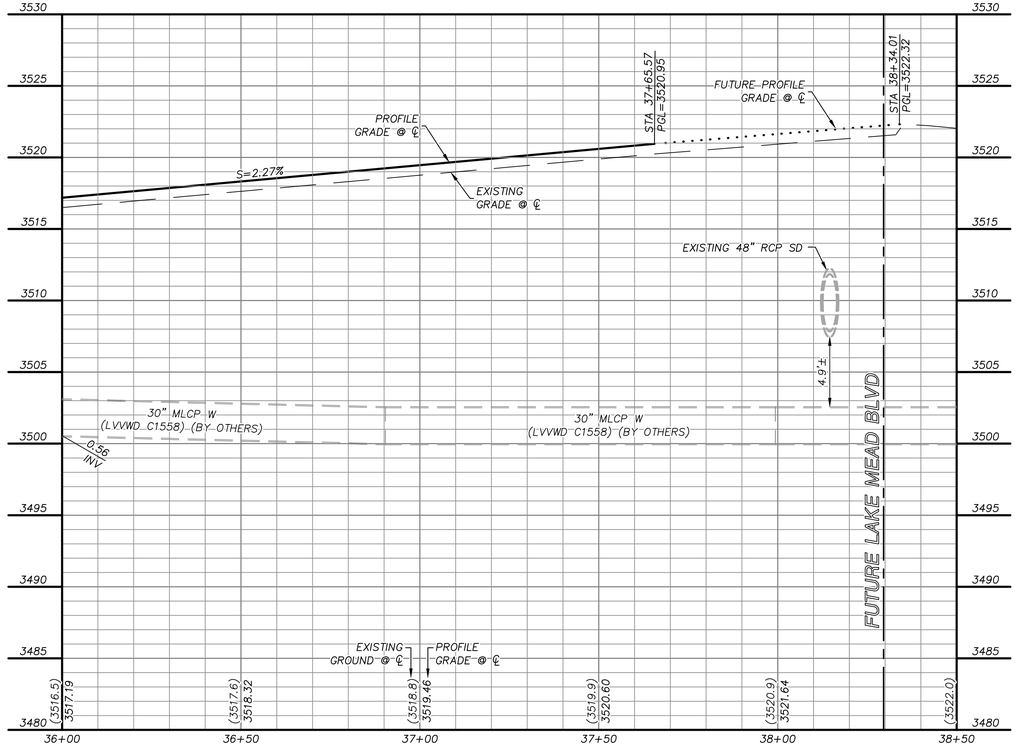

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

5 0 2.5 5 10

VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING AND PLANNING SERVICES

PROJECT NO. 000000 FIRST APPROVED DATE: _____

LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL

BASIS OF BEARING

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4. CONNECT TO EXISTING SEWER MAIN

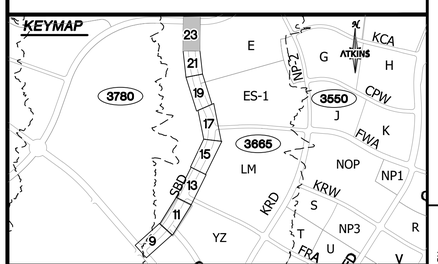
WATERLINE CONSTRUCTION NOTES

1. INSTALL WATER MAIN PER UDACS PLATES #17 AND PLATE #19
2. INSTALL GATE VALVE PER UDACS PLATES #30 AND #39
3. INSTALL CAP AND 2" MANUAL BLOWOFF ASSEMBLY PER UDACS PLATE #36
4. INSTALL TEE W/ VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31 AND #39
5. INSTALL FIRE HYDRANT WITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40.
6. INSTALL DEFLECTION AT PIPE JOINTS (MAXIMUM OF 1°)
7. INSTALL 1.5" METER WITH 1.5" RPPA PER UDACS PLATES #4 AND #8
8. INSTALL 1.5" SERVICE SADDLE PER UDACS PLATE #4
9. REMOVE CAP AND 2" BLOWOFF AND CONNECT TO EXISTING WATERLINE STUB
10. INSTALL VERTICAL BEND PER UDACS PLATE #31

ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 34 FOR TYPICAL PAVEMENT SECTION.
2. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
3. FUTURE SIDEWALK BY OTHERS
4. CONSTRUCT CURB RAMP, TYPE A, PER NDOT STANDARD PLAN R-5.2.1.
5. CONSTRUCT 0" FLUSH CURB
6. TRANSITION CURB FROM FULL HEIGHT (6") TO FLUSH (0")
7. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4",1-6") PER DETAIL C ON SHEET 37.
8. CONSTRUCT "A" TYPE ISLAND CURB PER CCAUSD #219

KEYMAP



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PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

ROADWAY PLAN + PROFILE
STA 37+00 TO END

DESIGNED BY:	B. MOCHTAK
DRAWN BY:	K. HENRY
CHECKED BY:	N. BARCOS
HORIZ.:	1"=20'
VERT.:	NONE
XXXVXXXX. LXX-XXXXX.	
DATE:	MARCH, 2021
DRAWING NO.	23/42
JOB NO.	100069098

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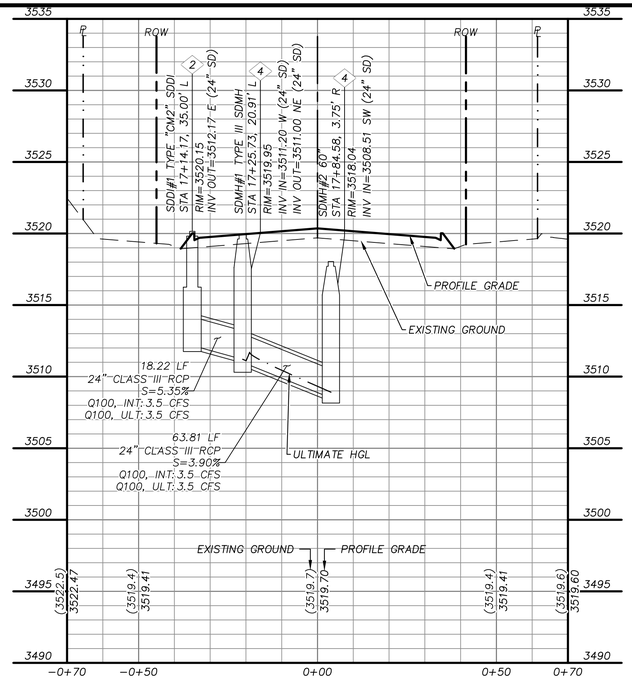
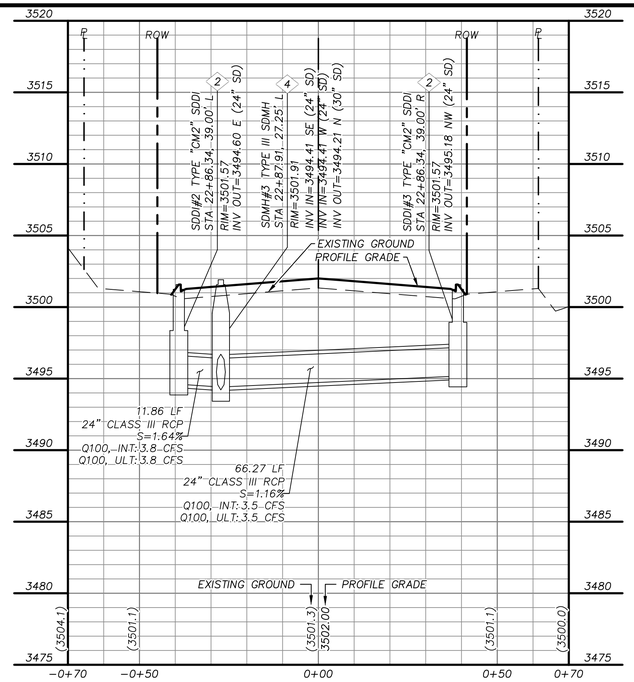


STORM DRAIN LATERAL 1

"SBD" STA. 17+25.85 SEE SHEET 13

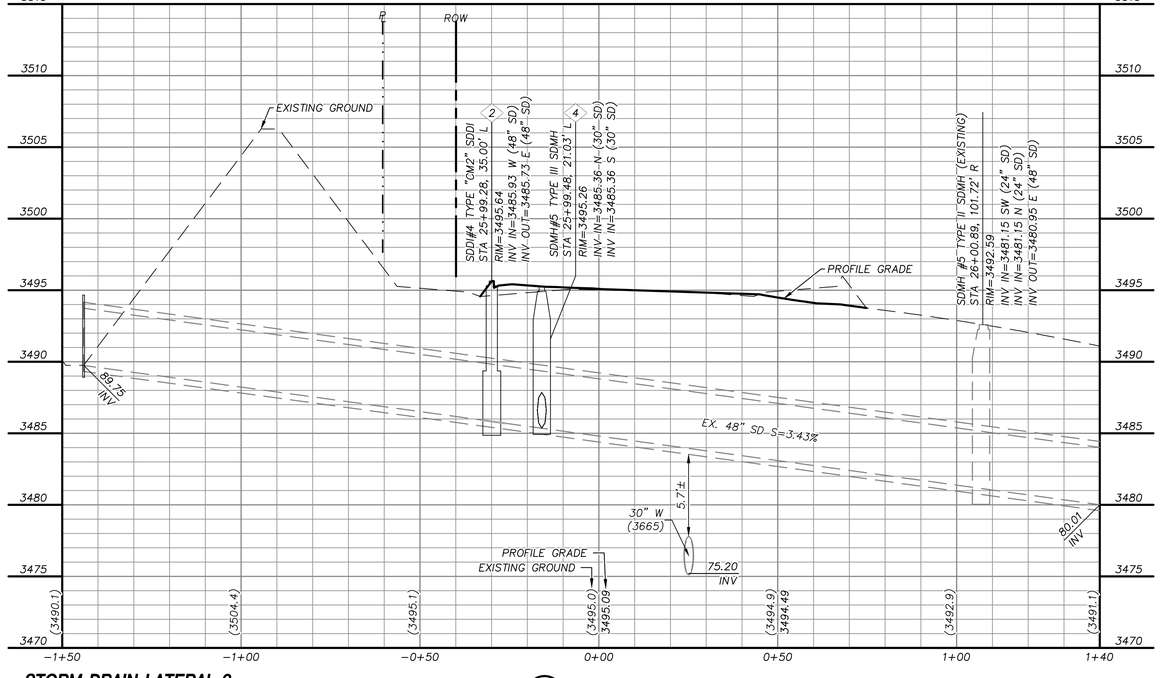
A 24



STORM DRAIN LATERAL 2

"SBD" STA. 22+86.34 SEE SHEET 15

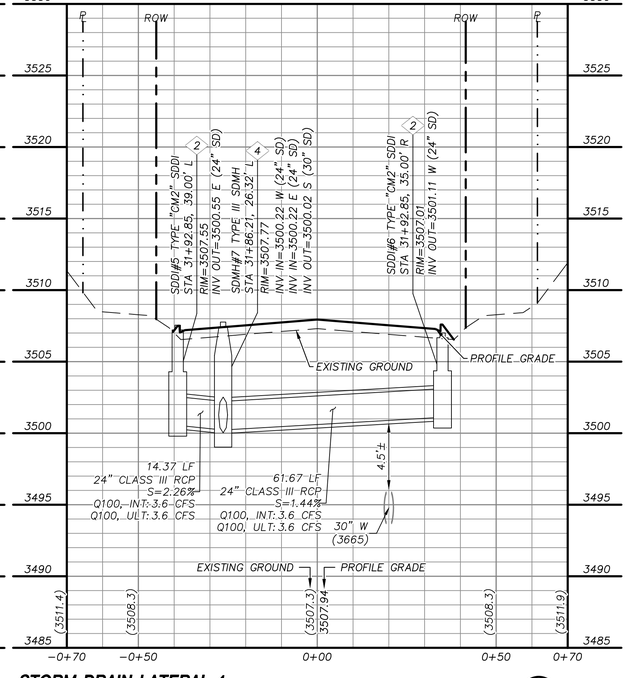
B 24



STORM DRAIN LATERAL 3

"SBD" STA. 25+99.76 SEE SHEET 17

C 24



STORM DRAIN LATERAL 4

"SBD" STA.31+92.85 SEE SHEET 19

D 24

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"= 20'

5 0 2.5 5 10

VERTICAL: 1"= 5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING AND PLANNING SERVICES

PROJECT NO. 000000 FIRST APPROVED DATE: _____

LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368
(REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS
(3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

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

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. ITS COSTLY. Call 811 OR 1-800-642-2444

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

STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET 3 FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
3. INSTALL TYPE II SD MANHOLE PER CCAUSD #405.2
4. INSTALL TYPE III SD MANHOLE PER CCAUSD #406
5. INSTALL NDOT TYPE 2 DROP INLET PER NDOT R-4.2.1 (SEE SHEET 29)
6. STUB & PLUG STORM DRAIN FOR FUTURE CONNECTION PER MANUFACTURER'S PLUG, OR APPROVED EQUAL (SEE SHEET 35)
7. NOT USED
8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 35 FOR DETAIL
10. INSTALL TYPE I SD RISER PER CCAUSD #403.1
11. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
12. INSTALL PRECAST REINFORCED CONCRETE BOX PER NDOT STANDARD 502 AND 503 SEE SHEET 35 FOR RCB INFORMATION

REV.	DESCRIPTION	BY	DATE	APPROVAL
	REVISIONS			

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

STORM DRAIN LATERAL PROFILES

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PROFESSIONAL ENGINEER, STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

DESIGNED BY: B. MCGHYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=20'
VERT.: 1"=5'
DATE: MARCH, 2021
DRAWING NO. 24/42
XXVVXXXX
LXX-XXXXX
JOB NO. 100069098

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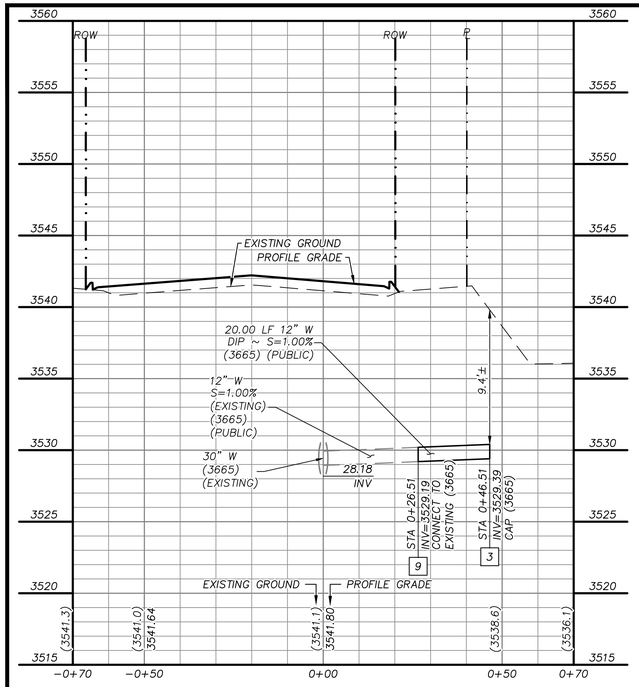
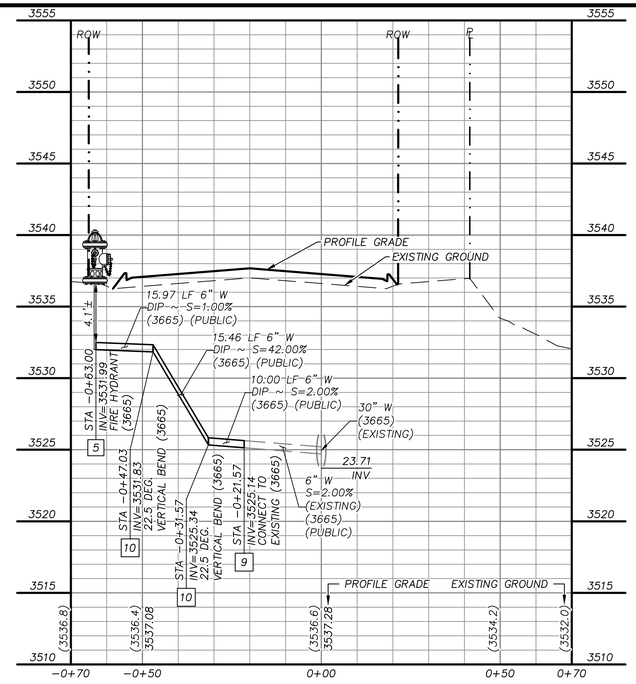


WATER LATERAL 1

"SBD" STA. 12+51.01 SEE SHEET 9

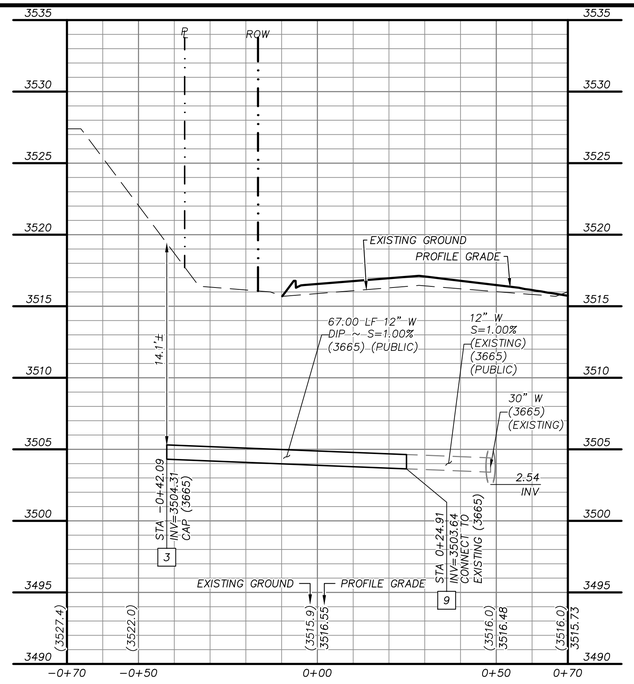
A 25



WATER LATERAL 2

"SBD" STA. 13+50.01 SEE SHEET 11

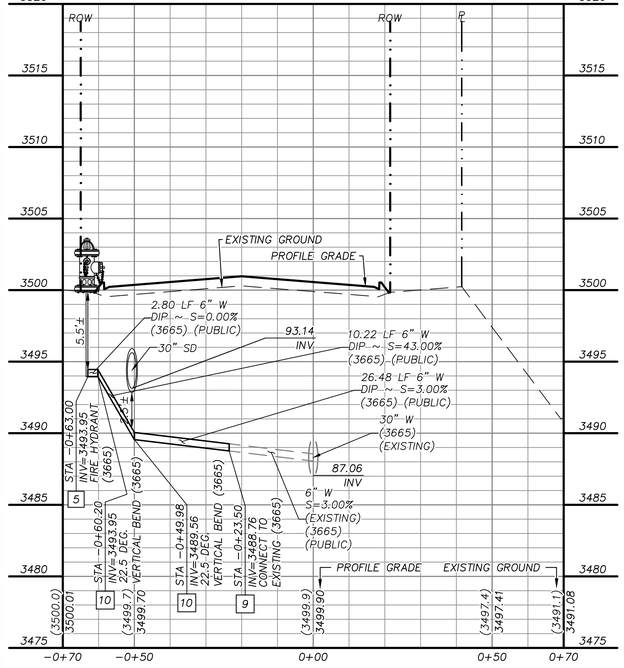
B 25



WATER LATERAL 3

"SBD" STA. 18+51.32 SEE SHEET 13

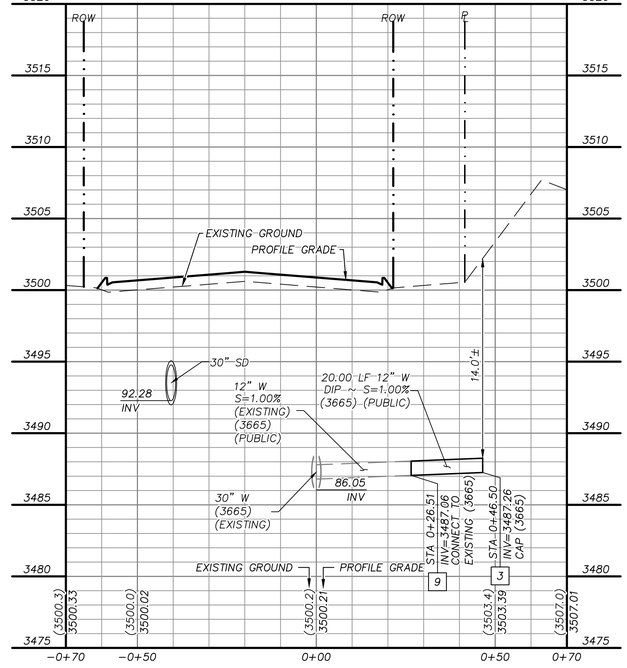
C 25



WATER LATERAL 4

"SBD" STA. 23+18.62 SEE SHEET 15

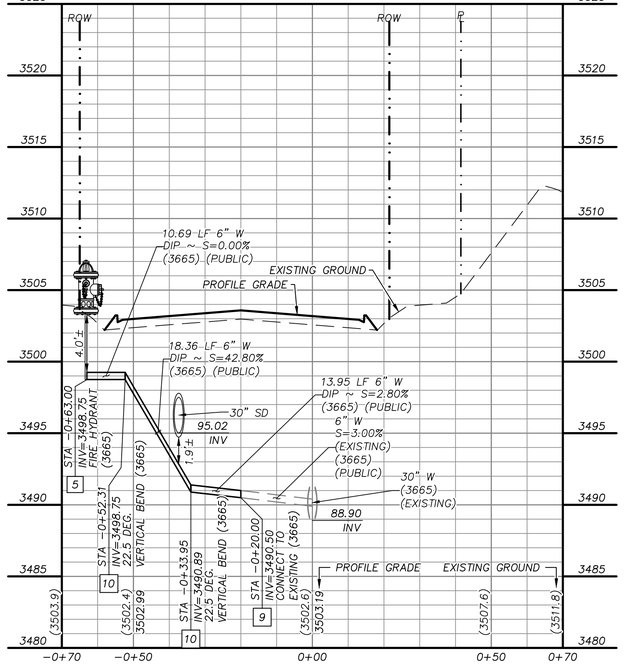
D 25



WATER LATERAL 5

"SBD" STA. 28+99.89 SEE SHEET 17

E 25



WATER LATERAL 6

"SBD" STA. 30+01.20 SEE SHEET 19

F 25

WATERLINE CONSTRUCTION NOTES

1. INSTALL WATER MAIN PER UDACS PLATES #17 AND PLATE #19
2. INSTALL GATE VALVE PER UDACS PLATES #30 AND #39
3. INSTALL CAP AND 2" MANUAL BLOWOFF ASSEMBLY PER UDACS PLATE #36
4. INSTALL TEE W/ VALVE AND LATERAL PER UDACS PLATES #17, #19, #30, #31 AND #39
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8. INSTALL 1.5" SERVICE SADDLE PER UDACS PLATE #4
9. REMOVE CAP AND 2" BLOWOFF AND CONNECT TO EXISTING WATERLINE STUB
10. INSTALL VERTICAL BEND PER UDACS PLATE #31

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

5 0 2.5 5 10

VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING AND PLANNING SERVICES

PROJECT NO. 000000 FIRST APPROVED DATE: _____

LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

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(REVISED 2008)
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T21S,R59E,S03

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Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. ITS COSTLY. Call 811 OR 1-800-642-2444

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PROFESSIONAL ENGINEER STATE OF NEVADA NICOLAS A. BARCOS EXP. 12-31-20 CIVIL No. 25673

3/8/2021

REVISIONS			
REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

WATER LATERAL PROFILES

DESIGNED BY: B. MCGHYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=20'
VERT.: 1"=5'

XXVVXXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 25/42
JOB NO. 100069098

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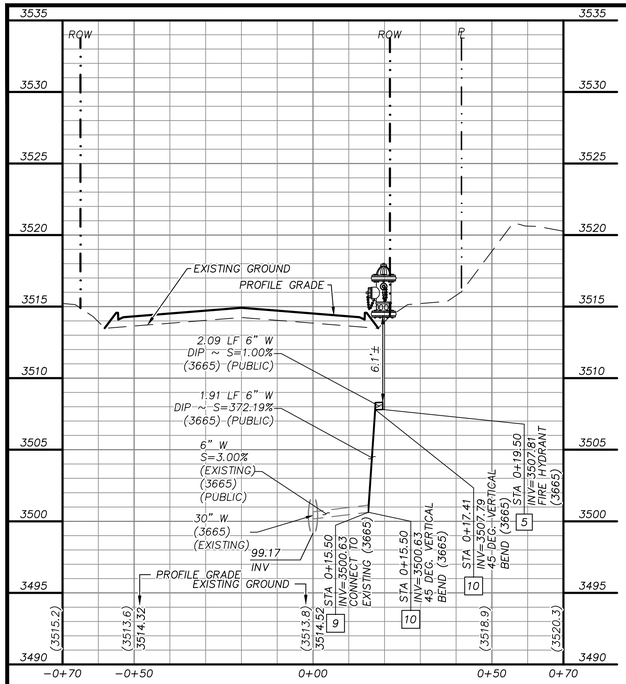
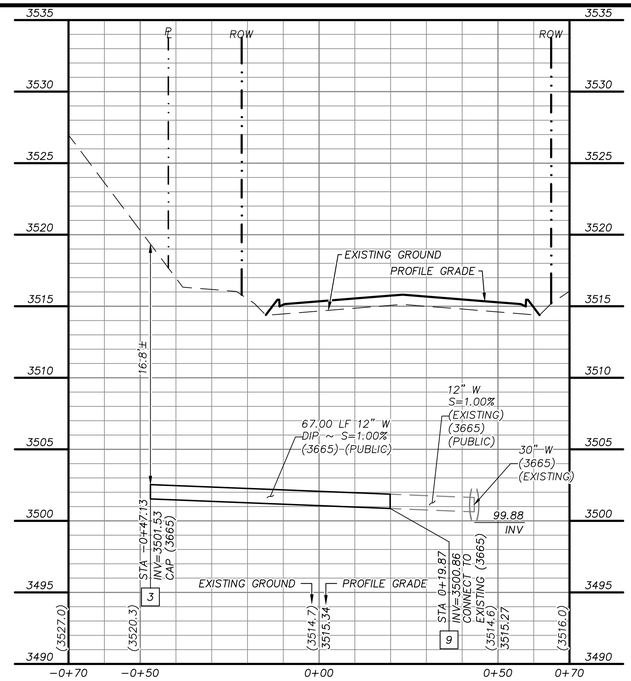


WATER LATERAL 1

"SBD" STA. 35+00.00 SEE SHEET 21

A
26



WATER LATERAL 2

"SBD" STA. 35+39.15 SEE SHEET 21

B
26

WATERLINE CONSTRUCTION NOTES

1. INSTALL WATER MAIN PER UDACS PLATES #17 AND PLATE #19
2. INSTALL GATE VALVE PER UDACS PLATES #30 AND #39
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9. REMOVE CAP AND 2" BLOWOFF AND CONNECT TO EXISTING WATERLINE STUB
10. INSTALL VERTICAL BEND PER UDACS PLATE #31

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

5 0 2.5 5 10

VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING AND PLANNING SERVICES

PROJECT NO. 000000 FIRST APPROVED DATE: _____

LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368
(REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 REMEMBER AND ARTERIAL SYSTEMS OF TRANSPORTATION

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

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NICOLAS A. BARCOS
EXP. 12-31-20
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No. 25673
3/8/2021

REVISIONS

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ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
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SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

WATER LATERAL PROFILES

DESIGNED BY: B. MOCHTAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=20'
VERT.: 1"=5'

XX.XX.XXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 26/42
JOB NO. 100069098

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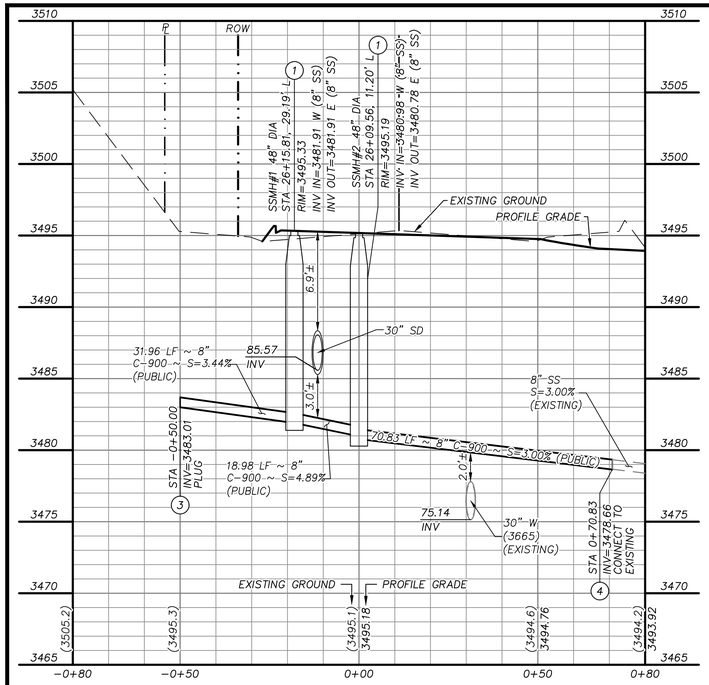

SEWER LATERAL 1

"SBD" STA. 26+09.53 SEE SHEET 13

A 27

SEWER CONSTRUCTION NOTES

1. INSTALL SEWER MANHOLE PER DCSWCS SD-1A, SD-1B, AND SD-4
2. INSTALL SEWER MAIN PER DCSWCS SD-17
3. STUB AND CAP SEWER PIPE. PLACE MARKER BALL AND 4"X4" POST, DOUGLAS FIR, OVER END OF PIPE AND INSTALL THRUST BLOCK (1 CUBIC FT. MINIMUM).
4. CONNECT TO EXISTING SEWER MAIN

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

5 0 2.5 5 10

VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING AND PLANNING SERVICES

PROJECT NO. 000000 FIRST APPROVED DATE: _____

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PROFESSIONAL ENGINEER-STATE OF NEVADA NICOLAS A. BARCOS EXP. 12-31-20 CIVIL No. 25673 3/8/2021

ATKINS
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Telephone: +1.702.263.7275
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SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

SEWER LATERAL PROFILES

DESIGNED BY: B. MOCHTAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=20'
VERT.: 1"=5'

XX.XX.XXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 27/42
JOB NO. 100069098

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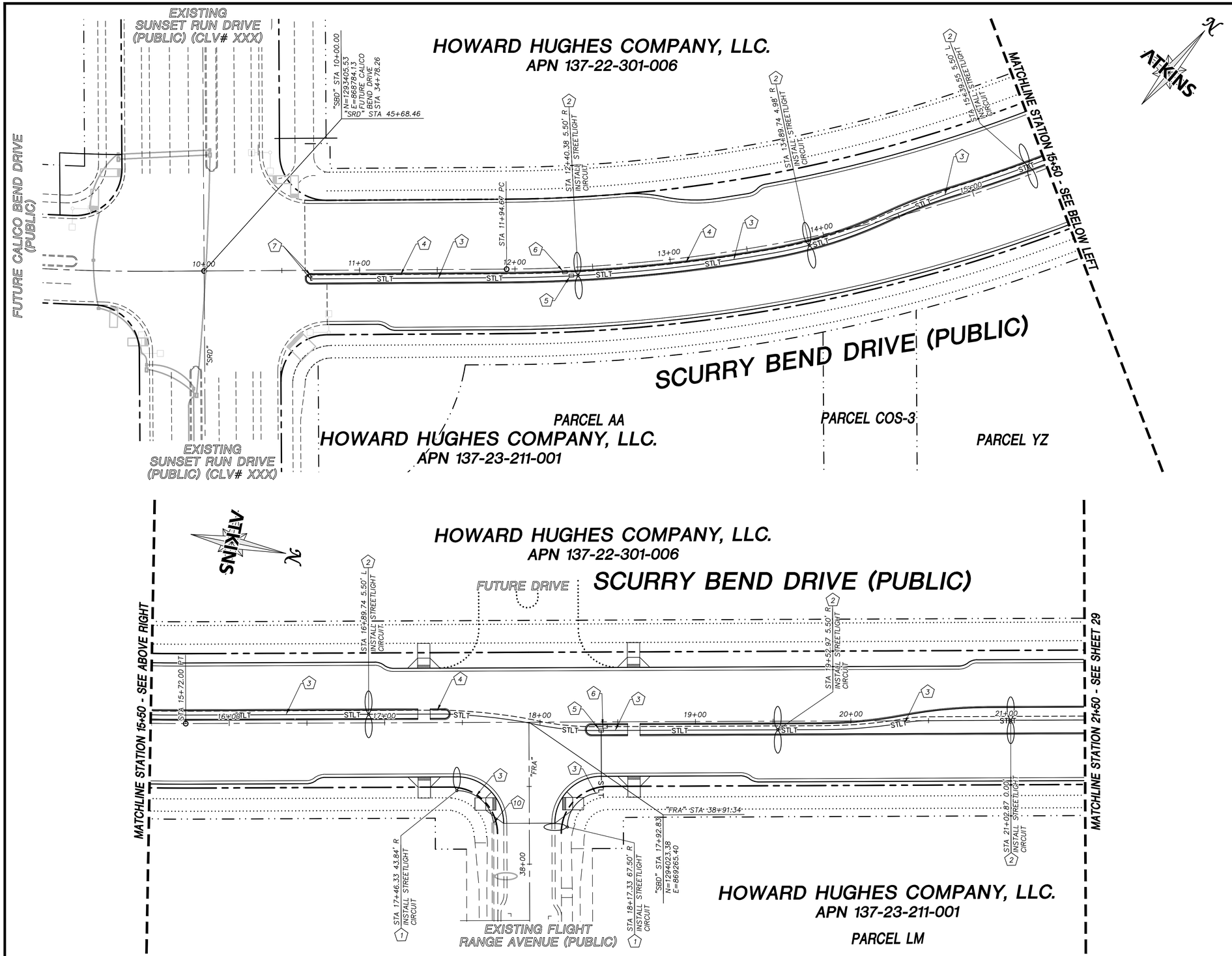


STREET LIGHTING CONSTRUCTION NOTES

1. INSTALL TYPE 4 LED SINGLE STREETLIGHT WITH 8' MAST ARMS AND LSI LUMINAIRE FIXTURE SUM-XGBM-LED-26L-SIL-2-UE-DIM-27-70CRI-BRZ-NR-4397-SMBRKT WITH A 2700K COLOR TEMPERATURE PER APPROVED LED LIGHTING ANALYSIS. REFER TO SUMMERLIN STD DWG E-2, SEE SHEET XX FOR TYPICAL LOCATION, AND CCAUSD #311.1, #316, AND #320.
2. INSTALL TYPE 2 LED TWIN STREETLIGHT WITH 8' MAST ARMS AND LSI LUMINAIRE FIXTURE SUM-XGBM-LED-26L-SIL-2-UE-DIM-27-70CRI-BRZ-NR-4397-SMBRKT WITH A 2700K COLOR TEMPERATURE PER APPROVED LED LIGHTING ANALYSIS. REFER TO SUMMERLIN STD DWG E-2, SEE SHEET XX FOR TYPICAL LOCATION, AND CCAUSD #311.1, #316, AND #320.
3. INSTALL 1-1/4" STREETLIGHT CONDUIT WITH (2) #4 AND (1) #8 PER CCAUSD #501
4. INSTALL 4" CONDUIT WITH PULL STRING AND 6 PAIR PE39 NO. 22 AWG INTERCONNECT CABLE
5. INSTALL NO. 3-1/2 PULL BOX MARKED "STREETLIGHT" PER CCAUSD #705
6. INSTALL P30 PULL BOX MARKED "FIBER OPTIC (FAST)" PER CCAUSD #761
7. STUB AND CAP CONDUIT 5' PAST EDGE OF CONSTRUCTION
8. INSTALL 200 AMP SERVICE PEDESTAL PER CCAUSD #332.S2, #331, #335.S2, #336, AND #730
9. CONNECT TO EXISTING FAST CONDUIT
10. CONNECT TO EXISTING STREETLIGHT CONDUIT

SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
TYPE 4 SINGLE ARM STREET LIGHT POLE ASSEMBLY	5	EA
TYPE 2 DOUBLE ARM STREET LIGHT POLE ASSEMBLY	14	EA
1 1/4" STREET LIGHT CONDUIT WITH ALL WIRING	3,006	LF
4" FAST CONDUIT WITH 6 PAIR PE39 NO 22 AWG	2,702	LF
NO 3-1/2 PULL BOX	6	EA
NO P30 PULL BOX	5	EA
SERVICE PEDESTAL	1	EA

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

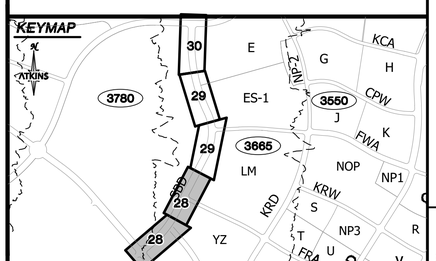
ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

STREETLIGHT PLAN
BEGIN TO STA 21+50

KEYMAP



GRAPHIC SCALE
30 0 15 30 60
HORIZONTAL: 1"= 30'

BASIS OF BEARING
GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK
CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

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

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PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

DESIGNED BY: B. MOCHTAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=50'
VERT.: NONE
XX/XX/XXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 28/42
JOB NO. 100069098

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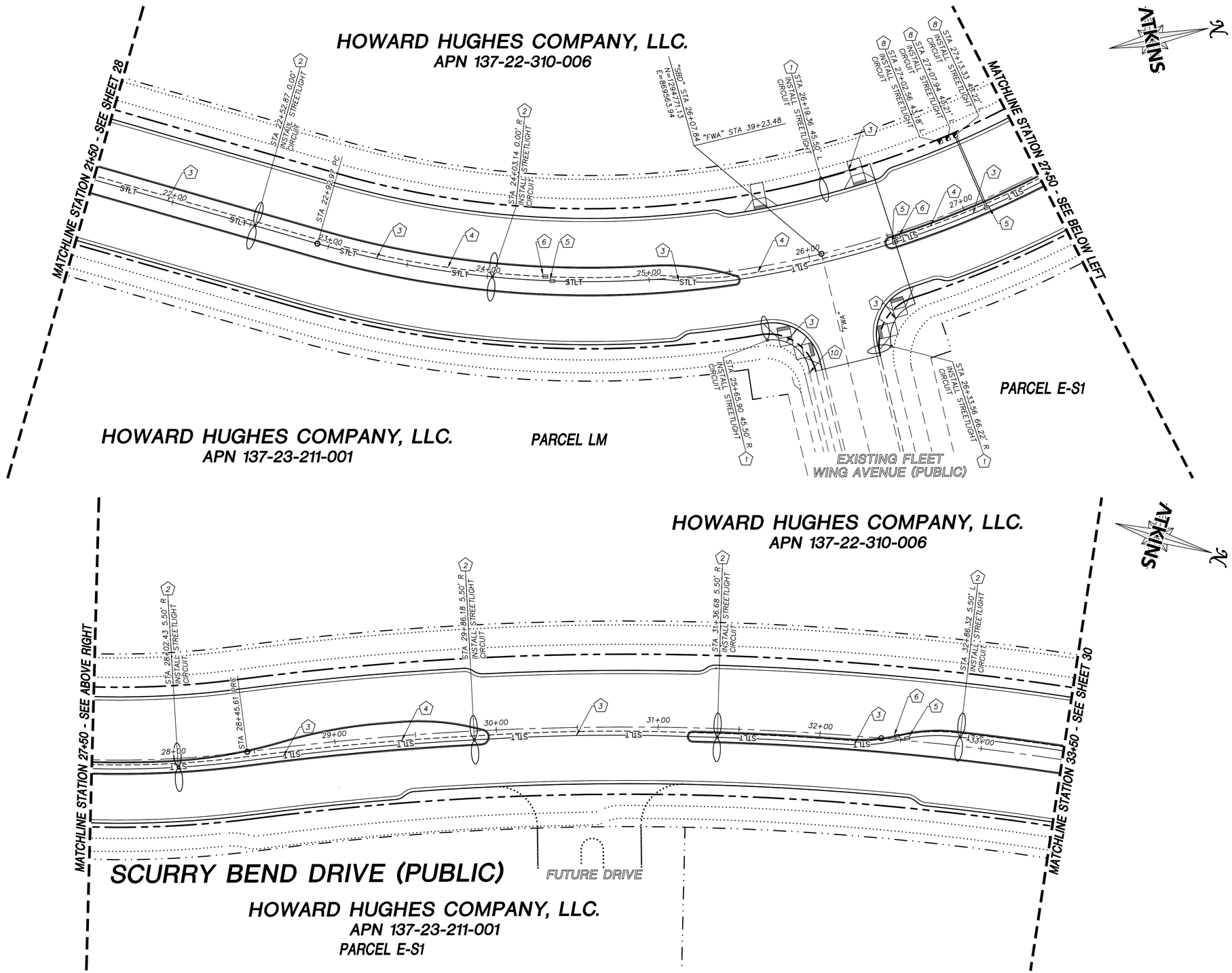

STREET LIGHTING CONSTRUCTION NOTES

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REV.	DESCRIPTION	BY	DATE	APPROVAL
	REVISIONS			

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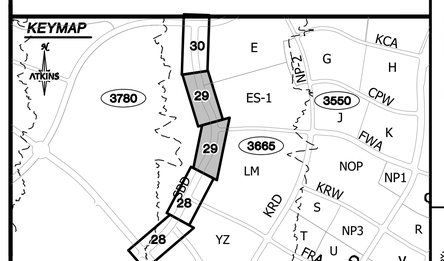
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

STREETLIGHT PLAN
STA 21+50 TO STA 33+60

KEYMAP



GRAPHIC SCALE
60 0 30 60 120
HORIZONTAL: 1"= 60'

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PROFESSIONAL ENGINEER-STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

DESIGNED BY:	B. MOCHTAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
HORIZ.:	1"=50'
VERT.:	NONE
DATE	MARCH, 2021
DRAWING NO.	29/42
JOB NO.	100069098

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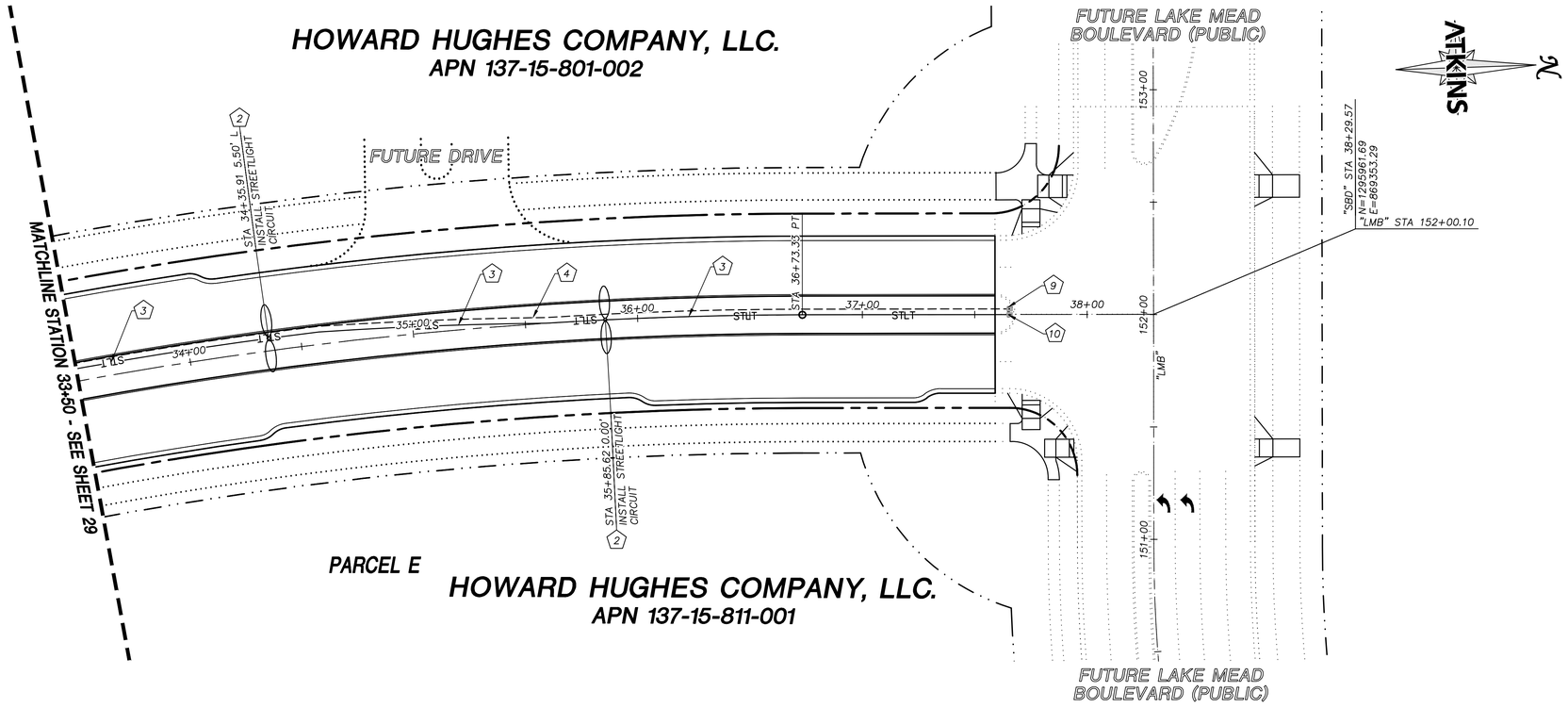

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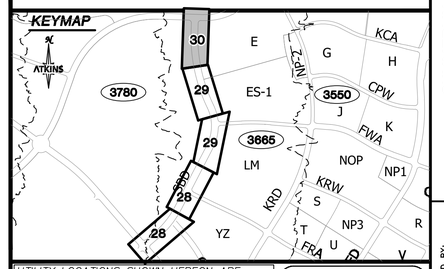
REV.	DESCRIPTION	BY	DATE	APPROVAL
	REVISIONS			



GRAPHIC SCALE
30 0 15 30 60
HORIZONTAL: 1"= 30'

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T21S,R59E,S03

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PROFESSIONAL ENGINEER-STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

STREETLIGHT PLAN
STA 33+50 TO END

DESIGNED BY: B. MOCHTYAK
DRAWN BY: K. HENRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=30'
VERT.: NONE
XXXVXXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 30/42
JOB NO. 100069098

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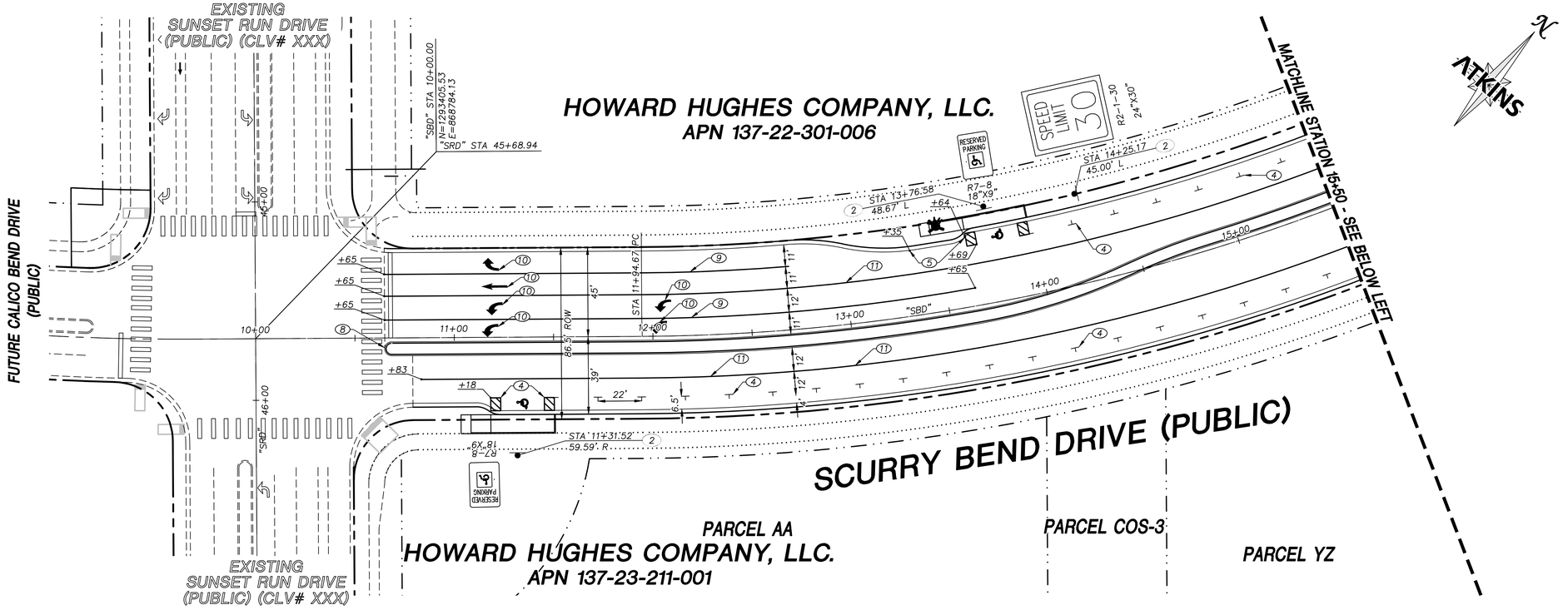
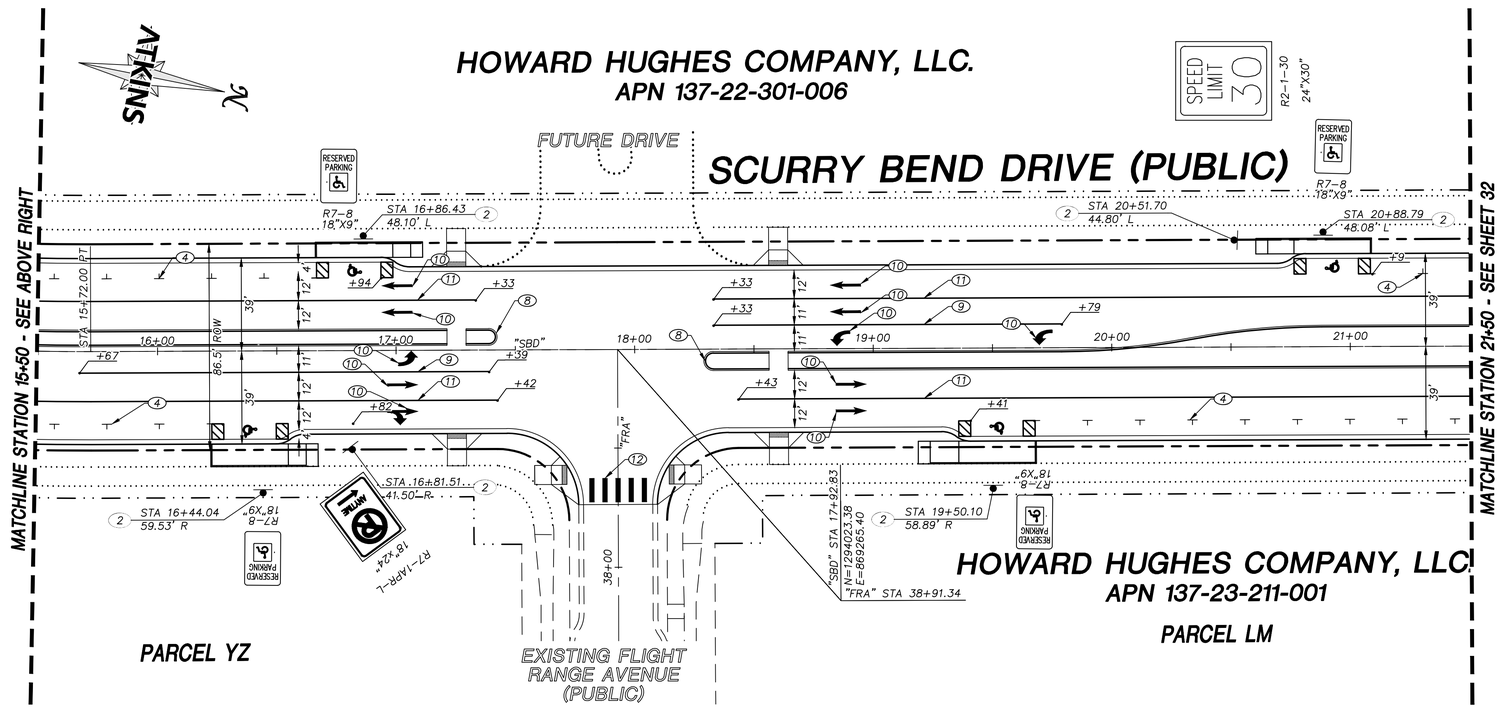




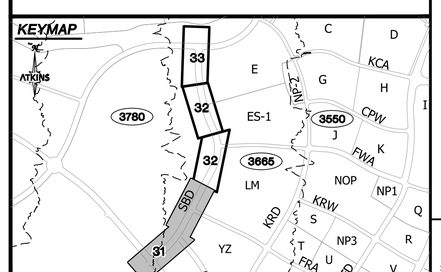
SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
ROADWAY		
STREET SIGNS	27	EA
TYPE 4 LANE LINE	8,582	LF
CCAUSD 248 MEDIAN NOSE MARKER	8	EA
RED PAINTED CURB (FIRE HYRDANT)	120	LF
TYPE 2 PMF WHITE TURN ARROW	30	EA
CURB RAMPS	12	EA
CCAUSD 601 BARRICADE	4	EA

STRIPING AND SIGNAGE CONSTRUCTION NOTES

1. INSTALL STREET NAME SIGN (D3-1) PER CCAUSD #250 ON TOP OF STOP SIGN
2. INSTALL SIGN(S) ON POST PER CCAUSD #249.1
3. INSTALL TYPE 1 CENTERLINE (RPM) PER CCAUSD #244
4. INSTALL PARKING STALLS PER DETAIL A THIS SHEET, TO BE MAINTAINED BY SUMMERLIN HOA.
5. PAINT CURB 15' EITHER DIRECTION OF FIRE HYDRANT (30' MINIMUM) & PLACE BLUE REFLECTIVE PAVEMENT MARKER IN MIDDLE OF ADJACENT DRIVE LANE NEAREST TO HYDRANT
6. INSTALL PORTABLE TYPE IIIA BARRICADE PER CCAUSD #601
7. INSTALL 24" SOLID WHITE LINE PER CCAUSD #254 (TYPE 2 PMF)
8. INSTALL MEDIAN NOSE MARKER PER CCAUSD #248 WITH R-71 AND TYPE C MARKING ALONG THE MEDIAN ISLAND PER DETAIL (D-8)
9. INSTALL STORAGE LANE LINE (RPM) PER CCAUSD #246
10. INSTALL WHITE TURN ARROW (TYPE 2 PMF) DETAIL
11. INSTALL TYPE 4 LANE LINE USING RAISED PAVEMENT MARKERS PER CCAUSD #246
12. INSTALL TYPE 24" WIDE WHITE CROSSWALK LINES USING TYPE 1 PAVEMENT MARKINS PER CCAUSD #254

KEYMAP



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PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

GRAPHIC SCALE
30 0 15 30 60
HORIZONTAL: 1"= 30'

BASIS OF BEARING

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T21S,R59E,S03

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REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

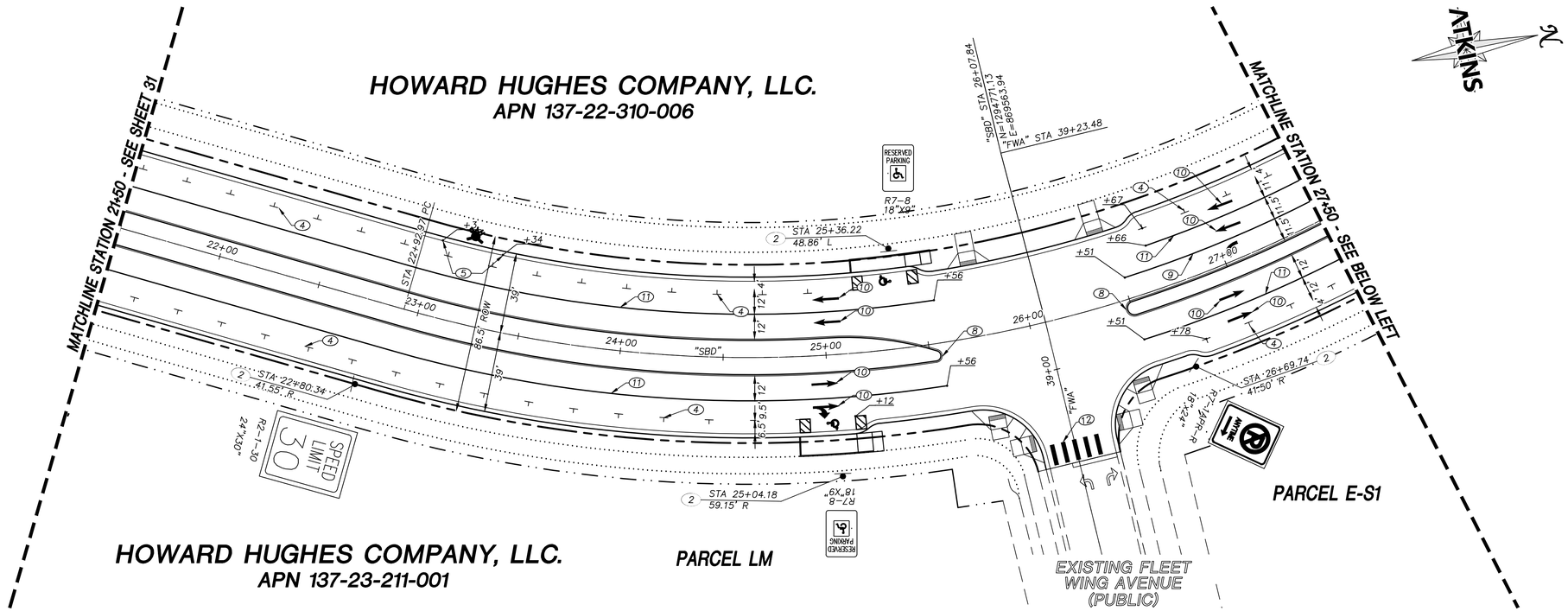
SUMMERLIN

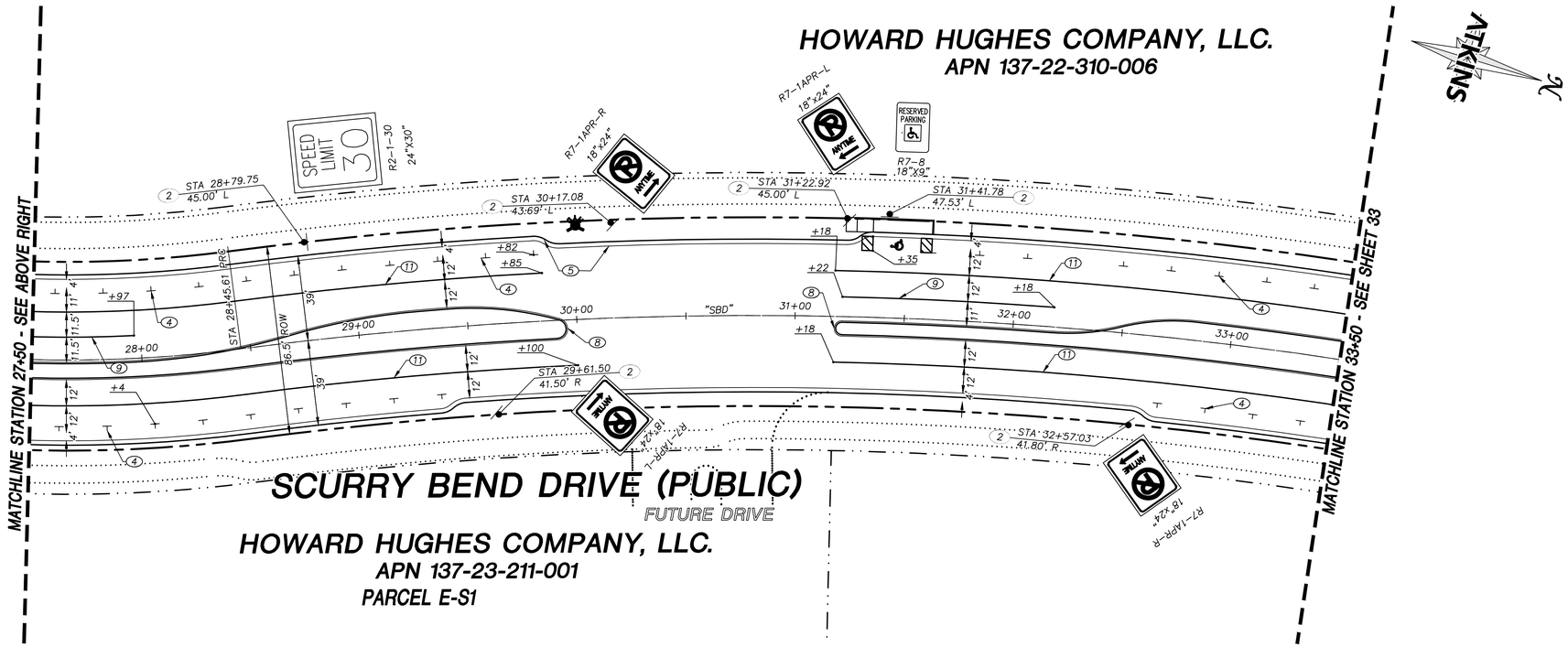
SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

TRAFFIC CONTROL PLAN
BEGIN TO STA 21+50

DESIGNED BY:	B. MOCHTYAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
HORIZ.:	1"=30'
VERT.:	NONE
XXXVXXXX	
LXX-XXXXX	
DATE	MARCH, 2021
DRAWING NO.	31/42
JOB NO.	100069098

C:\pw_work\atkrnam01\$mc8864\dms563261\69098-31-TRAF-T1.dwg LAYOUT: 31 TRAFFIC CONTROL PLAN Mar 08, 2021 - 3:37PM





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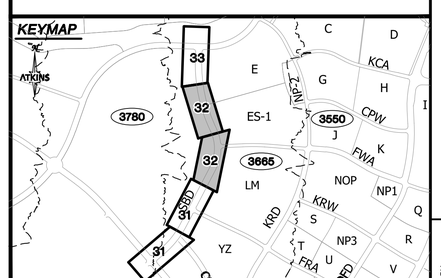
11. INSTALL TYPE 4 LANE LINE USING RAISED PAVEMENT MARKERS PER CCAUSD #246

KEYMAP



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NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

REVISIONS

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Henderson, Nevada 89074
Telephone: +1.702.263.7275
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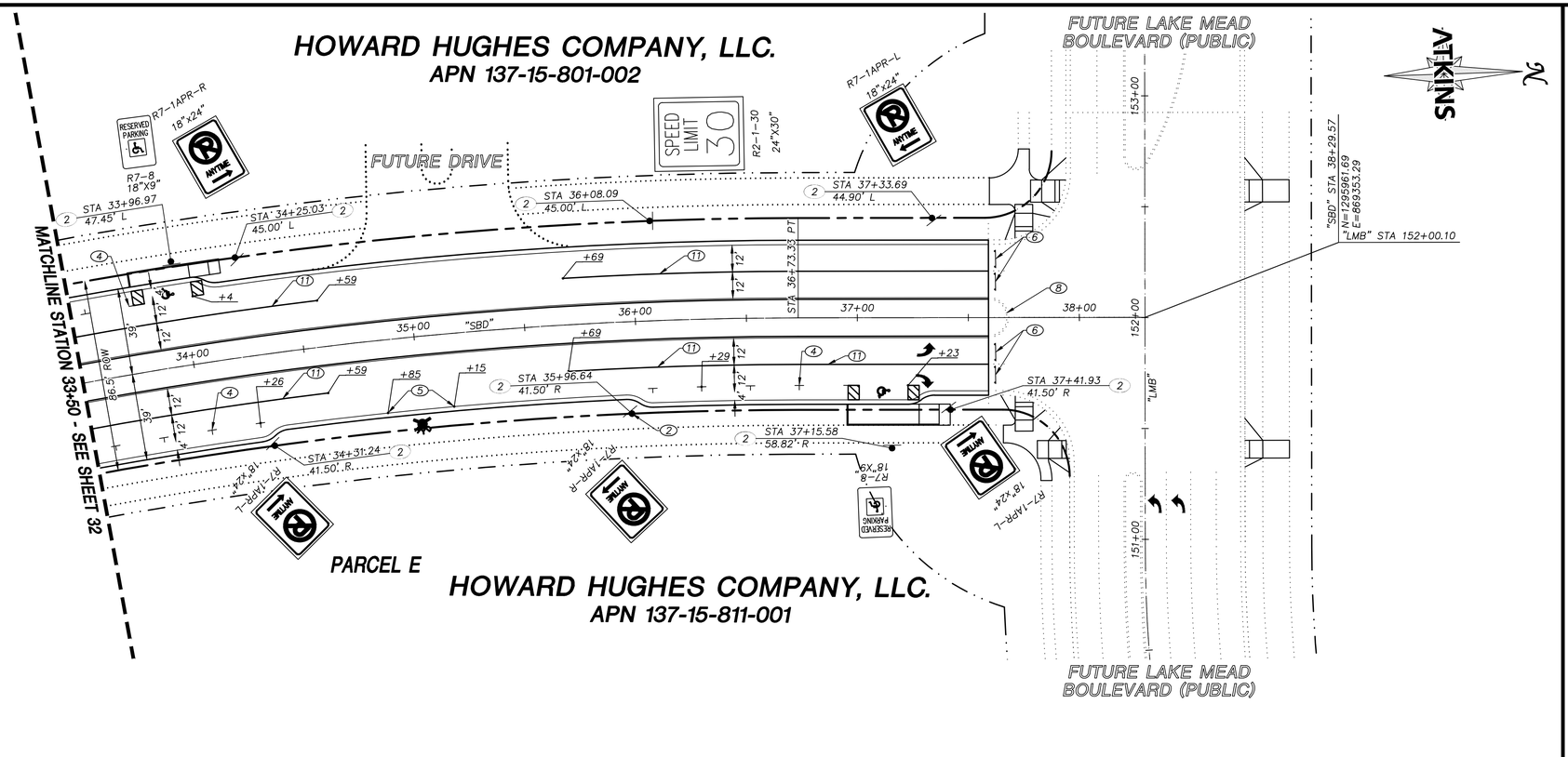
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

TRAFFIC CONTROL PLAN
STA 21+50 TO STA 33+50

XXXVXXXX	DESIGNED BY:	B. MOCHTYAK	
LXX-XXXXX	DRAWN BY:	K. HENDRY	
DATE:	MARCH, 2021	CHECKED BY:	N. BARCOS
DRAWING NO.	32/42	HORIZ.: 1"=30'	VERT.: NONE

JOB NO. 100069098

C:\pw_work\atkrnam01\simc8864\dms563261\69098-31-TRAF-T1.dwg LAYOUT: 32 TRAFFIC CONTROL PLAN Mar 08, 2021 - 3:37PM



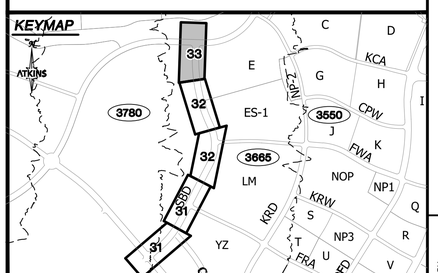
STRIPING AND SIGNAGE CONSTRUCTION NOTES

1. INSTALL STREET NAME SIGN (D3-1) PER CCAUSD #250 ON TOP OF STOP SIGN
2. INSTALL SIGN(S) ON POST PER CCAUSD #249.1
3. INSTALL TYPE 1 CENTERLINE (RPM) PER CCAUSD #244
4. INSTALL PARKING STALLS PER DETAIL A THIS SHEET, TO BE MAINTAINED BY SUMMERLIN HOA.
5. PAINT CURB 15' EITHER DIRECTION OF FIRE HYDRANT (30' MINIMUM) & PLACE BLUE REFLECTIVE PAVEMENT MARKER IN MIDDLE OF ADJACENT DRIVE LANE NEAREST TO HYDRANT
6. INSTALL PORTABLE TYPE IIIA BARRICADE PER CCAUSD #601
7. INSTALL 24" SOLID WHITE LINE PER CCAUSD #254 (TYPE 2 PMF)
8. INSTALL MEDIAN NOSE MARKER PER CCAUSD #248 WITH R-71 AND TYPE C MARKING ALONG THE MEDIAN ISLAND PER DETAIL (D-8)
9. INSTALL STORAGE LANE LINE (RPM) PER CCAUSD #246
10. INSTALL WHITE TURN ARROW (TYPE 2 PMF) DETAIL
11. INSTALL TYPE 4 LANE LINE USING RAISED PAVEMENT MARKERS PER CCAUSD #246

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

KEYMAP



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PROFESSIONAL ENGINEER-STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

GRAPHIC SCALE
30 0 15 30 60
HORIZONTAL: 1"= 30'

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368
(REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS
(3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 REGIONAL AND INTERNAL SYSTEMS OF TRANSPORTATION

Call before you Dig AVOID CUTTING HAZARDOUS 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

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

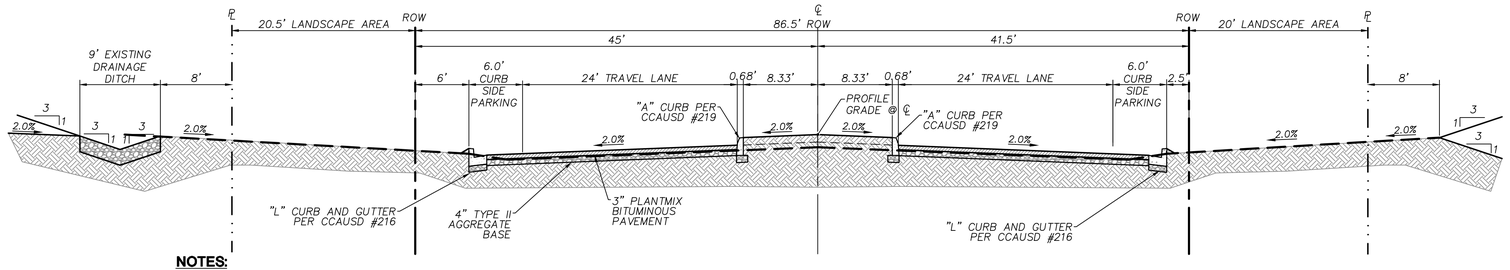
TRAFFIC CONTROL PLAN
STA 33+50 TO END

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

DESIGNED BY: B. MOCHTYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"=30'
VERT.: NONE
XX.XX.XXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 33/42
JOB NO. 100069098

C:\pw_work\atkinsnv01\bimo8864\dms56326\69098-31-TRAF-T1.dwg LAYOUT: 33 TRAFFIC CONTROL PLAN Mar 08, 2021 - 3:37PM



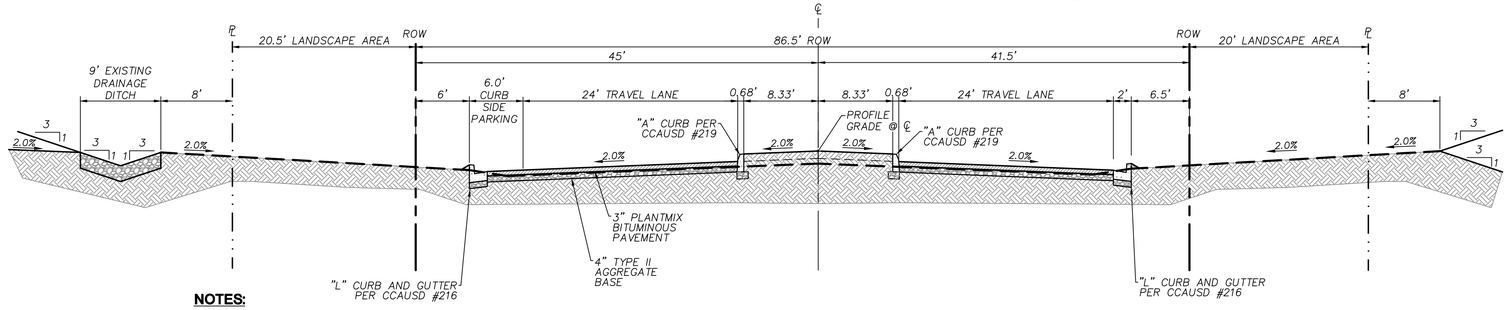
NOTES:

1. EXCAVATE BOTH SIDES TO DEPTH INDICATED PRIOR TO STREET IMPROVEMENTS. SIFT/SCREEN OUT ROCK AND DEBRIS GREATER THAN 6" FROM EXCAVATED MATERIAL, THEN BACKFILL TO 85% COMPACTION. FILL AS NECESSARY TO 2" BELOW THE FINISHED GRADE.

SCURRY BEND DRIVE - TYPICAL SECTION W/PARKING (BOTH SIDES)

N.T.S.

A 34



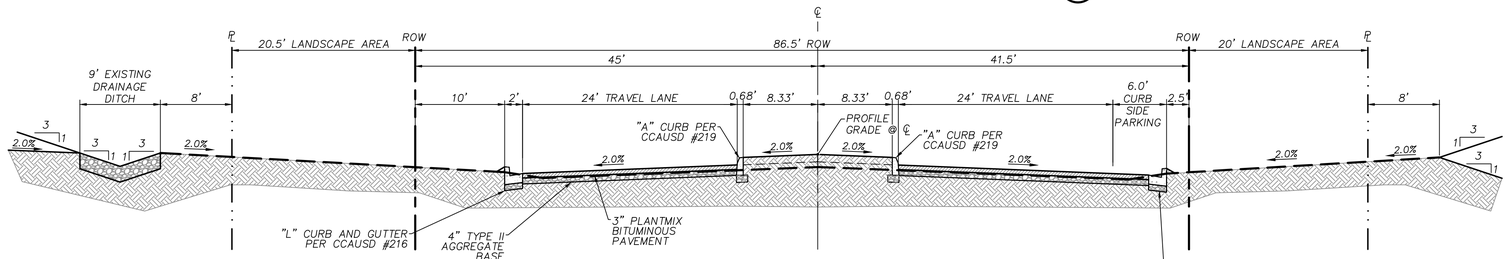
NOTES:

1. EXCAVATE BOTH SIDES TO DEPTH INDICATED PRIOR TO STREET IMPROVEMENTS. SIFT/SCREEN OUT ROCK AND DEBRIS GREATER THAN 6" FROM EXCAVATED MATERIAL, THEN BACKFILL TO 85% COMPACTION. FILL AS NECESSARY TO 2" BELOW THE FINISHED GRADE.

SCURRY BEND DRIVE - TYPICAL SECTION W/PARKING (LEFT SIDE)

N.T.S.

B 34



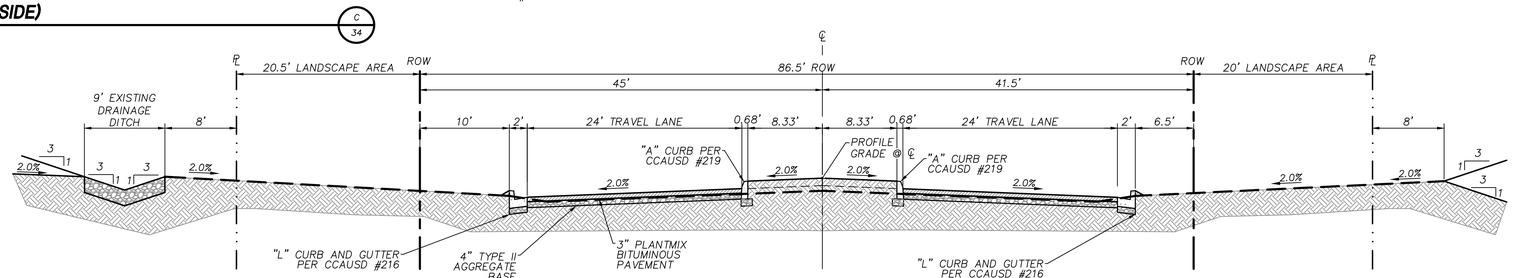
NOTES:

1. EXCAVATE BOTH SIDES TO DEPTH INDICATED PRIOR TO STREET IMPROVEMENTS. SIFT/SCREEN OUT ROCK AND DEBRIS GREATER THAN 6" FROM EXCAVATED MATERIAL, THEN BACKFILL TO 85% COMPACTION. FILL AS NECESSARY TO 2" BELOW THE FINISHED GRADE.

SCURRY BEND DRIVE - TYPICAL SECTION W/PARKING (RIGHT SIDE)

N.T.S.

C 34



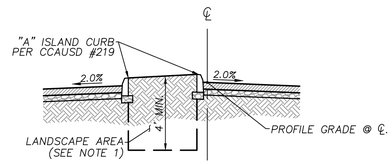
NOTES:

1. EXCAVATE BOTH SIDES TO DEPTH INDICATED PRIOR TO STREET IMPROVEMENTS. SIFT/SCREEN OUT ROCK AND DEBRIS GREATER THAN 6" FROM EXCAVATED MATERIAL, THEN BACKFILL TO 85% COMPACTION. FILL AS NECESSARY TO 2" BELOW THE FINISHED GRADE.

SCURRY BEND DRIVE - TYPICAL SECTION W/O PARKING

N.T.S.

D 34



LEFT TURN LANE

PROFILE GRADE LINE DETAIL FOR OFFSET MEDIAN

N.T.S.

E 34

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

TYPICAL SECTIONS

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

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T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 FEDERAL AND NATIONAL SYSTEMS OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COURTLY. Call 811 OR 1-800-642-2444

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

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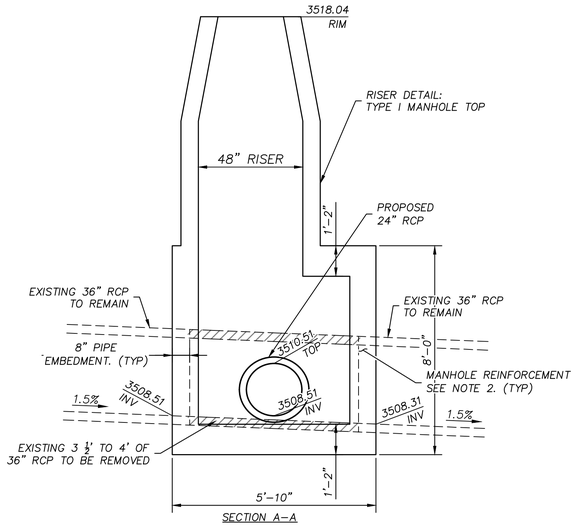
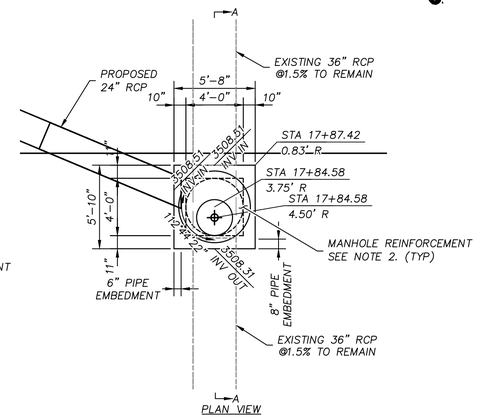
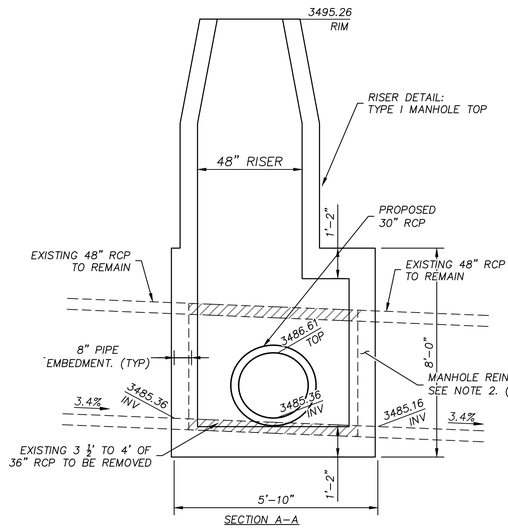
PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

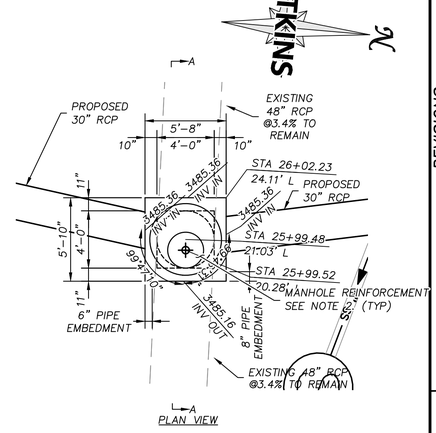
DESIGNED BY:	B. WICHTYAK
DRAWN BY:	K. HENRY
CHECKED BY:	N. BARCOS
HORIZ.:	NONE
VERT.:	NONE
XXXVXXXX	
LXX-XXXXX	
DATE:	MARCH, 2021
DRAWING NO.	34/42
JOB NO.	100069098

C:\pw_work\atkman01\simo8864\dms563261\69098-34-DETL-01.dwg LAYOUT: 34 TYPICAL SECTIONS Mar 08, 2021 - 3:37PM









STORM DRAIN MANHOLE #1 CONNECTION DETAIL

A
35

N.T.S.

NOTES:

1. SEE NOTES ON CLARK COUNTY UNIFORM STANDARD DRAWINGS 405.2 SHEET 2 OF 3.
2. FOR REINFORCEMENT LAYOUT FOR MANHOLE STRUCTURES, SEE CLARK COUNTY UNIFORM STANDARD DRAWINGS 405.2 SHEET 2 OF 3 FOR SINGLE SIDE DRAIN.
3. ALL STATION/OFFSETS REFERENCE "DFD" CENTERLINE.

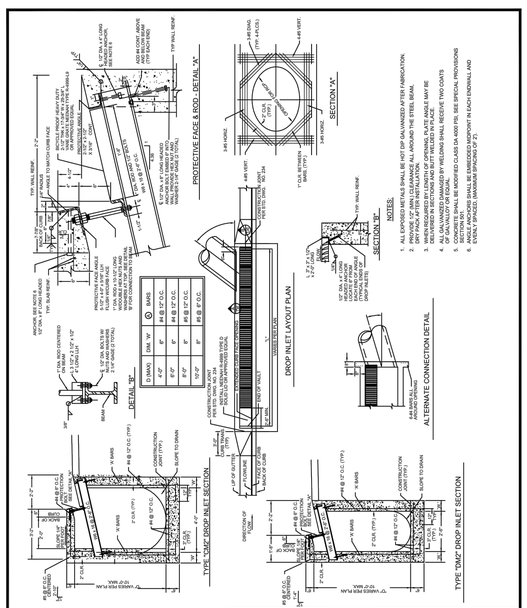
STORM DRAIN MANHOLE #2 CONNECTION DETAIL

B
35

N.T.S.

NOTES:

1. SEE NOTES ON CLARK COUNTY UNIFORM STANDARD DRAWINGS 405.2 SHEET 2 OF 3.
2. FOR REINFORCEMENT LAYOUT FOR MANHOLE STRUCTURES, SEE CLARK COUNTY UNIFORM STANDARD DRAWINGS 405.2 SHEET 2 OF 3 FOR SINGLE SIDE DRAIN.
3. ALL STATION/OFFSETS REFERENCE "DFD" CENTERLINE.



AGENCY APPROVED	B	C	H	L	M	N

SPECIFICATION REFERENCE	
501	CONCRETE
501	CONCRETE STRUCTURES
501	REINFORCING STEEL
501	STEEL

UNIFORM STANDARD DRAWINGS
CLARK COUNTY AREA

TYPE "C-D" MODIFIED
DROP INLET

DATE 9-14-06 | DWG. NO. 412.1

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
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T21S,R59E,S03

Call before you UnderGround 1-702-432-5300 (NEVADA ONE CALL)

Call before you Dig 811 1-800-642-2444

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

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PROFESSIONAL ENGINEER-STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

STORM DRAIN DETAILS

DESIGNED BY:	B. MOCHTYAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
HORZ.:	NONE
VERT.:	NONE
XXXVXXXX	
LXX-XXXXX	
DATE:	MARCH, 2021
DRAWING NO.	35/42
JOB NO.	100069098

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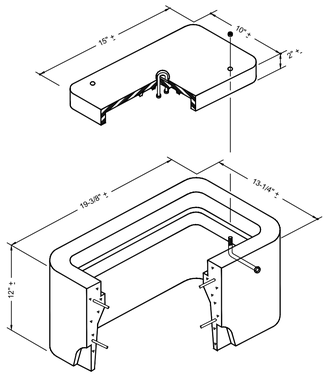


NOTES:

1. THIS PULL BOX SHALL NOT BE USED IN TRAFFIC OR PARKING LANES.
2. ALL DIMENSIONS ARE NOMINAL.

AGENCY APPROVED	B	C	H	L	M	N

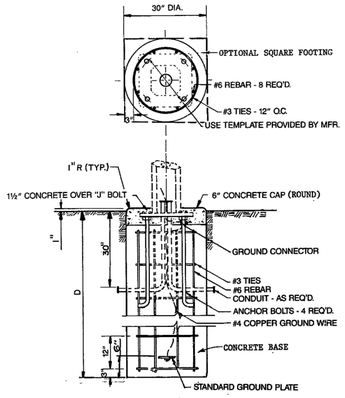
SPECIFICATION REFERENCE	

UNIFORM STANDARD DRAWINGS
CLARK COUNTY AREA

NO. 3 1/2 PULL BOX

DATE | DWG. NO. 705

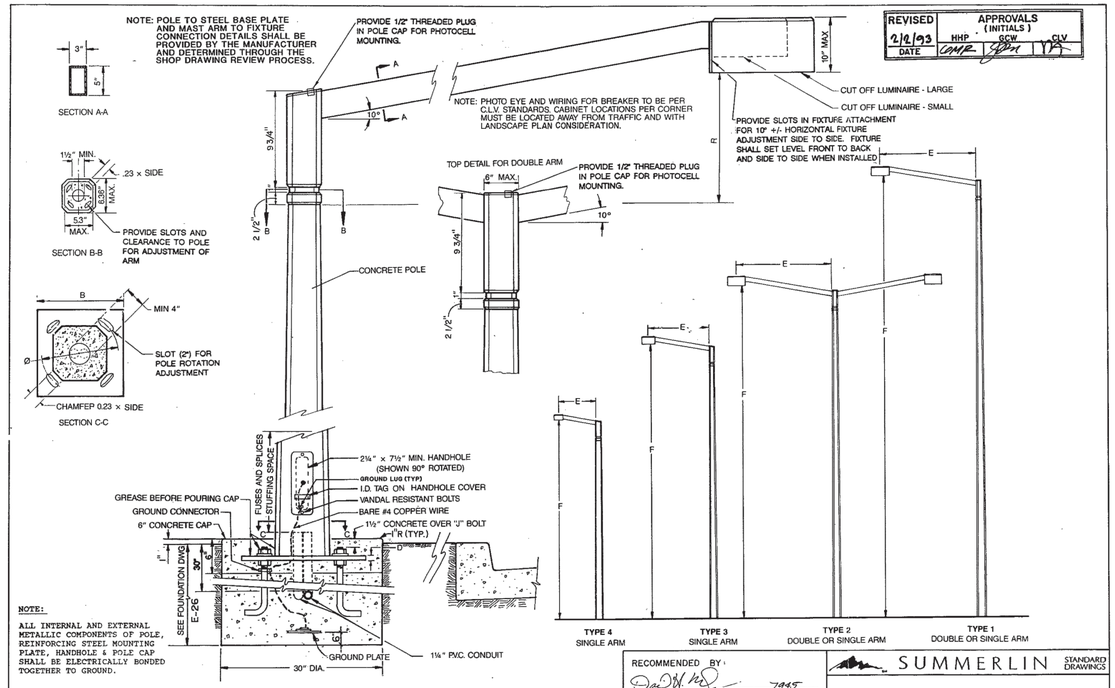
STREET LIGHT POLE FOUNDATIONS



	DEPTH "D"	ANCHOR BOLT
TYPE 1	6'6"	1¼" x 44" x 4"
TYPE 2	5'6"	1" x 36" x 4"
TYPE 3	4'6"	1" x 36" x 4"
TYPE 4	4'10"	1" x 30" x 4"

NOTE:

1. **ALL CONCRETE SHALL BE TYPE V CONCRETE CLASS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA.**
2. **PLACE CONCRETE AGAINST UNDISTURBED EARTH OR 95% COMPACTED BACKFILL (10' MIN. RADIUS AROUND FOUNDATION)**
3. **CALCULATION SHEETS AND DETAILS WILL BE SUBMITTED, SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER. TO CLV FOR REVIEW AND APPROVAL FOR FOUNDATION DESIGNS OTHER THAN SHOWN PER THIS STANDARD.**



NOTE:

ALL INTERNAL AND EXTERNAL METALLIC COMPONENTS OF POLE, REINFORCING STEEL MOUNTING PLATE, HANDHOLE & POLE CAP SHALL BE ELECTRICALLY BONDED TOGETHER TO GROUND.

	"B"	"B"	"D"	"E"	"F"	"R"	SHAFT BASE	FOOTING	CUTOFF LUMINAIRE
TYPE 1	16"	16"	1"	8'	41'-9"	2.16'	10'-1/4"	30"Øx 6'6"	LARGE
TYPE 2A	14"	14"	3/4"	6'	31'-2"	2.16'	9'-3/16"	30"Øx 5'6"	LARGE
TYPE 2B	14"	14"	3/4"	5'	30'-7"	1.64'	9'-3/16"	30"Øx 5'6"	LARGE

	"B"	"B"	"D"	"E"	"F"	"R"	SHAFT BASE	FOOTING	CUTOFF LUMINAIRE
TYPE 3	14"	14"	3/4"	5'	264.5"	1.64'	8'-5/8"	30"Øx 4'4"	SMALL
TYPE 4	14"	14"	3/4"	5'	16'11.5"	1.29'	7'-3/4"	30"Øx 4'0"	SMALL

REVISED	APPROVALS (INITIALS)		
2/2/93	HHP	GCW	CLV
DATE			

RECOMMENDED BY: DAVID H. MALPASS 7445 R.P.E.

APPROVED BY: C.L.V. CITY ENGINEER R.P.E.# 7569

SUMMERLIN STANDARD DRAWINGS

STREET LIGHT POLE, ARM AND FIXTURE DETAIL

DATE 8-88 | DWG. NO. E-2 | PAGE NO. 1 OF 1

REVISED	APPROVALS (INITIALS)		
6-10-88	HHP	GCW	CLV
DATE			

	DEPTH "D"	ANCHOR BOLTS
TYPE 5	12'-0"	1¾" x .0" x 6"
TYPE 6	10'-6"	1¼" x 44" x 4"

REVISED	APPROVALS (INITIALS)		
2/2/93	HHP	GCW	CLV
DATE			

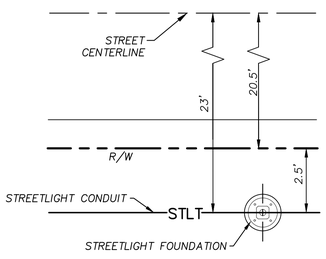
RECOMMENDED BY: DAVID H. MALPASS 7445 R.P.E.

APPROVED BY: C.L.V. CITY ENGINEER R.P.E.# 7569

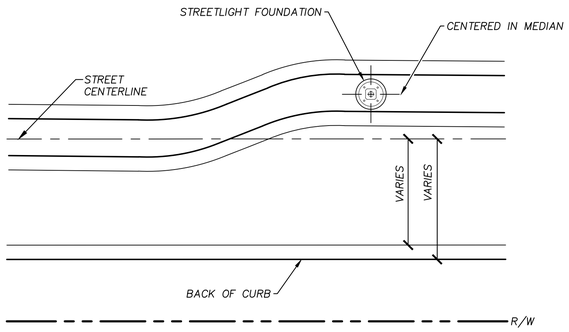
SUMMERLIN STANDARD DRAWINGS

FOUNDATION

DATE 8-88 | DWG. NO. E-26 | PAGE NO. 1 OF 1



STREETLIGHT FOUNDATION LOCATION DETAIL (A / 36)
N.T.S.



STREETLIGHT FOUNDATION MEDIAN LOCATION DETAIL (B / 36)
N.T.S.

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

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T21S,R59E,S03

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Call before you Dig AVOID EXPENSIVE FINES AND DOWNTIME. UTILITY LINES YOU DIGGIN'. Call 811 or 1-800-642-2444

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PROFESSIONAL ENGINEER-STATE OF NEVADA NICOLAS A. BARCOS EXP. 12-31-20 CIVIL No. 25673
3/8/2021

REV.	DESCRIPTION	BY	DATE	APPROVAL
	REVISIONS			

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

STREETLIGHT DETAILS

DESIGNED BY: B. WOCHTYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: NONE
VERT.: NONE

XXXVXXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 36/42

JOB NO. 100069098

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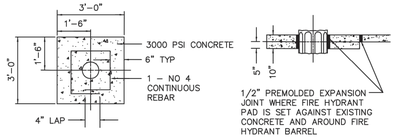
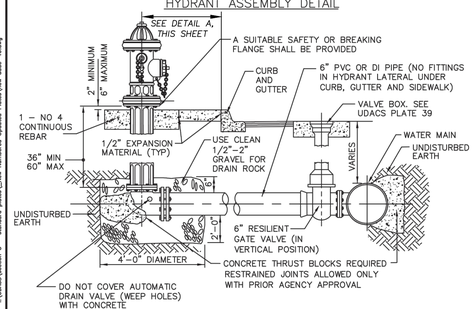
UNIFORM DESIGN STANDARDS FOR WATER DISTRIBUTION SYSTEMS

PAD DETAIL



NOTE
SEE SHEET 2 FOR LOCATION OF FIRE HYDRANTS, AND FIRE HYDRANT PADS.

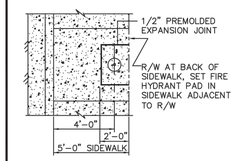
HYDRANT ASSEMBLY DETAIL



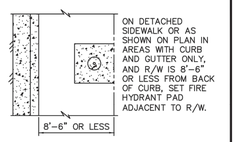
NOT TO SCALE	FILE NAME: UDACS–40 DRAWN BY: SDM CHECKED BY: SPM	FIRE HYDRANT INSTALLATION	UDACS PLATE NO. 40 SHEET 1 OF 3

10:28 Mar 08 2021 J:\UDACS\section 5 – standard details_New Numbered Updated Plates\new udacs-40.dwg

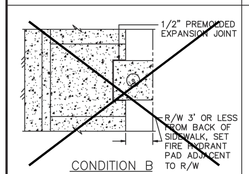
UNIFORM DESIGN STANDARDS FOR WATER DISTRIBUTION SYSTEMS



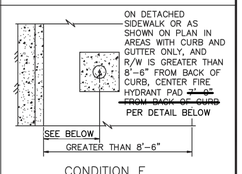
CONDITION A



CONDITION D



CONDITION B



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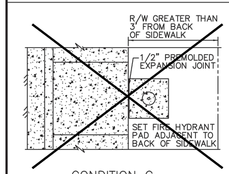
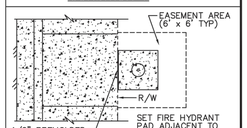


CONDITION C

IF NO SIDEWALK, CURB AND GUTTER EXISTS, SET FIRE HYDRANT PAD ADJACENT TO R/W AS SHOWN IN CONDITION D ABOVE.

CONDITION F



CONDITION G

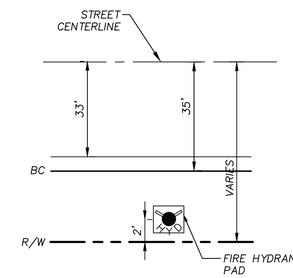
NOT TO SCALE	FILE NAME: UDACS–40 DRAWN BY: SDM CHECKED BY: SPM	FIRE HYDRANT INSTALLATION	UDACS PLATE NO. 40 SHEET 2 OF 3

UNIFORM DESIGN STANDARDS FOR WATER DISTRIBUTION SYSTEMS

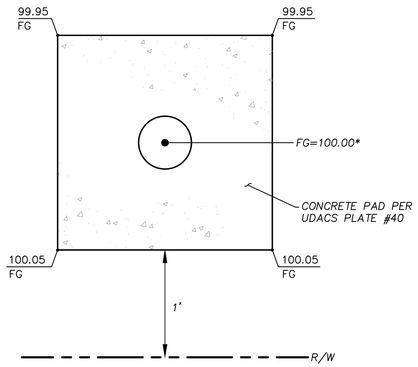
NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE REQUIREMENTS AND APPROVED FIRE HYDRANT INSTALLATION GUIDES OF THE FIRE DEPARTMENT HAVING JURISDICTION.
2. NO HYDRANT SHALL BE LOCATED WITHIN 25 FEET OF ANY STRUCTURE OR 6 FEET OF A DRIVEWAY, POWER POLE, LIGHT STANDARD, OR ANY OTHER OBSTRUCTION. FOR WALLS, FENCE, AND PLANTER LOCATIONS, A PERIMETER AROUND THE HYDRANT MEASURING A MINIMUM OF 3 FEET FROM ITS CIRCUMFERENCE SHALL BE MAINTAINED CLEAR OF ALL OBSTRUCTIONS AT ALL TIMES. HYDRANTS MUST BE LOCATED A MINIMUM OF 6 FEET AWAY FROM THE BEGINNING OF A TURNING RADIUS.
3. 6" FIRE HYDRANT LATERAL SHALL BE THE SAME PRESSURE CLASS AS THE DISTRIBUTION MAIN.
4. DUCTILE IRON PIPE TO BE ENCASED WITH TWO LAYERS EIGHT MILS THICK POLYETHYLENE FILM. DO NOT ENCASE FIRE HYDRANT BARREL.
5. ALL FIRE HYDRANTS SHALL BE REPAINTED AS REQUIRED IF DAMAGED DURING INSTALLATION.
6. USE OF FIRE HYDRANT BARREL EXTENSIONS MUST HAVE PRIOR AGENCY APPROVAL.
7. MAXIMUM FIRE HYDRANT LATERAL DEFLECTION SEE UDACS SECTIONS 2.07 AND 3.11
8. ADDITIONAL CLEARANCE FROM THE FRONT OF FIRE HYDRANT TO BACK OF CURB MAY BE REQUIRED BY THE AGENCY.

NOT TO SCALE	FILE NAME: UDACS–40 DRAWN BY: SDM CHECKED BY: SPM	FIRE HYDRANT INSTALLATION	UDACS PLATE NO. 40 SHEET 3 OF 3



FIRE HYDRANT LOCATION DETAIL (A / 37)
N.T.S.



*NOTE: THE GRADES SHOWN IN THIS DETAIL ARE RELATIVE NOT ACTUAL, 100.00 IS THE REFERENCE GRADE FOR THE CENTER OF PAD ELEVATION. SEE P–SHEETS FOR ACTUAL FINISHED GRADE FOR CENTER OF PAD. CALCULATE THE CORNER GRADES PER SHEET 9 FINISHED GRADE.

FIRE HYDRANT PAD GRADING DETAIL (B / 37)
N.T.S.

NOTES:

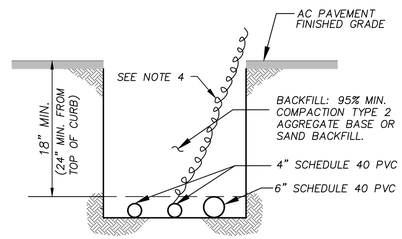
1 SLEEVES AND CONDUITS SHALL BE INSTALLED 18" BELOW FINISHED GRADE AND SHALL EXTEND 5' BEYOND BACK OF CURBS, WALLS AND PAVING.

2 CONTRACTOR SHALL RECORD LOCATIONS OF INSTALLED SLEEVES: A COPY OF THE FILED NOTES SHALL BE GIVEN TO SUMMERLIN'S ENGINEER FOLLOWING CONSTRUCTION.

3 HORIZONTAL LOCATION OF SLEEVES SHOWN ON P–SHEETS.

4 THE CONTRACTOR TO PROVIDE A WIRE THROUGH THE SLEEVE TO GRADE LEVEL (FOR FUTURE SLEEVE LOCATION).

5 CONTRACTOR TO IDENTIFY SLEEVE LOCATION ON TOP OF CURB.



IRRIGATION SLEEVES DETAIL (C / 37)
N.T.S.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT
PLANNING AND ENGINEERING SERVICES

PROJECT NO. 0000 FIRST APPROVED DATE: _____

LVVWD APPROVED FIRE FLOW 1500 GPM AT 20 PSI RESIDUAL

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368
(REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS
(3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 FEDERALLY AND NATIONAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID DIGGING IN YOUR UTILITY LINES. THEY DON'T LIE. Call 811 or 1-800-642-2444

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

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

PROFESSIONAL ENGINEER – STATE OF NEVADA – NICOLAS A. BARCOS – EXP. 12-31-20 – CIVIL – No. 25673
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

WATER DETAILS

DESIGNED BY: B. MOCHTYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: NONE
VERT.: NONE

XXXVXXXX
LXX–XXXXX
DATE: MARCH, 2021
DRAWING NO. 37/42
JOB NO. 100069098

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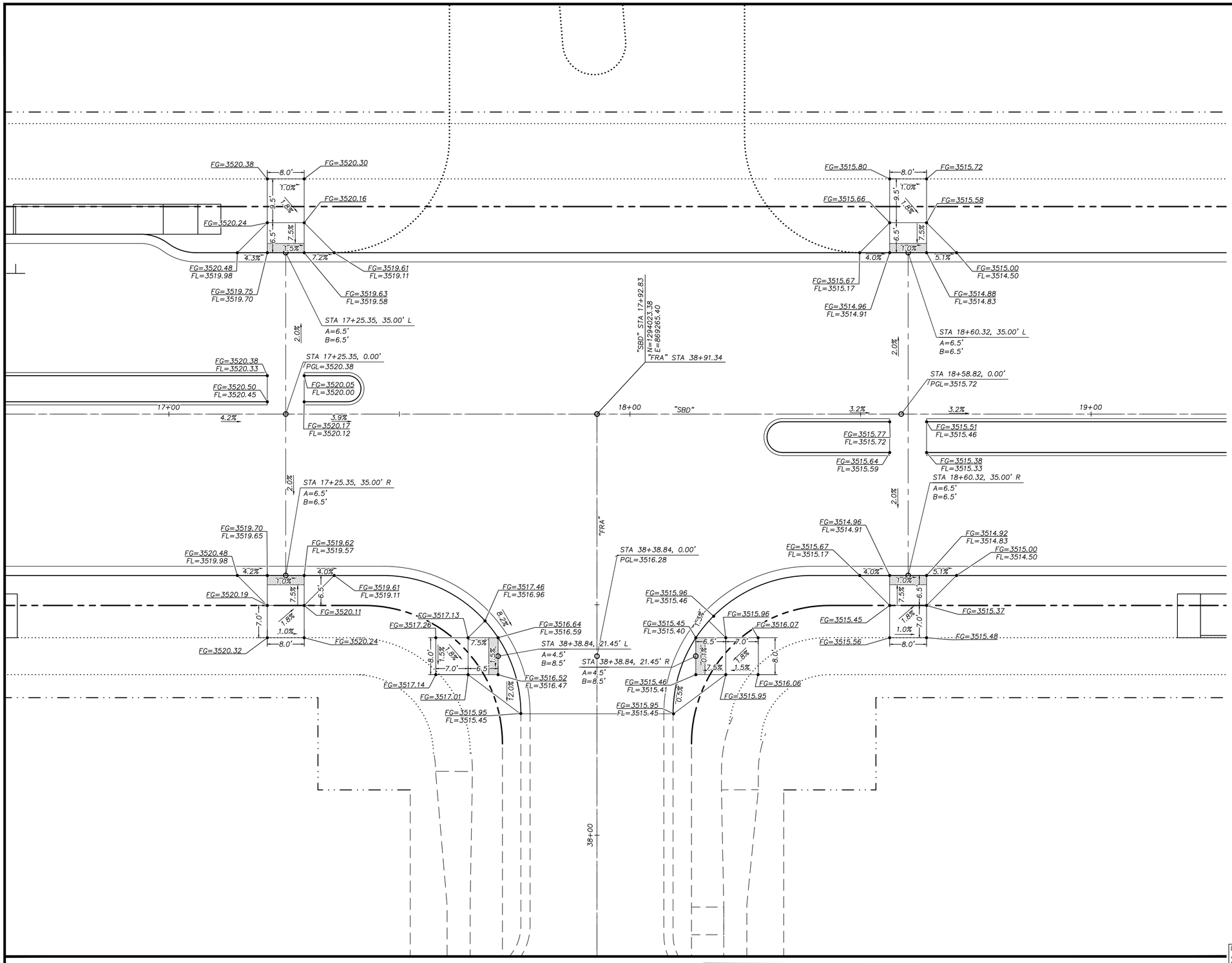

GRAPHIC SCALE

10 0 5 10 20

HORIZONTAL: 1"= 10'

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

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T21S,R59E,S03

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

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COURTLY. Call 811 OR 1-800-642-2444

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PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

FRA INTERSECTION DETAILS

DESIGNED BY:	B. WICHTYAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
HORIZ.:	1"=10'
VERT.:	NONE
XXXVXXXX	
LXX-YXXXX	
DATE:	MARCH, 2021
DRAWING NO.	38/42

JOB NO. 100069098

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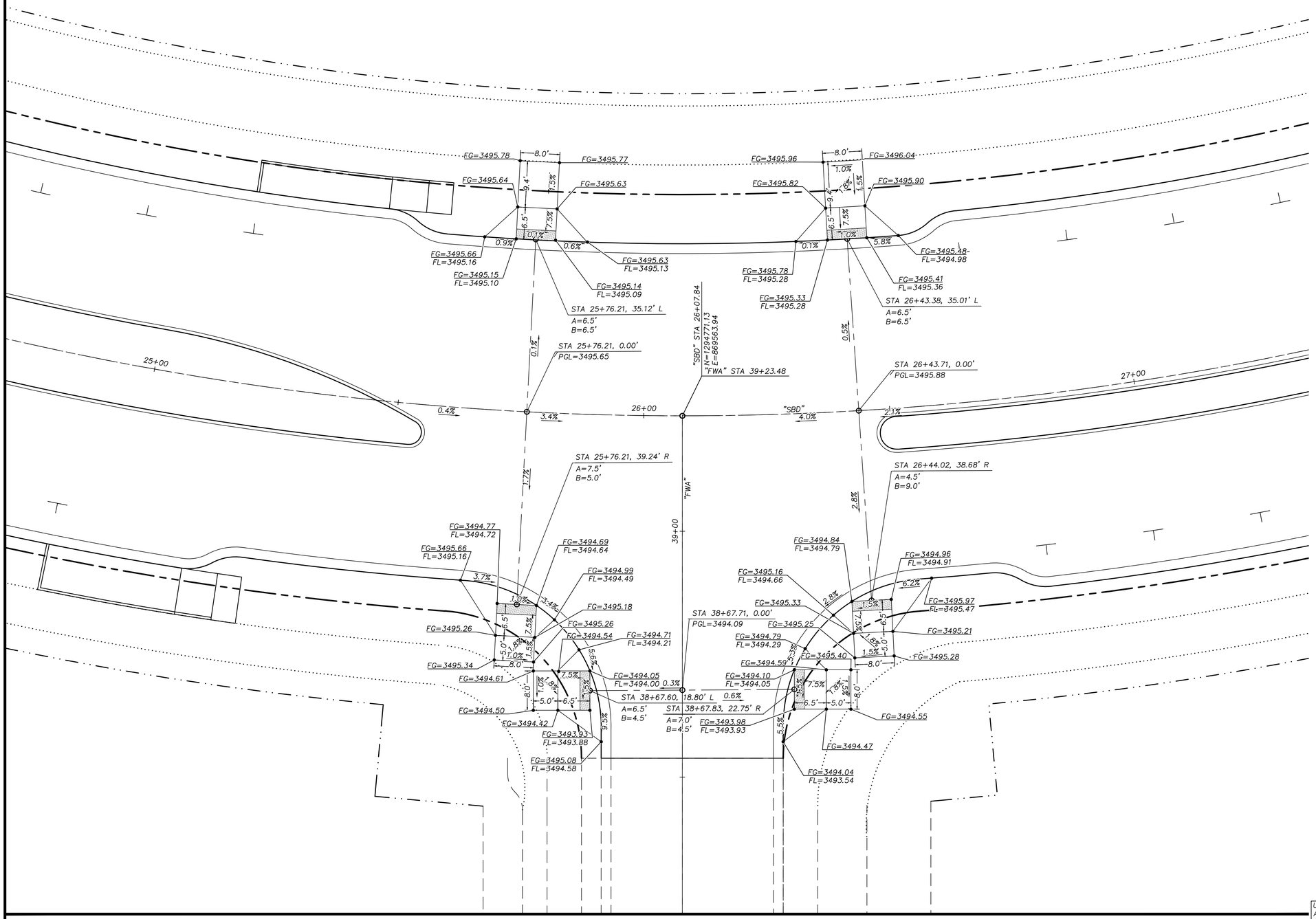

GRAPHIC SCALE
10 0 5 10 20
HORIZONTAL: 1"= 10'

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

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PROFESSIONAL ENGINEER STATE OF NEVADA NICOLAS A BARCOS EXP. 12-31-20 CIVIL No. 25870
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

FWA INTERSECTION DETAILS

DESIGNED BY:	B. MOCHTAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
HORIZ.:	1"=10'
VERT.:	NONE
XX/XX/XXXX	
LXX-XXXXX	
DATE:	MARCH, 2021
DRAWING NO.	39/42

JOB NO. 100069098

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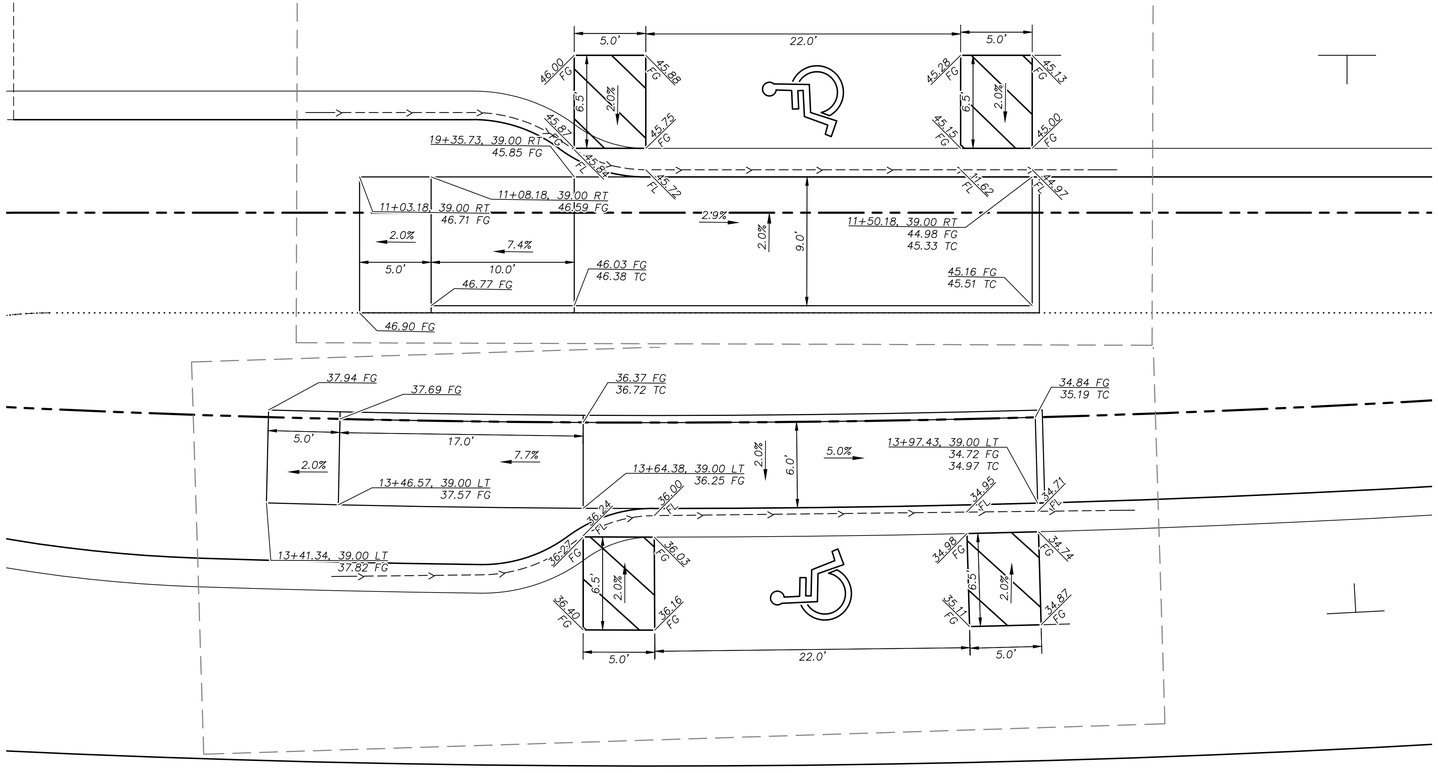
ADA PARKING GRADING DETAIL STA 11+35

A / 40

1"=5'



ADA PARKING GRADING DETAIL STA 13+81

B / 40

1"=5'

GRAPHIC SCALE

5 0 2.5 5 10

HORIZONTAL: 1"= 5'

BASIS OF BEARING

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T21S,R59E,S03

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PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25875
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

HANDICAP PARKING DETAILS

DESIGNED BY:	B. MICHTYAK
DRAWN BY:	K. HENDRY
CHECKED BY:	N. BARCOS
HORIZ.:	1"= 5'
VERT.:	NONE
XXXVXXXX.	
LXX-XXXXX	
DATE:	MARCH, 2021
DRAWING NO.	41/42
JOB NO.	100069098

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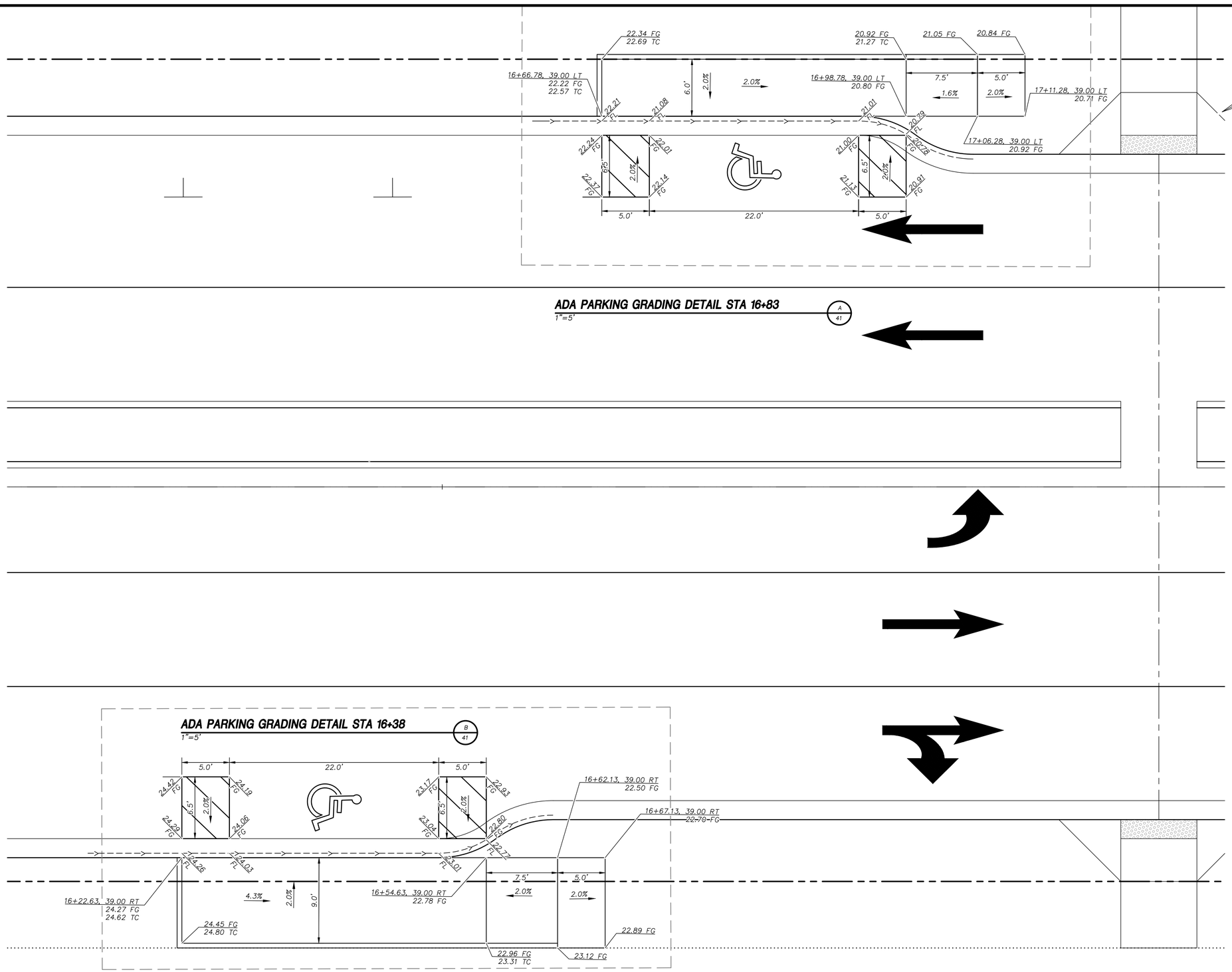

ADA PARKING GRADING DETAIL STA 16+83
1"=5'
A
41

GRAPHIC SCALE
5 0 2.5 5 10
HORIZONTAL: 1"= 5'

BASIS OF BEARING

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T21S,R59E,S03

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

Call before you Dig
AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
Call 811
OR
1-800-642-2444

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PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN®

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

HANDICAP PARKING DETAILS

DESIGNED BY: B. MOCHTYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1" = 5'
VERT.: NONE

XXXVXXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 41/42
JOB NO. 100069098

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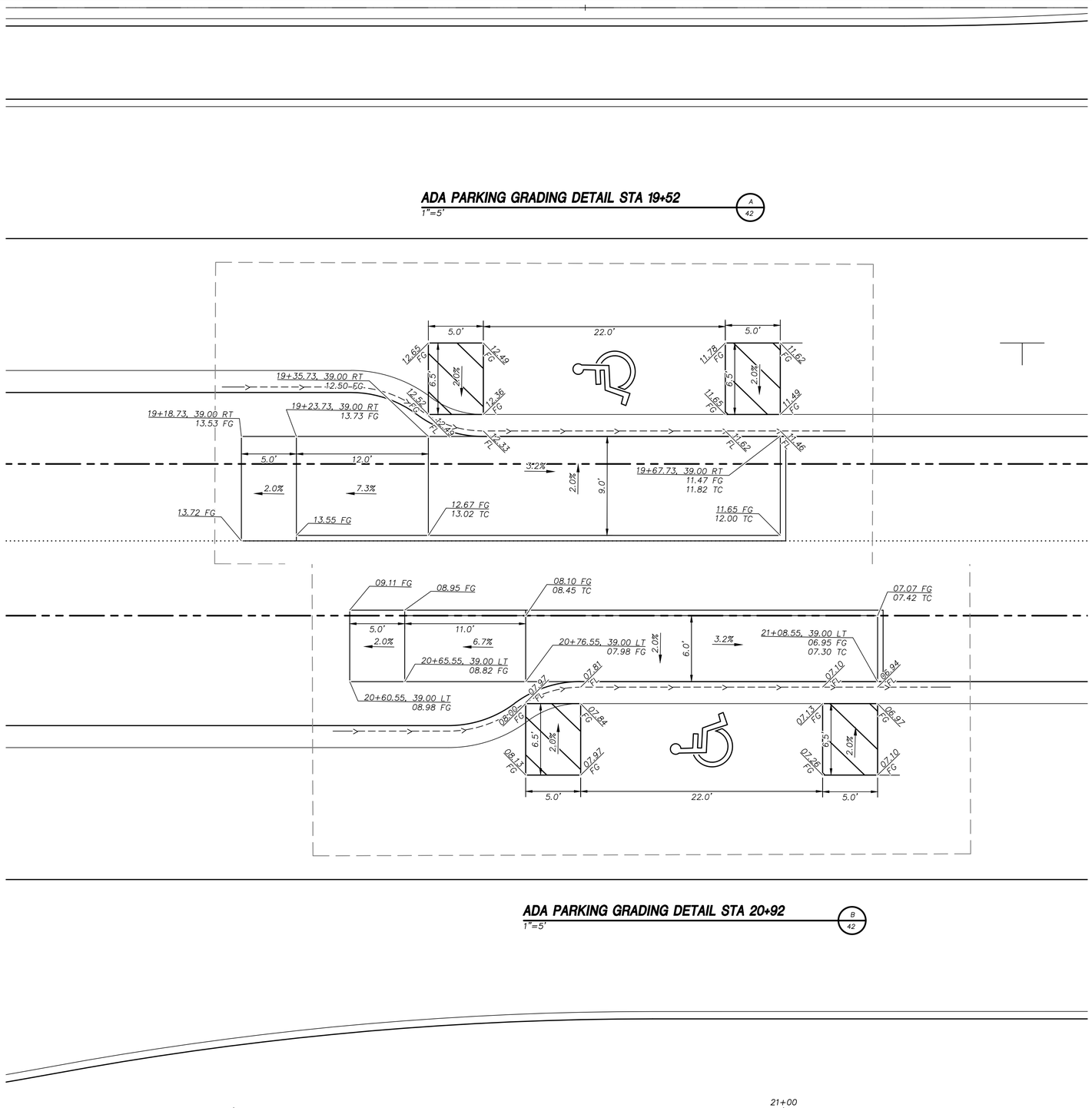
ADA PARKING GRADING DETAIL STA 19+52

1"=5'

GRAPHIC SCALE

5 0 2.5 5 10

HORIZONTAL: 1"= 5'

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

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T21S,R59E,S03

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PROFESSIONAL ENGINEER-STATE OF NEVADA NICOLAS A. BARCOS EXP. 12-31-20 CIVIL No. 25673 3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

HANDICAP PARKING DETAILS

DESIGNED BY: B. MOCHTYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1" = 5'
VERT.: NONE

XXXVXXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 43/42
JOB NO. 100069098

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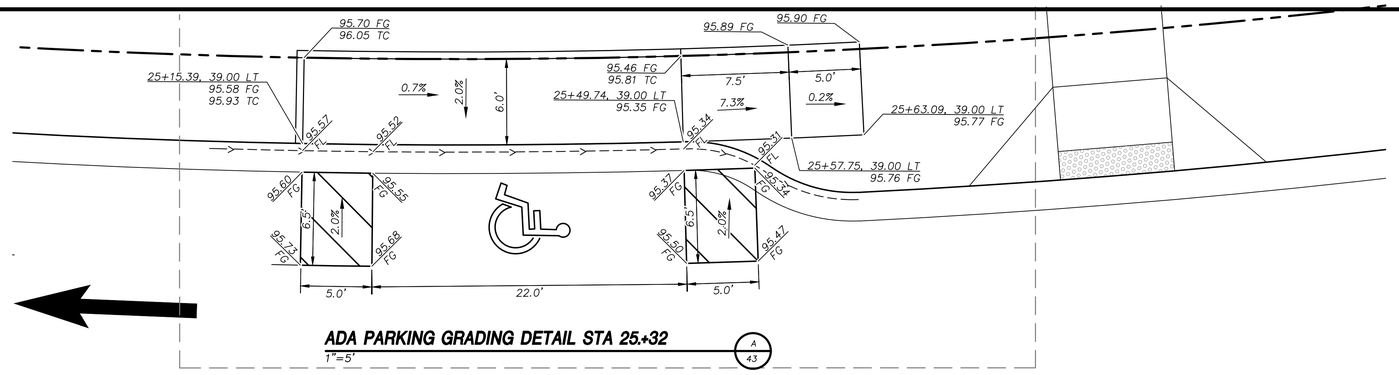
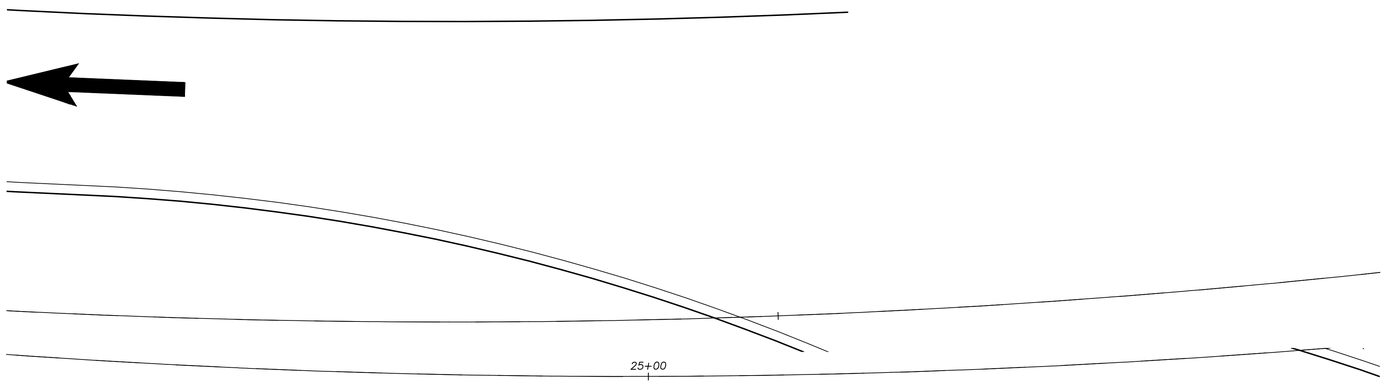
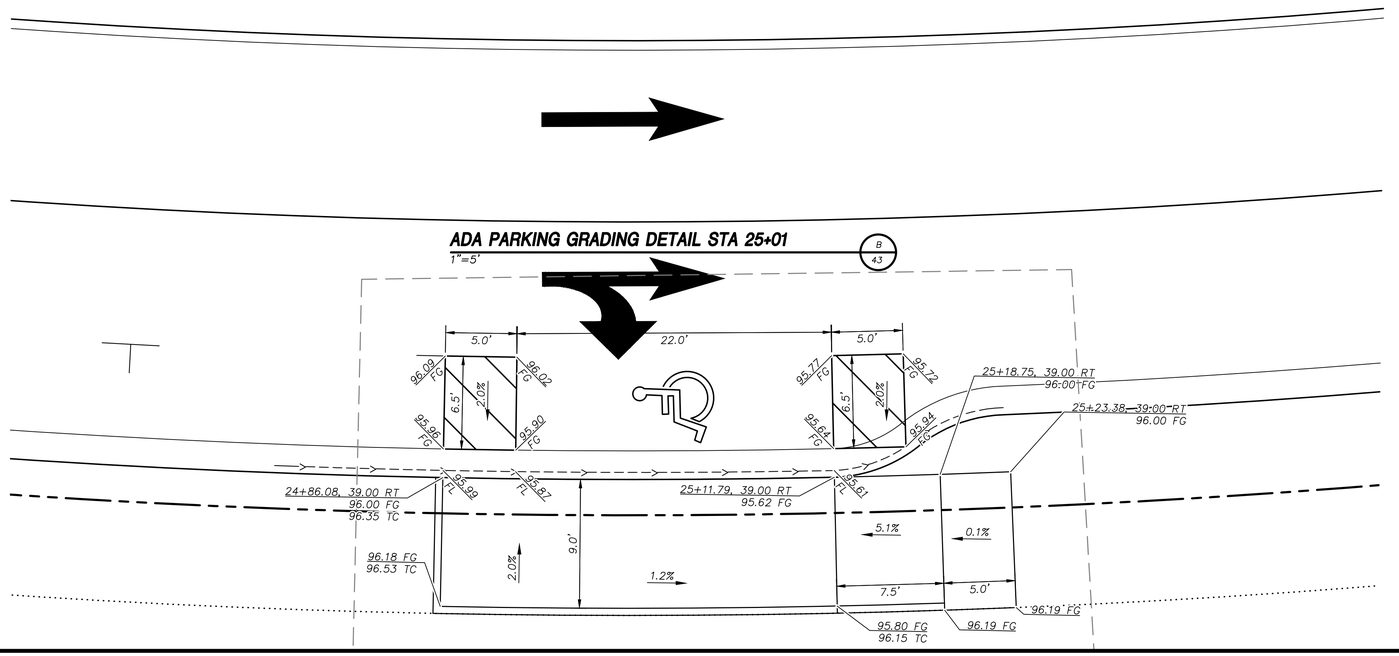


ADA PARKING GRADING DETAIL STA 25+32
1"=5'
A
43





ADA PARKING GRADING DETAIL STA 25+01
1"=5'
B
43

GRAPHIC SCALE
5 0 2.5 5 10
HORIZONTAL: 1"= 5'

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

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

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

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

PROFESSIONAL ENGINEER-STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN®

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

HANDICAP PARKING DETAILS

DESIGNED BY: B. MOCHTYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1" = 5'
VERT.: NONE

XXXVXXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 43/42
JOB NO. 100069098

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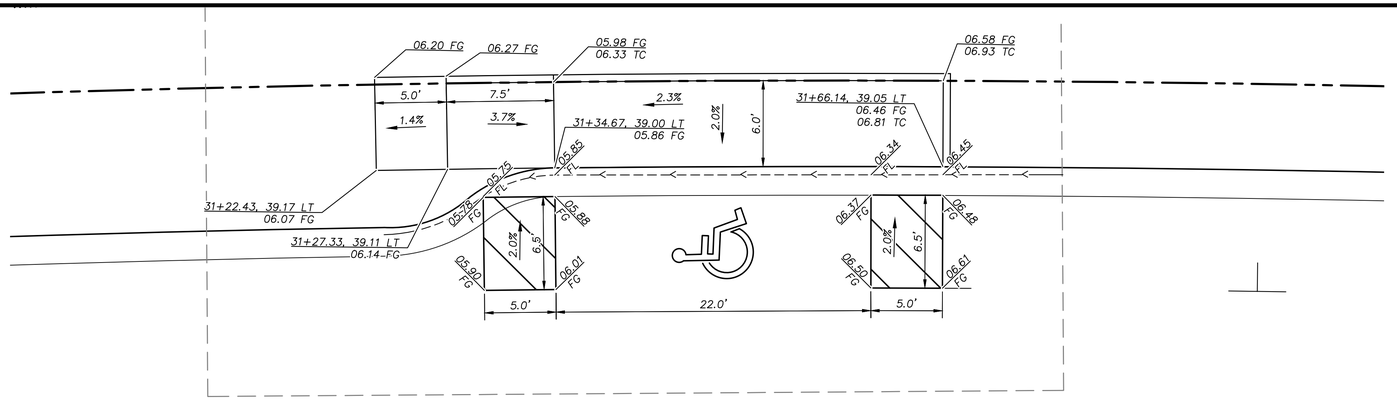
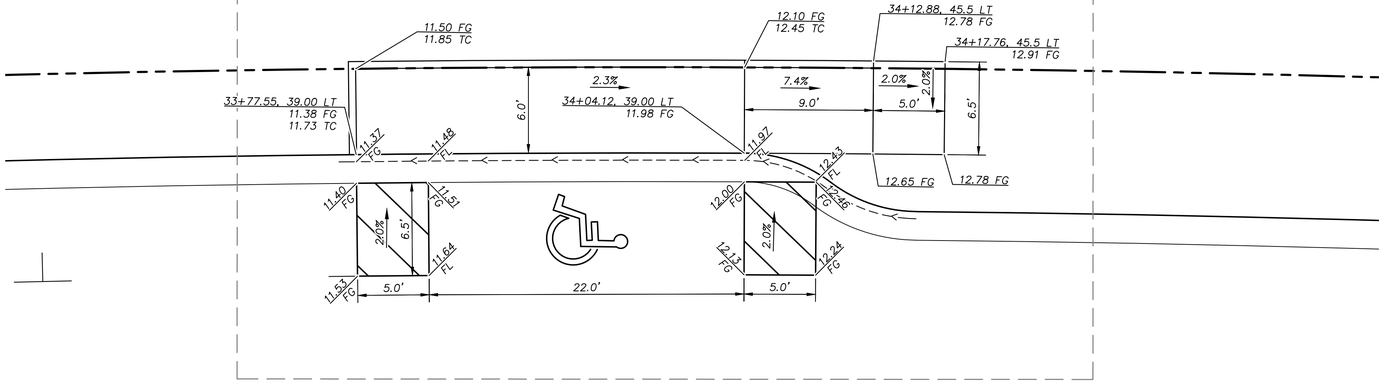


ADA PARKING GRADING DETAIL STA 31+46

1"=5'

A
44



ADA PARKING GRADING DETAIL STA 31+92

1"=5'

B
44

GRAPHIC SCALE
5 0 2.5 5 10
HORIZONTAL: 1"= 5'

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

CITY OF LAS VEGAS BENCHMARK: D368
(REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS
(3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 REGIONAL ONE-CALL AND NATIONAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING & BREAKING GAS OR 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

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PROFESSIONAL ENGINEER-STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

REVISIONS

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ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

HANDICAP PARKING DETAILS

DESIGNED BY: B. MICHTAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1"= 5'
VERT.: NONE

XXXVXXXX
LXX-XXXXX
DATE: MARCH, 2021
DRAWING NO. 44/42
JOB NO. 100069098

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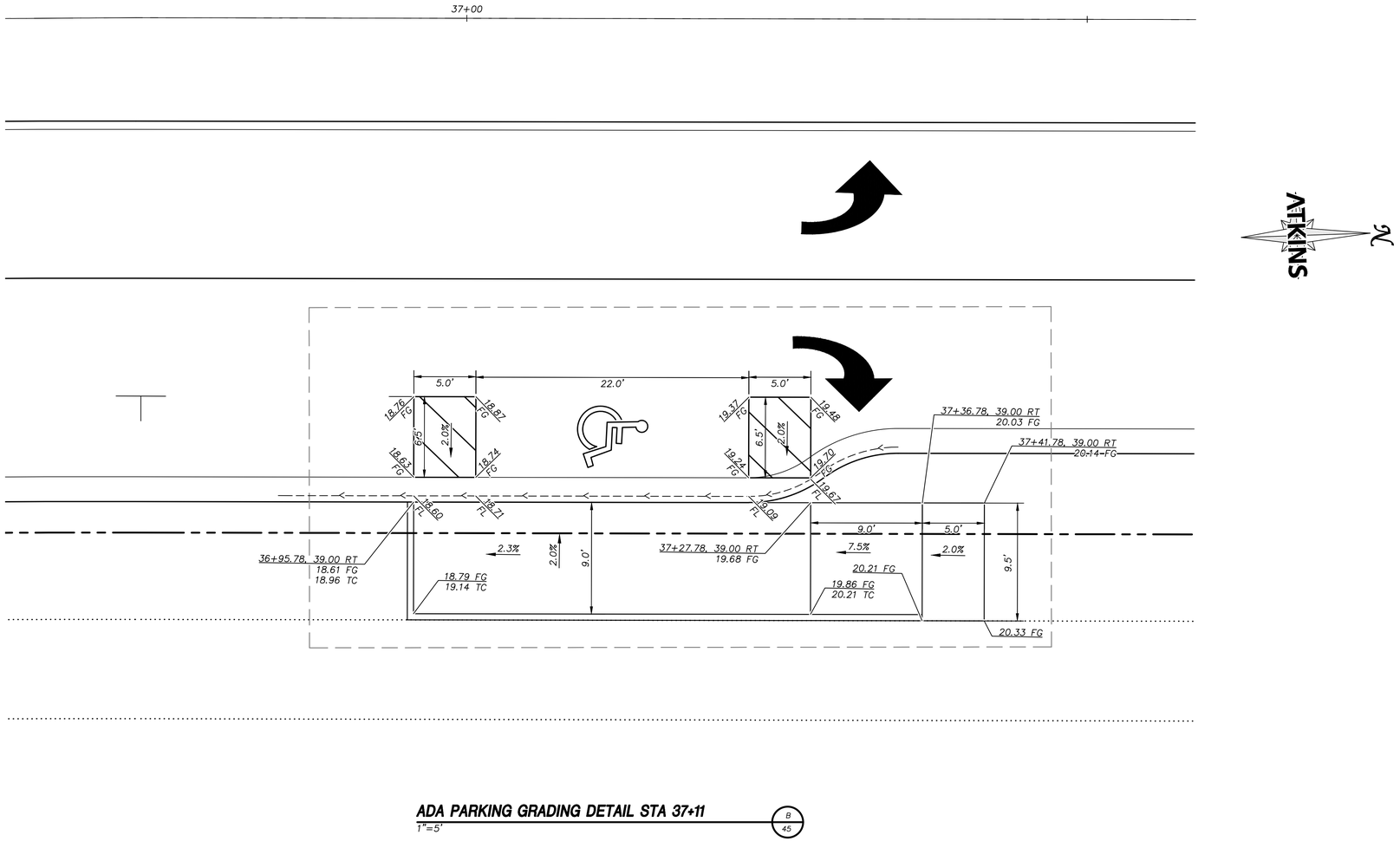

ADA PARKING GRADING DETAIL STA 37+11

1"=5'

B
45

GRAPHIC SCALE

5 0 2.5 5 10

HORIZONTAL: 1"= 5'

BASIS OF BEARING

GRID NORTH AS DEFINED BY THE CENTRAL MERIDIAN OF THE NEVADA COORDINATE REFERENCE SYSTEM (NCRS), LAS VEGAS HIGH ELEVATION ZONE, NORTH AMERICAN DATUM OF 1983; SAID MERIDIAN BEING COINCIDENT WITH 114°58' WEST OF THE GREENWICH MERIDIAN.

BENCHMARK

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(REVISED 2008)
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PROFESSIONAL ENGINEER - STATE OF NEVADA
NICOLAS A. BARCOS
EXP. 12-31-20
CIVIL
No. 25673
3/8/2021

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Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN WEST VILLAGE 25
SCURRY BEND DRIVE (STREET N)
SUNSET RUN DRIVE TO LAKE MEAD BOULEVARD

HANDICAP PARKING DETAILS

DESIGNED BY: B. WOCHYAK
DRAWN BY: K. HENDRY
CHECKED BY: N. BARCOS
HORIZ.: 1" = 5'
VERT.: NONE

XXXYXXXX
LXX-XXXXX

DATE: MARCH, 2021

DRAWING NO. 44/42

JOB NO. 100069098

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