CITY OF LAS VEGAS **INTER-OFFICE MEMORANDUM**			**DATE:** **October 30, 2019**
TO: **Land Development Services** Department of Building & Safety			**FROM:** Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT: Drainage Study for: **Summerlin West V22 – Kettle Ridge Drive (Street J) and Scurry Bend Drive (Street N) Street Improvements (both from Lake Mead Blvd. to Fleet Wing Ave.)**			**COPIES TO:** Atkins
Cross Streets:	Lake Mead Boulevard & Desert Foothill Drive		Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5156C.doc		Bart Anderson, P.E., DevCo
Parcel Number:	137-14-401-006 & 137-23-101-002		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	7/16/2019	8/8/2019	Not Approved	$400.00	3490122: $400
2nd Submittal	9/11/2019	9/25/2019	Not Approved	$400.00	3563447: $400
3rd Submittal	10/16/2019	10/30/2019	See Comments Below	$400.00	3612958: $400
			TOTAL FEES (LDDRS):	**$1,200.00**	----

REMARKS:

***** The Conditional Approval of this Drainage Study is to allow the engineer/developer to submit the *Improvement Plans* to City Land Development Only**

***** Do not submit the Drainage Study to Clark County Regional Flood Control District (CCRFCD) prior to the Structural Design and Calculations being approved by the City Building & Safety Department**

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. **Previous Comment**: From *Sheet 18/39* to *Sheet 21/39*, there are various proposed direct connection of lateral pipes to the 6'x6' RCB. However, the connection detail has not been provided. Provide as such in the next submittal.

   The response on *Storm Drain Construction Note #9* refers the connection detail to Sheet 33 should be revised to **Sheet 34**.

The following conditions are repeated until they are complete:

2. Drop inlets deeper than 10' require special structural design and structural calculations. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the *Building Department* for processing. The engineer must provide a copy of *Building Department* approval of the structures to *Flood Control* prior to final acceptance of the *Improvement Plans*.

3. The *Master Drainage Study Update* for *Summerlin West Planning Area* proposes a modification to internal flow patterns that alters the flow patterns to the *Beltway Channel* system downstream of the *Summerlin Parkway* interchange. The modification proposes a storm drain system within *Summerlin Village 22* area (Storm Drain F) that will collect flows from the Gowan channel tributary area and route them into the *Beltway Channel* (MPU Facility APBE 0122). This resulted in increased flows in the *Beltway Channel* segment between *Summerlin Parkway* and *Far Hills Boulevard*, ie, mitigation measures are required for the impacted *Beltway Channel* segment.

   A technical drainage study for the modification of the Beltway Channel has been submitted and has just been conditionally approved. The subject drainage study will not be approved prior to the construction bond of the *Beltway Channel Modification* project has been executed.

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

   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

5. The project proposes to build temporary drainage facilities, ie, berms/swales along the west side of *Scurry Bend Drive* and *Kettle Ridge Drive* and at the southern end of *Kettle Ridge Drive* 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.

6. The drainage study and the subject improvement plans also proposed a debris basin along the west side of the *Western Beltway*. Acknowledge in the next submittal that the debris basin is a temporary facility and will be removed in the ultimate condition.

   Since the debris basin is an interim facility, *Summerlin* or *Howard Hughes Company* will be solely responsible for the maintenance of the facility. A construction and maintenance bond for the debris basin must be prepared and executed prior to the approval of the improvement plans.

7. The regional facility in *Kettle Ridge Drive* will be a public facility and will be maintained by the City. The improvement plans must be reviewed for maintenance and access concerns by *City Streets & Sanitation Department* for their review and approval which must be secured prior to the subject drainage study approval. Contact *Mr. Matthew Meyer, Streets & Sanitation Manager* for guidance.

In an effort to increase administrative efficiency, for all original and re-submittal packages including updates and the addenda, the City of Las Vegas Public Works Department requires both a hardcopy and a digital copy (PDF) on CD for the drainage study.

A letter sealed and signed by a Nevada registered civil engineer must be included in every submittal certifying documents on the electronic CD matches 100% of the hardcopy submittal. The new submittal requirement is effective on May 1, 2019. If there are any questions regarding these new requirements, please contact Albert Sung in the City Flood Control Section at (702) 229-6541.

Sample Letter to certify CD.pdf

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

SNC·LAVALIN

ATKINS
Member of the SNC-Lavalin Group

SUMMERLIN®

Summerlin West Village 22

Kettle Ridge Drive (Street J)

Fleet Wing Avenue (Street G) to Lake Mead Boulevard

Scurry Bend Drive (Street N) Rough Grade

Fleet Wing Avenue (Street G) to Lake Mead Boulevard

September 11, 2019

Addendum #1

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Addendum #1: Kettle Ridge Drive & Scurry Bend Drive Rough Grade : Fleet Wing Avenue to Lake Mead Boulevard Date: September 11, 2019

Location of Development: a) Descriptive (Cross Streets) North/South: Fleet Wing Avenue

East/West: Lake Mead Boulevard

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

c) APN : 137-14-401-006, 137-23-101-002

Name of Owner: Howard Hughes Company, LLC

Telephone No.: (702) 791-4000 Fax No.: (702) 791-4450 E-Mail Address: chris.anderson@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: 35.89 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: 225.54 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
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.

Revision	Date

DS #5156

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Kettle Ridge Drive (Street J) & Scurry Bend Drive (Street N) Rough Grade	Map ID:
Firm Name: Atkins	Engineer: Molly Anderson, 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.
X		Design Manual **Standard Form 4**.
X		2 copies of the 24" x 36" Drainage Plan.
	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
X		Streets with off-set crowns.
X		Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X		Property lines.
X		Right-of-way lines and widths, existing and proposed.
X		Existing improvements and their elevations.
X		Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
X		Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X		Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
X		Location and cross-section of street capacity calculations.
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.
X		Building and/or lot numbers.
X		Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
X		Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
X		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.
X		Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
X		Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
X		Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

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

REFERENCE:	**STANDARD FORM 2**

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

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

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

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

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

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

II. GRADING PLAN INFORMATION		
Yes	No	
X		Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains.
X		All existing and "to be constructed" walls with cross-sections showing wall type, (e.g. block wall, retaining wall, flood wall, etc.), with limits clearly defined, adjacent ground elevations. Wall heights must meet current ordinances and in no case exceed 14 feet above the adjacent property.
X		Street slopes for both interior and perimeter streets. Note: The minimum slope for a roadway is 0.4 percent, a minimum 18-inch storm drain must be provided where minimum slopes cannot be met.
	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.)
X		This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included.
X		Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
	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.
X		Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
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 **Addendum #1 to the Technical Drainage Study for Kettle Ridge Drive (Street J): Fleet Wing Avenue (Street G) to Lake Mead Boulevard & Scurry Bend Drive (Street N) Rough Grade: Fleet Wing Avenue (Street G) to Lake Mead Boulevard** electronic submittal matches the paper version bound into the study.

Molly M. Anderson, PE (NV #24365)
Senior Engineer

Comment Response Letter

Your reference: DS #5156

Albert Sung
City of Las Vegas Public Works
333 N. Rancho Dr, 7th Floor
Las Vegas, NV 89106

September 11, 2019

RE: ADDENDUM #1 TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J): FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD & SCURRY BEND DRIVE (STREET N) ROUGH GRADE: FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

Dear Albert,

This letter and the attached documents have been prepared as an Addendum #1 to the *Technical Drainage Study (TDS) for Summerlin West Village 22 Kettle Ridge Drive (Street J) Fleet Wing Avenue (Street G) to Lake Mead Boulevard & Scurry Bend Drive (Street N) Rough Grade: Fleet Wing Avenue (Street G) to Lake Mead Boulevard*.

Comment #1: *The Master Drainage Study Update for Summerlin West Planning Area* proposes a modification to internal flow patterns that alters the flow patterns to the *Beltway Channel* system downstream of the *Summerlin Parkway* interchange. The modification proposes a storm drain system within *Summerlin Village 22* area (Storm Drain F) that will collect flows from the Gowan channel tributary area and route them into the *Beltway Channel* (MPU Facility APBE 0122). This resulted in increased flows in the *Beltway Channel* segment between *Summerlin Parkway* and *Far Hills Boulevard*, ie, mitigation measures are required for the impacted *Beltway Channel* segment.

A technical drainage study for the modification of the Beltway Channel has been submitted and has just been conditionally approved. The subject drainage study will not be approved prior to the construction bond of the *Beltway Channel Modification* project has been executed.

Comment response: The developer, The Howard Hughes Corporation, has acknowledged that a construction bond for the Beltway Channel Modification Project, will be in place for approval of this Technical Drainage Study. However, it is expected that this comment is not to hold up a conditional approval of the TDS.

Comment #2: The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

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

Comment response: The proposed report will be submitted to CCRFCD for concurrence.

Comment #3: The project proposes to build temporary drainage facilities, ie, berms/swales along the west side of *Scurry Bend Drive* and *Kettle Ridge Drive* 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.

Comment response: It is acknowledged that Atkins will contact the City's Land Development Section to begin the agreement process for the interim drainage improvements upon conditional approval of this study.

Comment #4: The drainage study and the subject improvements plans also proposed a debris basin along the west side of the *Western Beltway*. Acknowledge in the next submittal that the debris basin is a temporary facility and will be removed in the ultimate condition.

Since the debris basin is an interim facility, *Summerlin* or *Howard Hughes Company* will be solely responsible for the maintenance of the facility. A construction and maintenance bond for the debris basin must be prepared and executed prior to the approval of the improvement plans.

Comment response: It is acknowledged that Howard Hughes HOA will be responsible for maintenance of the debris basin and that a construction and maintenance bond will be in place prior to the approval of the TDS.

Comment #5: The regional facility in *Kettle Ridge Drive* will be a public facility and will be maintained by the City. The improvement plans must be reviewed for maintenance and access concerns by *City Streets & Sanitation Department* for their review and approval which must be secured prior to the subject drainage study approval. Contact *Mr. Matthew Meyer, Streets & Sanitation* for guidance.

Comment response: Atkins has realigned the regional storm drain per meeting with the City. It is acknowledged that Atkins will send plans to Mr. Meyer of Streets & Sanitation for his approval before final approval of the TDS. However, it is expected that this comment is not to hold up a conditional approval of the TDS.

Comment #6: A cursory review of the WSPGW output file for the storm drain in *Kettle Ridge Drive* <Street J (SJ)> showed that the velocity can reach beyond 300 ft/s. This appears to be some error in the model. Review and revise in the next submittal.

Comment response: The error in the model has been fixed and there are no longer excessive velocities in the WSPGW modeling.

Comment #7: The proposed 54"-RCP to 10'x6'-RCB storm drain system in *Kettle Ridge Drive* appears to be too close to the street curb & gutter. In case of repair or maintenance in the future, the curb & gutter will likely be disturbed for open trench or staging area for the repair. Relocate the 54"0RCP to 10'x6'-RCB system towards the center of *Kettle Ridge Drive* as much as possible.

Comment response: The storm drain system has been revised further from the curb & gutter.

Comment #8: It is noticed that besides storm drain and water lines are shown in the improvement plans, no sanitary sewer is shown. Is this an omission or no sanitary sewer is planned at all? *Kettle Ridge Drive*, a proposed 41'-ROW street is simply too narrow to contain various utilities and to satisfy all the minimum

clearances criteria. The developer may need to widen *Kettle Ridge Drive* roadway or choose another street to accommodate the 10'x6'-RCB regional facility. The layout of utilities as presented is simply unacceptable. This must be addressed and resolved prior to the next drainage study submittal.

Comment response: Utilities in Kettle Ridge Drive have been revised as discussed in the meeting with the City. For reference, sanitary sewer will only cross Kettle Ridge Drive at Kestrel Creek Avenue (Street I). It is not in parallel with the other utilities.

Comment #9: Storm Drain Manholes SDMH#2, SDMH#4, and SDMH#9 appears to be specially designed structures to combine a manhole with a drop inlet which the City has not tested before. By relocating the storm drain system away from the curb towards the street center, this special structure shall then be eliminated.

Comment response: The storm drain has been revised towards the street center and the special structure has been eliminated.

Comment #10: Drop inlets deeper than 10' require special structural design and structural calculations. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the *Building Department* for processing. The engineer must provide a copy of *Building Department* approval of the structures to *Flood Control* prior to the final acceptance of the drainage study.

Comment response: Structural calculations are being submitted to the Building Department.

Comment #11: Sheet 29/37: *Section Detail A* must show the riprap size information in the swale adjacent to the rough graded *Scurry Bend Drive* as proposed in the drainage study.

Comment response: The riprap sizing information has been added to the plans.

Comment #12: The proposed 54"-RCP to 10'x6'-RCB in *Kettle Ridge Drive* is a regional facility. Label with the *Clark County Regional Flood Control District's* facility ID on the plan.

Comment response: The storm drain has been labeled accordingly.

Comment #13: Revise all drop inlets to Type "C-D" Modified Drop Inlet per Standard Drawing 412.1 or Neenah Pre-cast inlets. Note that the lengths of "C-D" modified inlets are in the multiple of 2.5'. Revise all pertinent construction notes and callouts accordingly.

Comment response: The drop inlets, construction notes, and callouts have been revised.

Comment #14: Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (Stormwater Quality Management Stamp and Sign Detail).

Comment response: The note has been added to the relevant sheets.

Molly Anderson

Molly M. Anderson, PE (NV #24365)
Senior Engineer

Contents

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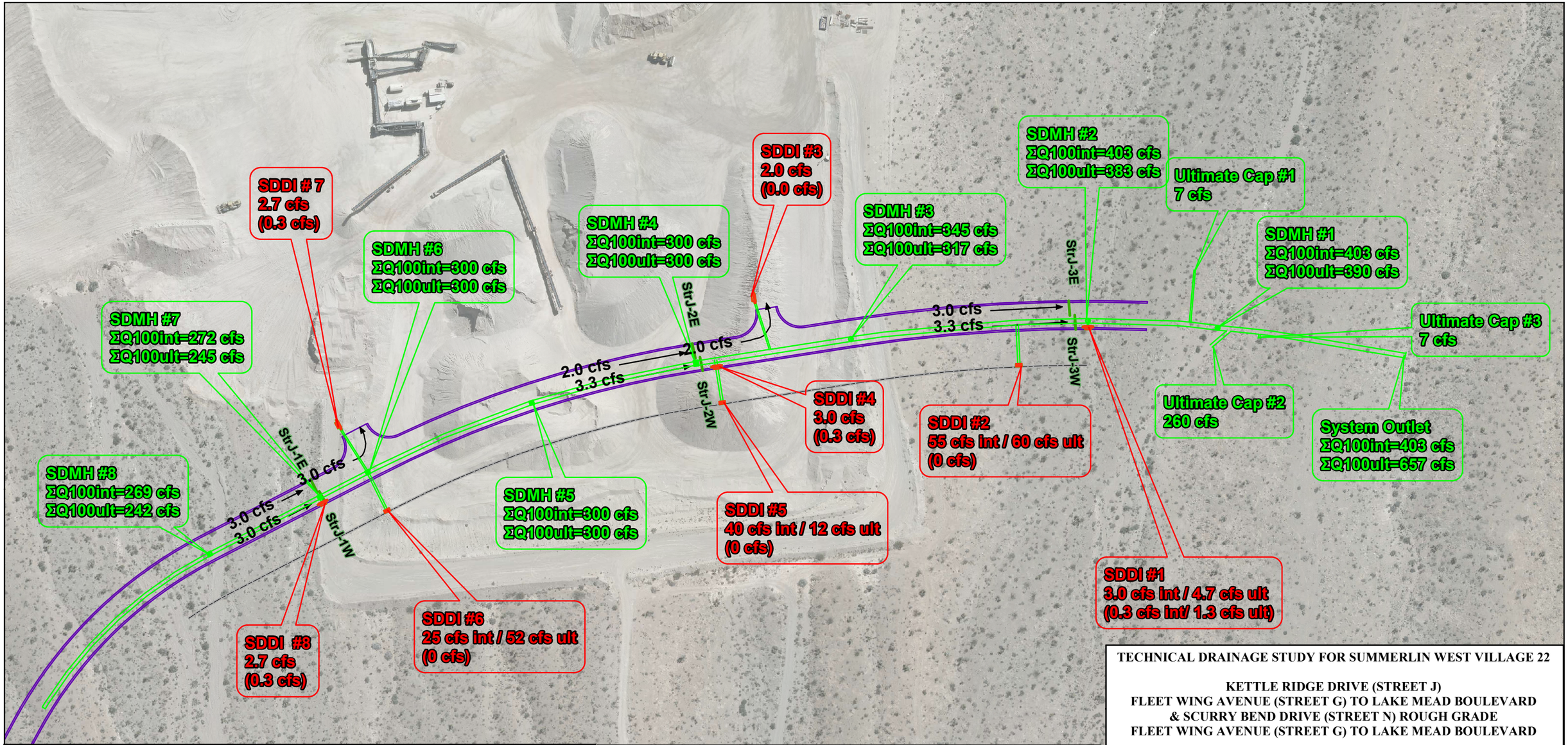
Appendix D.	**CD-ROM**	

Appendices

Appendix A. Revised Hydraulic Figure



Interim Condition (100-Year) Street Flow and Drop Inlet Calculations Summary Table

XS ID	Improvement Plans Station (ft)	Total Discharge (cfs)	Total Discharge Source	Drop Inlet			Flow Depth in Street (ft)	Velocity of Flow in Street (ft/s)	Depth*Velocity (must be less than 8)
				Intercepted Flow (cfs)	Intercepted Facility	Bypass Flow (cfs)			
StrJ-ST1W	68+83	3.0	StrJ-1W	N/A	N/A	N/A	0.3	4.8	1.3
StrJ-ST1E	68+83	3.0	StrJT1E	N/A	N/A	N/A	0.3	4.8	1.3
StrJ-ST2W	63+57	3.3	StrJ-2W + bypass SDDI #8	N/A	N/A	N/A	0.4	1.8	0.7
StrJ-ST2E	63+57	2.0	StrJ-2E	N/A	N/A	N/A	0.3	1.6	0.5
StrJ-ST3W	58+77	3.3	StrJ-3W + bypass SDDI#4	N/A	N/A	N/A	0.4	1.8	0.6
StrJ-ST3E	58+29	3.0	StrJ-3E	N/A	N/A	N/A	0.4	1.7	0.6
SDDI #1	58+76	3.3	StrJ-3E + bypass SDDI #4	3.0	24-inch RCP	0.3	N/A	N/A	N/A
SDDI #2	59+67	55.0	INT-J3	55.0	36-inch RCP	0.0	N/A	N/A	N/A
SDDI #3	62+86	2.0	StrJ-2E	2.0	24-inch RCP	0.0	N/A	N/A	N/A
SDDI #4	63+58	3.3	StrJ-2W + bypass SDDI #8	3.0	36-inch RCP	0.3	N/A	N/A	N/A
SDDI #5	63+58	40.0	INT-J2	40.0	36-inch RCP	0.0	N/A	N/A	N/A
SDDI #6	68+31	25.0	INT-J1	25.0	30-inch RCP	0.0	N/A	N/A	N/A
SDDI #7	68+31	3.0	StrJ-1E	2.7	24-inch RCP	0.3	N/A	N/A	N/A
SDDI #8	69+00	3.0	StrJ-1W	2.7	24-inch RCP	0.3	N/A	N/A	N/A

Ultimate Condition (100-Year) Street Flow and Drop Inlet Calculations Summary Table

XS ID	Improvement Plans Station (ft)	Total Discharge (cfs)	Total Discharge Source	Drop Inlet			Flow Depth in Street (ft)	Velocity of Flow in Street (ft/s)	Depth*Velocity (must be less than 8)
				Intercepted Flow (cfs)	Intercepted Facility	Bypass Flow (cfs)			
StrJ-ST1W	68+83	3.0	StrJ-1W	N/A	N/A	N/A	0.3	4.8	1.3
StrJ-ST1E	68+83	3.0	StrJT1E	N/A	N/A	N/A	0.3	4.8	1.3
StrJ-ST2W	63+57	3.3	StrJ-2W + bypass SDDI #8	N/A	N/A	N/A	0.4	1.8	0.7
StrJ-ST2E	63+57	2.0	StrJ-2E	N/A	N/A	N/A	0.4	1.6	0.6
StrJ-ST3W	58+77	3.3	StrJ-3W + bypass SDDI#4	N/A	N/A	N/A	0.4	1.6	0.6
StrJ-ST3E	58+29	3.0	StrJ-3E	N/A	N/A	N/A	0.4	1.6	0.5
SDDI #1	58+76	6.0	StrJ-3E + bypass SDDI #4	4.7	24-inch RCP	1.3	N/A	N/A	N/A
SDDI #2	59+67	60.0	Parcel F	60.0	36-inch RCP	0.0	N/A	N/A	N/A
SDDI #3	62+86	2.0	StrJ-2E	2.0	24-inch RCP	0.0	N/A	N/A	N/A
SDDI #4	63+58	3.3	StrJ-2W + bypass SDDI #8	3.0	36-inch RCP	0.3	N/A	N/A	N/A
SDDI #5	63+58	12.0	NP-2 + 10% Parcel E	40.0	36-inch RCP	0.0	N/A	N/A	N/A
SDDI #6	68+31	52.0	90% Parcel E	25.0	30-inch RCP	0.0	N/A	N/A	N/A
SDDI #7	68+31	3.0	StrJ-1E	2.7	24-inch RCP	0.3	N/A	N/A	N/A
SDDI #8	69+00	3.0	StrJ-1W	2.7	24-inch RCP	0.3	N/A	N/A	N/A
Ult-Cap#1	57+08	7.0	StrJ-3E + Offsite	N/A	24-inch RCP	N/A	N/A	N/A	N/A
Ult-Cap#2	57+15	260.0	Offsite	N/A	48-inch RCP	N/A	N/A	N/A	N/A
Ult-Cap#3	56+59	7.0	Offsite	N/A	24-inch RCP	N/A	N/A	N/A	N/A

TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 22

KETTLE RIDGE DRIVE (STREET J)
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
& SCURRY BEND DRIVE (STREET N) ROUGH GRADE
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

FIGURE 4: HYDRAULIC WORKMAP

Legend

- Proposed Drop Inlets
- Proposed Storm Drain
- Street Cross Section
- Street Flow
- Proposed Roadway
- Proposed Swale

Intercepted Flow (Bypass Flow)

ATKINS
Member of the SNC-Lavalin Group

0 50 100 200
Feet
1 inch = 125 feet

The 100-year D*V for all street cross-sections is less than 6.
Therefore, the10-year D*V is also less than 6.
To minimize redundancy, the 10-year calculations are not included.

Aerial Source: Clark County Spring 2018

Appendix B. Revised Drop Inlet Calculations

Worksheet for SDDI #1 StrJ-ST3E 7.5' Combination Inlet On Grade - 0.5% - 100-year

Project Description	
Solve For	Efficiency

Input Data	
Discharge	6.00 cfs
Slope	0.005 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	5.0 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	7.5 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	78.67 %
Intercepted Flow	4.72 cfs
Bypass Flow	1.28 cfs
Spread	15.7 ft
Depth	0.40 ft
Flow Area	2.5 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	2.36 ft/s
Splash Over Velocity	6.60 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.189
Grate Flow Ratio	0.280
Equivalent Cross Slope	0.079 ft/ft
Active Grate Length	2.5 ft
Length Factor	0.352
Total Interception Length	14.2 ft

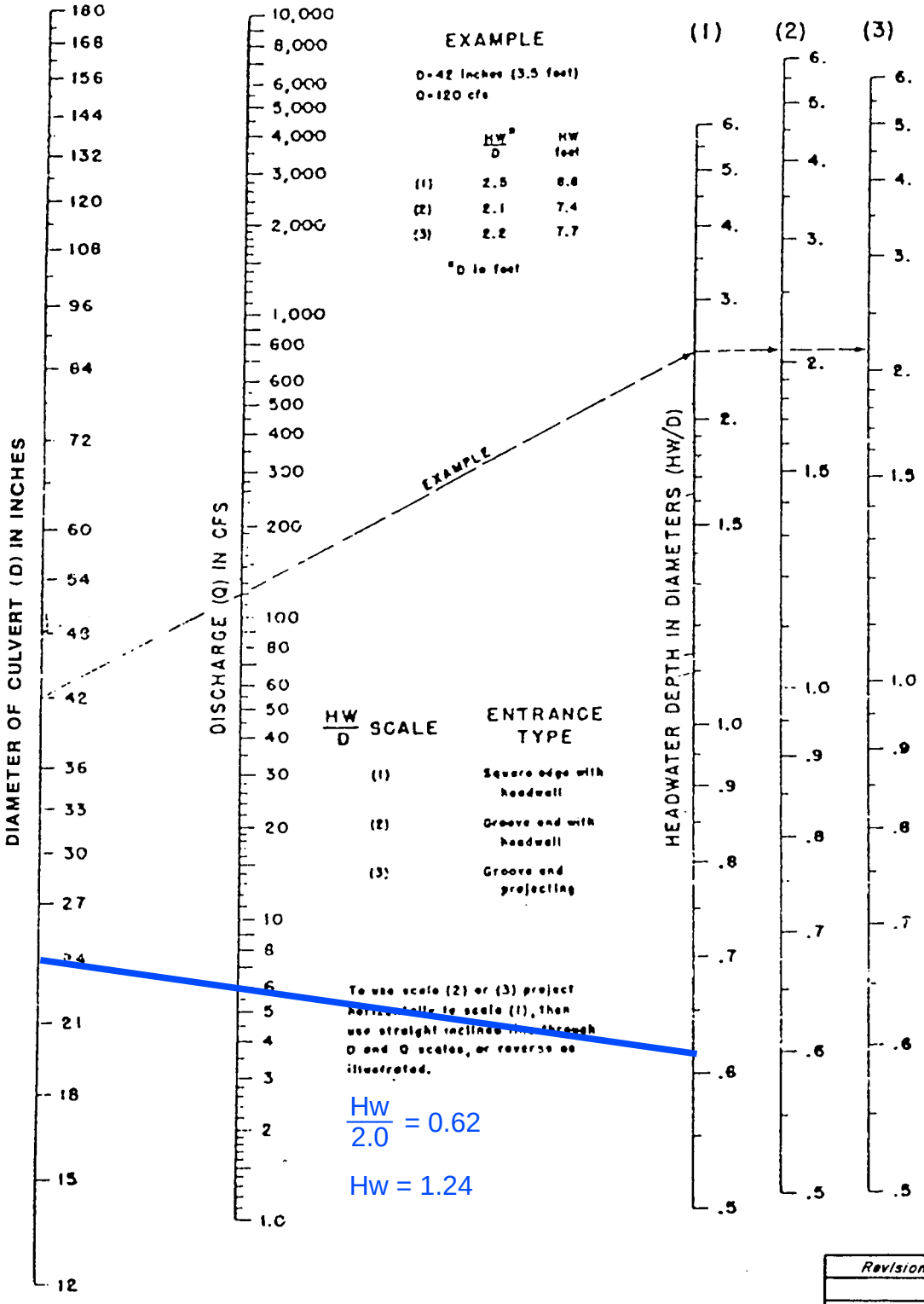
Messages

Worksheet for SDDI #1 StrJ-ST3E 7.5' Combination Inlet On Grade - 0.5% - 100-year

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).	

NOMOGRAPH – INLET CONTROL RCP

SDDI #1: StrJ-3E + bypass SDDI #4



INTERCEPTED
Q = 6.0-CFS

24" RCP
LATERAL

$\frac{Hw}{2.0} = 0.62$

Hw = 1.24

Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Worksheet for SDDI #2 INT-J3 Ditch Inlet In Sag - 100-year

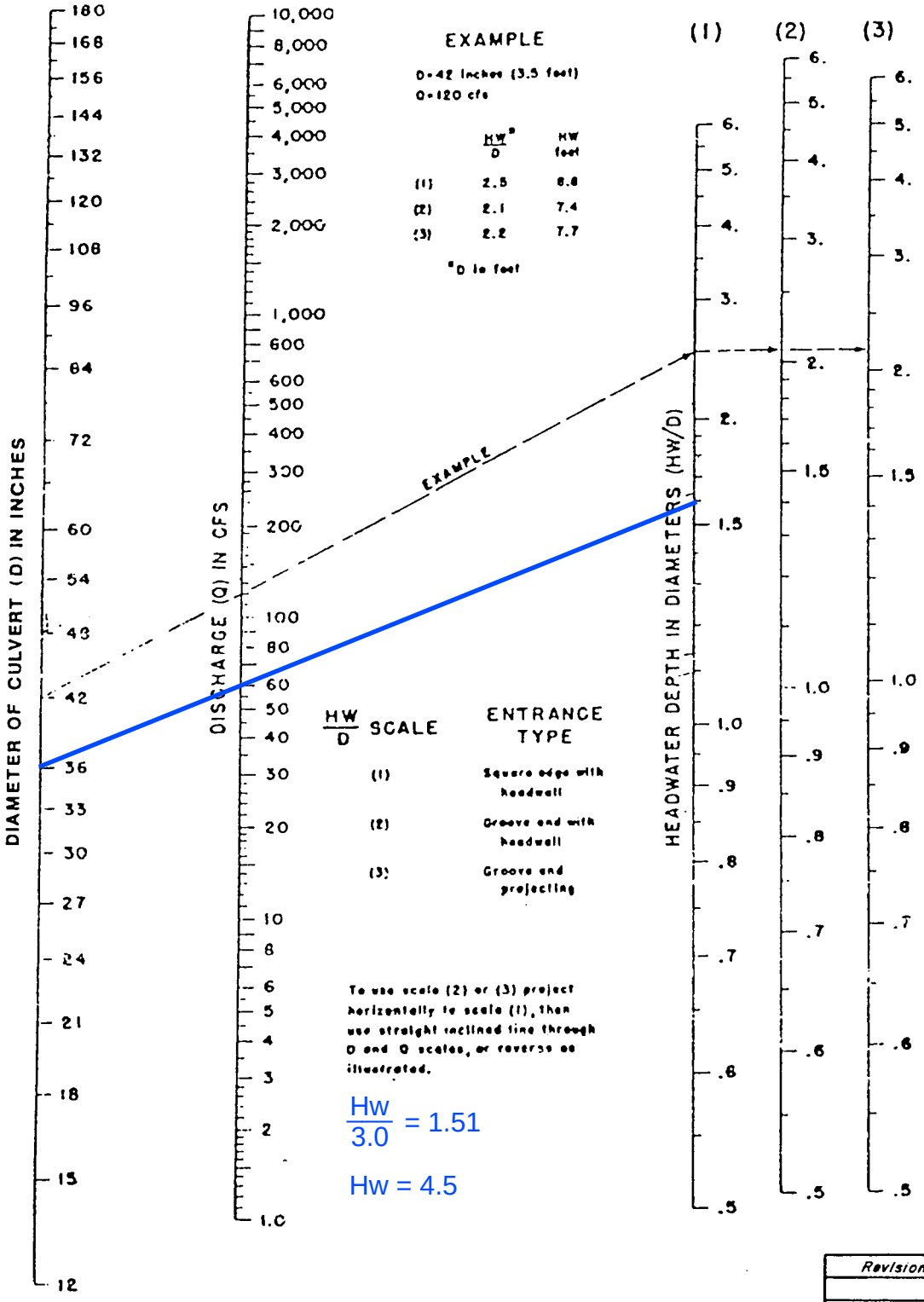
Project Description	
Solve For	Spread

Input Data	
Discharge	55.00 cfs
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	0.00 ft
Grate Width	4.00 ft
Grate Length	8.0 ft
Local Depression	2.0 in
Local Depression Width	24.0 in
Grate Type	P-50 mm x 100 mm (P-1-7/8"-4")
Clogging	50.0 %

Results	
Spread	4.7 ft
Depth	0.78 ft
Wetted Perimeter	4.9 ft
Top Width	4.66 ft
Open Grate Area	12.8 ft²
Active Grate Weir Length	20.0 ft

NOMOGRAPH – INLET CONTROL RCP

SDDI #2: INT-J3



INTERCEPTED
Q = 60.0-CFS

36" RCP
LATERAL

$\frac{Hw}{3.0} = 1.51$

Hw = 4.5

Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Worksheet for SDDI #3 StrJ-ST2E 7.5' Combination Inlet On Grade -3% - 100-year

Project Description	
Solve For	Efficiency

Input Data	
Discharge	2.00 cfs
Slope	0.030 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	5.0 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	7.5 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	97.44 %
Intercepted Flow	1.95 cfs
Bypass Flow	0.05 cfs
Spread	6.8 ft
Depth	0.23 ft
Flow Area	0.5 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	3.77 ft/s
Splash Over Velocity	6.60 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.091
Grate Flow Ratio	0.620
Equivalent Cross Slope	0.151 ft/ft
Active Grate Length	2.5 ft
Length Factor	0.480
Total Interception Length	10.4 ft

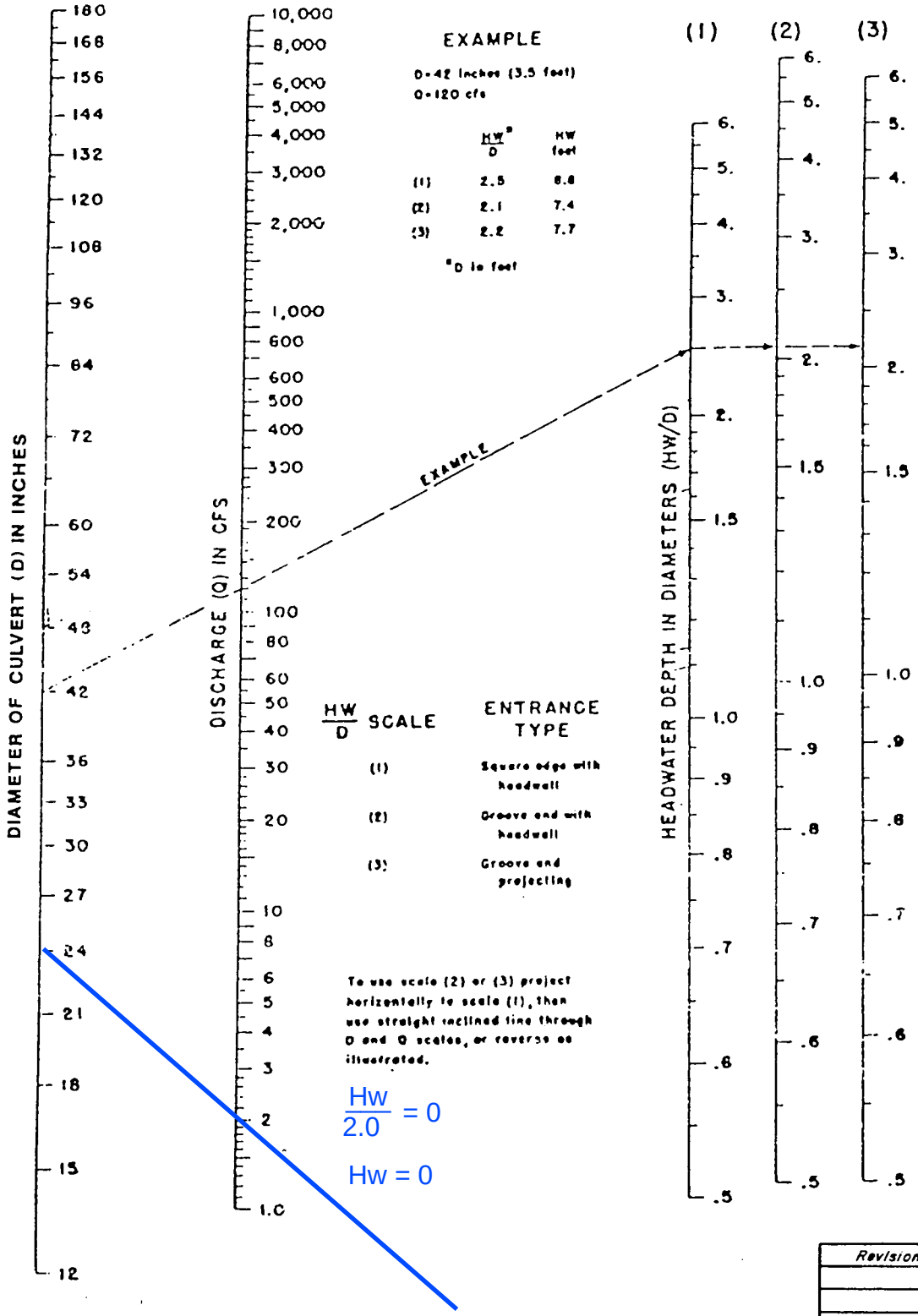
Messages

Worksheet for SDDI #3 StrJ-ST2E 7.5' Combination Inlet On Grade -3% - 100-year

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).	

NOMOGRAPH – INLET CONTROL RCP

SDDI #3: StrJ-2E



INTERCEPTED
Q = 2.0-CFS

24" RCP
LATERAL

$\frac{Hw}{2.0} = 0$

Hw = 0

Revision	Date

WRC ENGINEERING	REFERENCE: USDOT, FHWA, HDS, No. 5, 1985	FIGURE 1005

Worksheet for SDDI #4 StrJ-ST2W 7.5' Combination Inlet On Grade - 0.5% - 100-year

Project Description	
Solve For	Efficiency

Input Data		
Discharge	2.00	cfs
Slope	0.005	ft/ft
Gutter Width	1.50	ft
Gutter Cross Slope	0.080	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.016	
Local Depression	4.0	in
Local Depression Width	24.0	in
Grate Width	1.50	ft
Grate Length	5.0	ft
Grate Type	Curved Vaned	
Clogging	50.0	%
Curb Opening Length	7.5	ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results		
Efficiency	99.35	%
Intercepted Flow	1.99	cfs
Bypass Flow	0.01	cfs
Spread	10.1	ft
Depth	0.29	ft
Flow Area	1.1	ft^2
Gutter Depression	1.1	in
Total Depression	5.1	in
Velocity	1.84	ft/s
Splash Over Velocity	6.60	ft/s
Frontal Flow Factor	1.000	
Side Flow Factor	0.268	
Grate Flow Ratio	0.437	
Equivalent Cross Slope	0.112	ft/ft
Active Grate Length	2.5	ft
Length Factor	0.688	
Total Interception Length	7.3	ft

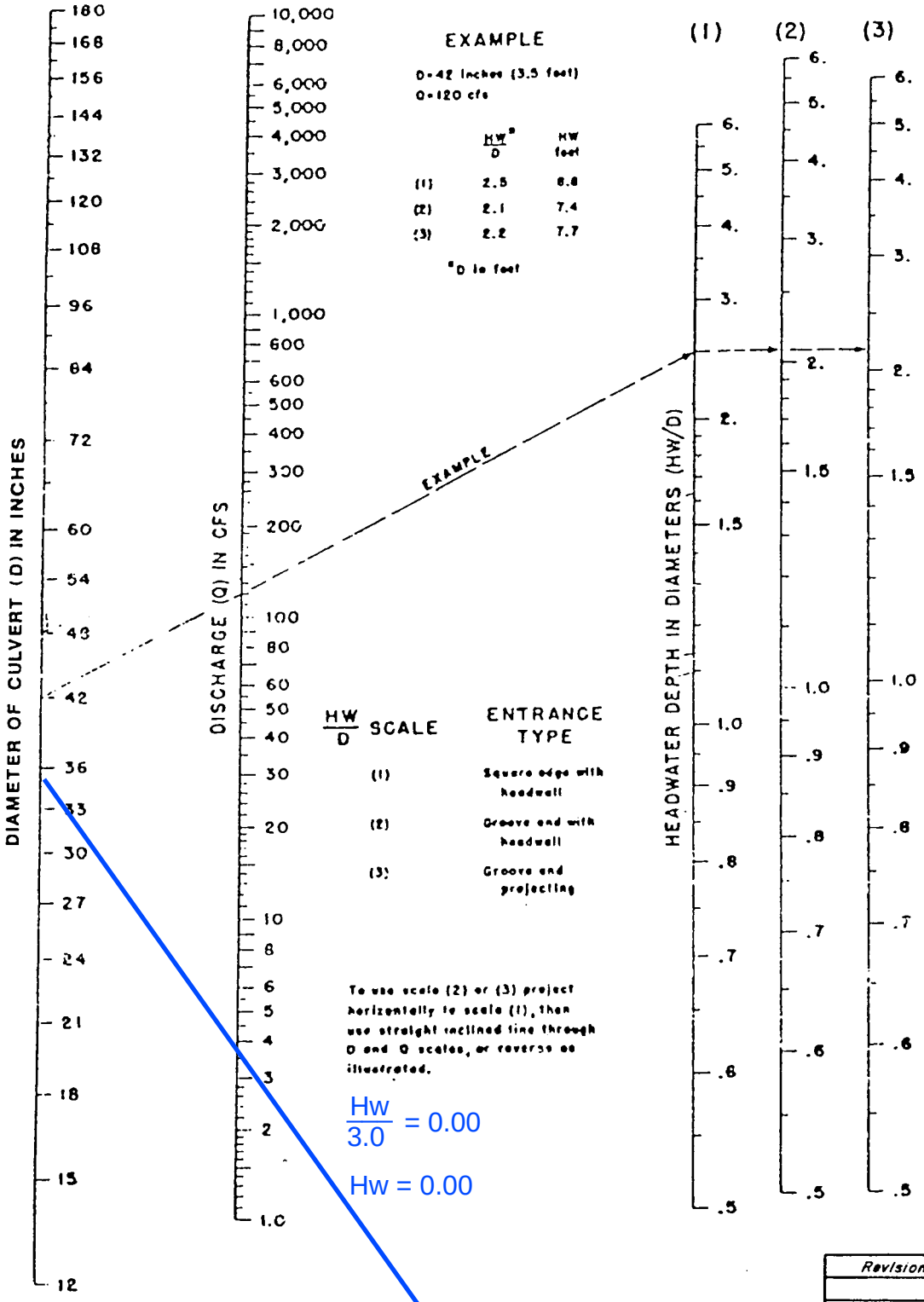
Messages

Worksheet for SDDI #4 StrJ-ST2W 7.5' Combination Inlet On Grade - 0.5% - 100-year

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).	

NOMOGRAPH – INLET CONTROL RCP

SDDI #4:StrJ-2W + bypass SDDI #8



INTERCEPTED
Q = 3.3-CFS

36" RCP
LATERAL

$\frac{Hw}{3.0} = 0.00$

Hw = 0.00

Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Worksheet for SDDI #5 INT-J2 Ditch Inlet In Sag - 100-year

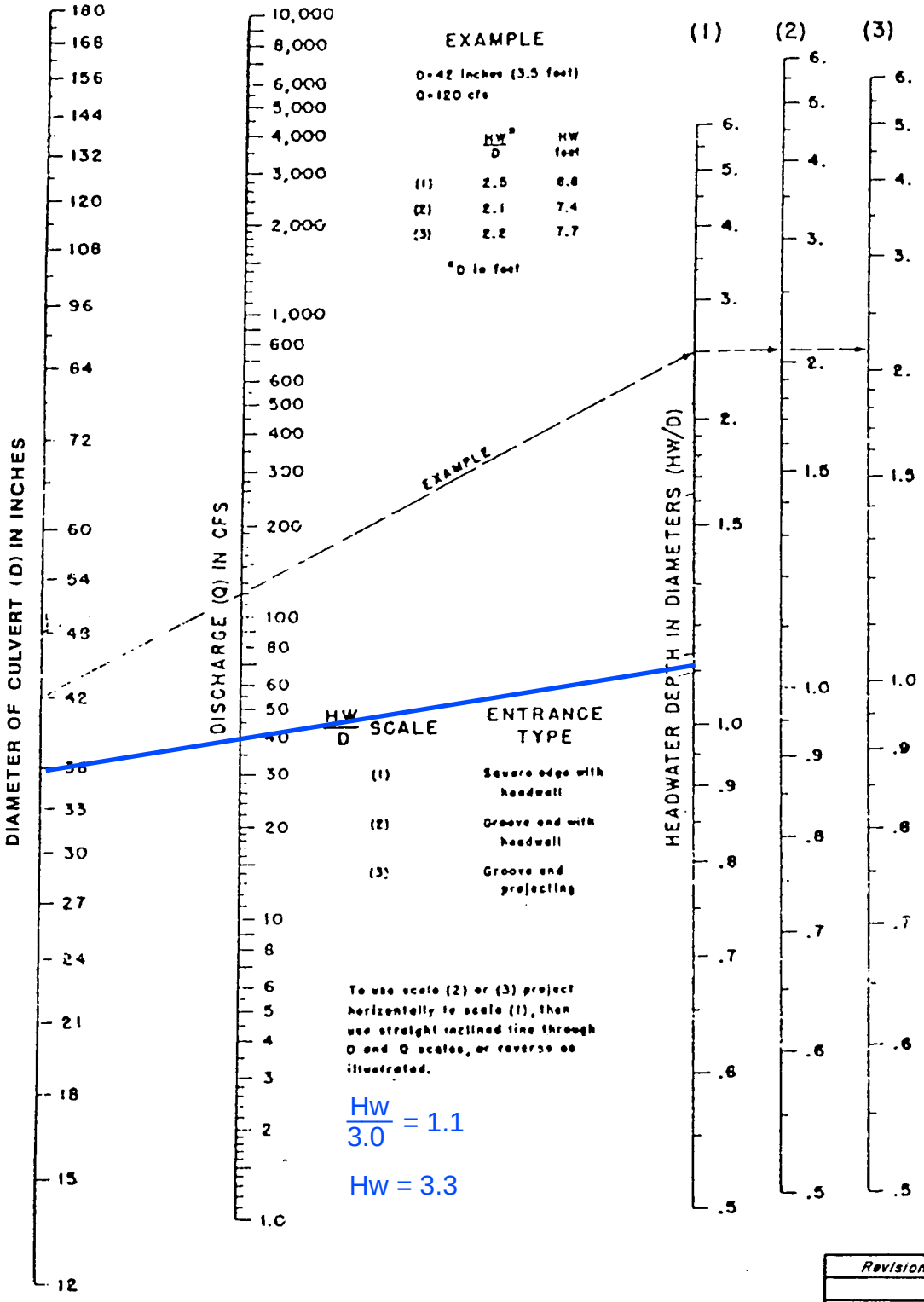
Project Description	
Solve For	Spread

Input Data	
Discharge	40.00 cfs
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	0.00 ft
Grate Width	4.00 ft
Grate Length	8.0 ft
Local Depression	2.0 in
Local Depression Width	24.0 in
Grate Type	P-50 mm x 100 mm (P-1-7/8"-4")
Clogging	50.0 %

Results	
Spread	3.6 ft
Depth	0.60 ft
Wetted Perimeter	3.8 ft
Top Width	3.58 ft
Open Grate Area	12.8 ft²
Active Grate Weir Length	20.0 ft

NOMOGRAPH – INLET CONTROL RCP

SDDI #5: INT-J2



INTERCEPTED
Q = 40.00-CFS

36" RCP
LATERAL

$\frac{Hw}{3.0} = 1.1$

Hw = 3.3

Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Worksheet for SDDI #6 INT-J1 Ditch Inlet In Sag- 100-year

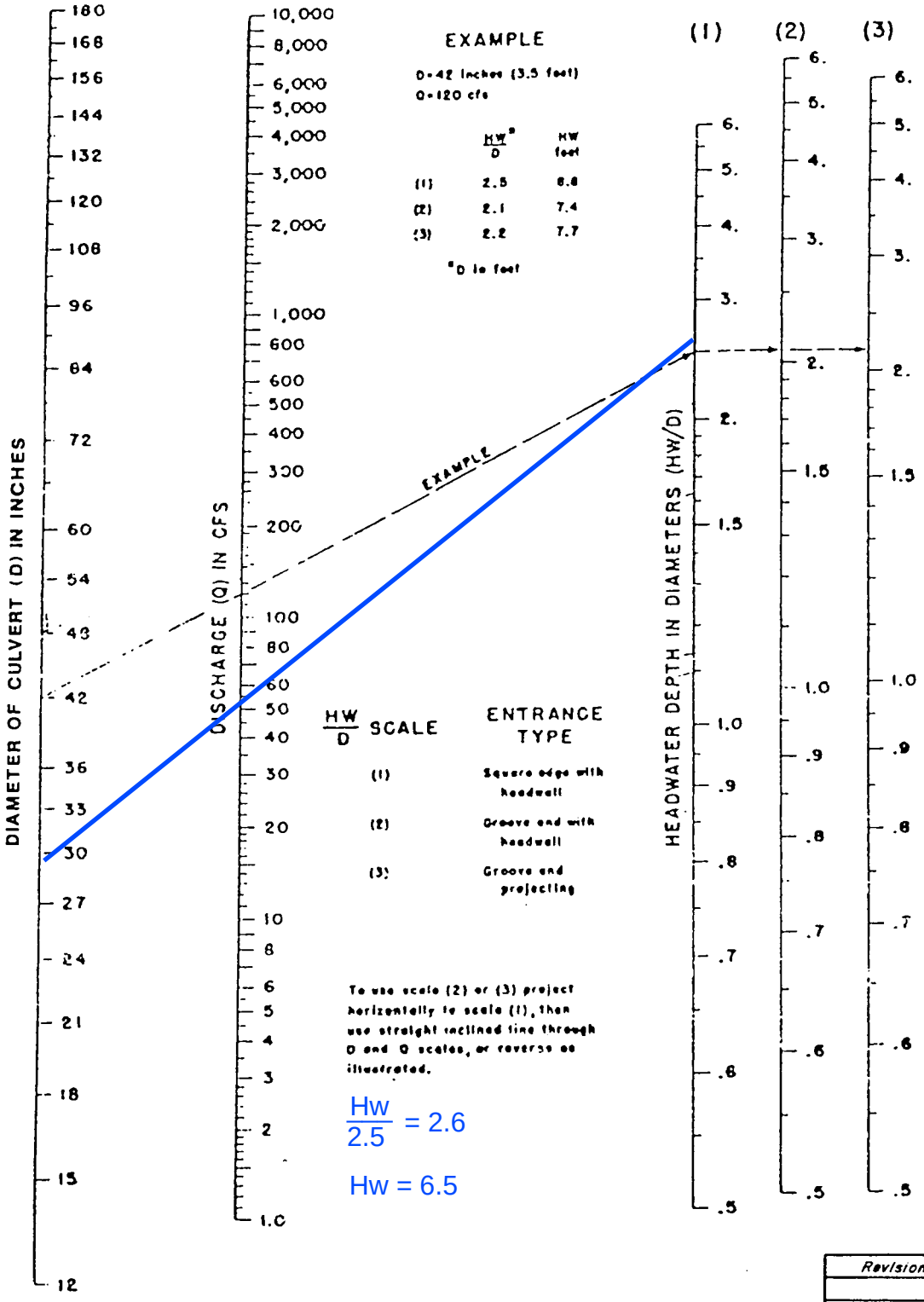
Project Description	
Solve For	Spread

Input Data	
Discharge	25.00 cfs
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	0.00 ft
Grate Width	4.00 ft
Grate Length	8.0 ft
Local Depression	2.0 in
Local Depression Width	24.0 in
Grate Type	P-50 mm x 100 mm (P-1-7/8"-4")
Clogging	50.0 %

Results	
Spread	2.3 ft
Depth	0.39 ft
Wetted Perimeter	2.5 ft
Top Width	2.35 ft
Open Grate Area	12.8 ft²
Active Grate Weir Length	20.0 ft

NOMOGRAPH – INLET CONTROL RCP

SDDI #6:StrJ-2W + bypass SDMH #9



$\frac{Hw}{2.5} = 2.6$

$Hw = 6.5$

INTERCEPTED
Q = 52.0-CFS

30" RCP
LATERAL

Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Worksheet for SDDI #7 StrJ-ST1W 7.5' Combination Inlet On Grade - 4% - 100-year

Project Description	
Solve For	Efficiency

Input Data	
Discharge	3.00 cfs
Slope	0.040 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	5.0 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	7.5 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	89.40 %
Intercepted Flow	2.68 cfs
Bypass Flow	0.32 cfs
Spread	7.7 ft
Depth	0.24 ft
Flow Area	0.7 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	4.57 ft/s
Splash Over Velocity	6.60 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.066
Grate Flow Ratio	0.561
Equivalent Cross Slope	0.139 ft/ft
Active Grate Length	2.5 ft
Length Factor	0.353
Total Interception Length	14.2 ft

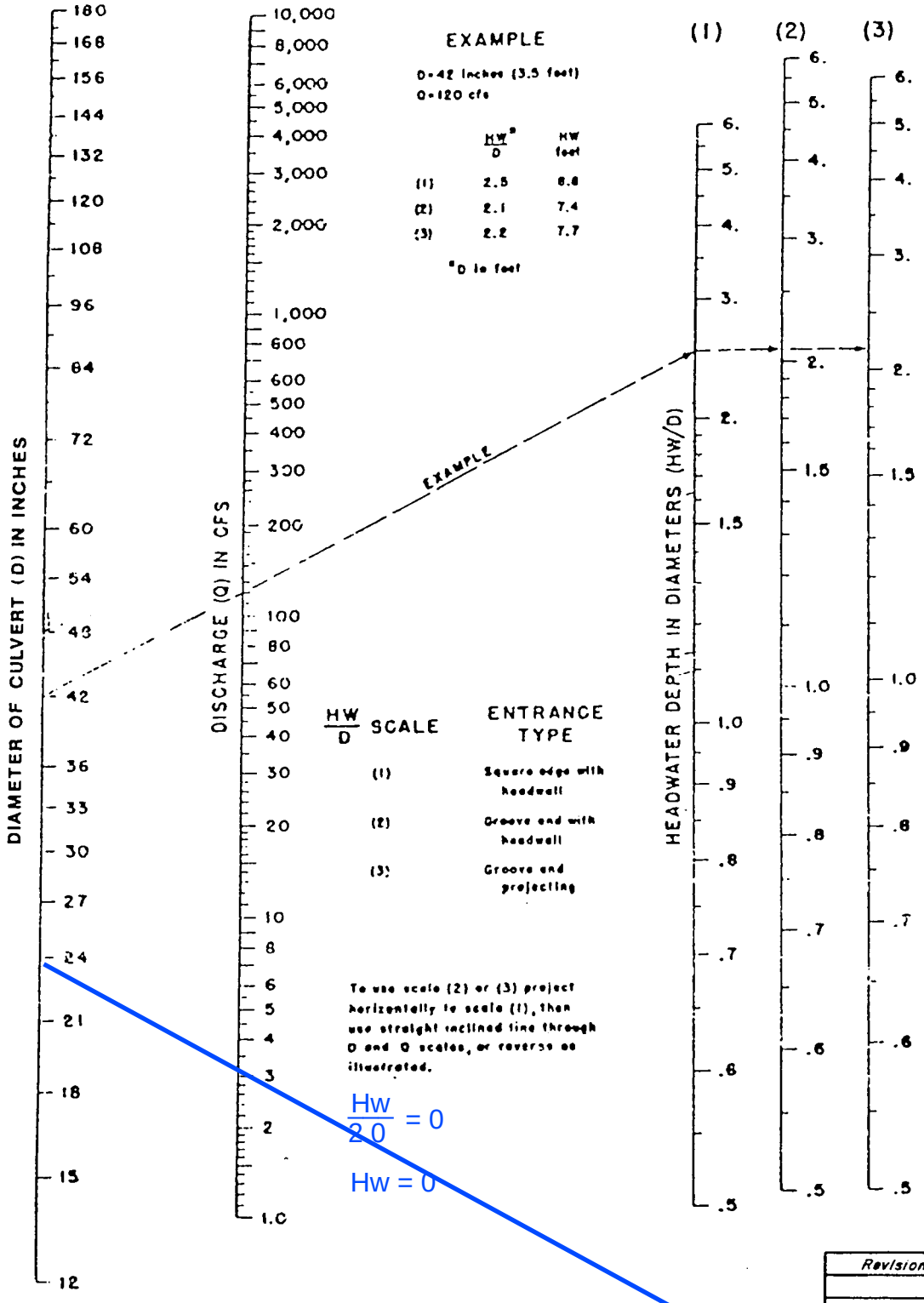
Messages

Worksheet for SDDI #7 StrJ-ST1W 7.5' Combination Inlet On Grade - 4% - 100-year

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).	

NOMOGRAPH – INLET CONTROL RCP

SDDI #7:StrJ-1E



INTERCEPTED
Q = 3.0-CFS

24" RCP
LATERAL

$\frac{Hw}{2.0} = 0$

Hw = 0

Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Worksheet for SDDI #8 StrJ-ST1E 7.5' Combination Inlet On Grade - 7% - 100-year

Project Description	
Solve For	Efficiency

Input Data		
Discharge	3.00	cfs
Slope	0.070	ft/ft
Gutter Width	1.50	ft
Gutter Cross Slope	0.080	ft/ft
Road Cross Slope	0.020	ft/ft
Roughness Coefficient	0.016	
Local Depression	4.0	in
Local Depression Width	24.0	in
Grate Width	1.50	ft
Grate Length	5.0	ft
Grate Type	Curved Vaned	
Clogging	50.0	%
Curb Opening Length	7.5	ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results		
Efficiency	90.04	%
Intercepted Flow	2.70	cfs
Bypass Flow	0.30	cfs
Spread	6.7	ft
Depth	0.22	ft
Flow Area	0.5	ft^2
Gutter Depression	1.1	in
Total Depression	5.1	in
Velocity	5.74	ft/s
Splash Over Velocity	6.60	ft/s
Frontal Flow Factor	1.000	
Side Flow Factor	0.045	
Grate Flow Ratio	0.624	
Equivalent Cross Slope	0.152	ft/ft
Active Grate Length	2.5	ft
Length Factor	0.315	
Total Interception Length	15.9	ft

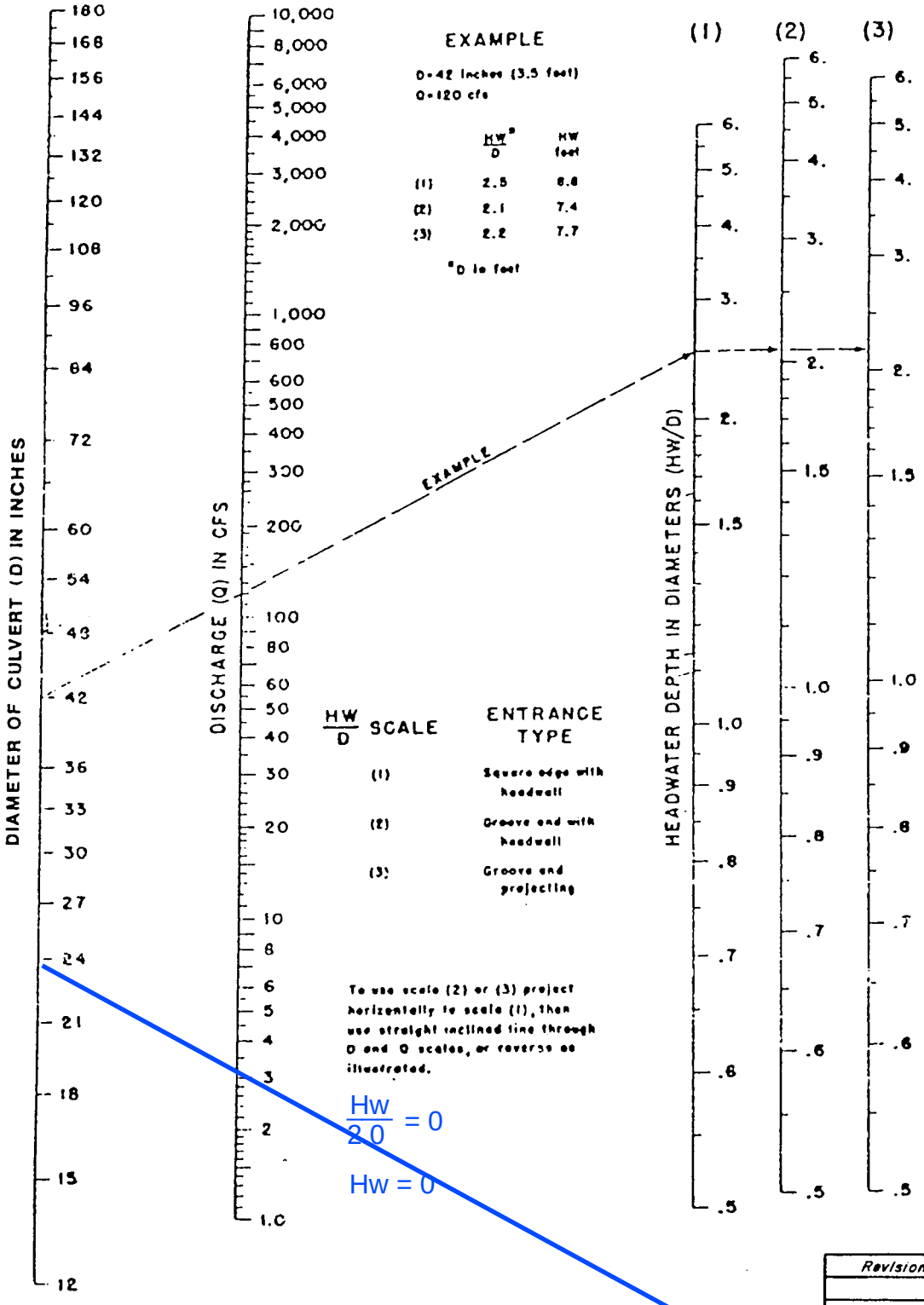
Messages

Worksheet for SDDI #8 StrJ-ST1E 7.5' Combination Inlet On Grade - 7% - 100-year

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).	

NOMOGRAPH – INLET CONTROL RCP

SDDI #8: StrJ-1W



INTERCEPTED
Q = 3.0-CFS

24" RCP
LATERAL

$\frac{Hw}{2.0} = 0$

Hw = 0

Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Appendix C. Revised WSPG-W Model

C.1. Interim Condition WSPG-W Model

C.2. Ultimate Condition WSPG-W Model

C.1 Interim Condition WSPG-W Model

FILE: STJ-INT.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 9:57:19

SUMMERLIN WEST VILLAGE 22

Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)

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
.000	3404.320	4.645	3408.966	403.00	14.46	3.25	3412.21	.01	5.19	6.00	10.000	6.000	.00	0 .0
13.453	.0053					.0099	.13	4.66	1.18	5.91	.015	.00	.00	BOX
13.453	3404.391	4.509	3408.900	403.00	14.90	3.45	3412.35	.01	5.19	6.00	10.000	6.000	.00	0 .0
23.584	.0053					.0110	.26	4.52	1.24	5.91	.015	.00	.00	BOX
37.037	3404.515	4.299	3408.814	403.00	15.62	3.79	3412.60	.01	5.19	6.00	10.000	6.000	.00	0 .0
25.097	.0053					.0124	.31	4.31	1.33	5.91	.015	.00	.00	BOX
62.134	3404.647	4.099	3408.747	403.00	16.38	4.17	3412.92	.02	5.19	6.00	10.000	6.000	.00	0 .0
25.873	.0053					.0140	.36	4.12	1.43	5.91	.015	.00	.00	BOX
88.008	3404.783	3.909	3408.692	403.00	17.18	4.59	3413.28	.02	5.19	6.00	10.000	6.000	.00	0 .0
26.173	.0053					.0158	.41	3.93	1.53	5.91	.015	.00	.00	BOX
114.180	3404.921	3.727	3408.648	403.00	18.02	5.04	3413.69	.02	5.19	6.00	10.000	6.000	.00	0 .0
26.153	.0053					.0179	.47	3.75	1.65	5.91	.015	.00	.00	BOX
140.334	3405.059	3.553	3408.612	403.00	18.90	5.55	3414.16	.02	5.19	6.00	10.000	6.000	.00	0 .0
25.914	.0053					.0203	.53	3.58	1.77	5.91	.015	.00	.00	BOX
166.248	3405.196	3.388	3408.583	403.00	19.83	6.10	3414.69	.02	5.19	6.00	10.000	6.000	.00	0 .0
25.522	.0053					.0230	.59	3.41	1.90	5.91	.015	.00	.00	BOX
191.770	3405.330	3.230	3408.560	403.00	20.79	6.71	3415.27	.00	5.19	6.00	10.000	6.000	.00	0 .0
12.807	.0049					.0253	.32	3.23	2.04	6.11	.015	.00	.00	BOX

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 9:57:19

SUMMERLIN WEST VILLAGE 22

Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)

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
204.577	3405.392	3.151	3408.543	403.00	21.32	7.05	3415.60	.00	5.19	6.00	10.000	6.000	.00	0 .0
24.283	.0049					.0279	.68	3.15	2.12	6.11	.015	.00	.00	BOX
228.860	3405.510	3.004	3408.514	403.00	22.36	7.76	3416.27	.00	5.19	6.00	10.000	6.000	.00	0 .0
14.260	.0063					.0307	.44	3.00	2.27	5.49	.015	.00	.00	BOX
243.120	3405.600	2.925	3408.525	403.00	22.96	8.19	3416.71	.00	5.19	6.00	10.000	6.000	.00	0 .0
TRANS STR	.6667					.0195	.12	2.92	2.37		.015	.00	.00	BOX
249.120	3409.600	5.194	3414.794	403.00	12.93	2.60	3417.39	.00	5.19	6.00	6.000	6.000	.00	0 .0
14.597	.0056					.0064	.09	5.19	1.00	5.75	.015	.00	.00	BOX
263.717	3409.682	5.448	3415.130	403.00	12.33	2.36	3417.49	.00	5.19	6.00	6.000	6.000	.00	0 .0
17.343	.0056					.0062	.11	5.45	.93	5.75	.015	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														
281.060	3409.780	5.526	3415.306	403.00	12.16	2.29	3417.60	.00	5.19	6.00	6.000	6.000	.00	0 .0
15.780	.0044					.0059	.09	5.53	.91	6.00	.015	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														
296.840	3409.850	5.653	3415.503	403.00	11.88	2.19	3417.70	.00	5.19	6.00	6.000	6.000	.00	0 .0
113.000	.0052					.0054	.61	5.65	.88	5.93	.015	.00	.00	BOX
---------- WARNING - Flow depth near top of box conduit ----------														

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 9:57:19

SUMMERLIN WEST VILLAGE 22

Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)

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	
409.840	3410.440	5.837	3416.277	403.00	11.51	2.06	3418.33	.00	5.19	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0000					.0073	.02	5.84	.84		.015	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
412.840	3410.440	6.025	3416.465	400.00	11.11	1.92	3418.38	.00	5.17	6.00	6.000	6.000	.00	0 .0
3.000	.0000					.0073	.02	6.02	.80	.00	.015	.00	.00	BOX
415.840	3410.440	6.143	3416.583	400.00	11.11	1.92	3418.50	.00	5.17	6.00	6.000	6.000	.00	0 .0
87.020	.0052					.0073	.64	.00	.80	5.91	.015	.00	.00	BOX
502.860	3410.890	6.411	3417.301	400.00	11.11	1.92	3419.22	.00	5.17	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0000					.0054	.01	6.41	.80		.015	.00	.00	BOX
503.860	3410.890	7.399	3418.289	345.00	9.58	1.43	3419.72	.00	4.68	6.00	6.000	6.000	.00	0 .0
1.000	.0000					.0054	.01	7.40	.69	.00	.015	.00	.00	BOX
504.860	3410.890	7.405	3418.295	345.00	9.58	1.43	3419.72	.00	4.68	6.00	6.000	6.000	.00	0 .0
210.190	.0052					.0054	1.15	.00	.69	5.24	.015	.00	.00	BOX
715.050	3411.980	7.552	3419.532	345.00	9.58	1.43	3420.96	.00	4.68	6.00	6.000	6.000	.00	0 .0
3.000	.0000					.0054	.02	7.55	.69	.00	.015	.00	.00	BOX

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 9:57:19

SUMMERLIN WEST VILLAGE 22
Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)
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
718.050	3411.980	7.568	3419.548	345.00	9.58	1.43	3420.97	.00	4.68	6.00	6.000	6.000	.00	0 .0
3.000	.0000					.0054	.02	7.57	.69	.00	.015	.00	.00	BOX
721.050	3411.980	7.656	3419.636	345.00	9.58	1.43	3421.06	.00	4.68	6.00	6.000	6.000	.00	0 .0
100.220	.0052					.0054	.55	7.66	.69	5.24	.015	.00	.00	BOX
821.270	3412.500	7.682	3420.182	345.00	9.58	1.43	3421.61	.00	4.68	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0000					.0054	.01	7.68	.69		.015	.00	.00	BOX
822.270	3412.500	7.720	3420.220	343.00	9.53	1.41	3421.63	.00	4.66	6.00	6.000	6.000	.00	0 .0
1.000	.0000					.0054	.01	7.72	.69	.00	.015	.00	.00	BOX
823.270	3412.500	7.726	3420.226	343.00	9.53	1.41	3421.64	.00	4.66	6.00	6.000	6.000	.00	0 .0
69.510	.0050					.0054	.37	7.73	.69	5.28	.015	.00	.00	BOX
892.780	3412.850	7.750	3420.600	343.00	9.53	1.41	3422.01	.00	4.66	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0000					.0041	.00	7.75	.69		.015	.00	.00	BOX
893.270	3412.850	8.415	3421.265	300.00	8.33	1.08	3422.34	.00	4.27	6.00	6.000	6.000	.00	0 .0
1.510	.0000					.0041	.01	8.42	.60	.00	.015	.00	.00	BOX
894.780	3412.850	8.421	3421.271	300.00	8.33	1.08	3422.35	.00	4.27	6.00	6.000	6.000	.00	0 .0
21.310	.0061					.0041	.09	8.42	.60	4.40	.015	.00	.00	BOX
916.090	3412.980	8.379	3421.359	300.00	8.33	1.08	3422.44	.00	4.27	6.00	6.000	6.000	.00	0 .0
TRANS STR	.1667					.0082	.05	8.38	.60		.013	.00	.00	BOX

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 9:57:19

SUMMERLIN WEST VILLAGE 22

Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)

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
922.090	3413.980	5.391	3419.371	300.00	15.28	3.62	3423.00	.00	4.67	.00	5.000	.000	.00	0 .0
211.130	.0052					.0133	2.80	.00	.00	5.00	.013	.00	.00	PIPE
1133.220	3415.070	7.335	3422.405	300.00	15.28	3.62	3426.03	.00	4.67	.00	5.000	.000	.00	0 .0
6.000	.0333					.0133	.08	7.33	.00	2.88	.013	.00	.00	PIPE
1139.220	3415.270	7.395	3422.665	300.00	15.28	3.62	3426.29	.00	4.67	.00	5.000	.000	.00	0 .0
206.590	.0055					.0133	2.74	.00	.00	5.00	.013	.00	.00	PIPE
1345.810	3416.410	9.229	3425.639	300.00	15.28	3.62	3429.26	.00	4.67	.00	5.000	.000	.00	0 .0
JUNCT STR	.0334							9.23	.00		.013	.00	.00	PIPE
1348.810	3416.510	2.482	3418.992	272.00	30.24	14.20	3433.19	.00	4.34	4.48	4.500	.000	.00	0 .0
TRANS STR	.0334					.0555	.17	2.48	3.76		.013	.00	.00	PIPE
1351.810	3416.610	2.475	3419.085	272.00	30.34	14.30	3433.38	.00	4.34	4.48	4.500	.000	.00	0 .0
63.280	.0637					.0541	3.42	2.48	3.78	2.38	.013	.00	.00	PIPE
1415.090	3420.640	2.523	3423.163	272.00	29.64	13.64	3436.80	.00	4.34	4.47	4.500	.000	.00	0 .0
JUNCT STR	.0300					.0537	.16	2.52	3.64		.013	.00	.00	PIPE
1418.090	3420.730	2.469	3423.199	269.00	30.10	14.07	3437.27	.00	4.33	4.48	4.500	.000	.00	0 .0
3.000	.0267					.0552	.17	2.47	3.76	3.15	.013	.00	.00	PIPE
1421.090	3420.810	2.462	3423.272	269.00	30.21	14.17	3437.44	.00	4.33	4.48	4.500	.000	.00	0 .0
17.599	.0605					.0552	.97	2.46	3.78	2.40	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

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SUMMERLIN WEST VILLAGE 22

Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)

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
1438.689	3421.875	2.468	3424.344	269.00	30.11	14.08	3438.42	.00	4.33	4.48	4.500	.000	.00	0 .0
135.391	.0605					.0518	7.01	2.47	3.76	2.40	.013	.00	.00	PIPE
1574.080	3430.070	2.566	3432.636	269.00	28.71	12.80	3445.43	.00	4.33	4.46	4.500	.000	.00	0 .0
6.000	.0300					.0489	.29	2.57	3.49	3.02	.013	.00	.00	PIPE
1580.080	3430.250	2.556	3432.806	269.00	28.85	12.92	3445.73	.24	4.33	4.46	4.500	.000	.00	0 .0
82.211	.0588					.0465	3.82	2.80	3.52	2.42	.013	.00	.00	PIPE
1662.291	3435.083	2.652	3437.735	269.00	27.59	11.82	3449.55	.22	4.33	4.43	4.500	.000	.00	0 .0
55.278	.0588					.0413	2.28	2.87	3.28	2.42	.013	.00	.00	PIPE
1717.569	3438.333	2.760	3441.093	269.00	26.30	10.74	3451.84	.20	4.33	4.38	4.500	.000	.00	0 .0
38.832	.0588					.0366	1.42	2.96	3.03	2.42	.013	.00	.00	PIPE
1756.401	3440.616	2.874	3443.490	269.00	25.08	9.77	3453.26	.18	4.33	4.32	4.500	.000	.00	0 .0
29.098	.0588					.0325	.94	3.05	2.81	2.42	.013	.00	.00	PIPE
1785.499	3442.327	2.997	3445.323	269.00	23.91	8.88	3454.20	.16	4.33	4.25	4.500	.000	.00	0 .0
22.610	.0588					.0289	.65	3.15	2.59	2.42	.013	.00	.00	PIPE
1808.110	3443.656	3.127	3446.783	269.00	22.80	8.07	3454.86	.14	4.33	4.14	4.500	.000	.00	0 .0
17.942	.0588					.0258	.46	3.27	2.38	2.42	.013	.00	.00	PIPE
1826.052	3444.711	3.269	3447.979	269.00	21.74	7.34	3455.32	.12	4.33	4.01	4.500	.000	.00	0 .0
14.366	.0588					.0230	.33	3.39	2.18	2.42	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 9:57:19

SUMMERLIN WEST VILLAGE 22

Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)

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	
1840.417	3445.555	3.422	3448.977	269.00	20.73	6.67	3455.65	.11	4.33	3.84	4.500	.000	.00	0 .0
11.475	.0588					.0207	.24	3.53	1.99	2.42	.013	.00	.00	PIPE
1851.892	3446.230	3.592	3449.822	269.00	19.76	6.06	3455.89	.09	4.33	3.61	4.500	.000	.00	0 .0
8.982	.0588					.0188	.17	3.68	1.79	2.42	.013	.00	.00	PIPE
1860.874	3446.758	3.784	3450.542	269.00	18.84	5.51	3456.06	.08	4.33	3.29	4.500	.000	.00	0 .0
6.580	.0588					.0173	.11	3.86	1.59	2.42	.013	.00	.00	PIPE
1867.454	3447.145	4.012	3451.157	269.00	17.97	5.01	3456.17	.06	4.33	2.80	4.500	.000	.00	0 .0
3.326	.0588					.0165	.05	4.07	1.37	2.42	.013	.00	.00	PIPE
1870.780	3447.340	4.328	3451.668	269.00	17.13	4.56	3456.22							

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)
T3 ATKINS / INTERIM CONDITIONS
SO      0.00 3404.32 106
R     191.77 3405.33 106      .015                                  07.2  00.0   0
REM   ################################ Stub Ultimate Condition
R     228.86 3405.51 106      .015                                  .000  00.0   0
REM   Stub for Ultimate Condition of 260 cfs
R     243.12 3405.60 106      .015                                  .000  00.0   0
REM   ################################ SDMH#1
TS    249.12 3409.60  66      .015                                  .000  02.0   1
R     281.06 3409.78  66      .015                                  .000  01.5   0
R     296.84 3409.85  66      .015                                  .000  02.0   0
REM   ################################ 409.84 through 718.05 13.3 degree Angle of Curve
R     409.84 3410.44  66      .015                                  0.00  00.0   0
REM   ################################ SDMH#2 JX DI#1
JX    412.84 3410.44  66 24   .015     03.0          3414.19         90.0
R     415.84 3410.44  66      .015                                  0.00  00.0   1
R     502.86 3410.89  66      .015                                  3.99  00.0   0
REM   ################################ DI#2 Direct Connection no ManHole
JX    503.86 3410.89  66 36   .015     55.0          3411.09         90.0
R     504.86 3410.89  66      .015                                  0.00  00.0   0
R     715.05 3411.98  66      .015                                  9.31  00.0   0
R     718.05 3411.98  66      .015                                  0.00  00.0   0
REM   ################################ SDMH #3
R     721.05 3411.98  66      .015                                  .000  00.0   1
R     821.27 3412.50  66      .015                                  .000  00.0   0
REM   ################################ JX DI#3 Direct Connection no ManHole
JX    822.27 3412.50  66 24   .015     02.0          3412.70         81.0
R     823.27 3412.50  66      .015                                  .000  00.0   0
R     892.78 3412.85  66      .015                                  .000  00.0   0
REM   ################################ JX DI#4&5 Direct Connection no ManHole
JX    893.27 3412.85  66 36   .015     43.0          3413.05         90.0
R     894.78 3412.85  66      .015                                  .000  00.0   0
R     916.09 3412.98  66      .015                                  .000  00.0   0
REM   ################################ SDMH#4
REM   ################################ 922.09 through 1345.81 18.5 degree Angle of Curve
TS    922.09 3413.98  60      .013                                  .000  00.0   1
R    1133.22 3415.07  60      .013                                  9.25  00.0   0
REM   ################################ SDMH#5
R    1139.22 3415.27  60      .013                                  .000  00.0   1
R    1345.81 3416.41  60      .013                                  9.25  00.0   0
REM   ################################ JX DI#6&7 SDMH#6
JX   1348.81 3416.51  54 30 24.013   25.0      3.0  3416.67 3416.67  89.0-85.0    .000
TS   1351.81 3416.61  54      .013                                  .000  00.0   1
R    1415.09 3420.64  54      .013                                  .000  00.0   0
REM   ################################ JX DI#8 SDMH #7
JX   1418.09 3420.73  54 24   .013     03.0          3420.27         90.0
R    1421.09 3420.81  54      .013                                  .000  00.0   1
R    1574.08 3430.07  54      .013                                  .000  00.0   0
REM   ################################ SDMH#8
R    1580.08 3430.25  54      .013                                  .000  00.0   1
```

```
R    1870.78 3447.34  54     .013                                    34.7  00.0   0
SH   1873.78 3447.34  54
CD  24  4   0     .000    2.000      .000  .000  .000    .00
CD  30  4   0     .000    2.500      .000  .000  .000    .00
CD  36  4   0     .000    3.000      .000  .000  .000    .00
CD  48  4   0     .000    4.000      .000  .000  .000    .00
CD  54  4   0     .000    4.500      .000  .000  .000    .00
CD  60  4   0     .000    5.000      .000  .000  .000    .00
CD  66  3   0    0.000    6.000     6.000
CD 106  3   0    0.000    10.00     6.000
Q            269.00     .0
```

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time:10:53:50

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+76 , 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
412.840	3410.440	6.000	3416.440	3.00	.08	.00	3416.44	.00	.20	6.00	6.000	6.000	.00	0 .0
TRANS STR 37.4977						.0000	.00	6.00	.01		.013	.00	.00	BOX
412.940	3414.190	2.250	3416.440	3.00	.95	.01	3416.45	.00	.60	.00	2.000	.000	.00	0 .0
1.103	.2269					.0002	.00	2.25	.00	.23	.013	.00	.00	PIPE
414.043	3414.440	2.000	3416.440	3.00	.95	.01	3416.45	.00	.60	.00	2.000	.000	.00	0 .0
.807	.2269					.0002	.00	2.00	.00	.23	.013	.00	.00	PIPE
414.850	3414.623	1.815	3416.438	3.00	1.00	.02	3416.45	.00	.60	1.16	2.000	.000	.00	0 .0
.468	.2269					.0002	.00	1.81	.11	.23	.013	.00	.00	PIPE
415.318	3414.729	1.707	3416.437	3.00	1.05	.02	3416.45	.00	.60	1.41	2.000	.000	.00	0 .0
.384	.2269					.0002	.00	1.71	.13	.23	.013	.00	.00	PIPE
415.702	3414.817	1.618	3416.435	3.00	1.10	.02	3416.45	.00	.60	1.57	2.000	.000	.00	0 .0
.335	.2269					.0002	.00	1.62	.15	.23	.013	.00	.00	PIPE
416.037	3414.893	1.540	3416.433	3.00	1.16	.02	3416.45	.00	.60	1.68	2.000	.000	.00	0 .0
.300	.2269					.0002	.00	1.54	.16	.23	.013	.00	.00	PIPE
416.337	3414.960	1.470	3416.431	3.00	1.21	.02	3416.45	.00	.60	1.77	2.000	.000	.00	0 .0
.273	.2269					.0002	.00	1.47	.18	.23	.013	.00	.00	PIPE
416.610	3415.022	1.406	3416.428	3.00	1.27	.03	3416.45	.00	.60	1.83	2.000	.000	.00	0 .0
.251	.2269					.0003	.00	1.41	.20	.23	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time:10:53:50

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+76 , 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
416.861	3415.079	1.347	3416.426	3.00	1.33	.03	3416.45	.00	.60	1.88	2.000	.000	.00	0 .0
.232	.2269					.0003	.00	1.35	.21	.23	.013	.00	.00	PIPE
417.092	3415.132	1.292	3416.423	3.00	1.40	.03	3416.45	.00	.60	1.91	2.000	.000	.00	0 .0
.215	.2269					.0003	.00	1.29	.23	.23	.013	.00	.00	PIPE
417.308	3415.180	1.240	3416.420	3.00	1.47	.03	3416.45	.00	.60	1.94	2.000	.000	.00	0 .0
.201	.2269					.0004	.00	1.24	.25	.23	.013	.00	.00	PIPE
417.508	3415.226	1.191	3416.417	3.00	1.54	.04	3416.45	.00	.60	1.96	2.000	.000	.00	0 .0
.187	.2269					.0004	.00	1.19	.27	.23	.013	.00	.00	PIPE
417.695	3415.269	1.145	3416.414	3.00	1.61	.04	3416.45	.00	.60	1.98	2.000	.000	.00	0 .0
.175	.2269					.0005	.00	1.15	.29	.23	.013	.00	.00	PIPE
417.870	3415.308	1.101	3416.409	3.00	1.69	.04	3416.45	.00	.60	1.99	2.000	.000	.00	0 .0
.163	.2269					.0005	.00	1.10	.32	.23	.013	.00	.00	PIPE
418.033	3415.345	1.060	3416.405	3.00	1.77	.05	3416.45	.00	.60	2.00	2.000	.000	.00	0 .0
.153	.2269					.0006	.00	1.06	.34	.23	.013	.00	.00	PIPE
418.186	3415.380	1.021	3416.400	3.00	1.86	.05	3416.45	.00	.60	2.00	2.000	.000	.00	0 .0
.142	.2269					.0007	.00	1.02	.37	.23	.013	.00	.00	PIPE
418.328	3415.412	.983	3416.395	3.00	1.95	.06	3416.45	.00	.60	2.00	2.000	.000	.00	0 .0
.122	.2269					.0008	.00	.98	.39	.23	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time:10:53:50

SUMMERLIN WEST VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+76 , 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	
418.450	3415.440	.950	3416.390	3.00	2.04	.06	3416.45	.00	.60	2.00	2.000	.000	.00	

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+76 , SDDI #1
T3 ATKINS / INTERIM CONDITIONS
SO    412.84 3410.44  66                        3416.44
TS    412.94 3414.19  66      .013
R     418.45 3415.44  24      .013
SH    418.45 3415.44  24
CD  24  4   0     .000    2.000     .000  .000  .000    .00
CD  66  3   0    0.000    6.000    6.000
Q             3.000    .0
```

FILE: SJ_Lateral-DI2_int-TEST.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9-10-2019 Time: 9: 5:52

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL 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
503.860	3410.890	7.410	3418.300	55.00	1.53	.04	3418.34	.00	1.38	6.00	6.000	6.000	.00	0 .0
TRANS STR	2.0018					.0001	.00	7.41	.11		.013	.00	.00	BOX
503.960	3411.090	7.210	3418.300	55.00	7.78	.94	3419.24	.00	2.41	.00	3.000	.000	.00	0 .0
41.553	.1002					.0068	.28	7.21	.00	1.04	.013	.00	.00	PIPE
545.513	3415.252	3.329	3418.581	55.00	7.78	.94	3419.52	.00	2.41	.00	3.000	.000	.00	0 .0
HYDRAULIC JUMP														
545.513	3415.252	1.661	3416.913	55.00	13.70	2.91	3419.83	.00	2.41	2.98	3.000	.000	.00	0 .0
1.650	.1002					.0186	.03	1.66	2.08	1.04	.013	.00	.00	PIPE
547.163	3415.418	1.705	3417.123	55.00	13.26	2.73	3419.85	.00	2.41	2.97	3.000	.000	.00	0 .0
2.155	.1002					.0168	.04	1.71	1.98	1.04	.013	.00	.00	PIPE
549.318	3415.634	1.774	3417.407	55.00	12.64	2.48	3419.89	.00	2.41	2.95	3.000	.000	.00	0 .0
1.795	.1002					.0149	.03	1.77	1.83	1.04	.013	.00	.00	PIPE
551.113	3415.813	1.846	3417.659	55.00	12.05	2.26	3419.91	.00	2.41	2.92	3.000	.000	.00	0 .0
1.474	.1002					.0132	.02	1.85	1.70	1.04	.013	.00	.00	PIPE
552.587	3415.961	1.923	3417.884	55.00	11.49	2.05	3419.93	.00	2.41	2.88	3.000	.000	.00	0 .0
1.181	.1002					.0117	.01	1.92	1.57	1.04	.013	.00	.00	PIPE
553.768	3416.079	2.005	3418.084	55.00	10.96	1.86	3419.95	.00	2.41	2.82	3.000	.000	.00	0 .0
.909	.1002					.0104	.01	2.00	1.45	1.04	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9-10-2019 Time: 9: 5:52

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL 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	
554.677	3416.170	2.093	3418.263	55.00	10.45	1.69	3419.96	.00	2.41	2.76	3.000	.000	.00	0 .0
.653	.1002					.0093	.01	2.09	1.33	1.04	.013	.00	.00	PIPE
555.330	3416.236	2.187	3418.423	55.00	9.96	1.54	3419.96	.00	2.41	2.67	3.000	.000	.00	0 .0
.400	.1002					.0083	.00	2.19	1.22	1.04	.013	.00	.00	PIPE
555.730	3416.276	2.291	3418.567	55.00	9.50	1.40	3419.97	.00	2.41	2.55	3.000	.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #2
T3 ATKINS / INTERIM CONDITIONS
SO    503.86 3410.89  66                          3418.30
TS    503.96 3411.09  66      .013
R     555.87 3416.29  36      .013
SH    557.87 3416.29  36
CD  66  3   0   0.000   6.000   6.000
CD  36  4   0    .000   3.000    .000  .000  .000   .00
Q           55.000   .0
```

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time:11:46:53

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL 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	ZR	No Wth Prs/Pip	Type Ch
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall					
822.270	3412.500	7.720	3420.220	2.00	.06	.00	3420.22	.00	.15	6.00	6.000	6.000	.00	0	.0	
TRANS STR	2.0000					.0000	.00	7.72	.00		.013	.00	.00	BOX		
822.370	3412.700	7.520	3420.220	2.00	.64	.01	3420.23	.00	.49	.00	2.000	.000	.00	0	.0	
69.320	.0411					.0001	.01	7.52	.00	.28	.013	.00	.00	PIPE		
891.690	3415.550	4.675	3420.225	2.00	.64	.01	3420.23	.00	.49	.00	2.000	.000	.00	0	.0	
.100	.0000					.0001	.00	4.68	.00	.00	.013	.00	.0			

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #3
T3 ATKINS / INTERIM CONDITIONS
SO    822.27 3412.50  66                          3420.22
TS    822.37 3412.70  66      .013
R     891.69 3415.55  24      .013
R     891.79 3415.55  24      .013
SH    895.89 3415.55  94
CD  66  3   0   0.000   6.000   6.000
CD  24  4   0    .000   2.000    .000  .000  .000   .00
CD  94  3   0   0.000   9.000   4.000
Q           02.000   .0
```

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time:11:28: 2

SUMMERLIN WEST VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #4 & #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	
893.270	3412.850	8.450	3421.300	43.00	1.19	.02	3421.32	.00	1.17	6.00	6.000	6.000	.00	0 .0
TRANS STR	2.0000					.0001	.00	8.45	.09		.013	.00	.00	BOX
893.370	3413.050	8.250	3421.300	43.00	6.08	.57	3421.87	.00	2.14	.00	3.000	.000	.00	0 .0
6.000	.0933					.0042	.02	8.25	.00	.94	.013	.00	.00	PIPE
899.370	3413.610	7.715	3421.325	43.00	6.08	.57	3421.90	.00	2.14	.00	3.000	.000	.00	0 .0
JUNCT STR	.0000					.0039	.00	7.71	.00		.013	.00	.00	PIPE
899.370	3413.810	7.670	3421.480	40.00	5.66	.50	3421.98	.00	2.06	.00	3.000	.000	.00	0 .0
44.990	.1074					.0036	.16	7.67	.00	.87	.013	.00	.00	PIPE
944.360	3418.642	3.000	3421.642	40.00	5.66	.50	3422.14	.00	2.06	.00	3.000	.000	.00	0 .0
1.010	.1074					.0033	.00							

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #4 & #5
T3 ATKINS / INTERIM CONDITIONS
SO    893.27 3412.85  66                          3421.30
TS    893.37 3413.05  66      .013
R     899.37 3413.61  36      .013
JX    899.37 3413.81  36      .013      03.0           3413.81
R     945.37 3418.75  36      .013
SH    945.37 3418.75  36
CD  36  4   0     .000    3.000      .000  .000  .000    .00
CD  66  3   0    0.000    6.000     6.000
Q             40.000    .0
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FILE: SJ_Lateral-DI6int.WSW                W S P G W - CIVILDESIGN Version 14.08                                    PAGE    1
                              Program Package Serial Number: 7271
                                                WATER SURFACE PROFILE LISTING                  Date: 9- 5-2019  Time:11:50: 2
                        SUMMERLIN WEST VILLAGE 22
                          KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #6
                            ATKINS / INTERIM CONDITIONS
************************************************************************************************************************ ********
         | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
 L/Elem  |Ch Slope |        |         |         |         SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|***** |*******
         |         |        |         |         |               |         |       |        |        |       |       |      |
 1348.810  3416.510    9.130  3425.640     25.00    1.57     .04  3425.68     .00    1.43      .00    4.500     .000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
TRANS STR  1.5995                                          .0002      .00    9.13     .00             .013       .00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |       |      |
 1348.910  3416.670    8.970  3425.640     25.00    5.09     .40  3426.04     .00    1.70      .00    2.500     .000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   55.000    .1131                                          .0037      .20    8.97     .00     .72    .013       .00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |       |      |
 1403.910  3422.890    2.954  3425.844     25.00    5.09     .40  3426.25     .00    1.70      .00    2.500     .000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
     .100    .0000                                          .0037      .00    2.95     .00     .00    .013       .00   .0
```

```
T1 SUMMERLIN WEST VILLAGE 22                                                  0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #6
T3 ATKINS / INTERIM CONDITIONS
SO    1348.81 3416.51  54                          3425.64
TS    1348.91 3416.67  54      .013
R     1403.91 3422.89  30      .013
R     1404.01 3422.89  30      .013
SH    1407.91 3422.89  94
CD  30  4   0    .000   2.500     .000  .000  .000   .00
CD  54  4   0    .000   4.500     .000  .000  .000   .00
CD  94  3   0   0.000   9.000    4.000
Q           25.000   .0
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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time:11:54:20

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #7
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	ZR	No Wth Prs/Pip	Type Ch
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall					
1348.810	3416.510	9.110	3425.620	3.00	.19	.00	3425.62	.00	.48	.00	4.500	.000	.00	0	.0	
TRANS STR	1.5995					.0000	.00	9.11	.00		.013	.00	.00			PIPE
1348.910	3416.670	8.950	3425.620	3.00	.95	.01	3425.63	.00	.60	.00	2.000	.000	.00	0	.0	
71.690	.0502					.0002	.01	8.95	.00	.33	.013	.00	.00			PIPE
1420.600	3420.270	5.363	3425.633	3.00	.95	.01	3425.65	.00	.60	.00	2.000	.000	.00	0	.0	
.100	.0000					.0002	.00	5.36	.00	.00	.013	.00	.0			

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #7
T3 ATKINS / INTERIM CONDITIONS
SO   1348.81 3416.51  54                          3425.62
TS   1348.91 3416.67  54      .013
R    1420.60 3420.27  24      .013
R    1420.70 3420.27  24      .013
SH   1424.60 3420.27  94
CD  24  4   0    .000   2.000     .000  .000  .000   .00
CD  54  4   0    .000   4.500     .000  .000  .000   .00
CD  94  3   0   0.000   9.000    4.000
Q           03.000   .0
```

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time:11:32:21

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #8
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	
1418.090	3420.810	2.390	3423.200	3.00	.35	.00	3423.20	.00	.48	4.49	4.500	.000	.00	0 .0
TRANS STR 21.9048								2.39	.04		.013	.00	.00	PIPE
1418.190	3423.000	.289	3423.289	3.00	10.74	1.79	3425.08	.00	.60	1.41	2.000	.000	.00	0 .0
.083	.1891					.0871	.01	.29	4.25	.24	.013	.00	.00	PIPE
1418.272	3423.016	.289	3423.305	3.00	10.72	1.78	3425.09	.00	.60	1.41	2.000	.000	.00	0 .0
1.415	.1891					.0813	.12	.29	4.23	.24	.013	.00	.00	PIPE
1419.687	3423.284	.299	3423.582	3.00	10.22	1.62	3425.20	.00	.60	1.43	2.000	.000	.00	0 .0
1.163	.1891					.0710	.08	.30	3.97	.24	.013	.00	.00	PIPE
1420.850	3423.504	.309	3423.812	3.00	9.74	1.47	3425.29	.00	.60	1.44	2.000	.000	.00	0 .0
.973	.1891					.0620	.06	.31	3.72	.24	.013	.00	.00	PIPE
1421.823	3423.688	.319	3424.006	3.00	9.29	1.34	3425.35	.00	.60	1.46	2.000	.000	.00	0 .0
.823	.1891					.0541	.04	.32	3.49	.24	.013	.00	.00	PIPE
1422.646	3423.843	.330	3424.173	3.00	8.86	1.22	3425.39	.00	.60	1.48	2.000	.000	.00	0 .0
.702	.1891					.0473	.03	.33	3.27	.24	.013	.00	.00	PIPE
1423.348	3423.976	.341	3424.317	3.00	8.44	1.11	3425.42	.00	.60	1.50	2.000	.000	.00	0 .0
.603	.1891					.0413	.02	.34	3.06	.24	.013	.00	.00	PIPE
1423.951	3424.090	.352	3424.442	3.00	8.05	1.01	3425.45	.00	.60	1.52	2.000	.000	.00	0 .0
.521	.1891					.0361	.02	.35	2.87	.24	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time:11:32:21

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #8
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
1424.472	3424.188	.364	3424.552	3.00	7.68	.92	3425.47	.00	.60	1.54	2.000	.000	.00	0 .0
.450	.1891					.0315	.01	.36	2.69	.24	.013	.00	.00	PIPE
1424.922	3424.273	.376	3424.649	3.00	7.32	.83	3425.48	.00	.60	1.56	2.000	.000	.00	0 .0
.389	.1891					.0275	.01	.38	2.52	.24	.013	.00	.00	PIPE
1425.311	3424.347	.389	3424.736	3.00	6.98	.76	3425.49	.00	.60	1.58	2.000	.000	.00	0 .0
.337	.1891					.0240	.01	.39	2.36	.24	.013	.00	.00	PIPE
1425.648	3424.411	.402	3424.813	3.00	6.65	.69	3425.50	.00	.60	1.60	2.000	.000	.00	0 .0
.291	.1891					.0210	.01	.40	2.21	.24	.013	.00	.00	PIPE
1425.939	3424.466	.416	3424.881	3.00	6.34	.62	3425.51	.00	.60	1.62	2.000	.000	.00	0 .0
.250	.1891					.0184	.00	.42	2.07	.24	.013	.00	.00	PIPE
1426.188	3424.513	.430	3424.943	3.00	6.05	.57	3425.51	.00	.60	1.64	2.000	.000	.00	0 .0
.214	.1891					.0160	.00	.43	1.94	.24	.013	.00	.00	PIPE
1426.402	3424.553	.445	3424.998	3.00	5.77	.52	3425.51	.00	.60	1.66	2.000	.000	.00	0 .0
.181	.1891					.0140	.00	.44	1.82	.24	.013	.00	.00	PIPE
1426.584	3424.587	.460	3425.047	3.00	5.50	.47	3425.52	.00	.60	1.68	2.000	.000	.00	0 .0
.153	.1891					.0123	.00	.46	1.70	.24	.013	.00	.00	PIPE
1426.736	3424.616	.476	3425.092	3.00	5.24	.43	3425.52	.00	.60	1.70	2.000	.000	.00	0 .0
.126	.1891					.0107	.00	.48	1.59	.24	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time:11:32:21

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #8
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
1426.863	3424.640	.492	3425.132	3.00	5.00	.39	3425.52	.00	.60	1.72	2.000	.000	.00	0 .0
.102	.1891					.0094	.00	.49	1.49	.24	.013	.00	.00	PIPE
1426.965	3424.659	.509	3425.168	3.00	4.77	.35	3425.52	.00	.60	1.74	2.000	.000	.00	0 .0
.081	.1891					.0082	.00	.51	1.40	.24	.013	.00	.00	PIPE
1427.046	3424.675	.526	3425.201	3.00	4.54	.32	3425.52	.00	.60	1.76	2.000	.000	.00	0 .0
.060	.1891					.0072	.00	.53	1.31	.24	.013	.00	.00	PIPE
1427.106	3424.686	.544	3425.230	3.00	4.33	.29	3425.52	.00	.60	1.78	2.000	.000	.00	0 .0
.042	.1891					.0063	.00	.54	1.22	.24	.013	.00	.00	PIPE
1427.147	3424.694	.563	3425.257	3.00	4.13	.27	3425.52	.00	.60	1.80	2.000	.000	.00	0 .0
.025	.1891					.0055	.00	.56	1.15	.24	.013	.00	.00	PIPE
1427.172	3424.698	.583	3425.281	3.00	3.94	.24	3425.52	.00	.60	1.82	2.000	.000	.00	0 .0
.008	.1891					.0048	.00	.58	1.07	.24	.013	.00	.00	PIPE

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T1 SUMMERLIN WEST VILLAGE 22                                                  0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #8
T3 ATKINS / INTERIM CONDITIONS
SO   1418.09 3420.81  54                        3423.20
TS   1418.19 3423.00  54      .013
R    1427.18 3424.70  24      .013
SH   1427.18 3424.70  24
CD  24  4   0     .000   2.000     .000  .000  .000   .00
CD  54  4   0     .000   4.500     .000  .000  .000   .00
Q            03.000   .0
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C.2 Ultimate Condition WSPG-W Model

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SUMMERLIN WEST VILLAGE 22
Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)
ATKINS / ULTIMATE 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
.000	3404.320	7.195	3411.515	657.00	15.22	3.60	3415.11	.01	7.19	6.00	10.000	6.000	.00	0 .0
8.296	.0053					.0077	.06	7.21	1.00	8.87	.015	.00	.00	BOX
8.296	3404.364	7.546	3411.910	657.00	14.51	3.27	3415.18	.01	7.19	6.00	10.000	6.000	.00	0 .0
34.859	.0053					.0069	.24	7.56	.93	8.87	.015	.00	.00	BOX
43.154	3404.549	7.914	3412.463	657.00	13.84	2.97	3415.44	.01	7.19	6.00	10.000	6.000	.00	0 .0
92.349	.0053					.0062	.57	7.93	.87	8.87	.015	.00	.00	BOX
135.503	3405.038	8.301	3413.338	657.00	13.19	2.70	3416.04	.01	7.19	6.00	10.000	6.000	.00	0 .0
55.267	.0053					.0060	.33	8.31	.81	8.87	.015	.00	.00	BOX
190.770	3405.330	8.421	3413.751	657.00	13.00	2.63	3416.38	.00	7.19	6.00	10.000	6.000	.00	0 .0
JUNCT STR	.0000					.0054	.01	8.42	.79		.015	.00	.00	BOX
191.770	3405.330	8.696	3414.026	650.00	12.46	2.41	3416.44	.00	7.14	6.00	10.000	6.000	.00	0 .0
1.000	.0000					.0054	.01	8.70	.74	.00	.015	.00	.00	BOX
192.770	3405.330	8.708	3414.038	650.00	12.44	2.40	3416.44	.00	7.14	6.00	10.000	6.000	.00	0 .0
29.090	.0062					.0054	.16	8.71	.74	8.22	.015	.00	.00	BOX
221.860	3405.510	8.660	3414.170	650.00	12.51	2.43	3416.60	.00	7.14	6.00	10.000	6.000	.00	0 .0
JUNCT STR	.0000					.0019	.00	8.66	.75		.015	.00	.00	BOX
222.860	3405.510	11.768	3417.278	390.00	6.50	.66	3417.93	.00	5.08	6.00	10.000	6.000	.00	0 .0
1.000	.0000					.0019	.00	11.77	.36	.00	.015	.00	.00	BOX

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 1:38:48

SUMMERLIN WEST VILLAGE 22
Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)
ATKINS / ULTIMATE 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
223.860	3405.510	11.770	3417.280	390.00	6.50	.66	3417.94	.00	5.08	6.00	10.000	6.000	.00	0 .0
19.260	.0047					.0019	.04	11.77	.36	6.04	.015	.00	.00	BOX
243.120	3405.600	11.716	3417.316	390.00	6.50	.66	3417.97	.00	5.08	6.00	10.000	6.000	.00	0 .0
TRANS STR	.8000					.0019	.01	11.72	.36		.015	.00	.00	BOX
248.120	3409.600	6.805	3416.405	390.00	10.83	1.82	3418.23	.00	5.08	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0000					.0067	.01	6.80	.78		.015	.00	.00	BOX
249.120	3409.600	6.941	3416.542	383.00	10.64	1.76	3418.30	.00	5.02	6.00	6.000	6.000	.00	0 .0
1.000	.0000					.0067	.01	6.94	.77	.00	.015	.00	.00	BOX
250.120	3409.600	6.948	3416.548	383.00	10.64	1.76	3418.31	.00	5.02	6.00	6.000	6.000	.00	0 .0
30.940	.0058					.0067	.21	6.95	.77	5.44	.015	.00	.00	BOX
281.060	3409.780	6.985	3416.765	383.00	10.64	1.76	3418.52	.00	5.02	6.00	6.000	6.000	.00	0 .0
15.780	.0044					.0067	.11	6.98	.77	6.00	.015	.00	.00	BOX
296.840	3409.850	7.032	3416.883	383.00	10.64	1.76	3418.64	.00	5.02	6.00	6.000	6.000	.00	0 .0
113.000	.0052					.0067	.76	7.03	.77	5.69	.015	.00	.00	BOX
409.840	3410.440	7.202	3417.642	383.00	10.64	1.76	3419.40	.00	5.02	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0000					.0065	.02	7.20	.77		.015	.00	.00	BOX
412.840	3410.440	7.331	3417.771	377.00	10.47	1.70	3419.47	.00	4.97	6.00	6.000	6.000	.00	0 .0
3.000	.0000					.0065	.02	7.33	.75	.00	.015	.00	.00	BOX

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 1:38:48

SUMMERLIN WEST VILLAGE 22
Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)
ATKINS / ULTIMATE 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
415.840	3410.440	7.435	3417.875	377.00	10.47	1.70	3419.58	.00	4.97	6.00	6.000	6.000	.00	0 .0
87.020	.0052					.0065	.57	.00	.75	5.64	.015	.00	.00	BOX
502.860	3410.890	7.624	3418.513	377.00	10.47	1.70	3420.22	.00	4.97	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0000					.0046	.00	7.62	.75		.015	.00	.00	BOX
503.860	3410.890	8.627	3419.517	317.00	8.81	1.20	3420.72	.00	4.43	6.00	6.000	6.000	.00	0 .0
1.000	.0000					.0046	.00	8.63	.63	.00	.015	.00	.00	BOX
504.860	3410.890	8.632	3419.521	317.00	8.81	1.20	3420.73	.00	4.43	6.00	6.000	6.000	.00	0 .0
210.190	.0052					.0046	.97	.00	.63	4.90	.015	.00	.00	BOX
715.050	3411.980	8.586	3420.566	317.00	8.81	1.20	3421.77	.00	4.43	6.00	6.000	6.000	.00	0 .0
3.000	.0000					.0046	.01	8.59	.63	.00	.015	.00	.00	BOX
718.050	3411.980	8.600	3420.580	317.00	8.81	1.20	3421.78	.00	4.43	6.00	6.000	6.000	.00	0 .0
3.000	.0000					.0046	.01	8.60	.63	.00	.015	.00	.00	BOX
721.050	3411.980	8.674	3420.654	317.00	8.81	1.20	3421.86	.00	4.43	6.00	6.000	6.000	.00	0 .0
100.220	.0052					.0046	.46	8.67	.63	4.90	.015	.00	.00	BOX
821.270	3412.500	8.615	3421.115	317.00	8.81	1.20	3422.32	.00	4.43	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0000					.0045	.00	8.62	.63		.015	.00	.00	BOX
822.270	3412.500	8.650	3421.150	315.00	8.75	1.19	3422.34	.00	4.41	6.00	6.000	6.000	.00	0 .0
1.000	.0000					.0045	.00	8.65	.63	.00	.015	.00	.00	BOX

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WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 1:38:48

SUMMERLIN WEST VILLAGE 22
Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)
ATKINS / ULTIMATE 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
823.270	3412.500	8.654	3421.155	315.00	8.75	1.19	3422.34	.00	4.41	6.00	6.000	6.000	.00	0 .0
69.510	.0050					.0045	.32	8.65	.63	4.93	.015	.00	.00	BOX
892.780	3412.850	8.620	3421.470	315.00	8.75	1.19	3422.66	.00	4.41	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0000					.0041	.00	8.62	.63		.015	.00	.00	BOX
893.270	3412.850	8.843	3421.694	300.00	8.33	1.08	3422.77	.00	4.27	6.00	6.000	6.000	.00	0 .0
1.510	.0000					.0041	.01	8.84	.60	.00	.015	.00	.00	BOX
894.780	3412.850	8.850	3421.700	300.00	8.33	1.08	3422.78	.00	4.27	6.00	6.000	6.000	.00	0 .0
21.310	.0061					.0041	.09	8.85	.60	4.40	.015	.00	.00	BOX
916.090	3412.980	8.808	3421.788	300.00	8.33	1.08	3422.87	.00	4.27	6.00	6.000	6.000	.00	0 .0
TRANS STR	.1667					.0082	.05	8.81	.60		.013	.00	.00	BOX
922.090	3413.980	5.819	3419.799	300.00	15.28	3.62	3423.42	.00	4.67	.00	5.000	.000	.00	0 .0
211.130	.0052					.0133	2.80	.00	.00	5.00	.013	.00	.00	PIPE
1133.220	3415.070	7.763	3422.833	300.00	15.28	3.62	3426.46	.00	4.67	.00	5.000	.000	.00	0 .0
6.000	.0333					.0133	.08	7.76	.00	2.88	.013	.00	.00	PIPE
1139.220	3415.270	7.824	3423.094	300.00	15.28	3.62	3426.72	.00	4.67	.00	5.000	.000	.00	0 .0
206.590	.0055					.0133	2.74	.00	.00	5.00	.013	.00	.00	PIPE
1345.810	3416.410	9.657	3426.067	300.00	15.28	3.62	3429.69	.00	4.67	.00	5.000	.000	.00	0 .0
JUNCT STR	.0334					.0144	.04	9.66	.00		.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 1:38:48

SUMMERLIN WEST VILLAGE 22

Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)

ATKINS / ULTIMATE 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
1348.810	3416.510	10.998	3427.508	245.00	15.40	3.68	3431.19	.00	4.26	.00	4.500	.000	.00	0 .0
TRANS STR	.0334					.0155	.05	11.00	.00		.013	.00	.00	PIPE
1351.810	3416.610	10.945	3427.555	245.00	15.40	3.68	3431.24	.00	4.26	.00	4.500	.000	.00	0 .0
31.864	.0637					.0155	.49	10.94	.00	2.23	.013	.00	.00	PIPE
1383.674	3418.639	9.409	3428.048	245.00	15.40	3.68	3431.73	.00	4.26	.00	4.500	.000	.00	0 .0
HYDRAULIC JUMP														
1383.674	3418.639	2.339	3420.978	245.00	29.33	13.36	3434.34	.00	4.26	4.50	4.500	.000	.00	0 .0
31.416	.0637					.0535	1.68	2.34	3.79	2.23	.013	.00	.00	PIPE
1415.090	3420.640	2.365	3423.005	245.00	28.92	12.99	3435.99	.00	4.26	4.49	4.500	.000	.00	0 .0
JUNCT STR	.0300					.0539	.16	2.37	3.71		.013	.00	.00	PIPE
1418.090	3420.730	2.311	3423.041	242.00	29.42	13.44	3436.48	.00	4.25	4.50	4.500	.000	.00	0 .0
3.000	.0267					.0556	.17	2.31	3.83	2.92	.013	.00	.00	PIPE
1421.090	3420.810	2.304	3423.114	242.00	29.53	13.54	3436.65	.00	4.25	4.50	4.500	.000	.00	0 .0
17.928	.0605					.0557	1.00	2.30	3.86	2.25	.013	.00	.00	PIPE
1439.018	3421.895	2.310	3424.205	242.00	29.43	13.45	3437.66	.00	4.25	4.50	4.500	.000	.00	0 .0
135.062	.0605					.0521	7.04	2.31	3.84	2.25	.013	.00	.00	PIPE
1574.080	3430.070	2.399	3432.469	242.00	28.06	12.23	3444.70	.00	4.25	4.49	4.500	.000	.00	0 .0
6.000	.0300					.0492	.30	2.40	3.57	2.80	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 1:38:48

SUMMERLIN WEST VILLAGE 22
Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)
ATKINS / ULTIMATE 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
1580.080	3430.250	2.390	3432.639	242.00	28.21	12.35	3444.99	.23	4.25	4.49	4.500	.000	.00	0 .0
47.514	.0588					.0481	2.28	2.62	3.60	2.27	.013	.00	.00	PIPE
1627.593	3433.043	2.434	3435.477	242.00	27.57	11.80	3447.28	.22	4.25	4.48	4.500	.000	.00	0 .0
65.600	.0588					.0439	2.88	2.65	3.47	2.27	.013	.00	.00	PIPE
1693.194	3436.900	2.529	3439.429	242.00	26.29	10.73	3450.16	.20	4.25	4.47	4.500	.000	.00	0 .0
43.665	.0588					.0388	1.69	2.73	3.23	2.27	.013	.00	.00	PIPE
1736.859	3439.467	2.630	3442.097	242.00	25.06	9.75	3451.85	.18	4.25	4.44	4.500	.000	.00	0 .0
31.822	.0588					.0343	1.09	2.81	2.99	2.27	.013	.00	.00	PIPE
1768.680	3441.338	2.737	3444.075	242.00	23.90	8.87	3452.94	.16	4.25	4.39	4.500	.000	.00	0 .0
24.367	.0588					.0304	.74	2.90	2.77	2.27	.013	.00	.00	PIPE
1793.047	3442.771	2.850	3445.621	242.00	22.78	8.06	3453.68	.15	4.25	4.34	4.500	.000	.00	0 .0
19.216	.0588					.0269	.52	3.00	2.57	2.27	.013	.00	.00	PIPE
1812.263	3443.900	2.971	3446.871	242.00	21.72	7.33	3454.20	.13	4.25	4.26	4.500	.000	.00	0 .0
15.412	.0588					.0239	.37	3.10	2.37	2.27	.013	.00	.00	PIPE
1827.674	3444.806	3.100	3447.906	242.00	20.71	6.66	3454.57	.12	4.25	4.17	4.500	.000	.00	0 .0
12.460	.0588					.0213	.27	3.22	2.18	2.27	.013	.00	.00	PIPE
1840.134	3445.539	3.239	3448.777	242.00	19.75	6.06	3454.83	.10	4.25	4.04	4.500	.000	.00	0 .0
10.064	.0588					.0191	.19	3.34	2.00	2.27	.013	.00	.00	PIPE

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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 1:38:48

SUMMERLIN WEST VILLAGE 22
Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)
ATKINS / ULTIMATE CONDITIONS

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
1850.198	3446.130	3.390	3449.520	242.00	18.83	5.51	3455.03	.09	4.25	3.88	4.500	.000	.00	0 .0
8.029	.0588					.0171	.14	3.48	1.82	2.27	.013	.00	.00	PIPE
1858.228	3446.602	3.556	3450.158	242.00	17.95	5.01	3455.16	.08	4.25	3.66	4.500	.000	.00	0 .0
6.197	.0588					.0155	.10	3.63	1.65	2.27	.013	.00	.00	PIPE
1864.424	3446.966	3.743	3450.709	242.00	17.12	4.55	3455.26	.06	4.25	3.37	4.500	.000	.00	0 .0
4.371	.0588					.0142	.06	3.81	1.47	2.27	.013	.00	.00	PIPE
1868.796	3447.223	3.961	3451.185	242.00	16.32	4.14	3455.32	.05	4.25	2.92	4.500	.000	.00	0 .0
1.984	.0588					.0134	.03	4.01	1.28	2.27	.013	.00	.00	PIPE
1870.780	3447.340	4.248	3451.588	242.00	15.56	3.76	3455.35	.03	4.25	2.07	4.500	.000	.00	0 .0
1873.780	3447.340	4.248	3451.											

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 Kettle Ridge Dr (STREET J) LMB TO Fleet Wing Ave (STREET H)
T3 ATKINS / ULTIMATE CONDITIONS
SO      0.00 3404.32 106
R       0.00 3404.32 106      .015                                    .000  00.0   0
R     190.77 3405.33 106      .015                                   07.2  00.0   0
REM  ################################ Stub 3 Ultimate Condition
JX    191.77 3405.33 106 24   .015     07.0          3413.08          90.0
R     192.77 3405.33 106      .015                                    .000  00.0   0
R     221.86 3405.51 106      .015                                    .000  00.0   0
REM  ################################ Stub 2 for Ultimate Condition of 260 cfs
JX    222.86 3405.51 106 48   .015   260.0          3405.72          90.0
R     223.86 3405.51 106      .015                                    .000  00.0   0
R     243.12 3405.60 106      .015                                    .000  00.0   0
REM  ################################ SDMH#1
TS    248.12 3409.60  66      .015                                    .000  02.0   1
REM  ################################ Stub 1 Ultimate Condition
JX    249.12 3409.60  66 24   .015     07.0          3409.97          90.0
R     250.12 3409.60  66      .015                                    .000  00.0   0
R     281.06 3409.78  66      .015                                    .000  01.5   0
R     296.84 3409.85  66      .015                                    .000  02.0   0
REM  ################################ 409.84 through 718.05 13.3 degree Angle of Curve
R     409.84 3410.44  66      .015                                   0.00  00.0   0
REM  ################################ SDMH#2 JX DI#1
JX    412.84 3410.44  66 24   .015     06.0          3414.19          90.0
R     415.84 3410.44  66      .015                                   0.00  00.0   1
R     502.86 3410.89  66      .015                                   3.99  00.0   0
REM  ################################ DI#2 Direct Connection no ManHole
JX    503.86 3410.89  66 36   .015     60.0          3411.09          90.0
R     504.86 3410.89  66      .015                                   0.00  00.0   0
R     715.05 3411.98  66      .015                                   9.31  00.0   0
R     718.05 3411.98  66      .015                                   0.00  00.0   0
REM  ################################ SDMH #3
R     721.05 3411.98  66      .015                                    .000  00.0   1
R     821.27 3412.50  66      .015                                    .000  00.0   0
REM  ################################ JX DI#3 Direct Connection no ManHole
JX    822.27 3412.50  66 24   .015     02.0          3412.70          81.0
R     823.27 3412.50  66      .015                                    .000  00.0   0
R     892.78 3412.85  66      .015                                    .000  00.0   0
REM  ################################ JX DI#4&5 Direct Connection no ManHole
JX    893.27 3412.85  66 36   .015     15.0          3413.05          90.0
R     894.78 3412.85  66      .015                                    .000  00.0   0
R     916.09 3412.98  66      .015                                    .000  00.0   0
REM  ################################ SDMH#4
REM  ################################ 922.09 through 1345.81 18.5 degree Angle of Curve
TS    922.09 3413.98  60      .013                                    .000  00.0   1
R    1133.22 3415.07  60      .013                                   9.25  00.0   0
REM  ################################ SDMH#5
R    1139.22 3415.27  60      .013                                    .000  00.0   1
R    1345.81 3416.41  60      .013                                   9.25  00.0   0
REM  ################################ JX DI#6&7 SDMH#6
JX   1348.81 3416.51  54 30 24.013    52.0       3.0  3416.67 3416.67  89.0-85.0     .000
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TS   1351.81 3416.61  54      .013                                        .000  00.0   1
R    1415.09 3420.64  54      .013                                        .000  00.0   0
REM  ############################## JX DI#8 SDMH #7
JX   1418.09 3420.73  54 24   .013     03.0          3420.27          90.0
R    1421.09 3420.81  54      .013                                        .000  00.0   1
R    1574.08 3430.07  54      .013                                        .000  00.0   0
REM  ############################## SDMH#8
R    1580.08 3430.25  54      .013                                        .000  00.0   1
R    1870.78 3447.34  54      .013                                       34.7   00.0   0
SH   1873.78 3447.34  54
CD  24  4   0     .000    2.000      .000  .000  .000    .00
CD  30  4   0     .000    2.500      .000  .000  .000    .00
CD  36  4   0     .000    3.000      .000  .000  .000    .00
CD  48  4   0     .000    4.000      .000  .000  .000    .00
CD  54  4   0     .000    4.500      .000  .000  .000    .00
CD  60  4   0     .000    5.000      .000  .000  .000    .00
CD  66  3   0    0.000    6.000     6.000
CD 106  3   0    0.000    10.00     6.000
Q            242.00     .0
```

FILE: SJ_Lateral-CAP1_ult.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9-10-2019 Time: 3: 7:42

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL ULTIMATE CAP 1
ATKINS / ULTIMATE 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	
249.120	3409.600	6.000	3415.600	7.00	.19	.00	3415.60	.00	.35	6.00	6.000	6.000	.00	0 .0
TRANS STR	3.6985				.0000	.00	6.00	.01		.013	.00	.00	BOX	
249.220	3409.970	5.630	3415.600	7.00	2.23	.08	3415.68	.00	.94	.00	2.000	.000	.00	0 .0
29.940	.0501				.0010	.03	5.63	.00	.50	.013	.00	.00	PIPE	
279.160	3411.470	4.159	3415.629	7.00	2.23	.08	3415.71	.00	.94	.00	2.000	.000	.00	0 .0
279.160	3411.470	4.159	3415.629	7.00	2.23	.08	3415.71	.00	.94	.00	2.000	.000	.00	0 .0
.100	.0000				.0370	.00	4.16	.00	.00	.013	.00	.00	PIPE	
279.260	3411.470	4.159	3415.629	7.00	.42	.00	3415.63	.00	.46	4.00	9.000	4.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL ULTIMATE CAP 1
T3 ATKINS / ULTIMATE CONDITIONS
SO    249.12 3409.60  66                          3415.60
TS    249.22 3409.97  66      .013
R     279.16 3411.47  24      .013
R     279.16 3411.47  24      .013
SH    279.26 3411.47  94
CD  24  4   0     .000    2.000     .000  .000  .000   .00
CD  66  3   0    0.000    6.000    6.000
CD  94  3   0    0.000    9.000    4.000
Q           07.000   .0
```

FILE: SJ_Lateral-CAP2_ult.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 2:40:42

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / ULTIMATE CAP #2
ATKINS / ULTIMATE 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	
222.860	3405.510	10.000	3415.510	260.00	4.33	.29	3415.80	.00	3.88	6.00	10.000	6.000	.00	0 .0
TRANS STR	2.0995							10.00	.24		.013	.00	.00	BOX
222.960	3405.720	2.827	3408.547	260.00	27.38	11.64	3420.19	.00	3.94	3.64	4.000	.000	.00	0 .0
6.244	.1667					.0436	.27	2.83	2.99	1.86	.013	.00	.00	PIPE
229.204	3406.761	2.933	3409.694	260.00	26.33	10.77	3420.46	.00	3.94	3.54	4.000	.000	.00	0 .0
6.597	.1667					.0395	.26	2.93	2.78	1.86	.013	.00	.00	PIPE
235.801	3407.861	3.072	3410.933	260.00	25.11	9.79	3420.72	.00	3.94	3.38	4.000	.000	.00	0 .0
5.607	.1667					.0355	.20	3.07	2.53	1.86	.013	.00	.00	PIPE
241.408	3408.796	3.226	3412.022	260.00	23.94	8.90	3420.92	.00	3.94	3.16	4.000	.000	.00	0 .0
4.708	.1667					.0323	.15	3.23	2.28	1.86	.013	.00	.00	PIPE
246.116	3409.581	3.402	3412.983	260.00	22.82	8.09	3421.07	.00	3.94	2.85	4.000	.000	.00	0 .0
3.820	.1667					.0298	.11	3.40	2.01	1.86	.013	.00	.00	PIPE
249.936	3410.218	3.615	3413.832	260.00	21.76	7.35	3421.19	.00	3.94	2.36	4.000	.000	.00	0 .0
2.474	.1667													

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / ULTIMATE CAP #2
T3 ATKINS / ULTIMATE CONDITIONS
SO    222.86 3405.51 106                        3415.51
TS    222.96 3405.72  48      .013
R     252.41 3410.63  48      .013
SH    252.41 3410.63  48
CD 106  3   0   0.000   10.00    6.000
CD  48  4   0    .000    4.000    .000  .000  .000   .00
Q           260.00   .0
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Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9-10-2019 Time: 3: 8: 3

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / ULTIMATE CAP #3
ATKINS / ULTIMATE 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	
191.770	3405.330	.051	3405.381	7.00	22.95	8.18	3413.56	.00	.35	6.00	10.000	6.000	.00	0 .0
TRANS STR 74.5063						1.1205	.11	.05	17.94		.013	.00	.00	BOX
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 1.12049														
191.870	3412.780	.498	3413.279	7.00	11.45	2.03	3415.31	.00	.94	1.73	2.000	.000	.00	0 .0
.059	.2350					.0514	.00	.50	3.39	.34	.013	.00	.00	PIPE
191.929	3412.794	.499	3413.293	7.00	11.41	2.02	3415.32	.00	.94	1.73	2.000	.000	.00	0 .0
.892	.2350					.0480	.04	.50	3.38	.34	.013	.00	.00	PIPE
192.820	3413.003	.517	3413.520	7.00	10.88	1.84	3415.36	.00	.94	1.75	2.000	.000	.00	0 .0
.774	.2350					.0420	.03	.52	3.16	.34	.013	.00	.00	PIPE
193.594	3413.185	.535	3413.719	7.00	10.38	1.67	3415.39	.00	.94	1.77	2.000	.000	.00	0 .0
.673	.2350					.0368	.02	.53	2.96	.34	.013	.00	.00	PIPE
194.267	3413.343	.553	3413.896	7.00	9.89	1.52	3415.42	.00	.94	1.79	2.000	.000	.00	0 .0
.587	.2350					.0322	.02	.55	2.77	.34	.013	.00	.00	PIPE
194.854	3413.481	.572	3414.053	7.00	9.43	1.38	3415.44	.00	.94	1.81	2.000	.000	.00	0 .0
.511	.2350					.0281	.01	.57	2.59	.34	.013	.00	.00	PIPE
195.365	3413.601	.592	3414.193	7.00	8.99	1.26	3415.45	.00	.94	1.83	2.000	.000	.00	0 .0
.444	.2350					.0246	.01	.59	2.43	.34	.013	.00	.00	PIPE
195.809	3413.706	.613	3414.319	7.00	8.58	1.14	3415.46	.00	.94	1.84	2.000	.000	.00	0 .0
.386	.2350					.0216	.01	.61	2.27	.34	.013	.00	.00	PIPE

FILE: SJ_Lateral-CAP3_ult.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 2

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9-10-2019 Time: 3: 8: 3

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / ULTIMATE CAP #3
ATKINS / ULTIMATE 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	
196.195	3413.796	.634	3414.431	7.00	8.18	1.04	3415.47	.00	.94	1.86	2.000	.000	.00	0 .0
.334	.2350					.0189	.01	.63	2.12	.34	.013	.00	.00	PIPE
196.528	3413.875	.657	3414.531	7.00	7.80	.94	3415.48	.00	.94	1.88	2.000	.000	.00	0 .0
.286	.2350					.0166	.00	.66	1.99	.34	.013	.00	.00	PIPE
196.815	3413.942	.680	3414.622	7.00	7.43	.86	3415.48	.00	.94	1.89	2.000	.000	.00	0 .0
.244	.2350					.0145	.00	.68	1.86	.34	.013	.00	.00	PIPE
197.059	3413.999	.704	3414.703	7.00	7.09	.78	3415.48	.00	.94	1.91	2.000	.000	.00	0 .0
.206	.2350					.0127	.00	.70	1.74	.34	.013	.00	.00	PIPE
197.265	3414.048	.729	3414.777	7.00	6.76	.71	3415.49	.00	.94	1.93	2.000	.000	.00	0 .0
.171	.2350					.0111	.00	.73	1.62	.34	.013	.00	.00	PIPE
197.436	3414.088	.755	3414.843	7.00	6.44	.64	3415.49	.00	.94	1.94	2.000	.000	.00	0 .0
.139	.2350					.0098	.00	.76	1.52	.34	.013	.00	.00	PIPE
197.575	3414.121	.783	3414.903	7.00	6.14	.59	3415.49	.00	.94	1.95	2.000	.000	.00	0 .0
.110	.2350					.0086	.00	.78	1.42	.34	.013	.00	.00	PIPE
197.685	3414.146	.811	3414.958	7.00	5.86	.53	3415.49	.00	.94	1.96	2.000	.000	.00	0 .0
.083	.2350					.0075	.00	.81	1.32	.34	.013	.00	.00	PIPE
197.768	3414.166	.841	3415.007	7.00	5.58	.48	3415.49	.00	.94	1.97	2.000	.000	.00	0 .0
.057	.2350					.0066	.00	.84	1.24	.34	.013	.00	.00	PIPE

FILE: SJ_Lateral-CAP3_ult.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 3

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9-10-2019 Time: 3: 8: 3

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / ULTIMATE CAP #3
ATKINS / ULTIMATE 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	
197.825	3414.179	.872	3415.051	7.00	5.32	.44	3415.49	.00	.94	1.98	2.000	.000	.00	0 .0
.034	.2350					.0058	.00	.87	1.15	.34	.013	.00	.00	PIPE
197.859	3414.187	.904	3415.091	7.00	5.08	.40	3415.49	.00	.94	1.99	2.000	.000	.00	0 .0
.011	.2350					.0051	.00	.90	1.08	.34	.013	.00	.00	PIPE
197.870	3414.190	.939	3415.129	7.00	4.83	.36	3415.49	.00	.94	2.00	2.000	.000	.00	0 .0
197.970	3414.190	.939	3415.129	7.00	4.83	.36	3415.49	.00	.94	2.00	2.000	.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / ULTIMATE CAP #3
T3 ATKINS / ULTIMATE CONDITIONS
SO    191.77 3405.33 106                        3415.33
TS    191.87 3412.78  24      .013
R     197.87 3414.19  24      .013
SH    197.97 3414.19  24
CD  24  4   0     .000    2.000     .000  .000  .000    .00
CD 106  3   0   0.000    10.00    6.000
Q            07.000    .0
```

FILE: SJ_Lateral-DI1_ult.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 2:10:58

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+76 , SDDI #1
ATKINS / ULTIMATE 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	ZR	No Wth Prs/Pip	Type Ch
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall					
412.840	3410.440	7.330	3417.770	6.00	.17	.00	3417.77	.00	.31	6.00	6.000	6.000	.00	0	.0	
TRANS STR 37.4977					.0000	.00	7.33	.01		.013	.00	.00				BOX
412.940	3414.190	3.580	3417.770	6.00	1.91	.06	3417.83	.00	.87	.00	2.000	.000	.00	0	.0	
5.510	.2269				.0007	.00	3.58	.00	.32	.013	.00	.00				PIPE
418.450	3415.440	2.334	3417.774	6.00	1.91	.06	3417.83	.00	.87	.00	2.000	.000	.00	0	.0	
.100	.0000				.0007	.00	2.33	.00	.00	.013	.00	.0				

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+76 , SDDI #1
T3 ATKINS / ULTIMATE CONDITIONS
SO    412.84 3410.44  66                          3417.77
TS    412.94 3414.19  66      .013
R     418.45 3415.44  24      .013
R     418.55 3415.44  24      .013
SH    422.45 3415.44  94
CD  24  4   0    .000   2.000     .000  .000  .000   .00
CD  66  3   0   0.000   6.000    6.000
CD  94  3   0   0.000   9.000    4.000
Q           6.000   .0
```

FILE: SJ_Lateral-DI2_ult.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 2:12:54

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #2
ATKINS / ULTIMATE CONDITIONS

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
L/Elem	Ch Slope													
503.860	3410.890	8.630	3419.520	60.00	1.67	.04	3419.56	.00	1.46	6.00	6.000	6.000	.00	0 .0
TRANS STR	2.0018					.0001	.00	8.63	.12		.013	.00	.00	BOX
503.960	3411.090	8.430	3419.520	60.00	8.49	1.12	3420.64	.00	2.50	.00	3.000	.000	.00	0 .0
51.910	.1069					.0081	.42	8.43	.00	1.08	.013	.00	.00	PIPE
555.870	3416.640	3.300	3419.940	60.00	8.49	1.12	3421.06	.00	2.50	.00	3.000	.000	.00	0 .0
2.000	.1069					.0305	1.58	3.30	.00	1.08	.013	.00	.0	

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #2
T3 ATKINS / ULTIMATE CONDITIONS
SO    503.86 3410.89  66                          3419.52
TS    503.96 3411.09  66      .013
R     555.87 3416.64  36      .013
SH    557.87 3416.64  36
CD  66  3   0   0.000   6.000   6.000
CD  36  4   0    .000   3.000    .000  .000  .000   .00
Q           60.000   .0
```

FILE: SJ_Lateral-DI3_ult.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 2:14:27

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #3
ATKINS / ULTIMATE 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	ZR	No Wth Prs/Pip	Type Ch
L/Elem	Ch Slope				SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall					
822.270	3412.500	8.650	3421.150	2.00	.06	.00	3421.15	.00	.15	6.00	6.000	6.000	.00	0	.0	
TRANS STR	2.0000					.0000	.00	8.65	.00		.013	.00	.00	BOX		
822.370	3412.700	8.450	3421.150	2.00	.64	.01	3421.16	.00	.49	.00	2.000	.000	.00	0	.0	
69.320	.0411					.0001	.01	8.45	.00	.28	.013	.00	.00	PIPE		
891.690	3415.550	5.605	3421.155	2.00	.64	.01	3421.16	.00	.49	.00	2.000	.000	.00	0	.0	
.100	.0000					.0001	.00	5.61	.00	.00	.013	.00	.0			

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #3
T3 ATKINS / ULTIMATE CONDITIONS
SO    822.27 3412.50  66                          3421.15
TS    822.37 3412.70  66      .013
R     891.69 3415.55  24      .013
R     891.79 3415.55  24      .013
SH    895.89 3415.55  94
CD  66  3   0   0.000   6.000   6.000
CD  24  4   0    .000   2.000    .000  .000  .000   .00
CD  94  3   0   0.000   9.000   4.000
Q           02.000   .0
```

FILE: SJ_Lateral-DI4_5_ult.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 2:15:55

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #4 & #5
ATKINS / ULTIMATE CONDITIONS

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
893.270	3412.850	8.850	3421.700	15.00	.42	.00	3421.70	.00	.58	6.00	6.000	6.000	.00	0 .0
TRANS STR	2.0000					.0000	.00	8.85	.03		.013	.00	.00	BOX
893.370	3413.050	8.650	3421.700	15.00	2.12	.07	3421.77	.00	1.23	.00	3.000	.000	.00	0 .0
6.000	.0933					.0005	.00	8.65	.00	.55	.013	.00	.00	PIPE
899.370	3413.610	8.093	3421.703	15.00	2.12	.07	3421.77	.00	1.23	.00	3.000	.000	.00	0 .0
JUNCT STR	.0000					.0004	.00	8.09	.00		.013	.00	.0	

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #4 & #5
T3 ATKINS / ULTIMATE CONDITIONS
SO    893.27 3412.85  66                          3421.70
TS    893.37 3413.05  66      .013
R     899.37 3413.61  36      .013
JX    899.37 3413.81  36      .013     03.0          3413.81
R     945.37 3418.75  36      .013
SH    945.37 3418.75  36
CD  36  4   0     .000    3.000      .000  .000  .000    .00
CD  66  3   0    0.000    6.000     6.000
Q             12.000    .0
```

FILE: SJ_Lateral-DI6_ult.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 2:17:40

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #6
ATKINS / ULTIMATE 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	
1348.810	3416.510	10.990	3427.500	52.00	3.27	.17	3427.67	.00	2.09	.00	4.500	.000	.00	0 .0
TRANS STR	1.5995					.0007	.00	10.99	.00		.013	.00	.00	PIPE
1348.910	3416.670	10.830	3427.500	52.00	10.59	1.74	3429.24	.00	2.32	.00	2.500	.000	.00	0 .0
55.000	.1131					.0161	.88	10.83	.00	1.06	.013	.00	.00	PIPE
1403.910	3422.890	5.494	3428.384	52.00	10.59	1.74	3430.13	.00	2.32	.00	2.500	.000	.00	0 .0
.100	.0000					.0161	.00	5.49	.00	.00	.013	.00	.0	

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #6
T3 ATKINS / ULTIMATE CONDITIONS
SO   1348.81 3416.51  54                          3427.50
TS   1348.91 3416.67  54      .013
R    1403.91 3422.89  30      .013
R    1404.01 3422.89  30      .013
SH   1407.91 3422.89  94
CD  30  4   0    .000   2.500     .000  .000  .000   .00
CD  54  4   0    .000   4.500     .000  .000  .000   .00
CD  94  3   0   0.000   9.000    4.000
Q           52.000   .0
```

FILE: SJ_Lateral-DI7_ult.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 2:20:19

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #7
ATKINS / ULTIMATE 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	
1348.810	3416.510	10.990	3427.500	3.00	.19	.00	3427.50	.00	.48	.00	4.500	.000	.00	0 .0
TRANS STR	1.5995					.0000	.00	10.99	.00		.013	.00	.00	PIPE
1348.910	3416.670	10.830	3427.500	3.00	.95	.01	3427.51	.00	.60	.00	2.000	.000	.00	0 .0
71.690	.0502					.0002	.01	10.83	.00	.33	.013	.00	.00	PIPE
1420.600	3420.270	7.243	3427.513	3.00	.95	.01	3427.53	.00	.60	.00	2.000	.000	.00	0 .0
.100	.0000					.0002	.00	7.24	.00	.00	.013	.00	.0	

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #7
T3 ATKINS / ULTIMATE CONDITIONS
SO   1348.81 3416.51  54                          3427.50
TS   1348.91 3416.67  54      .013
R    1420.60 3420.27  24      .013
R    1420.70 3420.27  24      .013
SH   1424.60 3420.27  94
CD  24  4   0    .000   2.000     .000  .000  .000   .00
CD  54  4   0    .000   4.500     .000  .000  .000   .00
CD  94  3   0   0.000   9.000    4.000
Q           03.000   .0
```

FILE: SJ_Lateral-DI8_ult.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 1

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 2:23:30

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #8
ATKINS / ULTIMATE 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	
1418.090	3420.810	2.230	3423.040	3.00	.38	.00	3423.04	.00	.48	4.50	4.500	.000	.00	0 .0
TRANS STR 21.9048								2.23	.05		.013	.00	.00	PIPE
1418.190	3423.000	.289	3423.289	3.00	10.74	1.79	3425.08	.00	.60	1.41	2.000	.000	.00	0 .0
.083	.1891					.0871	.01	.29	4.25	.24	.013	.00	.00	PIPE
1418.272	3423.016	.289	3423.305	3.00	10.72	1.78	3425.09	.00	.60	1.41	2.000	.000	.00	0 .0
1.415	.1891					.0813	.12	.29	4.23	.24	.013	.00	.00	PIPE
1419.687	3423.284	.299	3423.582	3.00	10.22	1.62	3425.20	.00	.60	1.43	2.000	.000	.00	0 .0
1.163	.1891					.0710	.08	.30	3.97	.24	.013	.00	.00	PIPE
1420.850	3423.504	.309	3423.812	3.00	9.74	1.47	3425.29	.00	.60	1.44	2.000	.000	.00	0 .0
.973	.1891					.0620	.06	.31	3.72	.24	.013	.00	.00	PIPE
1421.823	3423.688	.319	3424.006	3.00	9.29	1.34	3425.35	.00	.60	1.46	2.000	.000	.00	0 .0
.823	.1891					.0541	.04	.32	3.49	.24	.013	.00	.00	PIPE
1422.646	3423.843	.330	3424.173	3.00	8.86	1.22	3425.39	.00	.60	1.48	2.000	.000	.00	0 .0
.702	.1891					.0473	.03	.33	3.27	.24	.013	.00	.00	PIPE
1423.348	3423.976	.341	3424.317	3.00	8.44	1.11	3425.42	.00	.60	1.50	2.000	.000	.00	0 .0
.603	.1891					.0413	.02	.34	3.06	.24	.013	.00	.00	PIPE
1423.951	3424.090	.352	3424.442	3.00	8.05	1.01	3425.45	.00	.60	1.52	2.000	.000	.00	0 .0
.521	.1891					.0361	.02	.35	2.87	.24	.013	.00	.00	PIPE

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #8
ATKINS / ULTIMATE 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
1424.472	3424.188	.364	3424.552	3.00	7.68	.92	3425.47	.00	.60	1.54	2.000	.000	.00	0 .0
.450	.1891					.0315	.01	.36	2.69	.24	.013	.00	.00	PIPE
1424.922	3424.273	.376	3424.649	3.00	7.32	.83	3425.48	.00	.60	1.56	2.000	.000	.00	0 .0
.389	.1891					.0275	.01	.38	2.52	.24	.013	.00	.00	PIPE
1425.311	3424.347	.389	3424.736	3.00	6.98	.76	3425.49	.00	.60	1.58	2.000	.000	.00	0 .0
.337	.1891					.0240	.01	.39	2.36	.24	.013	.00	.00	PIPE
1425.648	3424.411	.402	3424.813	3.00	6.65	.69	3425.50	.00	.60	1.60	2.000	.000	.00	0 .0
.291	.1891					.0210	.01	.40	2.21	.24	.013	.00	.00	PIPE
1425.939	3424.466	.416	3424.881	3.00	6.34	.62	3425.51	.00	.60	1.62	2.000	.000	.00	0 .0
.250	.1891					.0184	.00	.42	2.07	.24	.013	.00	.00	PIPE
1426.188	3424.513	.430	3424.943	3.00	6.05	.57	3425.51	.00	.60	1.64	2.000	.000	.00	0 .0
.214	.1891					.0160	.00	.43	1.94	.24	.013	.00	.00	PIPE
1426.402	3424.553	.445	3424.998	3.00	5.77	.52	3425.51	.00	.60	1.66	2.000	.000	.00	0 .0
.181	.1891					.0140	.00	.44	1.82	.24	.013	.00	.00	PIPE
1426.584	3424.587	.460	3425.047	3.00	5.50	.47	3425.52	.00	.60	1.68	2.000	.000	.00	0 .0
.153	.1891					.0123	.00	.46	1.70	.24	.013	.00	.00	PIPE
1426.736	3424.616	.476	3425.092	3.00	5.24	.43	3425.52	.00	.60	1.70	2.000	.000	.00	0 .0
.126	.1891					.0107	.00	.48	1.59	.24	.013	.00	.00	PIPE

FILE: SJ_Lateral-DI8_ult.WSW W S P G W - CIVILDESIGN Version 14.08 PAGE 3

Program Package Serial Number: 7271

WATER SURFACE PROFILE LISTING Date: 9- 5-2019 Time: 2:23:30

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #8
ATKINS / ULTIMATE 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	
1426.863	3424.640	.492	3425.132	3.00	5.00	.39	3425.52	.00	.60	1.72	2.000	.000	.00	0 .0
.102	.1891					.0094	.00	.49	1.49	.24	.013	.00	.00	PIPE
1426.965	3424.659	.509	3425.168	3.00	4.77	.35	3425.52	.00	.60	1.74	2.000	.000	.00	0 .0
.081	.1891					.0082	.00	.51	1.40	.24	.013	.00	.00	PIPE
1427.046	3424.675	.526	3425.201	3.00	4.54	.32	3425.52	.00	.60	1.76	2.000	.000	.00	0 .0
.060	.1891					.0072	.00	.53	1.31	.24	.013	.00	.00	PIPE
1427.106	3424.686	.544	3425.230	3.00	4.33	.29	3425.52	.00	.60	1.78	2.000	.000	.00	0 .0
.042	.1891					.0063	.00	.54	1.22	.24	.013	.00	.00	PIPE
1427.147	3424.694	.563	3425.257	3.00	4.13	.27	3425.52	.00	.60	1.80	2.000	.000	.00	0 .0
.025	.1891					.0055	.00	.56	1.15	.24	.013	.00	.00	PIPE
1427.172	3424.698	.583	3425.281	3.00	3.94	.24	3425.52	.00	.60	1.82	2.000	.000	.00	0 .0
.008	.1891					.0048	.00	.58	1.07	.24	.013	.00	.00	PIPE

```
T1 SUMMERLIN WEST VILLAGE 22                                                  0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL SDDI #8
T3 ATKINS / ULTIMATE CONDITIONS
SO   1418.09 3420.81  54                        3423.04
TS   1418.19 3423.00  54      .013
R    1427.18 3424.70  24      .013
SH   1427.18 3424.70  24
CD  24  4   0    .000   2.000     .000  .000  .000   .00
CD  54  4   0    .000   4.500     .000  .000  .000   .00
Q           03.000   .0
```

Appendix D. CD-ROM

SUMMERLIN VILLAGE 22
IMPROVEMENT PLANS FOR:

KETTLE RIDGE DRIVE (STREET J)
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
FUTURE SID PROJECT

SCURRY BEND DRIVE (STREET N) ROUGH GRADE
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

SUMMERLIN®

SHEET INDEX

1	COVER SHEET	
2	LEGEND AND ABBREVIATIONS	
3	GENERAL NOTES	
4	MASTER GRADING PLAN	
5	~~HORIZONTAL CONTROL PLAN~~	
6	MASTER DRAINAGE PLAN	
7	~~MASTER WATER PLAN~~	
8	~~MASTER SEWER PLAN~~	
9	ROUGH GRADING PLAN AND PROFILE	SCURRY BEND DRIVE STA. 33+00 TO END
10	ROUGH GRADING PLAN AND PROFILE	SCURRY BEND DRIVE STA. 27+50 TO STA. 33+00
11	ROUGH GRADING PLAN AND PROFILE	SCURRY BEND DRIVE BEGIN TO STA. 27+50
12	ROADWAY GRADING PLAN	KETTLE RIDGE DRIVE STA. 72+00 TO END
13	ROADWAY PLAN AND PROFILE	KETTLE RIDGE DRIVE STA. 72+00 TO END
14	ROADWAY GRADING PLAN	KETTLE RIDGE DRIVE STA. 67+50 TO STA. 72+00
15	ROADWAY PLAN AND PROFILE	KETTLE RIDGE DRIVE STA. 67+50 TO STA. 72+00
16	ROADWAY GRADING PLAN	KETTLE RIDGE DRIVE STA. 64+50 TO STA. 67+50
17	ROADWAY PLAN AND PROFILE	KETTLE RIDGE DRIVE STA. 64+50 TO STA. 67+50
18	ROADWAY GRADING PLAN	KETTLE RIDGE DRIVE STA. 60+50 TO STA. 64+50
19	ROADWAY PLAN AND PROFILE	KETTLE RIDGE DRIVE STA. 60+50 TO STA. 64+50
20	ROADWAY GRADING PLAN	KETTLE RIDGE DRIVE STA. 56+50 TO STA. 60+50
21	ROADWAY PLAN AND PROFILE	KETTLE RIDGE DRIVE STA. 56+50 TO STA. 60+50
22	ROADWAY GRADING PLAN	KETTLE RIDGE DRIVE BEGIN TO STA. 56+50
23	ROADWAY PLAN AND PROFILE	KETTLE RIDGE DRIVE BEGIN TO STA. 56+50
24	STORM DRAIN LATERAL PROFILES	
25	STORM DRAIN LATERAL PROFILES	
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27	~~WATER LATERAL PROFILES~~	
28	~~STREETLIGHT PLAN~~	
28	~~SIGNAGE AND STRIPING PLAN~~	
29	TYPICAL SECTIONS	
30	TYPICAL SECTIONS	
31	STORM DRAIN DETAILS	
32	GRADING DETAILS – PARCELS E & F	
33	GRADING DETAILS – PARCELS E & F	
34	GRADING DETAILS BASIN	
35	GRADING DETAILS BASIN	
36	~~WATER DETAILS~~	
37	~~STREETLIGHT DETAILS~~	
38	~~INTERSECTION DETAILS AND CIVIL DETAILS~~	
39	~~INTERSECTION 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.

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
1.56 AC

PROPOSED DISTURBED AREA ACREAGE
34.13 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-18-176
DATED: DECEMBER 3, 2018

OWNER /DEVELOPER

OWNER

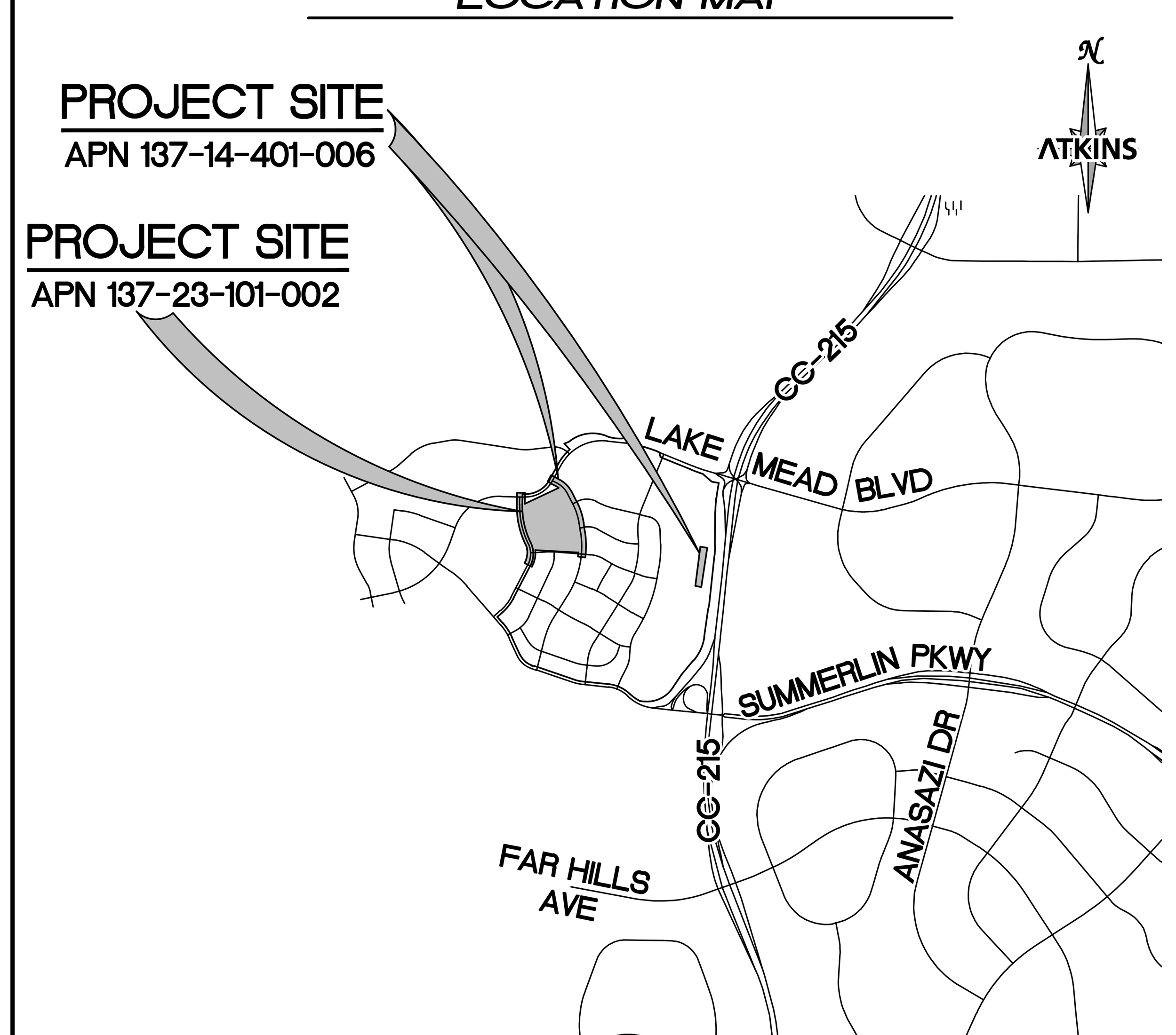
CONTACT: KEVIN ORROCK
HOWARD HUGHES COMPANY LLC, A DELAWARE LIMITED LIABILITY COMPANY
10845 GRIFFITH PEAK DRIVE, SUITE 160
LAS VEGAS, NV 89135

ENGINEER / CONSULTANT

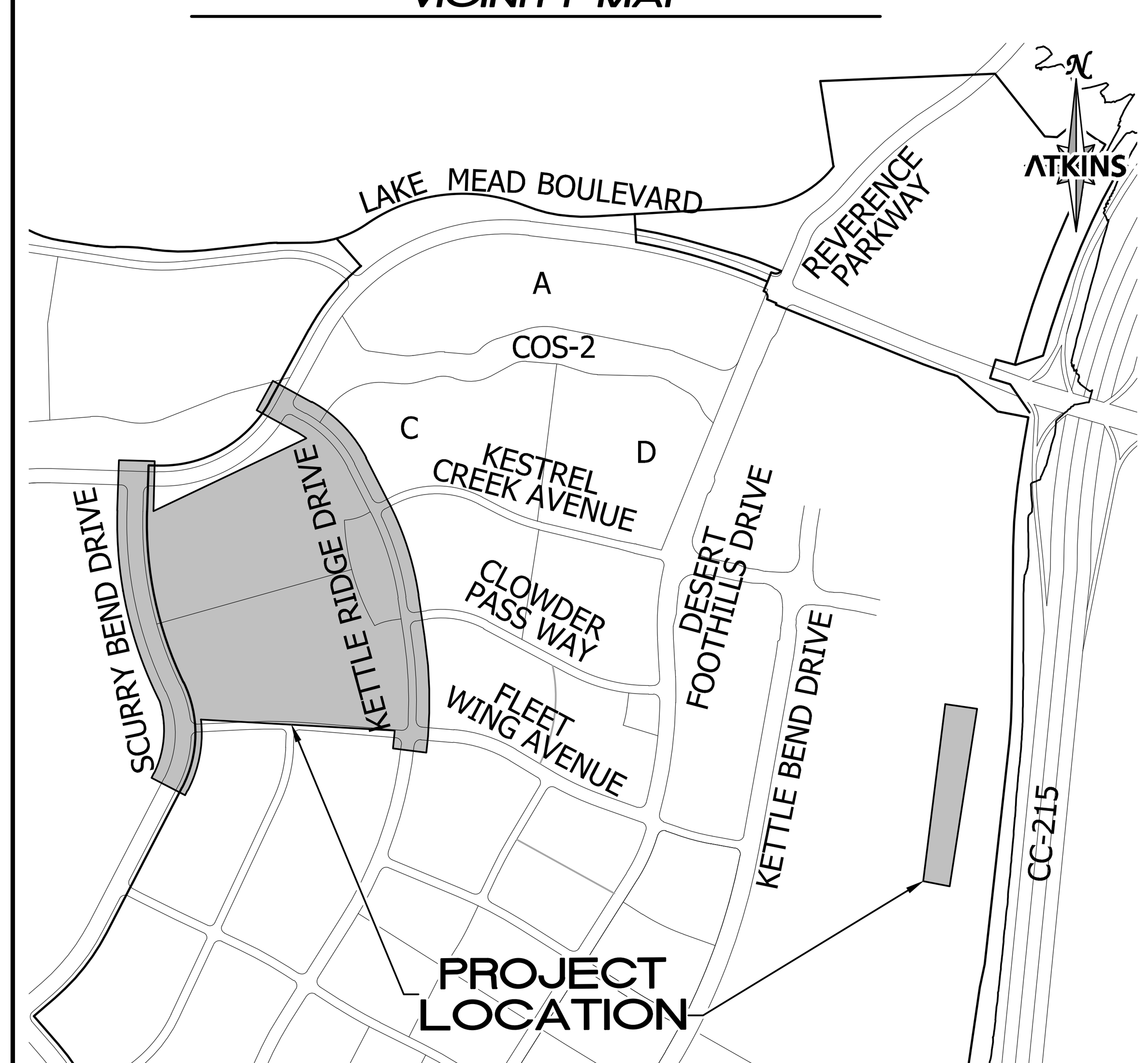
CIVIL

CONTACT: DAVID WILSON P.E.
ATKINS
2270 CORPORATE CIRCLE SUITE 200
HENDERSON, NEVADA 89074
(702) 263-7275

LOCATION MAP



VICINITY MAP



APPROVALS

HOWARD HUGHES COMPANY LLC, A DELAWARE LIMITED LIABILITY COMPANY

KEVIN T. ORROCK, VICE PRESIDENT DATE

ALLEN PAVELKA, P.E. #9029 DATE
CITY ENGINEER

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

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 ENGINEERING SERVICES

PROJECT NO. 136892 FIRST APPROVED DATE: ____________

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 THE 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 2 AS SHOWN ON THE MAP THEREOF IN BOOK 123 OF PLATS, PAGE 36, OFFICIAL RECORDS, CITY OF LAS VEGAS CLARK COUNTY, NEVADA.

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

PROFESSIONAL ENGINEER - STATE OF NEVADA
PAUL A. BATES
EXP. 12-31-20
CIVIL
No. 18723
9/11/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

COVER SHEET

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: NONE
VERT.: NONE

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 1/39

CLV 00-00000

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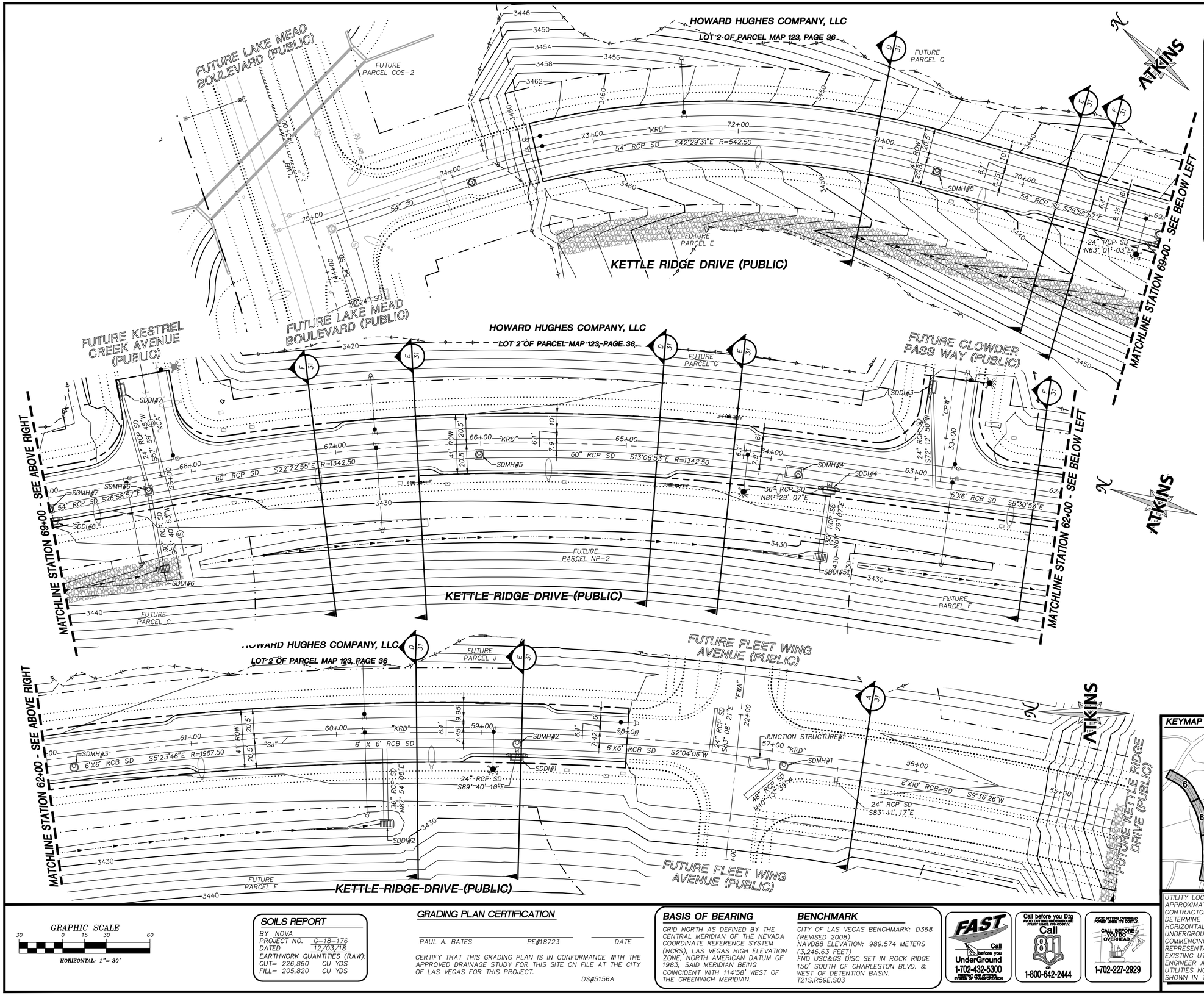


SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
DRAINAGE		
RIP-RAP (D50=8")	1890	CY
RIP-RAP (D50=24")	488	CY
7.5' TYPE "CM2" DROP INLET	3	EACH
7.5' TYPE "CM" DROP INLET	2	EACH
4' X 8' NDOT TYPE II DROP INLET	3	EACH
60" TYPE I RISER	3	EACH
30" TYPE II MANHOLE	1	EACH
60" TYPE III MANHOLE	4	EACH
24" CLASS III RCP SD	192	LF
30" CLASS III RCP SD	55	LF
36" CLASS III RCP SD	104	LF
48" CLASS III RCP SD	30	LF
54" CLASS IV RCP SD*	522	LF
60" CLASS IV RCP SD	446	LF
6' X 6' CONCRETE BOX CULVERT	860	LF
6' X 10' CONCRETE BOX CULVERT	243	LF

*WITH 1" SACRIFICIAL CONCRETE

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.

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. SEE SHEET 32 FOR REINFORCED CONCRETE BOX INFORMATION.
3. CONTRACTOR TO PROVIDE 6" MINIMUM OF CLEARANCE BETWEEN OUTSIDE OF PIPE TO INSIDE WALL OF STORM DRAIN STRUCTURES.
4. CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT FACILITY ID (APBE 0249)

GRAPHIC SCALE
30 0 15 30 60
HORIZONTAL: 1"= 30'

SOILS REPORT

BY NOVA
PROJECT NO. G-18-176
DATED 12/03/18
EARTHWORK QUANTITIES (RAW):
CUT= 226,860 CU YDS
FILL= 205,820 CU YDS

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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

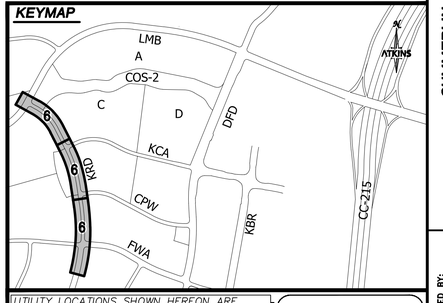
CITY OF LAS VEGAS BENCHMARK: D368 (REVISED 2008)
NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 REGIONAL AND ARTERIAL SYSTEMS OF TRANSPORTATION

Call before you Dig AVOID CUTTING INTO BURIED 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

KEYMAP



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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL BATES - No. 18723 - CIVIL - 9/11/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

MASTER DRAINAGE PLAN
KETTLE RIDGE DRIVE

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=30'
VERT.: NONE

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 6 /39
CLV 00-00000

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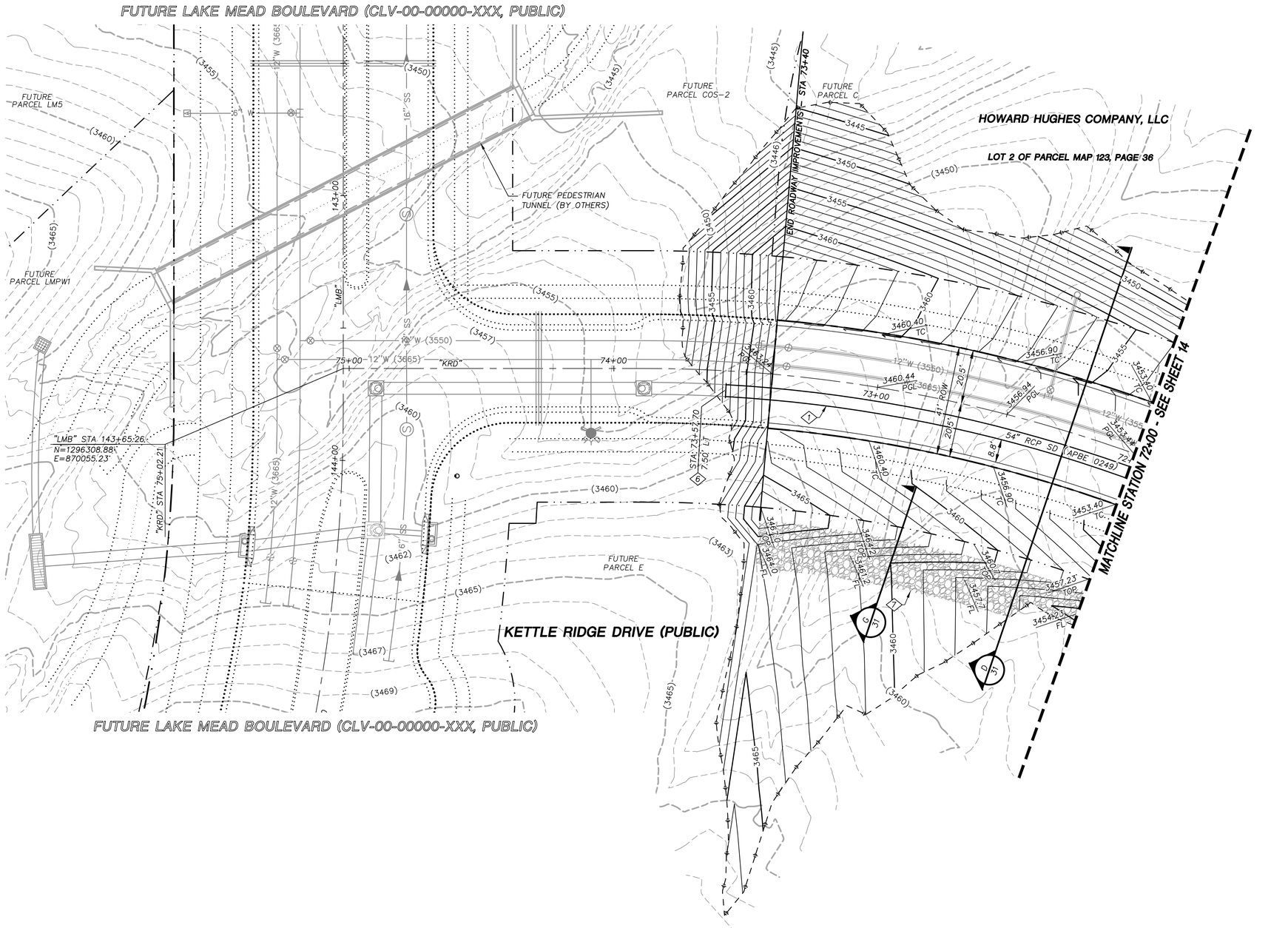
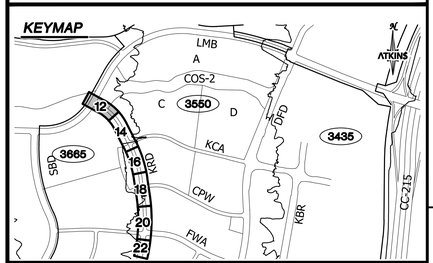


STORM DRAIN CONSTRUCTION NOTES

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 32)
7. INSTALL RIP-RAP (D50=8", THICKNESS=16") PER DETAIL B ON SHEET 30
8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 32 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 32 FOR RCB INFORMATION

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 OUTAGE INTERRUPTION OF UTILITY LINES. IT'S COSTLY. Call 811 OR 1-800-642-2444

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

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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL BATES - No. 18723 - CIVIL - 9/11/19

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

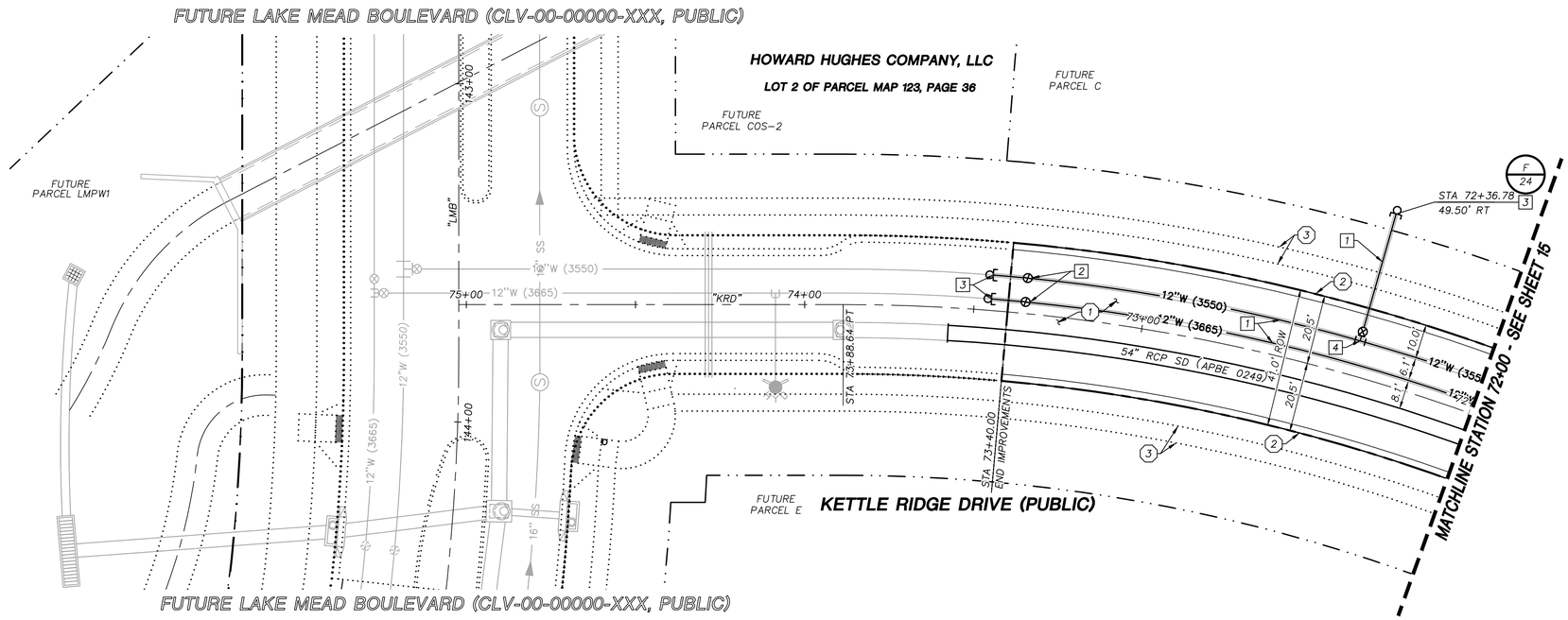
SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

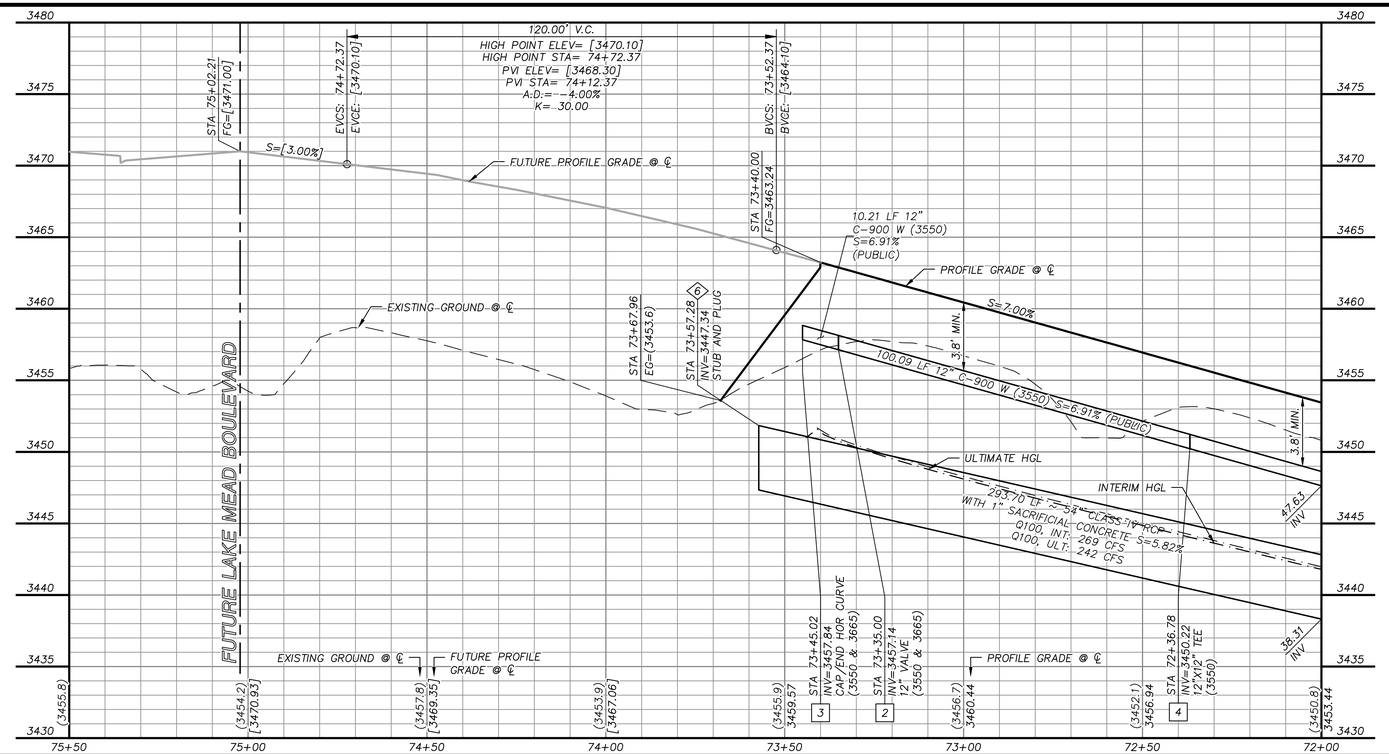
ROADWAY GRADING PLAN
KETTLE RIDGE DRIVE STA. 72+00 TO END

DESIGNED BY: N. BARCOS
DRAWN BY: O. OUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 12/39
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-09-GRAD-G1.dwg LAYOUT: 12 Sep 11, 2019 - 9:32AM





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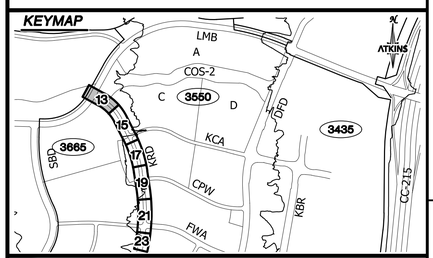
3. FUTURE SIDEWALK BY OTHERS
4. CONSTRUCT CURB RAMP, TYPE A, PER NDOT STANDARD PLAN R-5.2.1 (A=B=6.5').
5. CONSTRUCT 0" FLUSH CURB
6. TRANSITION CURB FROM FULL HEIGHT (6") TO FLUSH (0")
7. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4",1-6") PER DETAIL ON SHEET XX



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

PROJECT NO. 136892 FIRST APPROVED DATE: _____

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 INTELLIGENT AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING HYDROCARBON 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 - PAUL BATES - No. 18723 - CIVIL - 9/11/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET M) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE
KETTLE RIDGE DRIVE STA. 72+00 TO END

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 13/39
CLV 00-00000

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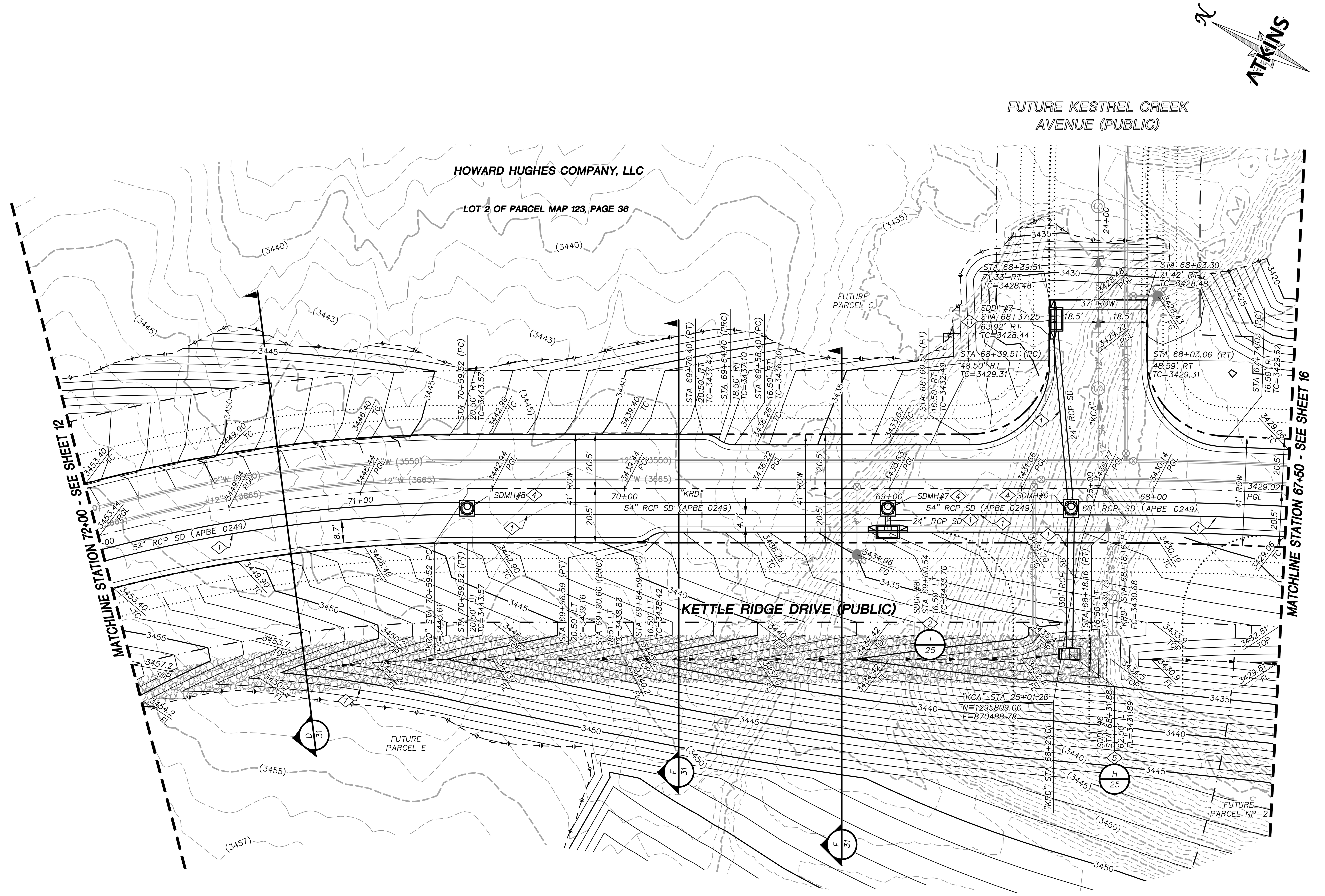

STORM DRAIN CONSTRUCTION NOTES

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
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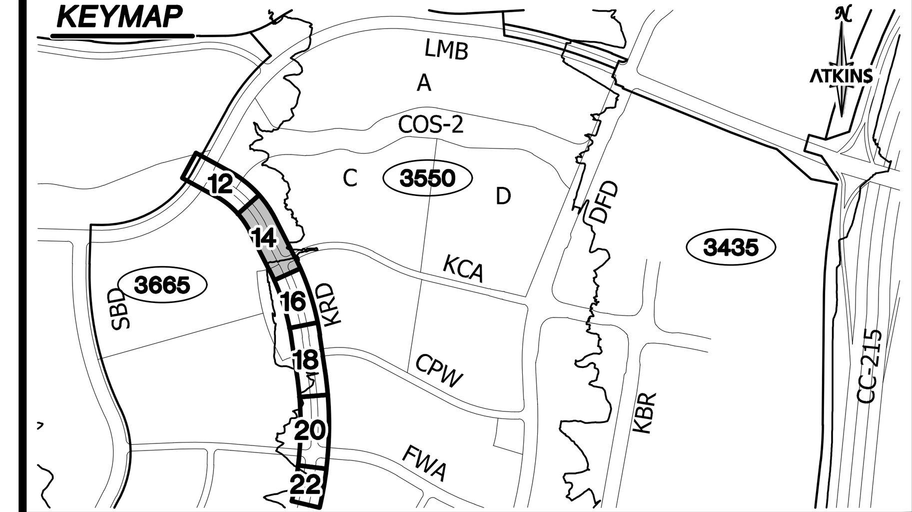
REVISIONS

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

KEYMAP



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PROFESSIONAL ENGINEER - STATE OF NEVADA
PAUL A. BATES
EXP. 12-31-20
CIVIL
No. 18723
9/11/19

SUMMERLIN VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN
KETTLE RIDGE DRIVE STA 67+50 TO STA 72+00

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 14/39
CLV 00-00000

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GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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T21S,R59E,S03

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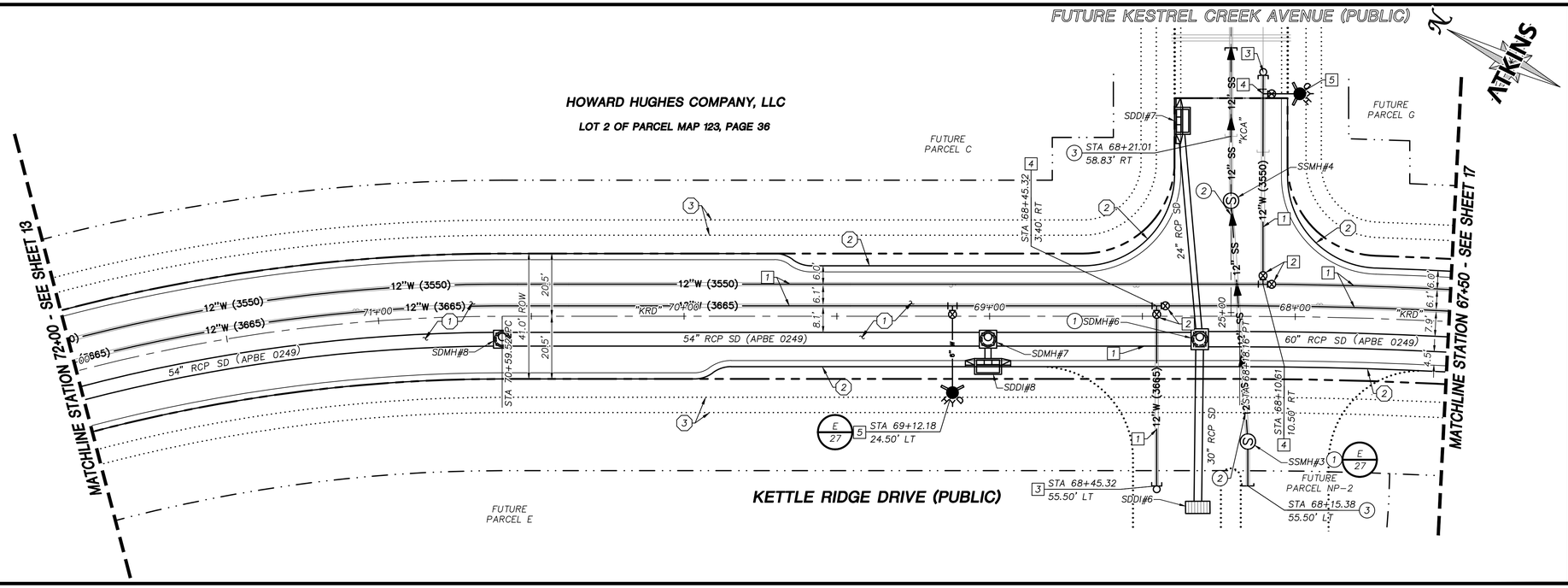

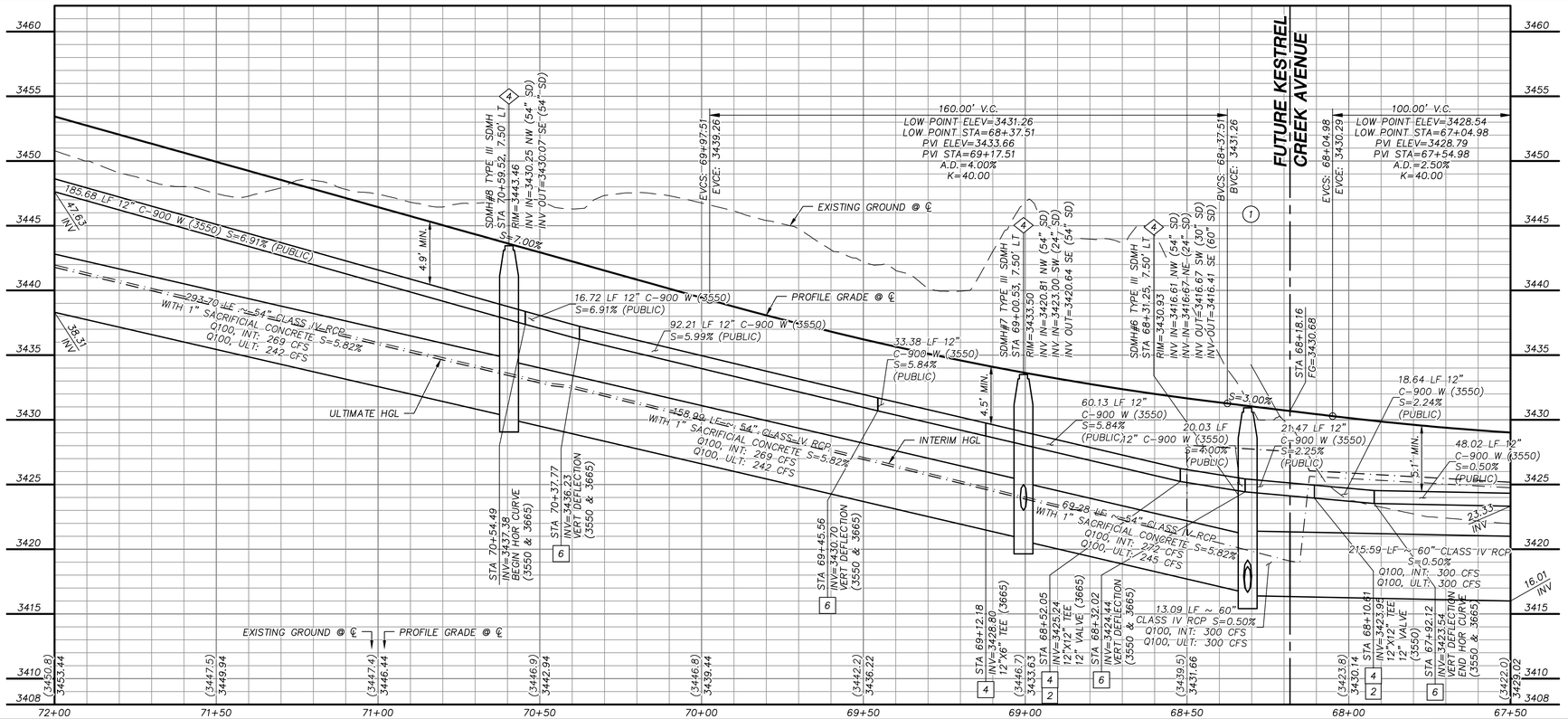

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

5 0 2.5 5 10

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APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 136892 FIRST APPROVED DATE: _____

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 DATE

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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

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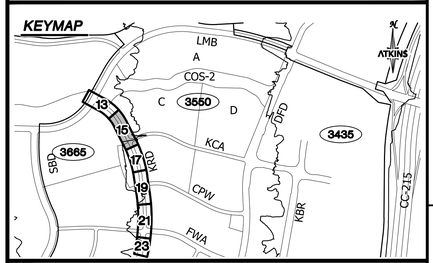
ROADWAY PLAN AND PROFILE
KETTLE RIDGE DRIVE STA. 67+50 TO STA. 72+00

KEYMAP



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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL BATES - No. 18723 - CIVIL - 9/11/19

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 15/39
CLV 00-00000

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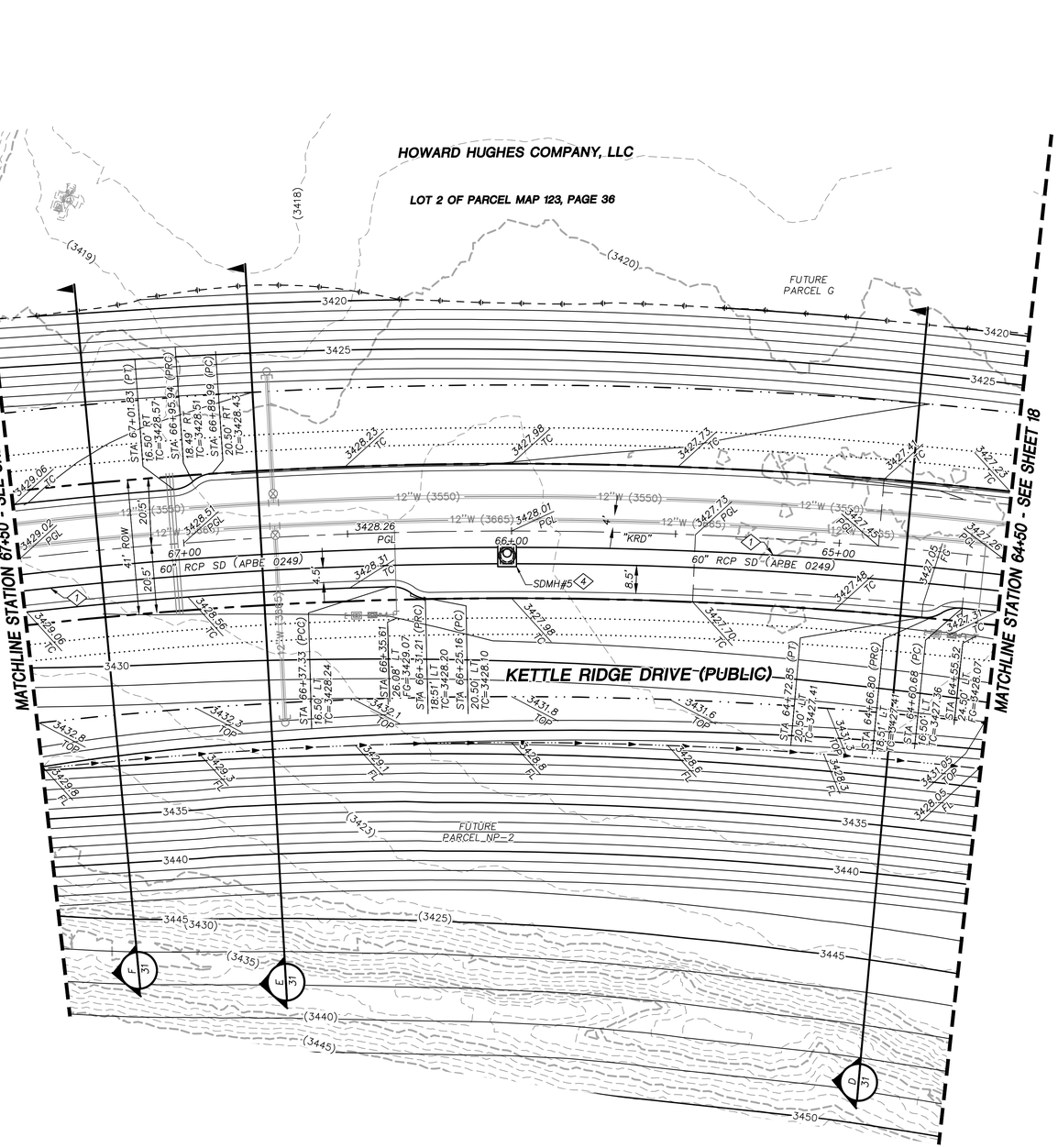

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REVISIONS

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Telephone: +1.702.263.7275
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SUMMERLIN

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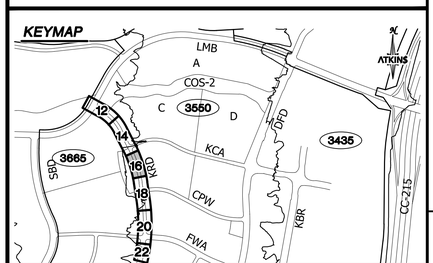
ROADWAY GRADING PLAN
KETTLE RIDGE DRIVE STA. 64+50 TO STA. 67+50

KEYMAP



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 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
PAUL BATES
No. 18723
CIVIL
9/11/19

JOB NO.	100060655
DATE	SEPTEMBER, 2019
DRAWING NO.	16/39
CLV	00-00000

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

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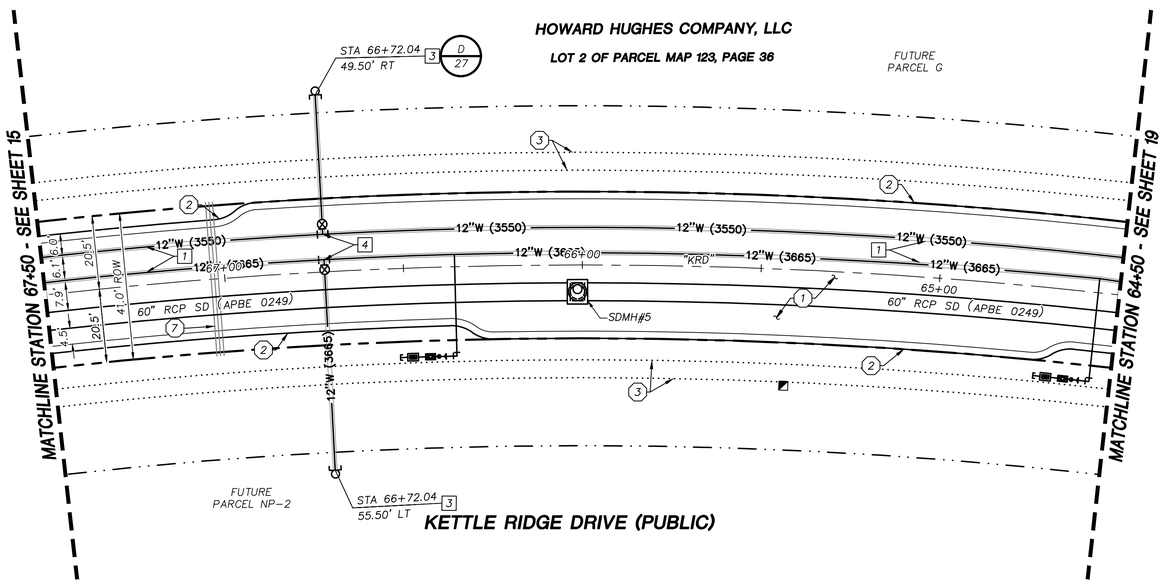

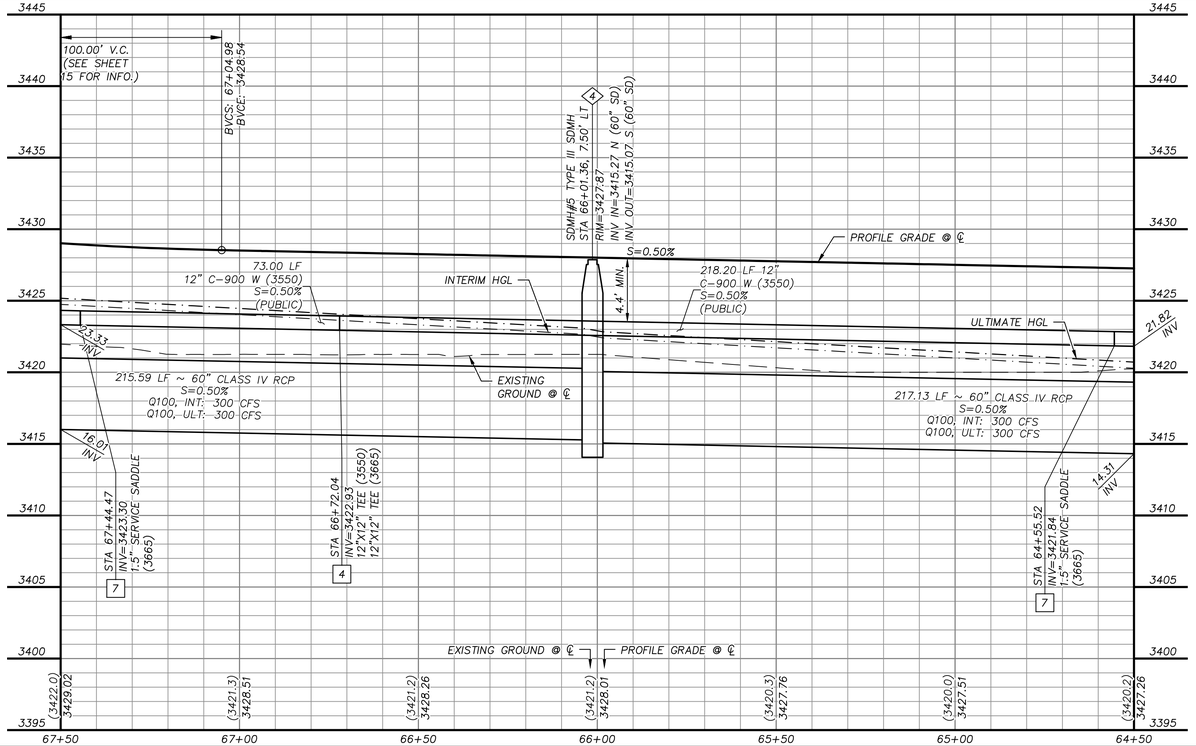

GRAPHIC SCALE

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

PROJECT NO. 136892 FIRST APPROVED DATE: _____

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 EMERGENCY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING HYDROCARBON 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 32)
7. INSTALL RIP-RAP (D50=8", THICKNESS=16") PER DETAIL B ON SHEET 30
8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 32 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 32 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).

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" SERVICE SADDLE PER UDACS PLATE #4

ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 31 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 (A=B=6.5').
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 ON SHEET XX

KEYMAP

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET H) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE
KETTLE RIDGE DRIVE STA. 64+50 TO STA. 67+50

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

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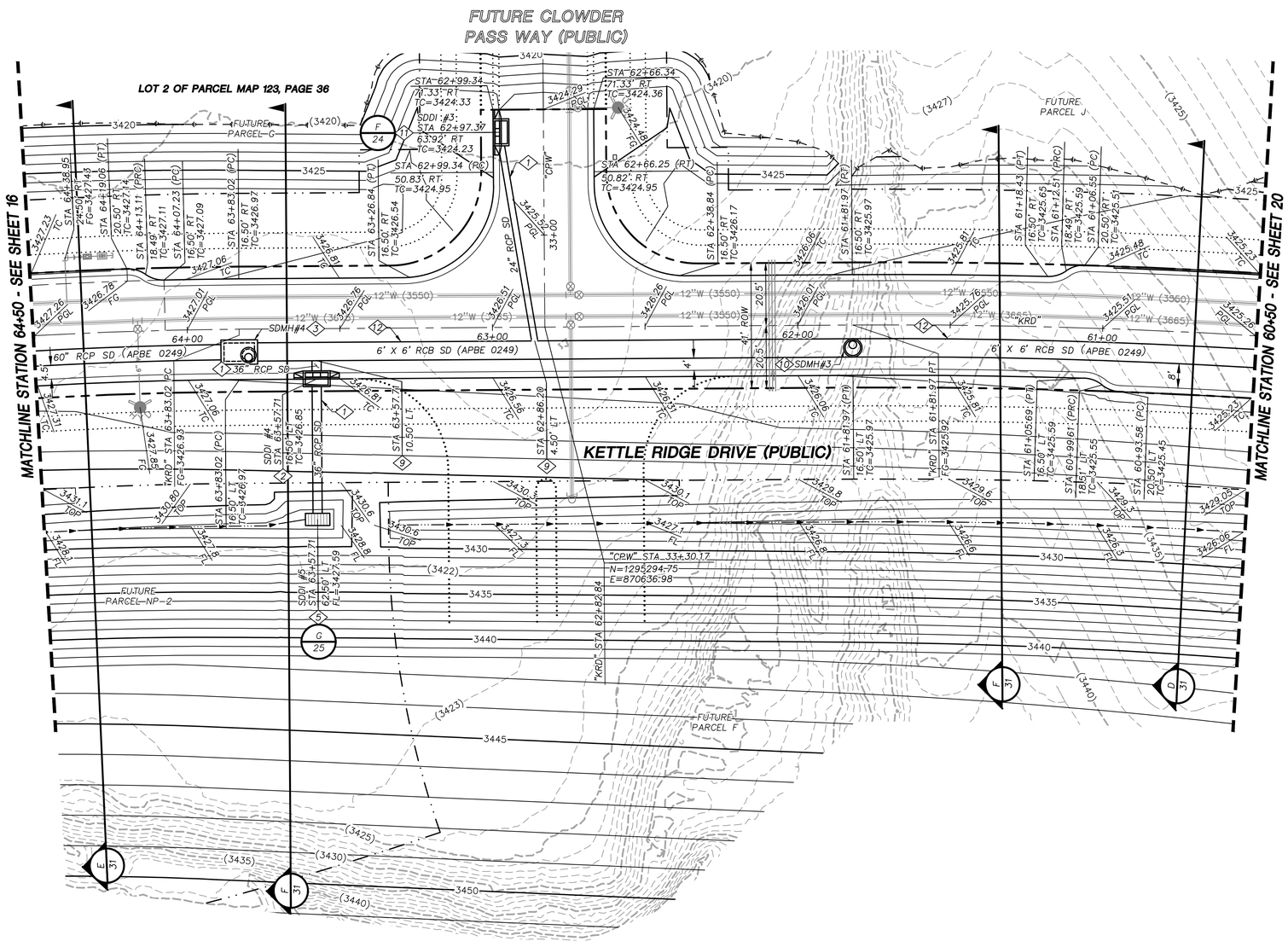
PROFESSIONAL ENGINEER - STATE OF NEVADA
PAUL A. BATES
No. 18723
CIVIL
9/11/19

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 17/39
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-11-PLAN-P1.dwg LAYOUT: 17 Sep 11, 2019 - 9:33AM



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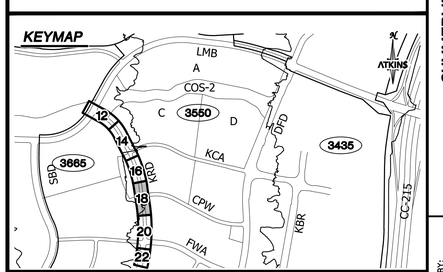
REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

BASIS OF BEARING

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PROFESSIONAL ENGINEER - STATE OF NEVADA
PAUL BATES
No. 18723
CIVIL
9/11/19

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN
KETTLE RIDGE DRIVE STA. 60+50 TO STA. 64+50

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE
JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 18/39
CLV 00-00000

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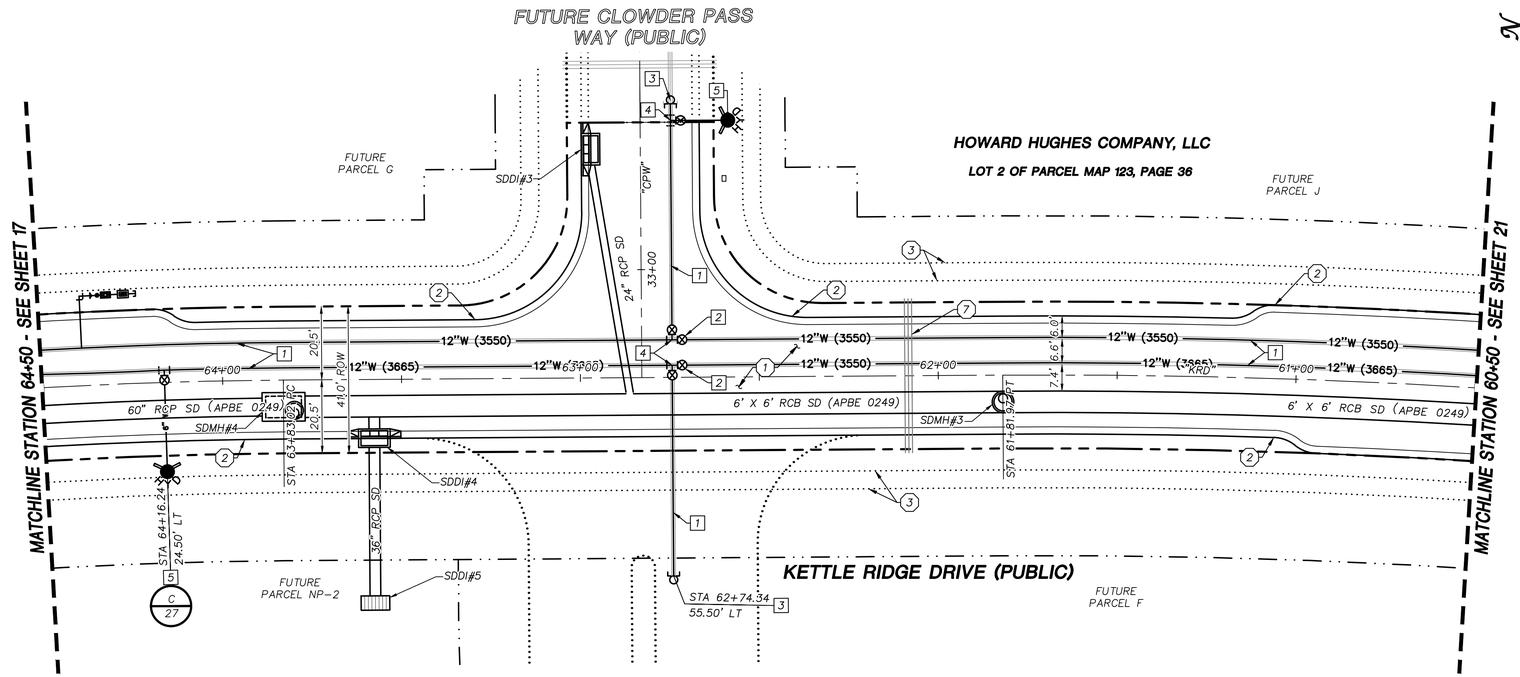

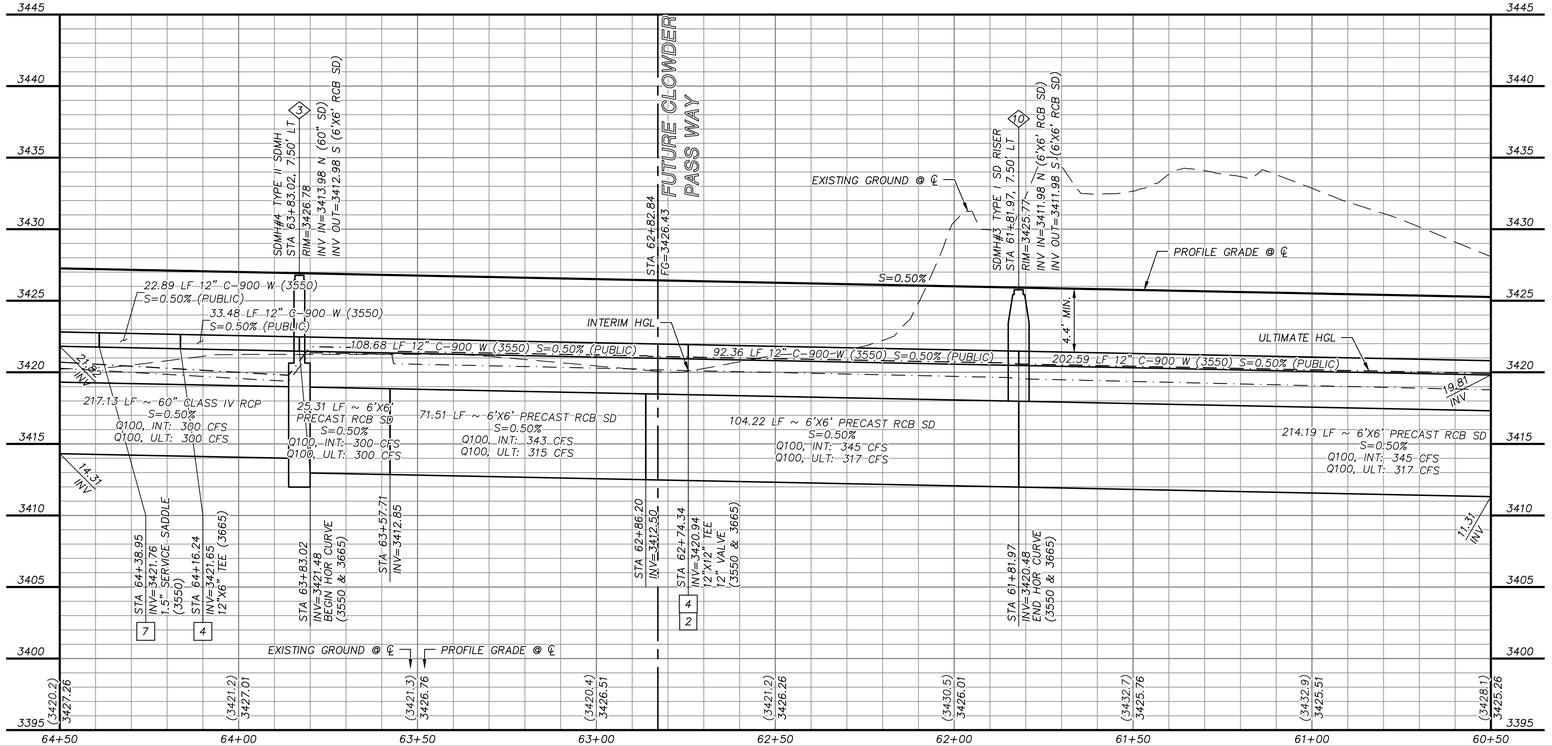

GRAPHIC SCALE

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

PROJECT NO. 136892 FIRST APPROVED DATE: _____

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 DATE

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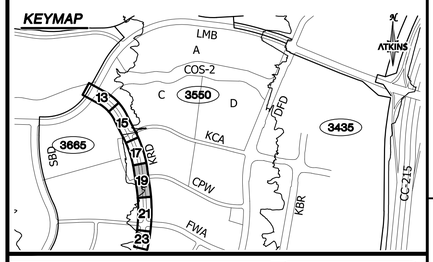
5. CONSTRUCT 0" FLUSH CURB
6. TRANSITION CURB FROM FULL HEIGHT (6") TO FLUSH (0")
7. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4",1-6") PER DETAIL ON SHEET XX

KEYMAP



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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL BATES - No. 18723 - CIVIL - 9/11/19

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

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ROADWAY PLAN AND PROFILE
KETTLE RIDGE DRIVE STA. 60+50 TO STA. 64+50

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 19/39
CLV 00-00000

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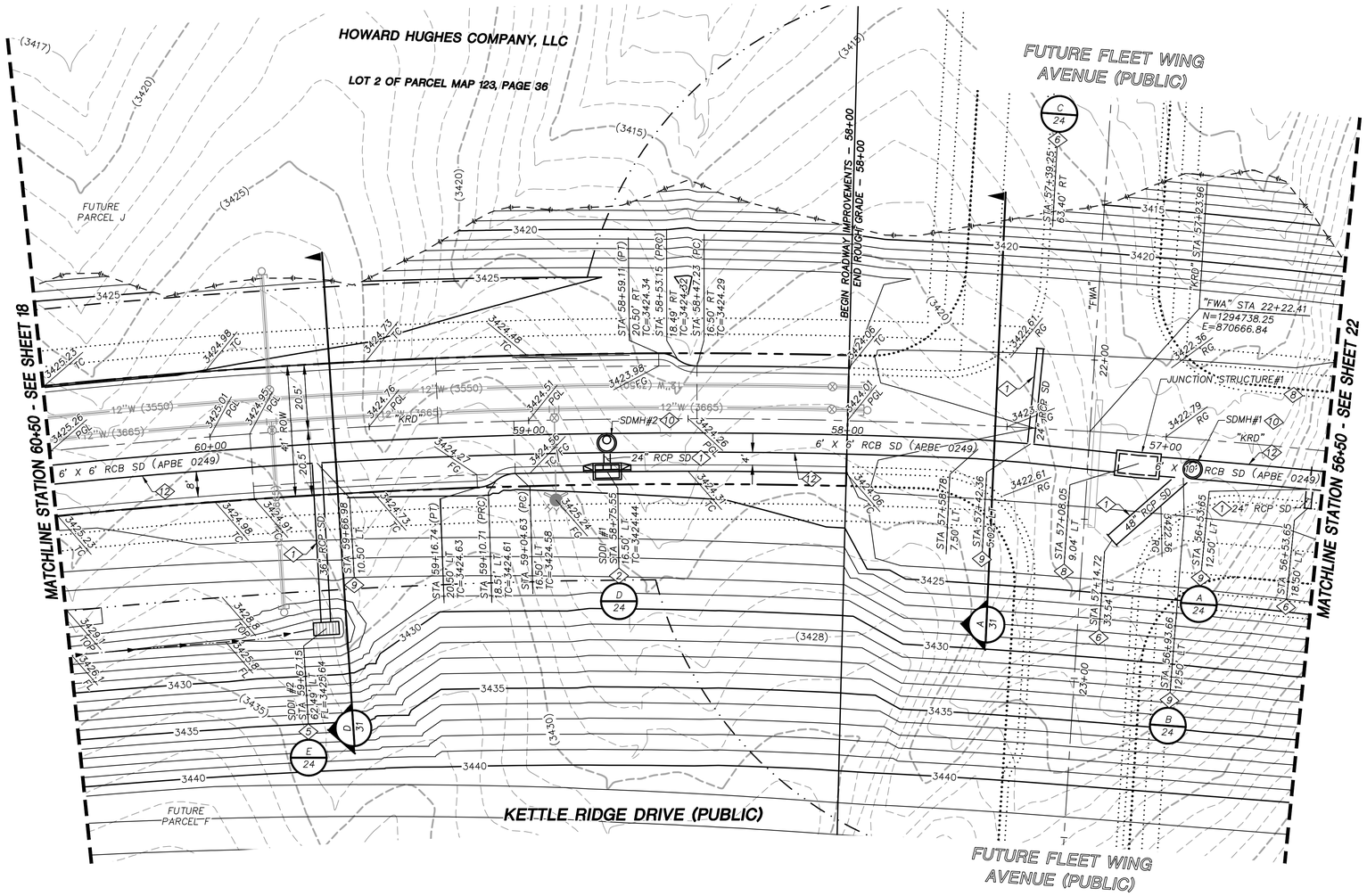

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REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7375
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
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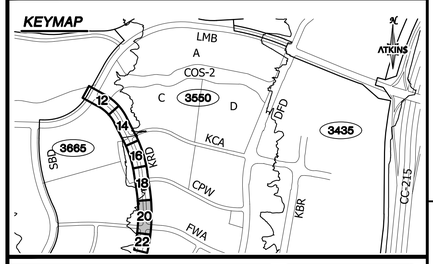
ROADWAY GRADING PLAN
KETTLE RIDGE DRIVE STA. 56+50 TO STA. 60+50

KEYMAP



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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PAUL BATES
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DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
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HORIZ.: 1"=20'
VERT.: NONE

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 20/39

CLV 00-00000

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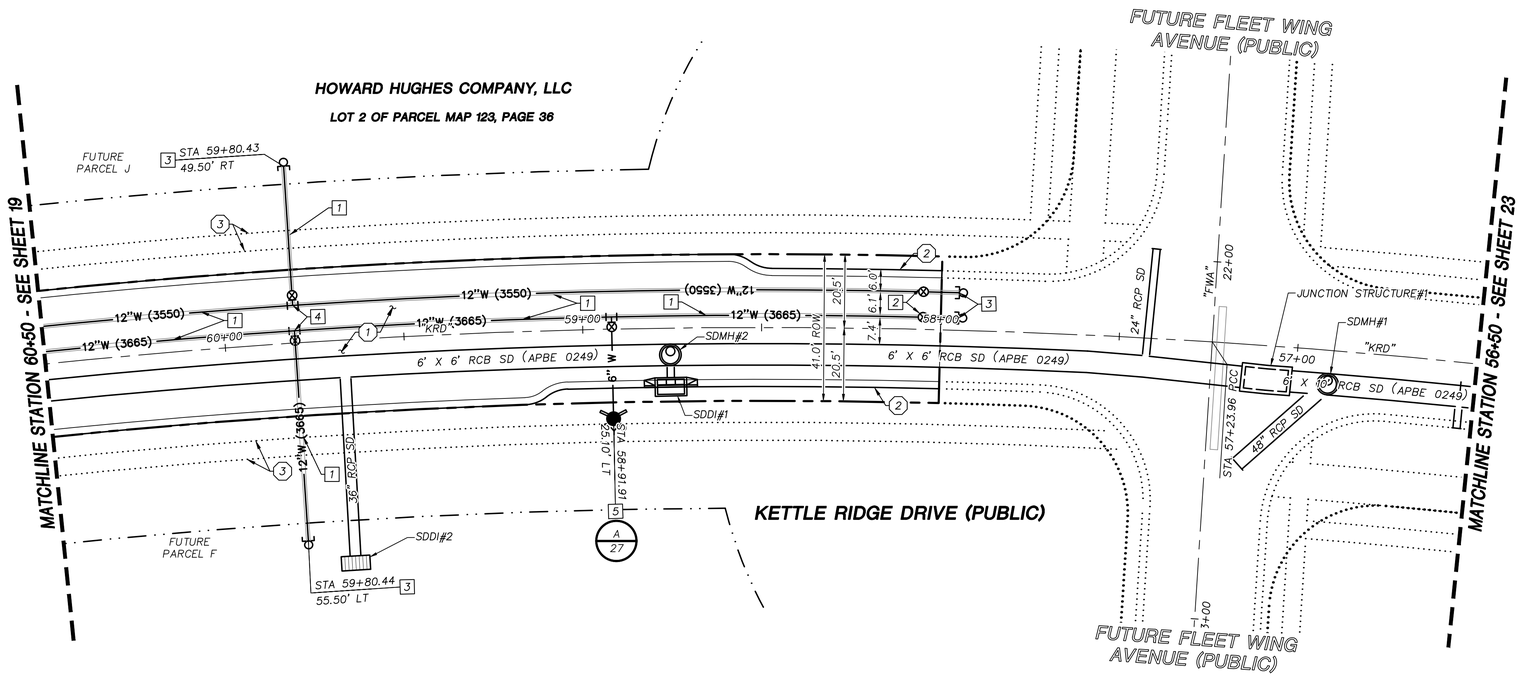


STORM DRAIN CONSTRUCTION NOTES

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 32)
7. INSTALL RIP-RAP (D50=8", THICKNESS=16") PER DETAIL B ON SHEET 30
8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 32 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 32 FOR RCB INFORMATION

SEWER CONSTRUCTION NOTES

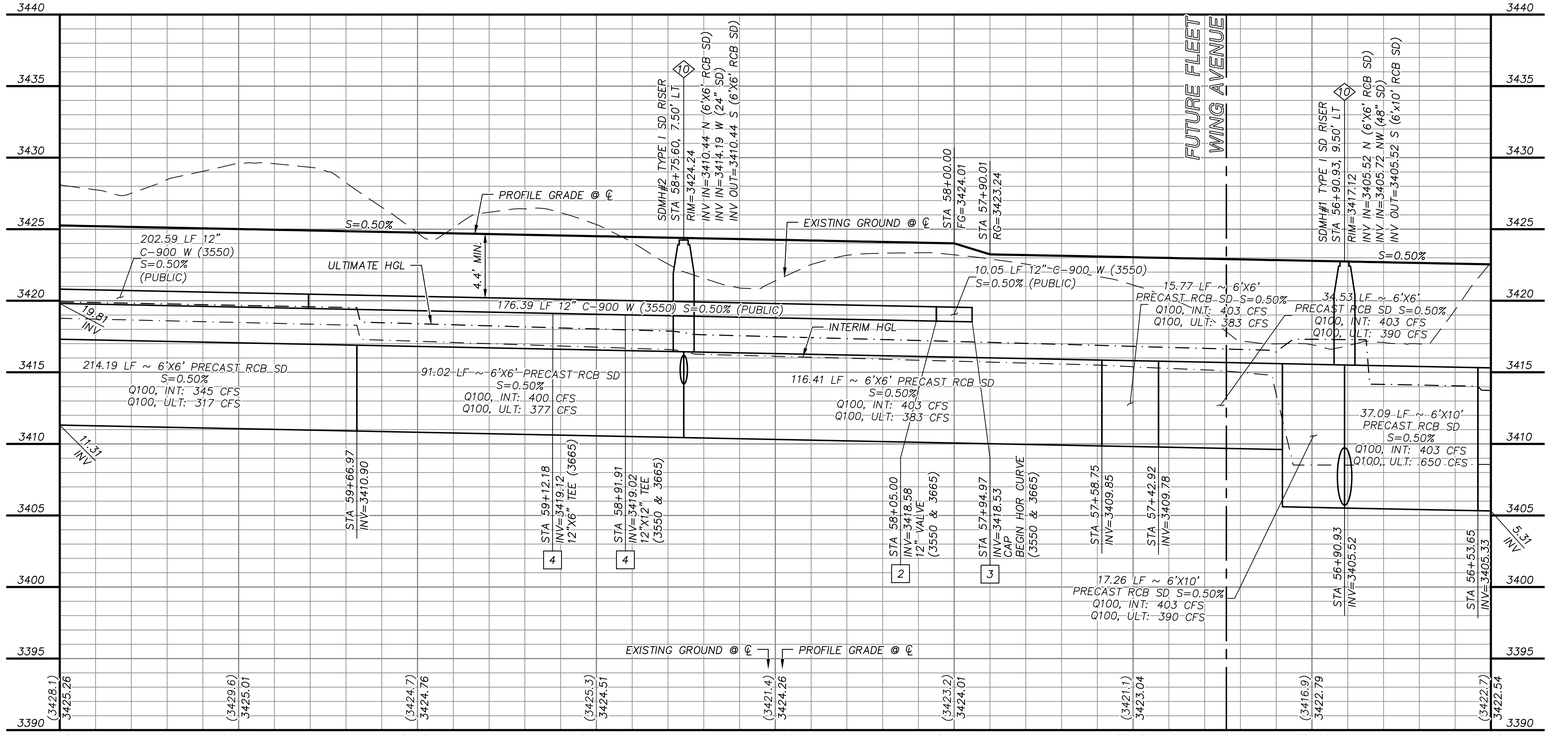
1. INSTALL SEWER MANHOLE PER DCSWCS SD-1A, SD-1B, AND SD-4
2. INSTALL SEWER MAIN PER DCSWCS SD-17
3. STUB AND CAP SEWER PIPE. PLACE MARKER BALL AND 4"X4" POST, DOUGLAS FIR, OVER END OF PIPE AND INSTALL THRUST BLOCK (1 CUBIC FT. MINIMUM).

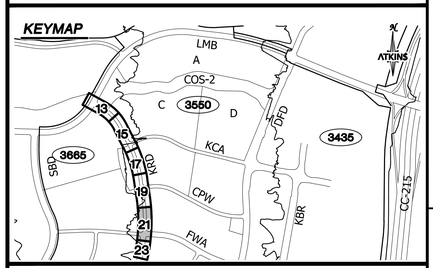
WATERLINE CONSTRUCTION NOTES

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" SERVICE SADDLE PER UDACS PLATE #4

ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 31 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 (A=B=6.5').
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 ON SHEET XX





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

PROJECT NO. 136892 FIRST APPROVED DATE: _____

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 EMERGENCY AND ARTERIAL 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

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 - PAUL BATES - No. 18723 - CIVIL - 9/11/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET M) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE
KETTLE RIDGE DRIVE STA. 56+50 TO STA. 60+50

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 21/39
CLV 00-00000

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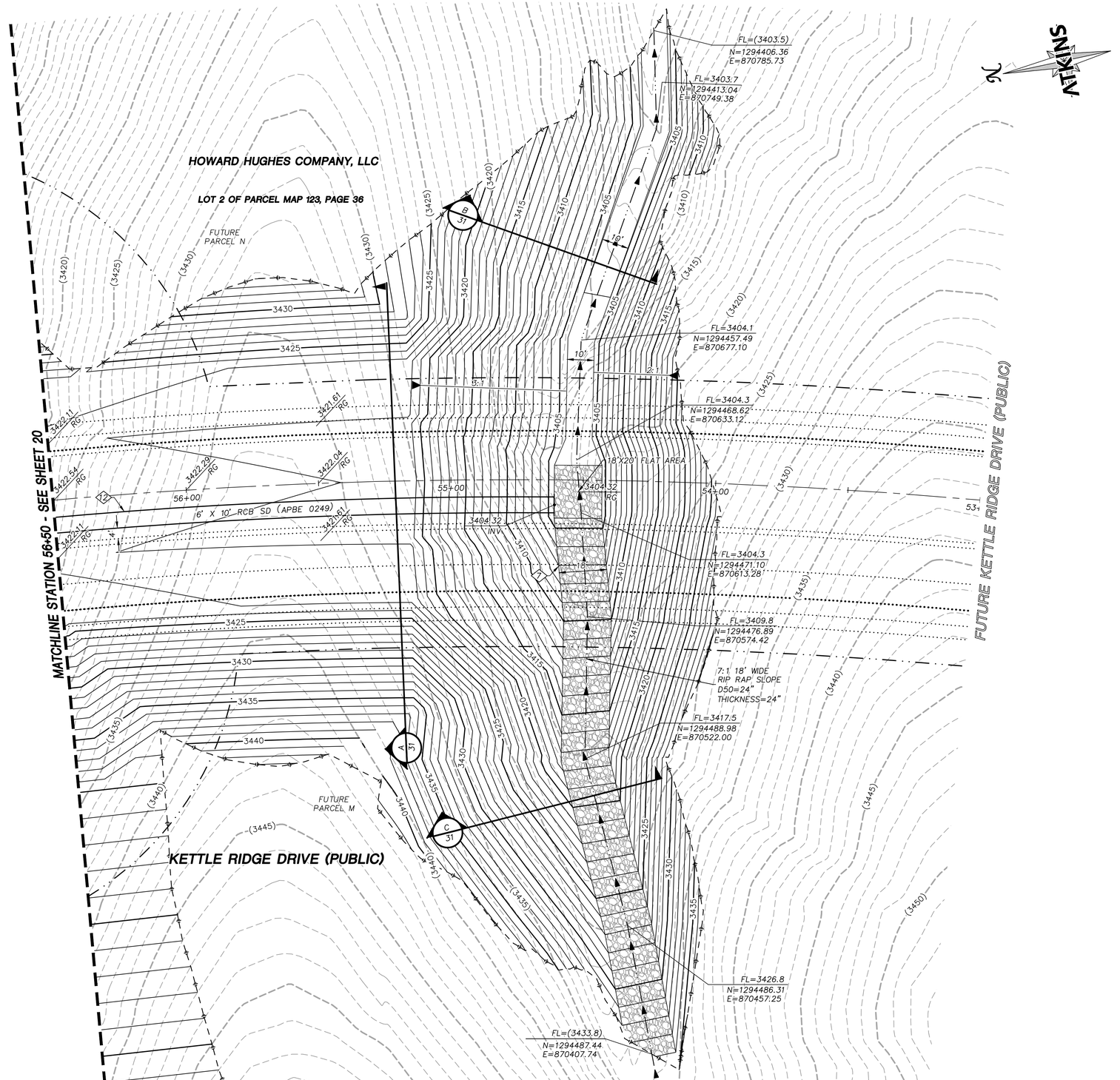

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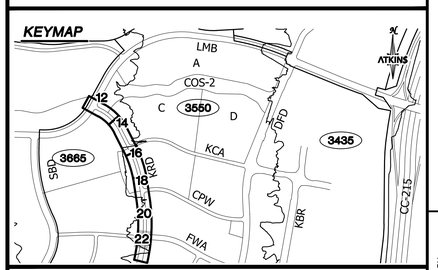

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

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PAUL A. BATES PE#18723 DATE

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DS#5156A

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PROFESSIONAL ENGINEER, STATE OF NEVADA, PAUL A. BATES, No. 18723, Exp. 12-31-20, CIVIL
9/11/19

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

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KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN
KETTLE RIDGE DRIVE BEGIN TO STA. 56+50

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 22/39

CLV 00-00000

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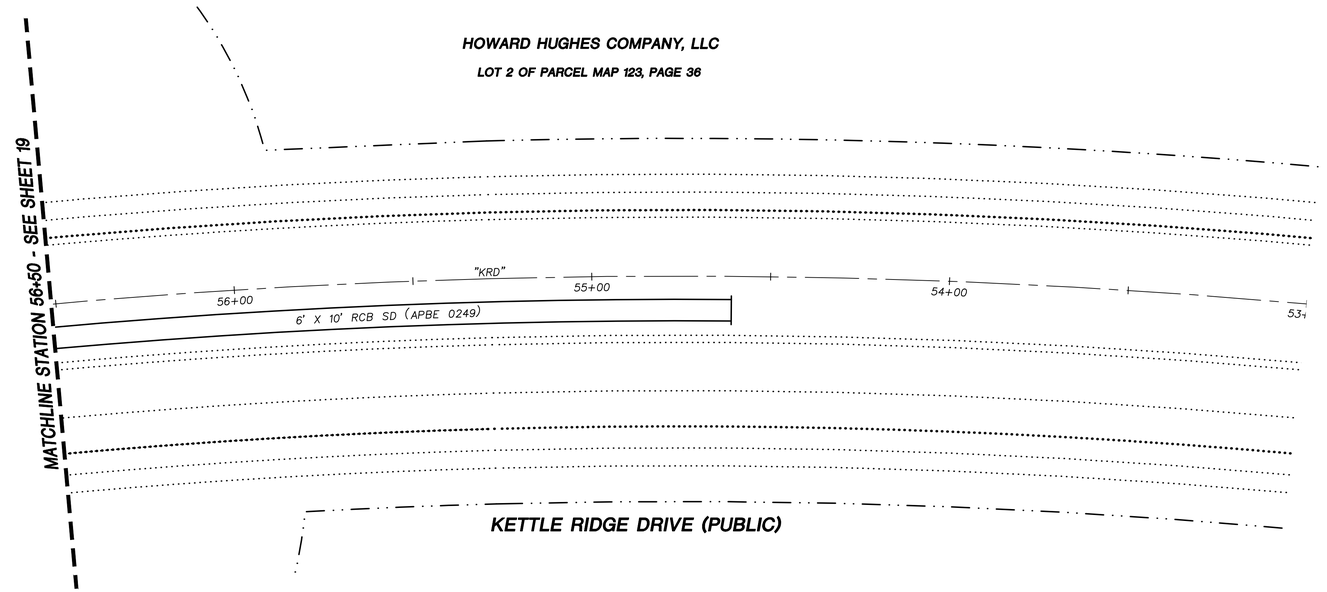

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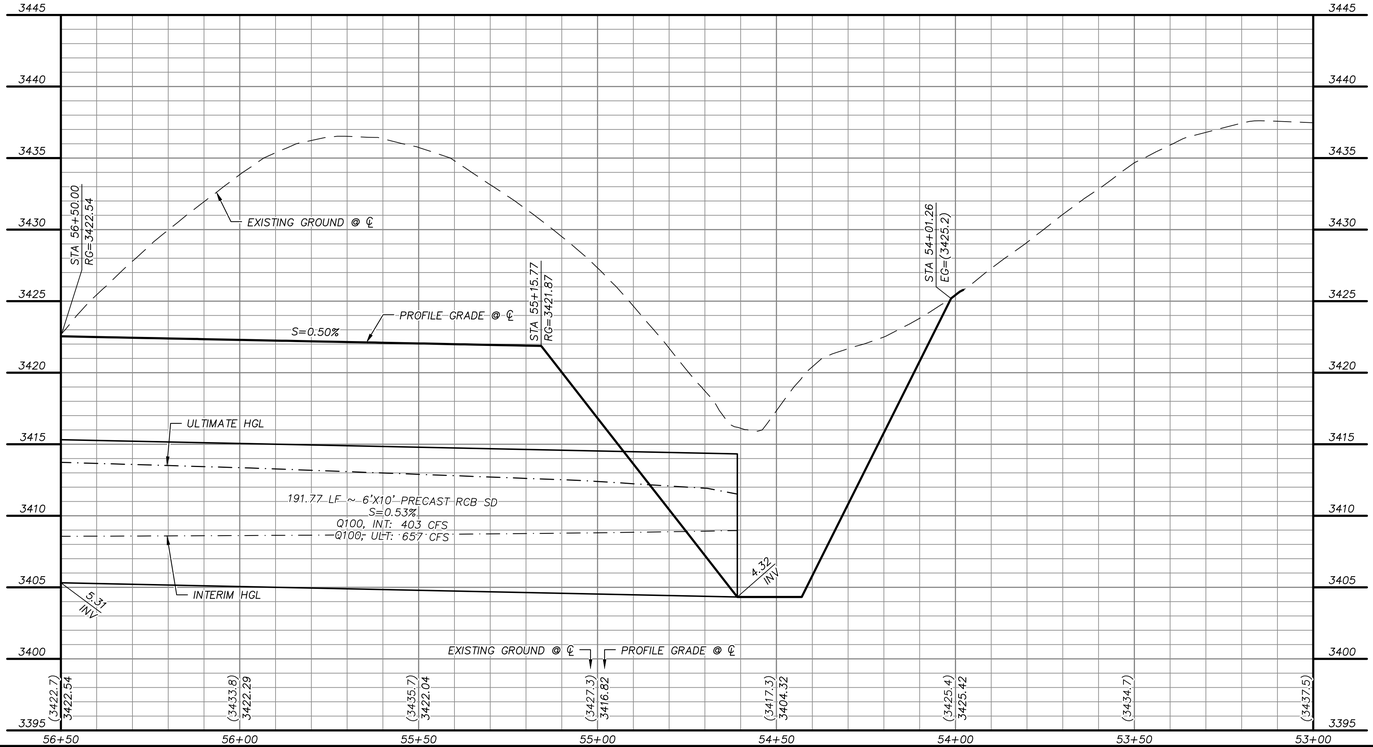

GRAPHIC SCALE

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

PROJECT NO. 136892 FIRST APPROVED DATE: _____

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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KEYMAP

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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL BATES - No. 18723 - CIVIL - 9/11/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE
KETTLE RIDGE DRIVE BEGIN TO STA. 56+50

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 23/39
CLV 00-00000

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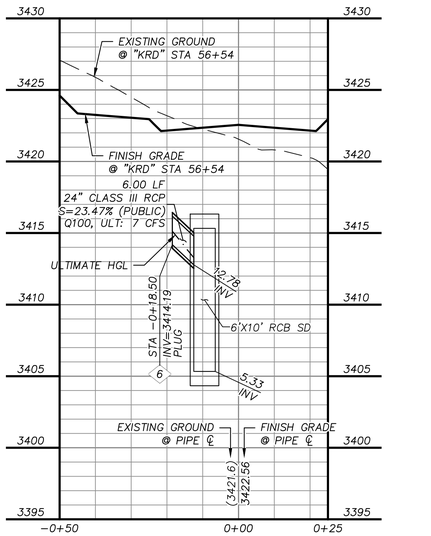
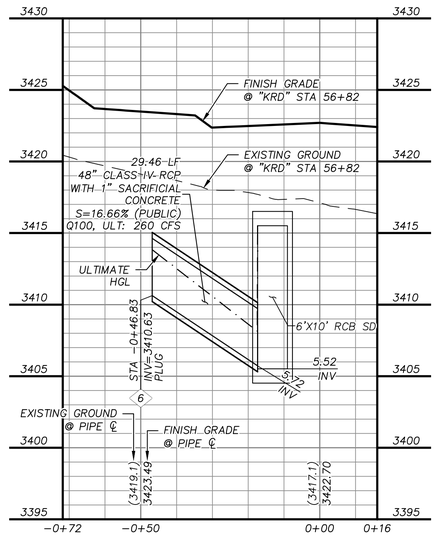


STORM DRAIN LATERAL

"KRD" STA. 56+54 SEE SHEETS 20 AND 21

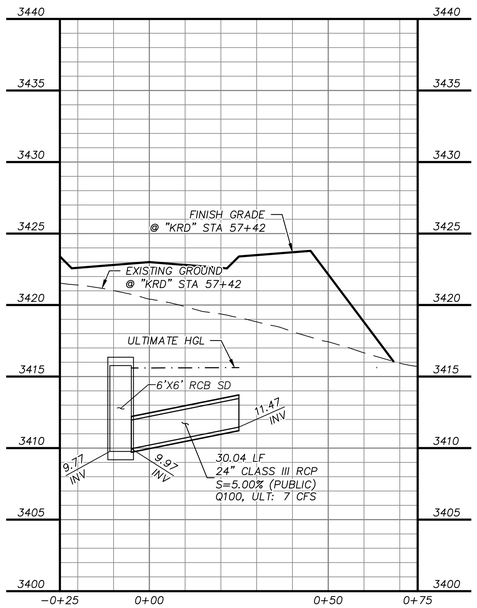
A / 24



STORM DRAIN LATERAL

"KRD" STA. 56+82 SEE SHEETS 20 AND 21

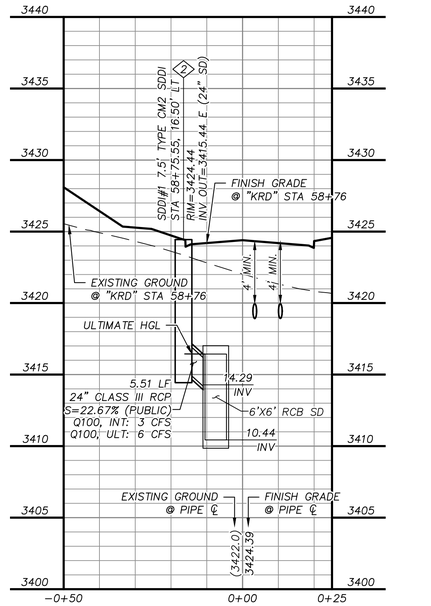
B / 24



STORM DRAIN LATERAL

"KRD" STA. 57+42 SEE SHEETS 20 AND 21

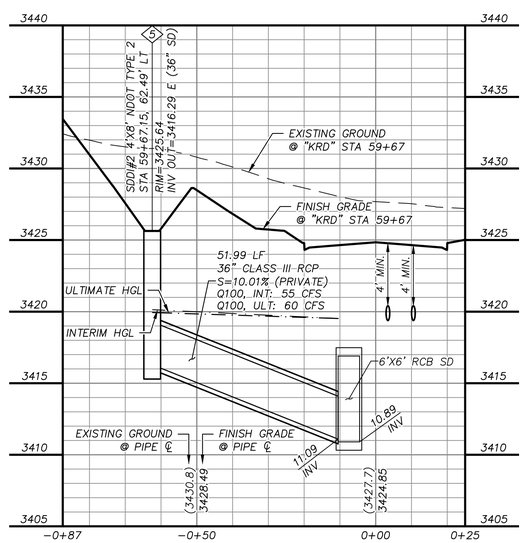
C / 24



STORM DRAIN LATERAL

"KRD" STA. 58+76 SEE SHEETS 20 AND 21

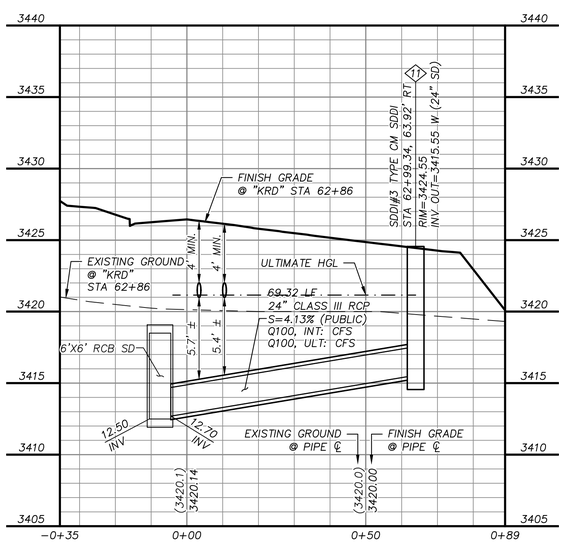
D / 24



STORM DRAIN LATERAL

"KRD" STA. 59+67 SEE SHEETS 20 AND 21

E / 24



STORM DRAIN LATERAL

"KRD" STA. 62+86 SEE SHEETS 16 AND 17

F / 24

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REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7375
Fax: +1.702.263.7200

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STORM DRAIN LATERAL PROFILES

GRAPHIC SCALE
20.00001225 0 10.00002613 0.00001225 40.0000245
HORIZONTAL: 1"= 20.00001225'
0 ### #
VERTICAL: 1"= #'

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

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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL A. BATES - No. 18723 - CIVIL - 9/11/19

DESIGNED BY: N. BARCOS
DRAWN BY: O. OUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 24/39
CLV 00-00000

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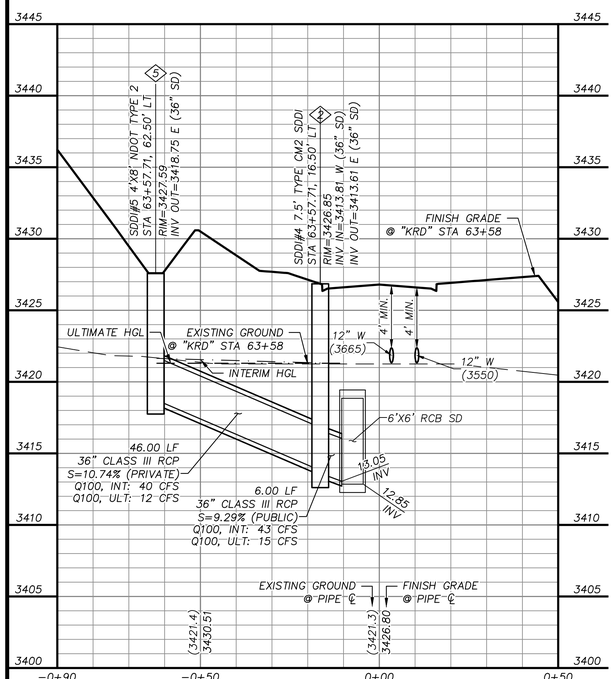
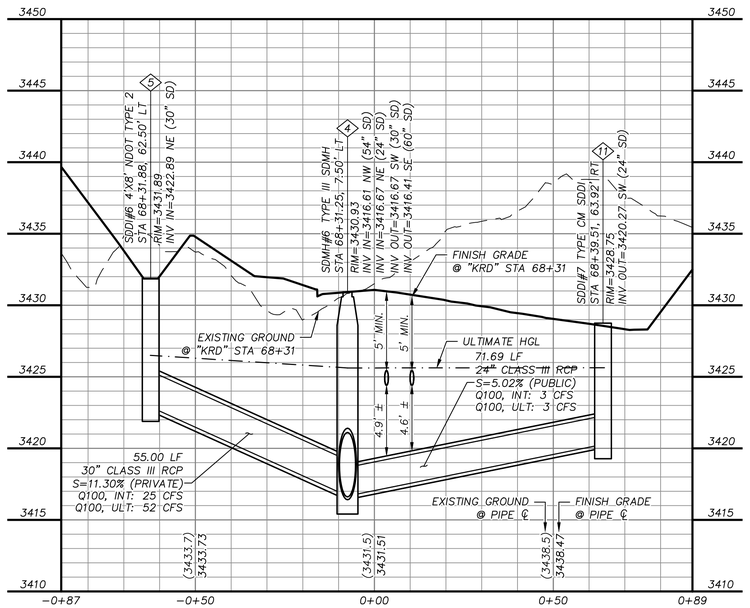


STORM DRAIN LATERAL

"KRD" STA. 63+58 SEE SHEETS 16 AND 17

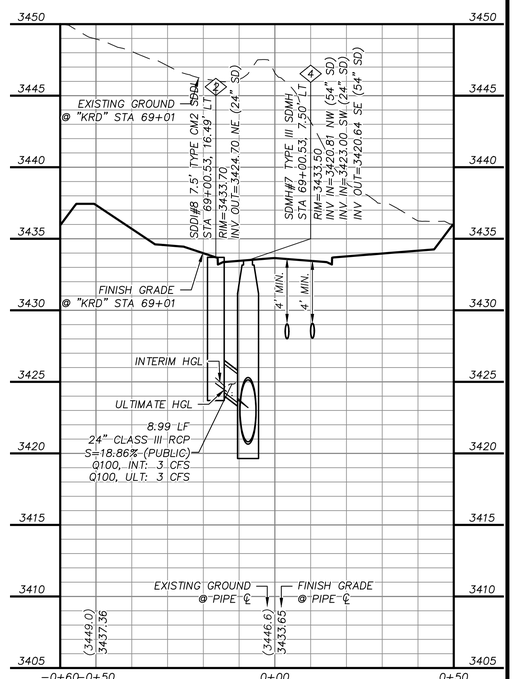
C / 25



STORM DRAIN LATERAL

"KRD" STA. 68+31 SEE SHEETS 14 AND 15

H / 25



STORM DRAIN LATERAL

"KRD" STA. 69+01 SEE SHEETS 14 AND 15

I / 25

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 32)
7. INSTALL RIP-RAP (D50=8", THICKNESS=16") PER DETAIL B ON SHEET 30
8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 32 FOR DETAIL
10. INSTALL TYPE I SD RISER PER CCAUSD #403.1

GRAPHIC SCALE

HORIZONTAL: 1"= ##'

VERTICAL: 1"= #'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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

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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL BATES - No. 18723 - CIVIL - 9/11/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

STORM DRAIN LATERAL PROFILES

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 25/39
CLV 00-00000

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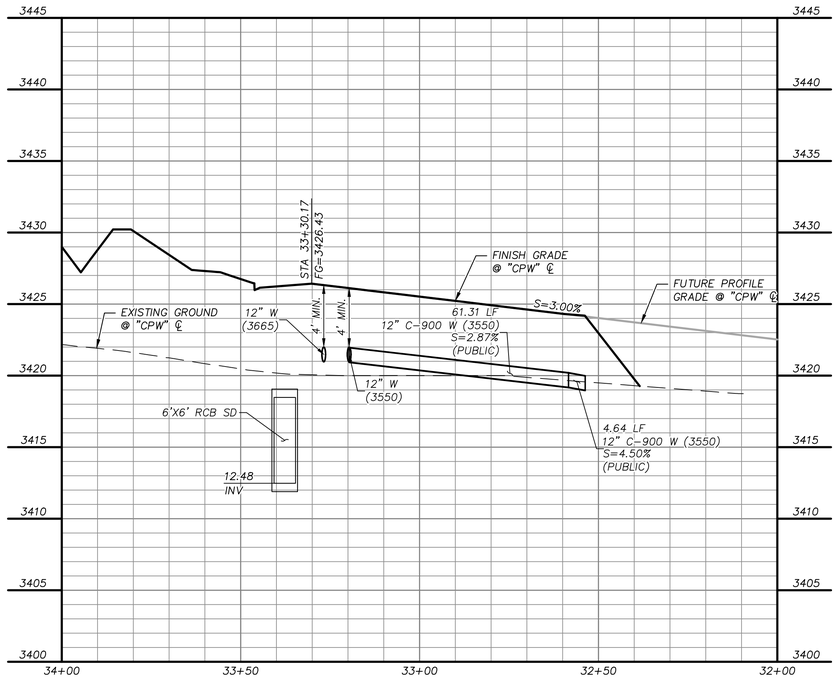
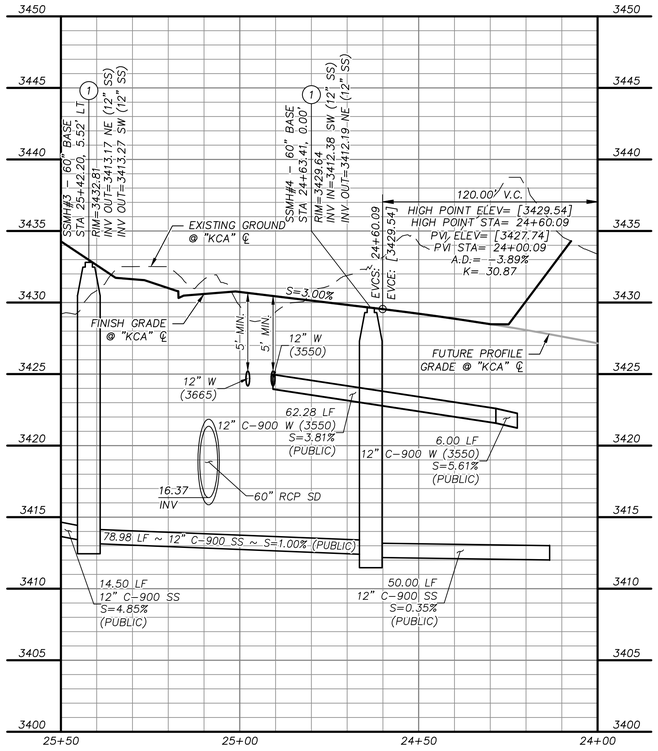


ROADWAY LATERAL

A
26

"KRD" STA. 62+83 SEE SHEETS 18 AND 19
FOR STORM DRAIN LATERAL INFORMATION
SEE DETAIL F ON SHEET 24



ROADWAY LATERAL

B
26

"KRD" STA. 68+21 SEE SHEETS 14 AND 15
FOR STORM DRAIN LATERAL INFORMATION
SEE DETAIL H ON SHEET 24

STORM DRAIN CONSTRUCTION NOTES

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REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

GRAPHIC SCALE

HORIZONTAL: 1"= ##'

VERTICAL: 1"= #'

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PAUL A. BATES PE#18723 DATE

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NAVD88 ELEVATION: 989.574 METERS (3,246.63 FEET)
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T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 NEVADA DEPARTMENT OF TRANSPORTATION

Call before you Dig AVOID CUTTING TELEPHONE OR UTILITY LINES. DON'T DIG BLIND. Call 811 or 1-800-642-2444

AVOID HITTING OVERHEAD POWER LINES. ITS DEADLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

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PROFESSIONAL ENGINEER - STATE OF NEVADA
PAUL BATES
No. 18723
CIVIL
9/11/19

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Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY LATERAL PROFILES

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 26/39
CLV 00-00000

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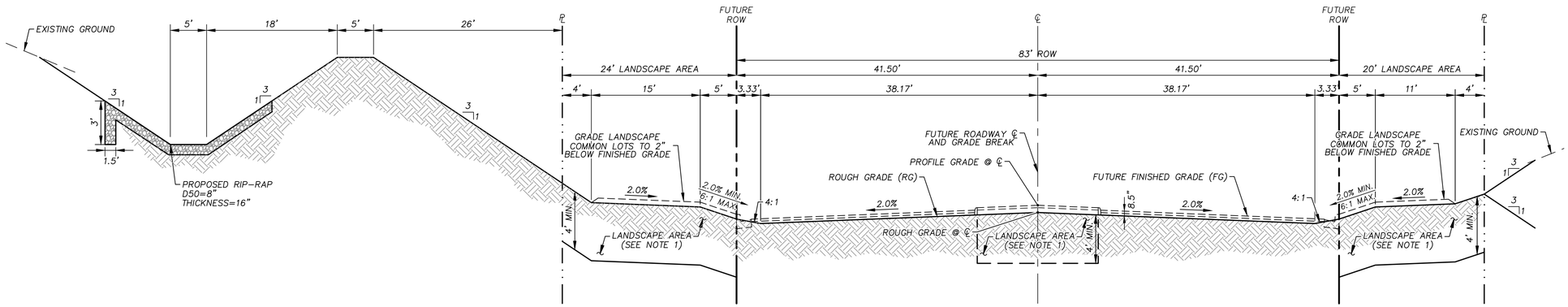

NOTES:

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 - ROUGH GRADE SECTION

N.T.S.

A
30

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

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SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

TYPICAL SECTIONS

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: J. IZZOLO/P. BATES
HORIZ: NONE
VERT: NONE

JOB NO. *100060655*
DATE *SEPTEMBER, 2019*
DRAWING NO. *30/39*
CLV 00-00000

PROFESSIONAL ENGINEER-STATE OF NEVADA
PAUL BATES
No. 18723
CIVIL
9/11/19

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1-702-432-5300
NEVADA'S ARTERIAL SYSTEM OF TRANSPORTATION

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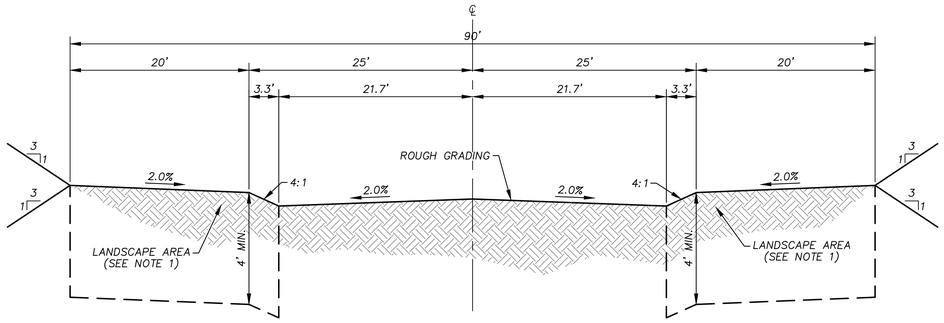

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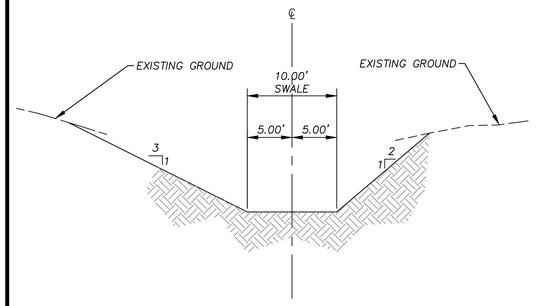
KETTLE RIDGE DRIVE - ROUGH GRADE SECTION

N.T.S.

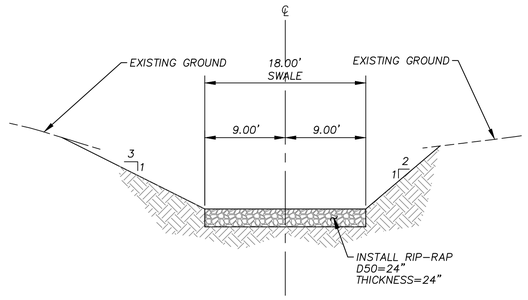
A 31



KETTLE RIDGE DRIVE - DAYLIGHT SWALE

N.T.S.

B 31



KETTLE RIDGE DRIVE - DAYLIGHT SWALE

N.T.S.

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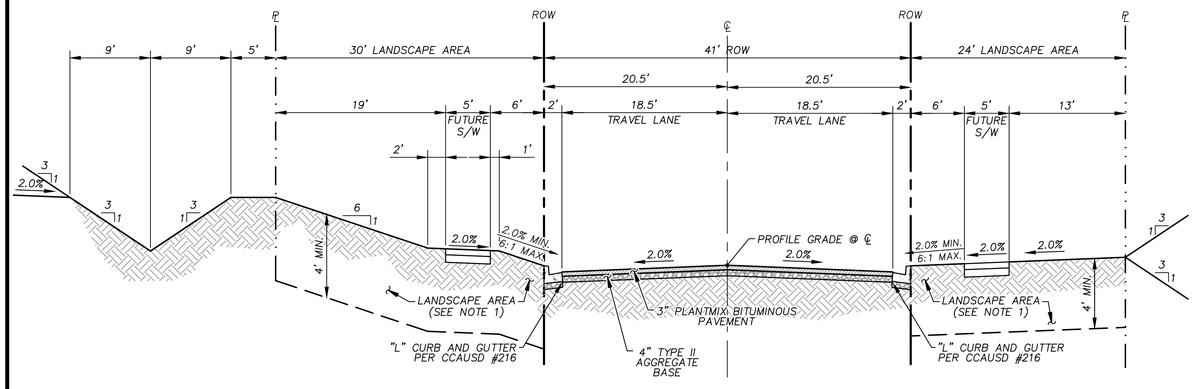

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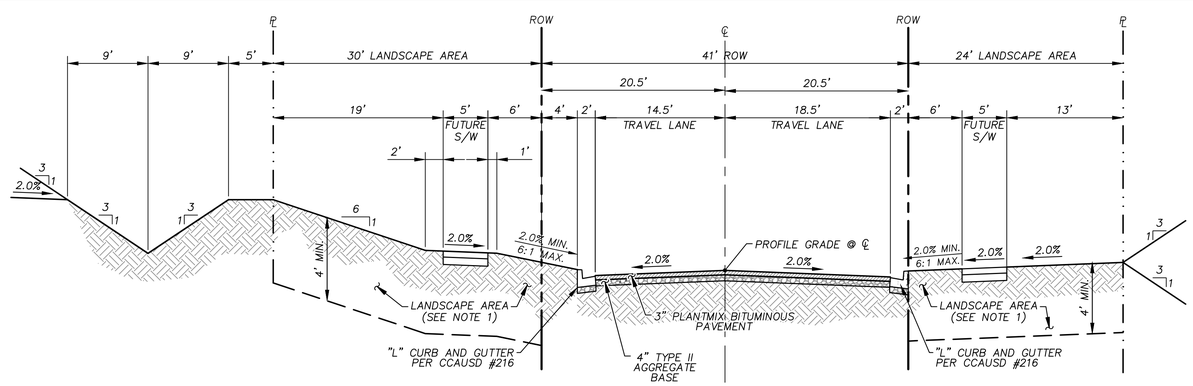
KETTLE RIDGE DRIVE - TYPICAL SECTION

N.T.S.

D 31



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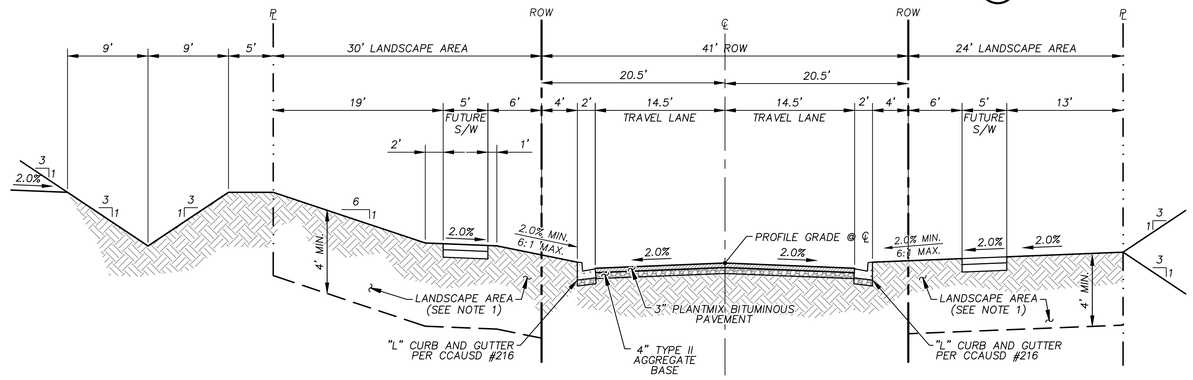
KETTLE RIDGE DRIVE - TYPICAL SECTION WITH LEFT CURB EXTENSION

N.T.S.

E 31



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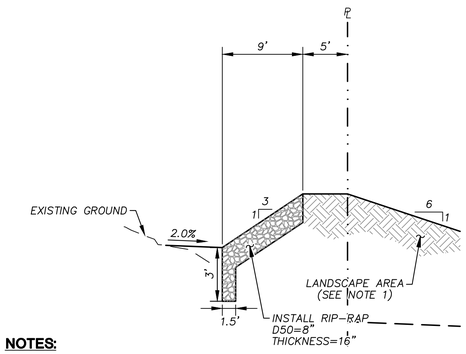
KETTLE RIDGE DRIVE - TYPICAL SECTION WITH CURB EXTENSION

N.T.S.

F 31



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KETTLE RIDGE DRIVE - SECTION IN FILL

N.T.S.

G 31

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7375
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22

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TYPICAL SECTIONS

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: NONE
VERT.: NONE

JOB NO. 100060655
DATE: SEPTEMBER, 2019
DRAWING NO. 31/39
CLV 00-00000

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

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PROFESSIONAL ENGINEER-STATE OF NEVADA PAUL BATES No. 18728 CIVIL 9/11/19

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2270 Corporate Circle
Suite 200
Henderson NV 89074-7755
Tel: 702.263.7275
www.atkinsglobal.com/northamerica

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SUMMERLIN®

Summerlin West Village 22

Kettle Ridge Drive (Street J)

Fleet Wing Avenue (Street G) to Lake Mead Boulevard

Scurry Bend Drive (Street N) Rough Grade

Fleet Wing Avenue (Street G) to Lake Mead Boulevard

October 16, 2019

Addendum #2

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Addendum #2: Kettle Ridge Drive & Scurry Bend Drive Rough Grade : Fleet Wing Avenue to Lake Mead Boulevard Date: October 16, 2019

Location of Development: a) Descriptive (Cross Streets) North/South: Fleet Wing Avenue

East/West: Lake Mead Boulevard

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

c) APN : 137-14-401-006, 137-23-101-002

Name of Owner: Howard Hughes Company, LLC

Telephone No.: (702) 791-4000 Fax No.: (702) 791-4450 E-Mail Address: chris.anderson@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: 35.89 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: 225.54 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
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.

DS #5156

Local Entity File No.

Revision	Date
Addendum #1	September 11, 2019

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Kettle Ridge Drive (Street J) & Scurry Bend Drive (Street N) Rough Grade	Map ID:
Firm Name: Atkins	Engineer: Molly Anderson, 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.
X		Design Manual **Standard Form 4**.
X		2 copies of the 24" x 36" Drainage Plan.
	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
X		Streets with off-set crowns.
X		Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X		Property lines.
X		Right-of-way lines and widths, existing and proposed.
X		Existing improvements and their elevations.
X		Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
X		Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X		Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
X		Location and cross-section of street capacity calculations.
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.
X		Building and/or lot numbers.
X		Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
X		Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
X		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.
X		Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
X		Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
X		Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

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

REFERENCE:	**STANDARD FORM 2**

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

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

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

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

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

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

II. GRADING PLAN INFORMATION		
Yes	No	
X		Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), design hydraulic grade line, (HGL) and 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying off-site flows. An overflow path must be provided over all storm drains.
X		All existing and "to be constructed" walls with cross-sections showing wall type, (e.g. block wall, retaining wall, flood wall, etc.), with limits clearly defined, adjacent ground elevations. Wall heights must meet current ordinances and in no case exceed 14 feet above the adjacent property.
X		Street slopes for both interior and perimeter streets. Note: The minimum slope for a roadway is 0.4 percent, a minimum 18-inch storm drain must be provided where minimum slopes cannot be met.
	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.)
X		This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included.
X		Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
	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.
X		Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
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.

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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 **Addendum #2 to the Technical Drainage Study for Kettle Ridge Drive (Street J): Fleet Wing Avenue (Street G) to Lake Mead Boulevard & Scurry Bend Drive (Street N) Rough Grade: Fleet Wing Avenue (Street G) to Lake Mead Boulevard** electronic submittal matches the paper version bound into the study.

Molly M. Anderson, PE (NV #24365)
Senior Engineer

Comment Response Letter

Your reference: DS #5156

Albert Sung
City of Las Vegas Public Works
333 N. Rancho Dr, 7th Floor
Las Vegas, NV 89106

October 16, 2019

RE: ADDENDUM #2 TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 22 KETTLE RIDGE DRIVE (STREET J): FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD & SCURRY BEND DRIVE (STREET N) ROUGH GRADE: FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

Dear Albert,

This letter and the attached documents have been prepared as an Addendum #2 to the *Technical Drainage Study (TDS) for Summerlin West Village 22 Kettle Ridge Drive (Street J) Fleet Wing Avenue (Street G) to Lake Mead Boulevard & Scurry Bend Drive (Street N) Rough Grade: Fleet Wing Avenue (Street G) to Lake Mead Boulevard*.

Comment #1: Drop inlets deeper than 10' require special structural design and structural calculations. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the *Building Department* for processing. The engineer must provide a copy of *Building Department* approval of the structures to *Flood Control* prior to the final acceptance of the drainage study.

Comment response: Structural details have been provided in this submittal for the deep drop inlets. Per coordination with Luis Morales of CLV Land Development, structural review will be concurrent with the Civil Improvement Plans. Atkins will provide approval letter of structural design to CLV Flood Control for final acceptance of drainage study.

Comment #2: From the *Sheet 18/39* to *Sheet 21/39*, there are various proposed direct connection of lateral pipes to the 6'x6' RCB. However, the connection detail has not been provided. Provide as such in the next submittal.

Comment response: Connection details have been provided in this submittal.

The following conditions are repeated until they are complete:

Comment #3: The *Master Drainage Study Update* for *Summerlin West Planning Area* proposes a modification to internal flow patterns that alters the flow patterns to the *Beltway Channel* system downstream of the *Summerlin Parkway* interchange. The modification proposes a storm drain system within *Summerlin Village 22* area (Storm Drain F) that will collect flows from the Gowan channel tributary area and route them into the *Beltway Channel* (MPU Facility APBE 0122). This resulted in increased flows in the *Beltway Channel* segment between *Summerlin Parkway* and *Far Hills Boulevard*, i.e., mitigation measures are required for the impacted *Beltway Channel* segment.

A technical drainage study for the modification of the Beltway Channel has been submitted and has just been conditionally approved. The subject drainage study will not be approved prior to the construction bond of the *Beltway Channel Modification* project has been executed.

Comment response: The construction bond of the Beltway Channel Modification project has been executed. See receipt provided by VTN Nevada in Appendix B.

Comment #4: The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

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

Comment response: This report will be submitted to CCRFCD for concurrence.

Comment #5: The project proposes to build temporary drainage facilities, i.e., berms/swales along the west side of *Scurry Bend Drive* and *Kettle Ridge Drive* and at the southern end of *Kettle Ridge Drive* 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 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.

Comment response: Once this drainage study is conditionally approved, the report will be submitted to the Land Development section to begin the agreement process.

Comment #6: The drainage study and the subject improvement plans also proposed a debris basin along the west side of the *Western Beltway.* Acknowledge in the next submittal that the debris basin is a temporary facility and will be removed in the ultimate condition.

Since the debris basin is an interim facility, *Summerlin* or *Howard Hughes Company* will be solely responsible for the maintenance of the facility. A construction and maintenance bond for the debris basin must be prepared and executed prior to the approval of the improvement plans.

Comment response: A construction and maintenance bond for the debris basin will be executed prior to the approval of the improvement plans.

Comment #7: The regional facility in *Kettle Ridge Drive* will be a public facility and will be maintained by the City. The improvement plans must be reviewed for maintenance and access concerns by *City Street & Sanitation Department* for their review and approval which must be secured prior to the subject drainage study approval. Contact *Mr. Matthew Meyer, Streets & Sanitation Manager* for guidance.

Comment response: The improvement plans were submitted to Mr. Meyer of the City Street & Sanitation Department on October 3, 2019.

Molly M. Anderson, PE (NV #24365)
Senior Engineer

Appendices

Appendix A. Comment Letter

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: September 25, 2019
TO: **Land Development Services** Department of Building & Safety			FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT: Drainage Study for: **Summerlin West V22 – Kettle Ridge Drive (Street J) and Scurry Bend Drive (Street N) Street Improvements** **(both from Lake Mead Blvd. to Fleet Wing Ave.)**			**COPIES TO:** Atkins
Cross Streets:	Lake Mead Boulevard & Desert Foothill Drive		Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5156B.doc		Bart Anderson, P.E., DevCo
Parcel Number:	137-14-401-006 & 137-23-101-002		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	7/16/2019	8/8/2019	Not Approved	$400.00	3490122: $400
2nd Submittal	9/11/2019	9/25/2019	See Comments Below	$400.00	3563447: $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:
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. Drop inlets deeper than 10' require special structural design and structural calculations. Provide a soils report, structural calculations and specifications, two wet stamped structural sets, and a grading plan to the *Building Department* for processing. The engineer must provide a copy of *Building Department* approval of the structures to *Flood Control* prior to final acceptance of the drainage study.

2. From *Sheet 18/39* to *Sheet 21/39*, there are various proposed direct connection of lateral pipes to the 6'x6' RCB. However, the connection detail has not been provided. Provide as such in the next submittal.

The following conditions are repeated until they are complete:

3. The *Master Drainage Study Update* for *Summerlin West Planning Area* proposes a modification to internal flow patterns that alters the flow patterns to the *Beltway Channel* system downstream of the *Summerlin Parkway* interchange. The modification proposes a storm drain system within *Summerlin Village 22* area (Storm Drain F) that will collect flows from the Gowan channel tributary area and route them into the *Beltway Channel* (MPU Facility APBE 0122). This resulted in increased flows in

the *Beltway Channel* segment between *Summerlin Parkway* and *Far Hills Boulevard*, ie, mitigation measures are required for the impacted *Beltway Channel* segment.

A technical drainage study for the modification of the Beltway Channel has been submitted and has just been conditionally approved. The subject drainage study will not be approved prior to the construction bond of the *Beltway Channel Modification* project has been executed.

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

   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

5. The project proposes to build temporary drainage facilities, ie, berms/swales along the west side of *Scurry Bend Drive* and *Kettle Ridge Drive* and at the southern end of *Kettle Ridge Drive* 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.

6. The drainage study and the subject improvement plans also proposed a debris basin along the west side of the *Western Beltway*. Acknowledge in the next submittal that the debris basin is a temporary facility and will be removed in the ultimate condition.

   Since the debris basin is an interim facility, *Summerlin* or *Howard Hughes Company* will be solely responsible for the maintenance of the facility. A construction and maintenance bond for the debris basin must be prepared and executed prior to the approval of the improvement plans.

7. The regional facility in *Kettle Ridge Drive* will be a public facility and will be maintained by the City. The improvement plans must be reviewed for maintenance and access concerns by *City Streets & Sanitation Department* for their review and approval which must be secured prior to the subject drainage study approval. Contact *Mr. Matthew Meyer, Streets & Sanitation Manager* for guidance.

In an effort to increase administrative efficiency, for all original and re-submittal packages including updates and the addenda, the City of Las Vegas Public Works Department requires both a hardcopy and a digital copy (PDF) on CD for the drainage study.

A letter sealed and signed by a Nevada registered civil engineer must be included in every submittal certifying documents on the electronic CD matches 100% of the hardcopy submittal. The new submittal requirement is effective on May 1, 2019. If there are any questions regarding these new requirements, please contact Albert Sung in the City Flood Control Section at (702) 229-6541.

Sample Letter to certify CD.pdf

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/14
AREA K-14

Appendix B. Beltway Channel Modification Construction Bond

CITY OF LAS VEGAS
BUILDING AND SAFETY DEPARTMENT
333 N. RANCHO DR.
LAS VEGAS, NV 89106

Payment Receipt

Transaction Date: 9/19/2019 2:32:48 PM
Cashier: 984618
Receipt #: 856433
Payer: Summerlin MPC West
Business Address: 13723410001, , NV

Application #	Charge Description	Amount Due	Amount Paid
L19-01775	Fire(FPE Express Fee)	$80.00	$80.00
L19-01775	Offsite(Express Plan Check Hourly Fee)	$600.00	$600.00
L19-01775	OffSite(Geotech Review)	$400.00	$400.00
L19-01775	Offsite(Improvement Agreements)	$100.00	$100.00
L19-01775	Offsite(Inspection Fee)	$13,941.41	$13,941.41
L19-01775	Offsite_Additional(Plan Check Fee)	$2,261.48	$2,261.48
	Total	**$17,382.89**	**$17,382.89**

Payment Tender	Payment ID / Check #	Amount Paid
Check	#40104891	$17,382.89
Total Paid		**$17,382.89**

9/19/2019 2:34:12 PM

Appendix C. CD-ROM

SUMMERLIN VILLAGE 22
IMPROVEMENT PLANS FOR:

KETTLE RIDGE DRIVE (STREET J)
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
FUTURE SID PROJECT

SCURRY BEND DRIVE (STREET N) ROUGH GRADE
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

SUMMERLIN®

SHEET INDEX

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2	LEGEND AND ABBREVIATIONS	
3	GENERAL NOTES	
4	MASTER GRADING PLAN	
5	HORIZONTAL CONTROL PLAN	
6	MASTER DRAINAGE PLAN	
7	MASTER WATER PLAN	
8	MASTER SEWER PLAN	
9	ROUGH GRADING PLAN AND PROFILE	SCURRY BEND DRIVE STA. 33+00 TO END
10	ROUGH GRADING PLAN AND PROFILE	SCURRY BEND DRIVE STA. 27+50 TO STA. 33+00
11	ROUGH GRADING PLAN AND PROFILE	SCURRY BEND DRIVE BEGIN TO STA. 27+50
12	ROADWAY GRADING PLAN	KETTLE RIDGE DRIVE STA. 72+00 TO END
13	ROADWAY PLAN AND PROFILE	KETTLE RIDGE DRIVE STA. 72+00 TO END
14	ROADWAY GRADING PLAN	KETTLE RIDGE DRIVE STA. 67+50 TO STA. 72+00
15	ROADWAY PLAN AND PROFILE	KETTLE RIDGE DRIVE STA. 67+50 TO STA. 72+00
16	ROADWAY GRADING PLAN	KETTLE RIDGE DRIVE STA. 64+50 TO STA. 67+50
17	ROADWAY PLAN AND PROFILE	KETTLE RIDGE DRIVE STA. 64+50 TO STA. 67+50
18	ROADWAY GRADING PLAN	KETTLE RIDGE DRIVE STA. 60+50 TO STA. 64+50
19	ROADWAY PLAN AND PROFILE	KETTLE RIDGE DRIVE STA. 60+50 TO STA. 64+50
20	ROADWAY GRADING PLAN	KETTLE RIDGE DRIVE STA. 56+50 TO STA. 60+50
21	ROADWAY PLAN AND PROFILE	KETTLE RIDGE DRIVE STA. 56+50 TO STA. 60+50
22	ROADWAY GRADING PLAN	KETTLE RIDGE DRIVE BEGIN TO STA. 56+50
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40	STREETLIGHT DETAILS	
41	INTERSECTION DETAILS	
42	INTERSECTION DETAILS	
43	HANDICAP SPOT GRADING DETAILS	
44	HANDICAP SPOT GRADING 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.

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
1.56 AC

PROPOSED DISTURBED AREA ACREAGE
36.32 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-18-176
DATED: DECEMBER 3, 2018

OWNER /DEVELOPER

OWNER

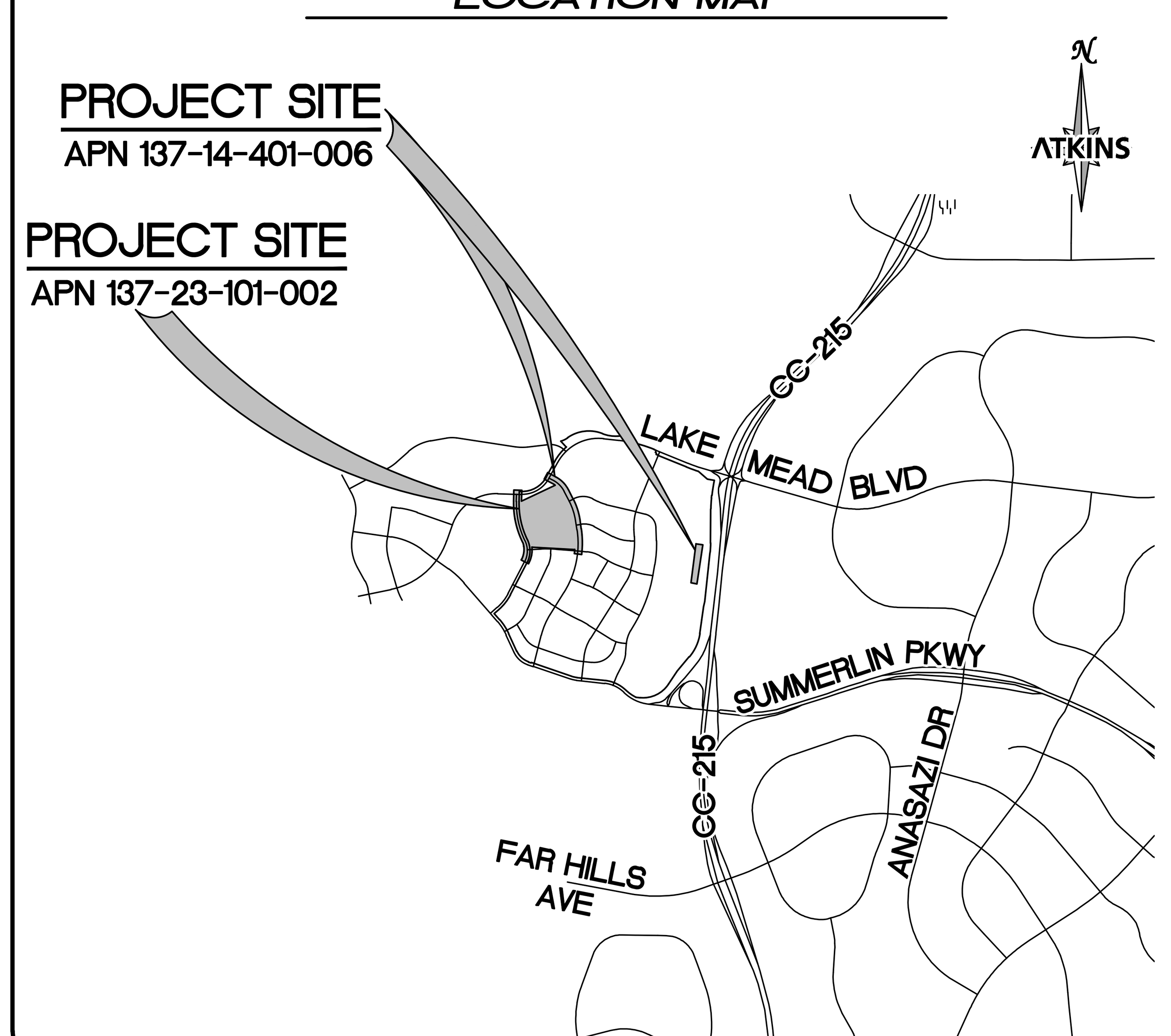
CONTACT: KEVIN ORROCK
HOWARD HUGHES COMPANY LLC, A DELAWARE LIMITED LIABILITY COMPANY
10845 GRIFFITH PEAK DRIVE, SUITE 160
LAS VEGAS, NV 89135

ENGINEER / CONSULTANT

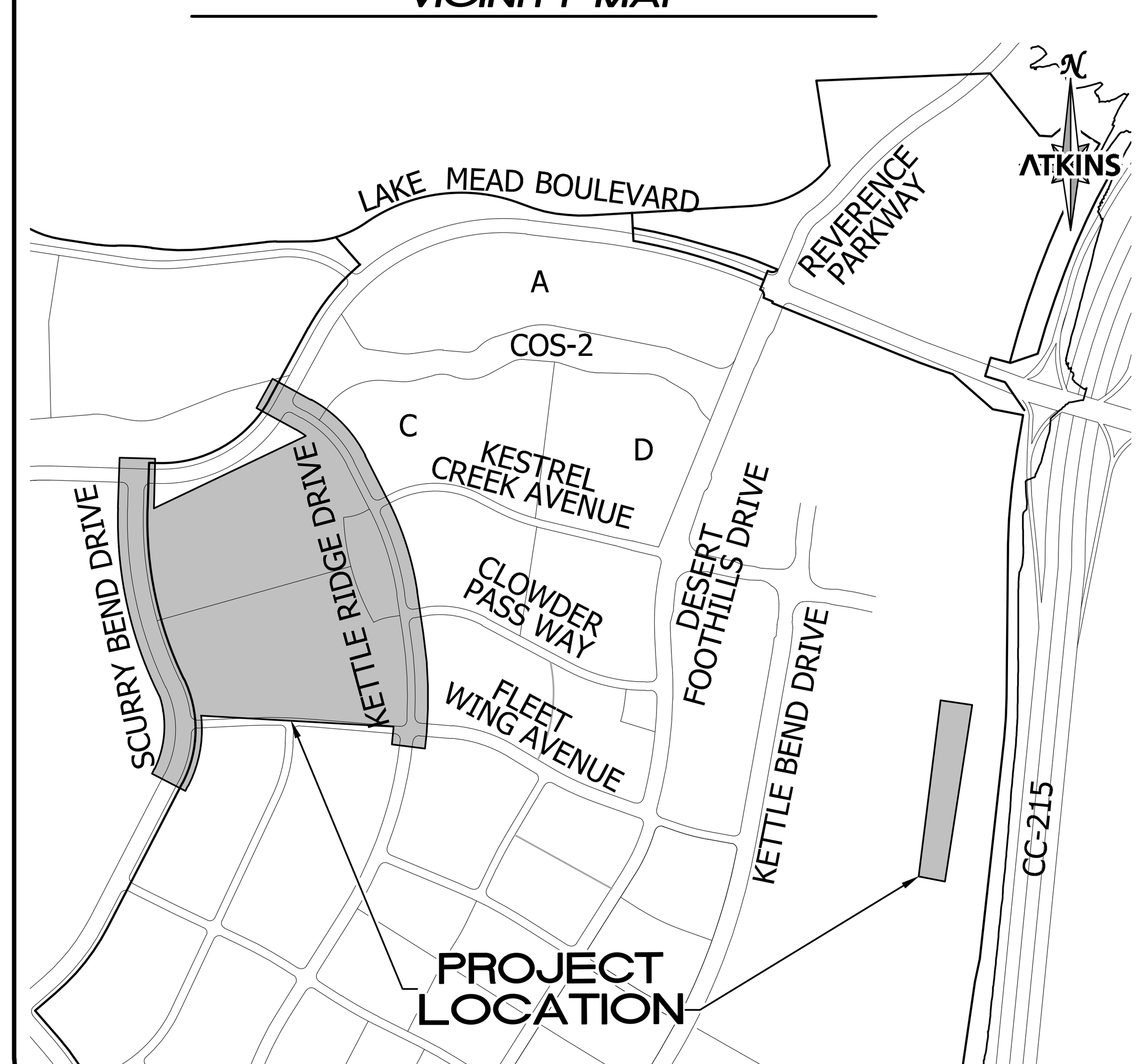
CIVIL

CONTACT: DAVID WILSON P.E.
ATKINS
2270 CORPORATE CIRCLE SUITE 200
HENDERSON, NEVADA 89074
(702) 263-7275

LOCATION MAP



VICINITY MAP



APPROVALS

HOWARD HUGHES COMPANY LLC, A DELAWARE LIMITED LIABILITY COMPANY

KEVIN T. ORROCK, VICE PRESIDENT — DATE

ALLEN PAVELKA, P.E. #9029 — DATE
CITY ENGINEER

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

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 ENGINEERING SERVICES

PROJECT NO. 136892 FIRST APPROVED DATE: ____

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 THE 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 2 AS SHOWN ON THE MAP THEREOF IN BOOK 123 OF PLATS, PAGE 36, OFFICIAL RECORDS, CITY OF LAS VEGAS CLARK COUNTY, NEVADA.

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

PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp: 12/31/20 CIVIL No. 18723
10/14/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

COVER SHEET

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: NONE
VERT.: NONE
JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 1/44
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-01-TITL-C1.dwg LAYOUT: C1 Oct 15, 2019 - 9:00AM

@	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
"FWA" = FLEET WING AVENUE (STREET G)
"CPW" = CLOWDER PASS WAY (STREET H)
"KCA" = KESTREL CREEK AVENUE (STREET I)
"KRD" = KETTLE RIDGE DIVE (STREET J)
"SBD" = SCURRY BEND DRIVE (STREET N)
"KBR" = KETTLE BEND ROAD

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 136892 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 QUICK! Call 811 OR 1-800-642-2444

AVOID HITTING OVERHEAD POWER LINES. IT'S QUICK! CALL BEFORE YOU DIG 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 — PAUL A. BATES — Exp: 12/31/20 — CIVIL — No. 10723 — STATE OF NEVADA — 10/14/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

LEGEND AND ABBREVIATIONS

DESIGNED BY: N. BARCOS	DRAWN BY: O. QUASSANI	CHECKED BY: P. BATES	HORIZ.: NONE VERT.: NONE
JOB NO. 100060655	DATE OCTOBER, 2019	DRAWING NO. 2 / 44	
CLV 00-00000			

X:\Projects\SummWest\Village 22\100060655 – V22N Street J (Lake Mead to Street G)_Sheets\60655-02-LGND-G2.dwg LAYOUT: G-2 Oct 15, 2019 – 9:00AM

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 THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE'S WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE (COMPANY, REPORT #, DATE) APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH 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 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

PLAN CONCURRENCE NOTE

THE FOLLOWING SEPARATE VILLAGE 22 ROADWAY IMPROVEMENT PLANS ARE TO BE CONSTRUCTED CONCURRENTLY AND ARE SHOWN AS FUTURE (BY OTHERS):

1. LAKE MEAD BOULEVARD (DESERT FOOTHILLS DRIVE TO SCURRY BEND DRIVE)
2. DESERT FOOTHILLS DRIVE (FLEET WING AVENUE (STREET G) TO LAKE MEAD BLVD)
3. KESTREL CREEK AVENUE (STREET I) (DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J))
4. CLOWDER PASS WAY (STREET H) (DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J))

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 § 102.4
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-IN 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 RADIUS. 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 DEAD-ENDS 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 AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY 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 SYSTEM. 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 BEINGS 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

REVISED FEBRUARY 4, 2019

CITY OF LAS VEGAS TRAFFIC NOTES

1. ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.
2. THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.
3. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL 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. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT CITY STANDARDS.
7. WHEN A PROPOSED STREET LIGHT STANDARD IS LOCATED WITHIN FIVE (5') FEET OF ANY PROPOSED SIGN SHOWN ON THE PLANS TO BE MOUNTED ON A SIGNPOST, THE SIGN SHALL BE MOUNTED ON THE STREET LIGHT STANDARD AND THE SIGNPOST SHALL BE ELIMINATED.
8. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HERE UNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.
9. STREET SIGNS AND STOP SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF STREET NAME SIGNS.
10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND FLAGGERS TO INSURE THE SAFETY OF THE PUBLIC IN OR AROUND THE WORK 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 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 WHEN POLE IS INSTALLED BEHIND SIDEWALK, AND SHALL AT NO TIME COMPLETELY ENCLOSE THE STREET LIGHTING POLE.
7. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TRAFFIC ENGINEERING DIVISION PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
8. SERVICE POINTS SHALL BE COORDINATED WITH NV ENERGY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICEPOINTS SHALL BE SHOWN ON THE PLANS.
9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREETLIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED BEFORE STREETLIGHT BASES ARE INSTALLED. AT NO EXPENSE TO THE CITY OF LAS VEGAS.
10. THE CONTRACTOR SHALL FURNISH COMPLETE CONDUIT, WIRE, ETC. FROM SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON THE PLANS.

REVISED 6/4/2018 (LD VERSION)

LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN CLARK COUNTY TITLE 24.40 AND IN THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

SOUTHWEST GAS CORPORATION GENERAL NOTES

GENERAL NOTES

1. IN THE EVENT OF NATURAL GAS EMERGENCIES CALL 911 AND 1-877-860-6020
2. MINIMUM HORIZONTAL AND VERTICAL CLEARANCES BETWEEN NATURAL GAS FACILITIES AND ANY UNDERGROUND FACILITIES AND/OR STRUCTURES, INCLUDING BUT NOT LIMITED TO WATER, SEWER, STORM DRAIN, COMMUNICATIONS, AND ELECTRIC SHALL BE AT LEST 12-INCHES OR GREATER AS DICTATED BY LOCAL CODES AND STANDARDS
   A. ANY DEVIATION FROM SPECIFIED MINIMUM CLEARANCES MUST BE APPROVED BY ALL AFFECTED UTILITIES AND/OR MUNICIPALITIES
3. FOR VALVE ADJUSTMENT CONTACT 702-668-6107 48 HOURS PRIOR TO CONSTRUCTION
4. IN THE EVENT OF A NATURAL GAS CONFLICT WITH PROPOSED UTILITIES AND/OR STRUCTURES CONTACT 702-365-2099

ALL CIVIL IMPROVEMENT PLANS MUST INCLUDE SOUTHWEST GAS CORPORATION HIGH PRESSURE NOTES ON THE NOTES SHEET AND ALL SHEETS DEPICTING HIGH PRESSURE NATURAL GAS MAINS AS INDICATED BELOW:

CAUTION: HIGH PRESSURE GAS!!
CALL SOUTHWEST GAS AT 702-400-1789 FOR STANDBY WHEN EXCAVATING
OVER OR NEAR HIGH PRESSURE GAS LINES 48 HOURS PRIOR TO CONSTRUCTION

SOUTHWEST GAS CORPORATION ____________ DATE

GRADING NOTES

1. INDICATED GRADES OTHER THAN TC, FG & GUTTER FL ARE ROUGH GRADES.
2. THE ROUGH GRADING PLANS SHALL BE ON THE JOB SITE AT ALL TIMES. THE ROUGH GRADING SHALL BE FINISHED IN CONFORMANCE WITH THE LINES AND GRADES SHOWN ON THE PLANS. THE GRADING QUANTITIES ARE BASED ON THE ELEVATION AND DETAILS SHOWN ON THE PLANS. ANY DEVIATIONS FROM THE PLAN WILL RESULT IN QUANTITY CHANGES.
3. SOILS REPORT PREPARED BY: NOVA GEOTECHNICAL & INSPECTION SERVICES 4480 W. HACIENDA AVENUE, SUITE 104, LAS VEGAS, NV 89118, PHONE: 702-873-3478, PROJECT NO. : G-18-76, DATED: DECEMBER 3, 2018.
4. EARTHWORK QUANTITIES (RAW):
   - −CUT = 230,600 CUBIC YARDS
   - −FILL = 206,800 CUBIC YARDS

A. THE ABOVE QUANTITIES DO NOT REFLECT LOSSES DUE TO SUBSIDENCE OR SHRINKAGE.
B. THE ABOVE QUANTITIES DO REFLECT USING NATIVE MATERIAL IN LIEU OF TYPE 1 GRAVEL BASE MATERIAL FOR STREET SECTIONS.
C. THE ABOVE QUANTITIES DO NOT REFLECT ANY EARTHWORK WHICH MAY BE REQUIRED BY THE ENGINEER TO CONSTRUCT ADDITIONAL PROTECTIVE DITCHES OR BERMS NOT SHOWN ON THESE DRAWINGS.

GENERAL NOTES

1. THE CONTRACTOR SHALL NOTIFY ALL AFFECTED PUBLIC ENTITIES, THE PROJECT ENGINEER AND CLARK COUNTY AT LEAST 48 HOURS PRIOR TO THE COMMENCEMENT OF WORK.
2. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE CONTRACT DRAWINGS. ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE PROJECT ENGINEER.
3. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST ISSUE; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE.
4. LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THE DRAWINGS WERE OBTAINED FROM INFORMATION RECEIVED FROM THE APPLICABLE UTILITY COMPANIES. NEITHER THE OWNER NOR ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES OR STRUCTURES NOT SHOWN, OR NOT IN THE LOCATION SHOWN ON THE DRAWINGS. CONTRACTOR TO VERIFY EXACT LOCATION OF UTILITIES PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR'S RESPONSIBILITY REGARDING UTILITIES SHALL BE AS REQUIRED UNDER SECTION 107.17 OF THE "UNIFORM STANDARD SPECIFICATIONS FOR CLARK COUNTY AREA, NEVADA" AND AS PROVIDED IN THE SPECIFICATIONS.
5. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES TO PROTECT EXISTING UTILITY LINES, STRUCTURES, AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE. ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE COUNTY ENGINEER OR OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
6. THE CONTRACTOR SHALL NOT REMOVE TREES, SHRUBS, LAWNS, WALLS, FENCES, SIGNS, STRUCTURES, LIGHTS, OR ANY OTHER EXISTING IMPROVEMENTS OUTSIDE OF STREET RIGHT-OF-WAY, EXCEPT WHERE REQUIRED TO DO SO BY THE CONTRACT DRAWINGS OR THE PROJECT ENGINEER. REPLACEMENT, RELOCATION OR RECONSTRUCTION OF ALL EXISTING IMPROVEMENTS INCLUDING SPRINKLER SYSTEMS, LAWNS, FENCES, WALLS, SIGNS, STEPS, SIDEWALKS, DRIVEWAYS, LAWN LIGHTS, AND ALL OTHER ITEMS APPLICABLE TO THIS CONTRACT SHALL BE REQUIRED BY THE PROJECT ENGINEER.
7. THE CONTRACTOR SHALL BACKFILL AND FINE GRADE ALL CUT OR FILL SLOPES TO MATCH EXISTING CONDITIONS TO THE SATISFACTION OF THE PROJECT ENGINEER. WHERE EXISTING LAWNS ARE DAMAGED BY THE CONTRACTOR'S OPERATIONS THE CONTRACTOR WILL SOD THE AFFECTED AREA TO A CONDITION EQUAL TO OR BETTER THAN THAT WHICH EXISTED PRIOR TO CONSTRUCTION.
8. THE 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 TRANSITIONS TO BE AS SHOWN PER CONTRACT DRAWINGS.
9. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.550.
10. THE ACTUAL LOCATIONS OF SAW CUT LINES, LIMITS OF COLD MILLING, LIMITS OF DRIVEWAY TRANSITIONS, AND LANDSCAPE REPAIR SHALL BE DETERMINED IN THE FIELD BY THE RESIDENT PROJECT REPRESENTATIVE.
11. THE ACTUAL LIMITS OF EXISTING OPEN GRADE REMOVAL AND UDACS APPLICATION SHALL BE DETERMINED IN THE FIELD BY THE RESIDENT PROJECT REPRESENTATIVE.
12. ALL STANDARD DRAWINGS REFERENCED IN THIS SET ARE BASED ON THE CURRENT "UNIFORM STANDARD DRAWINGS REVISION SET II-1997 RELEASE".
13. UNLESS OTHERWISE SHOWN ON THE CONTRACT DRAWINGS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OR RELOCATION OF ALL WATER SERVICES AND METERS WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON THE CONTRACT DRAWINGS.
14. THE CONTRACTOR SHALL MAINTAIN AN ONGOING REMOVAL PROCESS OF ALL SPILLAGE OF EXCAVATION MATERIAL ON ALL PAVED STREETS.
15. CURB AND GUTTER OF A GRADE OF LESS THAN 4/10 OF ONE PERCENT SHALL BE CONSTRUCTED BY FORMING. EACH JOINT SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION.
16. THE CONTRACTOR SHALL VERIFY IN THE FIELD ALL DIMENSIONS, EXISTING CONDITIONS AND POINTS OF CONNECTION WITH ADJOINING PROPERTY (PUBLIC AND PRIVATE). ANY DISCREPANCIES SHALL BE CALLED TO THE ATTENTION OF THE PROJECT ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
17. REMOVAL OR RELOCATION OF POWER POLES, TELEPHONE POLES, JOINTLY-OWNED POLES, AND APPURTENANCES WHICH INTERFERE WITH IMPROVEMENTS REQUIRED TO BE CONSTRUCTED UNDER THIS CONTRACT, SHALL BE THE RESPONSIBILITY OF THE RESPECTIVE UTILITY COMPANY. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH THE UTILITY COMPANIES FAR ENOUGH IN ADVANCE SO AS TO NOT IMPACT THE SCHEDULE.
18. COX COMMUNICATIONS SHALL BE RESPONSIBLE FOR THE VERTICAL OR HORIZONTAL ADJUSTMENT OF ALL CATV FACILITIES WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON THE CONTRACT DRAWINGS, UNLESS NOTED OTHERWISE.
19. NV ENERGY SHALL BE RESPONSIBLE FOR THE RELOCATION OF UNDERGROUND OR OVERHEAD POWER LINES THAT INTERFERE WITH THE REQUIRED IMPROVEMENTS AS SHOWN ON THE CONTRACT DRAWINGS.
20. EMBARQ SHALL BE RESPONSIBLE FOR THE VERTICAL OR HORIZONTAL ADJUSTMENT OF ALL TELEPHONE FACILITIES WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON CONTRACT DRAWINGS, UNLESS NOTED OTHERWISE.

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) NOTES

LVVWD PROJECT #136892
(REVISED 08/01/2017)

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. **WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.**
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE **2010** EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). **THE LATEST EDITION OF UDACS SHALL SUPERCEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.**
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE **2010** EDITION OF THE UDACS.
9. ALL WATER FACILITIES AND APPURTENANCES SHALL BE DISINFECTED, PRESSURE TESTED, AND HAVE AN ACCEPTABLE PASSING HEALTH WATER SAMPLE OBTAINED, PRIOR TO OPERATION AND USE.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802 TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01 AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD APPROVED PRODUCT'S LIST FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS BY SUBMITTING SHOP DRAWINGS..
13. TELEPHONE "CALL BEFORE YOU DIG" AT "811" OR 1-800-227-2600.
14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVWD) MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARD, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.

    ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DIRING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.
15. **NO LEAD COMPLIANCE NOTE:**
    TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER WORKS BRASS PRODUCTS PROPOSED TO BE RELOCATED, OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT.THE OLD LEADED PRODUCT MAY NOT BE REUSED.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. 136892 FIRST APPROVED DATE: ____________

PROFESSIONAL ENGINEER STATE OF NEVADA — PAUL A. BATES — Exp: 12/31/20 — CIVIL — No. 18723
10/14/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

GENERAL NOTES

JOB NO. 100060655
DATE: OCTOBER, 2019
DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: NONE
VERT.: NONE
DRAWING NO. 3/44
CLV 00-00000

RED ROCK CANYON
NATIONAL CONSERVATION AREA
UNITED STATES OF AMERICA
APN 137-15-101-001

REVERENCE / VILLAGE 26

VILLAGE 27

VILLAGE 22

VILLAGE 25

FUTURE STREET K

FUTURE LAKE MEAD BOULEVARD

FUTURE KESTREL CREEK AVENUE

FUTURE CLOWDER PASS WAY

FUTURE FLEET WING AVENUE

FUTURE KETTLE RIDGE DRIVE

FUTURE SCURRY BEND DRIVE

FUTURE DESERT FOOTHILLS DRIVE

FUTURE KETTLE BEND DRIVE

FUTURE PARCEL A

FUTURE COS-2

FUTURE PARCEL C

FUTURE PARCEL D

FUTURE PARCEL E

FUTURE PARCEL F

FUTURE PARCEL HS-1

HOWARD HUGHES COMPANY, LLC
LOT 2 OF PARCEL MAP 123, PAGE 36

HOWARD HUGHES COMPANY, LLC
LOT 2 OF PARCEL MAP 4, PAGE 51

SEE SHEETS 35 AND 36 FOR FILL WASH PLANS.

SEE SHEETS 5 TO 26 FOR KETTLE RIDGE DRIVE PLANS

SEE SHEETS 9 TO 11 FOR ROUGH GRADING OF SCURRY BEND DRIVE PLANS

SEE SHEETS 37 AND 38 FOR DEBRIS BASIN PLANS

FUTURE STOCKPILE BY SEPARATE PLANS

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.

LEGEND

FLOW LINE

N

ATKINS

GRAPHIC SCALE
100 0 100 200' 400
HORIZONTAL: 1"= 200'

SOILS REPORT

BY NOVA
PROJECT NO. G-18-176
DATED 12/03/18
EARTHWORK QUANTITIES (RAW):
CUT= 230,600 CU YDS
FILL= 206,800 CU YDS

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 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

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 PAUL A. BATES Exp: 12/31/20 CIVIL No. 19723
10/14/19

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

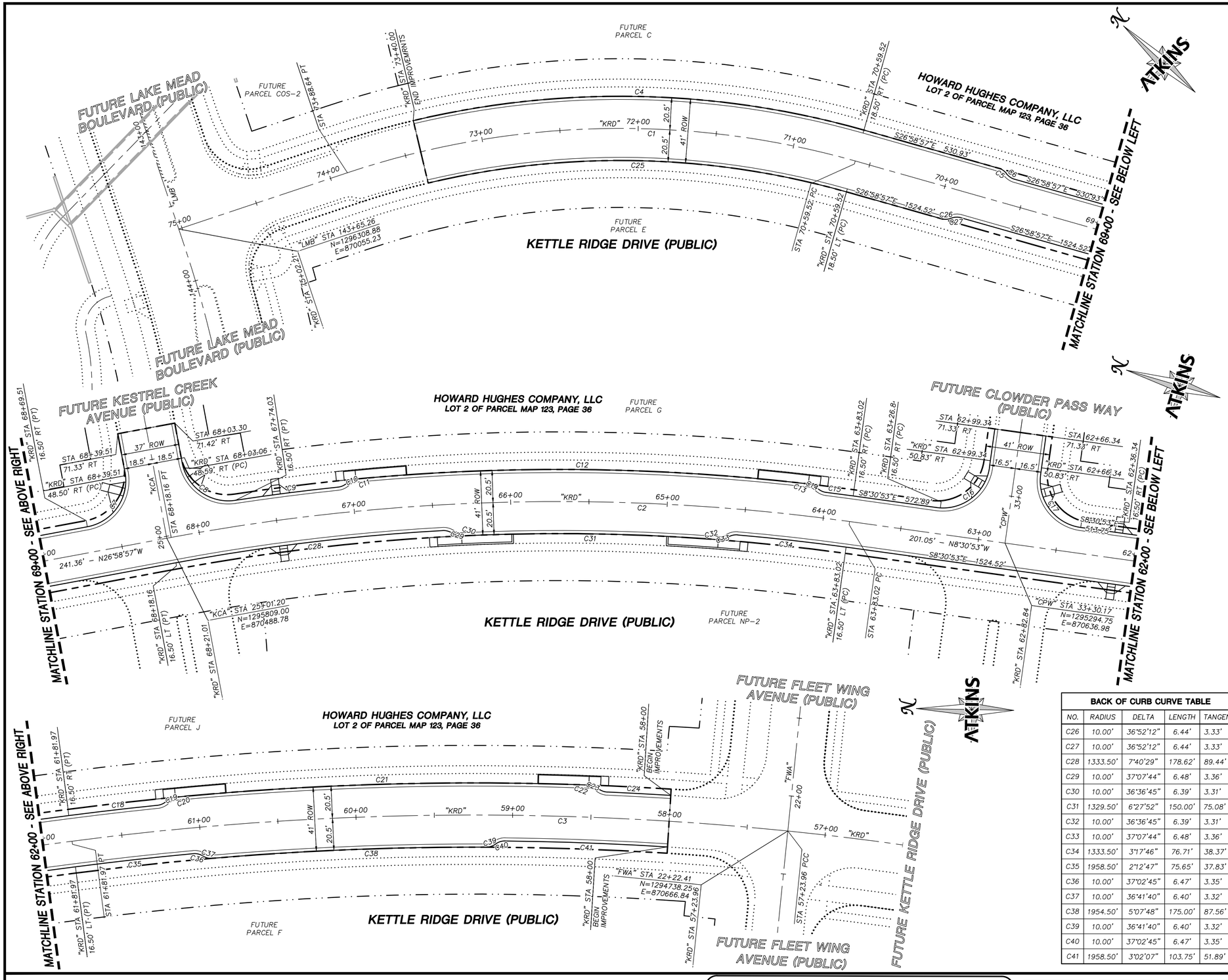
SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

MASTER GRADING PLAN

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=200'
VERT.: NONE

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 4 / 44
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-06-OVERALL DRAIN.dwg LAYOUT: MASTER GRADING PLAN Oct 15, 2019 - 9:20AM



SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
ROADWAY		
3" PLANTMIX MITUMINOUS PAVEMENT	6169	SY
STANDARD "L" TYPE CURB & GUTTER W/ TYPE II AGGREGATE BASE	3183	LF
4" AGGREGATE BASE, TYPE II	685	CY
SIDEWALK RAMP, CASE II	8	EA

CENTERLINE CURVE TABLE

NO.	RADIUS	DELTA	LENGTH	TANGENT
C1	550.00'	34°17'08"	329.12'	169.65'
C2	1350.00'	18°28'04"	435.14'	219.47'
C3	1975.00'	13°17'14"	458.02'	230.04'

BACK OF CURB CURVE TABLE

NO.	RADIUS	DELTA	LENGTH	TANGENT
C4	570.50'	29°13'07"	290.93'	148.70'
C5	10.00'	36°52'12"	6.44'	3.33'
C6	10.00'	36°52'12"	6.44'	3.33'
C7	30.00'	90°00'03"	47.12'	30.00'
C8	30.00'	88°07'37"	46.14'	29.03'
C9	1366.50'	3°03'51"	73.08'	36.55'
C10	10.00'	36°37'10"	6.39'	3.31'
C11	10.00'	37°07'19"	6.48'	3.36'
C12	1370.50'	11°29'54"	275.04'	137.98'
C13	10.00'	37°07'19"	6.48'	3.36'
C14	10.00'	36°37'10"	6.39'	3.31'
C15	1366.50'	1°01'38"	24.50'	12.25'
C16	30.00'	90°00'00"	47.12'	30.00'
C17	30.00'	90°00'00"	47.12'	30.00'
C18	1991.50'	1°50'36"	64.07'	32.04'
C19	10.00'	36°41'52"	6.40'	3.32'
C20	10.00'	37°02'34"	6.47'	3.35'
C21	1995.50'	7°10'41"	250.00'	125.16'
C22	10.00'	37°02'34"	6.47'	3.35'
C23	10.00'	36°41'52"	6.40'	3.32'
C24	1991.50'	1°22'12"	47.62'	23.81'
C25	529.50'	29°13'07"	270.02'	138.02'

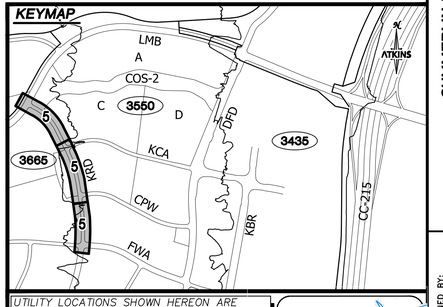
BACK OF CURB CURVE TABLE

NO.	RADIUS	DELTA	LENGTH	TANGENT
C26	10.00'	36°52'12"	6.44'	3.33'
C27	10.00'	36°52'12"	6.44'	3.33'
C28	1333.50'	7°40'29"	178.62'	89.44'
C29	10.00'	37°07'44"	6.48'	3.36'
C30	10.00'	36°36'45"	6.39'	3.31'
C31	1329.50'	6°27'52"	150.00'	75.08'
C32	10.00'	36°36'45"	6.39'	3.31'
C33	10.00'	37°07'44"	6.48'	3.36'
C34	1333.50'	3°17'46"	76.71'	38.37'
C35	1958.50'	2°12'47"	75.65'	37.83'
C36	10.00'	37°02'45"	6.47'	3.35'
C37	10.00'	36°41'40"	6.40'	3.32'
C38	1954.50'	5°07'48"	175.00'	87.56'
C39	10.00'	36°41'40"	6.40'	3.32'
C40	10.00'	37°02'45"	6.47'	3.35'
C41	1958.50'	3°02'07"	103.75'	51.89'

ROADWAY NOTES

1. SEE SHEET 32 FOR TYPICAL SECTIONS.
2. SEE SHEET 2 FOR ROADWAY ALIGNMENT ABBREVIATIONS

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)
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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 PRIMARY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID EXPOSURE TO GAS OR UTILITY LINES. IT'S COSTLY. Call 811 OR 1-800-642-2444

AVOID VICTIMS! 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 PAUL A. BATES Exp: 12/31/20 CIVIL No. 18723

10/14/19

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

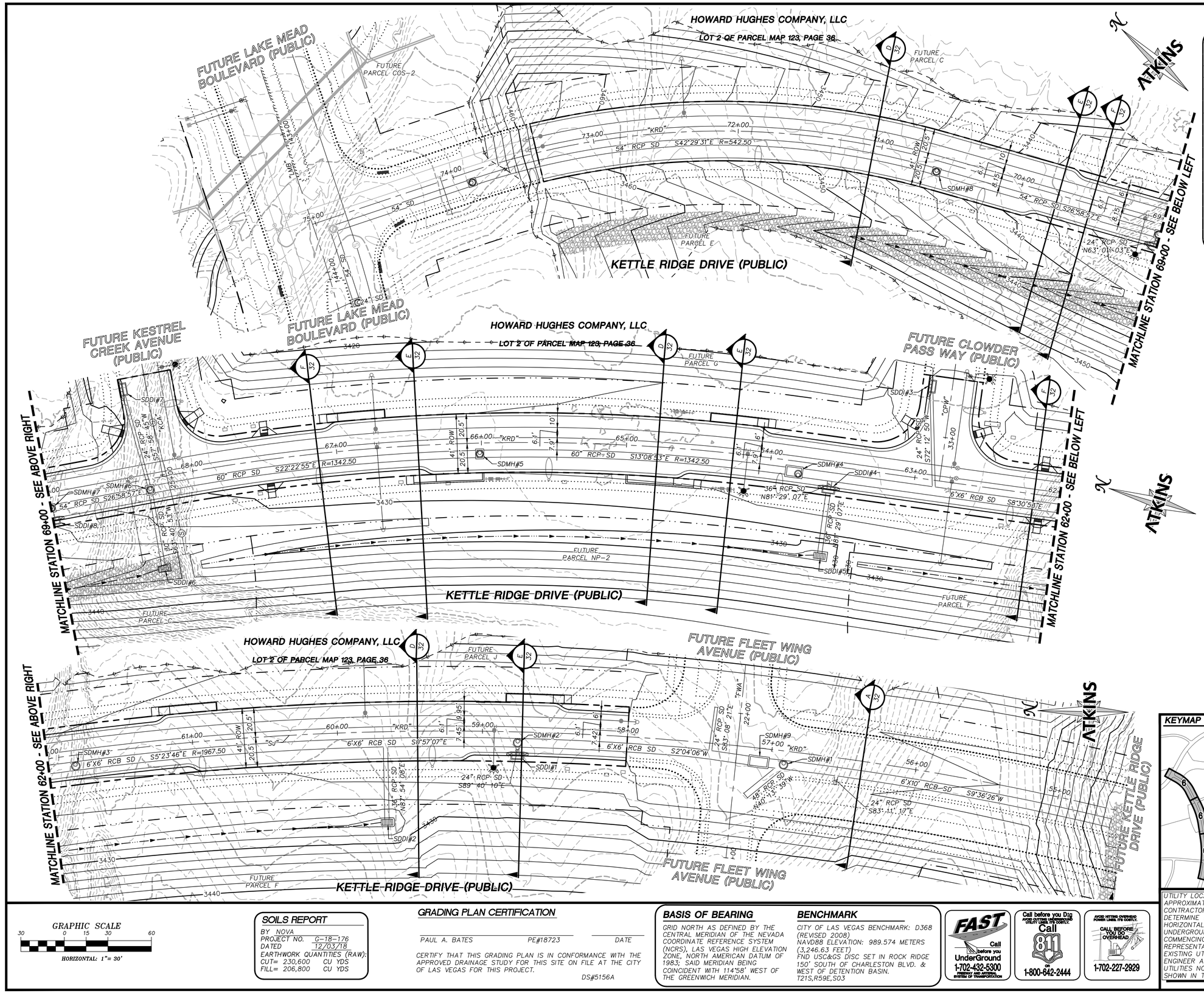
SUMMERLIN

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

HORIZONTAL CONTROL PLAN

JOB NO.	DESIGNED BY: N. BARCOS
100060655	DRAWN BY: O. OUASSANI
DATE: OCTOBER, 2019	CHECKED BY: P. BATES
DRAWING NO. 5 / 44	HORIZ.: 1"=30'
	VERT.: NONE
CLV 00-00000	

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-04-HORI-C4.dwg LAYOUT: HORIZONTAL CONTROL PLAN Oct 15, 2019 - 9:18AM



SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
DRAINAGE		
RIP-RAP (D50=8")	1890	CY
RIP-RAP (D50=24")	488	CY
7.5' TYPE "CM2" DROP INLET	3	EACH
7.5' TYPE "CM" DROP INLET	2	EACH
4' X 8' NDOT TYPE II DROP INLET	3	EACH
60" TYPE I RISER	3	EACH
30" TYPE II MANHOLE	1	EACH
60" TYPE III MANHOLE	4	EACH
24" CLASS III RCP SD	192	LF
30" CLASS III RCP SD	55	LF
36" CLASS III RCP SD	104	LF
48" CLASS III RCP SD	30	LF
54" CLASS IV RCP SD*	522	LF
60" CLASS IV RCP SD	446	LF
6' X 6' CONCRETE BOX CULVERT	860	LF
6' X 10' CONCRETE BOX CULVERT	243	LF

*WITH 1" SACRIFICIAL CONCRETE

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.

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. SEE SHEET 33 FOR REINFORCED CONCRETE BOX INFORMATION.
3. CONTRACTOR TO PROVIDE 6" MINIMUM OF CLEARANCE BETWEEN OUTSIDE OF PIPE TO INSIDE WALL OF STORM DRAIN STRUCTURES.
4. CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT FACILITY ID (APBE 0249)

GRAPHIC SCALE
30 0 15 30 60
HORIZONTAL: 1"= 30'

SOILS REPORT

BY NOVA
PROJECT NO. G-18-176
DATED 12/03/18
EARTHWORK QUANTITIES (RAW):
CUT= 230,600 CU YDS
FILL= 206,800 CU YDS

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 ARTERIAL SYSTEMS OF TRANSPORTATION

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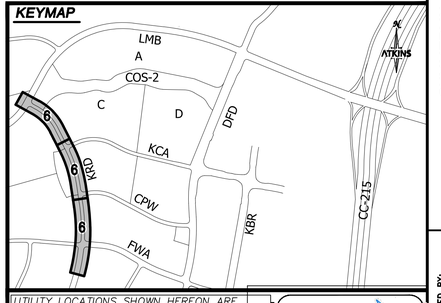
AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929



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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL A. BATES - Exp: 12/31/20 - CIVIL - No. 18723
10/14/19

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

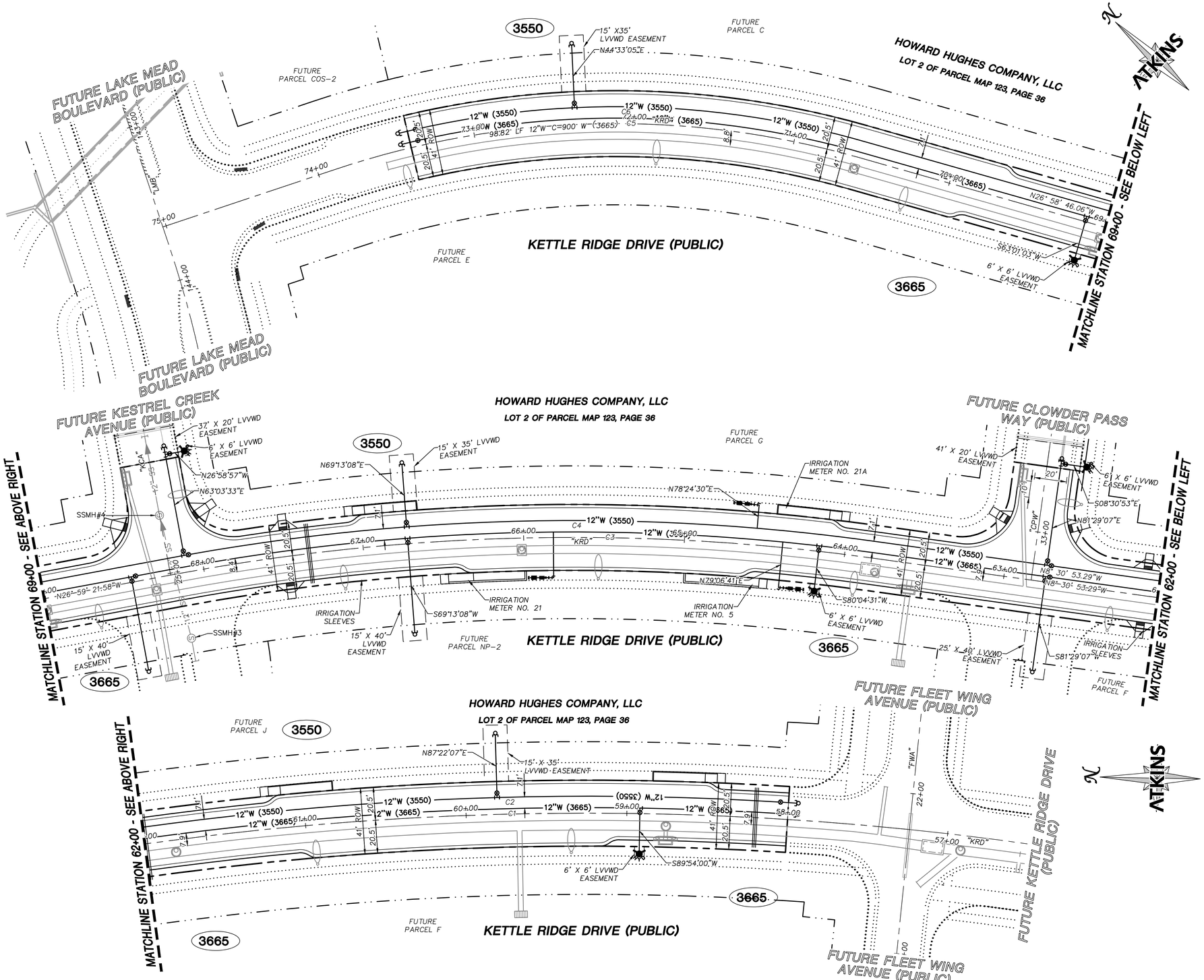
SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

MASTER DRAINAGE PLAN
KETTLE RIDGE DRIVE

JOB NO.	100060655
DATE:	OCTOBER, 2019
DRAWING NO.	6 /44
CLV	00-00000

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=30'
VERT.: NONE

X:\Projects\SummerWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-05-STRM-SD1.dwg LAYOUT: 6 Oct 15, 2019 - 9:20AM



SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
WATER		
12" C-900 PVC WATER PIPE	1789	LF
12" DUCTILE IRON WATER PIPE	1811	LF
6" C-900 PVC WATER PIPE	113	LF
12"X12" TEE PER UDACS PLATE #31	9	EA
12"X6" TEE PER UDACS PLATE #31	5	EA
12" GATE VALVE	16	EA
6" GATE VALVE	5	EA
6" FIRE HYDRANT ASSEMBLY	5	EA
IRRIGATION SLEEVES	345	LF

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 ROADWAY PLAN AND PROFILE SHEETS FOR CONSTRUCTION NOTES AND INFORMATION RELATED TO PIPE SIZE, LENGTH, AND SIZE OF FITTINGS.
2. ALL 3550 PRESSURE ZONE WATER PIPE MATERIAL TO BE WATER QUALITY RATED AWWA C-900, UNLESS OTHERWISE NOTED IN PROFILES.
3. ALL 3665 PRESSURE ZONE WATER PIPE MATERIAL TO BE DUCTILE IRON UNLESS OTHERWISE NOTED IN PROFILES.
4. ALL MEASUREMENTS ARE FROM CENTER OF FITTING TO CENTER OF FITTING.
5. INSTALL PIPELINE MARKER BALLS IN TRENCH ABOVE EACH HORIZONTAL ELBOW FITTING PER UDACS PLATE #15.
6. SEE SHEET 39 FOR WATERLINE DETAILS
7. THRUST BLOCKS WILL BE PROVIDED AT EVERY CHANGE IN DIRECTION PER UDACS PLATES #30 & #31

WATERLINE CURVE TABLE

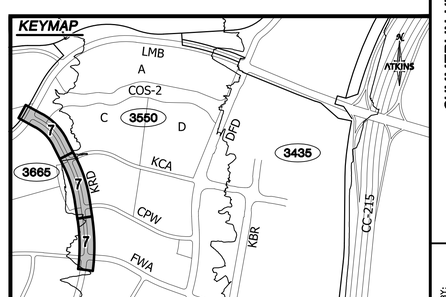
NO.	RADIUS	DELTA	LENGTH	TANGENT
C1	1978.40'	11°13'35"	387.64'	194.44'
C2	1983.57'	11°14'14"	389.03'	195.14'
C3	1358.90'	18°25'05"	436.83'	220.31'
C4	1360.09'	18°30'47"	439.46'	221.66'
C5	553.80'	30°14'07"	292.24'	149.61'
C6	560.26'	30°22'53"	297.08'	152.12'

IRRIGATION METER TABLE

NO.*	STA/OFF	FG ELEVATION	OWNER
21A	64+38.95/24.50R	3422.48	HOA
5	64+55.52/24.50L	3422.79	SUMMERLIN COUNCIL
21	67+44.47/24.50L	3424.37	HOA

*NOTE: METER NUMBERING SET BY SMP IRRIGATION MASTER PLAN DATED 03/12/2019

KEYMAP



GRAPHIC SCALE
30 0 15 30 60
HORIZONTAL: 1"= 30'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 136892 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 EMERGENCY AND INTERNAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING & 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

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PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp: 12/31/20 CIVIL No. 18729 10/14/19

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

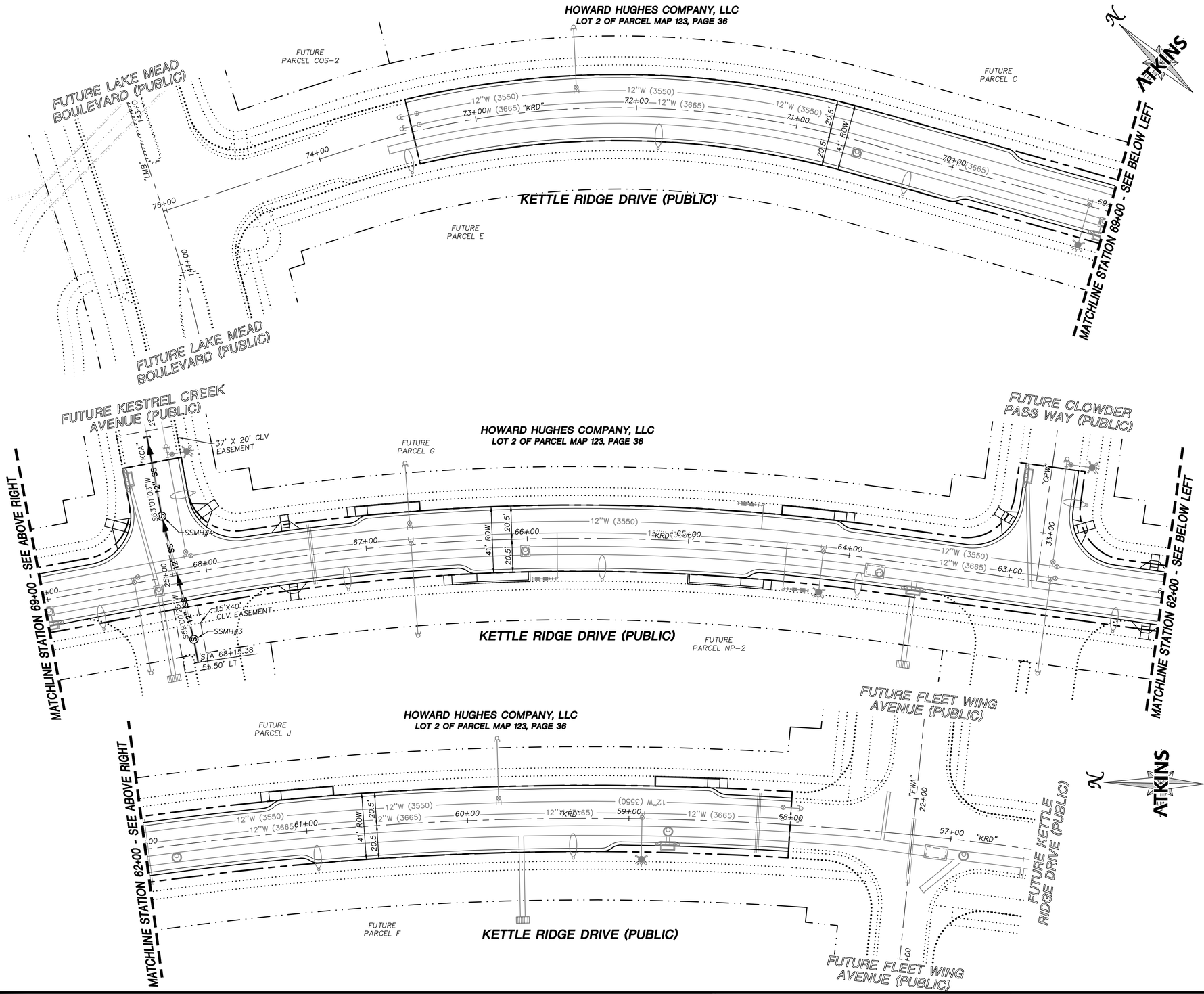
SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

MASTER WATER PLAN

JOB NO.	100060655
DATE	OCTOBER, 2019
DRAWING NO.	7/44
CLV	00-00000

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=30'
VERT.: NONE

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-07-WATR-W1.dwg LAYOUT: MASTER WATER PLAN Oct 15, 2019 - 9:21AM



GRAPHIC SCALE
30 0 15 30 60
HORIZONTAL: 1" = 30'

SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
SEWER		
12" C-900 SEWER PIPE	144	LF
SEWER MANHOLE	2	EA
SEWER CAP	2	EA

MASTER PLAN NOTE

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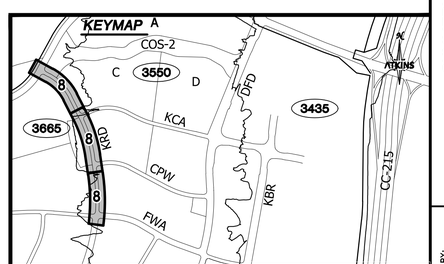
SEWER NOTES

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.
5. IN ROUGH GRADING AREAS, RIM ELEVATION FOR STRUCTURES IS SET AT 8.5" ABOVE ROUGH GRADE.



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

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 PAUL A. BATES Exp: 12/31/20 No. 18723 CIVIL 10/14/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

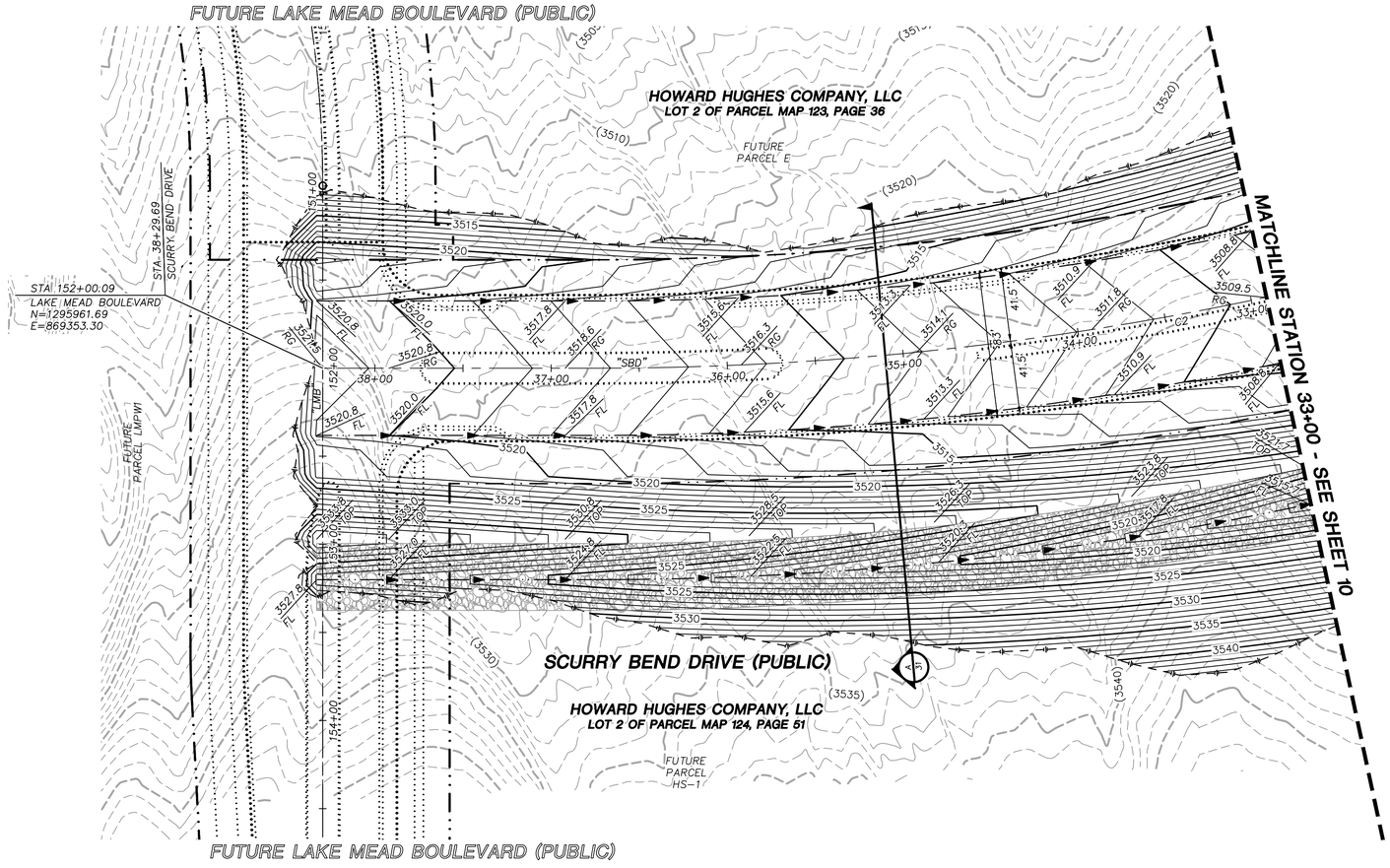
MASTER SEWER PLAN

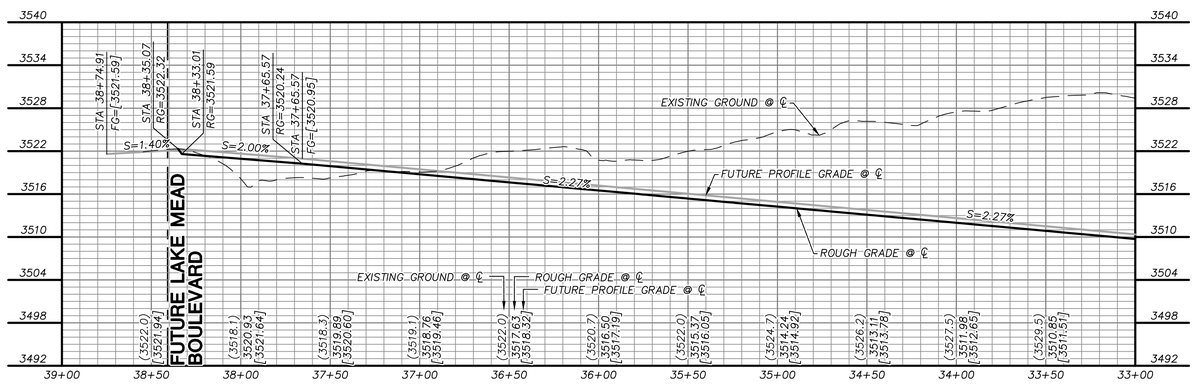
DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=30'
VERT.: NONE

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 8 /44
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-08-SEWER-SS1.dwg LAYOUT: MASTER SEWER PLAN Oct 15, 2019 - 9:22AM

CENTERLINE CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C2	1803.50'	26°17'46"	827.72'	421.28'

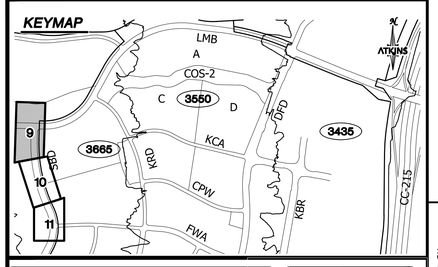




ROUGH GRADE

THE PROPOSED ROUGH GRADE IN PAVEMENT IS 8 1/2" BELOW THE FINISH GRADE SHOWN WITHIN THESE PLANS.

KEYMAP



GRAPHIC SCALE

40 0 20 40 80

HORIZONTAL: 1"=40'

10 0 5 10 20

VERTICAL: 1"=10'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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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NAD88 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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PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp: 12/31/20 CIVIL No. 10723 10/14/19

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

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SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

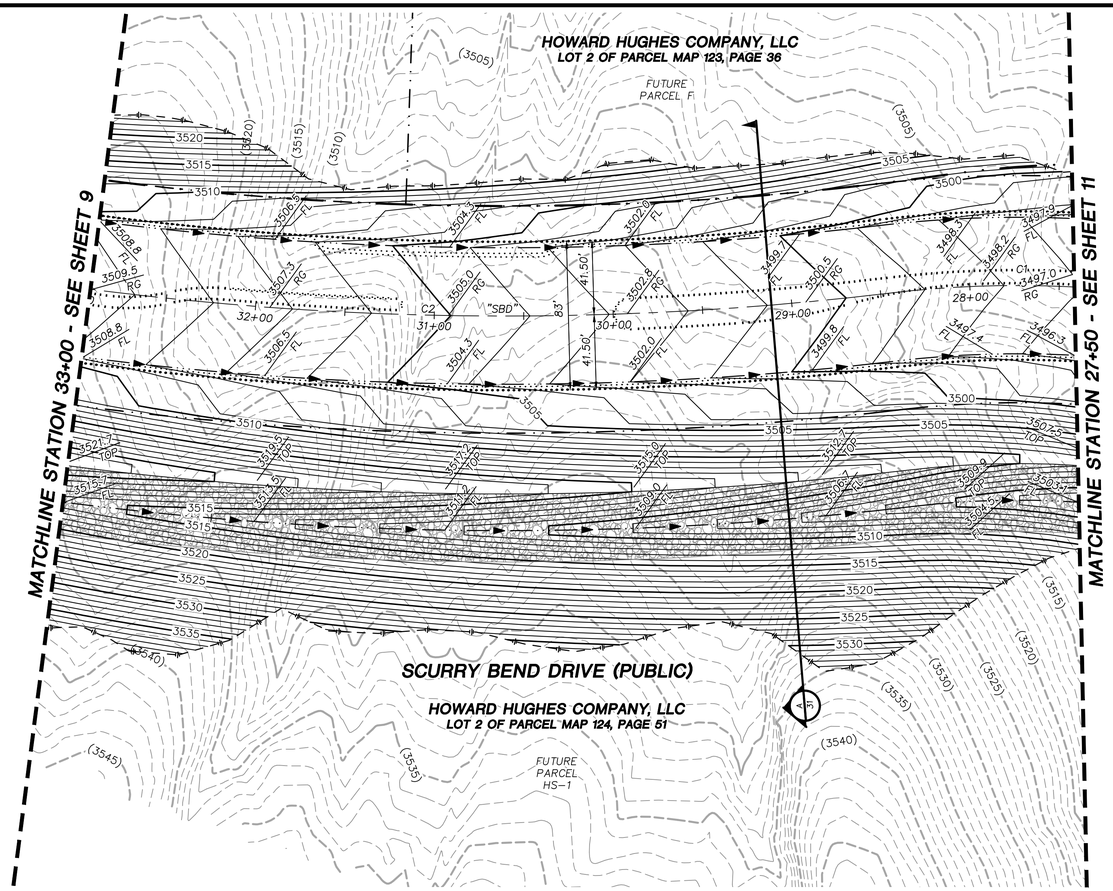
ROUGH GRADING PLAN AND PROFILE
SCURRY BEND DRIVE STA. 33+00 TO END

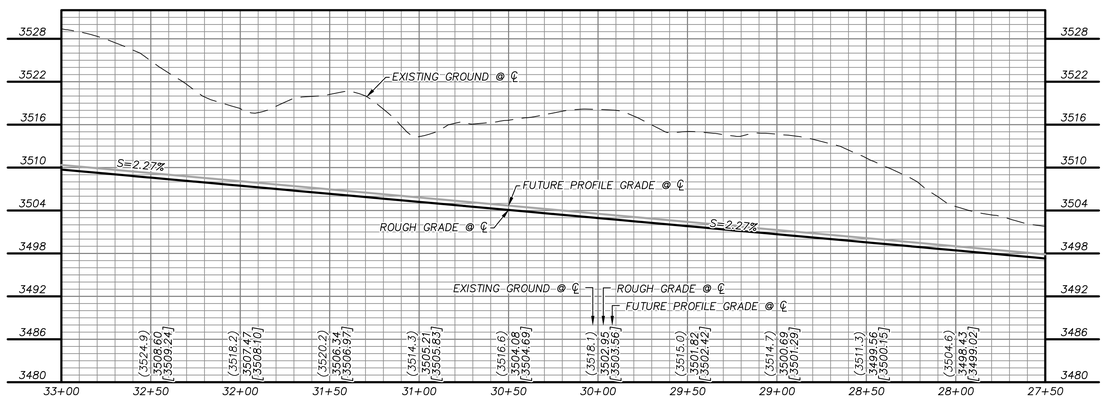
DESIGNED BY: N. BARCOS
DRAWN BY: L. MAMACLAY
CHECKED BY: P. BATES
HORIZ.: 1"=40'
VERT.: 1"=8'

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 9 /44
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-13-GRAD-02.dwg LAYOUT: 9 Oct 15, 2019 - 9:01AM

CENTERLINE CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C1	610.00'	48°26'31"	515.74'	274.41'
C2	1803.50'	26°17'46"	827.72'	421.28'





GRAPHIC SCALE

40 0 20 40 80

HORIZONTAL: 1"=40'

10 0 5 10 20

VERTICAL: 1"=10'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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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FND USC&GS DISC SET IN ROCK RIDGE 150' SOUTH OF CHARLESTON BLVD. & WEST OF DETENTION BASIN.
T21S,R59E,S03

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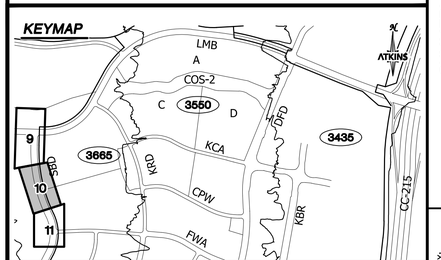
Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. Call 811 or 1-800-642-2444

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

ROUGH GRADE

THE PROPOSED ROUGH GRADE IN PAVEMENT IS 8 1/2" BELOW THE FINISH GRADE SHOWN WITHIN THESE PLANS.

KEYMAP



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PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp: 12/31/20 CIVIL No. 18723 10/14/19

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

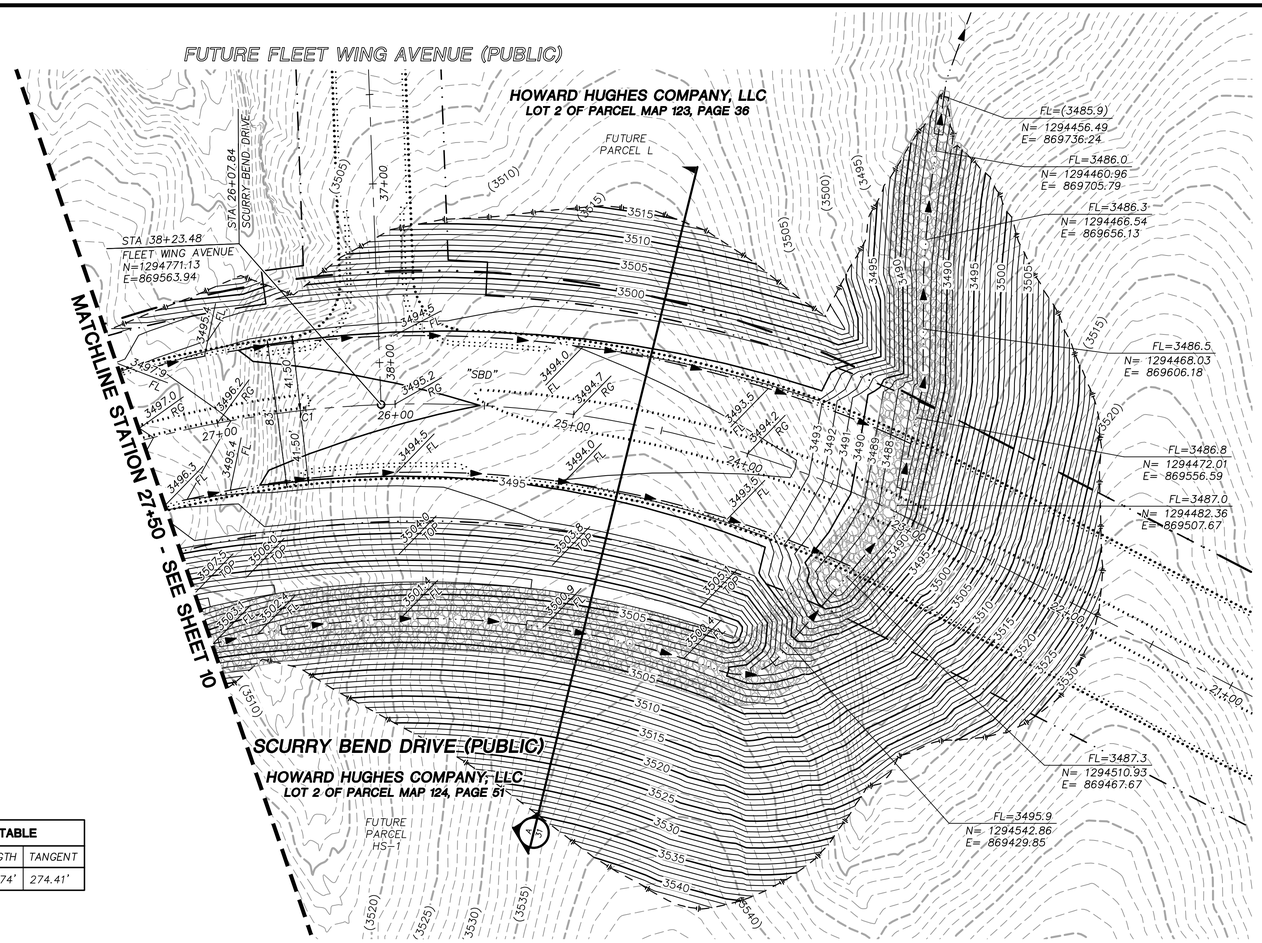
SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROUGH GRADING PLAN AND PROFILE
SCURRY BEND DRIVE STA. 27+50 TO STA. 33+00

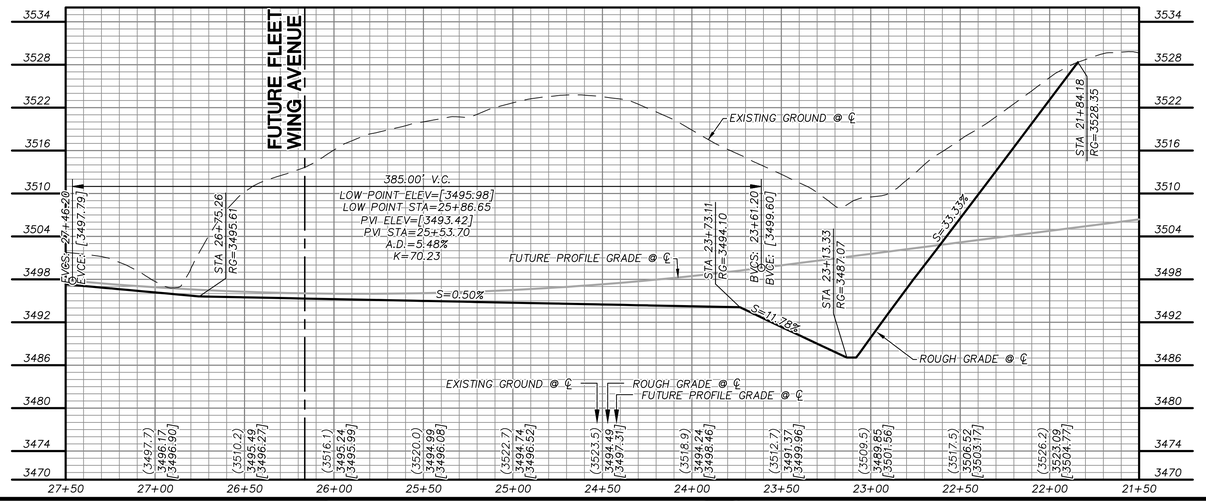
DESIGNED BY: N. BARCOS
DRAWN BY: L. MAMACLAY
CHECKED BY: P. BATES
HORIZ.: 1"=40'
VERT.: 1"=8'

JOB NO. 100060655
DATE OCTOBER, 2019
DRAWING NO. 10/44
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-13-GRAD-02.dwg LAYOUT: 10 Oct 15, 2019 - 9:02AM



CENTERLINE CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C1	610.00'	48°26'31"	515.74'	274.41'



GRAPHIC SCALE

40 0 20 40 80

HORIZONTAL: 1"=40'

10 0 5 10 20

VERTICAL: 1"=10'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 OUTAGES, INTERRUPTIONS, UTILITY LINES. IT'S COSTLY. Call 811 OR 1-800-642-2444

AVOID VICTIMS, OVERHEAD POWER LINES. IT'S COOPER. CALL BEFORE YOU DIG OVERHEAD 1-702-227-2929

ROUGH GRADE

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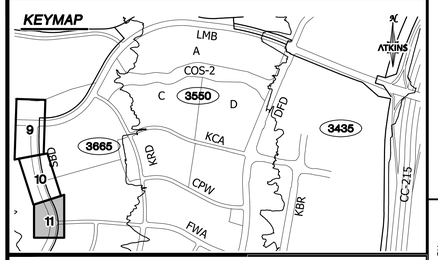
KEYMAP



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PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp: 12/31/20 CIVIL No. 18723 10/14/19

REVISIONS

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ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
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Fax: +1.702.263.7200

SUMMERLIN

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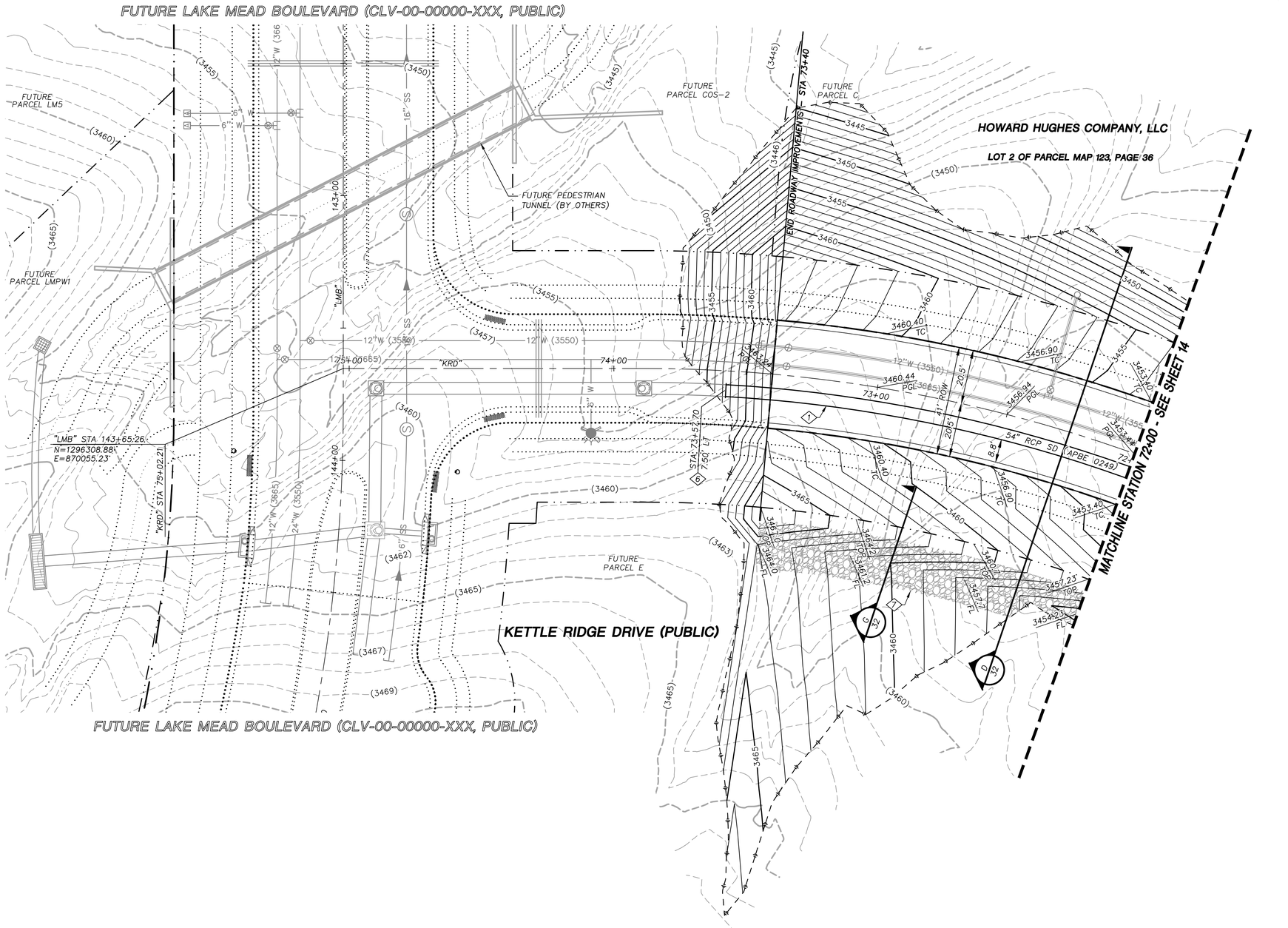
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROUGH GRADING PLAN AND PROFILE
SCURRY BEND DRIVE BEGIN TO STA 27+50

DESIGNED BY: N. BARCOS
DRAWN BY: L. MAMACLAY
CHECKED BY: P. BATES
HORIZ.: 1"=40'
VERT.: 1"=8'

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 11/44
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-13-GRAD-02.dwg LAYOUT: 11 Oct 15, 2019 - 9:02AM



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7. INSTALL RIP-RAP (D50=8", THICKNESS=16") PER DETAIL H ON SHEET 32
8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 33 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 33 FOR RCB INFORMATION

REVISIONS

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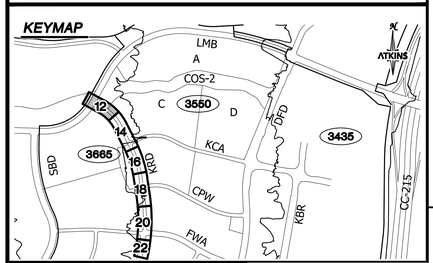

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 DATE

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DS#5156A

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PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp: 12/31/20 CIVIL No. 18723 10/14/19

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Fax: +1.702.263.7200

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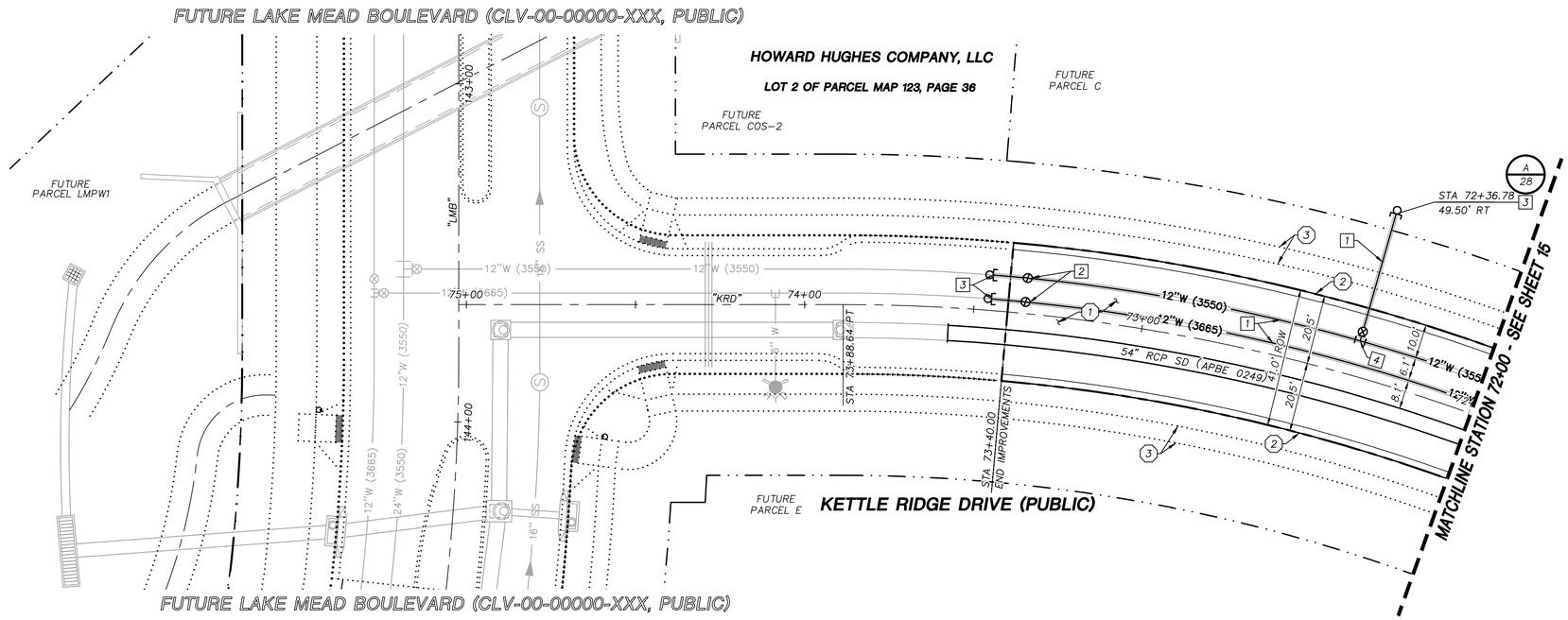
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

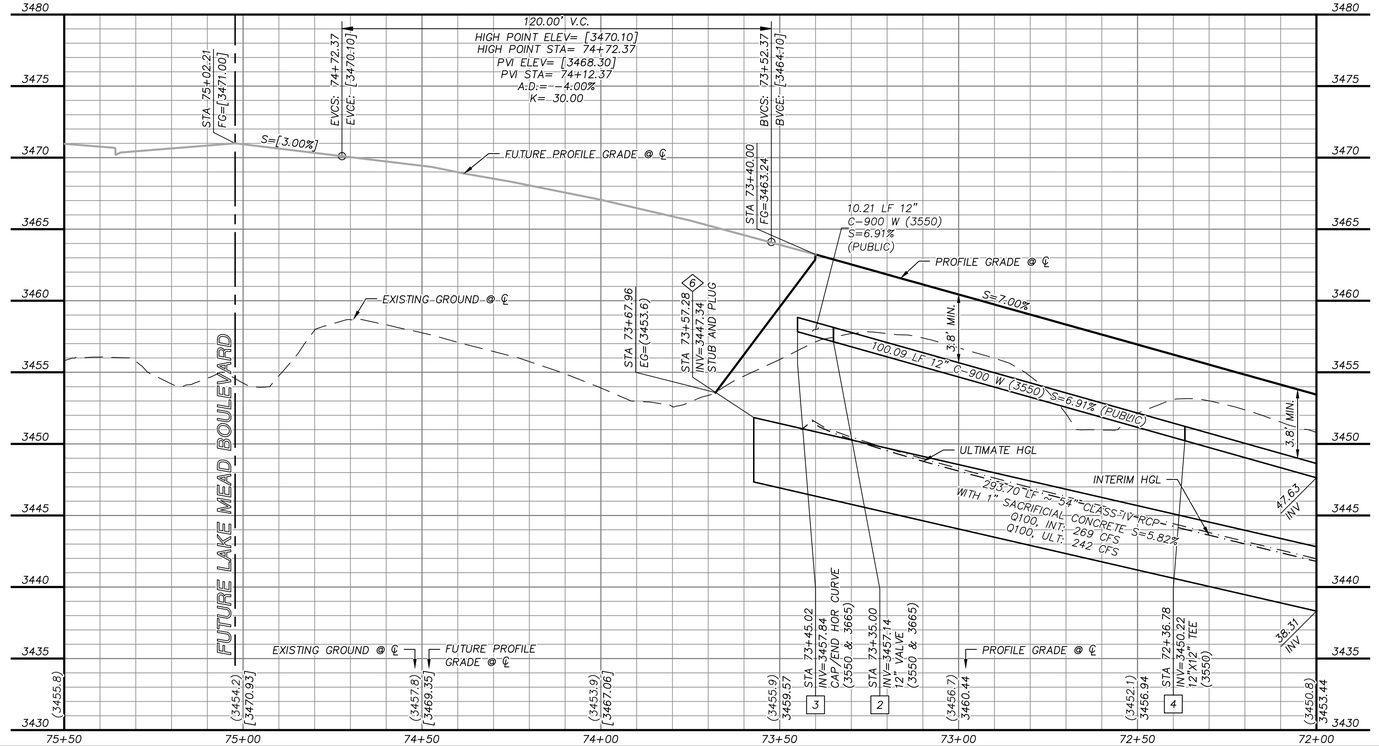
ROADWAY GRADING PLAN
KETTLE RIDGE DRIVE STA. 72+00 TO END

DESIGNED BY: N. BARCOS
DRAWN BY: O. OUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 12/44
CLV 00-00000

X:\Projects\SummerWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-09-GRAD-01.dwg LAYOUT: 12 Oct 15, 2019 - 9:02AM





STORM DRAIN CONSTRUCTION NOTES

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9. DIRECT CONNECTION INTO RCB SEE SHEET 33 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 33 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).

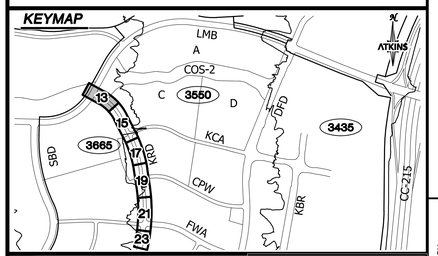
WATERLINE CONSTRUCTION NOTES

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" SERVICE SADDLE PER UDACS PLATE #4

ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 32 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 39.

KEYMAP



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

PROJECT NO. 136892 FIRST APPROVED DATE: _____

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

BASIS OF BEARING

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T21S,R59E,S03

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Call before you Dig AVOID CUTTING HYDROCARBON UTILITY LINES. IT'S COSTLY. Call 811 OR 1-800-642-2444

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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL A. BATES Exp.: 12/31/20 CIVIL No. 18723
10/14/19

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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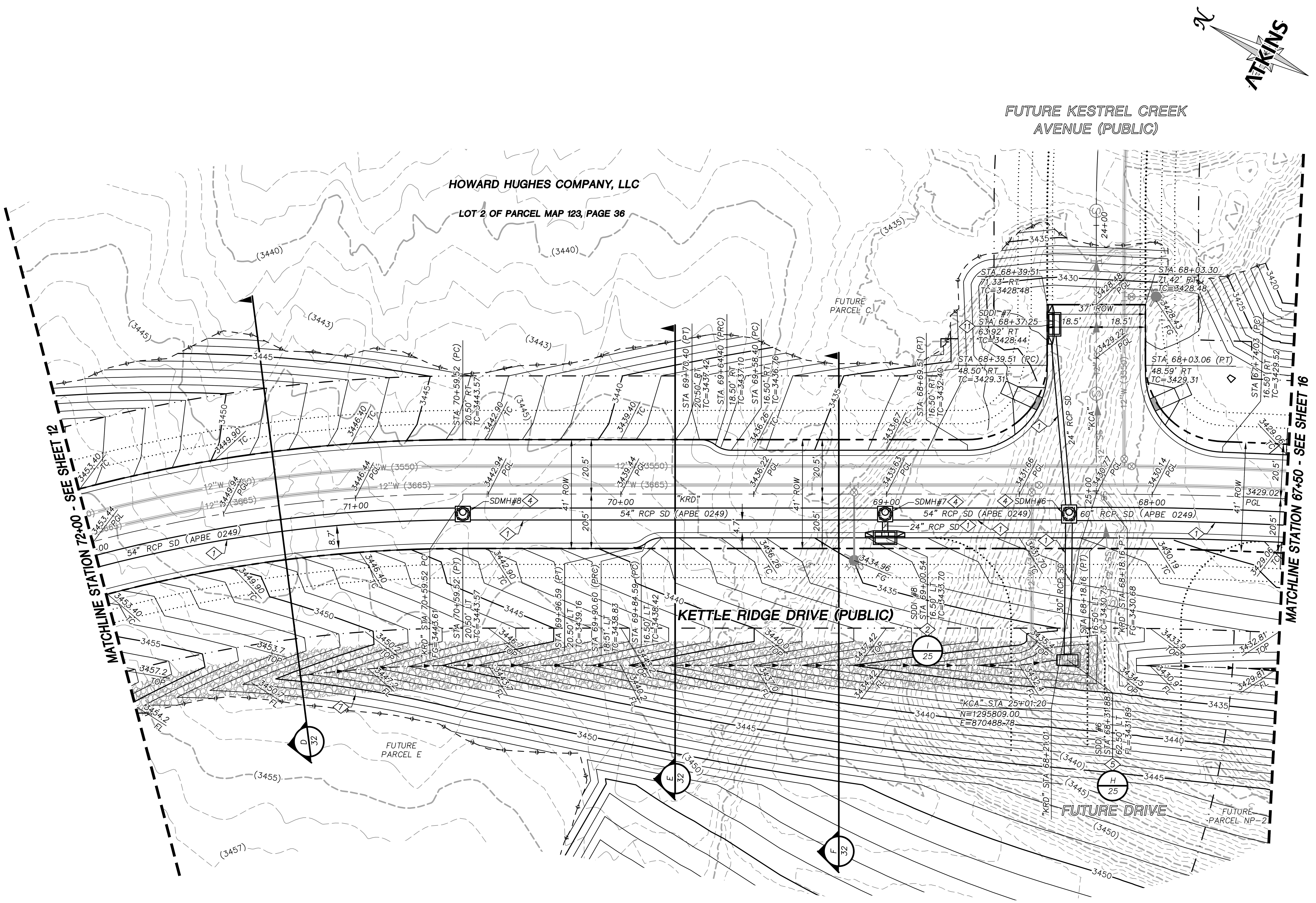
ROADWAY PLAN AND PROFILE
KETTLE RIDGE DRIVE STA. 72+00 TO END

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 13/44
CLV 00-00000

K:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-11-PLAN-P1.dwg LAYOUT: 13 Oct 15, 2019 - 9:02AM



STORM DRAIN CONSTRUCTION NOTES

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2. INSTALL TYPE "CM2" DROP INLET PER CCAUSD #412.1 & #421
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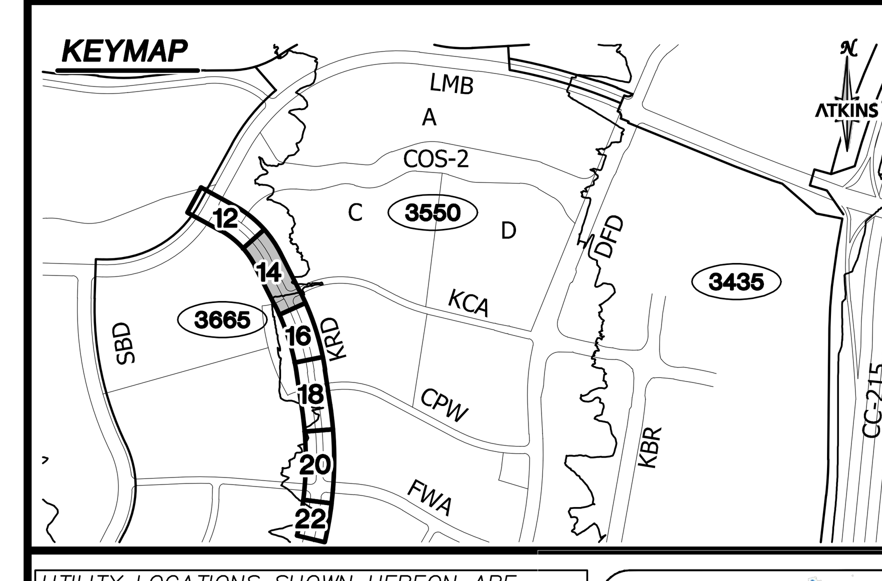
SUMMERLIN

KEYMAP



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Exp: 12/31/20
CIVIL
No. 18723
10/14/19

SUMMERLIN VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN
KETTLE RIDGE DRIVE STA 67+50 TO STA 72+00

JOB NO. 100060655
DATE: OCTOBER, 2019
DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE
DRAWING NO. 14/44
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-09-GRAD-G1.dwg LAYOUT: 14 Oct 15, 2019 - 9:02AM

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

BASIS OF BEARING

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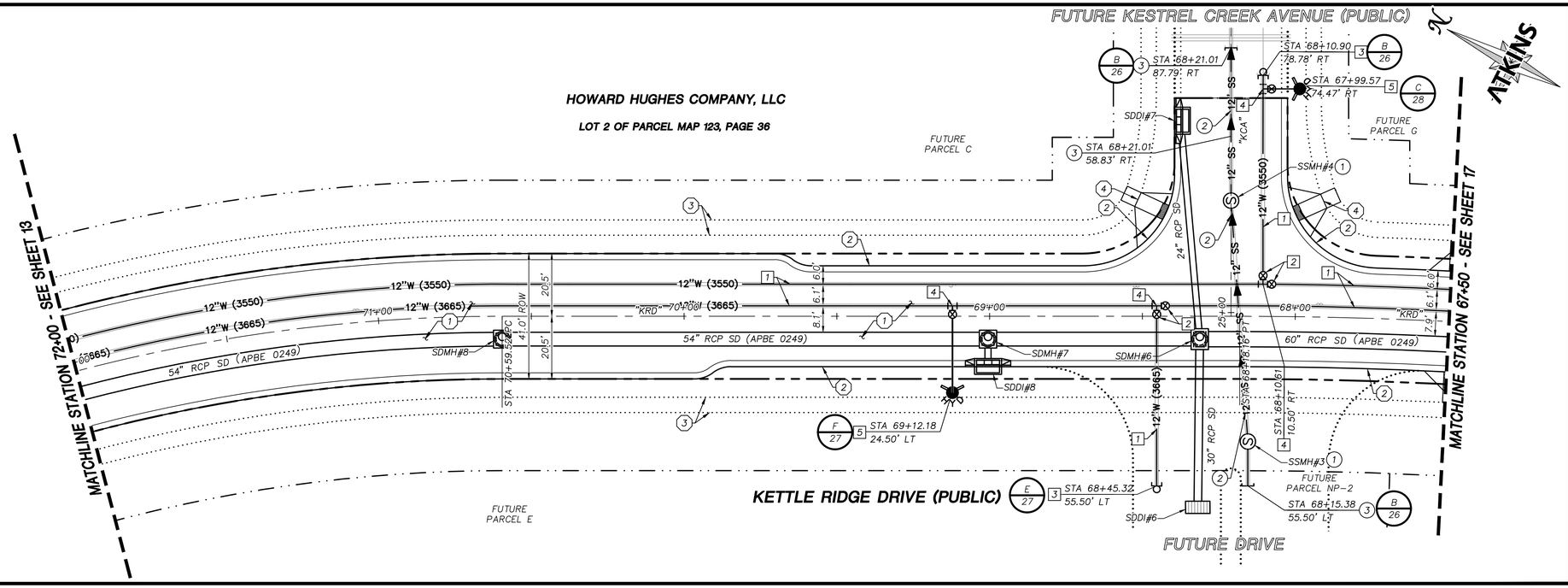

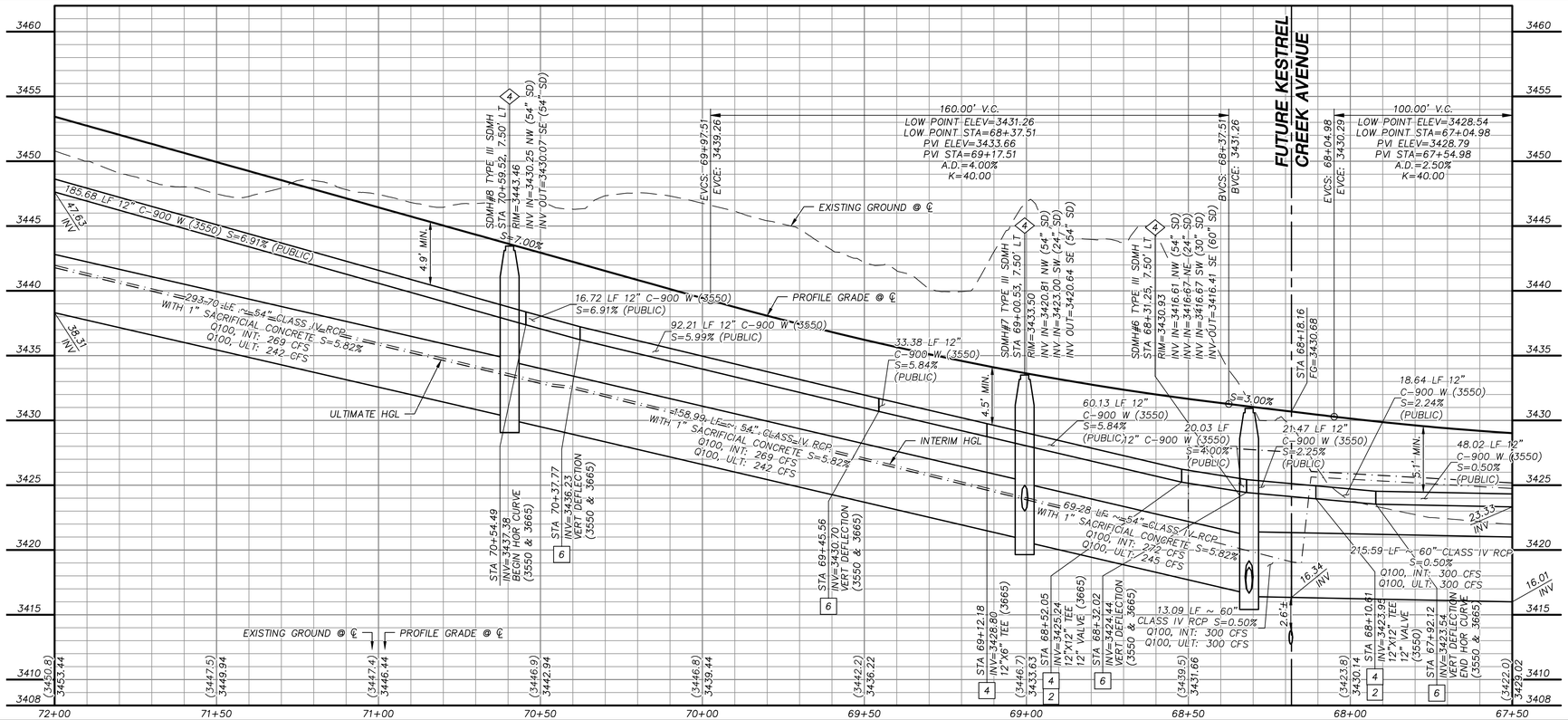

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11. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
12. INSTALL PRECAST REINFORCED CONCRETE BOX PER NDOT STANDARD 502 AND 503 SEE SHEET 33 FOR RCB INFORMATION

SEWER CONSTRUCTION NOTES

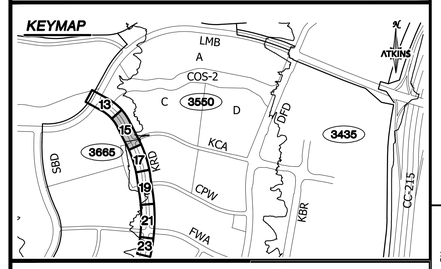
1. INSTALL SEWER MANHOLE PER DCSWCS SD-1A, SD-1B, AND SD-4
2. INSTALL SEWER MAIN PER DCSWCS SD-17
3. STUB AND CAP SEWER PIPE. PLACE MARKER BALL AND 4"X4" POST, DOUGLAS FIR, OVER END OF PIPE AND INSTALL THRUST BLOCK (1 CUBIC FT. MINIMUM).

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" SERVICE SADDLE PER UDACS PLATE #4

ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 32 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 39.



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

PROJECT NO. 136892 FIRST APPROVED DATE: _____

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 (EMERGENCY 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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PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp.: 12/31/20 CIVIL No. 18729 10/14/19

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

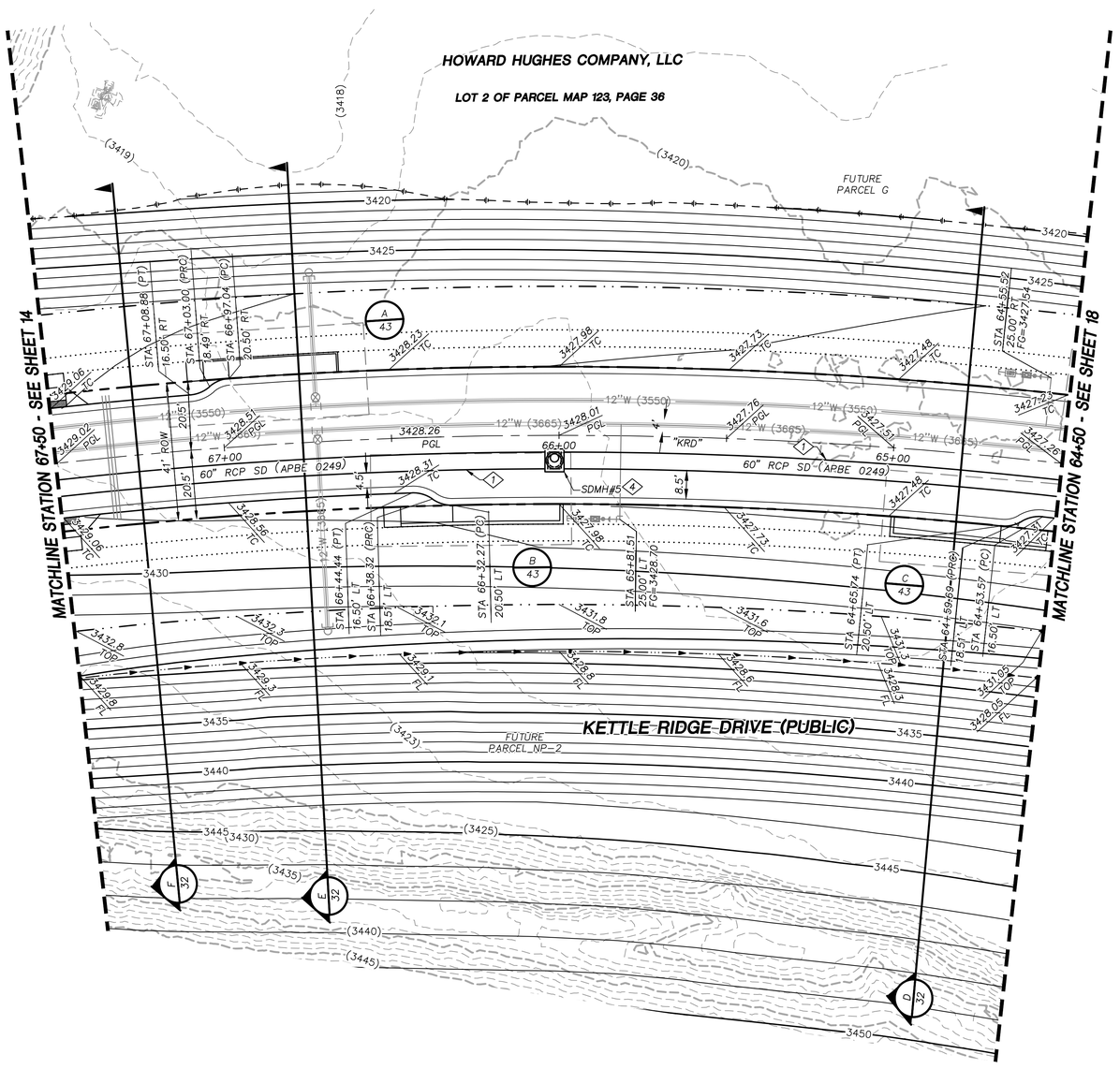
SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET M) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE
KETTLE RIDGE DRIVE STA. 67+50 TO STA. 72+00

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 15/44
CLV 00-00000

K:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-11-PLAN-P1.dwg LAYOUT: 15 Oct 15, 2019 - 9:03AM



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 33)
7. INSTALL RIP-RAP (D50=8", THICKNESS=16") PER DETAIL H ON SHEET 32
8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 33 FOR DETAIL
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11. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
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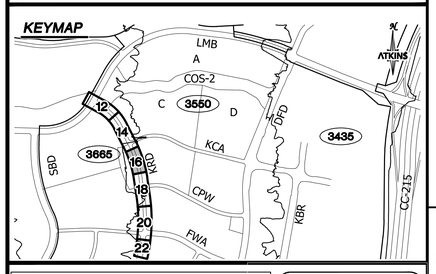

GRAPHIC SCALE
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HORIZONTAL: 1"=20'

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PAUL A. BATES PE#18723 DATE

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DS#5156A

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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL A. BATES - Exp: 12/31/20 - CIVIL - No. 18723
10/14/19

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN
KETTLE RIDGE DRIVE STA. 64+50 TO STA. 67+50

JOB NO.	100060655
DATE:	OCTOBER, 2019
DRAWING NO.	16/44

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

CLV 00-00000

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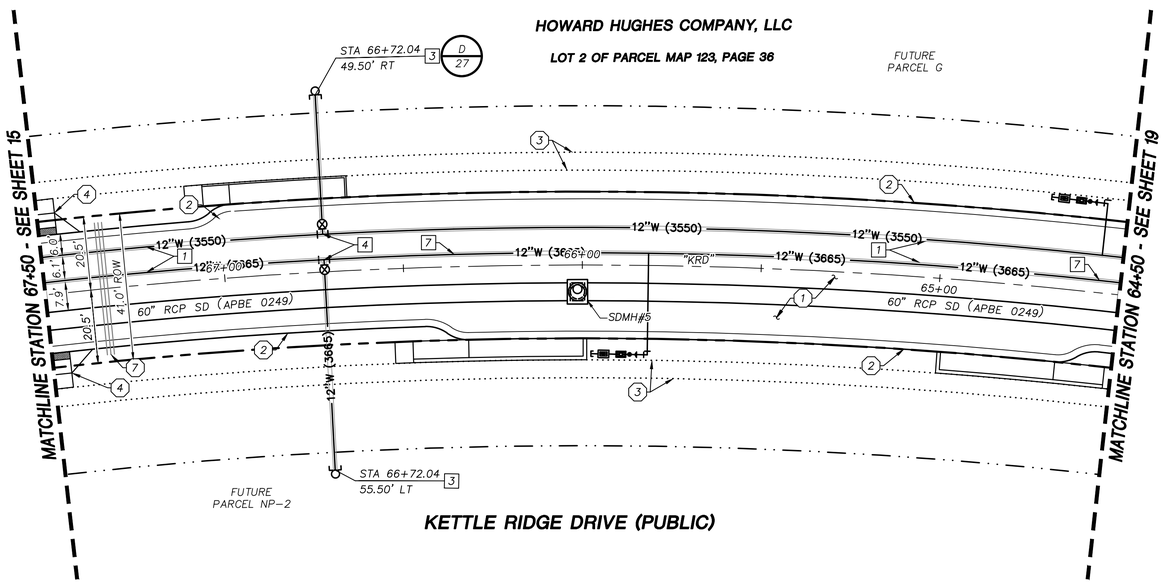

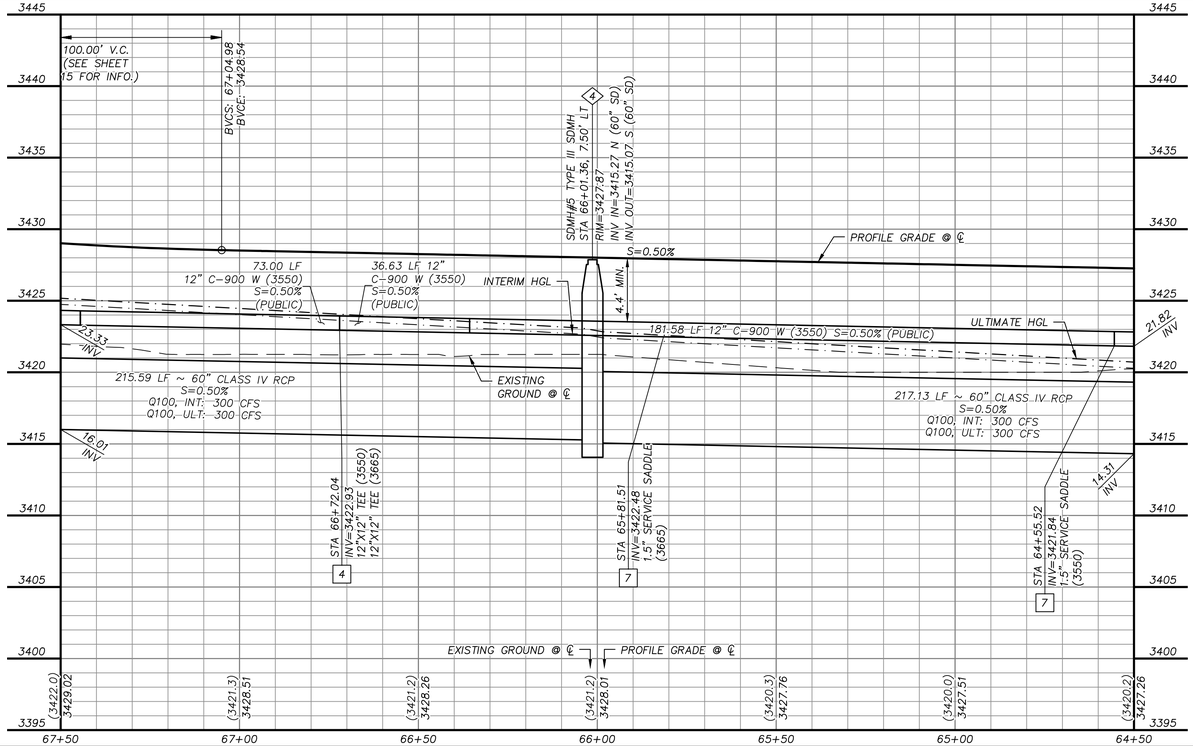

GRAPHIC SCALE

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HORIZONTAL: 1"=20'

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VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 136892 FIRST APPROVED DATE: _____

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PAUL A. BATES PE#18723 DATE

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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
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10. INSTALL TYPE I SD RISER PER CCAUSD #403.1
11. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
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SEWER CONSTRUCTION NOTES

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ROADWAY CONSTRUCTION NOTES

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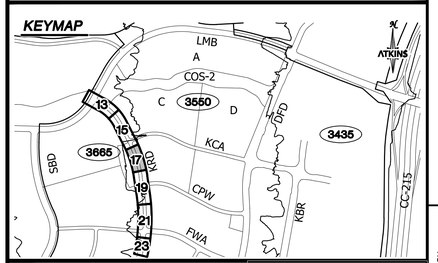
3. FUTURE SIDEWALK BY OTHERS
4. CONSTRUCT CURB RAMP, TYPE A, PER NDOT STANDARD PLAN R-5.2.1.
5. CONSTRUCT 0" FLUSH CURB
6. TRANSITION CURB FROM FULL HEIGHT (6") TO FLUSH (0")
7. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4",1-6") PER DETAIL C ON SHEET 39.

KEYMAP



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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL A. BATES - Exp.: 12/31/20 - CIVIL - No. 18723 - 10/14/19

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 VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET M) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE
KETTLE RIDGE DRIVE STA. 64+50 TO STA. 67+50

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 17/44
CLV 00-00000

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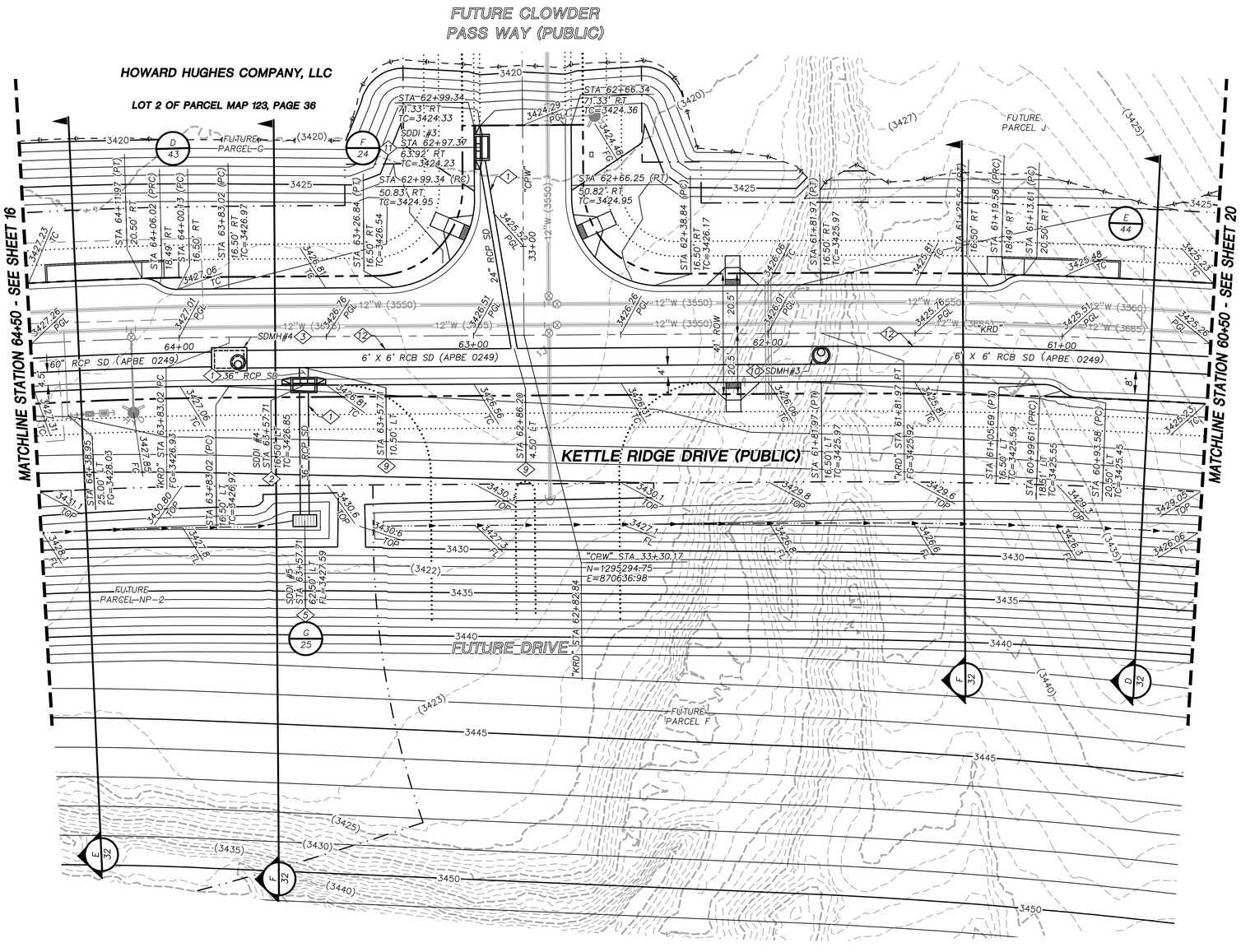

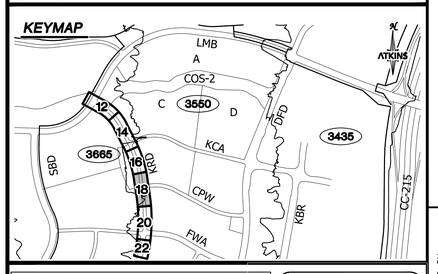

STORM DRAIN CONSTRUCTION NOTES

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REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL A. BATES - Exp: 12/31/20 - CIVIL - No. 18723
10/14/19

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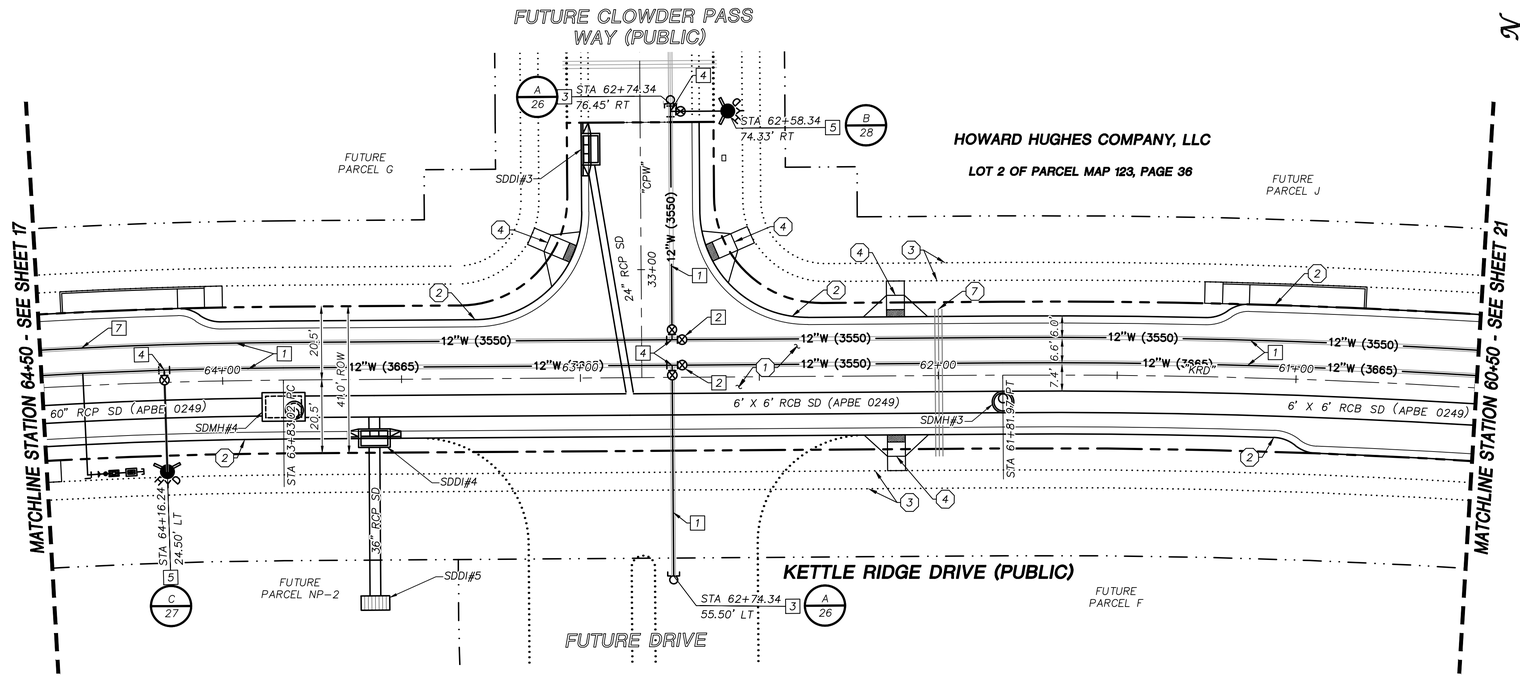
ROADWAY GRADING PLAN
KETTLE RIDGE DRIVE STA. 60+50 TO STA. 64+50

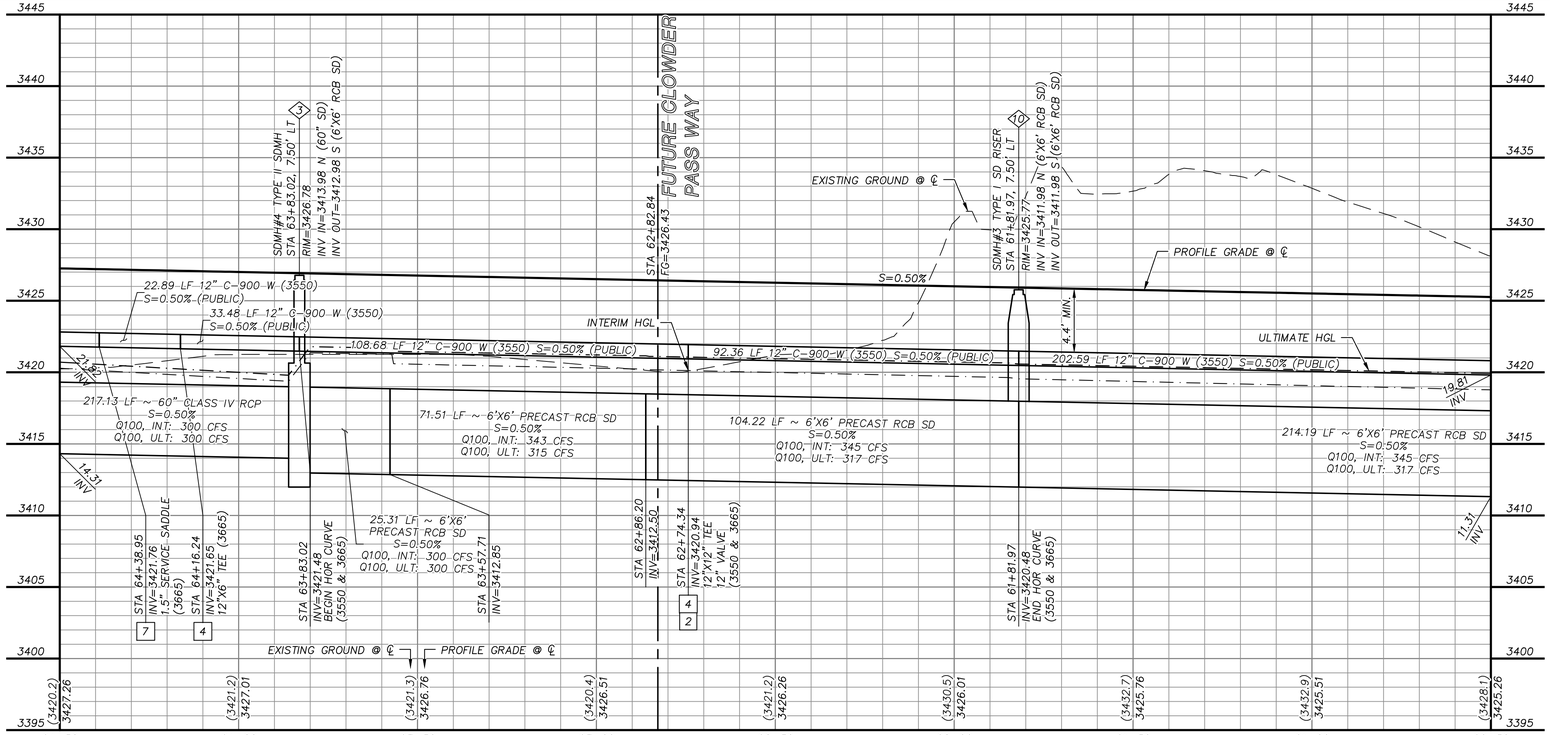
JOB NO.	100060655
DATE:	OCTOBER, 2019
DRAWING NO.	18/44

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - Y22N Street J (Lake Mead to Street G)_Sheets\60655-09-GRAD-G1.dwg LAYOUT: 18 Oct 15, 2019 - 9:04AM





GRAPHIC SCALE

20 0 10 20 40

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APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 136892 FIRST APPROVED DATE: _____

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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 33 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).

WATERLINE CONSTRUCTION NOTES

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3. INSTALL CAP AND 2" MANUAL BLOWOFF ASSEMBLY PER UDACS PLATE #36
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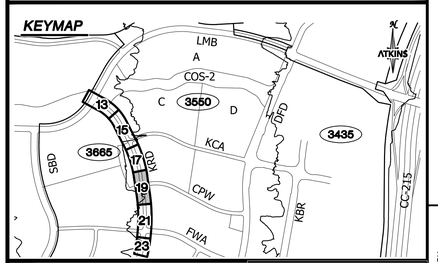
5. INSTALL FIRE HYDRANT WITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40.
6. INSTALL DEFLECTION AT PIPE JOINTS (MAXIMUM OF 1°)
7. INSTALL 1.5" SERVICE SADDLE PER UDACS PLATE #4

ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 32 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 39.

KEYMAP



REV.	DESCRIPTION	BY	DATE	APPROVAL
	REVISIONS			

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7375
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET H) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE
KETTLE RIDGE DRIVE STA. 60+50 TO STA. 64+50

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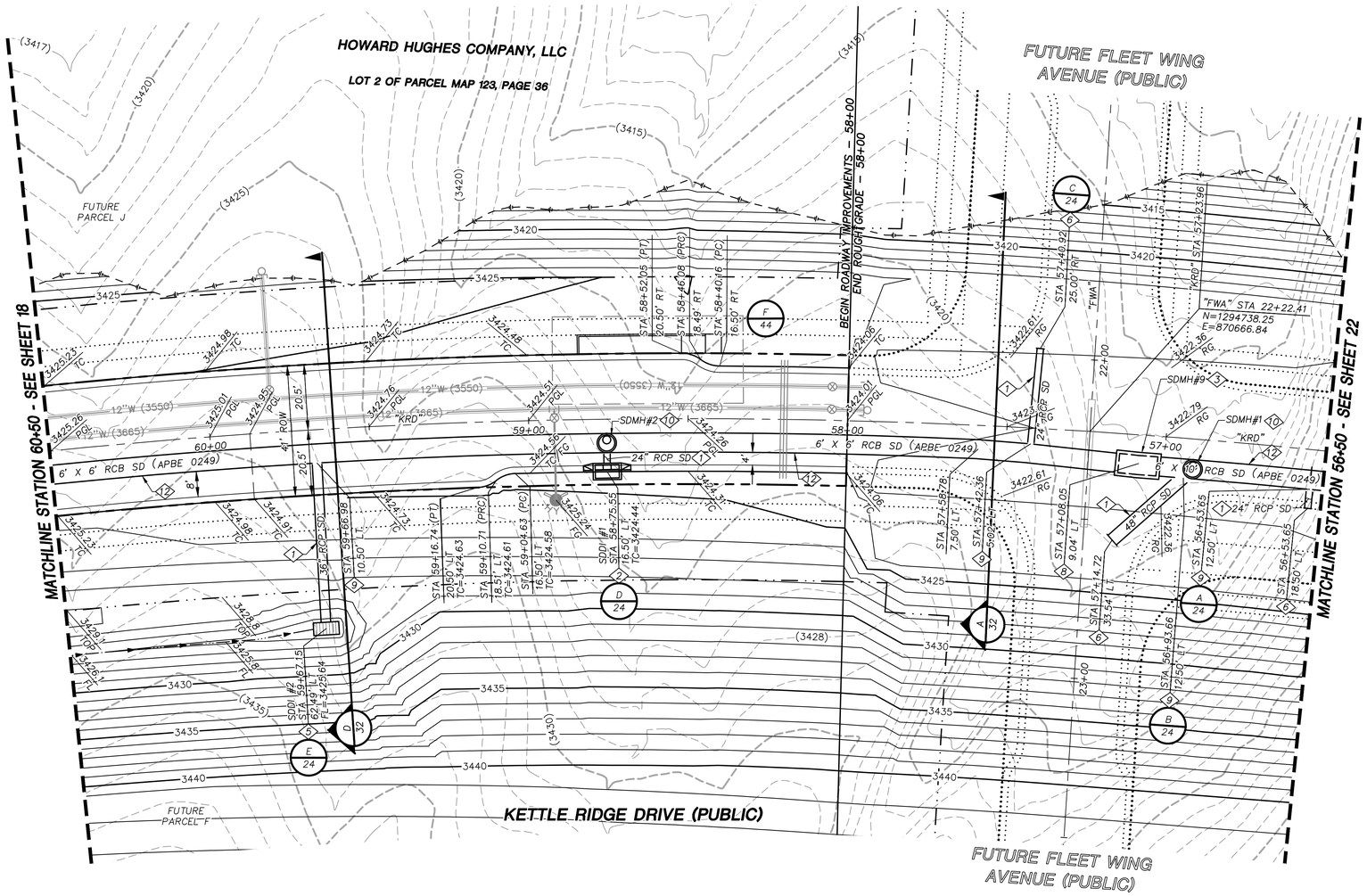
PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL A. BATES Exp.: 12/31/20 CIVIL No. 18723
10/14/19

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 19/44
CLV 00-00000

K:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-11-PLAN-P1.dwg LAYOUT: 19 Oct 15, 2019 - 9:04AM



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GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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

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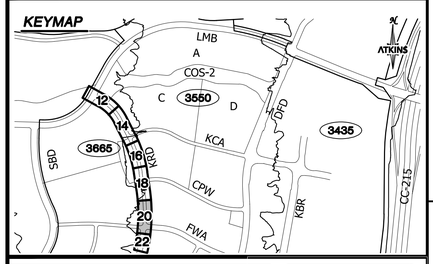
PROFESSIONAL ENGINEER – STATE OF NEVADA – PAUL A. BATES – Exp: 12/31/20 – CIVIL – No. 18723
10/14/19

KEYMAP



REV.	DESCRIPTION	BY	DATE	APPROVAL

REVISIONS

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7375
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN
KETTLE RIDGE DRIVE STA. 56+50 TO STA. 60+50

JOB NO.	100060655
DATE:	OCTOBER, 2019
DRAWING NO.	20/44

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

CLV 00-00000

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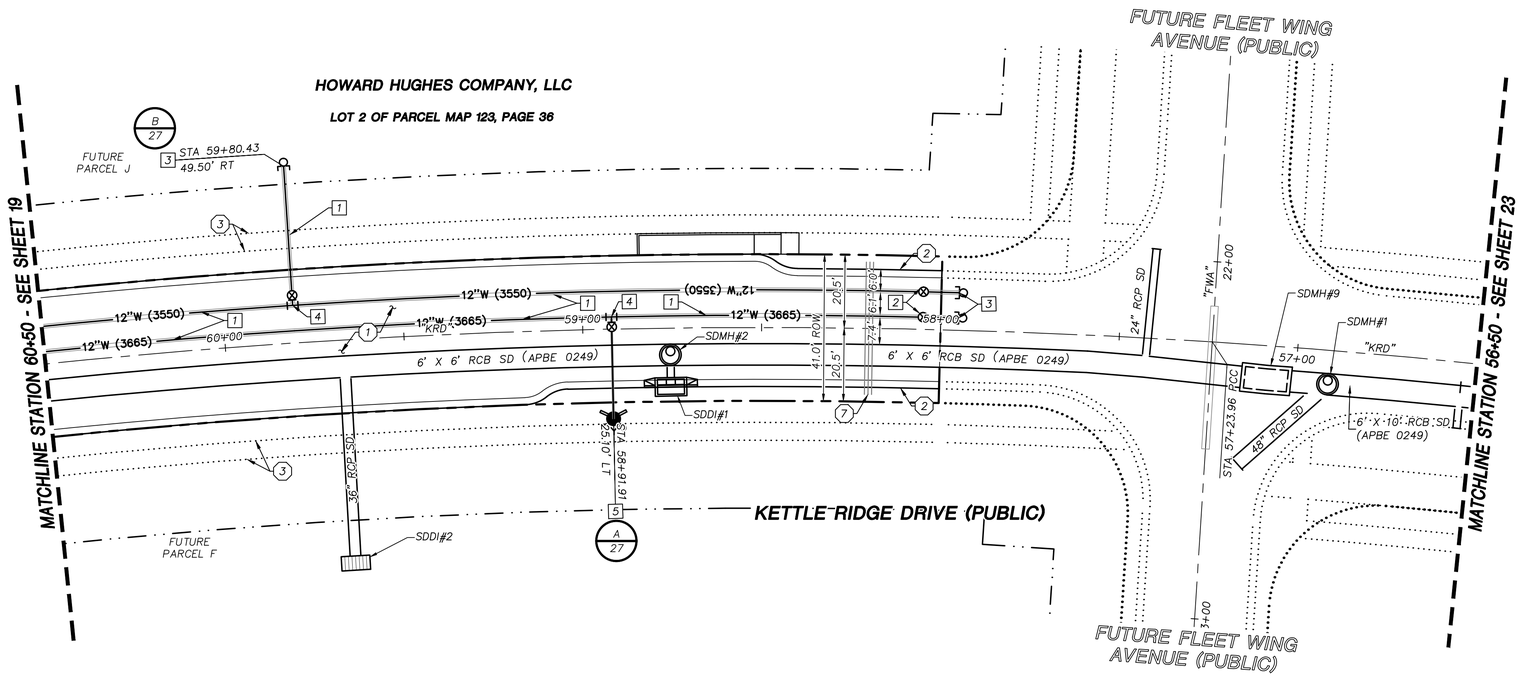

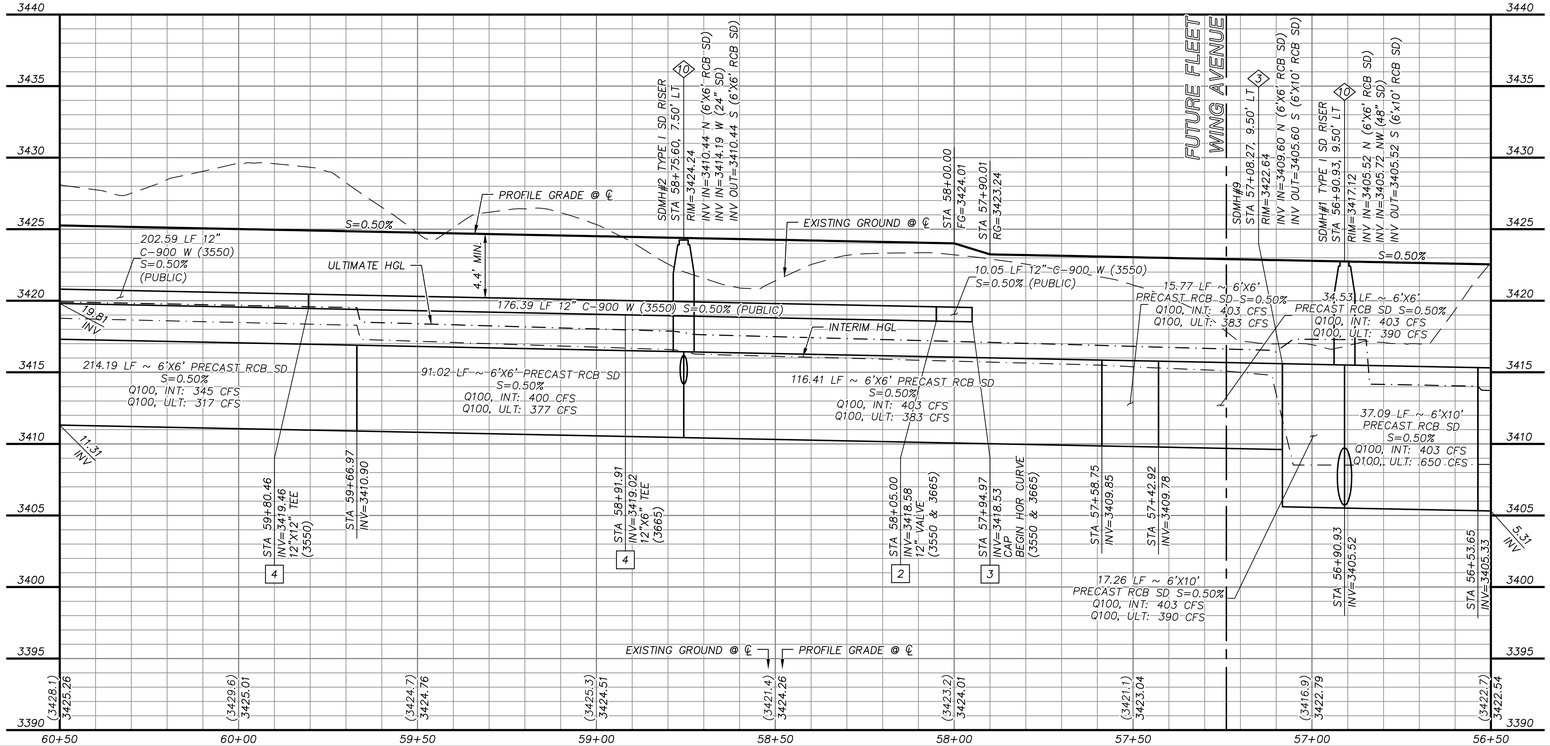

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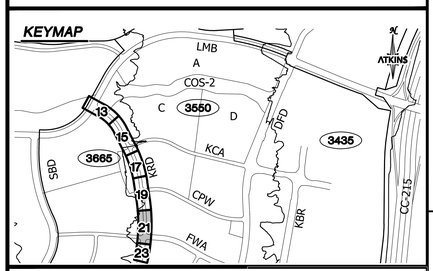

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'
5 0 2.5 5 10
VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 136892 FIRST APPROVED DATE: _____

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 (INTELLIGENT 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 PAUL A. BATES Exp.: 12/31/20 CIVIL No. 18723
10/14/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET M) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE
KETTLE RIDGE DRIVE STA. 56+50 TO STA. 60+50

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 21/44
CLV 00-00000

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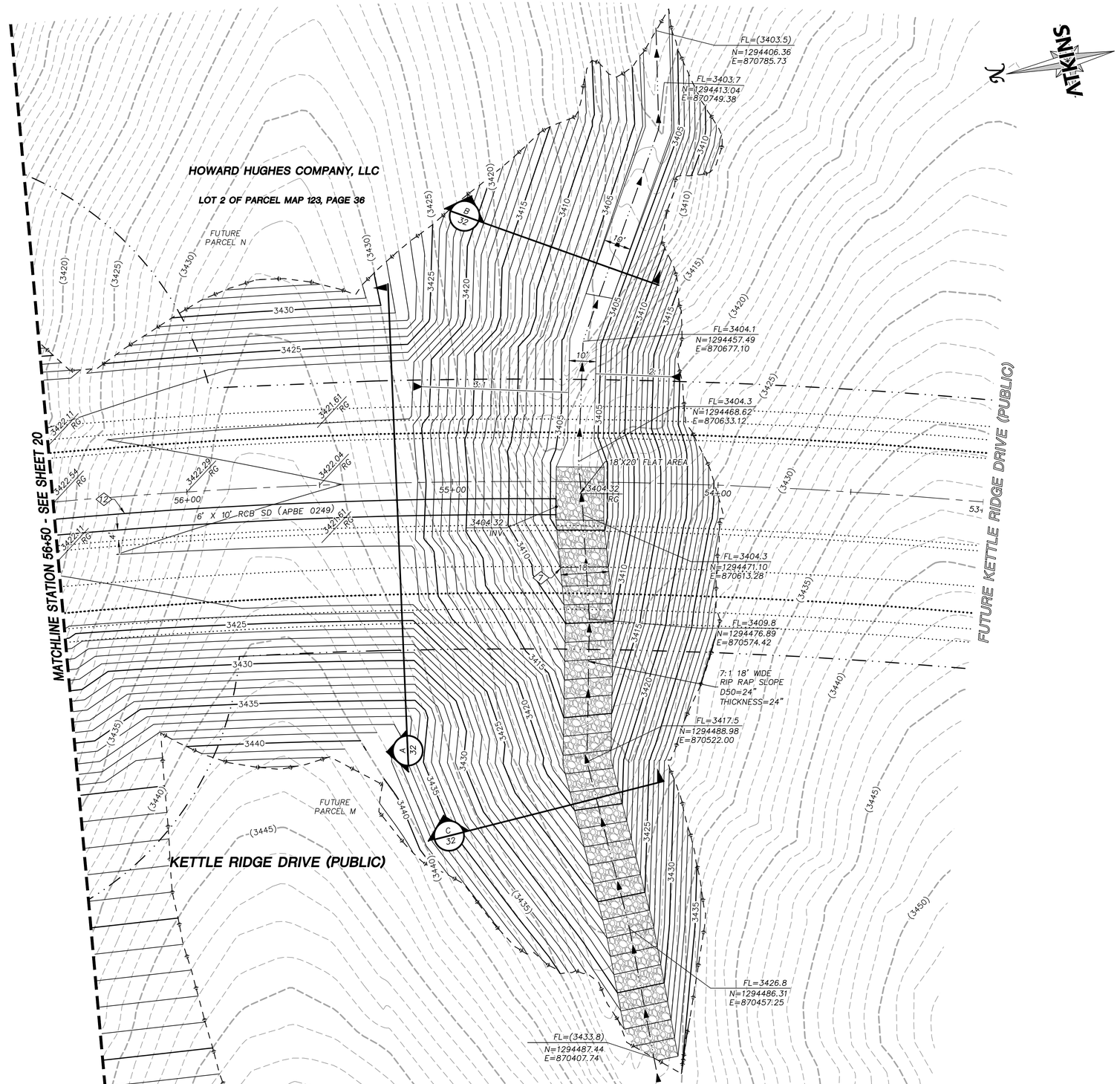

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REVISIONS			
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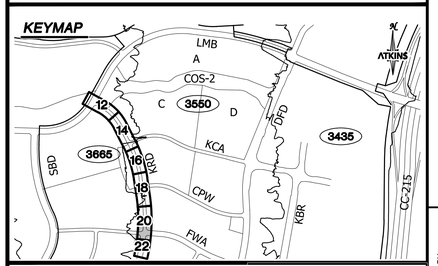
ROADWAY GRADING PLAN
KETTLE RIDGE DRIVE BEGIN TO STA. 56+50

KEYMAP



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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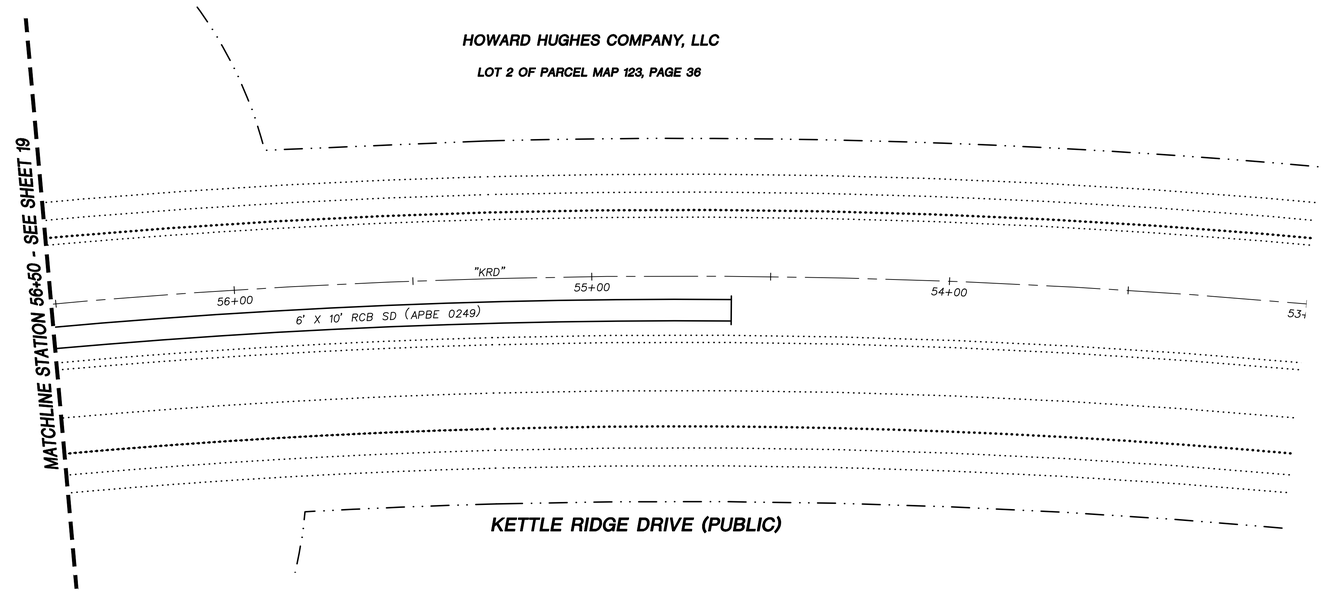
PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL A. BATES - Exp: 12/31/20 - CIVIL - No. 18723 - 10/14/19

JOB NO.	100060655
DATE:	OCTOBER, 2019
DRAWING NO.	22/44
CLV	00-00000

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-09-GRAD-01.dwg LAYOUT: 22 Oct 15, 2019 - 9:05AM



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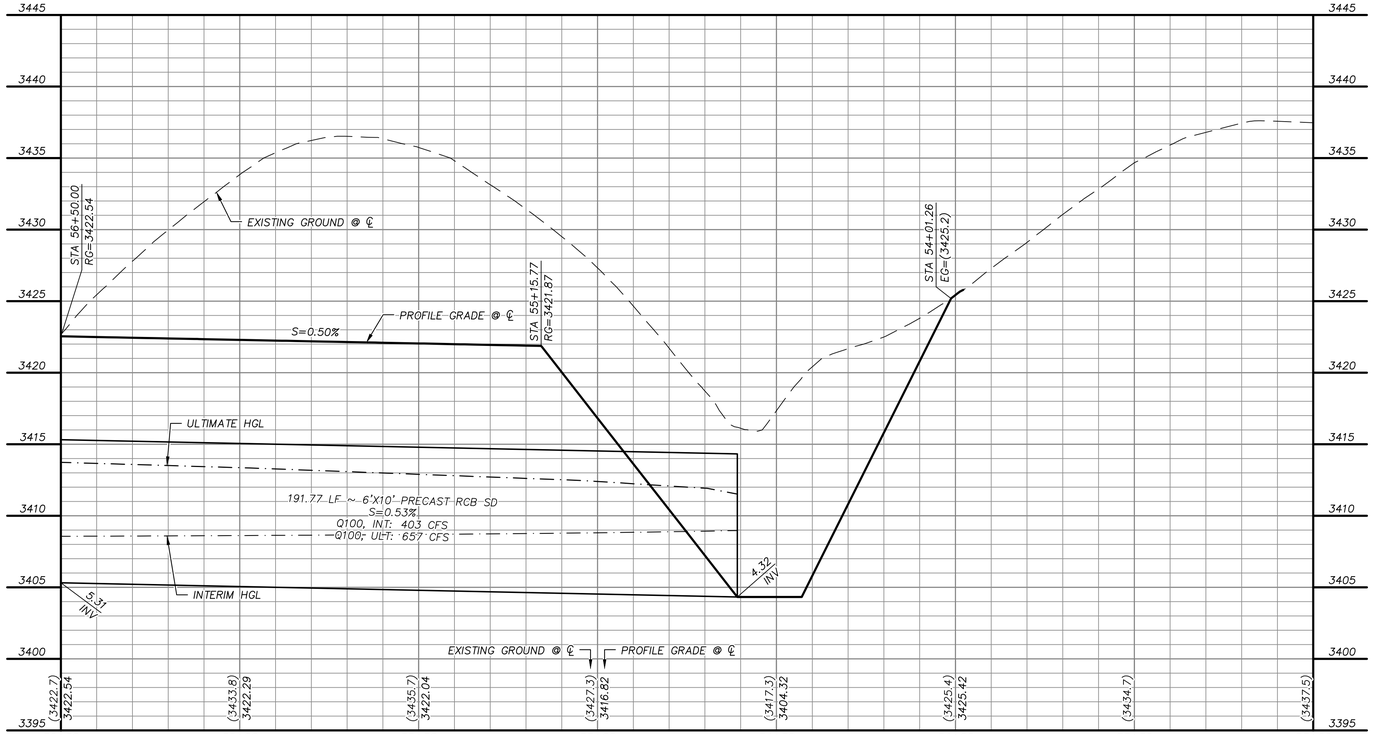

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

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VERTICAL: 1"=5'

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 136892 FIRST APPROVED DATE: _____

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 DITCHES, TRENCHING OR UTILITY WORK. DIAL 811 Call 811 or 1-800-642-2444

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

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

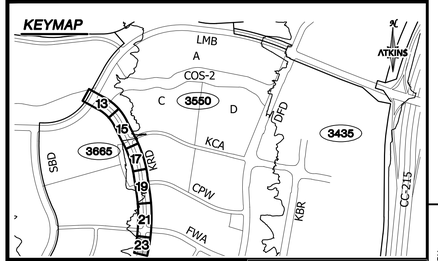
ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE
KETTLE RIDGE DRIVE BEGIN TO STA. 56+50

KEYMAP



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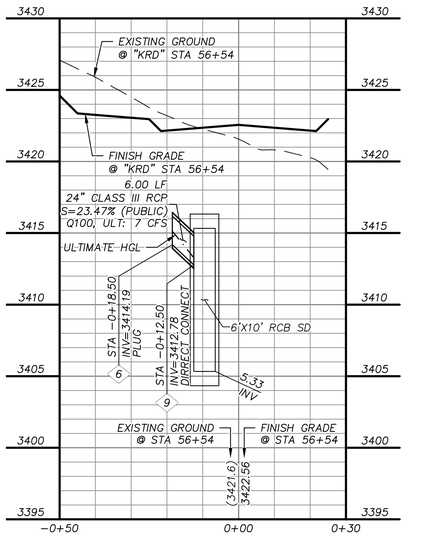
PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp.: 12/31/20 CIVIL No. 18723
10/4/19

JOB NO.	100060655
DATE:	OCTOBER, 2019
DRAWING NO.	23/44
CLV	00-00000

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

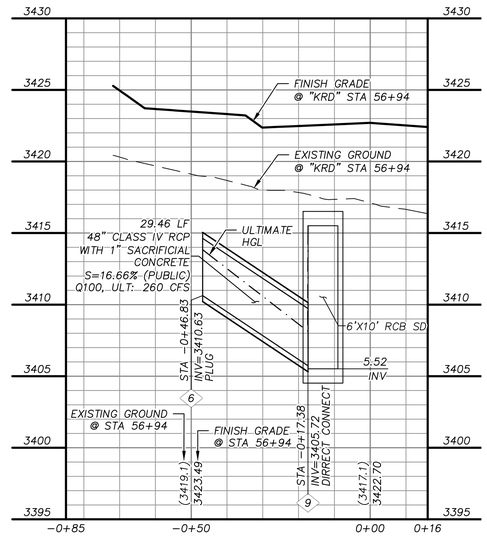
X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-11-PLAN-P1.dwg LAYOUT: 23 Oct 15, 2019 - 9:06AM



STORM DRAIN LATERAL

"KRD" STA. 56+54 SEE SHEETS 20 AND 21

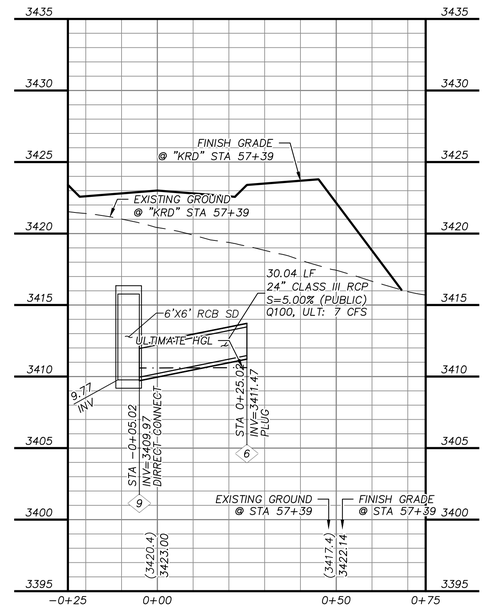
A 24



STORM DRAIN LATERAL

"KRD" STA. 56+94 SEE SHEETS 20 AND 21

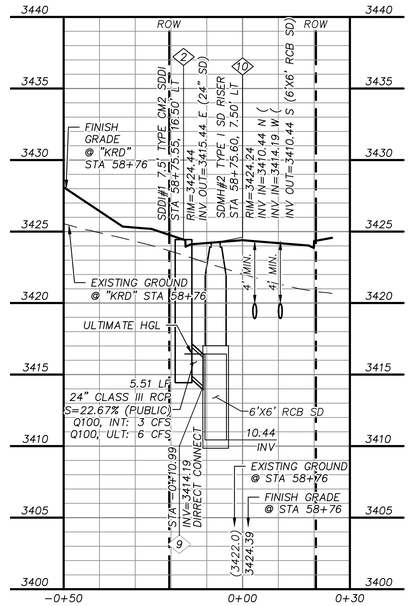
B 24



STORM DRAIN LATERAL

"KRD" STA. 57+39 SEE SHEETS 20 AND 21

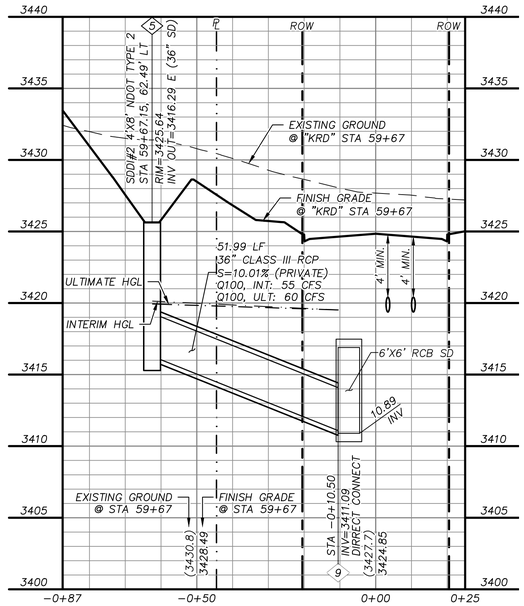
C 24



STORM DRAIN LATERAL

"KRD" STA. 58+76 SEE SHEETS 20 AND 21

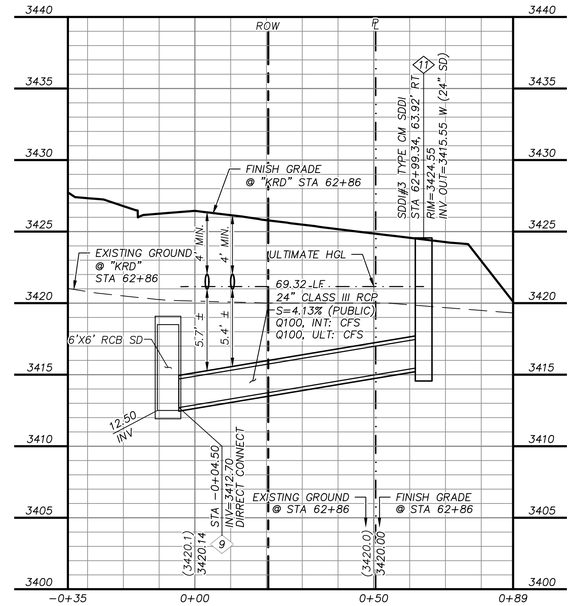
D 24



STORM DRAIN LATERAL

"KRD" STA. 59+67 SEE SHEETS 20 AND 21

E 24



STORM DRAIN LATERAL

"KRD" STA. 62+86 SEE SHEETS 18 AND 19

F 24

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 33)
7. INSTALL RIP-RAP (D50=8", THICKNESS=16") PER DETAIL H ON SHEET 32
8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 33 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 33 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 VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

STORM DRAIN LATERAL PROFILES

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"= 20'
5 0 2.5 5 10
VERTICAL: 1"= 5'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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

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PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp: 12/31/20 CIVIL No. 18723 10/14/19

JOB NO.	100060655	DESIGNED BY:	N. BARCOS
DATE:	OCTOBER, 2019	DRAWN BY:	O. OUASSANI
DRAWING NO.	24/44	CHECKED BY:	P. BATES
		HORIZ.:	1"=20'
		VERT.:	1"=5'
CLV	00-00000		

X:\Projects\SummitWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-20-LATL-SD1.dwg LAYOUT: 24 Oct 15, 2019 - 9:07AM

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
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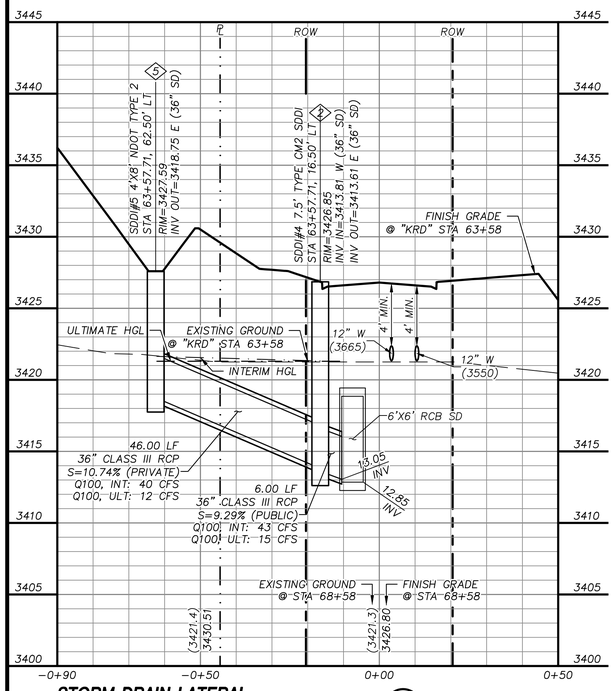
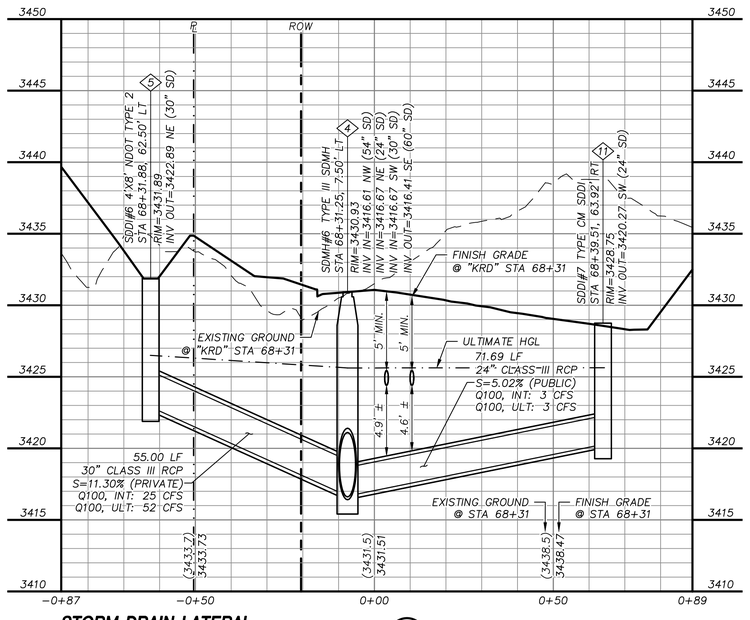


STORM DRAIN LATERAL

"KRD" STA. 63+58 SEE SHEETS 18 AND 19

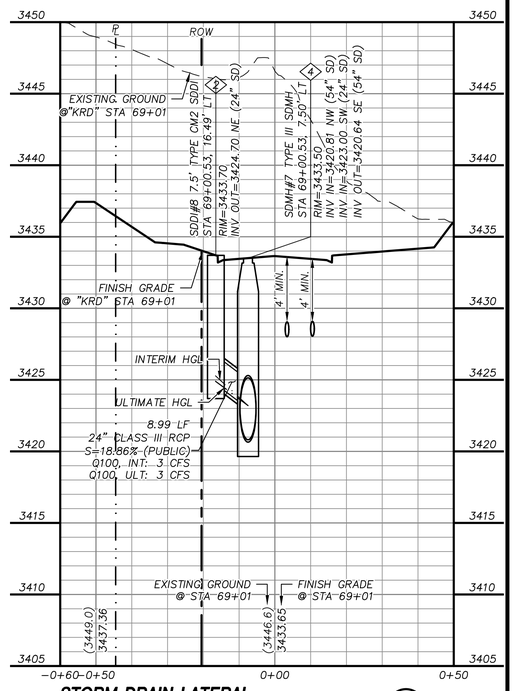
G / 25



STORM DRAIN LATERAL

"KRD" STA. 68+31 SEE SHEETS 14 AND 15

H / 25



STORM DRAIN LATERAL

"KRD" STA. 69+01 SEE SHEETS 14 AND 15

I / 25

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"= 20'

5 0 2.5 5 10

VERTICAL: 1"= 5'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

BASIS OF BEARING

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PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp: 12/31/20 CIVIL No. 18723

10/14/19

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 VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

STORM DRAIN LATERAL PROFILES

DESIGNED BY:	N. BARCOS
DRAWN BY:	O. QUASSANI
CHECKED BY:	P. BATES
HORIZ.:	1"=20'
VERT.:	1"=5'
JOB NO.	100060655
DATE:	OCTOBER, 2019
DRAWING NO.	25/44
CLV	00-00000

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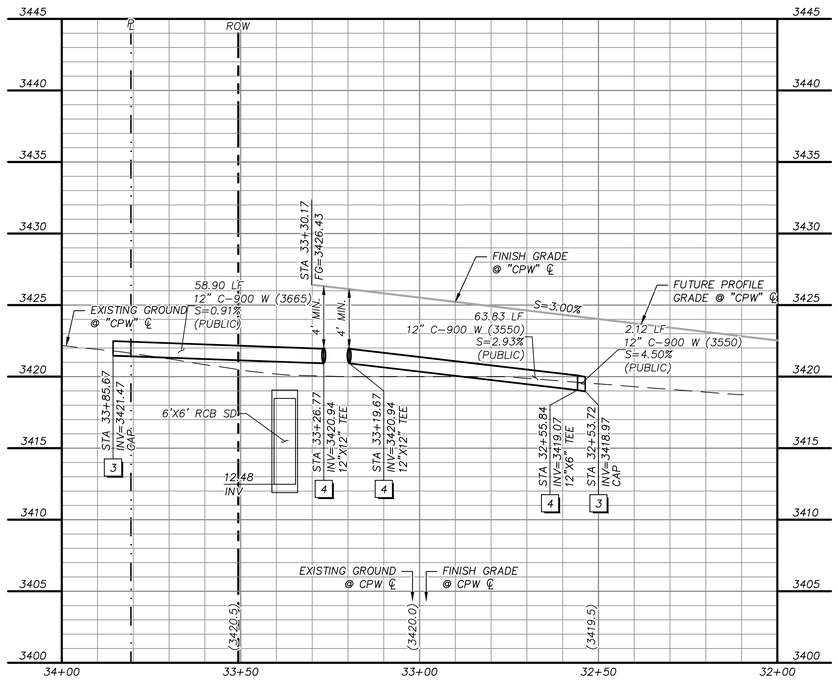
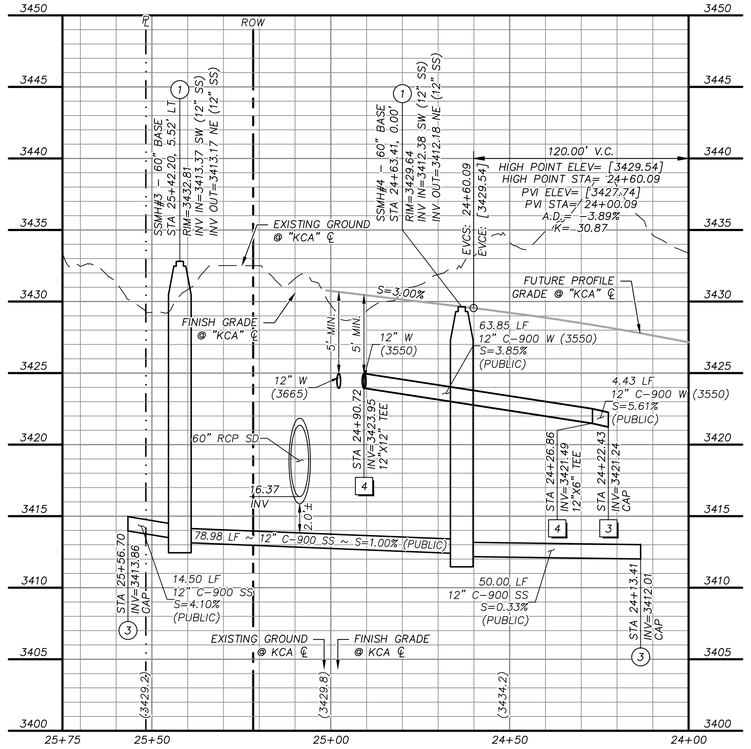


ROADWAY LATERAL CLOWDER PASS WAY

A / 26

"KRD" STA. 62+83 SEE SHEETS 18 AND 19 FOR STORM DRAIN LATERAL INFORMATION SEE DETAIL F ON SHEET 24.



ROADWAY LATERAL - KESTREL CREEK AVENUE

B / 26

"KRD" STA. 68+21 SEE SHEETS 14 AND 15 FOR STORM DRAIN LATERAL INFORMATION SEE DETAIL H ON SHEET 25.

STORM DRAIN CONSTRUCTION NOTES

1. INSTALL STORM DRAIN. SEE SHEET 3 FOR ADDITIONAL STORM DRAIN NOTES AND INFORMATION.
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7. INSTALL RIP-RAP (D50=8", THICKNESS=16") PER DETAIL H ON SHEET 32
8. INSTALL SD JUNCTION STRUCTURE
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11. INSTALL TYPE "CM" DROP INLET PER CCAUSD #421 & #422
12. INSTALL PRECAST REINFORCED CONCRETE BOX PER NDOT STANDARD 502 AND 503 SEE SHEET 33 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).

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" SERVICE SADDLE PER UDACS PLATE #4

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 VILLAGE 22
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SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY LATERAL PROFILES

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"= 20'
5 0 2.5 5 10
VERTICAL: 1"= 5'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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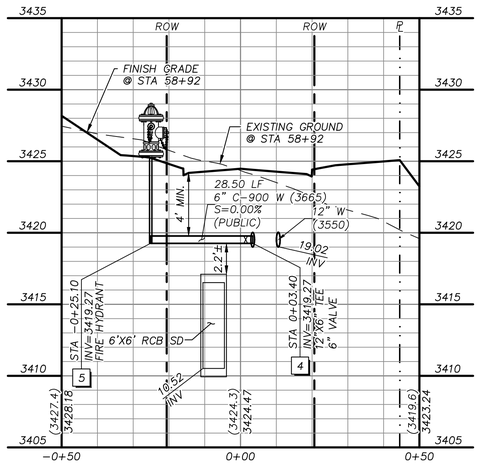
PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL A. BATES Exp: 12/31/20 CIVIL No. 18723
10/14/19

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 26/44
CLV 00-00000

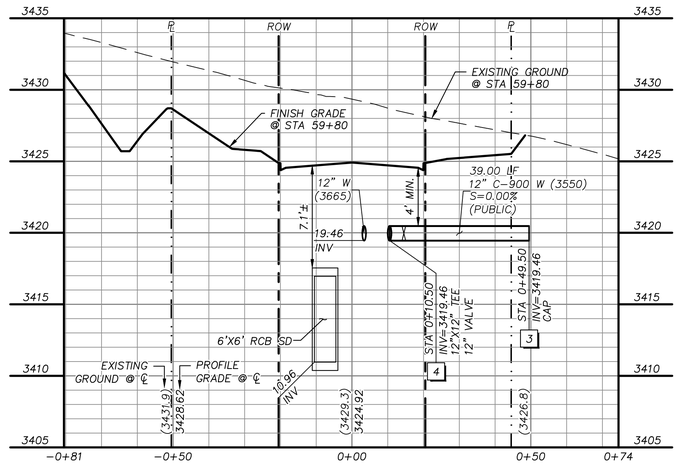
X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-20-LATL-SD1.dwg LAYOUT: 25 (2) Oct 15, 2019 - 9:07AM



WATER LATERAL

"KRD" STA. 58+92 SEE SHEET 21

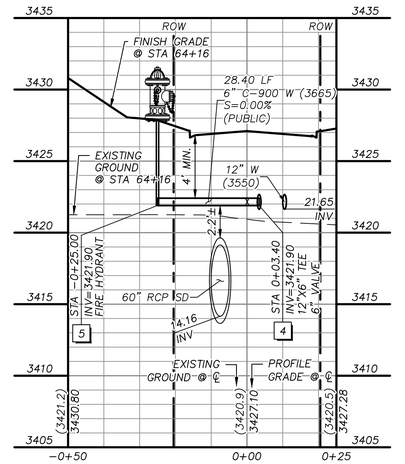
A / 27



WATER LATERAL

"KRD" STA. 59+80 SEE SHEET 21

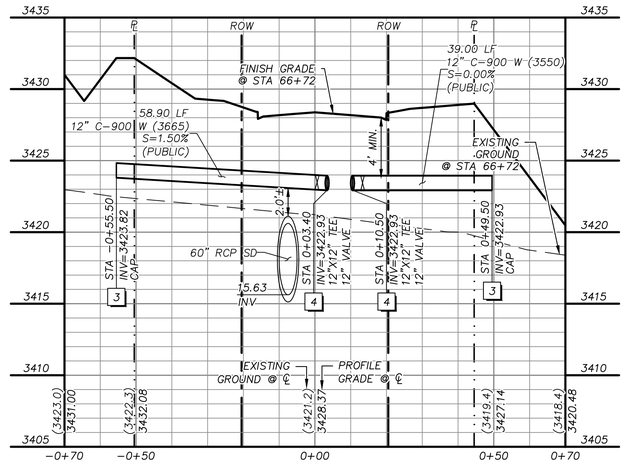
B / 27



WATER LATERAL

"KRD" STA. 64+16 SEE SHEET 19

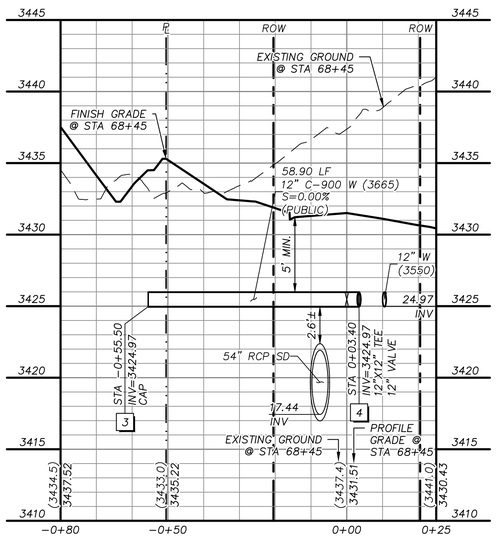
C / 27



WATER LATERAL

"KRD" STA. 66+72 SEE SHEET 17

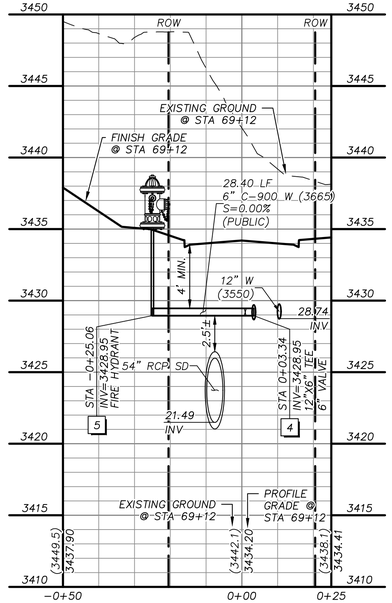
D / 27



WATER LATERAL

"KRD" STA. 68+45 SEE SHEET 15

E / 27



WATER LATERAL

"KRD" STA. 69+12 SEE SHEET 15

F / 27

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 33)
7. INSTALL RIP-RAP (D50=8", THICKNESS=16") PER DETAIL H ON SHEET 32
8. INSTALL SD JUNCTION STRUCTURE
9. DIRECT CONNECTION INTO RCB SEE SHEET 33 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 33 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).

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" SERVICE SADDLE PER UDACS PLATE #4

ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 32 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 39.

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 VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

WATER LATERAL PROFILES

KEYMAP

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"= 20'

5 0 2.5 5 10

VERTICAL: 1"= 5'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 (HEAVY AND ARTERIAL SYSTEM OF TRANSPORTATION)

Call before you Dig AVOID CUTTING HYDROCARBON UTILITY LINES. ITS COSTLY. Call 811 OR 1-800-642-2444

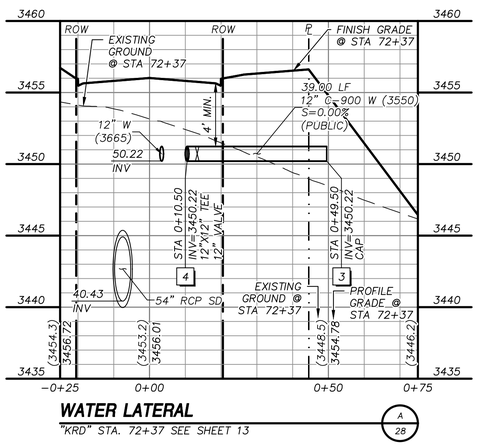
AVOID HITTING OVERHEAD POWER LINES. ITS COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

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 - PAUL A. BATES - Exp: 12/31/20 - CIVIL - No. 18723 - 10/14/19

JOB NO.	100060655
DATE:	OCTOBER, 2019
DRAWING NO.	27/44
DESIGNED BY:	N. BARCOS
DRAWN BY:	O. QUASSANI
CHECKED BY:	P. BATES
HORIZ.:	1"=20'
VERT.:	1"=5'
CLV	00-00000

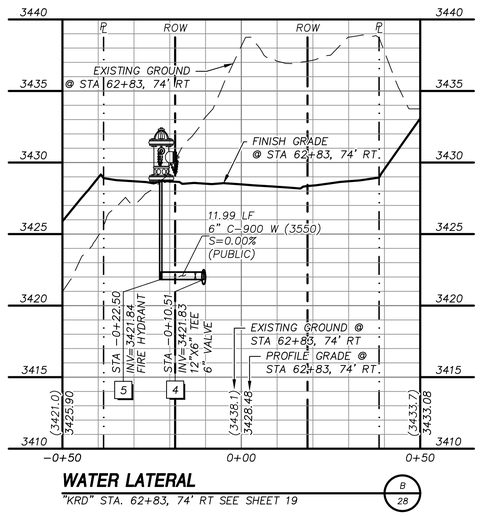
X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-21-LATL-WATR1.dwg LAYOUT: 25 Oct 15, 2019 - 8:09AM



WATER LATERAL

"KRD" STA. 72+37 SEE SHEET 13

A 28

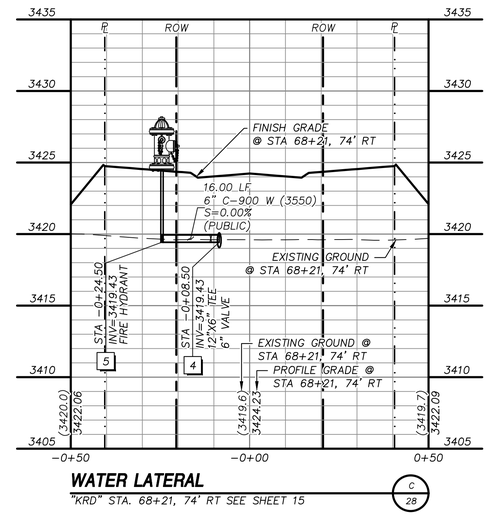


WATER LATERAL

"KRD" STA. 62+83, 74' RT SEE SHEET 19

B 28

FOR WATER MAIN INFORMATION SEE DETAIL A ON SHEET 26 FOR CLOWDER PASS WAY ROADWAY LATERAL PROFILE.



WATER LATERAL

"KRD" STA. 68+21, 74' RT SEE SHEET 15

C 28

FOR WATER MAIN INFORMATION SEE DETAIL B ON SHEET 26 FOR KESTREL CREEK AVENUE ROADWAY LATERAL PROFILE.

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 33)
7. INSTALL RIP-RAP (D50=8", THICKNESS=16") PER DETAIL H ON SHEET 32
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9. DIRECT CONNECTION INTO RCB SEE SHEET 33 FOR DETAIL
10. INSTALL TYPE I SD RISER PER CCAUSD #403.1
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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).

WATERLINE CONSTRUCTION NOTES

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6. INSTALL DEFLECTION AT PIPE JOINTS (MAXIMUM OF 1°)
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ROADWAY CONSTRUCTION NOTES

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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 39.

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

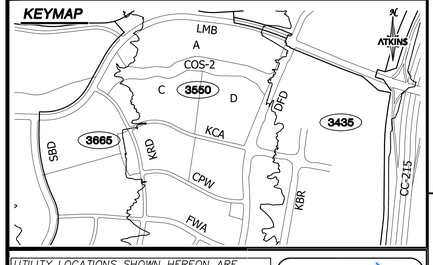
SUMMERLIN

SUMMERLIN VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

WATER LATERAL PROFILES

KEYMAP



GRAPHIC SCALE

HORIZONTAL: 1"= 20'

VERTICAL: 1"= 5'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 PREMIUM 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 DIG OVERHEAD 1-702-227-2929

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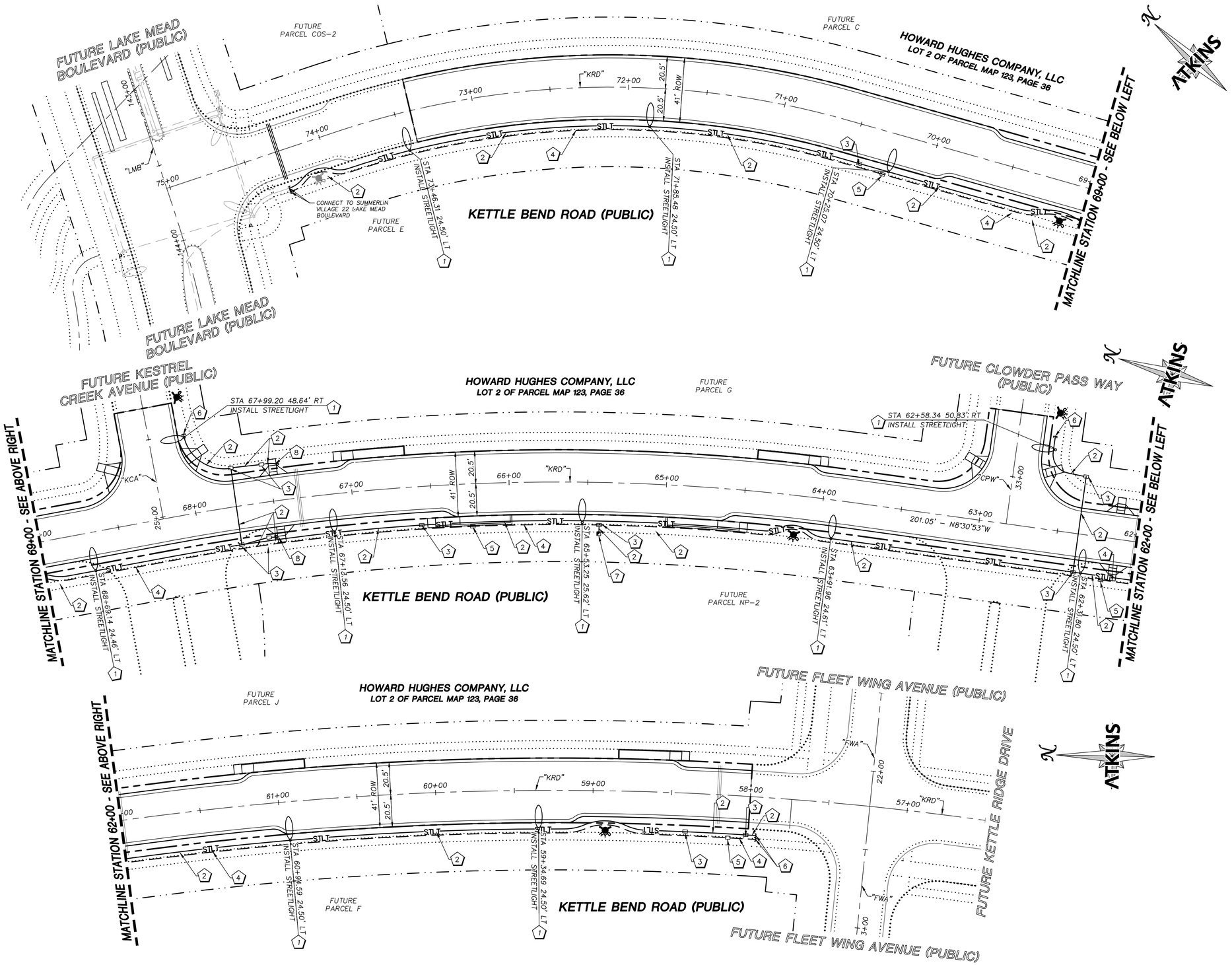
PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL A. BATES - Exp: 12/31/20 - CIVIL - No. 18723

10/14/19

JOB NO.	100060655
DATE:	OCTOBER, 2019
DRAWING NO.	28/44
CLV	00-00000

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-21-LATL-WATR1.dwg LAYOUT: 26 Oct 15, 2019 - 9:10AM



GRAPHIC SCALE

30 0 15 30 60

HORIZONTAL: 1"= 30'

STREET LIGHTING NOTES

1. SEE SHEET D-8 FOR DETAILS & USD'S FOR STREETLIGHTING

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 PREVENT AND PROTECT SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING, MISCONNECTING UTILITY LINES. IT'S COURTLY. Call 811 or 1-800-642-2444

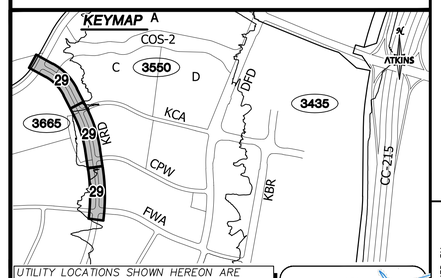
AVOID HITTING OVERHEAD POWER LINES. IT'S COURTLY. CALL BEFORE YOU DIG OVERHEAD 1-702-227-2929

STREET LIGHTING CONSTRUCTION NOTES

1. INSTALL TYPE 4 LED SINGLE STREETLIGHT WITH 8' MAST ARMS AND LSI LUMINAIRE FIXTURE XGBM-LED-26L-SIL-2-UNV-DIM-27-70-NR-4397-SMBRKT WITH A 2700k COLOR TEMPERATURE PER APPROVED LED LIGHTING ANALYSIS. REFER TO SUMMERLIN STD DWG E-2, SEE SHEET 40 FOR TYPICAL LOCATION, AND CCAUSD #311.1, #316, AND #320
2. INSTALL 1-1/4" STREETLIGHT CONDUIT WITH (2) #4 AND (1) #8 PER CCAUSD #501
3. INSTALL NO. 3-1/2 PULL BOX MARKED "STREETLIGHT" PER CCAUSD #705
4. INSTALL 4" CONDUIT WITH PULL STRING AND 6 PAIR PE39 NO. 22 AWG INTERCONNECT CABLE
5. INSTALL P30 PULL BOX MARKED "FIBER OPTIC (FAST)" PER CCAUSD #761
6. STUB AND CAP CONDUIT 5' PAST EDGE OF CONSTRUCTION
7. INSTALL 200 AMP STREETLIGHT SERVICE PEDESTAL PER CCAUSD #332.S2, #331, #335.S2, #336, AND #730
8. INSTALL PEDESTRIAN CROSSWALK FLASHING BEACON ASSEMBLY PER DETAILS B, C, AND D ON SHEET 40

SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
STREETLIGHTING		
TYPE 4 SINGLE ARM STREET LIGHT POLE ASSEMBLY	9	EA
NO 3 1/2 PULL BOX	11	EA
SERVICE PEDESTAL	1	EA
1 1/4" STREET LIGHT CONDUIT WITH ALL WIRING	1,964	LF
4" FAST CONDUIT WITH 6 PAIR PE39 NO 22 AWG	1,690	LF



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PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp: 12/31/20 CIVIL NO. 10733 10/14/19

REV.	DESCRIPTION	BY	DATE	APPROVAL

REVISIONS

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7375
Fax: +1.702.263.7200

SUMMERLIN

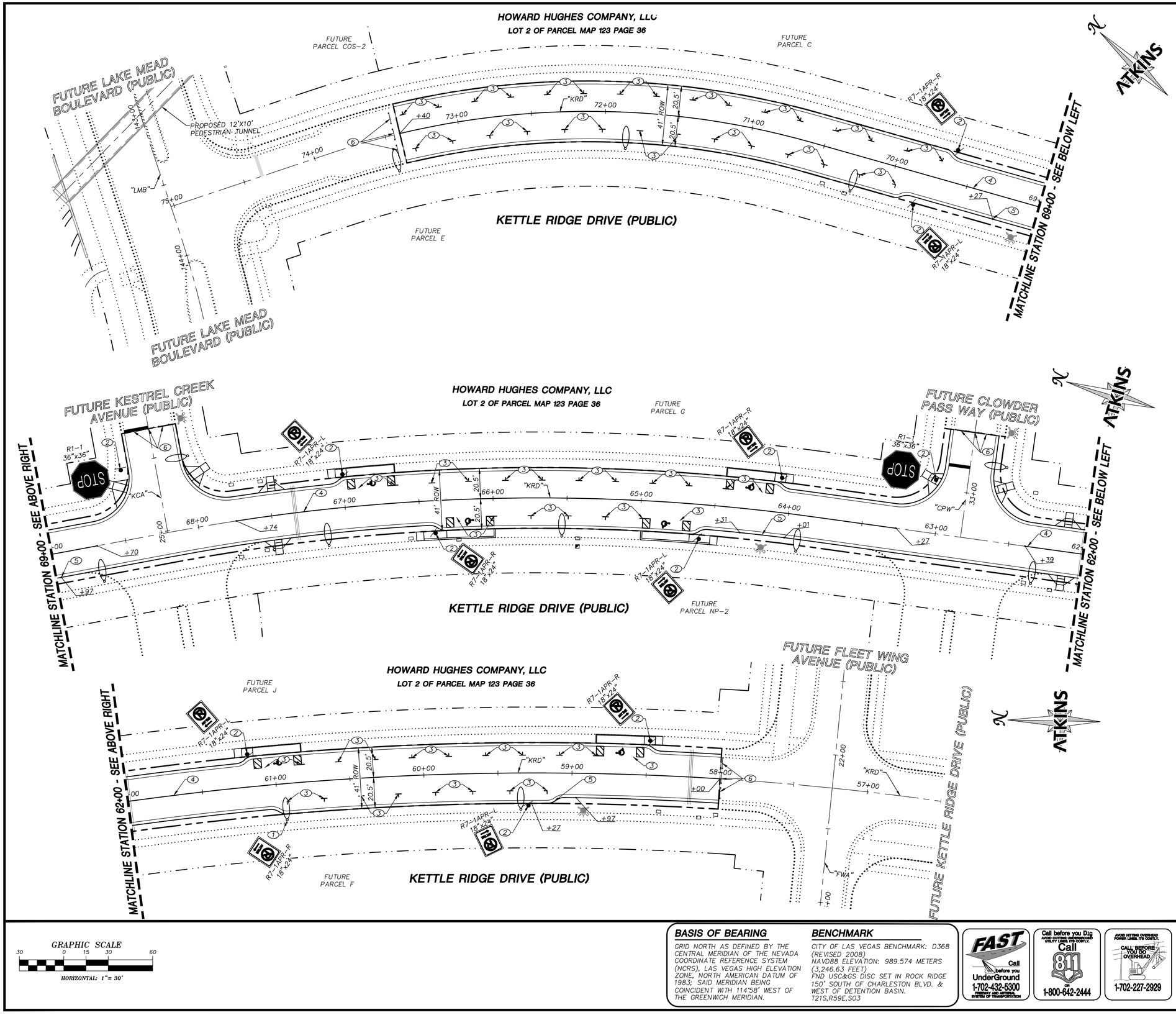
SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

STREETLIGHT PLAN

DESIGNED BY: N. BARCOS
DRAWN BY: L. MAMACLAY
CHECKED BY: P. BATES
HORIZ.: 1"=30'
VERT.: NONE

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 29/44
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-18-STLT-SLT.dwg LAYOUT: STREETLIGHT PLAN Oct 15, 2019 - 8:11AM

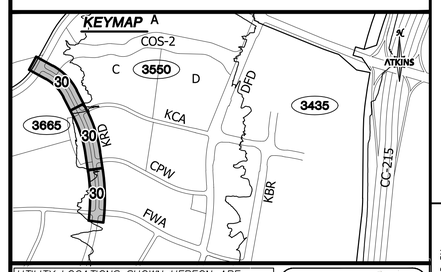


STRIPING AND SIGNAGE CONSTRUCTION NOTES

1. INSTALL SIGN(S) ON STREETLIGHT POLE
2. INSTALL SIGN(S) ON POST PER CCAUSD #249.1
3. INSTALL TEMPORARY PARKING STRIPE PER DETAIL ON SHEET ____ TO BE MAINTAINED PRIVATELY BY SUMMERLIN HOA
4. INSTALL TYPE 1 CENTERLINE (RPM) PER CCAUSD #244 ____
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

SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
TRAFFIC IMPROVEMENTS		
STREET SIGNS	3	EA
CCAUSD 601 BARRICADE	12	LF
TYPE I CENTER LINE	1,542	LF
24" SOLID WHITE LINE	17	LF



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

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 QUICK! Call 811 or 1-800-642-2444

AVOID HITTING OVERHEAD POWER LINES. IT'S QUICK! CALL BEFORE YOU GO OVERHEAD 1-702-227-2929

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PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp: 12/31/20 CIVIL No. 10723 10/14/19

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7375
Fax: +1.702.263.7200

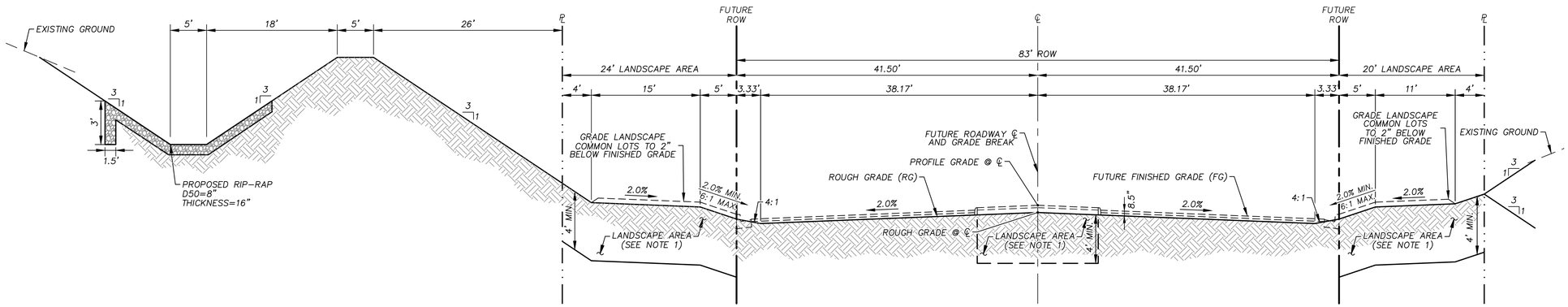
SUMMERLIN

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

SIGNAGE AND STRIPING PLAN

DESIGNED BY: N. BARCOS	DRAWN BY: O. QUASSANI	CHECKED BY: P. BATES	HORIZ.: 1"=30' VERT.: NONE
JOB NO. 100060655	DATE: OCTOBER, 2019	DRAWING NO. 30/44	
CLV 00-00000			

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-22-TRAF-T1.dwg LAYOUT: SIGNAGE AND STRIPING PLAN Oct 15, 2019 - 9:12AM



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 - ROUGH GRADE SECTION

N.T.S.

A 31

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

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SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

TYPICAL SECTIONS

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: J. IZZOLO/P. BATES
HORZ.: NONE
VERT.: NONE

JOB NO. 100060655
DATE OCTOBER, 2019
DRAWING NO. 31/44
CLV 00-00000

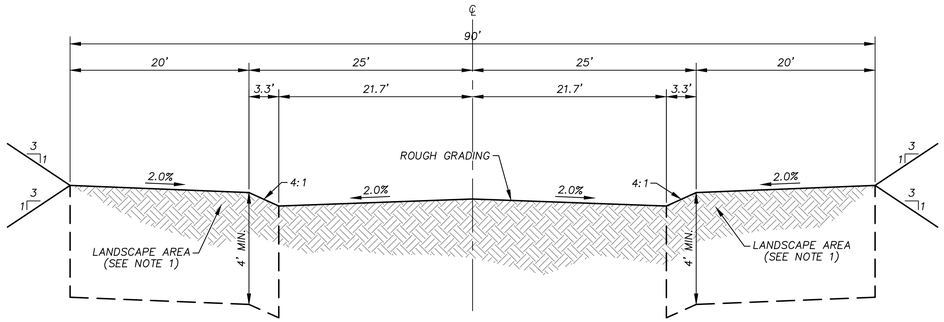
FAST Call before you UnderGround 1-702-432-5300 INTERSTATE AND NATIONAL SYSTEM OF TRANSPORTATION

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

PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp.: 12/31/20 CIVIL No. 18729 10/14/19

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)__Sheets\60655-24-DETL-01.dwg LAYOUT: 27 Oct 15, 2019 - 9:13AM



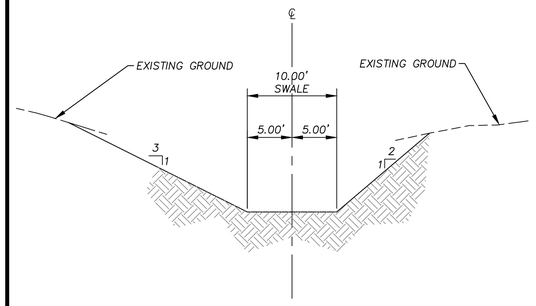
NOTES:

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.

KETTLE RIDGE DRIVE - ROUGH GRADE SECTION

N.T.S.

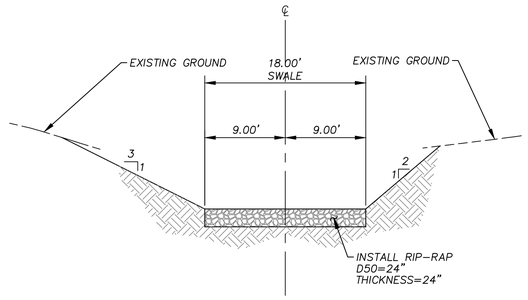
A / 32



KETTLE RIDGE DRIVE - DAYLIGHT SWALE

N.T.S.

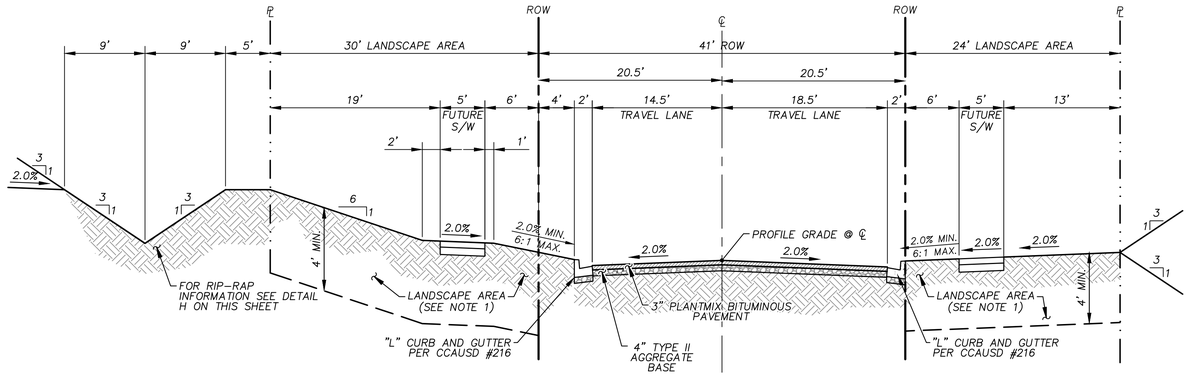
B / 32



KETTLE RIDGE DRIVE - DAYLIGHT SWALE

N.T.S.

C / 32



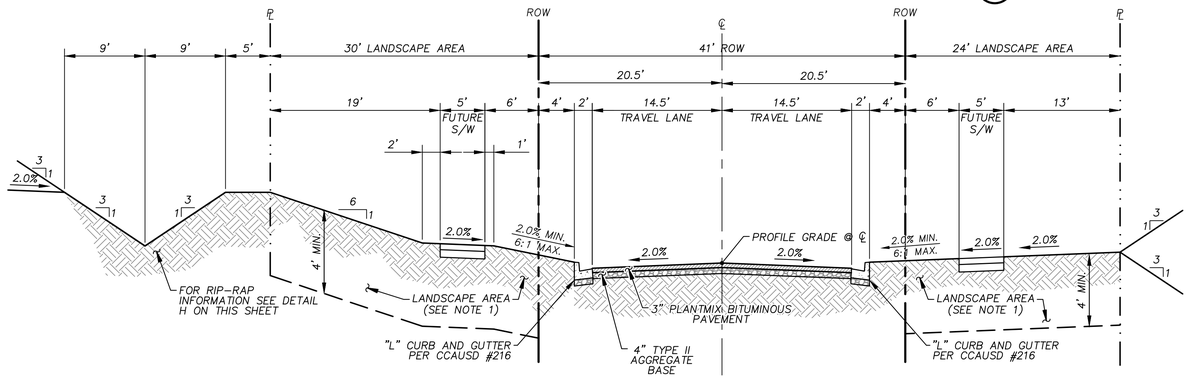
NOTES:

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.

KETTLE RIDGE DRIVE - TYPICAL SECTION WITH LEFT CURB EXTENSION

N.T.S.

E / 32



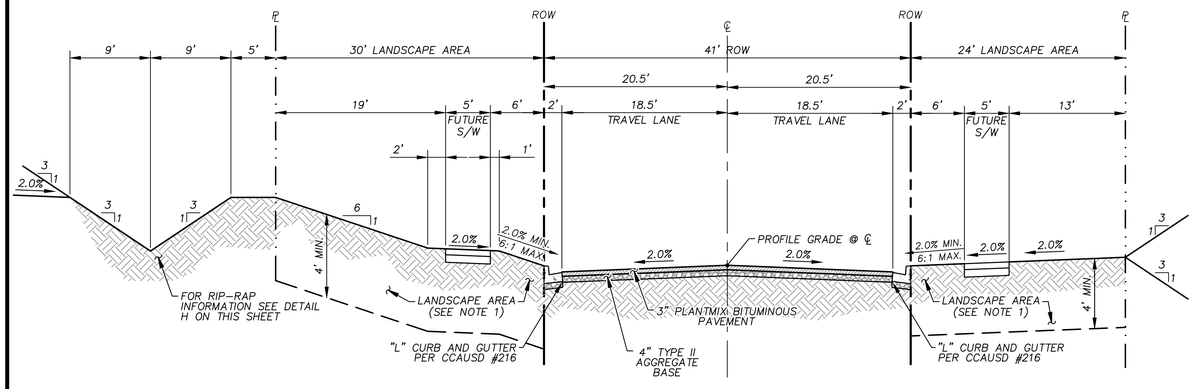
NOTES:

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.

KETTLE RIDGE DRIVE - TYPICAL SECTION WITH CURB EXTENSION

N.T.S.

F / 32



NOTES:

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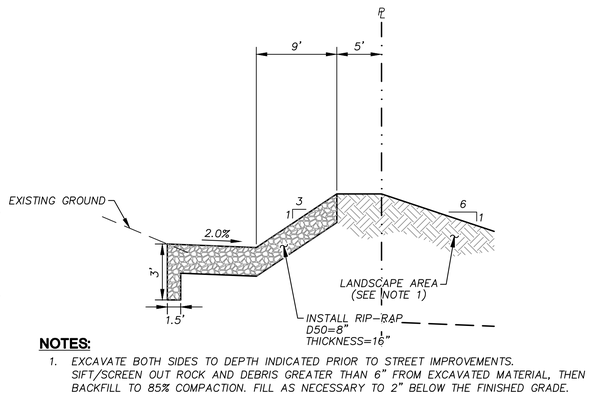
KETTLE RIDGE DRIVE - TYPICAL SECTION

N.T.S.

D / 32



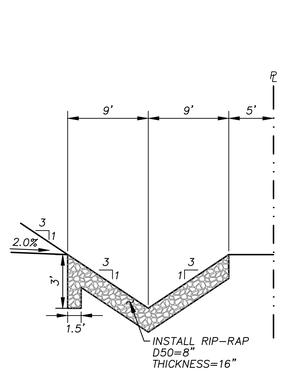
NOTES:

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.

KETTLE RIDGE DRIVE - SECTION IN FILL

N.T.S.

G / 32



KETTLE RIDGE DRIVE - RIP-RAP SWALE SECTION

N.T.S.

H / 32

FAST Call before you UnderGround 1-702-432-5300 (HOTLINE AND ADVISORY 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 DIG OVERHEAD 1-702-227-2929

PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL A. BATES - Exp.: 12/31/20 - CIVIL - No. 18723 - 10/14/19

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7375
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

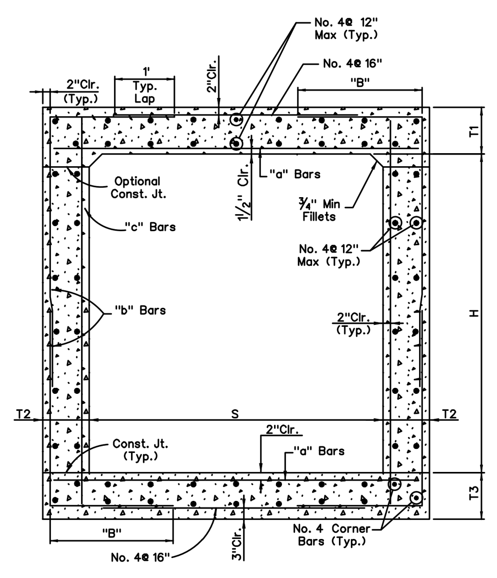
TYPICAL SECTIONS

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: NONE
VERT.: NONE

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 32/44
CLV 00-00000

K:\Projects\SummitWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-24-DETL-01.dwg LAYOUT: TYPICAL SECTIONS Oct 15, 2019 - 9:13AM

B-2



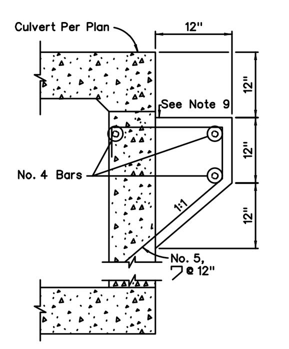
TYPICAL SECTION

NOTES:

1. DESIGN SPECIFICATIONS: "AASHTO LRFD Bridge Design Specifications 2012"
2. CONSTRUCTION SPECIFICATIONS: "State of Nevada Department of Transportation Standard Specifications for Road and Bridge Construction 2014"
3. LIVE LOADS:
   HL-93 Design Truck (32.0 KIP Axle)
   HL-93 Design Tandem (Two 25.0 KIP Axles Spaced 4 Feet Apart)
   (Live Load Impact Factor for Top Slab is 33% up to 2 Feet of Cover)

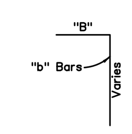
   LATERAL LIVE LOAD PRESSURE:
   Equivalent to 2 Feet of Earth Surcharge Applied Horizontally = 240 PSF

   DEAD LOADS:
   Soil Unit Weight = 120 PCF
   Min Lateral Earth Pressure = 30 PCF
   Max Lateral Earth Pressure = 60 PCF
4. CONCRETE: Class DA Modified (Major) F'C=4,500 PSI @ 28 Days. (Class D in Clark County)
5. REINFORCING STEEL: All reinforcing steel to be ASTM A615 grade 60 or A706. Dimension relating to bar spacing are center to center
6. DESIGNATION: Box culverts are shown on plans as span times height times length (10' x 8' x 196' RCB).
7. Where traffic loads will be placed directly on the top surface of the culvert, (and/or up to 2 feet of fill), increase top slab thickness by ½ inch and cover for top reinforcement from 2 inches to 2½ inches. Provide epoxy coated reinforcement in top slab (except in Clark County). Decrease spacing of top slab bottom longitudinal bars (#4 @ 12) to 6 inch spacing. Use EA Modified Major concrete (Class E in Clark County) in lieu of Class DA. Adjust quantities accordingly.
8. Provide 2 foot wide Type 1 or Type 2 drain backfill wrapped in Class 1 or Class 2 non-woven geotextile along full height of each culvert exterior wall face.
9. Provide paving notch when top slab is exposed and when pavement is concrete. Adjust quantities accordingly.
10. For additional notes, see sheet B-20.1.1



PAVING NOTCH DETAIL

BENT BARS



SHEET 1 OF 2

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RCB CULVERTS
SINGLE

B-20.1.2 (502,505) Signed Original On File
ADOPTED 11/70 REVISED 10/15 CHIEF BRIDGE ENGR.

B-3

			SPAN, "S"	5						6							
			HEIGHT, "H" (FT.)	3		4		5		3		4		5		6	
	MAXIMUM EARTH COVER		FT.	10	20	10	20	10	20	10	20	10	20	10	20	10	20
CONC.	ROOF	T1	IN.	9½	9½	9½	9½	9½	9½	10	10	10	10	10	10	10	10
CONC.	WALLS	T2	IN.	8	8	8	8	8	8	8	8	8	8	8	8	8	8
CONC.	INVERT	T3	IN.	8	8	8	8	8	8	9	9	9	9	9	9	9	9
REINFORCEMENT	"a"	BAR SIZE		4	5	4	5	4	5	5	5	5	5	5	5	5	5
REINFORCEMENT	"a"	SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6
REINFORCEMENT	"a"	LENGTH	ft-in	6-0	6-0	6-0	6-0	6-0	6-0	7-0	7-0	7-0	7-0	7-0	7-0	7-0	7-0
REINFORCEMENT	"b"	BAR SIZE		4	4	4	4	4	4	4	4	4	4	4	4	4	4
REINFORCEMENT	"b"	SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6
REINFORCEMENT	"b"	LENGTH	ft-in	5-7	5-7	6-1	6-1	6-7	6-7	5-9	5-9	6-3	6-3	6-9	6-9	7-3	7-3
REINFORCEMENT	"b"	B	ft-in	2-8	2-8	2-8	2-8	2-8	2-8	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10
REINFORCEMENT	"c"	BAR SIZE		4	4	4	4	4	4	4	4	4	4	4	4	4	4
REINFORCEMENT	"c"	SPACING	IN.	12	12	12	12	12	12	12	12	12	12	12	12	12	12
REINFORCEMENT	"c"	LENGTH	ft-in	4-0	4-0	5-0	5-0	6-0	6-0	4-2	4-2	5-2	5-2	6-2	6-2	7-2	7-2
REINFORCEMENT	#4@ 12"	LENGTH	ft-in	2-7	2-7	2-7	2-7	2-7	2-7	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5
REINFORCEMENT	#4@ 12"	NUMBER*		40	40	44	44	48	48	44	44	48	48	52	52	56	56
QUANT.	CONCRETE		CF/LF	13.2	13.2	14.6	14.6	15.9	15.9	15.6	15.6	16.9	16.9	18.3	18.3	19.6	19.6
QUANT.	REINFORCEMENT		LB/LF	81	90	88	97	95	104	99	99	106	106	113	113	119	119

			SPAN, "S"	7									
			HEIGHT, "H" (FT.)	3		4		5		6		7	
	MAXIMUM EARTH COVER		FT.	10	20	10	20	10	20	10	20	10	20
CONC.	ROOF	T1	IN.	10	10	10	10	10	10	10	10	10	10
CONC.	WALLS	T2	IN.	8	8	8	8	8	8	8	8	8	8
CONC.	INVERT	T3	IN.	10	10	10	10	10	10	10	10	10	10
REINFORCEMENT	"a"	BAR SIZE		5	6	5	6	5	6	5	6	5	6
REINFORCEMENT	"a"	SPACING	IN.	6	6	6	6	6	6	6	6	6	6
REINFORCEMENT	"a"	LENGTH	ft-in	8-0	8-0	8-0	8-0	8-0	8-0	8-0	8-0	8-0	8-0
REINFORCEMENT	"b"	BAR SIZE		4	4	4	4	4	4	4	4	4	5
REINFORCEMENT	"b"	SPACING	IN.	6	6	6	6	6	6	6	6	6	6
REINFORCEMENT	"b"	LENGTH	ft-in	5-11	5-11	6-4	6-5	6-10	6-11	7-4	7-5	7-11	8-6
REINFORCEMENT	"b"	B	ft-in	2-11	2-11	2-11	2-11	2-11	2-11	2-11	2-11	2-11	3-4
REINFORCEMENT	"c"	BAR SIZE		4	4	4	4	4	4	4	4	4	5
REINFORCEMENT	"c"	SPACING	IN.	12	12	12	12	12	12	12	12	12	12
REINFORCEMENT	"c"	LENGTH	ft-in	4-3	4-3	5-3	5-3	6-3	6-3	7-3	7-3	8-3	8-3
REINFORCEMENT	#4@ 12"	LENGTH	ft-in	4-2	4-2	4-2	4-2	4-2	4-2	4-2	4-2	4-2	3-4
REINFORCEMENT	#4@ 12"	NUMBER*		48	48	52	52	56	56	60	60	64	64
QUANT.	CONCRETE		CF/LF	17.9	17.9	19.2	19.2	20.6	20.6	21.9	21.9	23.2	23.2
QUANT.	REINFORCEMENT		LB/LF	108	123	115	129	121	136	128	143	135	184

			SPAN, "S"	8									
			HEIGHT, "H" (FT.)	4		5		6		7		8	
	MAXIMUM EARTH COVER		FT.	10	20	10	20	10	20	10	20	10	20
CONC.	ROOF	T1	IN.	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½
CONC.	WALLS	T2	IN.	8	8	8	8	8	8	8	8	8	8
CONC.	INVERT	T3	IN.	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½
REINFORCEMENT	"a"	BAR SIZE		5	7	5	7	5	7	5	7	5	7
REINFORCEMENT	"a"	SPACING	IN.	6	6	6	6	6	6	6	6	6	6
REINFORCEMENT	"a"	LENGTH	ft-in	9-0	9-0	9-0	9-0	9-0	9-0	9-0	9-0	9-0	9-0
REINFORCEMENT	"b"	BAR SIZE		4	5	4	5	4	6	4	6	6	6
REINFORCEMENT	"b"	SPACING	IN.	6	6	6	6	6	6	6	6	6	6
REINFORCEMENT	"b"	LENGTH	ft-in	6-6	7-2	7-0	7-8	7-6	8-10	8-0	8-8	9-10	9-10
REINFORCEMENT	"b"	B	ft-in	3-0	3-5	3-0	3-5	3-0	3-10	3-0	3-5	3-10	3-10
REINFORCEMENT	"c"	BAR SIZE		4	4	4	4	4	4	4	5	4	5
REINFORCEMENT	"c"	SPACING	IN.	12	12	12	12	12	12	12	12	12	12
REINFORCEMENT	"c"	LENGTH	ft-in	5-4	5-4	6-4	6-4	7-4	7-4	8-4	8-4	9-4	9-4
REINFORCEMENT	#4@ 12"	LENGTH	ft-in	5-0	4-2	5-0	4-2	5-0	3-4	5-0	4-2	3-4	3-4
REINFORCEMENT	#4@ 12"	NUMBER*		56	56	60	60	64	64	68	68	72	72
QUANT.	CONCRETE		CF/LF	21.7	21.7	23.0	23.0	24.3	24.3	25.7	25.7	27.0	27.0
QUANT.	REINFORCEMENT		LB/LF	124	183	130	192	137	236	144	253	220	263

			SPAN, "S"	10											
			HEIGHT, "H" (FT.)	5		6		7		8		9		10	
	MAXIMUM EARTH COVER		FT.	10	20	10	20	10	20	10	20	10	20	10	20
CONC.	ROOF	T1	IN.	11	11	11	11	11	11	11	11	11	11	11	11
CONC.	WALLS	T2	IN.	10	10	10	10	10	10	10	10	10	10	10	10
CONC.	INVERT	T3	IN.	12	13	12	13	12	13	12	13	12	13	12	13
REINFORCEMENT	"a"	BAR SIZE		6	7	6	7	6	7	6	7	6	7	6	7
REINFORCEMENT	"a"	SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6
REINFORCEMENT	"a"	LENGTH	ft-in	11-4	11-4	11-4	11-4	11-4	11-4	11-4	11-4	11-4	11-4	11-4	11-4
REINFORCEMENT	"b"	BAR SIZE		5	6	5	6	5	6	5	6	5	6	5	7
REINFORCEMENT	"b"	SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6
REINFORCEMENT	"b"	LENGTH	ft-in	8-1	8-9	8-7	9-3	9-1	9-9	9-7	10-3	10-1	10-9	10-7	11-11
REINFORCEMENT	"b"	B	ft-in	3-10	4-3	3-10	4-3	3-10	4-3	3-10	4-3	3-10	4-3	3-10	4-8
REINFORCEMENT	"c"	BAR SIZE		4	5	4	5	4	5	4	5	4	5	4	5
REINFORCEMENT	"c"	SPACING	IN.	12	12	12	12	12	12	12	12	12	12	12	12
REINFORCEMENT	"c"	LENGTH	ft-in	6-6	6-7	7-6	7-7	8-6	8-7	9-6	9-7	10-6	10-7	11-6	11-7
REINFORCEMENT	#4@ 12"	LENGTH	ft-in	5-9	4-11	5-9	4-11	5-9	4-11	5-9	4-11	5-9	4-11	5-9	4-1
REINFORCEMENT	#4@ 12"	NUMBER*		68	68	72	72	76	76	80	80	84	84	88	88
QUANT.	CONCRETE		CF/LF	30.7	31.7	32.4	33.3	34.0	35.0	35.7	36.7	37.4	38.3	39.0	40.0
QUANT.	REINFORCEMENT		LB/LF	198	264	206	275	214	285	222	296	230	307	238	376

			SPAN, "S"	12													
			HEIGHT, "H" (FT.)	6		7		8		9		10		11		12	
	MAXIMUM EARTH COVER		FT.	10	20	10	20	10	20	10	20	10	20	10	20	10	20
CONC.	ROOF	T1	IN.	11	13	11	13	11	13	11	13	11	13	11	13	11	13
CONC.	WALLS	T2	IN.	10	12	10	12	10	12	10	12	10	12	10	12	10	12
CONC.	INVERT	T3	IN.	12	15	12	15	12	15	12	15	12	15	12	15	12	15
REINFORCEMENT	"a"	BAR SIZE		7	8	7	8	7	8	7	8	7	8	7	8	7	8
REINFORCEMENT	"a"	SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6
REINFORCEMENT	"a"	LENGTH	ft-in	13-4	13-8	13-4	13-8	13-4	13-8	13-4	13-8	13-4	13-8	13-4	13-8	13-4	13-8
REINFORCEMENT	"b"	BAR SIZE		6	7	6	7	6	7	6	7	6	7	6	7	6	7
REINFORCEMENT	"b"	SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6
REINFORCEMENT	"b"	LENGTH	ft-in	9-5	10-5	9-11	10-11	10-5	11-5	10-11	11-11	11-5	12-5	11-11	12-11	12-5	13-5
REINFORCEMENT	"b"	B	ft-in	4-5	5-0	4-5	5-0	4-5	5-0	4-5	5-0	4-5	5-0	4-5	5-0	4-5	5-0
REINFORCEMENT	"c"	BAR SIZE		4	5	4	5	4	5	4	5	4	5	4	5	5	6
REINFORCEMENT	"c"	SPACING	IN.	12	12	12	12	12	12	12	12	12	12	12	12	12	12
REINFORCEMENT	"c"	LENGTH	ft-in	7-6	7-11	8-6	8-11	9-6	9-11	10-6	10-11	11-6	11-11	12-6	12-10	13-6	13-11
REINFORCEMENT	#4@ 12"	LENGTH	ft-in	6-6	5-8	6-6	5-8	6-6	5-8	6-6	5-8	6-6	5-8	6-6	5-8	6-6	5-8
REINFORCEMENT	#4@ 12"	NUMBER*		80	80	84	84	88	88	92	92	96	96	100	100	104	104
QUANT.	CONCRETE		CF/LF	36.2	44.7	37.9	46.7	39.5	48.7	41.2	50.7	42.9	52.7	44.5	54.7	46.2	56.7
QUANT.	REINFORCEMENT		LB/LF	295	394	305	407	315	420	325	433	335	446	345	459	365	485

			SPAN, "S"	14															
			HEIGHT, "H" (FT.)	7		8		9		10		11		12		13		14	
	MAXIMUM EARTH COVER		FT.	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
CONC.	ROOF	T1	IN.	13	15	13	15	13	15	13	15	13	15	13	15	13	15	13	15
CONC.	WALLS	T2	IN.	12	13	12	13	12	13	12	13	12	13	12	13	12	13	12	14
CONC.	INVERT	T3	IN.	14	17	14	17	14	17	14	17	14	17	14	17	14	17	14	17
REINFORCEMENT	"a"	BAR SIZE		7	8	7	8	7	8	7	8	7	8	7	8	7	8	7	8
REINFORCEMENT	"a"	SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
REINFORCEMENT	"a"	LENGTH	ft-in	15-8	15-10	15-8	15-10	15-8	15-10	15-8	15-10	15-8	15-10	15-8	15-10	15-8	15-10	15-8	16-0
REINFORCEMENT	"b"	BAR SIZE		6	7	6	7	6	7	6	7	6	7	6	7	6	7	7	8
REINFORCEMENT	"b"	SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
REINFORCEMENT	"b"	LENGTH	ft-in	10-6	11-5	11-0	11-11	11-6	12-5	12-0	12-11	12-6	13-5	13-0	13-11	13-6	14-5	14-7	16-1
REINFORCEMENT	"b"	B	ft-in	4-9	5-4	4-9	5-4	4-9	5-4	4-9	5-4	4-9	5-4	4-9	5-4	4-9	5-4	5-3	6-1
REINFORCEMENT	"c"	BAR SIZE		4	5	4	6	4	6	4	6	4	6	4	6	5	6	6	7
REINFORCEMENT	"c"	SPACING	IN.	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
REINFORCEMENT	"c"	LENGTH	ft-in	8-10	9-3	9-10	10-3	10-10	11-3	11-10	12-3	12-10	13-3	13-10	14-3	14-10	15-3	15-10	16-3
REINFORCEMENT	#4@ 12"	LENGTH	ft-in	8-1	7-3	8-1	7-3	8-1	7-3	8-1	7-3	8-1	7-3	8-1	7-3	8-1	7-3	7-3	5-10
REINFORCEMENT	#4@ 12"	NUMBER*		92	92	96	96	100	100	104	104	108	108	112	112	116	116	120	120
QUANT.	CONCRETE		CF/LF	50.0	58.3	52.0	60.4	54.0	62.6	56.0	64.8	58.0	66.9	60.0	69.1	62.0	71.3	64.0	76.2
QUANT.	REINFORCEMENT		LB/LF	338	446	348	468	358	482	368	496	378	510	388	524	409	538	504	668

* QUANTITY INCLUDES #4 CORNER BARS

SHEET 2 OF 2

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RCB CULVERTS
SINGLE

B-20.1.2.1 (502,505) Signed Original On File
ADOPTED 11/70 REVISED 10/15 CHIEF BRIDGE ENGR.

RCB DETAILS PER NDOT

N.T.S.

A / 33

R-43

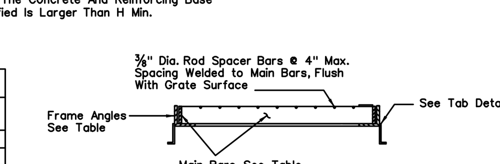
BILL OF MATERIALS (RCP HDPE CMP)

PIPE SIZE (INCH)	SINGLE (ONE GRATE) * CONCRETE (CY) BASE QUAN. (H MIN.)	ADD RATE (CY/FT)	* REINF. (LB.) BASE QUAN. (H MIN.)	ADD RATE (LB/FT)	STR STEEL (LB)	DOUBLE (TWO GRATES) * CONCRETE (CY) BASE QUAN. (H MIN.)	ADD RATE (CY/FT)	* REINF. (LB.) BASE QUAN. (H MIN.)	ADD RATE (LB/FT)	STR STEEL (LB)	TRIPLE (THREE GRATES) * CONCRETE (CY) BASE QUAN. (H MIN.)	ADD RATE (CY/FT)	* REINF. (LB.) BASE QUAN. (H MIN.)	ADD RATE (LB/FT)	STR STEEL (LB)
≤15	0.71	0.19	36	10	211	1.06	0.26	50	13	397	1.41	0.33	70	17	583
18	0.89	0.20	40	10	306	1.31	0.28	56	13	574	1.72	0.35	77	18	842
24	1.08	0.22	58	12	349	1.56	0.30	80	15	652	2.04	0.37	105	20	956
30	1.28	0.24	63	12	390	1.83	0.31	86	16	729	2.38	0.39	113	20	1068
36	1.50	0.26	67	13	524	2.11	0.33	92	16	980	2.72	0.41	120	21	1435
42	1.71	0.28	90	15	575	2.39	0.35	120	18	1073	3.07	0.43	154	22	1571
48	1.94	0.30	95	15	707	2.68	0.37	127	18	1329	3.42	0.44	163	23	1951

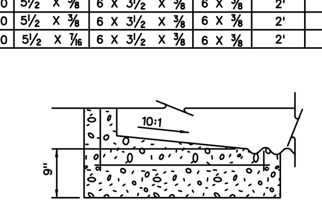
*The Concrete And Reinforcing Quantities Are Based On The H Min. Shown. Increase The Concrete And Reinforcing Base Quantity By The Corresponding Add Rate (Per Foot Of Increased H) If The H Specified Is Larger Than H Min.

TABLE OF DIMENSIONS (RCP HDPE CMP)

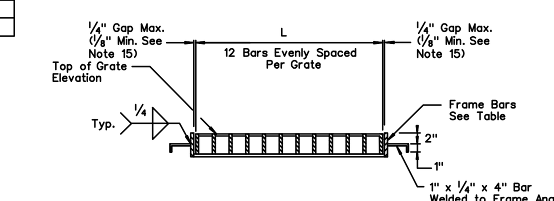
PIPE SIZE (INCH)	A	H Min. (FT)	MAIN BARS (INCH)	FRAME ANGLES (INCH)	FRAME BARS (INCH)	L (FT) SINGLE GRATE	DOUBLE GRATE	TRIPLE GRATE
≤ 15	2'	2.50	3½ X ⅜	4 X 3 X ⅜	4 X ⅜	2'	4'	6'
18	2' 6"	3.00	4½ X ⅜	5 X 3 X ⅜	5 X ⅜	2'	4'	6'
24	3'	3.50	4½ X ⅜	5 X 3 X ⅜	5 X ⅜	2'	4'	6'
30	3' 6"	4.00	4½ X ⅜	5 X 3 X ⅜	5 X ⅜	2'	4'	6'
36	4'	4.50	5½ X ⅜	6 X 3½ X ⅜	6 X ⅜	2'	4'	6'
42	4' 6"	5.00	5½ X ⅜	6 X 3½ X ⅜	6 X ⅜	2'	4'	6'
48	5'	5.50	5½ X 7/16	6 X 3½ X ⅜	6 X ⅜	2'	4'	6'



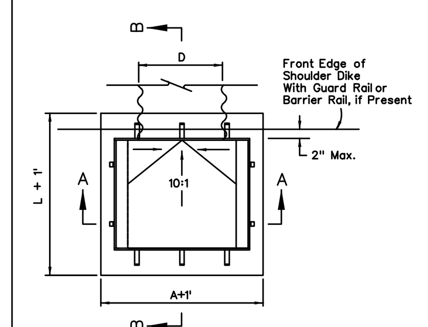
SECTION D-D



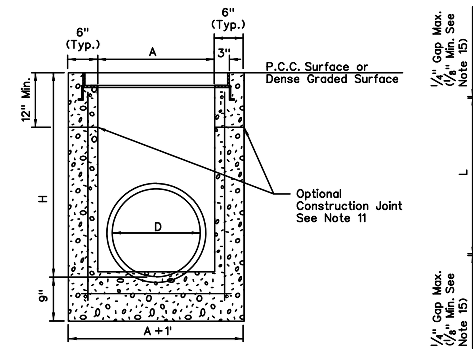
SECTION B-B



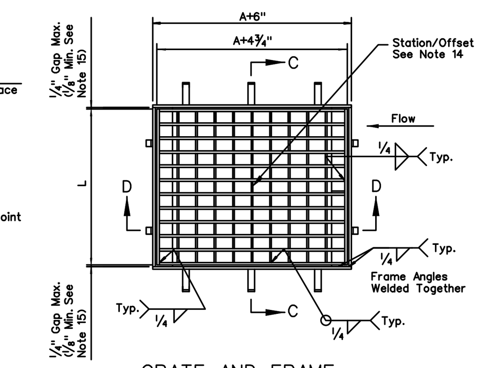
SECTION C-C



PLAN



SECTION A-A



GRATE AND FRAME

NOTES:

1. All concrete shall be class A or AA.
2. Reinforcing steel shall be No.4 bars with maximum spacing at 18 inch centers, wired tightly at all intersections and embedded 2 inches clear of all concrete surfaces.
3. Exposed edges of concrete shall be chamfered 1 inch.
4. Dimensions may be varied to fit local conditions if ordered by the engineer.
5. Commercial prefabricated gratings approved by the bridge division may be used in lieu of the field-welded grating shown.
6. Extreme low cover situations to be reviewed by hydraulics engineer.
7. Slope catch basin floors 10:1 from all directions toward outlet pipe. If basin is used as a junction, shape flow line(s) to outlet pipe and provide a 10:1 slpoe to flow line(s).
8. See sheet R-2.9.1 for details if connecting HDPE pipe.
9. A single Type 2 drop inlet shall be constructed unless a double or triple is specified.
10. Single grate configuration shown for clarity. Outside dimensions of each grate shall measure 2 feet by A+4¾".
11. Run rebar continuous thru construction joint. Joint must be a minimum of 3 inches from horizontal bars.
12. Weld one tab on ℄ of grate and remaining two tabs 6 inches from edge of frame. Six tabs per inlet, three tabs on each side
13. Weld tabs 6 inches from edge of frame. Four tabs per grate, two on each side.
14. For multiple grate installations, the station/offset is to the center of the concrete drop inlet structure.
15. Grate is to fit in the frame and be easily removed. If the gap between the grate and frame is greater than ¼" on each side of the grate, the grate and frame shall be removed and reconstructed to the tolerances specified or, with approval of the engineer, a filler strip up to ¼" in thickness may be welded flush to the top of the frame to reduce the gap to a maximum of ¼"
16. Additional pipe penetrations may be placed in any wall. Pipe penetrations are to be to the center of the structure wall unless specified otherwise.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

DROP INLET
TYPE 2

R-4.2.1 (609) Signed Original On File
ADOPTED 11/70 REVISED 10/15 CHIEF HYDRAULICS ENGR.

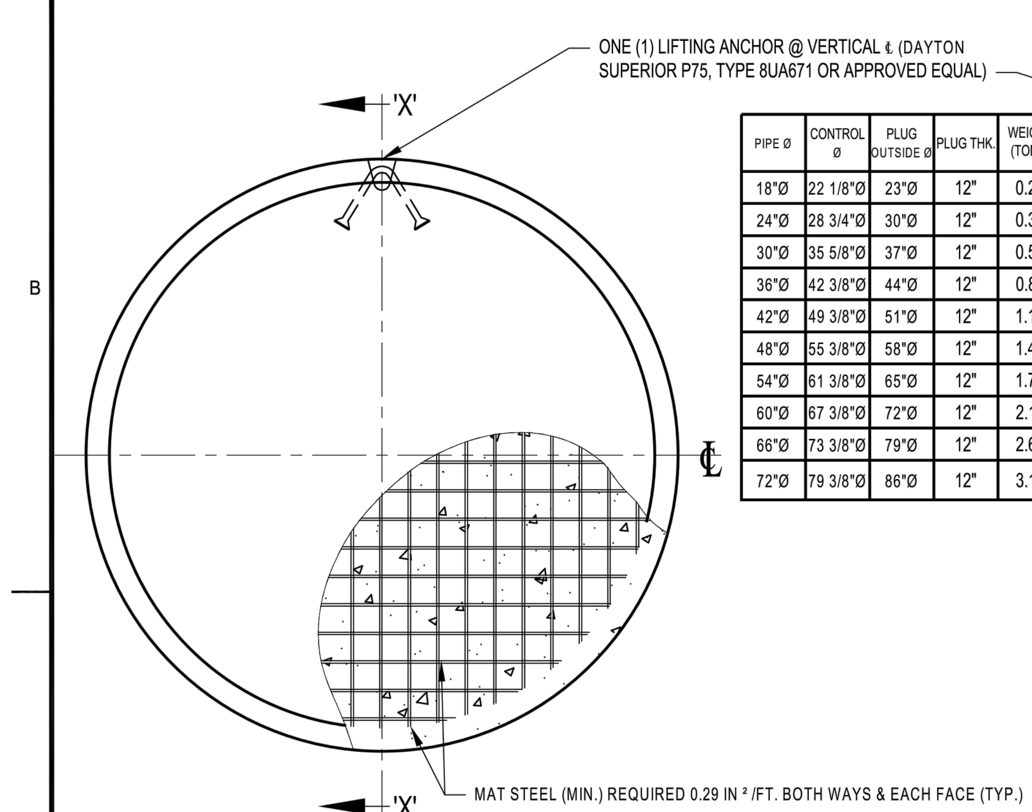
DROP INLET TYPE 2 PER NDOT

N.T.S.

B / 33

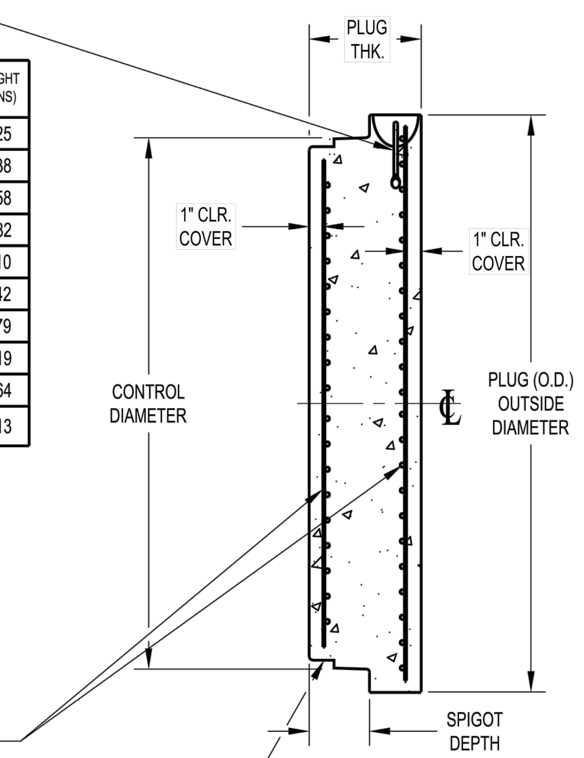
1 2

B



PLUG END VIEW

PIPE Ø	CONTROL Ø	PLUG OUTSIDE Ø	PLUG THK.	WEIGHT (TONS)
18"Ø	22 1/8"Ø	23"Ø	12"	0.25
24"Ø	28 3/4"Ø	30"Ø	12"	0.38
30"Ø	35 5/8"Ø	37"Ø	12"	0.58
36"Ø	42 3/8"Ø	44"Ø	12"	0.82
42"Ø	49 3/8"Ø	51"Ø	12"	1.10
48"Ø	55 3/8"Ø	58"Ø	12"	1.42
54"Ø	61 3/8"Ø	65"Ø	12"	1.79
60"Ø	67 3/8"Ø	72"Ø	12"	2.19
66"Ø	73 3/8"Ø	79"Ø	12"	2.64
72"Ø	79 3/8"Ø	86"Ø	12"	3.13



SECTION : 'X'-'X'

B

A

NOTES:

1) FOR ADDITIONAL PLUG / PIPE DETAIL INFORMATION CONTACT RINKER MATERIALS REPRESENTATIVE.
2) SEE CONTRACT BID ITEM SUMMARY FOR SIZE & QUANTITY REQUIRED.
3) MINIMUM CONCRETE STRENGTH (F'c) = 4,000 PSI.

A

Rinker MATERIALS™ A QUIKRETE® COMPANY
6560 LANGFIELD RD., BLDG. 3
HOUSTON, TEXAS 77092
PHONE #: 832-590-5300

FOR APPROVAL
SCALE: N. T. S.

REV. NO.: DESCRIPTION: BY: DATE:
REVISIONS
DRAWN BY: E. JACKSON DATE: JUNE 7, 2018
CHECKED BY: T. LOPEZ

GENERAL R.C. PLUG DETAIL (18"Ø TO 72"Ø)

PROJECT: LAS VEGAS AREA
LOCATION: NEVADA
CONTRACTOR:
DRAWING NO.: A200-CE-731 REV.:
SHEET NO.: END PLUG

1 2

TYPICAL STORM DRAIN CAP

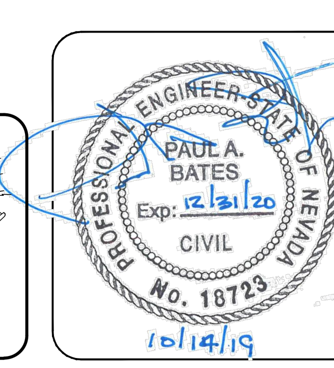
N.T.S.

C / 33

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



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

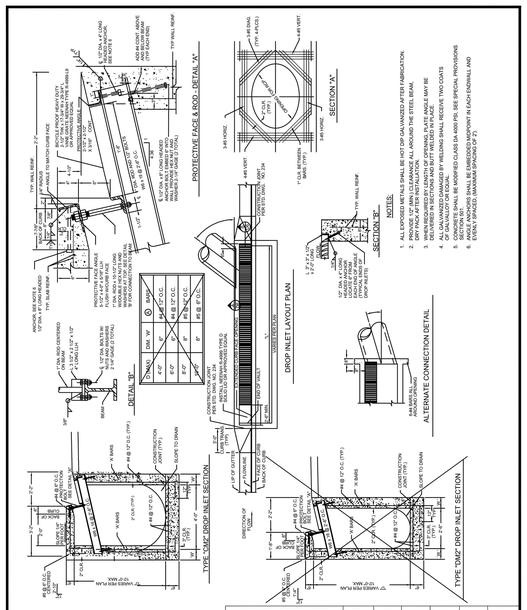
SUMMERLIN VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

STORM DRAIN DETAILS

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 33/44
DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: NONE
VERT.: NONE
CLV 00–00000

X:\Projects\SummWest\Village 22\100060655 – V22N Street J (Lake Mead to Street G)_Sheets\60655-28-DETL-STRM.dwg LAYOUT: STORM DRAIN DETAILS Oct 15, 2019 – 9:13AM



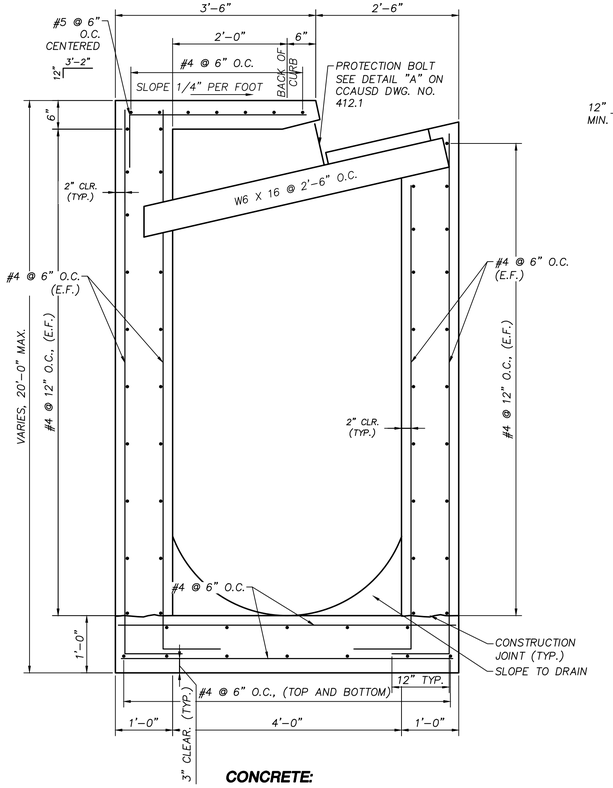
AGENCY APPROVED	B	C	H	L	M	N

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



CONCRETE:

CONCRETE SHALL BE MODIFIED CLASS DA 4500 PSI, SEE SPECIAL PROVISIONS SECTION 501.

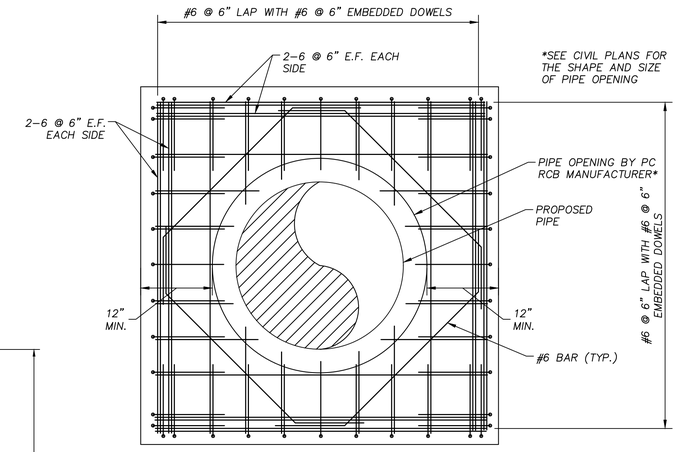
NOTE:

THIS DETAIL IS MEANT TO MODIFY THE TYPE "CM2" DROP INLET SECTION PER CCAUSD DWG. NO. 412.1 FOR STRUCTURES WITH DEPTHS GREATER THAN 10'. ALL OTHER INFORMATION OF THE STANDARD DRAWING STILL APPLY UNLESS OVERWRITTEN BY THIS DETAIL.

SUPPLEMENT TO "CM2" DROP INLET (D>10')

C 34

N.T.S.



NOTES:

1. FOR EXACT LOCATION SEE PIPE LAYING SCHEDULE.
2. RCB REINFORCEMENT NOT SHOWN FOR CLARITY.
3. USE ¾" CHAMFER FOR ALL EXPOSED CORNERS.
4. ALL REINFORCING BAR LAP SPLICES SHALL CONFORM TO ACI 318-11
5. THE OPENING SIZE MAY BE INCREASED (±2") FOR EASE OF INSTALLATION. FILL VOIDS WITH NON-SHRINK CONCRETE GROUT.
6. UNLESS OTHERWISE SHOWN ON THE DRAWINGS CONCRETE COVER FOR REINFORCING BARS SHALL BE AS FOLLOWS:

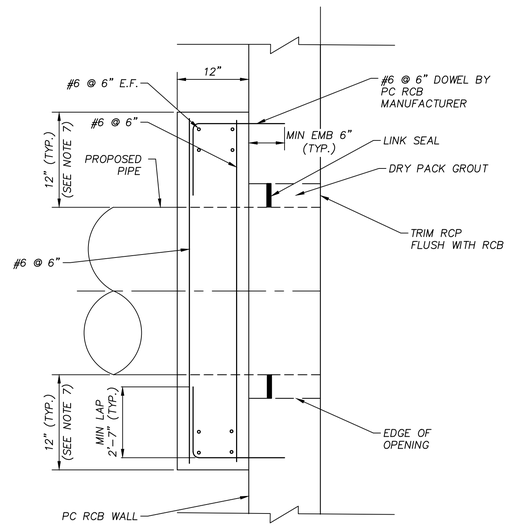
FOR SURFACES IN CONTACT WITH WATER OF WEATHER AND FORMED SURFACES IN CONTACT WITH EARTH	2"
FOR CONCRETE PLACED AGAINST EARTH	3"

7. COLLAR SHOULD NOT GO BEYOND THE TOP OR BOTTOM SLAB OF RCB

LATERAL CONNECTION DETAIL (FOR SMALL PIPES 24" TO 48")

A 34

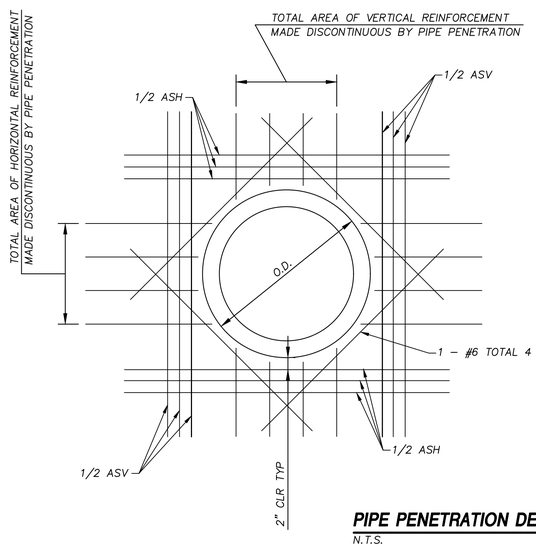
N.T.S.



CONCRETE:

UNLESS OTHERWISE NOTED OR SPECIFIED, ALL STRUCTURAL CONCRETE SHALL BE MODIFIED MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI IN 28 DAYS. CEMENT USED IN STRUCTURLA CONCRETE SHALL BE TYPE V CEMENT UNLESS OTHERWISE NOTED.

REINFORCEMENT STEEL SHALL BE DEFORMED BARS CONFORMING IN QUALITY TO THE REQUIREMENTS OF ASTM A-615 "SPECIFICATIONS FOR DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT" GRADE 60.



NOTES:

1. ALL BARS LENGTHS TO BE I.D. + 3'-10"
2. ASH= TOTAL AREA OF HORIZONTAL REINFORCEMENT MADE DISCONTINUOUS BY PIPE PENETRATION
3. ASV= TOTAL AREA OF VERTICAL REINFORCEMENT MADE DISCONTINUOUS BY PIPE PENETRATION
4. ASH AND ASV BARS SHALL BE EVENLY DISTRIBUTED ON EACH SIDE OF PIPE PENETRATION AND PLACED IN ADDITION TO TYPICAL WALL REINFORCEMENT SHOWN
5. ASH AND ASV BARS SHALL BE UNIFORMLY SPACED OVER A DISTANCE NOT TO EXCEED ¼ O.D. ON EACH SIDE OF THE PIPE PENETRATION

PIPE PENETRATION DETAILS

B 34

N.T.S.

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 VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

STORM DRAIN DETAILS

DESIGNED BY: A. ALAGIYAWANNA
DRAWN BY: O. QUASSANI
CHECKED BY: N. GAO
HORIZ.: NONE
VERT.: NONE

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 34/44

CLV 00-00000

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
PROFESSIONAL ENGINEER-STATE OF NEVADA A MOHOTTI ALAGIYAWANNA EXP. 12-31-20 CIVIL No. 026435

X:\Projects\SummitWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-28-DETL-STRM-STRC.dwg LAYOUT: STORM DRAIN DETAILS (2) Oct 16, 2019 - 8:11AM

GRAPHIC SCALE
50 0 25 50 100
HORIZONTAL: 1"= 50'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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 QUICK! Call 811 OR 1-800-642-2444

AVOID HITTING OVERHEAD POWER LINES. ITS QUICK! CALL BEFORE YOU DIG 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 - PAUL A. BATES Exp.: 12/31/20 CIVIL No. 18723 10/14/19

EARTH WORK FOR PARCELS E&F
CUT=7600 CU. YD.
FILL=170200 CU. YD.
NET=162600 CU. YD.

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

GRADING DETAILS - PARCELS E & F

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=50'
VERT.: NONE

JOB NO. 100060655
DATE OCTOBER, 2019
DRAWING NO. 35/44
CLV 00-00000

X:\Projects\SummitWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-29-GRAD-WASH.dwg LAYOUT: GRADING DETAILS - PARCELS E & F Oct 15, 2019 - 3:03PM

MATCHLINE - SEE SHEET 35

ATKINS

REV.	DESCRIPTION	BY	DATE	APPROVAL

REVISIONS

SUMMERLIN

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

GRADING DETAILS - PARCELS E & F

EARTH WORK FOR PARCELS E&F
CUT=7600 CU. YD.
FILL=170200 CU. YD.
NET=162600 CU. YD.

GRAPHIC SCALE
50 0 25 50 100
HORIZONTAL: 1"= 50'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

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

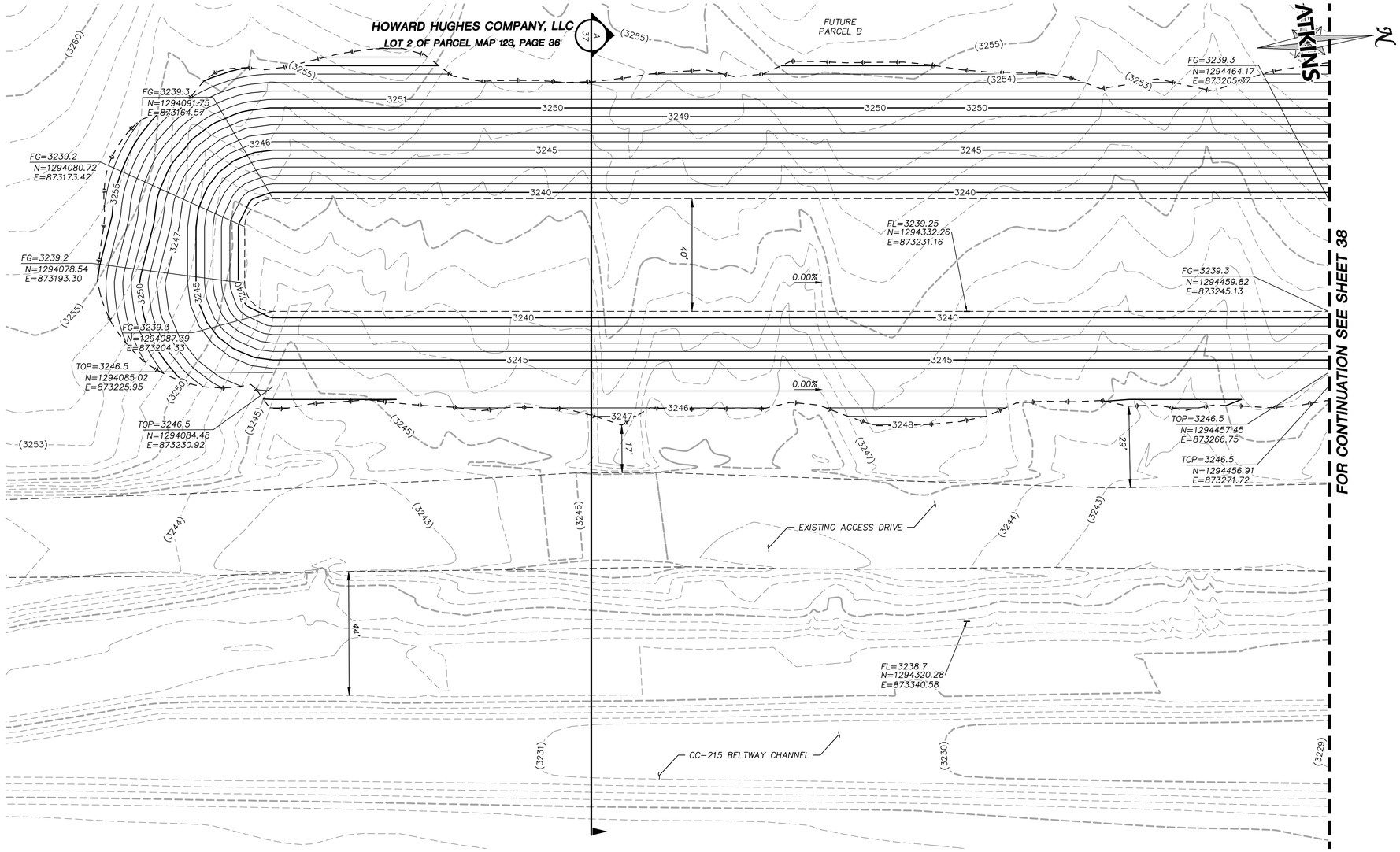
AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

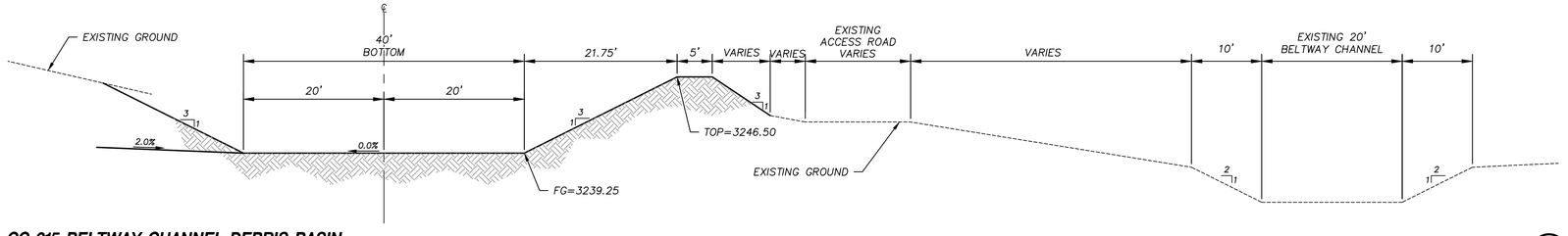
UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER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

PROFESSIONAL ENGINEER STATE OF NEVADA
PAUL A. BATES
Exp: 12/31/20
CIVIL
No. 18723
10/14/19

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 36/44
DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=50'
VERT.: NONE
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 – V22N Street J (Lake Mead to Street G)_Sheets\60655-29-GRAD-WASH.dwg LAYOUT: GRADING DETAILS – PARCELS E & F 2 Oct 15, 2019 – 9:23AM





CC-215 BELTWAY CHANNEL DEBRIS BASIN

N.T.S.

A
37

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

BASIS OF BEARING

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BENCHMARK

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T21S,R59E,S03

FAST Call before you UnderGround 1-702-432-5300 (702) 486-9234 STATEWIDE UTILITY NOTIFICATION SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING TELEPHONE OR UTILITY LINES. 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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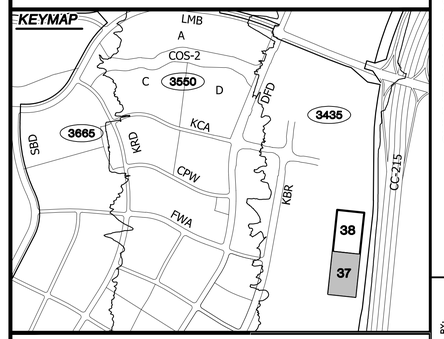
PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp.: 12/31/20 CIVIL No. 18723
10/14/19

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

KEYMAP



ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

GRADING DETAILS BASIN

DESIGNED BY:	N. BARCOS
DRAWN BY:	T. YOHMAN
CHECKED BY:	P. BATES
HORIZ.:	1"=20'
VERT.:	NONE
JOB NO.	100606655
DATE:	OCTOBER, 2019
DRAWING NO.	37/44
CLV	00-00000

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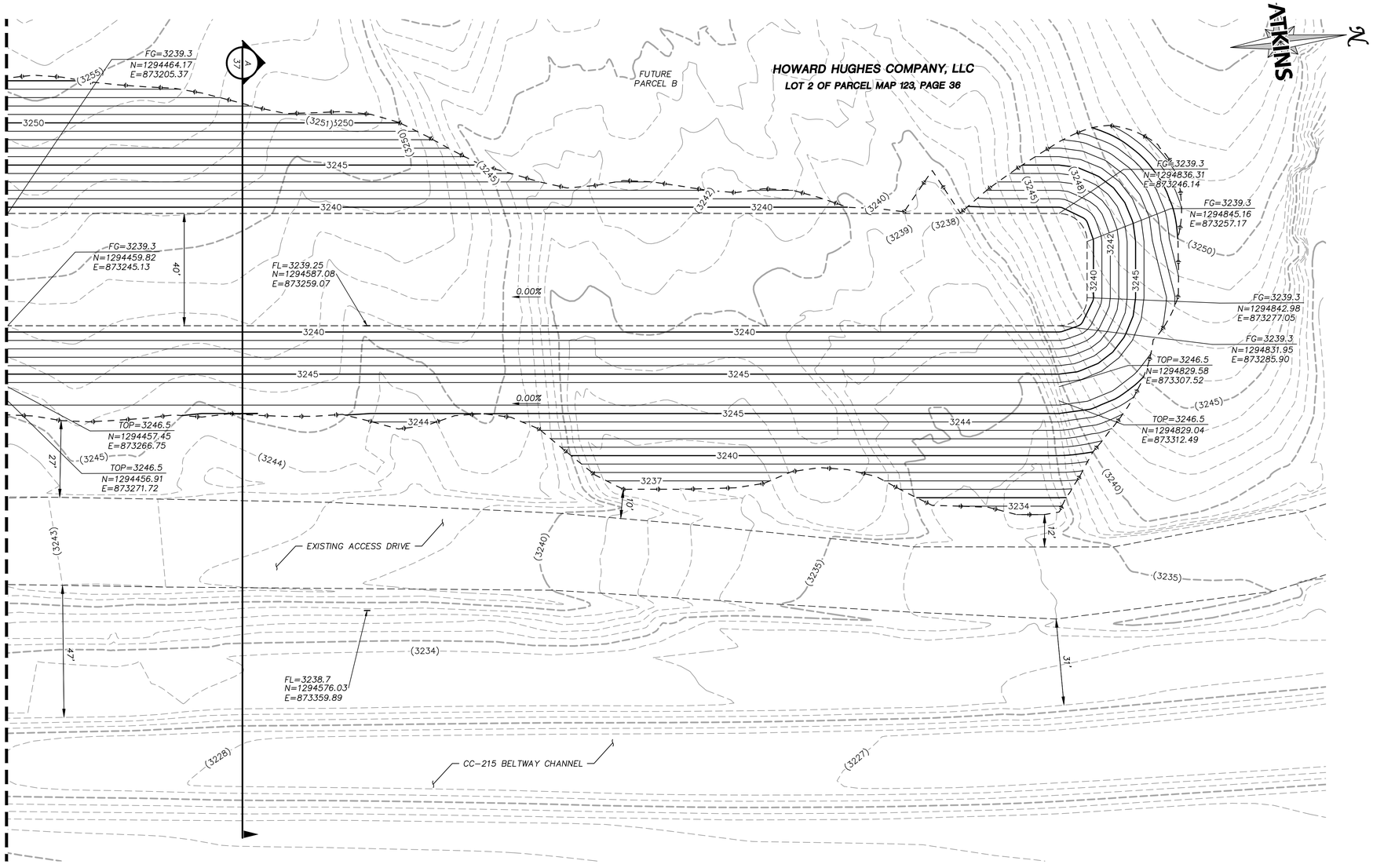

DEBRIS BASIN VOLUME TABLE

ELEVATION (FT.)	AREA (SQ. FT.)	INCREMENTAL VOLUME (CU. FT.)	CUMULATIVE VOLUME (CU. FT.)	CUMULATIVE VOLUME (ACRE-FT.)
3239.25	30,675	0	0	0
3240	34,730	24,527	24,527	0.56
3241	40,338	37,534	62,060	1.42
3242	46,226	43,282	105,342	2.42
3243	53,039	49,633	154,974	3.56
3244	60,528	56,784	211,757	4.86
3245	68,306	64,417	276,174	6.34
3246	76,034	72,170	348,344	8.00
3246.50	79,788	38,956	387,299	8.89

NOTE
1. REQUIRED CUMULATIVE VOLUME IS 7 ACRE-FT.
2. APPROXIMATE TRIBUTARY AREA OF 275 ACRES.
3. MAXIMUM FLOW INTO BASIN: Q100=334 CFS

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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#5156A

BASIS OF BEARING

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T21S,R59E,S03

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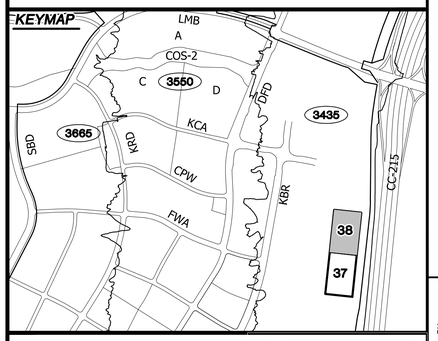
PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp.: 12/31/20 CIVIL No. 18723
10/14/19

KEYMAP



REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7375
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
KEITEL RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

GRADING DETAILS BASIN

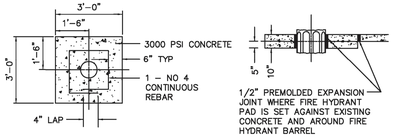
JOB NO.	100060655
DATE:	OCTOBER, 2019
DRAWING NO.	38/44
CLV	00-00000

DESIGNED BY: N. BARCOS
DRAWN BY: T. YOHMAN
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

X:\Projects\SummitWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-XX-GRAD-BASN.dwg LAYOUT: GRADING DETAILS BASIN 2 Oct 15, 2019 - 9:25AM

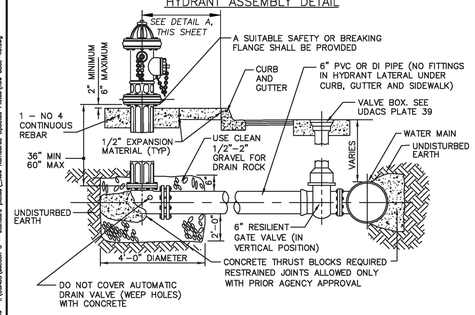
UNIFORM DESIGN STANDARDS FOR WATER DISTRIBUTION SYSTEMS

PAD DETAIL



NOTE
SEE SHEET 2 FOR LOCATION OF FIRE HYDRANTS, AND FIRE HYDRANT PADS.

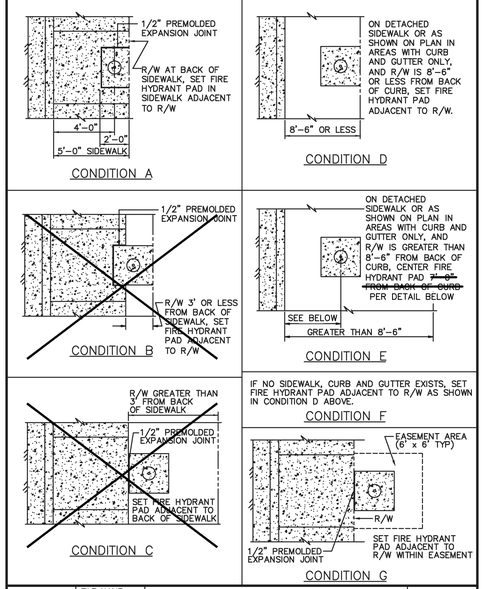
HYDRANT ASSEMBLY DETAIL



NOT TO SCALE	FILE NAME: UDACS–40 DRAWN BY: SDM CHECKED BY: SPM	FIRE HYDRANT INSTALLATION	UDACS PLATE NO. 40 SHEET 1 OF 3

15:28 Plot ● 03/10/09 I:\UDACS\section 5 - standard plates_New Numbered Updated Plates\new udac-40.dwg

UNIFORM DESIGN STANDARDS FOR WATER DISTRIBUTION SYSTEMS



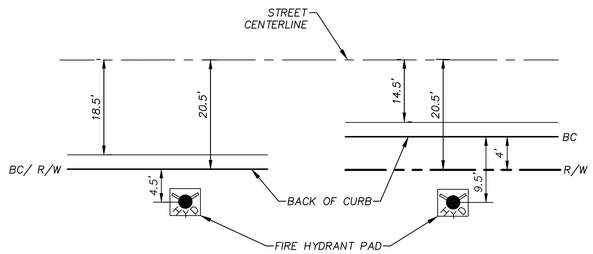
NOT TO SCALE	FILE NAME: UDACS–40 DRAWN BY: SDM CHECKED BY: SPM	FIRE HYDRANT INSTALLATION	UDACS PLATE NO. 40 SHEET 2 OF 3

UNIFORM DESIGN STANDARDS FOR WATER DISTRIBUTION SYSTEMS

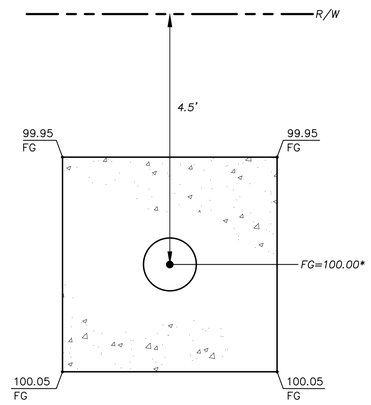
NOTES

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



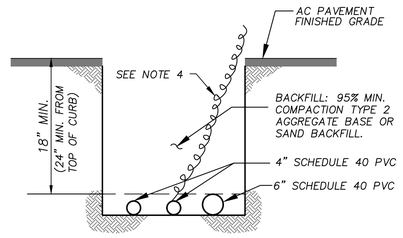
FIRE HYDRANT LOCATION DETAIL (A / 39)
N.T.S.



*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 / 39)
N.T.S.

NOTES:
1 SLEEVES AND CONDUITS SHALL BE INSTALLED 18" BELOW FINISHED GRADE AND SHALL EXTEND 2' 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 / 39)
N.T.S.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 136892 FIRST APPROVED DATE: _____

FAST Call before you UnderGround 1-702-432-5300 TOLL FREE AND PROTECTED 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 PAUL A. BATES No. 18723 Exp: 12/31/20 CIVIL 10/14/19

REVISIONS			
REV.	DESCRIPTION	BY	DATE

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

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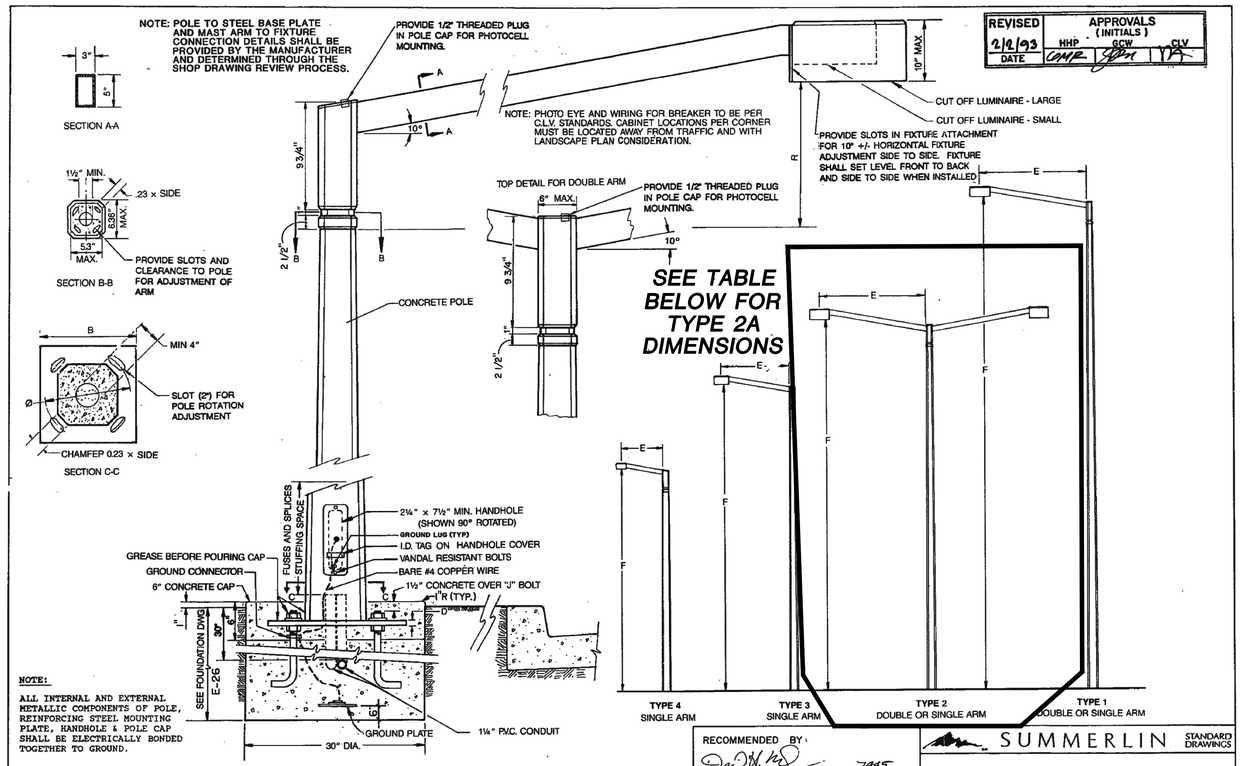
WATER DETAILS

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: NONE
VERT.: NONE

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 39/44
CLV 00–00000

X:\Projects\SummWest\Village 22\100060655 – V22N Street J (Lake Mead to Street G)_Sheets\60655–26–DETL–WATR.dwg LAYOUT: WATER DETAILS Oct 15, 2019 – 9:25AM



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"	5'	41'-9"	2.16"	10-1/4"	30"ØX 6'6"	LARGE
TYPE 2A	14"	14"	3/4"	5'	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"	"h"	SHAFT BASE	FOOTING	CUTOFF LUMINAIRE
TYPE 3	14"	14"	3/4"	5'	26'4.5"	1.64'	8-5/8"	30"ØX4'4"	SMALL
TYPE 4	14"	14"	3/4"	3'	16'11.5"	1.29'	7-3/4"	30"ØX4'0"	SMALL

RECOMMENDED BY:
DAVID H. MALPASS 7995 R.P.E.

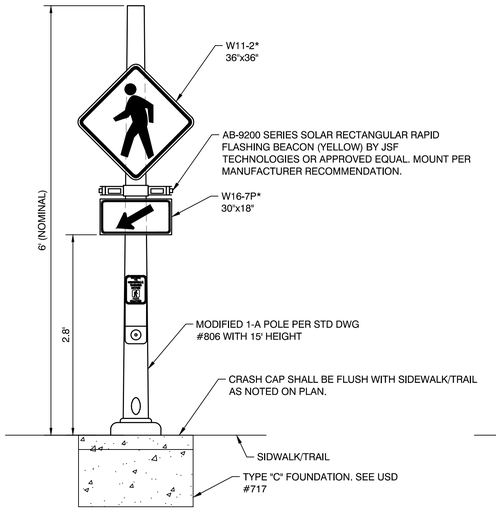
APPROVED BY:
C.L.V. CITY ENGINEER R.P.E.# 7565

SUMMERLIN STANDARD DRAWINGS

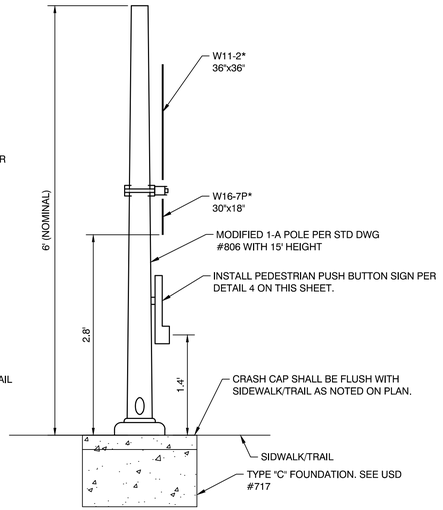
STREET LIGHT POLE, ARM AND FIXTURE DETAIL

DATE 8-88 | DWG. NO. E-2 | PAGE NO. 1 OF 1

REVISED	APPROVALS (INITIALS)		
DATE	HHP	GCW	CLV
2/12/93			



RRFB POLE WITH SIGNS (FRONT VIEW)



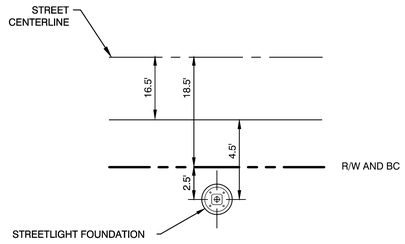
RRFB POLE (SIDE VIEW)

*SIGN SHALL BE FLUORSCENT YELLOW-GREEN (FYG)

RECTANGULAR RAPID FASHING BEACON (RRFB) DETAIL

N.T.S.

B / 40



STREETLIGHT FOUNDATION LOCATION DETAIL

N.T.S.

A / 40

RRFB SIGNAGE

N.T.S.

C / 40

PEDESTRIAN PUSH BUTTON SIGN

N.T.S.

D / 40

NOTE:

PER ZC-1020-07, A LIGHTING STUDY OF THE METAL HALIDE LUMINAIRES IS TO BE PROVIDED FOR REVIEW AND APPROVAL FOR PUBLIC WORKS.

IF LED LUMINAIRES ARE DESIRED, A SIMILAR LIGHTING STUDY WILL BE REQUIRED.

THE DESIGN AND EQUIPMENT USED FOR THE STREET LIGHT SYSTEM WILL NEED TO BE MODIFIED UPON APPROVAL OF LIGHTING STUDY AND ITS RESULTS. PLAN REVISION WILL BE REQUIRED AT THAT TIME.

FAST Call before you UnderGround 1-702-432-5300 (HEARING AND SPEECH IMPAIRED) SYSTEM OF TRANSPORTATION

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PROFESSIONAL ENGINEER STATE OF NEVADA PAUL A. BATES Exp: 12/31/20 CIVIL No. 16723 10/14/19

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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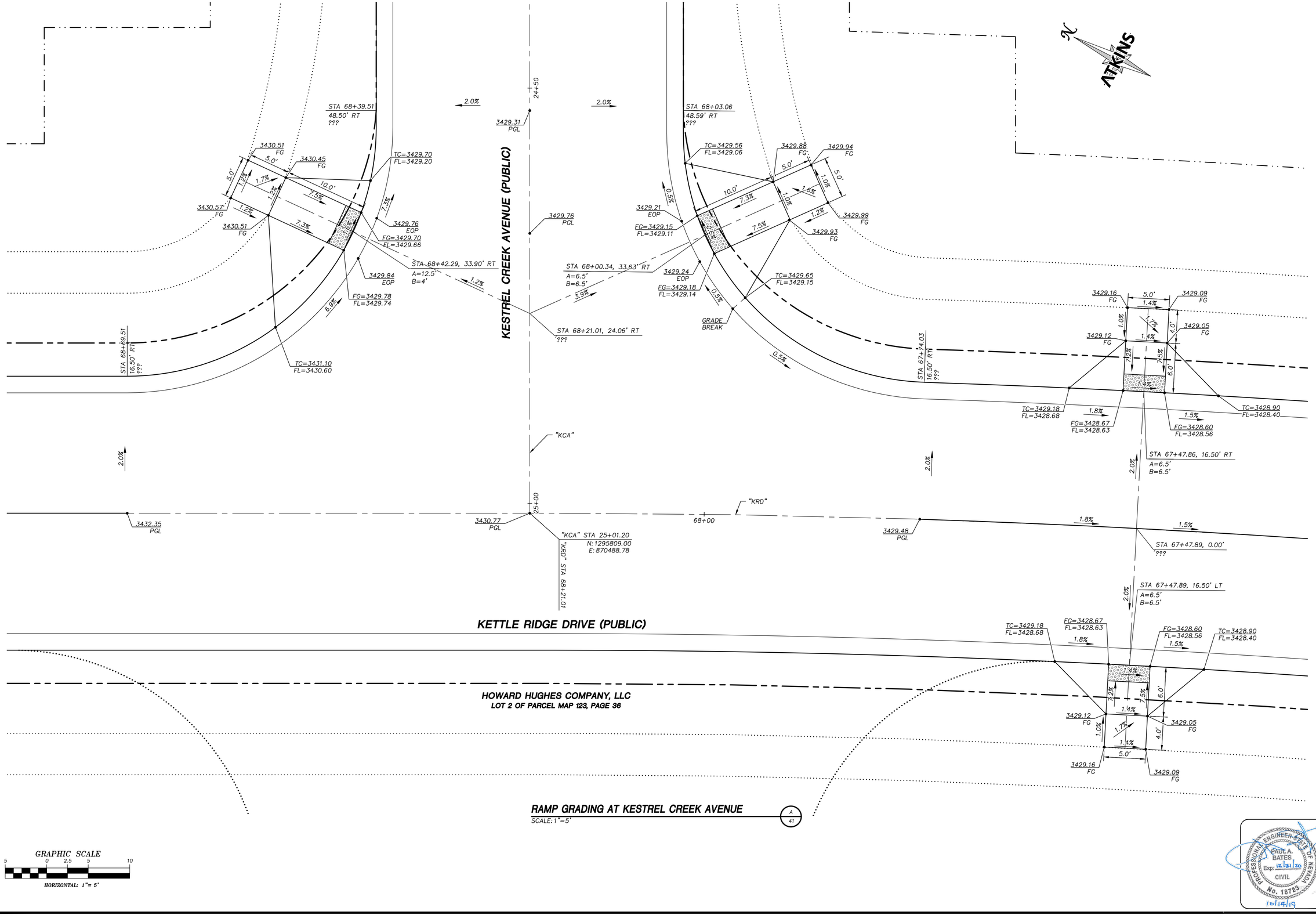
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

STREETLIGHT DETAILS

JOB NO. 100060655	DESIGNED BY: N. BARCOS	CHECKED BY: P. BATES	
DATE: OCTOBER, 2019	DRAWN BY: O. QUASSANI	HORIZ.: NONE	
DRAWING NO. 40/44		VERT.: NONE	
CLV 00-00000			

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-27-DETL-STLT.dwg LAYOUT: STREETLIGHT DETAILS Oct 15, 2019 - 9:25AM



RAMP GRADING AT KESTREL CREEK AVENUE

SCALE: 1"=5'

A / 41

GRAPHIC SCALE
5 0 2.5 5 10
HORIZONTAL: 1"= 5'

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

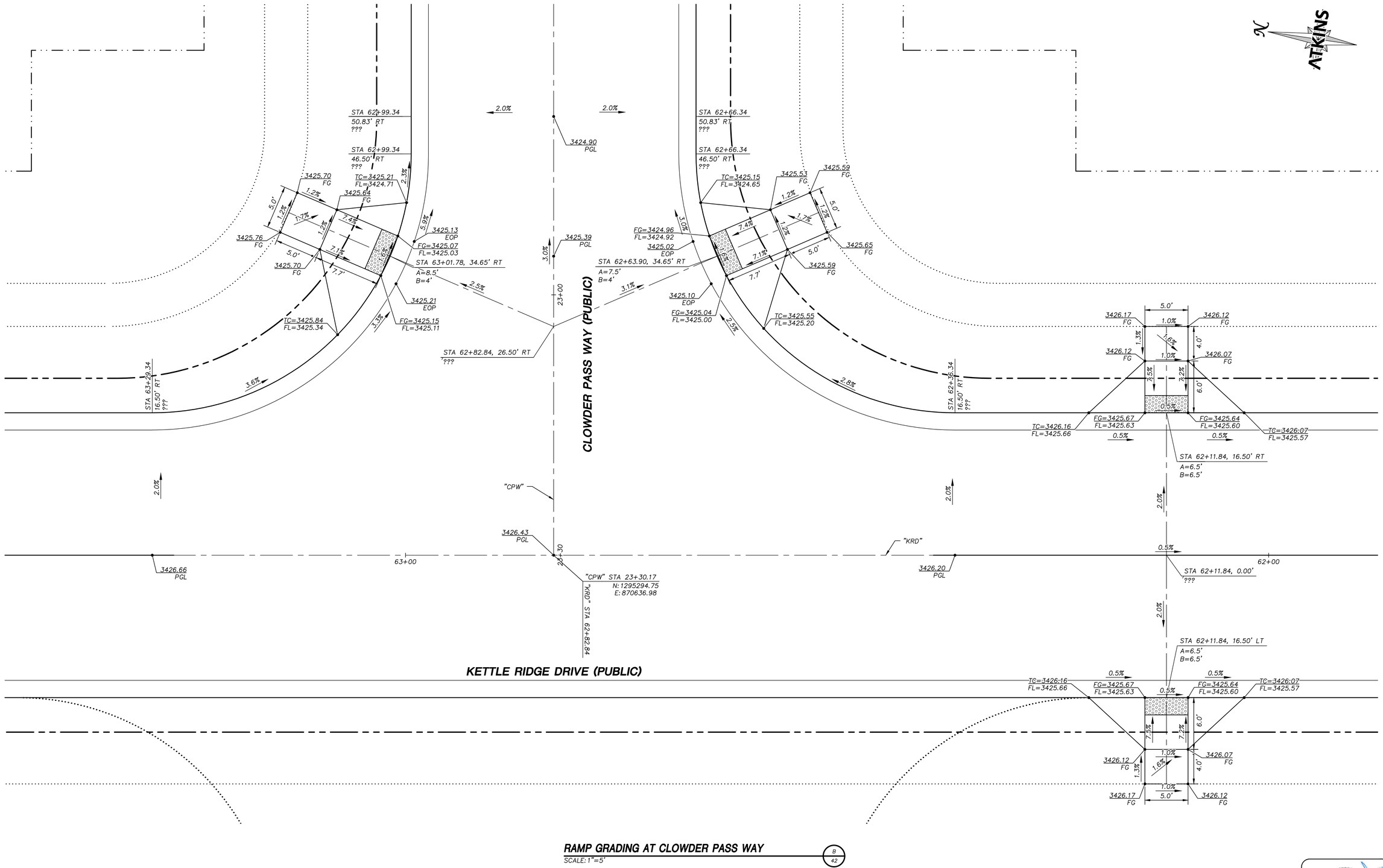
INTERSECTION DETAILS

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: AS SHOWN
VERT.: NONE

JOB NO. 100060655
DATE: OCTOBER, 2019
DRAWING NO. 41/44
CLV 00-00000

PROFESSIONAL ENGINEER - STATE OF NEVADA
PAUL A. BATES
Exp.: 12/31/20
CIVIL
No. 18723
10/14/19

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-22-DETL-D2.dwg LAYOUT: INTERSECTION DETAILS Oct 15, 2019 - 9:26AM



RAMP GRADING AT CLOWDER PASS WAY

SCALE: 1"=5'

8
42

GRAPHIC SCALE
5 0 2.5 5 10
HORIZONTAL: 1"= 5'

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

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Telephone: +1.702.263.7275
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SUMMERLIN

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KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

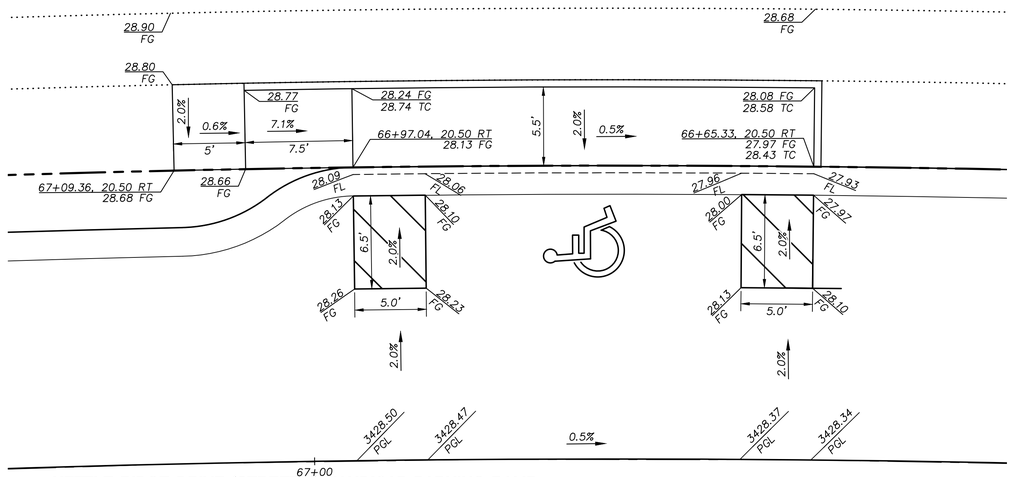
INTERSECTION DETAILS

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: AS SHOWN
VERT.: NONE

JOB NO. 100060655
DATE OCTOBER, 2019
DRAWING NO. 42/44
CLV 00-00000

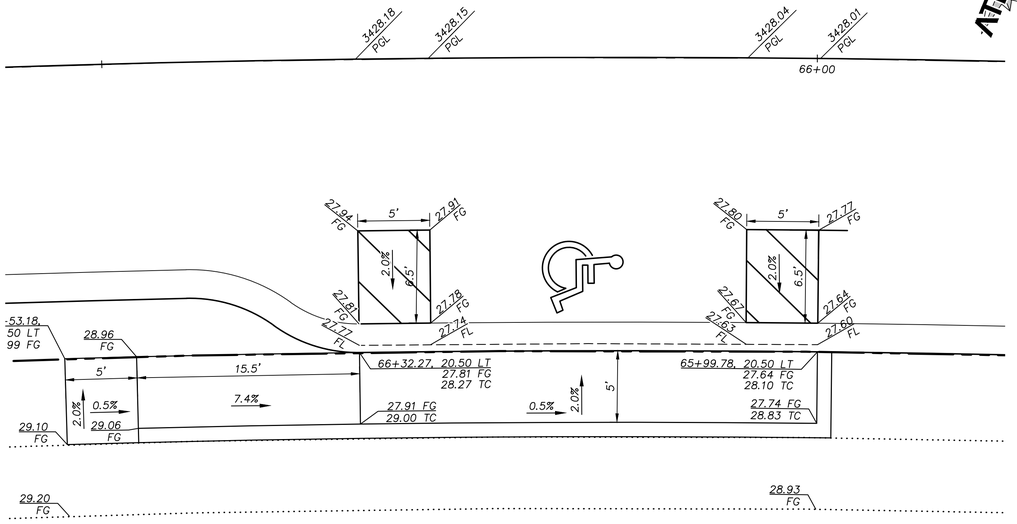
PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL A. BATES - Exp.: 12/31/20 - CIVIL - No. 10723 - 10/14/19

X:\Projects\SummitWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-22-DETL-02.dwg LAYOUT: INTERSECTION DETAILS (2) Oct 15, 2019 - 9:27AM



KETTLE RIDGE DRIVE (STREET J) HANDICAP PARKING RAMP
N.T.S.

A
43



KETTLE RIDGE DRIVE (STREET J) HANDICAP PARKING RAMP
N.T.S.

B
43

GRAPHIC SCALE
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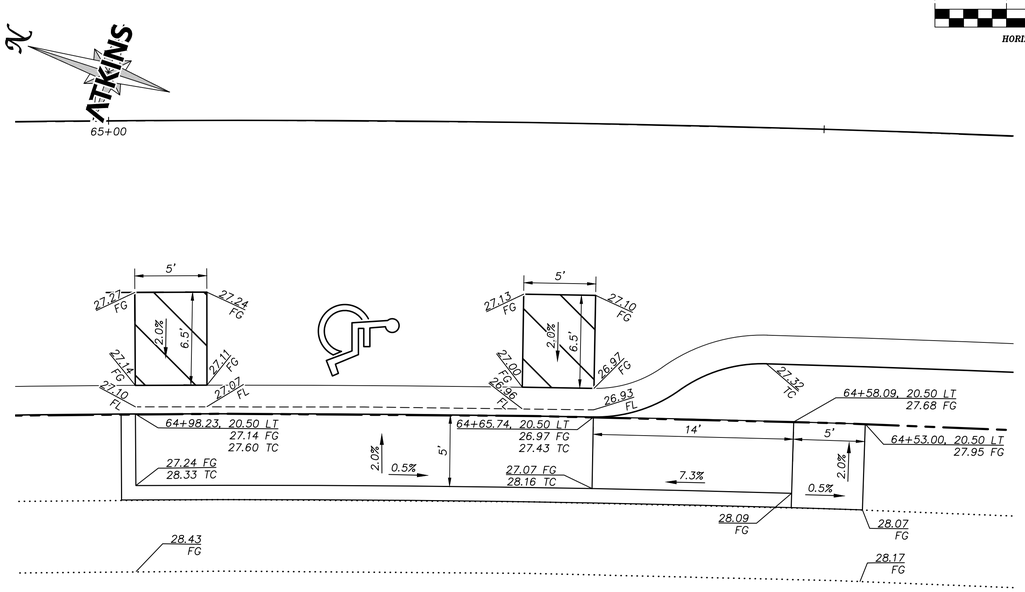
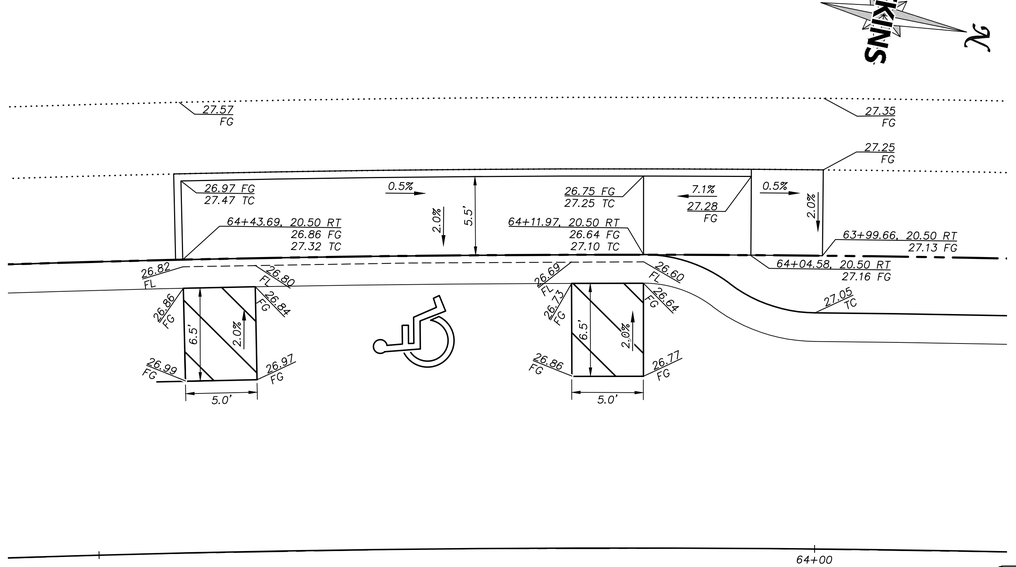
HORIZONTAL: 1"= 5'



KETTLE RIDGE DRIVE (STREET J) HANDICAP PARKING RAMP
N.T.S.

C
43



KETTLE RIDGE DRIVE (STREET J) HANDICAP PARKING RAMP
N.T.S.

D
43

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

HANDICAP SPOT GRADING DETAILS

PROFESSIONAL ENGINEER STATE OF NEVADA
PAUL A. BATES
Exp: 12/31/20
CIVIL
No. 18723
10/14/19

JOB NO. 100060655	DESIGNED BY: N. BARCOS		
DATE: OCTOBER, 2019	DRAWN BY: O. OUASSANI	CHECKED BY: P. BATES	HORIZ.: NONE
DRAWING NO. 43/44			VERT.: NONE
CLV 00-00000			

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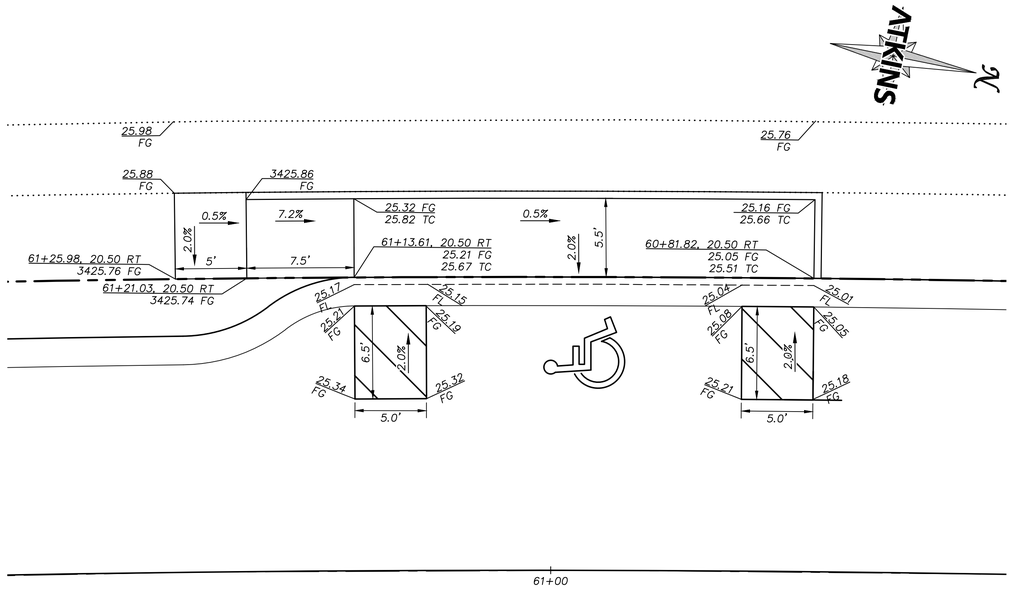

KETTLE RIDGE DRIVE (STREET J) HANDICAP PARKING RAMP

N.T.S.

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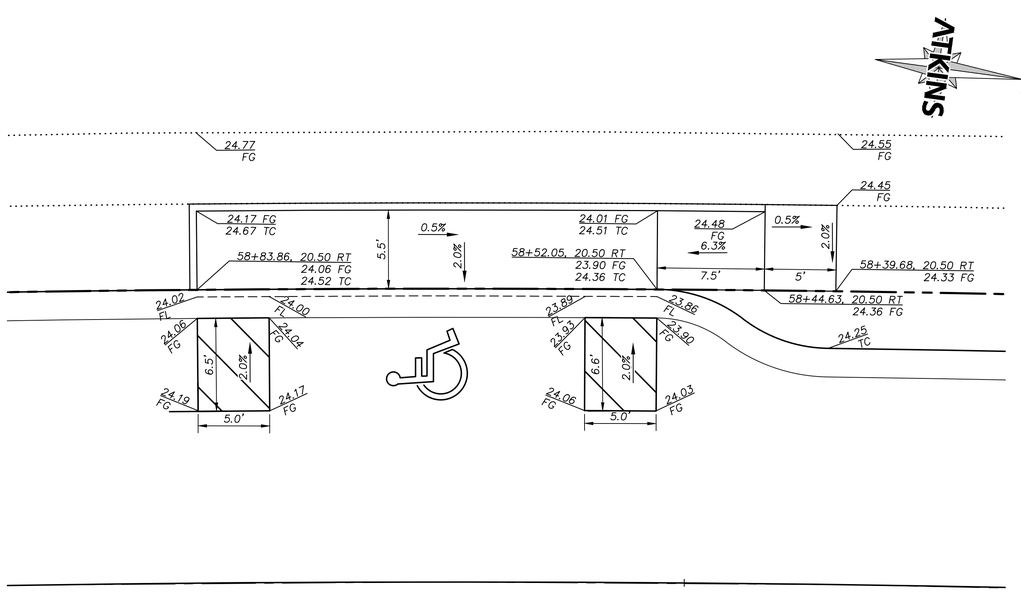
44



KETTLE RIDGE DRIVE (STREET J) HANDICAP PARKING RAMP

N.T.S.

F
44

GRAPHIC SCALE

5 0 2.5 5 10

HORIZONTAL: 1"= 5'

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 VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

HANDICAP SPOT GRADING DETAILS

PROFESSIONAL ENGINEER-STATE OF NEVADA
PAUL A. BATES
Exp: 12/31/20
CIVIL
No. 19723
10/14/19

JOB NO.	100060655
DATE:	OCTOBER, 2019
DRAWING NO.	44/44

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: J. IZZOLO/P. BATES
HORIZ.: NONE
VERT.: NONE

CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-22-DETL-03.dwg LAYOUT: 44 Oct 15, 2019 - 9:27AM

2270 Corporate Circle
Suite 200
Henderson NV 89074-7755
Tel: 702.263.7275
www.atkinsglobal.com/northamerica

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SUMMERLIN®

Summerlin West Village 22

Kettle Ridge Drive (Street J)

Fleet Wing Avenue (Street G) to Lake Mead Boulevard

Scurry Bend Drive (Street N) Rough Grade

Fleet Wing Avenue (Street G) to Lake Mead Boulevard

July 16, 2019

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Kettle Ridge Drive (Street J) & Scurry Bend Drive (Street N) Rough Grade : Fleet Wing Avenue (Street G) to Lake Mead Boulevard Date: July 16, 2019

Location of Development: a) Descriptive (Cross Streets) North/South: Fleet Wing Avenue

East/West: Lake Mead Boulevard

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

c) APN : 137-14-401-006, 137-23-101-002

Name of Owner: Howard Hughes Company, LLC

Telephone No.: (702) 791-4000 Fax No.: (702) 791-4450 E-Mail Address: chris.anderson@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

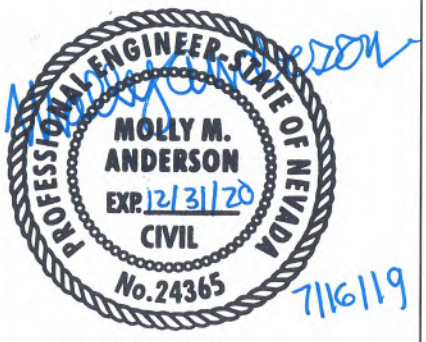
Firm: Atkins

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: 35.89 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: 225.54 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 (DS#5005)
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.

Local Entity File No.

Revision	Date

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Kettle Ridge Drive (Street J) & Scurry Bend Drive (Street N) Rough Grade	Map ID:
Firm Name: Atkins	Engineer: Molly Anderson, 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.
X		Design Manual **Standard Form 4**.
X		2 copies of the 24" x 36" Drainage Plan.
	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.

II. MAPS AND EXHIBITS

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

II. MAPS AND EXHIBITS (Continued)

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

III. DRAINAGE PLAN

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
X		Streets with off-set crowns.
X		Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X		Property lines.
X		Right-of-way lines and widths, existing and proposed.
X		Existing improvements and their elevations.
X		Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
X		Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X		Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
X		Location and cross-section of street capacity calculations.
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.
X		Building and/or lot numbers.
X		Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
X		Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
	X	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.
X		Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
X		Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.
	X	Location and detail of best management practice (BMP) for parking lots and low impact development (LID) (if required).

IV. HYDROLOGIC ANALYSIS

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

REFERENCE:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

V. HYDRAULIC ANALYSIS

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

REFERENCE:	**STANDARD FORM 2**

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

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

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

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

I. GENERAL REQUIREMENT		
Yes	No	
	N/A	A notarized letter from the adjacent property owner(s) allowing off-site grading. (A copy of the letter must be received prior to final acceptance of the drainage study.)
X		Copies of all conditions of approval for development related to this property. (e.g. zoning, use permit, tentative map, etc.) Verify compliance with conditions.
X		An electronic copy of the complete submittal is required to be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output device replicating your submittal. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats. If figures are in color, they must be scanned in color and saved as a separate file. MMA 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	(702) 551-0330	(1) 24" X 36" copy of the Grading Plan, (including all Detail Sheets) sealed by the engineer.
X		Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street. Note: Proposed top of curb elevations must be provided for both sides of roadways even if only half street construction is required.
X		Label existing topography at a minimum 5 foot elevation interval including adjacent developments, finished floor elevations of existing buildings and top of existing curbs extending 100 feet* around the perimeter of the site. (*Measured from the centerline of the adjacent roadway.)

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

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
	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.
X		Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
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 Kettle Ridge Drive (Street J): Fleet Wing Avenue (Street G) to Lake Mead Boulevard & Scurry Bend Drive (Street N) Rough Grade: Fleet Wing Avenue (Street G) to Lake Mead Boulevard** electronic submittal matches the paper version bound into the study.

7/16/19

Molly M. Anderson, PE (NV #24365)
Senior Engineer

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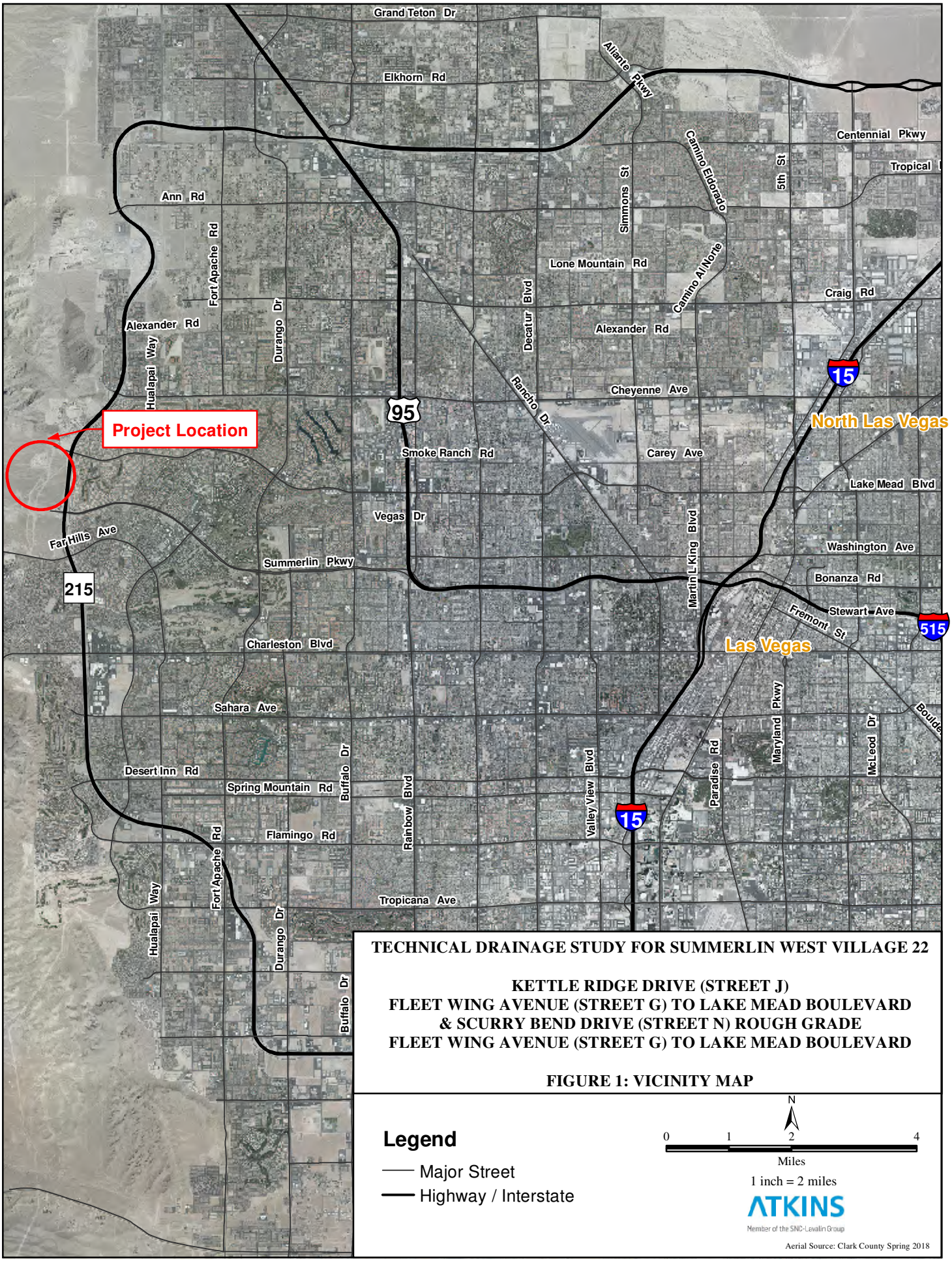
Executive Summary

This Technical Drainage Study (TDS), prepared on behalf of Howard Hughes Company, LLC represents the hydrologic and hydraulic analysis for the Kettle Ridge Drive (Street J) roadway improvements of the Summerlin West Village 22 development, as well as the Scurry Bend Drive (Street N) rough grade improvements. Summerlin West Village 22 is located in the northwest Las Vegas Valley west of the CC-215 beltway and is bounded by Lake Mead Boulevard and Summerlin Parkway. A vicinity map is provided in Figure 1. The Kettle Ridge Drive development and Scurry Bend Drive rough grade are located between Fleet Wing Avenue (Street G) and Lake Mead Boulevard and are shown on the location map on Figure 2.

A Master Conceptual Drainage Study (MCDS) for Summerlin West Village 22 (W.O. 7861-3A) was approved November 28, 2018. Addendum #2 to Update #1 of the MCDS was approved May 29, 2019. Portions of the TDS, such as parcel names, rainfall depths, and facility locations are directly referenced from the MCDS and the relevant information is included in Appendix A.



TECHNICAL DRAINAGE STUDY FOR SUMMERLIN WEST VILLAGE 22

KETTLE RIDGE DRIVE (STREET J)
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
& SCURRY BEND DRIVE (STREET N) ROUGH GRADE
FLEET WING AVENUE (STREET G) 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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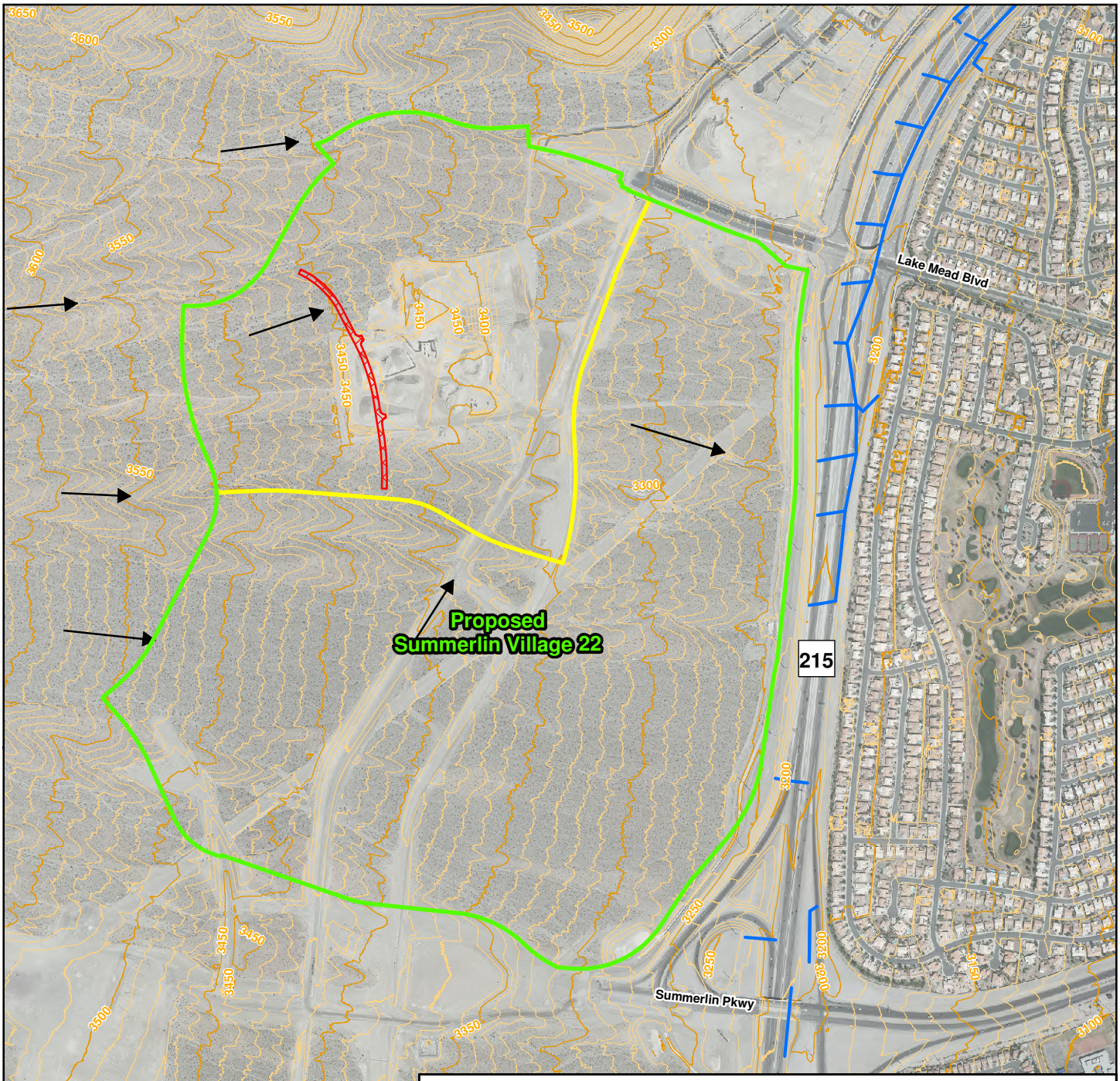
Aerial Source: Clark County Spring 2018



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FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

FIGURE 2: SITE MAP

Legend

- Existing Storm Water Facilities
- Proposed Roadway
- Summerlin Village 22 Boundary
- Summerlin Village 22 North Project Boundary
- Existing Flow Direction
- Existing 10-ft Contours
- Existing 50-ft Contours

N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

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Aerial Source: Clark County Spring 2018

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 development. The Western Beltway Channel to the east of the project is fully developed and includes a 20-foot wide concrete channel that conveys flow north to the Village 26 Detention Basin.

In the existing condition, runoff generated by the project and the undeveloped areas 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 Village 22. The Village 22 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

The proposed roadway is referred to as “Kettle Ridge Drive” in this study and on the plans. The MCDS refers to the proposed roadway by a letter name, “Street J”. Now that the roadways have been named, the plans and report refer to the roadways by name. Table 6 in Section 2.6 compares the roadway names to their letter name in the MCDS.

The proposed Kettle Ridge Drive improvements will be constructed prior to the adjacent onsite parcels and roadways. As a result, an interim condition exists for the proposed improvements. Refer to Figure 3 for the interim condition 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 and none of the existing downstream facilities are adversely affected by the proposed improvements.

The berm at Scurry Bend Drive will cut off upstream offsite flow for Parcels E, F, and Kettle Ridge Drive in the interim condition. The flow discharges within the proposed and existing ditch to the east to the existing Western Beltway Channel. The proposed berm and storm drain in Kettle Ridge Drive will cut off upstream offsite flow for Parcels G, H, J, and K. The Kettle Ridge Drive storm drain flows south and will discharge to the diversion ditch for the Scurry Bend Drive flow.

The interim subbasins were modeled using HEC-1. The results are summarized in Table 1 and on Figure 3.

Table 1 – Interim Condition HEC-1 Model Results

HEC-1 Node	Tributary Area (sq mi)	Tributary Area (ac)	100-year Flow (cfs)	10-year Flow (cfs)
3-0*	0.08050	51.52	189	100
DI-DIV	0.08417	53.87	84	69
CP1	*0.16467*	*105.39*	*269*	*163*
INT-J1	0.01270	8.13	25	11
StrJ-1E	0.00093	0.59	3	1
StrJ-1W	0.00109	0.70	3	2
CP2	*0.17937*	*114.80*	*299*	*175*
INT-J2	0.02073	13.27	40	18
StrJ-2E	0.00071	0.46	2	1
StrJ-2W	0.00093	0.59	3	1
CP3	*0.20174*	*129.11*	*343*	*194*
INT-J3	0.02834	18.13	55	24
StrJ-3E	0.00062	0.39	2	1
StrJ-3W	0.00082	0.53	2	1
CP4	*0.23151*	*148.17*	*402*	*218*
INT-N	0.18774	120.15	270	104
CP5	*0.41925*	*268.32*	*650*	*322*

1.3. Ultimate Condition

The ultimate condition flows were directly referenced from the approved MCDS as shown in the HEC-1 output and hydrology figure in Appendix A. These flows are also shown on Figure 3 as a comparison to the interim condition for reference for the ultimate condition hydraulic calculations.

Table 2 – Ultimate Condition MCDS Reference Information

HEC-1 Node	Tributary Area (sq mi)	Tributary Area (ac)	100-year Flow (cfs)	10-year Flow (cfs)
3-0*	0.08050	51.52	189	100
DI-DIV	0.08417	53.87	84	69
CP1	*0.16467*	*105.39*	*269*	*163*
INT-J1	0.01270	8.13	25	11
StrJ-1E	0.00093	0.59	3	1
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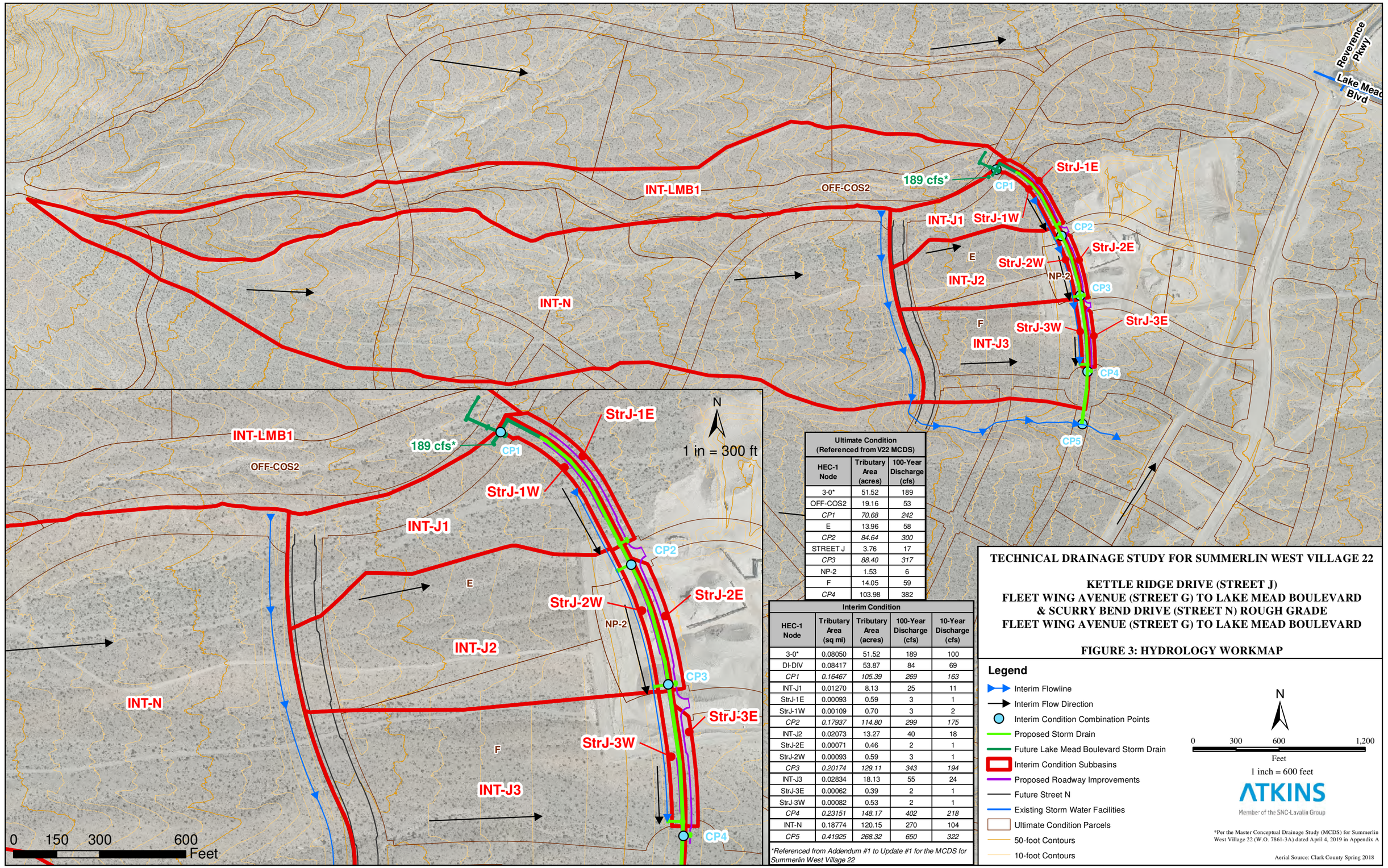

Ultimate Condition (Referenced from V22 MCDS)

HEC-1 Node	Tributary Area (acres)	100-Year Discharge (cfs)
3-0*	51.52	189
OFF-COS2	19.16	53
CP1	*70.68*	*242*
E	13.96	58
CP2	*84.64*	*300*
STREET J	3.76	17
CP3	*88.40*	*317*
NP-2	1.53	6
F	14.05	59
CP4	103.98	382

Interim Condition

HEC-1 Node	Tributary Area (sq mi)	Tributary Area (acres)	100-Year Discharge (cfs)	10-Year Discharge (cfs)
3-0*	0.08050	51.52	189	100
DI-DIV	0.08417	53.87	84	69
CP1	*0.16467*	*105.39*	*269*	*163*
INT-J1	0.01270	8.13	25	11
StrJ-1E	0.00093	0.59	3	1
StrJ-1W	0.00109	0.70	3	2
CP2	*0.17937*	*114.80*	*299*	*175*
INT-J2	0.02073	13.27	40	18
StrJ-2E	0.00071	0.46	2	1
StrJ-2W	0.00093	0.59	3	1
CP3	*0.20174*	*129.11*	*343*	*194*
INT-J3	0.02834	18.13	55	24
StrJ-3E	0.00062	0.39	2	1
StrJ-3W	0.00082	0.53	2	1
CP4	*0.23151*	*148.17*	*402*	*218*
INT-N	0.18774	120.15	270	104
CP5	*0.41925*	*268.32*	*650*	*322*

**Referenced from Addendum #1 to Update #1 for the MCDS for Summerlin West Village 22*

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& SCURRY BEND DRIVE (STREET N) ROUGH GRADE
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

FIGURE 3: HYDROLOGY WORKMAP

Legend

- Interim Flowline
- Interim Flow Direction
- Interim Condition Combination Points
- Proposed Storm Drain
- Future Lake Mead Boulevard Storm Drain
- Interim Condition Subbasins
- Proposed Roadway Improvements
- Future Street N
- Existing Storm Water Facilities
- Ultimate Condition Parcels
- 50-foot Contours
- 10-foot Contours

N

0 300 600 1,200
Feet

1 inch = 600 feet

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*Per the Master Conceptual Drainage Study (MCDS) for Summerlin West Village 22 (W.O. 7861-3A) dated April 4, 2019 in Appendix A

Aerial Source: Clark County Spring 2018

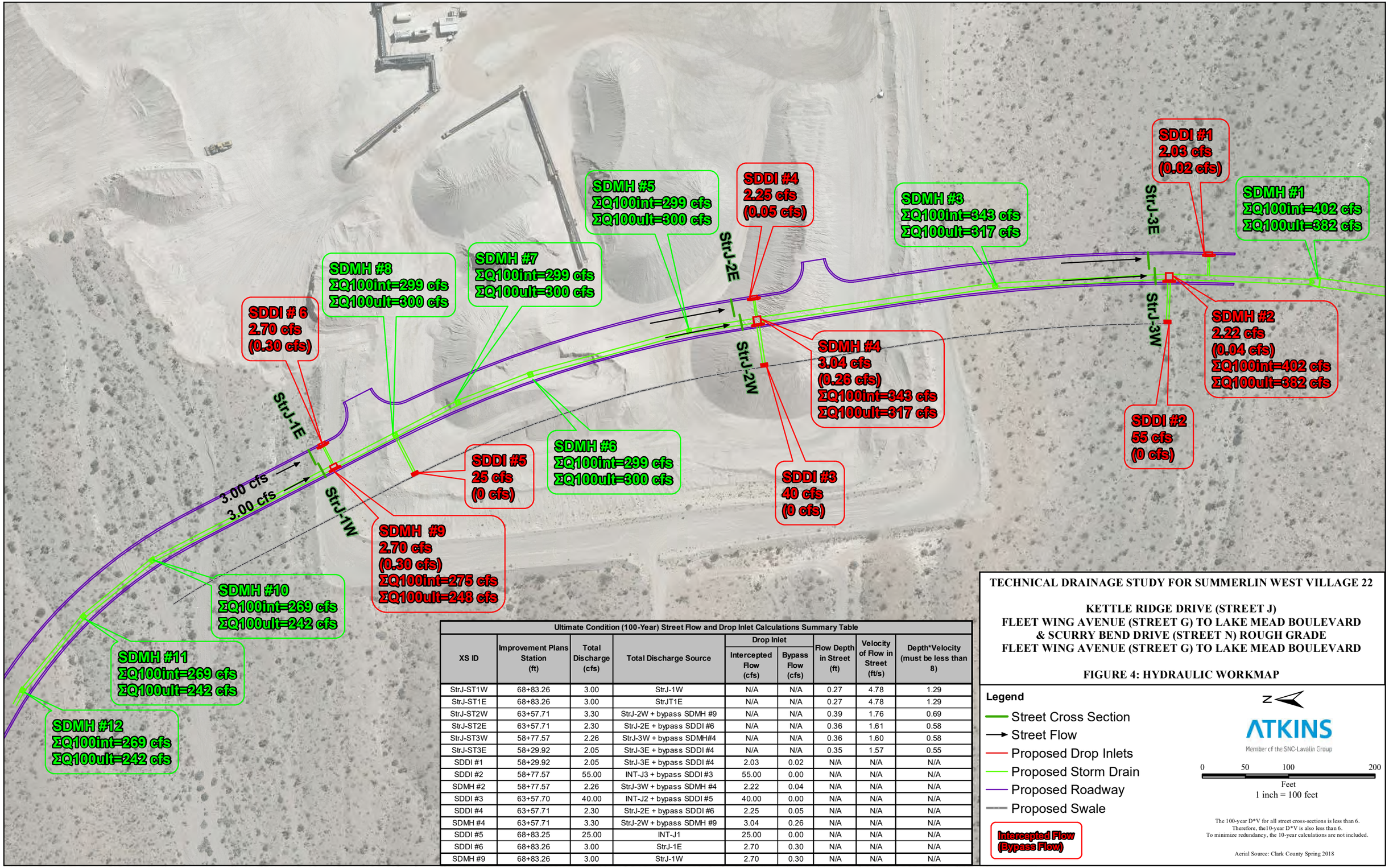
2. Hydraulic Analysis

2.1. Drop Inlet Calculations

The computer program Bentley FlowMaster was utilized to perform calculations for the nine proposed drop inlets along Street J. SDDI #2, SDDI #3, and SDDI #5 correspond to drop inlets in the proposed ditch west of the roadway. The remaining drop inlets capture the flow along the proposed roadway. Drop inlet calculations are provided in Appendix C.1. Table 3 provides a summary of the drop inlets. Drop inlet locations and calculation summaries are shown on Figure 4.

Table 3 – Drop Inlet Calculations

ID	Station (ft)	Total Flow (cfs)	Discharge Source	Intercepted Flow (cfs)	Bypass Flow (cfs)
100-year					
SDDI #1	58+29.92	2.05	StrJ-3E + bypass SDDI #4	2.03	0.02
SDDI #2	58+77.57	55.00	INT-J3 + bypass SDDI #3	55.00	0.00
SDMH #2	N/A	2.26	StrJ-3W + bypass SDMH #4	2.22	0.04
SDDI #3	N/A	40.00	INT-J2 + bypass SDDI #5	40.00	0.00
SDDI #4	63+57.71	2.30	StrJ-2E + bypass SDDI #6	2.25	0.05
SDMH #4	63+57.71	3.30	StrJ-2W + bypass SDMH #9	3.04	0.26
SDDI #5	N/A	25.00	INT-J1	25.00	0.00
SDDI #6	68+83.26	3.00	StrJ-1E	2.70	0.30
SDMH #9	68+83.26	3.00	StrJ-1W	2.70	0.30



Ultimate Condition (100-Year) Street Flow and Drop Inlet Calculations Summary Table

XS ID	Improvement Plans Station (ft)	Total Discharge (cfs)	Total Discharge Source	Drop Inlet		Flow Depth in Street (ft)	Velocity of Flow in Street (ft/s)	Depth*Velocity (must be less than 8)
				Intercepted Flow (cfs)	Bypass Flow (cfs)			
StrJ-ST1W	68+83.26	3.00	StrJ-1W	N/A	N/A	0.27	4.78	1.29
StrJ-ST1E	68+83.26	3.00	StrJT1E	N/A	N/A	0.27	4.78	1.29
StrJ-ST2W	63+57.71	3.30	StrJ-2W + bypass SDMH #9	N/A	N/A	0.39	1.76	0.69
StrJ-ST2E	63+57.71	2.30	StrJ-2E + bypass SDDI #6	N/A	N/A	0.36	1.61	0.58
StrJ-ST3W	58+77.57	2.26	StrJ-3W + bypass SDMH#4	N/A	N/A	0.36	1.60	0.58
StrJ-ST3E	58+29.92	2.05	StrJ-3E + bypass SDDI #4	N/A	N/A	0.35	1.57	0.55
SDDI #1	58+29.92	2.05	StrJ-3E + bypass SDDI #4	2.03	0.02	N/A	N/A	N/A
SDDI #2	58+77.57	55.00	INT-J3 + bypass SDDI #3	55.00	0.00	N/A	N/A	N/A
SDMH #2	58+77.57	2.26	StrJ-3W + bypass SDMH #4	2.22	0.04	N/A	N/A	N/A
SDDI #3	63+57.70	40.00	INT-J2 + bypass SDDI #5	40.00	0.00	N/A	N/A	N/A
SDDI #4	63+57.71	2.30	StrJ-2E + bypass SDDI #6	2.25	0.05	N/A	N/A	N/A
SDMH #4	63+57.71	3.30	StrJ-2W + bypass SDMH #9	3.04	0.26	N/A	N/A	N/A
SDDI #5	68+83.25	25.00	INT-J1	25.00	0.00	N/A	N/A	N/A
SDDI #6	68+83.26	3.00	StrJ-1E	2.70	0.30	N/A	N/A	N/A
SDMH #9	68+83.26	3.00	StrJ-1W	2.70	0.30	N/A	N/A	N/A

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FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
& SCURRY BEND DRIVE (STREET N) ROUGH GRADE
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

FIGURE 4: HYDRAULIC WORKMAP

Legend

- Street Cross Section
- Street Flow
- Proposed Drop Inlets
- Proposed Storm Drain
- Proposed Roadway
- Proposed Swale

Intercepted Flow (Bypass Flow)

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0 50 100 200
Feet
1 inch = 100 feet

The 100-year D*V for all street cross-sections is less than 6.
Therefore, the10-year D*V is also less than 6.
To minimize redundancy, the 10-year calculations are not included.

Aerial Source: Clark County Spring 2018

2.2. Normal Depth Calculations

The computer program Bentley FlowMaster V8i 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.

Six cross-sections were analyzed. The cross-section locations were specified based on the 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. The 100-year D*V for all street cross-sections is less than 6. Therefore, the10-year D*V is also less than 6. To minimize redundancy, the 10-year calculations are not included. Print-outs of all normal depth calculations for the ultimate condition are provided in Appendix C.2. Cross section locations and calculation summaries are shown on Figure 4.

Table 4 – Normal Depth Calculations

ID	Total Flow (cfs)	Discharge Source	Slope (%)	Flow Depth (ft)	Velocity (ft/s)	D* V
100-year						
StrJ-ST1W	3.00	StrJ-1W	7.00	0.27	4.78	1.29
StrJ-ST1E	3.00	StrJ-1E	7.00	0.27	4.78	1.29
StrJ-ST2W	3.30	StrJ-2W + bypass SDMH #9	0.50	0.39	1.76	0.69
StrJ-ST2E	2.30	StrJ-2E + bypass SDDI #6	0.50	0.36	1.61	0.58
StrJ-ST3W	2.26	StrJ-3W + bypass SDMH#4	0.50	0.36	1.60	0.58
StrJ-ST3E	2.05	StrJ-3E + bypass SDDI #4	0.50	0.35	1.57	0.55

2.3. Storm Drain System Modeling

The proposed storm drain systems were modeled using Water Surface Pressure Gradient (WSPG-W). A print-out of the WSPG-W models are provided in Appendix C.3 and Appendix C.4. Because the interim condition flows are higher than the ultimate condition flows in some areas, both conditions were analyzed in the WSPG-W models. The Q_{100} and hydraulic grade lines for both conditions are shown on the improvement plans in Appendix D. Table 5 summarizes the WSPG-W model at the mainline manholes.

Table 5 – WSPG-W Mainline Summary Table

SDMH#	WSPG- W Station	Ultimate Condition			Interim Condition		
		Q_{100}	ΣQ_{100}	HGL (ft)	Q_{100}	ΣQ_{100}	HGL (ft)
Upstream	1884.373	242	242	3447.58	269	269	3447.58
SDMH #12	1867.900	0	242	3447.05	0	269	3447.05
SDMH #11	1757.457	0	242	3441.16	0	269	3441.16
SDMH #10	1654.662	0	242	3434.85	0	269	3434.85
SDMH #9	1429.214	6	248	3421.29	6	275	3421.45
SDMH #8	1333.304	52	300	3419.34	24	299	3418.73
SDMH #7	1256.422	0	300	3423.72	0	299	3418.64
SDMH #6	1166.469	0	300	3422.28	0	299	3423.33
SDMH #5	975.916	0	300	3419.50	0	299	3420.57
SDMH #4	889.792	17	317	3420.11	44	343	3419.28
SDMH #3	614.789	0	317	3418.83	0	343	3419.07
SDMH #2	409.392	65	380	3416.76	59	402	3417.88
SDMH #1	306.764	0	382	3415.83	0	402	3419.22
Downstream	0.000	260	642	3413.62	0	402	3413.62

2.4. HEC-RAS 2D Modeling

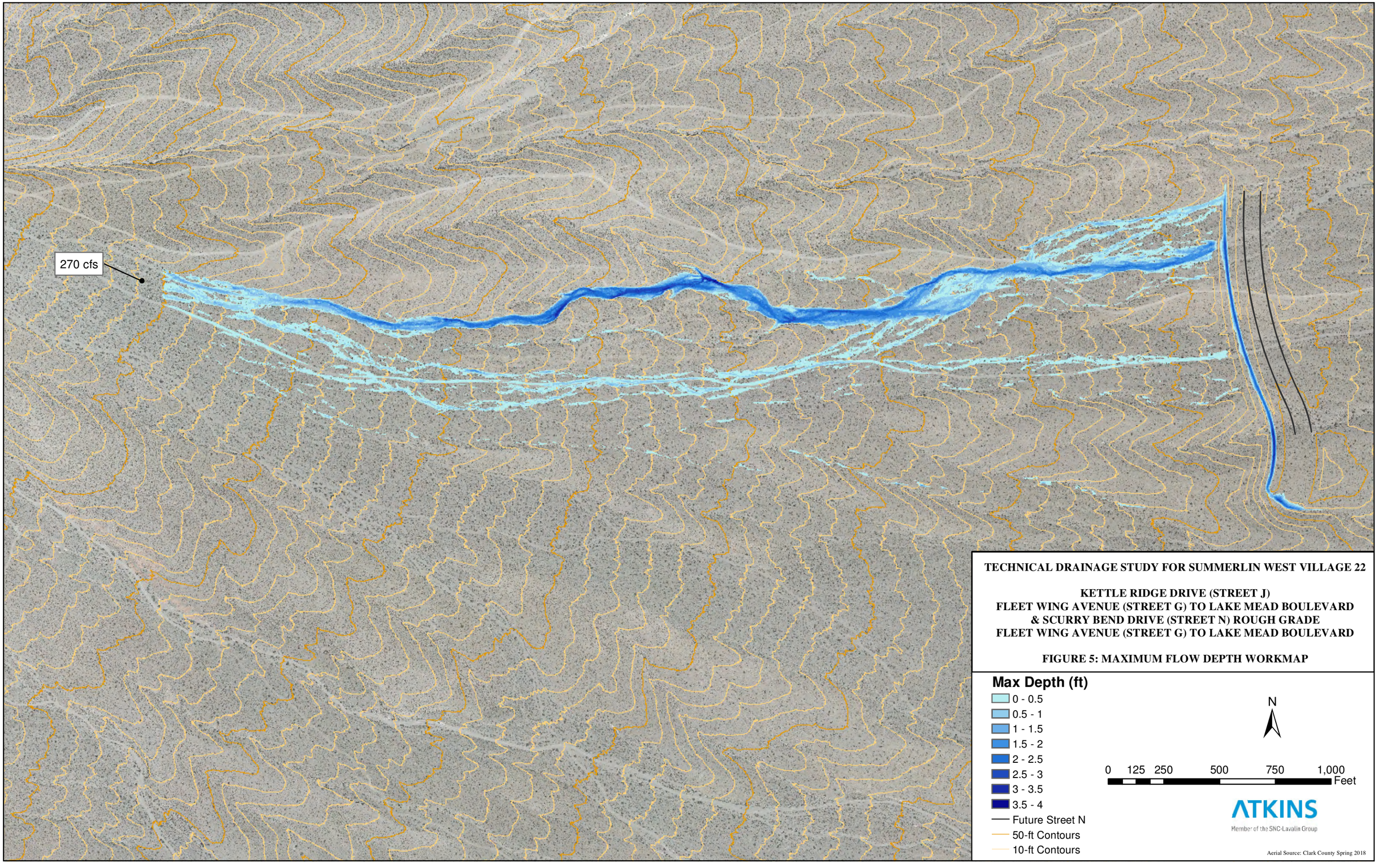
Atkins was tasked with performing detailed hydraulic modeling to review options for potential drainage channel improvements for Village 27. A 2-dimensional (2D) hydraulic model of the washes was used to establish the existing hydraulic condition and to analyze several potential options to divert flow away from the proposed development parcels. Portions of this 2D model were referenced in the approved Overall Summerlin West Planning Area (SWPA) MCDS.

Several of the washes analyzed in this model are upstream of Village 22 and were analyzed in further detail for this Technical Drainage Study (TDS).

The US Army Corps of Engineers HEC-RAS v. 5.0.7 program was used for the two-dimensional (2D) hydraulic model for this project. This program can run both 1-dimensional (1D) and 2D hydraulic calculations for a full network of natural and constructed channels. For the purposes of this project, only the 2D interface was used.

LiDAR collected by the Southern Nevada Water Authority (SNWA) in 2016 was used as the source for digital elevation data. The model was developed using a 20-ft maximum element size. Hydrographs from the offsite hydrology served as the inflow boundary conditions for the model. HEC-1 output for the 2D model for subbasin INT-N is located in Appendix B.2. A uniform Manning's roughness of 0.036 was used for the entire project area. The model simulations were run for 18 hours with a 1-second timestep.

The Scurry Bend Drive (Street N) rough grading contours were merged with the existing condition topography to analyze the berm and ditch required to divert the flow around the proposed project area. Figure 5 and Figure 6 represent the depth of flow and the velocity, respectively in the 2D model.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FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
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FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
FIGURE 5: MAXIMUM FLOW DEPTH WORKMAP
Max Depth (ft)
0 - 0.5
0.5 - 1
1 - 1.5
1.5 - 2
2 - 2.5
2.5 - 3
3 - 3.5
3.5 - 4
Future Street N
50-ft Contours
10-ft Contours
N
0 125 250 500 750 1,000
Feet
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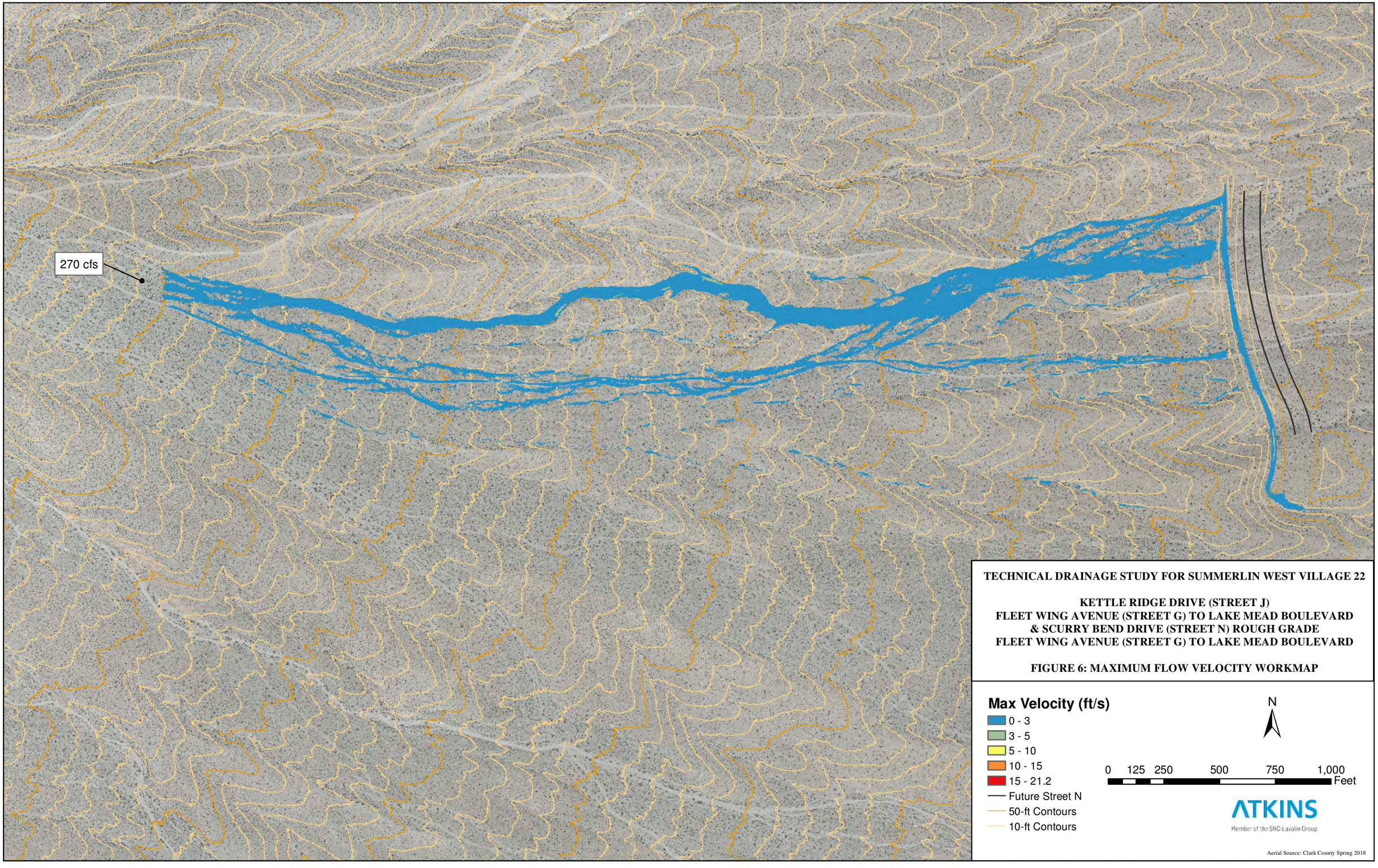
Aerial Source: Clark County Spring 2018



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KETTLE RIDGE DRIVE (STREET J)
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
& SCURRY BEND DRIVE (STREET N) ROUGH GRADE
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

FIGURE 6: MAXIMUM FLOW VELOCITY WORKMAP

Max Velocity (ft/s)
- 0 - 3
- 3 - 5
- 5 - 10
- 10 - 15
- 15 - 21.2
- Future Street N
- 50-ft Contours
- 10-ft Contours

N

0 125 250 500 750 1,000 Feet

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Aerial Source: Clark County Spring 2018

2.5. Riprap Calculations

The riprap calculations were performed utilizing shear stress calculations based on HCDDM Section 705 using HEC-11 methodology. Shear stress calculations show that a median riprap particle size (D_{50}) for the ditch along Kettle Ridge Drive of 8 inches is required to resist the average channel shear stress for the channel velocities along the ditch. Results are shown in Appendix C.5.

Riprap erosion control measures also were analyzed downstream of the proposed 10'x6' RCB that outlets into the channel carrying the flow diverted from upstream of Scurry Bend Drive. Conservative calculations using no tailwater elevation at the 10'x6' RCB outlet were used to determine the maximum velocity of 8.08 ft/s generated from a 100-year storm event, resulting in a D_{50} riprap size of 8 inches.

2.6. Debris Basin Calculations

A temporary debris basin is needed in Village 22 to detain sediment runoff from the adjacent foothills and the proposed roadway. The Modified Universal Soil Loss Equation was used in order to determine the sediment yield based on short-term, high-intensity storm events. The calculated parameters of this equation are described in detail and the final calculations are shown in Appendix C.6.

Soil Erodibility Factor, K=0.36
This factor is based on the function of percent of silt, percent of coarse sand, soil structure, permeability of soil and percent of organic matter. A conservative K value was determined by taking the weighted average of the K Factor (Rock Free) per USDA Web Soil Survey Map (shown in Appendix C.6).

Topographic Factor, LS=8.14
This factor is based on the field runoff length (Xr) and surface slope (So). Xr is based on the longest flow path to the proposed debris basin. The flowline begins at the top of subbasin "INT-LMB1" and flows east to Street J. Flow continues south along Street J before turning east towards the proposed debris basin. Xr = 10,547 ft & So= 0.0683 (ft/ft).

Cropping-Management Factor, C=0.45
This factor is based as the ratio of soil loss from land cropped under specific conditions to corresponding loss from tilled, continuously fallow ground.
C1 is the effect of canopy cover (Fig 1303b). The tributary area to the proposed debris basin does not have any canopy effect, thus C1=1.0
C2 is the effect of mulch or close-growing vegetation (Fig 1303c). The tributary area to the proposed debris basin does not have any canopy effect, thus C2=1.0
C3 is the effect of tillage and residual land use. The tributary area is roughly 20% covered in weeds, thus C3=0.45

Conservation Practice Factor, P=1.0
This factor is based on the soil loss due to the effect of conservation practices such as contouring, strip cropping and terracing on erosion. The tributary area to the proposed debris basin is undeveloped desert thus this factor has no significance.

Storm-event runoff volume (V) & storm-event peak flow (Q)
The 10, 5 & 2-year 24-hour storm events were analyzed in HEC-1 to determine each storm's peak flow and volume of runoff. HEC-1 results are in Appendix C.6.

Sediment Yield, Ys=19,415 tons
The 10-year 24-hour storm event produced the highest sediment yield. The volume in acre-feet was determined by dividing the sediment yield by the specific unit weight of soil. Boring Logs per the Nova Geotechnical Report of Village 22 showed the tributary area as having topsoils of Silty Sands (SM), Silty Gravels (GM) & Well-Graded Gravels (GW). SM soil has an approximate unit weight of 18-23 kN/m^3, GM has a unit weight of 20.5-22.5 kN/m^3, and GW has a unit weight of 20-22 kN/m^3. A conservative value of 20 kN/m^3 or 128 lb/ft^3 was assumed for the top soil. Thus, a 10-year 24-hour storm would produce approximately 7.0 acre-feet of soil deposit.

3. Differences between Village 22 MCDS and Proposed TDS

3.1.1. Road Names

Roadways in the Village 22 MCDS are represented by a letter or have been re-named. On the proposed improvement plans and in the report, the roadways are referenced by their proposed name. Table 6 compares the proposed name in the TDS to the MCDS letter.

Table 6 – Village 22 MCDS and TDS Roadway Names

MCDS Street Name	TDS Street Name
Street E	Flight Range Avenue
Street EE	Flight Edge Way
Street F	Kindle Rise Way
Street FF	Hive Bluff Lane
Street G	Fleet Wing Avenue
Street H	Clowder Pass Way
Street I	Kestrel Creek Avenue
Street J	Kettle Ridge Drive
Street L	Bask Ridge Drive
Street N	Scurry Bend Drive
Summerlin Parkway WB/Street Q	Sunset Run Drive
Carriage Hill Drive	Kettle Bend Road

3.1.2. Hydraulics

The downstream end of the proposed storm drain is a 10'x6' RCB. The MCDS shows a 7'x5' RCB at the same location (SD-F1D). This proposed box culvert had to be upsized because there is a hydraulic jump immediately upstream of this RCB. At the hydraulic jump, the slope of the storm drain decreases to 0.5% from 6.5%. Also, the velocity of flow in the smaller box was higher than the allowable storm drain velocities. By increasing the flow area, the velocity is within the allowable range for Class IV concrete.

Appendices

Appendix A. Summerlin West Village 22 Master Conceptual Drainage Study Reference

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: May 29, 2019
TO: **Land Development Services** Department of Building & Safety				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **Master Conceptual Drainage Study for – Update #1 Summerlin West Village 22**			**COPIES TO:** VTN Nevada
Cross Streets:	I-215 Western Beltway & Summerlin Parkway			Howard Hughes Company, LLC
File Number:	F:\Depot\DSMemos\DS5005F.doc			Bart Anderson, P.E., DevCo
Parcel Number:	137-14-401-006, 137-23-101-002			CCRFCD
Zoning Action:	MDR-73901			CCPW
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
			TOTAL FEES (LDDRS):	**$1,700.00**	**----**

REMARKS:

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 *Master Drainage Study Update* for *Summerlin West Planning Area* proposes a modification to internal flow patterns that alters the flow patterns to the *Beltway Channel* system downstream of the *Summerlin Parkway* interchange. The modification proposes a storm drain system within *Summerlin Village 22* area (Storm Drain F) that will collect flows from the Gowan channel tributary area and route them into the *Beltway Channel* (MPU Facility APBE 0122). This resulted in increased flows in the *Beltway Channel* segment between *Summerlin Parkway* and *Far Hills Boulevard*, ie, mitigation measures are required for the impacted *Beltway Channel* segment.

A technical drainage study for the analysis, design and construction plans for the Beltway Channel modifications must be submitted and approved by the City prior to the individual onsite parcel developments.

2. 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.

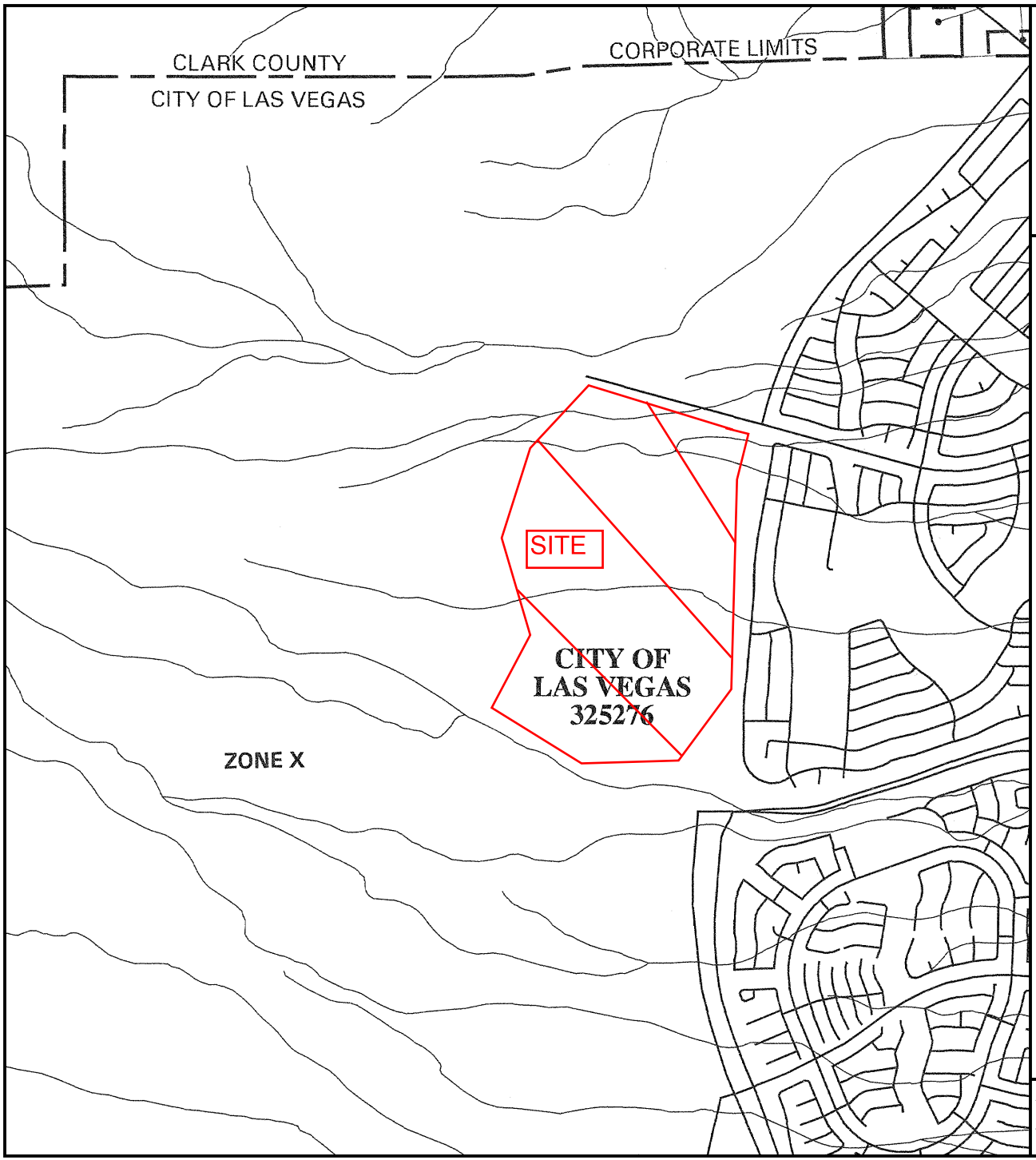
   A technical drainage study for the analysis, design and construction plans for the *Grand Park Detention Basin* must be submitted and approved by the City prior to the individual onsite parcel developments.

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

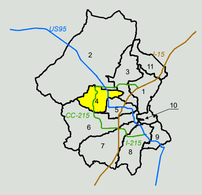
UPPER NORTHERN WATERSHED
GOWAN WATERSHED
TROPICANA/FLAMINGO WATERSHED
CENTRAL WATERSHED
LOWER NORTHERN WATERSHED

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
DEVONSHIRE 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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Louis Berger

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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Louis Berger

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

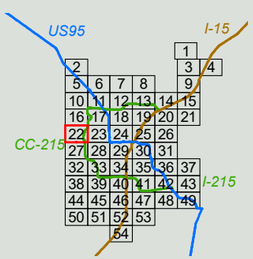
Category A	Category B
Channel	Channel
Stormdrain	Stormdrain
Crossing	Crossing

N

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

Scale: 1 inch = 2,000 feet

AerialSource:Esri World Imagery 2017



ATKINS
Member of the SNC-Lavalin Group

Louis Berger

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

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

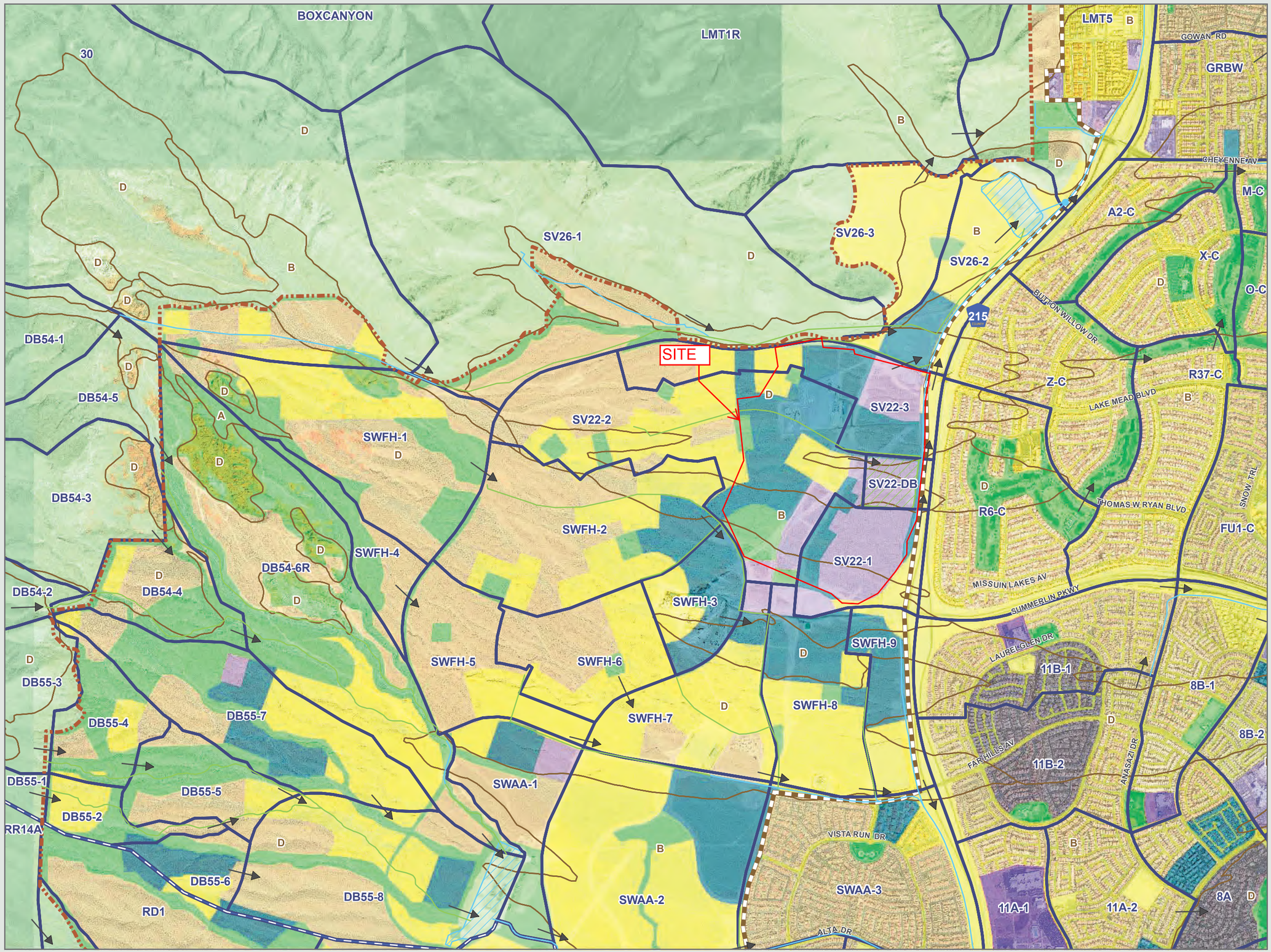
River Mile 0000
- Distance Above Confluence with Parent Stream (Miles)
- Miles in Hundredths

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

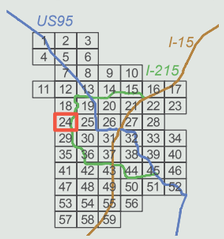
* Drought Ordinance Applied

N

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

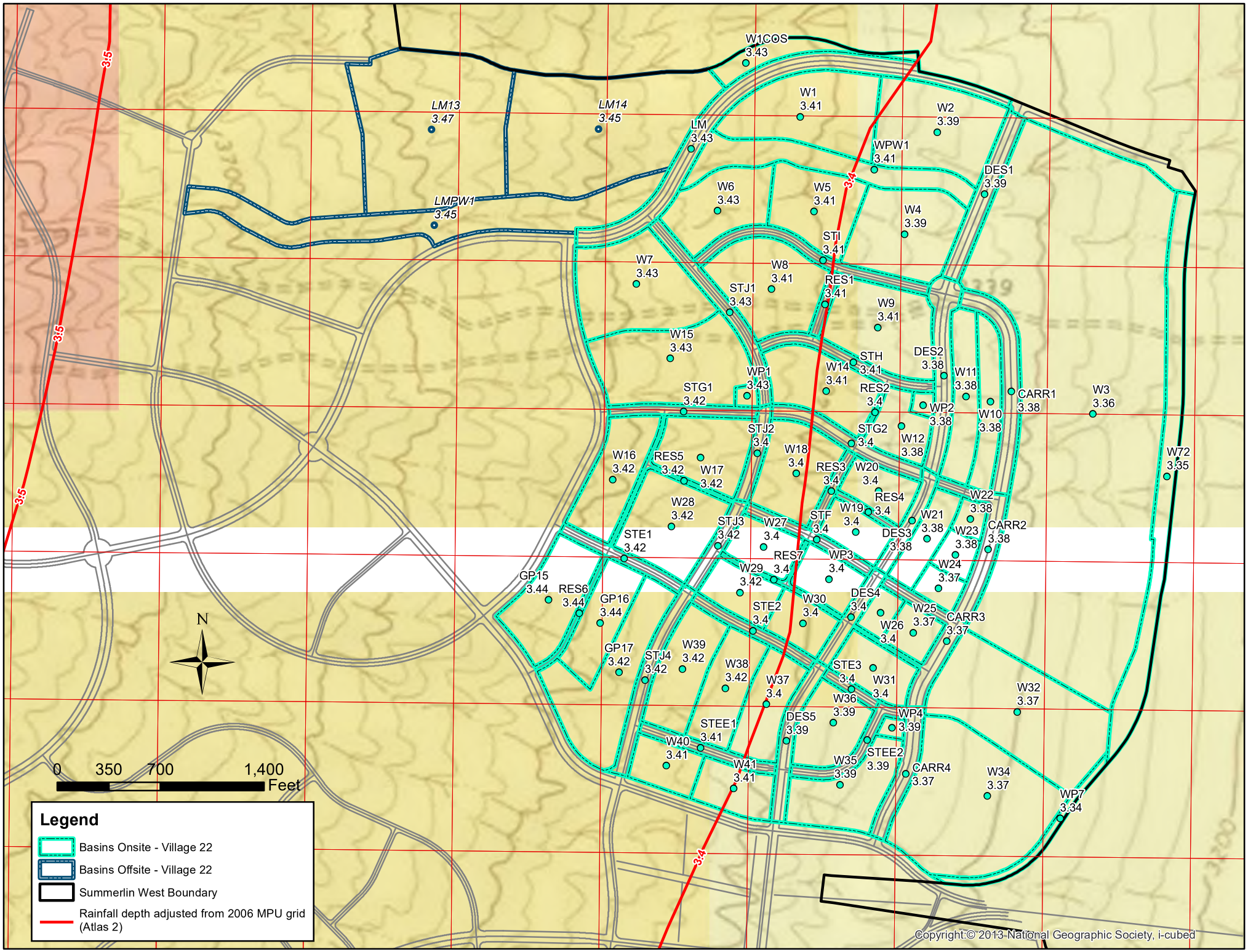
Scale: 1 inch = 2,000 feet

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

NORTH

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	9.16	41	STJ1	3.76	17
D	11.27	47	CSTJ1	-	317
DES1	3.76	14	NP-2	1.53	6
CDES1	-	62	ES-1	14.05	59
COS-2	10.17	32	CES-1	-	382
CCOS-2	-	93	OFF4	52.68	209
A	16.92	66	L	8.09	35
CA	-	160	STL1	1.78	8
CP1	-	201	CSTL1	-	43
STI	2.46	11	STG1	1.77	8
C	11.68	50	CSTG1	-	260
CSTI	-	61	M	11.24	48
G	7.08	30	STJ2	3.10	13
CG	-	91	S	3.01	11
H	7.65	33	STF	1.83	8
CH	-	124	NP-3	3.61	9
STH	2.29	10	U	3.49	11
J	5.8	25	DES4	1.72	8
CJ	-	35	CDES4	-	19
K	5.17	22	V	3.85	14
CK	-	58	W	3.97	15
NP-1	0.49	2	CVW	-	29
CNP-1	-	59	CARR3	2.95	13
DES2	3.40	15	STE3	1.11	5
CDES2	-	74	EE	6.65	24
CP2	-	198	STEE3	1.49	7
CARR1	6.68	29	HH	4.60	19
I	10.56	38	CARR4	3.10	13
CCARR1	-	265	OFF5	12.73	53
N	6.67	28	STE1	1.72	8
STFF	1.08	5	Y	8.07	31
CSTFF	-	33	CY	-	92
STG2	2.83	13	STL2	1.79	8
CSTG2	-	46	CSTL2	-	100
O	3.25	13	Z	7.04	22
P	3.37	13	STJ3	2.44	11
COP	-	26	CSTJ3	-	33
DES3	1.84	8	STE2	1.78	8
CDES3	-	34	BB	6.18	23
CP3	-	80	T	4.02	16
Q	3.62	14	CC	5.50	20
R	3.49	15	DD	4.57	16
CQR	-	29	DES5	1.80	8
CARR2	3.58	15	NP-4	0.71	2
CCARR2	-	44	AA	4.64	19
CP4	-	389	STJ4	1.05	4
II	19.56	77	CSTJ4	-	23
X	16.47	56	STEE1	1.45	7
B	87.12	328	CSTEE2	-	30
DC-1	10.84	48	STEE2	2.40	11
COS-3	1.75	4	FF	3.08	13
3-O*		189	CFF	-	53
OFF-COS2	19.16	53	GG	3.74	16
COFFCOS2	-	242	DES6	1.11	5
E	13.96	58			

REV	DATE	BY	REVISION

THE HOWARD HUGHES CORPORATION
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CONSULTING ENGINEERS ● PLANNERS ● LAND SURVEYORS

FIGURE 6
ULTIMATE CONDITION BASIN MAP

SUMMERLIN WEST VILLAGE 22

DRAWN BY: AH — AUGUST 2018
DESIGNED BY: JYA
CHECKED BY: JYA
PROJECT NO: 7861
SCALE: 1" = 300' HORIZ. N/A VERT.

SHEET
OF SHEETS
DRAWING NO.

H:\7861\Village 22 Master\Drainage\4_ADD TO LIP\1A_Figures\Figure 6 - Village 22 Drainage Basin Map.dwg

GRAPHIC SCALE

300 0 150 300 600

1" = 300'

NORTH

LEGEND

(red line)	CCRFCD STORM DRAIN ALIGNMENT
(orange line)	EXISTING FACILITY
(black line)	VILLAGE 22 LOCAL STORM DRAIN
W51	BASIN DESIGNATION
●	CONCENTRATION POINT
(1)	LOCAL FACILITY DESIGNATION
(arrow)	DEVELOPED CONDITION FLOW ARROW

VILLAGE 22 LOCAL FLOOD PROTECTION FACILITIES

Facility #	Design Slope %	Q100 cfs	Velocity ft/s	Facility	Facility #	Design Slope %	Q100 cfs	Velocity ft/s	Facility
4	5.4	41	18.69	30" RCP	56	1.5	44	11.54	30" RCP
5	2.0	47	13.16	30" RCP	58	1.5	15	8.93	30" RCP
6	2.7	62	15.58	30" RCP	61	3.1	389	26.21	60" RCP
7	2.0	32	12.11	30" RCP	62	8.0	35	20.39	30" RCP
8	2.9	93	17.93	36" RCP	63	1.5	43	11.50	30" RCP
9	8.0	66	14.44	36" RCP	64	8.0	48	22.29	36" RCP
10	3.0	160	20.54	42" RCP	65	8.2	260	33.90	42" RCP
11	N/A	201	N/A	EX 66" RCP**	66	3.1	11	10.63	30" RCP
12A	8.0	53	22.91	36" RCP	68	1.3	9	7.36	30" RCP
12B	2.6	53	15.05	36" RCP	69	8.0	11	14.88	30" RCP
13	8.0	58	10.63	36" RCP	72	7.0	29	18.72	30" RCP
19	0.5	50	8.01	42" RCP	74	6.3	5	10.83	30" RCP
20	5.8	61	20.97	42" RCP	77A	8.0	53	22.91	36" RCP
21	0.5	30	7.07	36" RCP	77B	7.4	209	31.33	42" RCP
22	9.7	91	28.22	42" RCP	78	8.0	31	20.01	30" RCP
23	0.8	33	8.46	30" RCP	79	8.1	92	26.52	36" RCP
24	10.1	124	31.13	42" RCP	80	3.1	8	9.69	30" RCP
25	1.5	6	6.89	30" RCP	81	8.0	100	27.08	36" RCP
27	2.3	59	14.86	36" RCP	82	2.9	22	12.60	30" RCP
29	0.5	25	6.65	30" RCP	83	3.2	23	13.22	30" RCP
30	7.0	35	19.71	30" RCP	84	0.5	16	6.05	30" RCP
33	0.6	22	6.99	30" RCP	85	2.3	20	11.29	30" RCP
34	5.0	58	19.78	36" RCP	86	8.0	16	16.59	30" RCP
35	1.0	2	4.32	30" RCP	87	8.0	19	17.43	30" RCP
36	1.0	74	11.43	42" RCP	88	7.8	30	19.83	30" RCP
37	0.9	198	13.98	60" RCP	89	8.0	13	15.62	30" RCP
40	7.6	38	20.77	30" RCP	90	7.8	53	22.70	36" RCP
41	0.9	265	13.39	6'X5' RCB	91	0.5	2	3.39	30" RCP
43	0.5	28	6.73	30" RCP	92	2.7	16	11.25	30" RCP
44	3.3	33	14.72	30" RCP	93	7.4	24	18.12	30" RCP
45	6.8	46	20.97	30" RCP	94	6.2	19	15.91	30" RCP
50	7.9	26	18.97	30" RCP	95	4.0	77	19.52	42" RCP
51	2.5	34	13.37	30" RCP	96	5.0	56	23.05	36" RCP
52	7.1	80	24.48	36" RCP	97	5.0	339	30.51	54" RCP
55	7.3	29	19.01	30" RCP	98	N/A	138	N/A	EX 48" RCP***

*Replaces existing 30" RCP stub provided in Lake Mead Study

**Existing 66" RCP per Lake Mead Blvd Study

***Existing Facility (Per Lake Mead Blvd Study) can accept 138 cfs and may be used for flexibility

REV	DATE	BY	REVISION

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

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 7
LOCAL STORM DRAIN FACILITIES MAP

SUMMERLIN WEST VILLAGE 22

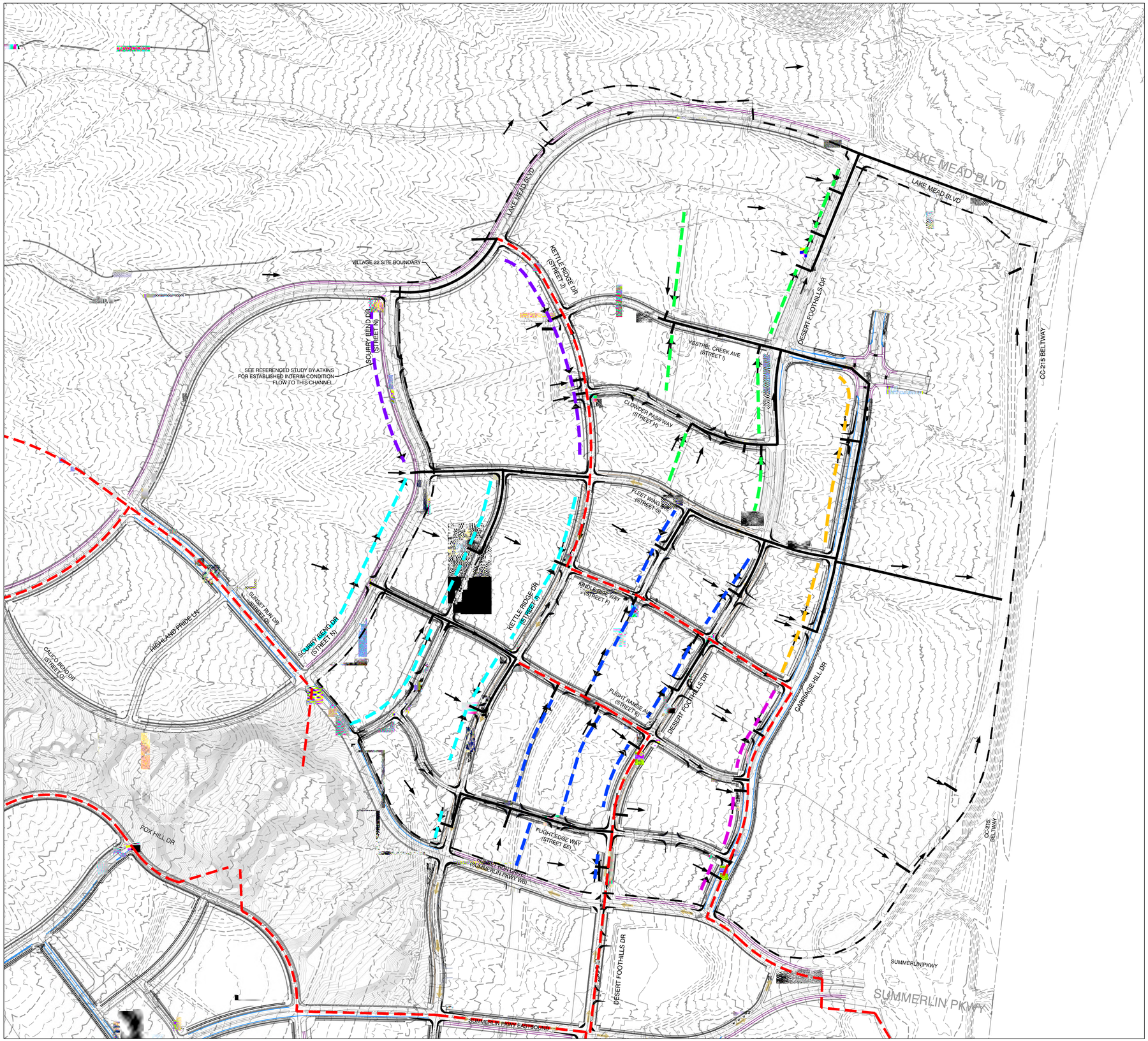
DRAWN BY: ATM	MAY 2018	
DESIGNED BY: SVB/JYA	MAY 2018	
CHECKED BY: JYA	MAY 2018	
PROJECT NO: 7861	SCALE:	HORIZ. 1"=300' VERT. NA

SHEET

OF SHEETS

DRAWING NO.

H:\7861\Village 22 Master\Drainage\4_ADD1 TO UP1\A_Figures\Figure 7 - Local Flood Control Facilities Map.dwg



GRAPHIC SCALE

300 0 150 300 600

1" = 300'

CHANNEL FACILITY LEGEND

- TO BE CONSTRUCTED WITH CARRIAGE HILL DR (KESTREL CREEK AVE TO KINDLE RISE WAY)
- TO BE CONSTRUCTED WITH CARRIAGE HILL DR (SUNSET RUN DR TO KINDLE RISE WAY)
- TO BE CONSTRUCTED WITH DESERT FOOTHILLS DR (LAKE MEAD BLVD TO FLEET WING AVE)
- TO BE CONSTRUCTED WITH DESERT FOOTHILLS DR (SUNSET RUN DR TO FLEET WING AVE)
- TO BE CONSTRUCTED WITH KETTLE RIDGE DR (LAKE MEAD BLVD TO FLEET WING AVE)
- TO BE CONSTRUCTED WITH KETTLE RIDGE DR (SUNSET RUN DR TO FLEET WING AVE)

STORM DRAIN LEGEND

- CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT STORM DRAIN
- VILLAGE 22 LOCAL STORM DRAIN

REV	DATE	BY	REVISION

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

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
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FIGURE 8
INTERIM CONDITION DITCH LOCATIONS

SUMMERLIN WEST VILLAGE 22

DRAWN BY: AH	AUGUST 2018	SCALE:	1" = 300' HORIZ. N/A VERT.
DESIGNED BY: JYA			
CHECKED BY: JYA			
PROJECT NO: 7961			

SHEET

OF SHEETS

DRAWING NO.

H:\7961\Village 22 Master Drainage\4_ADD1 TO UP1\A_Figures\Figure 8 - Interim Condition Basin Map.dwg

```
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   19MAR19  TIME  11:17:59   *                                                  *           (916) 756-1104             *
 *                                       *                                                  *                                      *
 *****************************************                                                  ****************************************


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


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

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


1                                                   HEC-1 INPUT                                                  PAGE  1

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

                        *DIAGRAM
 *** FREE ***
             1          ID    ULTIMATE CONDITION HYDROLOGIC MODEL
             2          ID    INPUT FILE DATE = NOVEMBER 1, 2018
             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 #1 - 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  0.0143
            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   0.050
                        *

            35          KK       D
            36          BA  0.0176
            37          PB    3.39
            38          LS       0    95.0
            39          UD   0.058
                        *

            40          KK    DES1
            41          BA   .0059
            42          PB    3.39
            43          LS       0    98.0
```

```
  44          UD   0.100
              *
1                                   HEC-1 INPUT                                    PAGE  2

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   COS-2
  49          BA  0.0159
  50          PB    3.41
  51          LS       0    89.0
  52          UD   0.100
              *

  53          KK  CCOS-2
  54          KM   COMBINE CDES1 AND COS-2
  55          HC       2
              *

  56          KK       A
  57          BA  0.0264
  58          PB    3.41
  59          LS       0    95.0
  60          UD   0.078
              *

  61          KK      CA
  62          KM   COMBINE CCOS-2 AND A
  63          HC       2
              *

  64          KK     CP1
  65          KM   COMBINE LM AND CA
  66          HC       2
              *

  67          KK     STI
  68          KM   STREET I
  69          BA  0.0038
  70          PB    3.41
  71          LS       0    98.0
  72          UD   0.050
              *

  73          KK       C
  74          BA  0.0183
  75          PB    3.41
  76          LS       0    95.0
  77          UD   0.054
              *
1                                   HEC-1 INPUT                                    PAGE  3

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


  78          KK    CSTI
  79          KM   COMBINE C AND STI
  80          HC       2
              *

  81          KK       G
  82          BA  0.0111
  83          PB    3.41
  84          LS       0    95.0
  85          UD   0.056
              *

  86          KK      CG
  87          KM   COMBINE CSTI AND CG
  88          HC       2
              *

  89          KK       H
  90          BA  0.0120
  91          PB    3.41
  92          LS       0    95.0
  93          UD   0.053
              *

  94          KK      CH
  95          KM   COMBINE CG AND CH
  96          HC       2
              *
```

```
 97          KK     STH
 98          KM   STREET H
 99          BA  0.0036
100          PB    3.41
101          LS       0    98.0
102          UD   0.057
             *

103          KK       J
104          BA  0.0091
105          PB    3.41
106          LS       0    95.0
107          UD   0.051
             *

108          KK      CJ
109          KM   COMBINE J AND STH
110          HC       2
             *
```



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

111          KK       K
112          BA  0.0081
113          PB    3.40
114          LS       0    95.0
115          UD   0.050
             *

116          KK      CK
117          KM   COMBINE CJ AND K
118          HC       2
             *

119          KK    NP-1
120          BA  0.0008
121          PB    3.38
122          LS       0    89.0
123          UD   0.097
             *

124          KK   CNP-1
125          KM   COMBINE CK AND NP-1
126          HC       2
             *

127          KK    DES2
128          BA   .0053
129          PB    3.38
130          LS       0    98.0
131          UD   0.058
             *

132          KK   CDES2
133          KM   COMBINE DES2 & CNP-1
134          HC       2
             *

135          KK     CP2
136          KM   COMBINE CDES2 & CH
137          HC       2
             *

138          KK   CARR1
139          BA  0.0104
140          PB    3.38
141          LS       0    98.0
142          UD   0.056
             *

143          KK       I
144          BA  0.0165
145          PB    3.38
146          LS       0    92.0
147          UD   0.083
             *
```



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

148          KK  CCARR1
149          KM   COMBINE CP2, I, CARR1
150          HC       3
             *

151          KK       N
```

```
 152          BA  0.0104
 153          PB    3.40
 154          LS       0    95.0
 155          UD   0.054
              *

 156          KK    STFF
 157          BA  0.0017
 158          PB    3.40
 159          LS       0    98.0
 160          UD   0.050
              *

 161          KK   CSTFF
 162          KM   COMBINE N AND STFF
 163          HC       2
              *

 164          KK    STG2
 165          BA  0.0044
 166          PB    3.40
 167          LS       0    98.0
 168          UD   0.050
              *

 169          KK   CSTG2
 170          KM   COMBINE  CSTFF AND STG2
 171          HC       2
              *

 172          KK       O
 173          BA  0.0051
 174          PB    3.40
 175          LS       0    92.2
 176          UD   0.055
              *

 177          KK       P
 178          BA  0.0053
 179          PB    3.40
 180          LS       0    92.2
 181          UD   0.060
              *
```



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

 182          KK     COP
 183          KM   COMBINE P AND O
 184          HC       2
              *

 185          KK    DES3
 186          BA  0.0029
 187          PB    3.38
 188          LS       0    98.0
 189          UD   0.069
              *

 190          KK   CDES3
 191          KM   COMBINE COP & DES3
 192          HC       2
              *

 193          KK     CP3
 194          KM   COMBINES CSTG2 & CDES3
 195          HC       2
              *

 196          KK       Q
 197          BA  0.0057
 198          PB    3.38
 199          LS       0    92.2
 200          UD   0.057
              *

 201          KK       R
 202          BA  0.0055
 203          PB    3.37
 204          LS       0    94.3
 205          UD   0.053
              *

 206          KK     CQR
 207          KM   COMBINE R AND Q
 208          HC       2
              *
```

```
  209          KK   CARR2
  210          BA  0.0056
  211          PB    3.38
  212          LS       0    98.0
  213          UD   0.075
               *

  214          KK  CCARR2
  215          KM   COMBINE CQR AND CARR2
  216          HC       2
               *
1                                    HEC-1 INPUT                                         PAGE  7

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


  217          KK     CP4
  218          KM   COMBINE CP3, CCARR1, AND CCARR2
  219          HC       3
               *

  220          KK      II
  221          BA  0.0306
  222          PB    3.37
  223          LS       0    92.7
  224          UD   0.062
               *

  225          KK       X
  226          BA  0.0257
  227          PB    3.37
  228          LS       0    90.0
  229          UD   0.080
               *

  230          KK       B
  231          BA  0.1361
  232          PB    3.36
  233          LS       0    93.5
  234          UD   0.077
               *

  235          KK    DC-1
  236          BA  0.0169
  237          PB    3.35
  238          LS       0    98.0
  239          UD   0.050
               *

  240          KK   COS-3
  241          BA  0.0027
  242          PB    3.36
  243          LS       0    84.7
  244          UD   0.140
               *

  245          KK  DUMMY1
  246          KM   REGIONAL FACILITY - BELTWAY CHANNEL NORTH
  247          KM   COMBINE CP1, CP4, II, X, B, DC1, AND COS-3
  248          HC       7
               *

  249          KK    3-O*
  250          KM   REFERENCED FROM THE OVERALL SWPA MPU
  251          BA  0.0805
  252          PB    3.48
  253          LS       0    94.5
  254          UD   0.103
               *
1                                    HEC-1 INPUT                                         PAGE  8

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


  255          KKOFF-COS2
  256          KM   OFFSITE BASIN
  257          BA   .0299
  258          PB    3.45
  259          LS       0    86.0
  260          UD   0.110
               *

  261          KKCOFFCOS2
  262          KM   COMBINE 3-O AND OFF-COS2
  263          HC       2
               *

  264          KK       E
  265          BA  0.0218
```

```
             266          PB    3.43
             267          LS       0    95.0
             268          UD   0.062
                          *

             269          KK    STJ1
             270          KM   STREET J1
             271          BA  0.0059
             272          PB    3.43
             273          LS       0    98.0
             274          UD   0.050
                          *

             275          KK   CSTJ1
             276          KM   COMBINE OFF-COS2, E, AND STJ1
             277          HC       3
                          *

             278          KK    NP-2
             279          BA  0.0024
             280          PB    3.43
             281          LS       0    89.0
             282          UD   0.059
                          *

             283          KK    ES-1
             284          BA  0.0220
             285          PB    3.43
             286          LS       0    95.0
             287          UD   0.063
                          *

             288          KK   CES-1
             289          KM   COMBINE CSTJ, NP-2, AND ES-1
             290          HC       3
                          *
1                                        HEC-1 INPUT                                          PAGE  9

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


             291          KK    OFF4
             292          BA  0.0823
             293          PB    3.44
             294          LS       0    94.8
             295          UD   0.077
                          *

             296          KK       L
             297          BA  0.0126
             298          PB    3.42
             299          LS       0    94.6
             300          UD   0.050
                          *

             301          KK    STL1
             302          BA  0.0028
             303          PB    3.42
             304          LS       0    98.0
             305          UD   0.050
                          *

             306          KK   CSTL1
             307          KM   COMBINE L AND STL1
             308          HC       2
                          *

             309          KK    STG1
             310          BA  0.0028
             311          PB    3.42
             312          LS       0    98.0
             313          UD   0.050
                          *

             314          KK   CSTG1
             315          KM   COMBINE OFF4, CSTL, AND STG1
             316          HC       3
                          *

             317          KK       M
             318          BA  0.0176
             319          PB    3.42
             320          LS       0    94.3
             321          UD   0.053
                          *

             322          KK    STJ2
             323          BA  0.0048
             324          PB    3.42
```

```
 325          LS       0    98.0
 326          UD   0.072
              *
1                                        HEC-1 INPUT                                        PAGE 10

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


 327          KK  DUMMY2
 328          KM   REGIONAL FACILITY
 329          HC       4
              *

 330          KK       S
 331          BA  0.0047
 332          PB    3.40
 333          LS       0    88.3
 334          UD   0.064
              *

 335          KK     STF
 336          BA  0.0029
 337          PB    3.40
 338          LS       0    98.0
 339          UD   0.050
              *

 340          KK    NP-3
 341          BA  0.0056
 342          PB     3.4
 343          LS       0    80.3
 344          UD   0.079
              *

 345          KK       U
 346          BA  0.0055
 347          PB    3.40
 348          LS       0    86.3
 349          UD   0.069
              *

 350          KK    DES4
 351          BA  0.0027
 352          PB    3.40
 353          LS       0    98.0
 354          UD   0.050
              *

 355          KK   CDES4
 356          KM   COMBINE U AND DES4
 357          HC       2
              *

 358          KK  DUMMY3
 359          KM   COMBINE S, STF, NP-3, CDES4
 360          HC       5
              *
1                                        HEC-1 INPUT                                        PAGE 11

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


 361          KK       V
 362          BA  0.0060
 363          PB    3.37
 364          LS       0    90.0
 365          UD   0.060
              *

 366          KK       W
 367          BA  0.0062
 368          PB    3.40
 369          LS       0    90.0
 370          UD   0.065
              *

 371          KK     CVW
 372          KM   COMBINE W AND V
 373          HC       2
              *

 374          KK   CARR3
 375          BA  0.0046
 376          PB    3.37
 377          LS       0    98.0
 378          UD   0.050
              *

 379          KK  DUMMY4
```

```
 380          KM   REGIONAL FACILITY
 381          HC       3
              *

 382          KK    STE3
 383          BA  0.0017
 384          PB    3.40
 385          LS       0    98.0
 386          UD   0.050
              *

 387          KK      EE
 388          BA  0.0104
 389          PB    3.39
 390          LS       0    90.5
 391          UD   0.075
              *

 392          KK  DUMMY5
 393          KM   REGIONAL FACILITY
 394          HC       3
              *
1                                        HEC-1 INPUT                                        PAGE 12

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


 395          KK   STEE3
 396          BA  0.0023
 397          PB    3.39
 398          LS       0    98.0
 399          UD   0.050
              *

 400          KK      HH
 401          BA  0.0072
 402          PB    3.39
 403          LS       0    94.2
 404          UD   0.055
              *

 405          KK   CARR4
 406          BA  0.0048
 407          PB    3.37
 408          LS       0    98.0
 409          UD   0.056
              *

 410          KK  DUMMY6
 411          KM   REGIONAL FACILITY - BELTWAY CHANNEL SOUTH
 412          HC       4
              *

 413          KK    OFF5
 414          BA  0.0199
 415          PB    3.44
 416          LS       0    92.2
 417          UD   0.050
              *

 418          KK    STE1
 419          BA  0.0027
 420          PB    3.42
 421          LS       0    98.0
 422          UD   0.050
              *

 423          KK       Y
 424          BA  0.0126
 425          PB    3.44
 426          LS       0    92.4
 427          UD   0.071
              *

 428          KK      CY
 429          KM   COMBINES OFF5, Y, AND STE1
 430          HC       3
              *
1                                        HEC-1 INPUT                                        PAGE 13

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


 431          KK    STL2
 432          BA  0.0028
 433          PB    3.44
 434          LS       0    98.0
 435          UD   0.050
              *
```

```
 436          KK   CSTL2
 437          KM   COMBINES CY AND STL2
 438          HC       2
              *

 439          KK       Z
 440          BA  0.0110
 441          PB    3.42
 442          LS       0    87.6
 443          UD   0.086
              *

 444          KK    STJ3
 445          BA  0.0038
 446          PB    3.42
 447          LS       0    98.0
 448          UD   0.058
              *

 449          KK   CSTJ3
 450          KM   COMBINE Z AND STJ3
 451          HC       2
              *

 452          KK  DUMMY7
 453          KM   REGIONAL FACILITY
 454          HC       2
              *

 455          KK    STE2
 456          BA  0.0028
 457          PB    3.40
 458          LS       0    98.0
 459          UD   0.050
              *

 460          KK      BB
 461          BA  0.0097
 462          PB    3.42
 463          LS       0    91.0
 464          UD   0.074
              *
```



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

 465          KK       T
 466          BA  0.0063
 467          PB    3.42
 468          LS       0    92.0
 469          UD   0.055
              *

 470          KK      CC
 471          BA  0.0086
 472          PB    3.42
 473          LS       0    90.7
 474          UD   0.079
              *

 475          KK      DD
 476          BA  0.0071
 477          PB    3.40
 478          LS       0    90.6
 479          UD   0.079
              *

 480          KK  DUMMY8
 481          KM   REGIONAL FACILITY
 482          HC       6
              *

 483          KK    DES5
 484          BA  0.0028
 485          PB    3.40
 486          LS       0    98.0
 487          UD   0.050
              *

 488          KK    NP-4
 489          BA  0.0011
 490          PB    3.39
 491          LS       0    84.1
 492          UD   0.071
              *

 493          KK  DUMMY9
```

```
 494          KM   REGIONAL FACILITY
 495          HC       3
              *

 496          KK      AA
 497          BA  0.0073
 498          PB    3.43
 499          LS       0    93.0
 500          UD   0.065
              *
1                                          HEC-1 INPUT                                          PAGE 15

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


 501          KK    STJ4
 502          BA  0.0016
 503          PB    3.41
 504          LS       0    98.0
 505          UD   0.059
              *

 506          KK   CSTJ4
 507          KM   COMBINE AA AND STJ4
 508          HC       2
              *

 509          KK   STEE1
 510          BA  0.0023
 511          PB    3.44
 512          LS       0    98.0
 513          UD   0.050
              *

 514          KK  CSTEE2
 515          KM   COMBINES CSTJ4 AND STEE1
 516          HC       2
              *

 517          KK   STEE2
 518          BA  0.0038
 519          PB    3.41
 520          LS       0    98.0
 521          UD   0.050
              *

 522          KK      FF
 523          BA  0.0048
 524          PB    3.41
 525          LS       0    94.2
 526          UD   0.059
              *

 527          KK     CFF
 528          KM   COMBINES CSTEE2,STEE2, AND FF
 529          HC       3
              *

 530          KK DUMMY10
 531          KM   REGIONAL FACILITY
 532          HC       2
              *

 533          KK      GG
 534          BA  0.0058
 535          PB    3.41
 536          LS       0    94.2
 537          UD   0.050
              *
1                                          HEC-1 INPUT                                          PAGE 16

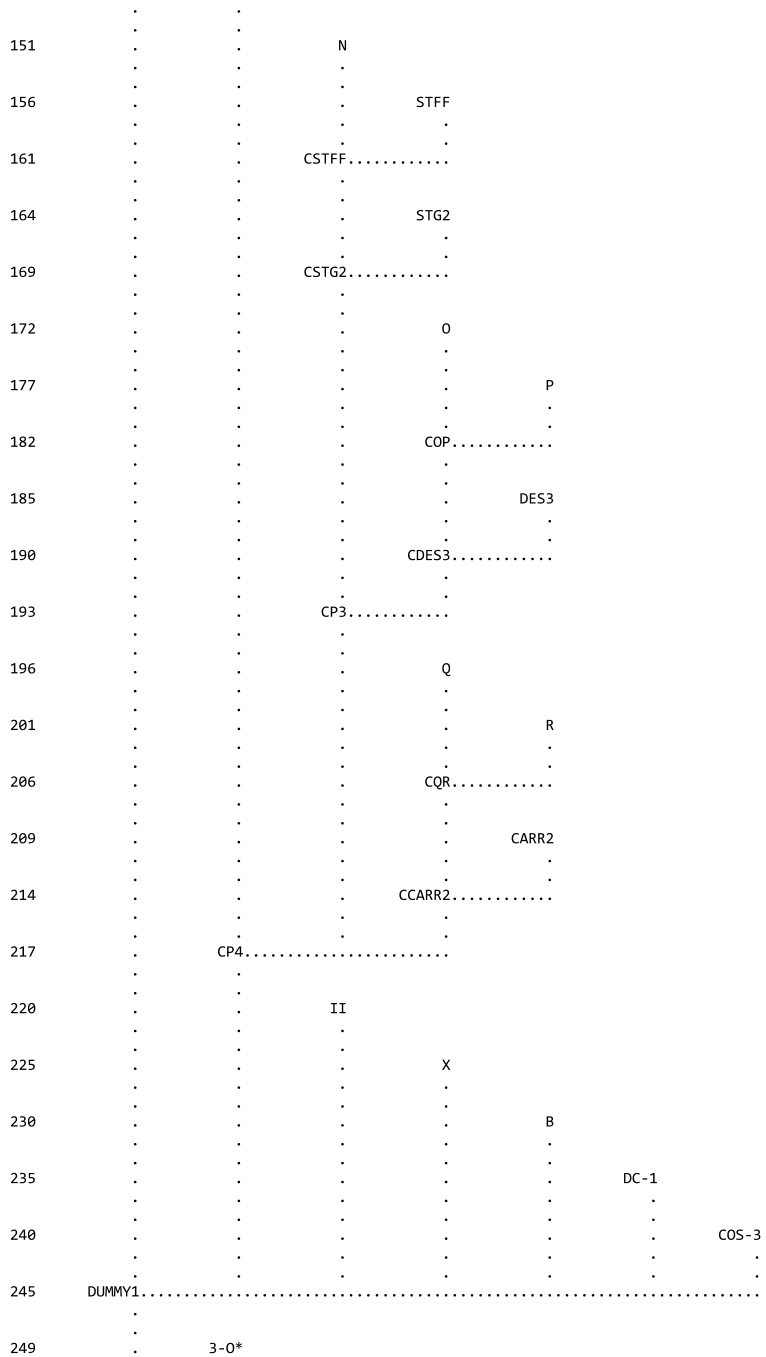
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

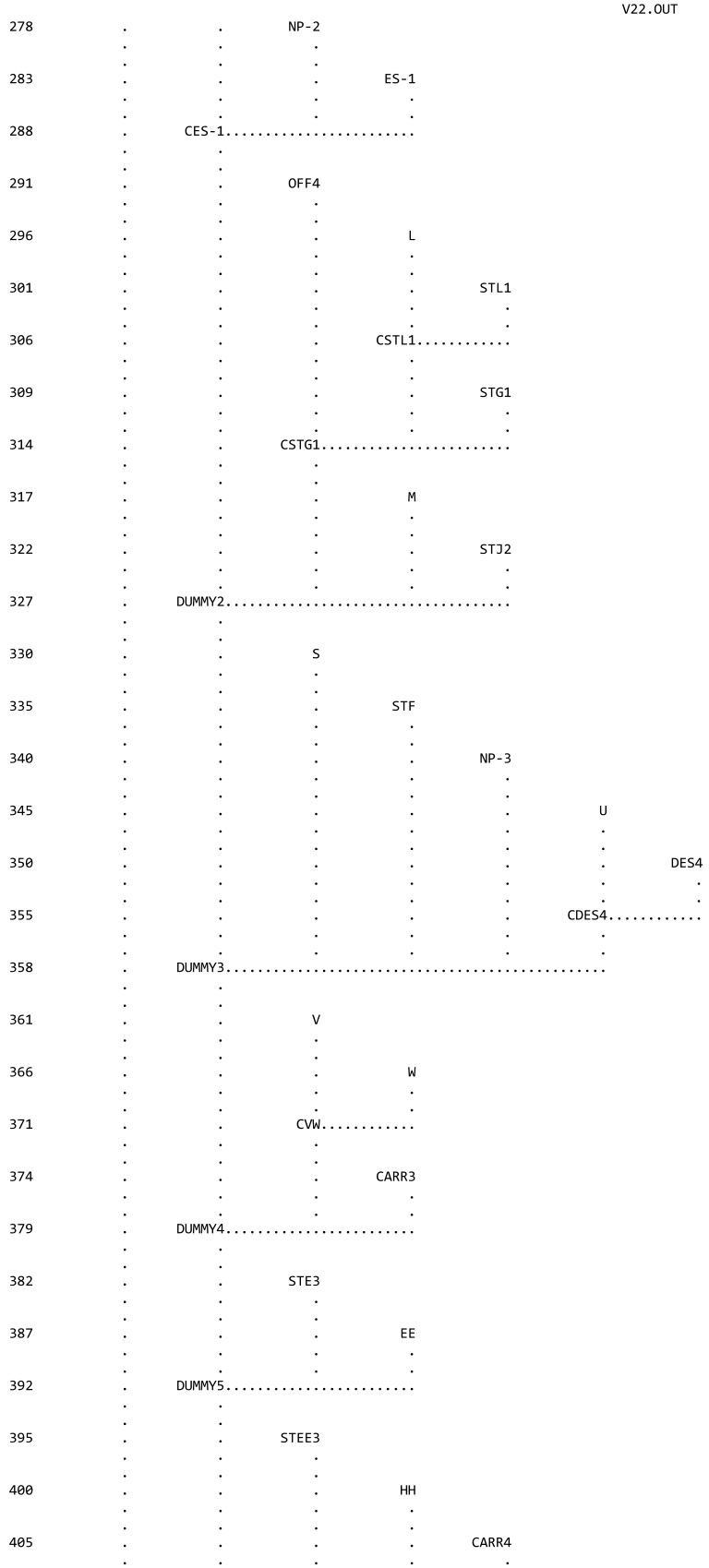

 538          KK    DES6
 539          BA  0.0017
 540          PB    3.39
 541          LS       0    98.0
 542          UD   0.053
              *

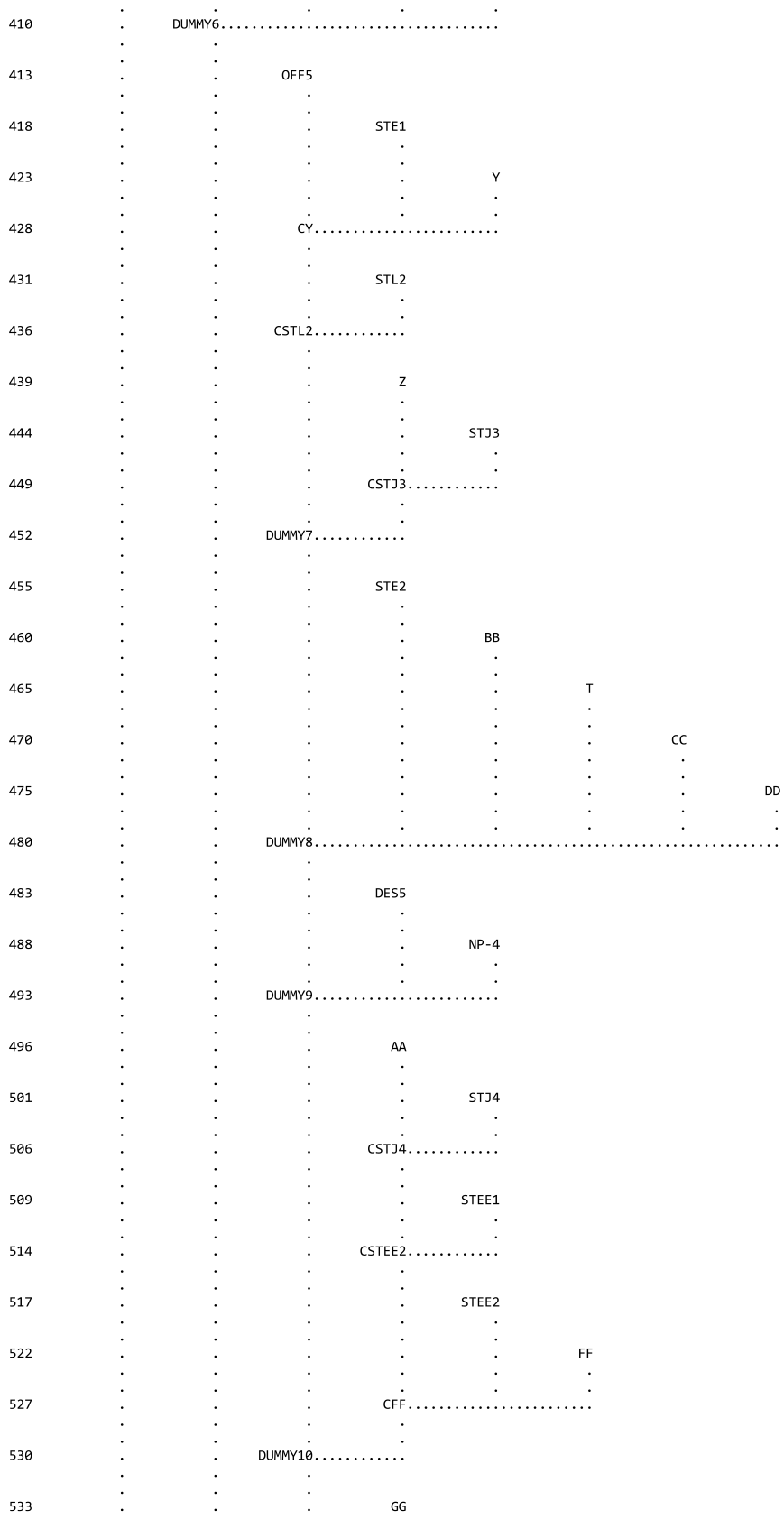
 543          KK DUMMY11
 544          KM   REGIONAL FACILITY - DESERT FOOTHILLS
 545          HC       3
              *
 546          ZZ
1
     SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
```

```
LINE      (V) ROUTING          (---->) DIVERSION OR PUMP FLOW
 NO.      (.) CONNECTOR        (<----) RETURN OF DIVERTED OR PUMPED FLOW

  22          LM
               .
               .
  35           .           D
               .           .
               .           .
  40           .           .        DES1
               .           .           .
               .           .           .
  45           .       CDES1............
               .           .
               .           .
  48           .           .       COS-2
               .           .           .
               .           .           .
  53           .      CCOS-2............
               .           .
               .           .
  56           .           .           A
               .           .           .
               .           .           .
  61           .          CA............
               .           .
               .           .
  64         CP1............
               .
               .
  67           .         STI
               .           .
               .           .
  73           .           .           C
               .           .           .
               .           .           .
  78           .        CSTI............
               .           .
               .           .
  81           .           .           G
               .           .           .
               .           .           .
  86           .          CG............
               .           .
               .           .
  89           .           .           H
               .           .           .
               .           .           .
  94           .          CH............
               .           .
               .           .
  97           .           .         STH
               .           .           .
               .           .           .
 103           .           .           .           J
               .           .           .           .
               .           .           .           .
 108           .           .          CJ............
               .           .           .
               .           .           .
 111           .           .           .           K
               .           .           .           .
               .           .           .           .
 116           .           .          CK............
               .           .           .
               .           .           .
 119           .           .           .        NP-1
               .           .           .           .
               .           .           .           .
 124           .           .       CNP-1............
               .           .           .
               .           .           .
 127           .           .           .        DES2
               .           .           .           .
               .           .           .           .
 132           .           .       CDES2............
               .           .           .
               .           .           .
 135           .         CP2............
               .           .
               .           .
 138           .           .       CARR1
               .           .           .
               .           .           .
 143           .           .           .           I
               .           .           .           .
               .           .           .           .
 148           .      CCARR1........................
```


N
STFF
CSTFF
STG2
CSTG2
O
P
COP
DES3
CDES3
CP3
Q
R
CQR
CARR2
CCARR2
CP4
II
X
B
DC-1
COS-3
DUMMY1
3-O*
OFF-COS2
COFFCOS2
E
STJ1
CSTJ1


278 NP-2
283 ES-1
288 CES-1
291 OFF4
296 L
301 STL1
306 CSTL1
309 STG1
314 CSTG1
317 M
322 STJ2
327 DUMMY2
330 S
335 STF
340 NP-3
345 U
350 DES4
355 CDES4
358 DUMMY3
361 V
366 W
371 CVW
374 CARR3
379 DUMMY4
382 STE3
387 EE
392 DUMMY5
395 STEE3
400 HH
405 CARR4


410 DUMMY6
413 OFF5
418 STE1
423 Y
428 CY
431 STL2
436 CSTL2
439 Z
444 STJ3
449 CSTJ3
452 DUMMY7
455 STE2
460 BB
465 T
470 CC
475 DD
480 DUMMY8
483 DES5
488 NP-4
493 DUMMY9
496 AA
501 STJ4
506 CSTJ4
509 STEE1
514 CSTEE2
517 STEE2
522 FF
527 CFF
530 DUMMY10
533 GG

```
                .          .          .          .
                .          .          .          .
  538           .          .          .          .       DES6
                .          .          .          .          .
                .          .          .          .          .
  543           .          .     DUMMY11.....................

 (***) 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   19MAR19  TIME  11:17:59  *                                    *          (916) 756-1104          *
*                                      *                                    *                                  *
****************************************                                    ************************************
```

ULTIMATE CONDITION HYDROLOGIC MODEL
INPUT FILE DATE = NOVEMBER 1, 2018
DESIGN STORM = 100-YEAR 6-HR STORM
STORM DISTRIBUTION = SDN #3
MODELED BY VTN (JYA)

****
* UPDATE #1 - 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       .01     1   FLOW          41.
                                          TIME         3.50

 HYDROGRAPH AT
+                     D       .02     1   FLOW          47.
```

```
                                        TIME         3.50

 HYDROGRAPH AT
+                   DES1       .01     1   FLOW          14.
                                           TIME         3.50

   2 COMBINED AT
+                  CDES1       .02     1   FLOW          62.
                                           TIME         3.50

 HYDROGRAPH AT
+                  COS-2       .02     1   FLOW          32.
                                           TIME         3.50

   2 COMBINED AT
+                 CCOS-2       .04     1   FLOW          93.
                                           TIME         3.50

 HYDROGRAPH AT
+                     A        .03     1   FLOW          66.
                                           TIME         3.50

   2 COMBINED AT
+                    CA        .07     1   FLOW         160.
                                           TIME         3.50

   2 COMBINED AT
+                   CP1        .08     1   FLOW         201.
                                           TIME         3.50

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

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

   2 COMBINED AT
+                  CSTI        .02     1   FLOW          61.
                                           TIME         3.50

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

   2 COMBINED AT
+                    CG        .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

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

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

   2 COMBINED AT
+                    CJ        .01     1   FLOW          35.
                                           TIME         3.50

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

   2 COMBINED AT
+                    CK        .02     1   FLOW          58.
                                           TIME         3.50

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

   2 COMBINED AT
+                 CNP-1        .02     1   FLOW          59.
                                           TIME         3.50

 HYDROGRAPH AT
+                   DES2       .01     1   FLOW          15.
                                           TIME         3.50
```

```
  2 COMBINED AT
+                  CDES2       .03     1   FLOW          74.
                                             TIME         3.50

  2 COMBINED AT
+                    CP2       .07     1   FLOW         198.
                                             TIME         3.50

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

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

  3 COMBINED AT
+                  CCARR1       .10     1   FLOW         265.
                                             TIME         3.50

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

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

  2 COMBINED AT
+                   CSTFF       .01     1   FLOW          33.
                                             TIME         3.50

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

  2 COMBINED AT
+                   CSTG2       .02     1   FLOW          46.
                                             TIME         3.50

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

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

  2 COMBINED AT
+                     COP       .01     1   FLOW          26.
                                             TIME         3.50

 HYDROGRAPH AT
+                    DES3       .00     1   FLOW           8.
                                             TIME         3.50

  2 COMBINED AT
+                   CDES3       .01     1   FLOW          34.
                                             TIME         3.50

  2 COMBINED AT
+                     CP3       .03     1   FLOW          80.
                                             TIME         3.50

 HYDROGRAPH AT
+                       Q       .01     1   FLOW          14.
                                             TIME         3.50

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

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

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

  2 COMBINED AT
+                  CCARR2       .02     1   FLOW          44.
                                             TIME         3.50

  3 COMBINED AT
+                     CP4       .15     1   FLOW         389.
                                             TIME         3.50
```

```
 HYDROGRAPH AT
+                     II       .03     1   FLOW          77.
                                            TIME         3.50

 HYDROGRAPH AT
+                      X       .03     1   FLOW          56.
                                            TIME         3.50

 HYDROGRAPH AT
+                      B       .14     1   FLOW         328.
                                            TIME         3.50

 HYDROGRAPH AT
+                   DC-1       .02     1   FLOW          48.
                                            TIME         3.50

 HYDROGRAPH AT
+                  COS-3       .00     1   FLOW           4.
                                            TIME         3.58

  7 COMBINED AT
+                 DUMMY1       .44     1   FLOW        1103.
                                            TIME         3.50

 HYDROGRAPH AT
+                   3-O*       .08     1   FLOW         189.
                                            TIME         3.50

 HYDROGRAPH AT
+               OFF-COS2       .03     1   FLOW          53.
                                            TIME         3.50

  2 COMBINED AT
+               COFFCOS2       .11     1   FLOW         242.
                                            TIME         3.50

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

 HYDROGRAPH AT
+                   STJ1       .01     1   FLOW          17.
                                            TIME         3.50

  3 COMBINED AT
+                  CSTJ1       .14     1   FLOW         317.
                                            TIME         3.50

 HYDROGRAPH AT
+                   NP-2       .00     1   FLOW           6.
                                            TIME         3.50

 HYDROGRAPH AT
+                   ES-1       .02     1   FLOW          59.
                                            TIME         3.50

  3 COMBINED AT
+                  CES-1       .16     1   FLOW         382.
                                            TIME         3.50

 HYDROGRAPH AT
+                   OFF4       .08     1   FLOW         209.
                                            TIME         3.50

 HYDROGRAPH AT
+                      L       .01     1   FLOW          35.
                                            TIME         3.50

 HYDROGRAPH AT
+                   STL1       .00     1   FLOW           8.
                                            TIME         3.50

  2 COMBINED AT
+                  CSTL1       .02     1   FLOW          43.
                                            TIME         3.50

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

  3 COMBINED AT
+                  CSTG1       .10     1   FLOW         260.
                                            TIME         3.50

 HYDROGRAPH AT
+                      M       .02     1   FLOW          48.
                                            TIME         3.50

 HYDROGRAPH AT
```

```
+                   STJ2       .00     1   FLOW          13.
                                           TIME         3.50

  4 COMBINED AT
+                  DUMMY2       .29     1   FLOW         702.
                                           TIME         3.50

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

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

 HYDROGRAPH AT
+                   NP-3       .01     1   FLOW           9.
                                           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

  5 COMBINED AT
+                  DUMMY3       .31     1   FLOW         749.
                                           TIME         3.50

 HYDROGRAPH AT
+                      V       .01     1   FLOW          14.
                                           TIME         3.50

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

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

 HYDROGRAPH AT
+                  CARR3       .00     1   FLOW          13.
                                           TIME         3.50

  3 COMBINED AT
+                  DUMMY4       .32     1   FLOW         791.
                                           TIME         3.50

 HYDROGRAPH AT
+                   STE3       .00     1   FLOW           5.
                                           TIME         3.50

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

  3 COMBINED AT
+                  DUMMY5       .34     1   FLOW         820.
                                           TIME         3.50

 HYDROGRAPH AT
+                  STEE3       .00     1   FLOW           7.
                                           TIME         3.50

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

 HYDROGRAPH AT
+                  CARR4       .00     1   FLOW          13.
                                           TIME         3.50

  4 COMBINED AT
+                  DUMMY6       .35     1   FLOW         859.
                                           TIME         3.50

 HYDROGRAPH AT
+                   OFF5       .02     1   FLOW          53.
                                           TIME         3.50

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

```
                                        TIME         3.50

 HYDROGRAPH AT
+                     Y       .01     1   FLOW          31.
                                          TIME         3.50

   3 COMBINED AT
+                    CY       .04     1   FLOW          92.
                                          TIME         3.50

 HYDROGRAPH AT
+                   STL2       .00     1   FLOW           8.
                                          TIME         3.50

   2 COMBINED AT
+                  CSTL2       .04     1   FLOW         100.
                                          TIME         3.50

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

 HYDROGRAPH AT
+                   STJ3       .00     1   FLOW          11.
                                          TIME         3.50

   2 COMBINED AT
+                  CSTJ3       .01     1   FLOW          33.
                                          TIME         3.50

   2 COMBINED AT
+                 DUMMY7       .05     1   FLOW         133.
                                          TIME         3.50

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

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

 HYDROGRAPH AT
+                      T       .01     1   FLOW          16.
                                          TIME         3.50

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

 HYDROGRAPH AT
+                     DD       .01     1   FLOW          16.
                                          TIME         3.50

   6 COMBINED AT
+                 DUMMY8       .09     1   FLOW         215.
                                          TIME         3.50

 HYDROGRAPH AT
+                   DES5       .00     1   FLOW           8.
                                          TIME         3.50

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

   3 COMBINED AT
+                 DUMMY9       .09     1   FLOW         225.
                                          TIME         3.50

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

 HYDROGRAPH AT
+                   STJ4       .00     1   FLOW           4.
                                          TIME         3.50

   2 COMBINED AT
+                  CSTJ4       .01     1   FLOW          23.
                                          TIME         3.50

 HYDROGRAPH AT
+                  STEE1       .00     1   FLOW           7.
                                          TIME         3.50

   2 COMBINED AT
+                 CSTEE2       .01     1   FLOW          30.
                                          TIME         3.50
```

```
 HYDROGRAPH AT
+                  STEE2       .00     1   FLOW          11.
                                           TIME         3.50

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

  3 COMBINED AT
+                   CFF        .02     1   FLOW          53.
                                           TIME         3.50

  2 COMBINED AT
+                DUMMY10       .11     1   FLOW         279.
                                           TIME         3.50

 HYDROGRAPH AT
+                    GG        .01     1   FLOW          16.
                                           TIME         3.50

 HYDROGRAPH AT
+                   DES6       .00     1   FLOW           5.
                                           TIME         3.50

  3 COMBINED AT
+                DUMMY11       .12     1   FLOW         299.
                                           TIME         3.50


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

Appendix B. Hydrology Appendix

B.1. Parameters

B.2. HEC-1 Model

B.3. 2D Model Input HEC-1 Model

B.1 Parameters

SUMMERLIN WEST VILLAGE 22

Kettle Ridge Drive (Street J)
Lake Mead Boulevard to Fleet Wing Avenue (Street G)
Scurry Bend Drive (Street N) Rough Grade
Lake Mead Boulevard to Fleet Wing Avenue (Street G)

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
INT-J1	1	Undeveloped Land, Open Desert	1155	88	353955	353955	100.0%	100.0%	88.00	88.00	**88.0**
INT-J2	1	Undeveloped Land, Open Desert	1155	88	577890	577890	100.0%	100.0%	88.00	88.00	**88.0**
INT-J3	1	Undeveloped Land, Open Desert	1155	88	789937	789937	100.0%	100.0%	88.00	88.00	**88.0**
INT-LMB1	1	Undeveloped Land, Open Desert	1155	88	2344383	2346443	99.9%	99.9%	87.92	87.92	
INT-LMB1	1	Undeveloped Land, Open Desert	1191	63	2060	2346443	0.1%	100.0%	0.06	87.98	**88.0**
INT-N	1	Undeveloped Land, Open Desert	1155	88	3837752	5233734	73.3%	73.3%	64.53	64.53	
INT-N	1	Undeveloped Land, Open Desert	1191	63	148364	5233734	2.8%	76.2%	1.79	66.31	
INT-N	1	Undeveloped Land, Open Desert	1502	73	1247617	5233734	23.8%	100.0%	17.40	83.72	**83.7**
StrJ-1E	7	Public Facility and Residential, 8-12 units/acre	1155	94	25786	25786	100.0%	100.0%	94.00	94.00	**94.0**
StrJ-1W	7	Public Facility and Residential, 8-12 units/acre	1155	94	30287	30287	100.0%	100.0%	94.00	94.00	**94.0**
StrJ-2E	7	Public Facility and Residential, 8-12 units/acre	1155	94	19917	19917	100.0%	100.0%	94.00	94.00	**94.0**
StrJ-2W	7	Public Facility and Residential, 8-12 units/acre	1155	94	25778	25778	100.0%	100.0%	94.00	94.00	**94.0**
StrJ-3E	7	Public Facility and Residential, 8-12 units/acre	1155	94	17181	17181	100.0%	100.0%	94.00	94.00	**94.0**
StrJ-3W	7	Public Facility and Residential, 8-12 units/acre	1155	94	22888	22888	100.0%	100.0%	94.00	94.00	**94.0**

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION

TDS for Summerlin Village 22 West
Kettle Ridge Drive (Street J)
Lake Mead Boulevard to Fleet Wing Avenue (Street G)
& Scurry Bend Drive (Street N) Rough Grade
Lake Mead Boulevard to Fleet Wing Avenue (Street G)
INTERIM CONDITION

BY: **MMA**
DATE: **5/2/19**

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check	Tlag
DESIG: (1)	DEV./EX. (D or E)	CN	K (2)	AREA Ac (3)	AREA Mi^2	INITIAL LENGTH Feet (4)	SLOPE % (5)	Ti Min (6)	TRAVEL LENGTH Feet (7)	SLOPE % (8)	V1 VELOCITY FPS (9a)	V2 VELOCITY FPS (9b)	Tt Min (10)	Min (13)	Min (14)	Tlag= 0.6Tc/60 Hours
INT-J1	E	88.0	0.772	8.13	0.01270	100	7.0	3.1	1011	6.8	3.9	7.7	3.3	6.4	N/A	**0.100****
INT-J2	E	88.0	0.772	13.27	0.02073	100	10.0	2.7	1216	8.1	4.2	8.4	3.4	6.1	N/A	**0.100****
INT-J3	E	88.0	0.772	18.13	0.02834	100	8.0	3.0	1219	8.0	4.2	8.3	3.4	6.4	N/A	**0.100****
INT-LMB1	E	88.0	0.771	53.87	0.08417	100	6.0	3.3	6217	8.0	4.2	8.3	13.4	16.7	N/A	**0.167**
INT-N	E	83.7	0.715	120.15	0.18774	100	8.0	3.5	6,493	7.3	4.0	7.9	14.7	18.1	N/A	**0.181**
StrJ-1E	D	94.0	0.851	0.59	0.00093	16	2.0	1.4	639	7.0	5.3	8.1	1.8	3.3	13.6	**0.050***
StrJ-1W	D	94.0	0.851	0.70	0.00109	16	2.0	1.4	611	7.0	5.3	8.1	1.8	3.2	13.5	**0.050***
StrJ-2E	D	94.0	0.851	0.46	0.00071	16	2.0	1.4	468	3.0	3.5	5.3	2.2	3.7	12.7	**0.050***
StrJ-2W	D	94.0	0.851	0.59	0.00093	16	2.0	1.4	533	3.0	3.5	5.3	2.5	3.9	13.1	**0.050***
StrJ-3E	D	94.0	0.851	0.39	0.00062	16	2.0	1.4	403	1.0	2.0	3.1	3.3	4.7	12.3	**0.050***
StrJ-3W	D	94.0	0.851	0.53	0.00082	16	2.0	1.4	474	1.0	2.0	3.1	3.9	5.3	12.7	**0.053**

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.

B.2 HEC-1 Model

```
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   22JUN19  TIME  16:33:21   *                                                  *           (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 22
             3          ID  KETTLE RIDGE DRIVE (STREET J)
             4          ID  FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
             5          ID  & SCURRY BEND DRIVE (STREET N) ROUGH GRADE
             6          ID  FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
             7          ID  JULY 2019
             8          ID
             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              0.99
            14          ID         Estimated 10-year    0.57
            15          ID
            16          IT       5       0       0     300
            17          IO       5       0       0
            18          IN       5       0       0
            19          JR    PREC    0.99    0.57
                        *

            20          KK    3-O*
            21          KM  REFERENCED FROM ADDENDUM #1 TO UPDATE #1 FOR THE MCDS FOR SUMMERLIN WEST VILLA
            22          KM  WHICH REFERENCED SUBBASIN FROM OVERALL SWPA MPU
            23          BA 0.08050
            24          PB    3.48
            25          PC   0.000   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   1.000
            33          LS       0    95.0
            34          UD   0.103
                        *

            35          KKINT-LMB1
            36          BA 0.08417
            37          PB    3.55
            38          LS       0    88.0
            39          UD   0.167
                        *

            40          KKDIV-LMB1
            41          KM  FLOW CAPTURED FROM INT-LMB1 INTO STREET J SYSTEM UTILIZING FUTURE LAKE MEAD BO
            42          DT  DI_DIV
            43          DI       0      69     153
            44          DQ       0       0      69
```

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

  45      KK     CP1
  46      HC       2
          *
  47      KK  INT-J1
  48      BA 0.01270
  49      PB    3.43
  50      LS       0    88.0
  51      UD   0.100
          *
  52      KK StrJ-1E
  53      BA 0.00093
  54      PB    3.43
  55      LS       0    94.0
  56      UD   0.050
          *
  57      KK StrJ-1W
  58      BA 0.00109
  59      PB    3.43
  60      LS       0    94.0
  61      UD   0.050
          *
  62      KK     CP2
  63      HC       4
          *
  64      KK  INT-J2
  65      BA 0.02073
  66      PB    3.43
  67      LS       0    88.0
  68      UD   0.100
          *
  69      KK StrJ-2E
  70      BA 0.00071
  71      PB    3.43
  72      LS       0    94.0
  73      UD   0.050
          *
  74      KK StrJ-2W
  75      BA 0.00093
  76      PB    3.43
  77      LS       0    94.0
  78      UD   0.050
          *
```



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

  79      KK     CP3
  80      HC       4
          *
  81      KK  INT-J3
  82      BA 0.02834
  83      PB    3.43
  84      LS       0    88.0
  85      UD   0.100
          *
  86      KK StrJ-3E
  87      BA 0.00062
  88      PB    3.43
  89      LS       0    94.0
  90      UD   0.050
          *
  91      KK StrJ-3W
  92      BA 0.00082
  93      PB    3.43
  94      LS       0    94.0
  95      UD   0.053
          *
  96      KK     CP4
  97      HC       4
          *
  98      KK   INT-N
```

```
             99           BA 0.18774
            100           PB    3.43
            101           LS       0    83.7
            102           UD   0.181
                          *

            103           KK     CP5
            104           HC       2
                          *
            105           ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    20        3-O*
                .
                .
    35          .    INT-LMB1
                .          .
                .          .
    42          .          .-------->  DI_DIV
    40          .    DIV-LMB1
                .          .
                .          .
    45        CP1............
                .
                .
    47          .      INT-J1
                .          .
                .          .
    52          .          .     StrJ-1E
                .          .          .
                .          .          .
    57          .          .          .     StrJ-1W
                .          .          .          .
                .          .          .          .
    62        CP2.....................................
                .
                .
    64          .      INT-J2
                .          .
                .          .
    69          .          .     StrJ-2E
                .          .          .
                .          .          .
    74          .          .          .     StrJ-2W
                .          .          .          .
                .          .          .          .
    79        CP3.....................................
                .
                .
    81          .      INT-J3
                .          .
                .          .
    86          .          .     StrJ-3E
                .          .          .
                .          .          .
    91          .          .          .     StrJ-3W
                .          .          .          .
                .          .          .          .
    96        CP4.....................................
                .
                .
    98          .       INT-N
                .          .
                .          .
   103        CP5............

 (***) 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   22JUN19  TIME  16:33:21  *                    *           (916) 756-1104             *
 *                                      *                    *                                      *
 ****************************************                    ****************************************
```

TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J)
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

& SCURRY BEND DRIVE (STREET N) ROUGH GRADE
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
JULY 2019

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES

AREA (SQUARE MILES)	DARF
0 - 0.5	0.99
Estimated 10-year	0.57

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
.99 .57
1

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .99	RATIO 2 .57
HYDROGRAPH AT						
+	3-O*	.08	1	FLOW	189.	100.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	INT-LMB1	.08	1	FLOW	153.	69.
				TIME	3.58	3.58
DIVERSION TO						
+	DI_DIV	.08	1	FLOW	69.	0.
				TIME	3.58	.00
HYDROGRAPH AT						
+	DIV-LMB1	.08	1	FLOW	84.	69.
				TIME	3.58	3.58
2 COMBINED AT						
+	CP1	.16	1	FLOW	269.	163.
				TIME	3.50	3.58
HYDROGRAPH AT						
+	INT-J1	.01	1	FLOW	25.	11.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	StrJ-1E	.00	1	FLOW	3.	1.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	StrJ-1W	.00	1	FLOW	3.	2.
				TIME	3.50	3.50
4 COMBINED AT						
+	CP2	.18	1	FLOW	299.	175.
				TIME	3.50	3.58

```
 HYDROGRAPH AT
+                INT-J2       .02     1   FLOW          40.      18.
                                          TIME        3.50     3.50

 HYDROGRAPH AT
+               StrJ-2E       .00     1   FLOW           2.       1.
                                          TIME        3.50     3.50

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

  4 COMBINED AT
+                   CP3       .20     1   FLOW         343.     194.
                                          TIME        3.50     3.58

 HYDROGRAPH AT
+                INT-J3       .03     1   FLOW          55.      24.
                                          TIME        3.50     3.50

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

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

  4 COMBINED AT
+                   CP4       .23     1   FLOW         402.     218.
                                          TIME        3.50     3.58

 HYDROGRAPH AT
+                 INT-N       .19     1   FLOW         270.     104.
                                          TIME        3.58     3.58

  2 COMBINED AT
+                   CP5       .42     1   FLOW         650.     322.
                                          TIME        3.58     3.58


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

B.3 2D Model Input HEC-1 Model

```
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   24JUN19  TIME  09:11:03  *                                                  *           (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 22
             3          ID  KETTLE RIDGE DRIVE (STREET J)
             4          ID  FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
             5          ID  & SCURRY BEND DRIVE (STREET N) ROUGH GRADE
             6          ID  FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
             7          ID  JULY 2019
             8          ID
             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              0.99
            14          ID         Estimated 10-year    0.57
            15          ID
            16          IT       5       0       0     300
            17          IO       5       0       0
            18          IN       5       0       0
            19          JR    PREC    0.99    0.57
                        *

            20          KK   INT-N
            21          BA 0.18774
            22          PB    3.43
            23          PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
            24          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
            25          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
            26          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
            27          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
            28          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
            29          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
            30          PC   0.998   0.999   1.000
            31          LS       0    83.7
            32          UD   0.181
            33          KO       1
                        *
            34          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    20       INT-N

 (***) 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   24JUN19  TIME  09:11:03  *                                        *           (916) 756-1104            *
*                                      *                                        *                                     *
****************************************                                        ***************************************
```

TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J)
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
& SCURRY BEND DRIVE (STREET N) ROUGH GRADE
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
JULY 2019

JR CARDS CONTAIN DARFS BASED ON THE FOLLOWING VALUES

AREA (SQUARE MILES)	DARF
0 - 0.5	0.99
Estimated 10-year	0.57

```
  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
                     .99       .57


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


            **************
            *            *
  20 KK     *     INT-N  *
            *            *
            **************

  33 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

               SUBBASIN RUNOFF DATA

  21 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .19  SUBBASIN AREA

                 PRECIPITATION DATA

  22 PB               STORM        3.43  BASIN TOTAL PRECIPITATION

  23 PI            INCREMENTAL PRECIPITATION PATTERN
                     .02       .04       .01       .02       .02       .02       .01       .00       .00       .00
                     .00       .00       .00       .01       .00       .01       .01       .01       .01       .01
                     .01       .00       .00       .00       .00       .01       .02       .01       .01       .00
                     .01       .01       .01       .00       .00       .01       .03       .03       .06       .09
```

.09	.12	.03	.04	.03	.01	.02	.02	.00	.00
.01	.01	.01	.02	.02	.01	.01	.02	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00								

31 LS SCS LOSS RATE

STRTL	.39	INITIAL ABSTRACTION
CRVNBR	83.70	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

32 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.18	LAG

***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

UNIT HYDROGRAPH
13 END-OF-PERIOD ORDINATES

113.	355.	397.	278.	141.	79.	42.	23.	13.	7.
4.	2.	1.							

HYDROGRAPH AT STATION INT-N

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	1		1230	151	.00	.00	.00	0.
1		0005	2	.07	.07	.00	0.	1		1235	152	.00	.00	.00	0.
1		0010	3	.13	.13	.00	0.	1		1240	153	.00	.00	.00	0.
1		0015	4	.04	.04	.00	0.	1		1245	154	.00	.00	.00	0.
1		0020	5	.06	.06	.00	0.	1		1250	155	.00	.00	.00	0.
1		0025	6	.07	.07	.00	0.	1		1255	156	.00	.00	.00	0.
1		0030	7	.05	.05	.00	0.	1		1300	157	.00	.00	.00	0.
1		0035	8	.02	.02	.00	0.	1		1305	158	.00	.00	.00	0.
1		0040	9	.00	.00	.00	1.	1		1310	159	.00	.00	.00	0.
1		0045	10	.00	.00	.00	1.	1		1315	160	.00	.00	.00	0.
1		0050	11	.00	.00	.00	0.	1		1320	161	.00	.00	.00	0.
1		0055	12	.00	.00	.00	0.	1		1325	162	.00	.00	.00	0.
1		0100	13	.00	.00	.00	0.	1		1330	163	.00	.00	.00	0.
1		0105	14	.01	.01	.00	0.	1		1335	164	.00	.00	.00	0.
1		0110	15	.02	.02	.00	0.	1		1340	165	.00	.00	.00	0.
1		0115	16	.01	.01	.00	1.	1		1345	166	.00	.00	.00	0.
1		0120	17	.02	.02	.00	1.	1		1350	167	.00	.00	.00	0.
1		0125	18	.03	.03	.00	2.	1		1355	168	.00	.00	.00	0.
1		0130	19	.05	.04	.01	4.	1		1400	169	.00	.00	.00	0.
1		0135	20	.03	.03	.01	6.	1		1405	170	.00	.00	.00	0.
1		0140	21	.03	.02	.01	7.	1		1410	171	.00	.00	.00	0.
1		0145	22	.02	.02	.01	8.	1		1415	172	.00	.00	.00	0.
1		0150	23	.01	.01	.00	8.	1		1420	173	.00	.00	.00	0.
1		0155	24	.00	.00	.00	6.	1		1425	174	.00	.00	.00	0.
1		0200	25	.00	.00	.00	4.	1		1430	175	.00	.00	.00	0.
1		0205	26	.01	.01	.00	3.	1		1435	176	.00	.00	.00	0.
1		0210	27	.03	.03	.01	4.	1		1440	177	.00	.00	.00	0.
1		0215	28	.05	.04	.02	7.	1		1445	178	.00	.00	.00	0.
1		0220	29	.04	.03	.01	12.	1		1450	179	.00	.00	.00	0.
1		0225	30	.03	.02	.01	15.	1		1455	180	.00	.00	.00	0.
1		0230	31	.01	.00	.00	15.	1		1500	181	.00	.00	.00	0.
1		0235	32	.02	.01	.01	12.	1		1505	182	.00	.00	.00	0.
1		0240	33	.05	.03	.02	11.	1		1510	183	.00	.00	.00	0.
1		0245	34	.03	.02	.01	14.	1		1515	184	.00	.00	.00	0.
1		0250	35	.01	.01	.00	15.	1		1520	185	.00	.00	.00	0.
1		0255	36	.01	.00	.00	13.	1		1525	186	.00	.00	.00	0.
1		0300	37	.04	.02	.02	11.	1		1530	187	.00	.00	.00	0.
1		0305	38	.09	.05	.04	17.	1		1535	188	.00	.00	.00	0.
1		0310	39	.10	.05	.05	30.	1		1540	189	.00	.00	.00	0.
1		0315	40	.20	.09	.10	53.	1		1545	190	.00	.00	.00	0.
1		0320	41	.31	.12	.19	93.	1		1550	191	.00	.00	.00	0.
1		0325	42	.31	.10	.21	154.	1		1555	192	.00	.00	.00	0.
1		0330	43	.41	.11	.30	224.	1		1600	193	.00	.00	.00	0.
1		0335	44	.12	.03	.09	275.	1		1605	194	.00	.00	.00	0.
1		0340	45	.13	.03	.10	260.	1		1610	195	.00	.00	.00	0.
1		0345	46	.11	.02	.08	215.	1		1615	196	.00	.00	.00	0.
1		0350	47	.02	.00	.02	167.	1		1620	197	.00	.00	.00	0.
1		0355	48	.05	.01	.04	124.	1		1625	198	.00	.00	.00	0.
1		0400	49	.05	.01	.04	94.	1		1630	199	.00	.00	.00	0.
1		0405	50	.02	.00	.01	75.	1		1635	200	.00	.00	.00	0.
1		0410	51	.01	.00	.01	58.	1		1640	201	.00	.00	.00	0.
1		0415	52	.03	.01	.02	42.	1		1645	202	.00	.00	.00	0.
1		0420	53	.03	.01	.02	35.	1		1650	203	.00	.00	.00	0.
1		0425	54	.04	.01	.03	34.	1		1655	204	.00	.00	.00	0.
1		0430	55	.08	.01	.06	41.	1		1700	205	.00	.00	.00	0.
1		0435	56	.05	.01	.05	54.	1		1705	206	.00	.00	.00	0.
1		0440	57	.04	.01	.03	61.	1		1710	207	.00	.00	.00	0.
1		0445	58	.04	.01	.04	59.	1		1715	208	.00	.00	.00	0.
1		0450	59	.07	.01	.06	58.	1		1720	209	.00	.00	.00	0.
1		0455	60	.02	.00	.02	60.	1		1725	210	.00	.00	.00	0.

1	0500	61	.02	.00	.02	53.	*	1	1730	211	.00	.00	.00	0.
1	0505	62	.01	.00	.01	42.	*	1	1735	212	.00	.00	.00	0.
1	0510	63	.01	.00	.01	30.	*	1	1740	213	.00	.00	.00	0.
1	0515	64	.01	.00	.01	21.	*	1	1745	214	.00	.00	.00	0.
1	0520	65	.00	.00	.00	15.	*	1	1750	215	.00	.00	.00	0.
1	0525	66	.01	.00	.01	12.	*	1	1755	216	.00	.00	.00	0.
1	0530	67	.00	.00	.00	10.	*	1	1800	217	.00	.00	.00	0.
1	0535	68	.00	.00	.00	7.	*	1	1805	218	.00	.00	.00	0.
1	0540	69	.00	.00	.00	6.	*	1	1810	219	.00	.00	.00	0.
1	0545	70	.01	.00	.01	5.	*	1	1815	220	.00	.00	.00	0.
1	0550	71	.00	.00	.00	6.	*	1	1820	221	.00	.00	.00	0.
1	0555	72	.00	.00	.00	6.	*	1	1825	222	.00	.00	.00	0.
1	0600	73	.00	.00	.00	5.	*	1	1830	223	.00	.00	.00	0.
1	0605	74	.00	.00	.00	4.	*	1	1835	224	.00	.00	.00	0.
1	0610	75	.00	.00	.00	3.	*	1	1840	225	.00	.00	.00	0.
1	0615	76	.00	.00	.00	2.	*	1	1845	226	.00	.00	.00	0.
1	0620	77	.00	.00	.00	1.	*	1	1850	227	.00	.00	.00	0.
1	0625	78	.00	.00	.00	0.	*	1	1855	228	.00	.00	.00	0.
1	0630	79	.00	.00	.00	0.	*	1	1900	229	.00	.00	.00	0.
1	0635	80	.00	.00	.00	0.	*	1	1905	230	.00	.00	.00	0.
1	0640	81	.00	.00	.00	0.	*	1	1910	231	.00	.00	.00	0.
1	0645	82	.00	.00	.00	0.	*	1	1915	232	.00	.00	.00	0.
1	0650	83	.00	.00	.00	0.	*	1	1920	233	.00	.00	.00	0.
1	0655	84	.00	.00	.00	0.	*	1	1925	234	.00	.00	.00	0.
1	0700	85	.00	.00	.00	0.	*	1	1930	235	.00	.00	.00	0.
1	0705	86	.00	.00	.00	0.	*	1	1935	236	.00	.00	.00	0.
1	0710	87	.00	.00	.00	0.	*	1	1940	237	.00	.00	.00	0.
1	0715	88	.00	.00	.00	0.	*	1	1945	238	.00	.00	.00	0.
1	0720	89	.00	.00	.00	0.	*	1	1950	239	.00	.00	.00	0.
1	0725	90	.00	.00	.00	0.	*	1	1955	240	.00	.00	.00	0.
1	0730	91	.00	.00	.00	0.	*	1	2000	241	.00	.00	.00	0.
1	0735	92	.00	.00	.00	0.	*	1	2005	242	.00	.00	.00	0.
1	0740	93	.00	.00	.00	0.	*	1	2010	243	.00	.00	.00	0.
1	0745	94	.00	.00	.00	0.	*	1	2015	244	.00	.00	.00	0.
1	0750	95	.00	.00	.00	0.	*	1	2020	245	.00	.00	.00	0.
1	0755	96	.00	.00	.00	0.	*	1	2025	246	.00	.00	.00	0.
1	0800	97	.00	.00	.00	0.	*	1	2030	247	.00	.00	.00	0.
1	0805	98	.00	.00	.00	0.	*	1	2035	248	.00	.00	.00	0.
1	0810	99	.00	.00	.00	0.	*	1	2040	249	.00	.00	.00	0.
1	0815	100	.00	.00	.00	0.	*	1	2045	250	.00	.00	.00	0.
1	0820	101	.00	.00	.00	0.	*	1	2050	251	.00	.00	.00	0.
1	0825	102	.00	.00	.00	0.	*	1	2055	252	.00	.00	.00	0.
1	0830	103	.00	.00	.00	0.	*	1	2100	253	.00	.00	.00	0.
1	0835	104	.00	.00	.00	0.	*	1	2105	254	.00	.00	.00	0.
1	0840	105	.00	.00	.00	0.	*	1	2110	255	.00	.00	.00	0.
1	0845	106	.00	.00	.00	0.	*	1	2115	256	.00	.00	.00	0.
1	0850	107	.00	.00	.00	0.	*	1	2120	257	.00	.00	.00	0.
1	0855	108	.00	.00	.00	0.	*	1	2125	258	.00	.00	.00	0.
1	0900	109	.00	.00	.00	0.	*	1	2130	259	.00	.00	.00	0.
1	0905	110	.00	.00	.00	0.	*	1	2135	260	.00	.00	.00	0.
1	0910	111	.00	.00	.00	0.	*	1	2140	261	.00	.00	.00	0.
1	0915	112	.00	.00	.00	0.	*	1	2145	262	.00	.00	.00	0.
1	0920	113	.00	.00	.00	0.	*	1	2150	263	.00	.00	.00	0.
1	0925	114	.00	.00	.00	0.	*	1	2155	264	.00	.00	.00	0.
1	0930	115	.00	.00	.00	0.	*	1	2200	265	.00	.00	.00	0.
1	0935	116	.00	.00	.00	0.	*	1	2205	266	.00	.00	.00	0.
1	0940	117	.00	.00	.00	0.	*	1	2210	267	.00	.00	.00	0.
1	0945	118	.00	.00	.00	0.	*	1	2215	268	.00	.00	.00	0.
1	0950	119	.00	.00	.00	0.	*	1	2220	269	.00	.00	.00	0.
1	0955	120	.00	.00	.00	0.	*	1	2225	270	.00	.00	.00	0.
1	1000	121	.00	.00	.00	0.	*	1	2230	271	.00	.00	.00	0.
1	1005	122	.00	.00	.00	0.	*	1	2235	272	.00	.00	.00	0.
1	1010	123	.00	.00	.00	0.	*	1	2240	273	.00	.00	.00	0.
1	1015	124	.00	.00	.00	0.	*	1	2245	274	.00	.00	.00	0.
1	1020	125	.00	.00	.00	0.	*	1	2250	275	.00	.00	.00	0.
1	1025	126	.00	.00	.00	0.	*	1	2255	276	.00	.00	.00	0.
1	1030	127	.00	.00	.00	0.	*	1	2300	277	.00	.00	.00	0.
1	1035	128	.00	.00	.00	0.	*	1	2305	278	.00	.00	.00	0.
1	1040	129	.00	.00	.00	0.	*	1	2310	279	.00	.00	.00	0.
1	1045	130	.00	.00	.00	0.	*	1	2315	280	.00	.00	.00	0.
1	1050	131	.00	.00	.00	0.	*	1	2320	281	.00	.00	.00	0.
1	1055	132	.00	.00	.00	0.	*	1	2325	282	.00	.00	.00	0.
1	1100	133	.00	.00	.00	0.	*	1	2330	283	.00	.00	.00	0.
1	1105	134	.00	.00	.00	0.	*	1	2335	284	.00	.00	.00	0.
1	1110	135	.00	.00	.00	0.	*	1	2340	285	.00	.00	.00	0.
1	1115	136	.00	.00	.00	0.	*	1	2345	286	.00	.00	.00	0.
1	1120	137	.00	.00	.00	0.	*	1	2350	287	.00	.00	.00	0.
1	1125	138	.00	.00	.00	0.	*	1	2355	288	.00	.00	.00	0.
1	1130	139	.00	.00	.00	0.	*	2	0000	289	.00	.00	.00	0.
1	1135	140	.00	.00	.00	0.	*	2	0005	290	.00	.00	.00	0.
1	1140	141	.00	.00	.00	0.	*	2	0010	291	.00	.00	.00	0.
1	1145	142	.00	.00	.00	0.	*	2	0015	292	.00	.00	.00	0.
1	1150	143	.00	.00	.00	0.	*	2	0020	293	.00	.00	.00	0.
1	1155	144	.00	.00	.00	0.	*	2	0025	294	.00	.00	.00	0.
1	1200	145	.00	.00	.00	0.	*	2	0030	295	.00	.00	.00	0.
1	1205	146	.00	.00	.00	0.	*	2	0035	296	.00	.00	.00	0.
1	1210	147	.00	.00	.00	0.	*	2	0040	297	.00	.00	.00	0.
1	1215	148	.00	.00	.00	0.	*	2	0045	298	.00	.00	.00	0.
1	1220	149	.00	.00	.00	0.	*	2	0050	299	.00	.00	.00	0.
1	1225	150	.00	.00	.00	0.	*	2	0055	300	.00	.00	.00	0.

TOTAL RAINFALL = 3.43, TOTAL LOSS = 1.58, TOTAL EXCESS = 1.85

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW (CFS) 6-HR	24-HR	72-HR	24.92-HR
275.	3.58	37.	9.	9.	9.
		(INCHES) 1.853	1.853	1.853	1.853
		(AC-FT) 19.	19.	19.	19.

CUMULATIVE AREA = .19 SQ MI

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

HYDROGRAPH AT STATION INT-N
PLAN 1, RATIO = .99

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	1		1230	151	.00	.00	.00	0.
1		0005	2	.07	.07	.00	0.	1		1235	152	.00	.00	.00	0.
1		0010	3	.13	.13	.00	0.	1		1240	153	.00	.00	.00	0.
1		0015	4	.04	.04	.00	0.	1		1245	154	.00	.00	.00	0.
1		0020	5	.06	.06	.00	0.	1		1250	155	.00	.00	.00	0.
1		0025	6	.07	.07	.00	0.	1		1255	156	.00	.00	.00	0.
1		0030	7	.05	.05	.00	0.	1		1300	157	.00	.00	.00	0.
1		0035	8	.02	.02	.00	0.	1		1305	158	.00	.00	.00	0.
1		0040	9	.00	.00	.00	1.	1		1310	159	.00	.00	.00	0.
1		0045	10	.00	.00	.00	0.	1		1315	160	.00	.00	.00	0.
1		0050	11	.00	.00	.00	0.	1		1320	161	.00	.00	.00	0.
1		0055	12	.00	.00	.00	0.	1		1325	162	.00	.00	.00	0.
1		0100	13	.00	.00	.00	0.	1		1330	163	.00	.00	.00	0.
1		0105	14	.01	.01	.00	0.	1		1335	164	.00	.00	.00	0.
1		0110	15	.02	.02	.00	0.	1		1340	165	.00	.00	.00	0.
1		0115	16	.01	.01	.00	1.	1		1345	166	.00	.00	.00	0.
1		0120	17	.02	.02	.00	1.	1		1350	167	.00	.00	.00	0.
1		0125	18	.03	.03	.00	2.	1		1355	168	.00	.00	.00	0.
1		0130	19	.05	.04	.01	4.	1		1400	169	.00	.00	.00	0.
1		0135	20	.03	.02	.01	6.	1		1405	170	.00	.00	.00	0.
1		0140	21	.03	.02	.01	7.	1		1410	171	.00	.00	.00	0.
1		0145	22	.02	.02	.01	8.	1		1415	172	.00	.00	.00	0.
1		0150	23	.01	.01	.00	8.	1		1420	173	.00	.00	.00	0.
1		0155	24	.00	.00	.00	6.	1		1425	174	.00	.00	.00	0.
1		0200	25	.00	.00	.00	4.	1		1430	175	.00	.00	.00	0.
1		0205	26	.01	.01	.00	3.	1		1435	176	.00	.00	.00	0.
1		0210	27	.03	.03	.01	4.	1		1440	177	.00	.00	.00	0.
1		0215	28	.05	.04	.01	7.	1		1445	178	.00	.00	.00	0.
1		0220	29	.04	.03	.01	11.	1		1450	179	.00	.00	.00	0.
1		0225	30	.03	.02	.01	15.	1		1455	180	.00	.00	.00	0.
1		0230	31	.01	.00	.00	14.	1		1500	181	.00	.00	.00	0.
1		0235	32	.02	.01	.01	12.	1		1505	182	.00	.00	.00	0.
1		0240	33	.05	.03	.02	11.	1		1510	183	.00	.00	.00	0.
1		0245	34	.03	.02	.01	14.	1		1515	184	.00	.00	.00	0.
1		0250	35	.01	.01	.00	15.	1		1520	185	.00	.00	.00	0.
1		0255	36	.01	.00	.00	13.	1		1525	186	.00	.00	.00	0.
1		0300	37	.04	.02	.02	11.	1		1530	187	.00	.00	.00	0.
1		0305	38	.09	.05	.04	16.	1		1535	188	.00	.00	.00	0.
1		0310	39	.10	.05	.05	30.	1		1540	189	.00	.00	.00	0.
1		0315	40	.19	.09	.10	52.	1		1545	190	.00	.00	.00	0.
1		0320	41	.31	.12	.18	92.	1		1550	191	.00	.00	.00	0.
1		0325	42	.31	.10	.21	151.	1		1555	192	.00	.00	.00	0.
1		0330	43	.41	.11	.30	221.	1		1600	193	.00	.00	.00	0.
1		0335	44	.12	.03	.09	270.	1		1605	194	.00	.00	.00	0.
1		0340	45	.13	.03	.10	256.	1		1610	195	.00	.00	.00	0.
1		0345	46	.11	.02	.08	212.	1		1615	196	.00	.00	.00	0.
1		0350	47	.02	.00	.02	165.	1		1620	197	.00	.00	.00	0.
1		0355	48	.05	.01	.04	123.	1		1625	198	.00	.00	.00	0.
1		0400	49	.05	.01	.04	92.	1		1630	199	.00	.00	.00	0.
1		0405	50	.02	.00	.01	74.	1		1635	200	.00	.00	.00	0.
1		0410	51	.01	.00	.01	57.	1		1640	201	.00	.00	.00	0.
1		0415	52	.03	.01	.02	42.	1		1645	202	.00	.00	.00	0.
1		0420	53	.03	.01	.02	34.	1		1650	203	.00	.00	.00	0.
1		0425	54	.04	.01	.03	34.	1		1655	204	.00	.00	.00	0.
1		0430	55	.07	.01	.06	41.	1		1700	205	.00	.00	.00	0.
1		0435	56	.05	.01	.04	53.	1		1705	206	.00	.00	.00	0.
1		0440	57	.04	.01	.03	60.	1		1710	207	.00	.00	.00	0.
1		0445	58	.04	.01	.04	58.	1		1715	208	.00	.00	.00	0.
1		0450	59	.07	.01	.06	57.	1		1720	209	.00	.00	.00	0.
1		0455	60	.02	.00	.02	59.	1		1725	210	.00	.00	.00	0.
1		0500	61	.02	.00	.02	53.	1		1730	211	.00	.00	.00	0.
1		0505	62	.01	.00	.01	41.	1		1735	212	.00	.00	.00	0.
1		0510	63	.01	.00	.01	30.	1		1740	213	.00	.00	.00	0.

1	0515	64	.01	.00	.01	21.	*	1	1745	214	.00	.00	.00	0.
1	0520	65	.00	.00	.00	15.	*	1	1750	215	.00	.00	.00	0.
1	0525	66	.01	.00	.01	11.	*	1	1755	216	.00	.00	.00	0.
1	0530	67	.00	.00	.00	10.	*	1	1800	217	.00	.00	.00	0.
1	0535	68	.00	.00	.00	7.	*	1	1805	218	.00	.00	.00	0.
1	0540	69	.00	.00	.00	6.	*	1	1810	219	.00	.00	.00	0.
1	0545	70	.01	.00	.01	5.	*	1	1815	220	.00	.00	.00	0.
1	0550	71	.00	.00	.00	6.	*	1	1820	221	.00	.00	.00	0.
1	0555	72	.00	.00	.00	6.	*	1	1825	222	.00	.00	.00	0.
1	0600	73	.00	.00	.00	5.	*	1	1830	223	.00	.00	.00	0.
1	0605	74	.00	.00	.00	4.	*	1	1835	224	.00	.00	.00	0.
1	0610	75	.00	.00	.00	3.	*	1	1840	225	.00	.00	.00	0.
1	0615	76	.00	.00	.00	2.	*	1	1845	226	.00	.00	.00	0.
1	0620	77	.00	.00	.00	1.	*	1	1850	227	.00	.00	.00	0.
1	0625	78	.00	.00	.00	0.	*	1	1855	228	.00	.00	.00	0.
1	0630	79	.00	.00	.00	0.	*	1	1900	229	.00	.00	.00	0.
1	0635	80	.00	.00	.00	0.	*	1	1905	230	.00	.00	.00	0.
1	0640	81	.00	.00	.00	0.	*	1	1910	231	.00	.00	.00	0.
1	0645	82	.00	.00	.00	0.	*	1	1915	232	.00	.00	.00	0.
1	0650	83	.00	.00	.00	0.	*	1	1920	233	.00	.00	.00	0.
1	0655	84	.00	.00	.00	0.	*	1	1925	234	.00	.00	.00	0.
1	0700	85	.00	.00	.00	0.	*	1	1930	235	.00	.00	.00	0.
1	0705	86	.00	.00	.00	0.	*	1	1935	236	.00	.00	.00	0.
1	0710	87	.00	.00	.00	0.	*	1	1940	237	.00	.00	.00	0.
1	0715	88	.00	.00	.00	0.	*	1	1945	238	.00	.00	.00	0.
1	0720	89	.00	.00	.00	0.	*	1	1950	239	.00	.00	.00	0.
1	0725	90	.00	.00	.00	0.	*	1	1955	240	.00	.00	.00	0.
1	0730	91	.00	.00	.00	0.	*	1	2000	241	.00	.00	.00	0.
1	0735	92	.00	.00	.00	0.	*	1	2005	242	.00	.00	.00	0.
1	0740	93	.00	.00	.00	0.	*	1	2010	243	.00	.00	.00	0.
1	0745	94	.00	.00	.00	0.	*	1	2015	244	.00	.00	.00	0.
1	0750	95	.00	.00	.00	0.	*	1	2020	245	.00	.00	.00	0.
1	0755	96	.00	.00	.00	0.	*	1	2025	246	.00	.00	.00	0.
1	0800	97	.00	.00	.00	0.	*	1	2030	247	.00	.00	.00	0.
1	0805	98	.00	.00	.00	0.	*	1	2035	248	.00	.00	.00	0.
1	0810	99	.00	.00	.00	0.	*	1	2040	249	.00	.00	.00	0.
1	0815	100	.00	.00	.00	0.	*	1	2045	250	.00	.00	.00	0.
1	0820	101	.00	.00	.00	0.	*	1	2050	251	.00	.00	.00	0.
1	0825	102	.00	.00	.00	0.	*	1	2055	252	.00	.00	.00	0.
1	0830	103	.00	.00	.00	0.	*	1	2100	253	.00	.00	.00	0.
1	0835	104	.00	.00	.00	0.	*	1	2105	254	.00	.00	.00	0.
1	0840	105	.00	.00	.00	0.	*	1	2110	255	.00	.00	.00	0.
1	0845	106	.00	.00	.00	0.	*	1	2115	256	.00	.00	.00	0.
1	0850	107	.00	.00	.00	0.	*	1	2120	257	.00	.00	.00	0.
1	0855	108	.00	.00	.00	0.	*	1	2125	258	.00	.00	.00	0.
1	0900	109	.00	.00	.00	0.	*	1	2130	259	.00	.00	.00	0.
1	0905	110	.00	.00	.00	0.	*	1	2135	260	.00	.00	.00	0.
1	0910	111	.00	.00	.00	0.	*	1	2140	261	.00	.00	.00	0.
1	0915	112	.00	.00	.00	0.	*	1	2145	262	.00	.00	.00	0.
1	0920	113	.00	.00	.00	0.	*	1	2150	263	.00	.00	.00	0.
1	0925	114	.00	.00	.00	0.	*	1	2155	264	.00	.00	.00	0.
1	0930	115	.00	.00	.00	0.	*	1	2200	265	.00	.00	.00	0.
1	0935	116	.00	.00	.00	0.	*	1	2205	266	.00	.00	.00	0.
1	0940	117	.00	.00	.00	0.	*	1	2210	267	.00	.00	.00	0.
1	0945	118	.00	.00	.00	0.	*	1	2215	268	.00	.00	.00	0.
1	0950	119	.00	.00	.00	0.	*	1	2220	269	.00	.00	.00	0.
1	0955	120	.00	.00	.00	0.	*	1	2225	270	.00	.00	.00	0.
1	1000	121	.00	.00	.00	0.	*	1	2230	271	.00	.00	.00	0.
1	1005	122	.00	.00	.00	0.	*	1	2235	272	.00	.00	.00	0.
1	1010	123	.00	.00	.00	0.	*	1	2240	273	.00	.00	.00	0.
1	1015	124	.00	.00	.00	0.	*	1	2245	274	.00	.00	.00	0.
1	1020	125	.00	.00	.00	0.	*	1	2250	275	.00	.00	.00	0.
1	1025	126	.00	.00	.00	0.	*	1	2255	276	.00	.00	.00	0.
1	1030	127	.00	.00	.00	0.	*	1	2300	277	.00	.00	.00	0.
1	1035	128	.00	.00	.00	0.	*	1	2305	278	.00	.00	.00	0.
1	1040	129	.00	.00	.00	0.	*	1	2310	279	.00	.00	.00	0.
1	1045	130	.00	.00	.00	0.	*	1	2315	280	.00	.00	.00	0.
1	1050	131	.00	.00	.00	0.	*	1	2320	281	.00	.00	.00	0.
1	1055	132	.00	.00	.00	0.	*	1	2325	282	.00	.00	.00	0.
1	1100	133	.00	.00	.00	0.	*	1	2330	283	.00	.00	.00	0.
1	1105	134	.00	.00	.00	0.	*	1	2335	284	.00	.00	.00	0.
1	1110	135	.00	.00	.00	0.	*	1	2340	285	.00	.00	.00	0.
1	1115	136	.00	.00	.00	0.	*	1	2345	286	.00	.00	.00	0.
1	1120	137	.00	.00	.00	0.	*	1	2350	287	.00	.00	.00	0.
1	1125	138	.00	.00	.00	0.	*	1	2355	288	.00	.00	.00	0.
1	1130	139	.00	.00	.00	0.	*	2	0000	289	.00	.00	.00	0.
1	1135	140	.00	.00	.00	0.	*	2	0005	290	.00	.00	.00	0.
1	1140	141	.00	.00	.00	0.	*	2	0010	291	.00	.00	.00	0.
1	1145	142	.00	.00	.00	0.	*	2	0015	292	.00	.00	.00	0.
1	1150	143	.00	.00	.00	0.	*	2	0020	293	.00	.00	.00	0.
1	1155	144	.00	.00	.00	0.	*	2	0025	294	.00	.00	.00	0.
1	1200	145	.00	.00	.00	0.	*	2	0030	295	.00	.00	.00	0.
1	1205	146	.00	.00	.00	0.	*	2	0035	296	.00	.00	.00	0.
1	1210	147	.00	.00	.00	0.	*	2	0040	297	.00	.00	.00	0.
1	1215	148	.00	.00	.00	0.	*	2	0045	298	.00	.00	.00	0.
1	1220	149	.00	.00	.00	0.	*	2	0050	299	.00	.00	.00	0.
1	1225	150	.00	.00	.00	0.	*	2	0055	300	.00	.00	.00	0.
							*							

****

TOTAL RAINFALL = 3.40, TOTAL LOSS = 1.57, TOTAL EXCESS = 1.82

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)				
		(CFS)			
270.	3.58	37.	9.	9.	9.
		(INCHES) 1.824	1.824	1.824	1.824
		(AC-FT) 18.	18.	18.	18.

CUMULATIVE AREA = .19 SQ MI

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

HYDROGRAPH AT STATION INT-N
PLAN 1, RATIO = .57

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	1		1230	151	.00	.00	.00	0.
1		0005	2	.04	.04	.00	0.	1		1235	152	.00	.00	.00	0.
1		0010	3	.07	.07	.00	0.	1		1240	153	.00	.00	.00	0.
1		0015	4	.03	.03	.00	0.	1		1245	154	.00	.00	.00	0.
1		0020	5	.03	.03	.00	0.	1		1250	155	.00	.00	.00	0.
1		0025	6	.04	.04	.00	0.	1		1255	156	.00	.00	.00	0.
1		0030	7	.03	.03	.00	0.	1		1300	157	.00	.00	.00	0.
1		0035	8	.01	.01	.00	0.	1		1305	158	.00	.00	.00	0.
1		0040	9	.00	.00	.00	0.	1		1310	159	.00	.00	.00	0.
1		0045	10	.00	.00	.00	0.	1		1315	160	.00	.00	.00	0.
1		0050	11	.00	.00	.00	0.	1		1320	161	.00	.00	.00	0.
1		0055	12	.00	.00	.00	0.	1		1325	162	.00	.00	.00	0.
1		0100	13	.00	.00	.00	0.	1		1330	163	.00	.00	.00	0.
1		0105	14	.01	.01	.00	0.	1		1335	164	.00	.00	.00	0.
1		0110	15	.01	.01	.00	0.	1		1340	165	.00	.00	.00	0.
1		0115	16	.00	.00	.00	0.	1		1345	166	.00	.00	.00	0.
1		0120	17	.01	.01	.00	0.	1		1350	167	.00	.00	.00	0.
1		0125	18	.02	.02	.00	0.	1		1355	168	.00	.00	.00	0.
1		0130	19	.03	.03	.00	0.	1		1400	169	.00	.00	.00	0.
1		0135	20	.02	.02	.00	0.	1		1405	170	.00	.00	.00	0.
1		0140	21	.02	.02	.00	0.	1		1410	171	.00	.00	.00	0.
1		0145	22	.01	.01	.00	0.	1		1415	172	.00	.00	.00	0.
1		0150	23	.00	.00	.00	0.	1		1420	173	.00	.00	.00	0.
1		0155	24	.00	.00	.00	0.	1		1425	174	.00	.00	.00	0.
1		0200	25	.00	.00	.00	0.	1		1430	175	.00	.00	.00	0.
1		0205	26	.01	.01	.00	0.	1		1435	176	.00	.00	.00	0.
1		0210	27	.02	.02	.00	0.	1		1440	177	.00	.00	.00	0.
1		0215	28	.03	.03	.00	0.	1		1445	178	.00	.00	.00	0.
1		0220	29	.02	.02	.00	1.	1		1450	179	.00	.00	.00	0.
1		0225	30	.02	.01	.00	1.	1		1455	180	.00	.00	.00	0.
1		0230	31	.00	.00	.00	2.	1		1500	181	.00	.00	.00	0.
1		0235	32	.01	.01	.00	1.	1		1505	182	.00	.00	.00	0.
1		0240	33	.03	.02	.00	2.	1		1510	183	.00	.00	.00	0.
1		0245	34	.02	.01	.00	2.	1		1515	184	.00	.00	.00	0.
1		0250	35	.01	.01	.00	3.	1		1520	185	.00	.00	.00	0.
1		0255	36	.00	.00	.00	2.	1		1525	186	.00	.00	.00	0.
1		0300	37	.02	.02	.00	2.	1		1530	187	.00	.00	.00	0.
1		0305	38	.05	.04	.01	4.	1		1535	188	.00	.00	.00	0.
1		0310	39	.06	.05	.01	7.	1		1540	189	.00	.00	.00	0.
1		0315	40	.11	.08	.03	14.	1		1545	190	.00	.00	.00	0.
1		0320	41	.18	.11	.06	27.	1		1550	191	.00	.00	.00	0.
1		0325	42	.18	.10	.08	50.	1		1555	192	.00	.00	.00	0.
1		0330	43	.23	.11	.12	79.	1		1600	193	.00	.00	.00	0.
1		0335	44	.07	.03	.04	104.	1		1605	194	.00	.00	.00	0.
1		0340	45	.07	.03	.04	102.	1		1610	195	.00	.00	.00	0.
1		0345	46	.06	.02	.04	87.	1		1615	196	.00	.00	.00	0.
1		0350	47	.01	.01	.01	69.	1		1620	197	.00	.00	.00	0.
1		0355	48	.03	.01	.02	52.	1		1625	198	.00	.00	.00	0.
1		0400	49	.03	.01	.02	40.	1		1630	199	.00	.00	.00	0.
1		0405	50	.01	.00	.01	32.	1		1635	200	.00	.00	.00	0.
1		0410	51	.01	.00	.00	25.	1		1640	201	.00	.00	.00	0.
1		0415	52	.02	.01	.01	19.	1		1645	202	.00	.00	.00	0.
1		0420	53	.02	.01	.01	15.	1		1650	203	.00	.00	.00	0.
1		0425	54	.02	.01	.02	15.	1		1655	204	.00	.00	.00	0.
1		0430	55	.04	.01	.03	19.	1		1700	205	.00	.00	.00	0.
1		0435	56	.03	.01	.02	24.	1		1705	206	.00	.00	.00	0.
1		0440	57	.02	.01	.01	27.	1		1710	207	.00	.00	.00	0.
1		0445	58	.03	.01	.02	27.	1		1715	208	.00	.00	.00	0.
1		0450	59	.04	.01	.03	27.	1		1720	209	.00	.00	.00	0.
1		0455	60	.01	.00	.01	27.	1		1725	210	.00	.00	.00	0.
1		0500	61	.01	.00	.01	24.	1		1730	211	.00	.00	.00	0.
1		0505	62	.01	.00	.00	19.	1		1735	212	.00	.00	.00	0.
1		0510	63	.00	.00	.00	14.	1		1740	213	.00	.00	.00	0.
1		0515	64	.00	.00	.00	10.	1		1745	214	.00	.00	.00	0.
1		0520	65	.00	.00	.00	7.	1		1750	215	.00	.00	.00	0.
1		0525	66	.01	.00	.00	5.	1		1755	216	.00	.00	.00	0.

1	0530	67	.00	.00	.00	4.	*	1	1800	217	.00	.00	.00	0.
1	0535	68	.00	.00	.00	3.	*	1	1805	218	.00	.00	.00	0.
1	0540	69	.00	.00	.00	3.	*	1	1810	219	.00	.00	.00	0.
1	0545	70	.01	.00	.00	3.	*	1	1815	220	.00	.00	.00	0.
1	0550	71	.00	.00	.00	3.	*	1	1820	221	.00	.00	.00	0.
1	0555	72	.00	.00	.00	3.	*	1	1825	222	.00	.00	.00	0.
1	0600	73	.00	.00	.00	2.	*	1	1830	223	.00	.00	.00	0.
1	0605	74	.00	.00	.00	2.	*	1	1835	224	.00	.00	.00	0.
1	0610	75	.00	.00	.00	1.	*	1	1840	225	.00	.00	.00	0.
1	0615	76	.00	.00	.00	1.	*	1	1845	226	.00	.00	.00	0.
1	0620	77	.00	.00	.00	0.	*	1	1850	227	.00	.00	.00	0.
1	0625	78	.00	.00	.00	0.	*	1	1855	228	.00	.00	.00	0.
1	0630	79	.00	.00	.00	0.	*	1	1900	229	.00	.00	.00	0.
1	0635	80	.00	.00	.00	0.	*	1	1905	230	.00	.00	.00	0.
1	0640	81	.00	.00	.00	0.	*	1	1910	231	.00	.00	.00	0.
1	0645	82	.00	.00	.00	0.	*	1	1915	232	.00	.00	.00	0.
1	0650	83	.00	.00	.00	0.	*	1	1920	233	.00	.00	.00	0.
1	0655	84	.00	.00	.00	0.	*	1	1925	234	.00	.00	.00	0.
1	0700	85	.00	.00	.00	0.	*	1	1930	235	.00	.00	.00	0.
1	0705	86	.00	.00	.00	0.	*	1	1935	236	.00	.00	.00	0.
1	0710	87	.00	.00	.00	0.	*	1	1940	237	.00	.00	.00	0.
1	0715	88	.00	.00	.00	0.	*	1	1945	238	.00	.00	.00	0.
1	0720	89	.00	.00	.00	0.	*	1	1950	239	.00	.00	.00	0.
1	0725	90	.00	.00	.00	0.	*	1	1955	240	.00	.00	.00	0.
1	0730	91	.00	.00	.00	0.	*	1	2000	241	.00	.00	.00	0.
1	0735	92	.00	.00	.00	0.	*	1	2005	242	.00	.00	.00	0.
1	0740	93	.00	.00	.00	0.	*	1	2010	243	.00	.00	.00	0.
1	0745	94	.00	.00	.00	0.	*	1	2015	244	.00	.00	.00	0.
1	0750	95	.00	.00	.00	0.	*	1	2020	245	.00	.00	.00	0.
1	0755	96	.00	.00	.00	0.	*	1	2025	246	.00	.00	.00	0.
1	0800	97	.00	.00	.00	0.	*	1	2030	247	.00	.00	.00	0.
1	0805	98	.00	.00	.00	0.	*	1	2035	248	.00	.00	.00	0.
1	0810	99	.00	.00	.00	0.	*	1	2040	249	.00	.00	.00	0.
1	0815	100	.00	.00	.00	0.	*	1	2045	250	.00	.00	.00	0.
1	0820	101	.00	.00	.00	0.	*	1	2050	251	.00	.00	.00	0.
1	0825	102	.00	.00	.00	0.	*	1	2055	252	.00	.00	.00	0.
1	0830	103	.00	.00	.00	0.	*	1	2100	253	.00	.00	.00	0.
1	0835	104	.00	.00	.00	0.	*	1	2105	254	.00	.00	.00	0.
1	0840	105	.00	.00	.00	0.	*	1	2110	255	.00	.00	.00	0.
1	0845	106	.00	.00	.00	0.	*	1	2115	256	.00	.00	.00	0.
1	0850	107	.00	.00	.00	0.	*	1	2120	257	.00	.00	.00	0.
1	0855	108	.00	.00	.00	0.	*	1	2125	258	.00	.00	.00	0.
1	0900	109	.00	.00	.00	0.	*	1	2130	259	.00	.00	.00	0.
1	0905	110	.00	.00	.00	0.	*	1	2135	260	.00	.00	.00	0.
1	0910	111	.00	.00	.00	0.	*	1	2140	261	.00	.00	.00	0.
1	0915	112	.00	.00	.00	0.	*	1	2145	262	.00	.00	.00	0.
1	0920	113	.00	.00	.00	0.	*	1	2150	263	.00	.00	.00	0.
1	0925	114	.00	.00	.00	0.	*	1	2155	264	.00	.00	.00	0.
1	0930	115	.00	.00	.00	0.	*	1	2200	265	.00	.00	.00	0.
1	0935	116	.00	.00	.00	0.	*	1	2205	266	.00	.00	.00	0.
1	0940	117	.00	.00	.00	0.	*	1	2210	267	.00	.00	.00	0.
1	0945	118	.00	.00	.00	0.	*	1	2215	268	.00	.00	.00	0.
1	0950	119	.00	.00	.00	0.	*	1	2220	269	.00	.00	.00	0.
1	0955	120	.00	.00	.00	0.	*	1	2225	270	.00	.00	.00	0.
1	1000	121	.00	.00	.00	0.	*	1	2230	271	.00	.00	.00	0.
1	1005	122	.00	.00	.00	0.	*	1	2235	272	.00	.00	.00	0.
1	1010	123	.00	.00	.00	0.	*	1	2240	273	.00	.00	.00	0.
1	1015	124	.00	.00	.00	0.	*	1	2245	274	.00	.00	.00	0.
1	1020	125	.00	.00	.00	0.	*	1	2250	275	.00	.00	.00	0.
1	1025	126	.00	.00	.00	0.	*	1	2255	276	.00	.00	.00	0.
1	1030	127	.00	.00	.00	0.	*	1	2300	277	.00	.00	.00	0.
1	1035	128	.00	.00	.00	0.	*	1	2305	278	.00	.00	.00	0.
1	1040	129	.00	.00	.00	0.	*	1	2310	279	.00	.00	.00	0.
1	1045	130	.00	.00	.00	0.	*	1	2315	280	.00	.00	.00	0.
1	1050	131	.00	.00	.00	0.	*	1	2320	281	.00	.00	.00	0.
1	1055	132	.00	.00	.00	0.	*	1	2325	282	.00	.00	.00	0.
1	1100	133	.00	.00	.00	0.	*	1	2330	283	.00	.00	.00	0.
1	1105	134	.00	.00	.00	0.	*	1	2335	284	.00	.00	.00	0.
1	1110	135	.00	.00	.00	0.	*	1	2340	285	.00	.00	.00	0.
1	1115	136	.00	.00	.00	0.	*	1	2345	286	.00	.00	.00	0.
1	1120	137	.00	.00	.00	0.	*	1	2350	287	.00	.00	.00	0.
1	1125	138	.00	.00	.00	0.	*	1	2355	288	.00	.00	.00	0.
1	1130	139	.00	.00	.00	0.	*	2	0000	289	.00	.00	.00	0.
1	1135	140	.00	.00	.00	0.	*	2	0005	290	.00	.00	.00	0.
1	1140	141	.00	.00	.00	0.	*	2	0010	291	.00	.00	.00	0.
1	1145	142	.00	.00	.00	0.	*	2	0015	292	.00	.00	.00	0.
1	1150	143	.00	.00	.00	0.	*	2	0020	293	.00	.00	.00	0.
1	1155	144	.00	.00	.00	0.	*	2	0025	294	.00	.00	.00	0.
1	1200	145	.00	.00	.00	0.	*	2	0030	295	.00	.00	.00	0.
1	1205	146	.00	.00	.00	0.	*	2	0035	296	.00	.00	.00	0.
1	1210	147	.00	.00	.00	0.	*	2	0040	297	.00	.00	.00	0.
1	1215	148	.00	.00	.00	0.	*	2	0045	298	.00	.00	.00	0.
1	1220	149	.00	.00	.00	0.	*	2	0050	299	.00	.00	.00	0.
1	1225	150	.00	.00	.00	0.	*	2	0055	300	.00	.00	.00	0.
							*							

****

TOTAL RAINFALL = 1.96, TOTAL LOSS = 1.26, TOTAL EXCESS = .70

PEAK FLOW TIME MAXIMUM AVERAGE FLOW

```
                                        6-HR       24-HR       72-HR     24.92-HR
+   (CFS)       (HR)
                        (CFS)
+     104.      3.58                    14.          4.          3.           3.
                        (INCHES)       .698        .698        .698         .698
                        (AC-FT)          7.          7.          7.           7.

                        CUMULATIVE AREA =     .19 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
+                  INT-N       .19     1   FLOW         270.     104.
                                           TIME        3.58     3.58


 *** NORMAL END OF HEC-1 ***
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Appendix C. Hydraulics Appendix

C.1. Drop Inlet Calculations

C.2. Normal Depth Calculations

C.3. Interim Condition WSPG-W Model

C.4. Ultimate Condition WSPG-W Model

C.5. Riprap Calculations

C.6. Debris Basin Calculations

C.1 Drop Inlet Calculations

Worksheet for SDDI #1 StrJ-ST3E 7.5' Combination Inlet On Grade - 0.5% - 100-year

Project Description	
Solve For	Efficiency

Input Data	
Discharge	2.05 cfs
Slope	0.005 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	5.0 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	7.5 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	99.16 %
Intercepted Flow	2.03 cfs
Bypass Flow	0.02 cfs
Spread	10.2 ft
Depth	3.5 in
Flow Area	1.1 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	1.85 ft/s
Splash Over Velocity	6.60 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.266
Grate Flow Ratio	0.432
Equivalent Cross Slope	0.112 ft/ft
Active Grate Length	2.5 ft
Length Factor	0.678
Total Interception Length	7.4 ft

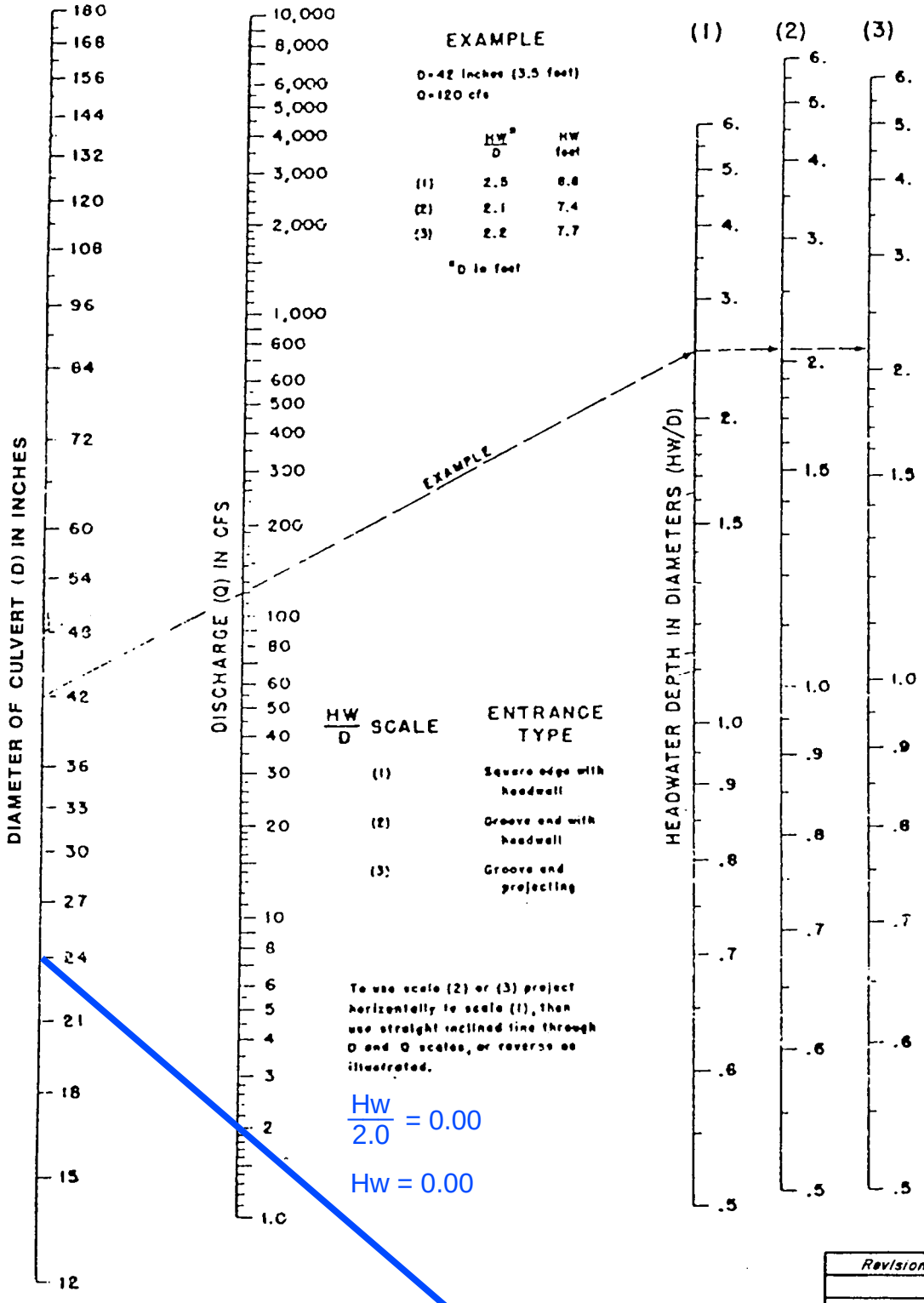
Messages

Worksheet for SDDI #1 StrJ-ST3E 7.5' Combination Inlet On Grade - 0.5% - 100-year

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).	

NOMOGRAPH – INLET CONTROL RCP

SDDI #1: StrJ-3E + bypass SDDI #4



INTERCEPTED
Q = 2.03-CFS

24" RCP
LATERAL

$\frac{Hw}{2.0} = 0.00$

Hw = 0.00

Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Worksheet for SDDI #2 INT-J3 Ditch Inlet In Sag - 100-year

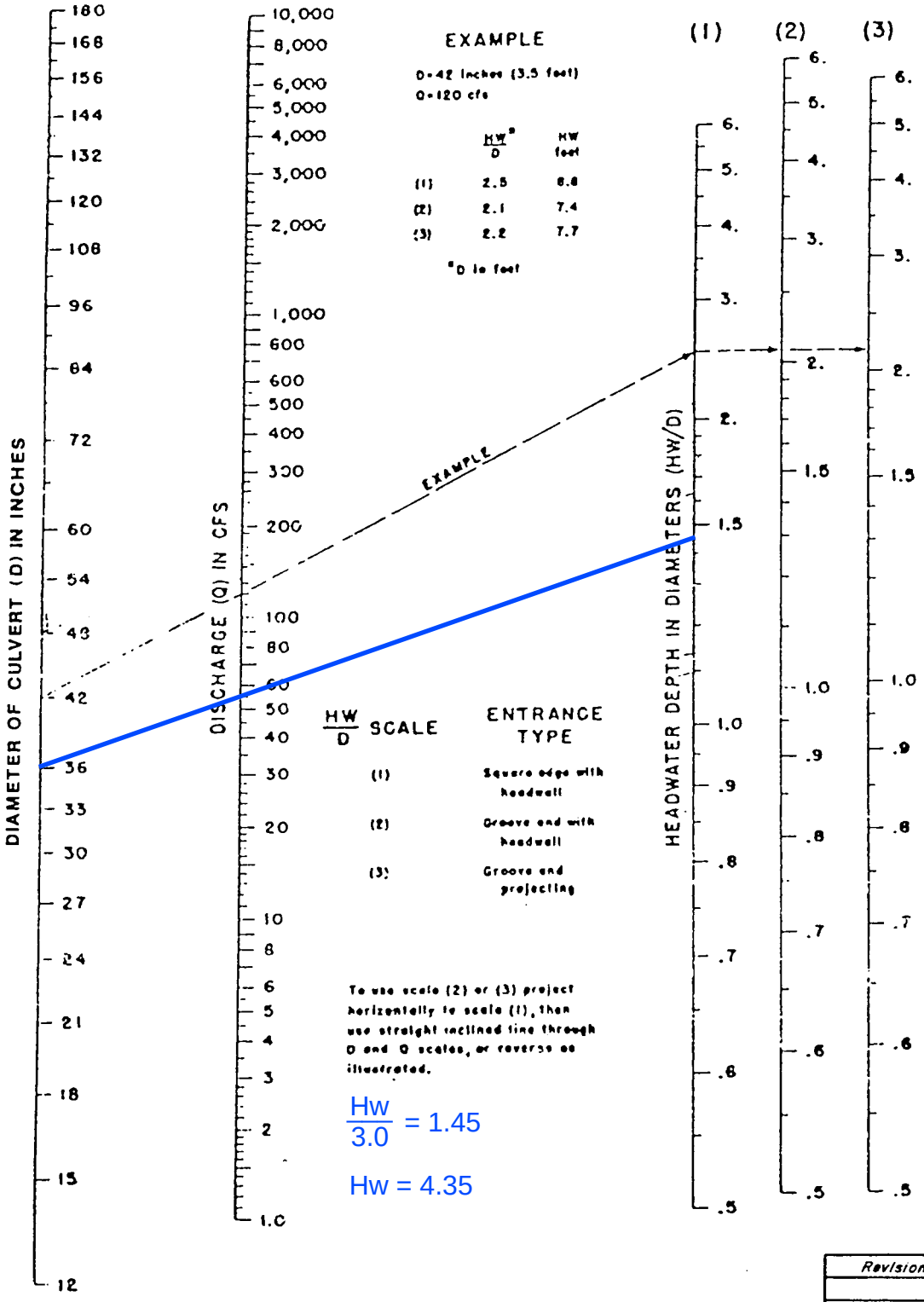
Project Description	
Solve For	Spread

Input Data	
Discharge	55.00 cfs
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	0.00 ft
Grate Width	4.00 ft
Grate Length	8.0 ft
Local Depression	2.0 in
Local Depression Width	24.0 in
Grate Type	Curved Vaned
Clogging	50.0 %

Results	
Spread	19.0 ft
Depth	38.1 in
Wetted Perimeter	20.1 ft
Top Width	19.04 ft
Open Grate Area	5.6 ft²
Active Grate Weir Length	20.0 ft

NOMOGRAPH – INLET CONTROL RCP

SDDI #2: INT-J3 + bypass SDDI #3



INTERCEPTED
Q = 55.00-CFS

36" RCP
LATERAL

$\frac{Hw}{3.0} = 1.45$

Hw = 4.35

Revision	Date

WRC ENGINEERING	REFERENCE: USDOT, FHWA, HDS, No. 5, 1985	FIGURE 1005

Worksheet for SDMH #2 StrJ-ST3W 7.5' Combination Inlet On Grade - 0.5% - 100-year

Project Description	
Solve For	Efficiency

Input Data	
Discharge	2.26 cfs
Slope	0.005 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	5.0 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	7.5 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	98.23 %
Intercepted Flow	2.22 cfs
Bypass Flow	0.04 cfs
Spread	10.6 ft
Depth	3.6 in
Flow Area	1.2 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	1.89 ft/s
Splash Over Velocity	6.60 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.259
Grate Flow Ratio	0.416
Equivalent Cross Slope	0.108 ft/ft
Active Grate Length	2.5 ft
Length Factor	0.638
Total Interception Length	7.8 ft

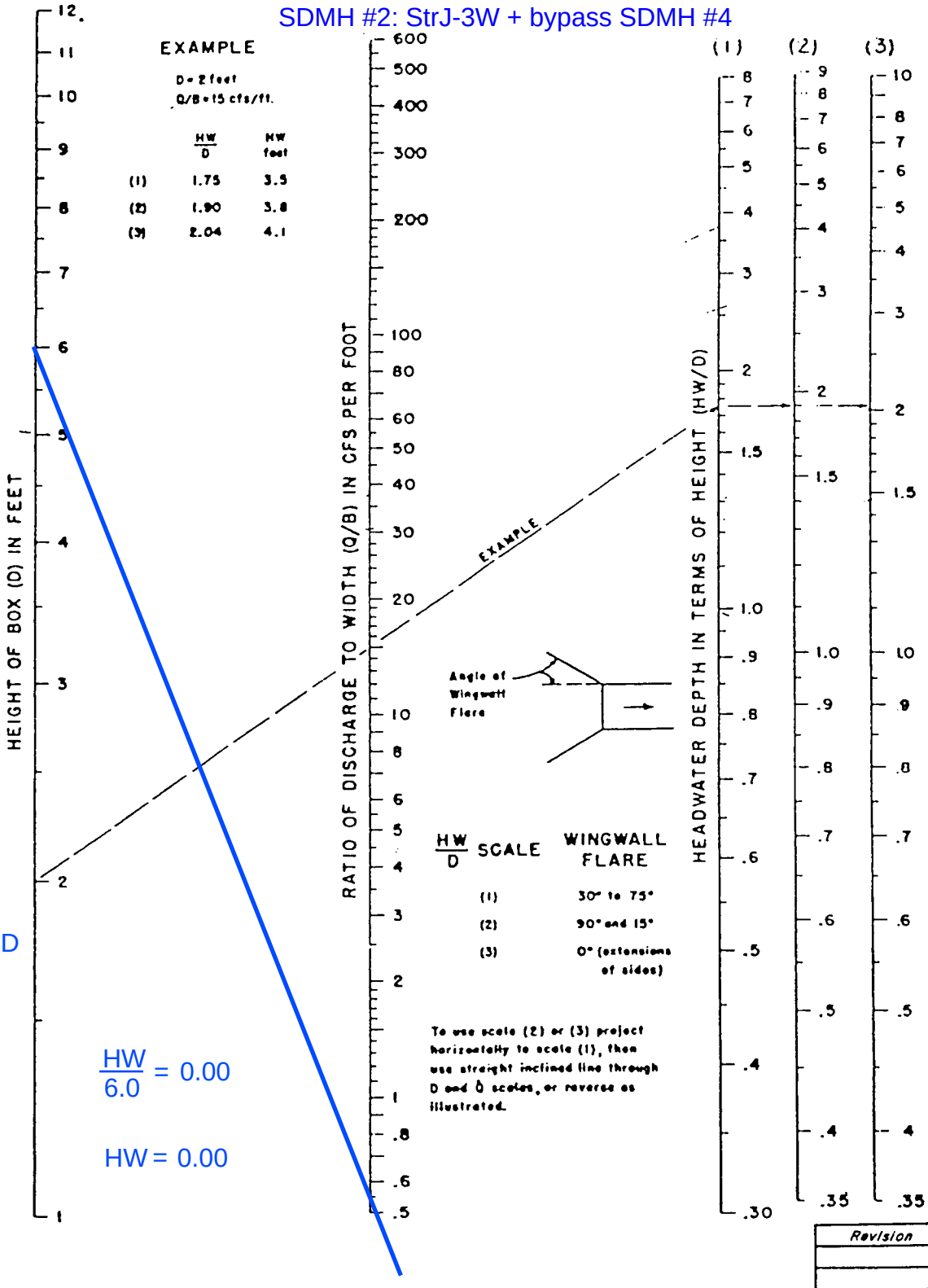
Messages

Worksheet for SDMH #2 StrJ-ST3W 7.5' Combination Inlet On Grade - 0.5% - 100-year

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).	

NOMOGRAPH – INLET CONTROL BOX CULVERT

SDMH #2: StrJ-3W + bypass SDMH #4



INTERCEPTED
Q = 2.22-CFS

6'x6' RCB
LATERAL

$\frac{HW}{6.0} = 0.00$

HW = 0.00

Revision	Date

WRC ENGINEERING

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

FIGURE 1004

Worksheet for SDDI #3 INT-J2 Ditch Inlet In Sag - 100-year

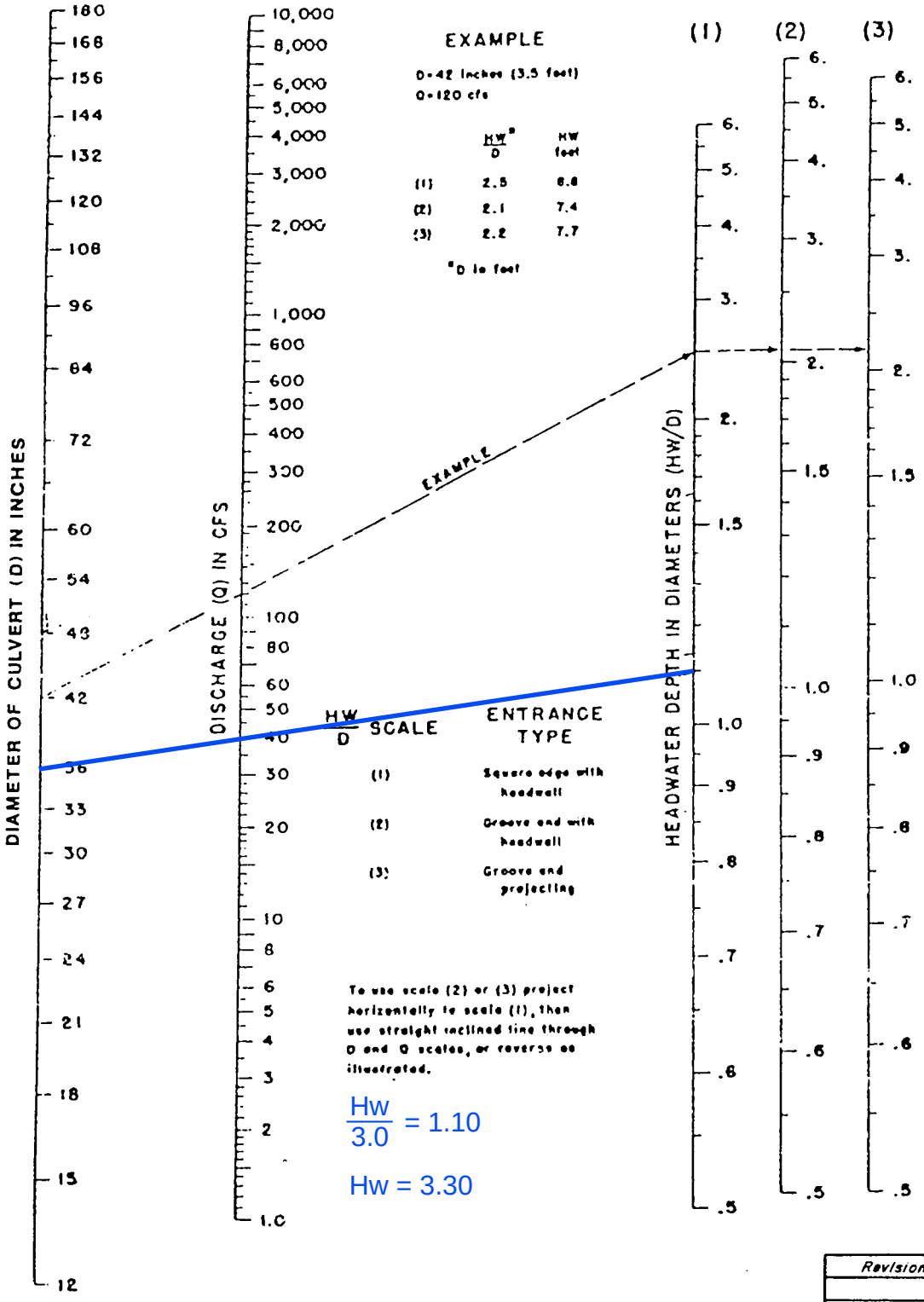
Project Description	
Solve For	Spread

Input Data	
Discharge	40.00 cfs
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	0.00 ft
Grate Width	4.00 ft
Grate Length	8.0 ft
Local Depression	2.0 in
Local Depression Width	24.0 in
Grate Type	Curved Vaned
Clogging	50.0 %

Results	
Spread	9.6 ft
Depth	19.2 in
Wetted Perimeter	10.1 ft
Top Width	9.60 ft
Open Grate Area	5.6 ft²
Active Grate Weir Length	20.0 ft

NOMOGRAPH – INLET CONTROL RCP

SDDI #3: INT-J2 + bypass SDDI #5



INTERCEPTED
Q = 40.00-CFS

36" RCP
LATERAL

$\frac{Hw}{3.0} = 1.10$

Hw = 3.30

Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Worksheet for SDDI #4 StrJ-ST2E 7.5' Combination Inlet On Grade - 0.5% - 100-year

Project Description	
Solve For	Efficiency

Input Data	
Discharge	2.30 cfs
Slope	0.005 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	5.0 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	7.5 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	98.03 %
Intercepted Flow	2.25 cfs
Bypass Flow	0.05 cfs
Spread	10.7 ft
Depth	3.6 in
Flow Area	1.2 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	1.90 ft/s
Splash Over Velocity	6.60 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.258
Grate Flow Ratio	0.413
Equivalent Cross Slope	0.107 ft/ft
Active Grate Length	2.5 ft
Length Factor	0.631
Total Interception Length	7.9 ft

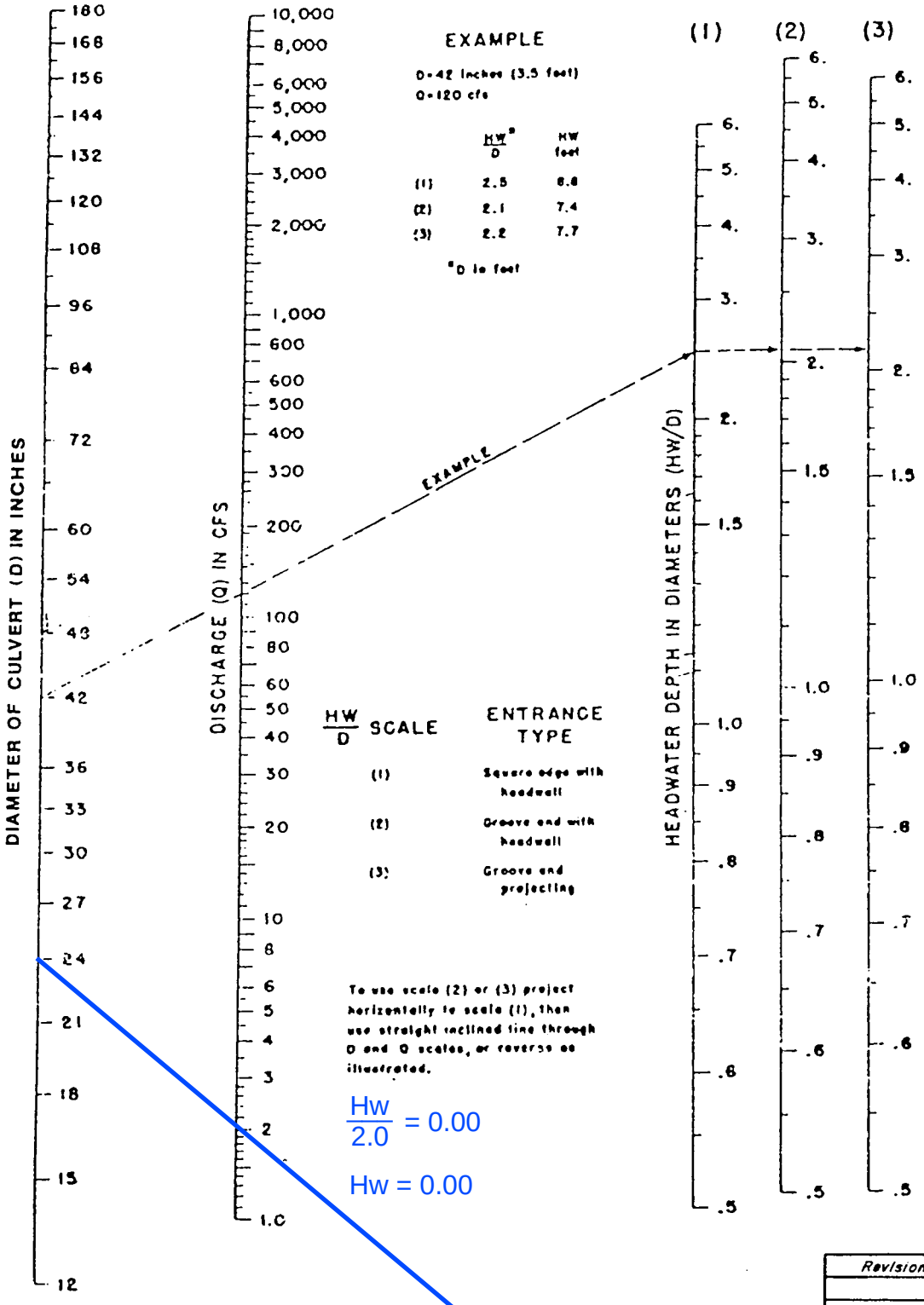
Messages

Worksheet for SDDI #4 StrJ-ST2E 7.5' Combination Inlet On Grade - 0.5% - 100-year

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).	

NOMOGRAPH – INLET CONTROL RCP

SDDI #4: StrJ-2E + bypass SDDI #6



INTERCEPTED
Q = 2.25-CFS

24" RCP
LATERAL

$\frac{Hw}{2.0} = 0.00$

Hw = 0.00

Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Worksheet for SDMH #4 StrJ-ST2W 7.5' Combination Inlet On Grade - 0.5% - 100-year

Project Description	
Solve For	Efficiency

Input Data	
Discharge	3.30 cfs
Slope	0.005 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	5.0 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	7.5 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	92.24 %
Intercepted Flow	3.04 cfs
Bypass Flow	0.26 cfs
Spread	12.4 ft
Depth	4.1 in
Flow Area	1.6 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	2.06 ft/s
Splash Over Velocity	6.60 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.231
Grate Flow Ratio	0.357
Equivalent Cross Slope	0.096 ft/ft
Active Grate Length	2.5 ft
Length Factor	0.506
Total Interception Length	9.9 ft

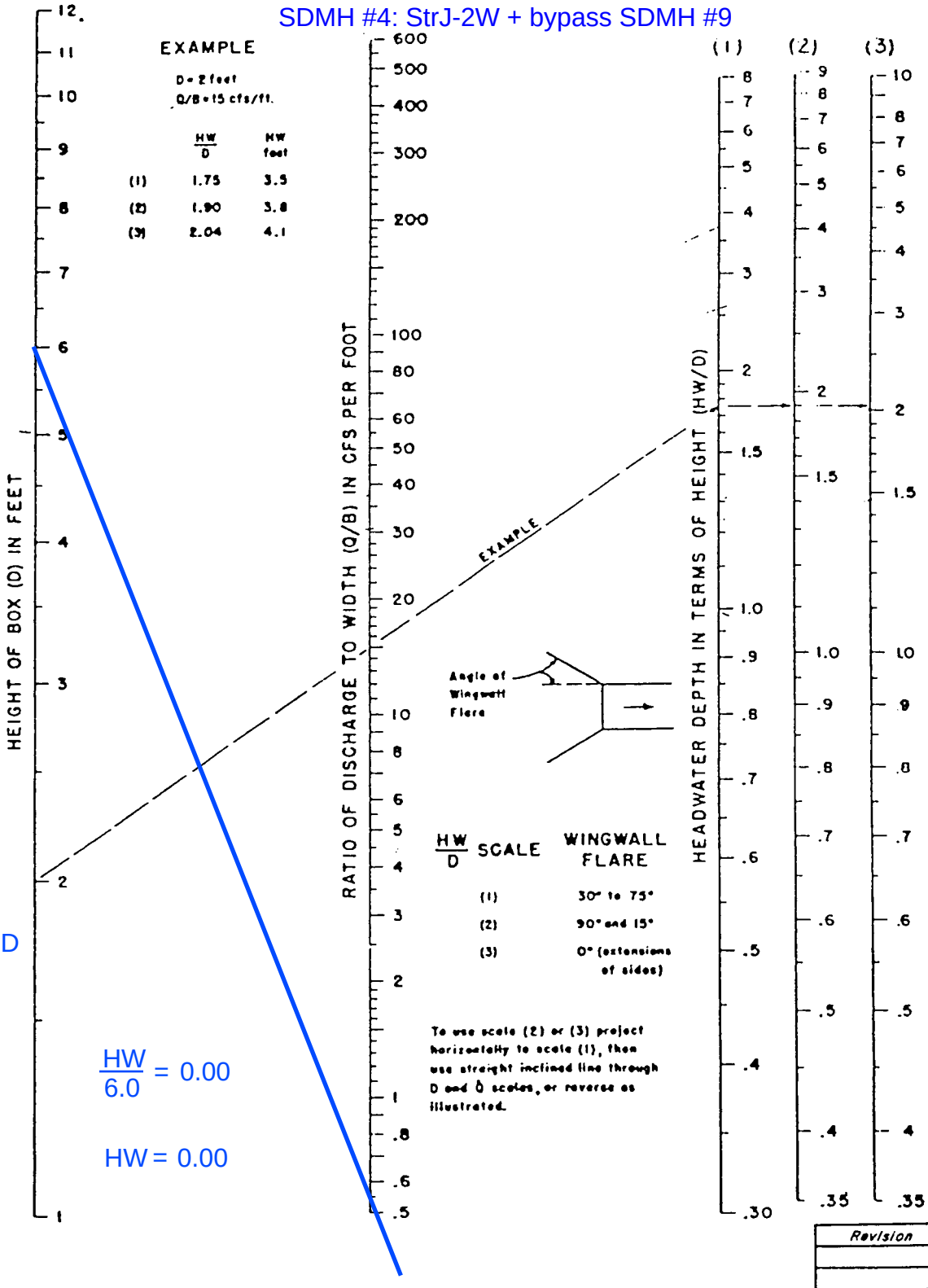
Messages

Worksheet for SDMH #4 StrJ-ST2W 7.5' Combination Inlet On Grade - 0.5% - 100-year

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).	

NOMOGRAPH – INLET CONTROL BOX CULVERT

SDMH #4: StrJ-2W + bypass SDMH #9



INTERCEPTED
Q = 3.04-CFS

6'x6' RCB
LATERAL

$\frac{HW}{6.0} = 0.00$

HW = 0.00

Revision	Date

WRC ENGINEERING

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

FIGURE 1004

Worksheet for SDDI #5 INT-J1 Ditch Inlet In Sag- 100-year

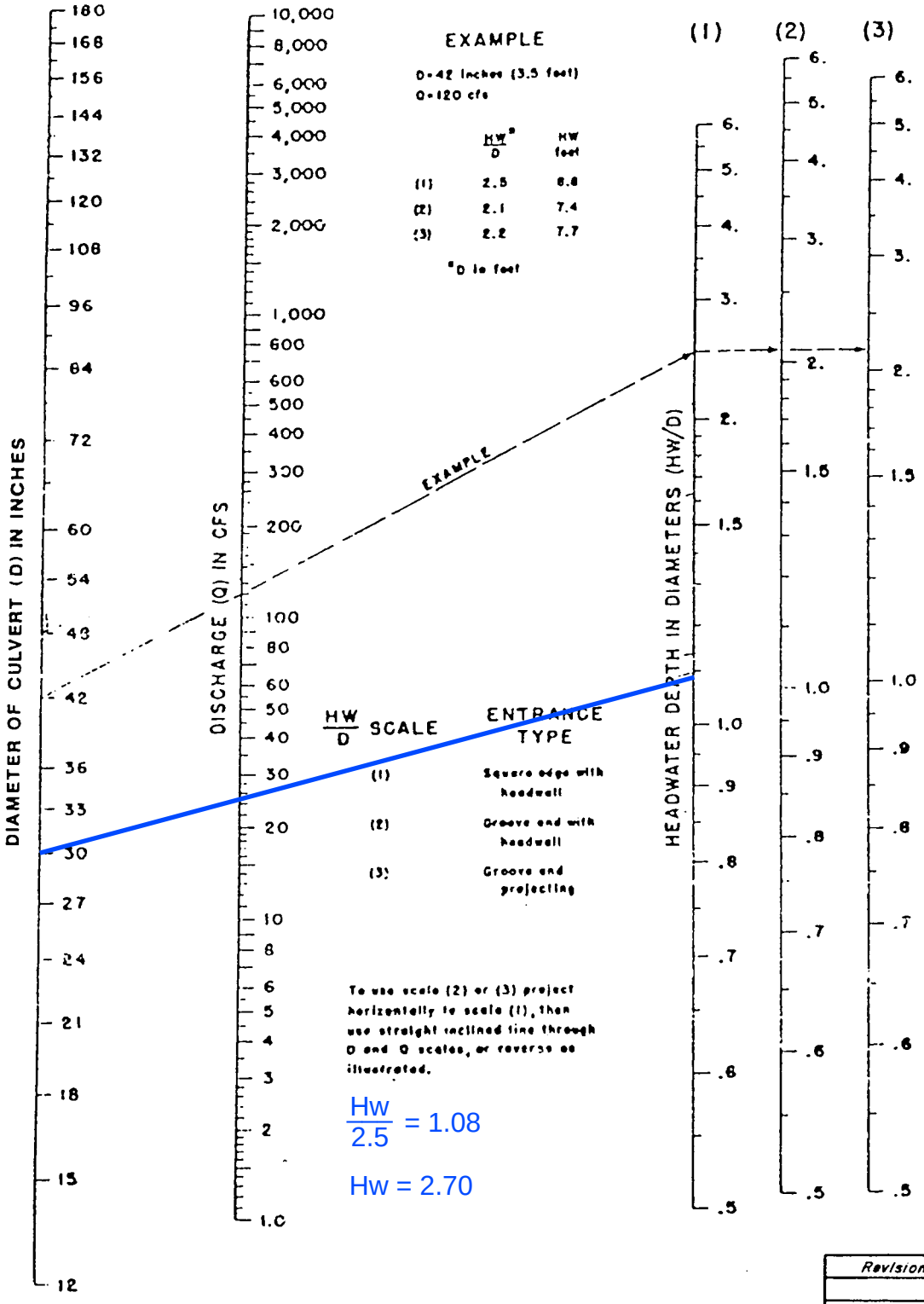
Project Description	
Solve For	Spread

Input Data	
Discharge	25.00 cfs
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	0.00 ft
Grate Width	4.00 ft
Grate Length	8.0 ft
Local Depression	2.0 in
Local Depression Width	24.0 in
Grate Type	Curved Vaned
Clogging	50.0 %

Results	
Spread	3.1 ft
Depth	6.3 in
Wetted Perimeter	3.3 ft
Top Width	3.14 ft
Open Grate Area	5.6 ft²
Active Grate Weir Length	20.0 ft

NOMOGRAPH – INLET CONTROL RCP

SDDI #5: INT-J1



INTERCEPTED
Q = 25.00-CFS

30" RCP
LATERAL

$\frac{Hw}{2.5} = 1.08$

Hw = 2.70

Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Worksheet for SDDI #6 StrJ-ST1E 7.5' Combination Inlet On Grade - 7% - 100-year

Project Description	
Solve For	Efficiency

Input Data	
Discharge	3.00 cfs
Slope	0.070 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	5.0 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	7.5 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	90.04 %
Intercepted Flow	2.70 cfs
Bypass Flow	0.30 cfs
Spread	6.7 ft
Depth	2.7 in
Flow Area	0.5 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	5.74 ft/s
Splash Over Velocity	6.60 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.045
Grate Flow Ratio	0.624
Equivalent Cross Slope	0.152 ft/ft
Active Grate Length	2.5 ft
Length Factor	0.315
Total Interception Length	15.9 ft

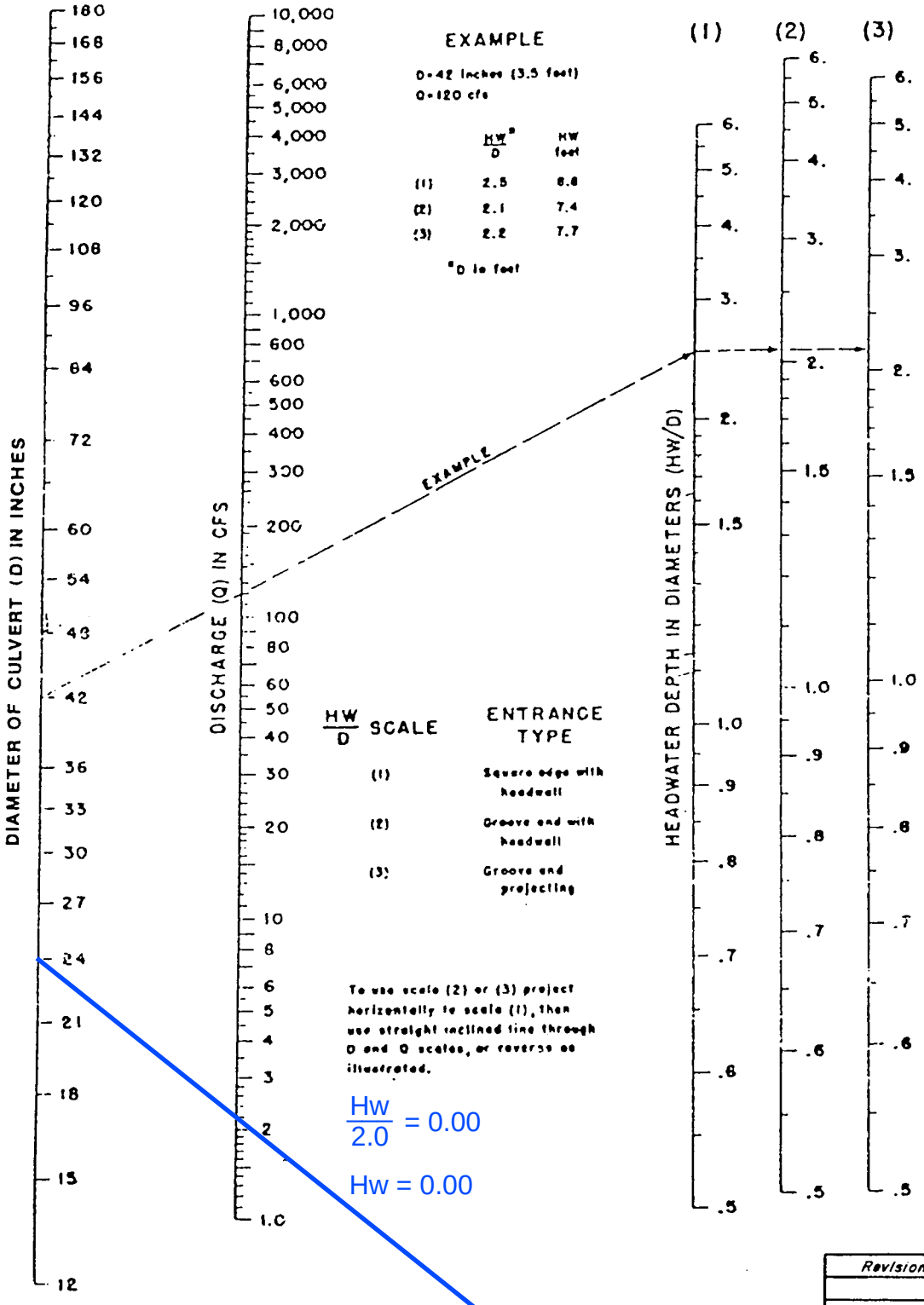
Messages

Worksheet for SDDI #6 StrJ-ST1E 7.5' Combination Inlet On Grade - 7% - 100-year

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).	

NOMOGRAPH – INLET CONTROL RCP

SDDI #6: StrJ-1E



INTERCEPTED
Q = 2.70-CFS

24" RCP
LATERAL

$\frac{Hw}{2.0} = 0.00$

Hw = 0.00

Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Worksheet for SDMH #9 StrJ-ST1W 7.5' Combination Inlet On Grade - 7% - 100-year

Project Description	
Solve For	Efficiency

Input Data	
Discharge	3.00 cfs
Slope	0.070 ft/ft
Gutter Width	1.50 ft
Gutter Cross Slope	0.080 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.016
Local Depression	4.0 in
Local Depression Width	24.0 in
Grate Width	1.50 ft
Grate Length	5.0 ft
Grate Type	Curved Vaned
Clogging	50.0 %
Curb Opening Length	7.5 ft

Options	
Calculation Option	Use Both
Grate Flow Option	Exclude None

Results	
Efficiency	90.04 %
Intercepted Flow	2.70 cfs
Bypass Flow	0.30 cfs
Spread	6.7 ft
Depth	2.7 in
Flow Area	0.5 ft²
Gutter Depression	1.1 in
Total Depression	5.1 in
Velocity	5.74 ft/s
Splash Over Velocity	6.60 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.045
Grate Flow Ratio	0.624
Equivalent Cross Slope	0.152 ft/ft
Active Grate Length	2.5 ft
Length Factor	0.315
Total Interception Length	15.9 ft

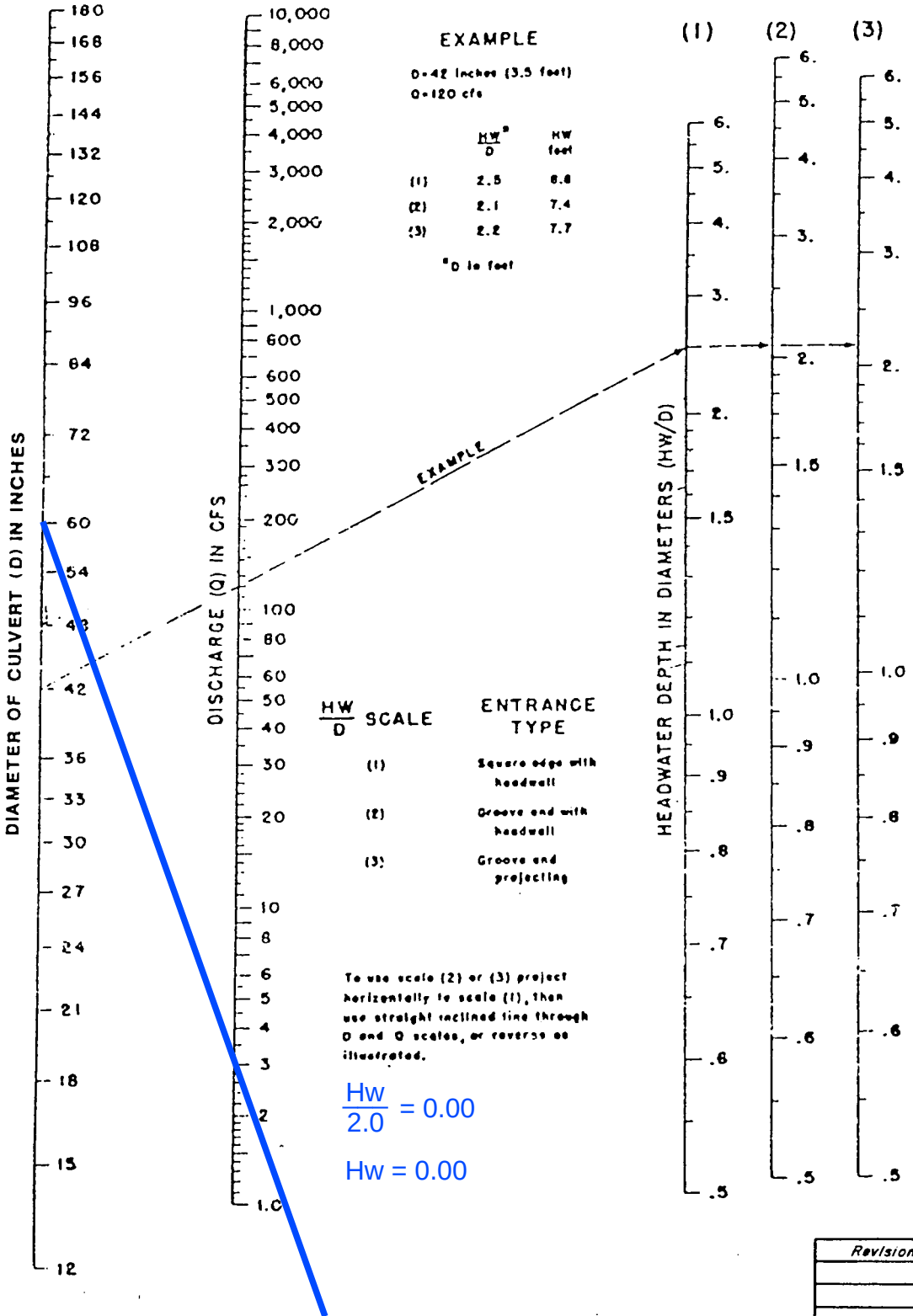
Messages

Worksheet for SDMH #9 StrJ-ST1W 7.5' Combination Inlet On Grade - 7% - 100-year

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).	

NOMOGRAPH – INLET CONTROL RCP

SDMH #9: StrJ-1W



INTERCEPTED
Q = 2.70-CFS

60" RCP
LATERAL

$\frac{Hw}{2.0} = 0.00$

Hw = 0.00

Revision	Date

WRC ENGINEERING

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

FIGURE 1005

C.2 Normal Depth Calculations

Worksheet for StrJ-ST1E - 100-year

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.070 ft/ft
Discharge	3.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.50
0+00	0.00
0+02	0.17
0+17	0.46

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.50)	(0+17, 0.46)	0.016

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

Results	
Normal Depth	3.3 in
Elevation Range	0.00 to 0.50 ft
Flow Area	0.6 ft²
Wetted Perimeter	7.3 ft
Hydraulic Radius	1.0 in
Top Width	7.05 ft
Normal Depth	3.3 in
Critical Depth	4.4 in
Critical Slope	0.008 ft/ft
Velocity	4.78 ft/s
Velocity Head	0.36 ft
Specific Energy	0.63 ft
Froude Number	2.825
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in

Worksheet for StrJ-ST1E - 100-year

GVF Input Data	
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.3 in
Critical Depth	4.4 in
Channel Slope	0.070 ft/ft
Critical Slope	0.008 ft/ft

Cross Section for StrJ-ST1E - 100-year

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.070 ft/ft
Normal Depth	3.3 in
Discharge	3.00 cfs

Worksheet for StrJ-ST1W - 100-year

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.070 ft/ft
Discharge	3.00 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.50
0+00	0.00
0+02	0.17
0+17	0.46

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.50)	(0+17, 0.46)	0.016

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

Results	
Normal Depth	3.3 in
Elevation Range	0.00 to 0.50 ft
Flow Area	0.6 ft²
Wetted Perimeter	7.3 ft
Hydraulic Radius	1.0 in
Top Width	7.05 ft
Normal Depth	3.3 in
Critical Depth	4.4 in
Critical Slope	0.008 ft/ft
Velocity	4.78 ft/s
Velocity Head	0.36 ft
Specific Energy	0.63 ft
Froude Number	2.825
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in

Worksheet for StrJ-ST1W - 100-year

GVF Input Data	
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.3 in
Critical Depth	4.4 in
Channel Slope	0.070 ft/ft
Critical Slope	0.008 ft/ft

Cross Section for StrJ-ST1W - 100-year

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.070 ft/ft
Normal Depth	3.3 in
Discharge	3.00 cfs

Worksheet for StrJ-ST2E - 100-year

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Discharge	2.30 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.50
0+00	0.00
0+02	0.17
0+17	0.46

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.50)	(0+17, 0.46)	0.016

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

Results	
Normal Depth	4.3 in
Elevation Range	0.00 to 0.50 ft
Flow Area	1.4 ft²
Wetted Perimeter	11.8 ft
Hydraulic Radius	1.5 in
Top Width	11.40 ft
Normal Depth	4.3 in
Critical Depth	4.0 in
Critical Slope	0.008 ft/ft
Velocity	1.61 ft/s
Velocity Head	0.04 ft
Specific Energy	0.40 ft
Froude Number	0.801
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in

Worksheet for StrJ-ST2E - 100-year

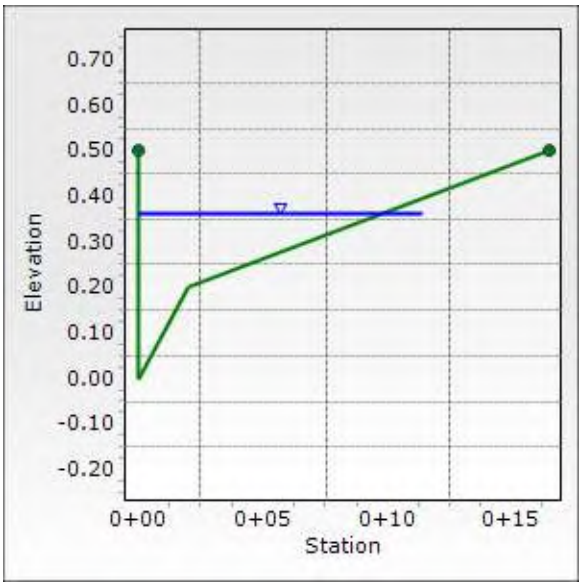
GVF Input Data	
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.3 in
Critical Depth	4.0 in
Channel Slope	0.005 ft/ft
Critical Slope	0.008 ft/ft

Cross Section for StrJ-ST2E - 100-year

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Normal Depth	4.3 in
Discharge	2.30 cfs



Worksheet for StrJ-ST2W - 100-year

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Discharge	3.30 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.50
0+00	0.00
0+02	0.17
0+17	0.46

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.50)	(0+17, 0.46)	0.016

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

Results	
Normal Depth	4.7 in
Elevation Range	0.00 to 0.50 ft
Flow Area	1.9 ft²
Wetted Perimeter	13.6 ft
Hydraulic Radius	1.7 in
Top Width	13.23 ft
Normal Depth	4.7 in
Critical Depth	4.5 in
Critical Slope	0.008 ft/ft
Velocity	1.76 ft/s
Velocity Head	0.05 ft
Specific Energy	0.44 ft
Froude Number	0.821
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in

Worksheet for StrJ-ST2W - 100-year

GVF Input Data	
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.7 in
Critical Depth	4.5 in
Channel Slope	0.005 ft/ft
Critical Slope	0.008 ft/ft

Cross Section for StrJ-ST2W - 100-year

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Normal Depth	4.7 in
Discharge	3.30 cfs

Worksheet for StrJ-ST3E - 100-year

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Discharge	2.05 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.50
0+00	0.00
0+02	0.17
0+17	0.46

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.50)	(0+17, 0.46)	0.016

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

Results	
Normal Depth	4.2 in
Elevation Range	0.00 to 0.50 ft
Flow Area	1.3 ft²
Wetted Perimeter	11.2 ft
Hydraulic Radius	1.4 in
Top Width	10.84 ft
Normal Depth	4.2 in
Critical Depth	3.9 in
Critical Slope	0.008 ft/ft
Velocity	1.57 ft/s
Velocity Head	0.04 ft
Specific Energy	0.39 ft
Froude Number	0.798
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in

Worksheet for StrJ-ST3E - 100-year

GVF Input Data	
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.2 in
Critical Depth	3.9 in
Channel Slope	0.005 ft/ft
Critical Slope	0.008 ft/ft

Cross Section for StrJ-ST3E - 100-year

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Normal Depth	4.2 in
Discharge	2.05 cfs

Worksheet for StrJ-ST3W - 100-year

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Discharge	2.26 cfs

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.50
0+00	0.00
0+02	0.17
0+17	0.46

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.50)	(0+17, 0.46)	0.016

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

Results	
Normal Depth	4.3 in
Elevation Range	0.00 to 0.50 ft
Flow Area	1.4 ft²
Wetted Perimeter	11.7 ft
Hydraulic Radius	1.4 in
Top Width	11.32 ft
Normal Depth	4.3 in
Critical Depth	4.0 in
Critical Slope	0.008 ft/ft
Velocity	1.60 ft/s
Velocity Head	0.04 ft
Specific Energy	0.40 ft
Froude Number	0.799
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in

Worksheet for StrJ-ST3W - 100-year

GVF Input Data	
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.3 in
Critical Depth	4.0 in
Channel Slope	0.005 ft/ft
Critical Slope	0.008 ft/ft

Cross Section for StrJ-ST3W - 100-year

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Normal Depth	4.3 in
Discharge	2.26 cfs

C.3 Interim Condition WSPG-W Model

```
T1 SUMMERLIN WEST VILLAGE 22                                                  0
T2 KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVE (STREET G) TO LAKE MEAD BLVD
T3 ATKINS / INTERIM CONDITIONS
SO      0.00 3408.37 106                        3413.62
R     214.7353409.44 106
R     238.3073409.59 106      .015                                          -5.6   1
TS    250.0313409.61  66      .015
R     306.7643410.20  66      .015                                                 0
JX    308.7643410.22  66 24   .015     2.00                          89.2
R     409.3923410.45  66      .015                                          -3.3   1
JX    412.3923410.55  66 36   .015    57.00          3410.65        -90.0
R     416.8923410.65  66      .015                                                 0
R     606.7113411.41  66      .015                                          -1.46  0
R     614.7893411.45  66      .015                                          -1.51  1
R     622.7113411.50  66      .015                                          -1.49  0
R     630.7113412.54  66      .015                                          -1.51  0
R     889.7923412.85  66      .015                                          -0.40  0
JX    892.7923412.95  60 36 24.013    44.00     2.00 3413.05 3413.05-90.089.5
R     897.2923413.05  60      .013                                                 0
R     970.9163413.58  60      .013                                          -6.7   1
R     975.9163413.78  60      .013                                                 0
R    1161.4693415.05  60      .013                                          -6.0   1
R    1166.4693415.25  60      .013                                                 0
R    1251.4223415.84  60      .013                                          -5.5   1
R    1256.4223416.04  60      .013                                                 0
R    1333.3043416.59  60      .013                                          -0.5   1
JX   1335.8043416.69  60 30   .013    24.00          3416.79        -90.0
R    1338.3043416.79  60      .013                                                 0
R    1429.2143419.51  60      .013                                                 0
JX   1431.2143419.61  54 24   .013     6.00          3418.62         90.0
R    1436.7143419.71  54      .013                                                 0
R    1649.6623433.41  54      .013                                        -11.76   1
R    1654.6623433.61  54      .013                                                 0
R    1752.4573440.05  54      .013                                        -11.22   1
R    1757.4573440.25  54      .013                                                 0
R    1862.9003446.34  54      .013                                        -11.10   1
R    1867.9003446.54  54      .013                                                 0
R    1884.3733447.14  54      .013                                                 0
SH   1884.3733447.14  54                        3447.58
CD  24  4   0    .000   2.000     .000  .000  .000   .00
CD  30  4   0    .000   2.500     .000  .000  .000   .00
CD  36  4   0    .000   3.000     .000  .000  .000   .00
CD  48  4   0    .000   4.000     .000  .000  .000   .00
CD  54  4   0    .000   4.500     .000  .000  .000   .00
CD  60  4   0    .000   5.000     .000  .000  .000   .00
CD  66  3   0   0.000   6.000    6.000
CD 106  3   0   0.000   6.000   10.000
Q           269.00    .0
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FILE: SJ_Interim.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 1

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 3:33:34

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVE (STREET G) TO LAKE MEAD B
LV 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	
.000	3408.370	5.250	3413.620	404.00	7.70	.92	3414.54	.00	3.70	10.00	6.000	10.000	.00	0 .0
45.071	.0050				.0015	.07	5.25	.59	3.38	.014	.00	.00	BOX	
45.071	3408.595	5.006	3413.600	404.00	8.07	1.01	3414.61	.00	3.70	10.00	6.000	10.000	.00	0 .0
24.160	.0050				.0017	.04	5.01	.64	3.38	.014	.00	.00	BOX	
69.231	3408.715	4.873	3413.588	404.00	8.29	1.07	3414.66	.00	3.70	10.00	6.000	10.000	.00	0 .0
HYDRAULIC JUMP														
69.231	3408.715	2.733	3411.448	404.00	14.78	3.39	3414.84	.00	3.70	10.00	6.000	10.000	.00	0 .0
28.608	.0050				.0095	.27	2.73	1.58	3.38	.014	.00	.00	BOX	
97.839	3408.857	2.656	3411.514	404.00	15.21	3.59	3415.11	.00	3.70	10.00	6.000	10.000	.00	0 .0
42.122	.0050				.0106	.45	2.66	1.64	3.38	.014	.00	.00	BOX	
139.960	3409.067	2.533	3411.600	404.00	15.95	3.95	3415.55	.00	3.70	10.00	6.000	10.000	.00	0 .0
38.768	.0050				.0121	.47	2.53	1.77	3.38	.014	.00	.00	BOX	
178.728	3409.260	2.415	3411.675	404.00	16.73	4.35	3416.02	.00	3.70	10.00	6.000	10.000	.00	0 .0
36.007	.0050				.0139	.50	2.41	1.90	3.38	.014	.00	.00	BOX	
214.735	3409.440	2.302	3411.742	404.00	17.55	4.78	3416.52	.00	3.70	10.00	6.000	10.000	.00	0 .0
23.572	.0064				.0180	.43	2.30	2.04	3.25	.015	.00	.00	BOX	
238.307	3409.590	2.221	3411.811	404.00	18.19	5.14	3416.95	.00	3.70	10.00	6.000	10.000	.00	0 .0
TRANS STR	.0017				.0142	.17	2.22	2.15		.015	.00	.00	BOX	

FILE: SJ_Interim.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 2

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 3:33:34

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVE (STREET G) TO LAKE MEAD B
LV 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	
250.031	3409.610	4.675	3414.285	404.00	14.40	3.22	3417.51	.00	5.20	6.00	6.000	6.000	.00	0 .0
17.822	.0104					.0093	.17	4.68	1.17	4.50	.015	.00	.00	BOX
267.853	3409.795	4.729	3414.524	404.00	14.24	3.15	3417.67	.00	5.20	6.00	6.000	6.000	.00	0 .0
32.186	.0104					.0087	.28	4.73	1.15	4.50	.015	.00	.00	BOX
300.039	3410.130	4.959	3415.090	404.00	13.58	2.86	3417.95	.00	5.20	6.00	6.000	6.000	.00	0 .0
6.725	.0104					.0077	.05	4.96	1.07	4.50	.015	.00	.00	BOX
306.764	3410.200	5.203	3415.402	404.00	12.94	2.60	3418.00	.00	5.20	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0100					.0060	.01	5.20	1.00		.015	.00	.00	BOX
308.764	3410.220	5.587	3415.807	402.00	11.99	2.23	3418.04	.00	5.19	6.00	6.000	6.000	.00	0 .0
20.552	.0023					.0053	.11	5.59	.89	6.00	.015	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
329.316	3410.267	5.860	3416.126	402.00	11.43	2.03	3418.16	.00	5.19	6.00	6.000	6.000	.00	0 .0
16.022	.0023					.0050	.08	5.86	.83	6.00	.015	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
345.338	3410.303	6.000	3416.303	402.00	11.17	1.94	3418.24	.00	5.19	6.00	6.000	6.000	.00	0 .0
64.054	.0023					.0074	.47	6.00	.80	6.00	.015	.00	.00	BOX

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 3:33:34

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVE (STREET G) TO LAKE MEAD B
LV 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
409.392	3410.450	6.389	3416.839	402.00	11.17	1.94	3418.78	.00	5.19	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0334					.0054	.02	6.39	.80		.015	.00	.00	BOX
412.392	3410.550	7.329	3417.879	345.00	9.58	1.43	3419.30	.00	4.68	6.00	6.000	6.000	.00	0 .0
4.500	.0222					.0054	.02	7.33	.69	2.98	.015	.00	.00	BOX
416.892	3410.650	7.253	3417.903	345.00	9.58	1.43	3419.33	.00	4.68	6.00	6.000	6.000	.00	0 .0
189.819	.0040					.0054	1.03	7.25	.69	5.82	.015	.00	.00	BOX
606.711	3411.410	7.535	3418.944	345.00	9.58	1.43	3420.37	.00	4.68	6.00	6.000	6.000	.00	0 .0
8.078	.0050					.0054	.04	7.53	.69	5.34	.015	.00	.00	BOX
614.789	3411.450	7.617	3419.067	345.00	9.58	1.43	3420.49	.00	4.68	6.00	6.000	6.000	.00	0 .0
7.922	.0063					.0054	.04	7.62	.69	4.84	.015	.00	.00	BOX
622.711	3411.500	7.617	3419.117	345.00	9.58	1.43	3420.54	.00	4.68	6.00	6.000	6.000	.00	0 .0
8.000	.1300					.0054	.04	7.62	.69	1.58	.015	.00	.00	BOX
630.711	3412.540	6.628	3419.168	345.00	9.58	1.43	3420.59	.00	4.68	6.00	6.000	6.000	.00	0 .0
259.081	.0012					.0054	1.41	6.63	.69	6.00	.015	.00	.00	BOX
889.792	3412.850	7.731	3420.582	345.00	9.58	1.43	3422.01	.00	4.68	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0333					.0086	.03	7.73	.69		.013	.00	.00	BOX

---------- WARNING - Junction Analysis - Change in Channel Type ----------

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 3:33:34

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVE (STREET G) TO LAKE MEAD B
LV 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
892.792	3412.950	6.265	3419.215	299.00	15.23	3.60	3422.82	.00	4.67	.00	5.000	.000	.00	0 .0
4.500	.0222					.0132	.06	6.27	.00	3.29	.013	.00	.00	PIPE
897.292	3413.050	6.225	3419.275	299.00	15.23	3.60	3422.88	.00	4.67	.00	5.000	.000	.00	0 .0
73.624	.0072					.0132	.97	6.22	.00	5.00	.013	.00	.00	PIPE
970.916	3413.580	6.925	3420.505	299.00	15.23	3.60	3424.11	.00	4.67	.00	5.000	.000	.00	0 .0
5.000	.0400					.0132	.07	6.92	.00	2.72	.013	.00	.00	PIPE
975.916	3413.780	6.791	3420.571	299.00	15.23	3.60	3424.17	.00	4.67	.00	5.000	.000	.00	0 .0
185.553	.0068					.0132	2.45	6.79	.00	5.00	.013	.00	.00	PIPE
1161.469	3415.050	8.217	3423.268	299.00	15.23	3.60	3426.87	.00	4.67	.00	5.000	.000	.00	0 .0
5.000	.0400					.0132	.07	8.22	.00	2.72	.013	.00	.00	PIPE
1166.469	3415.250	8.083	3423.333	299.00	15.23	3.60	3426.93	.00	4.67	.00	5.000	.000	.00	0 .0
1.330	.0069					.0132	.02	8.08	.00	5.00	.013	.00	.00	PIPE
1167.799	3415.259	8.092	3423.351	299.00	15.23	3.60	3426.95	.00	4.67	.00	5.000	.000	.00	0 .0
HYDRAULIC JUMP														
1167.799	3415.259	2.881	3418.140	299.00	25.52	10.12	3428.26	.00	4.67	4.94	5.000	.000	.00	0 .0
23.014	.0069					.0346	.80	2.88	2.92	5.00	.013	.00	.00	PIPE
1190.813	3415.419	2.804	3418.223	299.00	26.37	10.80	3429.02	.00	4.67	4.96	5.000	.000	.00	0 .0
30.921	.0069					.0384	1.19	2.80	3.08	5.00	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVE (STREET G) TO LAKE MEAD B
LV 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	
1221.734	3415.634	2.698	3418.332	299.00	27.66	11.88	3430.21	.00	4.67	4.98	5.000	.000	.00	0 .0
29.688	.0069					.0436	1.29	2.70	3.31	5.00	.013	.00	.00	PIPE
1251.422	3415.840	2.598	3418.438	299.00	29.01	13.07	3431.51	.00	4.67	5.00	5.000	.000	.00	0 .0
5.000	.0400					.0464	.23	2.60	3.56	2.72	.013	.00	.00	PIPE
1256.422	3416.040	2.595	3418.635	299.00	29.05	13.10	3431.74	.00	4.67	5.00	5.000	.000	.00	0 .0
22.633	.0072					.0489	1.11	2.60	3.57	5.00	.013	.00	.00	PIPE
1279.055	3416.202	2.519	3418.721	299.00	30.16	14.13	3432.85	.00	4.67	5.00	5.000	.000	.00	0 .0
27.666	.0072					.0549	1.52	2.52	3.77	5.00	.013	.00	.00	PIPE
1306.721	3416.400	2.426	3418.826	299.00	31.63	15.54	3434.36	.00	4.67	5.00	5.000	.000	.00	0 .0
26.583	.0072					.0623	1.66	2.43	4.05	5.00	.013	.00	.00	PIPE
1333.304	3416.590	2.339	3418.929	299.00	33.18	17.09	3436.02	.00	4.67	4.99	5.000	.000	.00	0 .0
JUNCT STR	.0399					.0786	.20	2.34	4.35		.013	.00	.00	PIPE
1335.804	3416.690	2.043	3418.733	275.00	36.45	20.63	3439.36	.00	4.56	4.92	5.000	.000	.00	0 .0
2.500	.0400					.0913	.23	2.04	5.18	2.58	.013	.00	.00	PIPE
1338.304	3416.790	2.038	3418.828	275.00	36.58	20.77	3439.60	.00	4.56	4.91	5.000	.000	.00	0 .0
11.737	.0299					.0941	1.10	2.04	5.21	2.82	.013	.00	.00	PIPE
1350.041	3417.141	2.009	3419.150	275.00	37.25	21.54	3440.69	.00	4.56	4.90	5.000	.000	.00	0 .0
28.478	.0299					.1031	2.94	2.01	5.35	2.82	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVE (STREET G) TO LAKE MEAD B
LV 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	
1378.518	3417.993	1.939	3419.932	275.00	39.07	23.70	3443.63	.00	4.56	4.87	5.000	.000	.00	0 .0
26.280	.0299					.1175	3.09	1.94	5.73	2.82	.013	.00	.00	PIPE
1404.799	3418.780	1.872	3420.652	275.00	40.97	26.07	3446.72	.00	4.56	4.84	5.000	.000	.00	0 .0
24.415	.0299					.1340	3.27	1.87	6.13	2.82	.013	.00	.00	PIPE
1429.214	3419.510	1.807	3421.317	275.00	42.97	28.67	3449.99	.00	4.56	4.80	5.000	.000	.00	0 .0
JUNCT STR	.0500					.1478	.30	1.81	6.56		.013	.00	.00	PIPE
1431.214	3419.610	1.838	3421.448	269.00	44.05	30.13	3451.58	.00	4.33	4.42	4.500	.000	.00	0 .0
5.500	.0182					.1555	.86	1.84	6.61	3.75	.013	.00	.00	PIPE
1436.714	3419.710	1.820	3421.530	269.00	44.61	30.91	3452.44	.00	4.33	4.42	4.500	.000	.00	0 .0
19.258	.0643					.1653	3.18	1.82	6.73	2.35	.013	.00	.00	PIPE
1455.972	3420.949	1.778	3422.727	269.00	46.02	32.89	3455.62	.00	4.33	4.40	4.500	.000	.00	0 .0
26.895	.0643					.1843	4.96	1.78	7.04	2.35	.013	.00	.00	PIPE
1482.867	3422.679	1.716	3424.395	269.00	48.27	36.18	3460.58	.00	4.33	4.37	4.500	.000	.00	0 .0
24.409	.0643					.2101	5.13	1.72	7.53	2.35	.013	.00	.00	PIPE
1507.276	3424.250	1.656	3425.906	269.00	50.63	39.80	3465.70	.00	4.33	4.34	4.500	.000	.00	0 .0
22.384	.0643					.2396	5.36	1.66	8.06	2.35	.013	.00	.00	PIPE
1529.660	3425.690	1.599	3427.289	269.00	53.10	43.78	3471.07	.00	4.33	4.31	4.500	.000	.00	0 .0
20.685	.0643					.2733	5.65	1.60	8.63	2.35	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVE (STREET G) TO LAKE MEAD B
LV 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	
1550.345	3427.021	1.544	3428.565	269.00	55.69	48.16	3476.72	.00	4.33	4.27	4.500	.000	.00	0 .0
19.241	.0643					.3119	6.00	1.54	9.23	2.35	.013	.00	.00	PIPE
1569.585	3428.258	1.491	3429.750	269.00	58.41	52.97	3482.72	.00	4.33	4.24	4.500	.000	.00	0 .0
17.991	.0643					.3559	6.40	1.49	9.87	2.35	.013	.00	.00	PIPE
1587.576	3429.416	1.440	3430.856	269.00	61.26	58.27	3489.13	.00	4.33	4.20	4.500	.000	.00	0 .0
16.891	.0643					.4065	6.87	1.44	10.56	2.35	.013	.00	.00	PIPE
1604.467	3430.502	1.392	3431.895	269.00	64.25	64.10	3495.99	.00	4.33	4.16	4.500	.000	.00	0 .0
15.911	.0643					.4642	7.39	1.39	11.29	2.35	.013	.00	.00	PIPE
1620.378	3431.526	1.344	3432.870	269.00	67.38	70.51	3503.38	.00	4.33	4.12	4.500	.000	.00	0 .0
15.040	.0643					.5301	7.97	1.34	12.06	2.35	.013	.00	.00	PIPE
1635.419	3432.494	1.299	3433.793	269.00	70.67	77.56	3511.35	.00	4.33	4.08	4.500	.000	.00	0 .0
14.243	.0643					.6058	8.63	1.30	12.89	2.35	.013	.00	.00	PIPE
1649.662	3433.410	1.256	3434.666	269.00	74.12	85.31	3519.98	.00	4.33	4.04	4.500	.000	.00	0 .0
5.000	.0400					.6630	3.31	1.26	13.78	2.73	.013	.00	.00	PIPE
1654.662	3433.610	1.240	3434.850	269.00	75.47	88.45	3523.30	.00	4.33	4.02	4.500	.000	.00	0 .0
10.506	.0659					.7161	7.52	1.24	14.13	2.34	.013	.00	.00	PIPE
1665.168	3434.302	1.207	3435.509	269.00	78.27	95.14	3530.65	.00	4.33	3.99	4.500	.000	.00	0 .0
12.793	.0659					.8064	10.32	1.21	14.86	2.34	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVE (STREET G) TO LAKE MEAD B
LV 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	
1677.961	3435.144	1.167	3436.311	269.00	82.10	104.65	3540.96	.00	4.33	3.94	4.500	.000	.00	0 .0
12.180	.0659				.9219	11.23	1.17	15.87	2.34	.013	.00	.00	PIPE	
1690.141	3435.946	1.128	3437.074	269.00	86.10	115.12	3552.19	.00	4.33	3.90	4.500	.000	.00	0 .0
11.610	.0659				1.0542	12.24	1.13	16.95	2.34	.013	.00	.00	PIPE	
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 1.05420														
1701.751	3436.711	1.091	3437.802	269.00	90.31	126.63	3564.43	.00	4.33	3.86	4.500	.000	.00	0 .0
11.077	.0659				1.2058	13.36	1.09	18.11	2.34	.013	.00	.00	PIPE	
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 1.20578														
1712.828	3437.440	1.055	3438.496	269.00	94.71	139.29	3577.79	.00	4.33	3.81	4.500	.000	.00	0 .0
10.580	.0659				1.3791	14.59	1.06	19.34	2.34	.013	.00	.00	PIPE	
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 1.37908														
1723.409	3438.137	1.020	3439.157	269.00	99.34	153.22	3592.38	.00	4.33	3.77	4.500	.000	.00	0 .0
10.115	.0659				1.5772	15.95	1.02	20.65	2.34	.013	.00	.00	PIPE	
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 1.57723														
1733.524	3438.803	.986	3439.789	269.00	104.18	168.55	3608.33	.00	4.33	3.72	4.500	.000	.00	0 .0
9.675	.0659				1.8045	17.46	.99	22.05	2.34	.013	.00	.00	PIPE	
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 1.80453														
1743.199	3439.440	.954	3440.395	269.00	109.27	185.40	3625.79	.00	4.33	3.68	4.500	.000	.00	0 .0
9.258	.0659				2.0652	19.12	.95	23.54	2.34	.013	.00	.00	PIPE	
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 2.06516														
1752.457	3440.050	.923	3440.973	269.00	114.60	203.94	3644.91	.00	4.33	3.63	4.500	.000	.00	0 .0
5.000	.0400				2.2922	11.46	.92	25.13	2.73	.013	.00	.00	PIPE	
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 2.29216														
1757.457	3440.250	.906	3441.155	269.00	117.75	215.31	3656.47	.00	4.33	3.61	4.500	.000	.00	0 .0
5.081	.0578				2.4738	12.57	.91	26.08	2.43	.013	.00	.00	PIPE	
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 2.47383														

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SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVE (STREET G) TO LAKE MEAD B
LV 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
1762.538	3440.543	.888	3441.431	269.00	120.97	227.23	3668.66	.00	4.33	3.58	4.500	.000	.00	0 .0
8.419	.0578					2.7532	23.18	.89	27.06	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 2.75318														
1770.957	3441.030	.859	3441.889	269.00	126.87	249.95	3691.84	.00	4.33	3.54	4.500	.000	.00	0 .0
8.070	.0578					3.1514	25.43	.86	28.88	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 3.15143														
1779.028	3441.496	.831	3442.327	269.00	133.07	274.95	3717.28	.00	4.33	3.49	4.500	.000	.00	0 .0
7.737	.0578					3.6077	27.91	.83	30.82	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 3.60774														
1786.765	3441.942	.804	3442.747	269.00	139.56	302.44	3745.19	.00	4.33	3.45	4.500	.000	.00	0 .0
7.419	.0578					4.1308	30.65	.80	32.89	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 4.13076														
1794.184	3442.371	.778	3443.149	269.00	146.37	332.69	3775.84	.00	4.33	3.40	4.500	.000	.00	0 .0
7.118	.0578					4.7281	33.65	.78	35.10	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 4.72813														
1801.302	3442.782	.752	3443.534	269.00	153.52	365.96	3809.49	.00	4.33	3.36	4.500	.000	.00	0 .0
6.829	.0578					5.4134	36.97	.75	37.45	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 5.41335														
1808.131	3443.176	.728	3443.904	269.00	161.01	402.55	3846.46	.00	4.33	3.31	4.500	.000	.00	0 .0
6.551	.0578					6.1989	40.61	.73	39.97	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 6.19885														
1814.682	3443.555	.704	3444.259	269.00	168.87	442.81	3887.07	.00	4.33	3.27	4.500	.000	.00	0 .0
6.284	.0578					7.1009	44.62	.70	42.64	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 7.10088														
1820.966	3443.918	.682	3444.600	269.00	177.11	487.09	3931.69	.00	4.33	3.23	4.500	.000	.00	0 .0
6.027	.0578					8.1361	49.04	.68	45.50	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 8.13610														

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 3:33:34

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVE (STREET G) TO LAKE MEAD B
LV 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	
1826.993	3444.266	.660	3444.926	269.00	185.76	535.80	3980.72	.00	4.33	3.18	4.500	.000	.00	0 .0
5.785	.0578					9.3156	53.89	.66	48.54	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 9.31560														
1832.778	3444.600	.638	3445.238	269.00	194.82	589.38	4034.62	.00	4.33	3.14	4.500	.000	.00	0 .0
5.551	.0578					10.6709	59.24	.64	51.77	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 10.67087														
1838.329	3444.921	.618	3445.539	269.00	204.33	648.32	4093.85	.00	4.33	3.10	4.500	.000	.00	0 .0
5.326	.0578					12.2272	65.12	.62	55.24	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 12.22723														
1843.655	3445.228	.598	3445.826	269.00	214.31	713.15	4158.97	.00	4.33	3.06	4.500	.000	.00	0 .0
5.113	.0578					14.0005	71.59	.60	58.92	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 14.00051														
1848.769	3445.524	.578	3446.102	269.00	224.77	784.46	4230.56	.00	4.33	3.01	4.500	.000	.00	0 .0
4.907	.0578					16.0400	78.71	.58	62.83	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 16.03997														
1853.676	3445.807	.560	3446.367	269.00	235.74	862.91	4309.28	.00	4.33	2.97	4.500	.000	.00	0 .0
4.708	.0578					18.3843	86.54	.56	67.03	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 18.38433														
1858.383	3446.079	.542	3446.621	269.00	247.24	949.20	4395.82	.00	4.33	2.93	4.500	.000	.00	0 .0
4.517	.0578					21.0694	95.16	.54	71.50	2.43	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 21.06940														
1862.900	3446.340	.525	3446.865	269.00	259.31	******	4490.98	.00	4.33	2.89	4.500	.000	.00	0 .0
.698	.0400					22.7512	15.87	.52	76.26	2.73	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 22.75119														
1863.598	3446.368	.522	3446.890	269.00	261.29	******	4507.06	.00	4.33	2.88	4.500	.000	.00	0 .0
4.302	.0400					24.6777	106.17	.52	77.05	2.73	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 24.67765														

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 3:33:34

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVE (STREET G) TO LAKE MEAD B
LV 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	
1867.900	3446.540	.506	3447.046	269.00	274.05	******	4613.23	.00	4.33	2.84	4.500	.000	.00	0 .0
1.088	.0364					26.8240	29.19	.51	82.18	2.82	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 26.82404														
1868.988	3446.580	.501	3447.081	269.00	277.42	******	4642.17	.00	4.33	2.83	4.500	.000	.00	0 .0
4.086	.0364					29.2832	119.64	.50	83.54	2.82	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 29.28315														
1873.074	3446.728	.485	3447.213	269.00	290.96	******	4761.81	.00	4.33	2.79	4.500	.000	.00	0 .0
3.922	.0364					33.5482	131.59	.49	89.09	2.82	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 33.54818														
1876.996	3446.871	.469	3447.340	269.00	305.17	******	4893.39	.00	4.33	2.75	4.500	.000	.00	0 .0
3.765	.0364					38.4368	144.73	.47	94.99	2.82	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 38.43684														
1880.761	3447.008	.454	3447.462	269.00	320.06	******	5038.12	.00	4.33	2.71	4.500	.000	.00	0 .0
3.612	.0364					44.0763	159.18	.45	101.30	2.82	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 44.07629														
1884.373	3447.140	.440	3447.580	269.00	335.68	******	5197.30	.00	4.33					

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                                                                        0
T1 SUMMERLIN WEST VILLAGE 22
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+30 WEST, SDDI #1
T3 ATKINS / INTERIM CONDITIONS
SO    369.6333410.41  24                          3416.16
R     394.2733416.57  24      .013
SH    394.2733416.57  24                          3417.50
CD  24  4   0    .000   2.000     .000  .000  .000   .00
Q             2.000   .0
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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 6-14-2019 Time:11: 4:47

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+30 WEST, 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
369.633	3410.410	5.750	3416.160	2.00	.64	.01	3416.17	.00	.49	.00	2.000	.000	.00	0 .0
15.004	.2500					.0001	.00	5.75	.00	.18	.013	.00	.00	PIPE
384.637	3414.161	2.000	3416.161	2.00	.64	.01	3416.17	.00	.49	.00	2.000	.000	.00	0 .0
.737	.2500					.0001	.00	2.00	.00	.18	.013	.00	.00	PIPE
385.375	3414.345	1.814	3416.160	2.00	.67	.01	3416.17	.00	.49	1.16	2.000	.000	.00	0 .0
.429	.2500					.0001	.00	1.81	.07	.18	.013	.00	.00	PIPE
385.804	3414.453	1.706	3416.159	2.00	.70	.01	3416.17	.00	.49	1.42	2.000	.000	.00	0 .0
.349	.2500					.0001	.00	1.71	.09	.18	.013	.00	.00	PIPE
386.153	3414.540	1.618	3416.158	2.00	.73	.01	3416.17	.00	.49	1.57	2.000	.000	.00	0 .0
.309	.2500					.0001	.00	1.62	.10	.18	.013	.00	.00	PIPE
386.462	3414.617	1.540	3416.157	2.00	.77	.01	3416.17	.00	.49	1.68	2.000	.000	.00	0 .0
.276	.2500					.0001	.00	1.54	.11	.18	.013	.00	.00	PIPE
386.738	3414.686	1.470	3416.156	2.00	.81	.01	3416.17	.00	.49	1.77	2.000	.000	.00	0 .0
.252	.2500					.0001	.00	1.47	.12	.18	.013	.00	.00	PIPE
386.990	3414.749	1.406	3416.155	2.00	.85	.01	3416.17	.00	.49	1.83	2.000	.000	.00	0 .0
.236	.2500					.0001	.00	1.41	.13	.18	.013	.00	.00	PIPE
387.226	3414.808	1.346	3416.154	2.00	.89	.01	3416.17	.00	.49	1.88	2.000	.000	.00	0 .0
.215	.2500					.0001	.00	1.35	.14	.18	.013	.00	.00	PIPE

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 6-14-2019 Time:11: 4:47

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+30 WEST, 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
387.441	3414.862	1.291	3416.153	2.00	.93	.01	3416.17	.00	.49	1.91	2.000	.000	.00	0 .0
.203	.2500					.0001	.00	1.29	.16	.18	.013	.00	.00	PIPE
387.644	3414.913	1.239	3416.152	2.00	.98	.01	3416.17	.00	.49	1.94	2.000	.000	.00	0 .0
.186	.2500					.0002	.00	1.24	.17	.18	.013	.00	.00	PIPE
387.830	3414.959	1.191	3416.150	2.00	1.03	.02	3416.17	.00	.49	1.96	2.000	.000	.00	0 .0
.178	.2500					.0002	.00	1.19	.18	.18	.013	.00	.00	PIPE
388.008	3415.004	1.145	3416.149	2.00	1.08	.02	3416.17	.00	.49	1.98	2.000	.000	.00	0 .0
.169	.2500					.0002	.00	1.15	.20	.18	.013	.00	.00	PIPE
388.177	3415.046	1.101	3416.147	2.00	1.13	.02	3416.17	.00	.49	1.99	2.000	.000	.00	0 .0
.156	.2500					.0002	.00	1.10	.21	.18	.013	.00	.00	PIPE
388.333	3415.085	1.060	3416.145	2.00	1.18	.02	3416.17	.00	.49	2.00	2.000	.000	.00	0 .0
.151	.2500					.0003	.00	1.06	.23	.18	.013	.00	.00	PIPE
388.484	3415.123	1.020	3416.143	2.00	1.24	.02	3416.17	.00	.49	2.00	2.000	.000	.00	0 .0
.139	.2500					.0003	.00	1.02	.24	.18	.013	.00	.00	PIPE
388.623	3415.157	.983	3416.141	2.00	1.30	.03	3416.17	.00	.49	2.00	2.000	.000	.00	0 .0
.134	.2500					.0004	.00	.98	.26	.18	.013	.00	.00	PIPE
388.757	3415.191	.947	3416.138	2.00	1.36	.03	3416.17	.00	.49	2.00	2.000	.000	.00	0 .0
.111	.2500					.0004	.00	.95	.28	.18	.013	.00	.00	PIPE

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 6-14-2019 Time:11: 4:47

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+30 WEST, 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	
388.868	3415.219	.913	3416.132	2.00	1.43	.03	3416.16	.00	.49	1.99	2.000	.000	.00	0 .0
HYDRAULIC JUMP														
388.868	3415.219	.228	3415.447	2.00	10.09	1.58	3417.03	.00	.49	1.27	2.000	.000	.00	0 .0
.467	.2500					.0960	.04	.23	4.50	.18	.013	.00	.00	PIPE
389.335	3415.336	.236	3415.572	2.00	9.57	1.42	3416.99	.00	.49	1.29	2.000	.000	.00	0 .0
.727	.2500					.0831	.06	.24	4.19	.18	.013	.00	.00	PIPE
390.061	3415.517	.244	3415.761	2.00	9.12	1.29	3417.05	.00	.49	1.31	2.000	.000	.00	0 .0
.617	.2500					.0726	.04	.24	3.93	.18	.013	.00	.00	PIPE
390.679	3415.672	.252	3415.924	2.00	8.70	1.18	3417.10	.00	.49	1.33	2.000	.000	.00	0 .0
.529	.2500					.0633	.03	.25	3.68	.18	.013	.00	.00	PIPE
391.208	3415.804	.260	3416.064	2.00	8.30	1.07	3417.13	.00	.49	1.35	2.000	.000	.00	0 .0
.452	.2500					.0552	.02	.26	3.45	.18	.013	.00	.00	PIPE
391.661	3415.917	.269	3416.186	2.00	7.91	.97	3417.16	.00	.49	1.36	2.000	.000	.00	0 .0
.393	.2500					.0482	.02	.27	3.24	.18	.013	.00	.00	PIPE
392.054	3416.015	.278	3416.293	2.00	7.54	.88	3417.18	.00	.49	1.38	2.000	.000	.00	0 .0
.343	.2500					.0421	.01	.28	3.04	.18	.013	.00	.00	PIPE
392.396	3416.101	.287	3416.388	2.00	7.19	.80	3417.19	.00	.49	1.40	2.000	.000	.00	0 .0
.295	.2500					.0368	.01	.29	2.85	.18	.013	.00	.00	PIPE

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 6-14-2019 Time:11: 4:47

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+30 WEST, 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
392.692	3416.175	.297	3416.472	2.00	6.86	.73	3417.20	.00	.49	1.42	2.000	.000	.00	0 .0
.259	.2500					.0321	.01	.30	2.67	.18	.013	.00	.00	PIPE
392.950	3416.239	.307	3416.546	2.00	6.54	.66	3417.21	.00	.49	1.44	2.000	.000	.00	0 .0
.227	.2500					.0280	.01	.31	2.50	.18	.013	.00	.00	PIPE
393.177	3416.296	.317	3416.613	2.00	6.23	.60	3417.22	.00	.49	1.46	2.000	.000	.00	0 .0
.194	.2500					.0245	.00	.32	2.34	.18	.013	.00	.00	PIPE
393.371	3416.344	.328	3416.673	2.00	5.94	.55	3417.22	.00	.49	1.48	2.000	.000	.00	0 .0
.170	.2500					.0214	.00	.33	2.20	.18	.013	.00	.00	PIPE
393.541	3416.387	.339	3416.726	2.00	5.67	.50	3417.22	.00	.49	1.50	2.000	.000	.00	0 .0
.148	.2500					.0187	.00	.34	2.06	.18	.013	.00	.00	PIPE
393.689	3416.424	.350	3416.774	2.00	5.40	.45	3417.23	.00	.49	1.52	2.000	.000	.00	0 .0
.125	.2500					.0163	.00	.35	1.93	.18	.013	.00	.00	PIPE
393.814	3416.455	.362	3416.817	2.00	5.15	.41	3417.23	.00	.49	1.54	2.000	.000	.00	0 .0
.108	.2500					.0142	.00	.36	1.81	.18	.013	.00	.00	PIPE
393.922	3416.482	.374	3416.856	2.00	4.91	.37	3417.23	.00	.49	1.56	2.000	.000	.00	0 .0
.089	.2500					.0124	.00	.37	1.69	.18	.013	.00	.00	PIPE
394.011	3416.505	.387	3416.892	2.00	4.68	.34	3417.23	.00	.49	1.58	2.000	.000	.00	0 .0
.075	.2500					.0109	.00	.39	1.59	.18	.013	.00	.00	PIPE

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 6-14-2019 Time:11: 4:47

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+30 WEST, 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	
394.086	3416.523	.400	3416.924	2.00	4.46	.31	3417.23	.00	.49	1.60	2.000	.000	.00	0 .0
.059	.2500					.0095	.00	.40	1.49	.18	.013	.00	.00	PIPE
394.145	3416.538	.414	3416.952	2.00	4.26	.28	3417.23	.00	.49	1.62	2.000	.000	.00	0 .0
.048	.2500					.0083	.00	.41	1.39	.18	.013	.00	.00	PIPE
394.193	3416.550	.428	3416.978	2.00	4.06	.26	3417.23	.00	.49	1.64	2.000	.000	.00	0 .0
.038	.2500					.0073	.00	.43	1.31	.18	.013	.00	.00	PIPE
394.231	3416.560	.442	3417.002	2.00	3.87	.23	3417.23	.00	.49	1.66	2.000	.000	.00	0 .0
.025	.2500					.0063	.00	.44	1.22	.18	.013	.00	.00	PIPE
394.256	3416.566	.457	3417.023	2.00	3.69	.21	3417.23	.00	.49	1.68	2.000	.000	.00	0 .0
.013	.2500					.0055	.00	.46	1.14	.18	.013	.00	.00	PIPE
394.269	3416.569	.473	3417.042	2.00	3.52	.19	3417.23	.00	.49	1.70	2.000	.000	.00	0 .0
.004	.2500					.0048	.00	.47	1.07	.18	.013	.00	.00	PIPE
394.273	3416.570	.491	3417.061	2.00	3.34	.17	3417.23	.00	.49	1.72	2.000	.000	.00	0 .0

```
                                                                        0
T1 SUMMERLIN WEST VILLAGE 22
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 2 EAST, SDDI #2
T3 ATKINS / INTERIM CONDITIONS
SO    419.77 3410.65  36                          3417.46
R     465.77 3413.77  36      .013
SH    465.77 3413.77  36                          3413.77
CD  36  4   0    .000   3.000     .000  .000  .000   .00
Q            55.000   .0
```

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FILE: SJ_Lateral-DI2_int.WSW                W S P G W - CIVILDESIGN Version 14.06                                    PAGE    1
                              Program Package Serial Number: 1615
                                                  WATER SURFACE PROFILE LISTING                    Date: 6-14-2019  Time:11: 4:20
                        SUMMERLIN WEST VILLAGE 22
                          KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 2 EAST, SDDI #2
                            ATKINS / INTERIM CONDITIONS
************************************************************************************************************************** ********
         | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
 L/Elem  |Ch Slope |        |         |         |         SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|***** |*******
         |         |        |         |         |               |         |       |        |        |       |       |      |
  419.770  3410.650    6.810  3417.460     55.00    7.78     .94  3418.40     .00    2.41      .00    3.000     .000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
   46.000    .0678                                         .0068      .31     6.81     .00    1.16    .013       .00   .00  PIPE
         |         |        |         |         |               |         |       |        |        |       |       |      |
  465.770  3413.770    4.003  3417.773     55.00    7.78     .94  3418.71     .00    2.41      .00    3.000     .000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
```

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T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 4 EAST, SDDI #3
T3 ATKINS / INTERIM CONDITIONS
SO    898.2223413.05  36                          3418.72
R     944.2223417.50  36      .013
SH    944.2223417.50  36                          3417.50
CD  36  4   0    .000   3.000     .000  .000  .000   .00
Q           40.000   .0
```

FILE: SJ_Lateral-DI3_int.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 1

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 6-14-2019 Time:11: 3:55

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 4 EAST, 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
898.222	3413.050	5.670	3418.720	40.00	5.66	.50	3419.22	.00	2.06	.00	3.000	.000	.00	0 .0
25.628	.0967					.0036	.09	5.67	.00	.89	.013	.00	.00	PIPE
923.850	3415.529	3.281	3418.810	40.00	5.66	.50	3419.31	.00	2.06	.00	3.000	.000	.00	0 .0
HYDRAULIC JUMP														
923.850	3415.529	1.227	3416.756	40.00	14.71	3.36	3420.12	.00	2.06	2.95	3.000	.000	.00	0 .0
1.731	.0967					.0284	.05	1.23	2.70	.89	.013	.00	.00	PIPE
925.581	3415.697	1.248	3416.945	40.00	14.38	3.21	3420.16	.00	2.06	2.96	3.000	.000	.00	0 .0
3.479	.0967					.0258	.09	1.25	2.61	.89	.013	.00	.00	PIPE
929.060	3416.033	1.293	3417.327	40.00	13.71	2.92	3420.25	.00	2.06	2.97	3.000	.000	.00	0 .0
2.933	.0967					.0226	.07	1.29	2.44	.89	.013	.00	.00	PIPE
931.993	3416.317	1.341	3417.658	40.00	13.07	2.65	3420.31	.00	2.06	2.98	3.000	.000	.00	0 .0
2.488	.0967					.0199	.05	1.34	2.27	.89	.013	.00	.00	PIPE
934.481	3416.558	1.391	3417.949	40.00	12.46	2.41	3420.36	.00	2.06	2.99	3.000	.000	.00	0 .0
2.111	.0967					.0175	.04	1.39	2.12	.89	.013	.00	.00	PIPE
936.592	3416.762	1.443	3418.205	40.00	11.88	2.19	3420.40	.00	2.06	3.00	3.000	.000	.00	0 .0
1.775	.0967					.0154	.03	1.44	1.98	.89	.013	.00	.00	PIPE
938.367	3416.934	1.498	3418.432	40.00	11.33	1.99	3420.43	.00	2.06	3.00	3.000	.000	.00	0 .0
1.481	.0967					.0136	.02	1.50	1.84	.89	.013	.00	.00	PIPE

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 6-14-2019 Time:11: 3:55

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 4 EAST, 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
939.848	3417.077	1.556	3418.633	40.00	10.80	1.81	3420.45	.00	2.06	3.00	3.000	.000	.00	0 .0
1.235	.0967					.0120	.01	1.56	1.71	.89	.013	.00	.00	PIPE
941.084	3417.197	1.616	3418.813	40.00	10.30	1.65	3420.46	.00	2.06	2.99	3.000	.000	.00	0 .0
1.007	.0967					.0105	.01	1.62	1.59	.89	.013	.00	.00	PIPE
942.091	3417.294	1.679	3418.973	40.00	9.82	1.50	3420.47	.00	2.06	2.98	3.000	.000	.00	0 .0
.791	.0967					.0093	.01	1.68	1.48	.89	.013	.00	.00	PIPE
942.881	3417.370	1.746	3419.116	40.00	9.36	1.36	3420.48	.00	2.06	2.96	3.000	.000	.00	0 .0
.596	.0967					.0082	.00	1.75	1.37	.89	.013	.00	.00	PIPE
943.478	3417.428	1.817	3419.245	40.00	8.93	1.24	3420.48	.00	2.06	2.93	3.000	.000	.00	0 .0
.419	.0967					.0073	.00	1.82	1.27	.89	.013	.00	.00	PIPE
943.897	3417.469	1.892	3419.361	40.00	8.51	1.13	3420.49	.00	2.06	2.90	3.000	.000	.00	0 .0
.247	.0967					.0065	.00	1.89	1.18	.89	.013	.00	.00	PIPE
944.144	3417.492	1.972	3419.465	40.00	8.12	1.02	3420.49	.00	2.06	2.85	3.000	.000	.00	0 .0
.078	.0967					.0057	.00	1.97	1.09	.89	.013	.00	.00	PIPE
944.222	3417.500	2.059	3419.559	40.00	7.73	.93	3420.49	.00	2.06	2.78	3.000	.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 4 WEST, SDDI #4
T3 ATKINS / INTERIM CONDITIONS
SO    898.2223413.05  24                          3418.72
R     924.6423417.60  24      .013
SH    924.6423417.60  24                          3417.50
CD  24  4   0    .000   2.000     .000  .000  .000   .00
Q             2.000   .0
```

FILE: SJ_Lateral-DI4_int.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 1

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 6-14-2019 Time:11: 1:46

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 4 WEST, SDDI #4
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
898.222	3413.050	5.670	3418.720	2.00	.64	.01	3418.73	.00	.49	.00	2.000	.000	.00	0 .0
21.319	.1722					.0001	.00	5.67	.00	.20	.013	.00	.00	PIPE
919.541	3416.722	2.000	3418.722	2.00	.64	.01	3418.73	.00	.49	.00	2.000	.000	.00	0 .0
1.070	.1722					.0001	.00	2.00	.00	.20	.013	.00	.00	PIPE
920.612	3416.906	1.814	3418.720	2.00	.67	.01	3418.73	.00	.49	1.16	2.000	.000	.00	0 .0
.623	.1722					.0001	.00	1.81	.07	.20	.013	.00	.00	PIPE
921.235	3417.013	1.706	3418.719	2.00	.70	.01	3418.73	.00	.49	1.42	2.000	.000	.00	0 .0
.507	.1722					.0001	.00	1.71	.09	.20	.013	.00	.00	PIPE
921.742	3417.101	1.618	3418.719	2.00	.73	.01	3418.73	.00	.49	1.57	2.000	.000	.00	0 .0
.448	.1722					.0001	.00	1.62	.10	.20	.013	.00	.00	PIPE
922.190	3417.178	1.540	3418.718	2.00	.77	.01	3418.73	.00	.49	1.68	2.000	.000	.00	0 .0
.401	.1722					.0001	.00	1.54	.11	.20	.013	.00	.00	PIPE
922.591	3417.247	1.470	3418.717	2.00	.81	.01	3418.73	.00	.49	1.77	2.000	.000	.00	0 .0
.366	.1722					.0001	.00	1.47	.12	.20	.013	.00	.00	PIPE
922.957	3417.310	1.406	3418.716	2.00	.85	.01	3418.73	.00	.49	1.83	2.000	.000	.00	0 .0
.342	.1722					.0001	.00	1.41	.13	.20	.013	.00	.00	PIPE
923.299	3417.369	1.346	3418.715	2.00	.89	.01	3418.73	.00	.49	1.88	2.000	.000	.00	0 .0
.313	.1722					.0001	.00	1.35	.14	.20	.013	.00	.00	PIPE

FILE: SJ_Lateral-DI4_int.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 2

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 6-14-2019 Time:11: 1:46

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 4 WEST, SDDI #4
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	
923.612	3417.422	1.291	3418.713	2.00	.93	.01	3418.73	.00	.49	1.91	2.000	.000	.00	0 .0
.294	.1722					.0001	.00	1.29	.16	.20	.013	.00	.00	PIPE
923.906	3417.473	1.239	3418.712	2.00	.98	.01	3418.73	.00	.49	1.94	2.000	.000	.00	0 .0
.270	.1722					.0002	.00	1.24	.17	.20	.013	.00	.00	PIPE
924.177	3417.520	1.191	3418.711	2.00	1.03	.02	3418.73	.00	.49	1.96	2.000	.000	.00	0 .0
.258	.1722					.0002	.00	1.19	.18	.20	.013	.00	.00	PIPE
924.435	3417.564	1.145	3418.709	2.00	1.08	.02	3418.73	.00	.49	1.98	2.000	.000	.00	0 .0
.207	.1722					.0002	.00	1.15	.20	.20	.013	.00	.00	PIPE
924.642	3417.600	1.108	3418.708	2.00	1.12	.02	3418.73	.00	.49	1.99	2.000	.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 8 EAST, SDDI #5
T3 ATKINS / INTERIM CONDITIONS
SO   1332.2413416.79  30                          3426.54
R    1382.5013422.17  30      .013
SH   1382.5013422.17  30                          3422.17
CD  30  4   0    .000   2.500     .000  .000  .000   .00
Q            25.000   .0
```

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 6-14-2019 Time:11: 1:13

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 8 EAST, 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	
1332.241	3416.790	9.750	3426.540	25.00	5.09	.40	3426.94	.00	1.70	.00	2.500	.000	.00	0 .0
50.260	.1070				.0037	.19	9.75	.00	.73	.013	.00	.00	PIPE	
1382.501	3422.170	4.557	3426.727	25.00	5.09	.40	3427.13	.00	1.70	.00	2.500	.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 9 EAST, SDDI #6
T3 ATKINS / INTERIM CONDITIONS
SO   1432.1513418.62  24                          3421.02
R    1460.9013424.82  24      .013
SH   1460.9013424.82  24                          3423.69
CD  24  4   0    .000   2.000     .000  .000  .000   .00
Q             3.000   .0
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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 6-20-2019 Time: 3:34:41

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 9 EAST, 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
1432.151	3418.620	2.400	3421.020	3.00	.95	.01	3421.03	.00	.60	.00	2.000	.000	.00	0 .0
1.856	.2157					.0002	.00	2.40	.00	.23	.013	.00	.00	PIPE
1434.007	3419.020	2.000	3421.020	3.00	.95	.01	3421.03	.00	.60	.00	2.000	.000	.00	0 .0
.851	.2157					.0002	.00	2.00	.00	.23	.013	.00	.00	PIPE
1434.858	3419.204	1.814	3421.018	3.00	1.00	.02	3421.03	.00	.60	1.16	2.000	.000	.00	0 .0
.494	.2157					.0002	.00	1.81	.11	.23	.013	.00	.00	PIPE
1435.352	3419.310	1.706	3421.016	3.00	1.05	.02	3421.03	.00	.60	1.42	2.000	.000	.00	0 .0
.400	.2157					.0002	.00	1.71	.13	.23	.013	.00	.00	PIPE
1435.753	3419.397	1.618	3421.015	3.00	1.10	.02	3421.03	.00	.60	1.57	2.000	.000	.00	0 .0
.353	.2157					.0002	.00	1.62	.15	.23	.013	.00	.00	PIPE
1436.106	3419.473	1.540	3421.013	3.00	1.16	.02	3421.03	.00	.60	1.68	2.000	.000	.00	0 .0
.315	.2157					.0002	.00	1.54	.16	.23	.013	.00	.00	PIPE
1436.421	3419.541	1.470	3421.011	3.00	1.21	.02	3421.03	.00	.60	1.77	2.000	.000	.00	0 .0
.286	.2157					.0002	.00	1.47	.18	.23	.013	.00	.00	PIPE
1436.708	3419.603	1.406	3421.009	3.00	1.27	.03	3421.03	.00	.60	1.83	2.000	.000	.00	0 .0
.267	.2157					.0003	.00	1.41	.20	.23	.013	.00	.00	PIPE
1436.975	3419.660	1.346	3421.007	3.00	1.33	.03	3421.03	.00	.60	1.88	2.000	.000	.00	0 .0
.243	.2157					.0003	.00	1.35	.21	.23	.013	.00	.00	PIPE

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 9 EAST, 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
1437.217	3419.713	1.291	3421.004	3.00	1.40	.03	3421.03	.00	.60	1.91	2.000	.000	.00	0 .0
.055	.2157					.0003	.00	1.29	.23	.23	.013	.00	.00	PIPE
1437.273	3419.725	1.291	3421.016	3.00	1.40	.03	3421.05	.00	.60	1.91	2.000	.000	.00	0 .0
HYDRAULIC JUMP														
1437.273	3419.725	.238	3419.962	3.00	14.25	3.15	3423.12	.00	.60	1.29	2.000	.000	.00	0 .0
3.282	.2157					.1835	.60	.24	6.23	.23	.013	.00	.00	PIPE
1440.554	3420.432	.245	3420.677	3.00	13.60	2.87	3423.55	.00	.60	1.31	2.000	.000	.00	0 .0
4.568	.2157					.1603	.73	.25	5.84	.23	.013	.00	.00	PIPE
1445.122	3421.417	.253	3421.671	3.00	12.97	2.61	3424.28	.00	.60	1.33	2.000	.000	.00	0 .0
3.022	.2157					.1398	.42	.25	5.48	.23	.013	.00	.00	PIPE
1448.144	3422.069	.261	3422.330	3.00	12.36	2.37	3424.70	.00	.60	1.35	2.000	.000	.00	0 .0
2.207	.2157					.1220	.27	.26	5.13	.23	.013	.00	.00	PIPE
1450.351	3422.545	.270	3422.815	3.00	11.79	2.16	3424.97	.00	.60	1.37	2.000	.000	.00	0 .0
1.715	.2157					.1065	.18	.27	4.81	.23	.013	.00	.00	PIPE
1452.066	3422.915	.279	3423.194	3.00	11.24	1.96	3425.16	.00	.60	1.39	2.000	.000	.00	0 .0
1.373	.2157					.0931	.13	.28	4.51	.23	.013	.00	.00	PIPE
1453.439	3423.211	.289	3423.500	3.00	10.72	1.78	3425.28	.00	.60	1.41	2.000	.000	.00	0 .0
1.139	.2157					.0813	.09	.29	4.23	.23	.013	.00	.00	PIPE

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 6-20-2019 Time: 3:34:41

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 9 EAST, 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	
1454.578	3423.457	.298	3423.755	3.00	10.22	1.62	3425.38	.00	.60	1.42	2.000	.000	.00	0 .0
.949	.2157					.0709	.07	.30	3.97	.23	.013	.00	.00	PIPE
1455.527	3423.661	.308	3423.969	3.00	9.74	1.47	3425.44	.00	.60	1.44	2.000	.000	.00	0 .0
.806	.2157					.0619	.05	.31	3.72	.23	.013	.00	.00	PIPE
1456.333	3423.835	.318	3424.153	3.00	9.29	1.34	3425.49	.00	.60	1.46	2.000	.000	.00	0 .0
.686	.2157					.0540	.04	.32	3.48	.23	.013	.00	.00	PIPE
1457.019	3423.983	.329	3424.312	3.00	8.86	1.22	3425.53	.00	.60	1.48	2.000	.000	.00	0 .0
.592	.2157					.0472	.03	.33	3.27	.23	.013	.00	.00	PIPE
1457.611	3424.111	.340	3424.451	3.00	8.44	1.11	3425.56	.00	.60	1.50	2.000	.000	.00	0 .0
.508	.2157					.0412	.02	.34	3.06	.23	.013	.00	.00	PIPE
1458.119	3424.220	.352	3424.572	3.00	8.05	1.01	3425.58	.00	.60	1.52	2.000	.000	.00	0 .0
.443	.2157					.0361	.02	.35	2.87	.23	.013	.00	.00	PIPE
1458.562	3424.316	.364	3424.680	3.00	7.68	.92	3425.59	.00	.60	1.54	2.000	.000	.00	0 .0
.386	.2157					.0315	.01	.36	2.69	.23	.013	.00	.00	PIPE
1458.948	3424.399	.376	3424.775	3.00	7.32	.83	3425.61	.00	.60	1.56	2.000	.000	.00	0 .0
.333	.2157					.0275	.01	.38	2.52	.23	.013	.00	.00	PIPE
1459.281	3424.471	.389	3424.860	3.00	6.98	.76	3425.62	.00	.60	1.58	2.000	.000	.00	0 .0
.291	.2157					.0240	.01	.39	2.36	.23	.013	.00	.00	PIPE

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 9 EAST, 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
1459.572	3424.533	.402	3424.936	3.00	6.65	.69	3425.62	.00	.60	1.60	2.000	.000	.00	0 .0
.254	.2157					.0210	.01	.40	2.21	.23	.013	.00	.00	PIPE
1459.826	3424.588	.415	3425.003	3.00	6.34	.62	3425.63	.00	.60	1.62	2.000	.000	.00	0 .0
.212	.2157					.0183	.00	.42	2.07	.23	.013	.00	.00	PIPE
1460.038	3424.634	.430	3425.064	3.00	6.05	.57	3425.63	.00	.60	1.64	2.000	.000	.00	0 .0
.189	.2157					.0160	.00	.43	1.94	.23	.013	.00	.00	PIPE
1460.227	3424.675	.444	3425.119	3.00	5.77	.52	3425.64	.00	.60	1.66	2.000	.000	.00	0 .0
.158	.2157					.0140	.00	.44	1.82	.23	.013	.00	.00	PIPE
1460.385	3424.709	.459	3425.168	3.00	5.50	.47	3425.64	.00	.60	1.68	2.000	.000	.00	0 .0
.131	.2157					.0123	.00	.46	1.70	.23	.013	.00	.00	PIPE
1460.516	3424.737	.475	3425.212	3.00	5.24	.43	3425.64	.00	.60	1.70	2.000	.000	.00	0 .0
.111	.2157					.0107	.00	.48	1.59	.23	.013	.00	.00	PIPE
1460.628	3424.761	.491	3425.252	3.00	5.00	.39	3425.64	.00	.60	1.72	2.000	.000	.00	0 .0
.089	.2157					.0094	.00	.49	1.49	.23	.013	.00	.00	PIPE
1460.716	3424.780	.508	3425.288	3.00	4.77	.35	3425.64	.00	.60	1.74	2.000	.000	.00	0 .0
.068	.2157					.0082	.00	.51	1.40	.23	.013	.00	.00	PIPE
1460.784	3424.795	.526	3425.321	3.00	4.54	.32	3425.64	.00	.60	1.76	2.000	.000	.00	0 .0
.053	.2157					.0072	.00	.53	1.31	.23	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 9 EAST, SDDI #6
ATKINS / INTERIM CONDITIONS

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
L/Elem	Ch Slope													
1460.838	3424.806	.544	3425.351	3.00	4.33	.29	3425.64	.00	.60	1.78	2.000	.000	.00	0 .0
.036	.2157					.0063	.00	.54	1.22	.23	.013	.00	.00	PIPE
1460.873	3424.814	.563	3425.377	3.00	4.13	.27	3425.64	.00	.60	1.80	2.000	.000	.00	0 .0
.024	.2157					.0055	.00	.56	1.15	.23	.013	.00	.00	PIPE
1460.898	3424.819	.582	3425.401	3.00	3.94	.24	3425.64	.00	.60	1.82	2.000	.000	.00	0 .0
.003	.2157					.0048	.00	.58	1.07	.23	.013	.00	.00	PIPE
1460.901	3424.820	.604	3425.424	3.00	3.75	.22	3425.64	.00	.60	1.84	2.000	.000	.00	0 .0

C.4 Ultimate Condition WSPG-W Model

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T1 SUMMERLIN WEST VILLAGE 22                                                  0
T2 KETTLE RIDGE DRIVE (STREET J) LAKE MEAD BLVD TO FLEET WING AVE (STREET G)
T3 ATKINS / ULTIMATE CONDITIONS
SO      0.00 3408.37 106                        3413.62
R     214.7352409.46 106
JX    218.7353409.49 106 48   .015   260.00          3409.59        -32.4
R     238.3073409.59 106      .015                                          -5.6   1
TS    250.0313409.61  66      .015
R     306.7643410.20  66      .015                                                 0
JX    308.7643410.22  66 24   .015     2.00                            89.2
R     409.3923410.45  66      .015                                          -3.3   1
JX    412.3923410.55  66 36   .015    63.00          3410.65        -90.0
R     416.8923410.65  66      .015                                                 0
R     606.7113411.41  66      .015                                        -1.46    0
R     614.7893411.45  66      .015                                        -1.51    1
R     622.7113411.50  66      .015                                        -1.49    0
R     630.7113412.54  66      .015                                        -1.51    0
R     889.7923412.85  66      .015                                        -0.40    0
JX    892.7923412.95  60 36 24.013    15.00     2.00 3413.05 3413.05-90.089.5
R     897.2923413.05  60      .013                                                 0
R     970.9163413.58  60      .013                                          -6.7   1
R     975.9163413.78  60      .013                                                 0
R    1161.4693415.05  60      .013                                          -6.0   1
R    1166.4693415.25  60      .013                                                 0
R    1251.4223415.84  60      .013                                          -5.5   1
R    1256.4223416.04  60      .013                                                 0
R    1333.3043416.59  60      .013                                          -0.5   1
JX   1335.8043416.69  60 30   .013    52.00          3416.79        -90.0
R    1338.3043416.79  60      .013                                                 0
R    1429.2143419.51  60      .013                                                 0
JX   1431.2143419.61  54 24   .013     6.00          3418.62         90.0
R    1436.7143419.71  54      .013                                                 0
R    1649.6623433.41  54      .013                                       -11.76    1
R    1654.6623433.61  54      .013                                                 0
R    1752.4573440.05  54      .013                                       -11.22    1
R    1757.4573440.25  54      .013                                                 0
R    1862.9003446.34  54      .013                                       -11.10    1
R    1867.9003446.54  54      .013                                                 0
R    1884.3733447.14  54      .013                                                 0
SH   1884.3733447.14  54                          3447.58
CD  24  4   0    .000   2.000     .000  .000  .000   .00
CD  30  4   0    .000   2.500     .000  .000  .000   .00
CD  36  4   0    .000   3.000     .000  .000  .000   .00
CD  48  4   0    .000   4.000     .000  .000  .000   .00
CD  54  4   0    .000   4.500     .000  .000  .000   .00
CD  60  4   0    .000   5.000     .000  .000  .000   .00
CD  66  3   0   0.000   6.000    6.000
CD 106  3   0   0.000   6.000   10.000
Q           242.00    .0
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SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) LAKE MEAD BLVD TO FLEET WING AVE (STREET G
) ATKINS / ULTIMATE 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	
.000	3408.370	5.250	3413.620	642.00	12.23	2.32	3415.94	.00	5.04	10.00	6.000	10.000	.00	0 .0
.010	-4.6518				.0033	.00	5.25	.94	.00	.014		.00	.00	BOX
.010	3408.323	5.512	3413.836	642.00	11.65	2.11	3415.94	.00	5.04	10.00	6.000	10.000	.00	0 .0
.017	-4.6518				.0029	.00	5.51	.87	.00	.014		.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
.027	3408.244	5.788	3414.032	642.00	11.09	1.91	3415.94	.00	5.04	10.00	6.000	10.000	.00	0 .0
.017	-4.6518				.0027	.00	5.79	.81	.00	.014		.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
.044	3408.165	6.000	3414.165	642.00	10.70	1.78	3415.94	.00	5.04	10.00	6.000	10.000	.00	0 .0
214.691	-4.6518				.0044	.94	6.00	.77	.00	.014		.00	.00	BOX
214.735	2409.460	*******	3415.108	642.00	10.70	1.78	3416.89	.00	5.04	10.00	6.000	10.000	.00	0 .0
JUNCT STR	*******				.0050	.02	******	.77			.015	.00	.00	BOX
218.735	3409.490	6.781	3416.271	382.00	6.37	.63	3416.90	.00	3.57	10.00	6.000	10.000	.00	0 .0
19.572	.0051				.0018	.03	6.78	.46	3.38	.015		.00	.00	BOX
238.307	3409.590	6.758	3416.349	382.00	6.37	.63	3416.98	.00	3.57	10.00	6.000	10.000	.00	0 .0
TRANS STR	.0017				.0018	.02	6.76	.46			.015	.00	.00	BOX

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) LAKE MEAD BLVD TO FLEET WING AVE (STREET G
) ATKINS / ULTIMATE 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	
250.031	3409.610	6.122	3415.732	382.00	10.61	1.75	3417.48	.00	5.01	6.00	6.000	6.000	.00	0 .0
32.811	.0104					.0067	.22	6.12	.76	4.31	.015	.00	.00	BOX
282.842	3409.951	6.000	3415.951	382.00	10.61	1.75	3417.70	.00	5.01	6.00	6.000	6.000	.00	0 .0
18.756	.0104					.0046	.09	6.00	.76	4.31	.015	.00	.00	BOX
301.598	3410.146	5.720	3415.866	382.00	11.13	1.92	3417.79	.00	5.01	6.00	6.000	6.000	.00	0 .0
5.166	.0104					.0051	.03	5.72	.82	4.31	.015	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
306.764	3410.200	5.634	3415.834	382.00	11.30	1.98	3417.82	.00	5.01	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0100					.0050	.01	5.63	.84		.015	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
308.764	3410.220	5.732	3415.952	380.00	11.05	1.90	3417.85	.00	5.00	6.00	6.000	6.000	.00	0 .0
41.276	.0023					.0045	.19	5.73	.81	6.00	.015	.00	.00	BOX
		---------- WARNING - Flow depth near top of box conduit ----------												
350.040	3410.314	6.000	3416.314	380.00	10.56	1.73	3418.04	.00	5.00	6.00	6.000	6.000	.00	0 .0
59.352	.0023					.0066	.39	6.00	.76	6.00	.015	.00	.00	BOX

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SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) LAKE MEAD BLVD TO FLEET WING AVE (STREET G
) ATKINS / ULTIMATE 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
409.392	3410.450	6.308	3416.758	380.00	10.56	1.73	3418.49	.00	5.00	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0334					.0046	.01	6.31	.76		.015	.00	.00	BOX
412.392	3410.550	7.277	3417.827	317.00	8.81	1.20	3419.03	.00	4.43	6.00	6.000	6.000	.00	0 .0
4.500	.0222					.0046	.02	7.28	.63	2.80	.015	.00	.00	BOX
416.892	3410.650	7.197	3417.847	317.00	8.81	1.20	3419.05	.00	4.43	6.00	6.000	6.000	.00	0 .0
189.819	.0040					.0046	.87	7.20	.63	5.43	.015	.00	.00	BOX
606.711	3411.410	7.317	3418.727	317.00	8.81	1.20	3419.93	.00	4.43	6.00	6.000	6.000	.00	0 .0
8.078	.0050					.0046	.04	7.32	.63	4.99	.015	.00	.00	BOX
614.789	3411.450	7.380	3418.830	317.00	8.81	1.20	3420.03	.00	4.43	6.00	6.000	6.000	.00	0 .0
7.922	.0063					.0046	.04	7.38	.63	4.53	.015	.00	.00	BOX
622.711	3411.500	7.372	3418.872	317.00	8.81	1.20	3420.08	.00	4.43	6.00	6.000	6.000	.00	0 .0
8.000	.1300					.0046	.04	7.37	.63	1.49	.015	.00	.00	BOX
630.711	3412.540	6.375	3418.915	317.00	8.81	1.20	3420.12	.00	4.43	6.00	6.000	6.000	.00	0 .0
259.081	.0012					.0046	1.19	6.38	.63	6.00	.015	.00	.00	BOX
889.792	3412.850	7.259	3420.109	317.00	8.81	1.20	3421.31	.00	4.43	6.00	6.000	6.000	.00	0 .0
JUNCT STR	.0333					.0084	.03	7.26	.63		.013	.00	.00	BOX

---------- WARNING - Junction Analysis - Change in Channel Type ----------

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SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) LAKE MEAD BLVD TO FLEET WING AVE (STREET G
) ATKINS / ULTIMATE 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
892.792	3412.950	5.183	3418.133	300.00	15.28	3.62	3421.76	.00	4.67	.00	5.000	.000	.00	0 .0
4.500	.0222					.0133	.06	5.18	.00	3.30	.013	.00	.00	PIPE
897.292	3413.050	5.142	3418.193	300.00	15.28	3.62	3421.82	.00	4.67	.00	5.000	.000	.00	0 .0
73.624	.0072					.0133	.98	5.14	.00	5.00	.013	.00	.00	PIPE
970.916	3413.580	5.851	3419.431	300.00	15.28	3.62	3423.06	.00	4.67	.00	5.000	.000	.00	0 .0
5.000	.0400					.0133	.07	5.85	.00	2.72	.013	.00	.00	PIPE
975.916	3413.780	5.717	3419.497	300.00	15.28	3.62	3423.12	.00	4.67	.00	5.000	.000	.00	0 .0
185.553	.0068					.0133	2.46	5.72	.00	5.00	.013	.00	.00	PIPE
1161.469	3415.050	7.162	3422.212	300.00	15.28	3.62	3425.84	.00	4.67	.00	5.000	.000	.00	0 .0
5.000	.0400					.0133	.07	7.16	.00	2.72	.013	.00	.00	PIPE
1166.469	3415.250	7.029	3422.279	300.00	15.28	3.62	3425.90	.00	4.67	.00	5.000	.000	.00	0 .0
84.953	.0069					.0133	1.13	7.03	.00	5.00	.013	.00	.00	PIPE
1251.422	3415.840	7.813	3423.653	300.00	15.28	3.62	3427.28	.00	4.67	.00	5.000	.000	.00	0 .0
5.000	.0400					.0133	.07	7.81	.00	2.72	.013	.00	.00	PIPE
1256.422	3416.040	7.679	3423.719	300.00	15.28	3.62	3427.34	.00	4.67	.00	5.000	.000	.00	0 .0
16.686	.0072					.0133	.22	7.68	.00	5.00	.013	.00	.00	PIPE
1273.108	3416.159	7.818	3423.978	300.00	15.28	3.62	3427.60	.00	4.67	.00	5.000	.000	.00	0 .0

HYDRAULIC JUMP

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SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) LAKE MEAD BLVD TO FLEET WING AVE (STREET G
) ATKINS / ULTIMATE 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
1273.108	3416.159	2.954	3419.113	300.00	24.85	9.59	3428.70	.00	4.67	4.92	5.000	.000	.00	0 .0
28.458	.0072					.0325	.93	2.95	2.79	5.00	.013	.00	.00	PIPE
1301.566	3416.363	2.856	3419.219	300.00	25.87	10.39	3429.61	.00	4.67	4.95	5.000	.000	.00	0 .0
31.738	.0072					.0365	1.16	2.86	2.98	5.00	.013	.00	.00	PIPE
1333.304	3416.590	2.748	3419.338	300.00	27.14	11.43	3430.77	.00	4.67	4.98	5.000	.000	.00	0 .0
JUNCT STR	.0399					.0592	.15	2.75	3.21		.013	.00	.00	PIPE
1335.804	3416.690	2.002	3418.692	248.00	33.77	17.71	3436.40	.00	4.41	4.90	5.000	.000	.00	0 .0
2.500	.0400					.0799	.20	2.00	4.86	2.43	.013	.00	.00	PIPE
1338.304	3416.790	1.997	3418.787	248.00	33.88	17.82	3436.61	.00	4.41	4.90	5.000	.000	.00	0 .0
8.875	.0299					.0817	.73	2.00	4.88	2.65	.013	.00	.00	PIPE
1347.179	3417.056	1.977	3419.033	248.00	34.33	18.30	3437.34	.00	4.41	4.89	5.000	.000	.00	0 .0
29.785	.0299					.0891	2.65	1.98	4.98	2.65	.013	.00	.00	PIPE
1376.964	3417.947	1.908	3419.855	248.00	36.01	20.13	3439.99	.00	4.41	4.86	5.000	.000	.00	0 .0
27.196	.0299					.1015	2.76	1.91	5.33	2.65	.013	.00	.00	PIPE
1404.160	3418.760	1.842	3420.603	248.00	37.77	22.15	3442.75	.00	4.41	4.82	5.000	.000	.00	0 .0
25.054	.0299					.1158	2.90	1.84	5.70	2.65	.013	.00	.00	PIPE
1429.214	3419.510	1.779	3421.289	248.00	39.61	24.36	3445.65	.00	4.41	4.79	5.000	.000	.00	0 .0
JUNCT STR	.0500					.1282	.26	1.78	6.10		.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) LAKE MEAD BLVD TO FLEET WING AVE (STREET G
) ATKINS / ULTIMATE 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	
1431.214	3419.610	1.801	3421.411	242.00	40.69	25.72	3447.13	.00	4.25	4.41	4.500	.000	.00	0 .0
5.500	.0182					.1354	.74	1.80	6.18	3.38	.013	.00	.00	PIPE
1436.714	3419.710	1.784	3421.494	242.00	41.22	26.38	3447.87	.00	4.25	4.40	4.500	.000	.00	0 .0
6.660	.0643					.1395	.93	1.78	6.29	2.21	.013	.00	.00	PIPE
1443.373	3420.138	1.771	3421.909	242.00	41.60	26.87	3448.78	.00	4.25	4.40	4.500	.000	.00	0 .0
30.263	.0643					.1511	4.57	1.77	6.37	2.21	.013	.00	.00	PIPE
1473.636	3422.085	1.710	3423.795	242.00	43.63	29.56	3453.36	.00	4.25	4.37	4.500	.000	.00	0 .0
26.830	.0643					.1723	4.62	1.71	6.82	2.21	.013	.00	.00	PIPE
1500.466	3423.811	1.650	3425.461	242.00	45.76	32.52	3457.98	.00	4.25	4.34	4.500	.000	.00	0 .0
24.184	.0643					.1964	4.75	1.65	7.30	2.21	.013	.00	.00	PIPE
1524.650	3425.367	1.593	3426.960	242.00	48.00	35.77	3462.73	.00	4.25	4.30	4.500	.000	.00	0 .0
22.046	.0643					.2241	4.94	1.59	7.81	2.21	.013	.00	.00	PIPE
1546.696	3426.785	1.539	3428.324	242.00	50.34	39.35	3467.67	.00	4.25	4.27	4.500	.000	.00	0 .0
20.275	.0643					.2558	5.19	1.54	8.36	2.21	.013	.00	.00	PIPE
1566.971	3428.090	1.486	3429.576	242.00	52.80	43.28	3472.86	.00	4.25	4.23	4.500	.000	.00	0 .0
18.794	.0643					.2919	5.49	1.49	8.94	2.21	.013	.00	.00	PIPE
1585.765	3429.299	1.435	3430.734	242.00	55.37	47.61	3478.34	.00	4.25	4.19	4.500	.000	.00	0 .0
17.521	.0643					.3333	5.84	1.44	9.56	2.21	.013	.00	.00	PIPE

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SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) LAKE MEAD BLVD TO FLEET WING AVE (STREET G
) ATKINS / ULTIMATE 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	
1603.286	3430.426	1.387	3431.813	242.00	58.07	52.37	3484.18	.00	4.25	4.16	4.500	.000	.00	0 .0
16.404	.0643					.3807	6.25	1.39	10.22	2.21	.013	.00	.00	PIPE
1619.690	3431.482	1.340	3432.822	242.00	60.91	57.61	3490.43	.00	4.25	4.12	4.500	.000	.00	0 .0
15.424	.0643					.4349	6.71	1.34	10.92	2.21	.013	.00	.00	PIPE
1635.114	3432.474	1.295	3433.769	242.00	63.88	63.37	3497.14	.00	4.25	4.07	4.500	.000	.00	0 .0
14.548	.0643					.4969	7.23	1.30	11.68	2.21	.013	.00	.00	PIPE
1649.662	3433.410	1.252	3434.662	242.00	67.00	69.71	3504.37	.00	4.25	4.03	4.500	.000	.00	0 .0
5.000	.0400					.5437	2.72	1.25	12.48	2.55	.013	.00	.00	PIPE
1654.662	3433.610	1.236	3434.846	242.00	68.21	72.25	3507.09	.00	4.25	4.02	4.500	.000	.00	0 .0
9.441	.0659					.5842	5.51	1.24	12.79	2.20	.013	.00	.00	PIPE
1664.103	3434.232	1.206	3435.438	242.00	70.50	77.18	3512.62	.00	4.25	3.99	4.500	.000	.00	0 .0
13.037	.0659					.6548	8.54	1.21	13.39	2.20	.013	.00	.00	PIPE
1677.139	3435.090	1.166	3436.256	242.00	73.94	84.90	3521.16	.00	4.25	3.94	4.500	.000	.00	0 .0
12.378	.0659					.7486	9.27	1.17	14.30	2.20	.013	.00	.00	PIPE
1689.517	3435.906	1.127	3437.033	242.00	77.55	93.39	3530.42	.00	4.25	3.90	4.500	.000	.00	0 .0
11.772	.0659					.8560	10.08	1.13	15.28	2.20	.013	.00	.00	PIPE
1701.289	3436.681	1.090	3437.771	242.00	81.34	102.73	3540.50	.00	4.25	3.86	4.500	.000	.00	0 .0
11.209	.0659					.9791	10.98	1.09	16.32	2.20	.013	.00	.00	PIPE

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) LAKE MEAD BLVD TO FLEET WING AVE (STREET G
) ATKINS / ULTIMATE 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	
1712.499	3437.419	1.054	3438.473	242.00	85.31	113.00	3551.48	.00	4.25	3.81	4.500	.000	.00	0 .0
10.689	.0659					1.1198	11.97	1.05	17.43	2.20	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 1.11981														
1723.188	3438.123	1.019	3439.142	242.00	89.47	124.31	3563.45	.00	4.25	3.77	4.500	.000	.00	0 .0
10.204	.0659					1.2807	13.07	1.02	18.61	2.20	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 1.28067														
1733.392	3438.795	.985	3439.780	242.00	93.84	136.74	3576.52	.00	4.25	3.72	4.500	.000	.00	0 .0
9.749	.0659					1.4652	14.28	.99	19.87	2.20	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 1.46520														
1743.140	3439.437	.953	3440.390	242.00	98.42	150.41	3590.80	.00	4.25	3.68	4.500	.000	.00	0 .0
9.317	.0659					1.6769	15.62	.95	21.21	2.20	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 1.67695														
1752.457	3440.050	.922	3440.972	242.00	103.22	165.45	3606.42	.00	4.25	3.63	4.500	.000	.00	0 .0
5.000	.0400					1.8612	9.31	.92	22.64	2.55	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 1.86124														
1757.457	3440.250	.905	3441.155	242.00	106.06	174.66	3615.81	.00	4.25	3.61	4.500	.000	.00	0 .0
4.862	.0578					2.0056	9.75	.90	23.50	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 2.00555														
1762.319	3440.531	.888	3441.419	242.00	108.84	183.94	3625.36	.00	4.25	3.58	4.500	.000	.00	0 .0
8.459	.0578					2.2289	18.85	.89	24.34	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 2.22887														
1770.778	3441.020	.859	3441.879	242.00	114.15	202.33	3644.21	.00	4.25	3.54	4.500	.000	.00	0 .0
8.103	.0578					2.5513	20.67	.86	25.98	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 2.55128														
1778.881	3441.488	.831	3442.319	242.00	119.72	222.56	3664.88	.00	4.25	3.49	4.500	.000	.00	0 .0
7.765	.0578					2.9207	22.68	.83	27.73	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 2.92069														

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) LAKE MEAD BLVD TO FLEET WING AVE (STREET G
) ATKINS / ULTIMATE 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	
1786.646	3441.936	.804	3442.740	242.00	125.56	244.82	3687.56	.00	4.25	3.45	4.500	.000	.00	0 .0
7.442	.0578					3.3441	24.89	.80	29.60	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 3.34411														
1794.087	3442.366	.778	3443.144	242.00	131.69	269.30	3712.44	.00	4.25	3.40	4.500	.000	.00	0 .0
7.136	.0578					3.8277	27.32	.78	31.58	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 3.82771														
1801.224	3442.778	.752	3443.530	242.00	138.12	296.23	3739.76	.00	4.25	3.36	4.500	.000	.00	0 .0
6.844	.0578					4.3824	29.99	.75	33.70	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 4.38244														
1808.068	3443.173	.728	3443.901	242.00	144.86	325.85	3769.76	.00	4.25	3.31	4.500	.000	.00	0 .0
6.564	.0578					5.0184	32.94	.73	35.96	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 5.01835														
1814.632	3443.552	.704	3444.256	242.00	151.93	358.44	3802.70	.00	4.25	3.27	4.500	.000	.00	0 .0
6.295	.0578					5.7486	36.19	.70	38.36	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 5.74860														
1820.927	3443.916	.682	3444.598	242.00	159.35	394.28	3838.88	.00	4.25	3.23	4.500	.000	.00	0 .0
6.036	.0578					6.5867	39.75	.68	40.94	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 6.58667														
1826.962	3444.264	.660	3444.925	242.00	167.13	433.71	3878.64	.00	4.25	3.18	4.500	.000	.00	0 .0
5.792	.0578					7.5415	43.68	.66	43.67	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 7.54155														
1832.755	3444.599	.638	3445.237	242.00	175.28	477.08	3922.32	.00	4.25	3.14	4.500	.000	.00	0 .0
5.557	.0578					8.6387	48.01	.64	46.58	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 8.63872														
1838.312	3444.920	.618	3445.538	242.00	183.84	524.79	3970.33	.00	4.25	3.10	4.500	.000	.00	0 .0
5.331	.0578					9.8987	52.77	.62	49.70	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 9.89869														

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) LAKE MEAD BLVD TO FLEET WING AVE (STREET G
) ATKINS / ULTIMATE 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	
1843.643	3445.228	.598	3445.826	242.00	192.81	577.27	4023.10	.00	4.25	3.06	4.500	.000	.00	0 .0
5.117	.0578					11.3343	58.00	.60	53.01	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 11.33427														
1848.760	3445.523	.578	3446.102	242.00	202.22	635.00	4081.10	.00	4.25	3.01	4.500	.000	.00	0 .0
4.911	.0578					12.9853	63.76	.58	56.53	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 12.98533														
1853.671	3445.807	.560	3446.367	242.00	212.09	698.50	4144.86	.00	4.25	2.97	4.500	.000	.00	0 .0
4.710	.0578					14.8832	70.10	.56	60.31	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 14.88324														
1858.381	3446.079	.542	3446.621	242.00	222.44	768.35	4214.97	.00	4.25	2.93	4.500	.000	.00	0 .0
4.519	.0578					17.0566	77.08	.54	64.33	2.28	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 17.05660														
1862.900	3446.340	.525	3446.865	242.00	233.30	845.18	4292.05	.00	4.25	2.89	4.500	.000	.00	0 .0
.698	.0400					18.4287	12.87	.52	68.62	2.55	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 18.42869														
1863.598	3446.368	.522	3446.890	242.00	235.17	858.76	4305.65	.00	4.25	2.88	4.500	.000	.00	0 .0
4.302	.0400					19.9986	86.03	.52	69.36	2.55	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 19.99863														
1867.900	3446.540	.505	3447.045	242.00	246.65	944.63	4391.68	.00	4.25	2.84	4.500	.000	.00	0 .0
1.085	.0364					21.7225	23.57	.51	73.97	2.63	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 21.72253														
1868.985	3446.579	.501	3447.081	242.00	249.58	967.22	4414.30	.00	4.25	2.83	4.500	.000	.00	0 .0
4.087	.0364					23.6998	96.86	.50	75.15	2.63	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 23.69976														
1873.072	3446.728	.485	3447.213	242.00	261.76	******	4511.15	.00	4.25	2.79	4.500	.000	.00	0 .0
3.923	.0364					27.1516	106.52	.49	80.15	2.63	.013	.00	.00	PIPE
WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION, AVERAGE FRICTION SLOPE = 27.15158														

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FILE: SJ_Ultimate.WSW                    W S P G W - CIVILDESIGN Version 14.06                                    PAGE   11
                              Program Package Serial Number: 1615
                                                WATER SURFACE PROFILE LISTING                    Date: 7-15-2019  Time: 3:53:43
                        SUMMERLIN WEST VILLAGE 22
                          KETTLE RIDGE DRIVE (STREET J) LAKE MEAD BLVD TO FLEET WING AVE (STREET G
                        )   ATKINS / ULTIMATE CONDITIONS
************************************************************************************************************************ ********
         | Invert  |  Depth |  Water  |    Q    |  Vel     Vel  |  Energy | Super |Critical|Flow Top|Height/|Base Wt|      |No Wth
 Station |  Elev   |  (FT)  |  Elev   |  (CFS)  | (FPS)    Head |  Grd.El.|  Elev | Depth  | Width  |Dia.-FT|or I.D.|  ZL  |Prs/Pip
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-    -|
 L/Elem  |Ch Slope |        |         |         |         SF Ave|    HF   |SE Dpth|Froude N|Norm Dp |  "N"  | X-Fall|  ZR  |Type Ch
*********|*********|********|*********|*********|*******|*******|*********|*******|********|********|*******|*******|***** |*******
         |         |        |         |         |               |         |       |        |        |       |       |      |
 1876.995  3446.871     .469  3447.340    242.00  274.54  ******  4617.68     .00    4.25     2.75    4.500     .000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    3.766    .0364                                      31.1081   117.16      .47   85.46    2.63    .013       .00   .00  PIPE
  WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION,  AVERAGE FRICTION SLOPE =  31.10813
         |         |        |         |         |               |         |       |        |        |       |       |      |
 1880.761  3447.008     .454  3447.462    242.00  287.93  ******  4734.83     .00    4.25     2.71    4.500     .000   .00   0   .0
        -|-       -|-      -|-       -|-       -|-     -|-     -|-       -|-     -|-      -|-      -|-     -|-     -|-     |-
    3.612    .0364                                      35.6723   128.85      .45   91.13    2.63    .013       .00   .00  PIPE
  WARNING: POSSIBLE ERROR IN CALCULATIONS, PROGRAM USES MANNINGS, EQUATION,  AVERAGE FRICTION SLOPE =  35.67231
         |         |        |         |         |               |         |       |        |        |       |       |      |
 1884.373  3447.140     .440  3447.580    242.00  301.99  ******  4863.69     .00    4.25     2.67    4.500     .000   .
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T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+30 WEST, SDDI #1
T3 ATKINS / ULTIMATE CONDITIONS
SO    308.7643410.41  24                          3415.8
R     333.4043416.57  24      .013
SH    333.4043416.57  24
CD  24  4   0    .000   2.000     .000  .000  .000    .00
Q             2.000   .0
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FILE: SJ_Lateral-DI1_ult.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 1

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:13:57

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+30 WEST, SDDI #1
ATKINS / ULTIMATE 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
308.764	3410.410	5.390	3415.800	2.00	.64	.01	3415.81	.00	.49	.00	2.000	.000	.00	0 .0
13.564	.2500					.0001	.00	5.39	.00	.18	.013	.00	.00	PIPE
322.328	3413.801	2.000	3415.801	2.00	.64	.01	3415.81	.00	.49	.00	2.000	.000	.00	0 .0
.737	.2500					.0001	.00	2.00	.00	.18	.013	.00	.00	PIPE
323.066	3413.985	1.814	3415.800	2.00	.67	.01	3415.81	.00	.49	1.16	2.000	.000	.00	0 .0
.429	.2500					.0001	.00	1.81	.07	.18	.013	.00	.00	PIPE
323.495	3414.093	1.706	3415.799	2.00	.70	.01	3415.81	.00	.49	1.42	2.000	.000	.00	0 .0
.349	.2500					.0001	.00	1.71	.09	.18	.013	.00	.00	PIPE
323.844	3414.180	1.618	3415.798	2.00	.73	.01	3415.81	.00	.49	1.57	2.000	.000	.00	0 .0
.309	.2500					.0001	.00	1.62	.10	.18	.013	.00	.00	PIPE
324.153	3414.257	1.540	3415.797	2.00	.77	.01	3415.81	.00	.49	1.68	2.000	.000	.00	0 .0
.276	.2500					.0001	.00	1.54	.11	.18	.013	.00	.00	PIPE
324.429	3414.326	1.470	3415.796	2.00	.81	.01	3415.81	.00	.49	1.77	2.000	.000	.00	0 .0
.252	.2500					.0001	.00	1.47	.12	.18	.013	.00	.00	PIPE
324.681	3414.389	1.406	3415.795	2.00	.85	.01	3415.81	.00	.49	1.83	2.000	.000	.00	0 .0
.236	.2500					.0001	.00	1.41	.13	.18	.013	.00	.00	PIPE
324.917	3414.448	1.346	3415.794	2.00	.89	.01	3415.81	.00	.49	1.88	2.000	.000	.00	0 .0
.215	.2500					.0001	.00	1.35	.14	.18	.013	.00	.00	PIPE

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:13:57

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+30 WEST, SDDI #1
ATKINS / ULTIMATE 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
325.132	3414.502	1.291	3415.793	2.00	.93	.01	3415.81	.00	.49	1.91	2.000	.000	.00	0 .0
.203	.2500					.0001	.00	1.29	.16	.18	.013	.00	.00	PIPE
325.335	3414.552	1.239	3415.792	2.00	.98	.01	3415.81	.00	.49	1.94	2.000	.000	.00	0 .0
.186	.2500					.0002	.00	1.24	.17	.18	.013	.00	.00	PIPE
325.521	3414.599	1.191	3415.790	2.00	1.03	.02	3415.81	.00	.49	1.96	2.000	.000	.00	0 .0
.178	.2500					.0002	.00	1.19	.18	.18	.013	.00	.00	PIPE
325.699	3414.644	1.145	3415.789	2.00	1.08	.02	3415.81	.00	.49	1.98	2.000	.000	.00	0 .0
.169	.2500					.0002	.00	1.15	.20	.18	.013	.00	.00	PIPE
325.868	3414.686	1.101	3415.787	2.00	1.13	.02	3415.81	.00	.49	1.99	2.000	.000	.00	0 .0
.156	.2500					.0002	.00	1.10	.21	.18	.013	.00	.00	PIPE
326.024	3414.725	1.060	3415.785	2.00	1.18	.02	3415.81	.00	.49	2.00	2.000	.000	.00	0 .0
.151	.2500					.0003	.00	1.06	.23	.18	.013	.00	.00	PIPE
326.175	3414.763	1.020	3415.783	2.00	1.24	.02	3415.81	.00	.49	2.00	2.000	.000	.00	0 .0
.139	.2500					.0003	.00	1.02	.24	.18	.013	.00	.00	PIPE
326.314	3414.797	.983	3415.781	2.00	1.30	.03	3415.81	.00	.49	2.00	2.000	.000	.00	0 .0
.123	.2500					.0004	.00	.98	.26	.18	.013	.00	.00	PIPE
326.437	3414.828	.947	3415.775	2.00	1.37	.03	3415.80	.00	.49	2.00	2.000	.000	.00	0 .0

HYDRAULIC JUMP

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:13:57

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+30 WEST, SDDI #1
ATKINS / ULTIMATE 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
326.437	3414.828	.214	3415.042	2.00	11.07	1.90	3416.94	.00	.49	1.24	2.000	.000	.00	0 .0
.102	.2500					.1256	.01	.21	5.10	.18	.013	.00	.00	PIPE
326.539	3414.854	.221	3415.075	2.00	10.53	1.72	3416.80	.00	.49	1.25	2.000	.000	.00	0 .0
1.060	.2500					.1090	.12	.22	4.77	.18	.013	.00	.00	PIPE
327.599	3415.119	.228	3415.347	2.00	10.04	1.56	3416.91	.00	.49	1.27	2.000	.000	.00	0 .0
.867	.2500					.0952	.08	.23	4.47	.18	.013	.00	.00	PIPE
328.466	3415.336	.236	3415.572	2.00	9.57	1.42	3416.99	.00	.49	1.29	2.000	.000	.00	0 .0
.727	.2500					.0831	.06	.24	4.19	.18	.013	.00	.00	PIPE
329.192	3415.517	.244	3415.761	2.00	9.12	1.29	3417.05	.00	.49	1.31	2.000	.000	.00	0 .0
.617	.2500					.0726	.04	.24	3.93	.18	.013	.00	.00	PIPE
329.810	3415.672	.252	3415.924	2.00	8.70	1.18	3417.10	.00	.49	1.33	2.000	.000	.00	0 .0
.529	.2500					.0633	.03	.25	3.68	.18	.013	.00	.00	PIPE
330.339	3415.804	.260	3416.064	2.00	8.30	1.07	3417.13	.00	.49	1.35	2.000	.000	.00	0 .0
.452	.2500					.0552	.02	.26	3.45	.18	.013	.00	.00	PIPE
330.792	3415.917	.269	3416.186	2.00	7.91	.97	3417.16	.00	.49	1.36	2.000	.000	.00	0 .0
.393	.2500					.0482	.02	.27	3.24	.18	.013	.00	.00	PIPE
331.185	3416.015	.278	3416.293	2.00	7.54	.88	3417.18	.00	.49	1.38	2.000	.000	.00	0 .0
.343	.2500					.0421	.01	.28	3.04	.18	.013	.00	.00	PIPE

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:13:57

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+30 WEST, SDDI #1
ATKINS / ULTIMATE 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
331.527	3416.101	.287	3416.388	2.00	7.19	.80	3417.19	.00	.49	1.40	2.000	.000	.00	0 .0
.295	.2500					.0368	.01	.29	2.85	.18	.013	.00	.00	PIPE
331.823	3416.175	.297	3416.472	2.00	6.86	.73	3417.20	.00	.49	1.42	2.000	.000	.00	0 .0
.259	.2500					.0321	.01	.30	2.67	.18	.013	.00	.00	PIPE
332.081	3416.239	.307	3416.546	2.00	6.54	.66	3417.21	.00	.49	1.44	2.000	.000	.00	0 .0
.227	.2500					.0280	.01	.31	2.50	.18	.013	.00	.00	PIPE
332.308	3416.296	.317	3416.613	2.00	6.23	.60	3417.22	.00	.49	1.46	2.000	.000	.00	0 .0
.194	.2500					.0245	.00	.32	2.34	.18	.013	.00	.00	PIPE
332.502	3416.344	.328	3416.673	2.00	5.94	.55	3417.22	.00	.49	1.48	2.000	.000	.00	0 .0
.170	.2500					.0214	.00	.33	2.20	.18	.013	.00	.00	PIPE
332.672	3416.387	.339	3416.726	2.00	5.67	.50	3417.22	.00	.49	1.50	2.000	.000	.00	0 .0
.148	.2500					.0187	.00	.34	2.06	.18	.013	.00	.00	PIPE
332.820	3416.424	.350	3416.774	2.00	5.40	.45	3417.23	.00	.49	1.52	2.000	.000	.00	0 .0
.125	.2500					.0163	.00	.35	1.93	.18	.013	.00	.00	PIPE
332.945	3416.455	.362	3416.817	2.00	5.15	.41	3417.23	.00	.49	1.54	2.000	.000	.00	0 .0
.108	.2500					.0142	.00	.36	1.81	.18	.013	.00	.00	PIPE
333.053	3416.482	.374	3416.856	2.00	4.91	.37	3417.23	.00	.49	1.56	2.000	.000	.00	0 .0
.089	.2500					.0124	.00	.37	1.69	.18	.013	.00	.00	PIPE

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:13:57

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 58+30 WEST, SDDI #1
ATKINS / ULTIMATE 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	
333.142	3416.505	.387	3416.892	2.00	4.68	.34	3417.23	.00	.49	1.58	2.000	.000	.00	0 .0
.075	.2500					.0109	.00	.39	1.59	.18	.013	.00	.00	PIPE
333.217	3416.523	.400	3416.924	2.00	4.46	.31	3417.23	.00	.49	1.60	2.000	.000	.00	0 .0
.059	.2500					.0095	.00	.40	1.49	.18	.013	.00	.00	PIPE
333.276	3416.538	.414	3416.952	2.00	4.26	.28	3417.23	.00	.49	1.62	2.000	.000	.00	0 .0
.048	.2500					.0083	.00	.41	1.39	.18	.013	.00	.00	PIPE
333.324	3416.550	.428	3416.978	2.00	4.06	.26	3417.23	.00	.49	1.64	2.000	.000	.00	0 .0
.038	.2500					.0073	.00	.43	1.31	.18	.013	.00	.00	PIPE
333.362	3416.560	.442	3417.002	2.00	3.87	.23	3417.23	.00	.49	1.66	2.000	.000	.00	0 .0
.025	.2500					.0063	.00	.44	1.22	.18	.013	.00	.00	PIPE
333.387	3416.566	.457	3417.023	2.00	3.69	.21	3417.23	.00	.49	1.68	2.000	.000	.00	0 .0
.013	.2500					.0055	.00	.46	1.14	.18	.013	.00	.00	PIPE
333.400	3416.569	.473	3417.042	2.00	3.52	.19	3417.23	.00	.49	1.70	2.000	.000	.00	0 .0
.004	.2500					.0048	.00	.47	1.07	.18	.013	.00	.00	PIPE
333.404	3416.570	.491	3417.061	2.00	3.34	.17	3417.23	.00	.49	1.72	2.000	.000	.00	0 .0

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T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 2 EAST, SDDI #2
T3 ATKINS / ULTIMATE CONDITIONS
SO    412.39 3410.65  36                          3416.8
R     458.39 3413.82  36      .013
SH    458.39 3413.82  36
CD  36  4   0    .000   3.000     .000  .000  .000    .00
Q             59.000    .0
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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:14:33

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 2 EAST, SDDI #2
ATKINS / ULTIMATE 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	
412.390	3410.650	6.150	3416.800	59.00	8.35	1.08	3417.88	.00	2.48	.00	3.000	.000	.00	0 .0
46.000	.0689				.0078	.36	6.15	.00	1.20	.013	.00	.00	PIPE	
458.390	3413.820	3.340	3417.160	59.00	8.35	1.08	3418.24	.00	2.48	.00	3.000	.000	.00	0 .0

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T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 4 EAST, SDDI #3
T3 ATKINS / ULTIMATE CONDITIONS
SO    892.7923413.05  36                          3420.1
R     938.7923417.50  36      .013
SH    938.7923417.50  36
CD  36  4   0     .000   3.000     .000  .000  .000    .00
Q               6.000    .0
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FILE: SJ_Lateral-DI3_ult.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 1

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:15: 1

SUMMERLIN WEST VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 4 EAST, SDDI #3

ATKINS / ULTIMATE 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	
892.792	3413.050	7.050	3420.100	6.00	.85	.01	3420.11	.00	.77	.00	3.000	.000	.00	0 .0
41.901	.0967					.0001	.00	7.05	.00	.35	.013	.00	.00	PIPE
934.693	3417.104	3.000	3420.104	6.00	.85	.01	3420.11	.00	.77	.00	3.000	.000	.00	0 .0
2.863	.0967					.0001	.00	3.00	.00	.35	.013	.00	.00	PIPE
937.557	3417.381	2.721	3420.102	6.00	.89	.01	3420.11	.00	.77	1.74	3.000	.000	.00	0 .0
1.235	.0967					.0001	.00	2.72	.08	.35	.013	.00	.00	PIPE
938.792	3417.500	2.601	3420.101	6.00	.92	.01	3420.11	.00	.77	2.04	3.000	.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 4 WEST, SDDI #4
T3 ATKINS / ULTIMATE CONDITIONS
SO    892.7923413.05  36                          3420.1
R     919.2123417.60  24      .013
SH    919.2123417.60  24
CD  36  4   0    .000   3.000     .000  .000  .000    .00
CD  24  4   0    .000   2.000     .000  .000  .000    .00
Q            2.000    .0
```

FILE: SJ_Lateral-DI4_ult.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 1

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:15:28

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 4 WEST, SDDI #4
ATKINS / ULTIMATE 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	
892.792	3413.050	7.050	3420.100	2.00	.64	.01	3420.11	.00	.49	.00	2.000	.000	.00	0 .0
26.420	.1722				.0001	.00	7.05	.00	.20	.013	.00	.00	PIPE	
919.212	3417.600	2.502	3420.102	2.00	.64	.01	3420.11	.00	.49	.00	2.000	.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 8 EAST, SDDI #5
T3 ATKINS / ULTIMATE CONDITIONS
SO   1335.8413416.79  30                          3419.3
R    1386.1013422.17  30      .013
SH   1386.1013422.17  30
CD  30   4    0     .000    2.500      .000   .000   .000     .00
Q              58.000     .0
```

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:16: 0

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 8 EAST, SDDI #5
ATKINS / ULTIMATE 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
1335.841	3416.790	1.387	3418.177	58.00	20.74	6.68	3424.86	.00	2.38	2.48	2.500	.000	.00	0 .0
4.705	.1070					.0552	.26	1.39	3.45	1.15	.013	.00	.00	PIPE
1340.546	3417.294	1.410	3418.704	58.00	20.32	6.41	3425.12	.00	2.38	2.48	2.500	.000	.00	0 .0
9.340	.1070					.0506	.47	1.41	3.34	1.15	.013	.00	.00	PIPE
1349.886	3418.293	1.466	3419.760	58.00	19.38	5.83	3425.59	.00	2.38	2.46	2.500	.000	.00	0 .0
7.547	.1070					.0448	.34	1.47	3.10	1.15	.013	.00	.00	PIPE
1357.432	3419.101	1.526	3420.627	58.00	18.48	5.30	3425.93	.00	2.38	2.44	2.500	.000	.00	0 .0
6.215	.1070					.0396	.25	1.53	2.87	1.15	.013	.00	.00	PIPE
1363.647	3419.767	1.589	3421.356	58.00	17.62	4.82	3426.17	.00	2.38	2.41	2.500	.000	.00	0 .0
5.162	.1070					.0352	.18	1.59	2.65	1.15	.013	.00	.00	PIPE
1368.810	3420.319	1.656	3421.975	58.00	16.80	4.38	3426.36	.00	2.38	2.36	2.500	.000	.00	0 .0
4.305	.1070					.0313	.13	1.66	2.45	1.15	.013	.00	.00	PIPE
1373.115	3420.780	1.728	3422.508	58.00	16.02	3.98	3426.49	.00	2.38	2.31	2.500	.000	.00	0 .0
3.588	.1070					.0279	.10	1.73	2.25	1.15	.013	.00	.00	PIPE
1376.702	3421.164	1.806	3422.970	58.00	15.27	3.62	3426.59	.00	2.38	2.24	2.500	.000	.00	0 .0
2.974	.1070					.0249	.07	1.81	2.07	1.15	.013	.00	.00	PIPE
1379.676	3421.482	1.891	3423.374	58.00	14.56	3.29	3426.67	.00	2.38	2.15	2.500	.000	.00	0 .0
2.437	.1070					.0224	.05	1.89	1.88	1.15	.013	.00	.00	PIPE

FILE: SJ_Lateral-DI5_ult.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 2

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:16: 0

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 8 EAST, SDDI #5
ATKINS / ULTIMATE 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	
1382.113	3421.743	1.984	3423.727	58.00	13.88	2.99	3426.72	.00	2.38	2.02	2.500	.000	.00	0 .0
1.925	.1070					.0203	.04	1.98	1.70	1.15	.013	.00	.00	PIPE
1384.038	3421.949	2.089	3424.038	58.00	13.24	2.72	3426.76	.00	2.38	1.85	2.500	.000	.00	0 .0
1.394	.1070					.0186	.03	2.09	1.52	1.15	.013	.00	.00	PIPE
1385.432	3422.098	2.213	3424.312	58.00	12.62	2.47	3426.78	.00	2.38	1.59	2.500	.000	.00	0 .0
.669	.1070					.0176	.01	2.21	1.31	1.15	.013	.00	.00	PIPE
1386.101	3422.170	2.379	3424.549	58.00	12.03	2.25	3426.80	.00	2.38	1.07	2.500	.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 9 EAST, SDDI #6
T3 ATKINS / ULTIMATE CONDITIONS
SO   1431.2143419.71  24                          3421.3
R    1459.9643424.82  24      .013
SH   1459.9643424.82  24
CD  24   4    0     .000    2.000      .000   .000   .000     .00
Q              3.000    .0
```

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:16:35

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 9 EAST, SDDI #6
ATKINS / ULTIMATE 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
1431.214	3419.710	1.590	3421.300	3.00	1.12	.02	3421.32	.00	.60	1.61	2.000	.000	.00	0 .0
.411	.1777					.0002	.00	1.59	.15	.24	.013	.00	.00	PIPE
1431.625	3419.783	1.515	3421.298	3.00	1.17	.02	3421.32	.00	.60	1.71	2.000	.000	.00	0 .0
.371	.1777					.0002	.00	1.52	.17	.24	.013	.00	.00	PIPE
1431.996	3419.849	1.447	3421.296	3.00	1.23	.02	3421.32	.00	.60	1.79	2.000	.000	.00	0 .0
.336	.1777					.0002	.00	1.45	.19	.24	.013	.00	.00	PIPE
1432.332	3419.909	1.385	3421.294	3.00	1.29	.03	3421.32	.00	.60	1.85	2.000	.000	.00	0 .0
.312	.1777					.0003	.00	1.39	.20	.24	.013	.00	.00	PIPE
1432.645	3419.964	1.327	3421.292	3.00	1.36	.03	3421.32	.00	.60	1.89	2.000	.000	.00	0 .0
.288	.1777					.0003	.00	1.33	.22	.24	.013	.00	.00	PIPE
1432.933	3420.016	1.273	3421.289	3.00	1.42	.03	3421.32	.00	.60	1.92	2.000	.000	.00	0 .0
.151	.1777					.0003	.00	1.27	.24	.24	.013	.00	.00	PIPE
1433.084	3420.042	1.222	3421.265	3.00	1.49	.03	3421.30	.00	.60	1.95	2.000	.000	.00	0 .0
HYDRAULIC JUMP														
1433.084	3420.042	.250	3420.293	3.00	13.23	2.72	3423.01	.00	.60	1.32	2.000	.000	.00	0 .0
2.803	.1777					.1538	.43	.25	5.63	.24	.013	.00	.00	PIPE
1435.887	3420.541	.253	3420.794	3.00	12.97	2.61	3423.40	.00	.60	1.33	2.000	.000	.00	0 .0
6.039	.1777					.1398	.84	.25	5.48	.24	.013	.00	.00	PIPE

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Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:16:35

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 9 EAST, SDDI #6
ATKINS / ULTIMATE 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	
1441.926	3421.614	.261	3421.875	3.00	12.36	2.37	3424.25	.00	.60	1.35	2.000	.000	.00	0 .0
3.707	.1777					.1220	.45	.26	5.13	.24	.013	.00	.00	PIPE
1445.633	3422.273	.270	3422.543	3.00	11.79	2.16	3424.70	.00	.60	1.37	2.000	.000	.00	0 .0
2.627	.1777					.1065	.28	.27	4.81	.24	.013	.00	.00	PIPE
1448.260	3422.740	.279	3423.019	3.00	11.24	1.96	3424.98	.00	.60	1.39	2.000	.000	.00	0 .0
1.987	.1777					.0931	.18	.28	4.51	.24	.013	.00	.00	PIPE
1450.247	3423.093	.289	3423.382	3.00	10.72	1.78	3425.17	.00	.60	1.41	2.000	.000	.00	0 .0
1.587	.1777					.0813	.13	.29	4.23	.24	.013	.00	.00	PIPE
1451.834	3423.375	.298	3423.673	3.00	10.22	1.62	3425.29	.00	.60	1.42	2.000	.000	.00	0 .0
1.286	.1777					.0709	.09	.30	3.97	.24	.013	.00	.00	PIPE
1453.120	3423.604	.308	3423.912	3.00	9.74	1.47	3425.39	.00	.60	1.44	2.000	.000	.00	0 .0
1.070	.1777					.0619	.07	.31	3.72	.24	.013	.00	.00	PIPE
1454.190	3423.794	.318	3424.112	3.00	9.29	1.34	3425.45	.00	.60	1.46	2.000	.000	.00	0 .0
.896	.1777					.0540	.05	.32	3.48	.24	.013	.00	.00	PIPE
1455.085	3423.953	.329	3424.282	3.00	8.86	1.22	3425.50	.00	.60	1.48	2.000	.000	.00	0 .0
.764	.1777					.0472	.04	.33	3.27	.24	.013	.00	.00	PIPE
1455.849	3424.089	.340	3424.429	3.00	8.44	1.11	3425.54	.00	.60	1.50	2.000	.000	.00	0 .0
.649	.1777					.0412	.03	.34	3.06	.24	.013	.00	.00	PIPE

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:16:35

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 9 EAST, SDDI #6
ATKINS / ULTIMATE 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
1456.498	3424.204	.352	3424.556	3.00	8.05	1.01	3425.56	.00	.60	1.52	2.000	.000	.00	0 .0
.561	.1777					.0361	.02	.35	2.87	.24	.013	.00	.00	PIPE
1457.059	3424.304	.364	3424.668	3.00	7.68	.92	3425.58	.00	.60	1.54	2.000	.000	.00	0 .0
.487	.1777					.0315	.02	.36	2.69	.24	.013	.00	.00	PIPE
1457.546	3424.390	.376	3424.767	3.00	7.32	.83	3425.60	.00	.60	1.56	2.000	.000	.00	0 .0
.417	.1777					.0275	.01	.38	2.52	.24	.013	.00	.00	PIPE
1457.963	3424.464	.389	3424.854	3.00	6.98	.76	3425.61	.00	.60	1.58	2.000	.000	.00	0 .0
.363	.1777					.0240	.01	.39	2.36	.24	.013	.00	.00	PIPE
1458.326	3424.529	.402	3424.931	3.00	6.65	.69	3425.62	.00	.60	1.60	2.000	.000	.00	0 .0
.316	.1777					.0210	.01	.40	2.21	.24	.013	.00	.00	PIPE
1458.641	3424.585	.415	3425.000	3.00	6.34	.62	3425.63	.00	.60	1.62	2.000	.000	.00	0 .0
.262	.1777					.0183	.00	.42	2.07	.24	.013	.00	.00	PIPE
1458.904	3424.632	.430	3425.062	3.00	6.05	.57	3425.63	.00	.60	1.64	2.000	.000	.00	0 .0
.233	.1777					.0160	.00	.43	1.94	.24	.013	.00	.00	PIPE
1459.137	3424.673	.444	3425.117	3.00	5.77	.52	3425.63	.00	.60	1.66	2.000	.000	.00	0 .0
.195	.1777					.0140	.00	.44	1.82	.24	.013	.00	.00	PIPE
1459.332	3424.708	.459	3425.167	3.00	5.50	.47	3425.64	.00	.60	1.68	2.000	.000	.00	0 .0
.161	.1777					.0123	.00	.46	1.70	.24	.013	.00	.00	PIPE

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WATER SURFACE PROFILE LISTING Date: 7-15-2019 Time: 4:16:35

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT MH 9 EAST, SDDI #6
ATKINS / ULTIMATE 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
1459.493	3424.736	.475	3425.211	3.00	5.24	.43	3425.64	.00	.60	1.70	2.000	.000	.00	0 .0
.137	.1777					.0107	.00	.48	1.59	.24	.013	.00	.00	PIPE
1459.630	3424.760	.491	3425.252	3.00	5.00	.39	3425.64	.00	.60	1.72	2.000	.000	.00	0 .0
.109	.1777					.0094	.00	.49	1.49	.24	.013	.00	.00	PIPE
1459.738	3424.780	.508	3425.288	3.00	4.77	.35	3425.64	.00	.60	1.74	2.000	.000	.00	0 .0
.083	.1777					.0082	.00	.51	1.40	.24	.013	.00	.00	PIPE
1459.821	3424.794	.526	3425.321	3.00	4.54	.32	3425.64	.00	.60	1.76	2.000	.000	.00	0 .0
.065	.1777					.0072	.00	.53	1.31	.24	.013	.00	.00	PIPE
1459.887	3424.806	.544	3425.350	3.00	4.33	.29	3425.64	.00	.60	1.78	2.000	.000	.00	0 .0
.044	.1777					.0063	.00	.54	1.22	.24	.013	.00	.00	PIPE
1459.930	3424.814	.563	3425.377	3.00	4.13	.27	3425.64	.00	.60	1.80	2.000	.000	.00	0 .0
.030	.1777					.0055	.00	.56	1.15	.24	.013	.00	.00	PIPE
1459.960	3424.819	.582	3425.401	3.00	3.94	.24	3425.64	.00	.60	1.82	2.000	.000	.00	0 .0
.004	.1777					.0048	.00	.58	1.07	.24	.013	.00	.00	PIPE
1459.964	3424.820	.604	3425.424	3.00	3.75	.22	3425.64	.00	.60	1.84	2.000	.000	.00	0 .0

```
T1 SUMMERLIN WEST VILLAGE 22                                                    0
T2 KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 56+59 WEST
T3 ATKINS / ULTIMATE CONDITIONS
SO    218.7353409.64  48                          3415.89
R     248.1453410.63  48      .013
SH    248.1453410.63  48                          3410.63
CD  48  4   0    .000   4.000     .000  .000  .000   .00
Q           260.000   .0
```

FILE: SJ_LATERAL-56+59_ULT.WSW W S P G W - CIVILDESIGN Version 14.06 PAGE 1

Program Package Serial Number: 1615

WATER SURFACE PROFILE LISTING Date: 7-10-2019 Time: 5:15:50

SUMMERLIN WEST VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) / LATERAL AT 56+59 WEST
ATKINS / ULTIMATE 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	
218.735	3409.640	6.250	3415.890	260.00	20.69	6.65	3422.54	.00	3.94	.00	4.000	.000	.00	0 .0
29.410	.0337				.0328	.96	6.25	.00	3.23	.013	.00	.00	PIPE	
248.145	3410.630	6.224	3416.854	260.00	20.69	6.65	3423.50	.00	3.94	.00	4.000	.000	.00	0 .0

C.5 Riprap Calculations

HEC-11 RIPRAP SIZING CALCULATIONS

Location: West of Kettle Ridge Drive (Street J)
Conditions: Q > 50 cfs

Equations:

$K_1 = [1-(\sin^2\theta/\sin^2\Phi)]^{0.5}$ (eq. 7, pg. 30)

d_{avg}= Flow Area/ Top Width

$n=0.39S_f^{0.38} R^{-0.16}$ (eq. 4, pg. 23)

(slopes > 0.002 ft/ft and D50 > 0.2 ft)

Bank & Bed $D_{50} = 0.001V_a^3/(d_{avg}^{0.5}K_1^{1.5})$ (eq. 6, pg. 30)

$C_{sg} = 2.12/(S_g-1)^{1.5}$ (eq. 8, pg. 31)

$C_{sf} = (SF/1.2)^{1.5}$ (eq. 9, pg. 31)

Stability Factor = 1.3 (Table 1 pg 31)

Gradually Varying Flow; Moderate Bed Curvature (30 > curve radius/channel width > 10)
Impact from waves or floating debris moderate

$C = C_{sg}C_{sf}$

$D'_{50} = CD_{50}$

Input Variables:

Channel BW =	0	ft	
Energy Grade Slope "S_f" =	0.005	ft/ft	
Hydraulic Radius "R" =	1.15	ft	
Flow area =	17.64	sqft	Balance w/ Manning's n until results match input FlowMaster
Wetted perimeter =	15.34	ft	
Top width =	14.55	ft	
Average channel velocity =	3.12	fps	
Depth of flow =	2.43	ft	
Side slope horizontal (H:1) =	3		
Riprap angle of repose "Φ" =	41	degrees	(Chart 4, pg. 129 HEC-11)
Rock riprap specific gravity =	2.65		
Stability Factor =	1.3		
D_{50} =	0.67	ft	

Calculations:

θ = 18.4 degrees
K_1 = 0.876
d_{avg} = 1.21 ft
Manning's n = 0.051
Bank D_{50} = 0.02 ft
Bed D_{50} = 0.03
C_{sf} = 1.128
C_{sg} = 1.000
C = 1.128
Bank D'_{50} = 0.03 ft
Bed D'_{50} = 0.03 ft
Stable? **Yes**
t_o = 0.4 lb/ft^2 (average shear stress on channel)
t_c = 2.8 lb/ft^2 (critical shear stress-resistance to movement)
Stable? **Yes**

CCRFCD Equations (d_{50} Eq.s use Eq. 732 for Manning's n)

R_h =	1.15	ft (Eq. 732 for $R_h > 2d_{50}$)
n =	0.037	Formula Under Predicts n Value
Y/d_{50} =	3.6	(Eq. 733 for $1.5 < Y/d_{50} < 185$)
n =	0.059	Yes
d_{50} =	0.07	ft (Eq. 734)
d_{50} =	0.16	ft (Eq. 735, generally larger sizes)
d_{50} =	0.26	ft (Eq. 736 for S_e=S)

Stability Factor:

1.0 - 1.2 Uniform flow; straight or mildly curving reach (curve radius/channel width > 30); impact from wave action and floating debris is minimal; little or no uncertainty in design parameters.

1.3 - 1.6 Gradually varying flow; moderate bend curvature (30 > curve radius/channel width > 10); impact from waves or floating debris moderate.

1.6 - 2.0 Approaching rapidly varying flow; sharp bend curvature (10 > curve radius/channel width); significant impact potential from floating debris and/or ice; significant wind and/or boat generated waves (1-2 ft); high flow turbulence; turbulently mixing flow at bridge abutments; significant uncertainty in design parameters.

= Values referenced in flow master

Spreadsheet not for pier scour or wave action

Worksheet for West of Kettle Ridge Drive (Street J)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.037	
Channel Slope	0.00500	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	55.00	ft^3/s

Results

Normal Depth	2.43	ft
Flow Area	17.64	ft^2
Wetted Perimeter	15.34	ft
Hydraulic Radius	1.15	ft
Top Width	14.55	ft
Critical Depth	1.84	ft
Critical Slope	0.02202	ft/ft
Velocity	3.12	ft/s
Velocity Head	0.15	ft
Specific Energy	2.58	ft
Froude Number	0.50	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.43	ft
Critical Depth	1.84	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.02202	ft/ft

Cross Section for West of Kettle Ridge Drive (Street J)

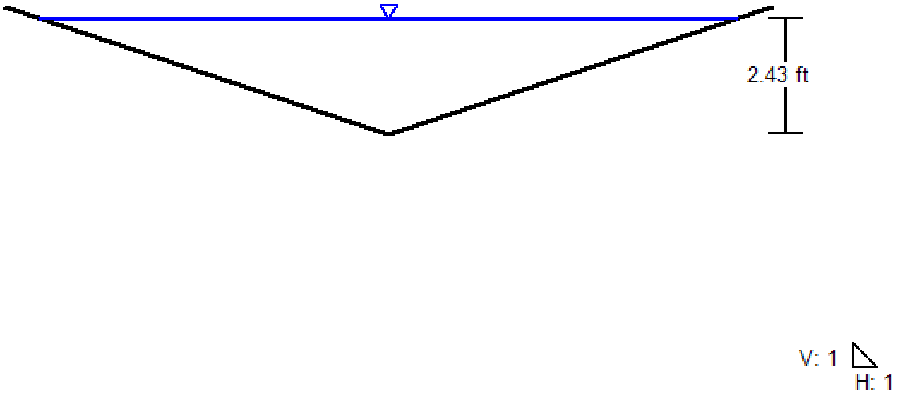
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.037	
Channel Slope	0.00500	ft/ft
Normal Depth	2.43	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	55.00	ft³/s

Cross Section Image



HEC-11 RIPRAP SIZING CALCULATIONS

Location: West of Scurry Bend Drive (Street N) Rough Grading
Conditions: Q > 50 cfs

Equations:

$K_1 = [1-(\sin^2\theta/\sin^2\Phi)]^{0.5}$ (eq. 7, pg. 30)

d_{avg}= Flow Area/ Top Width

$n=0.39S_f^{0.38} R^{-0.16}$ (eq. 4, pg. 23)

(slopes > 0.002 ft/ft and D50 > 0.2 ft)

Bank & Bed $D_{50} = 0.001V_a^3/(d_{avg}^{0.5}K_1^{1.5})$ (eq. 6, pg. 30)

$C_{sg} = 2.12/(S_g-1)^{1.5}$ (eq. 8, pg. 31)

$C_{sf} = (SF/1.2)^{1.5}$ (eq. 9, pg. 31)

Stability Factor = 1.3 (Table 1 pg 31)

Gradually Varying Flow; Moderate Bed Curvature (30 > curve radius/channel width > 10)
Impact from waves or floating debris moderate

$C = C_{sg}C_{sf}$

$D'_{50} = CD_{50}$

Input Variables:

Channel BW =	5	ft	
Energy Grade Slope "S_f" =	0.0237	ft/ft	
Hydraulic Radius "R" =	1.56	ft	
Flow area =	33.42	sqft	Balance w/ Manning's n until results match input FlowMaster
Wetted perimeter =	21.49	ft	
Top width =	20.64	ft	
Average channel velocity =	8.08	fps	
Depth of flow =	2.61	ft	
Side slope horizontal (H:1) =	3		
Riprap angle of repose "Φ" =	41	degrees	(Chart 4, pg. 129 HEC-11)
Rock riprap specific gravity =	2.65		
Stability Factor =	1.3		
D_{50} =	0.67	ft	

Calculations:

θ =	18.4	degrees
K_1 =	0.876	
d_{avg} =	1.62	ft
Manning's n =	0.088	
Bank D_{50} =	0.34	ft
Bed D_{50} =	0.41	
C_{sf} =	1.128	
C_{sg} =	1.000	
C =	1.128	
Bank D'_{50} =	0.38	ft
Bed D'_{50} =	0.47	ft
Stable?	**Yes**	
t_o =	2.3	lb/ft^2 (average shear stress on channel)
t_c =	2.8	lb/ft^2 (critical shear stress-resistance to movement)
Stable?	**Yes**	

CCRFCD Equations (d_{50} Eq.s use Eq. 732 for Manning's n)

R_h =	1.55	ft (Eq. 732 for $R_h > 2d_{50}$)
n =	0.037	OK
Y/d_{50} =	3.9	(Eq. 733 for $1.5 < Y/d_{50} < 185$)
n =	0.058	Yes
d_{50} =	0.75	ft (Eq. 734)
d_{50} =	1.64	ft (Eq. 735, generally larger sizes)
d_{50} =	1.30	ft (Eq. 736 for S_e=S)

Stability Factor:

1.0 - 1.2 Uniform flow; straight or mildly curving reach (curve radius/channel width > 30); impact from wave action and floating debris is minimal; little or no uncertainty in design parameters.

1.3 - 1.6 Gradually varying flow; moderate bend curvature (30 > curve radius/channel width > 10); impact from waves or floating debris moderate.

1.6 - 2.0 Approaching rapidly varying flow; sharp bend curvature (10 > curve radius/channel width); significant impact potential from floating debris and/or ice; significant wind and/or boat generated waves (1-2 ft); high flow turbulence; turbulently mixing flow at bridge abutments; significant uncertainty in design parameters.

= Values referenced in flow master

Spreadsheet not for pier scour or wave action

Worksheet for West of Scurry Bend Drive (Street N) Rough Grading

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.038	
Channel Slope	0.02370	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	270.00	ft³/s

Results

Normal Depth	2.61	ft
Flow Area	33.42	ft²
Wetted Perimeter	21.49	ft
Hydraulic Radius	1.56	ft
Top Width	20.64	ft
Critical Depth	2.75	ft
Critical Slope	0.01862	ft/ft
Velocity	8.08	ft/s
Velocity Head	1.01	ft
Specific Energy	3.62	ft
Froude Number	1.12	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.61	ft
Critical Depth	2.75	ft
Channel Slope	0.02370	ft/ft

Worksheet for West of Scurry Bend Drive (Street N) Rough Grading

GVF Output Data

Critical Slope	0.01862	ft/ft

Cross Section for West of Scurry Bend Drive (Street N) Rough Grading

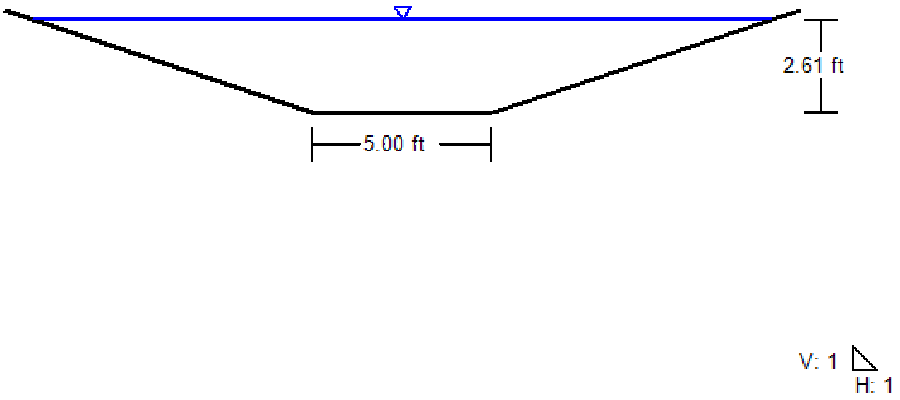
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.038	
Channel Slope	0.02370	ft/ft
Normal Depth	2.61	ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	270.00	ft³/s

Cross Section Image



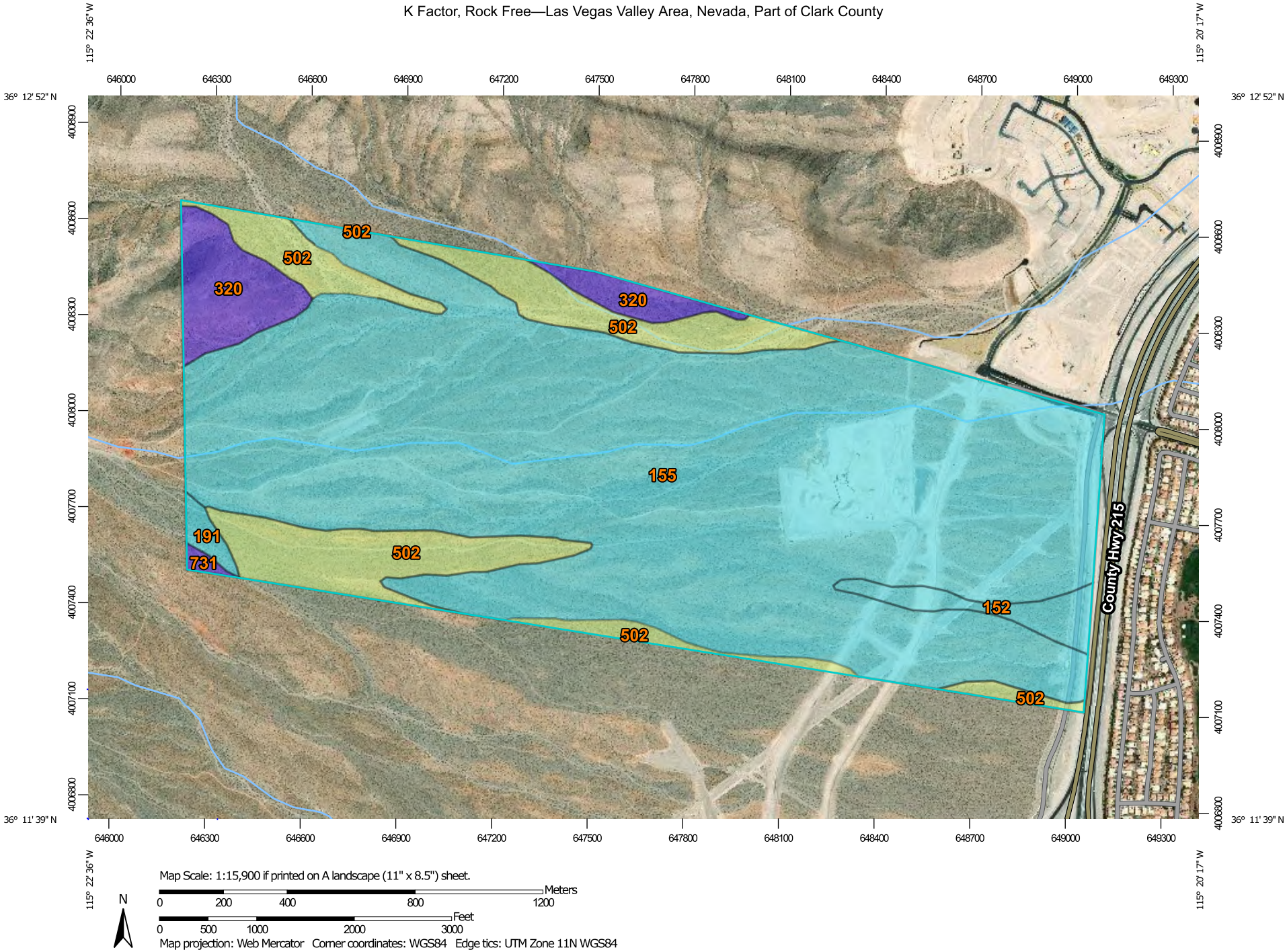
C.6 Debris Basin Calculations

The Modified Universal Soil Loss Equation

Given Parameters

α =	95	Given
β =	0.56	Given
Canopy Covery Effect, C_I =	1	Figure 1303b
Mulch/Close-growing vegetation Effect C_{II} =	1	Figure 1303c
Tillage/Residual Effect C_{III} =	0.45	Figure 1303d
X_r (ft) =	10547	Distance from the point of overland flow to extent that deposition begins
S_o =	0.0683	surface slope (ft/ft)
Conservation Practice Factor, P =	1	Table 1301A
Soil Erodibility Factor K =	0.36	Weighted Value per USGS Map
Specific Unit Weight of Soil γ (lb/ft^3) =	128	

	V (acre-ft)	Q_p (cfs)	LS [2]	C [3]	Y_s (tons)	Volume (ft^3)	Volume (ac-ft)
10 YR 24 HR	25	334	8.14	0.45	19415	303359.4162	6.964173925
5 YR 24 HR	20	271	8.14	0.45	17270.39	269849.8999	6.194901284
2 YR 24 HR	12	168	8.14	0.45	13213.34	206458.447	4.739633769


115° 22' 36" W
115° 20' 17" W
36° 12' 52" N
36° 11' 39" N
646000
646300
646600
646900
647200
647500
647800
648100
648400
648700
649000
649300
4008900
4008600
4008300
4008000
4007700
4007400
4007100
4006800
502
320
155
191
731
152
County Hwy 215
Map Scale: 1:15,900 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 200 400 800 1200
Feet
0 500 1000 2000 3000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Lines

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Points

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

Soil Survey Area: Las Vegas Valley Area, Nevada, Part of Clark County
Survey Area Data: Version 13, Sep 14, 2018

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

Date(s) aerial images were photographed: Jul 6, 2016—Sep 1, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

K Factor, Rock Free

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
152	Cave gravelly fine sandy loam, 0 to 4 percent slopes	.37	15.0	2.0%
155	Cave gravelly fine sandy loam, 4 to 15 percent slopes	.37	604.8	78.7%
191	Dalian very cobbly fine sandy loam, 2 to 8 percent slopes	.37	4.5	0.6%
320	Boxspring-Zeheme-Rock outcrop complex, 15 to 50 to percent slopes MLRA 30	.55	39.4	5.1%
502	Canutio-Cave gravelly fine sandy loams, 2 to 8 percent slopes	.24	103.5	13.5%
731	Purob-Irongold association	.55	1.8	0.2%
Totals for Area of Interest			**768.9**	**100.0%**

Description

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kf (rock free)" indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Rating Options

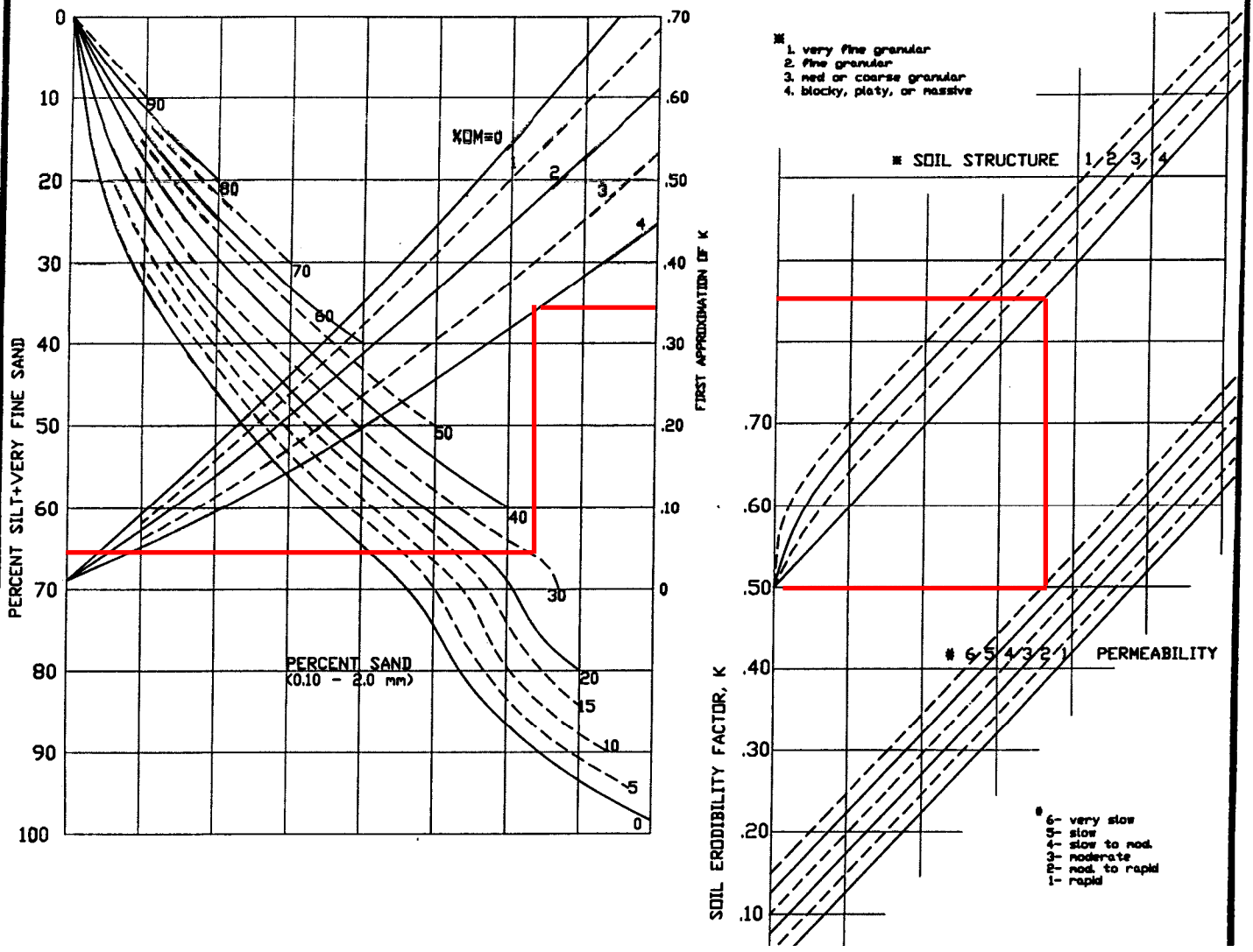
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

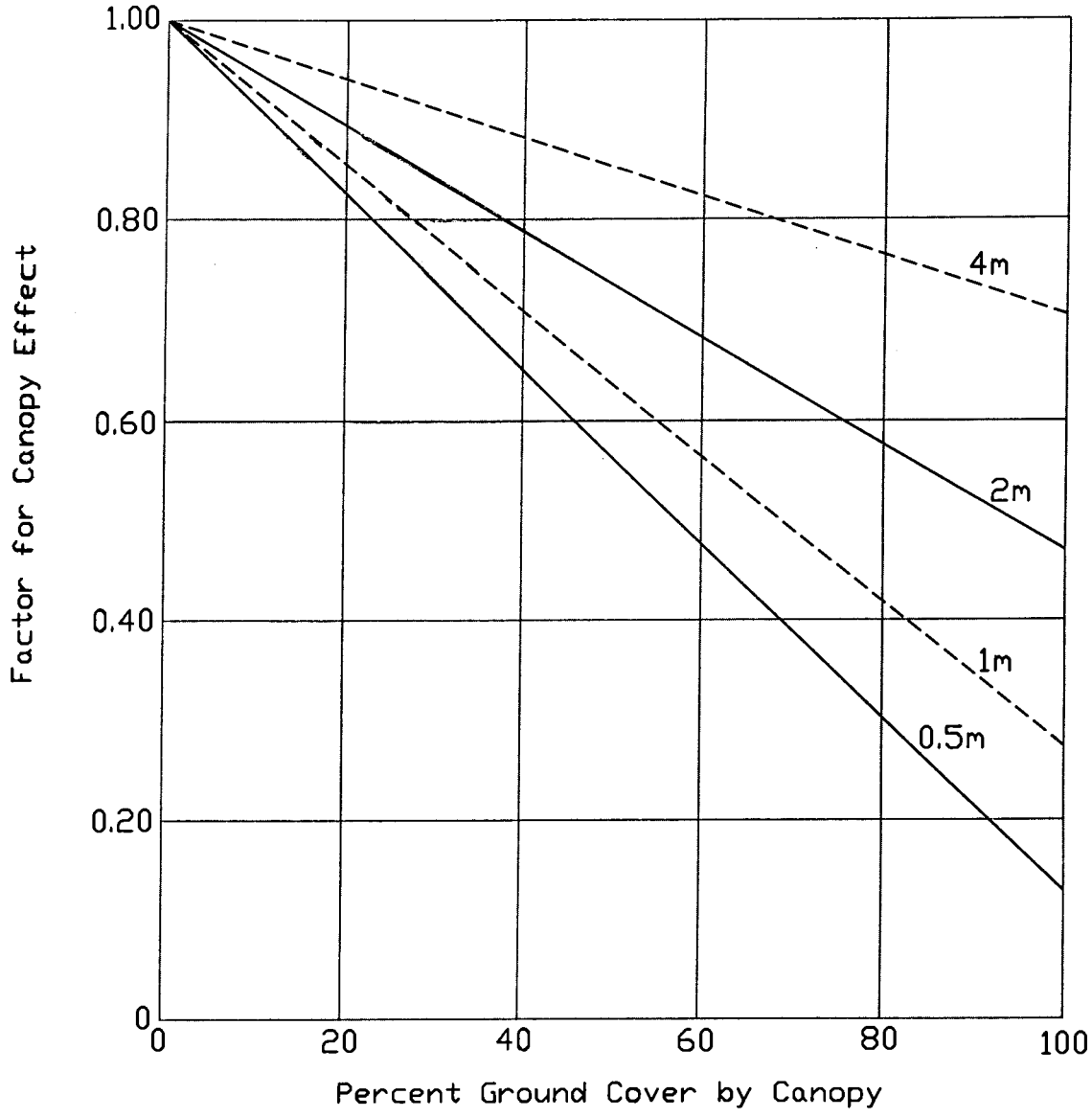
Tie-break Rule: Higher

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

SOIL ERODIBILITY NOMOGRAPH USED TO DETERMINE FACTOR K (TONS/ACRE) FOR SPECIFIC TOPSOILS OR SUBSOIL HORIZONS



INFLUENCE OF VEGETAL CANOPY

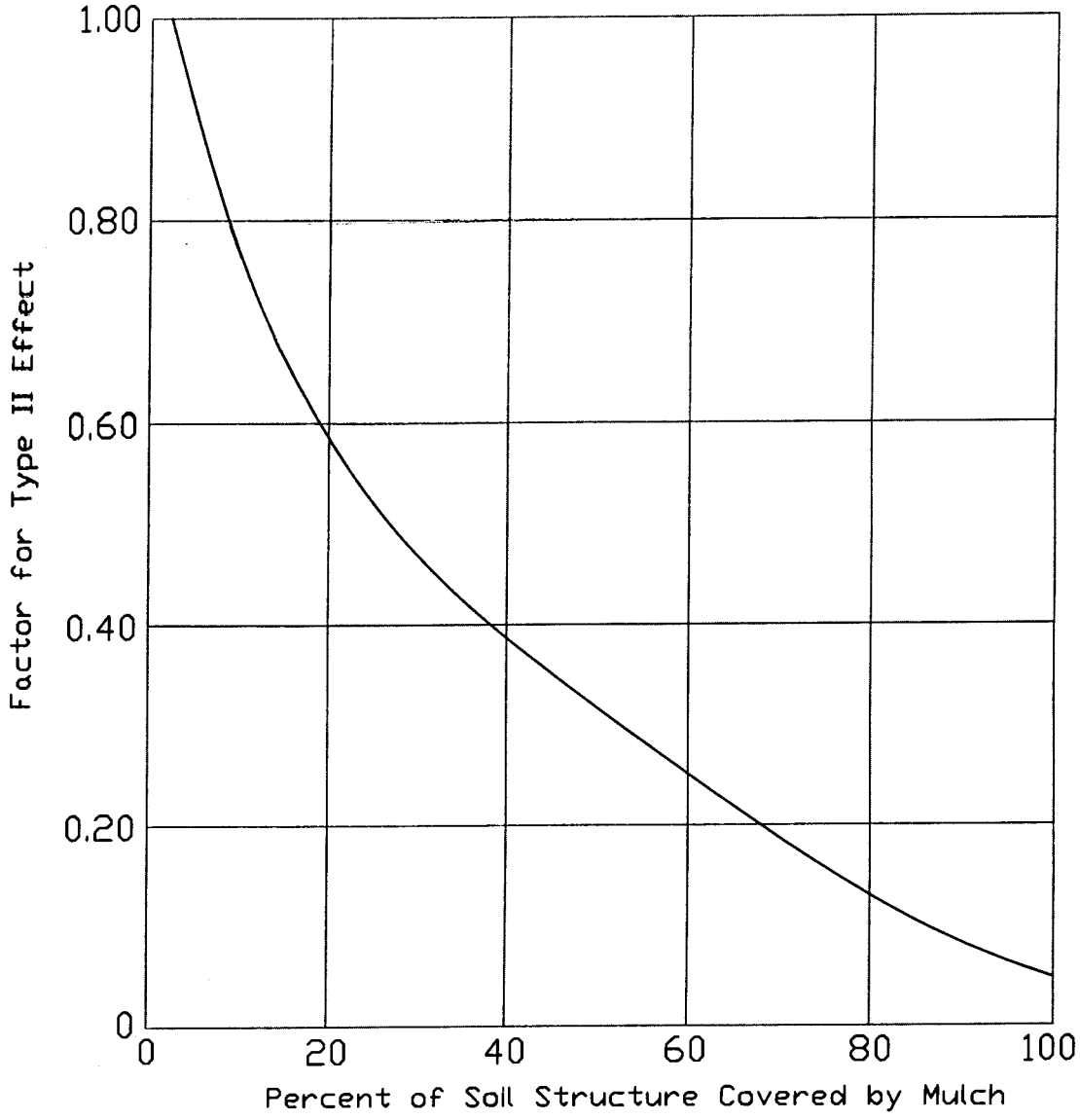


Revision	Date

REFERENCE: A Soil-Erodibility Nomograph for Farmland and Construction Sites, 1971

FIGURE 1303b

EFFECT OF PLANT RESIDUES OR CLOSE-GROWING STEMS AT THE SOIL SURFACE



Revision	Date

REFERENCE: Estimating the Cover and Management Factor for Undisturbed Areas, 1972

FIGURE 1303c

Appendix D. Proposed Improvement Plans

SUMMERLIN VILLAGE 22
IMPROVEMENT PLANS FOR:

KETTLE RIDGE DRIVE (STREET J)
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
FUTURE SID PROJECT

SCURRY BEND DRIVE (STREET N) ROUGH GRADE
FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

SUMMERLIN®

SHEET INDEX

1	COVER SHEET	
2	LEGEND AND ABBREVIATIONS	
3	GENERAL NOTES	
4	MASTER GRADING PLAN	
5	HORIZONTAL CONTROL PLAN	
6	MASTER DRAINAGE PLAN – KETTLE RIDGE DRIVE	
7	MASTER WATER PLAN	
8	MASTER SEWER PLAN	
9	ROUGH GRADING PLAN AND PROFILE – SCURRY BEND DRIVE	STA. 33+00 TO END
10	ROUGH GRADING PLAN AND PROFILE – SCURRY BEND DRIVE	STA. 27+50 TO STA. 33+00
11	ROUGH GRADING PLAN AND PROFILE – SCURRY BEND DRIVE	BEGIN TO STA 27+50
12	ROADWAY GRADING PLAN – KETTLE RIDGE DRIVE	STA. 72+00 TO END
13	ROADWAY PLAN AND PROFILE – KETTLE RIDGE DRIVE	STA. 72+00 TO END
14	ROADWAY GRADING PLAN – KETTLE RIDGE DRIVE	STA. 67+50 TO STA. 72+00
15	ROADWAY PLAN AND PROFILE – KETTLE RIDGE DRIVE	STA. 67+50 TO STA. 72+00
16	ROADWAY GRADING PLAN – KETTLE RIDGE DRIVE	STA. 64+50 TO STA. 67+50
17	ROADWAY PLAN AND PROFILE – KETTLE RIDGE DRIVE	STA. 64+50 TO STA. 67+50
18	ROADWAY GRADING PLAN – KETTLE RIDGE DRIVE	STA. 60+50 TO STA. 64+50
19	ROADWAY PLAN AND PROFILE – KETTLE RIDGE DRIVE	STA. 60+50 TO STA. 64+50
20	ROADWAY GRADING PLAN – KETTLE RIDGE DRIVE	STA. 56+50 TO STA. 60+50
21	ROADWAY PLAN AND PROFILE – KETTLE RIDGE DRIVE	STA. 56+50 TO STA. 60+50
22	ROADWAY GRADING PLAN – KETTLE RIDGE DRIVE	BEGIN TO STA. 56+50
23	ROADWAY PLAN AND PROFILE – KETTLE RIDGE DRIVE	BEGIN TO STA. 56+50
24	STORM DRAIN LATERAL PROFILES	
27	STREETLIGHT PLAN	
28	SIGNAGE AND STRIPING PLAN	
30	TYPICAL SECTIONS	
29	TYPICAL SECTIONS	
31	STORM DRAIN DETAILS	
32	GRADING DETAILS – PARCELS E & F	
33	GRADING DETAILS – PARCELS E & F	
34	GRADING DETAILS BASIN	
35	GRADING DETAILS BASIN	
36	WATER DETAILS	
37	STREETLIGHT DETAILS	
38	INTERSECTION DETAILS AND CIVIL DETAILS	
39	INTERSECTION 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.

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
1.52 AC

PROPOSED DISTURBED AREA ACREAGE
35.89 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-18-176
DATED: DECEMBER 3, 2018

OWNER /DEVELOPER

OWNER

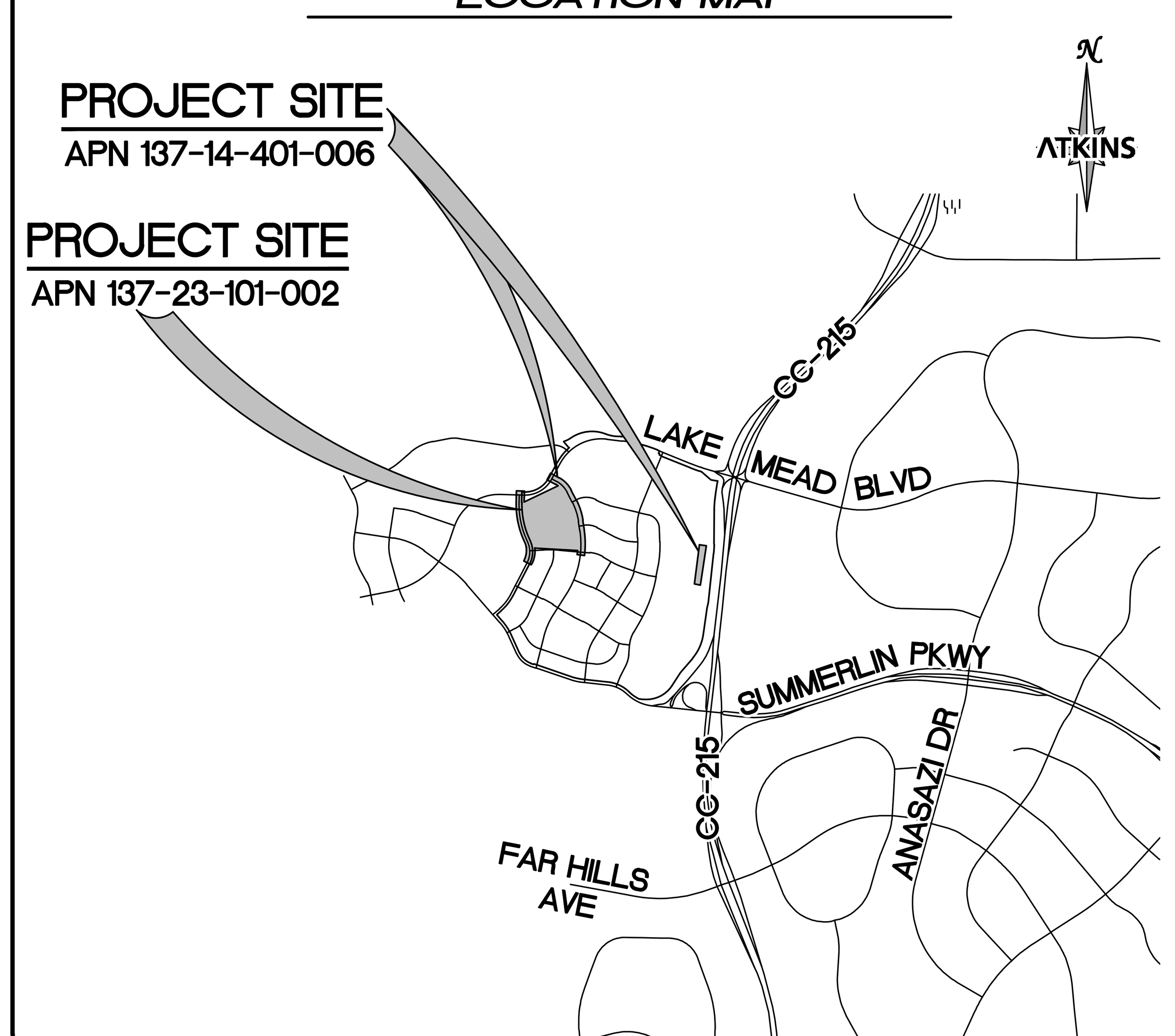
CONTACT: KEVIN ORROCK
HOWARD HUGHES COMPANY LLC, A DELAWARE LIMITED LIABILITY COMPANY
10845 GRIFFITH PEAK DRIVE, SUITE 160
LAS VEGAS, NV 89135

ENGINEER / CONSULTANT

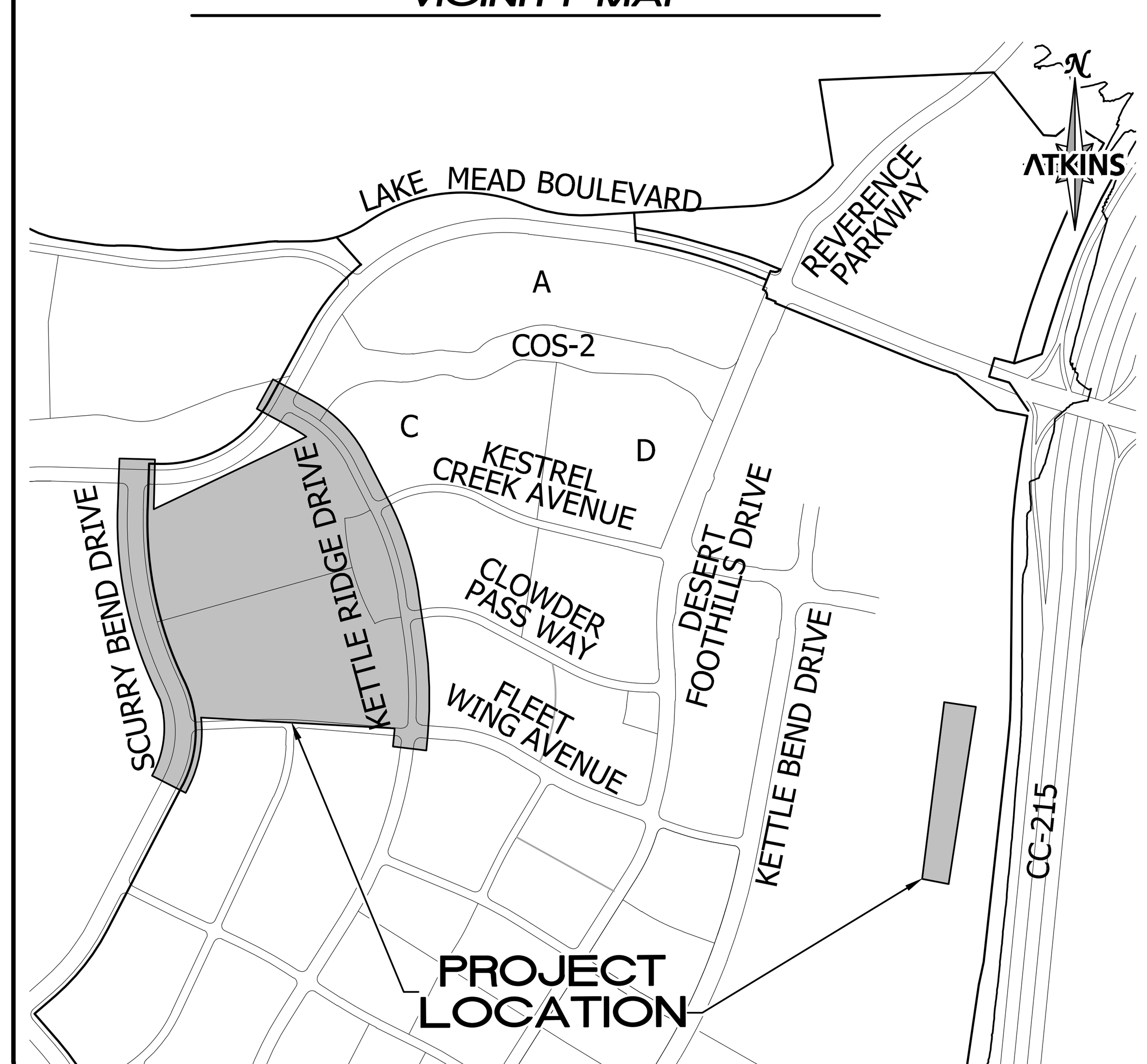
CIVIL

CONTACT: DAVID WILSON P.E.
ATKINS
2270 CORPORATE CIRCLE SUITE 200
HENDERSON, NEVADA 89074
(702) 263-7275

LOCATION MAP



VICINITY MAP



APPROVALS

HOWARD HUGHES COMPANY LLC, A DELAWARE LIMITED LIABILITY COMPANY

KEVIN T. ORROCK, VICE PRESIDENT — DATE

ALLEN PAVELKA, P.E. #9029 — DATE
CITY ENGINEER

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

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 ENGINEERING SERVICES

PROJECT NO. 0000 FIRST APPROVED DATE: ____

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 THE 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 2 AS SHOWN ON THE MAP THEREOF IN BOOK 123 OF PLATS, PAGE 36, OFFICIAL RECORDS, CITY OF LAS VEGAS CLARK COUNTY, NEVADA.

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

PROFESSIONAL ENGINEER - STATE OF NEVADA — PAUL A. BATES — EXP. 12-31-20 — CIVIL — No. 18723 — 7/15/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

COVER SHEET

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: NONE
VERT.: NONE
JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 1/37
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 – V22N Street J (Lake Mead to Street G)_Sheets\60655-01-TITL-C1.dwg LAYOUT: C1 Jul 15, 2019 – 2:34PM

@	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
"FWA" = FLEET WING AVENUE (STREET G)
"CPW" = CLOWDER PASS WAY (STREET H)
"KCA" = KESTREL CREEK AVENUE (STREET I)
"KRD" = KETTLE RIDGE DIVE (STREET J)
"SBD" = SCURRY BEND DRIVE (STREET N)

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT

PROJECT NO. 0000 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 FEDERAL AID ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig 811 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 PAUL BATES No. 18725 CIVIL 7/15/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

LEGEND AND ABBREVIATIONS

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: NONE
VERT.: NONE

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 2 / 37
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 – V22N Street J (Lake Mead to Street G)_Sheets\60655-02-LGND-C2.dwg LAYOUT: C-2 Jul 15, 2019 – 2:34PM

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 THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE'S WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.
5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.
6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.
7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300' IN EXTRUDED-TYPE CURB.
8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.
11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE (COMPANY, REPORT #, DATE) APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH 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. AFTER HAUNCHING AND PRIOR TO BACKFILL OPERATIONS WHICH WOULD COVER SANITARY SEWER AND STORM DRAIN FACILITIES, CONTRACTOR IS REQUIRED TO SCHEDULE CLV OPEN-TRENCH UTILITY SURVEY INSPECTION FOR DETERMINATION OF FINAL LOCATION COORDINATES. FACILITIES TO BE LOCATED BY CLV SHALL INCLUDE AT A MINIMUM THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES AND TRANSITION STRUCTURES, STORM DRAIN LATERALS AT THE CONNECTION 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.
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 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

PLAN CONCURRENCE NOTE

THE FOLLOWING SEPARATE VILLAGE 22 ROADWAY IMPROVEMENT PLANS ARE TO BE CONSTRUCTED CONCURRENTLY AND ARE SHOWN AS FUTURE (BY OTHERS):

1. LAKE MEAD BOULEVARD (DESERT FOOTHILLS DRIVE TO SCURRY BEND DRIVE)
2. DESERT FOOTHILLS DRIVE (FLEET WING AVENUE (STREET G) TO LAKE MEAD BLVD)
3. KESTREL CREEK AVENUE (STREET I) (DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J))
4. CLOWDER PASS WAY (STREET H) (DESERT FOOTHILLS DRIVE TO KETTLE RIDGE DRIVE (STREET J))

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 § 102.4
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-IN 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 RADIUS. 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 DEAD-ENDS 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 AN ACCESS ROADWAY IF NEEDED TO PREVENT PARKING ON EITHER SIDE. SIGNS TO BE INSTALLED NO HIGHER THAN 10 FT OR LESS THAN 6 FT FROM THE ROADWAY 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 SYSTEM. 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 BEINGS 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

REVISED FEBRUARY 4, 2019

CITY OF LAS VEGAS TRAFFIC NOTES

1. ALL CONSTRUCTION SIGNING, BARRICADING, AND TRAFFIC DELINEATION SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", LATEST EDITION.
2. THE STREET SIGN CONTRACTOR SHALL OBTAIN STREET NAMES AND BLOCK NUMBERING FROM THE PLANNING DEPARTMENT PRIOR TO CONSTRUCTION.
3. BEFORE ANY WORK IS STARTED IN THE RIGHT-OF-WAY, THE CONTRACTOR SHALL INSTALL ALL 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. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT CITY STANDARDS.
7. WHEN A PROPOSED STREET LIGHT STANDARD IS LOCATED WITHIN FIVE (5') FEET OF ANY PROPOSED SIGN SHOWN ON THE PLANS TO BE MOUNTED ON A SIGNPOST, THE SIGN SHALL BE MOUNTED ON THE STREET LIGHT STANDARD AND THE SIGNPOST SHALL BE ELIMINATED.
8. ALL PERMANENT TRAFFIC CONTROL DEVICES CALLED FOR HEREON SHALL BE IN PLACE AND IN FINAL POSITION PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE PORTIONS OF THE ROAD(S) BEING IMPROVED HERE UNDER, REGARDLESS OF THE STATUS OF COMPLETION OF PAVING OR OTHER OFF-SITE IMPROVEMENTS CALLED FOR BY THESE PLANS.
9. STREET SIGNS AND STOP SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF STREET NAME SIGNS.
10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND FLAGGERS TO INSURE THE SAFETY OF THE PUBLIC IN OR AROUND THE WORK 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 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 WHEN POLE IS INSTALLED BEHIND SIDEWALK, AND SHALL AT NO TIME COMPLETELY ENCLOSE THE STREET LIGHTING POLE.
7. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TRAFFIC ENGINEERING DIVISION PRIOR TO ANY PRE-FINAL INSPECTION. THE AS-BUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.
8. SERVICE POINTS SHALL BE COORDINATED WITH NV ENERGY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICEPOINTS SHALL BE SHOWN ON THE PLANS.
9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREETLIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED BEFORE STREETLIGHT BASES ARE INSTALLED. AT NO EXPENSE TO THE CITY OF LAS VEGAS.
10. THE CONTRACTOR SHALL FURNISH COMPLETE CONDUIT, WIRE, ETC. FROM SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON THE PLANS.

REVISED 6/4/2018 (LD VERSION)

LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDELINES

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN CLARK COUNTY TITLE 24.40 AND IN THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

SOUTHWEST GAS CORPORATION GENERAL NOTES

GENERAL NOTES

1. IN THE EVENT OF NATURAL GAS EMERGENCIES CALL 911 AND 1-877-860-6020
2. MINIMUM HORIZONTAL AND VERTICAL CLEARANCES BETWEEN NATURAL GAS FACILITIES AND ANY UNDERGROUND FACILITIES AND/OR STRUCTURES, INCLUDING BUT NOT LIMITED TO WATER, SEWER, STORM DRAIN, COMMUNICATIONS, AND ELECTRIC SHALL BE AT LEST 12-INCHES OR GREATER AS DICTATED BY LOCAL CODES AND STANDARDS.
   A. ANY DEVIATION FROM SPECIFIED MINIMUM CLEARANCES MUST BE APPROVED BY ALL AFFECTED UTILITIES AND/OR MUNICIPALITIES
3. FOR VALVE ADJUSTMENT CONTACT 702-668-6107 48 HOURS PRIOR TO CONSTRUCTION
4. IN THE EVENT OF A NATURAL GAS CONFLICT WITH PROPOSED UTILITIES AND/OR STRUCTURES CONTACT 702-365-2099

ALL CIVIL IMPROVEMENT PLANS MUST INCLUDE SOUTHWEST GAS CORPORATION HIGH PRESSURE NOTES ON THE NOTES SHEET AND ALL SHEETS DEPICTING HIGH PRESSURE NATURAL GAS MAINS AS INDICATED BELOW:

CAUTION: HIGH PRESSURE GAS!!
CALL SOUTHWEST GAS AT 702-400-1789 FOR STANDBY WHEN EXCAVATING
OVER OR NEAR HIGH PRESSURE GAS LINES 48 HOURS PRIOR TO CONSTRUCTION

SOUTHWEST GAS CORPORATION ____________ DATE

GRADING NOTES

1. INDICATED GRADES OTHER THAN TC, FG & GUTTER FL ARE ROUGH GRADES.
2. THE ROUGH GRADING PLANS SHALL BE ON THE JOB SITE AT ALL TIMES. THE ROUGH GRADING SHALL BE FINISHED IN CONFORMANCE WITH THE LINES AND GRADES SHOWN ON THE PLANS. THE GRADING QUANTITIES ARE BASED ON THE ELEVATION AND DETAILS SHOWN ON THE PLANS. ANY DEVIATIONS FROM THE PLAN WILL RESULT IN QUANTITY CHANGES.
3. SOILS REPORT PREPARED BY: NOVA GEOTECHNICAL & INSPECTION SERVICES 4480 W. HACIENDA AVENUE, SUITE 104, LAS VEGAS, NV 89118, PHONE: 702-873-3478, PROJECT NO. : G-18-76, DATED: DECEMBER 3, 2018.
4. EARTHWORK QUANTITIES (RAW):

   -CUT = 226,860 CUBIC YARDS
   -FILL = 205,820 CUBIC YARDS

A. THE ABOVE QUANTITIES DO NOT REFLECT LOSSES DUE TO SUBSIDENCE OR SHRINKAGE.
B. THE ABOVE QUANTITIES DO REFLECT USING NATIVE MATERIAL IN LIEU OF TYPE 1 GRAVEL BASE MATERIAL FOR STREET SECTIONS.
C. THE ABOVE QUANTITIES DO NOT REFLECT ANY EARTHWORK WHICH MAY BE REQUIRED BY THE ENGINEER TO CONSTRUCT ADDITIONAL PROTECTIVE DITCHES OR BERMS NOT SHOWN ON THESE DRAWINGS.

GENERAL NOTES

1. THE CONTRACTOR SHALL NOTIFY ALL AFFECTED PUBLIC ENTITIES, THE PROJECT ENGINEER AND CLARK COUNTY AT LEAST 48 HOURS PRIOR TO THE COMMENCEMENT OF WORK.
2. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE CONTRACT DRAWINGS. ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE PROJECT ENGINEER.
3. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST ISSUE; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE.
4. LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THE DRAWINGS WERE OBTAINED FROM INFORMATION RECEIVED FROM THE APPLICABLE UTILITY COMPANIES. NEITHER THE OWNER NOR ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES OR STRUCTURES NOT SHOWN, OR NOT IN THE LOCATION SHOWN ON THE DRAWINGS. CONTRACTOR TO VERIFY EXACT LOCATION OF UTILITIES PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR'S RESPONSIBILITY REGARDING UTILITIES SHALL BE AS REQUIRED UNDER SECTION 107.17 OF THE "UNIFORM STANDARD SPECIFICATIONS FOR CLARK COUNTY AREA, NEVADA" AND AS PROVIDED IN THE SPECIFICATIONS.
5. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES TO PROTECT EXISTING UTILITY LINES, STRUCTURES, AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE. ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE COUNTY ENGINEER OR OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
6. THE CONTRACTOR SHALL NOT REMOVE TREES, SHRUBS, LAWNS, WALLS, FENCES, SIGNS, STRUCTURES, LIGHTS, OR ANY OTHER EXISTING IMPROVEMENTS OUTSIDE OF STREET RIGHT-OF-WAY, EXCEPT WHERE REQUIRED TO DO SO BY THE CONTRACT DRAWINGS OR THE PROJECT ENGINEER. REPLACEMENT, RELOCATION OR RECONSTRUCTION OF ALL EXISTING IMPROVEMENTS INCLUDING SPRINKLER SYSTEMS, LAWNS, FENCES, WALLS, SIGNS, STEPS, SIDEWALKS, DRIVEWAYS, LAWN LIGHTS, AND ALL OTHER ITEMS APPLICABLE TO THIS CONTRACT SHALL BE REQUIRED BY THE PROJECT ENGINEER.
7. THE CONTRACTOR SHALL BACKFILL AND FINE GRADE ALL CUT OR FILL SLOPES TO MATCH EXISTING CONDITIONS TO THE SATISFACTION OF THE PROJECT ENGINEER. WHERE EXISTING LAWNS ARE DAMAGED BY THE CONTRACTOR'S OPERATIONS THE CONTRACTOR WILL SOD THE AFFECTED AREA TO A CONDITION EQUAL TO OR BETTER THAN THAT WHICH EXISTED PRIOR TO CONSTRUCTION.
8. THE 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 TRANSITIONS TO BE AS SHOWN PER CONTRACT DRAWINGS.
9. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.550.
10. THE ACTUAL LOCATIONS OF SAW CUT LINES, LIMITS OF COLD MILLING, LIMITS OF DRIVEWAY TRANSITIONS, AND LANDSCAPE REPAIR SHALL BE DETERMINED IN THE FIELD BY THE RESIDENT PROJECT REPRESENTATIVE.
11. THE ACTUAL LIMITS OF EXISTING OPEN GRADE REMOVAL AND UDACS APPLICATION SHALL BE DETERMINED IN THE FIELD BY THE RESIDENT PROJECT REPRESENTATIVE.
12. ALL STANDARD DRAWINGS REFERENCED IN THIS SET ARE BASED ON THE CURRENT "UNIFORM STANDARD DRAWINGS REVISION SET II-1997 RELEASE".
13. UNLESS OTHERWISE SHOWN ON THE CONTRACT DRAWINGS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OR RELOCATION OF ALL WATER SERVICES AND METERS WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON THE CONTRACT DRAWINGS.
14. THE CONTRACTOR SHALL MAINTAIN AN ONGOING REMOVAL PROCESS OF ALL SPILLAGE OF EXCAVATION MATERIAL ON ALL PAVED STREETS.
15. CURB AND GUTTER OF A GRADE OF LESS THAN 4/10 OF ONE PERCENT SHALL BE CONSTRUCTED BY FORMING. EACH JOINT SHALL BE CHECKED FOR GRADE PRIOR TO CONSTRUCTION AND WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION.
16. THE CONTRACTOR SHALL VERIFY IN THE FIELD ALL DIMENSIONS, EXISTING CONDITIONS AND POINTS OF CONNECTION WITH ADJOINING PROPERTY (PUBLIC AND PRIVATE). ANY DISCREPANCIES SHALL BE CALLED TO THE ATTENTION OF THE PROJECT ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
17. REMOVAL OR RELOCATION OF POWER POLES, TELEPHONE POLES, JOINTLY-OWNED POLES, AND APPURTENANCES WHICH INTERFERE WITH IMPROVEMENTS REQUIRED TO BE CONSTRUCTED UNDER THIS CONTRACT, SHALL BE THE RESPONSIBILITY OF THE RESPECTIVE UTILITY COMPANY. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH THE UTILITY COMPANIES FAR ENOUGH IN ADVANCE SO AS TO NOT IMPACT THE SCHEDULE.
18. COX COMMUNICATIONS SHALL BE RESPONSIBLE FOR THE VERTICAL OR HORIZONTAL ADJUSTMENT OF ALL CATV FACILITIES WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON THE CONTRACT DRAWINGS, UNLESS NOTED OTHERWISE.
19. NV ENERGY SHALL BE RESPONSIBLE FOR THE RELOCATION OF UNDERGROUND OR OVERHEAD POWER LINES THAT INTERFERE WITH THE REQUIRED IMPROVEMENTS AS SHOWN ON THE CONTRACT DRAWINGS.
20. EMBARQ SHALL BE RESPONSIBLE FOR THE VERTICAL OR HORIZONTAL ADJUSTMENT OF ALL TELEPHONE FACILITIES WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON CONTRACT DRAWINGS, UNLESS NOTED OTHERWISE.

LAS VEGAS VALLEY WATER DISTRICT (LVVWD) NOTES

LVVWD PROJECT #XXXXX
(REVISED 01/09/2017)

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN APPROVED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. FOR FUTURE INSPECTIONS, NOTICE MUST BE GIVEN BY 2:00 P.M. THE BUSINESS DAY PRIOR TO THE REQUESTED LVVWD INSPECTION. **WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.**
2. ALL WORK SHALL CONFORM TO LVVWD STANDARD PLATES, DRAWINGS, AND SPECIFICATIONS, AND TO THE **2010** EDITION OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEMS (UDACS). **THE LATEST EDITION OF UDACS SHALL SUPERCEDE ANY CONFLICTS CONTAINED IN THE APPROVED DRAWINGS AND/OR SPECIFICATIONS.**
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2 ABOVE, SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE TYPE K COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY AND CURB GUTTERS.
8. ALL WATER AND STORM DRAIN OR SANITARY SEWER CROSSINGS SHALL CONFORM TO SECTION 2.22 OF THE **2010** EDITION OF THE UDACS.
9. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED, AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD DISTRIBUTION SYSTEM.
10. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 OR 258-3802 TWO (2) WORKING DAYS PRIOR TO METER PICKUP.
11. ANY INTERRUPTION OF SERVICE MUST BE PERFORMED IN ACCORDANCE WITH UDACS SECTION 3.14.01 AND APPROVED BY THE LVVWD INSPECTION DIVISION PRIOR TO SHUTDOWN. PROPER WRITTEN NOTIFICATION MUST BE GIVEN TO ALL AFFECTED CUSTOMERS.
12. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.
13. TELEPHONE "CALL BEFORE YOU DIG" AT 811 OR 1-800-227-2600.
14. THE INSTALLATION OF LAS VEGAS VALLEY WATER DISTRICT (LVVWD) MUNICIPAL WATER FACILITIES WITHIN ALL STREETS IS ASSUMED TO BE IN COMPLIANCE WITH THE UNIFORM STANDARDS, INCLUDING THE PLACEMENT OF ASPHALT PAVING STREET SURFACES. ANY REPAIR WORK DONE BY THE LVVWD TO THE MUNICIPAL WATER FACILITIES WILL INCLUDE THE PLACEMENT OF AN APPROPRIATELY SIZED ASPHALT REPAIR PATCH ON THE STREET SURFACE.

    ANY DECORATIVE PAVING SURFACE WITHIN THE STREET IS THE RESPONSIBILITY OF THE OWNER'S ASSOCIATION, OR THE INDIVIDUAL PROPERTY OWNERS IF NO OWNER'S ASSOCIATION IS IN EXISTENCE, OR THE AGENCY HAVING JURISDICTION. DECORATIVE SURFACE MATERIALS PLACED WITHIN THE TEN FOOT EASEMENT ABUTTING A PUBLIC OR PRIVATE STREET, IF DISTURBED BY THE LVVWD DURING THE REPAIR OR OPERATION OF ITS FACILITIES, WILL BE REPLACED BY LVVWD WITH AN APPROPRIATELY SIZED PLAIN FINISH CONCRETE PATCH. THE LVVWD WILL NOT RESTORE, AND WILL NOT BE RESPONSIBLE FOR THE RESTORATION OF, ANY DECORATIVE PAVING SURFACE WITHIN THE STREET. THE LVVWD WILL NOT ATTEMPT TO MATCH COLOR OR FINISH OF ANY ADJACENT MATERIALS.
15. **NO LEAD COMPLIANCE NOTE:**
    TO COMPLY WITH THE FEDERAL SAFE DRINKING WATER ACT, ALL WATER WORKS BRASS PRODUCTS PROPOSED TO BE RELOCATED, OR INSTALLED AS NEW MUST BE INSTALLED WITH THE LEAD FREE APPROVED PRODUCT. THE OLD LEADED PRODUCT MAY NOT BE REUSED.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES

PROJECT NO. 0000 FIRST APPROVED DATE: ____________

PROFESSIONAL ENGINEER - STATE OF NEVADA
PAUL A. BATES
EXP. 12-31-20
CIVIL
No. 18723
7/15/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

GENERAL NOTES

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: NONE
VERT.: NONE
JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 3 /37
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 – V22N Street J (Lake Mead to Street G)_Sheets\60655-03-NOTE-C3.dwg LAYOUT: C-3 Jul 15, 2019 – 2:34PM

RED ROCK CANYON
NATIONAL CONSERVATION AREA
UNITED STATES OF AMERICA
APN 137-15-000-003

REVERENCE / VILLAGE 26

VILLAGE 27

VILLAGE 22

VILLAGE 25

FUTURE STREET K

FUTURE LAKE MEAD BOULEVARD

FUTURE KESTREL CREEK AVENUE

FUTURE CLOWDER PASS WAY

FUTURE FLEET WING AVENUE

FUTURE KETTLE RIDGE DRIVE

FUTURE SCURRY BEND DRIVE

FUTURE DESERT FOOTHILLS DRIVE

FUTURE KETTLE BEND DRIVE

FUTURE PARCEL A

FUTURE COS-2

FUTURE PARCEL C

FUTURE PARCEL D

FUTURE PARCEL E

FUTURE PARCEL F

FUTURE PARCEL HS-1

HOWARD HUGHES COMPANY, LLC
LOT 2 OF PARCEL MAP 4, PAGE 51

HOWARD HUGHES COMPANY, LLC
LOT 2 OF PARCEL MAP 123, PAGE 36

SEE SHEETS 32 AND 33 FOR FILL WASH PLANS.

SEE SHEETS 5 TO 23 FOR KETTLE RIDGE DRIVE PLANS

SEE SHEETS 9 TO 11 FOR ROUGH GRADING OF SCURRY BEND DRIVE PLANS

SEE SHEETS 34 AND 35 FOR DEBRIS BASIN PLANS

FUTURE STOCKPILE BY SEPARATE PLANS

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.

LEGEND

FLOW LINE

N

ATKINS

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

GRAPHIC SCALE
100 0 100 200' 400
HORIZONTAL: 1"= 200'

SOILS REPORT

BY NOVA
PROJECT NO. G-18-176
DATED 12/03/18
EARTHWORK QUANTITIES (RAW):
CUT= 226,860 CU YDS
FILL= 205,820 CU YDS

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID OUTSIDE 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
PAUL BATES
No. 18723
CIVIL
7/15/19

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

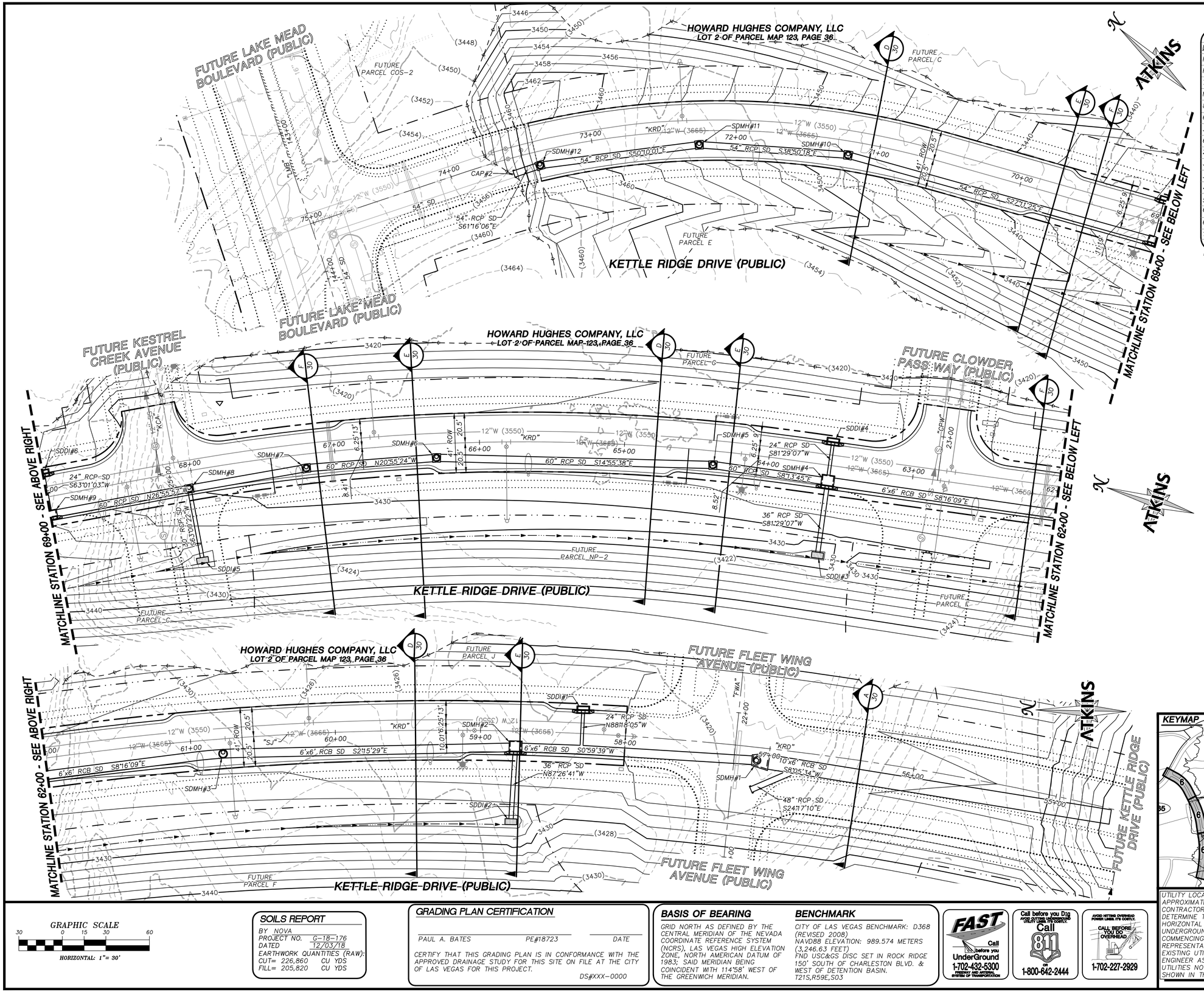
SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

MASTER GRADING PLAN

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=200'
VERT.: NONE

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 4 /37
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 – V22N Street J (Lake Mead to Street G)_Sheets\60655-06-OVERALL DRAIN.dwg LAYOUT: MASTER GRADING PLAN Jul 15, 2019 – 2:35PM



SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNIT
DRAINAGE		
RIP-RAP (D50=8")	1890	CY
RIP-RAP (D50=24")	220	CY
7.5' TYPE "CM2" DROP INLET	3	EACH
MODIFIED STRUCTURE DROP INLET SD	3	EACH
8' X 4' NDOT TYPE II DROP INLET	3	EACH
60" TYPE I RISER	1	EACH
30" TYPE II MANHOLE	1	EACH
60" TYPE III MANHOLE	6	EACH
24" CLASS III RCP SD	82	LF
30" CLASS III RCP SD	51	LF
36" CLASS III RCP SD	99	LF
48" CLASS III RCP SD	30	LF
54" CLASS IV RCP SD*	453	LF
60" CLASS IV RCP SD	540	LF
6' X 6' CONCRETE BOX CULVERT	650	LF
10' X 6' CONCRETE BOX CULVERT	248	LF

*WITH 1" SACRIFICIAL CONCRETE

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.

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. SEE SHEET 31 FOR REINFORCED CONCRETE BOX INFORMATION.
3. CONTRACTOR TO PROVIDE 6" MINIMUM OF CLEARANCE BETWEEN OUTSIDE OF PIPE TO INSIDE WALL OF STORM DRAIN STRUCTURES.

GRAPHIC SCALE
30 0 15 30 60
HORIZONTAL: 1"= 30'

SOILS REPORT

BY NOVA
PROJECT NO. G-18-176
DATED 12/03/18
EARTHWORK QUANTITIES (RAW):
CUT= 226,860 CU YDS
FILL= 205,820 CU YDS

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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 (FIBERNET AND ARTERIAL SYSTEMS OF TRANSPORTATION)

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES YOU DON'T OWN. Call 811 or 1-800-642-2444

AVOID HITTING OVERHEAD POWER LINES YOU DON'T OWN. CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

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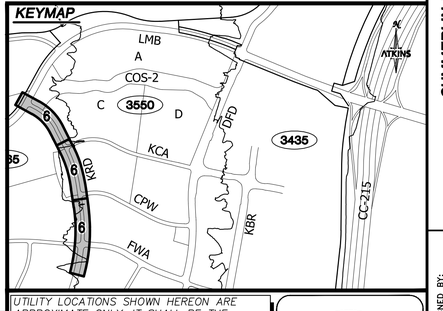

PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL BATES - No. 18723 - CIVIL - 7/15/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET H) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

MASTER DRAINAGE PLAN - KETTLE RIDGE DRIVE

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=30'
VERT.: NONE

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 6 /37
CLV 00-00000

X:\Projects\SummerlWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-05-STRM-SD1.dwg LAYOUT: MASTER DRAINAGE PLAN - KETTLE RIDGE DRIVE Jul 15, 2019 - 3:48PM

CENTERLINE CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
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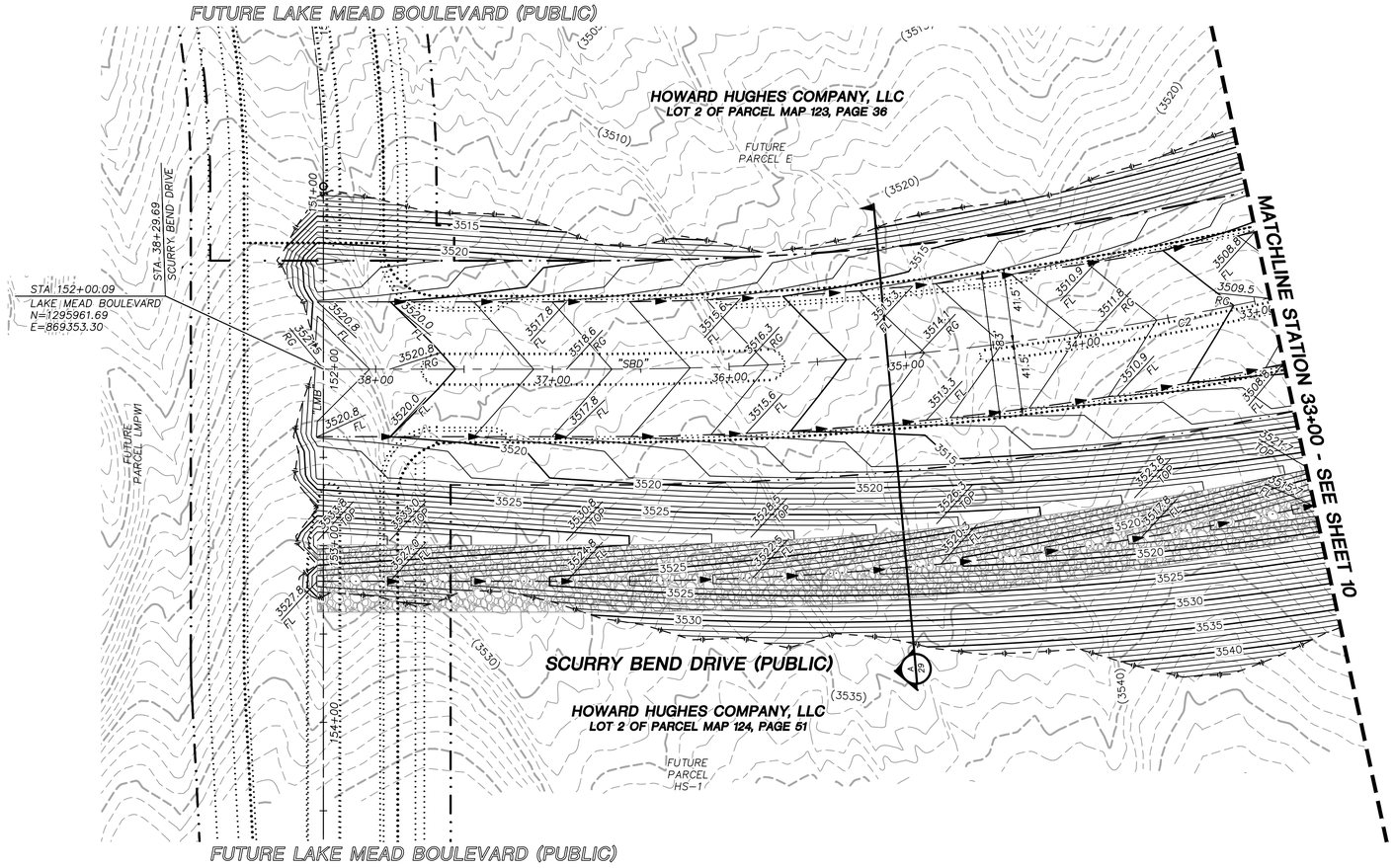

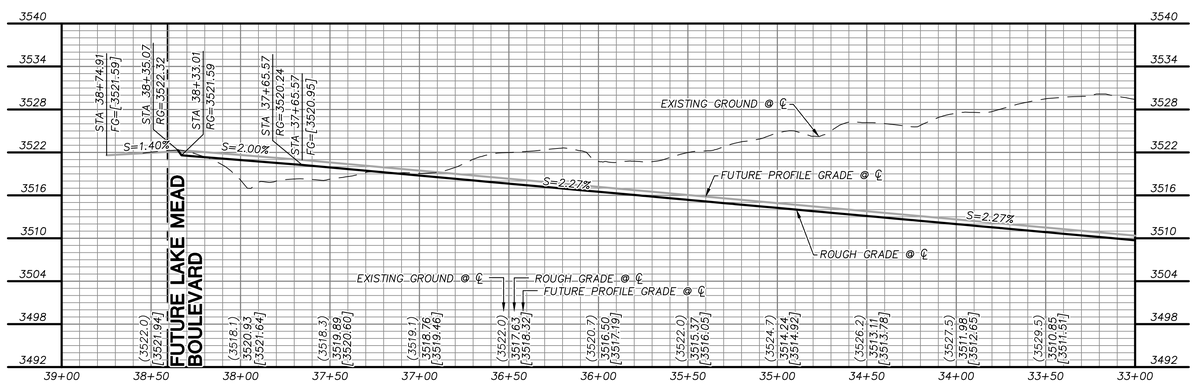

GRAPHIC SCALE

40 0 20 40 80

HORIZONTAL: 1"=40'

10 0 5 10 20

VERTICAL: 1"=10'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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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T21S,R59E,S03

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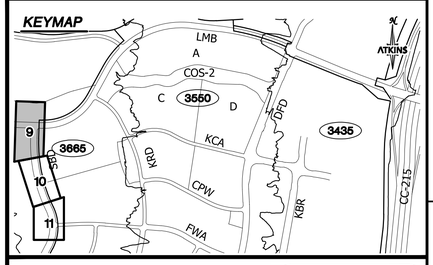
Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY. Call 811 or 1-800-642-2444

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

ROUGH GRADE

THE PROPOSED ROUGH GRADE IN PAVEMENT IS 8 1/2" BELOW THE FINISH GRADE SHOWN WITHIN THESE PLANS.

KEYMAP



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PROFESSIONAL ENGINEER-STATE OF NEVADA PAUL BATES 12-31-20 CIVIL No. 18729 7/15/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

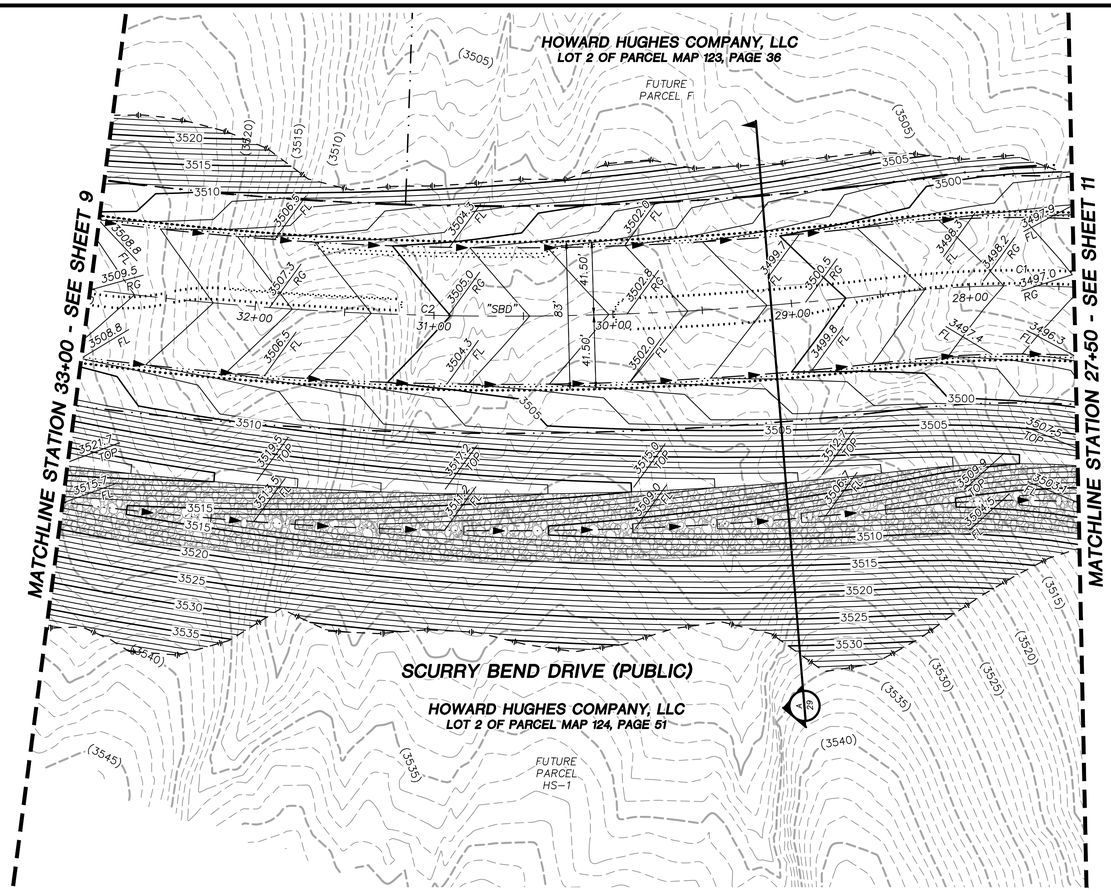
ROUGH GRADING PLAN AND PROFILE - SCURRY BEND DRIVE

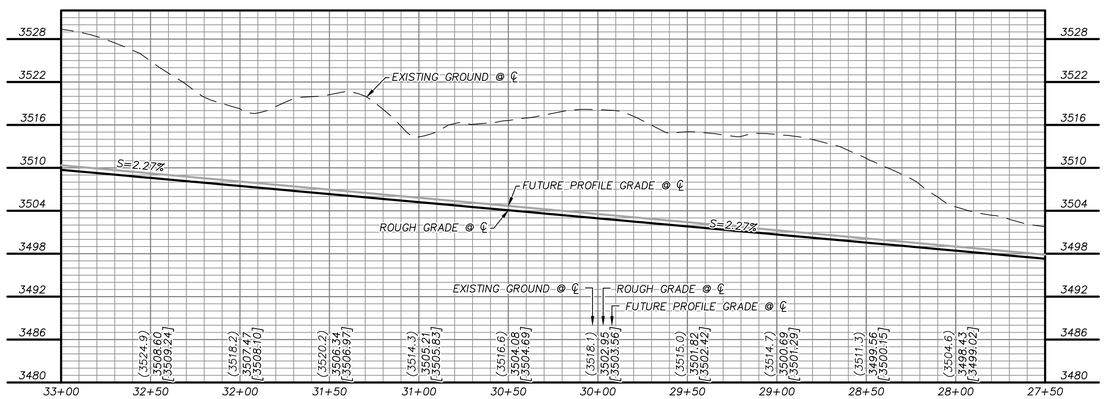
DESIGNED BY: N. BARCOS
DRAWN BY: L. MAMACLAY
CHECKED BY: P. BATES
HORIZ.: 1"=40'
VERT.: 1"=8'

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 9 /37
CLV 00-00000

X:\Projects\SummerWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-13-GRAD-02.dwg LAYOUT: ROUGH GRADING PLAN AND PROFILE - SCURRY BEND DRIVE JUL 15, 2019 - 2:38PM

CENTERLINE CURVE TABLE				
NO.	RADIUS	DELTA	LENGTH	TANGENT
C1	610.00'	48°26'31"	515.74'	274.41'
C2	1803.50'	26°17'46"	827.72'	421.28'

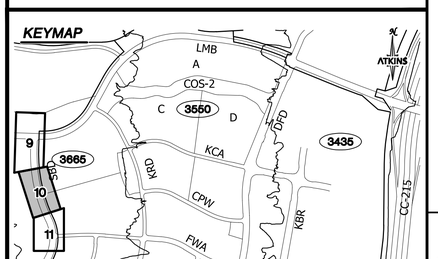




ROUGH GRADE

THE PROPOSED ROUGH GRADE IN PAVEMENT IS 8 1/2" BELOW THE FINISH GRADE SHOWN WITHIN THESE PLANS.

KEYMAP



GRAPHIC SCALE

40 0 20 40 80

HORIZONTAL: 1"=40'

10 0 5 10 20

VERTICAL: 1"=10'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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 REMOTELY 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
PAUL BATES
Expires 12-31-20
CIVIL
No. 18723
7/15/19

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

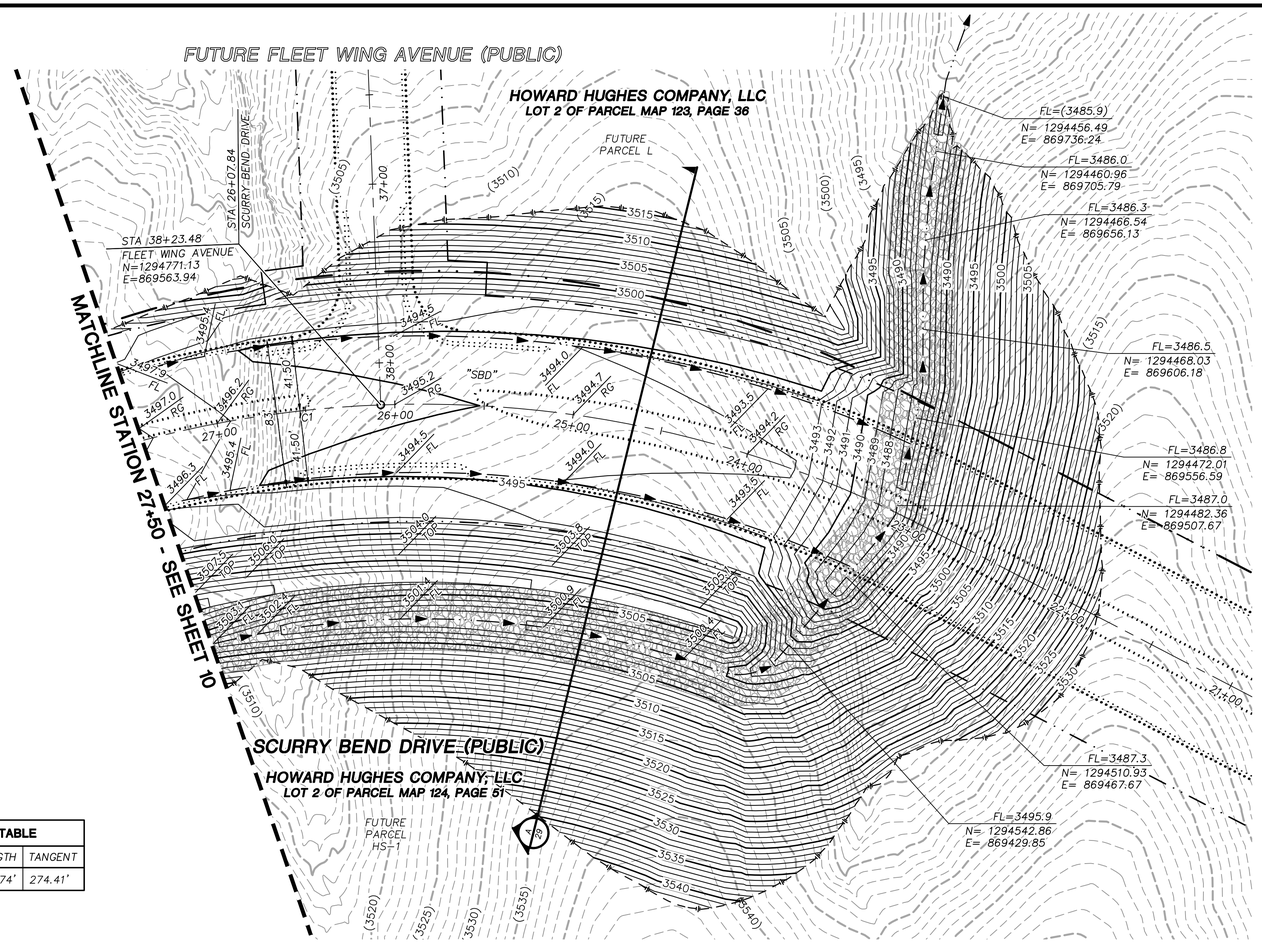
SUMMERLIN VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROUGH GRADING PLAN AND PROFILE - SCURRY BEND DRIVE

JOB NO.	100060655
DATE:	JULY, 2019
DRAWING NO.	10/37
DESIGNED BY:	N. BARCOS
DRAWN BY:	L. MAMACLAY
CHECKED BY:	P. BATES
HORIZ.:	1"=40'
VERT.:	1"=8'
CLV	00-00000

X:\Projects\SummitWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-13-GRAD-G2.dwg LAYOUT: 6 Jul 15, 2019 - 2:38PM



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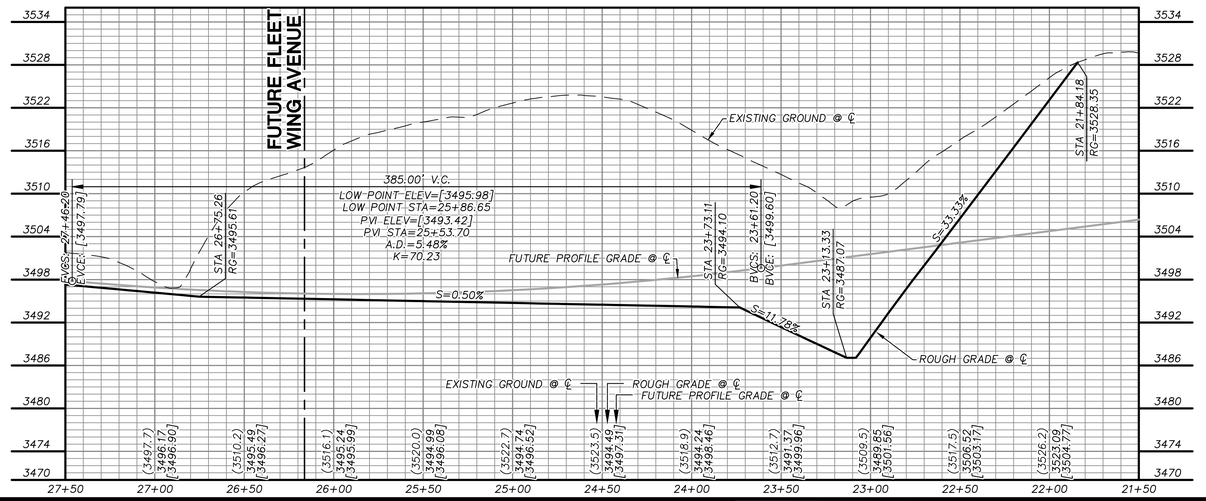

GRAPHIC SCALE

HORIZONTAL: 1"=40'

VERTICAL: 1"=10'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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

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

Call before you Dig AT LEAST TWO WORKING DAYS BEFORE YOU START DIGGING, 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

ROUGH GRADE

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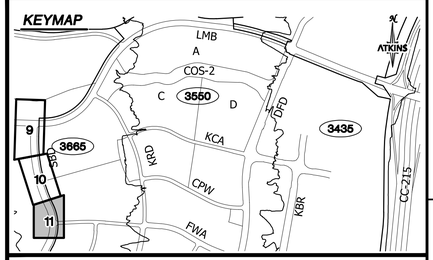
KEYMAP



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PROFESSIONAL ENGINEER-STATE OF NEVADA PAUL A. BATES Exp. 12-31-20 CIVIL No. 18723

7/15/19

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

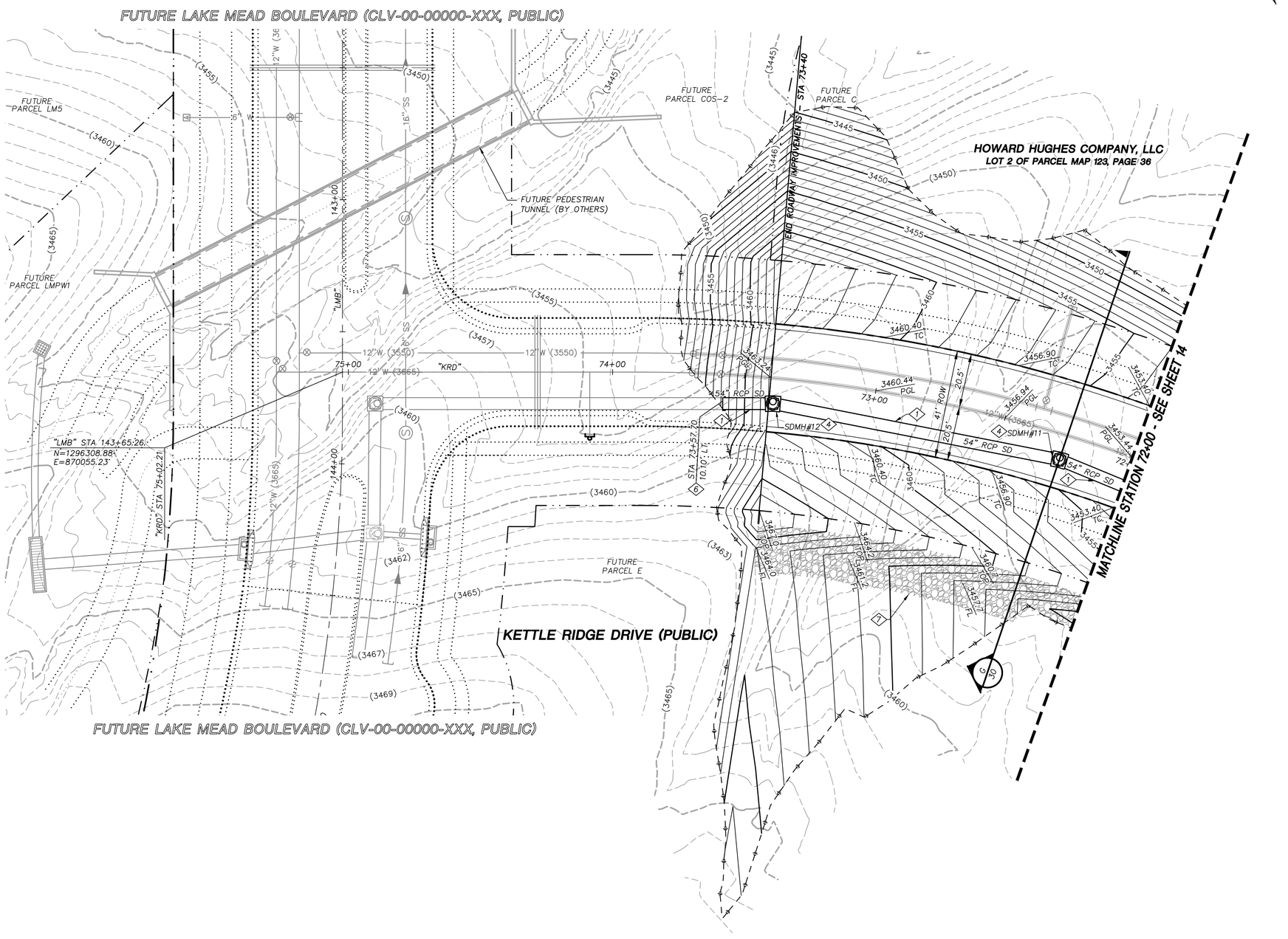
SUMMERLIN VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROUGH GRADING PLAN AND PROFILE - SCURRY BEND DRIVE

DESIGNED BY:	N. BARCOS
DRAWN BY:	L. MAMACLAY
CHECKED BY:	P. BATES
HORIZ.:	1"=40'
VERT.:	1"=8'
JOB NO.	100060655
DATE:	JULY, 2019
DRAWING NO.	11/37
CLV	00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-13-GRAD-62.dwg LAYOUT: 7 Jul 15, 2019 - 2:38PM

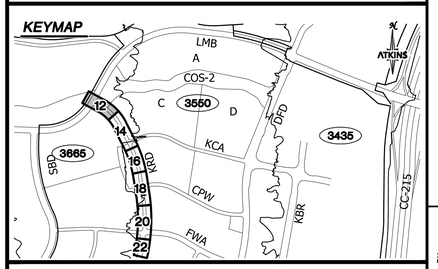


STORM DRAIN CONSTRUCTION NOTES

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 31)
7. INSTALL RIP-RAP (D50=8", THICKNESS=16")
8. INSTALL SD JUNCTION STRUCTURE
9. INSTALL SD DROP INLET MODIFIED STRUCTURE
10. DIRECT CONNECTION INTO RCB SEE SHEET 31 FOR DETAIL
11. INSTALL TYPE I SD RISER PER CCAUSD #403.1
12. INSTALL TYPE "A" DROP INLET PER CCAUSD #411

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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

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

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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL BATES - No. 18723 - Exp. 12-31-20 - CIVIL
7/15/19

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

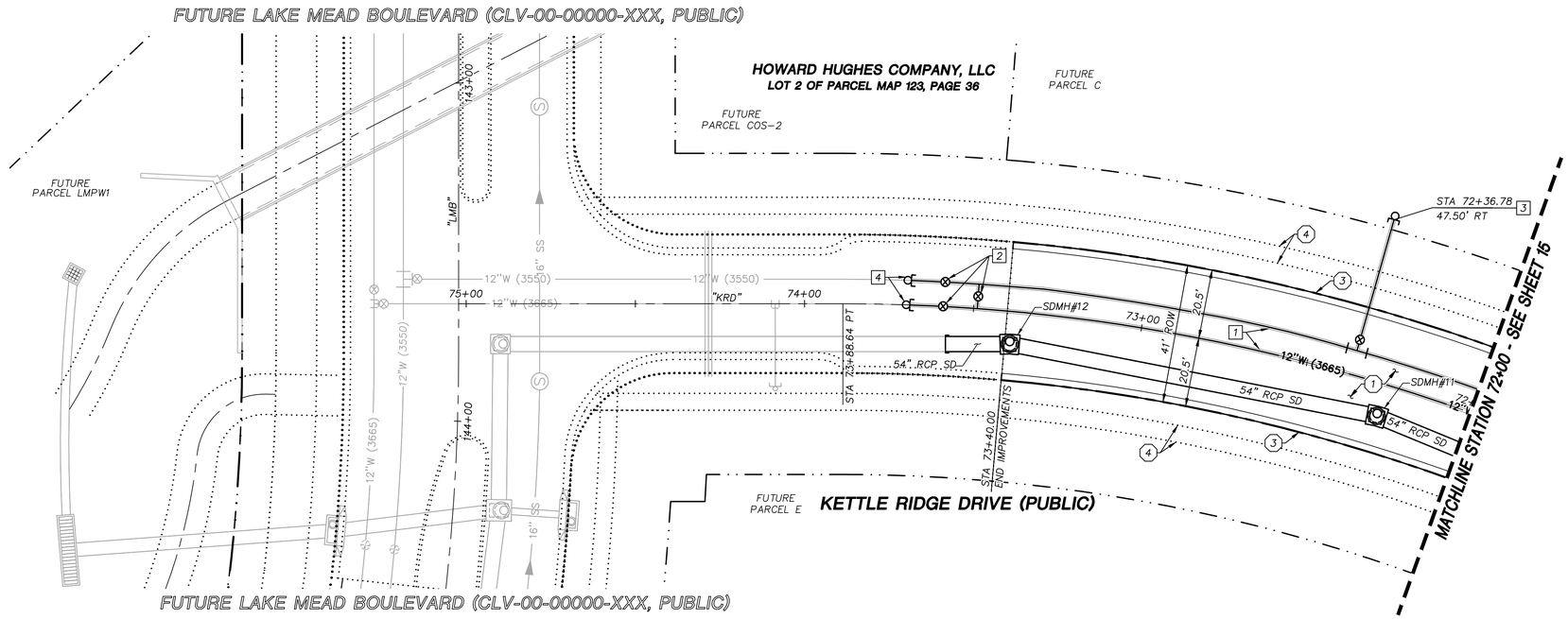
SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

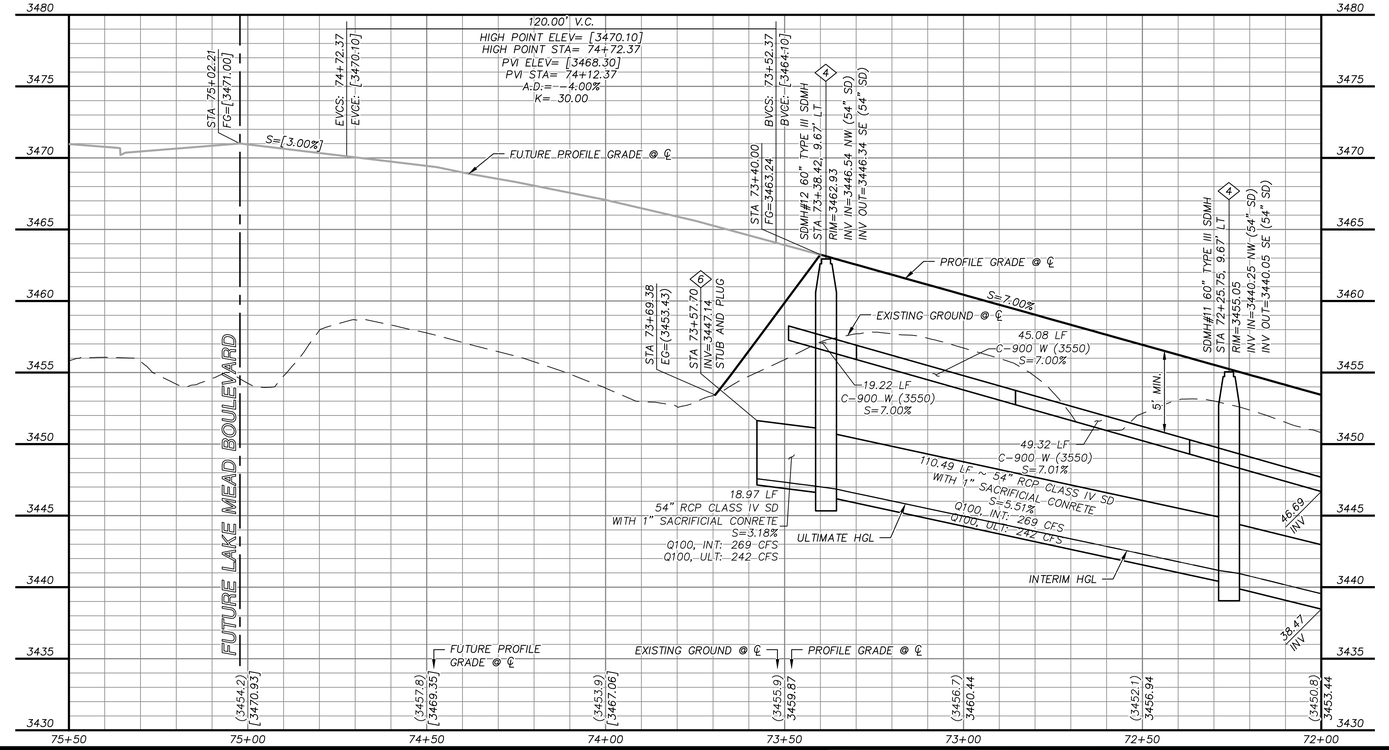
ROADWAY GRADING PLAN - KETTLE RIDGE DRIVE
STA. 72+00 TO END

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 12/37
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-09-GRAD-G1.dwg LAYOUT: 12 Jul 15, 2019 - 2:40PM





GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

5 0 2.5 5 10

VERTICAL: 1"=5'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 DATE

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DS#XXX-0000

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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
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5. INSTALL NDOT TYPE 2 DROP INLET PER NDOT R-4.2.1 (SEE SHEET 29)
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7. INSTALL RIP-RAP (D50=8", THICKNESS=16")
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9. INSTALL SD DROP INLET MODIFIED STRUCTURE
10. DIRECT CONNECTION INTO RCB SEE SHEET 31 FOR DETAIL
11. INSTALL TYPE I SD RISER PER CCAUSD #403.1
12. INSTALL TYPE "A" DROP INLET PER CCAUSD #411

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).

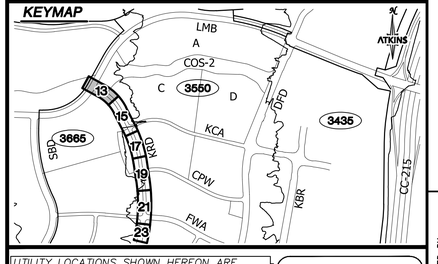
WATERLINE CONSTRUCTION NOTES

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 11.25° HORIZONTAL BEND PER UDACS PLATE #31
6. INSTALL 45° HORIZONTAL BEND PER UDACS PLATE #31
7. INSTALL IN-LINE REDUCER PER UDACS PLATE #30
8. INSTALL FIRE HYDRANTWITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40.

ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 30 FOR TYPICAL PAVEMENT SECTION.
2. SEE REFERENCED SHEET FOR LATERAL PLAN AND PROFILE
3. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
4. FUTURE SIDEWALK BY OTHERS
5. CONSTRUCT CURB RAMP, TYPE A, PER NDOT STANDARD PLAN R-5.2.1 (A=B=6.5').
6. CONSTRUCT 0" FLUSH CURB
7. TRANSITION CURB FROM FULL HEIGHT (6") TO FLUSH (0")
8. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4",1-6") PER DETAIL ON SHEET XX

KEYMAP



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PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL BATES - No. 18723 - CIVIL - Date is not valid after 12-31-19

7/15/19

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

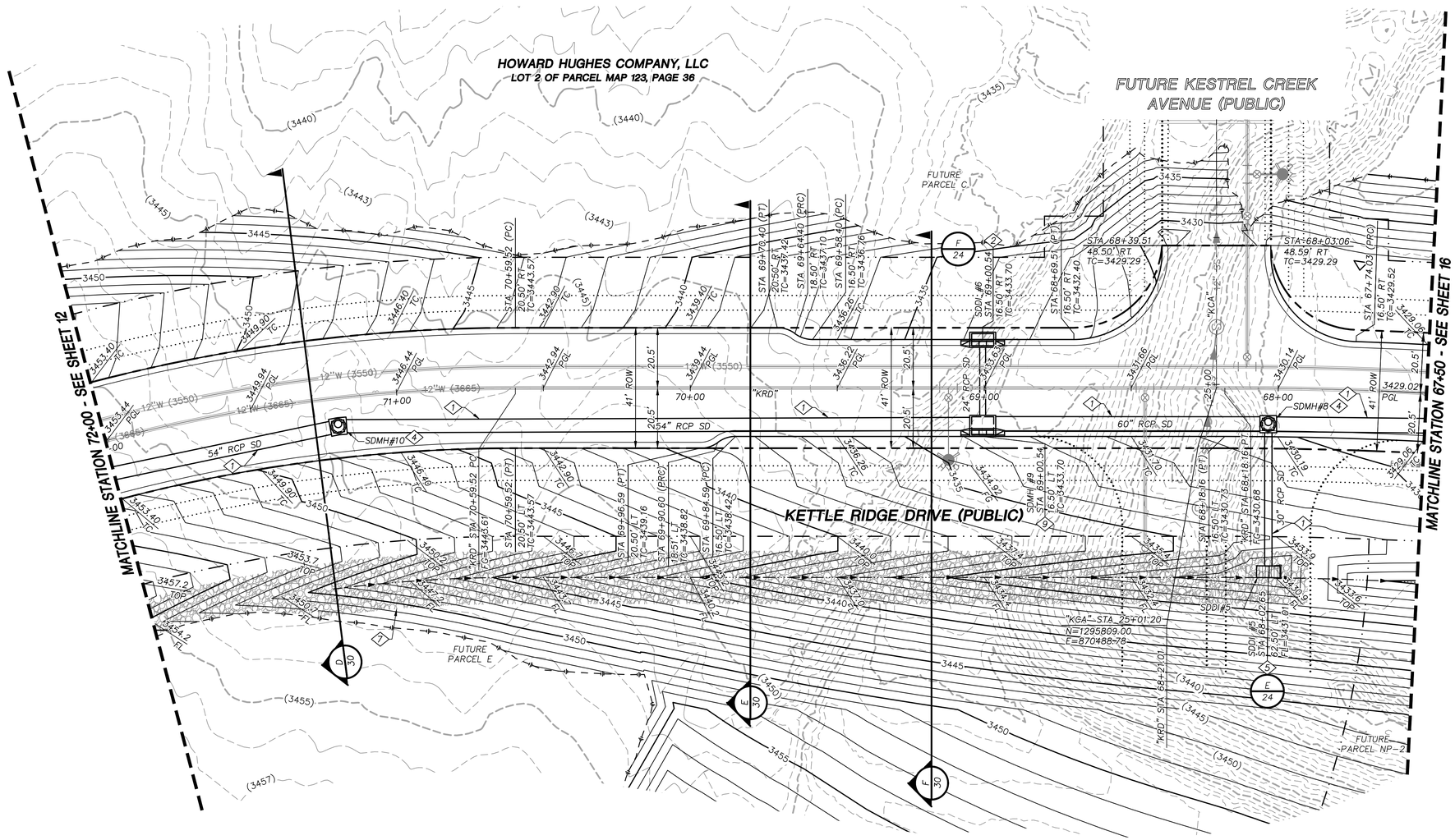
SUMMERLIN

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET M) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE - KETTLE RIDGE DRIVE
STA. 72+00 TO END

DESIGNED BY:	N. BARCOS
DRAWN BY:	O. QUASSANI
CHECKED BY:	P. BATES
HORIZ.:	1"=20'
VERT.:	1"=5'
JOB NO.	100060655
DATE:	JULY, 2019
DRAWING NO.	13/37
CLV	00-00000

K:\Projects\SummitWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-11-PLAN-P1.dwg LAYOUT: 13 Jul 15, 2019 - 7:20PM



STORM DRAIN CONSTRUCTION NOTES

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11. INSTALL TYPE I SD RISER PER CCAUSD #403.1
12. INSTALL TYPE "A" DROP INLET PER CCAUSD #411

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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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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

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Call before you Dig AVOID CUTTING, PUNCTURING OR DAMAGING UTILITY LINES, PITS OR CAVITY. Call 811 OR 1-800-642-2444

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PROFESSIONAL ENGINEER - STATE OF NEVADA
PAUL BATES
No. 18723
CIVIL
7/15/19

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

KEYMAP

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET K) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN - KETTLE RIDGE DRIVE
STA. 67+50 TO STA. 72+00

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 14/37
CLV 00-00000

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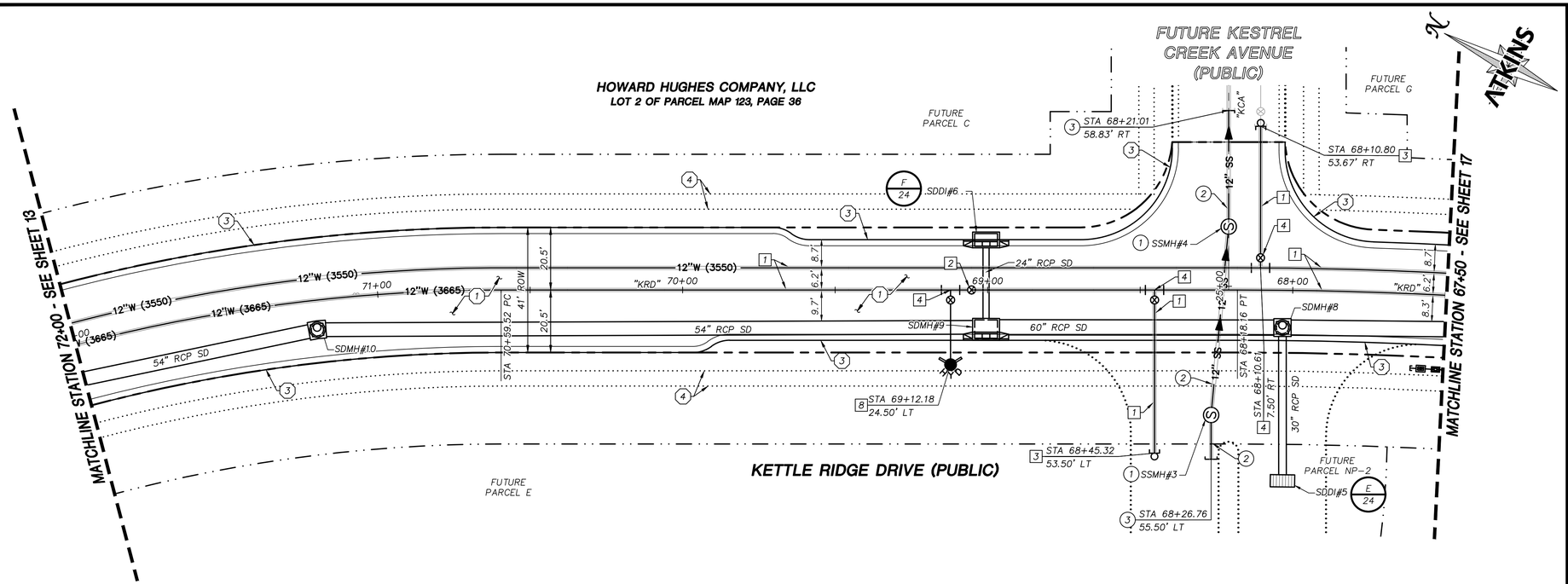

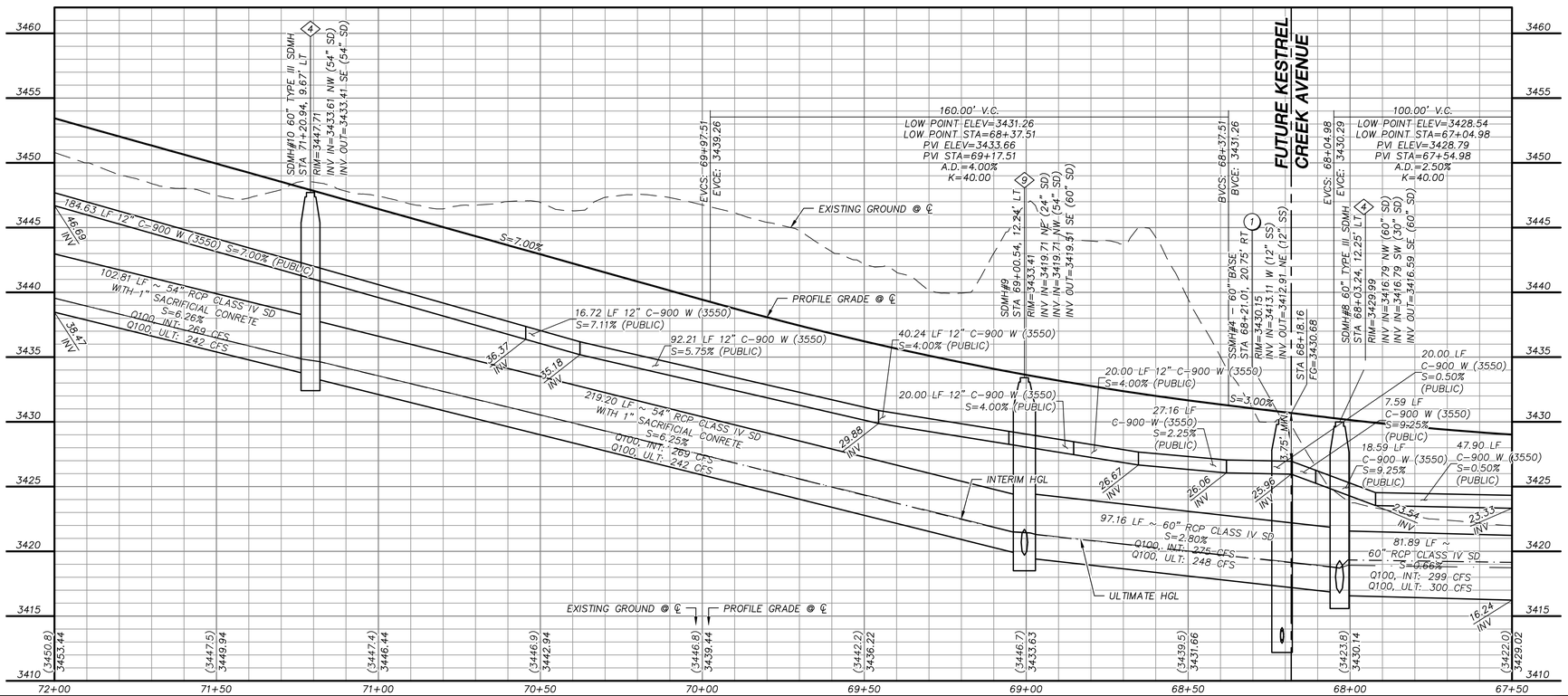

STORM DRAIN CONSTRUCTION NOTES

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 31)
7. INSTALL RIP-RAP (D50=8", THICKNESS=16")
8. INSTALL SD JUNCTION STRUCTURE
9. INSTALL SD DROP INLET MODIFIED STRUCTURE
10. DIRECT CONNECTION INTO RCB SEE SHEET 31 FOR DETAIL
11. INSTALL TYPE I SD RISER PER CCAUSD #403.1
12. INSTALL TYPE "A" DROP INLET PER CCAUSD #411

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).

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ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 30 FOR TYPICAL PAVEMENT SECTION.
2. SEE REFERENCED SHEET FOR LATERAL PLAN AND PROFILE
3. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
4. FUTURE SIDEWALK BY OTHERS
5. CONSTRUCT CURB RAMP, TYPE A, PER NDOT STANDARD PLAN R-5.2.1 (A=B=6.5').
6. CONSTRUCT 0" FLUSH CURB
7. TRANSITION CURB FROM FULL HEIGHT (6") TO FLUSH (0")
8. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4",1-6") PER DETAIL ON SHEET XX

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

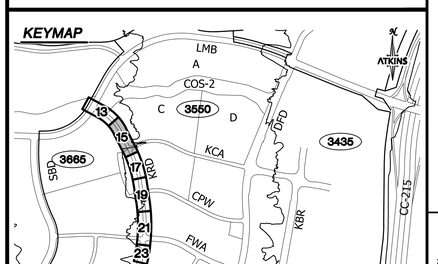
ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE - KETTLE RIDGE DRIVE
STA. 67+50 TO STA. 72+00

KEYMAP



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'
5 0 2.5 5 10
VERTICAL: 1"=5'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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 EMERGENCY AND NOTIFICATION SYSTEM OF TRANSMISSION

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
PAUL BATES
No. 18723
CIVIL
7/15/19

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 15/37
CLV 00-00000

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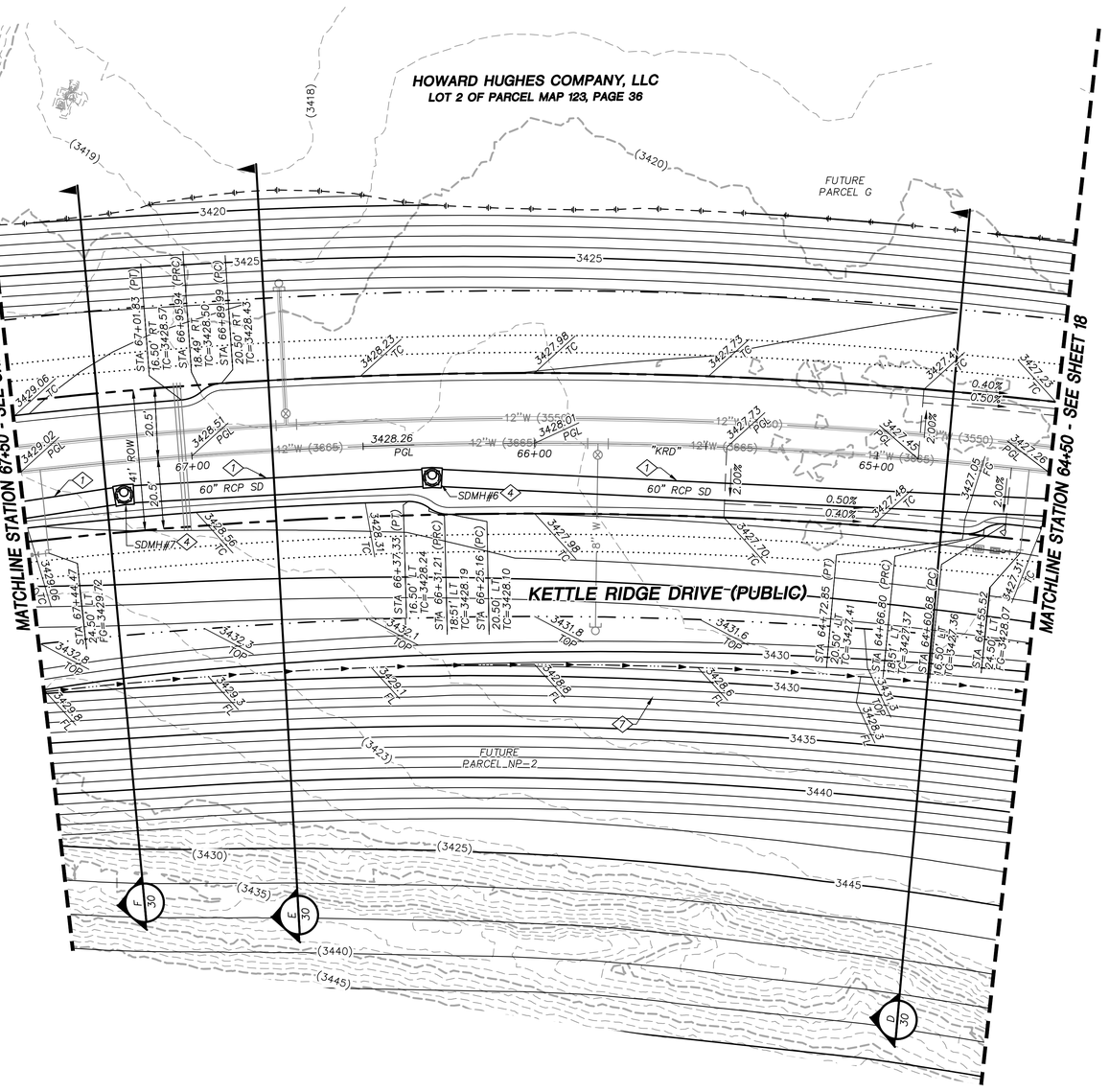

STORM DRAIN CONSTRUCTION NOTES

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10. DIRECT CONNECTION INTO RCB SEE SHEET 31 FOR DETAIL
11. INSTALL TYPE I SD RISER PER CCAUSD #403.1
12. INSTALL TYPE "A" DROP INLET PER CCAUSD #411

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APPROVAL

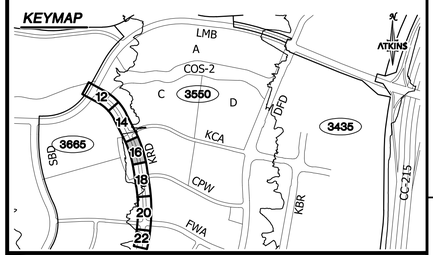
ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
Telephone: +1.702.263.7275
Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET H) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN - KETTLE RIDGE DRIVE STA. 64+50 TO STA. 67+50

KEYMAP



GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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 REGIONAL AND ARTERIAL SYSTEMS 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
PAUL BATES
No. 18723
CIVIL
7/15/19

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 16/37
DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE
CLV 00-00000

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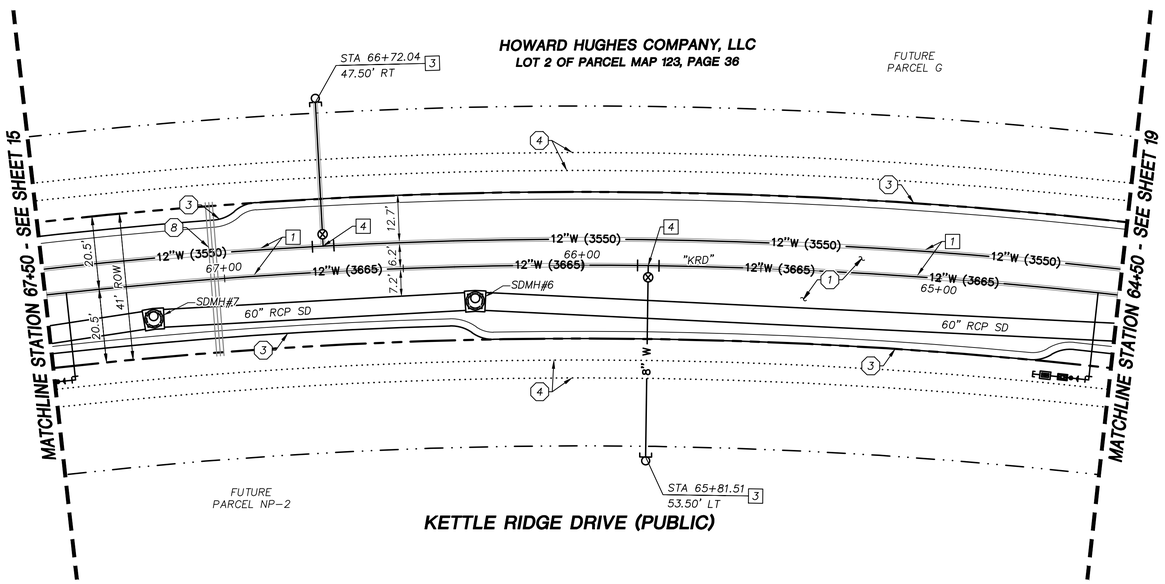

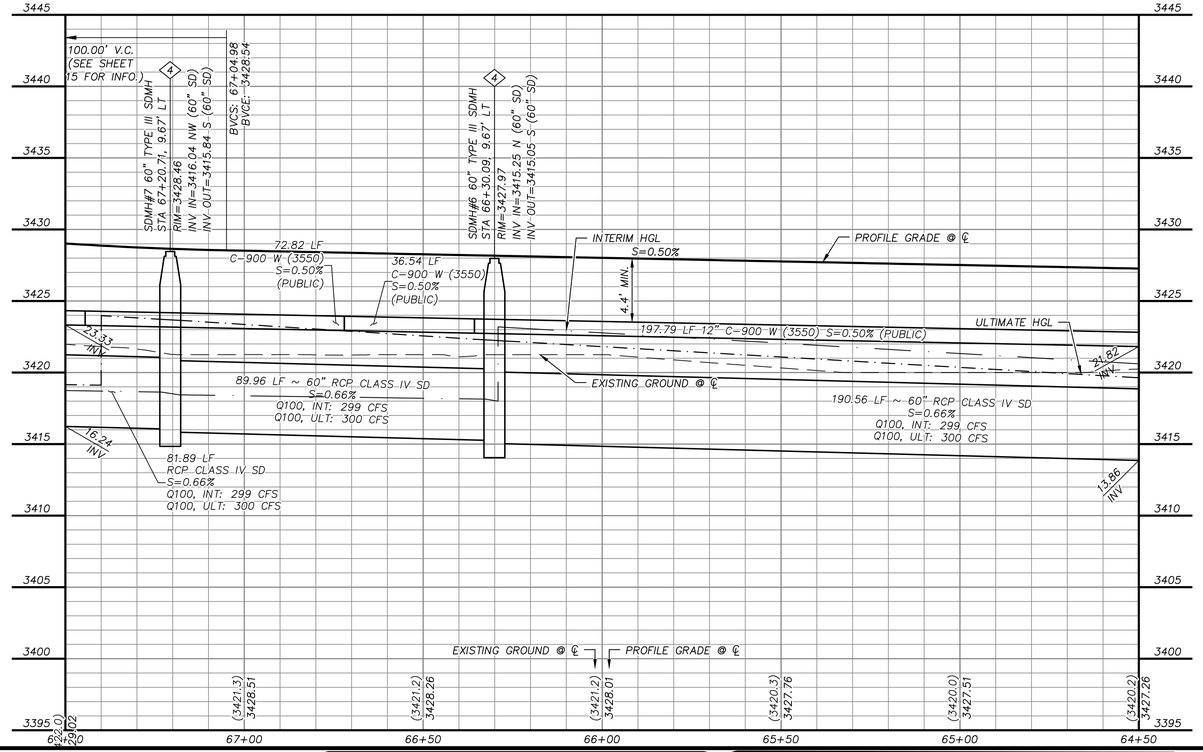

GRAPHIC SCALE

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HORIZONTAL: 1"=20'

5 0 2.5 5 10

VERTICAL: 1"=5'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 DATE

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DS#XXX-0000

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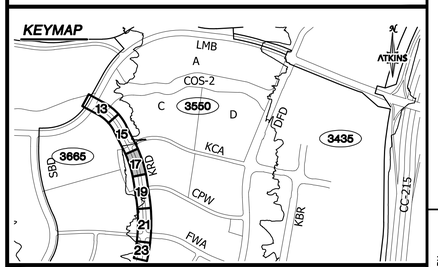
8. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4",1-6") PER DETAIL ON SHEET XX

KEYMAP



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PROFESSIONAL ENGINEER-STATE OF NEVADA PAUL BATES No. 18723 CIVIL 7/15/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE - KETTLE RIDGE DRIVE
STA. 64+50 TO STA. 67+50

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 17/37
CLV 00-00000

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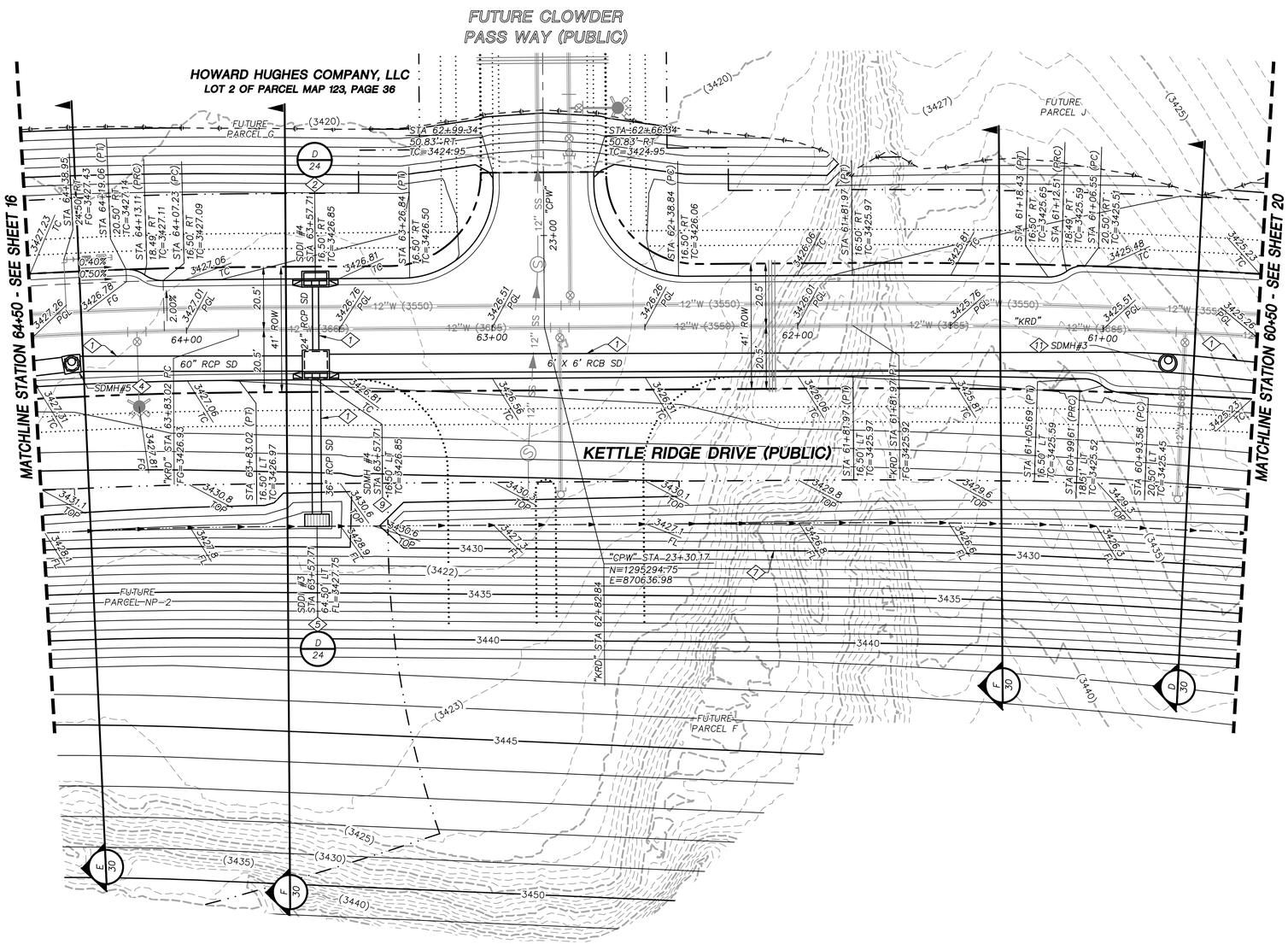

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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 BURYING YOUR UTILITY LINES. VTN CONTR.) Call 811 1-800-642-2444

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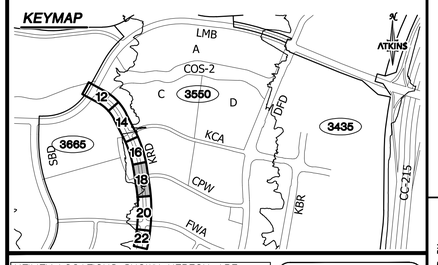
REV.	DESCRIPTION	BY	DATE	APPROVAL

KEYMAP



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PROFESSIONAL ENGINEER-STATE OF NEVADA PAUL BATES 18723 CIVIL 7/15/19

ATKINS
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Telephone: +1.702.263.7275
Fax: +1.702.263.7200

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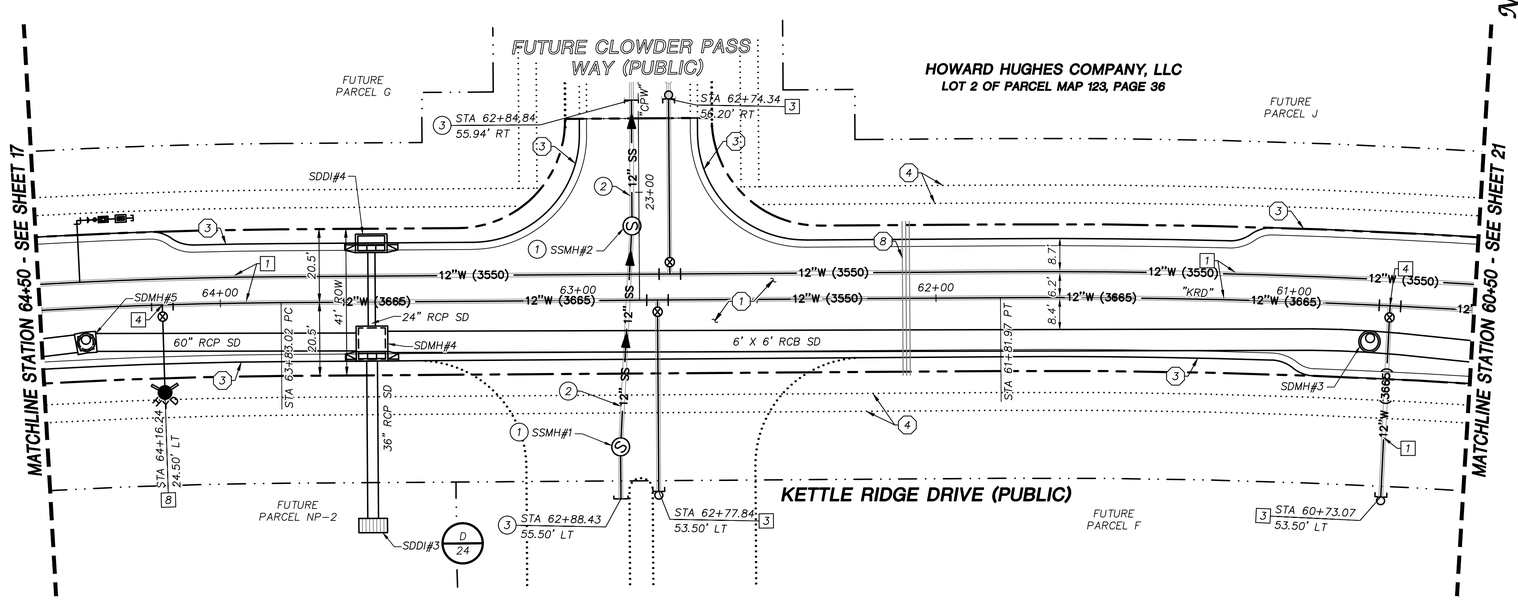
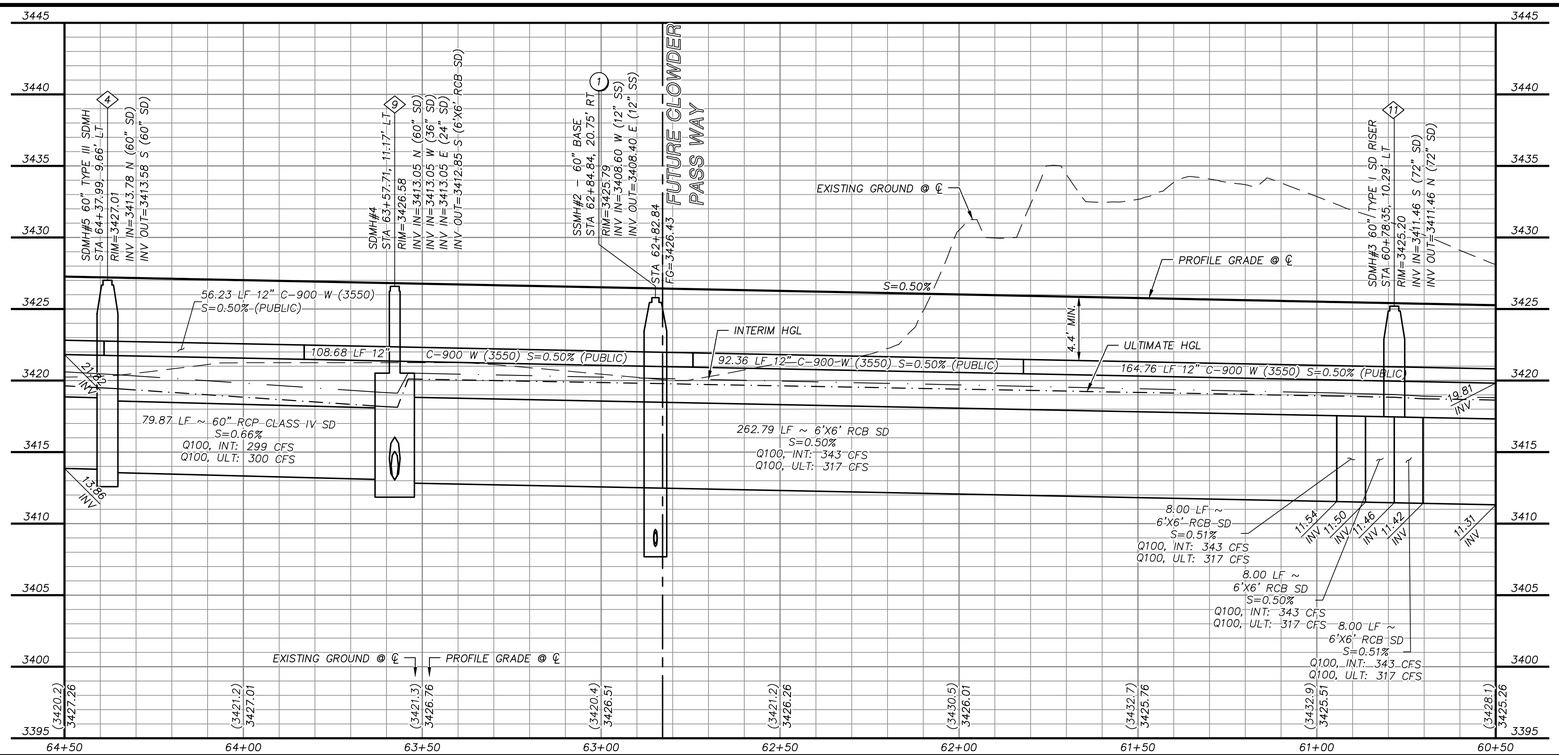
ROADWAY GRADING PLAN - KETTLE RIDGE DRIVE STA. 60+50 TO STA. 64+50

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 18/37
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-09-GRAD-G1.dwg LAYOUT: 18 Jul 15, 2019 - 3:48PM





GRAPHIC SCALE

HORIZONTAL: 1"=20'

VERTICAL: 1"=5'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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 REGIONAL AND NATIONAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES YOU CONTACT Call 811 OR 1-800-642-2444

AVOID HITTING OVERHEAD POWER LINES YOU CONTACT 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 31)
7. INSTALL RIP-RAP (D50=8", THICKNESS=16")
8. INSTALL SD JUNCTION STRUCTURE
9. INSTALL SD DROP INLET MODIFIED STRUCTURE
10. DIRECT CONNECTION INTO RCB SEE SHEET 31 FOR DETAIL
11. INSTALL TYPE I SD RISER PER CCAUSD #403.1
12. INSTALL TYPE "A" DROP INLET PER CCAUSD #411

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).

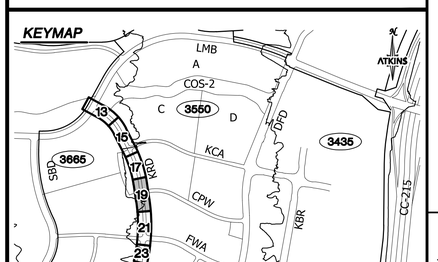
WATERLINE CONSTRUCTION NOTES

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 11.25° HORIZONTAL BEND PER UDACS PLATE #31
6. INSTALL 45° HORIZONTAL BEND PER UDACS PLATE #31
7. INSTALL IN-LINE REDUCER PER UDACS PLATE #30
8. INSTALL FIRE HYDRANTWITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40.

ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 30 FOR TYPICAL PAVEMENT SECTION.
2. SEE REFERENCED SHEET FOR LATERAL PLAN AND PROFILE
3. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
4. FUTURE SIDEWALK BY OTHERS
5. CONSTRUCT CURB RAMP, TYPE A, PER NDOT STANDARD PLAN R-5.2.1 (A=B=6.5').
6. CONSTRUCT 0" FLUSH CURB
7. TRANSITION CURB FROM FULL HEIGHT (6") TO FLUSH (0")
8. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4",1-6") PER DETAIL ON SHEET XX

KEYMAP



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PROFESSIONAL ENGINEER-STATE OF NEVADA PAUL BATES Expires 12-31-20 CIVIL No. 18723 7/15/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE - KETTLE RIDGE DRIVE STA. 60+50 TO STA. 64+50

JOB NO.	100060655	DESIGNED BY:	N. BARCOS
DATE:	JULY, 2019	DRAWN BY:	O. QUASSANI
DRAWING NO.	19/37	CHECKED BY:	P. BATES
		HORIZ.:	1"=20'
		VERT.:	1"=5'
CLV	00-00000		

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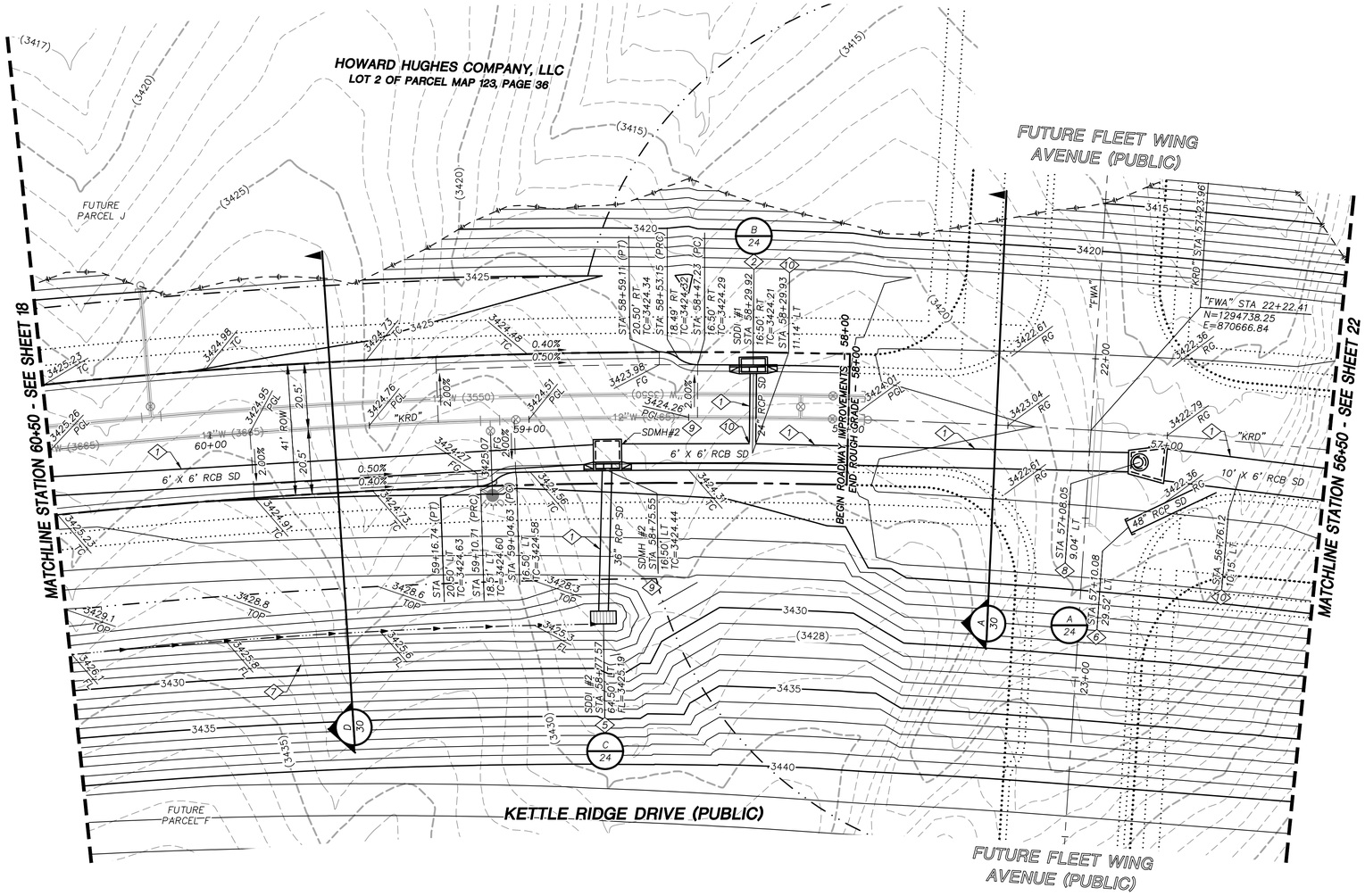

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GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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

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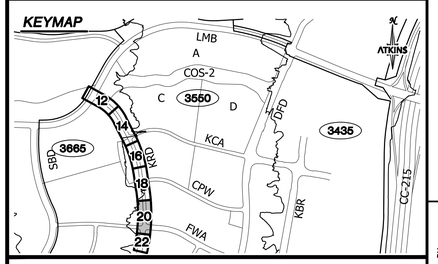
NEVADA PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL BATES - No. 18723 - CIVIL - 7/15/19

KEYMAP



REV.	DESCRIPTION	BY	DATE	APPROVAL

REVISIONS

ATKINS
2270 Corporate Circle Suite 200
Henderson, Nevada 89074
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SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY GRADING PLAN - KETTLE RIDGE DRIVE
STA. 56+50 TO STA. 60+50

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 20/37
CLV 00-00000

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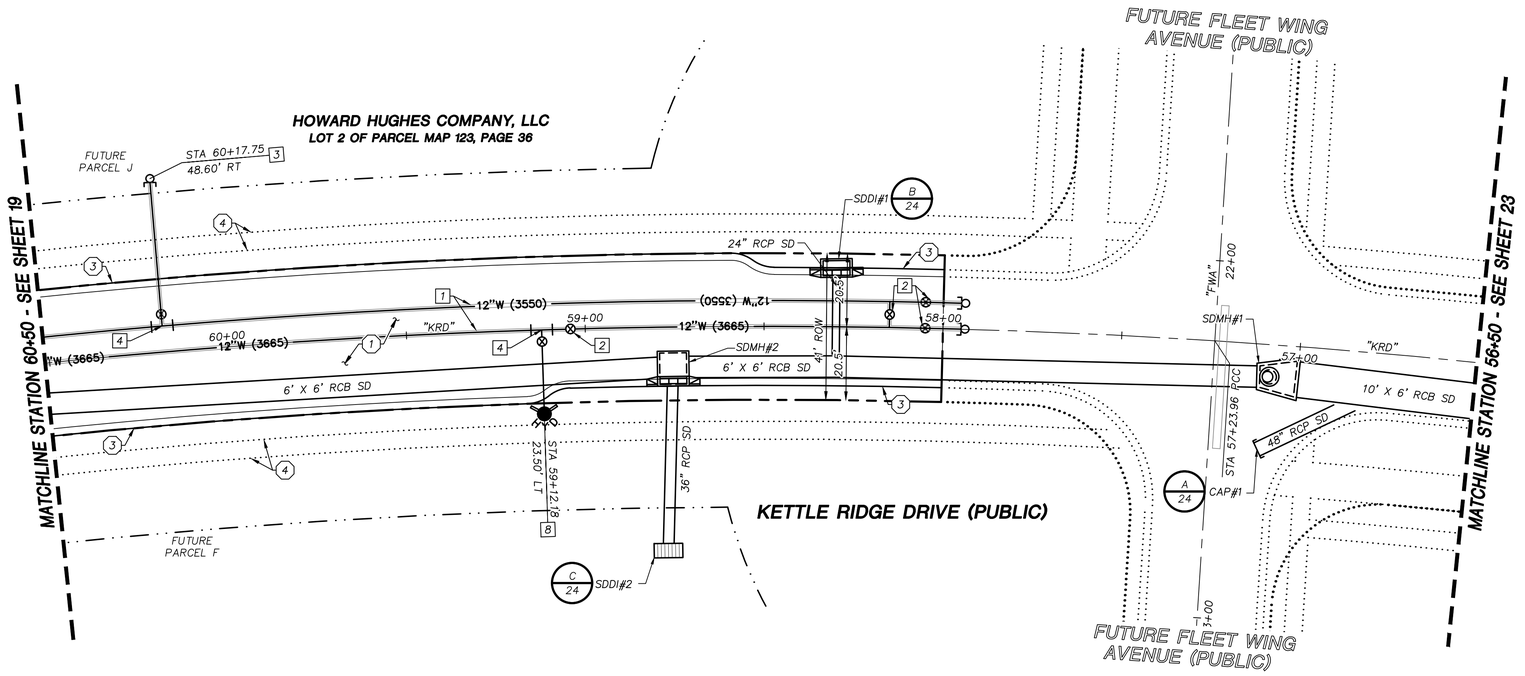

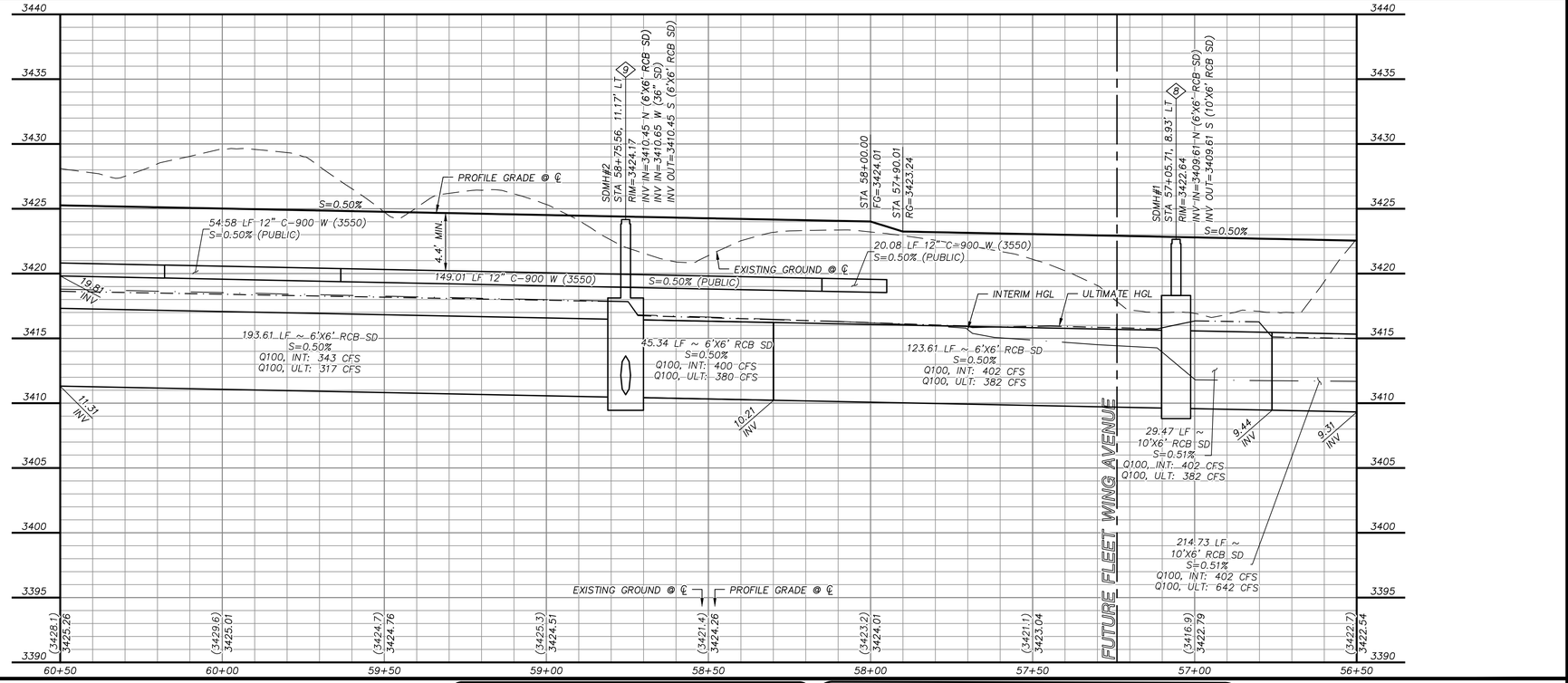

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

5 0 2.5 5 10

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PAUL A. BATES PE#18723 DATE

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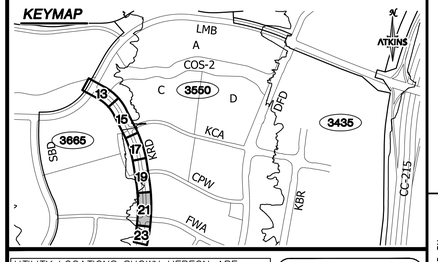
KEYMAP



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PROFESSIONAL ENGINEER-STATE OF NEVADA
PAUL BATES
No. 18723
CIVIL
7/15/19

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

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KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
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ROADWAY PLAN AND PROFILE - KETTLE RIDGE DRIVE
BEGIN TO STA 60+50

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: 1"=5'

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 21/37
CLV 00-00000

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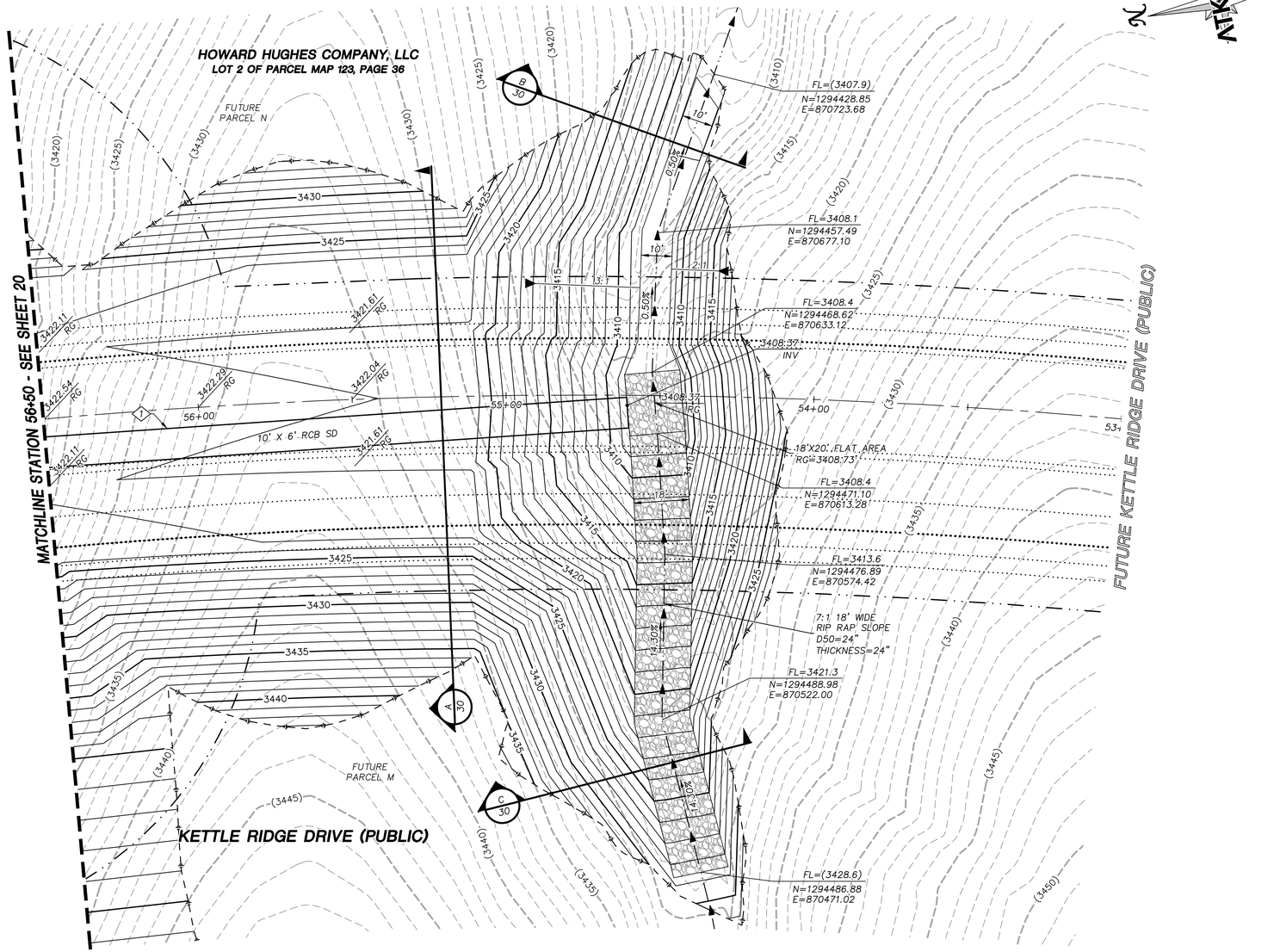

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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

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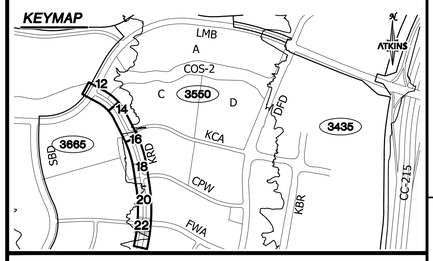

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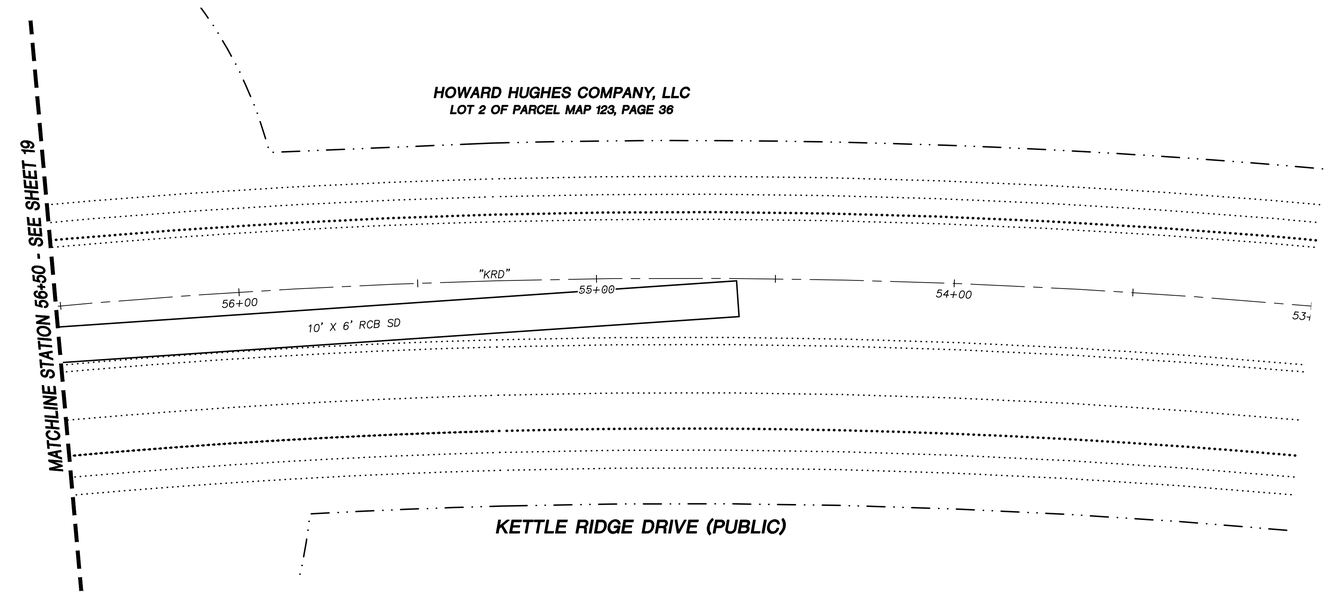
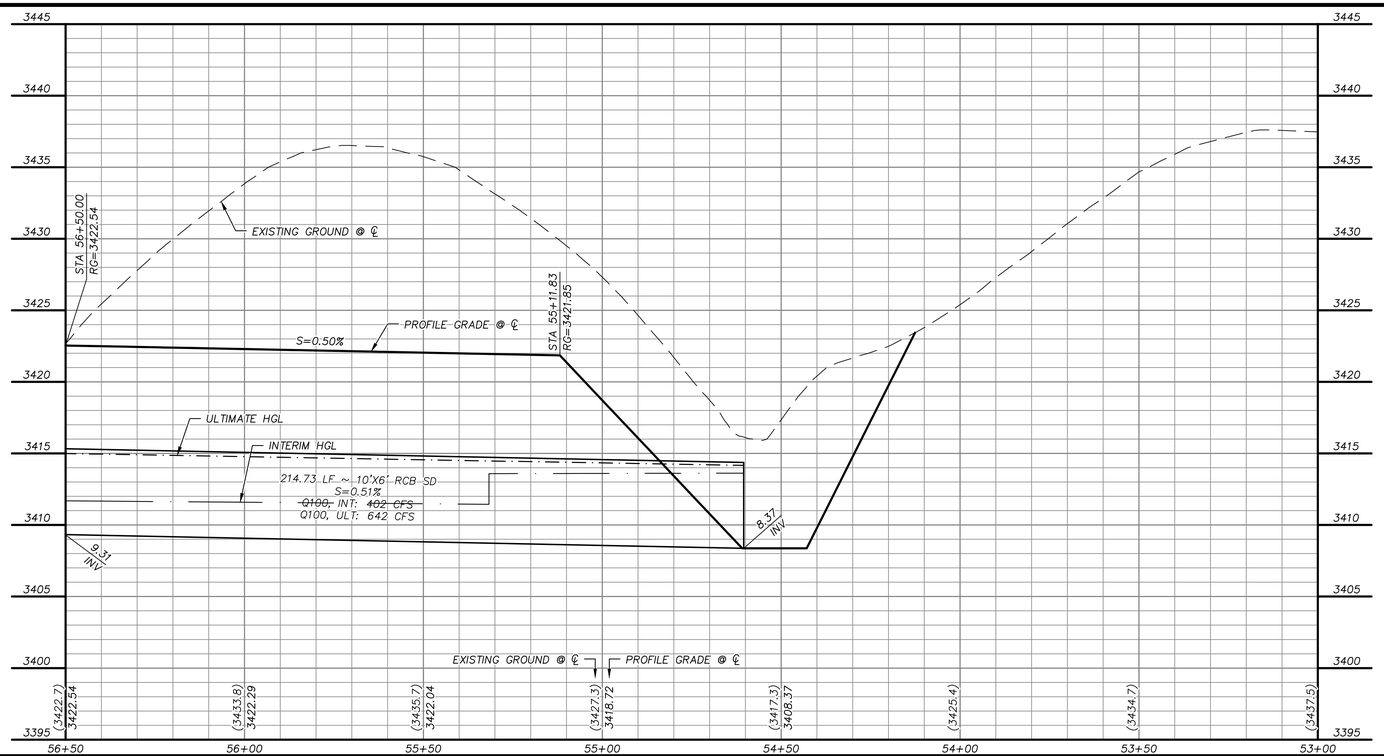
ROADWAY GRADING PLAN - KETTLE RIDGE DRIVE BEGIN TO STA 56+50

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 22/37
CLV 00-00000

K:\Projects\SummitWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-09-GRAD-Gl.dwg LAYOUT: 22 Jul 15, 2019 - 3:48PM





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GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 DATE

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9. INSTALL SD DROP INLET MODIFIED STRUCTURE
10. DIRECT CONNECTION INTO RCB SEE SHEET 31 FOR DETAIL
11. INSTALL TYPE I SD RISER PER CCAUSD #403.1
12. INSTALL TYPE "A" DROP INLET PER CCAUSD #411

SEWER CONSTRUCTION NOTES

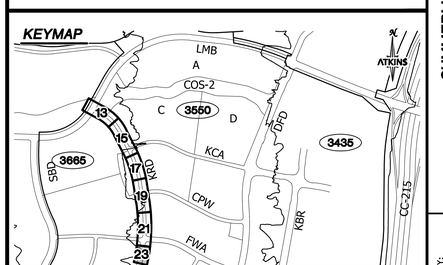
1. INSTALL SEWER MANHOLE PER DCSWCS SD-1A, SD-1B, AND SD-4
2. INSTALL SEWER MAIN PER DCSWCS SD-17
3. STUB AND CAP SEWER PIPE. PLACE MARKER BALL AND 4"X4" POST, DOUGLAS FIR, OVER END OF PIPE AND INSTALL THRUST BLOCK (1 CUBIC FT. MINIMUM).

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 11.25° HORIZONTAL BEND PER UDACS PLATE #31
6. INSTALL 45° HORIZONTAL BEND PER UDACS PLATE #31
7. INSTALL IN-LINE REDUCER PER UDACS PLATE #30
8. INSTALL FIRE HYDRANTWITH APPURTENANCES (CONCRETE PAD, LATERAL, VALVE, AND TEE) PER UDACS PLATES #30, #31, #39, AND #40.

ROADWAY CONSTRUCTION NOTES

1. CONSTRUCT PLANTMIX BITUMINOUS SURFACE OVER TYPE II AGGREGATE BASE PER SOILS REPORT. SEE SHEET 30 FOR TYPICAL PAVEMENT SECTION.
2. SEE REFERENCED SHEET FOR LATERAL PLAN AND PROFILE
3. CONSTRUCT "L" TYPE CURB AND GUTTER PER CCAUSD #216
4. FUTURE SIDEWALK BY OTHERS
5. CONSTRUCT CURB RAMP, TYPE A, PER NDOT STANDARD PLAN R-5.2.1 (A=B=6.5').
6. CONSTRUCT 0" FLUSH CURB
7. TRANSITION CURB FROM FULL HEIGHT (6") TO FLUSH (0")
8. INSTALL SCHEDULE 40 PVC IRRIGATION SLEEVES (2-4",1-6") PER DETAIL ON SHEET XX



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PROFESSIONAL ENGINEER-STATE OF NEVADA PAUL BATES 15-21-19 CIVIL No. 18723

7/15/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

ROADWAY PLAN AND PROFILE - KETTLE RIDGE DRIVE BEGIN TO STA. 56+50

DESIGNED BY:	N. BARCOS
DRAWN BY:	O. QUASSANI
CHECKED BY:	P. BATES
HORIZ.:	1"=20'
VERT.:	1"=5'
JOB NO.	100060655
DATE:	JULY, 2019
DRAWING NO.	23/37
CLV	00-00000

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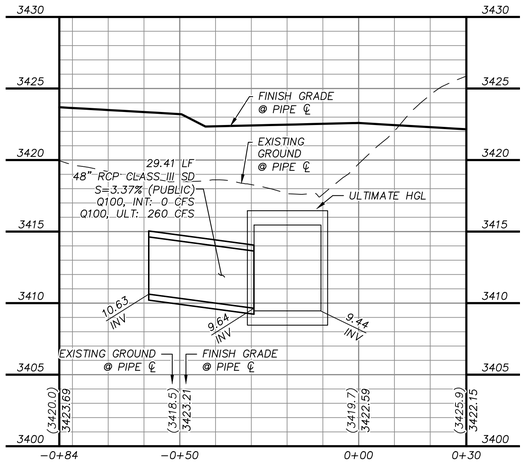
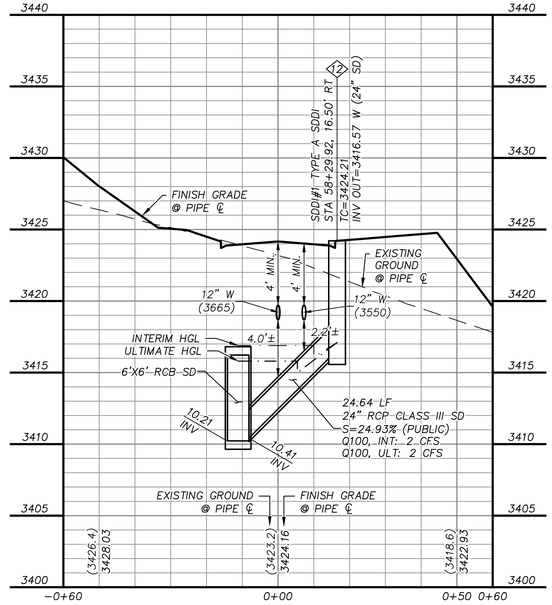


STORM DRAIN LATERAL

"KRD" STA. 56+59 SEE SHEETS 20 AND 21

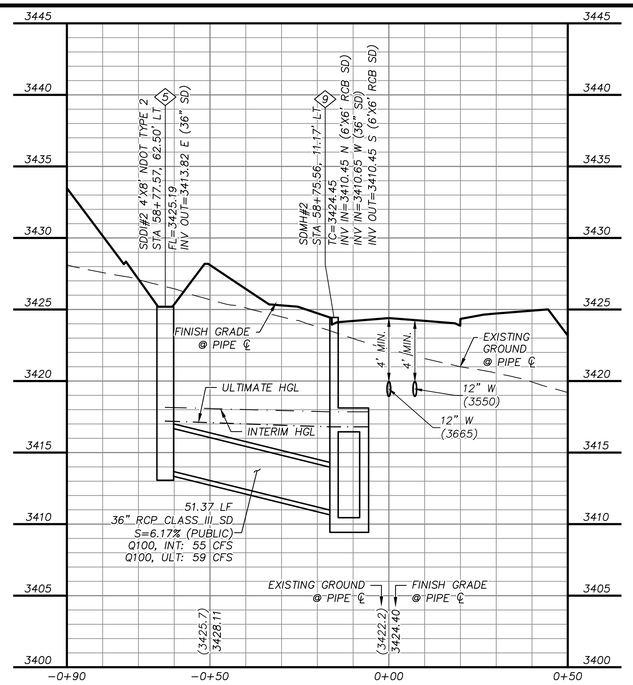
A 24



STORM DRAIN LATERAL

"KRD" STA. 58+30 SEE SHEETS 20 AND 21

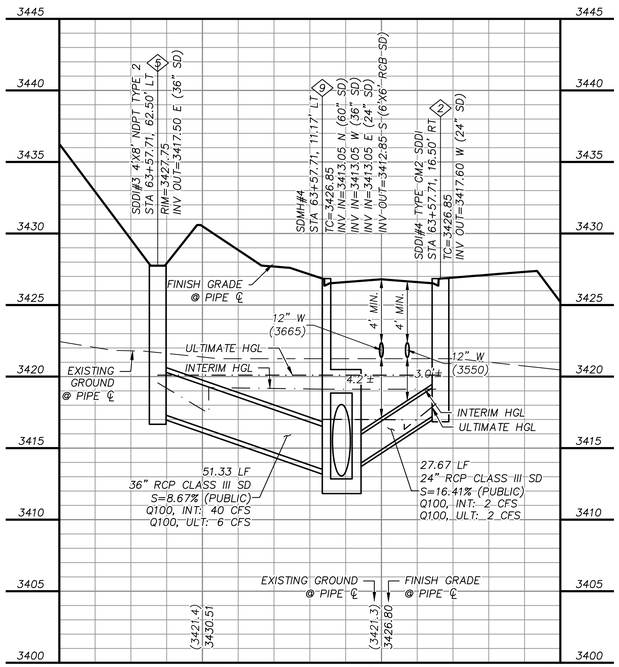
B 24



STORM DRAIN LATERAL

"KRD" STA. 58+78 SEE SHEETS 20 AND 21

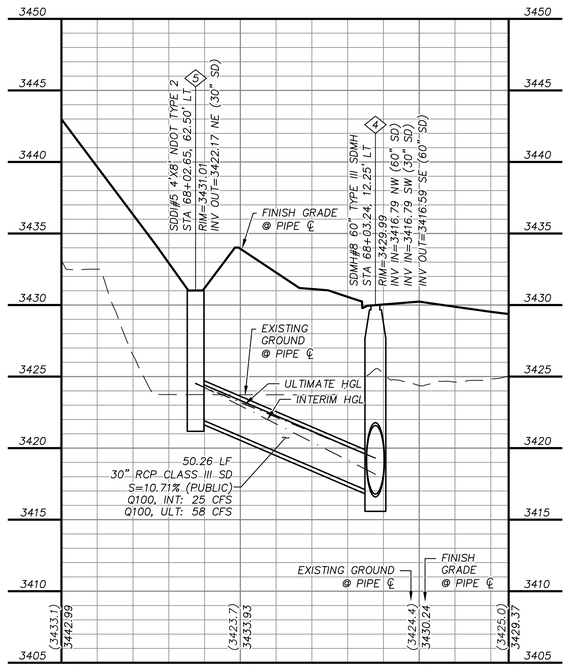
C 24



STORM DRAIN LATERAL

"KRD" STA. 63+58 SEE SHEETS 18 AND 19

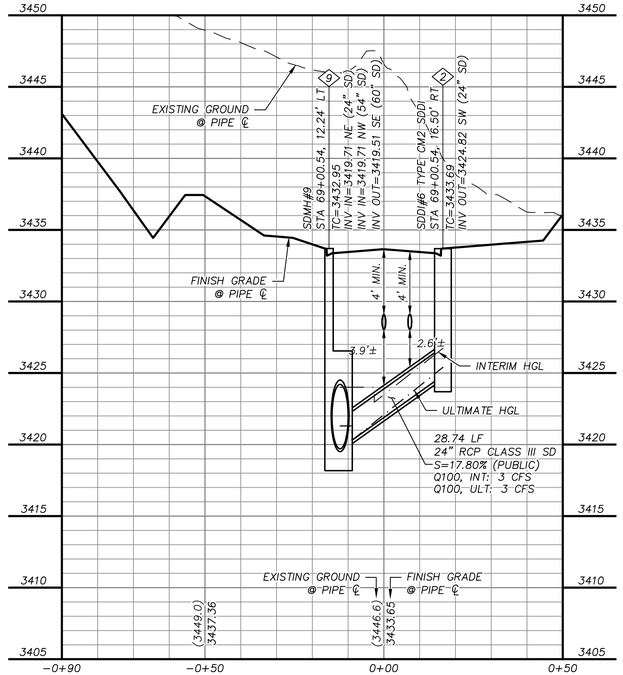
D 24



STORM DRAIN LATERAL

"KRD" STA. 68+04 SEE SHEETS 14 AND 15

E 24



STORM DRAIN LATERAL

"KRD" STA. 68+83 SEE SHEETS 14 AND 15

F 24

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 31)
7. INSTALL RIP-RAP (D50=8", THICKNESS=16")
8. INSTALL SD JUNCTION STRUCTURE
9. INSTALL SD DROP INLET MODIFIED STRUCTURE
10. DIRECT CONNECTION INTO RCB SEE SHEET 31 FOR DETAIL
11. INSTALL TYPE I SD RISER PER CCAUSD #403.1
12. INSTALL TYPE "A" DROP INLET PER CCAUSD #411

GRAPHIC SCALE

20 0 10 20 40

HORIZONTAL: 1"= 20'

0 ### #

VERTICAL: 1"= #'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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 (FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION)

Call before you Dig AVOID BURYING UNDERGROUND UTILITY LINES, IT'S COSTLY. Call 811 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 PAUL BATES Expires 12-31-20 CIVIL No. 18723 7/15/19

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

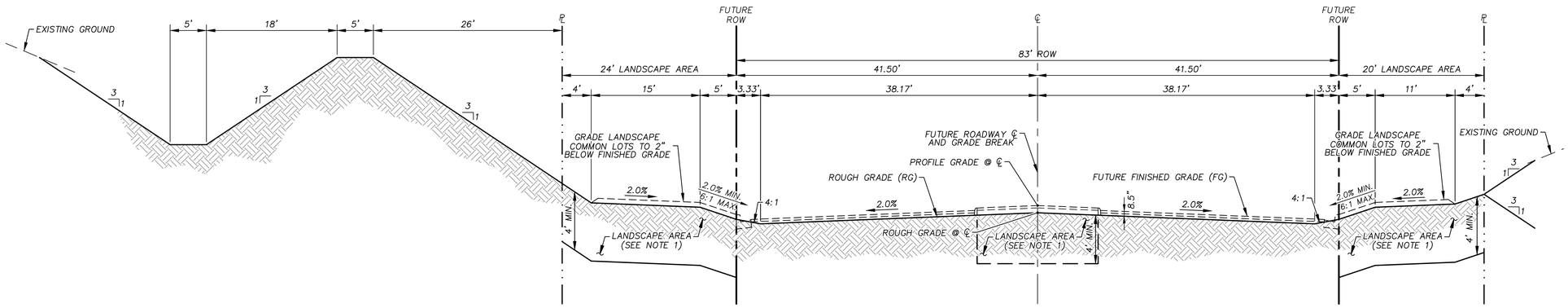
SUMMERLIN VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

STORM DRAIN LATERAL PROFILES

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=#'
VERT.: 1"=5'

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 24/37
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-20-LATL-SD1.dwg LAYOUT: SD1 Jul 15, 2019 - 7:21PM



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 - ROUGH GRADE SECTION

N.T.S.

A 29

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 VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

TYPICAL SECTIONS

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: J. LEDOUX / P. BATES
HORIZ.: NONE
VERT.: NONE

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 29/37
CLV 00-00000

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

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PROFESSIONAL ENGINEER-STATE OF NEVADA PAUL BATES No. 15723 CIVIL 7/15/19

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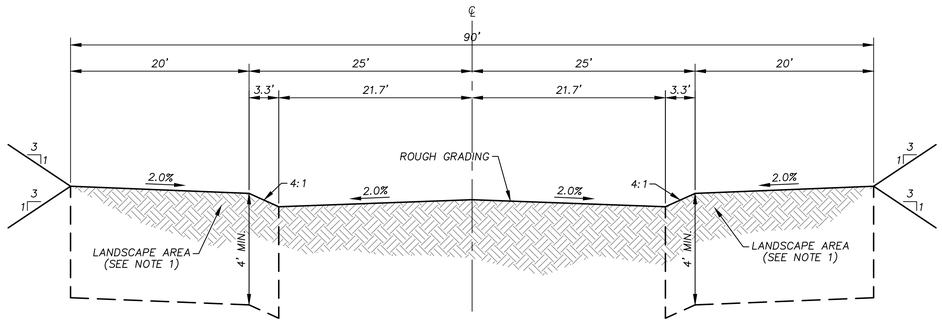

NOTES:

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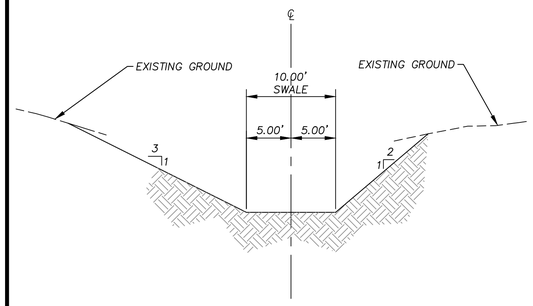
KETTLE RIDGE DRIVE - ROUGH GRADE SECTION

N.T.S.

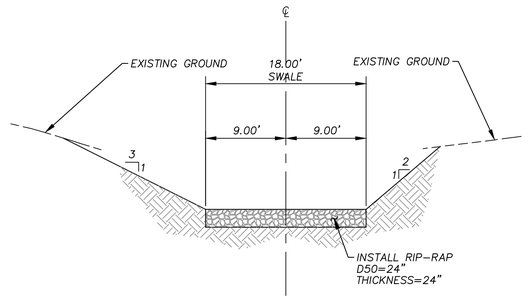
A / 30



KETTLE RIDGE DRIVE - DAYLIGHT SWALE

N.T.S.

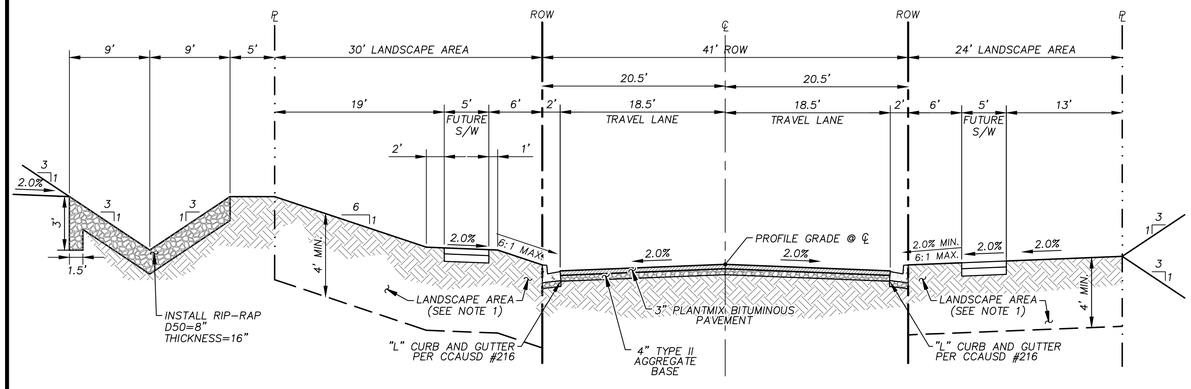
B / 30



KETTLE RIDGE DRIVE - DAYLIGHT SWALE

N.T.S.

C / 30



NOTES:

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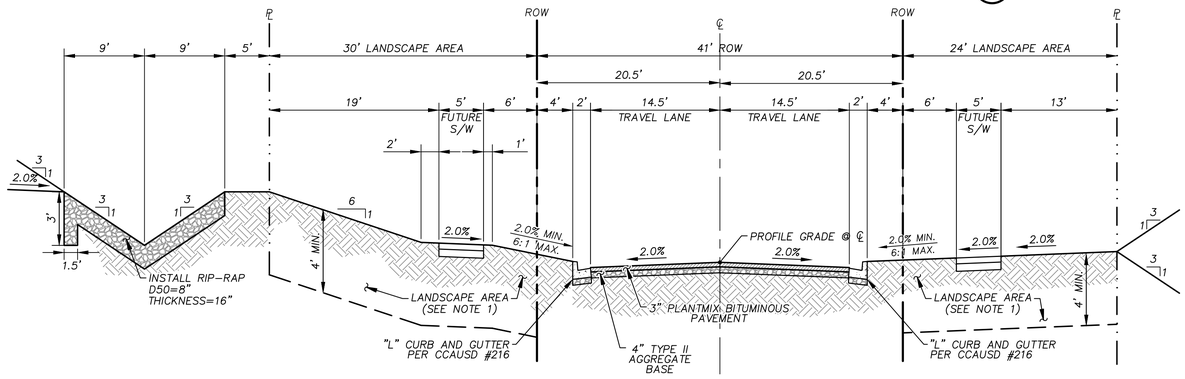
KETTLE RIDGE DRIVE - TYPICAL SECTION

N.T.S.

D / 30



NOTES:

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KETTLE RIDGE DRIVE - TYPICAL SECTION WITH LEFT CURB EXTENSION

N.T.S.

E / 30

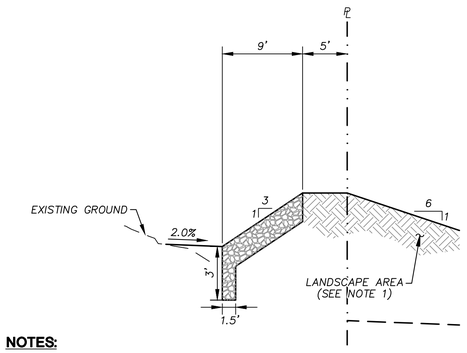
NOTES:

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.

KETTLE RIDGE DRIVE - TYPICAL SECTION WITH CURB EXTENSION

N.T.S.

F / 30



NOTES:

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KETTLE RIDGE DRIVE - SECTION IN FILL

N.T.S.

G / 30

REVISIONS

REV.	DESCRIPTION	BY	DATE	APPROVAL

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2270 Corporate Circle Suite 200
Henderson, Nevada 89074
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Fax: +1.702.263.7200

SUMMERLIN

SUMMERLIN VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET H) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

TYPICAL SECTIONS

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORZ.: NONE
VERT.: NONE

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 30/37
CLV 00-00000

PROFESSIONAL ENGINEER-STATE OF NEVADA
PAUL BATES
No. 18123
CIVIL
7/15/19

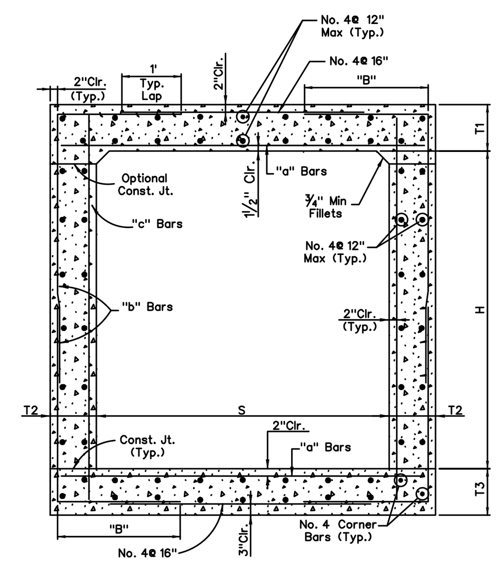
FAST Call before you UnderGround 1-702-432-5300 REGIONAL AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID HITTING 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

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-24-DETL-D1.dwg LAYOUT: TYPICAL SECTIONS Jul 15, 2019 - 2:59PM

B-2



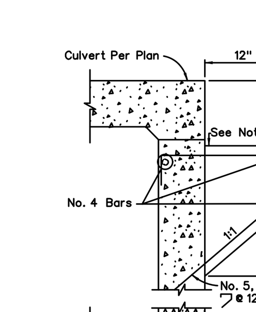
TYPICAL SECTION

NOTES:

1. DESIGN SPECIFICATIONS: "AASHTO LRFD Bridge Design Specifications 2012"
2. CONSTRUCTION SPECIFICATIONS: "State of Nevada Department of Transportation Standard Specifications for Road and Bridge Construction 2014"
3. LIVE LOADS:
   HL–93 Design Truck (32.0 KIP Axle)
   HL–93 Design Tandem (Two 25.0 KIP Axles Spaced 4 Feet Apart)
   (Live Load Impact Factor for Top Slab is 33% up to 2 Feet of Cover)

   LATERAL LIVE LOAD PRESSURE:
   Equivalent to 2 Feet of Earth Surcharge Applied Horizontally = 240 PSF

   DEAD LOADS:
   Soil Unit Weight = 120 PCF
   Min Lateral Earth Pressure = 30 PCF
   Max Lateral Earth Pressure = 60 PCF
4. CONCRETE: Class DA Modified (Major) F'C=4,500 PSI @ 28 Days. (Class D in Clark County)
5. REINFORCING STEEL: All reinforcing steel to be ASTM A615 grade 60 or A706. Dimension relating to bar spacing are center to center
6. DESIGNATION: Box culverts are shown on plans as span times height times length (10' x 8' x 196' RCB).
7. Where traffic loads will be placed directly on the top surface of the culvert, (and/or up to 2 feet of fill), increase top slab thickness by ½ inch and cover for top reinforcement from 2 inches to 2½ inches. Provide epoxy coated reinforcement in top slab (except in Clark County). Decrease spacing of top slab bottom longitudinal bars (#4 @ 12) to 6 inch spacing. Use EA Modified Major concrete (Class E in Clark County) in lieu of Class DA. Adjust quantities accordingly.
8. Provide 2 foot wide Type 1 or Type 2 drain backfill wrapped in Class 1 or Class 2 non-woven geotextile along full height of each culvert exterior wall face.
9. Provide paving notch when top slab is exposed and when pavement is concrete. Adjust quantities accordingly.
10. For additional notes, see sheet B-20.1.1



PAVING NOTCH DETAIL

BENT BARS

SHEET 1 OF 2

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RCB CULVERTS
SINGLE

B-20.1.2 (502,505) | Signed Original On File
ADOPTED 11/70 | REVISED 10/15 | CHIEF BRIDGE ENGR.

B-3

SPAN, "S"	FT.	5						6							
HEIGHT, "H"	FT.	3		4		5		3		4		5		6	
MAXIMUM EARTH COVER	FT.	10	20	10	20	10	20	10	20	10	20	10	20	10	20
CONC. ROOF T1	IN.	9½	9½	9½	9½	9½	9½	10	10	10	10	10	10	10	10
CONC. WALLS T2	IN.	8	8	8	8	8	8	8	8	8	8	8	8	8	8
CONC. INVERT T3	IN.	8	8	8	8	8	8	9	9	9	9	9	9	9	9
REINFORCEMENT "a" BAR SIZE		4	5	4	5	4	5	5	5	5	5	5	5	5	5
"a" SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6
"a" LENGTH	ft-in	6-0	6-0	6-0	6-0	6-0	6-0	7-0	7-0	7-0	7-0	7-0	7-0	7-0	7-0
"b" BAR SIZE		4	4	4	4	4	4	4	4	4	4	4	4	4	4
"b" SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6
"b" LENGTH	ft-in	5-7	5-7	6-1	6-1	6-7	6-7	5-9	5-9	6-3	6-3	6-9	6-9	7-3	7-3
"b" B	ft-in	2-8	2-8	2-8	2-8	2-8	2-8	2-10	2-10	2-10	2-10	2-10	2-10	2-10	2-10
"c" BAR SIZE		4	4	4	4	4	4	4	4	4	4	4	4	4	4
"c" SPACING	IN.	12	12	12	12	12	12	12	12	12	12	12	12	12	12
"c" LENGTH	ft-in	4-0	4-0	5-0	5-0	6-0	6-0	4-2	4-2	5-2	5-2	6-2	6-2	7-2	7-2
#4@ 12" LENGTH	ft-in	2-7	2-7	2-7	2-7	2-7	2-7	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5
#4@ 12" NUMBER*		40	40	44	44	48	48	44	44	48	48	52	52	56	56
QUANT. CONCRETE	CF/LF	13.2	13.2	14.6	14.6	15.9	15.9	15.6	15.6	16.9	16.9	18.3	18.3	19.6	19.6
QUANT. REINFORCEMENT	LB/LF	81	90	88	97	95	104	99	99	106	106	113	113	119	119

SPAN, "S"	FT.	7										8									
HEIGHT, "H"	FT.	3		4		5		6		7		4		5		6		7		8	
MAXIMUM EARTH COVER	FT.	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
CONC. ROOF T1	IN.	10	10	10	10	10	10	10	10	10	10	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½
CONC. WALLS T2	IN.	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
CONC. INVERT T3	IN.	10	10	10	10	10	10	10	10	10	10	10½	10½	10½	10½	10½	10½	10½	10½	10½	10½
REINFORCEMENT "a" BAR SIZE		5	6	5	6	5	6	5	6	5	6	5	7	5	7	5	7	5	7	5	7
"a" SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
"a" LENGTH	ft-in	8-0	8-0	8-0	8-0	8-0	8-0	8-0	8-0	8-0	8-0	9-0	9-0	9-0	9-0	9-0	9-0	9-0	9-0	9-0	9-0
"b" BAR SIZE		4	4	4	4	4	4	4	4	4	5	4	5	4	5	4	6	4	6	6	6
"b" SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
"b" LENGTH	ft-in	5-11	5-11	6-4	6-5	6-10	6-11	7-4	7-5	7-11	8-6	6-6	7-2	7-0	7-8	7-6	8-10	8-0	8-8	9-10	9-10
"b" B	ft-in	2-11	2-11	2-11	2-11	2-11	2-11	2-11	2-11	2-11	3-4	3-0	3-5	3-0	3-5	3-0	3-10	3-0	3-5	3-10	3-10
"c" BAR SIZE		4	4	4	4	4	4	4	4	4	5	4	4	4	4	4	4	4	5	4	5
"c" SPACING	IN.	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
"c" LENGTH	ft-in	4-3	4-3	5-3	5-3	6-3	6-3	7-3	7-3	8-3	8-3	5-4	5-4	6-4	6-4	7-4	7-4	8-4	8-4	9-4	9-4
#4@ 12" LENGTH	ft-in	4-2	4-2	4-2	4-2	4-2	4-2	4-2	4-2	4-2	3-4	5-0	4-2	5-0	4-2	5-0	3-4	5-0	4-2	3-4	3-4
#4@ 12" NUMBER*		48	48	52	52	56	56	60	60	64	64	56	56	60	60	64	64	68	68	72	72
QUANT. CONCRETE	CF/LF	17.9	17.9	19.2	19.2	20.6	20.6	21.9	21.9	23.2	23.2	21.7	21.7	23.0	23.0	24.3	24.3	25.7	25.7	27.0	27.0
QUANT. REINFORCEMENT	LB/LF	108	123	115	129	121	136	128	143	135	184	124	183	130	192	137	236	144	253	220	263

SPAN, "S"	FT.	10											
HEIGHT, "H"	FT.	5		6		7		8		9		10	
MAXIMUM EARTH COVER	FT.	10	20	10	20	10	20	10	20	10	20	10	20
CONC. ROOF T1	IN.	11	11	11	11	11	11	11	11	11	11	11	11
CONC. WALLS T2	IN.	10	10	10	10	10	10	10	10	10	10	10	10
CONC. INVERT T3	IN.	12	13	12	13	12	13	12	13	12	13	12	13
REINFORCEMENT "a" BAR SIZE		6	7	6	7	6	7	6	7	6	7	6	7
"a" SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6
"a" LENGTH	ft-in	11-4	11-4	11-4	11-4	11-4	11-4	11-4	11-4	11-4	11-4	11-4	11-4
"b" BAR SIZE		5	6	5	6	5	6	5	6	5	6	5	7
"b" SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6
"b" LENGTH	ft-in	8-1	8-9	8-7	9-3	9-1	9-9	9-7	10-3	10-1	10-9	10-7	11-11
"b" B	ft-in	3-10	4-3	3-10	4-3	3-10	4-3	3-10	4-3	3-10	4-3	3-10	4-8
"c" BAR SIZE		4	5	4	5	4	5	4	5	4	5	4	5
"c" SPACING	IN.	12	12	12	12	12	12	12	12	12	12	12	12
"c" LENGTH	ft-in	6-6	6-7	7-6	7-7	8-6	8-7	9-6	9-7	10-6	10-7	11-6	11-7
#4@ 12" LENGTH	ft-in	5-9	4-11	5-9	4-11	5-9	4-11	5-9	4-11	5-9	4-11	5-9	4-1
#4@ 12" NUMBER*		68	68	72	72	76	76	80	80	84	84	88	88
QUANT. CONCRETE	CF/LF	30.7	31.7	32.4	33.3	34.0	35.0	35.7	36.7	37.4	38.3	39.0	40.0
QUANT. REINFORCEMENT	LB/LF	198	264	206	275	214	285	222	296	230	307	238	376

SPAN, "S"	FT.	12													
HEIGHT, "H"	FT.	6		7		8		9		10		11		12	
MAXIMUM EARTH COVER	FT.	10	20	10	20	10	20	10	20	10	20	10	20	10	20
CONC. ROOF T1	IN.	11	13	11	13	11	13	11	13	11	13	11	13	11	13
CONC. WALLS T2	IN.	10	12	10	12	10	12	10	12	10	12	10	12	10	12
CONC. INVERT T3	IN.	12	15	12	15	12	15	12	15	12	15	12	15	12	15
REINFORCEMENT "a" BAR SIZE		7	8	7	8	7	8	7	8	7	8	7	8	7	8
"a" SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6
"a" LENGTH	ft-in	13-4	13-8	13-4	13-8	13-4	13-8	13-4	13-8	13-4	13-8	13-4	13-8	13-4	13-8
"b" BAR SIZE		6	7	6	7	6	7	6	7	6	7	6	7	6	7
"b" SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6
"b" LENGTH	ft-in	9-5	10-5	9-11	10-11	10-5	11-5	10-11	11-11	11-5	12-5	11-11	12-11	12-5	13-5
"b" B	ft-in	4-5	5-0	4-5	5-0	4-5	5-0	4-5	5-0	4-5	5-0	4-5	5-0	4-5	5-0
"c" BAR SIZE		4	5	4	5	4	5	4	5	4	5	4	5	5	6
"c" SPACING	IN.	12	12	12	12	12	12	12	12	12	12	12	12	12	12
"c" LENGTH	ft-in	7-6	7-11	8-6	8-11	9-6	9-11	10-6	10-11	11-6	11-11	12-6	12-10	13-6	13-11
#4@ 12" LENGTH	ft-in	6-6	5-8	6-6	5-8	6-6	5-8	6-6	5-8	6-6	5-8	6-6	5-8	6-6	5-8
#4@ 12" NUMBER*		80	80	84	84	88	88	92	92	96	96	100	100	104	104
QUANT. CONCRETE	CF/LF	36.2	44.7	37.9	46.7	39.5	48.7	41.2	50.7	42.9	52.7	44.5	54.7	46.2	56.7
QUANT. REINFORCEMENT	LB/LF	295	394	305	407	315	420	325	433	335	446	345	459	365	485

SPAN, "S"	FT.	14															
HEIGHT, "H"	FT.	7		8		9		10		11		12		13		14	
MAXIMUM EARTH COVER	FT.	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
CONC. ROOF T1	IN.	13	15	13	15	13	15	13	15	13	15	13	15	13	15	13	15
CONC. WALLS T2	IN.	12	13	12	13	12	13	12	13	12	13	12	13	12	13	12	14
CONC. INVERT T3	IN.	14	17	14	17	14	17	14	17	14	17	14	17	14	17	14	17
REINFORCEMENT "a" BAR SIZE		7	8	7	8	7	8	7	8	7	8	7	8	7	8	7	8
"a" SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
"a" LENGTH	ft-in	15-8	15-10	15-8	15-10	15-8	15-10	15-8	15-10	15-8	15-10	15-8	15-10	15-8	15-10	15-8	16-0
"b" BAR SIZE		6	7	6	7	6	7	6	7	6	7	6	7	6	7	7	8
"b" SPACING	IN.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
"b" LENGTH	ft-in	10-6	11-5	11-0	11-11	11-6	12-5	12-0	12-11	12-6	13-5	13-0	13-11	13-6	14-5	14-7	16-1
"b" B	ft-in	4-9	5-4	4-9	5-4	4-9	5-4	4-9	5-4	4-9	5-4	4-9	5-4	4-9	5-4	5-3	6-1
"c" BAR SIZE		4	5	4	6	4	6	4	6	4	6	4	6	5	6	6	7
"c" SPACING	IN.	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
"c" LENGTH	ft-in	8-10	9-3	9-10	10-3	10-10	11-3	11-10	12-3	12-10	13-3	13-10	14-3	14-10	15-3	15-10	16-3
#4@ 12" LENGTH	ft-in	8-1	7-3	8-1	7-3	8-1	7-3	8-1	7-3	8-1	7-3	8-1	7-3	8-1	7-3	7-3	5-10
#4@ 12" NUMBER*		92	92	96	96	100	100	104	104	108	108	112	112	116	116	120	120
QUANT. CONCRETE	CF/LF	50.0	58.3	52.0	60.4	54.0	62.6	56.0	64.8	58.0	66.9	60.0	69.1	62.0	71.3	64.0	76.2
QUANT. REINFORCEMENT	LB/LF	338	446	348	468	358	482	368	496	378	510	388	524	409	538	504	668

* QUANTITY INCLUDES #4 CORNER BARS

SHEET 2 OF 2

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

RCB CULVERTS
SINGLE

B-20.1.2.1 (502,505) | Signed Original On File
ADOPTED 11/70 | REVISED 10/15 | CHIEF BRIDGE ENGR.

RCB DETAILS PER NDOT

N.T.S.

A / 31

R-43

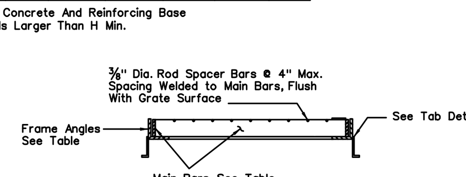
BILL OF MATERIALS (RCP HDPE CMP)

PIPE SIZE (INCH)	SINGLE (ONE GRATE) * CONCRETE (CY) BASE QUAN. (H MIN.)	ADD RATE (CY/FT)	* REINF. (LB.) BASE QUAN. (H MIN.)	ADD RATE (LB/FT)	STR STEEL (LB)	DOUBLE (TWO GRATES) * CONCRETE (CY) BASE QUAN. (H MIN.)	ADD RATE (CY/FT)	* REINF. (LB.) BASE QUAN. (H MIN.)	ADD RATE (LB/FT)	STR STEEL (LB)	TRIPLE (THREE GRATES) * CONCRETE (CY) BASE QUAN. (H MIN.)	ADD RATE (CY/FT)	* REINF. (LB.) BASE QUAN. (H MIN.)	ADD RATE (LB/FT)	STR STEEL (LB)
≤15	0.71	0.19	36	10	211	1.06	0.26	50	13	397	1.41	0.33	70	17	583
18	0.89	0.20	40	10	306	1.31	0.28	56	13	574	1.72	0.35	77	18	842
24	1.08	0.22	58	12	349	1.56	0.30	80	15	652	2.04	0.37	105	20	956
30	1.28	0.24	63	12	390	1.83	0.31	86	16	729	2.38	0.39	113	20	1068
36	1.50	0.26	67	13	524	2.11	0.33	92	16	980	2.72	0.41	120	21	1435
42	1.71	0.28	90	15	575	2.39	0.35	120	18	1073	3.07	0.43	154	22	1571
48	1.94	0.30	95	15	707	2.68	0.37	127	18	1329	3.42	0.44	163	23	1951

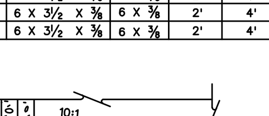
*The Concrete And Reinforcing Quantities Are Based On The H Min. Shown. Increase The Concrete And Reinforcing Base Quantity By The Corresponding Add Rate (Per Foot Of Increased H) If The H Specified Is Larger Than H Min.

TABLE OF DIMENSIONS (RCP HDPE CMP)

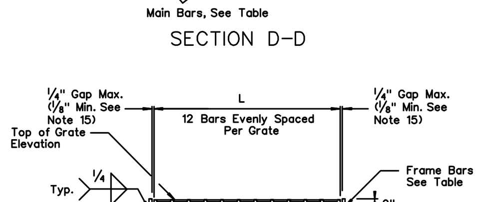
PIPE SIZE (INCH)	A	H Min. (FT)	MAIN BARS (INCH)	FRAME ANGLES (INCH)	FRAME BARS (INCH)	L (FT) SINGLE GRATE	DOUBLE GRATE	TRIPLE GRATE
≤ 15	2'	2.50	3½ X ⅜	4 X 3 X ⅜	4 X ⅜	2'	4'	6'
18	2' 6"	3.00	4½ X ⅜	5 X 3 X ⅜	5 X ⅜	2'	4'	6'
24	3'	3.50	4½ X ⅜	5 X 3 X ⅜	5 X ⅜	2'	4'	6'
30	3' 6"	4.00	4½ X ⅜	5 X 3 X ⅜	5 X ⅜	2'	4'	6'
36	4'	4.50	5½ X ⅜	6 X 3½ X ⅜	6 X ⅜	2'	4'	6'
42	4' 6"	5.00	5½ X ⅜	6 X 3½ X ⅜	6 X ⅜	2'	4'	6'
48	5'	5.50	5½ X 7/16	6 X 3½ X ⅜	6 X ⅜	2'	4'	6'



SECTION D–D



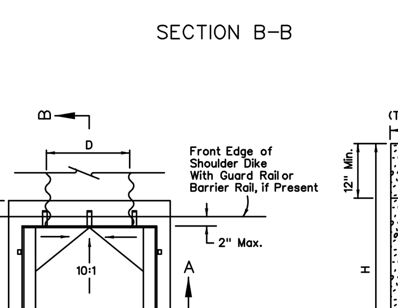
SECTION B–B



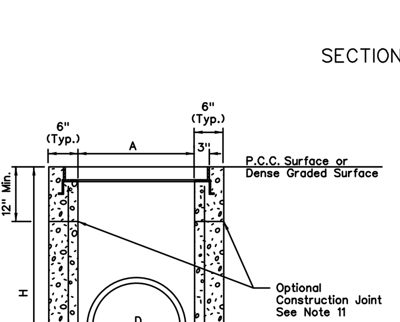
SECTION C–C

NOTES:

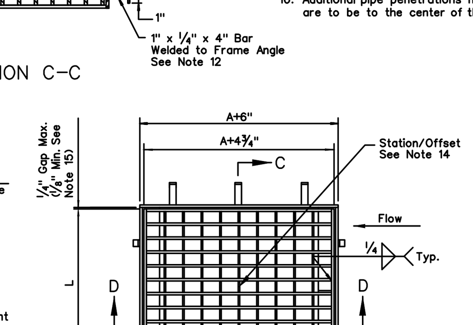
1. All concrete shall be class A or AA.
2. Reinforcing steel shall be No.4 bars with maximum spacing at 18 inch centers, wired tightly at all intersections and embedded 2 inches clear of all concrete surfaces.
3. Exposed edges of concrete shall be chamfered 1 inch.
4. Dimensions may be varied to fit local conditions if ordered by the engineer.
5. Commercial prefabricated gratings approved by the bridge division may be used in lieu of the field-welded grating shown.
6. Extreme low cover situations to be reviewed by hydraulics engineer.
7. Slope catch basin floors 10:1 from all directions toward outlet pipe. If basin is used as a junction, shape flow line(s) to outlet pipe and provide a 10:1 slpoe to flow line(s).
8. See sheet R-2.9.1 for details if connecting HDPE pipe.
9. A single Type 2 drop inlet shall be constructed unless a double or triple is specified.
10. Single grate configuration shown for clarity. Outside dimensions of each grate shall measure 2 feet by A+4¾".
11. Run rebar continuous thru construction joint. Joint must be a minimum of 3 inches from horizontal bars.
12. Weld one tab on ℄ of grate and remaining two tabs 6 inches from edge of frame. Six tabs per inlet, three tabs on each side
13. Weld tabs 6 inches from edge of frame. Four tabs per grate, two on each side.
14. For multiple grate installations, the station/offset is to the center of the concrete drop inlet structure.
15. Grate is to fit in the frame and be easily removed. If the gap between the grate and frame is greater than ¼" on each side of the grate, the grate and frame shall be removed and reconstructed to the tolerances specified or, with approval of the engineer, a filler strip up to ¼" in thickness may be welded flush to the top of the frame to reduce the gap to a maximum of ¼"
16. Additional pipe penetrations may be placed in any wall. Pipe penetrations are to be to the center of the structure wall unless specified otherwise.



PLAN



SECTION A–A



GRATE AND FRAME

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

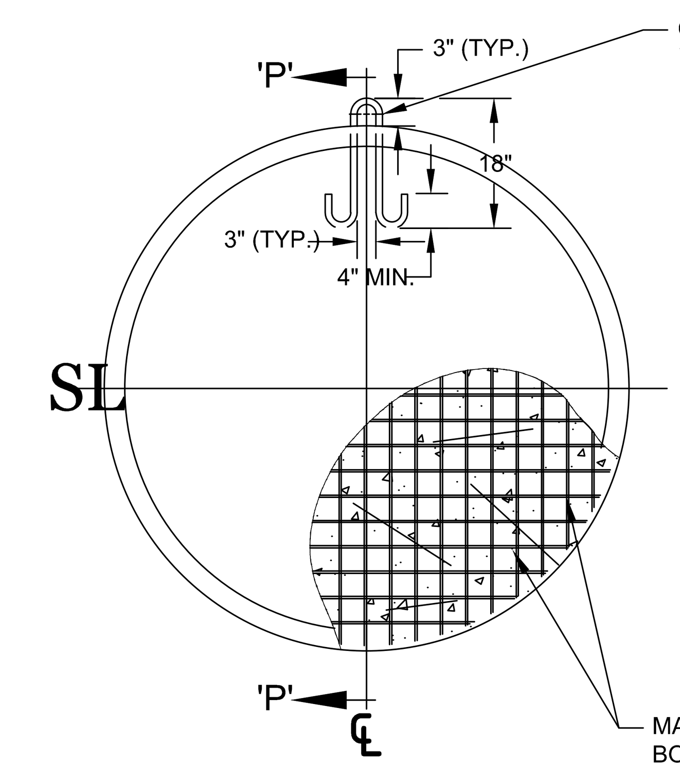
DROP INLET
TYPE 2

R-4.2.1 (609) | Signed Original On File
ADOPTED 11/70 | REVISED 10/15 | CHIEF HYDRAULICS ENGR.

DROP INLET TYPE 2 PER NDOT

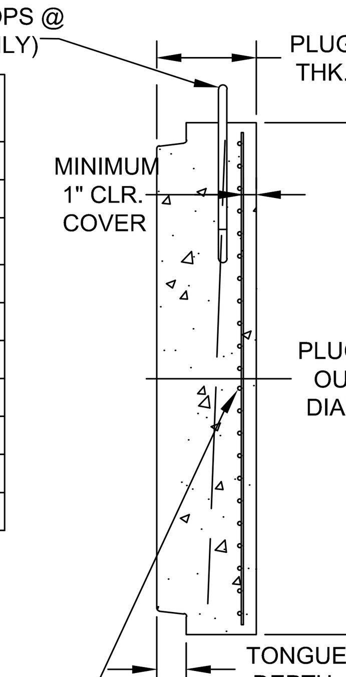
N.T.S.

B / 31



ONE (1) 1/2"Ø STEEL LIFTING LOOPS @ VERTICAL ℄ (27"Ø & GREATER ONLY)

PIPE Ø	PLUG O.D. Ø	PLUG THK.	WEIGHT (LBS.)
12"Ø	16"Ø	9"	160
15"Ø	19 1/2"Ø	9"	235
18"Ø	23"Ø	9"	325
21"Ø	26 1/2"Ø	9"	430
24"Ø	30"Ø	9"	555
27"Ø	33 1/2"Ø	9"	690
30"Ø	37"Ø	9"	840
33"Ø	40 1/2"Ø	9"	1010
36"Ø	44"Ø	9"	1190



MAT STEEL (MIN.) REQUIRED 0.22 IN ² /FT. BOTH WAYS & EACH FACE (TYP.)

PLUG END VIEW

SECTION : 'P'-'P'

NOTES:

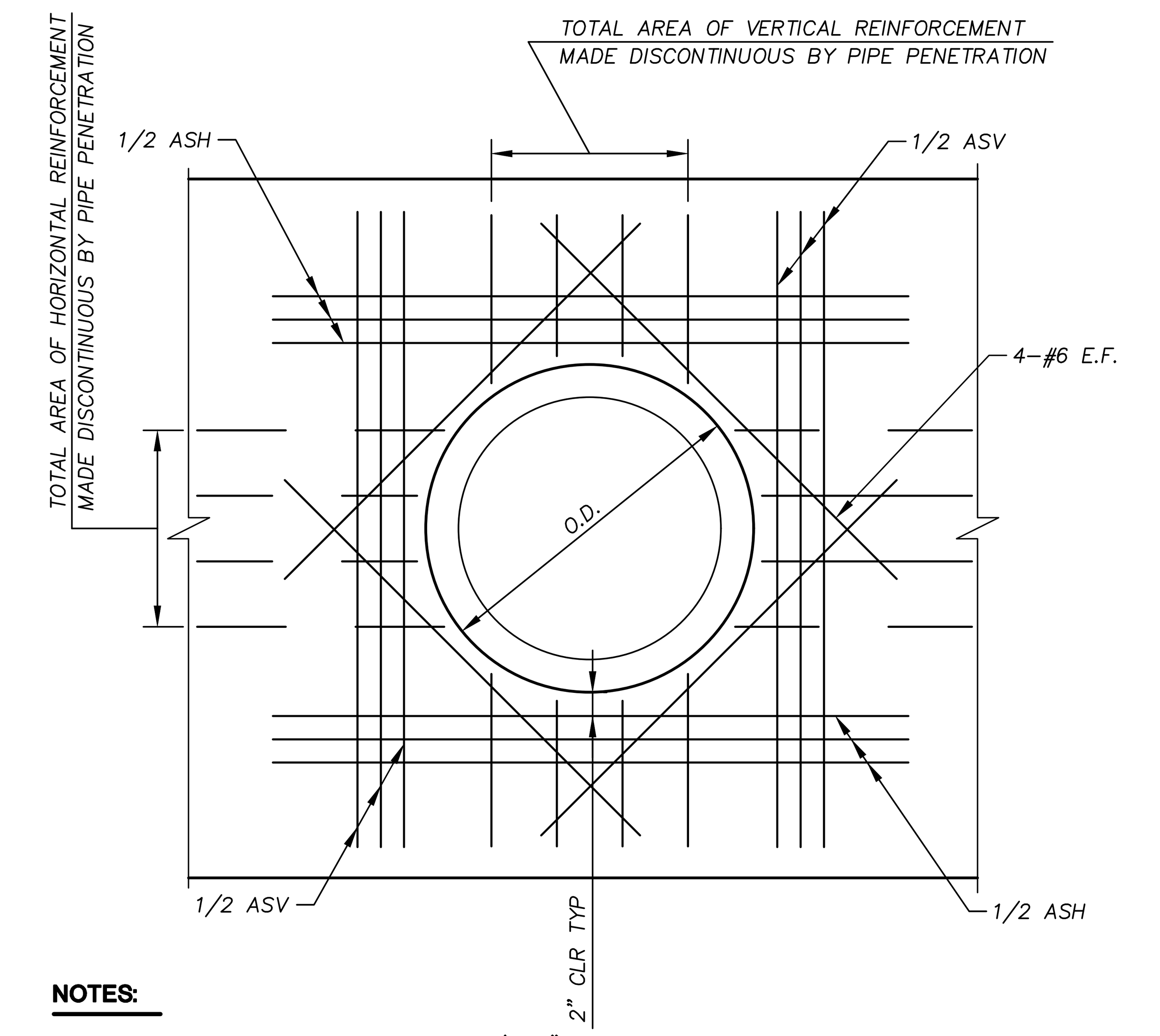
1) FOR ADDITIONAL PLUG / PIPE DETAIL INFORMATION CONTACT RINKER MATERIALS REPRESENTATIVE.
2) SEE CONTRACT BID ITEM SUMMARY FOR SIZE & QUANTITY REQUIRED.
3) MINIMUM CONCRETE STRENGTH (F'c) = 4,000 PSI.

REV.	DESCRIPTION	BY:	DATE	Rinker MATERIALS	CONCRETE PIPE DIVISION		12"Ø - 36"Ø TONGUE END REINFORCED CONCRETE PLUG DETAIL	
					SCALE: N. T. S.	DR. BY: E. JACKSON	PROJECT:	DRAWING NUMBER
					DATE: JULY 14, 2017	CK. BY: B.R. LANG	LOCATION:	DFW-TG-PLUG

TYPICAL STORM DRAIN CAP

N.T.S.

C / 31



NOTES:

1. ASH BARS LENGTHS TO BE O.D. + 3'–10"
2. ASH= TOTAL AREA OF HORIZONTAL REINFORCEMENT MADE DISCONTINUOUS BY PIPE PENETRATION
3. ASV= TOTAL AREA OF VERTICAL REINFORCEMENT MADE DISCONTINUOUS BY PIPE PENETRATION
4. ASH AND ASV BARS SHALL BE EVENLY DISTRIBUTED ON EACH SIDE OF PIPE PENETRATION AND PLACED IN ADDITION TO TYPICAL WALL REINFORCEMENT SHOWN
5. ASH AND ASV BARS SHALL BE UNIFORMLY SPACED OVER A DISTANCE NOT TO EXCEED ¼ O.D. ON EACH SIDE OF THE PIPE PENETRATION
6. PIPE INSIDE DIAMETER (I.D.) NOT TO EXCEED 60"

RCP TO RCB PENETRATION

N.T.S.

D / 31

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

PROFESSIONAL ENGINEER-STATE OF NEVADA
PAUL A. BATES
EXP. 12-31-20
CIVIL
No. 18723
7/15/19

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 VILLAGE 22
KETTLE RIDGE DRIVE (STREET J) – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE – FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

STORM DRAIN DETAILS

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: NONE
VERT.: NONE

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 31/37
CLV 00–00000

X:\Projects\SummWest\Village 22\100060655 – V22N Street J (Lake Mead to Street G)_Sheets\60655–28–DETL–STRM.dwg LAYOUT: STORM DRAIN DETAILS Jul 15, 2019 – 2:59PM

N

ATKINS

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 VILLAGE 22

KETTLE RIDGE DRIVE (STREET J) - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD
SCURRY BEND DRIVE (STREET N) ROUGH GRADE - FLEET WING AVENUE (STREET G) TO LAKE MEAD BOULEVARD

GRADING DETAILS - PARCELS E & F

EARTH WORK FOR PARCELS E&F
CUT=7580 CU. YD.
FILL=170160 CU. YD.
NET=162580 CU. YD.

GRAPHIC SCALE
50 0 25 50 100
HORIZONTAL: 1"= 50'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 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 FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Dig AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S CONTLC. Call 811 OR 1-800-642-2444

AVOID HITTING OVERHEAD POWER LINES. IT'S CONTLC. CALL BEFORE YOU DIG 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.

7/15/19

JOB NO.	100060655
DATE:	JULY, 2019
DRAWING NO.	32/37
CLV	00-00000

DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=50'
VERT.: NONE

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-29-GRAD-WASH.dwg LAYOUT: GRADING DETAILS - PARCELS E & F Jul 15, 2019 - 3:00PM

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CUT=7580 CU. YD.
FILL=170160 CU. YD.
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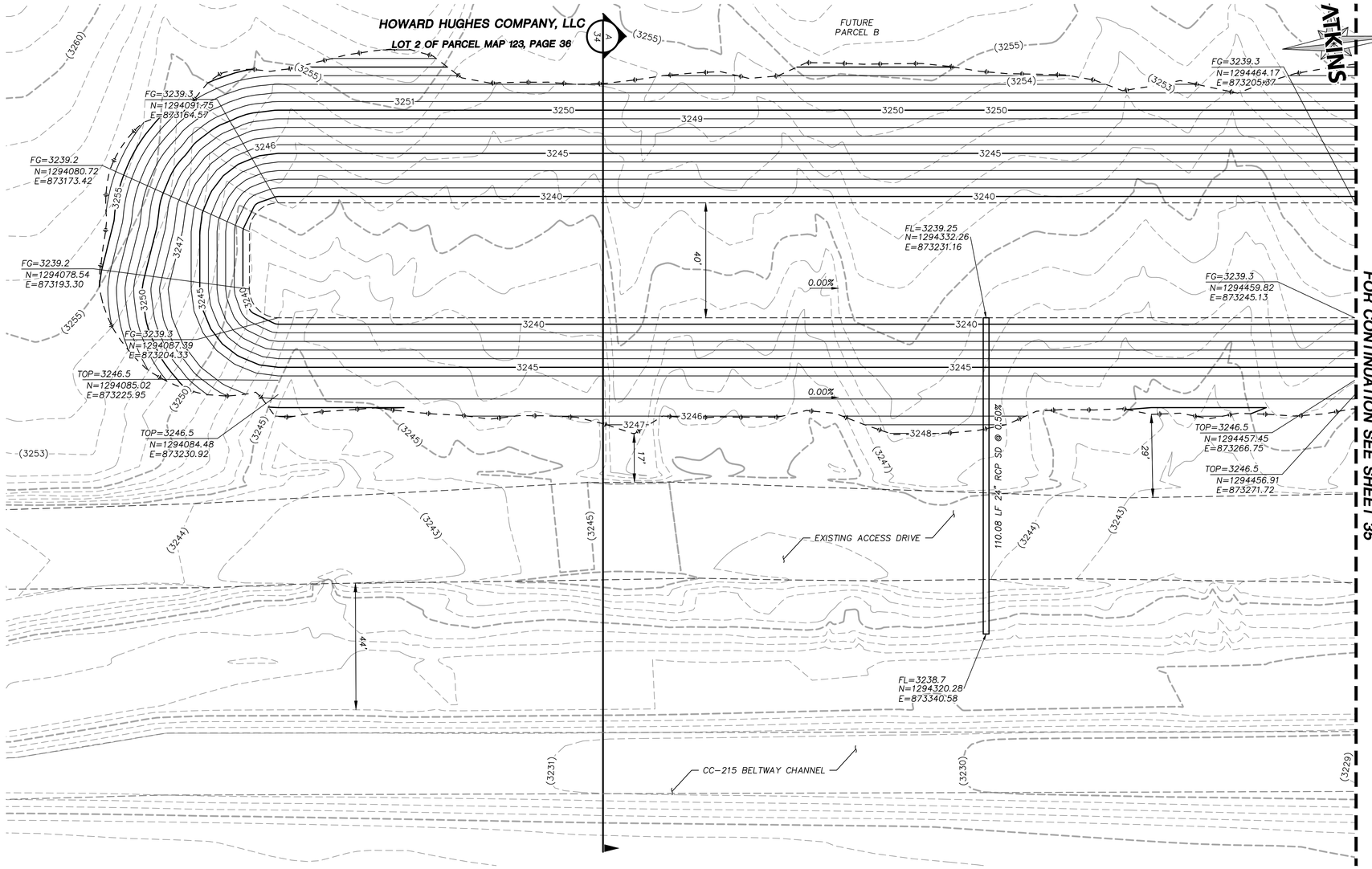
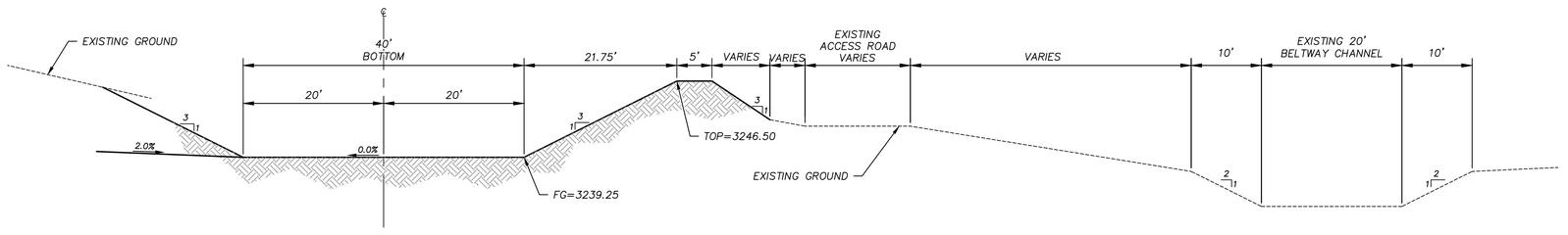
DESIGNED BY: N. BARCOS
DRAWN BY: O. QUASSANI
CHECKED BY: P. BATES
HORIZ.: 1"=50'
VERT.: NONE
JOB NO. 10060655
DATE: JULY, 2019
DRAWING NO. 33/37
CLV 00–00000

X:\Projects\SummWest\Village 22\10060655 – V22N Street J (Lake Mead to Street G)_Sheets\60655–29–GRAD–WASH.dwg LAYOUT: GRADING DETAILS – PARCELS E & F 2 Jul 15, 2019 – 3:00PM





CC-215 BELTWAY CHANNEL DEBRIS BASIN

N.T.S.

A
34

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

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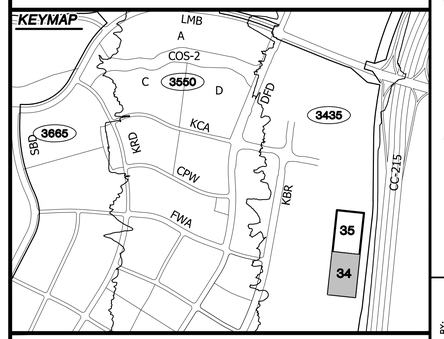
GRADING DETAILS BASIN

KEYMAP



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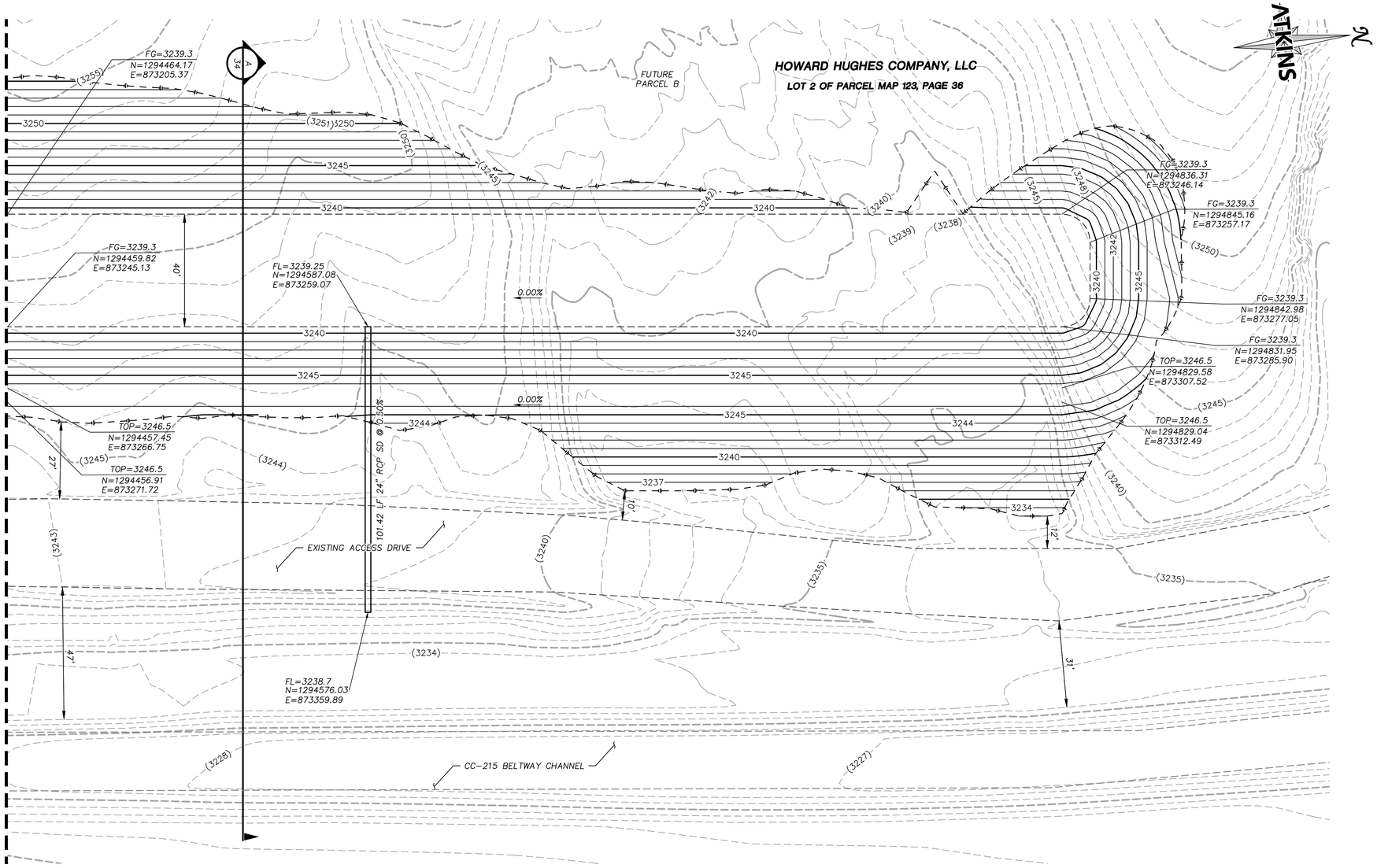
PROFESSIONAL ENGINEER-STATE OF NEVADA
PAUL BATES
No. 18723
CIVIL
7/15/19

DESIGNED BY: N. BARCOS
DRAWN BY: T. YOHMAN
CHECKED BY: P. BATES
HORIZ.: 1"=20'
VERT.: NONE

JOB NO. 100060655
DATE: JULY, 2019
DRAWING NO. 34/37
CLV 00-00000

X:\Projects\SummWest\Village 22\100060655 - V22N Street J (Lake Mead to Street G)_Sheets\60655-XX-GRAD-BASN.dwg LAYOUT: GRADING DETAILS BASIN Jul 15, 2019 - 3:00PM



DEBRIS BASIN VOLUME TABLE

ELEVATION (FT.)	AREA (SQ. FT.)	INCREMENTAL VOLUME (CU. FT.)	CUMULATIVE VOLUME (CU. FT.)	CUMULATIVE VOLUME (ACRE-FT.)
3239.25	30,675	0	0	0
3240	34,730	24,527	24,527	0.563
3241	40,338	37,534	62,060	1.424
3242	46,226	43,282	105,342	2.418
3243	53,039	49,633	154,974	3.558
3244	60,528	56,784	211,757	4.861
3245	68,306	64,417	276,174	6.340
3246	76,034	72,170	348,344	7.997
3246.50	79,788	38,956	387,299	8.891

NOTE
1. REQUIRED CUMULATIVE VOLUME IS 7 ACRE-FT.
2. APPROXIMATE TRIBUTARY AREA OF 275 ACRES.
3. MAXIMUM FLOW INTO BASIN: Q100=334 CFS

GRAPHIC SCALE
20 0 10 20 40
HORIZONTAL: 1"=20'

GRADING PLAN CERTIFICATION

PAUL A. BATES PE#18723 DATE

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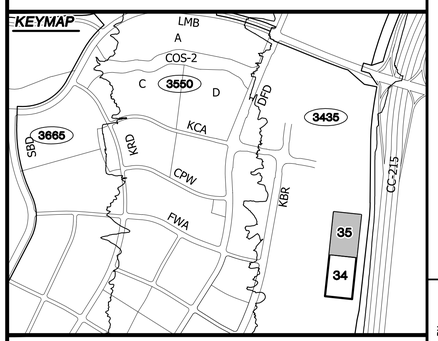
PROFESSIONAL ENGINEER - STATE OF NEVADA - PAUL BATES - Exp 15-31-20 - CIVIL - No. 18723 - 7/15/19

KEYMAP



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Appendix E. CD-ROM

2270 Corporate Circle
Suite 200
Henderson NV 89074-7755
Tel: 702.263.7275
www.atkinsglobal.com/northamerica

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