DS #: 4557

APN: 137-34-313-001

PROJECT: Catalina-Summerlin V23A Parcel N

SUBMITTAL: 1st

SCANNED BY/DATE:

CHECKED BY/DATE:

CITY OF LAS VEGAS **INTER-OFFICE MEMORANDUM**				**DATE:** June 11, 2012
TO: **Land Development Services** Department of Public Works				**FROM:** Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **Catalina – Summerlin V23A Parcel N**			**COPIES TO:** Slater Hanifan Group
Cross Streets:	West of Fox Hill Drive & Paseo Breeze Drive			Greystone Nevada / Lennar Homes
File Number:	F:\Depot\DSMemos\DS4557A.doc			Bart Anderson, P.E., DevCo
Parcel Number:	137-34-313-001			
Zoning Action:	TMP-45230			
FEMA Flood Zone	YES	NO	X	
Proposed Storm Drain	YES	NO	X	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	5/31/2012	6/11/2012	See Comments Below	$400.00	285166: $400
			TOTAL FEES (LDDRS):	**$400.00**	**----**

REMARKS:

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

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

1. Provide a copy of the zoning/planning conditions associated with this site (**TMP-45230**) with the next submittal to verify compliance with conditions. *Flood Control* will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the *City Council*). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.

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

3. The developer/engineer proposed rough grading in the future *Phase 2* area. Consult with *City of Las Vegas Planning Department* for approval of the proposed rough grading prior to the final approval of the drainage study.

4. It appears that the subject development is using an existing perimeter wall which is owned by the adjacent Parcel "O" Development to the north. Consult with and obtain approval from *City Planning Department* for whether this is allowed or not. Revise all pertinent grading plans and detail sheets accordingly if necessary.

5. By the same token, it appears that the subject development is placing its perimeter wall centering at the property line to the south, ie, encroaching into the adjacent Parcel "M" (Esperanza). Consult with and obtain approval from *City Planning Department* for direction. Revise all pertinent grading plans and detail sheets accordingly if necessary.

6. Page 11 of the Study stated that at Station 116+74.98, the HGL does not remain 1-ft below the Fox Hill roadway grade. Is there any storm drain manhole at or close to the location? If yes, that storm drain manhole must be modified to be bolted down. Provide an additional construction sheet and a corresponding drainage update for the revision.

7. **Sheet G-1 & Sheet G-2 (Phase 1)**:

    - Per Section Detail 6/D-1, a swale is proposed adjacent to the screen/flood wall. Show the swale on plan with flow line elevations at regular intervals.

    - Provide dimension of a proposed riprap pad at the interface between Phase 1 and Phase 2 in Barranca Avenue and Estrella Street.

8. **Sheet G-2 (Phase 1)**: A proposed 10'-drainage easement must be expanded from the drop inlet to the right-of-way line with the full street width. Review and revise accordingly.

9. **Sheet D-1 (Phase 1)**:

    Detail 6: Indicate that the depth in the proposed swale is 6"-minimum.

10. **Phase 2 Plans**: Address whether Sky Vista Drive will be at least half-street improved prior to the Phase 2 construction.

11. Private streets must be public drainage easements. Provide a note on the grading plans "Note: All Private Streets are P.U.., Public Sewer Easements and Public Drainage Easements to be privately maintained by the HOA."

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

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

14. The subject drainage study addresses *Interim improvements (Phase 1)* as well as the *Final improvements (Phase 1 and Phase 2)*. However, if *Phase 2 Improvements* commence more than one year after the final approval of this study, a drainage study update will be required to address the future *Phase 2 Improvements*.

15. 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*).

In an effort to increase administrative efficiency, the City of Las Vegas Public Works Department requires all soil reports, drainage studies and traffic impact analysis submittals to be accompanied by an electronic copy of the submittal. Electronic documents must be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output replicating your submittal to be used for archival or display purposes. This may be more than one file if necessary. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats, but provided it is a high quality digitized replication of the submittal, other formats may be acceptable. If figures are in color, they must be scanned in color and saved as a separate file. The new submittal requirement is effective on **July 1, 2011**. If there are any questions regarding these new requirements, please contact Albert Sung in the Flood Section at (702) 229-2001 or Rick Schroder in Traffic Engineering at (702) 229-6327.

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/34
AREA K-34

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

TRANSMITTAL

To: **Albert Sung, P.E.**
City of Las Vegas
333 N. Rancho Drive
Las Vegas, NV 89106

Date: May 31, 2012
Project No.: LEN1202.000

From: **Steve Jones, P.E.**

Subject: **Technical Drainage Study for Catalina**

CC: Tracy Stratton, SHG
CC: Chelsea Peltier, SHG
CC: Mark Failla, SHG
CC:
CC:
CC:

Transmitting Via:
☐ Mail
☒ Messenger / MDS
☐ Federal Express
☐ Pickup

For:
☒ Review & Comment
☐ Per your Request
☐ Information/File

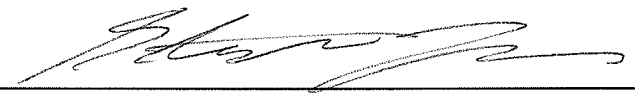
Acknowledgement of Receipt:
☐ Not Required
☒ Acknowledgement Required
Received By:_____
Date:_____ Time:_____

Copies	Description
1	Subject Study
1	Grading Plan, Profile and Detail Sheets (bound in back)
1	Stamped and Signed Standard Form 1 (bound in front)
1	$400 Submittal Fee (Lennar Check # 11750)
1	CD containing PDF of submittal documents

Comments:

Enclosed please find the above listed items in support of development of a residential subdivision on Parcel N, within Summerlin Village 23A. This study is intended to show the project's conformance with the previously established master drainage patterns for the site.

Please contact us if there are any questions at 702-284-5300. Thanks.

Signed: 

Steve Jones, P.E.
Assistant Project Manager – Flood Control Division

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Please, notify us at (702) 284-5300 if there are any problems receiving this transmission.

TECHNICAL DRAINAGE STUDY

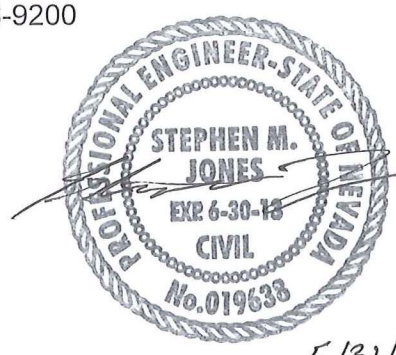
Catalina

City of Las Vegas, Nevada

Job No.: LEN1202.000
Date: May 2012

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

Prepared For:
Lennar Homes
2490 Paseo Verde Parkway, Suite 120
Henderson, Nevada 89014
Phone: 702-736-9100 ▪ Fax: 702-736-9200



5/31/2012

Steve Jones, P.E.
NV Professional Engineer No. 19638

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Catalina Date: May 2012

Location of Development: a) Descriptive (Cross Streets): North/South: Fox Hill Drive
East/West: Paseo Breeze Drive

b) Section: 34 Township: 20 South Range: 59 East

c) APN: 137-34-313-001

Name of Owner/Developer: Greystone Nevada, LLC / Lennar Homes

Telephone No.: 702-736-9100 Fax No.: 702-736-9200 E-mail Address: Robert.Johnson@Lennar.com

Address: 2490 Paseo Verde Parkway, Suite 120; Henderson, NV 89074

Contact Person – Name: Steve Jones, P.E. Telephone No.: 702-284-5300

*E-mail Address: sjones@shg-inc.com Fax No.: 702-284-5399

Firm: Slater Hanifan Group

Address: 5740 S. Arville Street, Suite 216; Las Vegas, NV 89118

Type of Land Development/Land Disturbance Process:

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

1. Total Owned Land Area: At Site: 16.5 Acres +/- Being Developed/Disturbed: All

2. Is a portion or all of the subject property located in a 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.): Single-Family Residential

5. Approximate upstream land area which drains to the subject site: 0 Acres

6. Has the site drainage been evaluated in the past? ☒ Yes** ☐ No If yes, please identify documentation:

Conceptual Drainage Study for Summerlin Village 23A, by G.C. Wallace (DS3077);

Technical Drainage Study for Summerlin Village 23A Unit 1 Improvements, by G.C. Wallace (DS3126);

Update #2 to the Technical Drainage Study for Summerlin Village 23A Unit 2 Improvements, by G.C. Wallace (DS3402)

Technical Drainage Study for Esperanza, by Slater Hanifan Group

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Existing Storm Drain in Fox Hill Drive

8. Briefly describe your proposed schedule for the subject project: 2 Phases;

Both Phase 1 & Phase 2 technically addressed by this study.



Engineer's Seal 5/31/2012

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.

*Newly Required Field

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

Revision	Date

Local Entity File No.

REFERENCE: ***SHG Job LEN1201.000***

STANDARD FORM 1

Updated 05/01/2008

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Catalina		Map ID:
Firm Name: Slater Hanifan Group		Engineer: Steve Jones, P.E.
Address: 5740 S. Arville St., Suite 216		
City: Las Vegas	State: Nevada	Zip: 89118
Phone Number: 702-284-5300	Fax Number: 702-284-5399	
Property Owner/Developer: Greystone Nevada, LLC / Lennar Homes		
Address: 2490 Paseo Verde Parkway, Suite 120		
City: Henderson	State: NV	Zip: 89074
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.

Reference:	**STANDARD FORM 2**

DRAINAGE SUBMITTAL CHECKLIST

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-29), for Flood Control Facilities and Environmental areas with the site delineated.
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.
X		Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.

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.

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
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.
	N/A	Streets with off-set crowns.
X		Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.
X		Property lines.
X		Right-of-way lines and widths, existing and proposed.
X		Existing improvements and their elevations.
X		Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
X		Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
X		Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
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 is16"x48". 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.

REFERENCE:	STANDARD FORM 2

DRAINAGE SUBMITTAL CHECKLIST

III. DRAINAGE PLAN (Continued)

Yes	No	
X		Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood Walls with 8-inch concrete masonry unit.
X		Building and/or lot numbers.
	N/A	Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
	N/A	Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.
	N/A	For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
	N/A	Appropriately elevated "humps" 6 inches above the 100-year water surface elevation at site accesses where the intent is to protect the site from the Q_{100} flows.
X		Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.

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 storm water flows showing basin area, Q_{10} and Q_{100} for both individual basins and combined basin flows, where acceptable.
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.

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 ≤ 8. Q_{10} d x v ≤ 6 and 12 foot dry lane for rights-of-way ≥ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
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.)
X		Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.
X		Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the Q_{100} weir height or flow depth, which ever 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.

REFERENCE:	STANDARD FORM 2

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 06/06/01)

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 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 Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (Design Manual).

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.

PLANNING COMMISSION: 6/12/12 CITY COUNCIL: 7/18/12

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.)
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.

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

II. GRADING PLAN INFORMATION		
Yes	No	
X		Back of lot elevations and lot drainage pattern for all lots including common lots.
	X	Sites with a grade difference two feet above or below existing ground are required to have approval from City of Las Vegas Current Planning. Current Planning approval is required prior to final approval of the drainage study. IN PROCESS OF OBTAINING
X		On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners. (The project must pass flows through the site every 600 feet where the project is blocking flow paths.)
	N/A	This project uses a solid grouted stem wall (or approved alternate) at the back of sidewalk to provide erosion protection for landscaped areas where the depth of flow in the roadway exceeds the back of walk elevation. A corresponding cross-section detail is included.
	N/A	Commercial and Common Lot Landscape areas are not allowed to drain over the sidewalk. The grading plans show flow lines with grades and sidewalk under drains for all landscape areas draining to the public ROW.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
X		Concrete valley gutters are required in parking lots with slopes less than 1 percent. Slopes through cul-de-sac must be at a 1 percent minimum where flow is drained through the cul-de-sac.
	N/A	Ten-foot wide public drainage easements to be privately maintained are allowed for flow less than 20 cfs. The depth of flow entering the easement must be checked using the submerged weir calculation.
	N/A	The limits of the flood zones and the base flood elevations (BFE) must be shown on all grading plans for all developments within a Special Flood Hazard Zone A, AO, AE, etc.
X		Minimum finish floor elevation is 6 inches above highest adjacent top of curb. Finish floor calculations must include allowances for super elevations on curves and velocity head for tee intersections.
X		Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.
	N/A	Lots with "B and C Type Drainage" shall be required to install an underground nuisance drainage system or a 2-foot valley gutter through the lot. 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.

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

- An appointment must be made to preview this checklist in conjunction with Clark County Regional Flood Control District Manual Standard Form 2 prior to the City accepting a new Drainage Study for review. The engineer may contact the Flood Control Section at 229-6541.

- Following the acceptance of the Drainage Study (meeting the minimum acceptable information above), there will be a charge of $250 for each Drainage Study review submittal. These fees are payable at the time the Grading Permit is obtained.

- The Drainage Study must be accepted prior to submitting grading plans to the Land Development Section 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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6-Jun-01

TABLE OF CONTENTS

1 **INTRODUCTION** 1

1.1 Project Overview & Study Purpose 1
1.2 Site Description 1
1.3 FEMA Flood Zone Designation 2
1.4 CCRFCD Facility Information 2
1.5 Reference Studies 2

2 **METHODOLOGY** 3

2.1 Compliance 3
2.2 Hydrologic Modeling 4
2.3 Hydraulic Modeling 5

3 **EXISTING DRAINAGE CONDITION** 5

3.1 Definition of Existing Drainage Condition 5
3.2 Discussion of Existing Drainage Condition 6

4 **PROPOSED DRAINAGE CONDITION** 6

4.1 Definition of Proposed Condition 6
4.2 Discussion of Developed Phase 2 Proposed Condition 6
4.3 Discussion of Interim Phase 1 Proposed Condition 7
4.4 Summary of Proposed Condition Flows 7
4.5 Summary of Proposed Condition Street Flows 8
4.6 Summary of Proposed Recommended Facilities 10
4.7 Summary of Proposed Finished Floor 12

5 **ULTIMATE DRAINAGE CONDITION** 12

5.1 Discussion of Ultimate Condition 12

6 **CONCLUSIONS & RECOMMENDATIONS** 12

7 **REFERENCES** 13

TABLES

TABLE 1: SUMMARY OF PROPOSED CONDITION FLOW RATES 7
TABLE 2: SUMMARY OF CATALINA FLOW RATES 7
TABLE 3: SUMMARY OF DISCHARGE LOCATIONS & PROPOSED CONDITION FLOW RATES 8
TABLE 4: SUMMARY OF ONSITE PRO-RATED FLOW RATES 9
TABLE 5: SUMMARY OF 100-YR ONSITE STREET FLOW HYDRAULIC CHARACTERISTICS 9
TABLE 6: SUMMARY OF PROPOSED DROP INLET HYDRAULIC CHARACTERISTICS 10
TABLE 7: SUMMARY OF FOX HILL STORM DRAIN REVISED HYDRAULIC CHARACTERISTICS 11

LIST OF APPENDICES

Appendix A Drainage Exhibits
- Exhibit A – Location Map
- Exhibit B – Current FEMA FIRM Panel Exhibit
- Exhibit C – CCRFCD 2008 MPU Facilities Exhibit
- Exhibit D – Soils Map
- Exhibit E – Proposed Condition Drainage Map

Appendix B Hydrologic Data & Computations
- Precipitation
- Soils & Curve Number
- Standard Form 4 Lag Time

Appendix C HEC-1 Analysis

Appendix D Flowmaster Street Flow Hydraulic Computations

Appendix E Drainage Facility Hydraulic Design
- Proposed Drop Inlets
- Emergency Overflow
- Fox Hill Storm Drain WSPG Re-Analysis
- Capistrano Storm Drain WSPG Analysis
- Paseo Breeze Storm Drain WSPG Analysis

Appendix F Proposed Finished Floors Evaluation

Appendix G Reference Material
Update #2 to the Technical Drainage Study for Summerlin Village 23A Unit 2 Improvements
- Approval Letter
- Developed Condition HEC-1 Analysis
- Drainage Facilities Exhibit & Storm Drain Hydraulic Analysis
- Relevant Storm Drain Profile Sheets

Appendix H Reference Material
Technical Drainage Study for Summerlin Village 23A Unit 1 Improvements
- Approval Letters
- Street Sections Exhibit & Section 1 Hydraulic Computation
- Relevant Storm Drain Profile Sheets

Appendix I Reference Material
Technical Drainage Study for Summerlin Village 23A Rough Grading
- Approval Letters
- Relevant Report Excerpts
- Drainage Plan & Interim Collector Channel Hydraulic Computations
- Relevant Profile and Detail Sheets

Appendix J Reference Material
Update to the Technical Drainage Study for Summerlin Village 23A Unit 2 – Parcel O
- Flood Control Facilities Exhibit
- Relevant Storm Drain Profile Sheets

Appendix K Reference Material
Technical Drainage Study for Summerlin Village 23A Desert Foothills Drive Improvements
- Relevant Report Excerpts
- Storm Drain Facilities Exhibit

Appendix L Reference Material
Conceptual Drainage Study for Summerlin Village 23A
- Approval Letters
- Relevant Report Excerpts
- Regional Type HEC-1 Analysis

Appendix M Reference Material
Technical Drainage Study for Esperanza
- HEC-1 Analysis & Proposed Condition Drainage Map
- Onsite Storm Drain WSPG Analysis
- Relevant Grading Plan & Profile Sheets

Appendix N Grading Plan, Profile and Detail Sheets

1 INTRODUCTION

1.1 Project Overview & Study Purpose

Lennar Homes is proposing to develop a single family residential development on an approximate 16.5 acre sized parcel within the Summerlin master planned community located in the City of Las Vegas, Nevada. Further, the development is located within the Summerlin Village 23A Unit 2 boundary on Parcel N, and is identified as *Catalina*.

Note that Catalina will be developed in two (2) phases as follows. This study and its associated grading plans, included in Appendix L, have been prepared in a manner that technically addresses both phases.

- **Phase 1** – Residential development of generally the eastern half of the property, including Lots 1 thru 46 and 83 thru 84. Additionally the park/paseo that is proposed by this project is to be developed with Phase 1. The Phase 2 portion of the site is proposed to be rough graded (pending approval from the City of Las Vegas Planning Department).
- **Phase 2** – Residential development of the remainder of the site that had been rough graded as a part of Phase 1, including Lots 47 thru 82.

The purpose of this study is to show how the development of Catalina conforms with the previously established Summerlin master planned drainage patterns. A detailed hydrologic and hydraulic analysis for the project site is provided in order to protect the property from onsite and offsite runoff in accordance with the master plan and local flood control criteria. An inventory of existing and master planned stormwater facilities intended for use by Catalina is provided. This study provides recommendations for additional flood control facilities necessary to protect the project site and adjacent downstream properties.

1.2 Site Description

Catalina is located on APN 137-34-313-001 within Township 20 South, Range 59 East, Section 34, whose location has been shown on Exhibit A, included in Appendix A. The proposed project is to be constructed in two (2) phases, as discussed above. An approximate 1.5 acre park/paseo is proposed as a part of Phase 1 in the center of the property.

Adjacent to Catalina is Parcel O, by Woodside Homes, to the north and Esperanza (Parcel M), by Lennar Homes, to the south. As Catalina is located within Summerlin, the Summerlin Development Agreement designates that perimeter roadways will be completed, as necessary, by the Master Developer (Summerlin). Thus, this study assumes that the adjacent perimeter infrastructure and roadway improvements for Fox Hill Drive and Desert Moon Road are considered complete and existing prior to the start of Catalina grading and construction. Additionally, although Sky Vista Drive is not considered a roadway for use by Catalina, its interim condition as a collector channel intended for flood protection from offsite flow generated to the west is considered complete and functioning.

In addition, all development completed in Summerlin is required to be reviewed by the Summerlin Design Review Committee, and this study has been forwarded for their review. All correspondence with Summerlin will be forwarded to City of Las Vegas for records.

1.3 FEMA Flood Zone Designation

The current FEMA Flood Insurance Rate Map (FIRM) that covers the Catalina site is Panel 32003C2150E, dated September 27, 2002, as shown on Exhibit B included in Appendix A. Per the current FIRM Panel, Catalina is located in a FEMA designated Zone 'X', or an area described as outside the 0.2% annual chance flood.

1.4 CCRFCD Facility Information

Catalina is not located adjacent to an existing or future planned Clark County Regional Flood Control District (CCRFCD) designated regional facility. Figure F-29 from the current 2008 MPU has been utilized as Exhibit C, included in Appendix A, showing the location of Catalina in relation to regional facilities in the vicinity.

1.5 Reference Studies

The following approved documents have been reviewed, considered acceptable and utilized as reference material in preparation of this study:

The document entitled, *Update #2 to the Technical Drainage Study for Summerlin Village 23A Unit 2 Improvements* (hereafter referred to as the Unit 2 Update Study, Reference 4) and prepared by G.C. Wallace (CLV DS3402) had conceptually addressed the development of the Catalina site. Catalina was previously identified as Parcel N within Summerlin Village 23A Unit 2. The Unit 2 Update Study had conceptually determined a 100-year storm runoff of 46 cfs generated by Parcel N and constructed a storm drain lateral from Fox Hill to be utilized by Parcel N. Note that this study will show a variance from the assumption of runoff generated by Parcel N and also its discharge location established in the Unit 2 Update Study. Also note that the adjacent perimeter roadways of Fox Hill Drive and the Paseo Breeze roundabout were improved by the Village 23A Unit 2 improvements. Relevant reference material from the Unit 2 Update Study has been included in Appendix G.

The document entitled, *Technical Drainage Study for Summerlin Village 23A Unit 1 Improvements* (hereafter referred to as the Unit 1 Study, Reference 5) and prepared by G.C. Wallace (CLV DS3126) had designed the storm drain in Fox Hill Drive downstream of the Unit 2 storm drain that the Catalina site utilizes for conveyance of its discharge to Desert Foothills Drive. Note that due to changes in contributing flows from Parcel N and Parcel O than those previously established in the referenced Unit 2 Update Study, the design of the Unit 1 storm drain in Fox Hill has been referenced for a re-analysis presented in this study. Relevant reference material from the Unit 1 Study has been included in Appendix H for reference.

The document entitled, *Technical Drainage Study for Summerlin Village 23A Rough Grading* (hereafter referred to as the Rough Grading Study, Reference 6) and prepared by G.C. Wallace (CLV DS3077) had technically designed the interim collector channel adjacent to the western property boundary that is intended to protect the Catalina site from offsite flow. The Rough Grading Study also set forth the design of the future Sky Vista Drive in the alignment of the collector channel. Relevant reference material from the Rough Grading Study has been included in Appendix I for reference.

The document entitled, *Update to the Technical Drainage Study for Summerlin Village 23A Unit 2 – Parcel O* (hereafter referred to as the Parcel O Study, Reference 7) and prepared by Slater Hanifan Group (concurrently under review) had proposed a residential development located adjacent Catalina. The Parcel O development shares with Catalina the same entry road from the Paseo Breeze roundabout and also the same storm drain lateral from Fox Hill Drive. Relevant reference material from the Parcel O Study has been included in Appendix J for reference.

The document entitled, *Technical Drainage Study for Summerlin Village 23A Desert Foothills Drive Improvements* (hereafter referred to as the Desert Foothills Study, Reference 8) and prepared by G.C. Wallace (CLV #5770) had proposed the roadway and associated regional drainage infrastructure in Desert Foothills Drive that connects the Fox Hill Drive/Desert Sunrise Road storm drain into the existing regional facility in Charleston Boulevard. Due to the re-analysis of the Unit 1 storm drain prepared by this study to assess the increase in flow in Fox Hill Drive, the Desert Foothills Study has been referenced to show that the existing storm drain in Desert Foothills can accommodate a flow rate of 452 cfs from the existing Unit 1 storm drain. Relevant reference material from the Parcel O Study has been included in Appendix K for reference.

The document entitled, *Conceptual Drainage Study for Summerlin Village 23A* (hereafter referred to as the Village 23A Conceptual Study, Reference 9) and prepared by G.C. Wallace (CLV DS3077) had established the total flow rate generated by developed Summerlin Village 23A, inclusive of Catalina, that discharges into the existing regional facility in Charleston Boulevard. The V23A Conceptual Study has been referenced to show the increase in flow from Parcels N and O is insignificant in terms of the capacity of the receiving regional facility. Relevant reference material from the V23A Conceptual Study has been included in Appendix L for reference.

The document entitled, *Technical Drainage Study for Esperanza* (hereafter referred to as the Parcel M Study, Reference 10) and prepared by Slater Hanifan Group (currently under review, DS4555) had established the existing condition for the Catalina site. Esperanza is identified as Village 23A Unit 2 – Parcel M, and considered to be developed prior to start of Catalina. The Parcel M Study's proposed condition acts as the existing condition for Parcel N. Also, Esperanza utilizes the existing storm drain in Fox Hill Drive that this study has re-analyzed due to an increase in flow; therefore, its storm drain improvements have been assessed to show no adverse impacts as a result of the larger flow in the trunk storm drain. Relevant reference material from the Parcel M Study has been included in Appendix M for reference.

2 METHODOLOGY

2.1 Compliance

The methodologies utilized in the preparation of this study are in compliance with the Clark County Regional Flood Control District's Hydrologic and Drainage Design Manual (CCRFCD Manual, Reference 2).

2.2 Hydrologic Modeling

Modeling: The SCS Unit Hydrograph Method (SCS Method) was utilized to determine peak flow rates. The SCS Method utilizes precipitation, drainage area, curve number and lag time parameters to determine peak flow rates. The HEC-1 Flood Hydrograph Package Version 4.1 by the U.S. Army Corps of Engineers was utilized to model the drainage basins analyzed by this study.

Precipitation: The site is located outside of the McCarran Rainfall Area. Therefore the point precipitation values were obtained from Figures 503 (10-year) and 506 (100-year) from the CCRFCD Manual. Utilizing Table 501 from the CCRFCD Manual to adjust the point precipitation values from Figures 503 and 506, the 10-year and 100-year adjusted point precipitation values are 1.86 inches and 3.29 inches respectively. Upon review of the Unit 2 Update Study, the precipitation values are in conformance with those utilized in the previous conceptual analysis of the Catalina site (formerly Parcel N). Additionally, since the drainage area of the contributing watershed is less than 8 square miles, the SDN 3 design storm distribution from Table 503 in the CCRFCD Manual was used. Reference tables and figures from the CCRFCD Manual are included in Appendix B.

Curve Number: The SCS curve number loss rate methodology has been utilized to approximate infiltration for the basins. The soils information within the watershed was obtained from the SCS Soil Survey of the Las Vegas Valley Area (Soil Survey, Reference 3). Exhibit D, depicting the project site on the soils map, has been included in Appendix A. Per the Soil Survey, the project site lies within Soil Types 155 and 502. Soil Type 155 is described as cave gravelly fine sandy loam, 4 to 15 percent slopes and is comprised of entirely hydrologic soil group (HSG) 'D'. Soil Type 502 is described as canutio-cave gravelly fine sandy loams, 2 to 8 percent slopes and is comprised of 55% HSG 'B', 40% HSG 'D' and 5% HSG 'A'.

The following is information regarding curve number selection for this study. Note that the site is located on two (2) different soil types, and also a park/paseo is located on the site; therefore, composite curve number calculations have been provided. The average lot size proposed on the Catalina site has been computed as 6,100 ft^2; therefore, a curve number corresponding to "6,000 ft^2 lots" has been selected from CCRFCD Manual Table 602A. To accommodate the proposed 1.5 acre park/paseo, a curve number corresponding to "open space, fair condition" has been selected from CCRFCD Manual Table 602 – 1 of 4 with the anticipation that it will be covered with at least 50% grass. After completion of Phase 1, a portion of the site is considered rough graded (future Phase 2); therefore, a curve number corresponding to "newly graded" has been selected from CCRFCD Manual Table 602 - 1 of 4. All soil and curve number data/computations, including CCRFCD Manual reference tables, have been included in Appendix B.

Note that the Unit 2 Update Study had designed its storm drain infrastructure to accommodate runoff generated by 8,000 square foot average lots on Parcel N. Therefore, the composite curve numbers incorporating the land uses detailed above for Catalina result in larger flows than previously anticipated in the Unit 2 Update Study. Further discussion regarding the impacts of the increased flow has been included in this study.

Lag Time: The lag time is defined as the time measured from the center of mass of effective rainfall to the time to peak of the outflow hydrograph. The lag time is related to the time of concentration as 0.6 times the time of concentration. The time of concentration is defined as the time required for runoff to flow from the hydraulically most distant point of a basin to the outlet point of the basin. Standard Form 4, as included in the CCRFCD Manual, was utilized to determine the lag times for basins modeled. A copy of the Standard Form 4 lag time computations is included in Appendix B.

2.3 Hydraulic Modeling

Street Flow: Street flow was analyzed utilizing the Flowmaster Version 7.0 software by Haestad Methods. In accordance with the CCRFCD Manual, the velocity times depth factor (v x d) for street flow for the 10-year storm event must be less than or equal to 6 with a maximum depth of 1 foot. The velocity times depth factor (v x d) for street flow for the 100-year storm event must be less than or equal to 8 with a maximum depth of 2 feet. Note all streets proposed by Catalina are less than 80-ft right-of-ways.

Storm Drain: The hydraulic gradient for the onsite storm drain system was determined utilizing the Water Surface and Pressure Gradient (WSPG) Hydraulic Analysis System software by the Los Angeles County Department of Public Works. The resulting hydraulic gradient in the storm drain has been limited to minimum 1-ft below finished grade and the flow velocity to not exceed 25 ft/s.

Drop Inlets: Drop inlets were modeled using a computation spreadsheet which incorporates methodologies from Section 805 of the Manual.

3 EXISTING DRAINAGE CONDITION

3.1 Definition of Existing Drainage Condition

The existing drainage condition is considered the current condition of the site. Although construction has not started, Phase 1 of Esperanza (Parcel M) is anticipated to be completed prior to start of grading on the proposed Catalina site. Therefore, the proposed condition presented in the Parcel M Study is considered the same as the existing condition of Catalina, and a project specific existing condition drainage analysis has not been prepared by this study.

Additionally, the collector channel adjacent to the west of the site, as well as Alta Drive located to the further north, are considered to be complete. These improvements are intended to function as hydrologic cut-off boundaries. Therefore, only runoff generated by onsite Parcel N property is to be conveyed to the existing storm drain opening in Fox Hill Drive. Thus, the existing condition drainage patterns mimic the ultimate condition drainage plan for the site.

3.2 Discussion of Existing Drainage Condition

Catalina is considered to be encompassed by the boundary of referenced Basin E.OFF1. Storm runoff produced by the existing condition of Catalina is directed by existing topography and offsite grading along the northern boundary of Esperanza to an existing 36-inch RCP storm drain opening in sump located at the southeast corner of the Catalina property. Note the subject 36-inch storm drain had been constructed by Village 23A Unit 2 improvements and opened in sump by Esperanza for interim collection. The runoff is then conveyed in the existing storm drain in Fox Hill to match the ultimate condition drainage plan for the site.

4 PROPOSED DRAINAGE CONDITION

4.1 Definition of Proposed Condition

The proposed condition considers the Catalina development complete. Catalina is proposed to be developed in two (2) phases; thus, this study has analyzed the proposed condition after completion of each phase of the project. The Phase 1 proposed condition includes the interim rough grading of the western portion of the site and the Phase 2 proposed condition considers Catalina fully complete as a single-family residential development.

All adjacent perimeter improvements and storm drain infrastructure required for conformance of Catalina to master planned drainage patterns are considered to be complete during the proposed condition, as discussed in the existing condition.

4.2 Discussion of Developed Phase 2 Proposed Condition

Refer to Exhibit E, included in Appendix A, for a detailed illustration of the proposed condition drainage patterns.

After final completion of Catalina, the site generates a total flow rate of 52/26 cfs (Q_{100}/Q_{10}) as analyzed by Basin DEV1. Note the flow rate of 52 cfs includes 2 cfs that has been designed to bypass from the Parcel O project. The site has been graded to discharge its onsite runoff at the following two (2) discharge locations:

1) 45 cfs into the existing 36-inch RCP storm drain lateral from Fox Hill storm drain, located at the southeast corner of Catalina in Capistrano Avenue. The subject existing storm drain lateral had been designed by the Unit 2 Update Study for collection of the entire runoff produced by Catalina. Therefore, this discharge location is considered acceptable.
2) 8 cfs into the existing 42-inch RCP storm drain lateral provided by the Unit 2 improvements in the Paseo Breeze roundabout. Although not designed to accommodate any discharge from Catalina, the contributing flow is considered small and does not produce any adverse hydraulic impacts to the existing storm drain. Therefore, this discharge location is considered acceptable.

4.3 Discussion of Interim Phase 1 Proposed Condition

Catalina is to be partially rough graded by the completion of Phase 1. The interim rough grading of Phase 2 has been proposed in a manner such that the Phase 1 drainage patterns match the Phase 2 drainage patterns discussed above in Section 4.2 of this study. However, due to curve number differences of the interim rough graded area, the total runoff generated by Catalina during the Phase 1 proposed condition is 53/27 cfs (Q_{100}/Q_{10}), as analyzed by Basin INT1.

4.4 Summary of Proposed Condition Flows

A summary of both the Phase 1 and Phase 2 proposed condition flow rates for Catalina has been presented below in Table 1. Note that Phase 1 has been identified as Basin INT1 and Phase 2 has been identified as Basin DEV1. The HEC-1 analysis utilized to determine the flow rates in Table 1 has been included in Appendix C.

Table 1: Summary of Proposed Condition Flow Rates

Basin ID	Area (acres)	Q_{100} (cfs)	Q_{10} (cfs)
INT1	16.5	53	27
DEV1	16.5	52	26

Review of Table 1 shows that, due to curve number differences, the interim rough grade present on the site during Phase 1 results in a slightly larger runoff quantity produced by Catalina. Therefore, the INT1 flow rates have been utilized in the onsite hydraulic design presented in this study.

Since Catalina discharges its runoff into the existing storm drain in Fox Hill, its proposed condition flow has been compared to the previously established flow designed in the referenced Unit 2 Update Study below in Table 2.

Table 2: Summary of Catalina Flow Rates

Catalina Study Q_{100} (cfs)	Unit 2 Update Study Q_{100} (cfs)
53 *(Basin INT1)*	46 *(Basin 'N')*

In addition to the 7 cfs increase produced by the denser Catalina product proposed on Parcel N property shown in Table 2, the project also utilizes a storm drain lateral for conveyance of a portion of its runoff that was not previously planned. The existing 36-inch RCP storm drain lateral from the Fox Hill storm drain, constructed by the Unit 2 Update Study, had been designated as the location for collection of entire runoff produced by Catalina. However, as discussed, this study proposes two (2) discharge locations into the Fox Hill storm drain whose flow rates have been summarized in Table 3.

Table 3: Summary of Discharge Locations & Proposed Condition Flow Rates		
Discharge Location	**Unit 2 Design Q_{100} (cfs)**	**Catalina Proposed Q_{100} (cfs)**
Existing 36-inch RCP Lateral @ Unit 2 Fox Hill Sta. 147+35.46	46 *(Basin 'N')*	45 *(Basin INT1-B + INT1-C)*
Existing 42-inch RCP Lateral @ Unit 2 Paseo Breeze Roundabout	62 *(Basin 'O')*	80 *(Parcel 'O' + Basin INT1-A)*
TOTAL	108	125

After review of Table 3, in addition to utilizing the existing 42-inch lateral in the Paseo Breeze roundabout, the total flow in the Unit 2 storm drain in Fox Hill has increased by 17 cfs due to the following:

- The 100-year runoff contributing from Catalina (53 cfs) is 7 cfs larger than previously established for Parcel N (46 cfs).
- The 100-year runoff contributing from Parcel O (72 cfs) is 10 cfs larger than previously established for Parcel O (62 cfs).

As a result of the variations to the master plan, the existing Fox Hill storm drain has been re-analyzed to show the impacts of the proposed flows and connections summarized in Table 3.

- Although the flow has increased in the existing Fox Hill storm drain, the resulting HGL does not surcharge above roadway grade in the system and it is believed that the storm drain functions in the same manner. Therefore, the increase in flow does not result in adverse impacts to the existing Fox Hill storm drain. The re-analysis of the existing Fox Hill storm drain utilizing WSPG has been included in the Appendix E, and further discussion regarding the re-analysis has been included in Section 4.6 of this study. The revised flow rates and HGLs have been annotated on the Unit 1 and Unit 2 storm drain profiles included in Appendix G and H for reference.
- The Unit 1 storm drain connects into an existing CCRFCD regional facility in Desert Foothills Drive that extends to the existing CCRFCD regional facility in Charleston Boulevard. The Desert Foothills Study had designed its storm drain to accommodate a flow of 452 cfs from the existing Fox Hill storm drain connection at Desert Sunrise Road. The flow increase results in an approximate 4% increase in flow to the system, which is believed insignificant to the storm drain in Desert Foothills. Upon reaching Charleston, the referenced V23A Conceptual Study shows that the existing regional facility had been designed to convey an additional 106 cfs (964 cfs – 858 cfs) than currently contributing from Village 23A. Therefore, it has been determined that the increase in flow conveyed in the existing Fox Hill storm drain results in no negative impacts to the downstream CCRFCD regional storm drain facilities.

4.5 Summary of Proposed Condition Street Flows

The interim partially rough graded Phase 1 condition generates the largest flow onsite; therefore the runoff generated by Basin INT1 has been utilized to hydraulically analyze the Esperanza interior streets. Basin INT1 has been pro-rated into smaller subbasins to

determine the flow rates utilized for the hydraulic analysis, and Table 4 summarizes the pro-rated flows.

Table 4: Summary of Onsite Pro-Rated Flow Rates					
Basin ID	**Area (acres)**	**Q_{100} (cfs)**	**Q_{10} (cfs)**	**Unit Q_{100} (cfs)**	**Unit Q_{10} (cfs)**
INT1	16.5	53	27	3.2	1.6
Subbasin ID	**Area (acres)**	**Q_{100} (cfs)**	**Q_{10} (cfs)**	**Unit Q_{100} (cfs)**	**Unit Q_{10} (cfs)**
A	2.4	7.7	4	3.2	1.6
B	8.9	28.6	15	3.2	1.6
C	5.2	16.7	9	3.2	1.6
TOTAL	***16.5***	***53***	***27***	***3.2***	***1.6***

Table 5 summarizes the 100-year street flow hydraulic computations for the interior Catalina streets utilizing the pro-rated flow rates reported in Table 4. Refer to Exhibit E, included in Appendix A, for the location of each street section. The associated Flowmaster street flow computations have been included in Appendix D.

Table 5: Summary of 100-Yr Onsite Street Flow Hydraulic Characteristics						
Location	**Q_{100} (cfs)**	**Contributing Subbasins**	**Slope (%)**	**Depth, D (ft)**	**Velocity, V (ft/s)**	**D x V**
Section A *Altimira Avenue*	8	A	5.00	0.28	4.39	1.2
Section B1 *Capistrano Avenue*	29	B	2.00	0.46	4.19	1.9
Section B2 *Capistrano Avenue*	45	B + C	1.74	0.53	4.74	2.5
Section C *Mira Vista Street*	17	C	3.20	0.37	4.42	1.6

After review of Table 5, it has been determined that the street flow criteria set forth in Section 2.3 of this study has been satisfied. The 100-year flows are shown to satisfy the 10-year DxV criteria; therefore, only the 100-year street flow computations have been performed.

Note that the flow depth in Capistrano Avenue exceeds the back of curb and may flow over the front yards or landscaping on several lots; however, the velocities are under 5 ft/s which are considered non-erosive and satisfy DxV product requirements. Therefore, no mitigation is necessary for the excessive flow depths.

The adjacent Fox Hill Drive has been designed to limit the street flow that is generated by the roadway itself. The resulting street flow is 8 cfs at 0.32-ft depth, per referenced Unit 1 Study's Street Section 1 included in Appendix H; therefore, the flow rates do not exceed the back of curb.

4.6 Summary of Proposed Recommended Facilities

Drop Inlets: A total of two (2) drop inlets are proposed by this project to collect the Catalina flow for conveyance to the existing Fox Hill storm drain. Table 6 summarizes the proposed drop inlets and their hydraulic characteristics. Refer to Exhibit E, included in Appendix A, for identification to the locations of the proposed drop inlets. The supporting drop inlet computations have been included in Appendix E.

Table 6: Summary of Proposed Drop Inlet Hydraulic Characteristics

Phase	Drop Inlet No.	Size & Type	Flow Breakdown	Impacting Q_{100} (cfs)	Collected Q_{100} (cfs)	Bypass Q_{100} (cfs)
1	1	22.5-ft Type CM2	B + C	45	45	0
2	1	5.0-ft Type CM2	A	8	8	0

Note that the 5.0-ft Drop Inlet is to be constructed by Phase 2; however, flow is directed to its location during the Phase 1 rough graded condition. Therefore, prior to construction of Phase 2, its storm drain lateral has been extended and temporarily opened up in a sump condition to allow for the flow to be collected in the same manner as what will occur after the drop inlet is constructed. An inlet control calculation for the interim shows the resulting headwater at the opening meets criteria.

Also note that both drop inlets are located at low points, where if the inlets were to become clogged, the flow would overtop the back of curb. The emergency overflow path for the clogged inlets is thru the proposed 39-ft wide drainage easement into Fox Hill Drive. The adjacent finished floors to the overflow path have been elevated above the emergency overflow depth, per computations included in Appendix E.

Capistrano Storm Drain: An existing 36-inch RCP storm drain constructed by the Unit 2 Update Study has been utilized to convey the flow collected by the 22.5-ft Drop Inlet. The drop inlet is to be constructed over the existing pipe and any additional pipe upstream of the drop inlet is to be abandoned. Note that the existing 36-inch RCP had been designed to convey 46 cfs and Catalina proposes only 45 cfs in the storm drain. However, due to increase in flow conveyed in the trunk system in Fox Hill, the 36-inch RCP lateral has been hydraulically analyzed to show no adverse backwater impacts. Note the HGL determined in the trunk storm drain analysis at WSPG Station 5772.91 has been utilized as the starting HGL for the 36-inch lateral.

Paseo Breeze & Fox Hill Storm Drain: An existing 42-inch RCP storm drain constructed by the V23A Unit 2 Improvements has been utilized to convey the flow collected by the 5.0-ft Drop Inlet. Note that this storm drain lateral was never previously designed to accommodate a portion of flow from Catalina, only Parcel O flow. Therefore, the re-analysis of the trunk Fox Hill storm drain has been extended from Desert Foothills Drive to the Paseo Breeze roundabout and existing 42-inch storm drain lateral to be utilized by Parcel O.

The referenced Unit 2 Update Study showed that although it modified flow rates generated by the Unit 2 parcels, downstream of the roundabout intersection of Fox Hill and Desert Moon the flows were in conformance with the Unit 1 analysis that showed 198 cfs in the Fox Hill storm drain. This study shows that an increase of 17 cfs during the 100-year storm is experienced by the Fox Hill storm drain, per Table 3. Therefore, the re-analysis of the Fox Hill storm drain by this study establishes 100-year flows of 215 cfs south of the roundabout intersection of Fox Hill and Desert Moon, and 469 cfs at the connection into the Desert Foothills regional facility. After review of the re-analysis of the Fox Hill storm drain included in Appendix E, the following are 3 locations that merit addressing impacts and summarized in Table 7. Note that at all other locations downstream not reported in Table 7, the increase in flow results in what are considered insignificant impacts because the revised HGL remains approximately 4-ft to 10-ft below the finished grade. Also note that the revised HGL impacts for the Parcel N utilized storm drain laterals have been accounted for in the Capistrano and Site Entry storm drain analyses.

Table 7: Summary of Fox Hill Storm Drain Revised Hydraulic Characteristics

Fox Hill Station	Revised Q_{100} (cfs)	Revised HGL (ft)	Approved Q_{100} (cfs)	Approved HGL (ft)
114+25.00	336/348	3225.4	318/333	3222.6
116+74.98	298/336	3231.4	281/319	3230.6
137+81.33	146/205	3305.4	129/188	3305.9

114+25.00 – This location is at approximately Paseo Flower Court. Although the HGL has increased by almost 3-ft, the resulting HGL does not surcharge out of the drop inlets at this location and remain approximately 1-ft below the grate elevations. Therefore, the increase in HGL is considered acceptable.

116+74.98 – This location is where Parcel F ties its storm drain into Fox Hill. Although the HGL at this location does not remain 1-ft below Fox Hill roadway grade, the flow does not surcharge out of the manhole onto the street. Additionally, inspection of Parcel F plans shows that the HGL increase does not affect the functionality of its drop inlet collection. Therefore, the increase in HGL is considered acceptable.

137+81.33 – This location is where Esperanza ties its storm drain into Fox Hill. Although the flow has increased, it is believed that due to modeling differences (WSPG vs. Standard Form 6), the HGL has been reduced in the trunk storm drain. Esperanza had designed its storm drain based on the higher approved HGL; therefore, no adverse impacts occur to Esperanza storm drain from the increase in flow. Therefore, the revised HGL is considered acceptable.

Site Entry & Parcel O Storm Drain: Note that this project shares its site entry with the adjacent Woodside Homes Parcel O. A Drainage Study Update for Parcel O (concurrently under review) has proposed the drainage infrastructure in the site entry that Catalina will connect into, is considered by this study to be existing and is utilized to discharge its flow rate generated by pro-rated Basin INT1-A. A comprehensive WSPG model extending from Fox Hill thru the Paseo Breeze roundabout's 42-inch RCP and to the upstream end of the proposed 18-inch RCP, identified on Exhibit E as Facility A.

4.7 Summary of Proposed Finished Floor

All proposed finished floor elevations have been determined to be a vertical distance above the gutter flowline of twice the depth of flow in the street and also 6-inches above the top of curb on the high side of the lot in accordance with the CCRFCD Manual and local criteria. The proposed finished floor evaluation and protection analysis has been included in Appendix F.

Note that the flow depths in the adjacent perimeter streets are below the back of curb; therefore, no solid grouting of the perimeter walls is necessary.

5 ULTIMATE DRAINAGE CONDITION

5.1 Discussion of Ultimate Condition

After completion of Phase 2 of the proposed Catalina project, the proposed condition drainage patterns will remain the same in the ultimate condition. The only change in improvements that occurs in the ultimate condition is that the interim collector channel, adjacent to the west, becomes the future Sky Vista roadway. However, the Sky Vista roadway is planned to function similar to the adjacent infrastructure roadways constructed by V23A Unit 1 and 2 improvements. Specifically, the only flow conveyed in the roadway is generated by the roadway itself and infrastructure storm drain will convey all contributing parcel flow.

Therefore, this study provides no analyses related to the ultimate drainage condition. Note that this study shows that although the development of Catalina results in an increase in flow to the existing Fox Hill drainage infrastructure, no adverse impacts occur to downstream properties and facilities.

6 CONCLUSIONS & RECOMMENDATIONS

1. The collection of flow from Catalina varies from the previous planned drainage patterns established in the Unit 2 Update Study. Rather than all runoff contributing to the existing 36-inch storm drain lateral, Catalina also discharges a portion of its runoff to the existing 42-inch lateral in the Paseo Breeze roundabout. Although the design of Catalina utilizes two (2) discharge locations instead of the one (1) discharge location planned, no adverse hydraulic impacts occur to the existing storm drain in Fox Hill Drive.

2. The total flow rate contributing to the existing Fox Hill storm drain from Catalina exceeds the flow established for Parcel N in the Unit 2 Update Study. Additionally, note that offsite Parcel O had been approved with an increase in flow to the Fox Hill storm drain from what was established in the Unit 2 Update Study. However, this study shows that the increase in flow rate generated by these two sites does not adversely impact the hydraulic functionality of the existing storm drain in Fox Hill. Therefore, the development of Catalina is considered acceptable.

3. In addition to the 36-inch RCP lateral provided from Fox Hill by the Village 23A Unit 2 Improvements, the site also utilizes Parcel O drainage infrastructure for conveyance of runoff in the shared site entry road. The necessary coordination between the three applicable parties, Lennar, Woodside and Summerlin, will continue.

4. Resulting street flow hydraulic characteristics within the Catalina site are in conformance with CCRFCD Manual criteria.

5. Proposed storm drain and drop inlets have been designed to satisfy CCRFCD Manual criteria.

6. Proposed finished floor elevations have been elevated to at least a height of two times the depth of the 100-year flow in the adjacent street and also 6-inches above the top of curb measured from the high side of the lot. Therefore, the finished floors are considered adequately flood protected.

7. Esperanza is located outside an SFHA. It is located within a FEMA designated Zone 'X', defined as an area determined to be outside the 0.2% annual chance flood.

8. The project is not located adjacent to an existing or future planned CCRFCD regional facility. Although this study proposes an increase in flow from Summerlin Village 23A into the downstream existing regional facilities in Desert Foothills and Charleston, the increase is considered insignificant.

7 REFERENCES

1. *Las Vegas Valley Flood Control Master Plan Update*, PBS&J, Inc. and G.C. Wallace, Inc, November 2002.

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

3. *Soil Survey of Las Vegas Valley Area, Nevada*, U.S. Department of Agriculture, Soil Conservation Service, July 1985.

4. *Update #2 to the Technical Drainage Study for Summerlin Village 23A Unit 2 Improvements,* G.C. Wallace, June 2011.

5. *Technical Drainage Study for Summerlin Village 23A Unit 1 Improvements,* G.C. Wallace, December 2003.

6. *Technical Drainage Study for Summerlin Village 23A Rough Grading,* G.C. Wallace, May 2002.

7. *Update to the Technical Drainage Study for Summerlin Village 23A Unit 2 – Parcel O,* Slater Hanifan Group, May 2012.

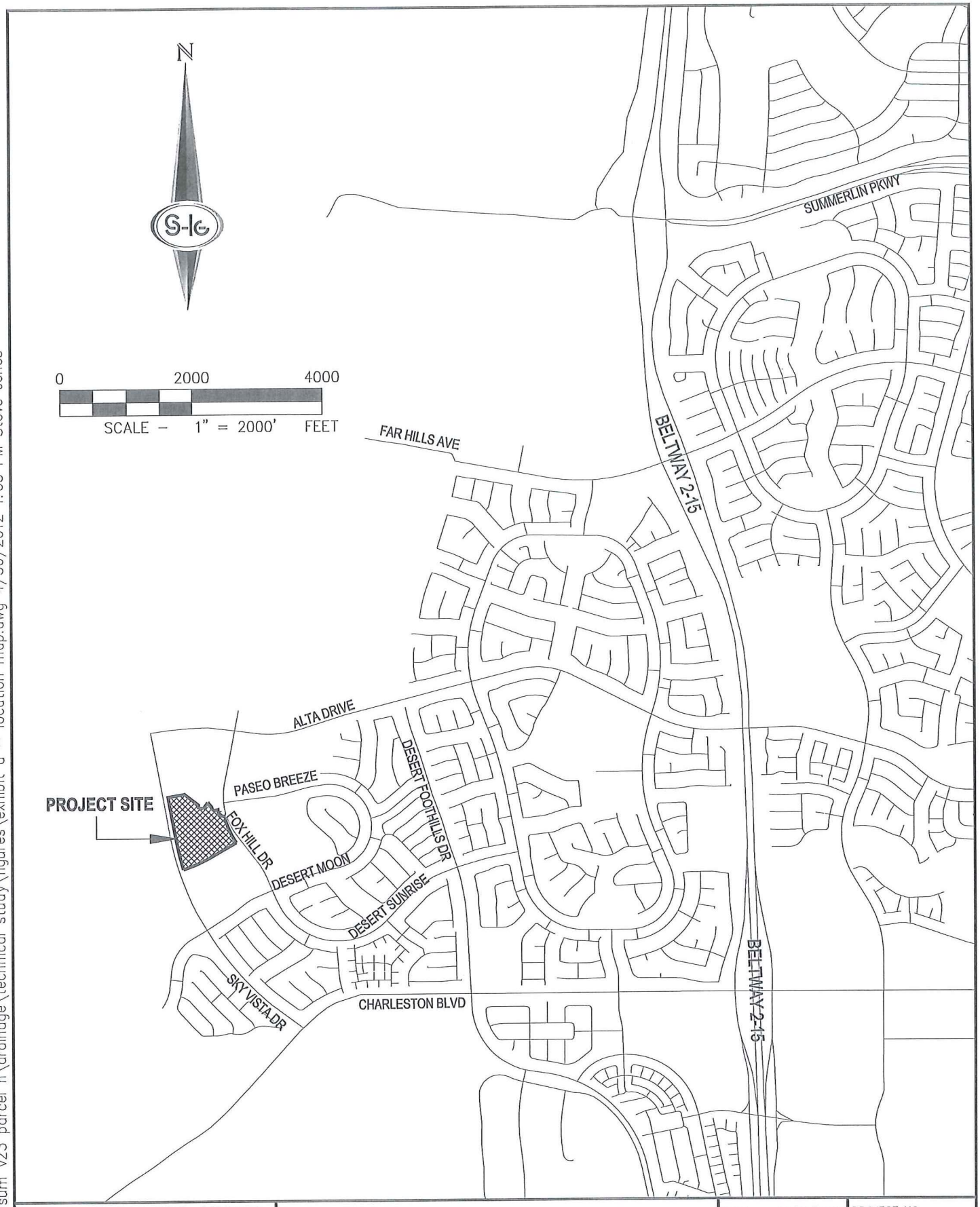
8. *Technical Drainage Study for Summerlin Village 23A Desert Foothills Drive Improvements,* G.C. Wallace, April 2002.

9. *Conceptual Drainage Study for Summerlin Village 23A,* G.C. Wallace, May 2003.

10. *Technical Drainage Study for Esperanza,* Slater Hanifan Group, May 2012.

APPENDIX A

Drainage Exhibits



SLATER HANIFAN GROUP
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LENNAR HOMES
CATALINA
LOCATION MAP

DATE: 05/08/2012	PROJECT NO. LEN1202.000
DRAFTER: SMJ	
DESIGNER: SMJ	EXHIBIT A
CHECKED: KCR	SHEET 1 OF 1

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JOINS PANEL

LIMIT OF STUDY

DETENTION BASIN NO 5

ZONE A

PROJECT SITE

CLARK COUNTY
UNINCORPORATED AREAS
320003

RED ROCK
DETENTION BASIN

T20S
T21S

CITY OF LAS VEGAS
CLARK COUNTY

ZONE A
ZONE X

100-YEAR FL
CONTAINED
CULVERT

ZONE X

REDROCK WASH
ROCK
RED

GR1237
GR1235
GR1238
GR1236
GR1234
GR1233
GR1232
GR1231

ZONE A

MASONRY DAM
Spillway

4
3
2
1

159
163
148

N

0 1500 3000

SCALE – 1" = 1500' FEET

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CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

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

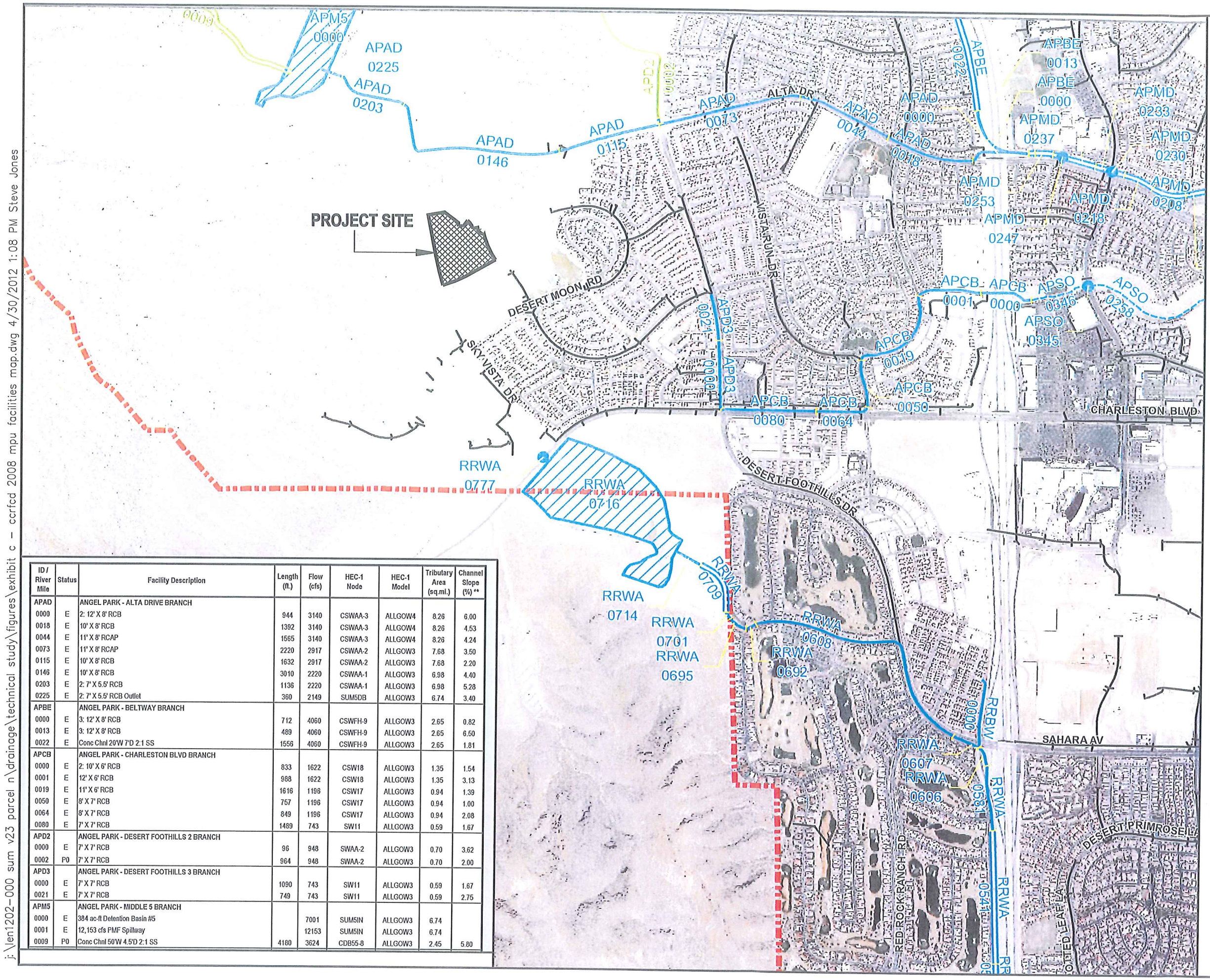
NATIONAL FLOOD INSURANCE PROGRAM

LENNAR HOMES
CATALINA
FEMA FIRM PANEL EXHIBIT

DATE:	05/08/2012
DRAFTER:	SMJ
DESIGNER:	SMJ
CHECKED:	KCR
PROJECT NO.	LEN1202.000

EXHIBIT B
SHEET 1 OF 1

j:\len1202-000 sum v23 parcel n\drainage\technical study\figures\exhibit b - fema firm map.dwg 4/30/2012 1:06 PM Steve Jones



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						
0000	E	2: 12' X 8' RCB	944	3140	CSWAA-3	ALLGOW4	8.26	6.00
0018	E	10' X 8' RCB	1392	3140	CSWAA-3	ALLGOW4	8.26	4.53
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
0115	E	10' X 8' RCB	1632	2917	CSWAA-2	ALLGOW3	7.68	2.20
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						
0000	E	3: 12' X 8' RCB	712	4060	CSWFH-9	ALLGOW3	2.65	0.82
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
APCB		ANGEL PARK - CHARLESTON BLVD BRANCH						
0000	E	2: 10' X 6' RCB	833	1622	CSW18	ALLGOW3	1.35	1.54
0001	E	12' X 6' RCB	988	1622	CSW18	ALLGOW3	1.35	3.13
0019	E	11' X 6' RCB	1616	1196	CSW17	ALLGOW3	0.94	1.39
0050	E	8' X 7' RCB	757	1196	CSW17	ALLGOW3	0.94	1.00
0064	E	8' X 7' RCB	849	1196	CSW17	ALLGOW3	0.94	2.08
0080	E	7' X 7' RCB	1489	743	SW11	ALLGOW3	0.59	1.67
APD2		ANGEL PARK - DESERT FOOTHILLS 2 BRANCH						
0000	E	7' X 7' RCB	96	948	SWAA-2	ALLGOW3	0.70	3.62
0002	P0	7' X 7' RCB	964	948	SWAA-2	ALLGOW3	0.70	2.00
APD3		ANGEL PARK - DESERT FOOTHILLS 3 BRANCH						
0000	E	7' X 7' RCB	1090	743	SW11	ALLGOW3	0.59	1.67
0021	E	7' X 7' RCB	749	743	SW11	ALLGOW3	0.59	2.75
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	
0009	P0	Conc Chnl 50'W 4.5'D 2:1 SS	4180	3624	CDB55-8	ALLGOW3	2.45	5.80

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-29
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
- 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

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

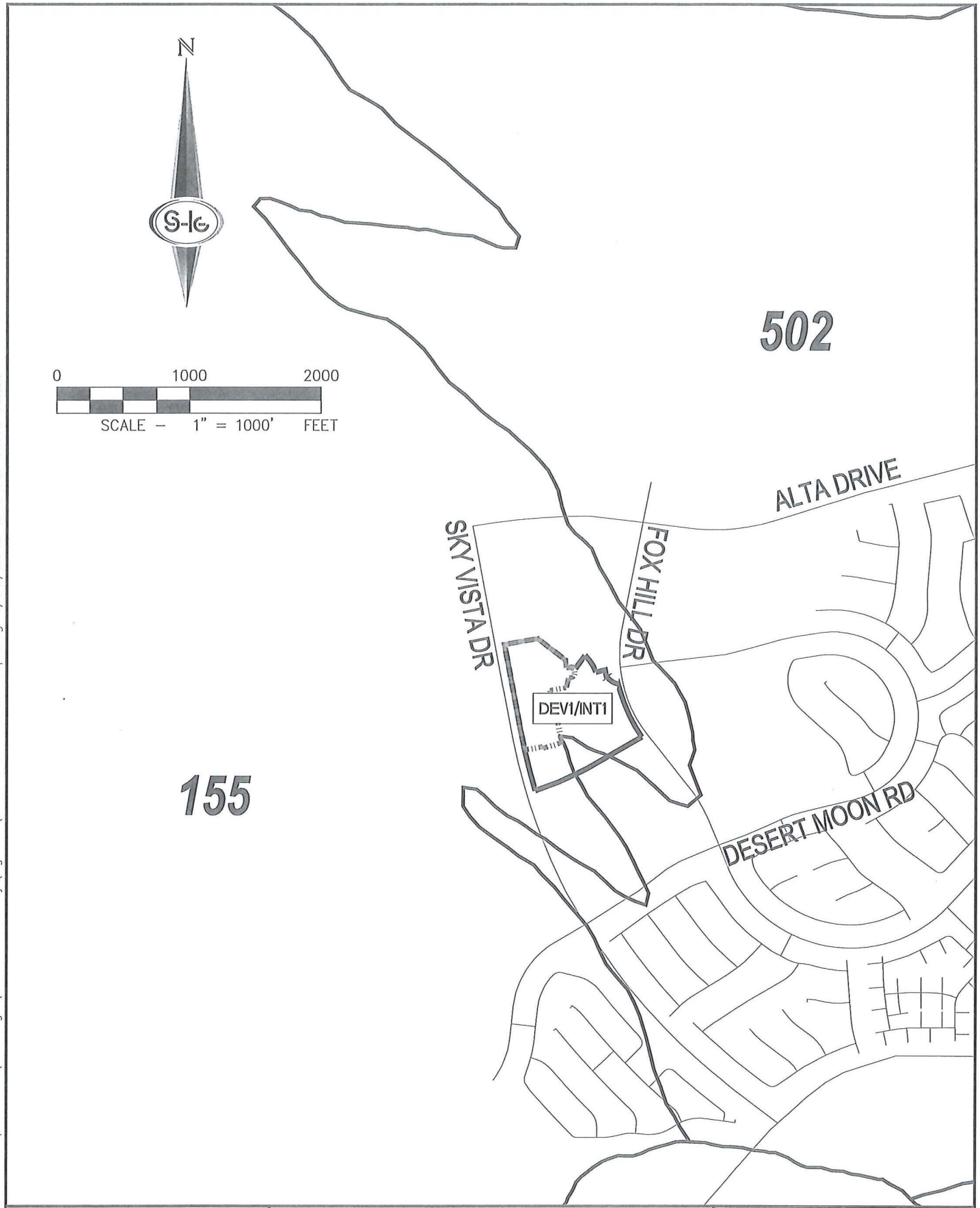
LENNAR HOMES
CATALINA

CCRFCD 2008 MPU REGIONAL FACILITIES EXHIBIT

DATE: 05/08/2012
DRAFTER: SMJ
DESIGNER: SMJ
CHECKED: KCR
PROJECT NO. LEN1202.000

EXHIBIT C
SHEET 1 OF 1

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LENNAR HOMES

CATALINA

SOILS MAP

DATE: 05/08/2012	PROJECT NO. LEN1202.000
DRAFTER: SMJ	
DESIGNER: SMJ	**EXHIBIT D**
CHECKED: KCR	SHEET 1 OF 1

Flow Rate Summary					
Phase 1 & Phase 2 Proposed Condition					
Basin	**Q_{100} (cfs)**	**Q_{10} (cfs)**	**Area (acres)**	**Q_{100} Unit Flow (cfs/acre)**	**Q_{10} Unit Flow (cfs/acre)**
DEV1	52	26	16.5	3.2	1.6
INT1	53	27	16.5	3.2	1.6
Subbasin	**Q_{100} (cfs)**	**Q_{10} (cfs)**	**Area (acres)**	**Q_{100} Unit Flow (cfs/acre)**	**Q_{10} Unit Flow (cfs/acre)**
INT1-A	7.7	4	2.4	3.2	1.6
INT1-B	28.6	15	8.9	3.2	1.6
INT1-C	16.7	9	5.2	3.2	1.6
TOTAL	***53***	***27***	***16.5***	***3.2***	***1.6***

Summary of Proposed Flood Control Facilities - Proposed Condition Flow Rates				
Drainage Facility ID	**Q_{100} (cfs)**	**Inflow Description**	**Size & Type**	**Comment**
1	45	INT1-B + INT1-C	22.5-ft Type CM2 Drop Inlet	Connects into existing 36-inch RCP storm drain constructed by Unit 2 Improvements.
2	8	INT1-A	5.0-ft Type CM2 Drop Inlet	Drop inlet constructed in Phase 2. Interim Sump & Storm Drain Opening to collect flow for Phase 1.
A	8	INT1-A	18-Inch RCP	Connects into existing Drop Inlet constructed by Parcel O by Woodside

100-Year Street Flow Summary - Proposed Condition Flow Rates						
Street Section ID	**Contributing Flow**	**Slope (%)**	**Q_{100} (cfs)**	**D_{100} (ft)**	**V_{100} (ft/s)**	**$D_{100}*V_{100}$**
A	INT1-A	5.00	8	0.28	4.39	1.2
B1	INT1-B	2.00	29	0.46	4.19	1.9
B2	INT1-B + INT1-C	1.74	45	0.53	4.74	2.5
C	INT1-C	3.20	17	0.37	4.42	1.6

LEGEND

- BASIN BOUNDARY
- DEV1 — BASIN ID
- PRO-RATED SUBBASIN BOUNDARY
- A — PRO-RATED SUBBASIN ID
- A — FLOWMASTER STREET SECTION
- FLOW DIRECTION
- 1 — FACILITY ID
- 8 CFS — SURFACE 100-YR FLOW RATE
- (200 CFS) — STORM DRAIN 100-YR FLOW RATE
- PHASE LINE

0 80 160
SCALE - 1" = 80' FEET

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CATALINA

PROPOSED CONDITION DRAINAGE MAP

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PROJECT NO.	LEN1202.000

EXHIBIT E
SHEET 1 OF 1

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APPENDIX B

Hydrologic Data & Computations

Precipitation

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Rainfall and Precipitation Computation

Project Name:	Catalina
Date:	4/24/2012
File Name:	SF4 - Catalina - TDS.xls
By:	SMJ

Data:

Reference:

Project is located in: Township: 20 S. Range: 59 E. Section: 34 — APN Map

Site is NOT located in the McCarran Airport Rainfall Area — Figure 513*

Rainfall Depth-Duration-Frequency 10-Year, 6-Hour: 1.5 inches — Figure 503*

Rainfall Depth-Duration-Frequency 100-Year, 6-Hour: 2.3 inches — Figure 506*

Precipitation Adjustment Ratios:

10-Year: 1.24 — Table 501*
100-Year: 1.43 — Table 501*

Six Hour Depth Area Reduction Factors (DARF):

Area (gross acres): 39.2 = 0.0613 square miles — Table 502*
DARF = 1.00

Calculations:

P_{10} = 1.86 10-Year Precipitation (in)
P_{100} = 3.29 100-Year Precipitation (in)

P10/P100= 0.57 HEC-1 Multiple Ratio Value

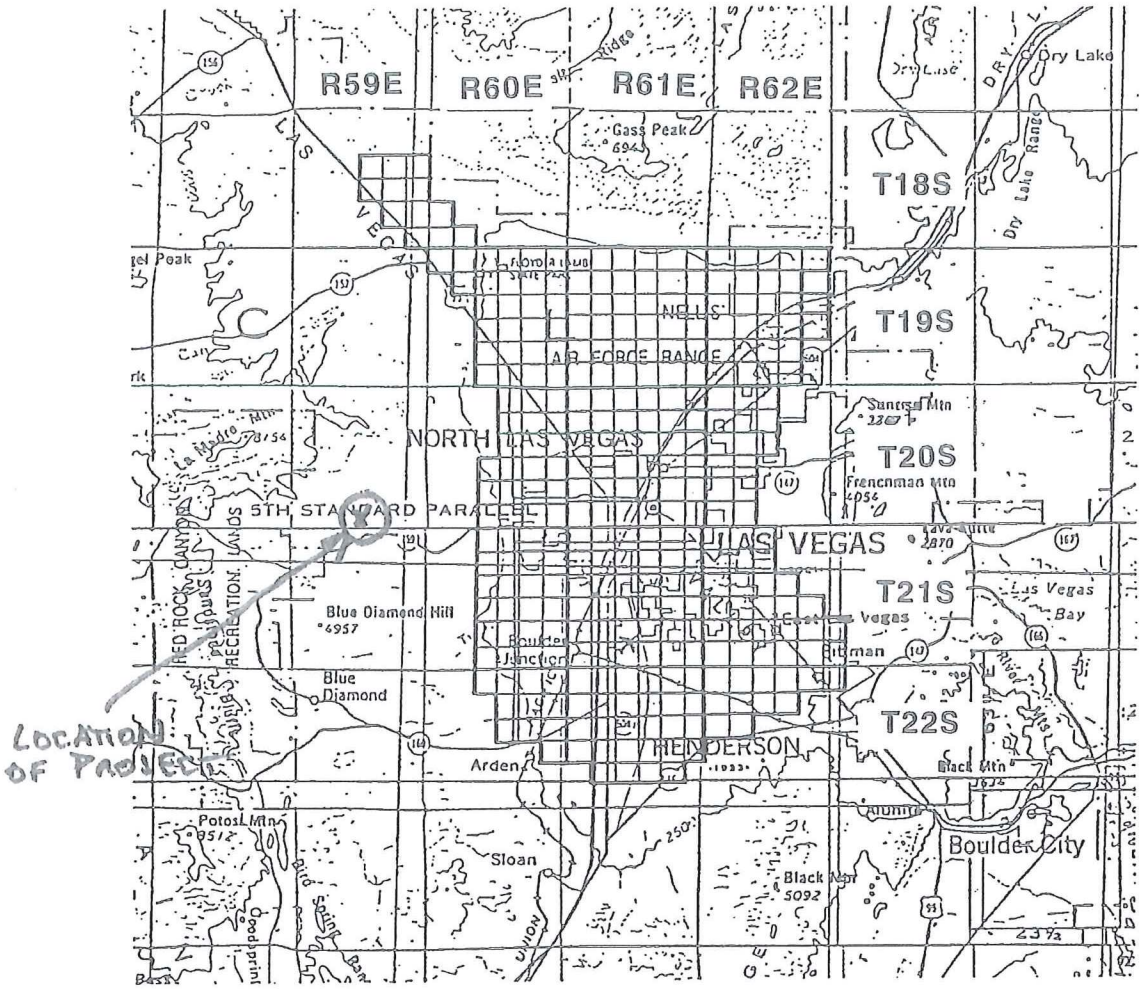
Equations:

P=(Rainfall)*(Precipitation Adjustment Ratio)*(Depth Area Reduction Factor)

* Equations taken from the Clark County Regional Flood Control District - Hydrologic Criteria and Drainage Design Manual

5740 S. Arville St., Suite 216 - Las Vegas, NV 89118
Ph. 702-284-5300 - Fx. 702-284-5399

McCARRAN AIRPORT RAINFALL AREA



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

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

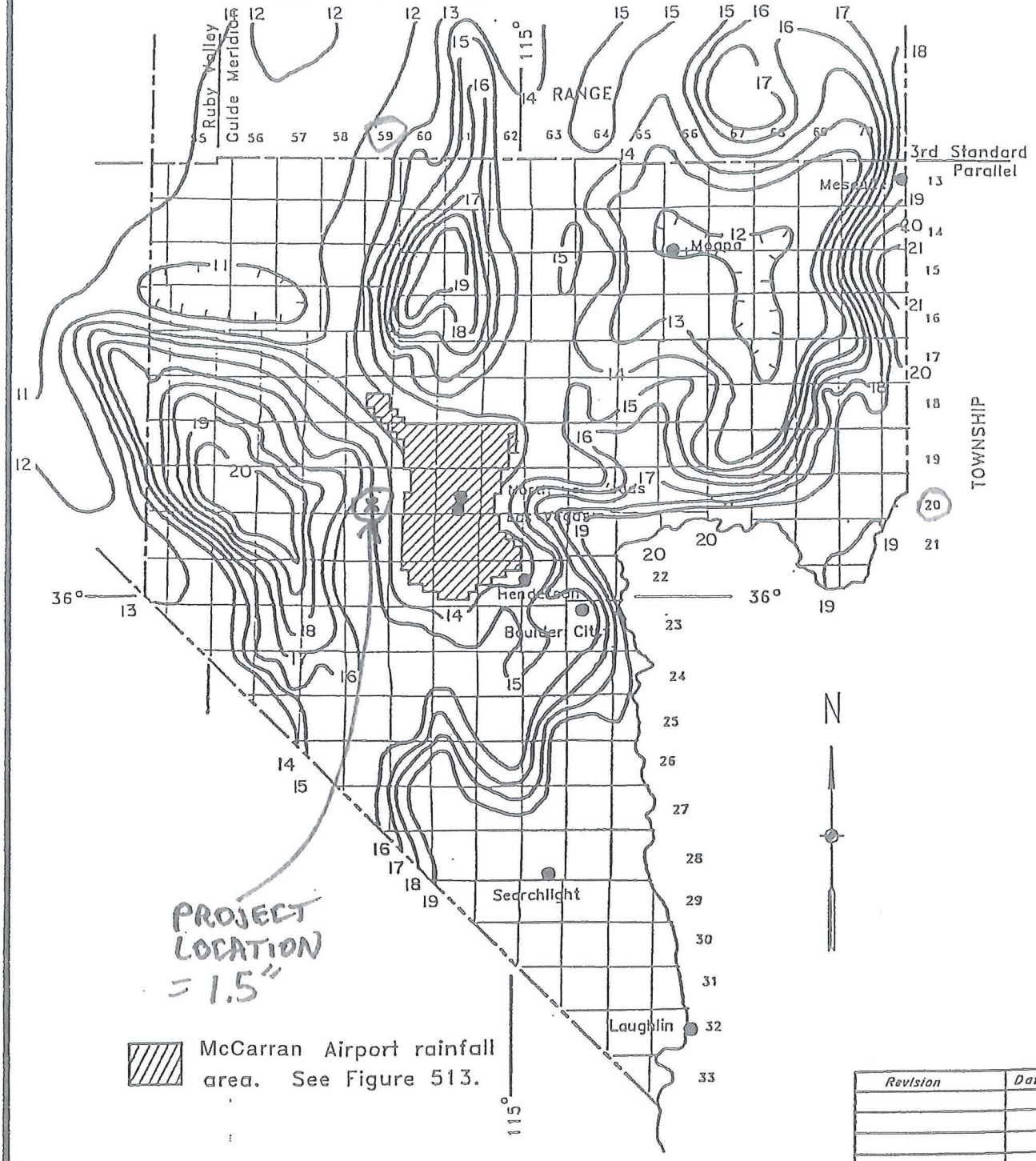
Revision	Date

WRC ENGINEERING

REFERENCE:
USACE, Los Angeles District, 1988

FIGURE 513

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



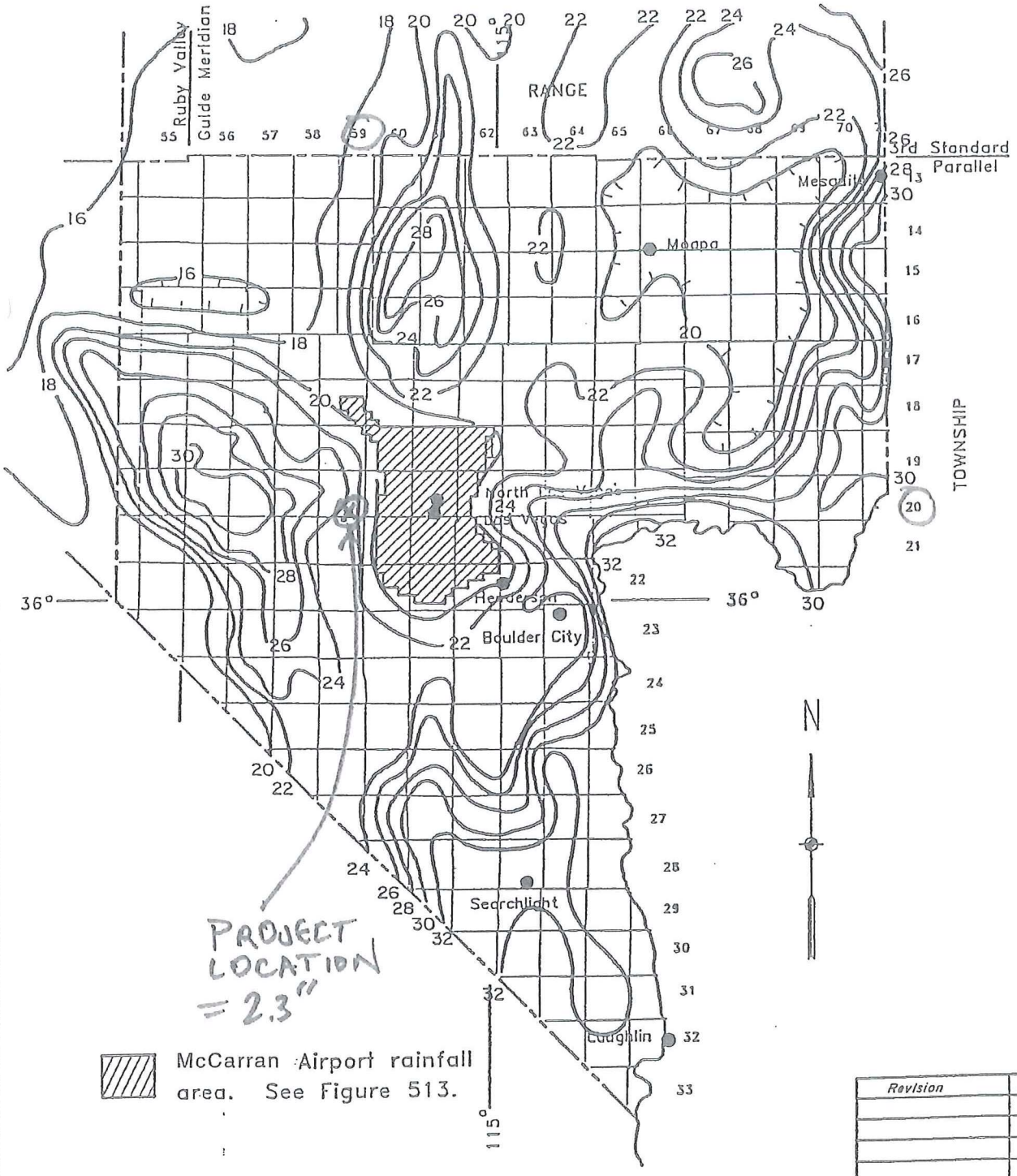
Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 503

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



Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 506

PRECIPITATION ADJUSTMENT RATIOS

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

NOTE: 1. Multiply the values obtained from the NOAA Atlas 2 by the above ratios to obtain the adjusted precipitation values.

2. NOAA Atlas 2 values for use with TR-55 shall not be adjusted by the above ratios.

3. Tables 505 and 506 require no adjustments.

Revision	Date

SIX HOUR DEPTH-AREA REDUCTION FACTORS

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

NOTES: 1. A graphical representation of these factors is presented in Figure 514.

2. Consult with the local entity and/or the CCRFCD for guidance in using the Depth-Area Reduction Factors for drainage areas greater than 200 square miles.

Revision	Date

SIX-HOUR STORM DISTRIBUTIONS

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

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

Revision	Date

REFERENCE:

TABLE 503

Soils & Curve Number

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Soil & Curve Number Computation

Project Name: Catalina
Date: 4/24/2012
File Name: SF4 - Catalina - TDS.xls
By: SMJ

Data:

Project is located in the following soil types:
155 Cave gravelly fine sandy loam, 4 to 15 percent slopes
502 Canutio-Cave gravelly fine sandy loams, 2 to 8 percent slopes

Soil Group:
D
55% B, 40% D, 5% A

Reference:

Exhibit D
SCS Soil Survey

Hydrologic Soil Group	Desert Shrub (Poor Condition)	Newly Graded	Park (Fair Condition, Approx. 50% Grass)	Residential (10,000 sq ft lot)	Residential (8,000 sq ft lot)	Residential (6,000 sq ft lot)
A	63	77	49	61	73	80
B	77	86	69	75	82	87
C	85	91	79	83	88	90
D	88	94	84	87	90	92

Soil Type	Desert Shrub (Poor Condition)	Newly Graded	Park (Fair Condition, Approx. 50% Grass)	Residential (10,000 ft^2 lot)	Residential (8,400 ft^2 lot)	Residential (8,000 ft^2 lot)	Residential (6,000 ft^2 lot)
155	88	94	84	87	89.4	90	92
502	80.7	88.8	74.0	79.1	83.6	84.8	88.7

Basin	Soil Type	% Area	Land Use	CN	Area (Acres)	Composite CN
DEV1	155	84.2%	6,000 ft^2 lots	92.0	13.9	77.5
	155	9.1%	Park	84.0	1.5	7.6
	502	6.7%	6,000 ft^2 lots	88.7	1.1	5.9
		100.0%		264.7	16.5	**91.0**
INT1	155	41.6%	6,000 ft^2 lots	92.0	6.4	38.2
	155	9.7%	Park	84.0	1.5	8.2
	155	41.6%	Newly Graded	94.0	6.4	39.1
	502	7.1%	6,000 ft^2 lots	88.7	1.1	6.3
		100.0%		358.7	15.4	**91.8**

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RUNOFF CURVE NUMBERS - RESIDENTIAL DISTRICTS

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

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

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

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

Revision	Date

REFERENCE:

TABLE 602A

RUNOFF CURVE NUMBERS
(URBAN AREAS[1])

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

See Table 602A

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

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

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

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

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

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

Revision	Date

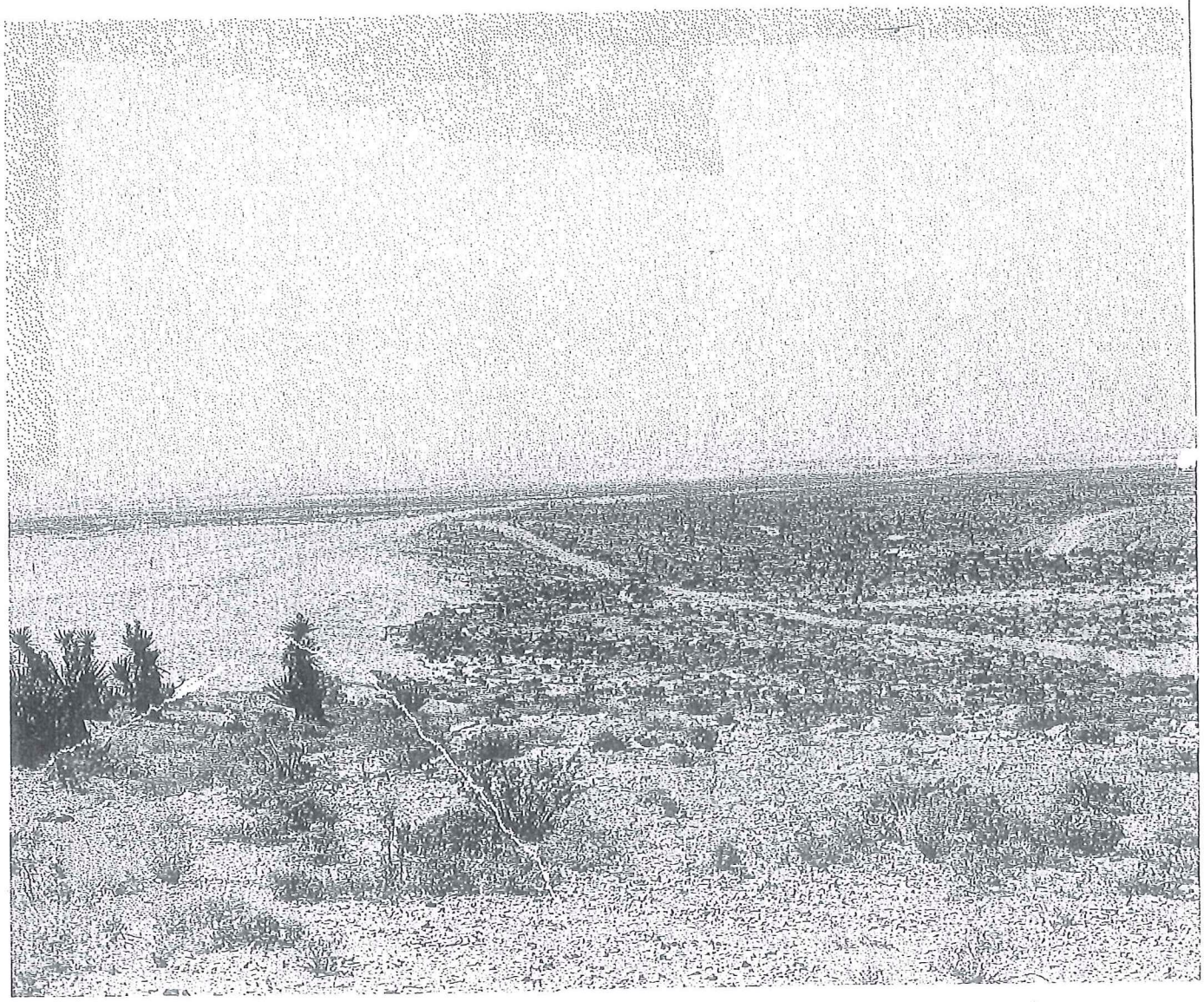
United States Department of Agriculture

Soil Conservation Service

In cooperation with United States Department of the Interior, Bureau of Land Management, and University of Nevada Agricultural Experiment Station

Soil Survey of Las Vegas Valley Area Nevada

Part of Clark County



This unit is limited for roads because of the depth to the indurated hardpan. Roads should be designed to minimize cuts.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

152—Cave gravelly fine sandy loam, 0 to 4 percent slopes. This shallow, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, about 80 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is pale brown gravelly fine sandy loam about 12 inches thick. The next layer to a depth of 36 inches is an indurated, lime-cemented hardpan. The underlying material to a depth of 60 inches or more is light brown very gravelly sandy loam. Depth to the hardpan ranges from 4 to 20 inches.

Included in this unit are about 5 percent Arizo soils, flooded, in channels, 5 percent Canutio soils on inset fans, and 5 percent Grapevine soils on side slopes of erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Cave soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

This unit is poorly suited to urban development. The main limitation is the shallow depth to the hardpan. Excavation for building sites is limited by the hardpan, and heavy equipment is needed. Special design of septic tank absorption fields is needed.

Roads should be designed to minimize cuts because of the limited depth to the hardpan.

It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

155—Cave gravelly fine sandy loam, 4 to 15 percent slopes. This shallow, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, about 70 percent of the surface is covered with a desert pavement of rock fragments and pan fragments. The surface layer is light brown gravelly fine sandy loam about 5 inches thick. The underlying material to a depth of 15 inches is light brown gravelly fine sandy loam. The next layer to a depth of 60 inches or more is an indurated, lime-cemented hardpan. Depth to the hardpan ranges from 4 to 20 inches.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 5 percent Caliza soils on side slopes of erosional fan remnants. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Cave soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is moderate, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to the indurated hardpan. Roads should be designed to minimize cuts. Cutting and filling can be reduced by building roads in the less sloping areas.

This map unit is in capability subclass VIIs, nonirrigated and in horticultural group 6.

160—Destazo cobbly fine sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on relict alluvial flats. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, about 60 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is pink cobbly fine sandy loam about 11 inches thick. The upper 29 inches of the underlying material is light brown very gravelly sandy clay loam, and the lower part to a depth of 60 inches or more is pinkish white gravelly sandy loam containing some crystalline gypsum.

Included in this unit are about 5 percent Bracken very cobbly fine sandy loam, 2 to 8 percent slopes, on side slopes of slightly higher remnants of relict alluvial flats and 10 percent Las Vegas soils on summits of slightly higher remnants of alluvial flats. Included areas make up about 15 percent of the total acreage.

Permeability of this Destazo soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

This unit is well suited to the construction of dwellings.

The main limitation for septic tank absorption fields is restricted permeability. The operation of septic tank

of 43 inches is stratified, light brown very cobbly sandy loam, brown very gravelly sandy loam, and brown extremely gravelly sandy loam, averaging extremely gravelly sandy loam. Bedrock is at a depth of about 43 inches. Depth to bedrock ranges from 40 to 60 inches or more.

Permeability of the Canutio soil is moderately rapid above the bedrock. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

The Akela soil is shallow and well drained. It formed in residuum derived dominantly from basalt and andesite. Typically, about 92 percent of the surface is covered with a desert pavement of pebbles, cobbles, and stones. The surface layer is pale brown very cobbly fine sandy loam about 3 inches thick. The underlying material to a depth of 11 inches is light brown very gravelly fine sandy loam. Basalt is at a depth of about 11 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Akela soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to bedrock in the Akela soil. Roads should be designed to minimize cuts because of the limited depth to bedrock. Heavy equipment is needed for excavation.

This map unit is in capability subclass VIIs, nonirrigated. The Canutio soil is in horticultural group 1, and the Akela soil is in horticultural group 6.

501—Canutio gravelly fine sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on inset fans. It formed in mixed alluvium derived dominantly from limestone, quartzite, and sandstone.

Typically, about 60 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is light brown gravelly fine sandy loam about 11 inches thick. The underlying material to a depth of 60 inches or more is light brown, stratified very gravelly sandy loam to very gravelly loam.

Included in this unit are about 5 percent Cave soils on erosional fan remnants and 5 percent Arizo soils, flooded, in channels. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Canutio soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

This unit is well suited to the construction of dwellings.

Unless the density of housing is too high, septic tank absorption fields normally function well on this unit.

Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are the desert pavement and the low available water capacity. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. Because the soil is droughty, applications of irrigation water should be light and frequent.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. During major floods, plugging of the drains is likely to result in accelerated erosion and possible damage to roads, homesites, and structures.

This map unit is in capability subclasses IIIs, irrigated, and VIIc, nonirrigated. It is in horticultural group 1.

502—Canutio-Cave gravelly fine sandy loams, 2 to 8 percent slopes. This map unit is on inset fans.

This unit is 55 percent Canutio gravelly fine sandy loam, 2 to 8 percent slopes, and 40 percent Cave gravelly fine sandy loam, 2 to 8 percent slopes. The Canutio soil is on inset fans, and the Cave soil is on nonburied fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Arizo soils, flooded, in channels. The percentage varies from one area to another.

The Canutio soil is very deep and well drained. It formed in mixed alluvium derived dominantly from limestone, quartzite, and sandstone. Typically, about 35 percent of the surface is covered with pebbles and 5 percent is covered with cobbles. The surface layer is light brown gravelly fine sandy loam about 9 inches thick. The underlying material to a depth of 60 inches or more is light brown, stratified very gravelly sandy loam to very gravelly loam.

Permeability of the Canutio soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

The Cave soil is shallow and well drained. It formed in mixed alluvium derived dominantly from limestone, quartzite, and sandstone. Typically, about 30 percent of the surface is covered with pebbles and 5 percent is covered with cobbles. The surface layer is pale brown gravelly fine sandy loam about 16 inches thick. The upper 14 inches of the underlying material is an indurated, lime-cemented hardpan, and the lower part to a depth of 60 inches or more is light brown very gravelly sandy loam. Depth to the hardpan ranges from 4 to 20 inches.

Permeability of the Cave soil is moderate to the hardpan. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the shallow depth to the hardpan in areas of the Cave soil. Excavation for building sites is limited by the hardpan.

The main limitation for septic tank absorption fields is the shallow depth to the hardpan in areas of the Cave soil. Excavation is limited by the hardpan. Special design of septic tank absorption fields is needed.

The Cave soil is limited for roads because of the shallow depth to the hardpan. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

The main limitation for lawns and landscaping is the shallow depth to the hardpan in areas of the Cave soil. The Cave soil is also moderately limited by the desert pavement and the low available water capacity of the Canutio soil. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. Because the soils are droughty, applications of irrigation water should be light and frequent. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated. The Canutio soil is in horticultural group 1, and the Cave soil is in horticultural group 6.

505—Canutio-Akela complex, 15 to 50 percent slopes. This map unit is on hills.

This unit is 50 percent Canutio very cobbly sandy loam, 15 to 30 percent slopes, and 40 percent Akela very cobbly fine sandy loam, 15 to 50 percent slopes. The Canutio soil is on foot slopes, and the Akela soil is on upper back slopes and shoulders. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Bracken soils, 4 to 15 percent slopes, on pediment remnants and 5 percent Rock outcrop on side slopes and ridges. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Canutio soil is deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, 50 percent of the surface is covered with pebbles and 25 percent is covered with cobbles. The surface layer is light brown very cobbly sandy loam about 10 inches thick. The underlying material to a depth of 43 inches is brown very gravelly sandy loam and extremely gravelly sandy loam, averaging extremely gravelly sandy loam. Bedrock is at a depth of about 43 inches. Depth to bedrock ranges from 40 to 60 inches or more.

Permeability of the Canutio soil is moderately rapid above the bedrock. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Akela soil is shallow and well drained. It formed in residuum derived dominantly from basalt and andesite. Typically, about 92 percent of the surface is covered with a desert pavement of pebbles, cobbles, and stones. The surface layer is pale brown very cobbly fine sandy loam about 3 inches thick. The underlying material to a depth of 11 inches is light brown very gravelly fine sandy loam. Basalt is at a depth of about 11 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Akela soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the steepness of slope and the limited depth to bedrock in areas of the Akela soil. Roads should be designed to minimize cuts because of the limited depth to the bedrock. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This map unit is in capability subclass VIIs, nonirrigated. The Canutio soil is in horticultural group 1, and the Akela soil is in horticultural group 6.

510—Akela-Rock outcrop complex, 15 to 50 percent slopes. This map unit is on mountains.

This unit is 55 percent Akela very cobbly fine sandy loam, 15 to 50 percent slopes, and 35 percent Rock outcrop. The Akela soil is on side slopes, and Rock outcrop is exposed on ridges and side slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Canutio soils, 8 to 30 percent slopes, on side slopes. The percentage

TABLE 15.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare" and "occasional" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
105*:											
McCullough	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
Bluepoint	A	None	---	>6.0	---	>60	---	---	---	High	Low.
107-- Arizo	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
112-- Arizo	A	Occasional	Mar-Sep	>6.0	---	>60	---	---	---	High	Low.
113-- Arizo	A	Rare	---	>6.0	---	>60	---	---	---	High	High.
117-- Arizo	A	None	---	>6.0	---	>60	---	---	---	High	Low.
120-- Bluepoint	A	Rare	---	4.0-6.0	Jun-Sep	>60	---	---	---	High	Moderate.
127, 128, 129-- Bluepoint	A	None	---	>6.0	---	>60	---	---	---	High	Low.
130*:											
Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
Destazo	B	None	---	>6.0	---	>60	---	---	---	High	High.
132-- Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
133*:											
Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
Rock outcrop.											
134-- Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
140-- Casaga	C	None	---	>6.0	---	>60	---	---	---	High	High.
150-- Cave	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
151-- Cave	D	None	---	>6.0	---	>60	---	10-20	Thick	High	Low.
152, 155-- Cave	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
160-- Destazo	B	None	---	>6.0	---	>60	---	---	---	High	High.
181*:											
Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Pittman	C	None	---	>6.0	---	>60	---	20-30	Thick	High	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
419*:											
Aztec	B	None	---	>6.0	---	>60	---	---	---	High	High.
Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
430 Knob Hill	B	None	---	>6.0	---	>60	---	---	---	High	Low.
440 Nickel	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
450 Cave Variant	D	None	---	>6.0	---	>60	---	5-18	Thick	High	High.
481, 484 Hobog	D	None	---	>6.0	---	8-20	Hard	---	---	High	Low.
500*											
Canutio	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
501 Canutio	B	None	---	>6.0	---	>60	---	---	---	High	Low.
502*:											
Canutio	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Cave	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
505*											
Canutio	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
510*:											
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
Rock outcrop.											
540 Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
542*:											
Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Aztec	B	None	---	>6.0	---	>60	---	---	---	High	High.
545*:											
Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Goodsprings	D	None	---	>6.0	---	>60	---	9-20	Thick	High	Low.
600*. Slickens											
605*. Dumps											
610*. Pits											
615*. Urban land											
630*. Badlands											
635*, 640*. Rock outcrop											
645*. Pits											

* See description of the map unit for composition and behavior characteristics of the map unit.

Standard Form 4 Lag Time

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION & LAG TIME

Project Name: Catalina
Description: TDS
File Name: SF4 - Catalina - TDS.xls
By: SMJ
Date: 4/24/2012

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
ID:	DEV./EX. (D or E)	CN	K [1]	AREA Ac	AREA Mi^2 [2]	INITIAL LENGTH Feet	SLOPE %	Ti Min [3]	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY FPS [4]	V2 VELOCITY FPS [5]	Tt Min [6]	Tc Calc. [7]	Total Length Feet [8]	Tc Check [9]	Tlag Hours [10]
DEV1	D	91.0	0.811	16.5	0.0258	110	1.0	5.45	1645	3.0	3.50	5.30	5.98	11.43	1755	19.750	0.114
INT1	D	91.8	0.822	16.5	0.0258	110	1.0	5.25	1645	3.0	3.50	5.30	5.98	11.24	1755	19.750	0.112

[1] K = 0.0132 (CN) - 0.39
[2] A = Area/640
[3] Ti = (1.8 (1.1-K) L^0.5)/S^0.33
[4] For Existing Conditions: V1 = 14.8 * (S/100)^0.5
For Developed Conditions: V1 = 20.2 * (S/100)^0.5
[5] For Existing Conditions: V2 = 29.4 * (S/100)^0.5
For Developed Conditions: V2 = 30.6 * (S/100)^0.5
[6] Tt = L/(60*V)
[7] Tc = Ti + Tt
[8] Total L = Initial L + Travel L
[9] Tc = (L/180) + 10
[10] Tlag = (0.6*Tc)/60
[11] Min Tlag =0.05

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

REFERENCE :

STANDARD FORM 4

APPENDIX C

HEC-1 Analysis

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   30APR12  TIME  13:23:51   *
*                                       *
*****************************************
```

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

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

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

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

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
                *DIAGRAM
  1             ID     SLATER HANIFAN GROUP
  2             ID     CATALINA
  3             ID     SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
  4             ID     BY LENNAR HOMES
  5             ID     TECHNICAL DRAINAGE STUDY
  6             ID     PROPOSED & INTERIM DRAINAGE CONDITIONS
  7             ID
  8             ID     RETURN PERIOD ------- 100-YEAR & 10-YEAR
  9             ID     DISTRIBUTION -------- 6-HOUR SDN3
 10             ID     PROJECT NO. --------- LEN1201.000
 11             ID     FILENAME ------------ Catalina.H1
 12             ID     DATE ---------------- 04/30/2012
 13             ID     MODELED BY ---------- SMJ
 14             ID
 15             ID        STORM EVENT RETURN PERIODS
 16             ID        PRECIPITATION DEPTHS INCHES)
 17             ID        100-YEAR = 3.29
 18             ID         10-YEAR = 1.86
 19             ID
 20             ID        PRECIPITATION DEPTH RATIOS
 21             ID        STORM EVENT     RATIO
 22             ID         100-YR          1.00
 23             ID          10-YR          0.57
 24             ID
 25             IT      5       0       0     300
 26             IO      5       0       0
 27             IN      5       0       0
 28             JR    PREC    1.00    0.57
                *

 29             KK    DEV1
 30             KM    PROPOSED CONDITION OF SITE
 31             KM    PHASES 1 & 2 COMPLETE AS SINGEL-FAMILY RESIDENTIAL DEVELOPMENT
 32             PB     3.29
 33             PC        0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
 34             PC    0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
 35             PC    0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
 36             PC    0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
 37             PC    0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
 38             PC    0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
 39             PC    0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
 40             PC    0.998   0.999   1.000
 41             BF        2
 42             BA   0.0258
 43             LS        0    91.0
 44             UD    0.114
                *

 45             KK     INT1
 46             KM    INTERIM CONDITION OF SITE
 47             KM    PHASE 1 COMPLETE AS SINGLE-FAMILY RESIDENTIAL DEVELOPMENT
 48             KM    PHASE 2 COMPLETE AS ROUGH GRADE
 49             BF        2
 50             BA   0.0258
```

1 HEC-1 INPUT PAGE 2

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
 51             LS        0    91.8
 52             UD    0.112
                *
 53             ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    29        DEV1
              .
              .
    45        .        INT1
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION


```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   30APR12  TIME  13:23:51   *
*                                       *
*****************************************
```

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


SLATER HANIFAN GROUP
CATALINA
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
BY LENNAR HOMES
TECHNICAL DRAINAGE STUDY
PROPOSED & INTERIM DRAINAGE CONDITIONS

RETURN PERIOD ------- 100-YEAR & 10-YEAR
DISTRIBUTION -------- 6-HOUR SDN3

```
                    PROJECT NO. --------- LEN1201.000
                    FILENAME ------------ Catalina.H1
                    DATE ---------------- 04/30/2012
                    MODELED BY ---------- SMJ

                       STORM EVENT RETURN PERIODS
                       PRECIPITATION DEPTHS INCHES)
                       100-YEAR = 3.29
                        10-YEAR = 1.86

                       PRECIPITATION DEPTH RATIOS
                       STORM EVENT     RATIO
                       100-YR           1.00
                        10-YR           0.57


  26 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

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

                   COMPUTATION INTERVAL      .08 HOURS
                        TOTAL TIME BASE    24.92 HOURS

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

     JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                   1.00      .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

                                                                  RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN            RATIO 1  RATIO 2
                                                       1.00      .57

 HYDROGRAPH AT
+                  DEV1       .03     1   FLOW          52.      26.
                                           TIME        3.50     3.58

 HYDROGRAPH AT
+                  INT1       .03     1   FLOW          53.      27.
                                           TIME        3.50     3.58


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

APPENDIX D

Flowmaster Street Flow Hydraulic Computations

Section A
Worksheet for Irregular Channel

Project Description	
Worksheet	Section A - Onsite Full Street Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	5.00	%
Discharge	8.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	0.28	ft
Elevation Range	0.00 to 0.47	
Flow Area	1.8	ft²
Wetted Perimeter	18.78	ft
Top Width	18.57	ft
Actual Depth	0.28	ft
Critical Elevation	0.37	ft
Critical Slope	0.73	%
Velocity	4.39	ft/s
Velocity Head	0.30	ft
Specific Energy	0.58	ft
Froude Number	2.47	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.0	0+39.0	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.0	0.38
0+00.4	0.38
0+01.5	0.00
0+02.5	0.08
0+02.5	0.13
0+19.5	0.47
0+36.5	0.13
0+36.5	0.08
0+37.5	0.00
0+38.6	0.38
0+39.0	0.38

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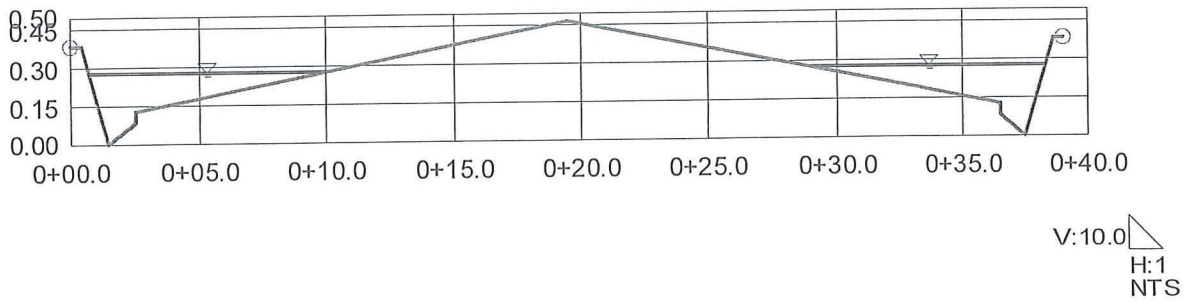
Section A
Worksheet for Irregular Channel

Notes: Q = Subbasin A

Section A
Cross Section for Irregular Channel

Project Description	
Worksheet	Section A - Onsite Full Street Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	5.00 %
Water Surface Elevation	0.28 ft
Elevation Range	0.00 to 0.47
Discharge	8.00 cfs



Section B1
Worksheet for Irregular Channel

Project Description	
Worksheet	Section B1 - Onsite Full Street Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	2.00 %
Discharge	29.00 cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results	
Mannings Coefficient	0.016
Water Surface Elevation	0.46 ft
Elevation Range	0.00 to 0.47
Flow Area	6.9 ft²
Wetted Perimeter	38.33 ft
Top Width	37.93 ft
Actual Depth	0.46 ft
Critical Elevation	0.54 ft
Critical Slope	0.60 %
Velocity	4.19 ft/s
Velocity Head	0.27 ft
Specific Energy	0.73 ft
Froude Number	1.73
Flow Type	Supercritical

Calculation Messages:
Water elevation exceeds lowest end station by 0.79265176e-1 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.0	0+39.0	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.0	0.38
0+00.4	0.38
0+01.5	0.00
0+02.5	0.08
0+02.5	0.13
0+19.5	0.47
0+36.5	0.13
0+36.5	0.08
0+37.5	0.00
0+38.6	0.38

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Section B1
Worksheet for Irregular Channel

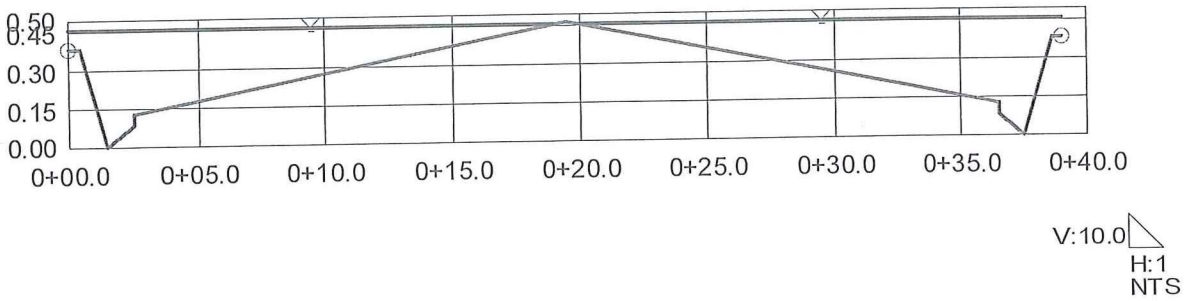
Natural Channel Points	
Station (ft)	Elevation (ft)
0+39.0	0.38

Notes: Q = Subbasin B

Section B1
Cross Section for Irregular Channel

Project Description	
Worksheet	Section B1 - Onsite Full Street Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	2.00 %
Water Surface Elevation	0.46 ft
Elevation Range	0.00 to 0.47
Discharge	29.00 cfs



Section B2
Worksheet for Irregular Channel

Project Description	
Worksheet	Section B2 - Onsite Full Street Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.74	%
Discharge	45.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	0.53	ft
Elevation Range	0.00 to 0.47	
Flow Area	9.5	ft²
Wetted Perimeter	39.53	ft
Top Width	39.00	ft
Actual Depth	0.53	ft
Critical Elevation	0.63	ft
Critical Slope	0.55	%
Velocity	4.74	ft/s
Velocity Head	0.35	ft
Specific Energy	0.87	ft
Froude Number	1.69	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.14574541 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.0	0+39.0	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.0	0.38
0+00.4	0.38
0+01.5	0.00
0+02.5	0.08
0+02.5	0.13
0+19.5	0.47
0+36.5	0.13
0+36.5	0.08
0+37.5	0.00
0+38.6	0.38
0+39.0	0.38

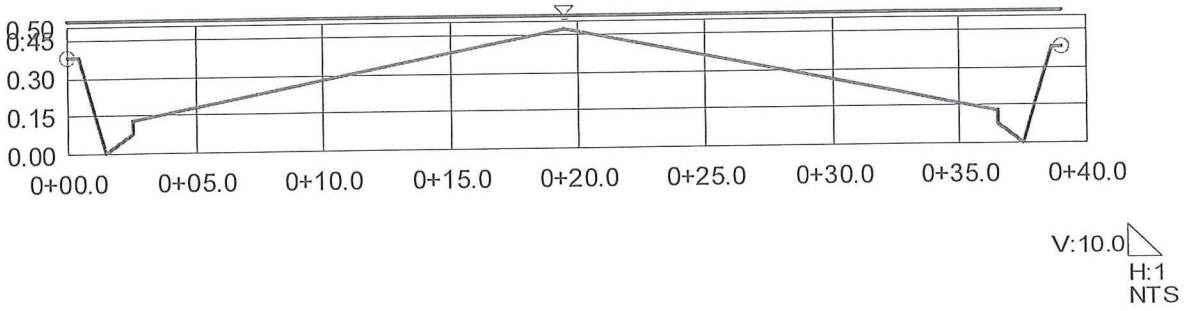
Section B2
Worksheet for Irregular Channel

Notes: Q = Subbasin B + C

Section B2
Cross Section for Irregular Channel

Project Description	
Worksheet	Section B2 - Onsite Full Street Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	1.74 %
Water Surface Elevation	0.53 ft
Elevation Range	0.00 to 0.47
Discharge	45.00 cfs



Section C
Worksheet for Irregular Channel

Project Description	
Worksheet	Section C - Onsite Full Street Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	3.20	%
Discharge	17.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	0.37	ft
Elevation Range	0.00 to 0.47	
Flow Area	3.8	ft²
Wetted Perimeter	28.04	ft
Top Width	27.80	ft
Actual Depth	0.37	ft
Critical Elevation	0.46	ft
Critical Slope	0.67	%
Velocity	4.42	ft/s
Velocity Head	0.30	ft
Specific Energy	0.67	ft
Froude Number	2.09	
Flow Type	Supercritical	

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.0	0+39.0	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.0	0.38
0+00.4	0.38
0+01.5	0.00
0+02.5	0.08
0+02.5	0.13
0+19.5	0.47
0+36.5	0.13
0+36.5	0.08
0+37.5	0.00
0+38.6	0.38
0+39.0	0.38

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Section C
Worksheet for Irregular Channel

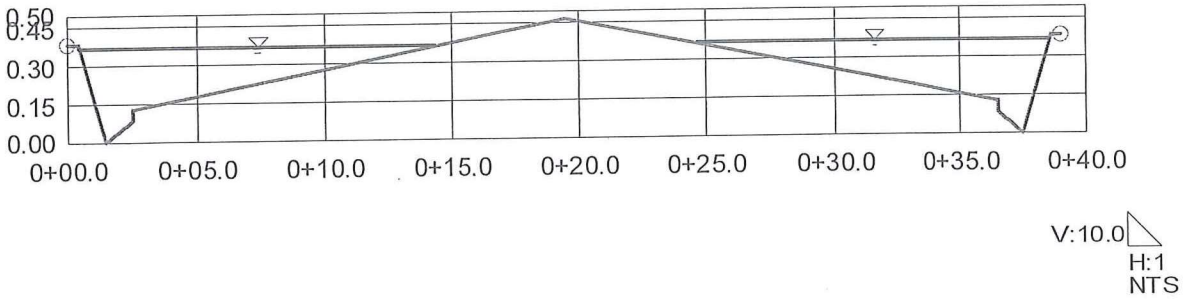
Notes: Q = Subbasin C

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Section C
Cross Section for Irregular Channel

Project Description	
Worksheet	Section C - Onsite Full Street Section
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	3.20	%
Water Surface Elevation	0.37	ft
Elevation Range	0.00 to 0.47	
Discharge	17.00	cfs



APPENDIX E

Drainage Facility Hydraulic Design

Proposed Drop Inlets

Project:	CATALINA
Title:	Type CM2 Drop Inlet (SUMP)
Subtitle:	22.5-ft Drop Inlet @ Capistrano
By:	SMJ
Date:	4/25/2012

Input:	Variable:	Input:
Depth at Inlet (ft)	D	0.67
Grate Width (ft)	W	1.50
Length of Grate (ft)	L_g	22.50
Length of Curb Opening (ft)	L_c	22.50
Height of Curb Opening (ft)	H	0.547
Weir Coef. - Curb Opening	W_c	2.3
Weir Coef. - Grate	W_g	3.0
Orifice Coef.	O_c	0.67
Grate Coef.	G_c	0.60
Clogging Factor - Grate (%)	CF_g	50
Clogging Factor - Curb (%)	CF_c	50
Output (Grate):	**Equation:**	**Output (Grate):**
Effective Weir Length (ft)	$2*W+L_g$	25.50
Adjusted Effective Weir Length (ft)	$2*(1-CF_g/100)*W+(1-CF_g/100)*L_g$	12.75
Grate Open Area (sf)	$W*L_g$	33.75
Adjusted Grate Open Area (sf)	Grate Open Area * $G_c*(1-CF_g/100)$	10.13
Controlling Flow Type (weir/orifice)	If D<1.792*(Adj. Grate Open Area/Adj. Eff. Length) use weir, else orifice	weir
Intercepted Flow (cfs)	weir: $W_g*(\text{Adj. Eff. Weir Length})*D^{1.5}$	21.0
	orifice: $O_c*(\text{Adj. Grate Open Area})*(64.4*D)^{0.5}$	
Output (Curb):	**Equation:**	**Output (Curb):**
Effective Weir Length (ft)	L+1.8*W	25.20
Adjusted Effective Weir Length (ft)	$L+1.8(1-CF_c/100)*W$	23.91
Curb Open Area (sf)	L*H	12.31
Adjusted Curb Open Area (sf)	Curb Open Area * $(1-CF_c/100)$	6.15
Controlling Flow Type (weir/orifice)	If D<H, weir, else orifice	orifice
Intercepted Flow (cfs)	weir: $W_c*(\text{Adj. Eff. Weir Length})*D^{1.5}$	27.00
	orifice: $O_c*(\text{Adj. Curb Open Area})*(64.4*(D-H/2))^{0.5}$	
Output (Combination):		**Output (Combination):**
Total Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	**48.0**

$Q_{COLLECTED} = 45$ CFS

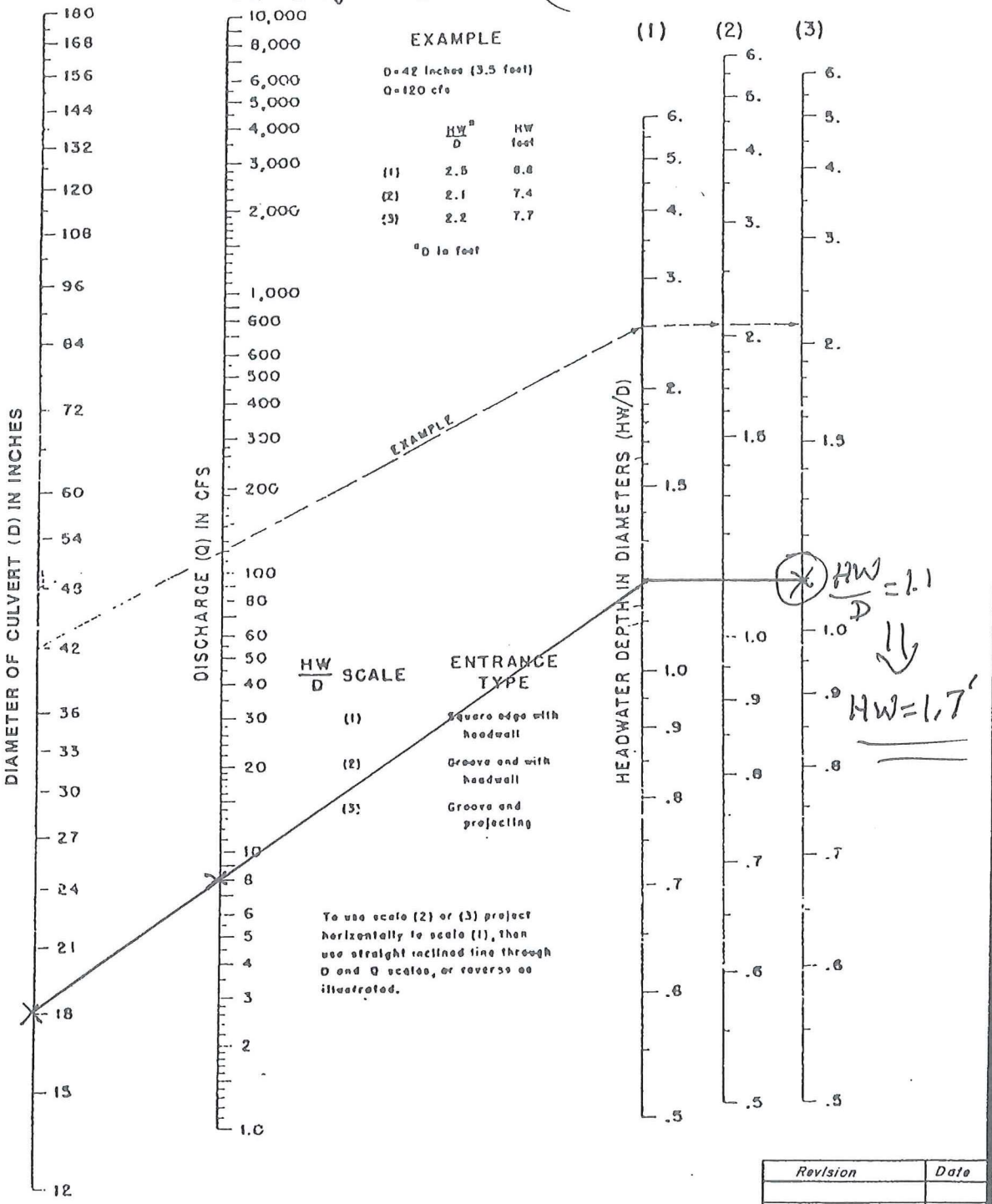
Project:	CATALINA
Title:	Type CM2 Drop Inlet (SUMP)
Subtitle:	5-ft Drop Inlet @ Altimira
By:	SMJ
Date:	4/25/2012

Input:	Variable:	Input:
Depth at Inlet (ft)	D	0.67
Grate Width (ft)	W	1.50
Length of Grate (ft)	L_g	5.00
Length of Curb Opening (ft)	L_c	5.00
Height of Curb Opening (ft)	H	0.547
Weir Coef. - Curb Opening	W_c	2.3
Weir Coef. - Grate	W_g	3.0
Orifice Coef.	O_c	0.67
Grate Coef.	G_c	0.60
Clogging Factor - Grate (%)	CF_g	50
Clogging Factor - Curb (%)	CF_c	50
Output (Grate):	**Equation:**	**Output (Grate):**
Effective Weir Length (ft)	$2*W+L_g$	8.00
Adjusted Effective Weir Length (ft)	$2*(1-CF_g/100)*W+(1-CF_g/100)*L_g$	4.00
Grate Open Area (sf)	$W*L_g$	7.50
Adjusted Grate Open Area (sf)	Grate Open Area * $G_c*(1-CF_g/100)$	2.25
Controlling Flow Type (weir/orifice)	If D<1.792*(Adj. Grate Open Area/Adj. Eff. Length) use weir, else orifice	weir
Intercepted Flow (cfs)	weir: $W_g*(\text{Adj. Eff. Weir Length})*D^{1.5}$	6.6
	orifice: $O_c*(\text{Adj. Grate Open Area})*(64.4*D)^{0.5}$	
Output (Curb):	**Equation:**	**Output (Curb):**
Effective Weir Length (ft)	$L+1.8*W$	7.70
Adjusted Effective Weir Length (ft)	$L+1.8(1-CF_c/100)*W$	6.41
Curb Open Area (sf)	$L*H$	2.74
Adjusted Curb Open Area (sf)	Curb Open Area * $(1-CF_c/100)$	1.37
Controlling Flow Type (weir/orifice)	If D<H, weir, else orifice	orifice
Intercepted Flow (cfs)	weir: $W_c*(\text{Adj. Eff. Weir Length})*D^{1.5}$	6.00
	orifice: $O_c*(\text{Adj. Curb Open Area})*(64.4*(D-H/2))^{0.5}$	
Output (Combination):		**Output (Combination):**
Total Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	**12.6**

$Q_{COLLECTED} = 8$ CFS

NOMOGRAPH – INLET CONTROL RCP

$Q_{DESIGN} = 8$ CFS (ALTIMIRA)



Revision	Date

WRC ENGINEERING

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

FIGURE 1005

Emergency Overflow

39-ft Drainage Easement Overflow
Worksheet for Generic Weir

Project Description	
Worksheet	Emergency Overflow
Type	Generic Weir
Solve For	Headwater Elevation

Input Data		
Discharge	53.00	cfs
Crest Elevation	3,354.16	ft
Discharge Coefficient	3.00	US
Crest Length	39.00	ft

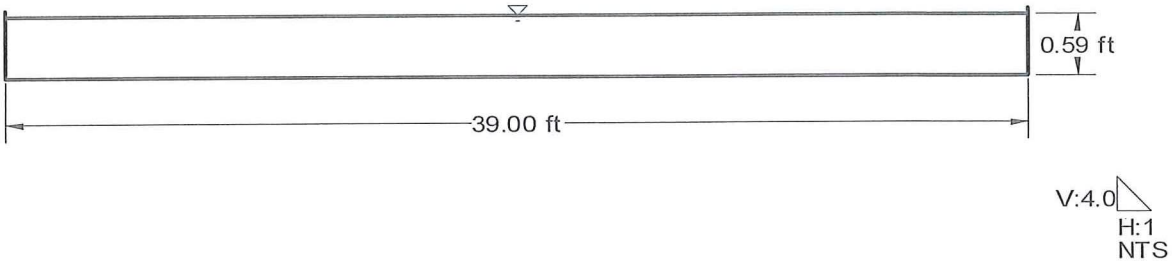
Results		
Headwater Elevation	3,354.75	ft
Headwater Height Above Crest	0.59	ft
Flow Area	23.0	ft²
Velocity	2.30	ft/s
Wetted Perimeter	40.18	ft
Top Width	39.00	ft

Notes: Adjacent Finished Floor Min. Elevation = 3354.8-ft
Lot 18 OK.

39-ft Drainage Easement Overflow
Cross Section for Generic Weir

Project Description	
Worksheet	Emergency Overflow
Type	Generic Weir
Solve For	Headwater Elevation

Section Data		
Discharge	53.00	cfs
Headwater Elevation	3,354.75	ft
Crest Elevation	3,354.16	ft
Discharge Coefficient	3.00	US
Crest Length	39.00	ft



Fox Hill Storm Drain WSPG Re-Analysis

Storm Drain Hydraulic Summary							
Existing Fox Hill Storm Drain - Revised Flows							
WSPG Station	Unit?	Fox Hill Station	Storm Drain Size (in.)	Q_{100} (cfs)	HGL (ft)	FG (ft)	Previous HGL (ft)
1000.00	1	100+30.43	72	469	105.7	111.1	105.7
1064.86	1	100+76.29	72	469	107.4	113.3	105.1
1244.41	1	102+56.12	72	469	109.8	116.7	107.3
1244.41	1	102+56.12	72	401	112.1	116.7	110.8
1629.90	1	106+47.33	72	401	116.0	120.5	113.9
1629.90	1	106+47.33	66	351	116.5	120.5	115.1
2406.05	1	114+25.00	66	351	125.4	127.1	122.6
2406.05	1	114+25.00	60	336	124.5	127.1	122.1
2500.02	1	115+17.25	60	336	126.6	128.0	124.0
2660.12	1	116+74.98	60	336	129.5	132.2	126.3
2660.12	1	116+74.98	60	298	131.4	132.2	130.6
2995.29	1	120+09.65	60	298	136.2	142.3	134.4
2995.29	1	120+09.65	60	279	137.1	142.3	135.8
3663.63	1	126+77.01	60	279	151.2	162.4	153.1
3663.63	1	126+77.01	54	230	151.0	162.4	155.2
3711.69	1	127+25.00	54	230	154.0	164.1	155.9
3711.69	1	127+25.00	54	215	153.7	164.1	157.1
4388.88	1	134+01.20	54	215	188.0	199.2	189.9
4492.13	1	135+04.08	54	215	190.4	202.2	192.0
4492.13	1	135+04.08	54	205	190.1	202.2	194.0
4581.72	1	135+57.62	54	205	193.2	203.0	195.5
4661.39	1	136+25.17	54	205	196.1	204.7	199.2
4748.08	1	136+99.47	54	205	199.2	205.6	200.9
4818.60	1	137+81.33	54	205	202.5	207.5	202.8
4818.60	1	137+81.33	54	146	205.4	207.5	205.9
4987.45	1	139+50.00	54	146	205.4	215.2	208.2
5253.40	1	142+15.95	54	146	218.5	227.1	221.2
5253.40	1	142+15.95	42	138	219.2	227.1	220.7
5772.91	2	147+35.46	42	138	245.3	253.1	245.4
5772.91	2	147+35.46	42	93	248.9	253.1	249.2
6027.45	2	149+90.00	42	93	254.2	264.6	255.7
6129.95	2	150+91.05	42	93	256.9	267.1	258.1
6181.17	2	151+24.85	42	93	258.7	267.9	260.2

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T1 ESPERANZA BY LENNAR HOMES, TECHNICAL DRAINAGE STUDY
T2 SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
T3 RE-ANALYSIS OF VILLAGE 23A UNIT 1 & 2 STORM DRAIN TO PROPOSED CONNECTIONS
SO   1000.00  97.12 72                              105.71                          45.   1
R    1064.86  98.26 72       .013                                                          1
R    1244.41 101.42 72       .013                                                  45.   1
JX   1244.41 101.42 72 42 24.013    60.      8.  103.92 105.42 90.   80.
R    1629.90 105.27 72       .013                                          18.           1
JX   1629.90 105.77 66 42 24.013    46.      4.  107.77 109.27 90.   45.
R    2406.05 113.53 66       .013                                                          2
JX   2406.05 114.03 60 24 24.013     8.      7.  117.03 117.03 80.   70.
R    2500.02 115.07 60       .013                                                  15.   1
R    2660.12 117.90 60       .013                                                        1
JX   2660.12 117.90 60 42   .013    38.          119.30         90.
R    2995.29 128.70 60       .013                                          10.           1
JX   2995.29 128.70 60 24 24.013     9.5     9.5 131.10 131.60 80.   80.
R    3663.63 148.06 60       .013                                          20.           2
JX   3663.63 148.56 54 42   .013    49.          149.56         90.
R    3711.69 151.52 54       .013                                                        1
JX   3711.69 151.52 54 24 24.013     7.5     7.5 153.92 153.92 80.   80.
R    4388.88 185.18 54       .013                                          20.           2
R    4492.13 187.60 54       .013                                                  75.   1
JX   4492.13 187.60 54 24   .013    10.          190.00         90.
R    4581.72 190.64 54       .013                                                  90.   1
R    4661.39 193.38 54       .013                                                  15.   1
R    4748.08 196.18 54       .013                                                        1
R    4818.60 198.40 54       .013                                                        1
JX   4818.60 198.40 54 48   .013    59.          198.90         90.
R    4987.45 203.55 54       .013                                                        1
R    5253.40 216.68 54       .013                                          10.           1
JX   5253.40 217.18 42 42 24.013     4.      4.  217.18 218.68 90.   90.
R    5772.91 241.98 42       .013                                          20.           3
JX   5772.91 241.98 42 36   .013    45.          242.48         90.
R    6027.45 252.17 42       .013                                          10.           1
R    6129.95 254.58 42       .013                                                  15.   1
R    6181.17 255.74 42       .013                                                  15.   1
SH   6181.17 255.74 42
CD  18  4              1.5
CD  24  4              2.
CD  30  4              2.5
CD  36  4              3.
CD  42  4              3.5
CD  48  4              4.
CD  54  4              4.5
CD  60  4              5.
CD  66  4              5.5
CD  72  4              6.
CD  78  4              6.5
CD  90  4              7.5
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93.

DATE: 5/10/2012
TIME: 16:36

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														
CD	36	4			3.00														
CD	42	4			3.50														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														
CD	66	4			5.50														
CD	72	4			6.00														
CD	78	4			6.50														
CD	90	4			7.50														

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

ESPERANZA BY LENNAR HOMES, TECHNICAL DRAINAGE STUDY

HEADING LINE NO 2 IS -

SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N

HEADING LINE NO 3 IS -

RE-ANALYSIS OF VILLAGE 23A UNIT 1 & 2 STORM DRAIN TO PROPOSED CONNECTIONS

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1000.00	97.12	72	105.71

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1064.86	98.26	72	0.013	0.00	0.00	45.00	1

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1244.41	101.42	72	0.013	0.00	0.00	0.00	1

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

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1244.41	101.42	72	42	24	0.013	60.0	8.0	103.92	105.42	90.00	80.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO	5 IS A REACH		*	*	*								RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	STATION	INVERT	SECT			N						0.00	18.00	0.00	1
		1629.90	105.27	72			0.013									
ELEMENT NO	6 IS A JUNCTION		*	*	*	*		*		*		*				
	U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4			
		1629.90	105.77	66	42	24	0.013	46.0	4.0	107.77	109.27	90.00	45.00			
ELEMENT NO	7 IS A REACH		*	*	*								RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	STATION	INVERT	SECT			N						0.00	0.00	0.00	2
		2406.05	113.53	66			0.013									
ELEMENT NO	8 IS A JUNCTION		*	*	*	*		*		*		*				
	U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4			
		2406.05	114.03	60	24	24	0.013	8.0	7.0	117.03	117.03	80.00	70.00			
ELEMENT NO	9 IS A REACH		*	*	*								RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	STATION	INVERT	SECT			N						0.00	0.00	15.00	1
		2500.02	115.07	60			0.013									
ELEMENT NO	10 IS A REACH		*	*	*								RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	STATION	INVERT	SECT			N						0.00	0.00	0.00	1
		2660.12	117.90	60			0.013									

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	11 IS A JUNCTION		*	*	*	*		*		*		*				
	U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4			
		2660.12	117.90	60	42	0	0.013	38.0	0.0	119.30	0.00	90.00	0.00			

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO	12 IS A REACH		*	*	*								RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	STATION	INVERT	SECT			N						0.00	10.00	0.00	1
		2995.29	128.70	60			0.013									
ELEMENT NO	13 IS A JUNCTION		*	*	*	*		*		*		*				
	U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4			
		2995.29	128.70	60	24	24	0.013	9.5	9.5	131.10	131.60	80.00	80.00			

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO	14 IS A REACH		*	*	*								RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	STATION	INVERT	SECT			N						0.00	20.00	0.00	2
		3663.63	148.06	60			0.013									
ELEMENT NO	15 IS A JUNCTION		*	*	*	*		*		*		*				
	U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4			
		3663.63	148.56	54	42	0	0.013	49.0	0.0	149.56	0.00	90.00	0.00			
ELEMENT NO	16 IS A REACH		*	*	*								RADIUS	ANGLE	ANG PT	MAN H
	U/S DATA	STATION	INVERT	SECT			N						0.00	0.00	0.00	1
		3711.69	151.52	54			0.013									
ELEMENT NO	17 IS A JUNCTION		*	*	*	*		*		*		*				

	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
U/S DATA	3711.69	151.52	54	24	24	0.013	7.5	7.5	153.92	153.92	80.00	80.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 18 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	4388.88	185.18	54	0.013	0.00	20.00	0.00	2♀

F 0 5 1 5 P PAGE NO 4

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 19 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	4492.13	187.60	54	0.013	0.00	0.00	75.00	1

ELEMENT NO 20 IS A JUNCTION

	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
U/S DATA	4492.13	187.60	54	24	0	0.013	10.0	0.0	190.00	0.00	90.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 21 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	4581.72	190.64	54	0.013	0.00	0.00	90.00	1

ELEMENT NO 22 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	4661.39	193.38	54	0.013	0.00	0.00	15.00	1

ELEMENT NO 23 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	4748.08	196.18	54	0.013	0.00	0.00	0.00	1

ELEMENT NO 24 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	4818.60	198.40	54	0.013	0.00	0.00	0.00	1

ELEMENT NO 25 IS A JUNCTION

	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
U/S DATA	4818.60	198.40	54	48	0	0.013	59.0	0.0	198.90	0.00	90.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 26 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	4987.45	203.55	54	0.013	0.00	0.00	0.00	1

ELEMENT NO 27 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	5253.40	216.68	54	0.013	0.00	10.00	0.00	1

ELEMENT NO 28 IS A JUNCTION

	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
U/S DATA	5253.40	217.18	42	42	24	0.013	4.0	4.0	217.18	218.68	90.00	90.00♀

F 0 5 1 5 P PAGE NO 5

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 29 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	5772.91	241.98	42	0.013	0.00	20.00	0.00	3

ELEMENT NO 30 IS A JUNCTION

	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
U/S DATA	5772.91	241.98	42	36	0	0.013	45.0	0.0	242.48	0.00	90.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 31 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	6027.45	252.17	42	0.013	0.00	10.00	0.00	1

ELEMENT NO 32 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	6129.95	254.58	42	0.013	0.00	0.00	15.00	1

ELEMENT NO 33 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	6181.17	255.74	42	0.013	0.00	0.00	15.00	1

ELEMENT NO 34 IS A SYSTEM HEADWORKS

	STATION	INVERT	SECT	W S ELEV
U/S DATA	6181.17	255.74	42	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC ♀

WATER SURFACE PROFILE LISTING
ESPERANZA BY LENNAR HOMES, TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
RE-ANALYSIS OF VILLAGE 23A UNIT 1 & 2 STORM DRAIN TO PROPOSED CONNECTIONS

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1000.00	97.12	8.590	105.710	469.0	16.59	4.273	109.983	0.00	5.592		6.00	0.00	0.00	0	0.00
64.86	0.01758					.012264	0.80			4.193			0.00		
1064.86	98.26	9.094	107.354	469.0	16.59	4.273	111.627	0.00	5.592		6.00	0.00	0.00	0	0.00
179.55	0.01760					.012264	2.20			4.190			0.00		
1244.41	101.42	8.349	109.769	469.0	16.59	4.273	114.042	0.00	5.592		6.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.010615	0.00						0.00		
1244.41	101.42	10.643	112.063	401.0	14.18	3.123	115.186	0.00	5.339		6.00	0.00	0.00	0	0.00
385.49	0.00999					.008965	3.46			4.656			0.00		

1629.90	105.27	10.685	115.955	401.0	14.18	3.123	119.078	0.00	5.339		6.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.009945	0.00						0.00		
1629.90	105.77	10.779	116.549	351.0	14.77	3.389	119.938	0.00	5.027		5.50	0.00	0.00	0	0.00
776.15	0.01000					.010925	8.48			4.772			0.00		
2406.05	113.53	11.838	125.368	351.0	14.77	3.389	128.757	0.00	5.027		5.50	0.00	0.00	0	0.00
JUNCT STR	0.00000					.013784	0.00						0.00		
2406.05	114.03	10.518	124.548	336.0	17.11	4.547	129.095	0.00	4.778		5.00	0.00	0.00	0	0.00
93.97	0.01107					.016644	1.56			5.000			0.00		
2500.02	115.07	11.494	126.564	336.0	17.11	4.547	131.111	0.00	4.778		5.00	0.00	0.00	0	0.00
160.10	0.01768					.016644	2.66			3.970			0.00		
2660.12	117.90	11.556	129.456	336.0	17.11	4.547	134.003	0.00	4.778		5.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.014868	0.00						0.00		
2660.12	117.90	13.497	131.397	298.0	15.18	3.577	134.974	0.00	4.662		5.00	0.00	0.00	0	0.00
335.17	0.03222					.013092	4.39			2.900			0.00		

WATER SURFACE PROFILE LISTING

ESPERANZA BY LENNAR HOMES, TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
RE-ANALYSIS OF VILLAGE 23A UNIT 1 & 2 STORM DRAIN TO PROPOSED CONNECTIONS

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
2995.29	128.70	7.502	136.202	298.0	15.18	3.577	139.779	0.00	4.662		5.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.012284	0.00						0.00		
2995.29	128.70	8.370	137.070	279.0	14.21	3.135	140.205	0.00	4.582		5.00	0.00	0.00	0	0.00
53.96	0.02897					.011476	0.62			2.877			0.00		
3049.25	130.26	7.494	137.757	279.0	14.21	3.135	140.892	0.00	4.582		5.00	0.00	0.00	0	0.00
HYDRAULIC JUMP													0.00		
3049.25	130.26	2.877	133.140	279.0	23.86	8.837	141.977	0.00	4.582		5.00	0.00	0.00	0	0.00
78.32	0.02897					.028957	2.27			2.877			0.00		
3127.57	132.53	2.877	135.409	279.0	23.86	8.837	144.246	0.00	4.582		5.00	0.00	0.00	0	0.00

407.74	0.02897					.027322	11.14			2.877			0.00		
3535.31	144.34	2.989	147.332	279.0	22.78	8.055	155.387	0.00	4.582		5.00	0.00	0.00	0	0.00
128.32	0.02897					.024221	3.11			2.877			0.00		
3663.63	148.06	3.112	151.172	279.0	21.72	7.322	158.494	0.00	4.582		5.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.033414	0.00						0.00		
3663.63	148.56	2.400	150.960	230.0	26.66	11.034	161.994	0.00	4.201		4.50	0.00	0.00	0	0.00
4.09	0.06159					.043863	0.18			2.173			0.00		
3667.72	148.81	2.407	151.219	230.0	26.56	10.956	162.175	0.00	4.201		4.50	0.00	0.00	0	0.00
43.97	0.06159					.041089	1.81			2.173			0.00		
3711.69	151.52	2.502	154.022	230.0	25.32	9.959	163.981	0.00	4.201		4.50	0.00	0.00	0	0.00
JUNCT STR	0.00000					.044134	0.00						0.00		
3711.69	151.52	2.224	153.744	215.0	27.44	11.693	165.437	0.00	4.127		4.50	0.00	0.00	0	0.00
59.02	0.04970					.049743	2.94			2.224			0.00		

WATER SURFACE PROFILE LISTING

ESPERANZA BY LENNAR HOMES, TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
RE-ANALYSIS OF VILLAGE 23A UNIT 1 & 2 STORM DRAIN TO PROPOSED CONNECTIONS

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
3770.71	154.45	2.224	156.678	215.0	27.44	11.693	168.371	0.00	4.127		4.50	0.00	0.00	0	0.00
334.10	0.04970					.047374	15.83			2.224			0.00		
4104.81	171.06	2.290	173.350	215.0	26.43	10.849	184.199	0.00	4.127		4.50	0.00	0.00	0	0.00
121.85	0.04970					.042334	5.16			2.224			0.00		
4226.66	177.12	2.378	179.495	215.0	25.20	9.863	189.358	0.00	4.127		4.50	0.00	0.00	0	0.00
64.92	0.04970					.037327	2.42			2.224			0.00		
4291.58	180.34	2.471	182.815	215.0	24.03	8.965	191.780	0.00	4.127		4.50	0.00	0.00	0	0.00
42.78	0.04970					.032947	1.41			2.224			0.00		
4334.36	182.47	2.569	185.039	215.0	22.91	8.149	193.188	0.00	4.127		4.50	0.00	0.00	0	0.00
30.98	0.04970					.029111	0.90			2.224			0.00		

4365.34	184.01	2.672	186.682	215.0	21.84	7.409	194.091	0.00	4.127		4.50	0.00	0.00	0	0.00
23.54	0.04970					.025757	0.61			2.224			0.00		
4388.88	185.18	2.782	187.962	215.0	20.83	6.736	194.698	0.00	4.127		4.50	0.00	0.00	0	0.00
103.25	0.02344					.024497	2.53			2.811			0.00		
4492.13	187.60	2.759	190.359	215.0	21.03	6.868	197.227	0.00	4.127		4.50	0.00	0.00	0	0.00
JUNCT STR	0.00000					.027444	0.00						0.00		
4492.13	187.60	2.515	190.115	205.0	22.43	7.810	197.925	0.00	4.069		4.50	0.00	0.00	0	0.00
89.59	0.03393					.028751	2.58			2.423			0.00		
4581.72	190.64	2.589	193.229	205.0	21.64	7.270	200.499	0.00	4.069		4.50	0.00	0.00	0	0.00
23.45	0.03439					.026904	0.63			2.413			0.00		
4605.17	191.45	2.620	194.067	205.0	21.33	7.062	201.129	0.00	4.069		4.50	0.00	0.00	0	0.00
56.22	0.03439					.024875	1.40			2.413			0.00		

WATER SURFACE PROFILE LISTING

ESPERANZA BY LENNAR HOMES, TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
RE-ANALYSIS OF VILLAGE 23A UNIT 1 & 2 STORM DRAIN TO PROPOSED CONNECTIONS

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
4661.39	193.38	2.727	196.107	205.0	20.33	6.420	202.527	0.00	4.069		4.50	0.00	0.00	0	0.00
17.65	0.03230					.022876	0.40			2.460			0.00		
4679.04	193.95	2.764	196.714	205.0	20.00	6.212	202.926	0.00	4.069		4.50	0.00	0.00	0	0.00
40.25	0.03230					.021125	0.85			2.460			0.00		
4719.29	195.25	2.879	198.129	205.0	19.07	5.648	203.777	0.00	4.069		4.50	0.00	0.00	0	0.00
28.79	0.03230					.018750	0.54			2.460			0.00		
4748.08	196.18	3.002	199.182	205.0	18.18	5.134	204.316	0.00	4.069		4.50	0.00	0.00	0	0.00
4.20	0.03148					.017475	0.07			2.480			0.00		
4752.28	196.31	3.023	199.335	205.0	18.04	5.054	204.389	0.00	4.069		4.50	0.00	0.00	0	0.00
21.59	0.03148					.016362	0.35			2.480			0.00		
4773.87	196.99	3.156	200.148	205.0	17.20	4.594	204.742	0.00	4.069		4.50	0.00	0.00	0	0.00

16.21	0.03148					.014603	0.24			2.480			0.00		
4790.08	197.50	3.300	200.802	205.0	16.40	4.176	204.978	0.00	4.069		4.50	0.00	0.00	0	0.00
12.16	0.03148					.013081	0.16			2.480			0.00		
4802.24	197.88	3.456	201.341	205.0	15.64	3.797	205.138	0.00	4.069		4.50	0.00	0.00	0	0.00
8.69	0.03148					.011781	0.10			2.480			0.00		
4810.93	198.16	3.630	201.788	205.0	14.91	3.452	205.240	0.00	4.069		4.50	0.00	0.00	0	0.00
5.57	0.03148					.010701	0.06			2.480			0.00		
4816.50	198.33	3.828	202.162	205.0	14.22	3.138	205.300	0.00	4.069		4.50	0.00	0.00	0	0.00
2.10	0.03148					.009874	0.02			2.480			0.00		
4818.60	198.40	4.069	202.469	205.0	13.55	2.852	205.321	0.00	4.069		4.50	0.00	0.00	0	0.00
JUNCT STR	0.00000					.007522	0.00						0.00		

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WATER SURFACE PROFILE LISTING

ESPERANZA BY LENNAR HOMES, TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
RE-ANALYSIS OF VILLAGE 23A UNIT 1 & 2 STORM DRAIN TO PROPOSED CONNECTIONS

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
4818.60	198.40	6.947	205.347	146.0	9.18	1.309	206.656	0.00	3.549		4.50	0.00	0.00	0	0.00
25.68	0.03050					.005512	0.14			2.048			0.00		
4844.28	199.18	6.316	205.499	146.0	9.18	1.309	206.808	0.00	3.549		4.50	0.00	0.00	0	0.00
HYDRAULIC JUMP													0.00		
4844.28	199.18	1.938	201.121	146.0	22.29	7.713	208.834	0.00	3.549		4.50	0.00	0.00	0	0.00
22.41	0.03050					.037613	0.84			2.048			0.00		
4866.69	199.87	1.924	201.791	146.0	22.48	7.849	209.640	0.00	3.549		4.50	0.00	0.00	0	0.00
70.36	0.03050					.040687	2.86			2.048			0.00		
4937.05	202.01	1.856	203.869	146.0	23.58	8.633	212.502	0.00	3.549		4.50	0.00	0.00	0	0.00
50.40	0.03050					.046350	2.34			2.048			0.00		
4987.45	203.55	1.792	205.342	146.0	24.73	9.496	214.838	0.00	3.549		4.50	0.00	0.00	0	0.00
265.95	0.04937					.046442	12.35			1.791			0.00		

5253.40	216.68	1.855	218.535	146.0	23.61	8.658	227.193	0.00	3.549		4.50	0.00	0.00	0	0.00
JUNCT STR	0.00000					.045444	0.00						0.00		
5253.40	217.18	2.015	219.195	138.0	24.06	8.991	228.186	0.00	3.346		3.50	0.00	0.00	0	0.00
217.02	0.04774					.045889	9.96			2.010			0.00		
5470.42	227.54	2.057	229.597	138.0	23.47	8.550	238.147	0.00	3.346		3.50	0.00	0.00	0	0.00
117.80	0.04774					.041851	4.93			2.010			0.00		
5588.22	233.16	2.141	235.305	138.0	22.37	7.773	243.078	0.00	3.346		3.50	0.00	0.00	0	0.00
57.98	0.04774					.037065	2.15			2.010			0.00		
5646.20	235.93	2.229	238.160	138.0	21.33	7.066	245.226	0.00	3.346		3.50	0.00	0.00	0	0.00
36.85	0.04774					.032883	1.21			2.010			0.00		

WATER SURFACE PROFILE LISTING

ESPERANZA BY LENNAR HOMES, TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
RE-ANALYSIS OF VILLAGE 23A UNIT 1 & 2 STORM DRAIN TO PROPOSED CONNECTIONS

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
5683.05	237.69	2.324	240.014	138.0	20.34	6.424	246.438	0.00	3.346		3.50	0.00	0.00	0	0.00
26.12	0.04774					.029241	0.76			2.010			0.00		
5709.17	238.94	2.425	241.362	138.0	19.39	5.840	247.202	0.00	3.346		3.50	0.00	0.00	0	0.00
19.43	0.04774					.026075	0.51			2.010			0.00		
5728.60	239.87	2.535	242.400	138.0	18.49	5.309	247.709	0.00	3.346		3.50	0.00	0.00	0	0.00
14.94	0.04774					.023331	0.35			2.010			0.00		
5743.54	240.58	2.653	243.231	138.0	17.63	4.827	248.058	0.00	3.346		3.50	0.00	0.00	0	0.00
11.47	0.04774					.020979	0.24			2.010			0.00		
5755.01	241.12	2.785	243.910	138.0	16.81	4.388	248.298	0.00	3.346		3.50	0.00	0.00	0	0.00
8.73	0.04774					.019008	0.17			2.010			0.00		
5763.74	241.54	2.933	244.475	138.0	16.03	3.989	248.464	0.00	3.346		3.50	0.00	0.00	0	0.00
6.19	0.04774					.017440	0.11			2.010			0.00		
5769.93	241.84	3.108	244.946	138.0	15.28	3.627	248.573	0.00	3.346		3.50	0.00	0.00	0	0.00

2.98	0.04774					.016555	0.05			2.010			0.00		
5772.91	241.98	3.346	245.326	138.0	14.57	3.296	248.622	0.00	3.346		3.50	0.00	0.00	0	0.00
JUNCT STR	0.00000					.012444	0.00						0.00		
5772.91	241.98	6.962	248.942	93.0	9.67	1.451	250.393	0.00	2.984		3.50	0.00	0.00	0	0.00
59.29	0.04003					.008544	0.51			1.670			0.00		
5832.20	244.35	5.148	249.502	93.0	9.67	1.451	250.953	0.00	2.984		3.50	0.00	0.00	0	0.00
HYDRAULIC JUMP													0.00		
5832.20	244.35	1.714	246.068	93.0	19.85	6.119	252.187	0.00	2.984		3.50	0.00	0.00	0	0.00
79.74	0.04003					.034683	2.77			1.670			0.00		

WATER SURFACE PROFILE LISTING

ESPERANZA BY LENNAR HOMES, TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
RE-ANALYSIS OF VILLAGE 23A UNIT 1 & 2 STORM DRAIN TO PROPOSED CONNECTIONS

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
5911.94	247.55	1.772	249.318	93.0	19.01	5.614	254.932	0.00	2.984		3.50	0.00	0.00	0	0.00
47.56	0.04003					.030753	1.46			1.670			0.00		
5959.50	249.45	1.841	251.291	93.0	18.13	5.103	256.394	0.00	2.984		3.50	0.00	0.00	0	0.00
30.42	0.04003					.027113	0.82			1.670			0.00		
5989.92	250.67	1.912	252.580	93.0	17.29	4.640	257.220	0.00	2.984		3.50	0.00	0.00	0	0.00
21.47	0.04003					.023925	0.51			1.670			0.00		
6011.39	251.53	1.988	253.515	93.0	16.48	4.218	257.733	0.00	2.984		3.50	0.00	0.00	0	0.00
16.06	0.04003					.021141	0.34			1.670			0.00		
6027.45	252.17	2.068	254.238	93.0	15.71	3.835	258.073	0.00	2.984		3.50	0.00	0.00	0	0.00
37.91	0.02351					.019125	0.73			1.960			0.00		
6065.36	253.06	2.119	255.180	93.0	15.26	3.618	258.798	0.00	2.984		3.50	0.00	0.00	0	0.00
39.30	0.02351					.017359	0.68			1.960			0.00		
6104.66	253.99	2.206	256.191	93.0	14.55	3.288	259.479	0.00	2.984		3.50	0.00	0.00	0	0.00
25.29	0.02351					.015395	0.39			1.960			0.00		

6129.95	254.58	2.300	256.880	93.0	13.87	2.989	259.869	0.00	2.984		3.50	0.00	0.00	0	0.00
11.57	0.02265					.014020	0.16			1.982			0.00		
6141.52	254.84	2.354	257.196	93.0	13.51	2.834	260.030	0.00	2.984		3.50	0.00	0.00	0	0.00
15.63	0.02265					.012820	0.20			1.982			0.00		
6157.15	255.20	2.458	257.654	93.0	12.88	2.576	260.230	0.00	2.984		3.50	0.00	0.00	0	0.00
10.91	0.02265					.011443	0.12			1.982			0.00		
6168.06	255.44	2.570	258.013	93.0	12.28	2.342	260.355	0.00	2.984		3.50	0.00	0.00	0	0.00
7.34	0.02265					.010253	0.08			1.982			0.00		

WATER SURFACE PROFILE LISTING

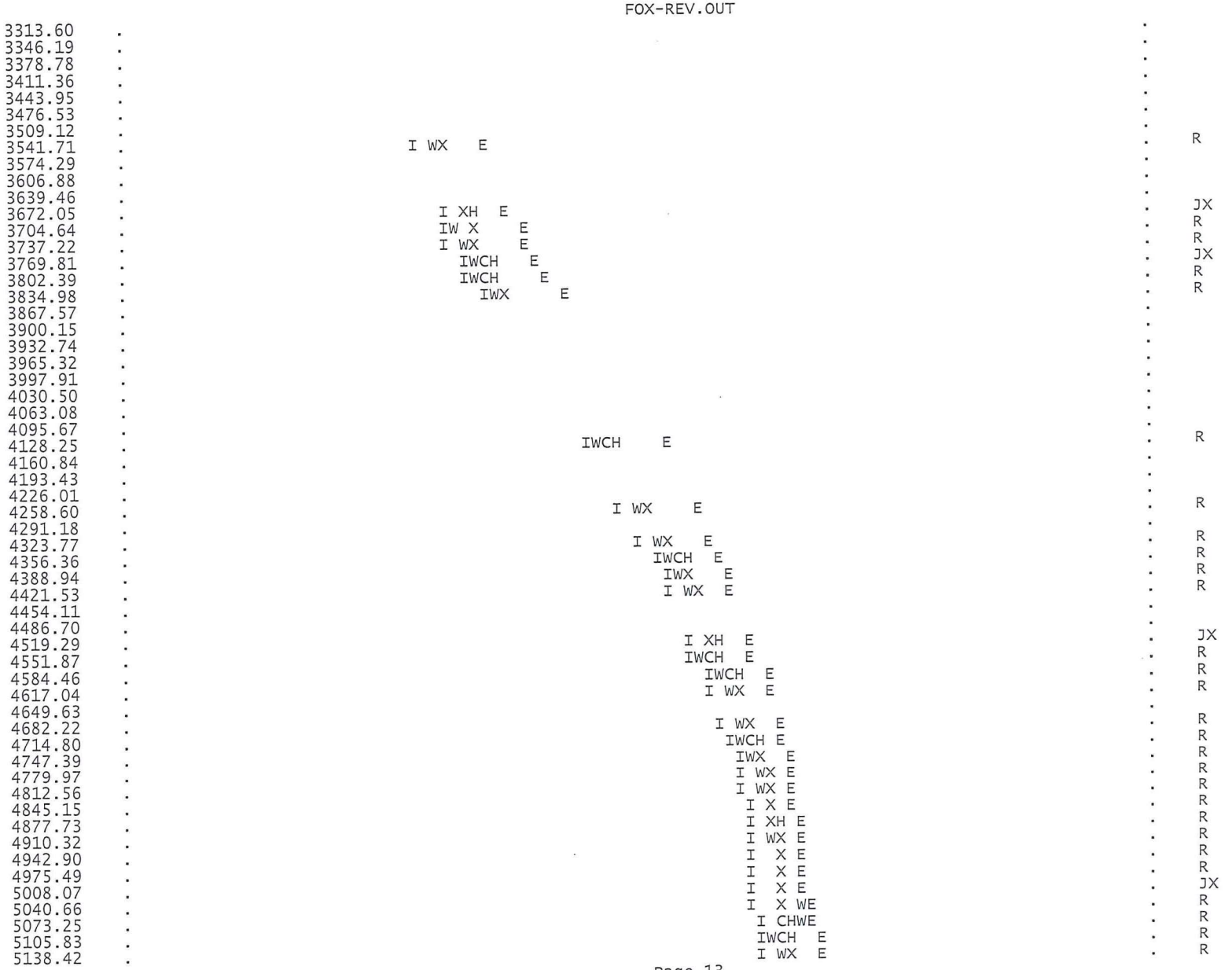
ESPERANZA BY LENNAR HOMES, TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
RE-ANALYSIS OF VILLAGE 23A UNIT 1 & 2 STORM DRAIN TO PROPOSED CONNECTIONS

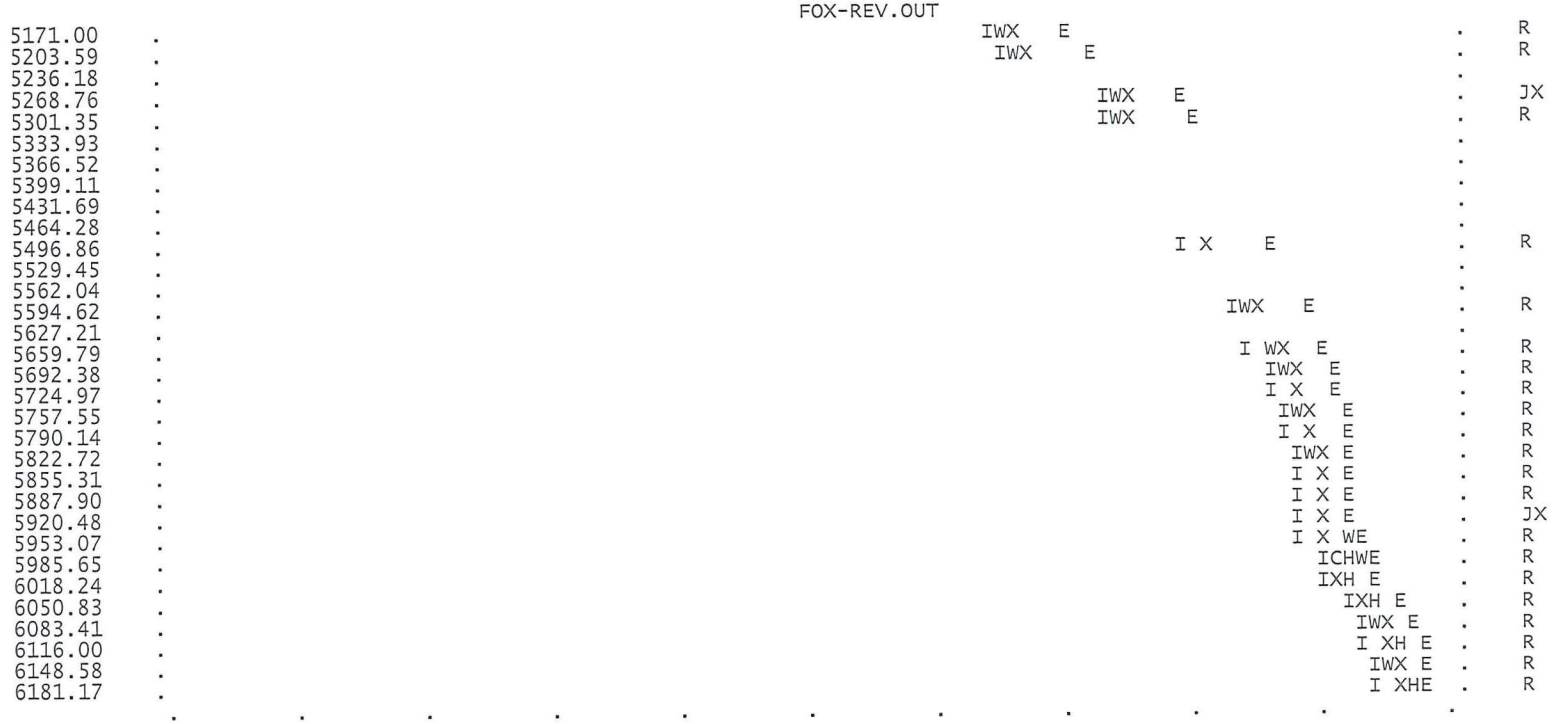
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
6175.40	255.61	2.692	258.301	93.0	11.71	2.129	260.430	0.00	2.984		3.50	0.00	0.00	0	0.00
4.29	0.02265					.009237	0.04			1.982			0.00		
6179.69	255.71	2.828	258.535	93.0	11.16	1.935	260.470	0.00	2.984		3.50	0.00	0.00	0	0.00
1.48	0.02265					.008391	0.01			1.982			0.00		
6181.17	255.74	2.984	258.724	93.0	10.64	1.759	260.483	0.00	2.984		3.50	0.00	0.00	0	0.00

ESPERANZA BY LENNAR HOMES, TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
RE-ANALYSIS OF VILLAGE 23A UNIT 1 & 2 STORM DRAIN TO PROPOSED CONNECTIONS

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1000.00    .I  X W E                                                    .    R
1032.59    .                                                            .
1065.17    .I   X W E                                                   .    R
1097.76    .                                                            .
1130.34    .                                                            .
1162.93    .                                                            .
1195.52    .                                                            .
1228.10    .                                                            .
1260.69    .  I   XW  E                                                 .    JX
1293.27    .  I  CH  W E                                                .    R
1325.86    .                                                            .
1358.45    .                                                            .
1391.03    .                                                            .
1423.62    .                                                            .
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1456.20    .                                                                  .
1488.79    .                                                                  .
1521.38    .                                                                  .
1553.96    .                                                                  .
1586.55    .                                                                  .
1619.13    .                                                                  .      JX
1651.72    .    I   X  W E                                                    .      R
1684.31    .     I  X  W E                                                    .
1716.89    .                                                                  .
1749.48    .                                                                  .
1782.06    .                                                                  .
1814.65    .                                                                  .
1847.24    .                                                                  .
1879.82    .                                                                  .
1912.41    .                                                                  .
1944.99    .                                                                  .
1977.58    .                                                                  .
2010.17    .                                                                  .
2042.75    .                                                                  .
2075.34    .                                                                  .
2107.92    .                                                                  .
2140.51    .                                                                  .
2173.10    .                                                                  .
2205.68    .                                                                  .
2238.27    .                                                                  .
2270.85    .                                                                  .
2303.44    .                                                                  .
2336.02    .                                                                  .
2368.61    .                                                                  .
2401.20    .                                                                  .      JX
2433.78    .          I  X   W E                                              .      R
2466.37    .          I  X  W  E                                              .
2498.95    .                                                                  .      R
2531.54    .          I  CH   W E                                             .
2564.13    .                                                                  .
2596.71    .                                                                  .
2629.30    .                                                                  .      JX
2661.88    .            I  X   W  E                                           .      R
2694.47    .            I  X    W  E                                          .
2727.06    .                                                                  .
2759.64    .                                                                  .
2792.23    .                                                                  .
2824.81    .                                                                  .
2857.40    .                                                                  .
2889.99    .                                                                  .
2922.57    .                                                                  .
2955.16    .                                                                  .
2987.74    .                                                                  .      JX
3020.33    .                   I  XW  E                                       .      R
3052.92    .                   I  X W E                                       .      R
3085.50    .                    I  XW E                                       .      R
3118.09    .                    I WX   E                                      .      R
3150.67    .                     I WX   E                                     .
3183.26    .                                                                  .
3215.85    .                                                                  .
3248.43    .                                                                  .
3281.02    .                                                                  .
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3313.60
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3476.53
3509.12
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3574.29
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4291.18
4323.77
4356.36
4388.94
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4454.11
4486.70
4519.29
4551.87
4584.46
4617.04
4649.63
4682.22
4714.80
4747.39
4779.97
4812.56
4845.15
4877.73
4910.32
4942.90
4975.49
5008.07
5040.66
5073.25
5105.83
5138.42
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N O T E S
1. GLOSSARY
   I = INVERT ELEVATION
   C = CRITICAL DEPTH
   W = WATER SURFACE ELEVATION
   H = HEIGHT OF CHANNEL
   E = ENERGY GRADE LINE
   X = CURVES CROSSING OVER
   B = BRIDGE ENTRANCE OR EXIT
   Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY♀

Capistrano Storm Drain WSPG Re-Analysis

```
0
T1 CATALINA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY
T2 SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
T3 PARCEL N LATERAL STORM DRAIN - PROVIDED BY UNIT 2 IMPROVEMENTS
SO    1000.00 242.48 36                              248.94
R     1058.29 243.65 36       .013                                    45.
SH    1058.29 243.65 36
CD   18   4                1.5
CD   24   4                2.
CD   30   4                2.5
CD   36   4                3.
CD   42   4                3.5
CD   48   4                4.
CD   54   4                4.5
CD   60   4                5.
CD   66   4                5.5
CD   72   4                6.
CD   78   4                6.5
CD   90   4                7.5
```

45.

♀
DATE: 5/16/2012
TIME: 14:17

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														
CD	36	4			3.00														
CD	42	4			3.50														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														
CD	66	4			5.50														
CD	72	4			6.00														
CD	78	4			6.50														
CD	90	4			7.50														

♀

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

CATALINA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY

HEADING LINE NO 2 IS -

SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N

HEADING LINE NO 3 IS -

PARCEL N LATERAL STORM DRAIN - PROVIDED BY UNIT 2 IMPROVEMENTS ♀

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1000.00	242.48	36	248.94

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1058.29	243.65	36	0.013	0.00	0.00	45.00	0

ELEMENT NO 3 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1058.29	243.65	36	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC ♀
LICENSEE: SLATER HANIFAN GROUP PAGE 1

F0515P
WATER SURFACE PROFILE LISTING
CATALINA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
PARCEL N LATERAL STORM DRAIN - PROVIDED BY UNIT 2 IMPROVEMENTS

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR

L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1000.00	242.48	6.460	248.940	45.0	6.37	0.629	249.569	0.00	2.186		3.00	0.00	0.00	0	0.00
58.29	0.02007					.004552	0.27			1.457			0.00		
1058.29	243.65	5.649	249.299	45.0	6.37	0.629	249.928	0.00	2.186		3.00	0.00	0.00	0	0.00♀

** WARNING NO. 22 ** - NO PLOT GENERATED, BAD DATA OR NOT ENOUGH POINTS, 3 OR LESS ♀

Paseo Breeze Storm Drain WSPG Analysis

```
0
T1 CATALINA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY
T2 SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
T3 SITE ENTRY ROAD STORM DRAIN - TIE-IN TO EXISTING PARCEL 'O' INFRASTRUCTURE
SO   6181.17 255.74 42                              258.72
R    6265.25 258.26 42      .013                                    45.   1
R    6275.25 259.21 42      .013                                    45.
R    6315.18 262.87 42      .013                                    75.   1
JX   6315.18 264.37 24 42   .013    57.             262.87        75.
R    6400.18 267.28 24      .013                                    15.   1
JX   6400.18 267.28 24 24   .013     7.5            267.28        45.
R    6434.68 267.61 24      .013                                          1
JX   6434.68 268.11 18 24   .013     7.5            267.61        45.
R    6569.68 271.00 18      .013
SH   6569.68 271.00 18
CD  18  4              1.5
CD  24  4              2.
CD  30  4              2.5
CD  36  4              3.
CD  42  4              3.5
CD  48  4              4.
CD  54  4              4.5
CD  60  4              5.
CD  66  4              5.5
CD  72  4              6.
CD  78  4              6.5
CD  90  4              7.5
```

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Q
⊣⊢

8.

DATE: 5/31/2012
TIME: 10: 1

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														
CD	36	4			3.00														
CD	42	4			3.50														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														
CD	66	4			5.50														
CD	72	4			6.00														
CD	78	4			6.50														
CD	90	4			7.50														

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

CATALINA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY

HEADING LINE NO 2 IS -

SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N

HEADING LINE NO 3 IS -

SITE ENTRY ROAD STORM DRAIN - TIE-IN TO EXISTING PARCEL 'O' INFRASTRUCTURE

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	6181.17	255.74	42	258.72

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	6265.25	258.26	42	0.013	0.00	0.00	45.00	1

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	6275.25	259.21	42	0.013	0.00	0.00	45.00	0

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	6315.18	262.87	42	0.013	0.00	0.00	75.00	1

ELEMENT NO 5 IS A JUNCTION * * * * * * *

	U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
		6315.18	264.37	24	42	0	0.013	57.0	0.0	262.87	0.00	75.00	0.00

ELEMENT NO 6 IS A REACH * * *

	U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
		6400.18	267.28	24	0.013	0.00	0.00	15.00	1

ELEMENT NO 7 IS A JUNCTION * * * * * * * *

	U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
		6400.18	267.28	24	24	0	0.013	7.5	0.0	267.28	0.00	45.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 8 IS A REACH * * *

	U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
		6434.68	267.61	24	0.013	0.00	0.00	0.00	1

ELEMENT NO 9 IS A JUNCTION * * * * * * * *

	U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
		6434.68	268.11	18	24	0	0.013	7.5	0.0	267.61	0.00	45.00	0.00

ELEMENT NO 10 IS A REACH * * *

	U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
		6569.68	271.00	18	0.013	0.00	0.00	0.00	0♀

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 11 IS A SYSTEM HEADWORKS * *

	U/S DATA	STATION	INVERT	SECT	W S ELEV
		6569.68	271.00	18	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC ♀
LICENSEE: SLATER HANIFAN GROUP F0515P

WATER SURFACE PROFILE LISTING
CATALINA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
SITE ENTRY ROAD STORM DRAIN - TIE-IN TO EXISTING PARCEL 'O' INFRASTRUCTURE

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
6181.17	255.74	1.601	257.341	80.0	18.65	5.400	262.741	0.00	2.794	3.50	0.00	0.00	0	0.00
21.51	0.02997					.034919	0.75		1.665			0.00		
6202.68	256.38	1.587	257.972	80.0	18.86	5.523	263.495	0.00	2.794	3.50	0.00	0.00	0	0.00
62.57	0.02997					.037893	2.37		1.665			0.00		
6265.25	258.26	1.531	259.791	80.0	19.78	6.074	265.865	0.00	2.794	3.50	0.00	0.00	0	0.00
1.62	0.09500					.039879	0.06		1.212			0.00		

6266.87	258.41	1.540	259.954	80.0	19.61	5.973	265.927	0.00	2.794		3.50	0.00	0.00	0	0.00
8.38	0.09500					.037039	0.31			1.212			0.00		
6275.25	259.21	1.598	260.808	80.0	18.70	5.430	266.238	0.00	2.794		3.50	0.00	0.00	0	0.00
5.53	0.09166					.033093	0.18			1.223			0.00		
6280.78	259.72	1.641	261.358	80.0	18.06	5.064	266.422	0.00	2.794		3.50	0.00	0.00	0	0.00
6.42	0.09166					.029639	0.19			1.223			0.00		
6287.20	260.31	1.703	262.008	80.0	17.22	4.602	266.610	0.00	2.794		3.50	0.00	0.00	0	0.00
5.41	0.09166					.026084	0.14			1.223			0.00		
6292.61	260.80	1.767	262.568	80.0	16.42	4.185	266.753	0.00	2.794		3.50	0.00	0.00	0	0.00
4.54	0.09166					.022971	0.10			1.223			0.00		
6297.15	261.22	1.835	263.053	80.0	15.65	3.804	266.857	0.00	2.794		3.50	0.00	0.00	0	0.00
3.84	0.09166					.020254	0.08			1.223			0.00		
6300.99	261.57	1.907	263.476	80.0	14.92	3.458	266.934	0.00	2.794		3.50	0.00	0.00	0	0.00
3.24	0.09166					.017874	0.06			1.223			0.00		
6304.23	261.87	1.982	263.849	80.0	14.23	3.144	266.993	0.00	2.794		3.50	0.00	0.00	0	0.00
2.73	0.09166					.015787	0.04			1.223			0.00		

WATER SURFACE PROFILE LISTING

CATALINA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
SITE ENTRY ROAD STORM DRAIN - TIE-IN TO EXISTING PARCEL 'O' INFRASTRUCTURE

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
6306.96	262.12	2.061	264.177	80.0	13.57	2.858	267.035	0.00	2.794		3.50	0.00	0.00	0	0.00
2.26	0.09166					.013962	0.03			1.223			0.00		
6309.22	262.32	2.145	264.469	80.0	12.93	2.598	267.067	0.00	2.794		3.50	0.00	0.00	0	0.00
1.85	0.09166					.012369	0.02			1.223			0.00		
6311.07	262.49	2.235	264.728	80.0	12.33	2.362	267.090	0.00	2.794		3.50	0.00	0.00	0	0.00
1.48	0.09166					.010979	0.02			1.223			0.00		
6312.55	262.63	2.330	264.959	80.0	11.76	2.147	267.106	0.00	2.794		3.50	0.00	0.00	0	0.00

1.15	0.09166					.009763	0.01			1.223			0.00		
6313.70	262.73	2.431	265.165	80.0	11.21	1.952	267.117	0.00	2.794		3.50	0.00	0.00	0	0.00
0.81	0.09166					.008705	0.01			1.223			0.00		
6314.51	262.81	2.541	265.350	80.0	10.69	1.775	267.125	0.00	2.794		3.50	0.00	0.00	0	0.00
0.50	0.09166					.007792	0.00			1.223			0.00		
6315.01	262.85	2.661	265.515	80.0	10.19	1.613	267.128	0.00	2.794		3.50	0.00	0.00	0	0.00
0.17	0.09166					.007008	0.00			1.223			0.00		
6315.18	262.87	2.794	265.664	80.0	9.72	1.466	267.130	0.00	2.794		3.50	0.00	0.00	0	0.00
JUNCT STR	0.00000					.008492	0.00						0.00		
6315.18	264.37	4.141	268.511	23.0	7.32	0.832	269.343	0.00	1.706		2.00	0.00	0.00	0	0.00
85.00	0.03424					.010337	0.88			1.060			0.00		
6400.18	267.28	2.192	269.472	23.0	7.32	0.832	270.304	0.00	1.706		2.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.007516	0.00						0.00		
6400.18	267.28	2.976	270.256	15.5	4.93	0.378	270.634	0.00	1.419		2.00	0.00	0.00	0	0.00
34.50	0.00957					.004694	0.16			1.231			0.00		

WATER SURFACE PROFILE LISTING

CATALINA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
SITE ENTRY ROAD STORM DRAIN - TIE-IN TO EXISTING PARCEL 'O' INFRASTRUCTURE

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
6434.68	267.61	2.827	270.437	15.5	4.93	0.378	270.815	0.00	1.419		2.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.005247	0.00						0.00		
6434.68	268.11	2.676	270.786	8.0	4.53	0.318	271.104	0.00	1.096		1.50	0.00	0.00	0	0.00
75.34	0.02141					.005737	0.43			0.770			0.00		
6510.02	269.72	1.500	271.223	8.0	4.53	0.318	271.541	0.00	1.096		1.50	0.00	0.00	0	0.00
0.68	0.02141					.005737	0.00			0.770			0.00		
6510.70	269.74	1.500	271.238	8.0	4.53	0.318	271.556	0.00	1.096		1.50	0.00	0.00	0	0.00
HYDRAULIC JUMP													0.00		

6510.70	269.74	0.770	270.508	8.0	8.75	1.190	271.698	0.00	1.096		1.50	0.00	0.00	0	0.00
7.04	0.02141					.020342	0.14			0.770			0.00		
6517.74	269.89	0.790	270.678	8.0	8.47	1.115	271.793	0.00	1.096		1.50	0.00	0.00	0	0.00
22.72	0.02141					.018310	0.42			0.770			0.00		
6540.46	270.37	0.821	271.196	8.0	8.08	1.014	272.210	0.00	1.096		1.50	0.00	0.00	0	0.00
11.46	0.02141					.016157	0.19			0.770			0.00		
6551.92	270.62	0.853	271.473	8.0	7.71	0.922	272.395	0.00	1.096		1.50	0.00	0.00	0	0.00
6.98	0.02141					.014270	0.10			0.770			0.00		
6558.90	270.77	0.887	271.656	8.0	7.35	0.838	272.494	0.00	1.096		1.50	0.00	0.00	0	0.00
4.46	0.02141					.012627	0.06			0.770			0.00		
6563.36	270.87	0.924	271.789	8.0	7.01	0.762	272.551	0.00	1.096		1.50	0.00	0.00	0	0.00
3.05	0.02141					.011189	0.03			0.770			0.00		
6566.41	270.93	0.962	271.892	8.0	6.68	0.692	272.584	0.00	1.096		1.50	0.00	0.00	0	0.00
1.91	0.02141					.009928	0.02			0.770			0.00		

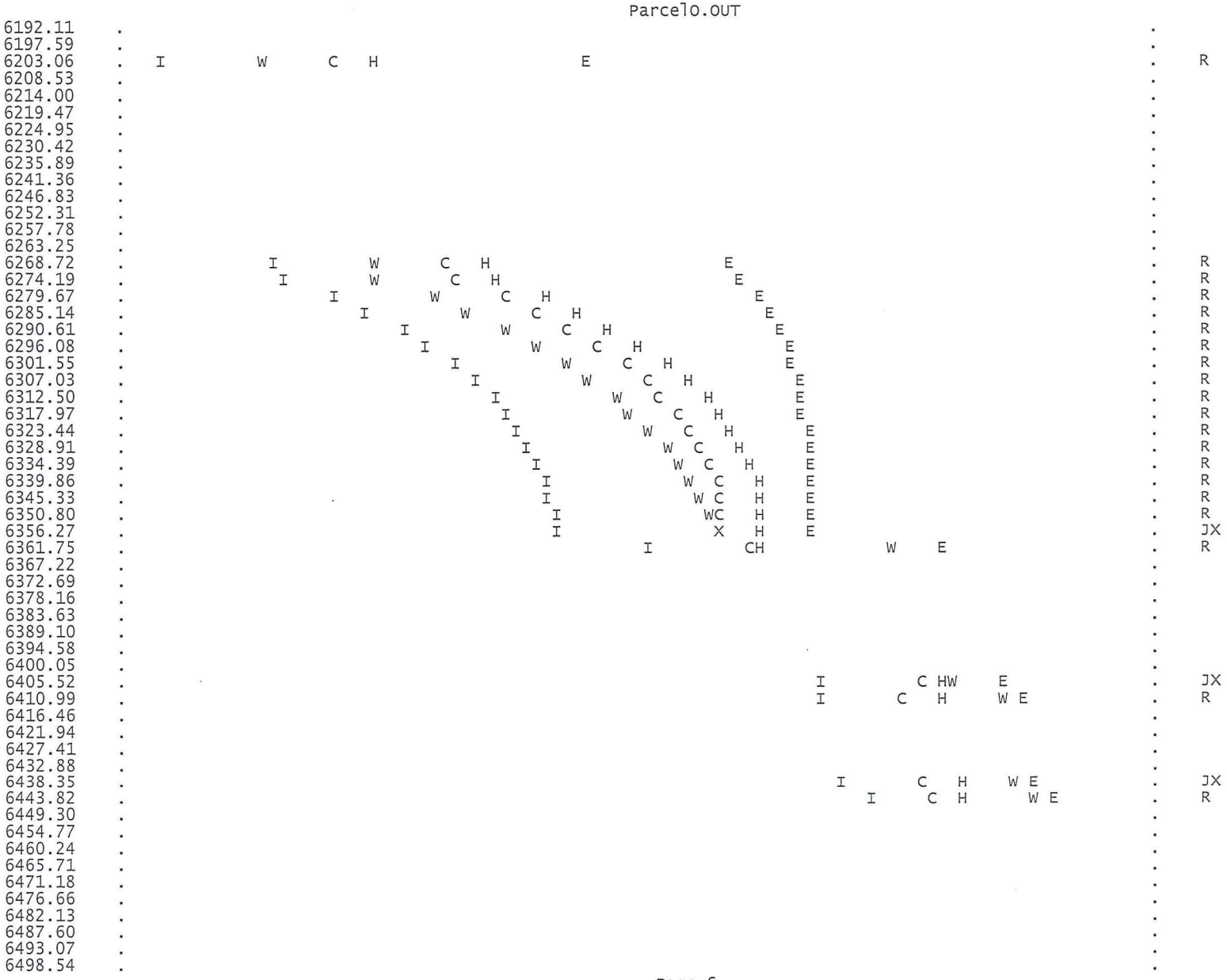
WATER SURFACE PROFILE LISTING

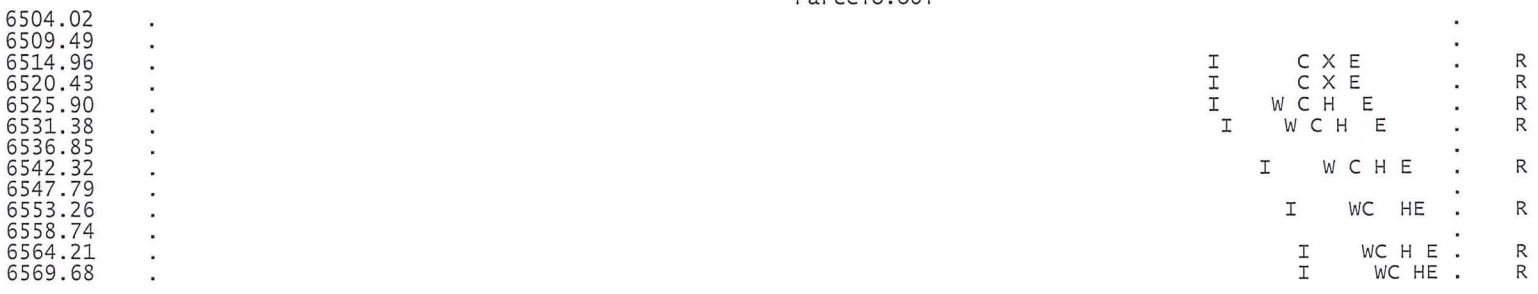
CATALINA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
SITE ENTRY ROAD STORM DRAIN - TIE-IN TO EXISTING PARCEL 'O' INFRASTRUCTURE

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
6568.32	270.97	1.003	271.974	8.0	6.36	0.629	272.603	0.00	1.096		1.50	0.00	0.00	0	0.00
1.06	0.02141					.008832	0.01			0.770			0.00		
6569.38	270.99	1.047	272.040	8.0	6.07	0.572	272.612	0.00	1.096		1.50	0.00	0.00	0	0.00
0.30	0.02141					.007873	0.00			0.770			0.00		
6569.68	271.00	1.096	272.096	8.0	5.78	0.519	272.615	0.00	1.096		1.50	0.00	0.00	0	0.00

CATALINA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL N
SITE ENTRY ROAD STORM DRAIN - TIE-IN TO EXISTING PARCEL 'O' INFRASTRUCTURE

6181.17 .I W C H E R
6186.64 .


6192.11
6197.59
6203.06
6208.53
6214.00
6219.47
6224.95
6230.42
6235.89
6241.36
6246.83
6252.31
6257.78
6263.25
6268.72
6274.19
6279.67
6285.14
6290.61
6296.08
6301.55
6307.03
6312.50
6317.97
6323.44
6328.91
6334.39
6339.86
6345.33
6350.80
6356.27
6361.75
6367.22
6372.69
6378.16
6383.63
6389.10
6394.58
6400.05
6405.52
6410.99
6416.46
6421.94
6427.41
6432.88
6438.35
6443.82
6449.30
6454.77
6460.24
6465.71
6471.18
6476.66
6482.13
6487.60
6493.07
6498.54
R
JX



N O T E S
1. GLOSSARY
   I = INVERT ELEVATION
   C = CRITICAL DEPTH
   W = WATER SURFACE ELEVATION
   H = HEIGHT OF CHANNEL
   E = ENERGY GRADE LINE
   X = CURVES CROSSING OVER
   B = BRIDGE ENTRANCE OR EXIT
   Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY♀

APPENDIX F

Finished Floor Elevation Analysis

CATALINA - PHASES 1 & 2
FINISH FLOOR ANALYSIS - CITY OF LAS VEGAS JURISDICTION

INPUT INFORMATION					FINISHED FLOORS					NOTES
Lot Number	Hydraulic Section Utilized	T/C[1] (ft)	F/L[2] (ft)	D_{100} (ft)	Flowline $F.F._{-min}$[3] (ft)	T/C + 6" $F.F._{-min}$[4] (ft)	$F.F._{-Design}$ (ft)	Flowline Check	T/C + 6" Check	Phase?
1	B1	3371.07	3370.69	0.46	3371.61	3371.57	3373.4	OK	OK	1
2	B1	3369.77	3369.39	0.46	3370.31	3370.27	3372.0	OK	OK	1
3	B1	3368.51	3368.13	0.46	3369.05	3369.01	3370.5	OK	OK	1
4	B1	3367.18	3366.80	0.46	3367.72	3367.68	3369.1	OK	OK	1
5	B1	3366.09	3365.71	0.46	3366.63	3366.59	3368.0	OK	OK	1
6	B1	3365.17	3364.79	0.46	3365.71	3365.67	3367.1	OK	OK	1
7	B1	3364.24	3363.86	0.46	3364.78	3364.74	3366.2	OK	OK	1
8	B1	3363.32	3362.94	0.46	3363.86	3363.82	3365.3	OK	OK	1
9	B1	3362.39	3362.01	0.46	3362.93	3362.89	3364.3	OK	OK	1
10	B1	3361.46	3361.08	0.46	3362.00	3361.96	3363.4	OK	OK	1
11	B1	3360.52	3360.14	0.46	3361.06	3361.02	3362.5	OK	OK	1
12	B1	3359.58	3359.20	0.46	3360.12	3360.08	3361.5	OK	OK	1
13	B1	3358.64	3358.26	0.46	3359.18	3359.14	3360.6	OK	OK	1
14	B1	3357.70	3357.32	0.46	3358.24	3358.20	3359.7	OK	OK	1
15	B2	3356.76	3356.38	0.53	3357.44	3357.26	3358.7	OK	OK	1
16	B2	3355.89	3355.51	0.53	3356.57	3356.39	3357.8	OK	OK	1
17	B2	3355.07	3354.69	0.53	3355.75	3355.57	3357.0	OK	OK	1
18	B2	3354.39	3354.01	0.53	3355.07	3354.89	3356.3	OK	OK	1
19	C	3357.59	3357.21	0.37	3357.95	3358.09	3359.3	OK	OK	1
20	C	3359.09	3358.71	0.37	3359.45	3359.59	3360.8	OK	OK	1
21	C	3360.59	3360.21	0.37	3360.95	3361.09	3362.3	OK	OK	1
22	C	3362.03	3361.65	0.37	3362.39	3362.53	3363.8	OK	OK	1
23	C	3363.47	3363.09	0.37	3363.83	3363.97	3365.3	OK	OK	1
24	C	3365.06	3364.68	0.37	3365.42	3365.56	3366.8	OK	OK	1
25	C	3366.86	3366.48	0.37	3367.22	3367.36	3368.3	OK	OK	1
26	C	3368.78	3368.40	0.37	3369.14	3369.28	3370.6	OK	OK	1
27	C	3366.36	3365.98	0.37	3366.72	3366.86	3368.3	OK	OK	1
28	C	3368.71	3368.33	0.37	3369.07	3369.21	3370.7	OK	OK	1
29	C	3371.06	3370.68	0.37	3371.42	3371.56	3373.0	OK	OK	1
30	C	3373.41	3373.03	0.37	3373.77	3373.91	3375.4	OK	OK	1
31	C	3376.46	3376.08	0.37	3376.82	3376.96	3378.4	OK	OK	1
32	C	3377.02	3376.64	0.37	3377.38	3377.52	3379.0	OK	OK	1
33	C	3375.54	3375.16	0.37	3375.90	3376.04	3377.4	OK	OK	1
34	C	3373.56	3373.18	0.37	3373.92	3374.06	3375.4	OK	OK	1
35	C	3371.21	3370.83	0.37	3371.57	3371.71	3373.0	OK	OK	1
36	C	3368.86	3368.48	0.37	3369.22	3369.36	3370.7	OK	OK	1
37	C	3366.51	3366.13	0.37	3366.87	3367.01	3368.3	OK	OK	1
38	B1	3357.54	3357.16	0.46	3358.08	3358.04	3359.4	OK	OK	1
39	B1	3358.49	3358.11	0.46	3359.03	3358.99	3360.3	OK	OK	1
40	B1	3359.43	3359.05	0.46	3359.97	3359.93	3361.3	OK	OK	1
41	B1	3360.37	3359.99	0.46	3360.91	3360.87	3362.2	OK	OK	1
42	B1	3361.31	3360.93	0.46	3361.85	3361.81	3363.2	OK	OK	1
43	B1	3362.26	3361.88	0.46	3362.80	3362.76	3364.1	OK	OK	1
44	B1	3363.21	3362.83	0.46	3363.75	3363.71	3365.0	OK	OK	1
45	B1	3368.82	3368.44	0.46	3369.36	3369.32	3370.7	OK	OK	1
46	B1	3371.01	3370.63	0.46	3371.55	3371.51	3372.9	OK	OK	1
47	B1	3373.20	3372.82	0.46	3373.74	3373.70	3375.1	OK	OK	2
48	B1	3375.39	3375.01	0.46	3375.93	3375.89	3377.3	OK	OK	2
49	B1	3377.58	3377.20	0.46	3378.12	3378.08	3379.5	OK	OK	2
50	B1	3378.94	3378.56	0.46	3379.48	3379.44	3380.8	OK	OK	2
51	C	3383.65	3383.27	0.37	3384.01	3384.15	3385.5	OK	OK	2
52	C	3385.84	3385.46	0.37	3386.20	3386.34	3387.7	OK	OK	2
53	C	3388.29	3387.91	0.37	3388.65	3388.79	3389.5	OK	OK	2
54	A	3392.12	3391.74	0.28	3392.30	3392.62	3394.0	OK	OK	2
55	A	3390.31	3389.93	0.28	3390.49	3390.81	3392.2	OK	OK	2
56	A	3387.95	3387.57	0.28	3388.13	3388.45	3389.8	OK	OK	2
57	A	3385.59	3385.21	0.28	3385.77	3386.09	3387.5	OK	OK	2
58	A	3383.24	3382.86	0.28	3383.42	3383.74	3385.1	OK	OK	2
59	A	3383.64	3383.26	0.28	3383.82	3384.14	3385.7	OK	OK	2
60	A	3387.55	3387.17	0.28	3387.73	3388.05	3387.9	OK	NO	2; Meets 2x Depth of Flow
61	A	3396.94	3396.56	0.28	3397.12	3397.44	3398.5	OK	OK	2
62	A	3398.87	3398.49	0.28	3399.05	3399.37	3400.7	OK	OK	2

CATALINA - PHASES 1 & 2
FINISH FLOOR ANALYSIS - CITY OF LAS VEGAS JURISDICTION

INPUT INFORMATION					FINISHED FLOORS					NOTES
Lot Number	Hydraulic Section Utilized	T/C[1] (ft)	F/L[2] (ft)	D_{100} (ft)	Flowline $F.F._{min}$[3] (ft)	T/C + 6" $F.F._{min}$[4] (ft)	$F.F._{Design}$ (ft)	Flowline Check	T/C + 6" Check	Phase?
63	A	3400.84	3400.46	0.28	3401.02	3401.34	3401.8	OK	OK	2
64	A	3402.43	3402.05	0.28	3402.61	3402.93	3404.3	OK	OK	2
65	A	3403.71	3403.33	0.28	3403.89	3404.21	3405.8	OK	OK	2
66	B1	3403.71	3403.33	0.46	3404.25	3404.21	3405.9	OK	OK	2
67	B1	3402.07	3401.69	0.46	3402.61	3402.57	3403.7	OK	OK	2
68	B1	3400.37	3399.99	0.46	3400.91	3400.87	3401.8	OK	OK	2
69	B1	3398.45	3398.07	0.46	3398.99	3398.95	3400.4	OK	OK	2
70	B1	3396.52	3396.14	0.46	3397.06	3397.02	3398.5	OK	OK	2
71	B1	3394.60	3394.22	0.46	3395.14	3395.10	3396.6	OK	OK	2
72	B1	3392.67	3392.29	0.46	3393.21	3393.17	3394.6	OK	OK	2
73	B1	3390.74	3390.36	0.46	3391.28	3391.24	3392.7	OK	OK	2
74	B1	3388.82	3388.44	0.46	3389.36	3389.32	3390.8	OK	OK	2
75	B1	3386.89	3386.51	0.46	3387.43	3387.39	3388.8	OK	OK	2
76	B1	3385.00	3384.62	0.46	3385.54	3385.50	3387.0	OK	OK	2
77	B1	3383.10	3382.72	0.46	3383.64	3383.60	3385.1	OK	OK	2
78	B1	3381.20	3380.82	0.46	3381.74	3381.70	3383.2	OK	OK	2
79	B1	3379.19	3378.81	0.46	3379.73	3379.69	3381.3	OK	OK	2
80	B1	3377.19	3376.81	0.46	3377.73	3377.69	3379.2	OK	OK	2
81	B1	3375.30	3374.92	0.46	3375.84	3375.80	3377.3	OK	OK	2
82	B1	3373.41	3373.03	0.46	3373.95	3373.91	3375.5	OK	OK	2
83	B1	3370.64	3370.26	0.46	3371.18	3371.14	3372.4	OK	OK	1
84	B1	3372.61	3372.23	0.46	3373.15	3373.11	3374.2	OK	OK	1

Where:

1: Top of Curb at High Side of Lot

2: TC-0.38 (For Roll Curb)

3: Minimum Allowable Finished Floor Elevation above flowline elevation @ high side of lot = (2 x D_{100}) + F/L

4: City of Las Vegas minimum allowable finished floor elevation = T.C. @ high side of lot + 6-inches

City of Las Vegas Finished Floor Criteria:

-The finished floor shall be set a vertical distance above the gutter flowline of at least twice the depth of flow in the gutter flowline up to a maximum of 18 inches above the WSEL in the street.

-The finished floor shall be set a vertical distance of at least 6-inches above the highest adjacent top of curb.

APPENDIX G

Reference Material

Update #2 to the Technical Drainage Study for Summerlin Village 23A Unit 2 Improvements

Approval Letters

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM	DATE: June 27, 2011
TO: Land Development Services Department of Public Works	FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT: Technical Drainage Study for: Summerlin Village 23A - Unit 2 Improvements – Update #2	COPIES TO: G.C. Wallace
Cross Streets: Desert Foothills Drive & Alta Drive	Howard Hughes Corp.
FILE NO.: F:\Depot\DSMEMOS\DS3402D.doc	Bart Anderson, P.E., DEVCO
Parcel Number: 137-22-000-010	CCRFCD
Zoning Action:	
FEMA Flood Zone: YES / No X	
Proposed Storm Drain: YES X / No	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID
1st Submittal	8/8/2003	8/26/2003	Conditional Approval	$250.00	109118: $250
CCRFCD	10/9/2003	10/23/2003	Concurrence	N/C	N/C
2nd Submittal	1/13/2011	1/18/2011	Approved	$100.00	160693: $100
3rd Submittal	6/16/2011	6/27/2011	See Comments Below	$100.00	171098: $100
			TOTAL FEES (LDDRS):	$450.00	----

REMARKS:

Update #2: Sub-divide parcels N and M into O, N, and M. Minor revision to storm drain systems on Fox Hill Drive.

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

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

1. Please note that HDPE storm drain pipes are not allowed in the public Right-of-Way.

In an effort to increase administrative efficiency, the City of Las Vegas Public Works will be requiring all soils report, drainage study and traffic impact analysis submittals to be accompanied by an electronic copy of the submittal. Electronic documents must be submitted with one original hard copy of the study. Electronic documents should be on a universal computer-readable digital output replicating your submittal to be used for archival or display purposes. This may be more than one file if necessary. An Indexed Portable Document Format (PDF) or Print Ready CAD file formats with a minimum of 300dpi are the desired formats, but provided it is a high quality digitized replication of the submittal, other formats may be acceptable. If figures are in color, they must be scanned in color and saved as a separate file. The new submittal requirements will become effective on July 1, 2011. If there are any questions regarding these new requirements, please contact Rob [illegible] at (702) 229-2177 or Rick Schroder in Traffic Engineering at (702) 229-631[illegible]

NOTE: Please be advised that all land surface area d[illegible] water way must submit to the Nevada Divisio[illegible]

Post-it® Fax Note 7671	Date 6/27/11	# of pages ▸ 2
To Debra Yamashika	From oh sang kwon	
Co./Dept. G.C. wallace	Co. CW – Flood	
Phone # 804-2000	Phone # 229-1815	
Fax # 804-2299	Fax #	

to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

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

END OF REMARKS
B&H/ays/osk

T/R/S: T20S/R59E/34
AREA K-34

Developed Condition HEC-1 Analysis

Summerlin V23A Unit 2 Improvements					
Basin	Soil	Percent	Land Use	CN	WCN
O	155	85.6%	Residential (7,000 sq ft lot)	89.9	89.4
	502	14.4%		86.4	
N	155	93.3%	Residential (8,000 sq ft lot)	88.8	88.5
	502	6.7%		84.8	
M	155	46.2%	Residential (8,000 sq ft lot)	88.8	86.6
	502	53.8%		84.8	

PARCEL N = CATALINA (6,000 FT² LOTS), CN = 91.0 & 91.8

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   13JUN11  TIME  12:56:46   *
*                                       *
*****************************************
```

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

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

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


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

          *DIAGRAM
    1     ID   ************************************************************
    2     ID   * ..........................................................  *
    3     ID   * :                  SUMMERLIN VILLAGE 23A                 :  *
    4     ID   * :                  UNIT 2 IMPROVEMENTS                   :  *
    5     ID   * :                  DEVELOPED ONSITE                      :  *
    6     ID   * : UPDATE #2 TO THE TDS-REVISED TO REFLECT M, N, O REVISION :  *
    7     ID   * :..................................................... :  *
    8     ID   * :              RETURN PERIOD_ _ _ _10 & 100-YEAR       :  *
    9     ID   * :              DISTRIBUTION_ _ _ _ 6-HOUR SDN3         :  *
   10     ID   * :              PROJECT NO_ _ _ _ _ 62023.112           :  *
   11     ID   * :              FILENAME_ _ _ _ _ _  112-ULT.H1         :  *
   12     ID   * :              DATE_ _ _ _ _ _ _ 6/13/2011             :  *
   13     ID   * :              MODELED BY_ _ _ _ _    DY               :  *
   14     ID   * :                                                      :  *
   15     ID   * :  DEPTH AREA REDUCTION FACTORS:                       :  *
   16     ID   * :  AREA              DARF                              :  *
   17     ID   * :  0.5 SQ MI          .98                              :  *
   18     ID   * :  10-YEAR STORM      .56                              :  *
   19     ID   * :..................................................... :  *
   20     ID   ************************************************************
   21     IT       5       0       0     200
   22     IO       5       0
   23     IN       5       0       0
   24     JR    PREC     1.0     .98     .56

   25     KK       L
   26     KM
   27     KM    SINGLE FAMILY: DENSITY = 6.3 UNITS/ACRE
   28     KM
   29     KM            AREA    20.8      AC
   30     KM            Tlag   13.73     MIN
   31     KM              CN    88.0
   32     BA   .0325
   33     PB    3.29
   34     PC  0.000   .0200   .0570   .0700   .0870   .1080   .1240   .1300   .1300   .1300
   35     PC  .1300   .1300   .1300   .1330   .1400   .1420   .1480   .1580   .1720   .1810
   36     PC  .1900   .1970   .1990   .2000   .2010   .2040   .2140   .2290   .2410   .2490
   37     PC  .2510   .2560   .2700   .2780   .2810   .2830   .2950   .3220   .3520   .4090
   38     PC  .4990   .5900   .7100   .7440   .7810   .8120   .8190   .8350   .8510   .8560
   39     PC  .8600   .8680   .8760   .8880   .9100   .9260   .9370   .9500   .9700   .9760
   40     PC  .9820   .9850   .9870   .9890   .9900   .9930   .9930   .9940   .9950   .9980
   41     PC  .9980   .9990  1.000
   42     LS       0    88.0
   43     UD   .1373
          *

   44     KK   COS-2
   45     KM
   46     KM    OPEN SPACE (DESERT LANDSCAPING)
   47     KM
   48     KM            AREA     2.0      AC
   49     KM            Tlag    6.59     MIN
   50     KM              CN      81
   51     BA  0.0032
```



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

   52     LS       0    81.0
   53     UD   .0659
          *

   54     KK     C-1
   55     KM   COMBINE L AND COS-2
   56     HC       2
          *
```

```
57          KK    RC-1
58          KM   ROUTE DOWNSTREAM OF L THROUGH LOOP ROAD "A" TO LINK ROAD
59          RD     600   0.023   0.013            CIRC     3.5
            *

60          KK       J
61          KM
62          KM    SINGLE FAMILY; DENSITY = 5.1 UNITS/ACRE
63          KM
64          KM            AREA    20.5      AC
65          KM            Tlag   10.92     MIN
66          KM              CN    86.0
67          BA  0.0320
68          LS       0    86.0
69          UD   .1092
            *

70          KK     C-2
71          KM   COMBINE C-1 AND J
72          HC       2
            *

73          KK    RC-2
74          KM   ROUTE DOWNSTREAM OF J THROUGH LOOP ROAD "A"
75          RD     500   0.023   0.013            CIRC     3.0
            *

76          KK    ST12
77          KM
78          KM    LOOP ROAD "A"
79          KM
80          KM            AREA     5.3      AC
81          KM            Tlag    9.13     MIN
82          KM              CN      94
83          BA   .0083
84          LS       0      94
85          UD   .0913
            *

86          KK     C-3
87          KM   COMBINE C-2 AND LOOP ROAD "A"
88          HC       2
            *
```



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

89          KK    ES-1
90          KM
91          KM    SINGLE FAMILY; DENSITY = 6.3 UNITS/ACRE
92          KM    (POSSIBLE SCHOOL SITE)
93          KM
94          KM            AREA    11.3      AC
95          KM            Tlag   10.65     MIN
96          KM              CN    88.0
97          BA   .0177
98          LS       0    88.0
99          UD   .1065
            *

100         KK    WS-1
101         KM
102         KM    COMMERCIAL SITE
103         KM
104         KM            AREA    4.83      AC
105         KM            Tlag    8.11     MIN
106         KM              CN    93.0
107         BA  0.0075
108         LS       0    93.0
109         UD   .0811
            *

110         KK     C-4
111         KM   COMBINE ES-1 AND WS-1
112         HC       2
            *

113         KK    NP-1
114         KM
115         KM    PARK (GRASS-FAIR CONDITIONS)
116         KM
117         KM            AREA    13.5      AC
118         KM            Tlag   14.35     MIN
119         KM              CN    74.0
120         BA   .0210
121         LS       0      74
122         UD   .1435
            *

123         KK     C-5
124         KM   COMBINE C-4 AND LOOP ROAD "A"
125         HC       2
            *

126         KK    RC-5
127         KM   ROUTE DOWNSTREAM OF NP-1 THROUGH LOOP ROAD "A"
128         RD    1000   0.023   0.013            CIRC     4.0
            *
```



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

```
129          KK    ST13
130          KM
131          KM    LOOP ROAD "A"
132          KM
133          KM             AREA      3.4       AC
134          KM             Tlag    10.56      MIN
135          KM               CN       95
136          BA   .0054
137          LS      0        95
138          UD   .1056
             *

139          KK     C-6
140          KM   COMBINE ST13 AND C-5
141          HC       2
             *

142          KK     C-6A
143          KM   COMBINE C-6 AND C-3
144          HC       2
             *

145          KK       K
146          KM
147          KM    SINGLE FAMILY ATTACHED: DENSITY = 10.0 UNITS/ACRE
148          KM
149          KM             AREA     20.4       AC
150          KM             Tlag    10.55      MIN
151          KM               CN       85
152          BA  0.0319
153          LS      0        85
154          UD   .1055
             *

155          KK     C-7
156          KM   COMBINE C-6A AND K
157          HC       2
             *

158          KK    RC-7
159          KM   ROUTE DOWNSTREAM OF K THROUGH LINK ROAD
160          RD    1000   0.046   0.013             CIRC      5.5
             *

161          KK       I
162          KM
163          KM   SINGLE FAMILY: DENSITY = 5.1 UNITS/ACRE
164          KM
165          KM             AREA     23.4       AC
166          KM             TLAG    .1182       HR
167          KM               CN       86
168          BA   .0365
169          LS      0        86
170          UD   .1182
             *
```


1

HEC-1 INPUT

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

171          KK     C-8
172          KM   COMBINE C-7 AND I
173          HC       2
             *

174          KK    ST19
175          KM
176          KM    LINK ROAD (SOUTH)
177          KM
178          KM             AREA      2.1       AC
179          KM             Tlag     6.63      MIN
180          KM               CN       95
181          BA  0.0033
182          LS      0        95
183          UD   .0663
             *

184          KK     C-9
185          KM   COMBINE SPINE ROAD AND C-8
186          HC       2
             *

187          KK   R-C-9
188          KM   ROUTE DOWNSTREAM OF I THROUGH DESERT FOOTHILLS DRIVE
189          RD    1350   0.029   0.013             CIRC      6.0
             *   START UNIT 2 UPDATE 2 REVISIONS

190          KK       O
191          KM    FUTURE PARCEL O DUE TO PARCEL SUBDIVISION
192          KM    SINGLE FAMILY
193          KM
194          KM             AREA    21.08       AC
195          KM             Tlag     10.8      MIN
196          KM               CN     89.4
197          BA   .0329
198          LS      0      89.4
199          UD    .108
             *

200          KK     R-O
201          KM   ROUTE DOWNSTREAM OF O THROUGH SPINE ROAD
202          RD    1000   0.035   0.013             CIRC      3.5
             *

203          KK       N
```

TDS APPROVED

```
204          KM    FUTURE PARCEL N DUE TO PARCEL SUBDIVISION
205          KM    SINGLE FAMILY
206          KM
207          KM           AREA   16.47      AC
208          KM           Tlag   11.1      MIN
209          KM             CN   88.5
210          BA   .0257
211          LS      0    88.5
212          UD   .111
             *
```

PROP. CATALINA


```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
213          KK       M
214          KM    FUTURE PARCEL M DUE TO PARCEL SUBDIVISION
215          KM    SINGLE FAMILY
216          KM
217          KM           AREA   22.71      AC
218          KM           Tlag   11.6      MIN
219          KM             CN   86.6
220          BA   .0355
221          LS      0    86.6
222          UD   .116
             *
```

ESPERANZA, PER SEPARATE TDS

```
223          KK    C-10
224          KM    COMBINE O, N, AND M
225          HC       3
             *  END UNIT 2 UPDATE 2 REVISIONS
226          KK    RC-10
227          KM    ROUTE DOWNSTREAM OF M THROUGH SPINE ROAD
228          RD     750   0.035   0.013            CIRC     5.0
             *
229          KK    ST10
230          KM
231          KM     SPINE ROAD
232          KM
233          KM           AREA     7.0      AC
234          KM           Tlag   10.09     MIN
235          KM             CN     93
236          BA   .0109
237          LS      0     93
238          UD   .1009
             *
239          KK    C-11
240          KM    COMBINE C-11 AND SPINE ROAD
241          HC       2
             *
242          KK    RC-11
243          KM    ROUTE DOWNSTREAM OF WS-2 THROUGH LOOP ROAD "A"
244          RD     900   0.021   0.013            CIRC     2.5
             *
245          KK    ST18
246          KM
247          KM    LOOP ROAD "A"
248          KM
249          KM           AREA     2.2      AC
250          KM           Tlag    8.43     MIN
251          KM             CN     95
252          BA  0.0035
253          LS      0     95
254          UD   .0843
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
255          KK    C-13
256          KM    COMBINE C-10 AND C-11
257          HC       2
             *
258          KK       E
259          KM
260          KM     SINGLE FAMILY: DENSITY = 6.3 UNITS/ACRE
261          KM
262          KM           AREA    23.4      AC
263          KM           Tlag   13.20     MIN
264          KM             CN     88
265          BA   .0366
266          LS      0     88
267          UD   .1320
             *
268          KK    C-14
269          KM    COMBINE C-13 AND E
270          HC       2
             *
271          KK    RC-14
272          KM    ROUTE DOWNSTREAM OF E THROUGH SPINE ROAD
273          RD    1200   0.025   0.013            CIRC     4.0
             *
274          KK       F
275          KM
276          KM    SINGLE FAMILY: DENSITY = 6.3 UNITS/ACRE
```

```
277          KM
278          KM           AREA    20.5      AC
279          KM           Tlag   10.90     MIN
280          KM             CN      68
281          BA   .0320
282          LS      0       88
283          UD   .1090
             *
284          KK    C-15
285          KM   COMBINE C-14 AND F
286          HC       2
             *
287          KK   RC-15
288          KM   ROUTE DOWNSTREAM OF F THROUGH SPINE ROAD
289          RD     800   0.025   0.013            CIRC      4.5
             *
```



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

290          KK   COS-3
291          KM
292          KM   OPEN SPACE AREA (DESERT LANDSCAPING)
293          KM
294          KM           AREA     2.3       AC
295          KM           Tlag    8.14      MIN
296          KM             CN      81
297          BA   .0036
298          LS      0       81
299          UD   .0814
             *
300          KK   C-15A
301          KM   COMBINE C-15 AND COS-3
302          HC       2
             *
303          KK       G
304          KM
305          KM    SINGLE FAMILY: DENSITY = 5.1 UNITS/ACRE
306          KM
307          KM           AREA    18.3       AC
308          KM           Tlag   14.29      MIN
309          KM             CN      86
310          BA  0.0286
311          LS      0       86
312          UD   .1429
             *
313          KK    C-16
314          KM   COMBINE C-15 AND G
315          HC       2
             *
316          KK   RC-16
317          KM   ROUTE DOWNSTREAM OF F THROUGH SPINE ROAD
318          RD     650   0.025   0.013            CIRC      5.5
             *
319          KK       H
320          KM
321          KM    SINGLE FAMILY: DENSITY = 5.1 UNITS/ACRE
322          KM
323          KM           AREA    19.7       AC
324          KM           Tlag   12.43      MIN
325          KM             CN      86
326          BA   .0308
327          LS      0       86
328          UD   .1243
             *
```



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

329          KK    ST11
330          KM
331          KM    SPINE ROAD (SOUTH)
332          KM
333          KM           AREA    10.2       AC
334          KM           Tlag   13.78      MIN
335          KM             CN      95
336          BA   .0160
337          LS      0       95
338          UD   .1378
             *
339          KK    C-17
340          KM   COMBINE H, C-16 AND SPINE ROAD
341          HC       3
             *
342          KK    C-9A
343          KM   COMBINE C-17 AND C-9
344          HC       2
             *
345          KK   RC-9A
346          KM   ROUTE DOWNSTREAM OF H THROUGH DESERT FOOTHILLS DRIVE
347          RD    1000   0.029   0.013            CIRC      7.5
             *
```

```
348          KK     ST2
349          KM
350          KM     STREET "CDS"
351          KM
352          KM              AREA      1.3       AC
353          KM              Tlag     4.32      MIN
354          KM                CN       93
355          BA    .0021
356          LS       0       93
357          UD    .0423
             *

358          KK     RST2
359          KM    ROUTE DOWNSTREAM OF STREET "A" THROUGH B
360          RD     1200   0.025   0.013             CIRC      2.0
             *

361          KK        B
362          KM
363          KM     MULTI-FAMILY: DENSITY = 18.3 UNITS/ACRE
364          KM
365          KM              AREA     15.4       AC
366          KM              Tlag    10.81      MIN
367          KM                CN       90
368          BA    .0241
369          LS       0       90
370          UD    .1081
             *
```



```
1                                    HEC-1 INPUT

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

371          KK     C-18
372          KM    COMBINE C-9A, ST2 AND B
373          HC        3
             *

374          KK    RC-18
375          KM    ROUTE DOWNSTREAM OF B THROUGH DESERT FOOTHILLS DRIVE
376          RD     1000   0.029   0.013             CIRC      7.5
             *

377          KK        A
378          KM
379          KM     MULTI-FAMILY: DENSITY = 18.3 UNITS/ACRE
380          KM
381          KM              AREA     16.1       AC
382          KM              Tlag    10.14      MIN
383          KM                CN       90
384          BA    .0252
385          LS       0       90
386          UD    .1014
             *

387          KK     C-19
388          KM    COMBINE C-18 AND A
389          HC        2
             *

390          KK     ST3
391          KM
392          KM     DESERT FOOTHILLS DRIVE (SOUTH)
393          KM
394          KM              AREA     17.0       AC
395          KM              Tlag    17.14      MIN
396          KM                CN       95
397          BA    .0265
398          LS       0       95
399          UD    .1714
             *

400          KK     C-20
401          KM    COMBINE C-19 AND A
402          HC        2
             *

403          KK     ST7B
404          KM
405          KM     COLLECTOR ROAD (SOUTH)
406          KM
407          KM              AREA      6.5       AC
408          KM              Tlag     7.94      MIN
409          KM                CN       95
410          BA    .0102
411          LS       0       95
412          UD    .0794
             *
```



```
1                                    HEC-1 INPUT

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

413          KK        D
414          KM
415          KM     SINGLE FAMILY: DENSITY = 5.1 UNITS/ACRE
416          KM
417          KM              AREA     25.5       AC
418          KM              Tlag    11.46      MIN
419          KM                CN       86
420          BA    .0398
421          LS       0       86
422          UD    .1146
             *
```

```
423            KK    C-21
424            KM    COMBINE COLLECTOR ROAD AND D
425            HC       2
               *

426            KK    RC-21
427            KM    ROUTE DOWNSTREAM OF D THROUGH CHARELSTON BLVD.
428            RD     900   0.023   0.013            CIRC     4.0
               *

429            KK       C
430            KM
431            KM     SINGLE FAMILY ATTACHED: DENSITY = 10.0 UNITS/ACRE
432            KM
433            KM              AREA    17.4      AC
434            KM              Tlag    10.09     MIN
435            KM                CN      90
436            BA    .0272
437            LS       0       90
438            UD    .1009
               *

439            KK    C-22
440            KM    COMBINE C-21 AND C
441            HC       2
               *

442            KK    RC-22
443            KM    ROUTE DOWNSTREAM OF C THROUGH CHARLESTON BLVD.
444            RD     1100   0.017   0.013            CIRC     4.0
               *

445            KK    ST-1
446            KM
447            KM     CHARLESTON BOULEVARD
448            KM
449            KM              AREA    10.6      AC
450            KM              Tlag    15.74     MIN
451            KM                CN      94
452            BA    .0165
453            LS       0       94
454            UD    .1574
               *
```



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

455            KK    C-23
456            KM    COMBINE C-22 AND ST-1
457            HC       2
               *

458            KK    CP-CH
459            KM    COMBINE C-23 AND C-9B
460            HC       2
               *

461            KK    ST7A
462            KM
463            KM     COLLECTOR ROAD ROUTED TO RED ROCK DETENTION BASIN
464            KM
465            KM              AREA     9.4      AC
466            KM              Tlag    10.97     MIN
467            KM                CN      95
468            BA    .0147
469            LS       0       95
470            UD    .1097
               *

471            KK     ST8
472            KM
473            KM     ALTA DRIVE
474            KM
475            KM              AREA    12.9      AC
476            KM              Tlag    13.55     MIN
477            KM                CN      94
478            BA    .0202
479            LS       0       94
480            UD    .1355
               *
481            ZZ
```

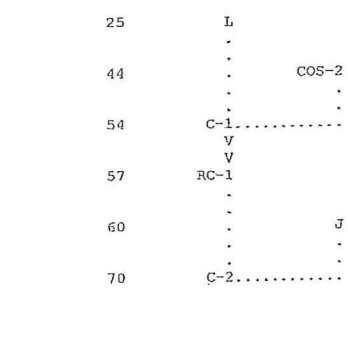
1

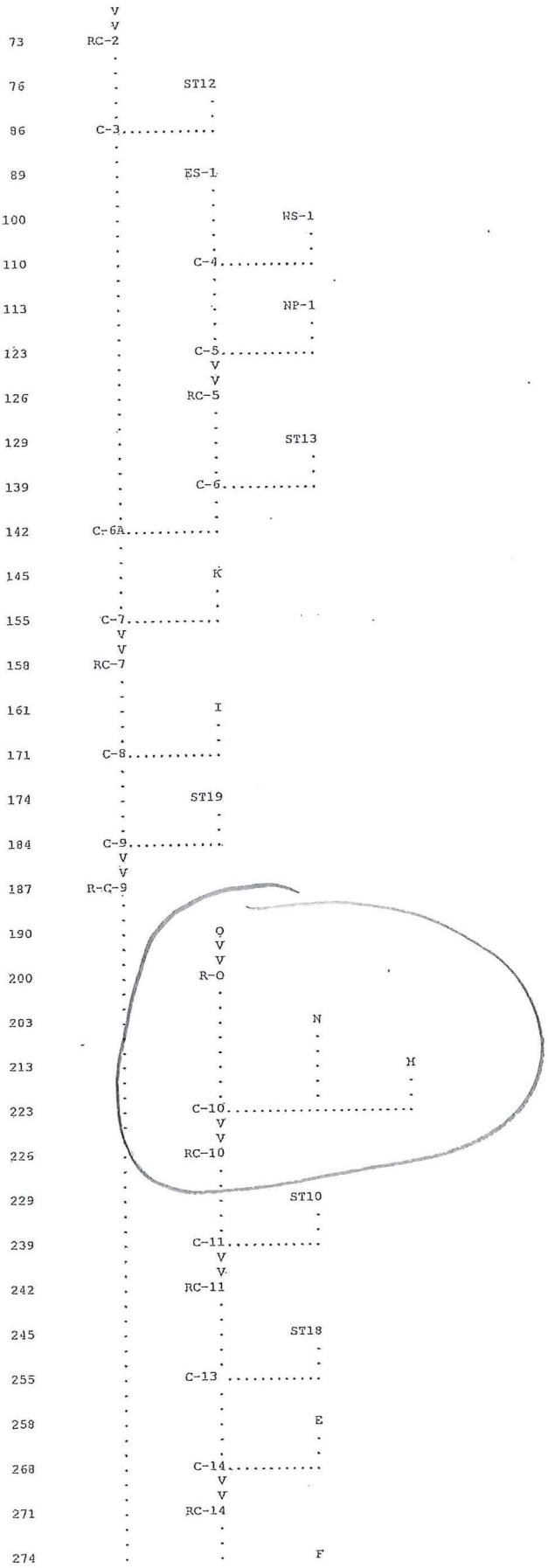
SCHEMATIC DIAGRAM OF STREAM NETWORK

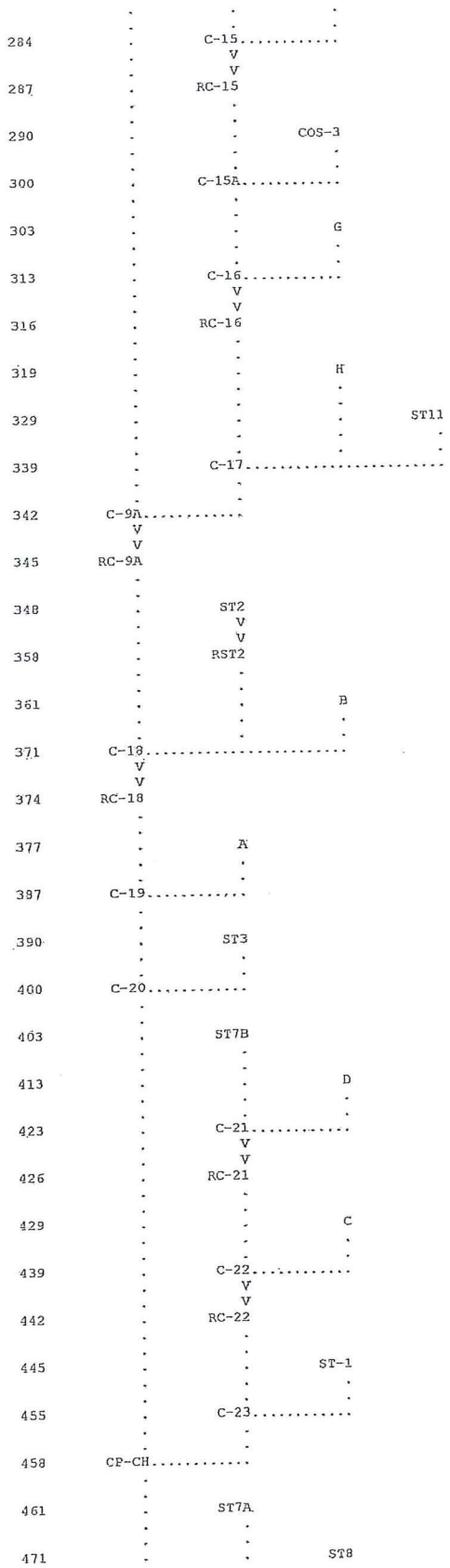
INPUT LINE NO.

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

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW




73 RC-2
76 ST12
86 C-3
89 ES-1
100 WS-1
110 C-4
113 NP-1
123 C-5
126 RC-5
129 ST13
139 C-6
142 C-6A
145 K
155 C-7
158 RC-7
161 I
171 C-8
174 ST19
184 C-9
187 R-C-9
190 O
200 R-O
203 N
213 M
223 C-10
225 RC-10
229 ST10
239 C-11
242 RC-11
245 ST18
255 C-13
258 E
268 C-14
271 RC-14
274 F



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1**********
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *

****
*
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *

```
*            VERSION 4.1                 *
*                                        *
*  RUN DATE   13JUN11  TIME  12:56:46    *
*                                        *
******************************************
```


```
*          609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616          *
*           (916) 756-1104               *
*                                        *
******************************************
```


```
**********************************************************
*  :.....................................................  *
*  :                  SUMMERLIN VILLAGE 23A              :  *
*  :                  UNIT 2 IMPROVEMENTS                :  *
*  :                  DEVELOPED ONSITE                   :  *
*  : UPDATE #2 TO THE TDS-REVISED TO REFLECT M, N, O REVISION :  *
*  :.....................................................  *
*  :            RETURN PERIOD_ _ _ _10 & 100-YEAR        :  *
*  :            DISTRIBUTION_ _ _ _ 6-HOUR SDN3          :  *
*  :            PROJECT NO_ _ _ _ _ 62023.112            :  *
*  :            FILENAME_ _ _ _ _ _  112-ULT.H1          :  *
*  :            DATE_ _ _ _ _ _ _ 6/13/2011              :  *
*  :            MODELED BY_ _ _ _      DY                :  *
*  :                                                     :  *
*  :  DEPTH AREA REDUCTION FACTORS:                     :  *
*  :  AREA              DARF                            :  *
*  :  0.5 SQ MI          .98                            :  *
*  :  10-YEAR STORM      .56                            :  *
*  :.....................................................  *
**********************************************************
```

```
  22 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         200  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1   0  ENDING DATE
                     NDTIME       1635  ENDING TIME
                      ICENT          19  CENTURY MARK

                   COMPUTATION INTERVAL      .08 HOURS
                     TOTAL TIME BASE   16.58 HOURS

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

     JP          MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                   1.00       .98       .56
1
```

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00	RATIO 2 .98	RATIO 3 .56
HYDROGRAPH AT	L	.03	1	FLOW	57.	55.	24.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	COS-2	.00	1	FLOW	5.	5.	2.
+				TIME	3.50	3.50	3.50
2 COMBINED AT	C-1	.04	1	FLOW	61.	59.	25.
+				TIME	3.58	3.58	3.58
ROUTED TO	RC-1	.04	1	FLOW	60.	59.	25.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	J	.03	1	FLOW	53.	52.	21.
+				TIME	3.50	3.50	3.58
2 COMBINED AT	C-2	.07	1	FLOW	113.	110.	47.
+				TIME	3.58	3.58	3.58
ROUTED TO	RC-2	.07	1	FLOW	113.	110.	46.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	ST12	.01	1	FLOW	19.	18.	9.
+				TIME	3.50	3.50	3.50

+ 2 COMBINED AT	C-3	.08	1	FLOW	129.	126.	55.
				TIME	3.58	3.58	3.58
+ HYDROGRAPH AT	ES-1	.02	1	FLOW	32.	31.	13.
				TIME	3.50	3.50	3.58
+ HYDROGRAPH AT	WS-1	.01	1	FLOW	17.	17.	8.
				TIME	3.50	3.50	3.50
+ 2 COMBINED AT	C-4	.03	1	FLOW	49.	48.	22.
				TIME	3.50	3.50	3.50
+ HYDROGRAPH AT	NP-1	.02	1	FLOW	20.	20.	5.
				TIME	3.58	3.58	3.58
+ 2 COMBINED AT	C-5	.05	1	FLOW	66.	64.	25.
				TIME	3.50	3.50	3.58
+ ROUTED TO	RC-5	.05	1	FLOW	65.	63.	25.
				TIME	3.58	3.58	3.58
+ HYDROGRAPH AT	ST13	.01	1	FLOW	12.	12.	6.
				TIME	3.50	3.50	3.50
+ 2 COMBINED AT	C-6	.05	1	FLOW	77.	74.	31.
				TIME	3.58	3.58	3.58
+ 2 COMBINED AT	C-6A	.13	1	FLOW	206.	200.	85.
				TIME	3.58	3.58	3.58
+ HYDROGRAPH AT	K	.03	1	FLOW	52.	50.	20.
				TIME	3.50	3.50	3.58
+ 2 COMBINED AT	C-7	.16	1	FLOW	257.	250.	105.
				TIME	3.58	3.58	3.58
+ ROUTED TO	RC-7	.16	1	FLOW	257.	249.	104.
				TIME	3.58	3.58	3.58
+ HYDROGRAPH AT	I	.04	1	FLOW	61.	59.	24.
				TIME	3.58	3.58	3.58
+ 2 COMBINED AT	C-8	.20	1	FLOW	317.	308.	129.
				TIME	3.58	3.58	3.58
+ HYDROGRAPH AT	ST19	.00	1	FLOW	8.	8.	4.
				TIME	3.50	3.50	3.50
+ 2 COMBINED AT	C-9	.20	1	FLOW	323.	314.	132.
				TIME	3.58	3.58	3.58
+ ROUTED TO	R-C-9	.20	1	FLOW	321.	312.	130.
				TIME	3.58	3.58	3.58
+ HYDROGRAPH AT	O	.03	1	FLOW	62.	60.	27.
				TIME	3.50	3.50	3.58
+ ROUTED TO	R-O	.03	1	FLOW	61.	59.	27.
				TIME	3.58	3.58	3.58
+ HYDROGRAPH AT	N	.03	1	FLOW	46.	45.	20.
				TIME	3.50	3.50	3.58
+ HYDROGRAPH AT	M	.04	1	FLOW	60.	58.	25.
				TIME	3.58	3.58	3.58
+ 3 COMBINED AT	C-10	.09	1	FLOW	167.	163.	72.
				TIME	3.58	3.58	3.58
+ ROUTED TO	RC-10	.09	1	FLOW	167.	162.	71.
				TIME	3.58	3.58	3.58
+ HYDROGRAPH AT	ST10	.01	1	FLOW	23.	23.	11.
				TIME	3.50	3.50	3.50
+ 2 COMBINED AT	C-11	.10	1	FLOW	188.	183.	82.
				TIME	3.58	3.58	3.58

$Q_{100} \approx 72$ CFS
(+17 CFS INCREASE)
$Q_{100} = 53$ CFS

ROUTED TO	RC-11	.10	1	FLOW	107.	183.	81.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	ST18	.00	1	FLOW	8.	8.	4.
+				TIME	3.50	3.50	3.50
2 COMBINED AT	C-13	.11	1	FLOW	194.	189.	85.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	E	.04	1	FLOW	64.	63.	27.
+				TIME	3.58	3.58	3.58
2 COMBINED AT	C-14	.15	1	FLOW	259.	252.	112.
+				TIME	3.58	3.58	3.58
ROUTED TO	RC-14	.15	1	FLOW	257.	250.	110.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	F	.03	1	FLOW	57.	56.	24.
+				TIME	3.50	3.50	3.58
2 COMBINED AT	C-15	.18	1	FLOW	314.	305.	135.
+				TIME	3.58	3.58	3.58
ROUTED TO	RC-15	.18	1	FLOW	311.	303.	133.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	COS-3	.00	1	FLOW	6.	5.	2.
+				TIME	3.50	3.50	3.50
2 COMBINED AT	C-15A	.18	1	FLOW	316.	308.	135.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	G	.03	1	FLOW	47.	45.	18.
+				TIME	3.58	3.58	3.58
2 COMBINED AT	C-16	.21	1	FLOW	363.	353.	153.
+				TIME	3.58	3.58	3.58
ROUTED TO	RC-16	.21	1	FLOW	361.	351.	151.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	H	.03	1	FLOW	51.	50.	20.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	ST11	.02	1	FLOW	34.	33.	17.
+				TIME	3.58	3.58	3.58
3 COMBINED AT	C-17	.26	1	FLOW	446.	434.	189.
+				TIME	3.58	3.58	3.58
2 COMBINED AT	C-9A	.46	1	FLOW	767.	746.	319.
+				TIME	3.58	3.58	3.58
ROUTED TO	RC-9A	.46	1	FLOW	762.	740.	315.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	ST2	.00	1	FLOW	6.	5.	3.
+				TIME	3.50	3.50	3.50
ROUTED TO	RST2	.00	1	FLOW	5.	5.	2.
+				TIME	3.50	3.50	3.50
HYDROGRAPH AT	B	.02	1	FLOW	46.	45.	20.
+				TIME	3.50	3.50	3.58
3 COMBINED AT	C-18	.48	1	FLOW	811.	780.	338.
+				TIME	3.58	3.58	3.58
ROUTED TO	RC-18	.48	1	FLOW	805.	782.	334.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT	A	.03	1	FLOW	50.	48.	22.
+				TIME	3.50	3.50	3.50
2 COMBINED AT	C-19	.51	1	FLOW	852.	827.	355.
+				TIME	3.58	3.58	3.58
HYDROGRAPH AT							

+	ST3	.03	1	FLOW	53.	52.	27.
				TIME	3.58	3.58	3.58
2 COMBINED AT							
+	C-20	.53	1	FLOW	905.	879.	382.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT							
+	ST7B	.01	1	FLOW	25.	24.	13.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	D	.04	1	FLOW	66.	64.	27.
				TIME	3.58	3.58	3.58
2 COMBINED AT							
+	C-21	.05	1	FLOW	89.	87.	38.
				TIME	3.50	3.50	3.50
ROUTED TO							
+	RC-21	.05	1	FLOW	86.	84.	37.
				TIME	3.50	3.50	3.58
HYDROGRAPH AT							
+	C	.03	1	FLOW	54.	52.	24.
				TIME	3.50	3.50	3.50
2 COMBINED AT							
+	C-22	.08	1	FLOW	140.	136.	60.
				TIME	3.50	3.50	3.58
ROUTED TO							
+	RC-22	.08	1	FLOW	137.	133.	60.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT							
+	ST-1	.02	1	FLOW	33.	32.	17.
				TIME	3.58	3.58	3.58
2 COMBINED AT							
+	C-23	.09	1	FLOW	170.	166.	76.
				TIME	3.58	3.58	3.58
2 COMBINED AT							
+	CP-CH	.63	1	FLOW	1075.	1045.	458.
				TIME	3.58	3.58	3.58
HYDROGRAPH AT							
+	ST7A	.01	1	FLOW	32.	31.	16.
				TIME	3.50	3.50	3.50
HYDROGRAPH AT							
+	ST8	.02	1	FLOW	42.	41.	21.
				TIME	3.58	3.58	3.58

1

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

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
RC-1	MANE	.57	60.43	215.10	2.03	5.00	60.37	215.00	2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3865E+01 EXCESS= .0000E+00 OUTFLOW= .3865E+01 BASIN STORAGE= .5234E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RC-1	MANE	.57	58.79	215.14	1.97	5.00	58.72	215.00	1.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3753E+01 EXCESS= .0000E+00 OUTFLOW= .3753E+01 BASIN STORAGE= .5239E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RC-1	MANE	.68	25.22	215.23	.81	5.00	25.12	215.00	.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1542E+01 EXCESS= .0000E+00 OUTFLOW= .1542E+01 BASIN STORAGE= .5073E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RC-2	MANE	.43	113.09	215.04	1.98	5.00	113.06	215.00	1.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7134E+01 EXCESS= .0000E+00 OUTFLOW= .7134E+01 BASIN STORAGE= .4261E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RC-2	MANE	.43	109.93	214.95	1.92	5.00	109.92	215.00	1.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6924E+01 EXCESS= .0000E+00 OUTFLOW= .6924E+01 BASIN STORAGE= .4378E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RC-2	MANE	.51	46.38	215.48	.77	5.00	46.21	215.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2792E+01 EXCESS= .0000E+00 OUTFLOW= .2792E+01 BASIN STORAGE= .4446E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-5 MANE .92 66.03 211.38 1.71 5.00 65.47 215.00 1.71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4204E+01 EXCESS= .0000E+00 OUTFLOW= .4204E+01 BASIN STORAGE= .8676E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-5 MANE .92 64.23 211.76 1.65 5.00 63.42 215.00 1.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4073E+01 EXCESS= .0000E+00 OUTFLOW= .4073E+01 BASIN STORAGE= .8876E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-5 MANE 1.12 24.97 212.17 .64 5.00 24.81 215.00 .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1574E+01 EXCESS= .0000E+00 OUTFLOW= .1574E+01 BASIN STORAGE= .8291E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-7 MANE .51 256.65 215.07 1.93 5.00 256.60 215.00 1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1642E+02 EXCESS= .0000E+00 OUTFLOW= .1642E+02 BASIN STORAGE= .5915E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-7 MANE .51 249.26 214.77 1.87 5.00 249.21 215.00 1.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1594E+02 EXCESS= .0000E+00 OUTFLOW= .1594E+02 BASIN STORAGE= .6197E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-7 MANE .61 104.63 215.22 .76 5.00 104.45 215.00 .76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6467E+01 EXCESS= .0000E+00 OUTFLOW= .6467E+01 BASIN STORAGE= .6188E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
R-C-9 MANE .78 321.59 215.17 1.94 5.00 321.36 215.00 1.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2064E+02 EXCESS= .0000E+00 OUTFLOW= .2064E+02 BASIN STORAGE= .1062E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
R-C-9 MANE .78 312.31 214.85 1.88 5.00 312.24 215.00 1.89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2003E+02 EXCESS= .0000E+00 OUTFLOW= .2003E+02 BASIN STORAGE= .1047E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
R-C-9 MANE .93 130.71 215.43 .76 5.00 130.12 215.00 .77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8130E+01 EXCESS= .0000E+00 OUTFLOW= .8130E+01 BASIN STORAGE= .1054E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
R-O MANE .80 61.94 211.46 2.20 5.00 60.55 215.00 2.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3858E+01 EXCESS= .0000E+00 OUTFLOW= .3858E+01 BASIN STORAGE= .7157E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
R-O MANE .81 60.20 210.97 2.14 5.00 59.12 215.00 2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3752E+01 EXCESS= .0000E+00 OUTFLOW= .3752E+01 BASIN STORAGE= .7366E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
R-O MANE .95 27.02 211.74 .92 5.00 26.93 215.00 .92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1620E+01 EXCESS= .0000E+00 OUTFLOW= .1620E+01 BASIN STORAGE= .7588E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-10 MANE .47 166.54 214.68 2.09 5.00 166.50 215.00 2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1048E+02 EXCESS= .0000E+00 OUTFLOW= .1048E+02 BASIN STORAGE= .4937E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-10 MANE .47 162.30 214.86 2.03 5.00 162.21 215.00 2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1019E+02 EXCESS= .0000E+00 OUTFLOW= .1019E+02 BASIN STORAGE= .5199E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-10 MANE .56 71.33 215.26 .85 5.00 71.23 215.00 .85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4257E+01 EXCESS= .0000E+00 OUTFLOW= .4257E+01 BASIN STORAGE= .4947E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-11 MANE .74 187.55 214.73 2.14 5.00 187.37 215.00 2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1196E+02 EXCESS= .0000E+00 OUTFLOW= .1196E+02 BASIN STORAGE= .3569E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-11 MANE .74 182.77 215.09 2.08 5.00 182.73 215.00 2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1163E+02 EXCESS= .0000E+00 OUTFLOW= .1163E+02 BASIN STORAGE= .8675E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-11 MANE .87 81.25 215.10 .88 5.00 81.16 215.00 .88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4941E+01 EXCESS= .0000E+00 OUTFLOW= .4941E+01 BASIN STORAGE= .9200E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-14 MANE .81 257.08 215.04 2.14 5.00 257.00 215.00 2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1654E+02 EXCESS= .0000E+00 OUTFLOW= .1654E+02 BASIN STORAGE= .9417E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-14 MANE .82 250.52 215.32 2.08 5.00 250.04 215.00 2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1608E+02 EXCESS= .0000E+00 OUTFLOW= .1608E+02 BASIN STORAGE= .1018E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-14 MANE .96 111.26 215.82 .88 5.00 110.32 215.00 .88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6835E+01 EXCESS= .0000E+00 OUTFLOW= .6835E+01 BASIN STORAGE= .9734E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-15 MANE .51 312.00 215.24 2.13 5.00 311.46 215.00 2.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2010E+02 EXCESS= .0000E+00 OUTFLOW= .2010E+02 BASIN STORAGE= .6734E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-15 MANE .52 303.68 215.38 2.07 5.00 303.12 215.00 2.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1954E+02 EXCESS= .0000E+00 OUTFLOW= .1954E+02 BASIN STORAGE= .6480E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-15 MANE .61 133.80 215.45 .88 5.00 133.00 215.00 .88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8275E+01 EXCESS= .0000E+00 OUTFLOW= .8275E+01 BASIN STORAGE= .6898E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-16 MANE .39 361.56 215.37 2.09 5.00 360.73 215.00 2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2333E+02 EXCESS= .0000E+00 OUTFLOW= .2333E+02 BASIN STORAGE= .5185E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-16 MANE .40 351.77 215.37 2.03 5.00 350.92 215.00 2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2267E+02 EXCESS= .0000E+00 OUTFLOW= .2267E+02 BASIN STORAGE= .5337E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-16 MANE .47 152.09 215.22 .85 5.00 151.42 215.00 .85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9495E+01 EXCESS= .0000E+00 OUTFLOW= .9495E+01 BASIN STORAGE= .5068E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-9A MANE .47 763.90 215.49 2.04 5.00 762.12 215.00 2.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4948E+02 EXCESS= .0000E+00 OUTFLOW= .4948E+02 BASIN STORAGE= .6734E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-9A MANE .47 742.38 215.27 1.98 5.00 740.38 215.00 1.98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4806E+02 EXCESS= .0000E+00 OUTFLOW= .4805E+02 BASIN STORAGE= .6797E-04 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00
RC-9A MANE .56 317.17 215.74 .82 5.00 315.37 215.00 .82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1998E+02 EXCESS= .0000E+00 OUTFLOW= .1998E+02 BASIN STORAGE= .6885E-04 PERCENT ERROR= .0

```
          FOR PLAN = 1  RATIO=  .00
              RST2  MANE          1.92       5.28    211.48      2.53      5.00      5.01    210.00        2.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2837E+00 EXCESS= .0000E+00 OUTFLOW= .2838E+00 BASIN STORAGE= .1523E-03 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              RST2  MANE          1.93       5.04    210.52      2.47      5.00      4.91    210.00        2.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2764E+00 EXCESS= .0000E+00 OUTFLOW= .2764E+00 BASIN STORAGE= .1567E-03 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              RST2  MANE          2.21       2.61    212.37      1.17      5.00      2.44    210.00        1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1312E+00 EXCESS= .0000E+00 OUTFLOW= .1312E+00 BASIN STORAGE= .1036E-03 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
              RC-18  MANE          .47     808.06    215.43      2.05      5.00    805.30    215.00        2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5269E+02 EXCESS= .0000E+00 OUTFLOW= .5269E+02 BASIN STORAGE= .7509E-04 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
              RC-18  MANE          .47     784.29    215.26      1.99      5.00    781.96    215.00        1.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5118E+02 EXCESS= .0000E+00 OUTFLOW= .5118E+02 BASIN STORAGE= .7422E-04 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
              RC-18  MANE          .56     336.80    215.55       .83      5.00    333.74    215.00         .83

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2136E+02 EXCESS= .0000E+00 OUTFLOW= .2136E+02 BASIN STORAGE= .7361E-04 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
              RC-21  MANE          .78      89.05    210.97      2.08      5.00     86.25    210.00        2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5549E+01 EXCESS= .0000E+00 OUTFLOW= .5549E+01 BASIN STORAGE= .7352E-04 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
              RC-21  MANE          .78      86.70    211.35      2.02      5.00     83.88    210.00        2.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5391E+01 EXCESS= .0000E+00 OUTFLOW= .5391E+01 BASIN STORAGE= .7463E-04 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
              RC-21  MANE          .93      37.63    211.96       .85      5.00     36.84    215.00         .86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2278E+01 EXCESS= .0000E+00 OUTFLOW= .2278E+01 BASIN STORAGE= .7562E-04 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
              RC-22  MANE          .98     139.78    212.02      2.14      5.00    136.72    215.00        2.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8823E+01 EXCESS= .0000E+00 OUTFLOW= .8823E+01 BASIN STORAGE= .1026E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
              RC-22  MANE          .99     135.75    211.20      2.08      5.00    133.05    215.00        2.08

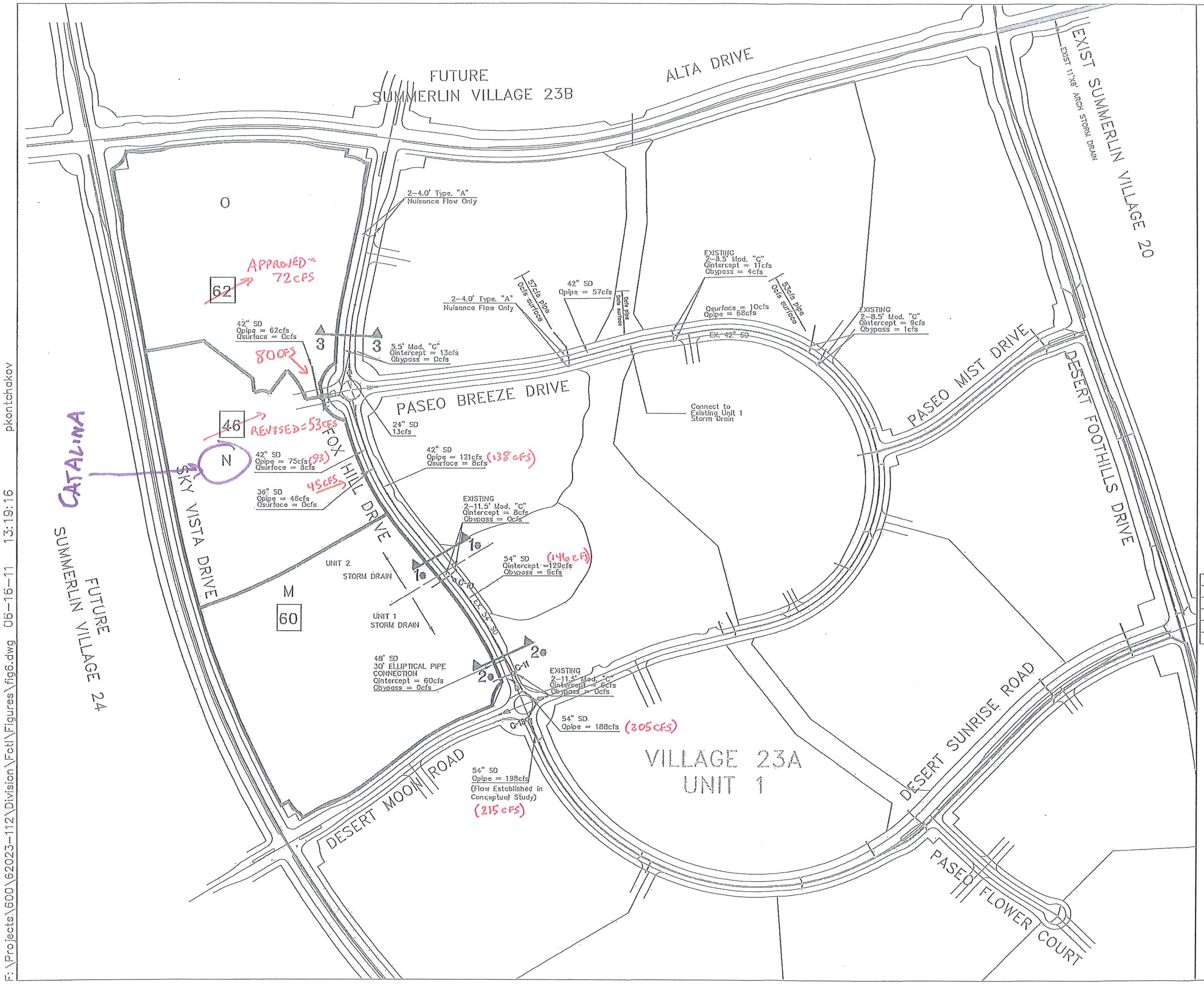
CONTINUITY SUMMARY (AC-FT) - INFLOW= .8576E+01 EXCESS= .0000E+00 OUTFLOW= .8575E+01 BASIN STORAGE= .1176E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
              RC-22  MANE         1.16      59.84    211.78       .89      5.00     59.61    215.00         .89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3674E+01 EXCESS= .0000E+00 OUTFLOW= .3674E+01 BASIN STORAGE= .1085E-03 PERCENT ERROR=    .0


*** NORMAL END OF HEC-1 ***
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Drainage Facilities Exhibit



NORTH

SCALE 1"=400'

GRAPHIC SCALE

400 0 200 400

(IN FEET)

1 inch = 400 ft.

LEGEND

- SUBBASIN BOUNDARY
- A PARCEL NAME
- PROPOSED STORM DRAIN
- 42" SD Qpipe = 121cfs Qsurface = 8cfs — PARCEL DISCHARGE
- 13 MAXIMUM COMBINED DISCHARGE FROM PARCEL
- 3 3 STREET CROSS SECTION LOCATION
- EXISTING STORM DRAIN

STREET CROSS SECTION SUMMARY

X-SECT LABEL	SLOPE %	Q100(cfs)	D100(ft)	V100(fps)	VxD
1*	4.9	28	0.44	5.9	2.6
2*	1.0	17	0.48	2.9	1.4
3	5.3	13	0.35	5.1	1.8
12*	2.7	15	0.40	4.1	1.6
13*	6.0	20	0.39	5.9	2.3

* ANALYZED IN THE UNIT 1 STUDY

Summary of HEC-1 Model

Basin or Location	Q100 (cfs)	Q10 (cfs)
O	62	27
N	46	20
M	60	25
C-10	167	72
C-11	188	82
C-13	194	85

SUMMERLIN VILLAGE 23A
UNIT 2 IMPROVEMENTS
UPDATE # 2

FIGURE 6 (REVISED)

DRAINAGE FACILITIES MAP

G.C. WALLACE, INC.
Engineers/Planners/Surveyors

F:\Projects\600\62023-112\Division\Fctl\Figures\fig6.dwg 06-16-11 13:19:16 pkontchakov

Storm Drain Hydraulics Calculations

Fox Hill Drive Storm Drain (unit 1)

G.C. Wallace, Inc. — Hydraulic Calculations for Example in Section 807.2 of CCRFCD Manual — DATE: 06/16/11 — FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 — Inlet Structure Type or K_i= 1 — Projecting Entrance:Grooved Edge (RCP)

	CONDUIT DATA									FLOW DATA									ENERGY LOSS DATA																					EGL & HGL				COMMENTS	
																			PIPE	TRANSITION																					CONDUIT		TRANSITION		FULL/	
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV		L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	Frict	Frict	Manhole			Junction			Contraction/ Inlet		Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		PART	CRTL
	FROM (ft)	TO (ft)	T/R	D (in)	SPAN (ft)	RISE (ft)	AREA (ft^2)	HYD RAD (ft)		D/S (ft)	U/S (ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	S_f (ft/ft)	H_f (ft)	H_f (ft)	Θ (deg)	K_{mh}	H_{mh} (ft)	Θ (deg)	K_j	H_j (ft)	Inlet/ Cont	K_i	H_e (ft)	Θ (deg)	K_o	H_o (ft)	R_{bend} (ft)	Θ (deg)	K_b	H_b (ft)	H_m (ft)	Total (ft)	U/S EGL	U/S HGL	U/S EGL	U/S HGL	FULL/ PART FLOW	CRTL
1		1000.00		72							97.12																															105.71	105.71		
2	1000.00	1062.36	R	72	DESERT FOOTHILLS				1	97.12	98.22	62.4	1.76%	28.27	0.0049	452	15.99	3.97	0.0114	0.0114	0.71		REVISED Q = 469 cfs																	0.00	108.19	104.22			PART	D/S
3	1062.36	1067.36	T	72					1	98.22	98.28	5.0	1.20%	28.27	0.0049	452	15.99	3.97	0.0114	0.0114		0.06	0	0.02	0.08										45	45	0.18	0.70		0.84			109.03	105.06	FULL	U/S
4	1067.36	1117.56	R	72					1	98.28	98.75	50.2	0.94%	28.27	0.0049	452	15.99	3.97	0.0114	0.0114	0.57																			0.00	109.60	105.63			FULL	U/S
5	1117.56	1241.90	R	72					1	98.75	101.34	124.3	2.08%	28.27	0.0049	452	15.99	3.97	0.0114	0.0114	1.42																			0.00	111.31	107.34			FULL	D/S
6	1241.90	1246.90	T	72					1	101.34	101.48	5.0	2.80%	28.27	0.0049	384	13.58	2.86	0.0082	0.0098		0.05	0	0.02	0.08														2.20	2.33			113.64	110.77	FULL	U/S
7	1246.90	1627.39	R	72					1	101.48	105.27	380.5	1.00%	28.27	0.0049	384	13.58	2.86	0.0082	0.0082	3.13																			0.00	116.77	113.90			FULL	U/S
8	1627.39	1632.39	T	66					1	105.27	105.77	5.0	10.00%	23.76	0.0049	331	13.93	3.01	0.0097	0.0090		0.04	0	0.02	0.06														1.21	1.31			118.08	115.06	FULL	U/S
9	1632.39	2008.54	R	66					1	105.77	109.52	376.2	1.00%	23.76	0.0049	331	13.93	3.01	0.0097	0.0097	3.66																			0.00	121.73	118.72			FULL	U/S
10	2008.54	2013.54	T	66					1	109.52	109.62	5.0	2.00%	23.76	0.0049	331	13.93	3.01	0.0097	0.0097		0.05	0	0.02	0.06															0.11			121.84	118.83	FULL	U/S
11	2013.54	2403.54	R	66	STA. 114+25.00				1	109.62	113.53	390.0	1.00%	23.76	0.0049	331	13.93	3.01	0.0097	0.0097	3.79																			0.00	125.63	122.62			FULL	U/S
12	2403.54	2408.54	T	60					1	113.53	114.08	5.0	11.00%	19.63	0.0049	319	16.25	4.10	0.0150	0.0124		0.06	0	0.02	0.06														0.41	0.53			126.17	122.07	FULL	U/S
13	2408.54	2497.51	R	60					1	114.08	114.97	89.0	1.00%	19.63	0.0049	319	16.25	4.10	0.0150	0.0150	1.33																			0.00	127.50	123.40			FULL	U/S
14	2497.51	2502.51	T	60					1	114.97	115.17	5.0	4.00%	19.63	0.0049	319	16.25	4.10	0.0150	0.0150		0.08	0	0.02	0.08										15	15	0.10	0.42		0.58			128.08	123.98	FULL	U/S
15	2502.51	2657.61	R	60	STA. 116+74.98				1	115.17	117.80	155.1	1.70%	19.63	0.0049	319	16.25	4.10	0.0150	0.0150	2.33																			0.00	130.40	126.30			FULL	U/S
16	2657.61	2662.61	T	60					1	117.80	118.00	5.0	4.00%	19.63	0.0049	281	14.31	3.18	0.0116	0.0133		0.07				90	0.25	3.30												3.37			133.77	130.59	FULL	U/S
17	2662.61	2992.78	R	60					1	118.00	128.60	330.2	3.21%	19.63	0.0049	281	14.31	3.18	0.0116	0.0116	3.84																			0.00	137.62	134.44			FULL	U/S
18	2992.78	2997.78	T	60					1	128.60	128.80	5.0	4.00%	19.63	0.0049	262	13.34	2.76	0.0101	0.0109		0.05	0	0.02	0.06														0.81	0.93			138.54	135.78	FULL	U/S
19	2997.78	3327.95	R	60					1	128.80	142.01	330.2	4.00%	19.63	0.0049	262	13.34	2.76	0.0101	0.0101	3.34																			0.00	149.77	147.01			PART	D/S
20	3327.95	3332.95	T	60					1	142.01	142.21	5.0	4.00%	19.63	0.0049	262	13.34	2.76	0.0101	0.0101		0.05																		0.05			149.97	147.21	FULL	U/S
21	3332.95	3661.12	R	60					1	142.21	148.06	328.2	1.78%	19.63	0.0049	262	13.34	2.76	0.0101	0.0101	3.32																			0.00	155.82	153.06			PART	D/S
22	3661.12	3666.12	T	54					1	148.06	148.56	5.0	10.00%	15.90	0.0049	213	13.39	2.79	0.0117	0.0109		0.05				90	0.25	2.07												2.12			157.95	155.16	FULL	U/S
23	3666.12	3709.18	R	54					1	148.56	151.42	43.1	6.64%	15.90	0.0049	213	13.39	2.79	0.0117	0.0117	0.50																			0.00	158.71	155.92			FULL	D/S
24	3709.18	3714.18	T	54					1	151.42	151.62	5.0	4.00%	15.90	0.0049	198	12.45	2.41	0.0101	0.0109		0.05																	0.75	0.80			159.51	157.10	FULL	U/S
25	3714.18	4024.48	R	54					1	151.62	170.40	310.3	6.05%	15.90	0.0049	198	12.45	2.41	0.0101	0.0101	3.14																			0.00	177.31	174.90			PART	D/S
26	4024.48	4029.48	T	54					1	170.40	170.60	5.0	4.00%	15.90	0.0049	198	12.45	2.41	0.0101	0.0101		0.05																		0.05			177.51	175.10	FULL	D/S
27	4029.48	4386.37	R	54					1	170.60	185.08	356.9	4.06%	15.90	0.0049	198	12.45	2.41	0.0101	0.0101	3.62																			0.00	191.99	189.58			PART	D/S
28	4386.37	4391.37	T	54					1	185.08	185.28	5.0	4.00%	15.90	0.0049	198	12.45	2.41	0.0101	0.0101		0.05												15	15	0.10	0.25		0.30			192.28	189.88	FULL	U/S
29	4391.37	4489.62	R	54					1	185.28	187.50	98.3	2.26%	15.90	0.0049	198	12.45	2.41	0.0101	0.0101	1.00																			0.00	194.41	192.00			PART	D/S
30	4489.62	4494.62	T	54					1	187.50	187.70	5.0	4.00%	15.90	0.0049	188	11.82	2.17	0.0091	0.0096		0.05				45	0.50	1.32								45	45	0.18	0.38		1.75			196.16	193.99	FULL	U/S
31	4494.62	4579.21	R	54					1	187.70	190.39	84.6	3.18%	15.90	0.0049	188	11.82	2.17	0.0091	0.0091	0.77																			0.00	197.06	194.89			FULL	D/S
32	4579.21	4584.21	T	54					1	190.39	190.89	5.0	10.00%	15.90	0.0049	188	11.82	2.17	0.0091	0.0091		0.05																		0.05			197.65	195.48	FULL	U/S
33	4584.21	4658.88	R	54					1	190.89	193.28	74.7	3.20%	15.90	0.0049	188	11.82	2.17	0.0091	0.0091	0.68																			0.00	199.95	197.78			PART	D/S
34	4658.88	4663.88	T	54					1	193.28	193.48	5.0	4.00%	15.90	0.0049	188	11.82	2.17	0.0091	0.0091		0.05	45	0.46	1.00										45	45	0.18	0.38		1.43			201.38	199.21	FULL	U/S
35	4663.88	4745.57	R	54					1	193.48	196.08	81.7	3.18%	15.90	0.0049	188	11.82	2.17	0.0091	0.0091	0.75																			0.00	202.75	200.58			FULL	D/S
36	4745.57	4750.57	T	54					1	196.08	196.28	5.0	4.00%	15.90	0.0049	188	11.82	2.17	0.0091	0.0091		0.05																	0.28	0.33			203.08	200.91	FULL	U/S
37	4750.57	4816.09	R	54	Sta. 137+81.33				1	196.28	198.33	65.5	3.13%	15.90	0.0049	188	11.82	2.17	0.0091	0.0091	0.60																			0.00	205.00	202.83			PART	D/S
38	4816.09	4821.09	T	54	ESPERANZA				1	198.33	198.48	5.0	3.00%	15.90	0.0049	129	8.11	1.02	0.0043	0.0067		0.03				90	0.25	1.91												1.95			206.95	205.93	FULL	U/S
39	4821.09	4984.94	R	54					1	198.48	203.45	163.8	3.03%	15.90	0.0049	129	8.11	1.02	0.0043	0.0043	0.70																			0.00	208.97	207.95			PART	D/S
40	4984.94	4989.94	T	54					1	203.45	203.65	5.0	4.00%	15.90	0.0049	129	8.11	1.02	0.0043	0.0043		0.02	0	0.02	0.02															0.04			209.17	208.15	FULL	D/S
41	4989.94	5250.89	R	54					1	203.65	216.68	261.0	4.99%	15.90	0.0049	129	8.11	1.02	0.0043	0.0043	1.12																			0.00	222.20	221.18			PART	D/S
42	5250.89	5255.89	T	42					1	216.68	217.18	5.0	10.00%	9.62	0.0049	121	12.58	2.46	0.0144	0.0094		0.05				90	0.25	0.41												0.45			223.14	220.68	FULL	D/S
43	5255.89	5294.21	R	42					1	217.18	219.18	38.3	5.22%	9.62	0.0049	121	12.58	2.46	0.0144	0.0144	0.55																			0.00	225.14	222.68			PART	D/S
44	5294.21	5294.21	R	42					1	219.18	219.18	0.0		9.62	0.0049	121	12.58	2.46	0.0144	0.0144	0.00																			0.61			225.75	225.75	FULL	U/S

Ki= 0.25 0.61

Date Printed 6/16/2011 — U1 SF6REV-dy.xls

Revised with this update

Storm Drain Hydraulics Calculations

Fox Hill Drive Storm Drain (unit 2)

G.C. Wallace, Inc.

Hydraulic Calculations for Example in Section 807.2 of CCRFCD Manual

DATE: 06/16/11 FILE: SF6.xls

Storm Drain Manning's n (typ=0.013)= 0.013 Inlet Structure Type or K_i= Projecting Entrance:Grooved Edge (RCP)

	CONDUIT DATA										FLOW DATA									ENERGY LOSS DATA																				EGL & HGL				COMMENTS	
	STATION			PIPE	BOX		IRREG		#	INVERT ELEV	L	S	A	Φ	Q	V	V2/2g	Sf	Ave.	PIPE	TRANSITION																								
	FROM	TO	T/R	D	SPAN	RISE	AREA	HYD RAD		D/S	U/S										Frict	Frict	Manhole			Junction			Contraction/ Inlet			Expansion/Outlet			Bend				Misc		CONDUIT		TRANSITION		FULL/	
	(ft)	(ft)		(in)	(ft)	(ft)	(ft^2)	(ft)		(ft)	(ft)	(ft)	(%)	(ft^2)		(cfs)	(ft/s)	(ft)	(ft/ft)	(ft/ft)	H_f	H_f	Θ	K_{mh}	H_{mh}	Θ	K_j	H_j	Inlet/ Cont	K_i	H_e	Θ	K_o	H_o	R_{bend}	Θ	K_b	H_b	H_m	Total	U/S EGL	U/S HGL	U/S EGL	U/S HGL	PART FLOW	CRTL
		(ft)																			(ft)	(ft)	(deg)		(ft)	(deg)		(ft)			(ft)			(ft)	(deg)		(ft)	(ft)	(ft)	(ft)						
1		1000.00		42							219.18																																	
2	1000.00	1173.23	R	42					1	219.18	227.67	173.2	4.90%	9.62	0.0049	121	12.58	2.46	0.0144	0.0144	2.50		0	0.02	0.05								Outlet K_o=		1.0								225.14	222.68		
3	1173.23	1405.23	R	42					1	227.67	239.04	232.0	4.90%	9.62	0.0049	121	12.58	2.46	0.0144	0.0144	3.35		0	0.02	0.05																0.05	233.63	231.17	233.63	231.17	PART	D/S
4	1405.23	1476.19	R	42					1	239.04	241.88	71.0	4.00%	9.62	0.0049	121	12.58	2.46	0.0144	0.0144	1.03																				0.05	245.00	242.54	245.00	242.54	PART	D/S
5	1476.19	1481.19	T	42	CATALINA				1	241.88	242.08	5.0	4.00%	9.62	0.0049	75	7.80	0.94	0.0056	0.0100		0.05				90	0.25	2.22												0.00	247.84	245.38			PART	D/S
6	1481.19	1733.38	R	42					1	242.08	252.17	252.2	4.00%	9.62	0.0049	75	7.80	0.94	0.0056	0.0056	1.40		0	0.02	0.02																2.27			250.11	249.16	FULL	U/S
7	1733.38	1835.88	R	42					1	252.17	254.58	102.5	2.35%	9.62	0.0049	75	7.80	0.94	0.0056	0.0056	0.57		45	0.46	0.43																0.02	256.61	255.67	256.61	255.67	PART	D/S
8	1835.88	1885.10	R	42					1	254.58	255.70	49.2	2.26%	9.62	0.0049	75	7.80	0.94	0.0056	0.0056	0.27																				0.43	259.02	258.08	259.02	258.08	PART	D/S
9	1885.10	1889.10	T	42	PARCEL O				1	255.70	255.80	4.0	2.50%	9.62	0.0049	62	6.44	0.64	0.0038	0.0047		0.02	0	0.02	0.02	45	0.50	0.62												0.00	260.14	259.20			PART	D/S
10	1889.10	1934.70	R	42					1	255.80	257.17	45.6	3.00%	9.62	0.0049	62	6.44	0.64	0.0038	0.0038	0.17		0	0.02	0.01																0.66			260.80	260.16	FULL	U/S
11	1934.70	1969.18	R	42					1	257.17	258.19	34.5	2.96%	9.62	0.0049	62	6.44	0.64	0.0038	0.0038	0.13																				0.01	261.31	260.67	261.31	260.67	FULL	D/S
12	1969.18	1973.18	T	42					1	258.19	258.45	4.0	6.50%	9.62	0.0049	62	6.44	0.64	0.0038	0.0038		0.02	45	0.46	0.30																0.00	262.33	261.69			PART	D/S
13	1973.18	1979.18	R	42					1	258.45	259.02	6.0	9.50%	9.62	0.0049	62	6.44	0.64	0.0038	0.0038	0.02																				0.31			262.65	262.00	FULL	U/S
14	1979.18	1983.18	T	42					1	259.02	259.40	4.0	9.50%	9.62	0.0049	62	6.44	0.64	0.0038	0.0038		0.02	45	0.46	0.30																0.00	263.16	262.52			FULL	D/S
15	1983.18	2121.18	R	42					1	259.40	272.50	138.0	9.49%	9.62	0.0049	62	6.44	0.64	0.0038	0.0038	0.52																				0.31			263.54	262.90	FULL	D/S
16	2121.18	2121.18	R	42					1	272.50	272.50	0.0		9.62	0.0049	62	6.44	0.64	0.0038	0.0038	0.00																				0.00	276.64	276.00			PART	D/S
17																													Ki=	0.25	0.16								0.16			276.81	276.81	FULL	U/S
18																																												
19																																												
20																																												

Relevant Storm Drain Profile Sheets

SUMMERLIN

SM

THE PASEOS
VILLAGE 23A UNIT 2 IMPROVEMENTS

FOX HILL DRIVE FROM STA 140+00 TO 161+94.00
PASEO BREEZE DRIVE FROM STA 142.+52.47 TO 158+81.64

APN # 137-34-210-001/002, 137-34-312-001/002/003, AND 137-34-601-003

SID #808 PROJECTS 9 AND 10

2003

REV	APPROVAL DATE	DESCRIPTION:
1	3/20/2003	REVISE STREET LIGHT VERIFICATION TABLE, ADD STREET LIGHT AND CONDUIT.
2	2/15/2007	REVISED APN & LVWD SHEET COUNT, PROJECT & FIRE DEPARTMENT SIGNATURE.
3	4/5/07 RB	ADDED 18" STORM DRAIN LATERAL.
4	8/15/11 DDC LVWD	ADDED 36" SD, 8" SS, 2" WATER LATERALS WATER BOND COMPLEX IMPROVEMENT. RB 9/23/11

BERT A. HUGHES No. 10259 PROFESSIONAL ENGINEER STATE OF NEVADA — 9/16/11

DANIEL J. KELLER No. 12212 PROFESSIONAL ENGINEER STATE OF NEVADA — 9-23-11

TIMOTHY D. TILL No. 9326 PROFESSIONAL ENGINEER STATE OF NEVADA — 4-4-11 For Rev. 3 only

BERT A. HUGHES No. 10259 PROFESSIONAL ENGINEER STATE OF NEVADA — 4/5/07

DESIGN: CBV/DTP
DRAWN: RJ/DTP
CHECK: BAH
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 01-16-04
PLOT TIME: 14:08:07

REV	DATE	DESCRIPTION	DATE	ADSN	APP	DATE	DCM	APP
3		AS-BUILT REVISED ADD'L LVWD SHEET COUNT, AND PROJECT & FIRE DEPT. SIGNATURE	2/15/07	RBS				

PROJECT NAME: VILLAGE 23A UNIT 2 (Projects 9 & 10)
APN #: 137-34-210-001/002, 137-34-312-001/002/003, 137-34-601-003
This plan/set/or plat complies with the Las Vegas Valley Water District's technical requirements. However, this water plan is
NOT APPROVED FOR CONSTRUCTION
at this time and this plan does not provide of finally water commitment.
LVWD — DATE 02/05/04

NEVADA POWER COMPANY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL LOADS ASSOCIATED WITH THIS PROJECT. NEVADA POWER COMPANY RESERVES ITS RIGHT TO ASSESS ANY EXISTING OR FUTURE CONTRACTS ONCE THE FINAL DESIGN IS COMPLETED. THE RIGHT TO SIGN AND THE RESOLUTION OF ANY CONTRACTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

DEVELOPER

[redacted] SM

An Affiliate of THE ROUSE COMPANY

THE HOWARD HUGHES CORPORATION
a Delaware corporation

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LAS VEGAS, NEVADA 89135
OFFICE PHONE NO. (702) 791-4300
OFFICE FAX NO. (702) 791-4450

75715 JB 99838 126668

ENGINEER

"The affixed Sprint Nevada approval does not assume or guarantee liability for known or unknown conflicts with existing or proposed improvements. Resolution of any conflict will be accomplished pursuant to Local Ordinances, Nevada Revised Statutes and/or Public Utility Commission Rules and Regulations."

G.C. WALLACE, INC.
Engineers/Planners/Surveyors

1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000, FAX: (702) 804-2299
SUMMERLIN OFFICE 10000 CHARLESTON BLVD., STE. 130
OFFICE: (702) 804-2160, FAX: (702) 804-2295

DRAINAGE CERTIFICATION

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

BERT A. HUGHES R.P.E. 10259 — 1/16/04 DATE

THE HOWARD HUGHES CORPORATION,
a Delaware corporation

By: LARRY BROCATO — 1/26/04 DATE

Title: EXECUTIVE VICE PRESIDENT, DEVELOPMENT

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

CHARLES KAJKOWSKI Jr.; PE #4784 CITY ENGINEER. CITY OF LAS VEGAS, NEVADA — 12-3-2004 DATE

CLV PLANNING DEPARTMENT

THIS PLAN MEETS THE APPLICABLE STANDARDS IF THE PLANNING AND DEVELOPMENT DEPARTMENT

MARGO WHEELER, AICP, CURRENT PLANNING MANAGER — 12.3.04 DATE

NEVADA POWER COMPANY 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 OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS.

CALL BEFORE YOU DIG: 1(800)227-2600

NEVADA POWER Co. Sandy Larsen Sandy Larsen — 1-21-04 REVIEWED BY — DATE

2-21-07 — LAS VEGAS VALLEY WATER DISTRICT (SHEETS 1, 2, 5, 8-9, 15-17, 21-23)(PROJECT #96939) — DATE

1-30-07 — FIRE DEPARTMENT — DATE

1/21/04 — PRINT- Kori Johnson — DATE

SOUTHWEST GAS CORP. — DATE

1-21-04 — COX COMMUNICATIONS LAS VEGAS INC. — DATE

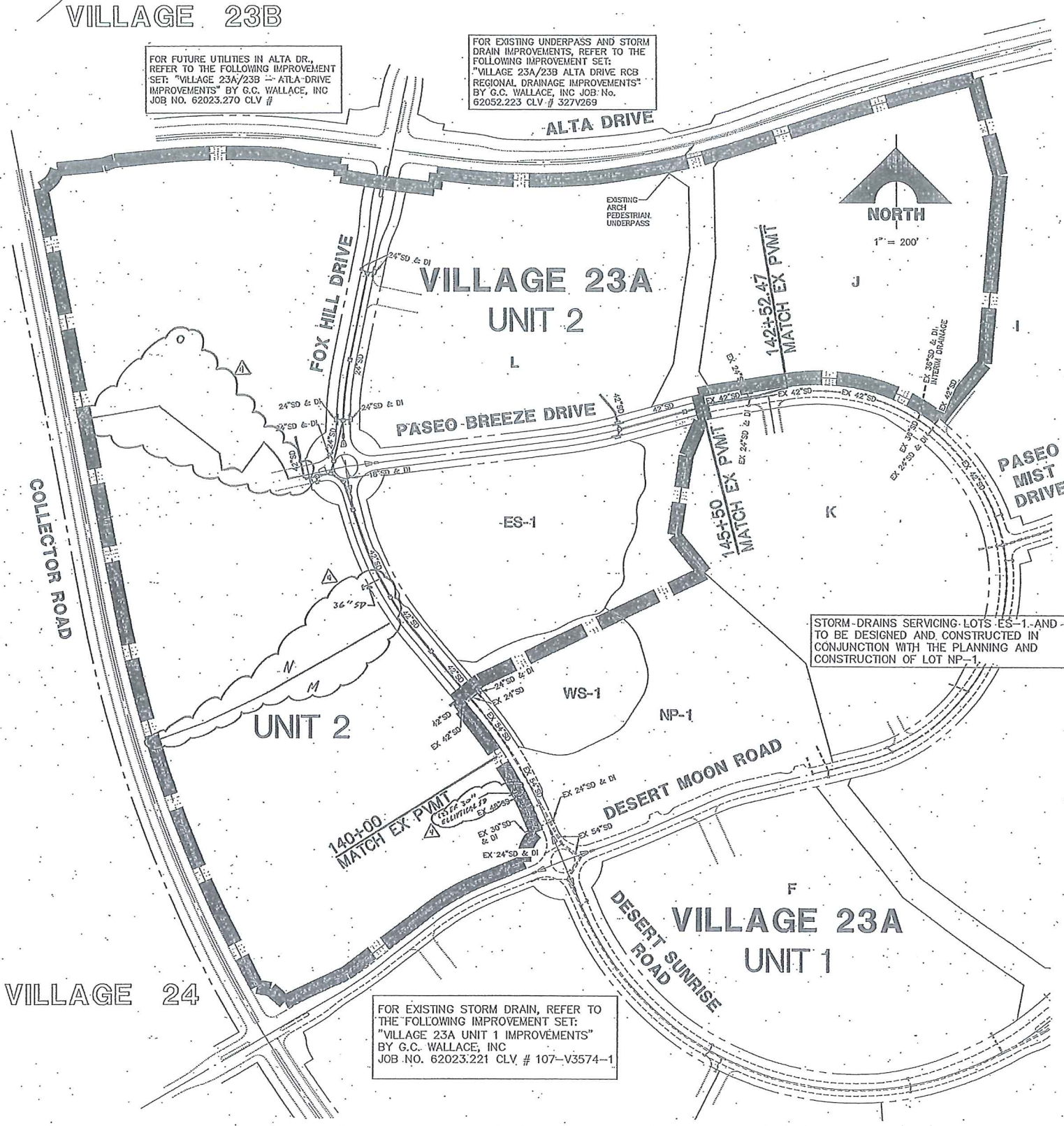
SUMMERLIN
VILLAGE 23A UNIT 2 IMPROVEMENTS
COVER SHEET

SHEET 1 OF 32

CLV DRAWING NO. 10V3574-2

JOB NO. 62023222

SHEET 1 OF 32 SHTS



STORM DRAIN ESTIMATED QUANTITIES (PUBLIC)

36" STORM DRAIN CLASS III RCP	65	LF
18" STORM DRAIN CLASS III RCP	28	LF
24" STORM DRAIN CLASS III RCP	1,103	LF
42" STORM DRAIN CLASS III RCP	1,277	LF
42" STORM DRAIN HDPE	260	LF
MANHOLE - TYPE I	1	EA
MANHOLE - TYPE II	7	EA
MANHOLE - TYPE III	6	EA
MOD "C" DROP INLET (11.5')	1	EA
MOD "C" DROP INLET (8.5')	2	EA
MOD "C" DROP INLET (5.5')	7	EA
JENSEN PRECAST 36"X36" DROP INLET	1	EA

QUANTITIES ARE ESTIMATED ONLY. CONTRACTOR IS TO VERIFY DURING BIDDING PROCESS.

SCALE: 200 0 200 400 FEET

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

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD. CALL 1-702-593-6111

BENCHMARK

CLV BM NO.	DESC.	NAVD 88 DATUM	NAVD 88 DATUM
D368 3	U.S.C.& G.S. BRASS DISC SET IN ROCK ON THE EAST SIDE OF CHARLESTON BOULEVARD AND SOUTH OF THE RED ROCK DETENTION BASIN.	3246.71 (FEET)	989.599 (METERS)

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

BRENT C. KELLEY — ENGINEER — STATE OF NEVADA — No. 12212 — PROFESSIONAL — CIVIL — DATE: 2/7/14

BRENT C. KELLEY — ENGINEER — STATE OF NEVADA — No. 12212 — PROFESSIONAL — CIVIL — DATE: 2/7/14

REV.	DATE	DESCRIPTION	DATE AGEN. APP.	DATE BOW. APP.
A	1/30/14	ADDED 42" SD & 36" SD REVISIONS	2/7/14	

DESIGN: GBW/GTP
DRAWN: NJ/GTP
CHECK: BAH
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 01-29-04
PLOT TIME: 08:36:02

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299
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SUMMERLIN
VILLAGE 23A UNIT 2 IMPROVEMENTS
STORM DRAIN MASTER PLAN

SHEET 7
7 OF 32 SHTS

JOB NO. 62023.222

CLV DRAWING NO. 107V3574-2

75721 10

LEGEND & ABBREVIATION

- (1) DETAIL DRAWING NUMBER
- (1/–) DRAWING NUMBER FOR DETAIL DRAWN ON SAME SHEET
- (1/7) DRAWING NUMBER FOR DETAIL WITH REFERENCE TO THE SHEET IT IS DRAWN ON
- (01,02/S) DRAWING NUMBER(S) FOR DETAIL(S) PER SUMMERLIN IMPROVEMENTS STANDARDS, OR PER STANDARDS IN ABBREVIATION TABLE
- (1/1) INDICATES CONSTRUCTION NOTE
- (A/1) INDICATES REMOVAL NOTE
- (1) INDICATES CURVE NUMBER
- INDICATES SEWER MANHOLE IN PROFILE
- INDICATES STORM DRAIN MANHOLE IN PROFILE
- (60.5) TC EXIST. SPOT ELEVATION
- END PIPE & PLUG
- CONCRETE ENCASEMENT
- GRADING OF REVISED LANDSCAPE AREA

NOTE: LEGEND & ABBREVIATIONS IN THE "SUMMERLIN IMPROVEMENT STANDARDS", LATEST EDITION, WILL BE UTILIZED FOR ANY LEGEND & ABBREVIATION REQUIRED WHICH ARE NOT SHOWN.

EMBANKMENT

TOP — PROPOSED
BOTTOM — BY SEPARATE CONTRACT
EXISTING

ABBREVIATION

I	= IMPROVEMENTS
W	= WATER
S	= SEWER
SD	= STORM DRAIN
DI	= DROP INLET
INV	= INVERT
SL	= STREET LIGHTING
SIG	= TRAFFIC SIGNAL
SMH	= SEWER MANHOLE
SDMH	= STORM DRAIN MANHOLE
FUT	= FUTURE
CLV	= CITY OF LAS VEGAS
DCSWCS	= DESIGN AND CONSTRUCTION STANDARDS FROM WASTEWATER COLLECTION SYSTEM (CLARK COUNTY 1997)
LVVWD	= LAS VEGAS VALLEY WATER DISTRICT
NDOT	= NEVADA DEPT. OF TRANSPORTATION
SIS	= SUMMERLIN IMPROVEMENT STANDARDS
THHC	= THE HOWARD HUGHES CORPORATION
UDS	= UNIFORM DESIGN AND CONSTRUCTION STANDARDS (UDACS)
USD	= UNIFORM STANDARD DWGS. (CLARK COUNTY)
OB	= OVERBUILD
AP	= ANGLE POINT

STREET CLASSIFICATION

FOX HILL DRIVE:	NEIGHBORHOOD COLLECTOR (LEVEL 1) WITH SHARED BIKE LANES
PASEO BREEZE DRIVE:	RESIDENTIAL COLLECTOR

BENCHMARK

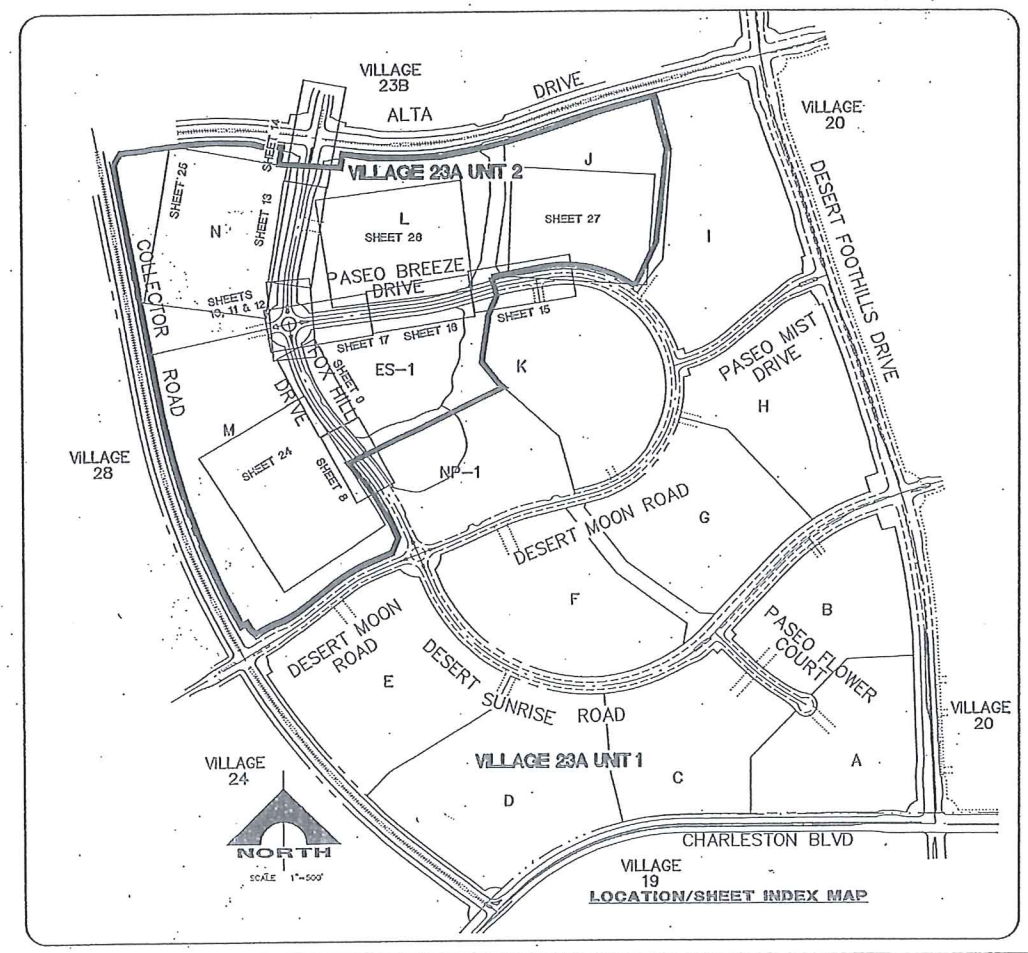
DESC.	NAVD 88 DATUM	NAVD 88 DATUM
U.S.C.& G.S. BRASS DISC SET IN ROCK ON THE EAST SIDE OF CHARLESTON BOULEVARD AND SOUTH OF THE RED ROCK DETENTION BASIN. (CLV BM No. D368 3)	3246.71 (FEET)	989.599 (METERS)

Avoid cutting underground utility lines. It's easy. Call before you Dig. 1-800-227-2600 (Nevada One Call)

AVOID HITTING OVERHEAD POWER LINES. IT'S EASY! CALL BEFORE YOU DO OVERHEAD. CALL 1-702-593-6111

BASIS OF BEARING

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.



LOCATION/SHEET INDEX MAP

INDEX OF DRAWINGS

1. COVER SHEET
2. PROJECT DATA SHEET
3. HORIZONTAL CONTROL PLAN I
4. HORIZONTAL CONTROL PLAN II
5. WATER MASTER PLAN
6. SEWER MASTER PLAN
7. STORM DRAIN MASTER PLAN
8. FOX HILL DRIVE PLAN AND PROFILE FROM START 140+00 TO 144+50
9. FOX HILL DRIVE PLAN AND PROFILE STA 144+50 TO 148+89
10. ROUNDABOUT GRADING PLAN
11. ROUNDABOUT UTILITY PLAN
12. ROUNDABOUT PROFILE
13. FOX HILL DRIVE PLAN AND PROFILE STA 154+00 TO 159+50
14. FOX HILL DRIVE PLAN AND PROFILE STA 159+50 TO END
15. PASEO BREEZE DRIVE PLAN AND PROFILE FROM START TO STA 147+50
16. PASEO BREEZE DRIVE PLAN AND PROFILE STA 147+50 TO 153+50
17. PASEO BREEZE DRIVE PLAN AND PROFILE STA 153+50 TO END
18. MISCELLANEOUS DETAILS I
19. MISCELLANEOUS DETAILS II
20. TYPICAL SECTIONS I
21. LATERAL PROFILES I
22. LATERAL PROFILES II
23. LATERAL PROFILES III
24. TRANSITIONAL DRAINAGE PLAN I
25. TRANSITIONAL DRAINAGE PLAN II
26. TRANSITIONAL DRAINAGE PLAN III
27. TRANSITIONAL DRAINAGE PLAN IV
28. SIGNAGE AND STRIPING PLAN I
29. SIGNAGE AND STRIPING PLAN II
30. STREET LIGHT, MASTER CONDUIT, AND ELECTRICAL PLAN I
31. STREET LIGHT, MASTER CONDUIT, AND ELECTRICAL PLAN II
32. STREET LIGHT, MASTER CONDUIT, AND ELECTRICAL PLAN III

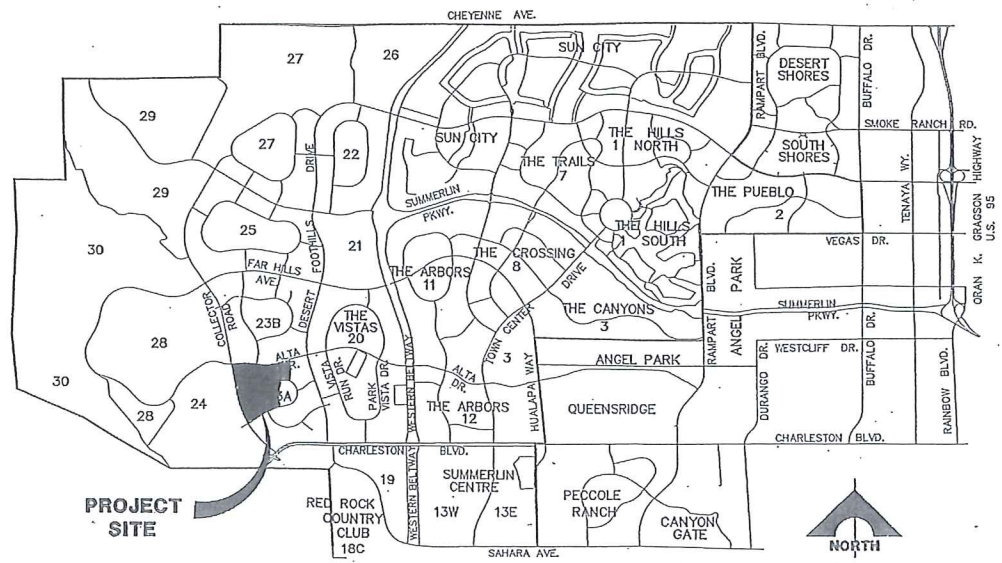
STREET QUANTITIES (PUBLIC)

STREETS	UNIT 2	
3" A.C. PAVEMENT	5,366	SY
4" A.C. PAVEMENT	11,763	SY
TYPE II BASE	2,455	CY
6" TYPE "L" C & G	7,240	LF
TYPE "A" CURBS	556	LF
STREET LIGHTS		
SINGLE ARM ST. LT.	33	EA
SINGLE ARM ST. LT. W/TRAFFIC SIGNAL	4	EA
DOUBLE ARM ST. LT.	0	LF
SERVICE PEDESTAL	1	EA
CONDUIT	3085	LF

NOTE: FOR OTHER GENERAL NOTES SEE:

FIRE ..... SHEET 5
LVVWD ..... SHEET 5
SEWER ..... SHEET 6
GRADING ..... SHEET 24
TRAFFIC ..... SHEET 28
STREETLIGHT ..... SHEET 30

VICINITY MAP



CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY. THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE 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 COSTS 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 OR OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.
4. ALL CONSTRUCTION SHALL BE 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 DESIGN TO BE APPROVED BY THE CITY ENGINEER 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 1/2" 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 TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE SOILS ENGINEER 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 OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.550.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC. SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOW LINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.
16. ALL WALLS, NEW OR EXISTING, ARE ONLY SHOWN WALL NOTES: 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.

CONSTRUCTION NOTES

IMPROVEMENTS

- (1/I) INSTALL A.C. PAVEMENT PER STREET SECTIONS, SEE SHEET 20
- (2/I) INSTALL 6" "L" TYPE CURB & GUTTER (S-42/S)
- (4/I) INSTALL "A" TYPE ISLAND CURB (S-50/S)
- (6/I) INSTALL HANDICAP RAMP CURB-DEPRESSION
- (7/I) INSTALL CONCRETE ENCASEMENT
- (9/I) ADJUST EXISTING FACILITY TO GRADE (S-73/S)
- (10/I) VERIFY LOCATION AND ELEVATION OF EX ROADWAY IMPROVEMENT AND MATCH TO EXISTING CONDITION

WATER

- (10/W) INSTALL CAP W/ 2" BLOW-OFF ASSEMBLY (4A/UDS)
- (11/W) INSTALL FIRE HYDRANT ASSEMBLY (7/UDS)
- (12/W) INSTALL 8" GATE VALVE & BOX W/ 1' RADIUS CONCRETE COLLAR (8/UDS)
- (13/W) INSTALL 12" GATE VALVE & BOX W/ 1' RADIUS CONCRETE COLLAR (8/UDS)
- (14/W) INSTALL 6" GATE VALVE & BOX W/ 1' RADIUS CONCRETE COLLAR (8/UDS)
- (15/W) INSTALL 24" GATE VALVE AND BOX AMERICAN FLOW CONTROL 24"RESILIENT SEATED MODEL NO 2500 W/ ALETCO MODEL ICR-10 SPUR GEAR ACTUATOR W/ 1' RADIUS CONCRETE COLLAR (8/UDS)
- (16/W) REMOVE CAP AND BLOW OFF PER UDACS PLATE NO. 4A, NOTE NO. 1, AND CONNECT TO EXISTING MAIN. (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EXISTING WATER LINE).

SEWER

- (25/S) INSTALL 48" DIA. SEWER MANHOLE (501-8/DCSWCS)
- (26/S) INSTALL TEMPORARY PLUG AND CAP
- (27/S) REMOVE PLUG & CONNECT TO EX. SEWER LINE (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EXISTING SEWER LINE) PRIOR TO CONSTRUCTION
- (28/S) INSTALL 60" DIA. DEEP SEER MANHOLE (501-8/DCSWCS)

STORM DRAIN

- (30/SD) INSTALL TYPE I STORM DRAIN MANHOLE (403/UDS)
- (31/SD) INSTALL TYPE II STORM DRAIN MANHOLE (405/UDS)
- (32/SD) INSTALL TYPE III STORM DRAIN MANHOLE (406/UDS)
- (33/SD) INSTALL TEMPORARY PLUG AND CAP
- (35/SD) INSTALL MODIFIED TYPE "C" DROP INLET (1/18) (2/18)
- (37/SD) PRECAST MANHOLE TEE (407/UDS)
- (38/SD) CONCRETE COLLAR (3/19)
- (39/SD) CONNECT TO EXISTING STORM DRAIN LINE (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EXISTING STORM DRAIN LINE)

IRRIGATION

- (43/IR) BANK "A": 1-6" & 2-4" SCH40 PVC (U-18/S)
- (45/IR) BANK "B": 2-4" SCH40 PVC (U-18/S)

NOTE TO CONTRACTOR:

1. ALL EXISTING UTILITY CROSSINGS MUST BE VERIFIED PRIOR TO CONSTRUCTION OF ANY MAIN LINES OR LATERALS THAT MAY BE ADVERSELY AFFECTED. ANY DISCREPANCIES IN LOCATION AND/OR ELEVATION MUST BE PROVIDED TO THE ENGINEER FOR ACCEPTANCE PRIOR TO CONSTRUCTION.
2. TOPOGRAPHY SHOWN HEREIN REFLECTS ORIGINAL EXISTING TOPOGRAPHY. ACTUAL FIELD CONDITIONS INCLUDE SITE ROUGH GRADING.
3. ALL COMMON LOTS AS SHOWN HEREIN TO BE PRIVATELY MAINTAINED BY THE SUMMERLIN H.O.A. A FUTURE MEANDERING SIDEWALK WILL BE INSTALLED BY SUMMERLIN AS REQUIRED TO SERVICE THE DEVELOPMENT OF EACH PARCEL.
4. ALL WATER LINE GATE VALVES, SERVICE GATE VALVES, AND FIRE HYDRANT GATE VALVES ARE TO BE CONSTRUCTED UNDER A.C. PAVEMENT. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY THAT ALL WATER VALVE CANS DO NOT CREATE CONFLICTS WITH THE PROPOSED CURB LINE PRIOR TO PLACEMENT OF CONCRETE. ALL WATER FACILITIES SHOWN IN THESE DRAWINGS HAVE BEEN "SCALED-UP" FOR CLARITY ONLY.

DEVIATIONS

1. REMOVE PROTECTION BAR FROM STORM DRAIN DROP INLETS (S.I.S. DWG. NO. D-21 AND USD. NO. 419) AS DIRECTED BY THE CITY OF LAS VEGAS.
2. MAXIMUM TYPICAL WIDTH OF DESERT MOON ROAD AND PASEO BREEZE DRIVE (BC TO BC) IS 44', IN LIEU OF 37' PER S.I.S. DWG. NO. S-7. THE ADDITIONAL WIDTH IS TO PROVIDE A 12' CENTER TURN LANE AND ALLOW FOR 3' OF ADDITIONAL BLACK-TOP IN THE TRAVEL LANES FOR SHARED BICYCLE USE.

APPROVAL:

LAS VEGAS VALLEY WATER DISTRICT (PROJECT #96435) — DATE 2-01-07

REGISTERED ENGINEER - STATE OF NEVADA — HENRY L. HEES — No. 12521 — PROFESSIONAL — CIVIL — EXP. 6/30/2007 — DATE 2/1/07

NO.	DESCRIPTION	DATE	APP
1	AS ISSUED	2/1/07	HLH
2	REVISED LVVWD, NDOT & CLV	4/1/07	HLH

DESIGN: GDW/CTP
DRAWN: NJ/CTP
CHECK: BAH
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 01-26-07
PLOT TIME: 08:16:12

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE (702) 804-2000 FAX (702) 804-2001 www.gcwallace.com
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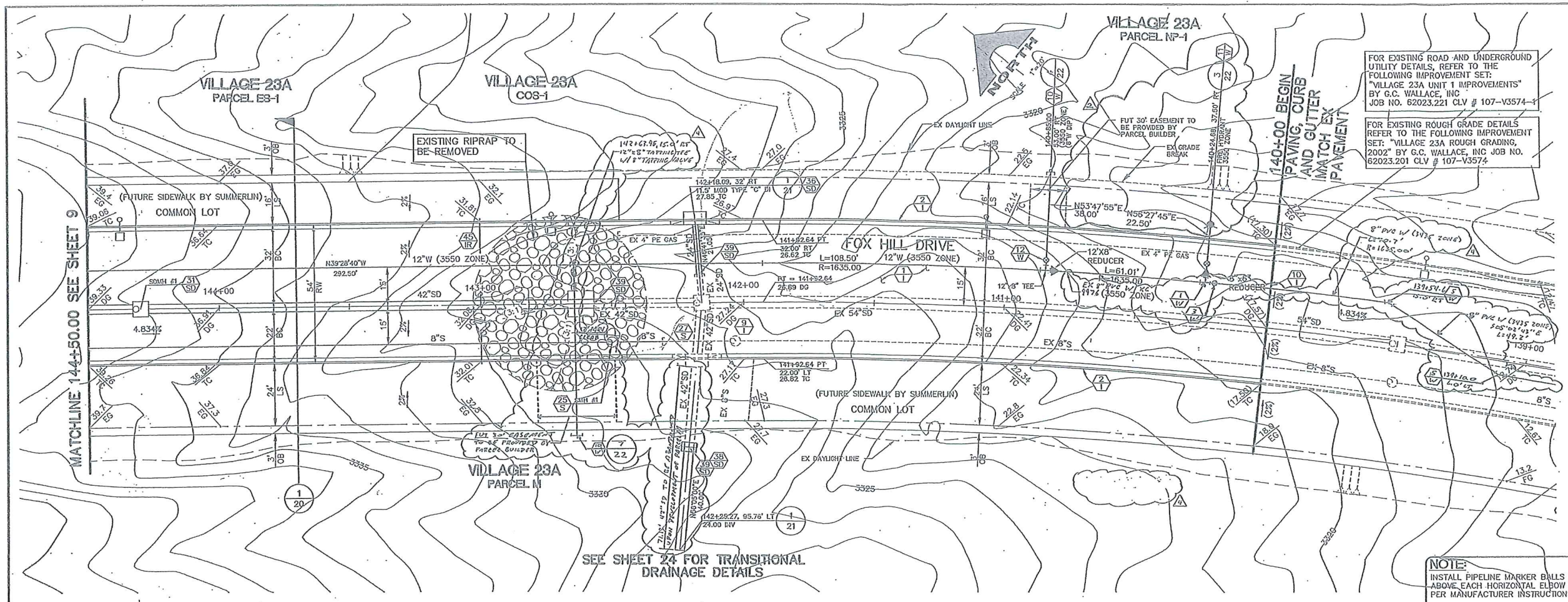
SUMMERLIN
VILLAGE 23A UNIT 2 IMPROVEMENTS
PROJECT DATA SHEET

SHEET 2 OF 32 SHTS

JOB NO. 62023.222

CLV DRAWING NO. 107V3574-2

REPLOT



BENCHMARK

CLV BM NO.	DESC.	NAVD 88 DATUM	NAVD 88 DATUM
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BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

FOX HILL DRIVE (PUBLIC)

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'
REFER TO SHEET 2 FOR CONSTRUCTION NOTES

20 0 20 40
SCALE FEET

NOTE

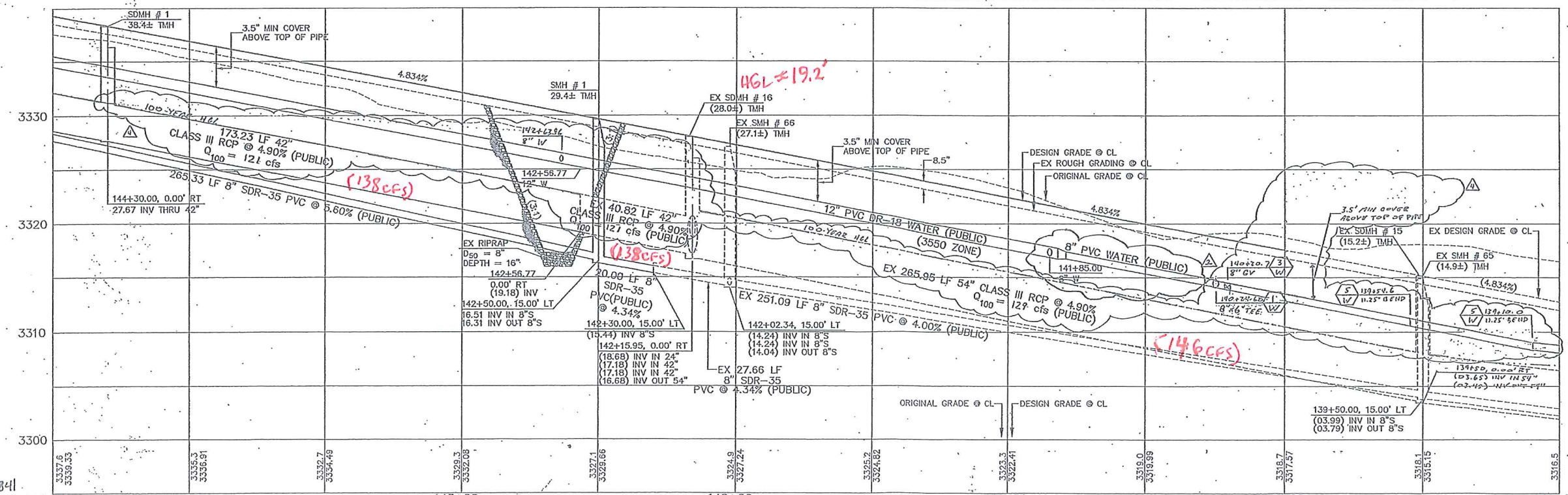
THIS SET OF DRAWINGS IS BASED UPON NAVD 88 DATUM. PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

Avoid cutting underground utility lines. It's costly.
Call before you Dig.
1-800-227-2600
(NEVADA ONE CALL)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
CALL 1-702-593-6111

APPROVAL:

LAS VEGAS VALLEY WATER DISTRICT (PROJECT #96435) — DATE 2-01-02



CLV DRAWING NO. 107V3574-2

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD., SUITE 400, LAS VEGAS, NEVADA 89146
TELEPHONE (702) 804-2100 FAX (702) 804-2299
mfarm

S:\V23\Unit 2\dwg\Ulips\23A2c008.dwg

DESIGN: CBW/CTP
DRAWN: NJ/CTP
CHECK: BAH
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 01-25-02
PLOT TIME: 15:58:56

REV.	DATE	DESCRIPTION
1	12/6/01	UTILITY REVISIONS PER CLV COMMENTS
2	1/25/02	REVISED LAYOUT & ALIGNMENT OF FOX HILL DRIVE AND INTERSECTIONS, REVISED REFERENCES, ADDED NOTE 3, CLASS FILL CONTOURS, MINOR CHANGES

DATE: 1/25/02
DATE PLOTTED: 1/25/02
DATE PLOTTED (CONV. DEPT.):

SUMMERLIN
VILLAGE 23A UNIT 2 IMPROVEMENTS
FOX HILL DRIVE PLAN AND PROFILE
FROM START 140+00 TO 144+50

SHEET 8
JOB NO. 62023.222
8 OF 32 SHTS

MATCHLINE 148+80.00 SEE SHEETS 10, 11 & 12

MATCHLINE 144+50.00 SEE SHEET 8

VILLAGE 23A
PARCEL ES-1

VILLAGE 23A
PARCEL M

(FUTURE SIDEWALK BY SUMMERLIN)
COMMON LOT

(3550 ZONE)
EX 12" PVC W #09876

EX DAYLIGHT LINE

FUT 30' EASEMENT TO BE PROVIDED BY PARCEL BUILDER

FUT 30' EASEMENT TO BE PROVIDED BY PARCEL BUILDER

148+27.16 PRC
27.17 RT
57.06 TC

148+47.62 PCC
22.00' RT
58.48 TC

148+07.94 PRC
32.00' RT
51.53 TC

146+83.35 PRC
32.00' RT
50.34 TC

146+42.40 PRC
32.00' RT
48.53 TC

148+49.81 PCC
27.64' RT
48.81 TC

148+33.45 PCC
32.00' RT
48.10 TC

146+21.22 PCC
32.00' RT
47.33 TC

146+04.87 PRC
27.64' RT
46.63 TC

145+92.19 PRC
32.00' RT
45.93 TC

145+59.10
15.26' RT
12"x8" TEE

144+69.88 PC
32.00' RT
40.98 TC

144+69.88 PC
22.00' LT
41.16 TC

L=243.63'
R=1150.00'

L=449.55'
R=1165.00'

L=73.05'
R=1150.00'

L=25.45'
R=1165.00'

SDMH #2

SMH #2

148+00

147+00

146+00

145+00

42"SD

8"S

4.834%

N 23°42'00"W
81.88'

FOR EXISTING ROUGH GRADE DETAILS REFER TO THE FOLLOWING IMPROVEMENT SET: "VILLAGE 23A ROUGH GRADING, 2002" BY G.C. WALLACE, INC JOB NO. 62023.201 CLV # 107-V3574

SCALE 1"=40'

20 0 20 40
SCALE FEET

NOTE:
INSTALL PIPELINE MARKER BALLS IN TRENCH ABOVE EACH HORIZONTAL ELBOW FITTING, PER MANUFACTURER INSTRUCTIONS.

BENCHMARK

CLV BM NO.	DESC.	NAVD 88 DATUM (FEET)	NAVD 88 DATUM (METERS)
0368 3	U.S.C.& G.S. BRASS DISC SET IN ROCK ON THE EASTERLY SIDE OF CHARLESTON BOULEVARD AND SOUTH OF THE RED ROCK DETENTION BASIN.	3246.71	989.599

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

NOTE

THIS SET OF DRAWINGS IS BASED UPON NAVD 88 DATUM. PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

Avoid cutting underground utility lines. It's easy.
Call before you Dig.
1-800-227-2600
UNDERGROUND SERVICE ALERT (USA)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
CALL 1-702-593-6111

APPROVAL:

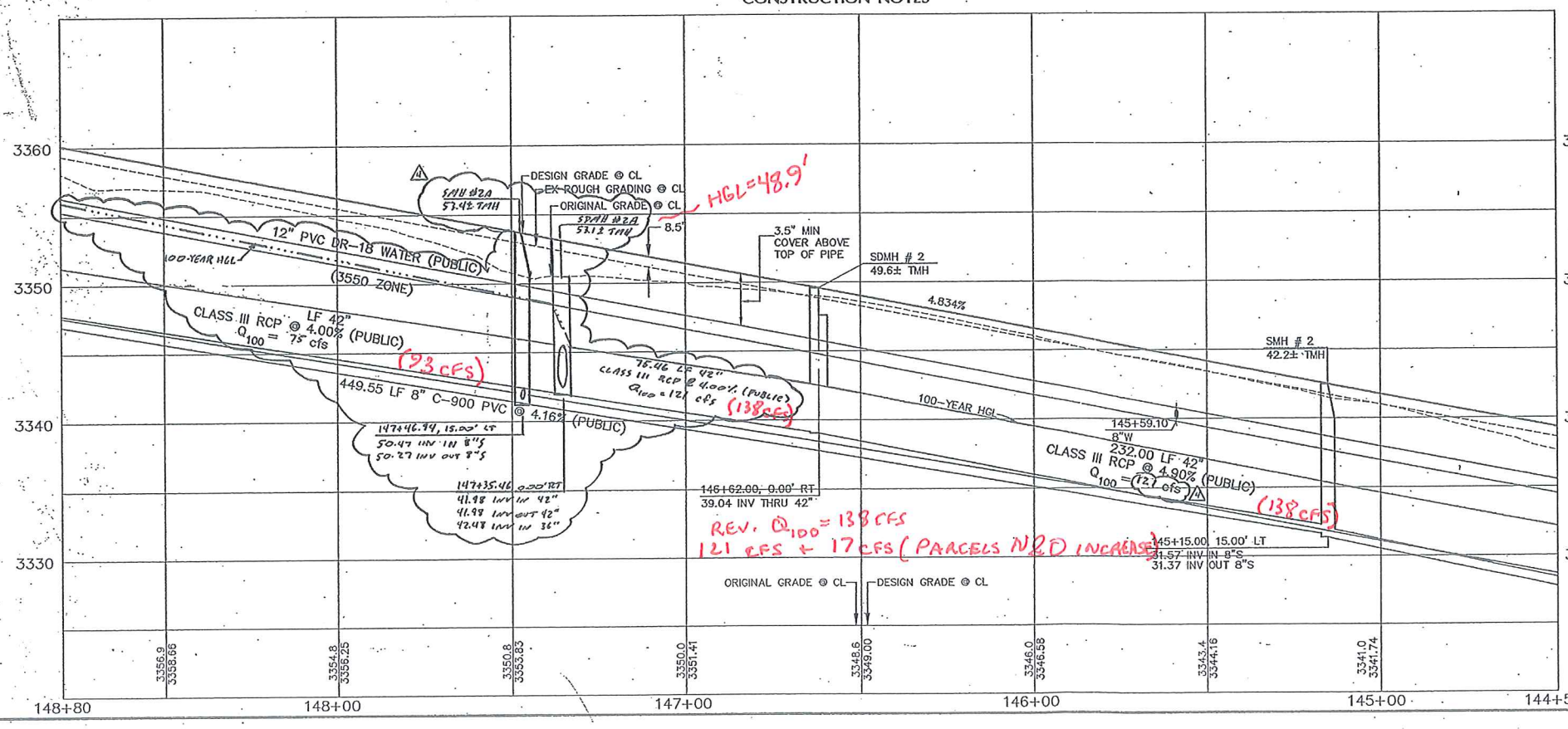
LAS VEGAS VALLEY WATER DISTRICT (PROJECT #96435)

2-01-07
DATE

FOX HILL DRIVE (PUBLIC)

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

REFER TO SHEET 2 FOR CONSTRUCTION NOTES



99042

CLV DRAWING NO. 107V3574-2

REV.	DATE	DESCRIPTION	DATE	ASSN.	APP.	DATE	ASSN.	APP.
1	01/26/07	PER AGENCY COMMENTS	1/31/07	CRS	MWS			
2	02/15/07	PER AGENCY COMMENTS	2/26/07	HB				

DESIGN: GBW/GTP
DRAWN: NJ/GTP
CHECK: BAH
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 01-29-07
PLOT TIME: 08:27:05

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE (702) 804-2000 / FAX (702) 804-2909
I:\V23\Unit 2\dwg\sheets\23x2c09b.dwg mfong

SUMMERLIN
VILLAGE 23A UNIT 2 IMPROVEMENTS
FOX HILL DRIVE PLAN AND PROFILE
STA 144+50 TO 148+80

SHEET 9
9 OF 32 SHTS

JOB NO. 62023.222

ROUNDABOUT GRADING PLAN

SCALE: HORIZ. 1" = 20'

REFER TO SHEET 2 FOR CONSTRUCTION NOTES

BENCHMARK			
BM #	DESC.	NAVD 88 DATUM	NAVD 88 DATUM
OLV09-34SS56	HDOT BRASS CAP, 50 FEET NORTH OF STATION 767+19.42 OF CHARLESTON BOULEVARD.	3209.81 (FEET)	978.351 (METERS)

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

NOTE

THIS SET OF DRAWINGS IS BASED UPON NAVD 88 DATUM. PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

SCALE: 20 0 20 40 FEET

Avoid cutting underground utility lines. It's costly. Call before you Dig. 1-800-227-2600 (UNDERGROUND SERVICE ALERT (USA))

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD. CALL 1-702-593-6111

CLV DRAWING NO. 107V3574-2

SUMMERLIN
VILLAGE 23A UNIT 2 IMPROVEMENTS
ROUNDABOUT GRADING PLAN

SHEET 10
10 OF 32 SHTS

JOB NO. 62023.222

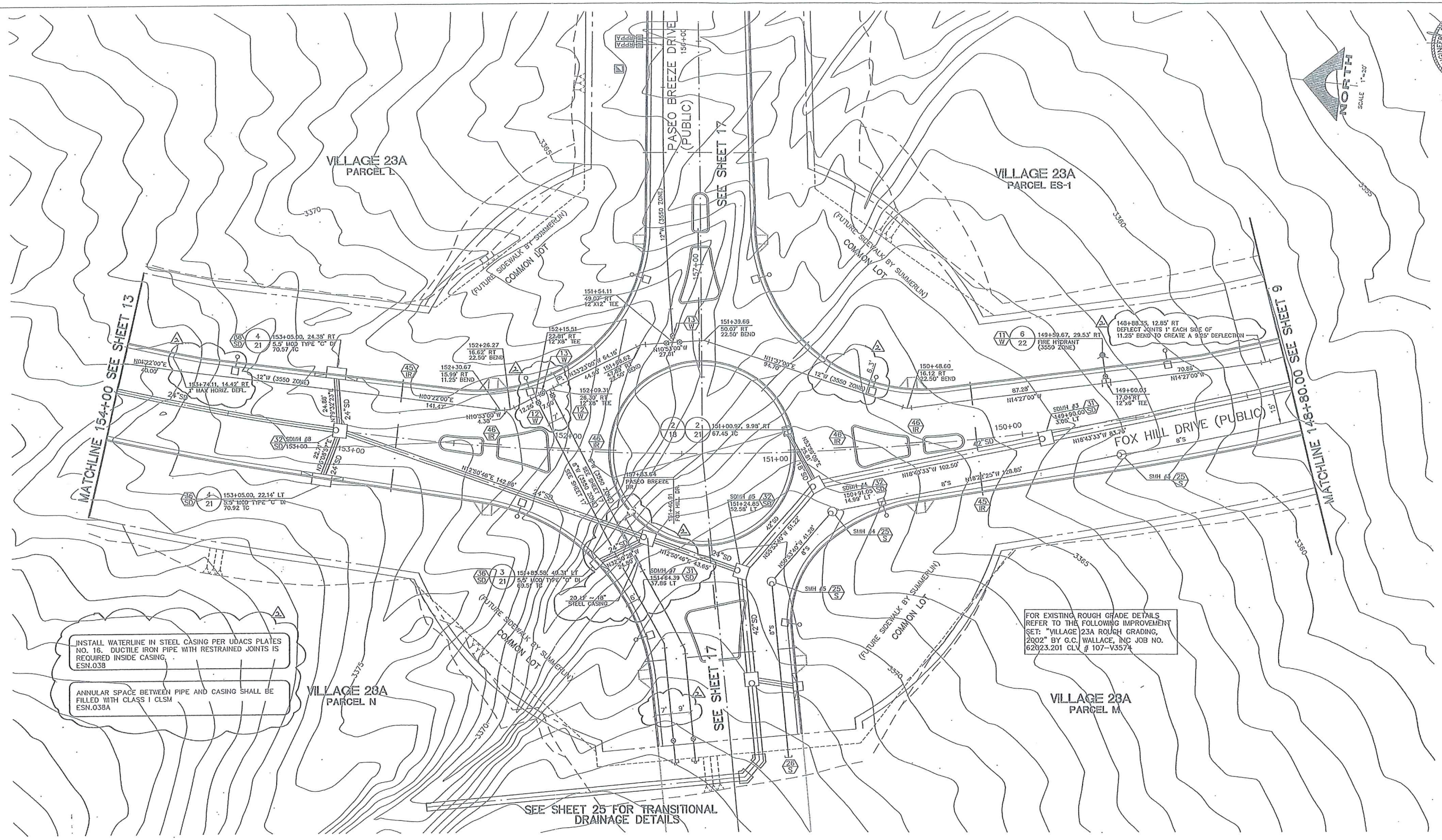
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299
mpeterson

DESIGN: DSW/CTP
DRAWN: NJ/CTP
CHECK: BAH
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 01-28-04
PLOT TIME: 14:58:17

DATE: 2/3/04
DATE ASSN. APP'D | DATE SOW. APP'D | DESCRIPTION | REV'D DATE

BERT A. HUGHES — STATE OF NEVADA — PROFESSIONAL ENGINEER — CIVIL — No. 10369

VILLAGE 23A PARCEL L
VILLAGE 23A PARCEL N
VILLAGE 23A PARCEL ES-1
VILLAGE 23A PARCEL M
PASEO BREEZE DRIVE (PUBLIC)
FOX HILL DRIVE (PUBLIC)
COMMON LOT (FUTURE SIDEWALK BY SUMMERLIN)
MATCHLINE 154+00 SEE SHEET 13
MATCHLINE 148+80 SEE SHEET 9
SEE SHEET 17
REVISED LANDSCAPE AREA TO BE GRADED
REMOVE EXISTING EARTHEN DAM
FOR ROUNDABOUT PROFILE SHEET 12
FOR TRANSITIONAL DRAINAGE PROTECTION GRADING SEE SHEET 25
FOR ROUNDABOUT UTILITIES SHEET 11
FOR EXISTING ROUGH GRADE DETAILS REFER TO THE FOLLOWING IMPROVEMENT SET: "VILLAGE 23A ROUGH GRADING, 2002" BY G.C. WALLACE, INC JOB NO. 62023.201 CLV # 107-V3574
158+81.64 END OF PAVEMENT
EXISTING DAYLIGHT LINE
EXISTING ROUGH GRADE
DAYLIGHT LINE



BENCHMARK			
BM #	DESC.	NAVD 88 DATUM	NAVD 88 DATUM
CLV09-34SSE6	NDOT BRASS CAP. 50 FEET NORTH OF STATION 787+19.42 OF CHARLESTON BOULEVARD.	3209.81 (FEET)	978.351 (METERS)

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

ROUNDABOUT UTILITY PLAN

SCALE: HORIZ. 1" = 20'

REFER TO SHEET 2 FOR CONSTRUCTION NOTES

NOTE:
INSTALL PIPELINE MARKER BALLS IN TRENCH ABOVE EACH HORIZONTAL ELBOW FITTING, PER MANUFACTURER INSTRUCTIONS.

20 0 20 40
SCALE FEET

NOTE
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Avoid cutting underground utility lines. It's costly.
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1-800-227-2600
(A CORPORATE SERVICE ALERT DCA)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
CALL 1-702-593-6111

APPROVAL:

LAS VEGAS VALLEY WATER DISTRICT (PROJECT #96435) — DATE 2-01-07

CLV DRAWING NO. 107V3574-2

STATE OF NEVADA — PROFESSIONAL ENGINEER — No. 10959 — CIVIL — 8/30/2008 — ROBERT L. HUGHES — DATE 4/10/07

REV	DATE	DESCRIPTION	DATE	APPR	DATE	DSNR	APP
1	10/4/07	REVISED WHOLE SHEET TO ADD 2 VALVE & TEST, ADDED NUMBERING, STEEL CASING NOTES	2/15/07	MEC			

DESIGN: GBW/GTP
DRAWN: NJ/GTP
CHECK: BAH
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 02-01-07
PLOT TIME: 11:15:37

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD. SUITE 400
LAS VEGAS, NEVADA 89146
(702) 804-2000 • FAX: (702) 804-2299

I:\V23\Unit 2\dwg\MPS\23U2c011.dwg
mfong

SUMMERLIN
VILLAGE 23A UNIT 2 IMPROVEMENTS
ROUNDABOUT UTILITY PLAN

SHEET 11
11 OF 32 SHTS

JOB NO. 62023.222

REPLOT

MATCHLINE 154+00 SEE SHEET 13

MATCHLINE 148+80 SEE SHEET 9

220.000' VC
PVI STA = 153+46
PVI ELEV = 3370.63
A.D. = 4.300
K = 51.160

3.5" MIN COVER ABOVE TOP OF PIPE

8.5"

SDMH # 8
70.6± TMH

DESIGN GRADE @ CL
EX ROUGH GRADING @ CL
ORIGINAL GRADE @ CL

12" PVC DR-18 WATER (PUBLIC)
(3550 ZONE)

213.37 LF 24"
CLASS III RCP @ 3.72% (PUBLIC)
NUISANCE FLOW ONLY

153+00.00, 0.00' RT
61.47 INV THRU 24"
61.47 INV IN 24" (E&W)

BVCS: 1524+36
BVCE: 3369.53

PVI STA = 152+07.910
PVI ELEV = 3369.25

152+30.67
11.25° BEND

152+26.27
22.5° BEND

152+15.51
8"W

152+09.31
8"W

1.000%

2.000%

PVI STA = 151+81.910
PVI ELEV = 3369.77

151+68.62
22.5° BEND

151+54.11
12"W

100-YEAR HGL

142.86 LF 24"
CLASS III RCP @ 2.27% (PUBLIC)
Q_{100} = 13 cfs

151+64.30, 37.86' LT
58.23 INV THRU 24"
58.23 INV THRU 24" (W)

SDMH # 7
68.4± TMH

151+24.85, 52.58' LT
55.74 INV THRU 42"
57.24 INV IN 24"

℄ PASEO BREEZE DRIVE
STA 151+40.91

HGL=58.7'

SMH # 5
SEE SHEET 17

SDMH # 5
67.9± TMH

3.270%

151+39.66
22.5° BEND

100-YEAR HGL

43.85 LF 24"
CLASS III RCP
@ 2.27%
Q_{100} = 13 cfs

41.28 LF 8"
SDR-35 PVC @
2.00% (PUBLIC)

151+12.09, 57.20' LT
FOX HILL DR.
54.27 INV IN 8"S
54.07 INV OUT 8"S

150+42.96, 25.00' LT
PASEO BR. DR.
FOR CONTINUATION
OF 8" SEWER
SEE SHEET 17

PVI STA = 150+99.910
PVI ELEV = 3367.09

HGL=56.9'

(93 CFS)

SDMH # 4
67.1± TMH

SMH # 4
66.5± TMH

2.000%

BVCS: 150+45.910
BVCE: 3366.01

8.5"

150+48.60
22.5° BEND

51.24 LF 42"
CLASS III RCP
@ 2.27%
Q_{100} = 75 cfs

(PUBLIC)

100-YEAR HGL

102.50 LF 42"
CLASS III RCP @ 2.35% (PUBLIC)
Q_{100} = (75 cfs)

(93 CFS)

28.85 LF 8" SDR-35 PVC @ 2.00% (PUBLIC)

150+84.80, 27.14' LT
53.25 INV IN 8"S
53.05 INV OUT 8"S

150+91.05, 14.99' LT
54.58 INV THRU 42"
56.58 INV IN 18"

149+90.00, 3.05' LT
52.17 INV THRU 42"

149+58.76, 15.00' LT
50.47 INV IN 8"S
50.27 INV OUT 8"S

150.000' VC
PVI STA = 149+70.910
PVI ELEV = 3364.51
A.D. = -2.834
K = 52.921

SDMH # 3
64.6± TMH

SMH # 3
63.4± TMH

3.5" MIN COVER ABOVE TOP OF PIPE

BVCS: 149+95.910
BVCE: 3360.88

4.834%

148+88.35
11.25° BEND

149+60.03
6"W

SEE SHEET 11 FOR PLAN VIEW

Rev. Q_{100} = 93 cfs
13 cfs + 80 cfs (PARCEL O + INT1-A)

ORIGINAL GRADE @ CL
DESIGN GRADE @ CL

3400
3390
3380
3370
3360
3350
3340
3330

3373.80
3373.6 3371.94
3372.3 3370.57
3373.1 3369.69
3369.7 3368.41
3368.9 3368.79
3367.7 3367.09
3366.4 3366.09
3364.6 3364.89
3362.5 3363.22
3359.5 3361.08

154+00 153+00 152+00 151+00 150+00 149+00 148+80

ROUNDABOUT PROFILE

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

REFER TO SHEET 2 FOR CONSTRUCTION NOTES

99844

BENCHMARK

BM #	DESC.	NAVD 88 DATUM	NAVD 88 DATUM
CLV09-34SS66	NDOT BRASS CAP, 50 FEET NORTH OF STATION 787+19.42 OF CHARLESTON BOULEVARD.	3209.81 (FEET)	978.351 (METERS)

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

SCALE 20 0 20 40 FEET

NOTE

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Avoid cutting underground utility lines. It's costly.
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1-800-227-2600
(NEVADA811 SERVICE ALERT SYS)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
CALL 1-702-593-6111

APPROVAL:

LAS VEGAS VALLEY WATER DISTRICT (PROJECT #96435) — 2-01-07 DATE

CLV DRAWING NO. 16N3574-2

SHEET 12 12 OF 32 SHTS

JOB NO. 62023.222

SUMMERLIN
VILLAGE 23A UNIT 2 IMPROVEMENTS
ROUNDABOUT PROFILE

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

REV	DATE	DESCRIPTION	DRAWN	CHECK	APP	DATE
1	12/21/06	ADDED REVISED LOWER PASEO & ADDED LEGAL AND TITLE	KG	MM	MM	12/21/06
2	1/31/07	REVISED PER COMMENTS	KG	MM	MM	1/31/07

DESIGN: GBW/GTP
DRAWN: MJ/GTP
CHECK: BAH
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 01-26-07
PLOT TIME: 09:31:55

ENGINEER - STATE OF NEVADA
No. 21189
GREGORY B. WALLACE
CIVIL
DATE: 1-31-07

PROFESSIONAL ENGINEER
DANIEL F. KELLEY
Exp. 6-30-08
No. 21189
CIVIL
2-1-07
Print 22x34 & only

SEE SHEET 25 FOR TRANSITIONAL DRAINAGE DETAILS AND CONTINUATION OF STORM DRAIN

158+81.64 END OF PAVEMENT

SEE ROUNDABOUT DETAIL SHEETS 10, 11 & 12

FOX HILL DRIVE

3550 PZ

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 NOT BE INSPECTED OR INCLUDED IN THE ACCEPTANCE OF LVWD FACILITIES.

EX DAYLIGHT LINE

PASEO BREEZE DRIVE

(FUTURE SIDEWALK BY SUMMERLIN)
COMMON LOT

EX 12" PVC W (3550 ZONE)

MATCHLINE 153+50.00 SEE SHEET 16

NORTH
SCALE 1"=20'

INSTALL WATERLINE IN STEEL CASING PER UDACS PLATES NO. 16. DUCTILE IRON PIPE WITH RESTRAINED JOINTS IS REQUIRED INSIDE CASING. ESN.038

ANNULAR SPACE BETWEEN PIPE AND CASING SHALL BE FILLED WITH CLASS I CLSM ESN.038A

REDUCED PRESSURE PRINCIPLE ASSEMBLY, (2) 1 1/2"

APPROVED REDUCED PRESSURE PRINCIPLE ASSEMBLY(S) SHALL BE INSTALLED PER THE UDACS PLATE NO. 11A. NO WATER SHALL BE TAKEN FROM A SERVICE REQUIRING BACKFLOW PREVENTION UNTIL THE REDUCED PRESSURE PRINCIPLE ASSEMBLY HAS BEEN SUCCESSFULLY TESTED BY THE LVWD.
ANY BLOCK WALL OR OTHER FENCE MATERIAL SHALL BE DESIGNED AND CONSTRUCTED AROUND THE OUTSIDE OF THE EASEMENT(S), TO ALLOW THE DISTRICT DIRECT ACCESS FROM THE ADJACENT RIGHT-OF-WAY.
EASEMENTS SHALL BE CLEARLY MARKED ON-STAKED PRIOR TO THE START OF CONSTRUCTION.

FOR EXISTING ROUGH GRADE DETAILS REFER TO THE FOLLOWING IMPROVEMENT SET: "VILLAGE 23A ROUGH GRADING, 2002" BY G.C. WALLACE, INC JOB NO. 62023.201 .CLV # 107-V3574

NOTE:
INSTALL PIPELINE MARKER BALLS IN TRENCH ABOVE EACH HORIZONTAL ELBOW FITTING, PER MANUFACTURER INSTRUCTIONS.

BENCHMARK			
CLV BM NO.	DESC.	NAVD 88 DATUM	NAVD 88 DATUM
D368 3	U.S.C.& G.S. BRASS DISC SET IN ROCK ON THE EAST SIDE OF CHARLESTON BOULEVARD AND SOUTH OF THE RED ROCK DETENTION BASIN.	3246.71 (FEET)	989.599 (METERS)

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

PASEO BREEZE DRIVE (PUBLIC)

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'
REFER TO SHEET 2 FOR CONSTRUCTION NOTES

20 0 20 40
SCALE FEET

NOTE
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Call before you Dig. 1-800-227-2600

CALL BEFORE YOU DO OVERHEAD
CALL 1-702-593-6111

APPROVAL:

LAS VEGAS VALLEY WATER DISTRICT (PROJECT #96435) — DATE 2-26-07

STA 158+61.64 END OF PAVEMENT

SEE SHEET 25 FOR CONTINUATION OF SD

TWO 8" PVC DR-18 WATER (PUBLIC) (3550 ZONE)

100-YEAR HGL

36.48 LF 42" CLASS III RCP @ 3.00% (PUBLIC) Q_{100} = 62 cfs

47.60 LF 42" CLASS III RCP @ 3.00% (PUBLIC) Q_{100} = 62 cfs

78.52 LF 8" SDR-35 PVC @ 2.00% (PUBLIC) (80 cfs)

(80 cfs)

REV. Q_{100} = 80 cfs
62 cfs + 10 cfs (PARCEL O INCREASE) + 8 cfs (ADDITION OF PORTION OF PARCEL N)

PVI STA = 158+50.64
PVI ELEV = 3368.32
PVI STA = 157+83.64
PVI ELEV = 3368.84
PVI STA = 157+42.64
PVI ELEV = 3368.02
RP ROUNDABOUT

1.00% -2.00% 1.00% 2.00%

ORIGINAL GRADE @ CL
DESIGN GRADE @ CL
EX ROUGH GRADING @ CL

EVCS: 154+90
EVCE: 3362.97

PVI STA = 154+00
PVI ELEV = 3361.17
A.D. = -3.52
K = 51.20
180.00' VC

12" PVC DR-18 WATER (PUBLIC) (3550 ZONE)

3.5" MIN COVER ABOVE TOP OF PIPE

154+67.00 6" W

FOR CONTINUATION OF 42" STORM DRAIN SEE SHEETS 11 & 12

FOR CONTINUATION OF 8" SEWER SEE SHEETS 11 & 12

FOR PROFILE OF 12" W SEE SHEETS 11 & 12

DESIGN: CBW/STP	6	REVISED PER COMMENTS	2/15/07	DATE
DRAWN: HJ/STP	5	REVISED PER COMMENTS	2/14/07	DATE
CHECK: BAH	4	REVISED PER COMMENTS	2/13/07	DATE
ISSUE DATE:	3	REVISED PER COMMENTS	2/12/07	DATE
ISSUE EDITOR:	2	REVISED PER COMMENTS	2/9/07	DATE
PLOT DATE: 02-01-07	1	REVISED PER COMMENTS	1/30/07	DATE
PLOT TIME: 11:20:48	NO.	REVISIONS		DATE

G. C. WALLACE, INC.
Engineers/Planners/Surveyors
2030 HICKS ROAD, SUITE B RENO, NEVADA 89509
TELEPHONE (702) 804-8000 • FAX (702) 804-8299

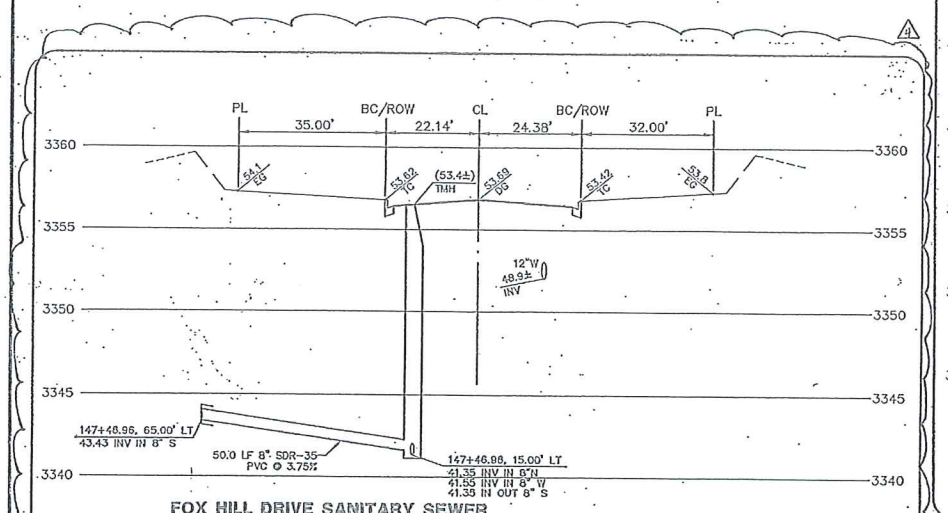
SUMMERLIN
VILLAGE 23A UNIT 2 IMPROVEMENTS
PASEO BREEZE DRIVE PLAN AND PROFILE
STA 156+60 TO END

JOB NO. 62028.222

SHEET 17

CLV DRAWING NO. 107V3571-2

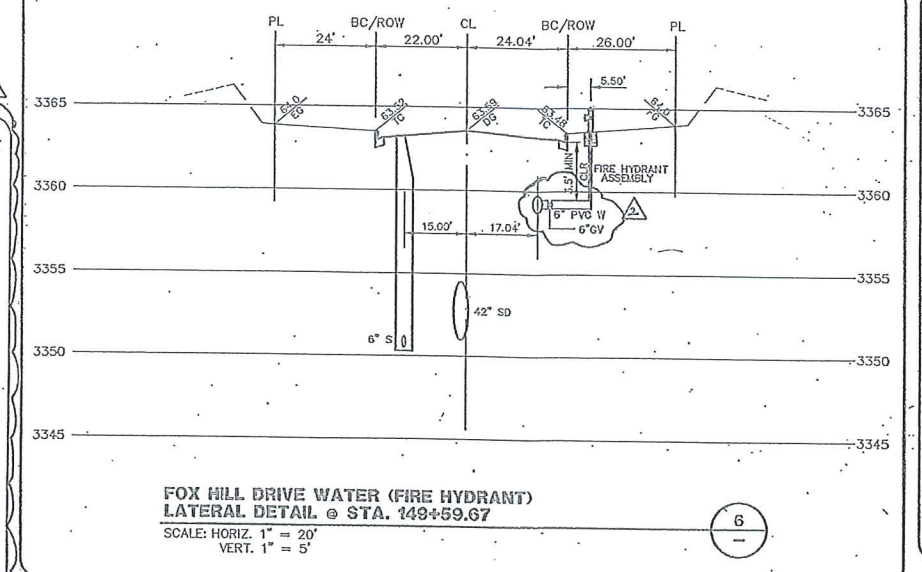
17 OF 32 SHTS



FOX HILL DRIVE SANITARY SEWER
LATERAL DETAIL @ STA. 147+46.96

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

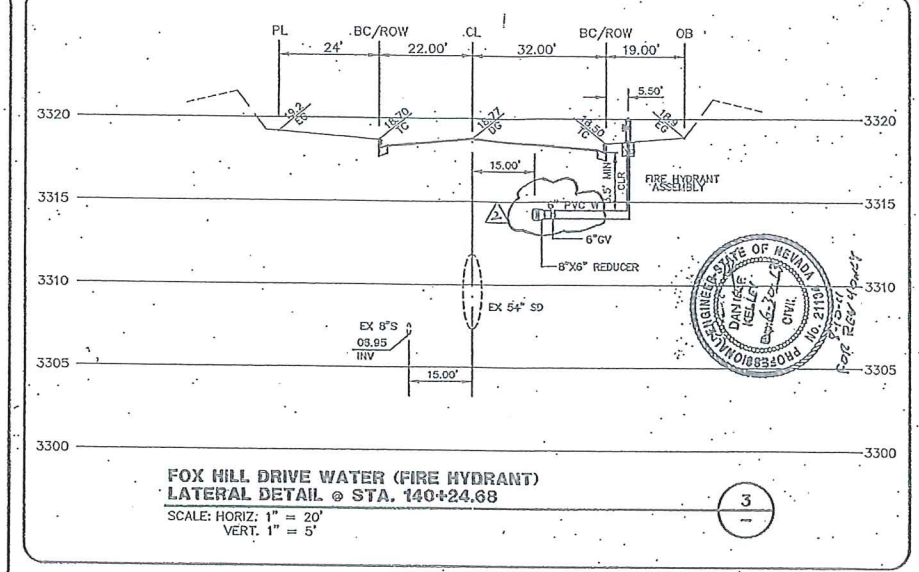
9



FOX HILL DRIVE WATER (FIRE HYDRANT)
LATERAL DETAIL @ STA. 149+59.67

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

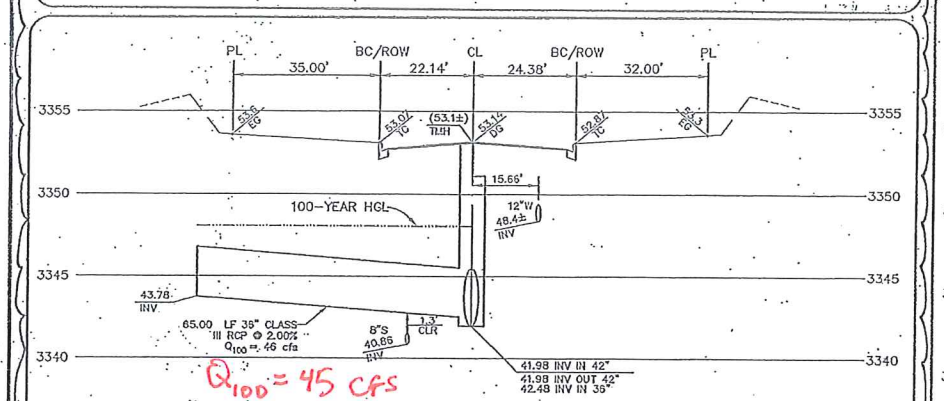
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FOX HILL DRIVE WATER (FIRE HYDRANT)
LATERAL DETAIL @ STA. 140+24.68

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

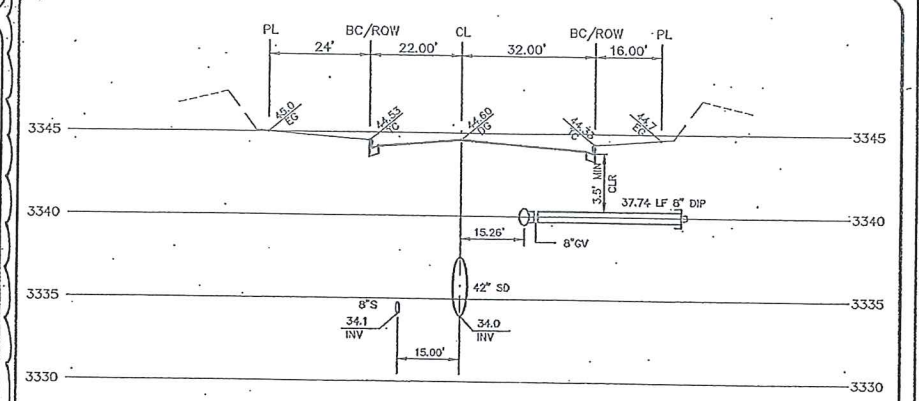
3



FOX HILL DRIVE STORM DRAIN
LATERAL DETAIL @ STA. 147+35.46

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

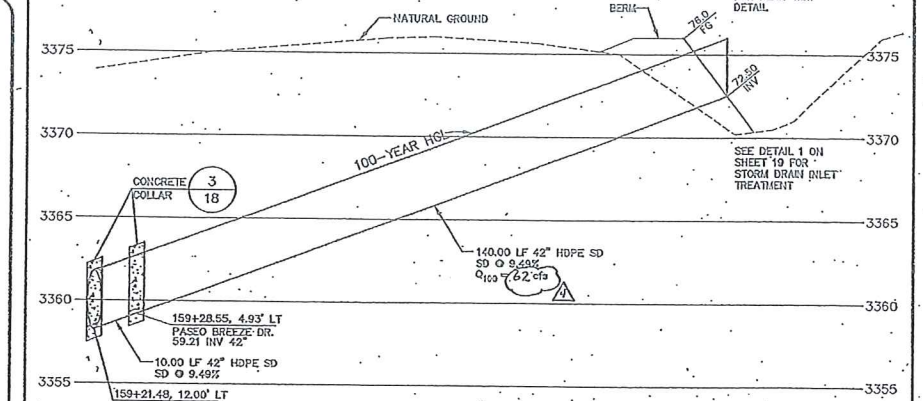
8



FOX HILL DRIVE WATER
LATERAL DETAIL @ STA. 145+59.10

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

5



PROFILE DETAIL OF STORM DRAIN IN PARCEL O

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

2

FOX HILL DRIVE WATER
LATERAL DETAIL @ STA. 142+64.00

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

7

FOX HILL DRIVE WATER
LATERAL DETAIL @ STA. 140+85.00

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

4

PASEO BREEZE DRIVE STORM DRAIN
LATERAL DETAIL @ STA. 158+85

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

1

APPROVAL:

LAS VEGAS VALLEY WATER DISTRICT (PROJECT #96435) — DATE 2-01-07

2

STATE OF NEVADA — PROFESSIONAL ENGINEER — DANIEL L. DELL'ARA — No. 21114 — CIVIL — 12-31-07

DESIGN: GBW/DTP
DRAWN: NJ/DTP
CHECK: BAH
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 01-26-07
PLOT TIME: 08:13:38

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
PHONE (702) 804-2000 FAX (702) 804-2099
I:\V23\Unit-2\dwg\MUP3\23U2d022.dwg

SUMMERLIN
VILLAGE 23A UNIT 2 IMPROVEMENTS
LATERAL PROFILES II

SHEET 22

JOB NO. 62023.222

NO.	DESCRIPTION	DATE	BY	CHK	APP
1	ADDED TEMP. D.I. AND C. ASPHALT @ STA.	01/26/07	GBW	DTP	
2	CURATED ROAD PROFILE GRADE	01/26/07	GBW	DTP	
3	REVISED DRIVE & DIP CALLOUT	01/26/07	GBW	DTP	
4					
5					
6					
7					
8					
9					
10					

DATE: 1/26/07

4995

APPENDIX H

Reference Material

Technical Drainage Study for Summerlin Village 23A Unit 1 Improvements

Approval Letters

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: December 31, 2003
TO: Land Development Services Department of Public Works				FROM: Albert J. Jankowiak, P.E. Flood Control Civil Engineer Department of Public Works
SUBJECT:	Technical Drainage Study for:			COPIES TO:
Summerlin Village 23A - Unit 1 Improvements				G.C. Wallace, Inc.
Cross Streets:	Charleston Blvd. & Desert Foothills Dr.			Howard Hughes Corporation
FILE NO.	F:\Depot\DSMEMOS\DS3126F.doc			Bart Anderson, P.E. DevCo
Parcel Number:	137-22-000-005			
Zoning Action:				
FEMA Flood Zone	YES	No X		
Proposed Storm Drain	YES X	No		

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID G.R. #
1st Submittal	5/6/2002	5/20/2002	Not Acceptable	$250.00	-----
2nd Submittal	5/28/2002	6/7/2002	Accepted	$250.00	-----
3rd Submittal	9/4/2002	9/18/2002	Accepted	$250.00	91041: $250
4th Submittal	7/11/2003	7/24/2003	See Comments Below	$250.00	107629: $250
5th Submittal	9/17/2003	10/6/2003	See Comments Below	$250.00	111201: $250
6th Submittal	12/17/2003	12/31/2003	See Comments Below	$400.00	116309: $400
			TOTAL FEES (LDDRS):	**$1,650.00**	**Balance: $500.00**

REMARKS:

3rd Submittal: Update #1 for minor change of stub locations in Parcel NP-1

4th Submittal: Update #2 to address 100-yr flow depths in all perimeter street of village parcels being below top of curb.

5th Submittal: Update #3 to move Parcel WS-1, reduce the size of Parcels ES-1 and NP-1, add additional storm drain, and update the hydrology and hydraulic analyses accordingly

6th Submittal: Update #4 to revise the storm drain system due to existing electrical conduit, revised the hydraulic analysis accordingly

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

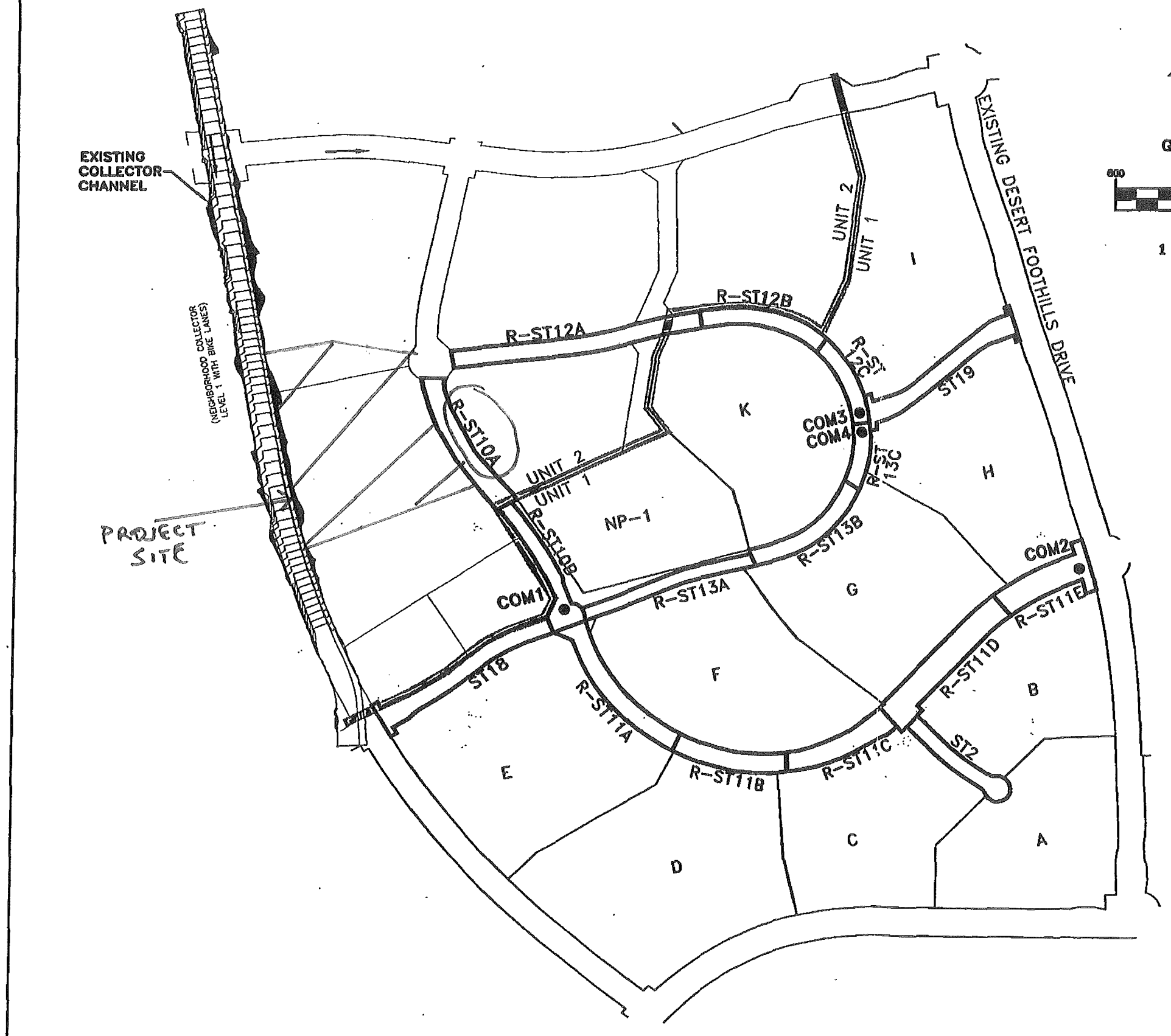
X	is acceptable in concept subject to conformance to all City standards and the following conditions.
	must be resubmitted or supplemented including the following:
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1. On profile sheet 17, revise the invert for the dual 30-inch equivalent reinforced concrete elliptical pipes to 98.40 in order to r[illegible] hydraulic calculation.

2. On detail sheet 4 [illegible] standard design. Structural plans for the storm [illegible] de a soils report, structural calculations and [illegible] ng plan to land development for processing.

Post-it® Fax Note 7671	Date 1-13	# of pages ▶ 2
To Randy Greenlich	From Al Jankowiak
Co./Dept. GC. Wallace	Co. CLV Flood
Phone #	Phone #
Fax # 804-2299	Fax #

Street Sections Exhibit & Section 1 Hydraulic Computation



NORTH
SCALE: 1"=600'

GRAPHIC SCALE
600 0 300 600
(IN FEET)
1 inch = 600 ft.

SUMMARY OF HEC-1 MODEL

BASIN OR LOC.	Q100 (CFS)	Q10 (CFS)
RST10A**	8	4
RST10B	6	3
COM1	14	7
RST11A	8	4
RST11B	6	3
RST11C	6	3
RST11D	11	6
RST11E	8	4
COM2	39	20
RST12A**	10	5
RST12B	6	3
RST12C	4	2
COM3	20	10
RST13A	6	3
RST13B	6	3
RST13C	3	2
COM4	14	7
ST2*	6	3
ST18*	8	4
ST19*	8	4

* TAKEN DIRECTLY FROM THE CONCEPTUAL STUDY
** WILL BE DEVELOPED IN FUTURE PHASES

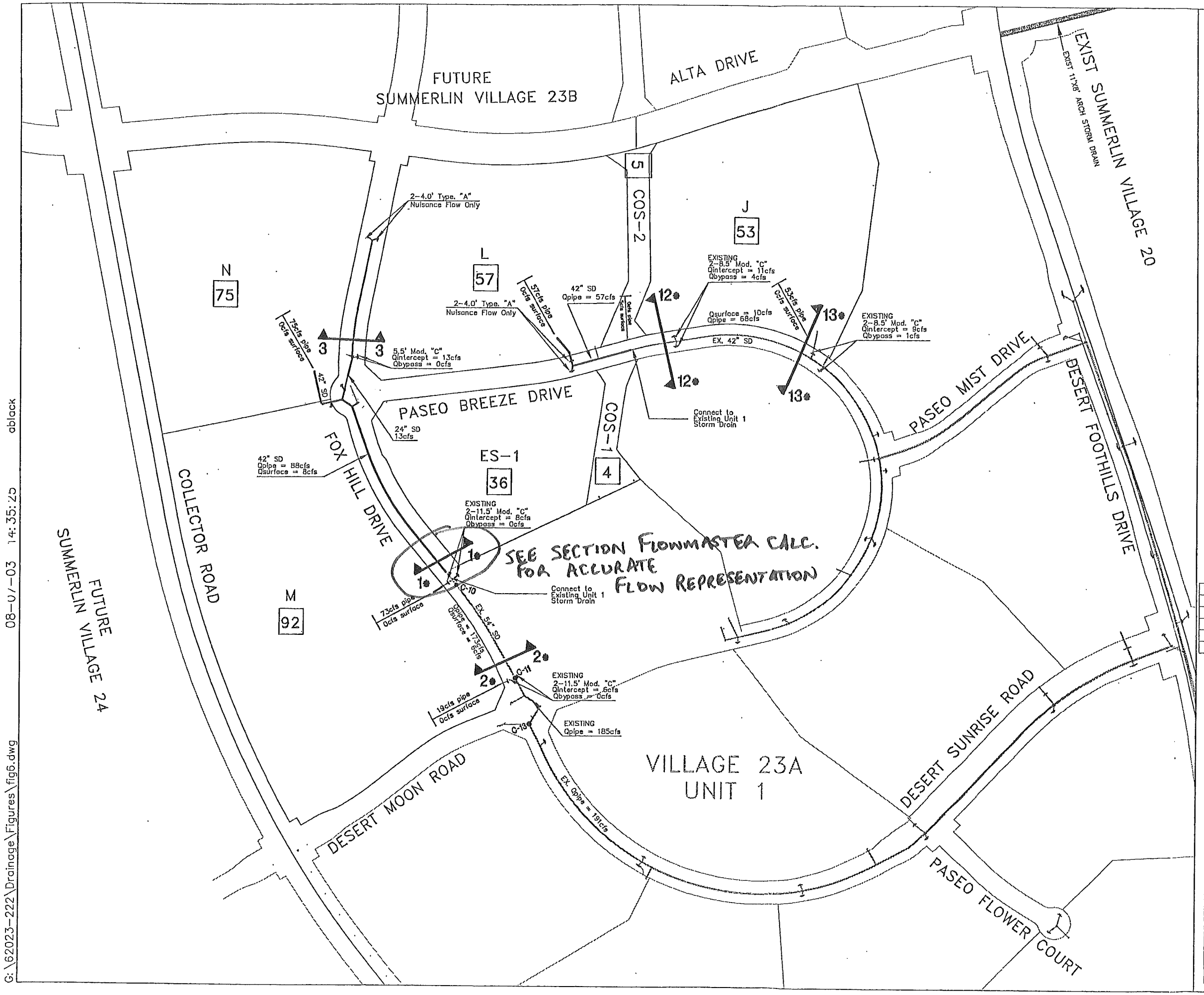
LEGEND

R-ST11B REVISED DRAINAGE BASINS
COM1 CONCENTRATION POINT
SUBBASIN BOUNDARY
UNIT BOUNDARY

SUMMERLIN VILLAGE 23A
UNIT 1 IMPROVEMENTS

FIGURE 5
DRAINAGE BASINS FOR
DROP INLET SIZES

G.C. WALLACE, INC.
Engineers/Planners/Surveyors



NORTH

SCALE 1"=400'

GRAPHIC SCALE

400 0 200 400

(IN FEET)

1 inch = 400 ft.

LEGEND

A	PARCEL NAME
———	PROPOSED STORM DRAIN
MAXIMUM PIPE DISCHARGE / MAXIMUM SURFACE DISCHARGE	PARCEL DISCHARGE
13	MAXIMUM COMBINED DISCHARGE FROM PARCEL
3 3	STREET CROSS SECTION LOCATION
	EXISTING STORM DRAIN

STREET CROSS SECTION SUMMARY

X-SECT LABEL	SLOPE %	Q100(cfs)	D100(ft)	V100(fps)	VxD
1*	4.9	28	0.44	5.9	2.6
2*	1.0	17	0.48	2.9	1.4
3	5.3	13	0.35	5.1	1.8
12*	2.7	15	0.40	4.1	1.6
13*	6.0	20	0.39	5.9	2.3

* ANALYZED IN THE UNIT 1 STUDY

SUMMERLIN VILLAGE 23A
UNIT 2 IMPROVEMENTS

FIGURE 6

DRAINAGE FACILITIES MAP

G.C. WALLACE, INC.
Engineers/Planners/Surveyors

ablack

08-07-03 14:35:25

G:\62023-222\Drainage\Figures\fig6.dwg

Rec'd 7-11-03
DS 3126
K-34
250.00

ADDENDUM 3
TO THE
TECHNICAL DRAINAGE STUDY
FOR
SUMMERLIN VILLAGE 23A
UNIT 1 IMPROVEMENTS

62023.221

July 2003

Prepared for:

The Howard Hughes Corporation
a Delaware Corporation
10000 West Charleston Blvd., Ste. 200
Las Vegas, Nevada 89135
Phone: (702) 791-4300
Fax: (702) 791-4453

Spine Road (Section1)
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION 1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	4.8	%
Discharge	8	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Method	Horton's Method

Results		
Mannings Coefficient	0.016	
Water Surface Elevation	0.32	ft
Elevation Range	0.00 to 1.08	
Flow Area	1.8	ft²
Wetted Perimeter	18.46	ft
Top Width	17.73	ft
Actual Depth	0.32	ft
Critical Elevation	0.40	ft
Critical Slope	0.7	%
Velocity	4.4	ft/s
Velocity Head	0.30	ft
Specific Energy	0.61	ft
Froude Number	2.40	
Flow Type	Supercritical	

FOX HILL ADJACENT FLOW DEPTH

Calculation Messages:
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+40.0	1+10.0	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+40.0	0.50
0+40.5	0.50
0+40.5	0.00
0+42.0	0.13
0+42.0	0.17
0+62.7	0.58
0+62.7	1.08
0+87.3	1.08
0+87.3	0.58
1+08.0	0.17

© Haestad Methods, Inc.
G. C. Wallace Inc
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Spine Road (Section1)
Worksheet for Irregular Channel

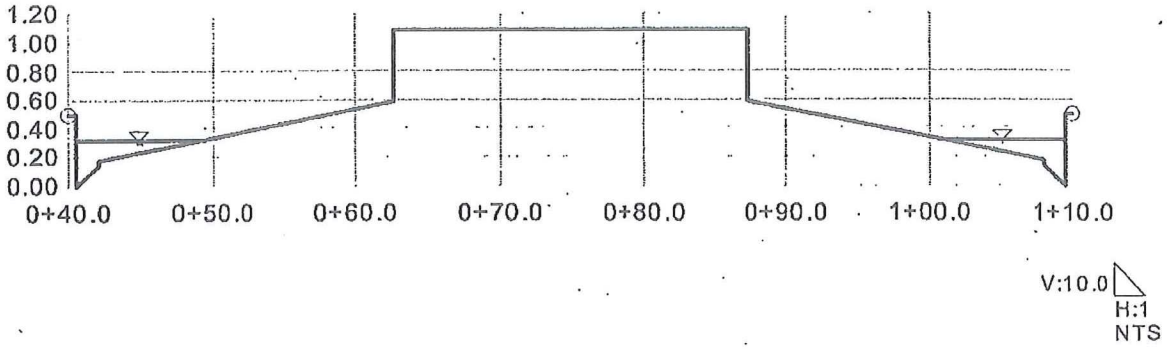
Natural Channel Points	
Station (ft)	Elevation (ft)
1+08.0	0.13
1+09.5	0.00
1+09.5	0.50
1+10.0	0.50

© Haestad Methods, Inc.
G. C. Wallace Inc
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Section 1
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION 1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Slope	4.8 %
Water Surface Elevation	0.32 ft
Elevation Range	0.00 to 1.08
Discharge	8 cfs



Relevant Storm Drain Profile Sheets

APPENDIX I

Reference Material

Technical Drainage Study for Summerlin Village 23A Rough Grading

Approval Letters

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM				DATE: May 16, 2003
TO: Land Development Services Department of Public Works				FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: Summerlin Village 23A – Update			COPIES TO: G. C. Wallace, Inc.
Cross Streets:	NWC Charleston and Desert Foothills			Howard Hughes Corporation
FILE NO.:	F:\Depot\DSMEMOS\DS3077E.doc			Bart Anderson, P.E., DEVCO
Parcel Number:	137-22-000-005			CCRFCD
Zoning Action:				
FEMA Flood Zone	YES		No X	
Proposed Storm Drain	YES X		No	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID G.R. #
1st Submittal	2/1/2002	2/15/2002	Conditional Acceptance	$250.00	----
2nd Submittal	2/28/2002	3/13/2002	Not Acceptable	$250.00	----
3rd Submittal	3/22/2002	4/5/2002	Acceptable	$250.00	----
4th Submittal	5/6/2002	5/16/2002	Acceptable	$250.00	86133: $1,000
5th Submittal	4/17 & 5/15/2003	5/16/2003	See Comments Below	$250.00	102770: $250
			TOTAL FEES (LDDRS):	$1,250.00	---

REMARKS:

1st Submittal is for Conceptual Storm Facilities; 2nd & 3rd Submittals are for Rough Grading;

4th & 5th Submittals are Updates

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

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

1. This update is to address the 100-yr flow depths in all interior streets of *Village 23A* being at or below the top of curb; the onsite houses should be well protected even if they are below the corresponding street grade. This is true conceptually, however freeboard must also be considered for further protection. Curb height of 8" high and/or sidewalk with landscaping strip must be considered to provide the freeboard in lieu of the solid grouting of wall. This will be reviewed in a case by case situation upon individual parcel development.

The following comments are re-iterated until they are complete:

1. *Detail 1/43 for the berm along Charleston Boulevard must provide a layer of geotextile filter fabric beneath the riprap.*

2. *The submitted study proposes rough grading of interior streets and protection berm / channel only. Future development of interior parcels and improvement of roadways (asphalt paving, curb & gutter,*

storm drains and inlets etc.) and Collector Road will require detail hydrologic and hydraulic calculations with subsequent technical drainage studies.

3. *The proposed rough graded interior streets and site are privately owned and maintained by Howard Hughes Corporation.*

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

END OF REMARKS
ays

T/R/S: T20S/R59E/34
AREA K34

Relevant Report Excerpts

Rec'd 2-28-02
K34
DS 307)
250.00

TECHNICAL DRAINAGE STUDY
FOR
SUMMERLIN VILLAGE 23A
ROUGH GRADING

62023.201

February 2002

Prepared for:

The Howard Hughes Corporation
a Delaware Corporation
10000 West Charleston Blvd., Ste. 200
Las Vegas, Nevada 89134
Phone: (702) 791-4300
Fax: (702) 791-4453

TABLE 1 SUMMARY OF HEC-1 MODEL		
Subbasin/ Combination Point*	Q_{10} (cfs)	Q_{100} (cfs)
RG15	14	44
COM15	75	215
RG16	15	48
COM16	89	243
RG17	19	59
COM17	172	509
RG14	35	107
RG18	32	100
COM18	64	198
COM20	222	656

*See Figure 5.

The rough grading proposed with this project will direct offsite storm flows in ultimate drainage patterns. A berm directs flow generated north of Alta Drive east into the existing Desert Foothills Channel. The proposed channel is 20 feet wide and the berm is 6.5 feet high. The berm / channel has a longitudinal slope of 1.4 percent. The calculated velocity along the berm is less than 8 fps. Riprap, d_{50} = 6-inch, thickness = 12 inches, will be placed along the berm and 3 feet across the bottom to protect the berm from erosive velocities.

Grading within the Collector Road alignment will direct existing storm flows generated west of Village 23A south to the Red Rock Detention Basin. The proposed graded roadway is 80 feet wide. A 3-foot high berm will be placed adjacent to the roadway to contain storm flows. Riprap, d_{50} = 12-inch, thickness = 24 inches, will be placed along the berm and 3 feet across the bottom to protect the berm from erosive velocities.

In addition, the existing detention basin berm (COM1 on Figure 5) will be extended north approximately 600 feet. This will allow the outflow from the detention basin to disperse in the natural washes which drain to the existing channel within the Desert Foothills Drive alignment. This channel was designed to intercept and convey a peak flow of 3,100 cfs. The existing channel drains to the existing 11-foot by 8-foot arch culvert located in Alta Drive. The proposed drainage patterns are consistent with the existing and future drainage patterns.

The flow collected in Spoke "A" and Spine Road (at the respective intersections with Desert Foothills Drive) is 167 cfs and 243 cfs for the 100-year storm. The flow within

Spoke "A" and Spine Road is proposed to be released in the Desert Foothills Channel as surface flow. To minimize erosion at these points, riprap (d_{50} = 12-inch, thickness = 24 inches) will be placed at these locations. Despite these measures, some erosion may occur during major storm events. However, the Desert Foothills Channel and the proposed rough graded interior streets will be privately owned and maintained. This temporary condition is expected to exist for approximately 6 months.

The street flow calculations are presented in Table 2. These street sections represent the rough graded streets. In some areas the rough graded street will have a velocity over 5 fps and some damage may occur in major storm events. However, because this is a temporary condition, no erosion protection is provided for the rough graded streets. The proposed grading site will be privately owned and maintained by the Howard Hughes Corporation.

TABLE 2
STREET FLOW CALCULATIONS

Section*	Slope %	Discharge (cfs)	Depth (ft)	Velocity (fps)	DxV
A	1.4	205	1.6	6.3	–
B	2.6	430	0.7	6.5	–
C	4.9	215	0.6	7.2	–
D	2.5	11	0.1	1.3	0.1
E	3.7	145	0.7	5.7	4.0
E2	4.0	145	0.5	5.8	2.9
F	5.3	57	0.5	5.1	1.8
G	0.6	94	0.8	3.2	2.6
H	1.8	167	0.8	4.8	4.0
K	6.0	70	0.5	5.8	2.9
J	5.5	174	0.7	6.8	4.8
L	2.7	198	0.8	5.6	4.5
M	3.0	215	0.8	5.8	4.6
N	0.8	243	1.1	4.2	4.9
P	3.0	87	0.3	3.1	0.9
S	2.6	430	1.2	8.8	–
R (berm extension)	0.3	2282	5.8	7.6	–

*See Figure 5.

In addition, small berms will be placed at the intersections of Spine Road and Alta Drive, Spine Road and Loop "A" Road (north), Spine Road and Loop "A" Road (south), and Spine Road and CDS "A" to maintain the ultimate drainage patterns for the Village. These berms were sized to contain the 100-year storm flows with

Drainage Plan & Interim Collector Channel Computations

Rec'd 2-28-02
K34
DS 307)
250.00

TECHNICAL DRAINAGE STUDY
FOR
SUMMERLIN VILLAGE 23A
ROUGH GRADING

62023.201

February 2002

Prepared for:

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APPENDIX I

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Cross Streets:	NWC Charleston and Desert Foothills			Howard Hughes Corporation
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Proposed Storm Drain	YES X		No	

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END OF REMARKS
ays

T/R/S: T20S/R59E/34
AREA K34

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K34
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TECHNICAL DRAINAGE STUDY
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ROUGH GRADING

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Prepared for:

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Phone: (702) 791-4300
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TABLE 1 SUMMARY OF HEC-1 MODEL		
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COM15	75	215
RG16	15	48
COM16	89	243
RG17	19	59
COM17	172	509
RG14	35	107
RG18	32	100
COM18	64	198
COM20	222	656

*See Figure 5.

The rough grading proposed with this project will direct offsite storm flows in ultimate drainage patterns. A berm directs flow generated north of Alta Drive east into the existing Desert Foothills Channel. The proposed channel is 20 feet wide and the berm is 6.5 feet high. The berm / channel has a longitudinal slope of 1.4 percent. The calculated velocity along the berm is less than 8 fps. Riprap, d_{50} = 6-inch, thickness = 12 inches, will be placed along the berm and 3 feet across the bottom to protect the berm from erosive velocities.

Grading within the Collector Road alignment will direct existing storm flows generated west of Village 23A south to the Red Rock Detention Basin. The proposed graded roadway is 80 feet wide. A 3-foot high berm will be placed adjacent to the roadway to contain storm flows. Riprap, d_{50} = 12-inch, thickness = 24 inches, will be placed along the berm and 3 feet across the bottom to protect the berm from erosive velocities.

In addition, the existing detention basin berm (COM1 on Figure 5) will be extended north approximately 600 feet. This will allow the outflow from the detention basin to disperse in the natural washes which drain to the existing channel within the Desert Foothills Drive alignment. This channel was designed to intercept and convey a peak flow of 3,100 cfs. The existing channel drains to the existing 11-foot by 8-foot arch culvert located in Alta Drive. The proposed drainage patterns are consistent with the existing and future drainage patterns.

The flow collected in Spoke "A" and Spine Road (at the respective intersections with Desert Foothills Drive) is 167 cfs and 243 cfs for the 100-year storm. The flow within

Spoke "A" and Spine Road is proposed to be released in the Desert Foothills Channel as surface flow. To minimize erosion at these points, riprap (d_{50} = 12-inch, thickness = 24 inches) will be placed at these locations. Despite these measures, some erosion may occur during major storm events. However, the Desert Foothills Channel and the proposed rough graded interior streets will be privately owned and maintained. This temporary condition is expected to exist for approximately 6 months.

The street flow calculations are presented in Table 2. These street sections represent the rough graded streets. In some areas the rough graded street will have a velocity over 5 fps and some damage may occur in major storm events. However, because this is a temporary condition, no erosion protection is provided for the rough graded streets. The proposed grading site will be privately owned and maintained by the Howard Hughes Corporation.

TABLE 2
STREET FLOW CALCULATIONS

Section*	Slope %	Discharge (cfs)	Depth (ft)	Velocity (fps)	DxV
A	1.4	205	1.6	6.3	–
B	2.6	430	0.7	6.5	–
C	4.9	215	0.6	7.2	–
D	2.5	11	0.1	1.3	0.1
E	3.7	145	0.7	5.7	4.0
E2	4.0	145	0.5	5.8	2.9
F	5.3	57	0.5	5.1	1.8
G	0.6	94	0.8	3.2	2.6
H	1.8	167	0.8	4.8	4.0
K	6.0	70	0.5	5.8	2.9
J	5.5	174	0.7	6.8	4.8
L	2.7	198	0.8	5.6	4.5
M	3.0	215	0.8	5.8	4.6
N	0.8	243	1.1	4.2	4.9
P	3.0	87	0.3	3.1	0.9
S	2.6	430	1.2	8.8	–
R (berm extension)	0.3	2282	5.8	7.6	–

*See Figure 5.

In addition, small berms will be placed at the intersections of Spine Road and Alta Drive, Spine Road and Loop "A" Road (north), Spine Road and Loop "A" Road (south), and Spine Road and CDS "A" to maintain the ultimate drainage patterns for the Village. These berms were sized to contain the 100-year storm flows with

Drainage Plan & Interim Collector Channel Computations

Rec'd 2-28-02
K34
DS 307)
250.00

TECHNICAL DRAINAGE STUDY
FOR
SUMMERLIN VILLAGE 23A
ROUGH GRADING

62023.201

February 2002

Prepared for:

The Howard Hughes Corporation
a Delaware Corporation
10000 West Charleston Blvd., Ste. 200
Las Vegas, Nevada 89134
Phone: (702) 791-4300
Fax: (702) 791-4453



SUMMARY OF HEC-1 MODEL

SECTION	Q100(CFS)	D100(FT)	V100(FT/S)	VID.
A	205	1.8	4.9	-
B	430	0.7	6.5	-
C	215	0.8	7.3	-
D	11	0.1	1.3	0.1
E	145	0.7	5.7	4.0
E2	145	0.5	5.5	2.7
F	37	0.5	3.8	1.8
G	119	0.9	3.5	3.1
H	160	0.9	6.0	4.3
I	174	0.9	6.6	4.8
K	70	0.5	5.6	2.7
L	107	0.7	7.0	3.7
M	215	0.8	5.9	4.7
N	243	1.0	4.8	4.6
P	87	0.5	5.1	3.1
R	2282	5.8	7.6	-
S	430	1.2	8.8	-

SUMMARY OF HEC-1 MODEL

BASIN OR LOC.	Q100 (CFS)	Q10 (CFS)
*OSSI00	3251	1662
RG1	117	42
RG3	168	54
COM1	2283	1702
RG2	87	28
RG5	63	20
COM2	146	48
RG4	99	35
COM3	305	161
RG44	7	3
COM4	3531	1718
RG6	430	174
RG10	70	25
RG11	72	28
RG12	47	16
COM12	180	62
RG13	83	27
COM13	247	84
RG7	67	22
RG8	78	30
COM8	131	65
RG9	43	16
COM9	174	661
RG15	44	14
COM15	215	75
RG16	48	15
COM16	263	83
RG17	59	19
COM17	322	181
RG14	107	35
RG18	111	37
COM18	574	201
COM20	693	233

LEGEND

- RG1 — DRAINAGE SUBBASIN
- PT1 — CONCENTRATION POINT
- STREET FLOW CALCULATION
- SUBBASIN BOUNDARY
- FLOW DIRECTION

This grading plan is a part of drainage study # 355/ which was received on 11/4 and Revised on 4/18/89. Page 1 Of 11

G.C. WALLACE, INC.
Engineering/Architecture
CARLSBAD, CALIFORNIA 92008
TELEPHONE (760) 804-0600 FAX (760) 804-9299

SUMMERLIN VILLAGE 22A - ROUGH GRADING
FIGURE 5
PROPOSED DRAINAGE PLAN

SHEET FIG5

SECTION B (100-YEAR)
Worksheet for Irregular Channel

Project Description	
Worksheet	SECT-B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	2.5900	%
Discharge	430.00	cfs

Options	
Current Roughness Method	mproved Lotter's Method
Open Channel Weighting Method	mproved Lotter's Method
Closed Channel Weighting Metho	Horton's Method

Results		
Mannings Coefficient	0.025	
Water Surface Elevation	0.68	ft
Elevation Range	0.00 to 2.50	
Flow Area	66.1	ft²
Wetted Perimeter	115.90	ft
Top Width	115.78	ft
Actual Depth	0.68	ft
Critical Elevation	0.87	ft
Critical Slope	1.0443	%
Velocity	6.51	ft/s
Velocity Head	0.66	ft
Specific Energy	1.33	ft
Froude Number	1.52	
Flow Type	Supercritical	

→ FLOW CONTAINED IN COLLECTOR CHANNEL

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+55	1+82	0.025
1+82	1+93	0.035

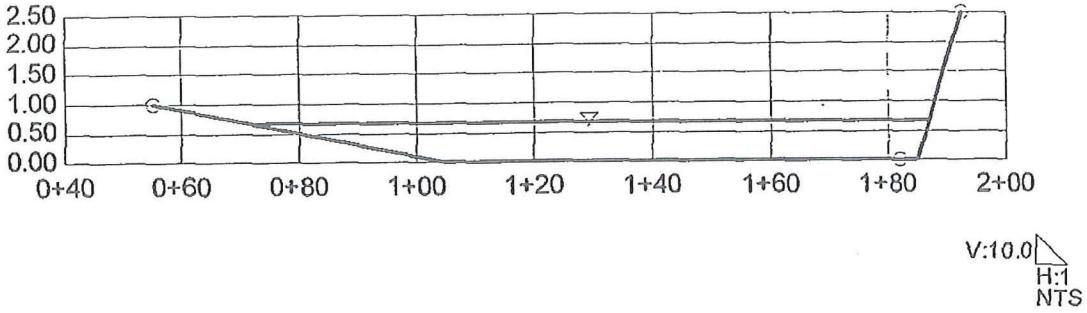
Natural Channel Points	
Station (ft)	Elevation (ft)
0+55	1.00
1+05	0.00
1+82	0.00
1+85	0.00
1+93	2.50

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G.C. Wallace
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

SECTION B (100-YEAR)
Cross Section for Irregular Channel

Project Description	
Worksheet	SECT-B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.025	
Slope	2.5900	%
Water Surface Elevation	0.68	ft
Elevation Range	0.00 to 2.50	
Discharge	430.00	cfs



SECTION C (100-YEAR)
Worksheet for Irregular Channel

Project Description	
Worksheet	SECT-C
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	4.9000	%
Discharge	215.00	cfs

Options	
Current Roughness Method	mproved Lotter's Method
Open Channel Weighting Method	mproved Lotter's Method
Closed Channel Weighting Metho	Horton's Method

Results		
Mannings Coefficient	0.025	
Water Surface Elevation	0.61	ft
Elevation Range	0.00 to 2.00	
Flow Area	29.8	ft²
Wetted Perimeter	73.30	ft
Top Width	73.06	ft
Actual Depth	0.61	ft
Critical Elevation	0.85	ft
Critical Slope	1.0639	%
Velocity	7.22	ft/s
Velocity Head	0.81	ft
Specific Energy	1.42	ft
Froude Number	1.99	
Flow Type	Supercritical	

→ FLOW CONTAINED IN COLLECTOR CHANNEL

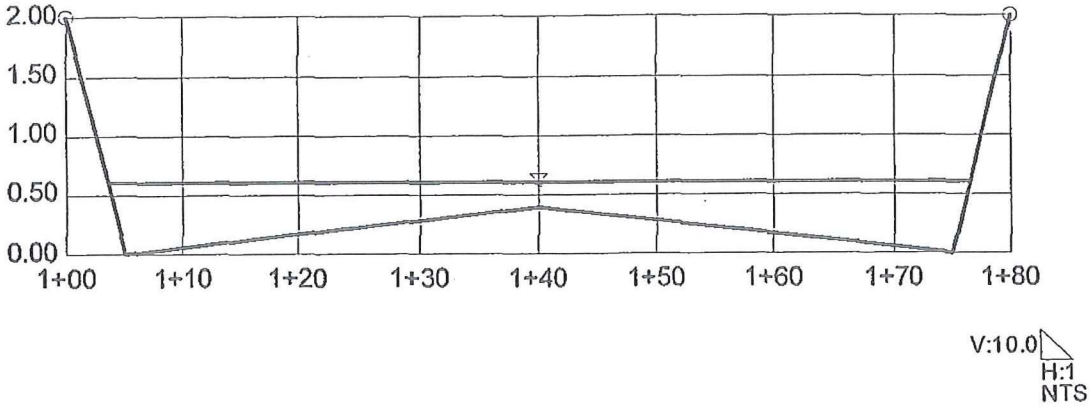
Roughness Segments		
Start Station	End Station	Mannings Coefficient
1+00	1+80	0.025

Natural Channel Points	
Station (ft)	Elevation (ft)
1+00	2.00
1+05	0.00
1+40	0.40
1+75	0.00
1+80	2.00

SECTION C (100-YEAR)
Cross Section for Irregular Channel

Project Description	
Worksheet	*SECT-C*
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.025	
Slope	4.9000	%
Water Surface Elevation	0.61	ft
Elevation Range	0.00 to 2.00	
Discharge	215.00	cfs



RIP RAP SIZE FOR TRAPEZOIDAL CHANNEL
Normal depth calculations by Manning's equation.

Collector Road Berm/Channel

INPUT VARIABLES:		OUTPUT VARIABLES:	
FLOW (Q)	430 cfs	VELOCITY	6.99 ft/sec
MANNING's 'n'	0.039	DEPTH	0.75 ft
SLOPE	5.2 % ← MOST CONSERVATIVE SLOPE	FREEBOARD	1.16 ft
BOTTOM WIDTH	80 ft	TOTAL DEPTH	1.91 ft
SIDE SLOPE (Lt)	2 H:1V	FROUD No.	1.45
SIDE SLOPE (Rt)	6 H:1V	d50 Rip RAP SIZE	10.6 in
SPECIFIC GRAVITY	2.5		

Fb= 0.5+V^2/2g (Sub-critical) 1+0.025Vd^(1/3) (Super-critical)
Rip rap size and manning's 'n' per CCRFCD Design Manual

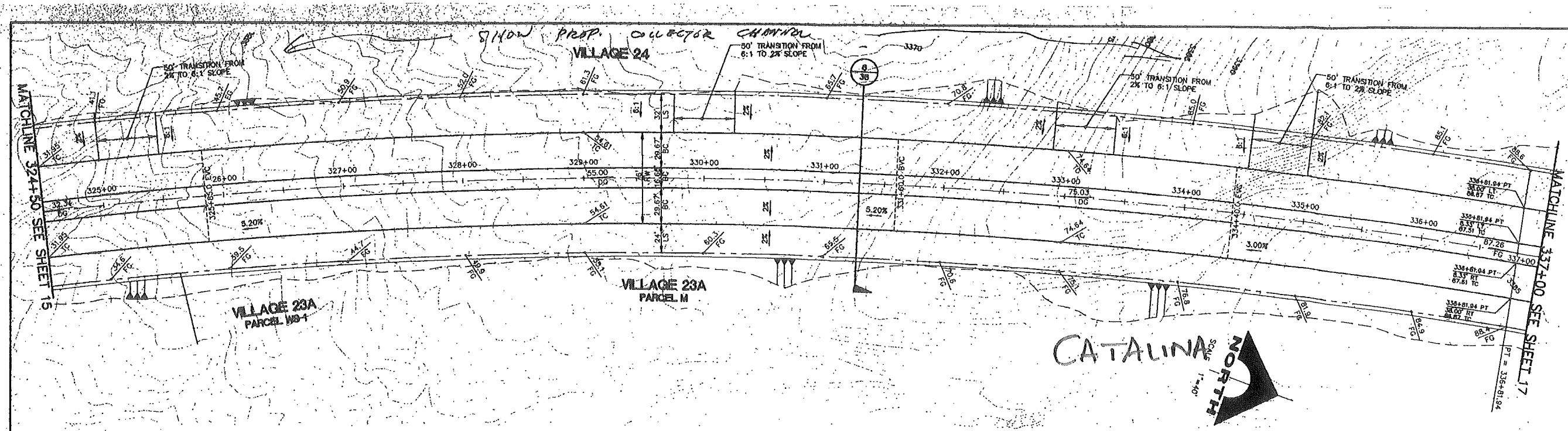
RIP RAP SIZE FOR TRAPEZOIDAL CHANNEL
Normal depth calculations by Manning's equation.

Collector Road Berm/Channel Southern Portion of the Channel

INPUT VARIABLES:		OUTPUT VARIABLES:	
FLOW (Q)	430 cfs	VELOCITY	7.19 ft/sec
MANNING's 'n'	0.037	DEPTH	1.33 ft
SLOPE	2.59 %	FREEBOARD	1.20 ft
BOTTOM WIDTH	40 ft	TOTAL DEPTH	2.53 ft
SIDE SLOPE (Lt)	2 H:1V	FROUD No.	1.17
SIDE SLOPE (Rt)	6 H:1V	d50 Rip RAP SIZE	8.8 in
SPECIFIC GRAVITY	2.5		

Fb= 0.5+V^2/2g (Sub-critical) 1+0.025Vd^(1/3) (Super-critical)
Rip rap size and manning's 'n' per CCRFCD Design Manual

Relevant Profile & Detail Sheets



BENCHMARK			
B.M. #	DESC.	NAVD 88 DATUM	NAVD 88 DATUM
06108-346858	NDOT BRASS CAP, 50 FEET NORTH OF STATION 327+18.42 OF CHARLESTON BOULEVARD.	3200.81 (FEET)	976.351 (METERS)

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

FUTURE COLLECTOR ROAD

SCALE: HORIZ. 1" = 40'±.
VERT. 1" = 10'

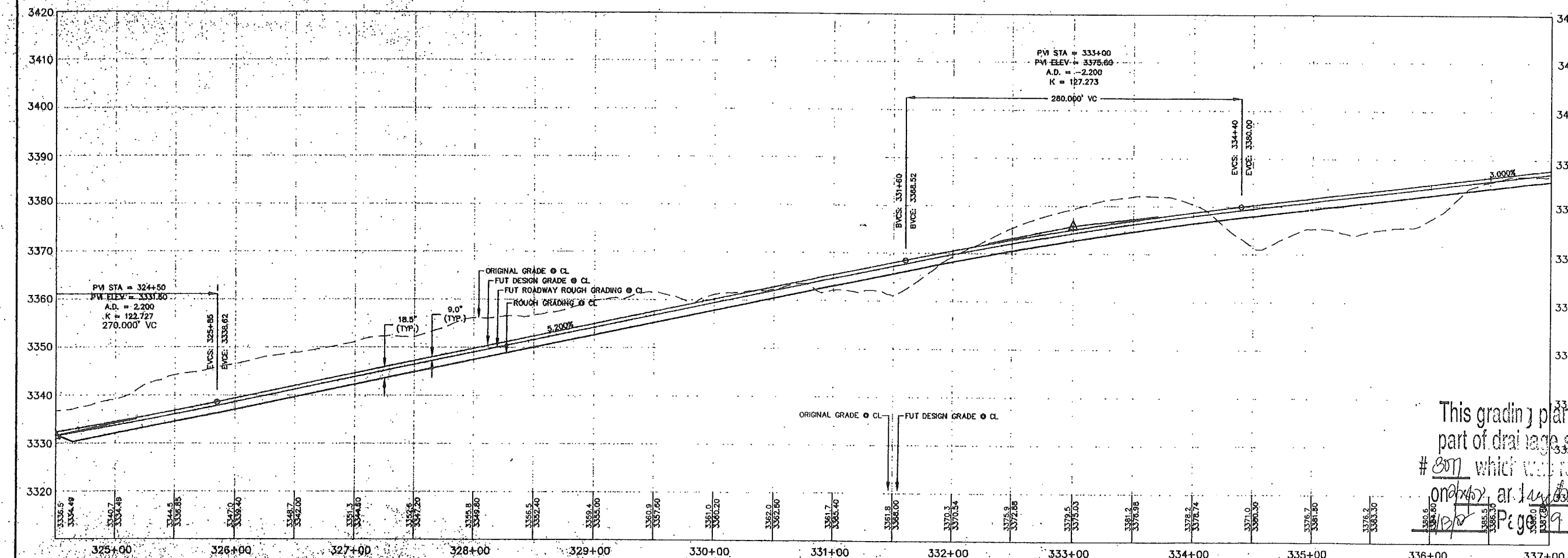
40 0 40 80
SCALE FEET

NOTE

THIS SET OF DRAWINGS IS BASED UPON NAVD 88 DATUM. PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

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

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
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CALL 1-702-503-6111



This grading plan is a part of drainage study # 807 which was received on 9/29/07 and approved on 11/6/2020

Page 9 Of 37

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ISSUE DATE:	
ISSUE EDITION:	1st-02
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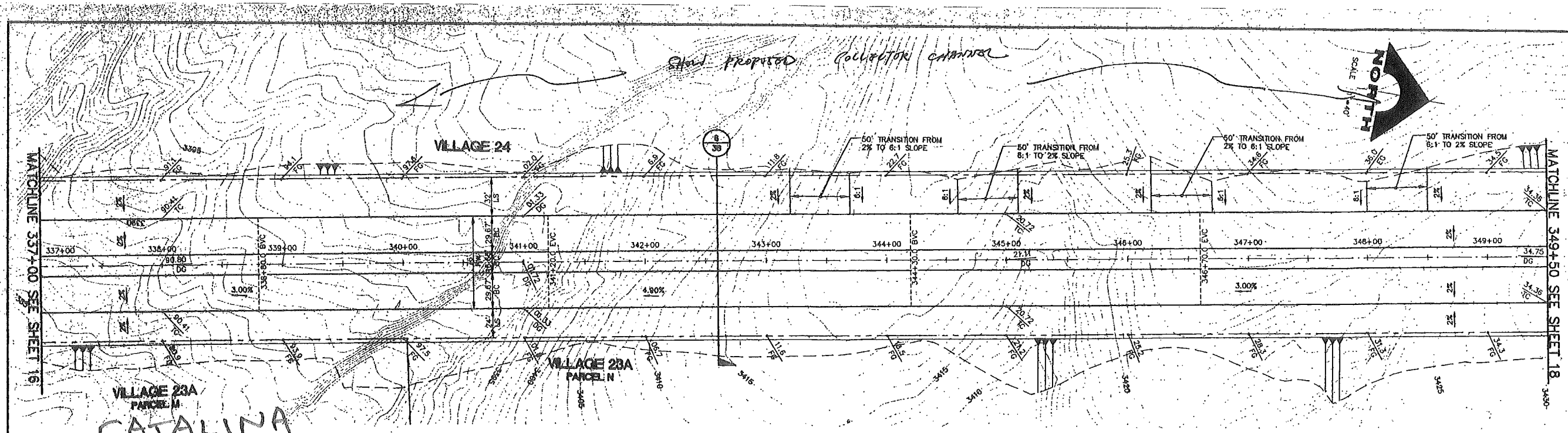
REV. DATE DESCRIPTION

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD., LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000, FAX: (702) 804-2299
SUMMERLIN OFFICE: 10000 CHARLESTON BLVD., STE. 130
OFFICE: (702) 804-2100, FAX: (702) 804-2295
E:\V33\Roadways\dwg\Village 23A\Village23A.dwg

ISSUE DATE: 9/29/20

SUMMERLIN
VILLAGE 23A ROUGH GRADING PLANS
ROUGH GRADING IMPROVEMENTS
PLAN AND PROFILE

SHEET 16
16 OF 40 SHTS



BENCHMARK

BM #	DESC.	NAVD 88(FEET) DATUM	NAVD 88(METERS) DATUM
CLV09-348838	MONUMENT BRASS CAP, 60 FEET NORTH OF STAKE, NORTH 42 DEGREES EAST OF CHARLESTON BOULEVARD.	3308.81 (FEET)	978.391 (METERS)

BASIS OF BEARINGS

NORTH 89°45'08" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

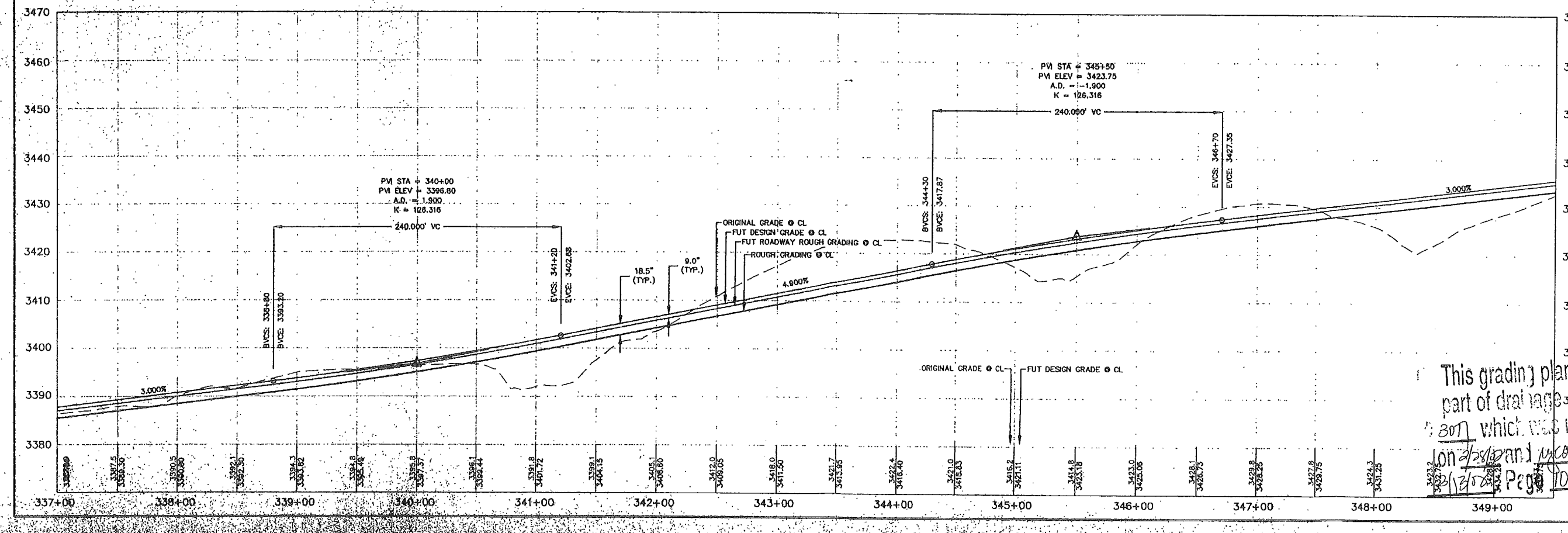
FUTURE COLLECTOR ROAD

SCALE: HORIZ. 1" = 40'
VERT. 1" = 10'

40 0 40 80
SCALE FEET

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

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This grading plan is a part of drainage study 3307 which was received on 2/24/2010 and approved on 3/12/2010 Page 10 Of 27

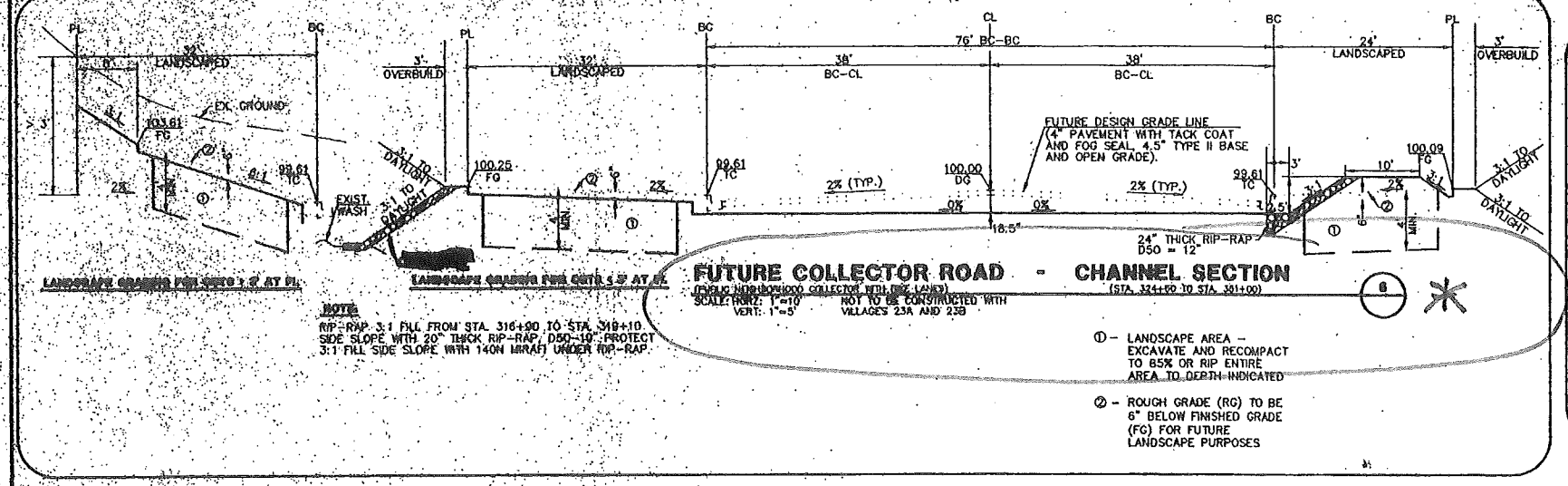
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD., SUITE 400, LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000, FAX: (702) 804-2299
SUMMERLIN OFFICE 10000 CHARLESTON BLVD., STE. 130
OFFICE: (702) 804-2160, FAX: (702) 804-2285

DESIGN: DGC/AJ
DRAWN: SSG
CHECK:
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 25-02
PLOT TIME: 15:30

SUMMERLIN
VILLAGE 23A ROUGH GRADING PLANS
ROUGH GRADING IMPROVEMENTS
PLAN AND PROFILE

JOB NO. 9230.00

SHEET 17
17 OF 40 SHTS.



LANDSCAPE GRADING FOR CUTS ≤ 3' AT PL

LANDSCAPE GRADING FOR CUTS > 3' AT PL

NOTE:
RIP-RAP 3:1 FILL FROM STA. 316+00 TO STA. 319+10 SIDE SLOPE WITH 20" THICK RIP-RAP, D50=12". PROTECT 3:1 FILL SIDE SLOPE WITH 140N MIRAFI UNDER RIP-RAP.

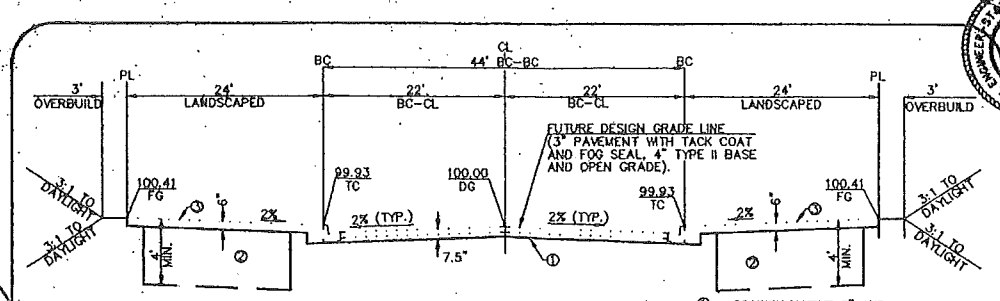
FUTURE COLLECTOR ROAD - CHANNEL SECTION

(PUBLIC NEIGHBORHOOD COLLECTOR WITH BIKE LANES)
SCALE: HORIZ: 1"=10' VERT: 1"=5
NOT TO BE CONSTRUCTED WITH VILLAGES 23A AND 23B
(STA. 324+00 TO STA. 331+00)

6

① – LANDSCAPE AREA – EXCAVATE AND RECOMPACT TO 85% OR RIP ENTIRE AREA TO DEPTH INDICATED

② – ROUGH GRADE (RG) TO BE 6" BELOW FINISHED GRADE (FG) FOR FUTURE LANDSCAPE PURPOSES



LANDSCAPE GRADING FOR CUTS ≤ 3' AT PL

LOOP "A"

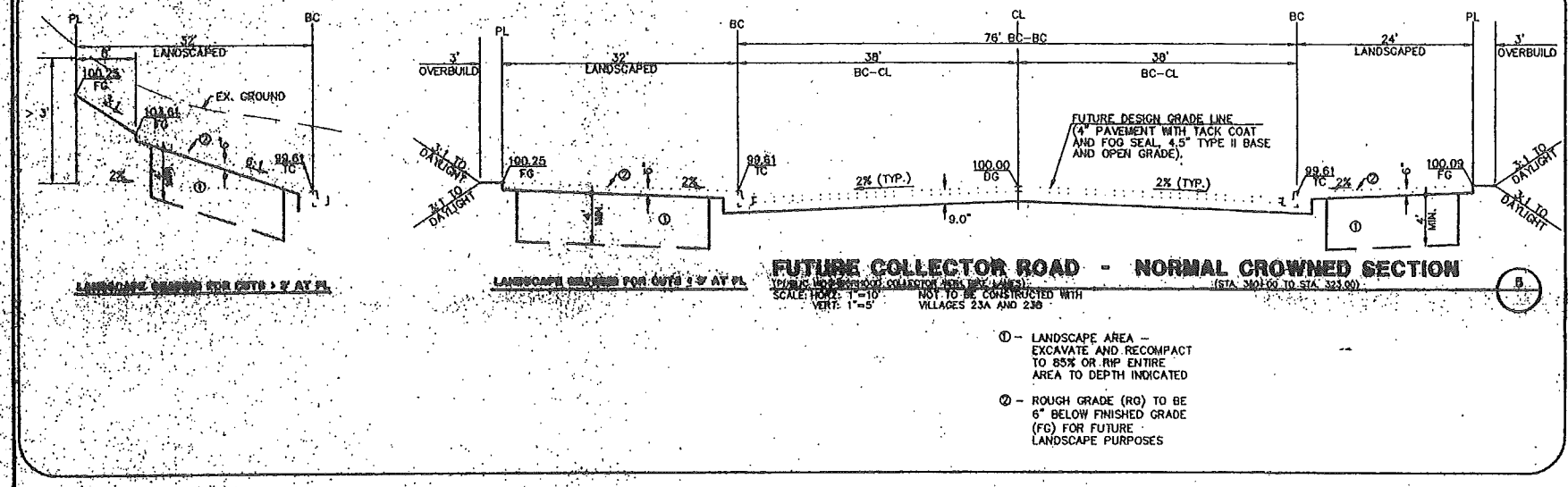
(PUBLIC RESIDENTIAL COLLECTOR)
SCALE: HORIZ: 1"=10' VERT: 1"=5

3

① – SCARIFY NATIVE 6" AND RECOMPACT TO 95%

② – LANDSCAPE AREA – EXCAVATE AND RECOMPACT TO 85% OR RIP ENTIRE AREA TO DEPTH INDICATED

③ – ROUGH GRADE (RG) TO BE 6" BELOW FINISHED GRADE (FG) FOR FUTURE LANDSCAPE PURPOSES



LANDSCAPE GRADING FOR CUTS ≤ 3' AT PL

LANDSCAPE GRADING FOR CUTS > 3' AT PL

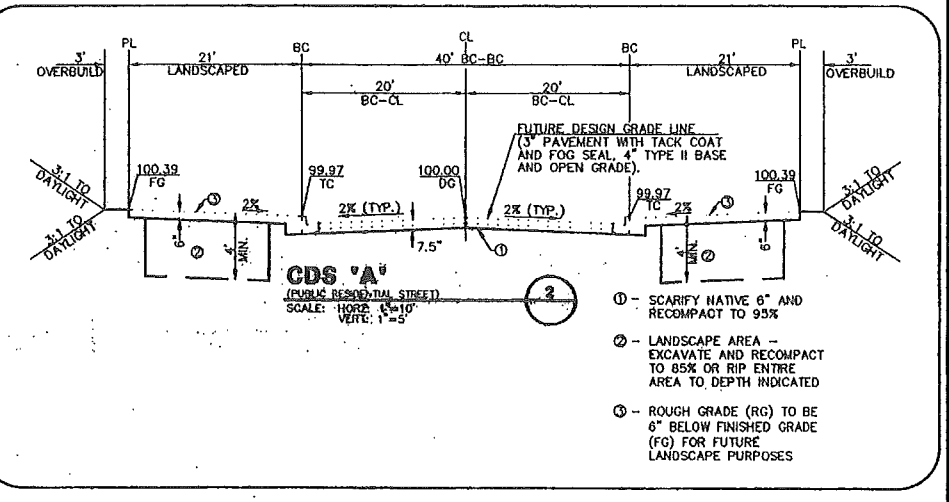
FUTURE COLLECTOR ROAD - NORMAL CROWNED SECTION

(PUBLIC NEIGHBORHOOD COLLECTOR WITH BIKE LANES)
SCALE: HORIZ: 1"=10' VERT: 1"=5
NOT TO BE CONSTRUCTED WITH VILLAGES 23A AND 23B
(STA. 340+00 TO STA. 323.00)

5

① – LANDSCAPE AREA – EXCAVATE AND RECOMPACT TO 85% OR RIP ENTIRE AREA TO DEPTH INDICATED

② – ROUGH GRADE (RG) TO BE 6" BELOW FINISHED GRADE (FG) FOR FUTURE LANDSCAPE PURPOSES



CDS "A"

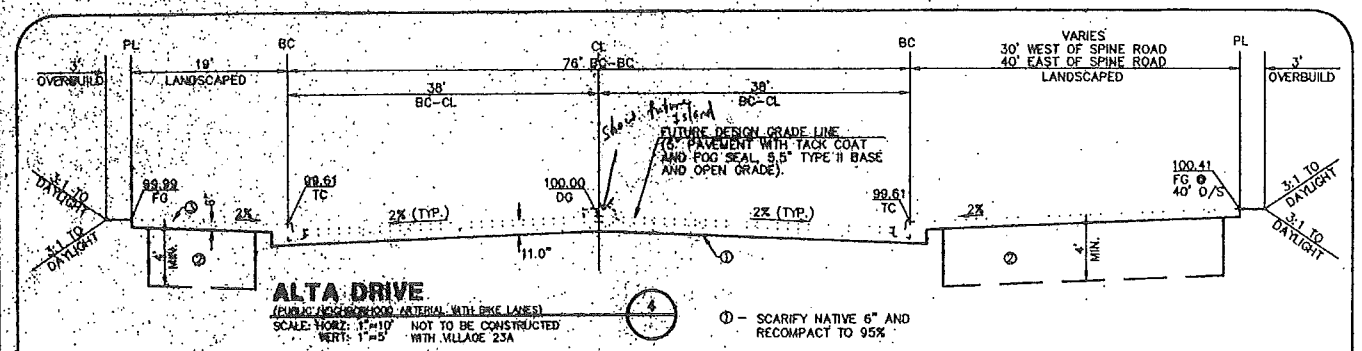
(PUBLIC RESIDENTIAL STREET)
SCALE: HORIZ: 1"=10' VERT: 1"=5

2

① – SCARIFY NATIVE 6" AND RECOMPACT TO 95%

② – LANDSCAPE AREA – EXCAVATE AND RECOMPACT TO 85% OR RIP ENTIRE AREA TO DEPTH INDICATED

③ – ROUGH GRADE (RG) TO BE 6" BELOW FINISHED GRADE (FG) FOR FUTURE LANDSCAPE PURPOSES



ALTA DRIVE

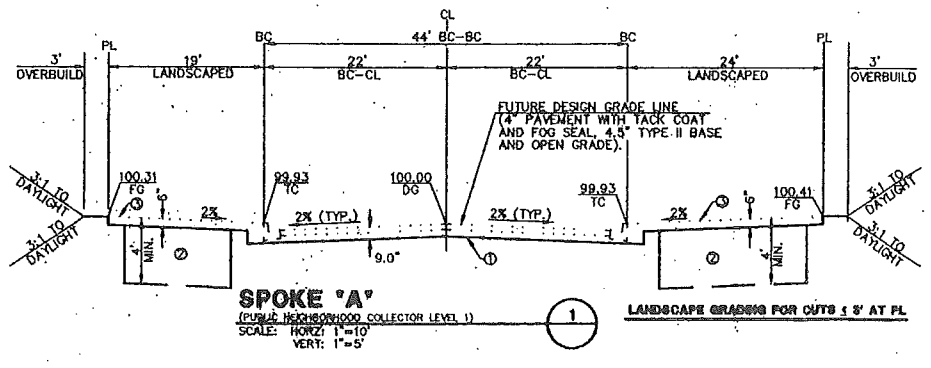
(PUBLIC NEIGHBORHOOD ARTERIAL WITH BIKE LANES)
SCALE: HORIZ: 1"=10' VERT: 1"=5
NOT TO BE CONSTRUCTED WITH VILLAGE 23A

4

① – SCARIFY NATIVE 6" AND RECOMPACT TO 95%

② – LANDSCAPE AREA – EXCAVATE AND RECOMPACT TO 85% OR RIP ENTIRE AREA TO DEPTH INDICATED

③ – ROUGH GRADE (RG) TO BE 6" BELOW FINISHED GRADE (FG) FOR FUTURE LANDSCAPE PURPOSES



SPOKE "A"

(PUBLIC NEIGHBORHOOD COLLECTOR LEVEL 1)
SCALE: HORIZ: 1"=10' VERT: 1"=5

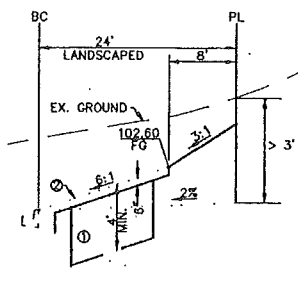
1

LANDSCAPE GRADING FOR CUTS ≤ 3' AT PL

① – SCARIFY NATIVE 6" AND RECOMPACT TO 95%

② – LANDSCAPE AREA – EXCAVATE AND RECOMPACT TO 85% OR RIP ENTIRE AREA TO DEPTH INDICATED

③ – ROUGH GRADE (RG) TO BE 6" BELOW FINISHED GRADE (FG) FOR FUTURE LANDSCAPE PURPOSES



LANDSCAPE GRADING FOR CUTS > 3' AT PL

This grading plan is a part of drainage study #80717 which was received on 2/8/02 and approved on 2/12/02. Page 21 of 37

DESIGN: DSD/JJJ
DRAWN: SDS
CHECK:
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 02-25-02
PLOT TIME: 15:45:37

DATE: APRIL 2001 CURRENT REV. DATE

KEY DATE: FOR AGENCY REVIEW - NOT FOR CONSTRUCTION

DESIGN DATE: 2/22/02

ISSUE DATE: 2/22/02

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000, FAX: (702) 804-2299
SUMMERLIN OFFICE: 1120 WIGWAM PKWY., STE. 130
OFFICE: (702) 804-2100, FAX: (702) 804-2285

SUMMERLIN

VILLAGE 23A ROUGH GRADING PLANS

TYPICAL SECTIONS

SHEET 38

38 OF 40 SHTS

SUMMERLIN

SM

THE PASEOS
VILLAGE 23A UNIT 1 IMPROVEMENTS

DESERT SUNRISE ROAD FROM STA 100+00 TO 111+80.96, FOX HILL DRIVE FROM STA 111+80.96 TO 142+46.77, PASEO FLOWER COURT
~~SPINE ROAD FROM STA 100+00 TO 142+46.77, CUL-DE-SAC "A",~~
DESERT MOON ROAD FROM STA 100+00 TO 132+48.53, PASEO BREEZE DRIVE FORM STA 132+48.53 TO STA 145+75, PASEO MIST DRIVE
~~LOOP "A" FROM STA 100+00 TO 145+75, SPOKE "A"~~

APN # 137-22-000-005

SID #XXX PROJECT NO.: YYY

2002

PROJECT NAME: Village 23A Unit 1
9-18,16-31,34-40,44,45,42,43
This project water plan complies with the Las Vegas Valley Water District's technical requirements. However, this water plan is

NOT APPROVED FOR CONSTRUCTION

at this time and this signature does not provide or imply a water commitment.

LVVWD #52 — DATE 9/5/02

"The attached Special Nevada approval does not assume or guarantee liability for known or unknown conflicts with existing or proposed improvements. Resolution of any conflict will be accomplished pursuant to Local Ordinances, Nevada Revised Statutes and/or Public Utility Commission Rules and Regulations"

DRAINAGE CERTIFICATION

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

BERT A. HUGHES R.P.E. 10259 — DATE 8/27/02

THE HOWARD HUGHES CORPORATION,
a Delaware corporation

By: JOHN T. POTTS — DATE 8-23-02

Title: SENIOR VICE PRESIDENT, DEVELOPMENT

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

CHARLES KAJKOWSKI Jr.; PE #4794 — DATE 9-18-2002
CITY ENGINEER
CITY OF LAS VEGAS, NEVADA

CLV PLANNING DEPARTMENT

THIS PLAN MEETS THE APPLICABLE STANDARDS IF THE PLANNING AND DEVELOPMENT DEPARTMENT

M. MARGO WHEELER, AICP, CURRENT PLANNING MANAGER — DATE 9-17-02

NEVADA POWER COMPANY 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 OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATIONS.

CALL BEFORE YOU DIG: 1(800)227-2600

NEVADA POWER Co. Juanita Oldfield REVIEWED BY — DATE 8-30-02

LAS VEGAS VALLEY WATER DISTRICT (SHEETS 1,2,6,9-14,16-31,34-40,44,45,42,43) — DATE 9/11/02

CLV FIRE DEPARTMENT — DATE 9.4.02

SPRINT — DATE 08.30.02

SOUTHWEST GAS CORP. (Russell C. Hugo) — DATE 9-4-02

CITY OF LAS VEGAS DRAWING NO. **SHEET 1 OF 61**

Contr. Construction
As-Builts
Sewer

DEVELOPER

The Howard Hughes Corporation SM
An Affiliate of THE ROUSE COMPANY

THE HOWARD HUGHES CORPORATION
a Delaware corporation
10000 W. CHARLESTON, SUITE 200
LAS VEGAS, NEVADA 89135
OFFICE PHONE NO. (702) 791-4300
OFFICE FAX NO. (702) 791-4450

ENGINEER

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000, FAX: (702) 804-2299
SUMMERLIN OFFICE 10000 CHARLESTON BLVD., STE. 130
OFFICE: (702) 804-2160, FAX: (702) 804-2295

44728 ~ 34863

NEVADA PROFESSIONAL ENGINEER BERT A. HUGHES No. 10259 — DATE 8/27/02

DESIGN: GRV	DRAWN: SJ	CHECK: BAH	ISSUE DATE:	ISSUE EDITOR:	PLOT DATE: 08-24-02	PLOT TIME: 12:20:11

NO.	DATE	DESCRIPTION
1	12/17/02	CHANGE WATER ALIGNMENT AND 3RD 3/4" AND 4" METER AND REPOSITION
2	3/4/03	REVISED STREET NAMES, ADD PARALLEL PARKING & CORE RECEIVED COMMENTS

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000, FAX: (702) 804-2299
SUMMERLIN OFFICE 10000 CHARLESTON BLVD., STE. 130
OFFICE: (702) 804-2160, FAX: (702) 804-2295

05/19/03 ISSUE TO CONSTRUCT

SUMMERLIN
VILLAGE 23A UNIT 1 IMPROVEMENTS
COVER SHEET
Sewer As-Built

SHEET 1
JOB NO. 62023.221
LOT-V3574-1
1 OF 61 SHTS

LEGEND & ABBREVIATION

(1) DETAIL DRAWING NUMBER

(1/-) DRAWING NUMBER FOR DETAIL DRAWN ON SAME SHEET

(1/7) DRAWING NUMBER FOR DETAIL WITH REFERENCE TO THE SHEET IT IS DRAWN ON

(01.02/5) DRAWING NUMBER(S) FOR DETAIL(S) PER SUMMERLIN IMPROVEMENTS STANDARDS, OR PER STANDARDS IN ABBREVIATION TABLE

(1/1) INDICATES CONSTRUCTION NOTE

(A/1) INDICATES REMOVAL NOTE

① INDICATES CURVE NUMBER

INDICATES SEWER MANHOLE IN PROFILE

INDICATES STORM DRAIN MANHOLE IN PROFILE

(60.5) TC EXIST. SPOT ELEVATION

END PIPE & PLUG

CONCRETE ENCASEMENT

NOTE: LEGEND & ABBREVIATIONS IN THE "SUMMERLIN IMPROVEMENT STANDARDS", LATEST EDITION, WILL BE UTILIZED FOR ANY LEGEND & ABBREVIATION REQUIRED WHICH ARE NOT SHOWN.

EMBANKMENT

TOP
BOTTOM — PROPOSED
— YYY — BY SEPARATE CONTRACT
EXISTING

ABBREVIATION

I = IMPROVEMENTS
W = WATER
S = SEWER
SD = STORM DRAIN
SL = STREET LIGHTING
SIG = TRAFFIC SIGNAL
SMH = SEWER MANHOLE
SDMH = STORM DRAIN MANHOLE
CLV = CITY OF LAS VEGAS
DCSWCS = DESIGN AND CONSTRUCTION STANDARDS FROM WASTEWATER COLLECTION SYSTEM (CLARK COUNTY 1997)
LVVWD = LAS VEGAS VALLEY WATER DISTRICT
NDOT = NEVADA DEPT. OF TRANSPORTATION
SIS = SUMMERLIN IMPROVEMENT STANDARDS
THHC = THE HOWARD HUGHES CORPORATION
UDS = UNIFORM DESIGN AND CONSTRUCTION STANDARDS (UDACS)
USD = UNIFORM STANDARD DWGS. (CLARK COUNTY)

STREET CLASSIFICATION

DESERT SUNRISE ROAD & FOX HILL DRIVE:	NEIGHBORHOOD COLLECTOR (LEVEL 1) WITH SHARED BIKE LANES
DESERT MOON ROAD & PASEO BREEZE DRIVE:	RESIDENTIAL COLLECTOR
PASEO MIST DRIVE:	NEIGHBORHOOD COLLECTOR (LEVEL 1)
PASEO FLOWER COURT:	RESIDENTIAL STREET

BENCHMARK

DESC.	NAVD 88 DATUM	NAVD 88 DATUM
U.S.C.& G.S. BRASS DISC SET IN ROCK ON THE EAST SIDE OF CHARLESTON BOULEVARD AND SOUTH OF THE RED ROCK DETENTION BASIN.	3246.71 (FEET)	989.599 (METERS)

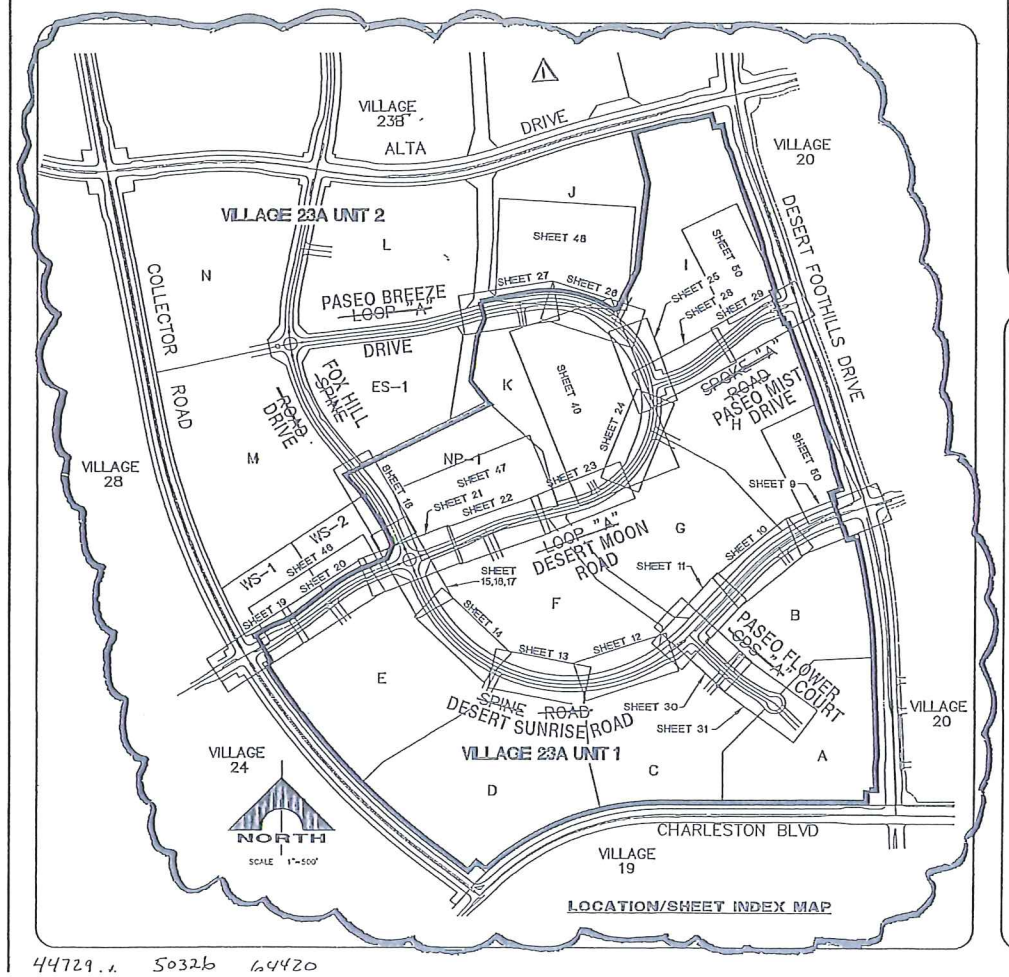
(CLV BM No. 0368 3)

Avoid cutting underground utility lines. It's costly.
Call before you Dig.
1-800-227-2600
(WASHINGTON STATE ONE-CALL)

HIGH VOLTAGE OVERHEAD POWER LINES. IT'S COSTLY.
CALL BEFORE YOU DO OVERHEAD
CALL 1-702-593-6111

BASIS OF BEARING

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.



LOCATION/SHEET INDEX MAP

INDEX OF DRAWINGS

1. COVER SHEET
2. PROJECT DATA SHEET
3. HORIZONTAL CONTROL PLAN I
4. HORIZONTAL CONTROL PLAN II
5. HORIZONTAL CONTROL PLAN III
6. WATER MASTER PLAN
7. SEWER MASTER PLAN
8. STORM DRAIN MASTER PLAN
9. DESERT SUNRISE ROAD PLAN AND PROFILE START TO STA 104+50
10. DESERT SUNRISE ROAD PLAN AND PROFILE STA 104+50 TO 110+00
11. DESERT SUNRISE ROAD PLAN AND PROFILE STA 110+00 TO 115+50
12. DESERT SUNRISE ROAD PLAN AND PROFILE STA 115+50 TO 121+00
13. DESERT SUNRISE ROAD PLAN AND PROFILE STA 121+00 TO 127+00
14. DESERT SUNRISE ROAD PLAN AND PROFILE STA 127+00 TO 132+50
15. ROUNDABOUT GRADING PLAN
16. ROUNDABOUT UTILITY PLAN
17. ROUNDABOUT PROFILE
18. FOX HILL DRIVE PLAN AND PROFILE STA 135+00 TO END
19. DESERT MOON ROAD PLAN AND PROFILE START TO STA 103+50
20. DESERT MOON ROAD PLAN AND PROFILE STA 103+50 TO 109+00
21. DESERT MOON ROAD PLAN AND PROFILE STA 109+00 TO 114+75
22. DESERT MOON ROAD PLAN AND PROFILE STA 114+75 TO 120+50
23. DESERT MOON ROAD PLAN AND PROFILE STA 120+50 TO 126+00
24. DESERT MOON ROAD PLAN AND PROFILE STA 126+00 TO 131+50
25. PASEO BREEZE DRIVE PLAN AND PROFILE STA 131+50 TO 135+00
26. PASEO BREEZE DRIVE PLAN AND PROFILE STA 135+00 TO 141+50
27. PASEO BREEZE DRIVE PLAN AND PROFILE STA 141+50 TO END
28. PASEO MIST DRIVE PLAN AND PROFILE START TO STA 55+50
29. PASEO MIST DRIVE PLAN AND PROFILE STA 55+50 TO END
30. PASEO FLOWER COURT PLAN AND PROFILE START TO STA 48+50
31. PASEO FLOWER COURT PLAN AND PROFILE STA 48+50 TO END
32. TYPICAL SECTIONS I
33. TYPICAL SECTIONS II
34. LATERAL PROFILES I
35. LATERAL PROFILES II
36. LATERAL PROFILES III
37. LATERAL PROFILES IV
38. LATERAL PROFILES V
39. LATERAL PROFILES VI
40. LATERAL PROFILES VII
41. MODIFIED STORM DRAIN MANHOLES
42. MISCELLANEOUS DETAILS I
43. MISCELLANEOUS DETAILS II
44. 24" WATERLINE DETAILS I
45. 24" WATERLINE DETAILS II
46. TRANSITIONAL DRAINAGE PLAN I
47. TRANSITIONAL DRAINAGE PLAN II
48. TRANSITIONAL DRAINAGE PLAN III
49. TRANSITIONAL DRAINAGE PLAN IV
50. TRANSITIONAL DRAINAGE PLAN V
51. SIGNAGE AND STRIPING PLAN I
52. SIGNAGE AND STRIPING PLAN II
53. SIGNAGE AND STRIPING PLAN III
54. SIGNAGE AND STRIPING PLAN IV
55. SIGNAGE AND STRIPING PLAN V
56. STREET LIGHT, MASTER CONDUIT, AND ELECTRICAL PLAN I
57. STREET LIGHT, MASTER CONDUIT, AND ELECTRICAL PLAN II
58. STREET LIGHT, MASTER CONDUIT, AND ELECTRICAL PLAN III
59. STREET LIGHT, MASTER CONDUIT, AND ELECTRICAL PLAN IV
60. STREET LIGHT, MASTER CONDUIT, AND ELECTRICAL PLAN V
61. STREET LIGHT, MASTER CONDUIT, AND ELECTRICAL PLAN VI

(1) P.C. CONCRETE JUNCTION STRUCTURES (2)

STREET QUANTITIES (PUBLIC)

STREETS	UNIT	
3" A.C. PAVEMENT	22,279	SY
4" A.C. PAVEMENT	28058	SY
TYPE II BASE	169,265	CY
6" TYPE "L" C & G	19,553	LF
TYPE "A" CURBS	3,952	LF

STREET LIGHTS		
SINGLE ARM ST. LT.	7	EA
DOUBLE ARM ST. LT.	61	EA
CONDUIT	10,937	LF

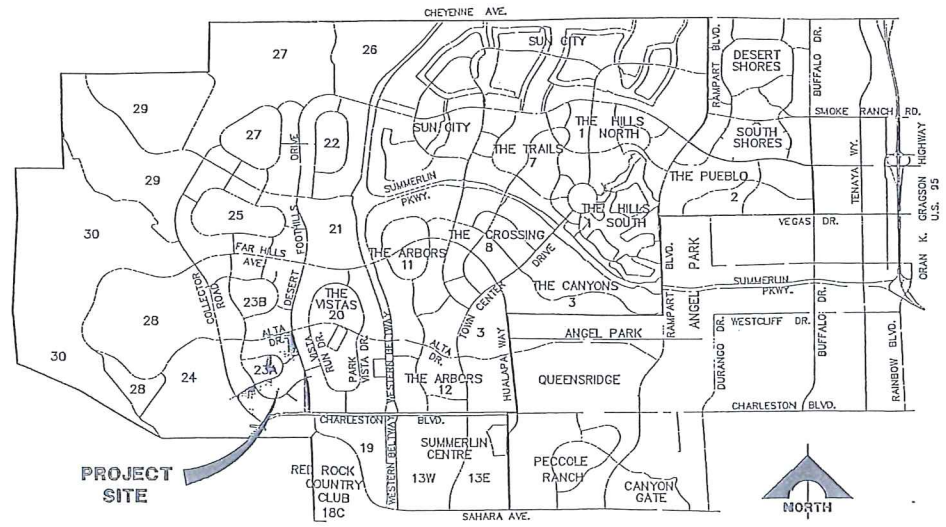
CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".
2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON THESE PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE 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 OR UNDERGROUND POWER, GAS AND/OR OTHER UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COSTS 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 OR 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 DESIGN TO BE APPROVED BY THE CITY PRIOR TO 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 1/2" ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.
9. CURB & GUTTER WITH A GRADE OF LESS THAN FIVE TENTHS OF ONE PERCENT SHALL BE WATER TESTED AS SOON AS POSSIBLE AFTER CONSTRUCTION. ANY CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY SHALL BE REMOVED AND REPLACED AT THE EXPENSE OF THE CONTRACTOR PER SUMMERLIN STD DRAWING NO. S-47.
10. SIDEWALK RAMPS SHALL BE CONSTRUCTED AS SHOWN ON PLANS PER SUMMERLIN STD. DRAWING NO. S-75. 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 TRANSITIONS TO BE AS SHOWN ON PLANS.
12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY THE SOILS ENGINEER APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.
13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS INSPECTOR IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATION.
14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.550.
15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC. SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOW LINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER.
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 1000 OF THE CLARK COUNTY AREA SPECIFICATIONS (AS APPLICABLE) AND THE PLANS AND DETAILS SHOWN HEREON.

NOTE: FOR OTHER GENERAL NOTES SEE:

FIRE	SHEET 6
LVVWD	SHEET 6
24" PVC WATER	SHEET 44
SEWER	SHEET 7
GRADING	SHEET 46
TRAFFIC	SHEET 51
STREETLIGHT	SHEET 56

VICINITY MAP



CONSTRUCTION NOTES

IMPROVEMENTS

(1/I) INSTALL A.C. PAVEMENT PER STREET SECTIONS, SEE SHEET 32 AND 33
(2/I) INSTALL 6" "L" TYPE CURB & GUTTER (D-12/S)
(3/I) INSTALL "A" TYPE ISLAND CURB (D-20/S)
(4/I) INSTALL HANDICAP RAMP CURB DEPRESSION
(5/I) ADJUST EXISTING FACILITY TO GRADE (D-12/S)
(6/I) VERIFY LOCATION AND ELEVATION OF EX ROADWAY IMPROVEMENT AND MATCH TO EXISTING CONDITION
(10/I) INSTALL CONCRETE ENCASEMENT (1/12)

WATER

(10/W) INSTALL CAP W/ 2" BLOW-OFF ASSEMBLY (1/UD5)
(11/W) INSTALL FIRE HYDRANT ASSEMBLY (7/UD9)
(12/W) INSTALL 8" GATE VALVE & BOX W/ 1' RADIUS CONCRETE COLLAR (8/UD5)
(13/W) INSTALL 12" GATE VALVE & BOX W/ 1' RADIUS CONCRETE COLLAR (8/UD5)
(14/W) INSTALL 6" GATE VALVE & BOX W/ 1' RADIUS CONCRETE COLLAR (8/UD5)
(15/W) INSTALL 24" GATE VALVE AND BOX AMERICAN FLOW CONTROL 24"RESILIENT SEATED MODEL NO 2500 W/ AWWCO MODEL NCR-10 SPUR GEAR ACTUATOR W/ 1' RADIUS CONCRETE COLLAR (8/UD5)
(16/W) REMOVE CAP & CONNECT TO EXISTING WATER LINE (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EXISTING WATER LINE)
(17/W) SEE (4/14) FOR CATHODIC PROTECTION OF METALLIC APPURTENANCES RELATED TO THE 24" PVC WATER MAIN

SEWER

(42/S) INSTALL 48" DIA. SEWER MANHOLE (201-2/DCSWCS)
(43/S) INSTALL TEMPORARY PLUG AND CAP
(44/S) REMOVE PLUG & CONNECT TO EX. SEWER LINE (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EXISTING SEWER LINE) PRIOR TO CONSTRUCTION
(45/S) INSTALL 60" DIA. DEEP SEER MANHOLE (501-8/DCSWCS) (9/42)

STORM DRAIN

(33/D) INSTALL TYPE II STORM DRAIN MANHOLE (403/USD)
(34/D) INSTALL TYPE III STORM DRAIN MANHOLE (405/USD)
(35/D) INSTALL TEMPORARY PLUG AND CAP
(36/D) INSTALL TYPE "A" DROP INLET (D-12/S) (3/13)
(37/D) INSTALL TYPE "C" DROP INLET (413/USD) (3/13)
(38/D) INSTALL MODIFIED TYPE "C" DROP INLET (3/13) (3/13)
(39/D) PRECAST MANHOLE TEE (407/USD)
(40/D) INSTALL MODIFIED STORM DRAIN MANHOLE (1/11) (1/N/A) (5)
(41/D) CONNECT TO EXISTING STORM DRAIN LINE (CONTRACTOR TO VERIFY SIZE, INVERT, AND LOCATION OF EXISTING STORM DRAIN LINE)

IRRIGATION

(49/IRR) BANK "A"; 1-6" & 2-4" SCH40 PVC (U-18/S)
(50/IRR) BANK "B"; 2-4" SCH40 PVC (U-18/S)

NOTE TO CONTRACTOR:

1. ALL EXISTING UTILITY CROSSINGS MUST BE VERIFIED PRIOR TO CONSTRUCTION OF ANY MAIN LINES OR LATERALS THAT MAY BE ADVERSELY AFFECTED. ANY DISCREPANCIES IN LOCATION AND/OR ELEVATION MUST BE PROVIDED TO THE ENGINEER FOR ACCEPTANCE PRIOR TO CONSTRUCTION.
2. TOPOGRAPHY SHOWN HEREIN REFLECTS ORIGINAL EXISTING TOPOGRAPHY. ACTUAL FIELD CONDITIONS INCLUDE SITE ROUGH GRADING.
3. ALL COMMON LOTS AS SHOWN HEREIN TO BE PRIVATELY MAINTAINED BY THE SUMMERLIN H.O.A. A FUTURE MEANDERING SIDEWALK WILL BE INSTALLED BY SUMMERLIN AS REQUIRED TO SERVICE THE DEVELOPMENT OF EACH PARCEL.
4. ALL WATER LINE GATE VALVES, SERVICE GATE VALVES, AND FIRE HYDRANT GATE VALVES ARE TO BE CONSTRUCTED UNDER A.C. PAVEMENT. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY THAT ALL WATER VALVE CANS DO NOT CREATE CONFLICTS WITH THE PROPOSED CURB LINE PRIOR TO PLACEMENT OF CONCRETE. ALL WATER FACILITIES SHOWN IN THESE DRAWINGS HAVE BEEN "SCALED-UP" FOR CLARITY ONLY.

DEVIATIONS

1. REMOVE PROTECTION BAR FROM STROM DRAIN DROP INLETS (S.I.S. DWG. NO. D-21 AND USD. NO. 419) AS DIRECTED BY THE CITY OF LAS VEGAS.
2. MAXIMUM TYPICAL WIDTH OF SPINE ROAD (BC TO BC) BETWEEN CUL-DE-SAC "A" AND DESERT FOOTHILLS DRIVE IS SET AT 80' TO ACCOMODATE A 24.66' WIDE MEDIAN ISLAND FOR MARKETING ENTRANCE INTO VILLAGE 23A. STREETLIGHTS ARE ALSO PROPOSED DOWN THE CENTER OF THE MEDIAN ISLAND IN LIEU OF BACK OF CURB ALIGNMENT AS SPECIFIED PER S.I.S. DWG. NO. E-1. (A)
3. MAXIMUM TYPICAL WIDTH OF LOOP "A" ROAD (BC TO BC) IS 44', IN LIEU OF 37' PER S.I.S. DWG. NO. S-7. THE ADDITIONAL WIDTH IS TO PROVIDE A 12' CENTER TURN LANE AND ALLOW FOR 3' OF ADDITIONAL BLACK-TOP IN THE TRAVEL LANES FOR SHARED BICYCLE USE.
4. MAXIMUM TYPICAL WIDTH OF CUL-DE-SAC "A" (BC TO BC) IS 40', IN LIEU OF 37' PER S.I.S. DWG. NO. S-14. THE ADDITIONAL WIDTH IS TO PROVIDE THREE (3) 12' TRAVEL LANES, IN LIEU OF PARKING ADJACENT TO CURB ALIGNMENTS.

APPROVAL:

LAS VEGAS VALLEY WATER DISTRICT — DATE 9/4/02

PROFESSIONAL ENGINEER — STATE OF NEVADA — BERT A. HUGHES — No. 9029 — CIVIL — DATE 9/10/02

DATE	BY	DESCRIPTION
7/9/02	CHIAVOLINI	REVISE STREET NAMES
7/17/02	CHIAVOLINI	REVISE CURB RETURN RADII
9/4/02	CHIAVOLINI	ADD APPROVAL

DESIGN: BJ
DRAWN: SDTC
CHECK: BAH
ISSUE DATE:
PLOT DATE: 07-29-02
PLOT TIME: 15:37:17

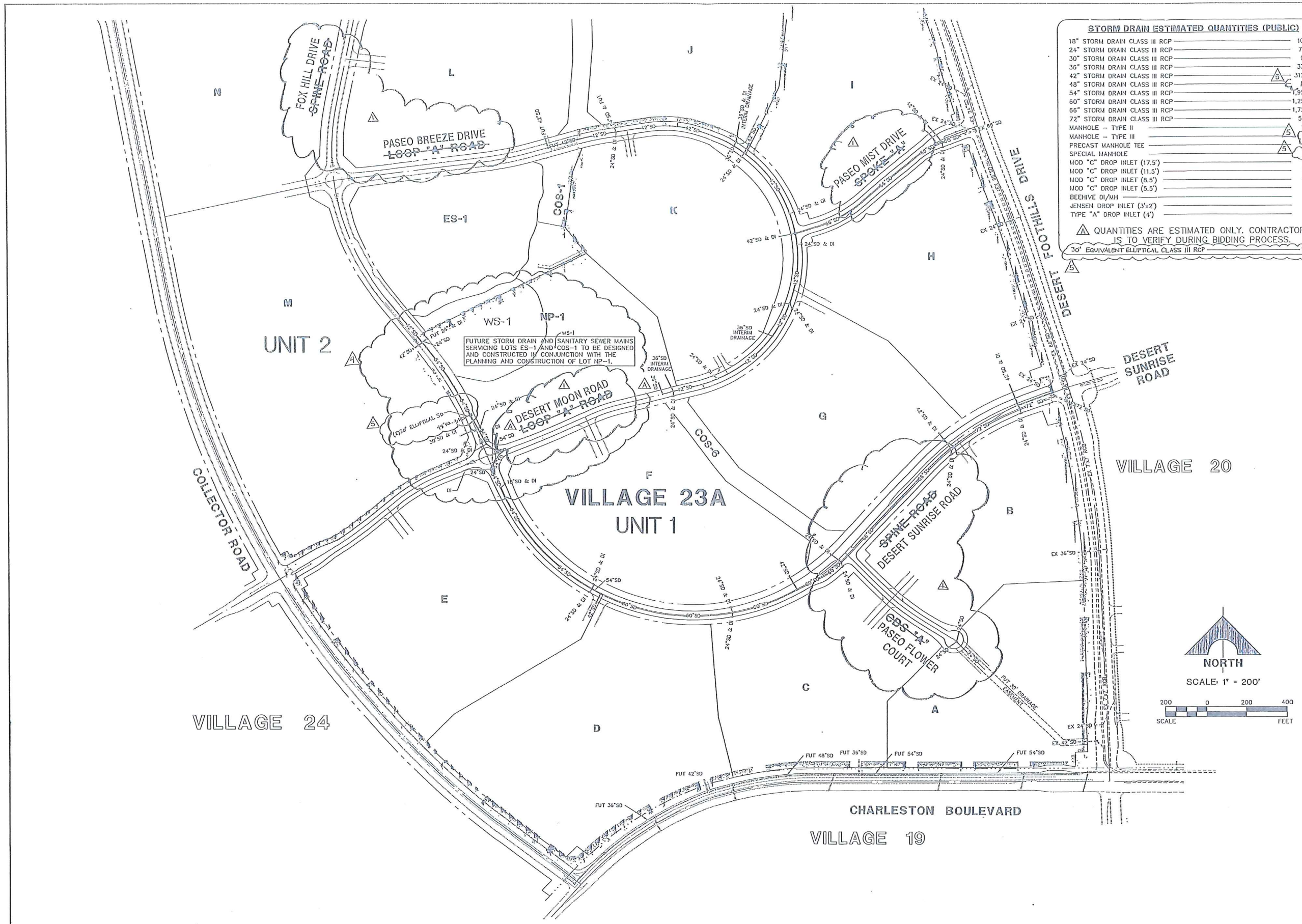
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
DESERT PLAZA, 6671 LAS VEGAS BLVD. SOUTH, SUITE 210, LAS VEGAS, NEVADA 89119
(702) 263-3000, FAX: (702) 804-2299
SUMMERLIN OFFICE 10000 CHARLESTON BLVD., STE. 130, LAS VEGAS, NEVADA 89134
OFFICE (702) 804-2100, FAX: (702) 804-2295
P:\LV23\Unit 1\Dwg\Misc\23A1cd02.dwg

SUMMERLIN
VILLAGE 23A UNIT 1 IMPROVEMENTS
PROJECT DATA SHEET

SHEET 2
107-VS574-1

JOB NO. 62023.221

44729.x 50326 64420



STORM DRAIN ESTIMATED QUANTITIES (PUBLIC)

18" STORM DRAIN CLASS III RCP	104 LF
24" STORM DRAIN CLASS III RCP	741 LF
30" STORM DRAIN CLASS III RCP	95 LF
36" STORM DRAIN CLASS III RCP	372 LF
42" STORM DRAIN CLASS III RCP	3129 LF
48" STORM DRAIN CLASS III RCP	15 LF
54" STORM DRAIN CLASS III RCP	1,952 LF
60" STORM DRAIN CLASS III RCP	1,258 LF
66" STORM DRAIN CLASS III RCP	1,725 LF
72" STORM DRAIN CLASS III RCP	512 LF
MANHOLE – TYPE II	14 EA
MANHOLE – TYPE III	7 EA
PRECAST MANHOLE TEE	1 EA
SPECIAL MANHOLE	8 EA
MOD "C" DROP INLET (17.5')	1 EA
MOD "C" DROP INLET (11.5')	12 EA
MOD "C" DROP INLET (8.5')	12 EA
MOD "C" DROP INLET (5.5')	3 EA
BEEHIVE DI/MH	1 EA
JENSEN DROP INLET (3'x2')	1 EA
TYPE "A" DROP INLET (4')	2 EA
30" EQUIVALENT ELLIPTICAL CLASS III RCP	98 LF

△ QUANTITIES ARE ESTIMATED ONLY. CONTRACTOR IS TO VERIFY DURING BIDDING PROCESS.

NORTH
SCALE: 1" = 200'
200 0 200 400
SCALE FEET

NO.	DATE	DESCRIPTION	BY	APP
1	10/4/21	REVISED STREET NAMES	MRD	
2	11/19/21	REVISED DRAIN PLAN	MRD	
3	12/16/21	REVISED STORM DRAIN	MRD	
4	2/14/22	REVISED LOCAL STORM AND MINOR LATERALS TO PASS "M"	MRD	

DESIGN: AJF
DRAWN: SBC
CHECK: RAH
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 06-24-22
PLOT TIME: 12:10:08

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000, FAX: (702) 804-2299
SUMMERLIN OFFICE: (702) 804-2100, FAX: (702) 804-2130
F:\V23\Unit 1\dwg\xrefs\23A1c000.dwg

SUMMERLIN
VILLAGE 23A UNIT 1 IMPROVEMENTS
STORM DRAIN MASTER PLAN

SHEET 8
JOB NO. 62023.221

107-V3574-1

44735 & 50332 58721 64421

SEE SHEET 50 FOR TRANSITIONAL DRAINAGE DETAILS

FOR EXISTING IMPROVEMENTS SEE: "VILLAGE 23A DESERT FOOTHILLS DRIVE IMPROVEMENTS" BY G.C. WALLACE, INC LVVWD # 26755 CLV # 5770

VILLAGE 23A PARCEL H

VILLAGE 20 PARCEL Y

MATCHLINE 104+50.00 SEE SHEET 10

(FUTURE SIDEWALK BY SUMMERLIN) COMMON LOT

EX GRADE BREAK LINE

EX DAYLIGHT LINE

PUE EASEMENT TO BE PROVIDED BY PARCEL BUILDER

EX 24" PVC W (3435 ZONE)

EX 24" MLCP W (3435 ZONE) CONT C1066

EX 30" MLCP W (3435 ZONE) CONT C1066

EX 16" DIP W (3320 ZONE) CONT C1066

EX 16" DIP W (3435 ZONE) CONT C1066

EX PRV

NORTH SCALE 1"=20'

DESERT SUNRISE ROAD

FOR EXISTING IMPROVEMENTS SEE: "3435 ZONE PIPELINE PHASE 1A" (LVVWD CONT # C1066) BY G.C. WALLACE, INC. CLV # 565-365

EX 24" MLCP W (3320 ZONE) CONT 878

EX 72" SD

EX 60" SD

EX 10"S

EX 12"S

EX 72"W RCB

DESERT FOOTHILLS DRIVE

MATCH EX PVMT

EX 16" DIP W (3320 ZONE)

FOR EXISTING IMPROVEMENTS SEE: "VILLAGE 25A DESERT FOOTHILLS DRIVE IMPROVEMENTS" BY G.C. WALLACE, INC. JOB #62052.230 CLV # 5770

FOR EXISTING IMPROVEMENTS SEE: "VILLAGE 20 UNIT 1 IMPROVEMENTS" BY G.C. WALLACE, INC. JOB #62020.221 CLV #1077~4563

VILLAGE 20 PARCEL B

DESERT SUNRISE SPINE ROAD

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'
REFER TO SHEET 2 FOR CONSTRUCTION NOTES

SCALE 20 0 20 40 FEET

NOTE
THIS SET OF DRAWINGS IS BASED UPON NAVD 88 DATUM. PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

Avoid cutting underground utility lines. It's costly. Call before you Dig. 1-800-227-2600 (EMERGENCY SERVICE ASAP only)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD. CALL 1-702-593-6111

NOTE:
INSTALL PIPELINE MARKER BALLS IN TRENCH ABOVE EACH HORIZONTAL ELBOW FITTING, PER MANUFACTURER INSTRUCTIONS.

BENCHMARK

CLV BM NO.	DESC.	NAVD 88 DATUM (FEET)	NAVD 88 DATUM (METERS)
0368 3	U.S.C.& G.S. BRASS DISC SET IN ROCK ON THE EAST SIDE OF CHARLESTON BOULEVARD AND SOUTH OF THE RED ROCK DETENTION BASIN.	3246.71	989.599

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

WATER NOTE:
1. PVC RESTRAINED JOINTS MUST BE "NON-POINT LOADING".
2. ALL 24" WATERMAIN RESTRAINING JOINTS TO BE CATHODICALLY PROTECTED AS PER DETAIL 4 ON SHEET 44.

APPROVAL:
LAS VEGAS VALLEY WATER DISTRICT — DATE 9/11/02

Sewer Installed Per Plan

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000, FAX: (702) 804-2299
1295 NORTH GREEN VALLEY PKWY., SUITE 130
OFFICE: (702) 804-2100, FAX: (702) 804-2125
F:\V23\Unit1_1\dwg\Vmap\23A1s050.dwg

SUMMERLIN

VILLAGE 23A UNIT 1 IMPROVEMENTS

DESERT SPINE ROAD PLAN AND PROFILE
SUNRISE ROAD START TO STA 104+50

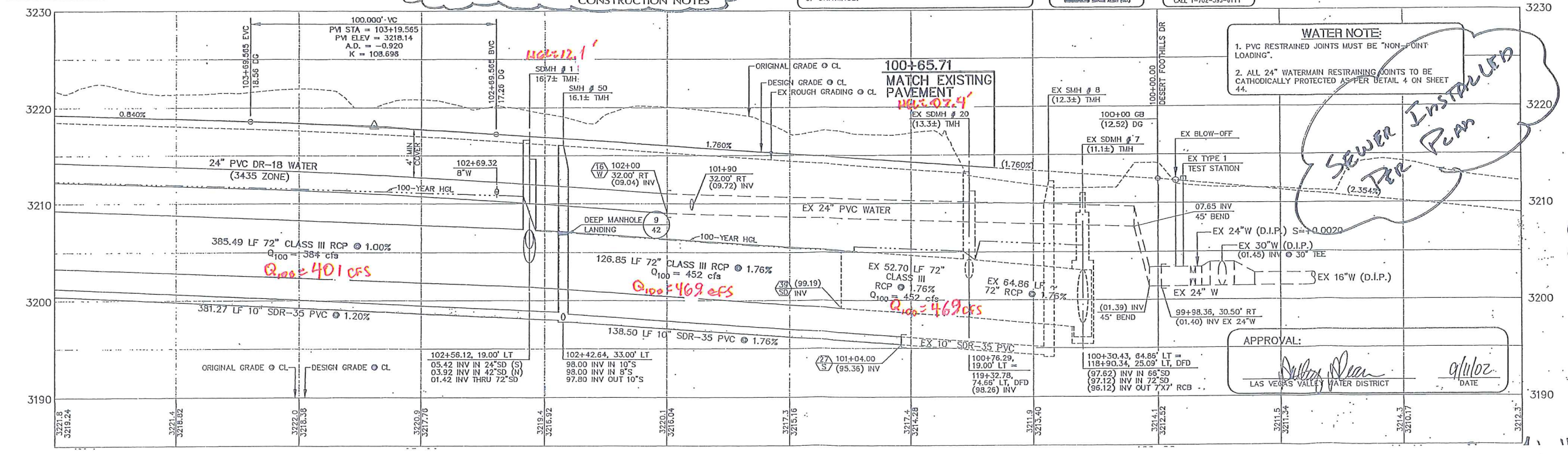
JOB NO. 62023.221

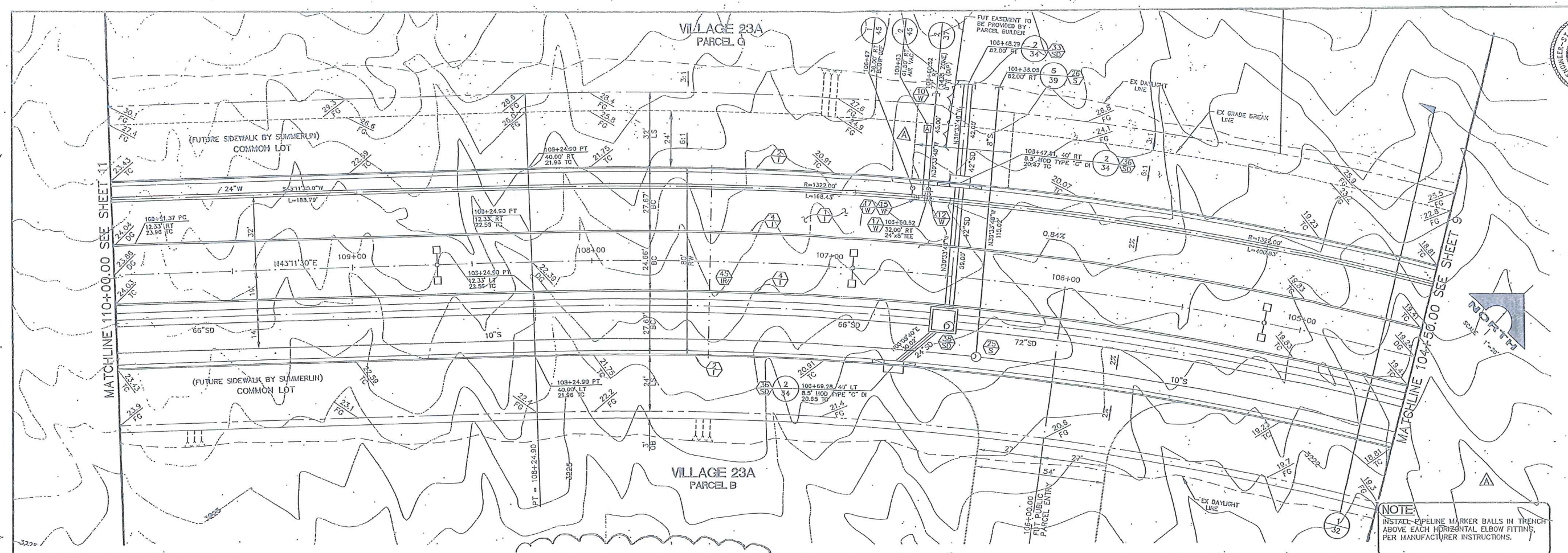
SHEET 9

107-V3574-1

DESIGN: S.J
DRAWN: SDS
CHECK: GBW
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 08-22-02
PLOT TIME: 15:43:55
mulep

DATE: 12/31/01 | DESCRIPTION: REVISE STREET NAMES | REV: A | DATE: 1/31/02





BENCHMARK

CLV BM NO.	DESC.	NAVD 88 DATUM	NAVD 88 DATUM
D368 3	U.S.C.& G.S. BRASS DISC SET IN ROCK ON THE EAST SIDE OF CHARLESTON BOULEVARD AND SOUTH OF THE RED ROCK DETENTION BASIN.	3246.71 (FEET)	989.599 (METERS)

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

DESERT SUNRISE ROAD
~~SPINE ROAD~~

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

REFER TO SHEET 2 FOR CONSTRUCTION NOTES

20 0 20 40
SCALE FEET

NOTE

THIS SET OF DRAWINGS IS BASED UPON NAVD 88 DATUM. PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

Avoid cutting underground utility lines. It's costly.
Call before you Dig.
1-800-227-2600
NEVADA ONE CALL ALERT SYSTEM

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
"CALL BEFORE YOU DO OVERHEAD"
CALL 1-702-593-6111

APPROVAL:

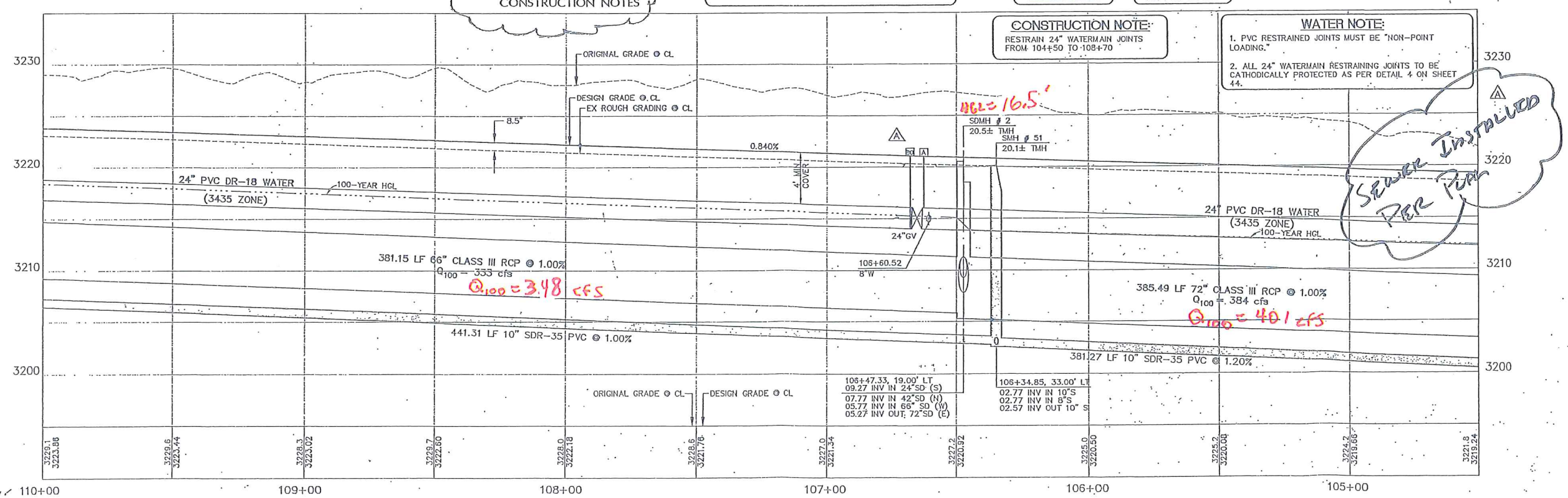
LAS VEGAS VALLEY WATER DISTRICT — DATE 9/11/02

CONSTRUCTION NOTE:

RESTRAIN 24" WATERMAIN JOINTS FROM 104+50 TO 108+70

WATER NOTE:

1. PVC RESTRAINED JOINTS MUST BE "NON-POINT LOADING."
2. ALL 24" WATERMAIN RESTRAINING JOINTS TO BE CATHODICALLY PROTECTED AS PER DETAIL 4 ON SHEET 44.



G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000 FAX: (702) 804-2299
CARLSBAD OFFICE: (760) 804-2100 FAX: (760) 804-2295
F:\V23\Utilities\Dwgs\23A1ce10.dwg

DESIGN: JJJ
DRAWN: SDG
CHECK: CBW
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 08-22-02
PLOT TIME: 18:46:03

REV	DATE	DESCRIPTION
1	12/12/01	REVISE STREET NUMBERS
2	3/19/02	REVISIONS TO PLANS PRIOR TO CLV APPROVAL

DATE LAGEN, ABD DATE WOW, ABD

SUMMERLIN
VILLAGE 23A UNIT 1 IMPROVEMENTS
DESERT ~~SPINE~~ ROAD PLAN AND PROFILE
SUNRISE ROAD STA 104+50 TO 110+00

SHEET 10
JOB NO. 62023.22
87-V3376-1

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 NOT BE INSPECTED OR INCLUDED IN THE ACCEPTANCE OF LVVWD FACILITIES.

VILLAGE 23A PARCEL COS-6

VILLAGE 23A PARCEL G

VILLAGE 23A PARCEL B

MATCHLINE 115+50.00 SEE SHEET 12

MATCHLINE 110+00.00 SEE SHEET 10

(FUTURE SIDEWALK BY SUMMERLIN) COMMON LOT

EX GRADE BREAK LINE

EX DAYLIGHT LINE

PASEO FLOWER COURT

SUMMERLIN TRANSFORMER AND SERVICE PEDESTAL SEE ELEC. SHTS.

PUE EASEMENT TO BE PROVIDED BY PARCEL BUILDER

SEE SHEET 30

DESERT SUNRISE ROAD SPINE ROAD

NOTE:
INSTALL PIPELINE MARKER BALLS IN TRENCH ABOVE EACH HORIZONTAL ELBOW FITTING, PER MANUFACTURER INSTRUCTIONS.

REDUCED PRESSURE PRINCIPLE ASSEMBLY (RPPA) (2) - 1 1/2"

APPROVED RPPA(S) SHALL BE INSTALLED PER THE DISTRICT STANDARD PLATE NO. 11A. PRE FINISHED HYDRO COIL BACK FLOW ENCLOSURES WITH A FINISHED COLOR OF SIERRA TAN, MODEL 200S-AK, (OR LVVWD APPROVED EQUAL BY ENGINEER) SHALL BE USED FOR 1 1/2" RPPA'S. NO WATER SHALL BE TAKEN FROM A SERVICE REQUIRING BACKFLOW PREVENTION UNTIL THE RPPA HAS BEEN SUCCESSFULLY TESTED BY THE LVVWD. ANY BLOCK WALL OR OTHER FENCE MATERIAL SHALL BE DESIGNED AND CONSTRUCTED AROUND THE OUTSIDE OF THE EASEMENT(S), SO AS TO ALLOW THE DISTRICT ACCESS FROM THE ADJACENT RIGHT-OF-WAY.

BENCHMARK

CLV BM NO.	DESC.	NAVD 88 DATUM	NAVD 88 DATUM
0368 J	U.S.C.& G.S. BRASS DISC SET IN ROCK ON THE EAST SIDE OF CHARLESTON BOULEVARD AND SOUTH OF THE RED ROCK DETENTION BASIN.	3246.71 (FEET)	989.599 (METERS)

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'
REFER TO SHEET 2 FOR CONSTRUCTION NOTES

SCALE 20 0 20 40 FEET

NOTE
THIS SET OF DRAWINGS IS BASED UPON NAVD 88 DATUM. PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

Avoid cutting underground utility lines. It's costly. Call before you Dig. 1-800-227-2600 (NEVADA811 BLUE STAKE ALERT (NSA))

CALL BEFORE YOU DO OVERHEAD

CALL 1-702-593-6111

APPROVAL:

LAS VEGAS VALLEY WATER DISTRICT — DATE 9/11/02

CONSTRUCTION NOTE:
RESTRAIN 24" WATERMAIN JOINTS FROM 111+85 TO 116+02

WATER NOTE:
1. PVC RESTRAINED JOINTS MUST BE "NON-POINT LOADING."
2. ALL 24" WATERMAIN RESTRAINING JOINTS TO BE CATHODICALLY PROTECTED AS PER DETAIL 4 ON SHEET 44.

150.000' VC
PVI STA = 115+50
PVI ELEV = 3228.48
A.D. = 2.173
K = 69.018

HGL=26.5'
HGL=25.4'
SDMH # 5 28.0± TMH
SDMH # 53 27.7± TMH
SDMH # 4 27.1± TMH
SDMH # 52 23.9± TMH
SDMH # 3 23.7± TMH
ORIGINAL GRADE @ CL
DESIGN GRADE @ CL
EX ROUGH GRADING @ CL
100-YEAR HGL
24" PVC DR-18 WATER (3435 ZONE)
93.97' LF 60" CLASS III RCP @ 1.00%
Q_{100} = 318 cfs
Q_{100} = 336 cfs
395.00 LF 66" CLASS III RCP @ 1.00%
Q_{100} = 333 cfs
Q_{100} = 348 cfs
146.79 LF 10" SDR-35 PVC @ 1.65%
443.42 LF 10" SDR-35 PVC @ 1.00%
441.31 LF 10" SDR-35 PVC @ 1.00%
24"x6" TEE
115+17.25, 19.00' LT
15.17 INV IN 60"SD
14.97 INV OUT 60"SD
115+18.53, 33.00' LT
12.02 INV IN 10"S
11.82 INV OUT 10"S
114+25.00, 19' LT
17.03 INV IN 24" (S)
17.03 INV IN 24" (N)
14.03 INV IN 60"SD
13.53 INV OUT 66"SD
110+80.00, 33.00' LT
07.39 INV IN 10"S
07.19 INV OUT 10"S
110+31.07, 19.00' LT
09.58 INV THRU 66"SD
0.840%
8.5"
4" MIN. COVER
24"x6" TEE
24"GV
3240
3230
3220
3210
3200
115+00
114+00
113+00
112+00
111+00
110+00

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000, FAX: (702) 804-2299
SHAMROCK OFFICE: 10000 CHARLESTON BLVD., STE. 130
BEATTY OFFICE: (775) 553-2425, FAX: (775) 553-2424

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DESIGN: MJ
DRAWN: SDG
CHECK: GBW
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 09-22-02
PLOT TIME: 18:47:35

REV	DATE	DESCRIPTION
2	5/31/02	REVISIONS PER DESIGN REVIEW COMMENTS
1	3/19/02	REVISIONS TO PLANS PRIOR TO CLV APPROVAL

DATE: 4/18/02

BERT A. HUGHES, No. 6303, CIVIL, STATE OF NEVADA, PROFESSIONAL ENGINEER

SUMMERLIN
VILLAGE 23A UNIT 1 IMPROVEMENTS
DESERT SUNRISE ROAD SPINE ROAD PLAN AND PROFILE STA 110+00 TO 115+50

SHEET 11

JOB NO. 62023.221

VILLAGE 23A
PARCEL F

VILLAGE 23A
PARCEL C

NORTH
SCALE 1"=20'

MATCHLINE 121+00.00 SEE SHEET 13

MATCHLINE 115+50.00 SEE SHEET 11

(FUTURE SIDEWALK BY SUMMERLIN)
COMMON LOT

EX DAYLIGHT LINE

100' LANDSCAPE TRANSITION FROM 6:1 TO 2:1

EX GRADE BREAK LINE

FUT EASEMENT TO BE PROVIDED BY PARCEL BUILDER

FUT EASEMENT TO BE PROVIDED BY PARCEL BUILDER

120+62.12 6"W

119+34.37 17.02' RT 11.25' BEND

118+35.60 24.62' RT 24"x8" TEE

117+27.98 22.62' RT 11.25' BEND

117+92.22 PCC 22.00' LT 35.71 TC

116+75.91 76.81' RT

116+60.76 77.15' RT

116+34.52 PRC 22.62' LT 30.94 TC

115+71.60 PRC 32.67' LT 33.05 TC

115+50.00

116+00

117+00

118+00

119+00

120+00

R=1020.00

3.013%

L=125.50'

L=97.02'

L=105.09'

L=37.62'

L=191.14'

L=57.77'

S78°35'12.0"W

S57°40'12.0"W

S67°40'12.0"W

S55°25'12.0"W

S65°23'12.0"W

N11°04'48"W 11.81'

N21°39'14"W 32.49'

N04°12'21"E 21.20'

N21°39'14"W 72.58'

N62°18'12"E 160.10'

N62°18'12"E 146.79'

60"SD

42"SD

24"SD

8"S

10"S

24"W

VARIES R/W

VARIES BC

LS

OS

EX DAYLIGHT LINE

324.9

324.5

32.2

32.5

32.6

32.68

33.6

35.7

36.4

38.4

39.4

41.89

42.5

44.97

45.5

45.6

28.89

28.9

29.55

30.4

30.65

31.7

33.7

35.4

120+15 28.48' RT 11.5" HOD 42.42 TC 0" DI

120+15 22' LT 11.5" HOD 42.42 TC 0" DI

120+92.12 17.65' RT 12"x6" TEE

116+89.64 8"W

116+74.98, 1.50' LT 19.30 INV IN 42" 18.00 INV IN 60" 17.60 INV OUT 60"

116+61.03, 16.08' LT 14.64 INV IN 8"S 14.64 INV IN 8"S 14.44 INV OUT 10"S

117+21 28.40' RT 3435 ZONE

116+33.29, 51.01' LT 3435 ZONE 8"W (UP)

BENCHMARK

CLV BM NO.	DESC.	NAVD 83 DATUM	NAVD 88 DATUM
0368 3	U.S.C.& G.S. BRASS DISC SET IN ROCK ON THE EAST SIDE OF CHARLESTON BOULEVARD AND SOUTH OF THE RED ROCK DETENTION BASIN.	3246.71 (FEET)	989.599 (METERS)

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

DESERT SUNRISE ROAD
~~SPINE ROAD~~

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

REFER TO SHEET 2 FOR CONSTRUCTION NOTES

-20 0 20 40
SCALE FEET

NOTE

THIS SET OF DRAWINGS IS BASED UPON NAVD 88 DATUM. PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

Avoid cutting underground utility lines. It's costly.
Call before you Dig.
1-800-227-2600
WESTERNWIDE SERVICE ALERT (USA)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
CALL 1-702-593-6111

NOTE:

INSTALL PIPELINE MARKER BALLS IN TRENCH ABOVE EACH HORIZONTAL ELBOW FITTING, PER MANUFACTURER INSTRUCTIONS.

APPROVAL:

LAS VEGAS VALLEY WATER DISTRICT — DATE 9/11/02

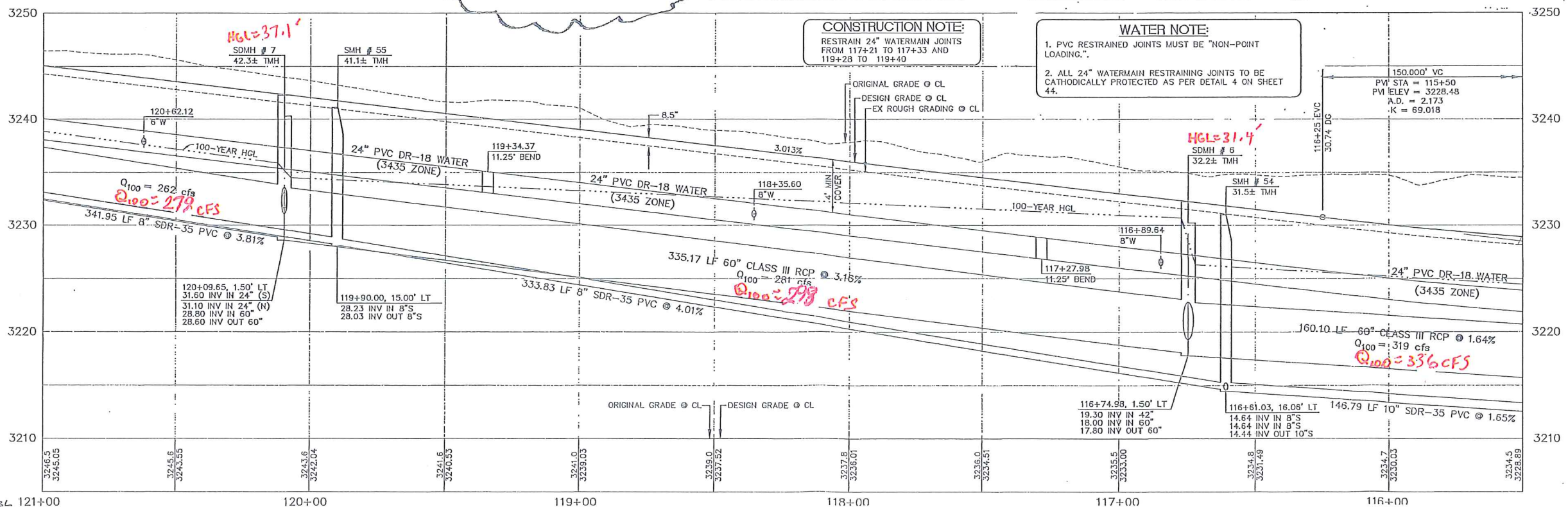
CONSTRUCTION NOTE:

RESTRAIN 24" WATERMAIN JOINTS FROM 117+21 TO 117+33 AND 119+28 TO 119+40

WATER NOTE:

1. PVC RESTRAINED JOINTS MUST BE "NON-POINT LOADING.".

2. ALL 24" WATERMAIN RESTRAINING JOINTS TO BE CATHODICALLY PROTECTED AS PER DETAIL 4 ON SHEET 44.



NO.	DATE	DESCRIPTION
1	7/31/02	REVISE STREET NAMES
A	8/30/02	CHANGES TO PLANS PRIOR TO CLV APPROVAL

DESIGN: RJ
DRAWN: SDG
CHECK: GBW
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 09-22-02
PLOT TIME: 18:58:01

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000, FAX: (702) 804-2299
SUMMERLIN OFFICE: 10000 CHARLESTON BLVD., STE. 130
OFFICE: (702) 804-2100, FAX: (702) 804-2295

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SUMMERLIN
VILLAGE 23A UNIT 1 IMPROVEMENTS
DESERT ~~SPINE ROAD~~ PLAN AND PROFILE
DESERT SUNRISE ROAD STA 115+50 TO 121+00

SHEET 12
JOB NO. 620/2321
(07-V3374-)

DESERT SUNRISE ROAD
SPINE ROAD PLAN AND PROFILE
STA 121+00 TO 127+00

VILLAGE 23A UNIT IMPROVEMENTS

SUMMERLIN

SHEET 13

JOB NO. 6200027.22

Sewer Line Per Plan

Q100 = 2.79 cfs

Q100 = 2.79 cfs

Q100 = 2.79 cfs

Q100 = 262 cfs

Q100 = 262 cfs

Q100 = 202 cfs

24" PVC DR-18 WATER (3435 ZONE)

8" W

24" W

24"GV

8"GV

SAN # 57

SAN # 56

SDMH # 8

SDMH # 9

T-LOCK LINED

100-YEAR HGL

4' MIN COVER

ORIGINAL GRADE @ C.L.

DESIGN GRADE @ C.L.

EX ROUGH GRADING @ C.L.

3.01%

3.94%

3.81%

1.76%

1.25%

341.95 LF 8" SDR-35 PVC @ 3.81%

333.17 LF 60" CLASS III RCP @ 3.94%

338.00 LF 8" SDR-35 PVC @ 1.25%

333.17 LF 60" CLASS III RCP @ 1.76%

385.49 LF 8" SDR-35 PVC @ 7.10%

48.06 LF 54" CLASS III RCP @ 5.95%

126+60.10, 15.00' LT
43.88 INV IN 8"S
43.88 INV IN 8"S
43.58 INV OUT 8"S

126+77.01, 15.00' LT
49.56 INV IN 42"
48.55 INV IN 54"
48.05 INV OUT 60"

123+27.00, 15.00' LT
41.46 INV IN 8"S
41.29 INV OUT 8"S

123+44.33, 15.00' LT
42.21 INV IN
42.01 INV OUT

125+04.00
11.25° BEND

123+03.72
11.25° BEND

121+20.55
11.25° BEND

126+42.65

126+95.16

120+75.00

62.30 DC

61.6± TMH

62.4± TMH

52.4± TMH

51.6± TMH

8.5°

3255

3250

3245

3240

3235

3230

3225

3220

3215

3210

3205

3200

3195

3190

3185

3180

3175

3170

3165

3160

3155

3150

3145

3140

3135

3130

3125

3120

3115

3110

3105

3100

3095

3090

3085

3080

3075

3070

3065

3060

3055

3050

3045

3040

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-155

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-195

-200

MATCHLINE 132+50.00 SEE SHEET 15/16/17 (PROFILE)

MATCHLINE 127+00.00 SEE SHEET 13

VILLAGE 23A
PARCEL F

VILLAGE 23A
PARCEL E

(FUTURE SIDEWALK BY SUMMERLIN)
COMMON LOT

EX DAYLIGHT LINE

NORTH
SCALE 1"=20'

DESERT SUNRISE ROAD
~~SPINE ROAD~~ ⚠

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'
REFER TO SHEET 2 FOR CONSTRUCTION NOTES

20 0 20 40
SCALE FEET

NOTE:
INSTALL PIPELINE MARKER BALLS IN TRENCH ABOVE EACH HORIZONTAL ELBOW FITTING, PER MANUFACTURER INSTRUCTIONS.

BENCHMARK

CLV BM NO.	DESC.	NAVD 88 DATUM	NAVD 88 DATUM
0368 J	U.S.C.& G.S. BRASS DISC SET IN ROCK ON THE EAST SIDE OF CHARLESTON BOULEVARD AND SOUTH OF THE RED ROCK DETENTION BASIN.	3246.71 (FEET)	989.599 (METERS)

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

NOTE

THIS SET OF DRAWINGS IS BASED UPON NAVD 88 DATUM. PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS. . .

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

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
CALL 1-702-593-5111

APPROVAL:
LAS VEGAS VALLEY WATER DISTRICT — DATE 9/11/02

CONSTRUCTION NOTE:

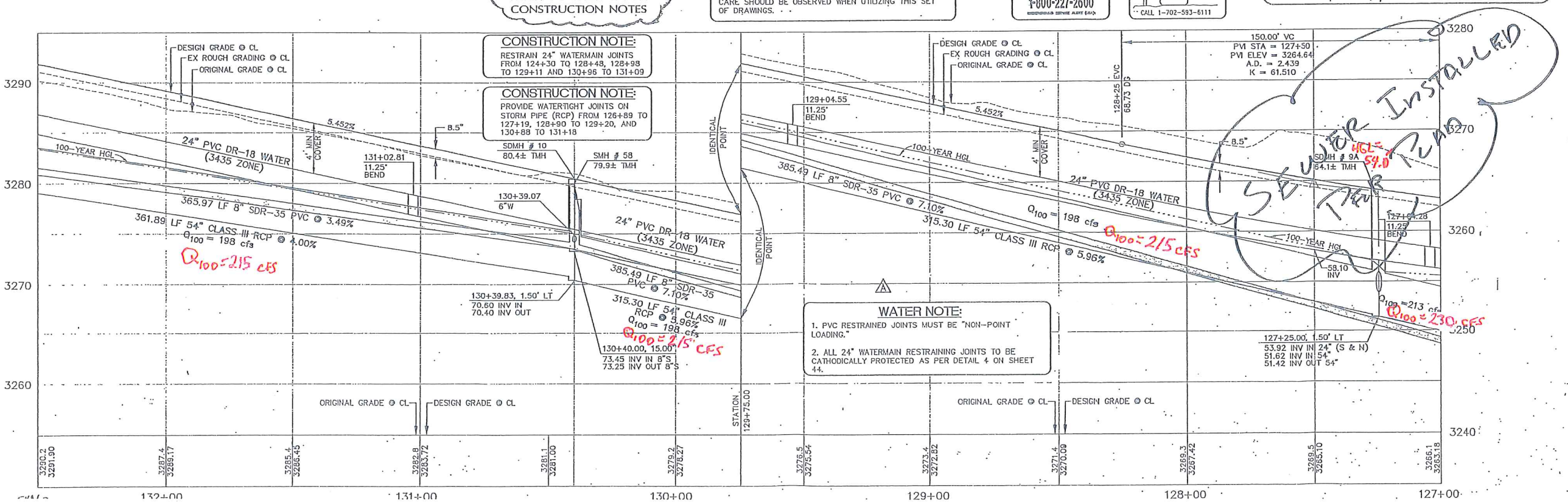
RESTRAIN 24" WATERMAIN JOINTS FROM 124+30 TO 128+48, 128+98 TO 129+11 AND 130+96 TO 131+09

CONSTRUCTION NOTE:

PROVIDE WATERTIGHT JOINTS ON STORM PIPE (RCP) FROM 126+89 TO 127+19, 128+90 TO 129+20, AND 130+88 TO 131+18

WATER NOTE:

1. PVC RESTRAINED JOINTS MUST BE "NON-POINT LOADING."
2. ALL 24" WATERMAIN RESTRAINING JOINTS TO BE CATHODICALLY PROTECTED AS PER DETAIL 4 ON SHEET 44.



G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
(702) 804-2100 FAX: (702) 804-2101
SUMMERLIN OFFICE 10000 CHARLESTON BLVD., STE. 130
OFFICE: (702) 804-2160, FAX: (702) 804-2225

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REV	DATE	DESCRIPTION
1	10/17/02	REVISE STREET NAMES, REVISE SEWER LAYOUT
2	9/9/02	CHANGES TO PLANS PRIOR TO CLV APPROVAL

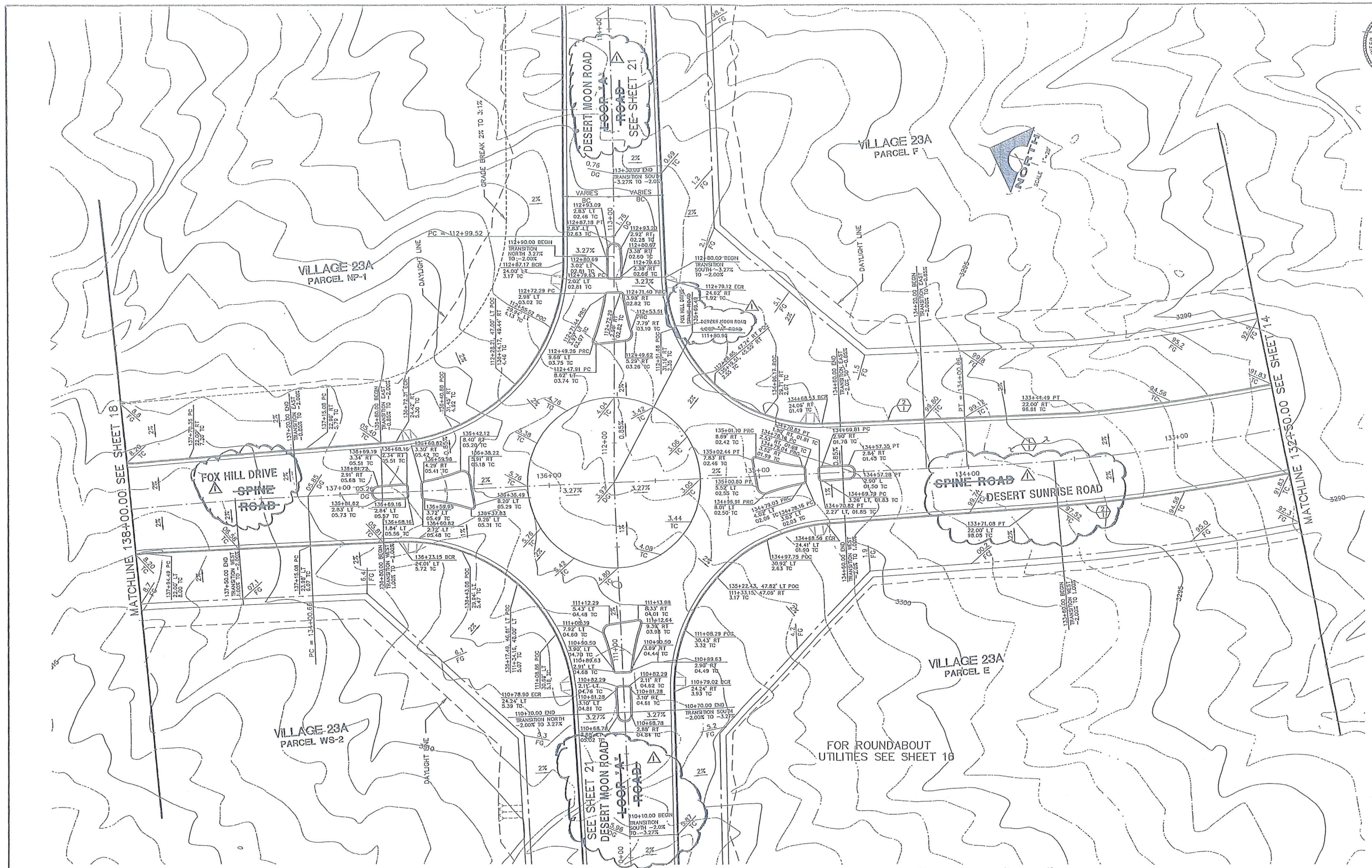
DESIGN: JLJ
DRAWN: SDG
CHECK: GBW
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 08-22-02
PLOT TIME: 18:54:50

DATE: 9/11/02
DATE: AGEN. APP. DATE: CIVIL APP.

SUMMERLIN
VILLAGE 23A UNIT 1 IMPROVEMENTS
DESERT ~~SPINE~~ ROAD PLAN AND PROFILE
SUNRISE ROAD STA 127+00 TO 132+50

SHEET 14
107-Y3579-1
14 OF 61 SHTS

JOB NO. 62023.221



BENCHMARK			
BM #	DESC.	NAVD 88 DATUM	NAVD 83 DATUM
OLV09-34SSE6	NDOT BRASS CAP, 50 FEET NORTH OF STATION 767+19.42 OF CHARLESTON BOULEVARD.	3209.81 (FEET)	978.351 (METERS)

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

ROUNDABOUT GRADING PLAN

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

REFER TO SHEET 2 FOR CONSTRUCTION NOTES

NOTE

THIS SET OF DRAWINGS IS BASED UPON NAVD 88 DATUM. PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

Avoid cutting underground utility lines. It's costly. Call before you Dig. 1-800-227-2600 (USABlueStake Service Area Only)

Avoid hitting overhead power lines. It's costly. CALL BEFORE YOU DO OVERHEAD. CALL 1-702-593-6111

STATE OF NEVADA — DEPARTMENT OF PROFESSIONAL ENGINEERS — DAVID W. HUGHES — No. 6300 — CIVIL — DATE: 4/19/07

NO.	DATE	DESCRIPTION	DRWG	TRC	APP
1	12/12/06	REVISE STREET NAMES	DATE	APP	DATE
2	4/19/07	ADD LOOP "A" ROAD	KJN	MPP	4/19/07

DESIGN: AJ
DRAWN: SDG
CHECK: DWH
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 07-24-02
PLOT TIME: 15:04:17

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000, FAX: (702) 804-2239
SUMMERLIN OFFICE 10000 CHARLESTON BLVD., STE. 130
OFFICE: (702) 804-2100, FAX: (702) 804-2235

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SUMMERLIN
VILLAGE 23A UNIT 1 IMPROVEMENTS
ROUNDABOUT GRADING PLAN

SHEET 15 of 137

JOB NO. 62022.221

44742 — 50239

WATER NOTE:

1. PVC RESTRAINED JOINTS MUST BE "NON-POINT LOADING."

2. ALL 24" WATERMAIN RESTRAINING JOINTS TO BE CATHODICALLY PROTECTED AS PER DETAIL 4 ON SHEET 44.

CONSTRUCTION NOTE:

RESTRAIN 24" WATERMAIN JOINTS ON DESERT SUNRISE ROAD FROM 133+02 TO 135+15 AND DESERT MOON ROAD FROM 109+90 TO 112+00

CONSTRUCTION NOTE:

PROVIDE WATERTIGHT JOINTS ON STORM PIPE (RCP) FROM 132+93 TO 133+23

NOTE:

INSTALL PIPELINE MARKER BALLS IN TRENCH ABOVE EACH HORIZONTAL ELBOW FITTING, PER MANUFACTURER INSTRUCTIONS.

BENCHMARK			
BM #	DESC.	NAVD 83 DATUM	NAVD 88 DATUM
OLV09-34SSE6	NDOT BRASS CAP, 50 FEET NORTH OF STATION 787+19.42 OF CHARLESTON BOULEVARD.	3209.81 (FEET)	978.351 (METERS)

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

ROUNDABOUT UTILITY PLAN

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

REFER TO SHEET 2 FOR CONSTRUCTION NOTES

20 0 20 40
SCALE FEET

NOTE

THIS SET OF DRAWINGS IS BASED UPON NAVD 88 DATUM. PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

APPROVAL:
FIRST APPROVAL 9/11/03
LAS VEGAS VALLEY WATER DISTRICT
9/30/03
DATE

Avoid cutting underground utility lines. It's costly.
Call before you Dig.
1-800-227-2600
WASHOE/DOUGLAS AREA CALL

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
CALL 1-702-593-5111

58722

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
(702) 804-2100 FAX: (702) 804-2295
SUMMERLIN OFFICE: 10000 CHARLESTON BLVD., STE. 130
OFFICE: (702) 804-2160, FAX: (702) 804-2295

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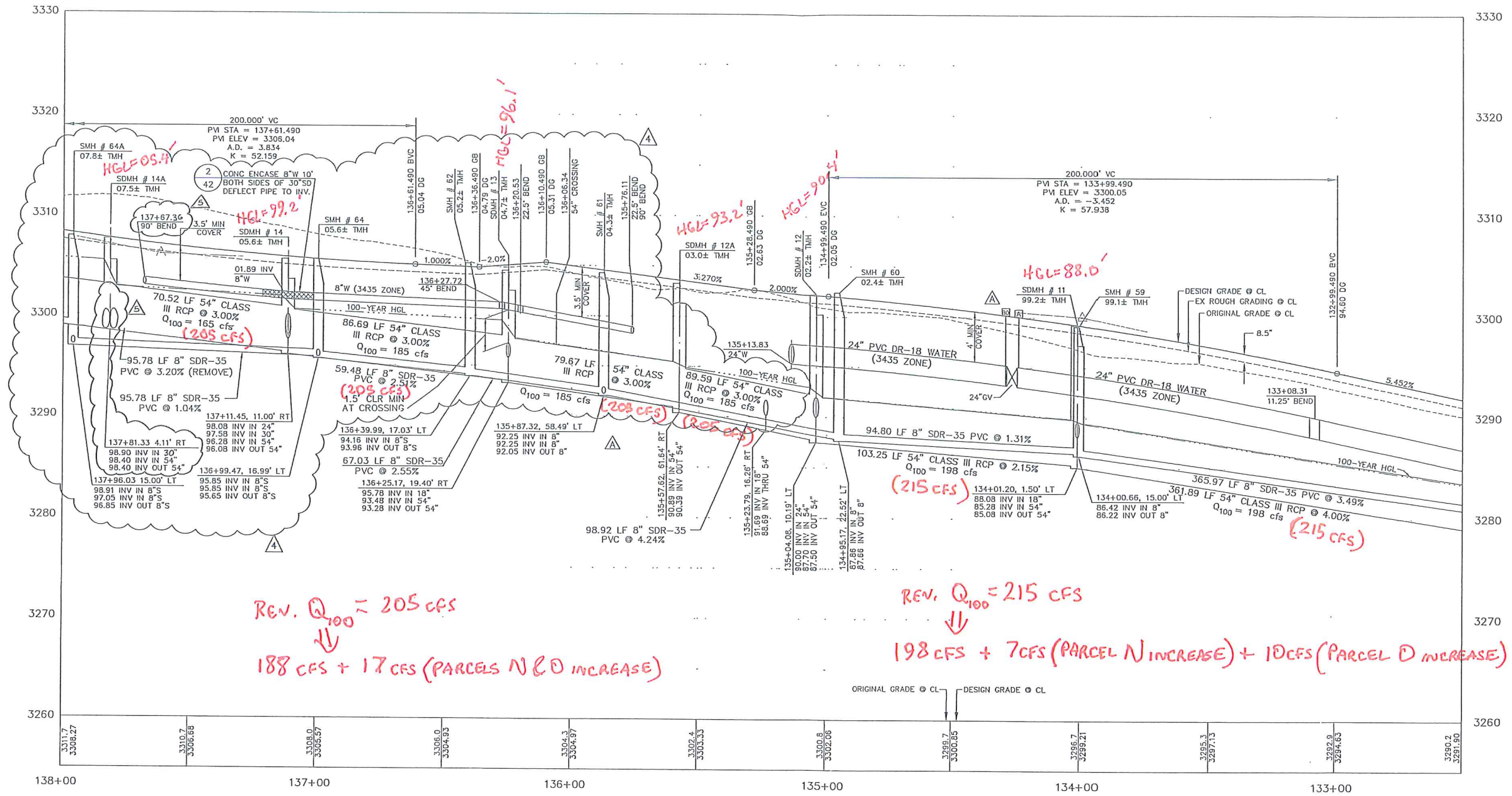
SUMMERLIN
VILLAGE 23A UNIT 1 IMPROVEMENTS
ROUNDABOUT UTILITY PLAN

SHEET 16
JOB NO. 62023.221

REV	DATE	DESCRIPTION	DATE ASSM. APP.	DATE ECON. APP.
1	6/06/03	REVISED WATER MAINS, SEWERS AND RELATED UTILITIES	7/15/03	7/16/03
2	10/10/03	REVISED STREET PROFILES	11/4/03	11/4/03
3	12/05/03	REVISIONS TO PLANS PRIOR TO CLV APPROVAL		

DESIGN: RJJ
DRAWN: SSG
CHECK: GBW
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 03-01-03
PLOT TIME: 13:08:29
mkonnelly

DATE: 1/2007



ROUNDABOUT PROFILE

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

REFER TO SHEET 2 FOR CONSTRUCTION NOTES

BENCHMARK

BM #	DESC.	NAVD 88 DATUM	NAVD 88 DATUM
DLV09-3455E6	NDOT BRASS CAP, 50 FEET NORTH OF STATION 787+19.42 OF CHARLESTON BOULEVARD.	3209.81 (FEET)	978.351 (METERS)

58723 64423

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

20 0 20 40
SCALE FEET

NOTE

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Avoid cutting underground utility lines. It's costly.
Call before you Dig.
1-800-227-2600
UNDERGROUND SERVICE ALERT (USA)



APPROVAL:
FIRST APPROVAL 9/11/03
LAS VEGAS VALLEY WATER DISTRICT — DATE 9/30/03

STATE OF NEVADA — BERT LEE HUGHES — No. 10269 — PROFESSIONAL ENGINEER — CIVIL

DATE: 9/30/03

1	9/11/03	MBS	FIRST SUBMITTAL
2	9/30/03	MBS	FIRST SUBMITTAL
NO.	DATE	BY	DESCRIPTION

DESIGN: JLJ
DRAWN: SDG
CHECK: GBW
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 09-04-03
PLOT TIME: 13:13:19

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000, FAX: (702) 804-2299
SUITE 130, 8329 W. SUNSET ROAD/LAS VEGAS, NEVADA 89113
OFFICE: (702) 804-2160, FAX: (702) 804-2299
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mbennett

SUMMERLIN
VILLAGE 23A UNIT 1 IMPROVEMENTS
ROUNDABOUT PROFILE

SHEET 17
107-13571-1

JOB NO. 62023.221

JOB NO. 62028.221

SHEET 18

FOX HILL DRIVE
SPINE ROAD PLAN AND PROFILE
STA 138+00 TO END

SUMMERLIN
VILLAGE 23A UNIT 1 IMPROVEMENTS

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
OFFICE: (702) 804-2000, FAX: (702) 804-2299
SUMMERLIN OFFICE 10000 DARLESTON BLVD., STE. 130
OFFICE: (702) 804-2000, FAX: (702) 804-2299

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DESIGN:	JLJ
DRAWN:	SDG
CHECK:	GBW
ISSUE DATE:	
ISSUE EDITOR:	
PLOT DATE:	09-22-02
PLOT TIME:	18:59:48

NO.	DATE	DESCRIPTION
1	10/23/02	REVISED PACIFIC STREAM, WATER, AND SEWER
2	3/3/03	CHANGES TO PLANS PRIOR TO CLV APPROVAL

DATE: 6/11/03 APP'D

PROFESSIONAL ENGINEER
STATE OF NEVADA
BERT A. LARSEN
No. 6404
CIVIL
No. 10359

BENCHMARK

CLV BM NO.	DESC.	NAVD 88 DATUM	NAVD 88 DATUM
0388 3	U.S.C.& G.S. BRASS DISC SET IN CHANNELSTION BOULEVARD AND SOUTH ROCK ON THE EAST SIDE OF OF THE RED ROCK DETERMINATION BASIN.	3246.71 (FEET)	989.599 (METERS)

BASIS OF BEARINGS

NORTH 89°45'05" EAST BEING THE SOUTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 35, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., AS SHOWN BY MAP ON FILE IN FILE 91, PAGE 28 OF PARCEL MAPS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA

FOX HILL DRIVE SPINE ROAD

SCALE: HORIZ. 1" = 20'
VERT. 1" = 5'

REFER TO SHEET 2 FOR CONSTRUCTION NOTES

NOTE
THIS SET OF DRAWINGS IS BASED UPON NAVD 88 DATUM. PREVIOUS DRAWINGS MAY BE BASED ON OTHER DATUM. CARE SHOULD BE OBSERVED WHEN UTILIZING THIS SET OF DRAWINGS.

SCALE 20 0 20 40 FEET

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

CALL BEFORE YOU DIG OVERHEAD
AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
CALL 1-702-593-6111

NOTE:
INSTALL PIPELINE MARKER BALLS IN TRENCH ABOVE EACH HORIZONTAL ELBOW FITTING. PER MANUFACTURER INSTRUCTIONS.

APPROVAL:
LAS VEGAS VALLEY WATER DISTRICT
DATE 6/11/03

MATCHLINE 138+00.00 SEE SHEET 15/16/17

140+00 LIMIT OF PAVING, CURB AND GUTTER

142+30.00 LIMIT OF PAVEMENT

VILLAGE 23A PARCEL WB-2

VILLAGE 23A PARCEL M

VILLAGE 23A PARCEL NP-1

VILLAGE 23A PARCEL EB-1

(FUTURE SIDEWALK BY SUMMERLIN) COMMON LOT

FUT EASEMENT TO BE PROVIDED BY PARCEL BUILDER

FUT 8" W

FUT 12" W

FUT FH

RIPRAP D50 = 8" DEPTH = 16"

GEOTEXTILE FILTER FABRIC AND 6" TYPE II BASE

100-YEAR HGL

J-MIN COVER

DESIGN GRADE @ CL

EX ROUGH GRADING @ CL

ORIGINAL GRADE @ CL

EX GRADE BREAK

SCALE 1"=20'

NOTE: Rev. Q100 = 138 cfs (Parcels M & NP-1 Increased) 142+30.00 LIMIT OF PAVEMENT

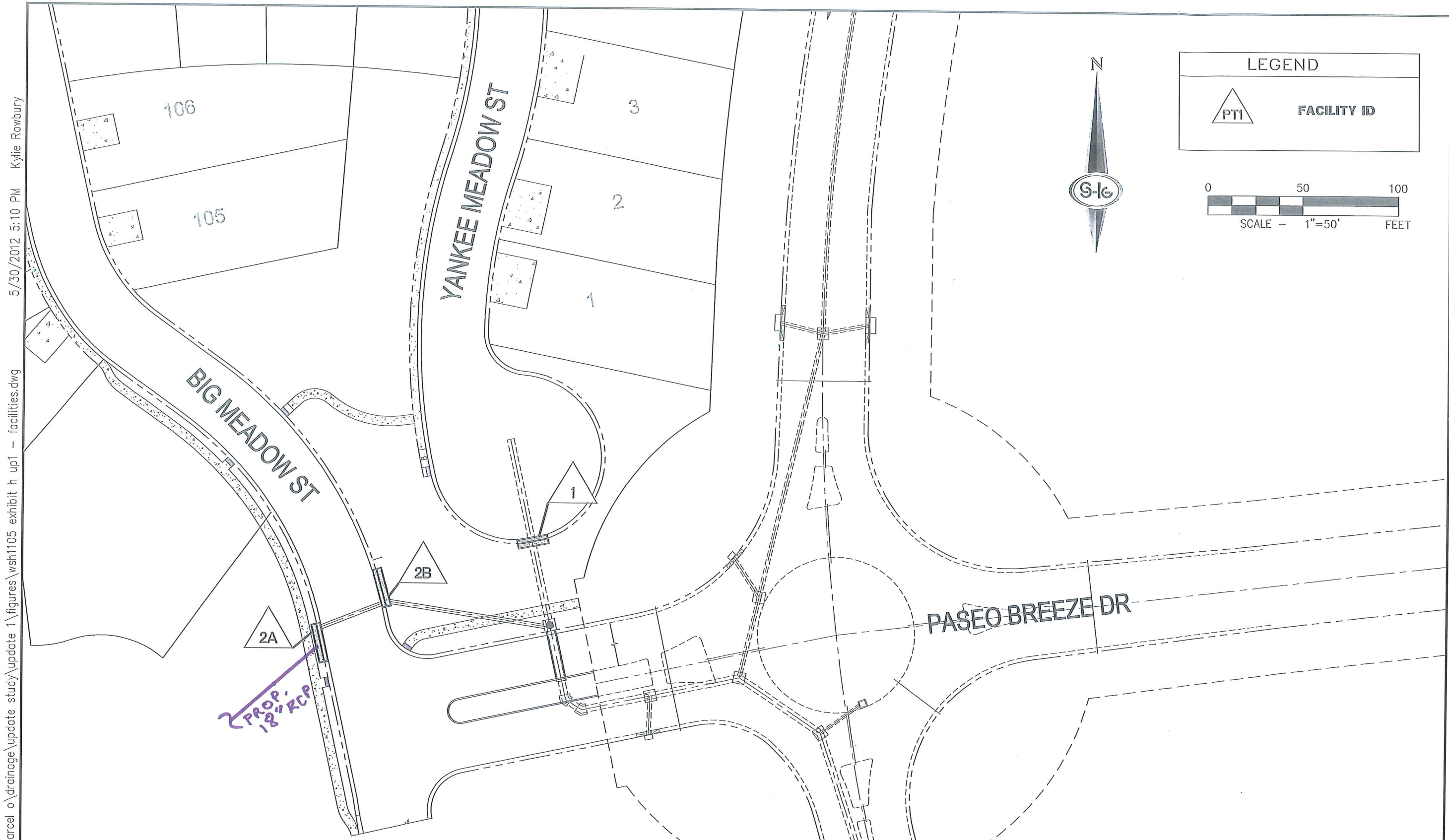
NOTE: Rev. Q100 = 129 cfs 17 cfs (Parcels NP-1 Increased) 142+30.00 LIMIT OF PAVEMENT

APPENDIX J

Reference Material

Update to Technical Drainage Study for Summerlin Village 23A– Parcel O

Flood Control Facilities Exhibit



Flood Control Facility Summary
Interim Condition

ID	Facility	Description of Flow	$Q_{FACILITY}$ (cfs)	Q_{BYPASS} (cfs)	Comment
1	Proposed Sump Inlet	Q = CP2	57	0	15.0-ft Mod. Type C Drop Inlet
2A	Proposed CG Inlet	Q = ½CP3	7.5	0	20.0-ft Type CM Drop Inlet, 24-inch C-900 SD Lateral
2B	Proposed CG Inlet	Q = ½CP3	7.5	0	20.0-ft Type CM Drop Inlet, 24-inch C-900 SD Lateral

Q_{TOTAL} = 72 cfs. CATALINA TIES INTO DI 2A.

Flood Control Facility Summary
Proposed Condition

ID	Facility	Description of Flow	$Q_{FACILITY}$ (cfs)	Q_{BYPASS} (cfs)	Comment
1	Proposed Sump Inlet	Q = CP2	52	0	15.0-ft Mod. Type C Drop Inlet
2A	Proposed CG Inlet	Q = ½CP3	8	1	20.0-ft Type CM Drop Inlet, 24-inch C-900 SD Lateral
2B	Proposed CG Inlet	Q = ½CP3	8	1	20.0-ft Type CM Drop Inlet, 24-inch C-900 SD Lateral

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
6740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

WOODSIDE HOMES

SUMMERLIN VILLAGE 23A PARCEL O
FLOOD CONTROL FACILITIES MAP

DATE: 05/30/12
DRAFTER: KCR
DESIGNER: KCR
CHECKED: SMJ
PROJECT NO. WSH1105.000

EXHIBIT H
UPDATE NO. 1

j:\wsh1105-000 v23 parcel o\drainage\update study\update 1\figures\wsh1105 exhibit h up1 – facilities.dwg 5/30/2012 5:10 PM Kylie Rowbury

APPENDIX K

Reference Material

Technical Drainage Study for Summerlin Village 23A Desert Foothills Drive Improvements

Relevant Report Excerpts

TECHNICAL DRAINAGE STUDY
FOR
SUMMERLIN VILLAGE 23A
DESERT FOOTHILLS DRIVE IMPROVEMENTS

62052.230

April 2002

Prepared for:

The Howard Hughes Corporation
a Delaware Corporation
10000 West Charleston Blvd., Ste. 200
Las Vegas, Nevada 89135
Phone: (702) 791-4300
Fax: (702) 791-4453

G. C. WALLACE, INC.
Engineers/Planners/Surveyors

The proposed storm drain system is shown on Figure 6. The proposed storm drain system was designed and modeled using the 100-year peak flows from the HEC-1 analysis established in the Conceptual Drainage Study (Reference 6). Hydraulic calculations for the storm drain were performed using Standard Form 6 and are included in the appendix. The hydraulic grade line is included with the pipe profile in the drawings. A discussion of the design flows for the proposed drop inlets and storm drain facilities follows.

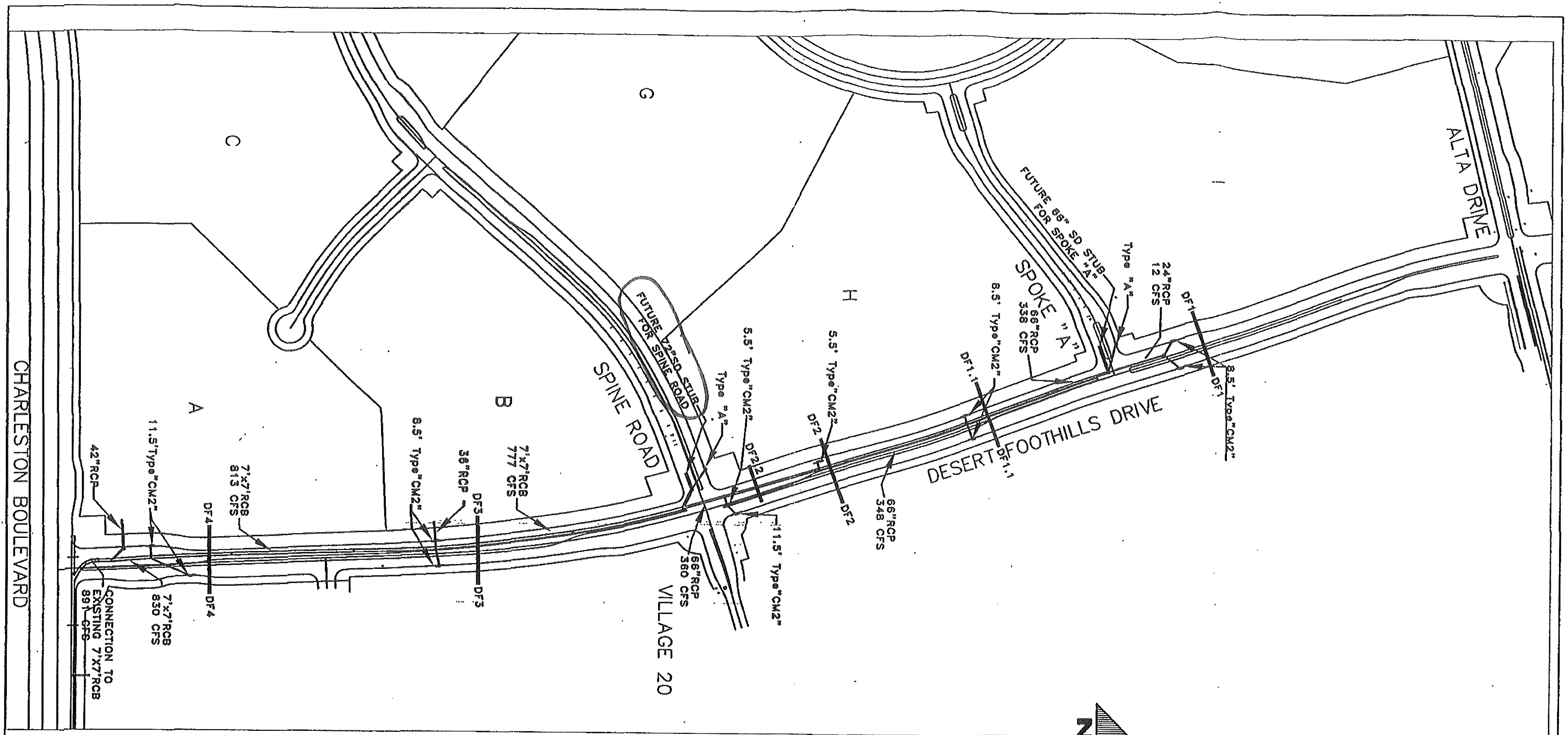
At Section DF1, Basin DF1 generates 17 cfs. Two 8.5-foot Type "CM2" will intercept 12 cfs allowing 5 cfs to bypass as surface flow. At the intersection, the future storm drain in Spoke "A" will connect to the Desert Foothills Drive storm drain. This concentration point is represented in the Conceptual Drainage Study (Reference 6) as Concentration Point C-9 (326 cfs). Concentration Point C-9 (326 cfs) is added to the flow intercepted by the 8.5-foot drop inlets (12 cfs) for a total design flow in the 66-inch storm drain of 338 cfs. The surface flow bypassing this point is 5 cfs.

At Section DF1.1, the 100-year street flow is 13 cfs (5 cfs bypassed from Section DF1 plus half of the flow generated by Basin DF2, 8 cfs). Two 8.5-foot Type "CM2" drop inlets with connecting 24-inch laterals discharge to the 66-inch main line. The drop inlets will intercept 10 cfs. The remainder of the flow, 3 cfs, will continue south as surface flow in Desert Foothills Drive. The design flow for the 66-inch main line is 348 cfs.

At Section DF2, the 100-year street flow is 12 cfs (3 cfs bypassed from Section DF1.1 plus the additional half flow generated by Basin DF2, 9 cfs). One 11.5-foot Type "CM2" drop inlet and two 5.5-foot Type "CM2" drop inlets located at Sections DF2 and DF2.2 will intercept a total flow of 12 cfs. The total design flow for the 66-inch main line is 360 cfs.

At the intersection with Spine Road, a future 72-inch storm drain will discharge storm flows to the Desert Foothills Drive storm drain. The storm drain in Desert Foothills increases from a 66-inch storm drain to a 7-foot by 7-foot RCB. The design flow for the 7-foot by 7-foot RCB main line is 777 cfs (Concentration Point C-9A in the Conceptual Drainage Study).

Storm Drain Facilities Exhibit



STREET SECTIONS

SECTION	Q100(CFS)	SLOPE %	D (FT)	VEL (FPS)	D X V	DROP INLETS*
DF1	17	4.1	0.4	4.9	1.9	2–8.5' Type "CM2"
DF1.1	13	3.0	0.4	4.1	1.5	2–8.5' Type "CM2"
DF2	12	2.9	0.4	4.0	1.5	1–5.5'Type"CM2"(WEST) 1–11.5'Type"CM2"(EAST)
DF2.2*	2.5	2.9	0.3	3.2	1.0	1–5.5' Type"CM2"
DF3	19	1.8	0.5	3.7	1.7	2–8.5' Type"CM2"
DF4	17	1.6	0.5	3.4	1.5	2–11.5' Type"CM2"

*Type "CM2" is equivalent to Summerlin standard Modified Type "C" as noted on the plans

LEGEND

DF1 ═══ DF1 STREET FLOW CALCULATION

NORTH

GRAPHIC SCALE

300 0 150 300

(IN FEET)

1 inch = 300 ft.

SUMMERLIN VILLAGE 23A
DESERT FOOTHILLS IMPROVEMENTS

FIGURE 6

STORM DRAIN FACILITIES

G.C. WALLACE, INC.
Engineers/Planners/Surveyors

Spine Road 72" connection @ Sta. 118+90
Worksheet for Circular Channel
Lateral Calculation

Project Description	
Worksheet	Sta. 118+90
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.013
Slope	1.76 %
Diameter	72 in
Discharge	452.00 cfs

Results	
Depth	4.08 ft
Flow Area	20.5 ft²
Wetted Perimeter	11.63 ft
Top Width	5.60 ft
Critical Depth	5.54 ft
Percent Full	67.9 %
Critical Slope	0.99 %
Velocity	22.10 ft/s
Velocity Head	7.59 ft
Specific Energy	11.67 ft
Froude Number	2.04
Maximum Discharg	604.35 cfs
Discharge Full	561.82 cfs
Slope Full	1.14 %
Flow Type	Supercritical

FLOW INCREASE TO 469 CFS (+17CFS) CONSIDERED INSIGNIFICANT (<5%) IN TERMS OF REGIONAL FACILITY CAPACITY

APPENDIX L

Reference Material

Conceptual Drainage Study for Summerlin Village 23A

Approval Letters

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM	DATE: May 16, 2003
TO: Land Development Services Department of Public Works	FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT: Drainage Study for: Summerlin Village 23A – Update	COPIES TO: G. C. Wallace, Inc.
Cross Streets: NWC Charleston and Desert Foothills	Howard Hughes Corporation
FILE NO.: F:\Depot\DSMEMOS\DS3077E.doc	Bart Anderson, P.E., DEVCO
Parcel Number: 137-22-000-005	CCRFCD
Zoning Action:	
FEMA Flood Zone: YES / No X	
Proposed Storm Drain: YES X / No	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID G.R. #
1st Submittal	2/1/2002	2/15/2002	Conditional Acceptance	$250.00	----
2nd Submittal	2/28/2002	3/13/2002	Not Acceptable	$250.00	----
3rd Submittal	3/22/2002	4/5/2002	Acceptable	$250.00	----
4th Submittal	5/6/2002	5/16/2002	Acceptable	$250.00	86133: $1,000
5th Submittal	4/17 & 5/15/2003	5/16/2003	See Comments Below	$250.00	102770: $250
			TOTAL FEES (LDDRS):	$1,250.00	----

REMARKS:

1st Submittal is for Conceptual Storm Facilities; 2nd & 3rd Submittals are for Rough Grading;

4th & 5th Submittals are Updates

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

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

1. This update is to address the 100-yr flow depths in all interior streets of *Village 23A* being at or below the top of curb; the onsite houses should be well protected even if they are below the corresponding street grade. This is true conceptually, however freeboard must also be considered for further protection. Curb height of 8" high and/or sidewalk with landscaping strip must be considered to provide the freeboard in lieu of the solid grouting of wall. This will be reviewed in a case by case situation upon individual parcel development.

The following comments are re-iterated until they are complete:

1. *Detail 1/43 for the berm along Charleston Boulevard must provide a layer of geotextile filter fabric beneath the riprap.*

2. *The submitted study proposes rough grading of interior streets and protection berm / channel only. Future development of interior parcels and improvement of roadways (asphalt paving, curb & gutter,*

storm drains and inlets etc.) and Collector Road will require detail hydrologic and hydraulic calculations with subsequent technical drainage studies.

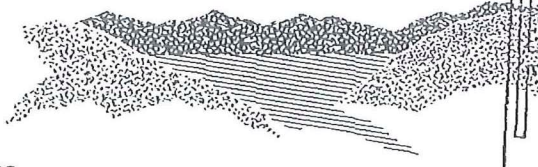
3. *The proposed rough graded interior streets and site are privately owned and maintained by Howard Hughes Corporation.*

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

END OF REMARKS
ays

T/R/S: T20S/R59E/34
AREA K34

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



RECEIVED
MAR 2 5 2002

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

BOARD OF DIRECTORS

Larry Brown
Chairman
City of Las Vegas

Cresent Hardy
Vice-Chairman
City of Mesquite

Shari Buck
City of North Las Vegas

Mayor James Gibson
City of Henderson

Michael Mack
City of Las Vegas

Chip Maxfield
Clark County

Bryan A. Nix
City of Boulder City

Bruce L. Woodbury
Clark County

March 21, 2002

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

DISTRICT CONCURRENCE: SUMMERLIN VILLAGE 23A (CLV DS3077A)

Dear Mr. Fultz:

Clark County Regional Flood Control District (District) reviewed Conceptual Drainage Study dated January 31, 2002, for the above-mentioned project as submitted by G. C. Wallace, Inc. In addition, District is in receipt of the Conditional Letter of Acceptance from City of Las Vegas Public Works dated February 15, 2002.

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

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

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

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

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

ART:css

c: Kayann Jongsma, P.E., G. C. Wallace, Inc.

File: 20-59-34.GCW

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

Relevant Report Excerpts

Rec'd 2-1-02

CONCEPTUAL DRAINAGE STUDY
FOR
SUMMERLIN VILLAGE 23A

3077
K34
P3
$250
CCRFCD

62023.010

January 2002

Prepared for:

The Howard Hughes Corporation
a Delaware Corporation
10000 West Charleston Blvd., Ste. 200
Las Vegas, Nevada 89134
Phone: (702) 791-4300
Fax: (702) 791-4453

G. C. WALLACE, INC.
Engineers/Planners/Surveyors

The Charleston Boulevard RCB was designed to convey the interim storm flows that drain to the Desert Foothills Drive/Charleston Boulevard intersection (Q_{100}=964 cfs). The criteria for calculating peak flows for regional facilities include a restriction of the subbasin size to between 160 acres and 320 acres. Therefore, a separate HEC-1 model was performed to estimate the impacts to this system. The drainage basins for this model are shown on Figure 7.

According to this HEC-1 model, the 100-year flow to the storm drain in Charleston Boulevard under ultimate conditions is 858 cfs. This is less than the design flow for the RCB. Therefore, the downstream facilities will have sufficient capacity to convey the 100-year storm runoff generated in Summerlin Village 23A under developed conditions.

The ultimate conditions for Village 23A and the surrounding area were addressed on an overall basis with the Summerlin West Master Plan Update. The referenced drainage study establishes that the storm flows generated west of the project site (Village 24) will drain south to the Red Rock Detention Basin (see Figure 6 from the Summerlin West Master Plan Update in Appendix C). This includes the storm flows generated within the Collector Road.

The master drainage plan for the area north of the site (Village 23B) was updated in the DB5 Study. According to the DB5 Study, approximately 2,300 cfs is released from the DB5 Detention Basin during a 100-year storm event. The 100-year peak flow to the intersection of Alta Drive and Desert Foothills Drive is approximately 2,520 cfs. The estimated peak flow discharged to the storm drain facility in Alta Drive by Village 23B is 855 cfs (see Subbasin 4-8 on Figure 7 from the Summerlin West Master Plan Update in Appendix C). The assumption is made that storm flows generated within Alta Drive (Subbasin ST8) will also drain to this facility. The storm drain facility in Alta Drive is constructed east of Desert Foothills Drive as an 11-foot by 8-foot arch storm drain.

The proposed development plan for Village 23A is in general conformance with the master drainage plan established in the Summerlin West Master Plan Update and updated in the DB5 Study and the Charleston Study. Therefore, the downstream

TABLE 1
EXISTING CONDITIONS
HEC-1 MODEL SUMMARY

Design Point*	Q_{10} (cfs)	Q_{100} (cfs)
EX3	28	84
EX4	22	65
EX5	16	50
COM3	58	176
EX6	243	673
EX1	149	369
COM4	412	1088
EX2	38	96
EX7	18	54
COM2	52	141

*See Figure 5, Existing Conditions Drainage Map

The HEC-1 model estimates a 100-year flow to the existing box storm drain at the corner of Desert Foothills Drive and Charleston Boulevard of 1,088 cfs. The existing peak flow to the Collector Road/Charleston Boulevard intersection is 139 cfs. This flow is directed west to the Red Rock Detention Basin south of Charleston Boulevard.

The *Technical Drainage Study for Charleston Boulevard Regional Drainage Improvements* (Reference 7, Charleston Study) estimated the existing flow to the Charleston Boulevard/Desert Foothills Drive intersection as 964 cfs. This peak flow was used in the design of the box storm drain in Charleston Boulevard (CCRFCD Facility APCB 0095). Therefore, this peak value (964 cfs) was used as the limiting discharge to this facility.

VII. ULTIMATE CONDITIONS

The ultimate drainage patterns for this area were established in the Summerlin West Master Plan Update and updated in the *Detention Basin No. 5/Diversion Berm Final Design Report* (Reference 6, DB5 Study). More recently, this area was analyzed as part of the Charleston Study to establish design flows for the RCB storm drain in Charleston Boulevard. The proposed project is in general conformance with these documents. From the referenced reports, the estimated ultimate flow from Village 23A is 672 cfs. It should be noted that the development plan at that time included a golf course within Village 23A boundaries. However, the existing RCB storm drain in

TABLE 2
SUMMARY OF HEC-1 MODEL
ULTIMATE CONDITIONS

Subbasin/ Combination Point	Q_{10} (cfs)	Q_{100} (cfs)
C-14	116	262
F	25	59
C-15	140	319
G	20	51
C-16	159	369
H	20	51
ST11	17	34
C-17	196	452
C-9A	777	329
ST2	3	6
B	20	46
C-18	348	779
A	22	50
C-19	365	839
ST3	27	53
C-20	392	891
ST7B	13	25
D	27	66
C-21	38	89
C	24	54
C-22	60	140
ST-1	17	33
C-23	76	170
CP-CH	468	1056
ST7A	16	32
ST8	21	42

*See Figure 6

The majority of the flows generated within Summerlin Village 23A will be directed to the intersection of Charleston Boulevard and Desert Foothills Drive. The storm drain system in Village 23A will tie into the existing 7-foot by 7-foot reinforced concrete box (RCB) storm drain (CCRFCD Facility APCB 0095) at this intersection. The junction structure at this intersection was designed as a part of the approved Charleston Study. As designed, a 7-foot by 7-foot RCB storm drain extends north Desert Foothills Drive and a 7-foot by 7-foot RCB lateral is extended west in Charleston Boulevard to allow flexibility in the development of Village 23A. With the current layout, the majority of the 100-year storm flows from Summerlin Village 23A will discharge to the box storm drain via Desert Foothills Drive. Pertinent excerpts from the Charleston Study are included in Appendix C.

Downstream of this point, a 48-inch storm drain is recommended to convey 85 cfs.

At Design Point 17, a 42-inch lateral is provided to Parcel C. The combined flow at this point is 140 cfs (HEC-1 Point C-22). A 54-inch storm drain downstream of this point will convey approximately 135 cfs.

Design Point 18 is located at the Charleston Boulevard/Desert Foothills Drive intersection. A 42-inch lateral to Parcel A is located just north of this intersection. The calculated 100-year flow to this point is 1,056 cfs (HEC-Concentration Point CP-CH). However, this model was used for the analysis of interior facilities. The impacts to the existing RCB storm drain in Charleston Boulevard were measured with an overall HEC-1 model which more closely matches the modeling techniques used to size regional facilities. The 100-year peak flow to this point based on this model is 858 cfs. Therefore, the existing downstream facilities have capacity to convey the ultimate 100-year storm flow discharge from Village 23A.

At Design Point 19, the ultimate 100-year storm flow to this point is 32 cfs (Subbasin ST7A). Drop inlets will be provided to intercept the 100-year storm flow at the Collector Road/Loop "A" Road intersection and convey it to the natural wash west of the site. In addition, future development of Village 24 will require construction of storm drain facilities in the Collector Road. The planning information for Village 24 is limited at this time. However, the existing flow to this street is approximately 465 cfs. A 78-inch storm drain at 1.0 percent is recommended to convey 465 cfs. This wash eventually discharges to the Red Rock Detention Basin south of Charleston Boulevard. This drainage pattern is consistent with the master drainage plan for this area.

As noted above, the pipe sizes given are preliminary sizes only. More specific design and detailed hydraulic calculations will be included in technical drainage studies to accompany design drawings. More detailed hydraulic analyses may indicate that smaller pipe sizes are acceptable.

Regional Type HEC-1 Analysis

Rec'd 2-1-02

CONCEPTUAL DRAINAGE STUDY
FOR
SUMMERLIN VILLAGE 23A

307
K34
P3
$250
CCRFCD

62023.010

January 2002

Prepared for:

The Howard Hughes Corporation
a Delaware Corporation
10000 West Charleston Blvd., Ste. 200
Las Vegas, Nevada 89134
Phone: (702) 791-4300
Fax: (702) 791-4453

G. C. WALLACE, INC.
Engineers/Planners/Surveyors

```
**************************************
*                                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *
*        MAY  1991                   *
*      VERSION 4.0.1E                *
*   Lahey F77L-EM/32 version 5.01    *
*     Dodson & Associates, Inc.      *
* RUN DATE  01/31/02  TIME  07:22:01 *
**************************************
```

```
**************************************
*                                    *
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*       609 SECOND STREET            *
*    DAVIS, CALIFORNIA 95616         *
*       (916) 551-1748               *
*                                    *
**************************************
```

```
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

HEC-1 INPUT PAGE 1

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
          *DIAGRAM
    1     ID   ********************************************************************
    2     ID   * .....................................................................
    3     ID   * :                  SUMMERLIN VILLAGE 23A                          :
    4     ID   * :                  MASTER STUDY UPDATE (JAN 2001)                 :
    5     ID   * :                  COMBINED DEVELOPED ONSITE                      :
    6     ID   * :                                                                 :
    7     ID   * :.................................................................:
    8     ID   * :              RETURN PERIOD_ _ _ _10 & 100-YEAR                  :
    9     ID   * :              DISTRIBUTION_ _ _ _ 6-HOUR SDN3                    :
   10     ID   * :              PROJECT NO_ _ _ _ _ 62023.010                      :
   11     ID   * :              FILENAME_ _ _ _ _ _ 010-PROP.H1                    :
   12     ID   * :              DATE_ _ _ _ _ _ _ _  1/30/02                       :
   13     ID   * :              MODELED BY_ _ _ _ _     ALG                        :
   14     ID   * :                                                                 :
   15     ID   * :  DEPTH AREA REDUCTION FACTORS:                                  :
   16     ID   * :  AREA              DARF                                         :
   17     ID   * :  0.5 SQ MI          .98                                         :
   18     ID   * :  1.0 SQ MI          .97                                         :
   19     ID   * :  10-YEAR STORM      .56                                         :
   20     ID   * :.................................................................:
   21     ID   ********************************************************************
   22     IT       5       0       0     200
   23     IO       5       0
   24     IN       5       0       0
   25     JR    PREC     1.0     .98     .97     .56

   26     KK    CH-1
   27     KM
   28     KM    PARCELS DRAINING TO DESERT FOOTHILLS DRIVE
   29     KM
   30     KM              AREA   213.2      AC
   31     KM              Tlag   34.10     MIN
   32     KM                CN     90
   33     BA    .3331
   34     PB    3.29
   35     PC   0.000    .0200   .0570   .0700   .0870   .1080   .1240   .1300   .1300   .1300
   36     PC   .1300    .1300   .1300   .1330   .1400   .1420   .1480   .1580   .1720   .1810
   37     PC   .1900    .1970   .1990   .2000   .2010   .2040   .2140   .2290   .2410   .2490
   38     PC   .2510    .2560   .2700   .2780   .2810   .2830   .2950   .3220   .3520   .4090
   39     PC   .4990    .5900   .7100   .7440   .7810   .8120   .8190   .8350   .8510   .8560
   40     PC   .8600    .8680   .8760   .8880   .9100   .9260   .9370   .9500   .9700   .9760
   41     PC   .9820    .9850   .9870   .9890   .9900   .9930   .9930   .9940   .9950   .9980
   42     PC   .9980    .9990  1.000
   43     LS       0    90.0
   44     UD   .3410
          *

   45     KK    CH-2
   46     KM
   47     KM    PARCELS DRAINING TO CHARELSTON
   48     KM
   49     KM              AREA   210.9      AC
   50     KM              Tlag   21.90     MIN
   51     KM                CN     87
```

HEC-1 INPUT PAGE 2

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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   53     LS       0    87.0
   54     UD   .2190
          *

   55     KK   CP-CH
   56     KM   COMBINE CP-DF AND CP-CH AT THE CHARLESTON BOX CULVERT
   57     HC       2
```

```
                *
     58         ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW
 NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   26       CH-1
              .
              .
   45         .        CH-2
              .          .
              .          .
   55       CP-CH.........
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*              MAY  1991                     *
*            VERSION 4.0.1E                  *
*      Lahey F77L-EM/32 version 5.01         *
*        Dodson & Associates, Inc.           *
*   RUN DATE  01/31/02  TIME  07:22:01       *
**********************************************
```

```
**********************************************
*                                            *
*     U.S. ARMY CORPS OF ENGINEERS           *
*     HYDROLOGIC ENGINEERING CENTER          *
*           609 SECOND STREET                *
*        DAVIS, CALIFORNIA 95616             *
*           (916) 551-1748                   *
*                                            *
**********************************************
```

```
*****************************************************************
*                                                               *
*  SUMMERLIN VILLAGE 23A                                        *
*  MASTER STUDY UPDATE (JAN 2001)                               *
*  COMBINED DEVELOPED ONSITE                                    *
*                                                               *
*  RETURN PERIOD_ _ _ _10 & 100-YEAR                            *
*  DISTRIBUTION_ _ _ _ 6-HOUR SDN3                              *
*  PROJECT NO_ _ _ _ _ 62023.010                                *
*  FILENAME_ _ _ _ _ _ 010-PROP.H1                              *
*  DATE_ _ _ _ _ _ _ _  1/30/02                                 *
*  MODELED BY_ _ _ _ _      ALG                                 *
*                                                               *
*  DEPTH AREA REDUCTION FACTORS:                                *
*  AREA                DARF                                     *
*  0.5 SQ MI            .98                                     *
*  1.0 SQ MI            .97                                     *
*  10-YEAR STORM        .56                                     *
*                                                               *
*****************************************************************
```

```
 23 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           200  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE     1   0  ENDING DATE
                     NDTIME       1635  ENDING TIME
                     ICENT         19  CENTURY MARK

                   COMPUTATION INTERVAL     0.08 HOURS
                       TOTAL TIME BASE     16.58 HOURS

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

    JP           MULTI-PLAN OPTION
                     NPLAN          1  NUMBER OF PLANS

    JR           MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                   1.00      0.98      0.97      0.56
```

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00	RATIO 2 0.98	RATIO 3 0.97	RATIO 4 0.56
HYDROGRAPH AT	CH-1	0.33	1	FLOW	440.	429.	423.	194.
				TIME	3.75	3.75	3.75	3.75
+ HYDROGRAPH AT	CH-2	0.33	1	FLOW	472.	459.	452.	192.
				TIME	3.67	3.67	3.67	3.67

APPENDIX M

Reference Material

Technical Drainage Study for Esperanza

HEC-1 Analysis & Proposed Condition Drainage Map

TECHNICAL DRAINAGE STUDY

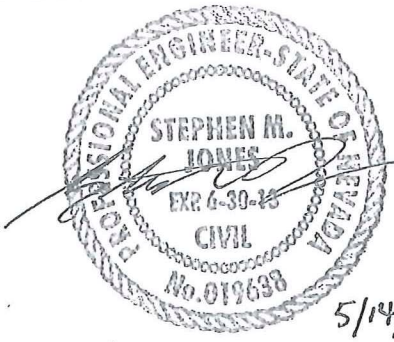
Esperanza

City of Las Vegas, Nevada

Job No.: LEN1201.000
Date: May 2012

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

Prepared For:
Lennar Homes
2490 Paseo Verde Parkway, Suite 120
Henderson, Nevada 89014
Phone: 702-736-9100 ▪ Fax: 702-736-9200



5/14/2012

Steve Jones, P.E.
NV Professional Engineer No. 19638

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
TIME OF CONCENTRATION & LAG TIME

Project Name: Esperanza
Description: TDS
File Name: SF4 - Esperanza - TDS.xls
By: SMJ
Date: 5/14/2012

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
ID:	DEV./EX. (D or E)	CN	K [1]	AREA Ac	AREA Mi^2 [2]	INITIAL LENGTH Feet	SLOPE %	Ti Min [3]	TRAVEL LENGTH Feet	SLOPE %	V1 VELOCITY FPS [4]	V2 VELOCITY FPS [5]	Tt Min [6]	Tc Calc. [7]	Total Length Feet [8]	Tc Check [9]	Tlag Hours [10]
DEV1	D	86.1	0.747	22.7	0.0355	110	1.0	6.67	1435	3.2	3.61	5.47	5.15	11.83	1545	18.583	0.118
INT1	D	87.8	0.769	22.7	0.0355	110	1.0	6.25	1435	3.2	3.61	5.47	5.15	11.40	1545	18.583	0.114
E.OFF1	E	87.5	0.765	16.5	0.0258	300	10.5	4.77	1365	2.9	2.52	5.01	6.19	10.96			0.110

[1] K = 0.0132 (CN) - 0.39
[2] A = Area/640
[3] Ti = (1.8 (1.1-K) L^0.5)/S^0.33
[4] For Existing Conditions: V1 = 14.8 * (S/100)^0.5
For Developed Conditions: V1 = 20.2 * (S/100)^0.5
[5] For Existing Conditions: V2 = 29.4 * (S/100)^0.5
For Developed Conditions: V2 = 30.6 * (S/100)^0.5
[6] Tt = L/(60*V)
[7] Tc = Ti + Tt
[8] Total L = Initial L + Travel L
[9] Tc = (L/180) + 10
[10] Tlag = (0.6*Tc)/60
[11] Min Tlag =0.05

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

REFERENCE :

STANDARD FORM 4

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   10MAY12  TIME  08:38:24   *
*                                       *
*****************************************
```

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

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

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

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

1 HEC-1 INPUT PAGE 1

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

              *DIAGRAM
    1         ID     SLATER HANIFAN GROUP
    2         ID     ESPERANZA
    3         ID     SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL M
    4         ID     BY LENNAR HOMES
    5         ID     TECHNICAL DRAINAGE STUDY
    6         ID     PROPOSED & INTERIM DRAINAGE CONDITIONS
    7         ID
    8         ID     RETURN PERIOD ------- 100-YEAR & 10-YEAR
    9         ID     DISTRIBUTION -------- 6-HOUR SDN3
   10         ID     PROJECT NO. --------- LEN1201.000
   11         ID     FILENAME ------------ Esperanza.H1
   12         ID     DATE ---------------- 03/27/2012
   13         ID     MODELED BY ---------- SMJ
   14         ID
   15         ID        STORM EVENT RETURN PERIODS
   16         ID        PRECIPITATION DEPTHS INCHES)
   17         ID        100-YEAR = 3.29
   18         ID         10-YEAR = 1.86
   19         ID
   20         ID        PRECIPITATION DEPTH RATIOS
   21         ID        STORM EVENT     RATIO
   22         ID        100-YR           1.00
   23         ID         10-YR           0.57
   24         ID
   25         IT      5       0       0     300
   26         IO      5       0       0
   27         IN      5       0       0
   28         JR    PREC    1.00    0.57
              *
   29         KK    DEV1
   30         KM   PROPOSED CONDITION OF SITE
   31         KM   PHASES 1 & 2 COMPLETE AS SINGEL-FAMILY RESIDENTIAL DEVELOPMENT
   32         PB    3.29
   33         PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
   34         PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
   35         PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
   36         PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
   37         PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
   38         PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
   39         PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
   40         PC   0.998   0.999   1.000
   41         BA  0.0355
   42         LS       0    86.1
   43         UD   0.118
              *
   44         KK    INT1
   45         KM   INTERIM CONDITION OF SITE
   46         KM   PHASE 1 COMPLETE AS SINGLE-FAMILY RESIDENTIAL DEVELOPMENT
   47         KM   PHASE 2 COMPLETE AS ROUGH GRADE
   48         BA  0.0355
   49         LS       0    87.8
   50         UD   0.114
              *
```

1 HEC-1 INPUT PAGE 2

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

   51         KK  E.OFF1
   52         KM   INTERIM OFFSITE FLOW GENERATED BY ADJACENT "PARCEL N" TO THE NORTH
   53         KM   DRAINAGE DITCH PROPOSED TO ROUTE FLOW TO FOX HILL STORM DRAIN
   54         KM   PROPOSED INTERIM DRIANAGE PATTERN CONFORMS TO MASTER STUDY
   55         BA  0.0258
   56         LS       0    87.5
   57         UD   0.110
              *
   58         ZZ
```

EXISTING CONDITION OF PARCEL N

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

```
 INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW
  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   29        DEV1
             .
             .
   44        .        INT1
             .          .
             .          .
   51        .          .      E.OFF1
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION


```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   10MAY12  TIME  08:38:24   *
*                                       *
*****************************************
```

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

```
                        SLATER HANIFAN GROUP
                        ESPERANZA
                        SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL M
                        BY LENNAR HOMES
                        TECHNICAL DRAINAGE STUDY
                        PROPOSED & INTERIM DRAINAGE CONDITIONS

                        RETURN PERIOD ------- 100-YEAR & 10-YEAR
                        DISTRIBUTION -------- 6-HOUR SDN3
                        PROJECT NO. --------- LEN1201.000
                        FILENAME ------------ Esperanza.H1
                        DATE ---------------- 03/27/2012
                        MODELED BY ---------- SMJ

                           STORM EVENT RETURN PERIODS
                           PRECIPITATION DEPTHS INCHES)
                           100-YEAR = 3.29
                            10-YEAR = 1.86

                           PRECIPITATION DEPTH RATIOS
                           STORM EVENT     RATIO
                           100-YR           1.00
                            10-YR           0.57


  26 IO          OUTPUT CONTROL VARIABLES
                       IPRNT          5  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

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

                    COMPUTATION INTERVAL      .08 HOURS
                        TOTAL TIME BASE   24.92 HOURS

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

     JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                    1.00      .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

                                                                    RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION      AREA    PLAN                    RATIO 1  RATIO 2
                                                                 1.00     .57

 HYDROGRAPH AT
+                  DEV1        .04     1   FLOW                  59.      25.
                                           TIME                3.58     3.58

 HYDROGRAPH AT
+                  INT1        .04     1   FLOW                  62.      27.
                                           TIME                3.58     3.58

 HYDROGRAPH AT
+                  E.OFF1      .03     1   FLOW                  45.      20.
                                           TIME                3.50     3.58


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

Flow Rate Summary					
Phase 1 & Phase 2 Proposed Condition					
Basin	**Q_{100} (cfs)**	**Q_{10} (cfs)**	**Area (acres)**	**Q_{100} Unit Flow (cfs/acre)**	**Q_{10} Unit Flow (cfs/acre)**
DEV1	59	25	22.7	2.6	1.1
INT1	62	27	22.7	2.7	1.2
E.OFF1	45	20	16.5	2.7	1.2
Subbasin	**Q_{100} (cfs)**	**Q_{10} (cfs)**	**Area (acres)**	**Q_{100} Unit Flow (cfs/acre)**	**Q_{10} Unit Flow (cfs/acre)**
INT1-A	16	7	5.8	2.7	1.2
INT1-B	18	8	6.5	2.7	1.2
INT1-C	19	8	6.8	2.7	1.2
INT1-D	10	4	3.6	2.7	1.2
TOTAL	***62***	***27***	***22.7***	***2.7***	***1.2***
E.OFF1-1	21	9	7.7	2.7	1.2
E.OFF1-2	24	11	8.8	2.7	1.2
TOTAL	***45***	***20***	***16.5***	***2.7***	***1.2***

100-Year Street Flow Summary - Proposed Condition Flow Rates						
Street Section ID	**Contributing Flow**	**Slope (%)**	**Q_{100} (cfs)**	**D_{100} (ft)**	**V_{100} (ft/s)**	**D_{100}*V_{100}**
A	INT1-A	1.00	16	0.43	2.78	1.2
B1	INT1-B	4.56	18	0.35	5.13	1.8
B2	INT1-B	2.56	18	0.39	4.07	1.6
C1	INT1-B + INT1-C	5.04	37	0.43	6.30	2.7
C2	INT1-C	2.83	19	0.39	4.28	1.7
D	INT1-D + Bypass(INT1-A)	3.44	18	0.37	4.61	1.7

Summary of Proposed Flood Control Facilities - Proposed Condition Flow Rates				
Drainage Facility ID	**Proposed Q_{100} (cfs)**	**Inflow Description**	**Size & Type**	**Comment**
1	7	INT1-B + INT1-C	7.5-ft Type CM2 Drop Inlet & 18-inch RCP	Q_{BYPASS} = 11.5 cfs; Bypass flow is considered non-erosive
2	7	INT1-B + INT1-C	7.5-ft Type CM2 Drop Inlet & 18-inch RCP	Q_{BYPASS} = 11.5 cfs; Bypass flow is considered non-erosive
3	20	INT1 - (A - Desert Moon) - (Dis 1&2)	10.0-ft Type CM2 Drop Inlet & 24-inch RCP	Sag Inlet
4	20	INT1 - (A - Desert Moon) - (Dis 1&2)	10.0-ft Type CM2 Drop Inlet	Sag Inlet
A	54	INT1 - Desert Moon	36-inch RCP	Ex. Fox Hill SD designed to accommodate 60 cfs at this lateral location.
B	34	Dis 1&2&3	36-inch RCP	
C	14	Dis 1&2	18-inch RCP	
D	9	Half(INT1-C)	2-ft concrete flume for low flow, remainder of easement earthen/landscape rock lined	Drainage Easement to be Privately Maintained
E	45	E.OFF1	Ex. 36-inch RCP	Proposed Interim Sump Opening with 3.3-ft Headwater
F	22	E.OFF1-1	Earthen Ditch; Riprap Lined (D_{50} = 6-inch) at locations of slope steeper than 0.5% or of significant transverse flow	Offsite Grading to protect Esperanza and conform Parcel N to master drainage plan

* UTILIZED DURING EXISTING CONDITION FOR CATALINA

NOTE - STORM DRAIN FLOW RATES IN FOX HILL STORM DRAIN ARE ASSOCIATED WITH THE INTERIM PHASE 1 CONDITION, UPON COMPLETION OF PHASE 2 AND FULL DEVELOPMENT OF ESPERANZA, THE STORM DRAIN FLOW RATES IN FOX HILL REDUCE TO CONFORMANCE WITH THE APPROVED *UPDATE #2 TO TECHNICAL DRAINAGE STUDY FOR SUMMERLIN VILLAGE 23A UNIT 2 IMPROVEMENTS.*

LEGEND

- BASIN BOUNDARY
- DEV1 — BASIN ID
- PRO-RATED SUBBASIN BOUNDARY
- A — PRO-RATED SUBBASIN ID
- FLOW DIRECTION
- A — STREET HYDRAULIC SECTION
- 1 — FACILITY ID
- 8 CFS — SURFACE 100-YR FLOW RATE
- (200 CFS) — STORM DRAIN 100-YR FLOW RATE
- PHASE LINE

SCALE – 1" = 80' FEET (0, 80, 160)

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

LENNAR HOMES

ESPERANZA

PROPOSED CONDITION DRAINAGE MAP

DATE:	05/14/2012
DRAFTER:	SMJ
DESIGNER:	SMJ
CHECKED:	KCR
PROJECT NO.	LEN1201.000

EXHIBIT E
SHEET 1 OF 1

X:\len1201-000 sum v23 parcel m\drainage\technical study - civil\finance\exhibit e - proposed condition drainage map.dwg 5/10/2012 8:52 AM Steve Jones

Onsite Storm Drain WSPG Analysis

```
0
T1 ESPERANZA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY
T2 SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL M
T3 ONSITE STORM DRAIN EXTENDING FROM EX. 48-INCH LATERAL
SO    1000.00 198.40 42                          205.93                          1
R     1041.70 198.75 42       .013                                               1
TS    1046.70 198.75 36       .013                                       40.     1
R     1158.65 201.73 36       .013                                               1
JX    1158.65 201.73 36 36    .013     20.          201.73          45.
R     1198.48 202.77 36       .013
JX    1198.48 203.77 24 18    .013     14.          204.27          50.
R     1219.24 204.10 24       .013
SH    1219.24 204.10 24
CD  18  4                 1.5
CD  24  4                 2.
CD  30  4                 2.5
CD  36  4                 3.
CD  42  4                 3.5
CD  48  4                 4.
CD  54  4                 4.5
CD  60  4                 5.
CD  66  4                 5.5
CD  72  4                 6.
CD  78  4                 6.5
CD  90  4                 7.5
```

REVISED HGL FROM CATALINA'S RE-ANALYSIS OF FOX HILL = 205.4'; NO BACKWATER TO ESPERANZA STORM DRAIN.

20.

DATE: 5/10/2012
TIME: 7:49

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														
CD	36	4			3.00														
CD	42	4			3.50														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														
CD	66	4			5.50														
CD	72	4			6.00														
CD	78	4			6.50														
CD	90	4			7.50														

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

ESPERANZA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY

HEADING LINE NO 2 IS -

SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL M

HEADING LINE NO 3 IS -

ONSITE STORM DRAIN EXTENDING FROM EX. 48-INCH LATERAL

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1000.00	198.40	42	205.93

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1041.70	198.75	42	0.013	0.00	0.00	0.00	1

ELEMENT NO 3 IS A TRANSITION * * *

U/S DATA	STATION	INVERT	SECT	N
	1046.70	198.75	36	0.013

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1158.65	201.73	36	0.013	0.00	0.00	40.00	1

ELEMENT NO 5 IS A JUNCTION

	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
U/S DATA	1158.65	201.73	36	36	0	0.013	20.0	0.0	201.73	0.00	45.00	0.00

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 6 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	1198.48	202.77	36	0.013	0.00	0.00	0.00	1

ELEMENT NO 7 IS A JUNCTION

	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
U/S DATA	1198.48	203.77	24	18	0	0.013	14.0	0.0	204.27	0.00	50.00	0.00

ELEMENT NO 8 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	1219.24	204.10	24	0.013	0.00	0.00	0.00	0

ELEMENT NO 9 IS A SYSTEM HEADWORKS

	STATION	INVERT	SECT	W S ELEV
U/S DATA	1219.24	204.10	24	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC ⚲

WATER SURFACE PROFILE LISTING
ESPERANZA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL M
ONSITE STORM DRAIN EXTENDING FROM EX. 48-INCH LATERAL

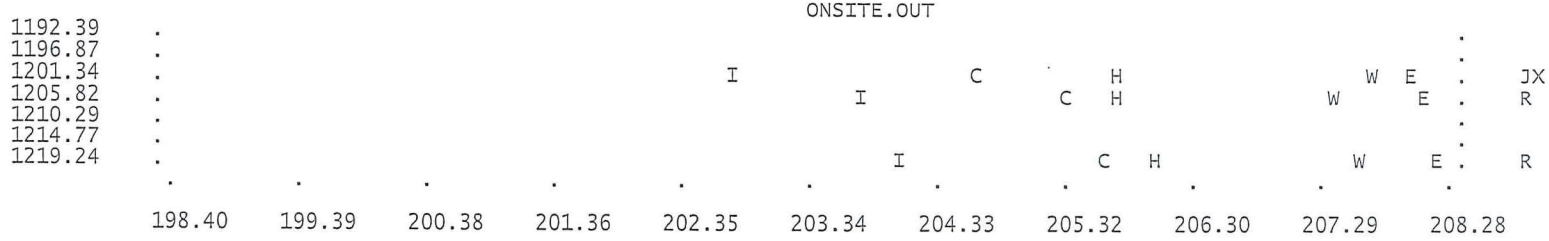
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
1000.00	198.40	7.530	205.930	54.0	5.61	0.489	206.419	0.00	2.300		3.50	0.00	0.00	0	0.00
41.70	0.00839					.002881	0.12			1.925			0.00		
1041.70	198.75	7.325	206.075	54.0	5.61	0.489	206.564	0.00	2.300		3.50	0.00	0.00	0	0.00
TRANS STR	0.00000					.004718	0.02						0.00		
1046.70	198.75	7.015	205.765	54.0	7.64	0.906	206.671	0.00	2.387		3.00	0.00	0.00	0	0.00
111.95	0.02662					.006555	0.73			1.492			0.00		
1158.65	201.73	4.933	206.663	54.0	7.64	0.906	207.569	0.00	2.387		3.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.004577	0.00						0.00		
1158.65	201.73	5.851	207.581	34.0	4.81	0.359	207.940	0.00	1.894		3.00	0.00	0.00	0	0.00
39.83	0.02611					.002599	0.10			1.156			0.00		
1198.48	202.77	4.933	207.703	34.0	4.81	0.359	208.062	0.00	1.894		3.00	0.00	0.00	0	0.00

STARTING HGL FOR GRANADA SD ANALYSIS

							ONSITE.OUT									
JUNCT STR	0.00000					.005208	0.00							0.00		
1198.48	203.77	3.719	207.489	20.0	6.37	0.629	208.118	0.00	1.606		2.00	0.00	0.00	0	0.00	
20.76	0.01590					.007816	0.16			1.232			0.00			
1219.24	204.10	3.552	207.652	20.0	6.37	0.629	208.281	0.00	1.606		2.00	0.00	0.00	0	0.00	

ESPERANZA BY LENNAR HOMES - TECHNICAL DRAINAGE STUDY
SUMMERLIN VILLAGE 23A UNIT 2 - PARCEL M
ONSITE STORM DRAIN EXTENDING FROM EX. 48-INCH LATERAL

```
1000.00   .I          C          H                    W   E                R
1004.47   .                                                               .
1008.95   .                                                               .
1013.42   .                                                               .
1017.90   .                                                               .
1022.37   .                                                               .
1026.85   .                                                               .
1031.32   .                                                               .
1035.79   .                                                               .
1040.27   .                                                               .
1044.74   .   I          C          H                    W   E            .   TX
1049.22   .   I            C    H                      W     E            .   R
1053.69   .                                                               .
1058.17   .                                                               .
1062.64   .                                                               .
1067.11   .                                                               .
1071.59   .                                                               .
1076.06   .                                                               .
1080.54   .                                                               .
1085.01   .                                                               .
1089.49   .                                                               .
1093.96   .                                                               .
1098.43   .                                                               .
1102.91   .                                                               .
1107.38   .                                                               .
1111.86   .                                                               .
1116.33   .                                                               .
1120.81   .                                                               .
1125.28   .                                                               .
1129.75   .                                                               .
1134.23   .                                                               .
1138.70   .                                                               .
1143.18   .                                                               .
1147.65   .                                                               .
1152.13   .                                                               .
1156.60   .                                                               .
1161.07   .                I          C      H          W       E         .   JX
1165.55   .                I        C        H            E   W   E       .   R
1170.02   .                                                               .
1174.50   .                                                               .
1178.97   .                                                               .
1183.45   .                                                               .
1187.92   .                                                               .
```



N O T E S
1. GLOSSARY
   I = INVERT ELEVATION
   C = CRITICAL DEPTH
   W = WATER SURFACE ELEVATION
   H = HEIGHT OF CHANNEL
   E = ENERGY GRADE LINE
   X = CURVES CROSSING OVER
   B = BRIDGE ENTRANCE OR EXIT
   Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY?

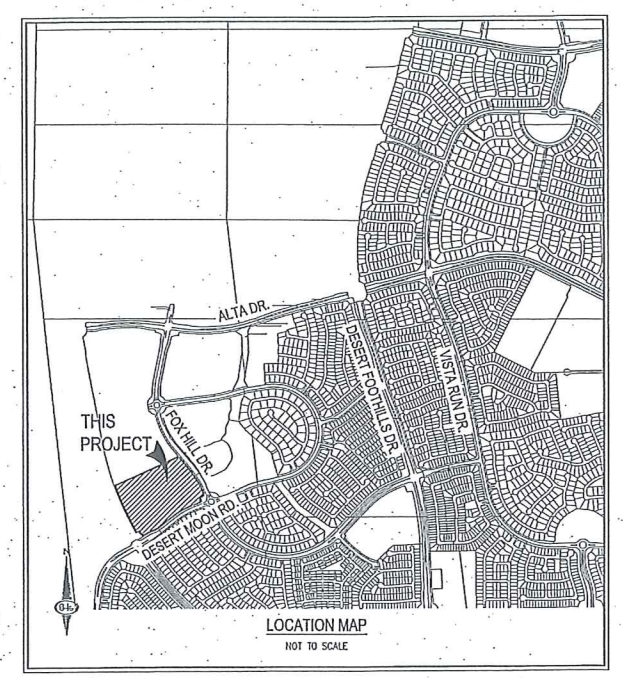
Relevant Grading Sheets

LENNAR

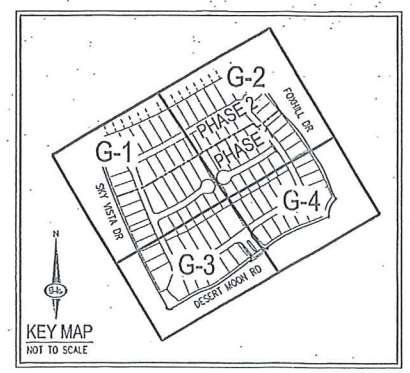
ESPERANZA PHASE 1

A SINGLE FAMILY DETACHED RESIDENTIAL COMMUNITY

A PORTION OF APN 137-34-313-002



CITY OF LAS VEGAS NEVADA



LEGAL DESCRIPTION

LOCATED WITHIN PARCEL M AS SHOWN ON FILE IN BOOK 143, PAGE 47 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA, LYING WITHIN SECTION 34, TOWNSHIP 20 SOUTH, RANGE 59 EAST M.D.M., CLARK COUNTY, NEVADA.

BENCHMARK

FOUND NDOT BRASS CAP, 50 FEET NORTH OF STATION 787+19.42 OF CHARLESTON BLVD, CLV03-345566

NAVD 83 ELEVATION = 978.351 METERS = 3209.81 FEET

BASIS OF BEARING

NORTH 05°59'55" WEST, BEING THE BEARING OF THE WEST LINE OF SECTION 34, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN BOOK 143, PAGE 47 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

SHEET INDEX

SHEET NUMBER	SHEET DESCRIPTION	SHEET TITLE
1	C-1	COVER SHEET
2	C-2	NOTES SHEET
3	G-1	GRADING PLAN I
4	G-2	GRADING PLAN II
5	G-3	GRADING PLAN III
6	G-4	GRADING PLAN IV
7	D-1	GRADING SECTIONS AND DETAILS
8	P-1	PLAN AND PROFILE I
9	P-2	PLAN AND PROFILE II

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/BHPC/STORMWATER.HTM PROJECTS THAT DISTURB MORE THEN ONE ACRE OF LAND MUST SUBMIT TO NDEP A "NOTICE OF INTENT" FOR INCLUSION UNDER STORMWATER PERMIT NO. NVR100000 ALONG WITH THE APPROPRIATE FILING FEE.

APPROVALS

ACTING CITY ENGINEER-DAVID BOWERS PE, PTOE #16736 — DATE

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

CLV FIRE MARSHALL — DATE

DOUG RANSOM, AICP
PLANNING MANAGER — DATE

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING AND DEVELOPMENT DEPARTMENT.

CENTURYLINK — DATE

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

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
PROJECT NO. 117428 DATE:_____
SHEETS:

APPROVAL BY THE FIRE DEPARTMENT HAVING JURISDICTION IS REQUIRED PRIOR TO OBTAINING FINAL APPROVAL FROM LAS VEGAS VALLEY WATER DISTRICT.

NV ENERGY — DATE

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

SOUTHWEST GAS — DATE

COX COMMUNICATIONS LAS VEGAS, INC. — DATE

SUMMERLIN

SUMMERLIN RESIDENTIAL DESIGN REVIEW COMMITTEE — DATE

THIS SIGNATURE IS LIMITED TO APPROVAL OF THESE DOCUMENTS FOR CONFORMANCE TO THE DESIGN INTENT OF THE APPLICABLE DESIGN CRITERIA. NEITHER SUMMERLIN NOR THE SUMMERLIN RESIDENTIAL DESIGN REVIEW COMMITTEE ASSUMES RESPONSIBILITY FOR PLAN CONFORMANCE WITH APPLICABLE LAWS, ORDINANCES, AND CODES.

OWNER

HOWARD HUGHES COMPANY, LLC
ROUSE CO
P.O. BOX 833
COLUMBIA, MD 21044
PH (702) 791-4000

DEVELOPER

LENNAR COMMUNITIES NEVADA, LLC
2490 PASEO VERDE PARKWAY
SUITE 120
HENDERSON, NV 89074
PH (702) 458-7700
FX (702) 889-0501

ENGINEER

SLATER HANIFAN GROUP
5740 S. ARVILLE ST SUITE 216
LAS VEGAS, NV 89118
PH (702) 284-5300
FX (702) 284-5399

PROJECT INFORMATION

APN: 137-34-313-002

NET ACREAGE	15.83 AC
RESIDENTIAL LOTS	64
COMMON ELEMENTS	6
DENSITY	4.09 - DU/AC
TYPICAL LOT SIZE	4,950 SF (45'x110') 6,050 SF (55'x110')
ZONING	P-C

EARTHWORK SUMMARY (ADJUSTED)

CUT	- CY
FILL	- CY
SITE IMPORT	- CY







SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

LAS VEGAS, NEVADA

LENNAR

ESPERANZA PHASE 1

COVER SHEET

S34 T20 R59

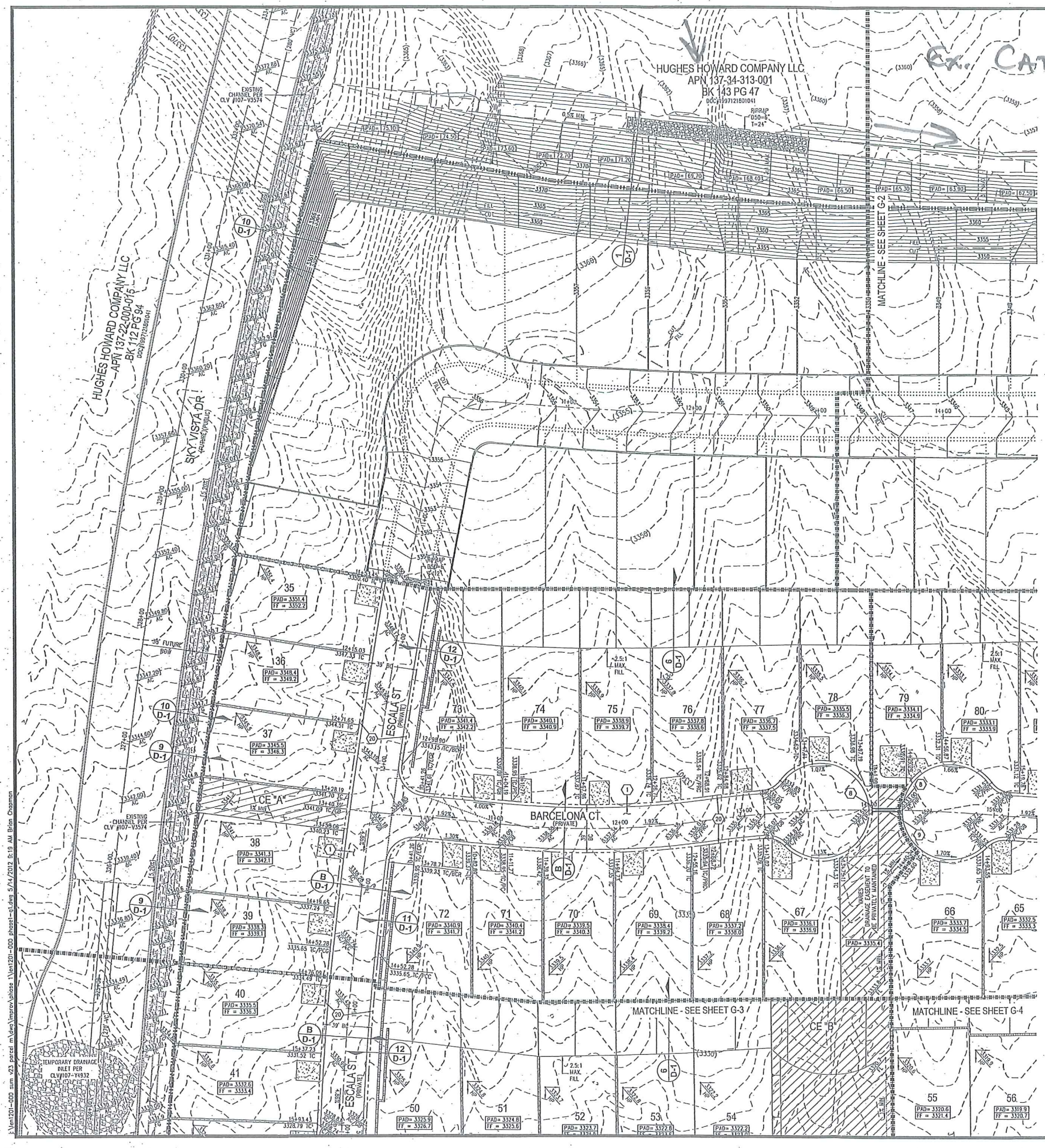
DATE: 05/14/12
DRAFTER: BCC
DESIGNER: BCC
CHECKED: STS

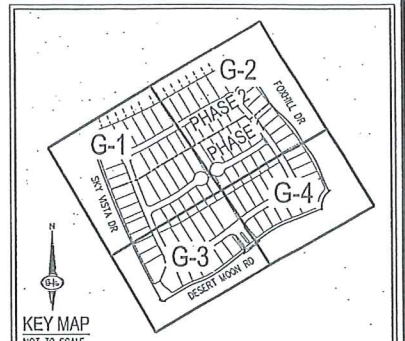
PROJECT NO.
LEN1201.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY SLATER
Exp. 05/31/2013
CIVIL
No. 14167

C-1
SHEET 1 OF 9

A:\len1201-600 acres v23 (xerox) on \\Jerry\Vmware\Xerox A\len1201-000 photos\e-cad\dwg 5/14/2012 8:48 AM Brian Chapman





PHASE I DRAINAGE QUANTITIES		
1. 7.5' MOD TYPE "CH" DROP INLET	EA	2
2. 10.0' MOD TYPE "CH" DROP INLET	EA	2
3. 18" CLASS III RCP STORM DRAIN	LF	212
4. 24" CLASS III RCP STORM DRAIN	LF	21
5. 36" CLASS III RCP STORM DRAIN	LF	74
6. 48" TYPE I SDMH	EA	2
7. 60" TYPE II SDMH	EA	1
8.		
9.		

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811
1-800-227-2600
CLARK COUNTY TRAFFIC OPERATIONS 1-702-455-6000

AVOID HITTING UNDERGROUND TRAFFIC SIGNAL SYSTEMS AND STREET LIGHT SYSTEM CONDUITS. IT'S COSTLY.
Call before you do UnderGround
1-702-455-6000
CLARK COUNTY TRAFFIC OPERATIONS
AND
1-702-432-5300
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

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

STORMWATER RUNOFF MANAGEMENT

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQFT.))

1. THE OWNER, SITE DEVELOPER, CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATE IN, THE PUBLIC RIGHTS OF WAYS OF 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 TITLE 24.60 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION II.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 ACTUAL RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION II.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.

GENERAL NOTES

1. SEE SHEETS 9-13 FOR WALL PLAN.
2. SEE PLAN AND PROFILE SHEETS FOR CENTERLINE AND BACK OF CURB CURVE DATA.
3. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2006, SECTION 2304.11.2.2.
4. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
5. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
6. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
7. SEE DETAIL SHEETS FOR STREET SECTIONS AND DETAILS.
8. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
9. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL.
10. EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLACING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
11. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY LINES.
12. ALL ELEVATIONS SHOWN, WITH EXCEPTION TO PAD AND FINISHED FLOOR ELEVATIONS, ARE THE VALUE SHOWN PLUS 3300'.

GRADING NOTES

1. CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II OVER 6" TYPE I AGGREGATE BASE
2. CONSTRUCT 3" AC PAVEMENT WITH 4" TYPE II OVER 6" TYPE I AGGREGATE BASE
3. SAWCUT AND MATCH EXISTING IMPROVEMENTS
4. INSTALL "L" TYPE CURB AND GUTTER PER CCAUSD #216
5. INSTALL "A" TYPE ISLAND CURB PER CCAUSD #219
6. CONSTRUCT 8" CROSS GUTTER PER SUMMERLIN IMPROVEMENT STANDARDS S-64
7. CONSTRUCT 5' WIDE SIDEWALK PER SUMMERLIN IMPROVEMENT STANDARDS S-72
8. INSTALL ROLL CURB DEPRESSION PER DETAIL ON SHEET D-1
9. INSTALL CONCRETE FLUME PER DETAIL ON SHEET D-1
10. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 2359
11. FIELD VERIFY AND TIE INTO EXISTING CURB AND GUTTER
12. INSTALL ROLL CURB TO "L" CURB TRANSITION PER DETAIL ON SHEET D-1
13. INSTALL RCP SD (CLASS III) (SIZE PER PLAN)
14. INSTALL 48" TYPE I STORM DRAIN MANHOLE
15. INSTALL 60" TYPE II STORM DRAIN MANHOLE
16. INSTALL 7.5' TYPE CM2 DROP INLET (2) GRATES PER CCAUSD NO. 412A "TYPE C-D MODIFIED DROP INLET"
17. INSTALL 10' TYPE CM2 DROP INLET (4) GRATES PER CCAUSD NO. 412A "TYPE C-D MODIFIED DROP INLET"
18. REMOVE EXISTING STORM DRAIN TO WEST OF EX. INLET AND REPAIR INLET AS NEEDED
19. REMOVE EX. STORM DRAIN AND CONNECT TO EXISTING STORM DRAIN MANHOLE
20. INSTALL 30" ROLL CURB PER CCAUSD NO. 217.51 OVER 6" TYPE II AGGREGATE BASE
21. INSTALL RCP END SECTION PER NDOT R-2.3.1

SEE SHEET C-2 FOR ABBREVIATIONS

PERIMETER SIDEWALKS

PERIMETER SIDEWALK DISPLAYED FOR CONCEPTUAL PURPOSES ONLY. MASTER DEVELOPER TO PROVIDE DESIGN AND CONNECTIONS FOR ONSITE PEDESTRIAN ACCESS

BENCHMARK

FOUND NDOT BRASS CAP, 50 FEET NORTH OF STATION 787+19.42 OF CHARLESTON BLVD, CLV09-34SSE6

NAVD 88 ELEVATION = 978.351 METERS = 3209.81 FEET

BASIS OF BEARING

NORTH 05°59'55" WEST, BEING THE BEARING OF THE WEST LINE OF SECTION 34, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN BOOK 143, PAGE 47 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

LEGAL DESCRIPTION

PARCEL M AS SHOWN ON FILE IN BOOK 143, PAGE 47 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA, LYING WITHIN SECTION 34, TOWNSHIP 20 SOUTH, RANGE 59 EAST M.D.M., CLARK COUNTY, NEVADA.

FEMA FLOOD ZONE DESIGNATION

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (AREA OUTSIDE THE 500-YEAR FLOOD PLAIN) PER FIRM PANEL 32003C2150E, DATED SEPTEMBER 27, 2002.

SUMMERLIN

SUMMERLIN RESIDENTIAL DESIGN REVIEW COMMITTEE _____ DATE _____

THIS SIGNATURE IS LIMITED TO APPROVAL OF THESE DOCUMENTS FOR CONFORMANCE TO THE DESIGN INTENT OF THE APPLICABLE DESIGN CRITERIA. NEITHER SUMMERLIN NOR THE SUMMERLIN RESIDENTIAL DESIGN REVIEW COMMITTEE ASSUMES RESPONSIBILITY FOR PLAN CONFORMANCE WITH APPLICABLE LAWS, ORDINANCES, AND CODES.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY _____ ON FILE AT CITY OF LAS VEGAS FOR THE SUBJECT PROJECT.

JERRY J. SLATER, P.E. 14167 _____ DATE

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 254-5300 FAX (702) 254-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

LENNAR®
LAS VEGAS, NEVADA

ESPERANZA PHASE 1
GRADING PLAN I

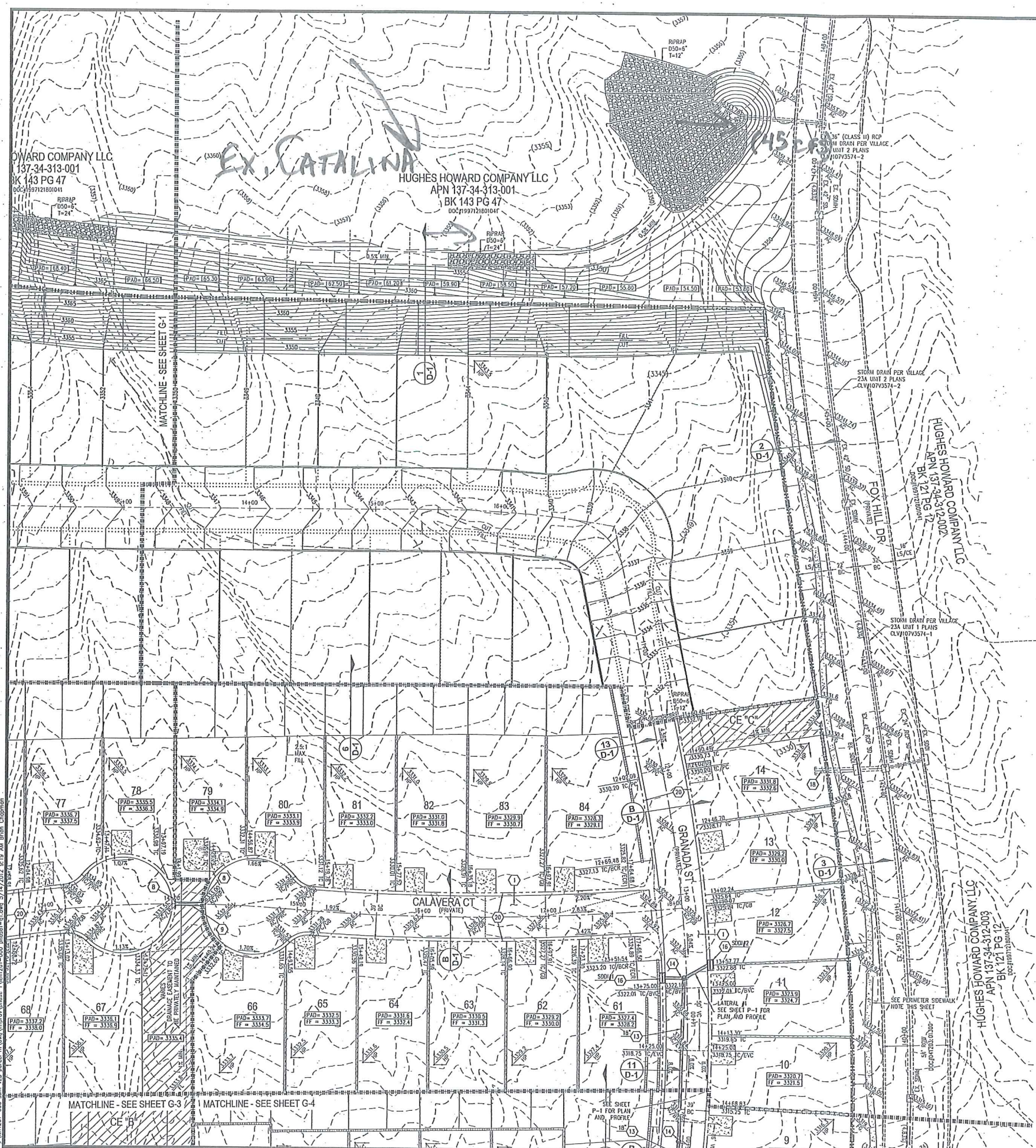
S24 R59

DATE: 05/14/12
DRAFTER: BCC
DESIGNER: BCC
CHECKED: STS
PROJECT NO.
LEN1201.000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 6/30/2013
CIVIL
No. 14167

G-1
SHEET 3 OF 9

J:\Len1201-000 sum v23 parcel m\dwg\mrrow\plotss 1\len1201-000 plotsht-g1.dwg 5/14/2012 8:19 AM Brian Chapman


HUGHES HOWARD COMPANY LLC
APN 137-34-313-001
BK 143 PG 47
DOC#19971218010411
HUGHES HOWARD COMPANY LLC
APN 137-34-313-001
BK 143 PG 47
DOC#19971218010411
Ex. Catalina
145 c.f.s.
RIPRAP D50=6" T=12"
RIPRAP D50=6" T=24"
RIPRAP D50=6" T=24"
36" (CLASS III) RCP STORM DRAIN PER VILLAGE 23A UNIT 2 PLANS CLV10Y3574-2
STORM DRAIN PER VILLAGE 23A UNIT 1 PLANS CLV10Y3574-1
MATCHLINE - SEE SHEET G-1
HUGHES HOWARD COMPANY LLC
APN 137-34-312-002
BK 121 PG 12
DOC#19971218010411
FOX HILL DR. (PRIVATE)
GRANADA ST. (PRIVATE)
CALAVERA CT. (PRIVATE)
SEE PERIMETER SIDEWALK NOTE THIS SHEET
LATERAL H SEE SHEET P-1 FOR PLAN AND PROFILE
SEE SHEET P-1 FOR PLAN AND PROFILE
HUGHES HOWARD COMPANY, LLC
APN 137-34-312-003
BK 121 PG 12
DOC#19971218010411
MATCHLINE - SEE SHEET G-3
MATCHLINE - SEE SHEET G-4
CE "A"
CE "B"
CE "C"
UNDER DRAINAGE EASEMENT TO BE PRIVATELY MAINTAINED
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APPENDIX N

Grading Plan, Storm Drain Profile and Detail Sheets

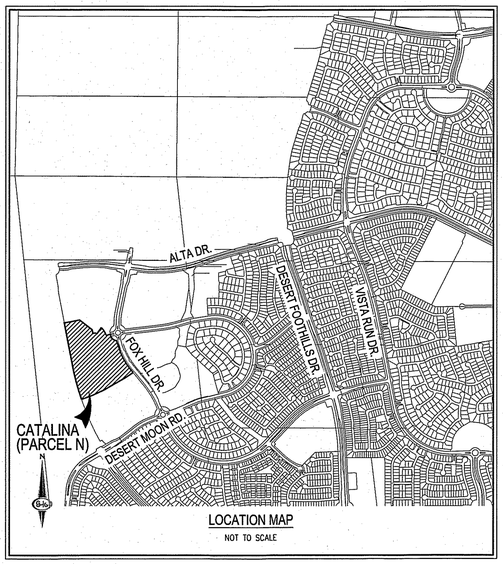
PHASE 1

LENNAR®

CATALINA PHASE 1

A SINGLE FAMILY DETACHED RESIDENTIAL COMMUNITY

A PORTION OF APN 137-34-313-001



LOCATION MAP

NOT TO SCALE

CITY OF LAS VEGAS NEVADA

LEGAL DESCRIPTION

LOCATED WITHIN PARCEL M AS SHOWN ON FILE IN BOOK 143, PAGE 47 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA, LYING WITHIN SECTION 34, TOWNSHIP 20 SOUTH, RANGE 59 EAST M.D.M., CLARK COUNTY, NEVADA.

BENCHMARK

FOUND NDOT BRASS CAP, 50 FEET NORTH OF STATION 787+19.42 OF CHARLESTON BLVD, OLV09-34SSE6

NAVD 88 ELEVATION = 978.351 METERS = 3209.81 FEET

BASIS OF BEARING

NORTH 05°59'55" WEST, BEING THE BEARING OF THE WEST LINE OF SECTION 34, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN BOOK 143, PAGE 47 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

APPROVALS

ACTING CITY ENGINEER-DAVID BOWERS PE, PTOE #16736 DATE

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

CLV FIRE MARSHALL DATE

DOUG RANKIN, AICP DATE
PLANNING MANAGER

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING AND DEVELOPMENT DEPARTMENT.

CENTURYLINK DATE

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

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
PROJECT NO. 117426 DATE:
SHEETS:

APPROVAL BY THE FIRE DEPARTMENT HAVING JURISDICTION IS REQUIRED PRIOR TO OBTAINING FINAL APPROVAL FROM LAS VEGAS VALLEY WATER DISTRICT.

NV ENERGY DATE

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

SOUTHWEST GAS DATE

COX COMMUNICATIONS LAS VEGAS, INC. DATE

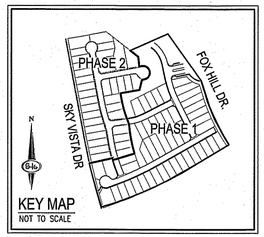
SUMMERLIN

SUMMERLIN RESIDENTIAL DESIGN REVIEW COMMITTEE DATE

THIS SIGNATURE IS LIMITED TO APPROVAL OF THESE DOCUMENTS FOR CONFORMANCE TO THE DESIGN INTENT OF THE APPLICABLE DESIGN CRITERIA. NEITHER SUMMERLIN NOR THE SUMMERLIN RESIDENTIAL DESIGN REVIEW COMMITTEE ASSUMES RESPONSIBILITY FOR PLAN CONFORMANCE WITH APPLICABLE LAWS, ORDINANCES, AND CODES.

SHEET INDEX

SHEET NUMBER	SHEET DESCRIPTION	SHEET TITLE
1	C-1	COVER SHEET
2	C-2	GENERAL NOTES AND QUANTITIES
3	G-1	GRADING PLAN I
4	G-2	GRADING PLAN II
5	D-1	GRADING SECTIONS AND DETAILS
6	P-1	PLAN AND PROFILE I



KEY MAP

NOT TO SCALE

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 THEN ONE ACRE OF LAND MUST SUBMIT TO NDEP A "NOTICE OF INTENT" FOR INCLUSION UNDER STORMWATER PERMIT NO. NVR100000 ALONG WITH THE APPROPRIATE FILLING FEE.

OWNER

GREYSTONE NEVADA, LLC
2490 PASEO VERDE PARKWAY
SUITE 120
HENDERSON, NV 89074
PH (702) 458-7700
FX (702) 889-0801

DEVELOPER

LENNAR COMMUNITIES NEVADA, LLC
2490 PASEO VERDE PARKWAY
SUITE 120
HENDERSON, NV 89074
PH (702) 458-7700
FX (702) 889-0801

ENGINEER

SLATER HANIFAN GROUP
5740 S. ARVILLE ST SUITE 216
LAS VEGAS, NV 89118
PH (702) 284-5300
FX (702) 284-5399

PROJECT INFORMATION

APN: 137-34-313-001	
NET ACREAGE	10.31 AC
RESIDENTIAL LOTS	48
COMMON ELEMENTS	5
DENSITY	4.65 - DU/AC
TYPICAL LOT SIZE	5,170 SF (47'x110') 7,050 SF (47'x150')
ZONING	P-C
EARTHWORK SUMMARY (ADJUSTED)	
CUT	- CY
FILL	- CY
SITE IMPORT	- CY







SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

LENNAR®
LAS VEGAS, NEVADA

CATALINA PHASE 1
COVER SHEET

S34
T20
R59

DATE: 05/31/12
DRAFTER: BCC
DESIGNER: BCC
CHECKED: STS

PROJECT NO.
LEN1202-000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY L. SLATER
Exp. 06/30/2012
CIVIL
No. 14167
5-31-12

C-1
SHEET 1 OF 6

J:\len1202-000 sum v23 parcel n\dwg\mprov\phase 1\len1202-002 ph1-cvr.dwg 5/31/2012 11:23 AM Brian Chapman

2.1 CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".

2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCE'S WHICH MAY AFFECT HIS OPERATION DURING CONSTRUCTION AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO SAME. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEAR OVERHEAD UTILITIES SO AS TO SAFELY PROTECT ALL PERSONNEL AND EQUIPMENT, AND SHALL BE RESPONSIBLE FOR ALL COST AND LIABILITY IN CONNECTION THEREWITH.

3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING UTILITY LINES, STRUCTURES AND STREET IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE, FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED SATISFACTORY TO THE CITY ENGINEER AND OWNING UTILITY COMPANY AT THE EXPENSE OF THE CONTRACTOR.

4. ALL CONSTRUCTION SHALL BE AS SHOWN ON THESE PLANS, ANY REVISIONS SHALL HAVE THE PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER.

5. TYPE V CEMENT SHALL BE USED IN ALL OFF-SITE CONCRETE WORK. CONCRETE TO BE 3000 P.S.I. MINIMUM @ 28 DAYS. MIX DESIGNS TO BE APPROVED BY THE CITY, PRIOR TO THE USE ON THE PROJECT.

6. PERMITS ARE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR THIS CONSTRUCTION.

7. EXPANSION JOINTS REQUIRED, MAXIMUM EVERY 300'IN EXTRUDED-TYPE CURB.

8. AC PAVEMENT TO BE ONE-HALF INCH (½") ABOVE LIP OF ALL GUTTERS AFTER COMPACTION, EXCEPT AT SIDEWALK RAMPS AND CROSS GUTTERS.

9. CURB AND GUTTER FOUND TO BE UNACCEPTABLE TO THE CITY OF LAS VEGAS SHALL BE REMOVED AND REPLACED PER STANDARD DRAWING 216.

10. SIDEWALK RAMPS SHALL BE CONSTRUCTED IN EACH QUADRANT OF AN INTERSECTION PER STANDARD DRAWING 235. EXACT LOCATION OF RAMPS MAY BE ADJUSTED IN THE FIELD BY A CITY INSPECTOR.

11. CONTRACTOR SHALL PROVIDE ALL NECESSARY HORIZONTAL AND VERTICAL TRANSITIONS BETWEEN NEW CONSTRUCTION AND EXISTING SURFACES TO PROVIDE FOR PROPER DRAINAGE AND FOR INGRESS AND EGRESS TO NEW CONSTRUCTION. THE EXTENT OF THE TRANSITIONS TO BE AS SHOWN ON PLANS.

12. ALL GRADING WORK SHALL CONFORM TO THE SOILS REPORT AS PREPARED BY GEOTEK, REPORT #9942-LVS, JUNE 4, 2010 APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.

13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.

14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS, ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.

15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER. ALL ABOVE GROUND UTILITY APPERTANANCES SHALL CONFORM TO THE REQUIREMENTS OF 19.12.040.

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 OFFSITE INSPECTION AND TESTING SECTION PRIOR TO PROJECT ACCEPTANCE. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, AND THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXITS THE PUBLIC RIGHT-OF-WAY. THE LOCATION SHALL BE DESCRIBED BY STATE PLANE COORDINATES WHICH SHALL BE BASED ON THE "NEVADA COORDINATE SYSTEM OF 1983, EAST ZONE" AS DEFINED BY THE NEVADA REVISED STATUTES CHAPTER 327, AND TIED TO THE CITY OF LAS VEGAS VERTICAL CONTROL BENCHMARK NETWORK. COORDINATES MUST BE CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINTIES OF +/- 0.1 METER (+/- 0.3 FEET). 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. SANITARY SEWER SERVICE LATERALS REQUIRE THE INSTALLATION OF A MARKER BALL AT THE CONNECTION OF THE SEWER SERVICE LATERAL TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERAL EXITS THE PUBLIC RIGHT-OF-WAY. STORM DRAIN LATERALS REQUIRE THE INSTALLATION OF A MARKER BALL AT THE CONNECTION OF THE STORM DRAIN LATERAL TO THE STORM DRAIN MAIN AND WHERE THE STORM DRAIN LATERAL EXITS THE PUBLIC RIGHT-OF-WAY OR WHERE THE STORM DRAIN LATERAL CONNECTS TO A DROP INLET. THE MARKER BALL SHALL BE 3M 4" MARKER BALL 1404-XR OR APPROVED EQUAL.

23. 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 ADDITION.

24. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

2.2 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.

2.3 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 "SAFE ROUTE TO SCHOOL" IS ENCROACHED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO BE ASSISTED IN THE SAFE CROSSING THROUGH THAT WORK ZONE, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A QUALIFIED "CROSSING GUARD". THE GUARD SHALL BE PRESENT FOR THE FULL DURATION OF TIME THAT CHILDREN ARE LIKELY TO BE PRESENT.

5. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL PERMANENT SIGNS SHOWN ON THE PLANS. ALL NEW TRAFFIC SIGNS SHALL BE FABRICATED WITH DIAMOND GRADE VIP CLASS 6 REFLECTIVE SHEETING OR APPROVED EQUAL. ALL NEW TRAFFIC SIGNS, EXCEPT STREET NAME AND SCHOOL SPEED LIMIT SIGNS, SHALL HAVE 3M SERIES 1160 OR APPROVED EQUIVALENT ANTI-GRAFFITI PROTECTIVE OVERLAY FILM. SCHOOL ZONE SIGNS SHALL HAVE 3M SERIES 1150 ANTI-GRAFFITI PROTECTIVE OVERLAY FILM. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT CITY STANDARDS.

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 STOPS SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF STREET NAME SIGNS.

10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND FLAGGERS TO INSURE THE SAFETY OF THE PUBLIC IN OR AROUND THE WORK AREA. THE CONTRACTOR SHALL HAVE A CERTIFIED ATSSA TRAFFIC CONTROL TECHNICIAN OR IMSA WORK ZONE SAFETY SPECIALIST SET UP, MAINTAIN AND/OR REMOVE ALL TRAFFIC CONTROL DEVICES IN THE CITY OF LAS VEGAS RIGHT OF WAY.

11. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE EXPEDITED TO COMPLETION SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.

12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING CITIZENS AREA TRANSIT (C.A.T.) IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP OR HAS AN ADVERSE EFFECT ON BUS SERVICE ON THAT STREET TO ARRANGE FOR TEMPORARY RELOCATION OF STOP.

13. GUARDS SHALL BE OBTAINED BY CONTACTING THE METROPOLITAN POLICE DEPARTMENT SPECIAL EVENTS UNIT (PHONE # 828-3442) WHO WILL PROVIDE OFFICERS PROPERLY TRAINED IN TRAFFIC CONTROL. FEES FOR THE USE OF THESE OFFICERS SHALL BE SET BY METRO AND WILL BE PAID BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR ALL ARRANGEMENTS WITH METRO.

14. ANY WORK WITHIN 300' OF A SIGNALIZED INTERSECTION WILL BE NIGHT WORK, UNLESS OTHERWISE 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.

2.4 CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND ANY ADOPTED SPECIAL AREA STANDARDS.

2. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF TRAFFIC ENGINEERING AND THE CITY ENGINEER.

3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION.

4. ALL STREET LIGHTING CONDUITS STUB SHALL HAVE AT LEAST ONE GREEN #8 THW WIRE INSTALLED, AS TRACER WIRE. WHEN "EMPTY" CONDUIT IS COMPLETELY INSTALLED FROM PB TO PB, IT SHALL HAVE MINIMUM OF 2 #4 AND 1 #8 THW WIRE WITH THE ENDS TAPED OR "SAFE OFF" PRIOR TO FINAL INSPECTION.

5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN ACCORDANCE WITH THE USD NO. 320A.

6. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TEFO PRIOR TO ANY PRE-FINAL INSPECTION. THE ASBUILT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.

7. SERVICE POINT SHALL BE COORDINATED WITH NV ENERGY COMPANY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE CIVIL PLANS.

8. IT SHALL BE ASSUMED THAT IN THE ABSENCE OF AN EXISTING, WORKABLE CIRCUIT TO ATTACH TO, ALL INSTALLATIONS SHALL REQUIRE A NEW SERVICE FOR OPERATION OF THE CIRCUIT.

9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREET LIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED, AT NO EXPENSE TO THE CITY OF LAS VEGAS, BEFORE STREETLIGHT BASES ARE INSTALLED.

10. THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.

11. THE DEVELOPER/OWNER WILL BE REQUIRED TO SUPPLY POWER TO ALL NEW PUBLIC STREET LIGHTS INSTALLED UNDER THIS DESIGN PRIOR TO BOND RELEASE OR PROJECT COMPLETION. THE DEVELOPER/OWNER WILL BE RESPONSIBLE FOR ALL ITEMS ASSOCIATED WITH THE INSTALLATION, CONSTRUCTION, ENERGIZING, MAINTENANCE AND OPERATIONAL COST OF SAID STREET LIGHTS PRIOR TO PROJECT COMPLETION. REFER TO THE PLAN FOR ANY NEW SERVICE REQUIREMENTS. THE TRANSFER OF OWNERSHIP FROM THE DEVELOPER/OWNER TO THE CITY OF LAS VEGAS FOR ALL NEW PUBLIC STREET LIGHT/S AND/OR SERVICE/S INSTALLED UNDER THIS PLAN DESIGN WILL BE IN CONJUNCTION WITH THIS PROJECT COMPLETION. COORDINATE ALL MAINTENANCE AND OPERATIONAL TRANSFERS WITH THE CITY OF LAS VEGAS TRAFFIC ENGINEERING DEPARTMENT (TEFO) AT (702) 229-6331.

2.5 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 REPORT	0.1'+	+0.0' TO -0.1'	SEE SOILS
B. ENGINEERED FILL REPORT COMPACTION	0.5'+	+0.1' TO -0.1' TESTING WILL BE PERFORMED BY THE OWNER OR HIS REPRESENTATIVE.	SEE SOILS

7. ALL CUT AND FILL SLOPES SHALL BE PROTECTED UNTIL EFFECTIVE EROSION CONTROL HAS BEEN ESTABLISHED.

8. THE USE OF POTABLE WATER WITHOUT A SPECIAL PERMIT FOR BUILDING OR CONSTRUCTION PURPOSES INCLUDING CONSOLIDATION OF BACKFILL OR DUST CONTROL IS PROHIBITED. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CONSTRUCTION WATER.

9. THE CONTRACTOR SHALL MAINTAIN THE STREETS, SIDEWALKS AND ALL OTHER PUBLIC RIGHT-OF-WAY IN A CLEAN, SAFE AND USABLE CONDITION. ALL SPILLS OF SOIL, ROCK OR CONSTRUCTION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE PUBLICLY OWNED PROPERTY DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. ALL ADJACENT PROPERTY, PRIVATE OR PUBLIC SHALL BE MAINTAINED IN A CLEAN, SAFE AND USABLE CONDITION.

10. IN THE EVENT THAT ANY TEMPORARY CONSTRUCTION ITEM IS REQUIRED THAT IS NOT SHOWN ON THESE DRAWINGS, THE OWNER AGREES TO PROVIDE AND INSTALL SUCH ITEM AT HIS OWN EXPENSE AND AT THE DIRECTION OF THE CITY ENGINEER. TEMPORARY CONSTRUCTION INCLUDES DITCHES, BERMS, ROAD SIGNS AND BARRICADES, ETC.

CITY OF LAS VEGAS FIRE AND RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE CITY OF LAS VEGAS FIRE DEPARTMENT'S ORDINANCE # 5667, "HYDRANT SPECIFICATIONS", AND "HYDRANT INSTALLATION SPECIFICATION".

2. AUTHORIZED FIRE HYDRANTS FOR THIS PROJECT ARE:
   A. KENNEDY - GUARDIAN MODELS K81A AND K81D
   B. MUELLER - SUPER CENTURION 250 MODEL A-423
   C. CLOW - MEDALLION MODEL F-2546LVD
   D. TROY VALVE - PATRIOT MODEL P1810DN NEVADA HYDRANT
   E. U.S. PIPE - METROFLOW/M-03

3. 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.

4. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF STREET ADJACENT TO THE FIRE HYDRANTS AS REQUIRED BY ORDINANCE # 5667.

5. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CALL THE CITY OF LAS VEGAS INSPECTION HOT-LINE AT 229-2071 TO REQUEST AN INSPECTION BY THE CITY OF LAS VEGAS FIRE DEPARTMENT.

6. PAINTING OF THE CURBS AND FIRE HYDRANTS AND ALL OTHER WORK NECESSARY AS REQUIRED BY ORDINANCE # 5667, FOR THE PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, SHALL BE COMPLETED BEFORE APPROVAL BY THE CITY OF LAS VEGAS FIRE DEPARTMENT.

7. A PERMIT IS REQUIRED FROM THE CITY OF LAS VEGAS FIRE DEPARTMENT FOR THE ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK.

8. PRIVATE FIRE HYDRANTS SHALL BE PAINTED RED.

9. PRIOR TO THE FINAL OCCUPANCY, A FLOW TEST MUST BE WITNESSED BY THE CITY OF LAS VEGAS FIRE DEPARTMENT TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW.

10. 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.

11. FIRE HYDRANTS SPACING SHALL BE:
    RESIDENTIAL - 500 FEET UNSPRINKLERED; 600 FEET SPRINKLERED.
    COMMERCIAL - 300 FEET UNSPRINKLERED; 400 FEET SPRINKLERED.

12. WHERE NEW WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT REQUIRED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT MAXIMUM 1,000 FOOT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FEET ON AN ALTERNATING BASIS.

13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE REQUIRED RADIUS OF A CUL-DE-SAC OR WITHIN 20 FEET OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.

14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FEET OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION.

15. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FEET, AS MEASURED BY AN APPROVED ROUTE.

16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FEET, AS MEASURED BY AN APPROVED ROUTE.

17. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FEET.

18. TWO SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE ARE 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN.

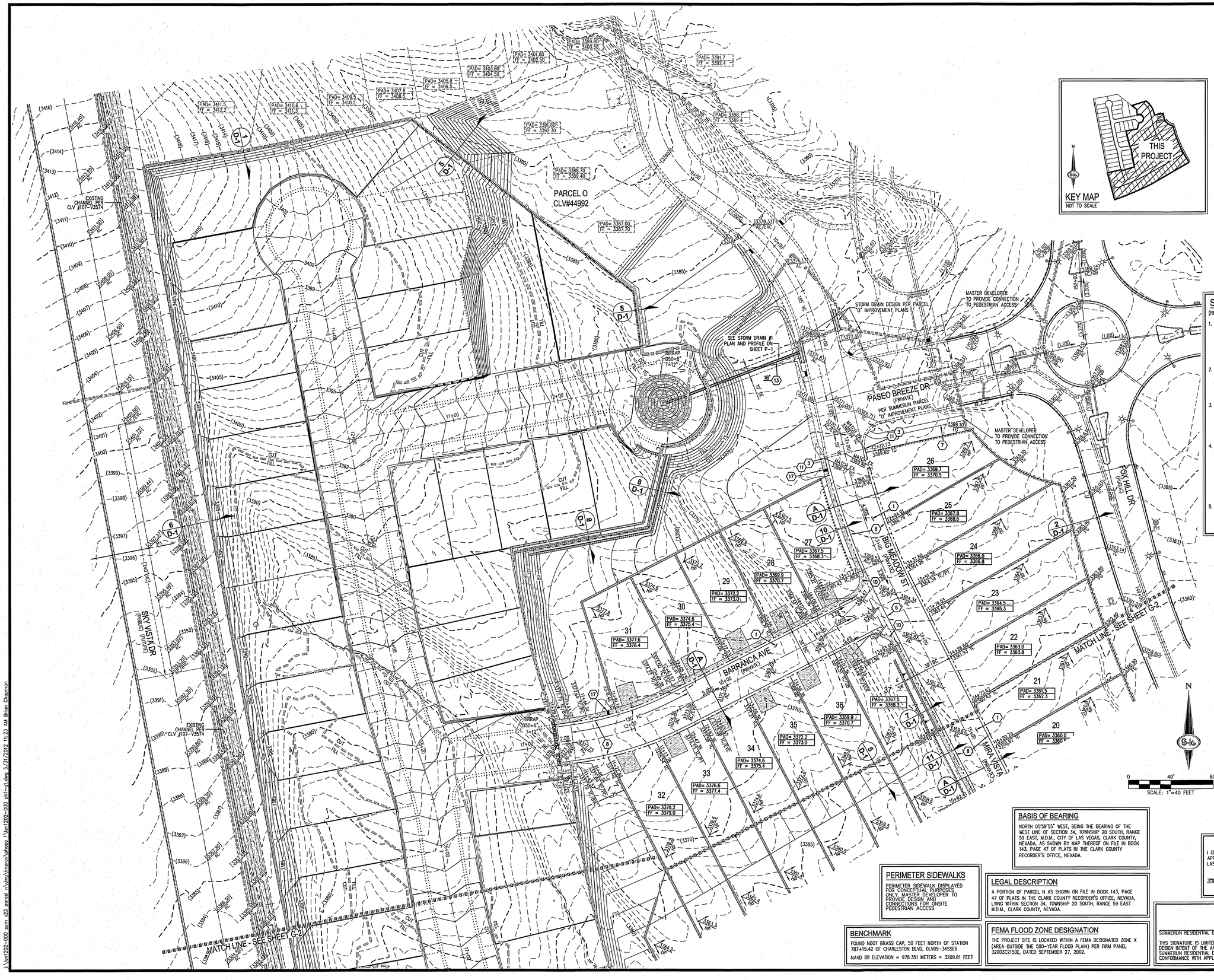
19. ALL FIRE APPARATUS ACCESS ROADS SHALL BE PAVED TO PROVIDE ALL-WEATHER DRIVING CAPABILITIES, AND SHALL BE DESIGNED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF THE FIRE APPARATUS.

20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12%. ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FEET PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%

21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FEET OUTSIDE AND 28 FEET INSIDE TURNING RADIUS.

22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL BE NOT LESS THAN 13 FEET 6 INCHES.

23. FIRE DEPARTMENT ACCESS ROADS IN ALL RESIDENTIAL DEVELOPMENTS (EXCEPT FOR THE APARTMENT BUILDINGS) SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 36 FEET FLOW LINE TO THE FLOW LINE (THIS WIDTH MAY BE REDUCED TO 24 FEET, IF ALL BUILDINGS FRONTING THE STREET ARE SPRIN



GENERAL NOTES

1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2006, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEETS FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL.
8. EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLACING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.
10. ALL ELEVATIONS SHOWN, WITH EXCEPTION TO PAD AND FINISHED FLOOR ELEVATIONS, ARE THE VALUE SHOWN PLUS 3300'.

STORMWATER RUNOFF MANAGEMENT

(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

1. THE OWNER, SITE DEVELOPER, CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATE IN, THE PUBLIC RIGHTS OF WAYS OF 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 TITLE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.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 ACCUMULATED RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

GRADING NOTES

1. CONSTRUCT 2" AC PAVEMENT WITH 4" TYPE II OVER 6" TYPE I AGGREGATE BASE
2. CONSTRUCT 3" AC PAVEMENT WITH 4" TYPE II OVER 6" TYPE I AGGREGATE BASE
3. SAWCUT AND MATCH EXISTING IMPROVEMENTS
4. INSTALL "L" TYPE CURB AND GUTTER PER CCAUSD #216
5. INSTALL "A" TYPE ISLAND CURB PER CCAUSD #219
6. INSTALL 8-FT CROSS GUTTER PER DETAIL ON SHEET D-1
7. CONSTRUCT 5' WIDE SIDEWALK PER SUMMERLIN IMPROVEMENT STANDARDS S-7.2
8. INSTALL 30" ROLL CURB PER CCAUSD NO. 217.S1 OVER 6" TYPE II AGGREGATE BASE
9. INSTALL 60" TYPE II STORM DRAIN MANHOLE
10. CONSTRUCT SIDEWALK RAMPS USING ARMOR TILE TRUNCATED DOMES OR EQUIVALENT PER CCAUSD NO. 235I
11. FIELD VERIFY AND TIE INTO EXISTING CURB AND GUTTER
12. INSTALL ROLL CURB TO "L" CURB TRANSITION PER DETAIL ON SHEET D-1
13. INSTALL RCP SD (CLASS III) (SIZE PER PLAN)
14. INSTALL CONCRETE COLLAR PER DETAIL ON SHEET D-1
15. INSTALL 22.5° TYPE CM2 DROP INLET (9) GRATES AS PER CCAUSD NO. 412.1
16. REMOVE RIPRAP INSTALLED PER ESPERANZA IMPROVEMENT PLANS CLV#_____
17. INSTALL SIDEWALK DRAIN PER CCAUSD #236

SEE SHEET C-2 FOR ABBREVIATIONS

BASIS OF BEARING

NORTH 05°59'55" WEST, BEING THE BEARING OF THE WEST LINE OF SECTION 34, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN BOOK 143, PAGE 47 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

FLOOD CERTIFICATION

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH THE APPROVED TECHNICAL DRAINAGE STUDY _____ ON FILE AT CITY OF LAS VEGAS FOR THE SUBJECT PROJECT.

JERRY J. SLATER, P.E. 14167 DATE

PERIMETER SIDEWALKS

PERIMETER SIDEWALK DISPLAYED FOR CONCEPTUAL PURPOSES ONLY. MASTER DEVELOPER TO PROVIDE DESIGN AND CONNECTIONS FOR ONSITE PEDESTRIAN ACCESS

LEGAL DESCRIPTION

A PORTION OF PARCEL N AS SHOWN ON FILE IN BOOK 143, PAGE 47 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA, LYING WITHIN SECTION 34, TOWNSHIP 20 SOUTH, RANGE 59 EAST M.D.M., CLARK COUNTY, NEVADA.

BENCHMARK

FOUND NDOT BRASS CAP, 50 FEET NORTH OF STATION 787+19.42 OF CHARLESTON BLVD, 0LV09-34SSE6

NAVD 88 ELEVATION = 978.351 METERS = 3209.81 FEET

FEMA FLOOD ZONE DESIGNATION

THE PROJECT SITE IS LOCATED WITHIN A FEMA DESIGNATED ZONE X (AREA OUTSIDE THE 500-YEAR FLOOD PLAIN) PER FIRM PANEL 32003C2150E, DATED SEPTEMBER 27, 2002.

SUMMERLIN

SUMMERLIN RESIDENTIAL DESIGN REVIEW COMMITTEE DATE

THIS SIGNATURE IS LIMITED TO APPROVAL OF THESE DOCUMENTS FOR CONFORMANCE TO THE DESIGN INTENT OF THE APPLICABLE DESIGN CRITERIA. NEITHER SUMMERLIN NOR THE SUMMERLIN RESIDENTIAL DESIGN REVIEW COMMITTEE ASSUMES RESPONSIBILITY FOR PLAN CONFORMANCE WITH APPLICABLE LAWS, ORDINANCES, AND CODES.

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

LENNAR®
LAS VEGAS, NEVADA

CATALINA PHASE 1
GRADING PLAN I

S34 T20 R59

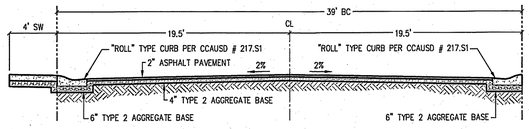
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DRAFTER: BCC
DESIGNER: BCC
CHECKED: STS
PROJECT NO. LEN1202-000

PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 05/30/2012
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No. 14167

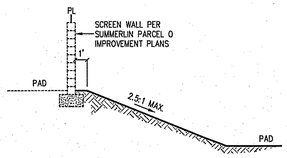
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SHEET 3 OF 6

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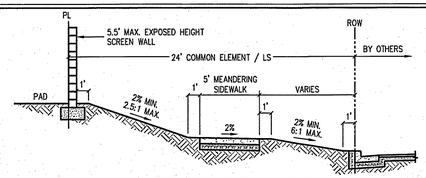

MATCH LINE - SEE SHEET G-1
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CAPISTRANO AVE (PRIVATE)
MIRA VISTA ST (PRIVATE)
FOX HILL DR (PUBLIC)
ESPERANZA
ESTRELLA ST (PRIVATE)
SKY VISTA DR (PUBLIC) (FUTURE)
EXISTING CHANNEL PER CLV #107-V3574
EX. GRADING PER ESPERANZA IMPROVEMENT PLANS CLV#_____
EX. GRADING PER ESPERANZA IMPROVEMENT PLANS CLV#_____
SEE STORM DRAIN #1 PLAN AND PROFILE ON SHEET P-1
10' PRIVATE DRAINAGE EASEMENT
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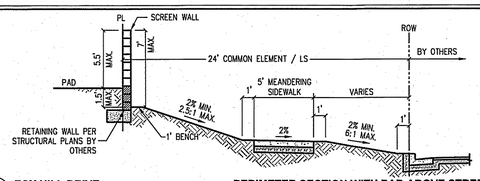
A **INTERIOR STREET SECTION**
NOT TO SCALE



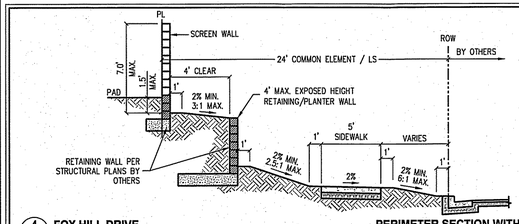
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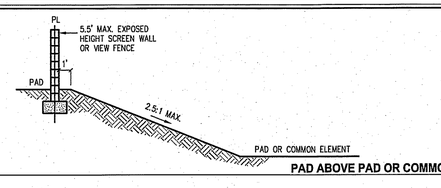
2 **FOX HILL DRIVE** **PERIMETER SECTION WITH PAD ABOVE STREET WITHOUT RETAINING WALL**
NOT TO SCALE



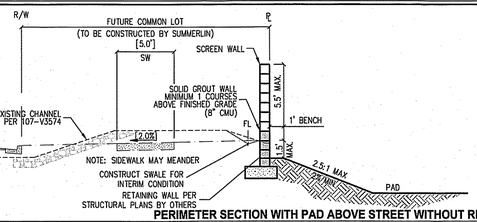
3 **FOX HILL DRIVE** **PERIMETER SECTION WITH PAD ABOVE STREET WITH RETAINING WALL**
NOT TO SCALE



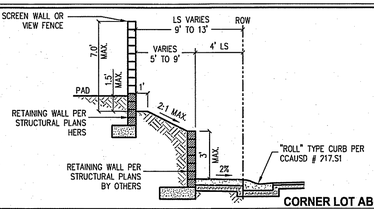
4 **FOX HILL DRIVE** **PERIMETER SECTION WITH DUAL RETAINING WALLS**
NOT TO SCALE



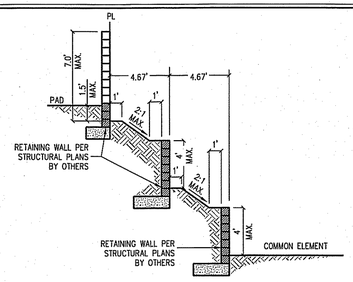
5 **PAD ABOVE PAD OR COMMON ELEMENT WITH SCARP**
NOT TO SCALE



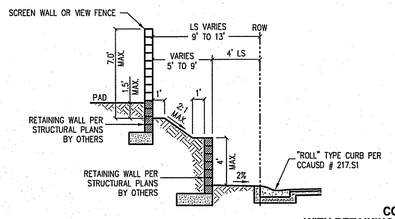
6 **PERIMETER SECTION WITH PAD ABOVE STREET WITHOUT RETAINING WALL**
NOT TO SCALE



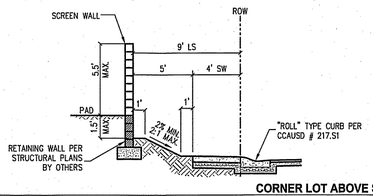
7 **CORNER LOT ABOVE STREET WITH RETAINING WALLS**
NOT TO SCALE



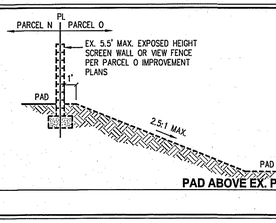
8 **STACKED RETAINING WALLS**
NOT TO SCALE



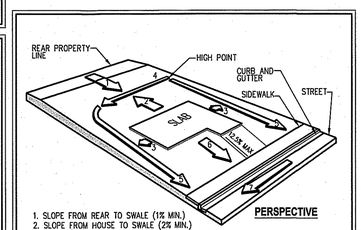
9 **CORNER LOT ABOVE STREET WITH RETAINING WALLS AND NO SIDEWALK**
NOT TO SCALE



10 **CORNER LOT ABOVE STREET WITHOUT RETAINING WALL**
NOT TO SCALE

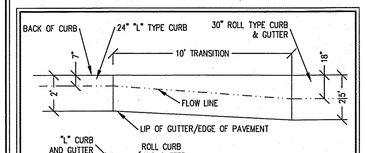


11 **PAD ABOVE EX. PAD WITH SCARP**
NOT TO SCALE

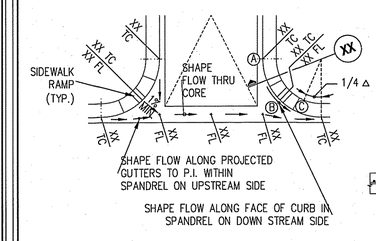


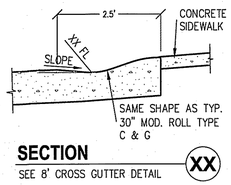
1. SLOPE FROM REAR TO SWALE (1% MIN.)
2. SLOPE FROM HOUSE TO SWALE (2% MIN.)
3. SLOPE FROM HOUSE TO SIDE SWALE (5% MIN.)
4. REAR SWALE (10' MIN. FROM REAR OF HOUSE)
5. SLOPE SIDE SWALE TO CURB (1% MIN.)
6. SLOPE FROM HOUSE TO SIDEWALK (5% MIN.)
7. SLOPE OF STREET

TYPE "A" LOT GRADING (TYP.)
NOT TO SCALE



10' L CURB TO ROLL CURB TRANSITION
NOT TO SCALE

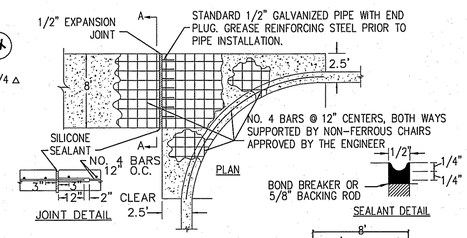


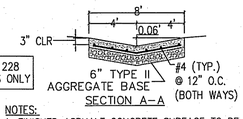


SECTION XX
SEE 8' CROSS GUTTER DETAIL

SEE CCAUSD NO. 235 FOR CURB TRANSITION FOR SIDEWALK RAMP

MODIFIED CCAUSD 228 INTERNAL STREETS ONLY

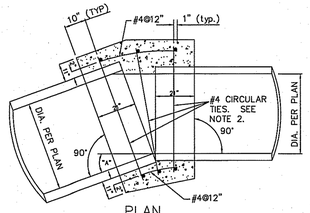




NOTES:
1. VALLEY GUTTERS TO FLOW AT GRADES SHOWN ON DRAWINGS.
2. CONSTRUCTION STAKING TO BE PROVIDED AT ALL POINTS DESIGNATED BY XX SHOWN ON DETAIL ABOVE.
3. MAINTAIN SECTION "X" FROM POINT A TO POINT B, TRANSITION AREA FROM POINT B TO POINT C.

NOTES:
1. FINISHED ASPHALT CONCRETE SURFACE TO BE FLUSH WITH CROSS GUTTER LIP.
2. CONSTRUCTION OF CROSS GUTTER IS NOT ALLOWED ACROSS MAJOR COLLECTOR OR ARTERIAL STREETS.
3. ADJACENT SPANDREL SHALL BE 9" THICK P.C.C.

MODIFIED 8' WIDE CROSS GUTTER
NOT TO SCALE



PLAN

C CONCRETE COLLAR DETAIL
NOT TO SCALE

CIRCULAR TIES:

PIPE DIAMETER	SPACE BETWEEN PIPE EXTREMITIES	NO. OF CIRCULAR TIES
21" or less	2 1/2"	3
24" to 30"	2 1/2" or less	3
33" to 57"	2 1/2" or less	4
60" to 66"	2 1/2" or less	5

NOTES:

1. WHERE THE SLOPE OF THE UPSTREAM PIPE IS GREATER THAN THE SLOPE OF THE DOWNSTREAM PIPE, JOIN SOFFITS. WHERE THE SLOPE OF THE UPSTREAM PIPE IS LESS THAN THE SLOPE OF THE DOWNSTREAM PIPE, JOIN INVERTS.

2. WHERE THE SPACE BETWEEN THE PIPE EXTREMITIES EXCEEDS 2 1/2 INCHES, THE NUMBER OF CIRCULAR TIES SHALL BE INCREASED TO MAINTAIN A MAXIMUM SPACING OF 6 INCHES CENTER TO CENTER. CIRCULAR TIES SHALL HAVE A DIAMETER 5 INCHES GREATER THAN THE OUTSIDE DIAMETER OF THE LARGER PIPE.

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

LENNAR® LAS VEGAS, NEVADA

CATALINA PHASE 1
GRADING SECTIONS AND DETAILS

S34 T20 R59

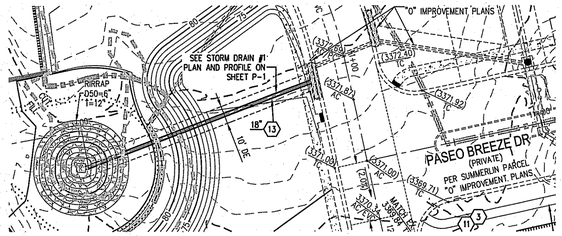
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DRAFTER: BCC
DESIGNER: BCC
CHECKED: STS

PROJECT NO.
LEN1202-000

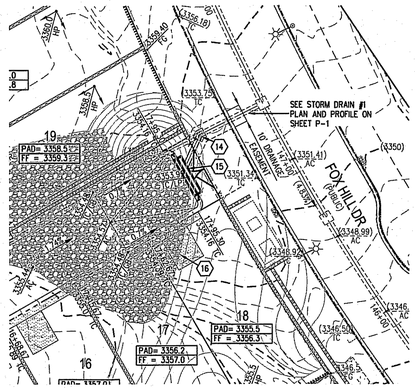
PROFESSIONAL ENGINEER-STATE OF NEVADA
JERRY L. SLATER
EXP. 6-30-12
CIVIL
No. 016167

D-1
SHEET 5 OF 6

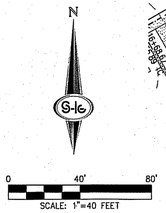
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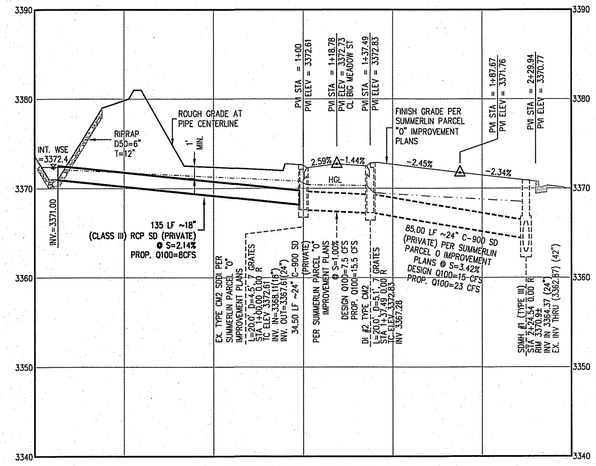
STORM DRAIN #1 PLAN VIEW
(PRIVATE)



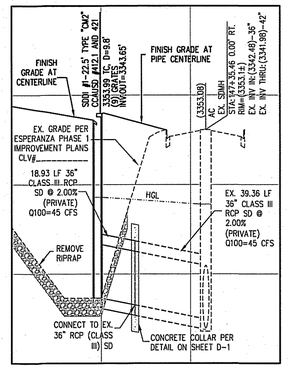
STORM DRAIN #2 PLAN VIEW
(PRIVATE)



0 40' 80'
SCALE: 1"=40 FEET



STORM DRAIN #1 PROFILE VIEW
VERT.SCALE:1"=8'



STORM DRAIN #2 PROFILE VIEW
VERT.SCALE:1"=4'

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

LENNAR®
LAS VEGAS, NEVADA

CATALINA PHASE 1
PLAN AND PROFILE I

S34
T20
R59

DATE: 05/31/12
DRAFTER: BCC
DESIGNER: BCC
CHECKED: STS
PROJECT NO.
LEN1202-000

PROFESSIONAL ENGINEER – STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2012
CIVIL
No. 14167

P-1
SHEET 6 OF 6

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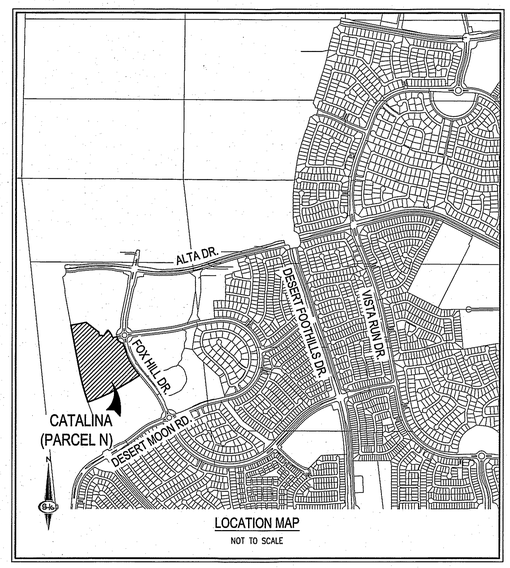
PHASE 2

LENNAR®

CATALINA PHASE 2

A SINGLE FAMILY DETACHED RESIDENTIAL COMMUNITY

A PORTION OF APN 137-34-313-001



LOCATION MAP
NOT TO SCALE

CITY OF LAS VEGAS NEVADA

LEGAL DESCRIPTION

LOCATED WITHIN PARCEL M AS SHOWN ON FILE IN BOOK 143, PAGE 47 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA, LYING WITHIN SECTION 34, TOWNSHIP 20 SOUTH, RANGE 59 EAST M.D.M., CLARK COUNTY, NEVADA.

BENCHMARK

FOUND NDOT BRASS CAP, 50 FEET NORTH OF STATION 787+19.42 OF CHARLESTON BLVD, OLV09-34SSE6

NAVD 88 ELEVATION = 978.351 METERS = 3209.81 FEET

BASIS OF BEARING

NORTH 05°59'55" WEST, BEING THE BEARING OF THE WEST LINE OF SECTION 34, TOWNSHIP 20 SOUTH, RANGE 59 EAST, M.D.M., CITY OF LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP THEREOF ON FILE IN BOOK 143, PAGE 47 OF PLATS IN THE CLARK COUNTY RECORDER'S OFFICE, NEVADA.

APPROVALS

ACTING CITY ENGINEER-DAVID BOWERS PE, PTOE #16736 DATE

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

CLV FIRE MARSHALL DATE

DOUG RANKIN, AICP DATE
PLANNING MANAGER

THIS PLAN MEETS THE APPLICABLE STANDARDS OF THE PLANNING AND DEVELOPMENT DEPARTMENT.

CENTURYLINK DATE

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

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER
PROJECT NO. 117426 DATE:
SHEETS:

APPROVAL BY THE FIRE DEPARTMENT HAVING JURISDICTION IS REQUIRED PRIOR TO OBTAINING FINAL APPROVAL FROM LAS VEGAS VALLEY WATER DISTRICT.

NV ENERGY DATE

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

SOUTHWEST GAS DATE

COX COMMUNICATIONS LAS VEGAS, INC. DATE

SUMMERLIN

SUMMERLIN RESIDENTIAL DESIGN REVIEW COMMITTEE DATE

THIS SIGNATURE IS LIMITED TO APPROVAL OF THESE DOCUMENTS FOR CONFORMANCE TO THE DESIGN INTENT OF THE APPLICABLE DESIGN CRITERIA. NEITHER SUMMERLIN NOR THE SUMMERLIN RESIDENTIAL DESIGN REVIEW COMMITTEE ASSUMES RESPONSIBILITY FOR PLAN CONFORMANCE WITH APPLICABLE LAWS, ORDINANCES, AND CODES.

SHEET INDEX

SHEET NUMBER	SHEET DESCRIPTION	SHEET TITLE
1	C-1	COVER SHEET
2	C-2	NOTES SHEET
3	G-1	GRADING PLAN I
4	D-1	GRADING SECTIONS AND DETAILS

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/STORMGI.HTM PROJECTS THAT DISTURB MORE THEN ONE ACRE OF LAND MUST SUBMIT TO NDEP A "NOTICE OF INTENT" FOR INCLUSION UNDER STORMWATER PERMIT NO. NVR100000 ALONG WITH THE APPROPRIATE FILLING FEE.

OWNER

GREYSTONE NEVADA, LLC
2490 PASEO VERDE PARKWAY
SUITE 120
HENDERSON, NV 89074
PH (702) 458-7700
FX (702) 889-0801

DEVELOPER

LENNAR COMMUNITIES NEVADA, LLC
2490 PASEO VERDE PARKWAY
SUITE 120
HENDERSON, NV 89074
PH (702) 458-7700
FX (702) 889-0801

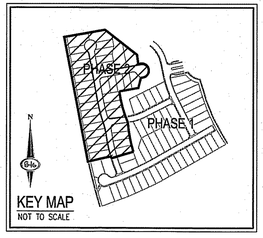
ENGINEER

SLATER HANIFAN GROUP
5740 S. ARVILLE ST SUITE 216
LAS VEGAS, NV 89118
PH (702) 284-5300
FX (702) 284-5399

PROJECT INFORMATION

APN: 137-34-313-002

NET ACREAGE	6.45 AC
RESIDENTIAL LOTS	36
COMMON ELEMENTS	0
DENSITY	5.58 - DU/AC
TYPICAL LOT SIZE	5,170 SF (47'x110') 5,875 SF (47'x125')
ZONING	P-C
EARTHWORK SUMMARY (ADJUSTED)	
CUT	- CY
FILL	- CY
SITE IMPORT	- CY



KEY MAP
NOT TO SCALE







SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

LENNAR®
LAS VEGAS, NEVADA

CATALINA PHASE 2
COVER SHEET

S34 T20 R59

DATE: 05/31/12
DRAFTER: BCC
DESIGNER: BCC
CHECKED: STS

PROJECT NO.
LEN1202-000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2012
No. 14167
CIVIL

C-1
SHEET 1 OF 4

J:\len1202-000 sum v23 parcel n\dwg\improv\phase 2\len1202-000 pn2-cvr.dwg 5/31/2012 11:25 AM Brian Chapman

2.1 CITY OF LAS VEGAS GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA", LATEST ISSUE; THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY AREA NEVADA", LATEST REVISED EDITION; THE "SUMMERLIN IMPROVEMENT STANDARDS" FOR WORK IN THE SUMMERLIN AREA; AND OTHER APPLICABLE APPROVED STANDARDS ISSUED BY THE CONTROLLING AGENCY; THE UNIFORM BUILDING CODE; AND ALL LOCAL CITY CODES AND ORDINANCES APPLICABLE, EXCEPT AS NOTED ON THIS SHEET AS "DEVIATIONS FROM STANDARDS".

2. THE EXISTENCE AND LOCATION OF ANY OVERHEAD OR UNDERGROUND UTILITY LINES, PIPES, OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A RESEARCH OF THE AVAILABLE RECORDS. EXISTING UTILITIES AS SHOWN FROM CLV PLANS LIBRARY ARE APPROXIMATE AND FOR RECORD PURPOSES. EXISTING UTILITIES ARE LOCATED ON PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, LOCATE ALL UNDERGROUND AND OVERHEAD INTERFERENCES WHICH MAY AFFECT HIS OPERATIONS AND 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 HIS 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 GEOTEK, REPORT #9942-LV6, JUNE 4, 2010 APPROVED BY THE CITY ENGINEER, AND AS SHOWN ON THESE PLANS.

13. EXACT LOCATION OF ALL SAWCUT LINES MAY BE ADJUSTED OR DETERMINED IN THE FIELD BY A CITY OF LAS VEGAS ENGINEER IF LOCATION ON PLANS IS NOT CLEARLY SHOWN, OR EXISTING PAVEMENT CONDITION REQUIRES RELOCATIONS.

14. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PROTECT EXISTING PERMANENT SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE REPLACED AND ADJUSTED PER AVAILABLE RECORDS IN ACCORDANCE WITH N.R.S. STATUTE NO. 625.380 & CITY OF LAS VEGAS TITLE 18, APPENDIX D.

15. UTILITY COMPANY METER BOXES, MANHOLE LIDS, VALVE COVERS, ETC., SHALL BE LOCATED OUT OF DRIVEWAYS, DRIVEWAY APRONS, FLOWLINES, AND CROSS GUTTERS UNLESS WRITTEN APPROVAL IS GRANTED BY THE UTILITY COMPANY AND THE CITY ENGINEER. ALL ABOVE GROUND UTILITY APPERTANANCES SHALL CONFORM TO THE REQUIREMENTS OF 19.12.040.

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 OFFSITE INSPECTION AND TESTING SECTION PRIOR TO PROJECT ACCEPTANCE. THE MAP(S) SHALL INCLUDE THE HORIZONTAL AND VERTICAL (INVERT) LOCATION OF PUBLIC SEWER MANHOLES, STORM DRAIN MANHOLES, STORM DRAIN LATERALS AT THE CONNECTION TO THE STORM DRAIN MAIN AND AT THE CONNECTION TO A DROP INLET, AND THE CONNECTION OF SEWER SERVICE LATERALS TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERALS EXITS THE PUBLIC RIGHT-OF-WAY. THE LOCATION SHALL BE DESCRIBED BY STATE PLANE COORDINATES WHICH SHALL BE BASED ON THE "NEVADA COORDINATE SYSTEM OF 1983, EAST ZONE" AS DEFINED BY THE NEVADA REVISED STATUTES CHAPTER 327, AND TIED TO THE CITY OF LAS VEGAS VERTICAL CONTROL BENCHMARK NETWORK. COORDINATES MUST BE CERTIFIED BY A NEVADA PROFESSIONAL LAND SURVEYOR TO HAVE POSITIONAL CERTAINTIES OF +/- 0.1 METER (+/- 0.3 FEET). 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. SANITARY SEWER SERVICE LATERALS REQUIRE THE INSTALLATION OF A MARKER BALL AT THE CONNECTION OF THE SEWER SERVICE LATERAL TO THE SEWER MAIN AND WHERE THE SEWER SERVICE LATERAL EXITS THE PUBLIC RIGHT-OF-WAY. STORM DRAIN LATERALS REQUIRE THE INSTALLATION OF A MARKER BALL AT THE CONNECTION OF THE STORM DRAIN LATERAL TO THE STORM DRAIN MAIN AND WHERE THE STORM DRAIN LATERAL EXITS THE PUBLIC RIGHT-OF-WAY OR WHERE THE STORM DRAIN LATERAL CONNECTS TO A DROP INLET. THE MARKER BALL SHALL BE 3M 4" MARKER BALL 1404-XR OR APPROVED EQUAL.

23. 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 ADDITION.

24. A SEPARATE BORING PERMIT IS REQUIRED FOR ALL BORING ACTIVITIES.

2.2 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 "C" IN CURBS WHERE SEWER OR GAS LATERALS PASS UNDER THE CURB.

4. POLYVINYL (PVC) SEWER PIPE SHALL MEET ASTM D-3034 SDR 35 SPECIFICATIONS, INSTALLED WITH SAND BEDDING AND BACKFILL OF TYPE II AGGREGATE BASE.

5. ALL MANHOLES PAVED IN STREETS EIGHTY (80') FOOT R/W AND LARGER SHALL HAVE CONCRETE COLLARS. STREETS LESS THAN EIGHTY (80') FOOT R/W WILL REQUIRE RETROFIT IF PAVING DOES NOT CONFORM TO CITY STANDARDS AT THE MANHOLE.

6. TEE SADDLES SHALL BE USED TO CONNECT SEWER LATERALS TO EXISTING MAIN LINES UP TO TWELVE INCH (12") DIAMETER. CONNECTIONS TO FIFTEEN INCH (15") OR LARGER MAINS SHALL REQUIRE SPECIAL PROCEDURES. IN LINE "Y" 'S SHALL BE USED ON LINES TWELVE INCHES (12") OR ABOVE.

7. WATER MAINS SHALL BE PROTECTED IN ACCORDANCE WITH LVVWD STANDARDS WHENEVER A SEWER MAIN CROSSES OVER A WATER MAIN OR THE SEWER IS LESS THAN EIGHTEEN INCH (18") UNDER A WATER MAIN.

8. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CITY OF LAS VEGAS MUST BE STATE OF NEVADA CLASS "A" CONTRACTORS.

9. THE CITY OF LAS VEGAS WILL NOT ACCEPT ANY SEWER MAINS WHICH HAVE A VERTICAL DEFLECTION OF MORE THAN ONE TENTH (0.1) OF A FOOT FROM THE APPROVED CONSTRUCTION PLANS AT ANY LOCATION. SEWER MAINS FOUND TO EXCEED THIS TOLERANCE WILL HAVE TO BE REPAIRED OR REMOVED OR REPLACED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO ACCEPTANCE BY THE CITY OF LAS VEGAS.

10. INSTALLATION OF CURVED SEWER REQUIRES THE USE OF C-900 PIPE WHICH ALLOWS FOR PIPE DEFLECTION AT THE JOINTS.

2.3 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 "SAFE ROUTE TO SCHOOL" IS ENCROACHED UPON BY A CONSTRUCTION WORK ZONE AND PUBLIC WORKS STAFF IDENTIFIES A NEED FOR STUDENTS TO BE ASSISTED IN THE SAFE CROSSING THROUGH THE CONSTRUCTION AREA, 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 BE FABRICATED WITH DIAMOND GRADE VIP CLASS 6 REFLECTIVE SHEETING OR APPROVED EQUAL. ALL NEW TRAFFIC SIGNS, EXCEPT STREET NAME AND SCHOOL SPEED LIMIT SIGNS, SHALL HAVE 3M SERIES 1160 OR APPROVED EQUIVALENT ANTI-GRAFFITI PROTECTIVE OVERLAY FILM; SCHOOL ZONE SIGNS SHALL HAVE 3M SERIES 1150 ANTI-GRAFFITI PROTECTIVE OVERLAY FILM. STREET NAME SIGNS SHALL CONFORM IN THEIR ENTIRETY TO CURRENT CITY STANDARDS. ALL OTHER SIGNS SHALL BE STANDARD SIZE UNLESS OTHERWISE SPECIFIED ON THE PLANS. ALL SIGN POSTS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT CITY STANDARDS.

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 STOPS SIGNS SHALL BE INSTALLED PER CITY STANDARD SPECIFICATIONS FOR PLACEMENT OF STREET NAME SIGNS.

10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRAFFIC CONTROL DEVICES AND FLAGGERS TO INSURE THE SAFETY OF THE PUBLIC IN OR AROUND THE WORK AREA. THE CONTRACTOR SHALL HAVE A CERTIFIED ATSSA TRAFFIC CONTROL TECHNICIAN OR IMSA WORK ZONE SAFETY SPECIALIST SET UP, MAINTAIN AND/OR REMOVE ALL TRAFFIC CONTROL DEVICES IN THE CITY OF LAS VEGAS RIGHT OF WAY.

11. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE EXPEDITED TO COMPLETION SO AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.

12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING CITIZENS AREA TRANSIT (C.A.T.) IF THE CONSTRUCTION INTERRUPTS OR RELOCATES A BUS STOP OR HAS AN ADVERSE EFFECT ON BUS SERVICE ON THAT STREET TO ARRANGE FOR TEMPORARY RELOCATION OF STOP.

13. GUARDS SHALL BE OBTAINED BY CONTACTING THE METROPOLITAN POLICE DEPARTMENT SPECIAL EVENTS UNIT (PHONE # 828-3442) WHO WILL PROVIDE OFFICERS PROPERLY TRAINED IN TRAFFIC CONTROL. FEES FOR THE USE OF THESE OFFICERS SHALL BE SET BY METRO AND WILL BE PAID BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR ALL ARRANGEMENTS WITH METRO.

14. ANY WORK WITHIN 300' OF A SIGNALIZED INTERSECTION WILL BE NIGHT WORK, UNLESS OTHERWISE 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 PAVING AND 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.

2.4 CITY OF LAS VEGAS STREETLIGHT NOTES

1. ALL STREET LIGHTING INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE STREET LIGHTING PLANS, THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA", LATEST REVISION, AND ANY ADOPTED SPECIAL AREA STANDARDS.

2. NO DEVIATION OF STREET LIGHT, PULL BOX, CONDUITS (ETC.) LOCATIONS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL OF TRAFFIC ENGINEERING AND THE CITY ENGINEER.

3. ALL EXISTING STREET LIGHTING SHALL REMAIN OPERATIONAL DURING CONSTRUCTION.

4. ALL STREET LIGHTING CONDUITS STUB SHALL HAVE AT LEAST ONE GREEN #8 THW WIRE INSTALLED, AS TRACER WIRE. WHEN "EMPTY" CONDUIT IS COMPLETELY INSTALLED FROM PB TO PB, IT SHALL HAVE MINIMUM OF 2 #4 AND 1 #8 THW WIRE WITH THE ENDS TAPED OR "SAFE OFF" PRIOR TO FINAL INSPECTION.

5. ANY STRUCTURE SUCH AS BLOCK WALLS, CHAIN LINK FENCES, RETAINING WALLS, ETC., SHALL LEAVE A MINIMUM CLEARANCE IN ACCORDANCE WITH THE USD NO. 320A.

6. AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE TEFO PRIOR TO ANY PRE-FINAL INSPECTION. THE ASBULT DRAWING NEEDS TO BE STAMPED AS-BUILT AND SIGNED BY THE PREPARER.

7. SERVICE POINT SHALL BE COORDINATED WITH NV ENERGY COMPANY, AND WHEREVER POSSIBLE, BE LOCATED NEAR THE CENTER OF THE CIRCUIT. SERVICE POINTS SHALL BE SHOWN ON THE CIVIL PLANS.

8. IT SHALL BE ASSUMED THAT IN THE ABSENCE OF AN EXISTING, WORKABLE CIRCUIT TO ATTACH TO, ALL INSTALLATIONS SHALL REQUIRE A NEW SERVICE FOR OPERATION OF THE CIRCUIT.

9. WHEREVER THERE IS AN OVERHEAD UTILITY THAT MAY CONFLICT WITH THE INSTALLATION OF STREET LIGHTING CIRCUITS AND/OR POLES, THESE CONFLICTS MUST BE RESOLVED BETWEEN THE DEVELOPER AND THE UTILITIES INVOLVED, AT NO EXPENSE TO THE CITY OF LAS VEGAS, BEFORE STREETLIGHT BASES ARE INSTALLED.

10. THE CONTRACTOR SHALL FURNISH COMPLETE SERVICE TO TRANSFORMERS AND CONTROL SYSTEMS IF REQUIRED ON PLANS.

11. THE DEVELOPER/OWNER WILL BE REQUIRED TO SUPPLY POWER TO ALL NEW PUBLIC STREET LIGHTS INSTALLED UNDER THIS DESIGN PRIOR TO BOND RELEASE OR PROJECT COMPLETION. THE DEVELOPER/OWNER WILL BE RESPONSIBLE FOR ALL ITEMS ASSOCIATED WITH THE INSTALLATION, CONSTRUCTION, ENERGIZING, MAINTENANCE AND OPERATIONAL COST OF SAID STREET LIGHTS PRIOR TO PROJECT COMPLETION. REFER TO THE PLAN FOR ANY NEW SERVICE REQUIREMENTS. THE TRANSFER OF OWNERSHIP FROM THE DEVELOPER/OWNER TO THE CITY OF LAS VEGAS FOR ALL NEW PUBLIC STREET LIGHT/S AND/OR SERVICE/S INSTALLED UNDER THIS PLAN DESIGN WILL BE IN CONJUNCTION WITH THIS PROJECT COMPLETION. COORDINATE ALL MAINTENANCE AND OPERATIONAL TRANSFERS WITH THE CITY OF LAS VEGAS TRAFFIC ENGINEERING DEPARTMENT (TEFO) AT (702) 229-6331.

2.5 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.

CITY OF LAS VEGAS FIRE AND RESCUE GENERAL NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE CITY OF LAS VEGAS FIRE DEPARTMENT'S ORDINANCE # 5667, "HYDRANT SPECIFICATIONS", AND "HYDRANT INSTALLATION SPECIFICATION".

2. AUTHORIZED FIRE HYDRANTS FOR THIS PROJECT ARE:
   A. KENNEDY – GUARDIAN MODELS K81A AND K81D
   B. MUELLER – SUPER CENTURION 250 MODEL A-423
   C. CLOW – MEDALLION MODEL F-2546LVD
   D. TROY VALVE – PATRIOT MODEL PTB100N NEVADA HYDRANT
   E. U.S. PIPE – METROFLOW/M-03

3. 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.

4. TO IDENTIFY THE FIRE HYDRANT LOCATIONS, CONTRACTOR SHALL PLACE A BLUE REFLECTIVE MARKER AT THE CENTER LINE OF STREET ADJACENT TO THE FIRE HYDRANTS AS REQUIRED BY ORDINANCE # 5667.

5. ALL UNDERGROUND INSPECTIONS, PRESSURE AND FLUSH VERIFICATIONS OF ALL FIRE HYDRANTS AND FIRE LINES, SHALL BE CONDUCTED BEFORE COVERING THE LINES. CALL THE CITY OF LAS VEGAS INSPECTION HOT-LINE AT 229-2071 TO REQUEST AN INSPECTION BY THE CITY OF LAS VEGAS FIRE DEPARTMENT.

6. PAINTING OF THE CURBS AND FIRE HYDRANTS AND ALL OTHER WORK NECESSARY AS REQUIRED BY ORDINANCE # 5667, FOR THE PROTECTION OF FIRE HYDRANTS FROM PHYSICAL DAMAGE, SHALL BE COMPLETED BEFORE APPROVAL BY THE CITY OF LAS VEGAS FIRE DEPARTMENT.

7. A PERMIT IS REQUIRED FROM THE CITY OF LAS VEGAS FIRE DEPARTMENT FOR THE ON-SITE WATER LINES AND FIRE HYDRANTS. THE PERMIT AND CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR UNDERGROUND PIPING FORM SHALL BE OBTAINED FROM THE FIRE PROTECTION ENGINEER BEFORE COMMENCEMENT OF WORK.

8. PRIVATE FIRE HYDRANTS SHALL BE PAINTED RED.

9. PRIOR TO THE FINAL OCCUPANCY, A FLOW TEST MUST BE WITNESSED BY THE CITY OF LAS VEGAS FIRE DEPARTMENT TO VERIFY AVAILABILITY OF THE REQUIRED FIRE FLOW.

10. 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.

11. FIRE HYDRANTS SPACING SHALL BE:
    RESIDENTIAL – 500 FEET UNSPRINKLERED; 600 FEET SPRINKLERED.
    COMMERCIAL – 300 FEET UNSPRINKLERED; 400 FEET SPRINKLERED.

12. WHERE NEW WATER MAINS ARE EXTENDED ALONG STREETS OR NEW STREETS ARE INSTALLED WHERE FIRE HYDRANTS ARE NOT NEEDED FOR PROTECTION OF THE STRUCTURES, FIRE HYDRANTS SHALL BE INSTALLED AT MAXIMUM 1,000 FOOT SPACING, TO PROVIDE FOR TRANSPORTATION HAZARDS. WHERE STREETS ARE PROVIDED WITH MEDIAN DIVIDERS OR HAVE FOUR OR MORE TRAFFIC LANES AND HAVE A TRAFFIC COUNT OF MORE THAN 30,000 PER DAY, HYDRANTS ARE REQUIRED ON EACH SIDE OF THE STREET SPACED AT 500 FEET ON AN ALTERNATING BASIS.

13. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN THE REQUIRED RADIUS OF A CUL-DE-SAC OR WITHIN 20 FEET OF THE PERIMETER OF THE RADIUS OF THE CUL-DE-SAC.

14. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN 6 FEET OF ANY CURB RETURN, DRIVEWAY, POWER POLE, STREETLIGHT OR ANY OTHER OBSTRUCTION.

15. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A ONE-TWO FAMILY DWELLING SHALL NOT EXCEED 300 FEET, AS MEASURED BY AN APPROVED ROUTE.

16. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FIRE DEPARTMENT CONNECTION (FDC) SHALL NOT EXCEED 100 FEET, AS MEASURED BY AN APPROVED ROUTE.

17. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO THE END OF A DEAD-END STREET SHALL NOT EXCEED 200 FEET.

18. TWO SOURCES OF SUPPLY ARE REQUIRED WHENEVER THERE ARE 4 OR MORE FIRE HYDRANTS/SPRINKLER LEAD-INS ARE INSTALLED ON A SINGLE SYSTEM. SECTIONAL CONTROL VALVES SHALL BE INSTALLED SO THAT NO MORE THAN 2 FIRE HYDRANTS CAN BE OUT OF SERVICE DUE TO A BREAK IN A WATER MAIN.

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.

20. THE GRADIENT FOR THE FIRE APPARATUS ACCESS ROADS SHALL NOT EXCEED 12%. ANGLES OF APPROACH AND ANGLES OF DEPARTURE SHALL NOT EXCEED 6% FOR 25 FEET PRIOR TO OR AFTER THE GRADE CHANGE. ADJACENT TO THE STRUCTURES GRADIENT SHALL NOT EXCEED 6%

21. THE TURNING RADIUS OF THE FIRE APPARATUS ACCESS ROADS SHALL BE NO LESS THAN 52 FEET OUTSIDE AND 28 FEET INSIDE TURNING RADIUS.

22. VERTICAL CLEARANCE OF ALL FIRE APPARATUS ACCESS ROADS SHALL BE NOT LESS THAN 13 FEET 6 INCHES.

23. FIRE DEPARTMENT ACCESS ROADS IN ALL RESIDENTIAL DEVELOPMENTS (EXCEPT FOR THE APARTMENT BUILDINGS) SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF NOT LESS THAN 36 FEET FLOW LINE TO THE FLOW LINE (THIS WIDTH MAY BE REDUCED TO 24 FEET, IF ALL BUILDINGS FRONTING THE STREET ARE SP

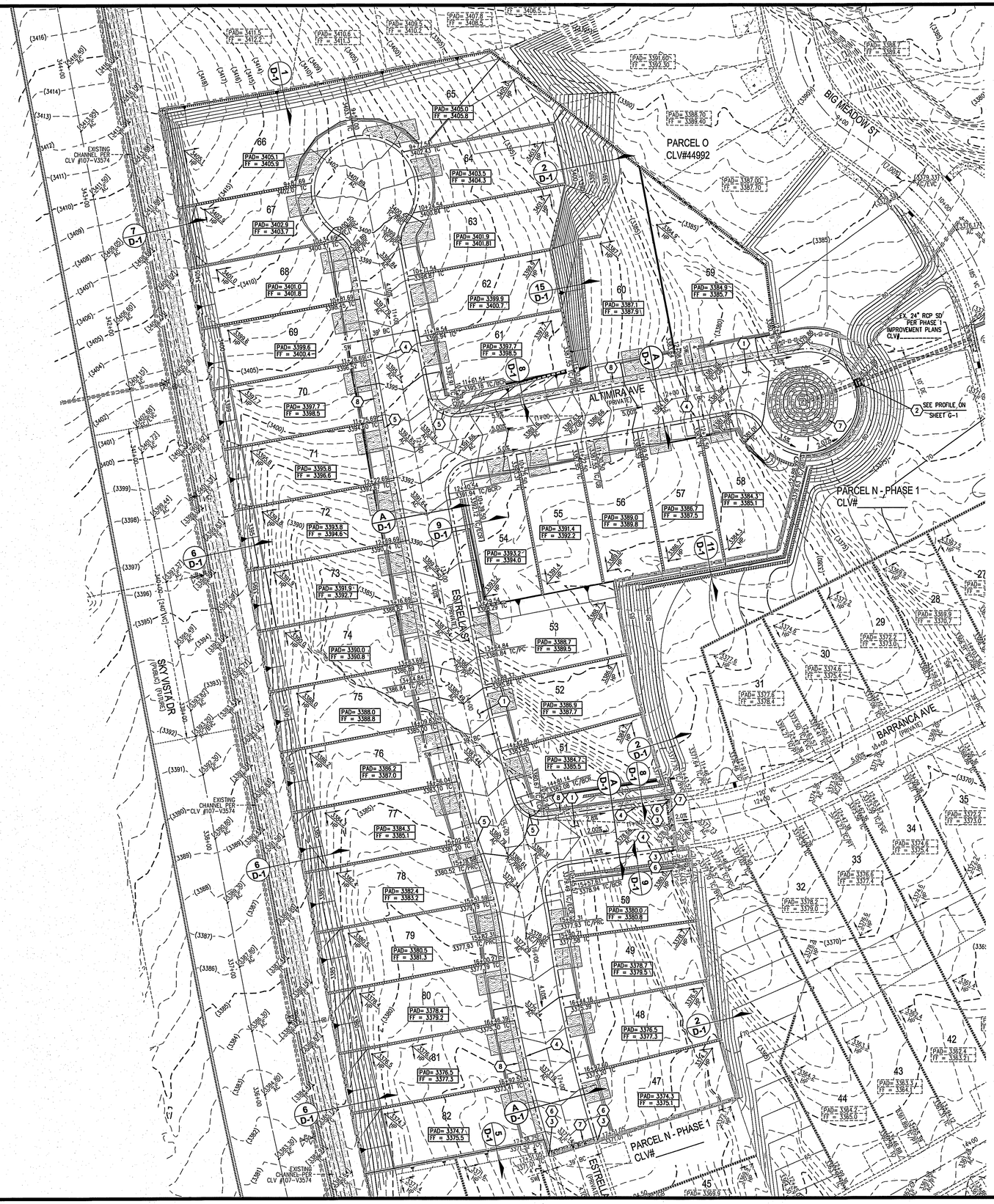
GENERAL NOTES

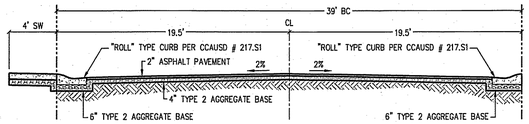
1. FINAL GRADES ADJACENT TO STRUCTURES SHALL BE IN CONFORMANCE WITH IBC 2006, SECTION 2304.11.2.2.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND REPORT ALL DISCREPANCIES TO THE ENGINEER.
3. ALL IMPROVEMENTS TO BE PROTECTED FROM EROSION BY SWPPP.
4. MAXIMUM/MINIMUM SLOPES AND MINIMUM STREET SECTIONS NOT TO EXCEED THAT SHOWN ON GEOTECH REPORT.
5. SEE DETAIL SHEETS FOR STREET SECTIONS AND DETAILS.
6. ALL PUBLIC AND PRIVATE DRAINAGE IMPROVEMENTS TO BE BONDED FOR AND INSPECTED.
7. CONSTRUCTION OF BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL.
8. EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITY STRUCTURES AND FACILITIES AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION. CONTRACTOR TO PROTECT IN PLACE DURING CONSTRUCTION. ENGINEER/OWNER SHALL BE NOTIFIED OF PRIOR DAMAGE TO EXISTING FACILITIES PRIOR TO CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR/REPLACING FACILITIES IF ENGINEER/OWNER IS NOT NOTIFIED OF EXISTING DAMAGE PRIOR TO CONSTRUCTION COMMENCING.
9. NO STRUCTURE, VEGETATION, OR OBJECTS OF ANY KIND IS PERMITTED OVER TWENTY-FOUR (24) INCHES IN HEIGHT (MEASURED FROM THE TOP OF THE ADJACENT CURB IF CURB EXIST) WITHIN THE SIGHT VISIBILITY ZONES.
10. ALL ELEVATIONS SHOWN, WITH EXCEPTION TO PAD AND FINISHED FLOOR ELEVATIONS, ARE THE VALUE SHOWN PLUS 3300'.

STORMWATER RUNOFF MANAGEMENT

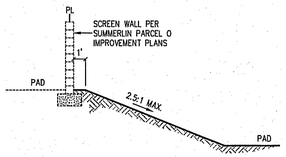
(REQUIRED FOR ALL SITES GREATER THAN 1 ACRE (43,560 SQ.FT.))

1. THE OWNER, SITE DEVELOPER, CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATE IN, THE PUBLIC RIGHTS OF WAYS OF 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 TITLE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.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 ACTUAL RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

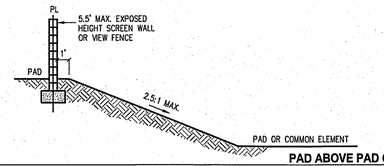

ALTIMIRA AVE (PRIVATE)
BIG MEADOW ST
BARRANCA AVE (PRIVATE)
ESTRELLA AVE (PRIVATE)
SKY VISTADOR (PUBLIC) (FUTURE)
PARCEL O CLV#44992
PARCEL N - PHASE 1 CLV#
EXISTING CHANNEL PER CLV #107-V3574
SEE PROFILE ON SHEET G-1
FX 24" RCP SD PER PHASE 1 IMPROVEMENT PLANS CLV
PAD= 3405.0 FF = 3405.8
PAD= 3405.1 FF = 3405.9
PAD= 3403.5 FF = 3404.3
PAD= 3402.9 FF = 3403.7
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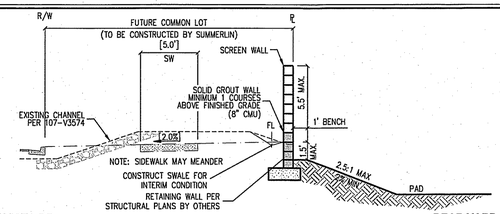
A **INTERIOR STREET SECTION**
NOT TO SCALE



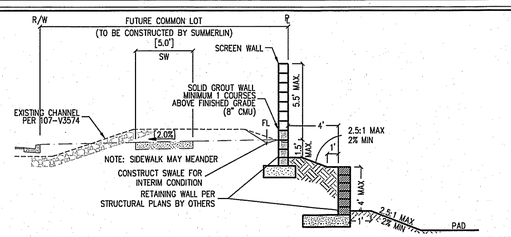
1 **GRADING SECTION**
NOT TO SCALE



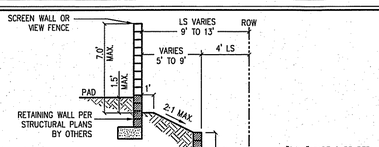
2 **PAD ABOVE PAD OR COMMON ELEMENT WITH SCARP**
NOT TO SCALE



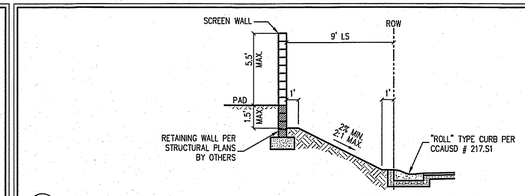
6 **SKY VISTA DR** — **REAR YARD WALL SECTION**
NOT TO SCALE



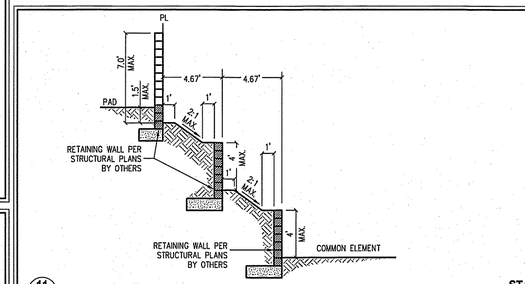
7 **SKY VISTA DR** — **REAR YARD WITH STACKED WALL SECTION**
NOT TO SCALE



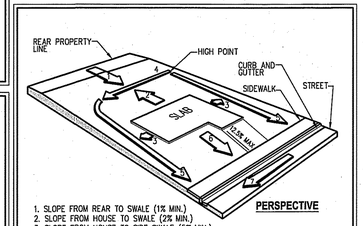
8 **CORNER LOT ABOVE STREET WITH RETAINING WALLS**
NOT TO SCALE



9 **CORNER LOT ABOVE STREET WITHOUT RETAINING WALL**
NOT TO SCALE

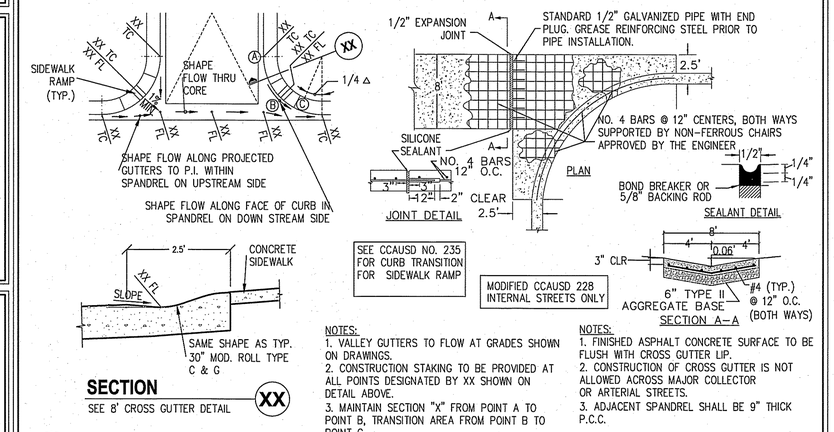


11 **STACKED RETAINING WALLS**
NOT TO SCALE



1. SLOPE FROM REAR TO SWALE (1% MIN.)
2. SLOPE FROM HOUSE TO SWALE (2% MIN.)
3. SLOPE FROM HOUSE TO SIDE SWALE (5% MIN.)
4. REAR SWALE (10' MIN. FROM REAR OF HOUSE)
5. SLOPE SIDE SWALE TO CURB (1% MIN.)
6. SLOPE FROM HOUSE TO SIDEWALK (5% MIN.)
7. SLOPE OF STREET

TYPE "A" LOT GRADING (TYP.)
NOT TO SCALE



NOTES:
1. VALLEY GUTTERS TO FLOW AT GRADES SHOWN ON DRAWINGS.
2. CONSTRUCTION STAKING TO BE PROVIDED AT ALL POINTS DESIGNATED BY XX SHOWN ON DETAIL ABOVE.
3. MAINTAIN SECTION "X" FROM POINT A TO POINT B, TRANSITION AREA FROM POINT B TO POINT C.

NOTES:
1. FINISHED ASPHALT CONCRETE SURFACE TO BE FLUSH WITH CROSS GUTTER LIP.
2. CONSTRUCTION OF CROSS GUTTER IS NOT ALLOWED ACROSS MAJOR COLLECTOR OR ARTERIAL STREETS.
3. ADJACENT SPANDREL SHALL BE 9" THICK P.C.C.

MODIFIED 8' WIDE CROSS GUTTER
NOT TO SCALE

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

LENNAR® LAS VEGAS, NEVADA

CATALINA PHASE 2
GRADING SECTIONS AND DETAILS

S34 T20 R58

DATE: 05/31/12
DRAFTER: BCC
DESIGNER: BCC
CHECKED: STS

PROJECT NO.
LEN1202-000

PROFESSIONAL ENGINEER — STATE OF NEVADA
JERRY SLATER
Exp. 06/30/2012
CIVIL
No. 14167
5-31-12

D-1
SHEET 4 OF 4

J:\len1202-000 sum v23 parcel n\dwg\improv\phase 2\len1202-000 ph2-d1.dwg 5/31/2012 11:26 AM Brian Chapman