CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: June 3, 2014
TO: **Land Development Services** Department of Public Works			FROM: Albert Sung, P.E. for Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **Park Highlands West (Project in CNLV)** **– AKA North Las Vegas 600-Acre Site**		**COPIES TO:** Slater Hanifan Group (SHG)
Cross Streets:	Grand Teton Blvd. & Decatur Blvd.		Crescent Bay Holdings
File Number:	F:\Depot\DSMemos\DS4670A.doc		Bart Anderson, P.E., DevCo
Parcel Number:	124-07-499-001 & More		CCRFCD
Zoning Action:	N/A		CNLV
FEMA Flood Zone	YES	NO X	
Proposed Storm Drain	YES X	NO	

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1st Submittal	4/24/2014; 5/8/2014 & 5/19/2014	6/2/2014	Approved	$400.00	355211: $400
			TOTAL FEES (LDDRS):	**$800.00**	**$800.00**

REMARKS: Master Plan Amendment Required.

1st Submittal: Development split into two projects.

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

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

***City of Las Vegas Flood Control* staff has reviewed the Technical Drainage Study, Addendum #1 and Addendum #2 of the subject development in the *City of North Las Vegas. City of Las Vegas* concurs with the acceptance of the drainage study by the *City of North Las Vegas Department of Public Works*. The review of this project was limited to issues of flood control significance to the *City of Las Vegas*.**

1. Study flow rates at the Grand Teton facility are based upon a *Clark County Regional Flood Control District Master Plan Amendment (MPA)* being adopted. Future MPU facilities will significantly impact these proposed facility improvements without the approval of the MPA. **If the MPA is not approved, the drainage studies and improvement plans must be updated to accommodate the flow impacts from the adopted Master Planned Facilities.**

2. Approval is predicated upon the construction of the Grand Teton Regional Flood Control Facility improvements at the west side of the intersection of Decatur Boulevard and Grand Teton Drive as shown on the improvement plans prepared by SHG dated 11-12-2013.

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

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

END OF REMARKS
Ays/pbj

T/R/S: T19S/R61E/18
AREA H-18

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

MEETING MINUTES

Project Number: CBH1301.002
Project Name: Park Highlands West MPU Amendment
Meeting Date: April 24, 2014 @ 1:30PM
Meeting Location: CCRFCD
Meeting Topic: Park Highlands West MPU Amendment

Attendees:	*Company Name:*	*Contact Info (email/phone)*
Steve Parrish	CCRFCD	SParrish@regionalflood.org, 685-0000
Andrew Trelease	CCRFCD	ATrelease@ccrfcd.org, 685-0000
Abigail Mayrena	CCRFCD	AMayrena@regionalflood.org, 685-0000
Rob McLaughlin	CNLV	McLaughlinR@cityofnorthlasvegas.com, 633-1252
Dan Le	CNLV	LeD@cityofnorthlasvegas.com, 633-1932
Peter Jackson	CLV	pjackson@lasvegasnevada.gov, 229-5266
Phil Miller	Crescent Bay	developaz@gmail.com, 408-215-1780
Mike Ross	Mike Ross Advisors	Mike@mikerossadvisors.com, 743-3928
Mark Failla	SHG	MFailla@shg-inc.com, 284-5300
Kellin Collins	Pardee Homes	KCollins@shg-inc.com, 284-5300

Meeting Notes:

Item:	*Discussion:*
1	**Project Scope –** This Master Plan Amendment (MPA) is prepared to only address the new Park Highlands West (PHW) by SHG. It will assume the existing (previously approved) Park Highlands East (PHE) land plan and drainage pattern. A future separate MPA will be prepared to address the new PHE land plan and drainage pattern. This MPA will address the downstream impacts due to the PHW facilities. Phil Miller and Mike Ross mentioned that the split of PHW and PHE will be at the CNLV Council on May 21st. Steve Parrish would prefer a single MPA addressing both PHW and PHE but will be okay with two separate MPA. SHG explained that the land plan for PHE is still in flux and the developers of PHW do not want to wait. The CNLV and CLV are okay with two separate MPAs.
2	**Horse Alignment** – The proposed Horse Alignment extends from Decatur to the Las Vegas Wash and would replace the proposed facility in Decatur between Horse and Grand Teton. Phil Miller and Mike Ross highlighted that the BLM easement application was filed by the CNLV today (4/24/14). The question was posed as to the adoption of the MPA prior to obtaining the BLM easement for the Horse alignment. • CCRFCD hesitates to adopt or present to the Board an alignment in which an easement is not guaranteed. Steve Parrish is concerned about removing a facility (along Decatur) that can be built today with one that may not be built if the easement is not granted. • Mike Ross presented that the current Conservation Transfer Area (CTA) documents state that the CTA must respect and consider the planned CCRFCD MPU facilities within the CTA. Even without the BLM easement for the Horse Alignment, if the MPA is adopted with the Horse Alignment then the CTA will have to accept the easement request. • SHG/Developer thinks the adoption of the MPA will add credibility to acceptance of BLM Easement. • Peter Jackson explained that the CLV and CNLV are currently struggling with the BLM because they have

Prepared By: K. Collins

Please notify the preparer if you have any questions, concerns or additions to these minutes within 2 days. After 2 days the content of this document will be considered accurate and accepted as the final recordation.

Item:	Discussion:
	not provided any consideration of the planned regional facilities within the CTA. Peter Jackson does not think by just getting MPA adopted with the Horse Alignment that it will necessarily force BLM to accept easement/alignment. If the easement is granted then there would be no problem. • The consensus of all reviewing agency was that the BLM easement must be in place for the MPA to be accepted and adopted with the Horse Alignment. An potential alternative suggested by Phil Miller includes the following (now known as the Aviary Alignment): • Remove the proposed dog park in the detention basin as the dog park is not required of the PHW development agreement (DA) to obtain additional storage. • Route the flows from the intersection of Horse/Aviary south into the proposed detention basin. This will avoid the upsizing of the proposed Grand Teton facility between Decatur and Aviary. This will avoid the need for the BLM easement for the Horse Alignment. • The proposed Aviary facility will discharge directly into the proposed detention basin and not tie into the Grand Teton facility. Note that the current local Aviary facility ties into the Grand Teton facility, this connection would be removed. Phil Miller suggest the following steps me made by SHG: • Establish that the proposed detention basin has capacity with the removal of the dog park for the Horse/Aviary flow. • Should the detention basin have capacity for the Aviary Alignment flow and the Aviary Alignment is pursued then an update will be prepared • Dan Le requested that the Update to the PH GT TDS be approved by CNLV and concurred by CLV and CCRFCD before perusing the MPA. • Phil Miller requested that the Updates and the MPA be review concurrently by all agencies. • Should the BLM easement be granted by the time the PHE MPA is in progress, as part of the PHE MPA is the removal of the Aviary alignment and the proposal of the Horse alignment to the Las Vegas Wash. If the Horse Alignment is pursued, CCRFCD request the following: • The existing natural wash (Facility E3) be delineated on the F and H maps with 2 lines, similar to the presentation of the Las Vegas Wash. • The existing natural wash (Facility E3) be evaluated for capacity of the flow rate.
3	**Drainage Pattern –** The following was a consensus of the attendees: • Good idea to assume the 30cfs that currently routes south in Decatur from Horse will be kept in Horse with the regional facility in Horse. • The preferred drainage pattern (independent of necessary easement and conflict with the CTA) is the Horse Alignment. This will address the ponding problem at the Horse/Decatur intersection and provide an outlet from the Horse/Aliante intersection. • The newly suggested Aviary Alignment will still address the ponding problem with the Horse/Decatur intersection. It reduces the flows to the Horse/Aliante intersection but it does not address the flows that still get to the intersection.
4	**Points of Comparison/Limit of Analysis** – The limit of analysis will be based on showing no adverse impacts to existing and planned regional facilities.
5	**Proposed Facilities: Category A vs. B –** Steve Parrish wants the proposed facility in Grand Teton and thru the PHW site be a Category A facility. CCRFCD requested that the line for the Grand Teton facility on the F and H maps only extend to the current facility design.
6	**Existing Golf Course thru Aliante** – SHG asked if the existing golf course channel can have one ID with the description being "golf course channel." The following was a result of this question: • CCRFCD will not provide funding for the maintenance of the golf course. • CCRFCD stated that the golf course channel segments may be dictated by who maintains it. • There may be a need for an agreement on the maintenance funding of the golf course channel between CCRFCD and CNLV. • CCRFCD requires that geometry be provided for the existing golf course channel with the MPA.
7	**Entity Coordination/Schedule** – CNLV (Peter Jackson) and CLV (Dan Le) are okay with reviewing the MPA concurrently. No fees are required. Peter Jackson mentioned that should they have any comments/concerns, it will

Prepared By: K. Collins

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Item:	*Discussion:*
	be forwarded to the CNLV to be incorporated in their comment letter. CLV will not be issuing their own comment letter. CCRFCD questioned if County even needs to review the MPA if there are no changes to the County facilities.
8	**Additional Items to Note –** • It would not be appropriate to propose a detention with the MPA that would require an upsize. • SHG can consider keeping the Decatur facility and proposing a parallel facility in Grand Teton to the proposed detention basin.

Action Items:

Item:	*Person:*	*Comments:*
1	Kellin/Mark	Determine whether the proposed PHW detention basin with the removal of the dog park will have capacity for the additional flows from the Horse/Aviary intersection. Should the proposed PHW detention basin have capacity: • Determine the necessary changes • Determine schedule for the Update to the PHW MDS and PH GT TDS • Discuss with client on necessary changes and schedules
2	Developer	Determine which alignment to pursue.
3	Kellin	Coordinate with Clark County if they would be interested in reviewing the MPA since they were not in attendance to this meeting.
4	Kellin	Send a PDF of improvement plans for the Decatur/Grand Teton intersection to Peter Jackson at the CLV.
5	Dan	Revise the current approval letters for PHW MDS and PH GT TDS to remove Park Highlands East from the required MPA.
6	Dan	Research to determine the current responsible party for the maintenance of the golf course channel.
7	Dan	Schedule a follow-up meeting to discuss the existing Aliante Golf Course facility(s) with CNLV and CCRFCD to establish any required document/agreement between CCRFCD and CNLV on the maintenance and funding
8	Kellin/Mark	Based on the CNLV and CCRFCD meeting on the Aliante golf course facility, obtain a consensus on how many segments of regional facilities with ID will be required.

Prepared By: K. Collins

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SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

MEETING MINUTES

Project Number: CBH1301.002
Project Name: Park Highlands West MPU Amendment
Meeting Date: April 24, 2014 @ 4:00PM
Meeting Location: Clark County Public Works
Meeting Topic: Park Highlands West MPU Amendment

Attendees:	*Company Name:*	*Contact Info (email/phone)*
Layne Weber	CCPW	WLWEBER@co.clark.nv.us, 455-4856
Wade Gerstenkorn	CCPW	wade@co.clark.nv.us, 455-4899
Kellin Collins	Pardee Homes	KCollins@shg-inc.com, 284-5300

Meeting Notes:

Item:	*Discussion:*
1	**Project Scope** – Park Highlands West (PHW) and Park Highlands East (PHE) are projects located in the CNLV. The original intent of the Master Plan Amendment (MPA_ was to address regional changes due to the two developments. The two developments are planned to be split. This MPA is prepared to only address the new PHW by SHG. It will assume the existing (previously approved) PHE land plan and drainage pattern. A future separate MPA will be prepared to address the new PHE land plan and drainage pattern. This MPA will address the downstream impacts due to the PHW facilities. The proposed regional facility alignment ties into the Clark County Beltway storm drain system.
2	**CC Review of the MPA** – SHG inquired as to whether Clark County wants to review the PHW MPA. Clark County is not sure at this time and requires additional information for coordination with other members of Clark County to determine whether Clark County needs to review the PHW MPA.

Action Items:

Item:	*Person:*	*Comments:*
1	Kellin	E-mail Layne Weber with a PDF of the proposed MPU changes
2	Layne	Coordinate with others at CCPW as to whether they are interested in reviewing the PHW MPA. If County wants to review the PHW MPA, determine if they will review it concurrently with CNLV and CLV.

Prepared By: K. Collins

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SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

MEETING MINUTES

Project Number: CBH1301.002
Project Name: Park Highlands West MPU Amendment
Meeting Date: April 29, 2014 @ 9:00AM
Meeting Location: CNLV
Meeting Topic: Park Highlands West MPU Amendment

Attendees:	*Company Name:*	*Contact Info (email/phone)*
Jennifer Doody	CNLV	doodyj@cityofnorthlasvegas.com, 633-1233
Dan Le	CNLV	LeD@cityofnorthlasvegas.com, 633-1932
Mark Failla	SHG	MFailla@shg-inc.com, 284-5300
Kellin Collins	Pardee Homes	KCollins@shg-inc.com, 284-5300

Meeting Notes:

Item:	*Discussion:*
1	**Went over discussion items of the technical workshop on 4/24 –** Project Scope - This Master Plan Amendment (MPA) is prepared to only address the new Park Highlands West (PHW) by SHG. It will assume the existing (previously approved) Park Highlands East (PHE) land plan and drainage pattern. A future separate MPA will be prepared to address the new PHE land plan and drainage pattern. This MPA will address the downstream impacts due to the PHW facilities. Horse Alignment: The proposed Horse alignment extends from Decatur to the Las Vegas Wash and would replace the proposed facility in Decatur between Horse and Grand Teton. The question was posed as to the adoption of the MPA prior to obtaining the BLM easement for the Horse alignment. • CCRFCD hesitates to adopt or present to the Board for a regional facility alignment in which an easement is not guaranteed. Steve Parrish is concerned about removing a facility (along Decatur) that can be built today with one that may not be if the easement is not granted. • Mike Ross presented that the current Conservation Transfer Area (CTA) documents states that the CTA must respect and consider all planned CCRFCD MPU facilities within the CTA. Even without the BLM easement for the Horse alignment, if the MPA is adopted then the CTA will have to accept the Horse alignment. • Peter Jackson explained that the CLV and CNLV are currently struggling with the BLM because they have no consideration of all the planned CCRFCD MPU facilities within the CTA. Peter does not think by just getting MPA adopted will necessarily force BLM to accept easement/alignment. If the easement is granted then there would be no problem. • SHG/Developed thinks the adoption of the MPA will add credibility to acceptance of BLM Easement • The consensus of all reviewing agency was that the BLM easement must be in place for the MPA to be accepted and adopted. A potential alternative suggested by Phil Miller includes the following (now known as the Aviary Alignment): • Remove the proposed dog park in the detention basin as the dog park is not required of the PHW development agreement (DA) to obtain additional storage. • Route the flows from the intersection of Horse/Aviary south into the proposed detention basin. This will avoid the upsizing of the proposed Grand Teton facility between Decatur and Aviary. This will avoid the need for the BLM easement for the Horse Alignment.

Prepared By: K. Collins

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Item:	*Discussion:*
	• The proposed Aviary facility will discharge directly into the proposed detention basin and not tie into the Grand Teton facility. Note that the current local Aviary facility ties into the Grand Teton facility, this connection would be removed. Drainage Pattern – The following was a consensus of the attendees: • Good idea to assume the 30cfs that currently routes south in Decatur from Horse will be kept in Horse with the regional facility in Horse. • The preferred drainage pattern (independent of necessary easement and conflict with the CTA) is the Horse Alignment. This will address the ponding problem at the Horse/Decatur intersection and provide an outlet from the Horse/Aliante intersection. • The newly suggested Aviary Alignment will still address the ponding problem with the Horse/Decatur intersection. It reduces the flows to the Horse/Aliante intersection but it does not address the flows that still get to the intersection. Proposed Facilities: Category A vs. B – Steve Parrish wants the proposed facility in Grand Teton and thru the PHW site be a Category A facility. Existing Golf Course thru Aliante – SHG asked if the existing golf course channel can have one ID with the description being "golf course channel." The following was a result of this question: • CCRFCD will not provide funding for the maintenance of the golf course. • CCRFCD stated that the golf course channel segments may be dictated by who maintains it. • There may be a need for an agreement on the maintenance of the golf course channel between CCRFCD and CNLV. Existing Golf Course thru Aliante – CNLV and CLV is willing to review the MPA concurrently without any fees. It is still uncertain at this time if CCPW will review the MPA.
2	**Horse Alignment vs. Aviary Alignment vs. Decatur Alignment** – It is unclear at this time whether the developer will take the risk associated with the Horse Alignment and continue with the MPA. The developer may pursue an alternate alignment (Decatur Alignment or Aviary Alignment) that will avoid the CTA and BLM easement which would result in an Update to the PH GT TDS and PHW MDS. SHG is currently looking into the extra storage volume available with the removal of the dog park within the proposed detention basin. SHG is looking into Decatur Alignment and Aviary Alignment: as to the additional flow to the Grand Teton system, the potential upsize of the Grand Teton system, and capacity of the detention basin. Jennifer Doody is okay with the removal of the dog park as long as CNLV Planning is okay with the removal. Jennifer is also okay with the two alternative alignments. It was noted that if the Decatur or Aviary Alignment is selected for the MPA, the CNLV will still pursue the BLM easement to address the outlet at Horse/Aliante. Depending on the timing of the BLM easement, if it is obtained prior to the start of the PHE MPA, the CNLV will request the removal of the planned Decatur or Aviary Alignment and replace it with the Horse Alignment.
3	**Aliante Golf Course** – Jennifer Doody stated that the golf course and the culvert crossings are public facilities and maintained by the CNLV. Dan Le mentioned that he had recently received a phone call from Steve Parrish at CCRFCD to schedule a meeting on the maintenance and funding of the maintenance for the existing golf course. Jennifer Doody mentioned that she is okay with establishing a maintenance agreement and that the CNLV will only request money to maintain flood components once it becomes a regional alignment.
4	**CNLV Coordination/Schedule** – Should the proposed detention basin with the removal of the dog park have capacity for the addition flows from Horse (whether from Decatur or Aviary), will the CNLV be willing to review the updates to the PH GT TDS and PHW MDS concurrently with the MPA. Jennifer Doody will permit the submittal of the MPA for review after the first review of the update to the PH GT TDS. Dan asked about the review of the update to the PG GT TDS vs. the review of the PHE MDS currently in queue for review. Mark Failla stated that the PHW and the PH GT facility have priority over PHE. Therefore, depending when the update is submitted (if before the PHE MDS is under review) SHG/developer may request that the update replace the spot of the PHE MDS in the queue.

Prepared By: K. Collins

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Item:	*Discussion:*
5	**Additional Items to Note –** • For all Park Highlands meetings invite Jennifer Doody as well as Rob McLaughlin until told otherwise by the CNLV. • Jennifer Doody was okay with 2 separate MPA. • If the Aviary Alignment is feasible and selected for the MPA, CNLV request to have it classified as a Category A in the MPA. • Jennifer is okay with the Grand Teton facility being a Category B as requested by CCRFCD. • CNLV mentioned that any proposed beautification of the proposed detention basin needs to be included in the improvement plans of the detention basin. CNLV wants to insure that any proposed landscaping will not impact the function of the detention basin. • Before CNLV can approve anything onsite, civil plans for the Grand Teton facility must be approved.

Action Items:

Item:	*Person:*	*Comments:*
1	Kellin/Mark	Determine whether the proposed PHW detention basin with the removal of the dog park bench will have capacity for the additional flows from the Horse/Aviary intersection. Should the proposed PHW detention basin have capacity: • Determine the necessary changes • Determine schedule for the Update to the PHW MDS and PH GT TDS and discuss with client
2	Developer	Determine which alignment to pursue.
3	Kellin/Dan	Verify the current utilities within Aviary between Horse and Grand Teton for the constructability of that storm drain alignment.
4	Dan	Schedule a follow-up meeting to discuss the existing Aliante Golf Course facility(s) with CNLV and CCRFCD to establish any required document/agreement between CCRFCD and CNLV on the maintenance and funding
5	Kellin/Mark	Based on the CNLV and CCRFCD meeting on the Aliante golf course facility, obtain a consensus on how many segments of regional facilities with ID will be required.

Prepared By: K. Collins

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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: April 24, 2014

Project No.: CBH1301.002

From: **Kellin Collins**

Subject: **Park Highlands West**

CC: Chelsea Peltier, SHG
CC: Jerry Slater, SHG
CC: Phil Miller, Crescent Bay Holdings
CC: Mark Failla, SHG
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	CNLV Approval Letter
1	Master Drainage Study for Park Highlands West
1	Addendum No. 1 to the Master Drainage Study for Park Highlands West
1	Addendum No. 2 to the Master Drainage Study for Park Highlands West
1	Review Fee Check payable to CLV for $400.00

Comments:
Enclosed please find the above listed items in support of our application of the *Master Drainage Study for Park Highlands West.* Please contact us if there are any questions at 702-284-5300. Thanks.

Signed: Kellin Collins

Kellin Collins, P.E.
Director of Flood Control

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

5740 S. Arville Street #216, Las Vegas, NV 89118 ph (702) 284-5300 fax (702) 284-5399

Mayor
John J. Lee

Council Members
Anita G. Wood
Pamela A. Goynes-Brown
Wade W. Wagner
Isaac E. Barron

CITY OF
NORTH LAS VEGAS

Your Community of Choice

Interim City Manager
Jeff L. Buchanan

Deputy City Manager
Dr. Qiong X. Liu, PE, PTOE

PUBLIC WORKS – DEVELOPMENT AND FLOOD CONTROL
2250 N Las Vegas Blvd., Suite 200 • North Las Vegas, Nevada 89030-6307
Telephone: (702) 633-1200 • Fax: (702) 649-4696 • TDD: (800) 326-6868
www.cityofnorthlasvegas.com

April 22, 2014 Mailed via: E-mail

Mark Failla, PE, CFM
Kellin Collins, PE

Slater Hanifan Group, Inc.
5740 S. Arville Street. Suite #216
Las Vegas, Nevada 89118

Re: Master Drainage Study Addendum#2 - Park Highlands West (AKA North Las Vegas 600-Acre Site)
CNLV No. 46257

Dear Mr. Failla and Mrs. Collins:

CNLV staff has reviewed the above referenced study, dated May 29, 2013, Addendum #1, dated October 28, and Addendum #2, dated February 11, 2014 and found it to meet the minimum accepted standards for the technical drainage study. This acceptance is contingent upon the following conditions:

1. Concurrence must be obtained by the Clark County Regional Flood Control District (CCRFCD) due to the proposed improvement's proximity to a Regional Flood Control Facilities. Please submit a copy of this drainage study and all addenda to CCRFCD upon acceptance from CNLV.

2. Please note that since the Technical Drainage Study for Park Highlands Grand Teton Regional Flood Control Facility (DB Study) has not been approved by CCRFCD, any changes to the DB Study as the result of the review comments from CCRFCD must be addressed and reflected in this study.

3. Since this study is proposing to add, remove, and revise various regional flood control facilities, a CCRFCD Master Plan Amendment must be submitted and processed by the Engineer once this study and the currently submitted Park Highlands Grand Teton Regional Flood Control Facility (DB Study) and Master Drainage Study for Park Highland West have been reviewed and approved by CNLV, CLV, and CCRFCD.

   Also, please note that the proposed detention must be fully constructed and maintained by the developer until the Master Plan Amendment has been approved and that CNLV receives maintenance funding from the Regional Flood Control District for the maintenance operation of the detention basin.

4. Approval from the City of Las Vegas (CLV) will be required since the project is adjacent to the jurisdictional boundary and will construct storm drain improvements within CLV's public ROW.

5. Please note that no onsite development will be allowed until either a required interim or a permanent regional flood control facility are fully constructed along Grand Teton.

6. Please note that prior to approving the Improvement Drawings fro this project, all previously approved Improvement Drawings on CNLV files must be revised to reflect the changes from this approved drainage study.

7. Please note that any changes to the proposed land-use or drainage patterns as shown in this study will require the Engineer to provide a drainage study update to this master drainage study.

8. Please coordinate with Duane McNelly, Development and Flood Control Project Leader, when submitting Improvement Drawings for this project. Mr. McNelly can be reached at 633-2312.

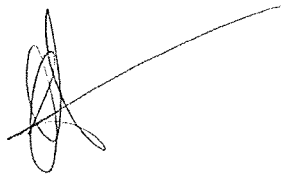
Please be advised that all land surface area disturbances over 1 acre and/or adjacent to a water way must submit a "Notice of Intent" to discharge to the Nevada Division of Environmental Protection, which certifies that a stormwater pollution prevention plan has been developed and is maintained on site. For more information, including forms and applications, see http://ndep.nv.gov/bwpc/storm01.htm.

Acceptance of this drainage study update does not imply approval of the Improvement Drawings and calculations associated with the drainage for this site. A detailed review of the drawings will be performed by staff during the improvement plan review process.

Any future changes in the proposed design (or design assumptions) as outlined in the approved drainage study and the attached preliminary plans which affect drainage must be addressed in a Drainage Study Amendment and accepted by the CNLV Development and 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, CNLV 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.

CNLV, its officials, or employees assume no liability for information, data, calculations and conclusions presented by the consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review. If you have any questions concerning this matter, please contact me at 633-1932.

Sincerely,



Dan Le, P.E., CFM
Senior Engineer
Development and Flood Control Division

MASTER DRAINAGE STUDY

Park Highlands West
(A.K.A. North Las Vegas 600-Acre Site)
VOLUME 1 OF 2
City of North Las Vegas, Nevada

Job No.: CBH1301.002
Date: May 2013

Prepared For:
Crescent Bay Holdings
7144 East Stetson Drive, Suite 410
Scottsdale, AZ 85251
Phone: 480-584-6997

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



5/29/13

Mark J. Failla, P.E., CFM
NV Professional Engineer No. 14566

Assisted by: Kylie Anderson, P.E.
Kellin Collins, P.E.
Erick Mata, E.I.

DEPARTMENT OF PUBLIC WORKS

CITY OF NORTH LAS VEGAS
Your Community of Choice

Drainage Study Submittal Application

- City of North Las Vegas Use Only -	Project name: Master Drainage Study Park Highlands West
Project #:_____ Received :____/____/____ ☐ Fee paid $_____ ☐ Engineer's seal ☐ Drainage Study Checklist	☑ Initial drainage study ☐ Concurrence ☐ CLOMR/LOMR ☐ Addendum #____ ☐ Amendment ☐ Supplement ☐ Update to *(original study name)*:_____ Study review process desired: ☑ In-house ☐ Outsourced

Project location (incl. cross streets): Grand Teton Drive and Decatur Boulevard

Assessor parcel number(s): see attached

Acreage: +/- 600 acres	Number of lots: n/a	Section/Township/Range: 18 & 19/19S/61E

Type of development:
☐ Residential subdivision ☐ Commercial subdivision ☐ Commercial
☐ Multi-family ☑ Other (please specify): Master Planned Community

Drainage Study Review Fee Schedule

A pre-submittal meeting must be arranged prior to Initial and Update Study submittals (702/633-1932)

Initial drainage studies:		Other submittals:	
☐ ≤6 gross acres	$ 500	☐ Addendum	$ 0
☐ >6 to 41 gross acres	$1000	☐ Addendum 2 or greater	(see DFC Fee Schedule)
☐ >41 to 321 gross acres	$ 2000	☐ Update	$400
☑ >321 to 2,561 gross acres	$ 4000	☐ Amendment	$400
☐ >2,561 gross acres	$ 6000	☐ CLOMR/LOMR	$0
☐ Concurrence	$250		

Additional outsourced review fees: Drainage study $4,200 Update $2,500

3 copies of the study must be supplied for outsourced review.

Engineering firm: Slater Hanifan Group	Contact person: Mark J. Failla, PE, CFM
Address: 5740 S. Arville Street, Suite 216	Phone: 702-284-5300
	Fax: 702-284-5399
City: Las Vegas State./Zip NV/89118	E-mail: mfailla@shg-inc.com
Owner/developer: Crescent Bay Holdings	Contact person: Philip Miller
Address: 7144 East Stetson Drive, Suite 410	Phone: 480-584-6997
	Fax: n/a
City: Scottsdale State/Zip AZ/85251	E-Mail: developpaz@gmail.com

Owner/developer wishes to be copied on all review correspondence: ☑ Yes ☐ No

Projects on the North Las Vegas municipal boundaries must be submitted to the adjacent jurisdiction for their review and/or approval. Projects that will impact the State's highway system must be submitted to the Nevada Department of Transportation District Office for review and approval.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: Master Drainage Study Park Highlands West Date: May 2013

Location of Development: a) Descriptive (Cross Streets): North/South: Decatur Boulevard

East/West: Grand Teton Drive

b) Section: 18 & 19 Township: 19S Range: 61E

c) APN: See attached.

Name of Owner: Crescent Bay Holdings

Telephone No.: 480-584-6997 Fax No.: n/a E-mail Address: developaz@gmail.com

Address: 7144 East Stetson Drive, Suite 410, Scottsdale AZ 85251

Contact Person – Name: Mark J. Failla, PE, CFM Telephone No.: 702-284-5300

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

Firm: Slater Hanifan Group

Address: 5740 Arville St. #216

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		Master Planned Community

1. Total Owned Land Area: At Site: ±600 Acres Being Developed/Disturbed: ±600 Acres

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.): Master Planned Community

5. Approximate upstream land area which drains to the subject site: 3.04 square miles

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

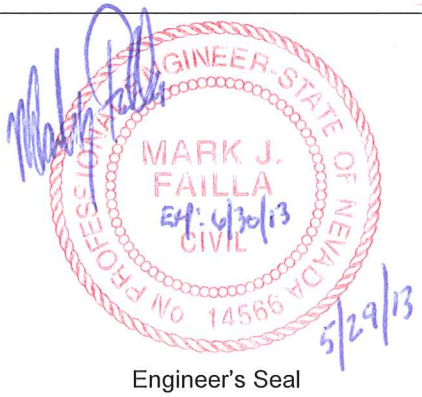
Conceptual Drainage Study for the North Las Vegas 600-Acre Site (CNLV No. 24576)

Update No. 1 to the Conceptual Drainage Study for the North Las Vegas 600-Acre Site (CNLV No. 27888)

Update No. 2 to the Conceptual Drainage Study for the North Las Vegas 600-Acre Site (CNLV No. 28463)

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Linear Park at Aliante Parkway, Aliante Golf Course Channel, Elkhorn Road & Linear Park at Aviary Way

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



Engineer's Seal

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

*Newly Required Field

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

Local Entity File No.

Revision	Date

REFERENCE: STANDARD FORM 1

Updated 05/01/2008

Project Assessor Parcel Numbers:

124-18-110-001, 124-18-110-002
124-18-510-001 thru 124-18-510-004
124-18-210-001, 124-18-210-002
124-18-610-001 thru 124-18-610-004
124-18-310-001 thru 124-18-310-003
124-18-714-001, 124-18-714-002
124-18-410-001, 124-18-410-003
124-18-816-001, 124-18-816-002
124-19-111-001

DEPARTMENT OF PUBLIC WORKS

CITY OF NORTH LAS VEGAS
Your Community of Choice

Drainage Study Checklist

Background

The City of North Las Vegas strives to provide the development community with adequate information to ensure the successful completion of any project in the City. To aid in the submittal of a complete, thorough drainage study, the following checklist has been compiled to assist the design engineer. This checklist focuses on requirements specific to the City of North Las Vegas. When preparing a drainage study, the engineer will still be required to adhere to all local criterion and guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) *Hydrologic Criteria and Drainage Design Manual* (HCDDM) and the *Uniform Standard Drawings for Public Works' Construction Off-site Improvements* for Clark County Area, Nevada. **In order to have a complete drainage study for submittal to the City, this checklist must be completed, signed, and stamped by the engineer in responsible charge for the completion of the drainage**. Incomplete submittals will not be accepted at the front counter.

Checklist

Provide N/A to an item that is not applicable for the subject site.

I. General Requirement		
Yes	No	
x		Ensure that the new Standard Form 1 and 2 are utilized for all incoming drainage study submittals. The form can be acquired from the CCRFCD's website at http://www.ccrfcd.org/engineering.htm.
x		Ensure that the new 2008 CCRFCD's Master Plan Update (MPU) is utilized for all incoming drainage study submittals. Both the Flood Control Facilities and Facility Inventory Maps must be included with the drainage study.
	n/a	A copy of the approved zoning/planning conditions associated with this site must be included with the initial submittal to verify compliance with conditions.
	n/a	If offsite grading is anticipated, a notarized permission letter to construct from the property owner is required prior to the approval of this technical drainage study.
	n/a	If the site is proposing to increase or concentrate storm flow and/or nuisance flows onto the adjacent property. A notarized permission letter to accept from the property owner is required prior to the approval of this technical drainage study.
	n/a	The City of North Las Vegas (CNLV) does not allow valley gutters to be constructed across streets with right-of-way widths of 80 feet or greater.
	n/a	Provide map pockets in the back of the drainage study in order to keep the improvement plans with the study.
x		Include a CD-ROM that contains a pdf of the entire study, including improvement plans. When submitting flow split analysis for a site, staff suggests using the Pima County flow split calculations. Make sure to provide all supporting documents.
x		When submitting flow split analysis for a site, staff suggests using the ~~Pima County flow split calculations~~. Make sure to provide all supporting documents.

FLOWMASTER EQUAL WSE APPROACH UTILIZED

	n/a	The project proposes to construct facilities and/or discharge flows within Nevada Department of Transportation (NDOT) right of way. The engineer must contact NDOT for an encroachment permit for the proposed project and it must be received prior to approval of the improvement plans. NOTE: NDOT does not allow for development to increase the 100-year flow rate into their ROW - onsite detention may be required.
	n/a	Where right-of-way does not exist, a roadway or drainage easement must be obtained from the adjacent property owner(s) prior to improvement plans approval. Roadway and drainage easement dedication documentation must be processed through the CNLV Real Property Services Division. For more information, please contact Lorena Candelario at 633-2396.
x		This report serves as a master drainage study for the site. A separate technical drainage study will be required by the City of North Las Vegas upon development of areas shown on the conceptual site plan. Each technical drainage study should provide more detailed design information, including final grading plans with corresponding drainage facility details, hydraulic design calculations, etc.
x		Ensure that the longitudinal slope used to calculate the 100-year flow depth for a given street matches with the slope indicated on the grading plans.
	n/a	The City of North Las Vegas (CNLV) is a member of the Community Rating System, which requires Base Flood Elevations (BFE's) to be indicated for any structures located within a Special Flood Hazard Area (SFHA) Zone A, AO, AE, etc.. Please indicate the extent of the effective regulatory SFHA on the grading plan and show the BFE's of the affected lots.
x		If a site is adjacent to a future Clark County Regional Flood Control Facility, the developer is required to construct drop inlets at the site's discharge point along the alignment, which will collect 100% of the site's 100-year discharge.
x		If the proposed development is required to construct flood control facilities that are depicted on the Clark County Regional Flood Control District's Master Plan Update, structural drawings must be submitted with the drainage study for review and approval by the City of North Las Vegas prior to submitting to CCRFCD for concurrence.
x		The City of North Las Vegas North Neighborhood Flood Control Master Plan (NNFCMP) has established centerline intersection grades with corresponding street slopes. Please ensure that the street intersection designs are compatible with the NNFCMP.
	n/a	For rectangular shaped culverts, the minimum shall be 6 feet in height and 5 feet in width.
x		The City of North Las Vegas requires that all local drainage facilities identified on the North Neighborhood Flood Control Master Plan (NNFCMP) to be constructed by the developer for the full frontage of the site.
	n/a	This property is adjacent to Unincorporated Clark County. Please note that a copy of this study and any addenda must be submitted to Clark County Development Services for their review and concurrence.
x		This property is adjacent to the City of Las Vegas. Please note that a copy of this study and any addenda must be submitted to City of Las Vegas for their review and concurrence.

	n/a	Side lot easement for all residential development will need to meet all the requirements as set forth in the City of North Las Vegas Municipal Code under Title 17.24.210.D.4
	n/a	"Arizona" style crossing is not permitted within CNLV right-of-way. Culvert crossings, sized to convey the 100-year flow without any backwater effects, must be designed to convey the flow back to its historical path.
x		The minimum pipe diameter to be constructed within public drainage easement or right-of-way shall be 18-inch in reinforced concrete pipe. HDPE pipes are allowed with the caveat that it must be slurry back fill.
	n/a	Backwater ponding limits that extend outside of the public right-of-way shall be delineated on the grading plans and a public drainage easement or right-of-way be obtained from the property owner. Roadway and drainage easement dedication documentation must be processed through the CNLV Real Property Services Division. For more information, please contact Lorena Candelario at 633-2396.
x		When referencing other drainage studies, all relevant information such as approval letters, drainage basin maps, HEC-1 analyses, details, plans, etc. must be included with the study. The material being referenced should be highlighted in some manner to indicate what is being referenced.

II. Grading Plan Information		
Yes	No	MASTER DRAINAGE STUDY (NO IP's PROVIDED)
	n/a	24"X36" copies of Grading Plans including Detail Sheets. Additionally, Plan and Profile sheets must be provided for all public offsite streets and/or storm drain/channel system improvements. The information provided in profile shall include: stationing, length, slope, size, discharge (Q100), material, class of pipe (Class III, IV, V, etc.), hydraulic grade line, inlet locations, finished grade over the pipe and etc.
	n/a	On a 100' right-of-way street, the developer is required to build their half of the street, the median island, and one lane on the opposite side of the median. Additionally, the median island will be required to be landscaped.
	n/a	Alignment of all existing, proposed, or future Regional Flood Control Facilities adjacent to the site must be shown on the grading plans.
	n/a	Appropriate elevated "humps" 6 inches above the 100-year water surface elevation at all driveways location where the intent is to protect the site from the Q100 flows.
	n/a	Erosion protection must be provided at the upstream and downstream terminus of all public roadway improvements.
	n/a	Landscape berms used to protect property from flows in the adjacent streets must meet the criterium of being twice the depth of flow above the adjacent flowline up to 18 inches above the adjacent water surface.
	n/a	Temporary pavements used to satisfy Clark County PM-10 requirements cannot be used to establish centerline grades for any proposed streets. All proposed street improvements must be designed per the Uniform Standard Drawings for Public Works Construction, Offsite Improvements, Clark County Area, Nevada.
	n/a	Show cross sections along all project boundaries showing the elevational relationship, property line, and any existing or proposed walls.

	n/a	Verify all finished floor elevations of the proposed development meet Section 304.4 of the HCDDM.
	n/a	All onsite drainage swale must maintain a minimum of 1% slope. If < 1% is anticipated, concrete valley gutter is required.
	n/a	Proposed on-site and off-site storm drains and other flood control facilities with plan and profile sheets for public storm drains showing the class of pipe, (Class III, IV, V, etc.), utilities conflict (if any), design hydraulic grade line (HGL) and the 100 year storm flow. A public drainage easement must be provided over on-site storm drains conveying the off-site flows.
	n/a	Identify all adjacent parcels with the appropriate assessor parcel number and ownership information.
	n/a	The Engineer must show existing and proposed development at least 100-feet beyond the project site limits. Finished floor elevations of existing buildings, centerline grades, centerline slopes, and top of existing curb elevations must be shown. Reference all adjacent existing improvements with a CNLV Project #. Ensure that it matches with the approved civil plans.
	n/a	Make every effort to provide plan sheets that are clean and clear to review. Be sure to eliminate superimposed text.
	n/a	Due to air quality regulations, all proposed streets must maintain a total of 32' asphalt area. For instance, a 60' half-street improvements will require an additional of 9-foot of overpaving from the centerline.
	n/a	Full intersection designs abutting the proposed development must be provided to ensure that all quadrants of the intersection will drain properly.
	n/a	Provide slopes of driveway fronting all public right-of-ways. Per CNLV Fire Code, the angles of approach and angles of departure must not exceed 6%.
	n/a	For commercial and industrial developments, landscape areas are not allowed to sheet flow over the sidewalk. Provide flow lines with grades and sidewalk under drains for all landscape areas draining to the streets.

III. Hydrologic and Hydraulic Analyzes		
Yes	No	
x		Verify that the street capacity calculations for "ABC" and "XYZ" streets were completed for the worst case scenario for both water surface elevation and velocity (flattest and steepest slopes). In the interim condition, provide street capacity calculations for the 100-year event. In the ultimate condition, provide street capacity calculations for the 10-year and 100-year events.
	n/a	For 100-year street flows with depths greater than 0.6' and velocities higher than 5 fps, erosion resistant landscaping or pony walls at the back of sidewalk (to the height of the flow in the street) must be provided.
	n/a	If a CNLV modified 60' standard street section with offset sidewalk is to be proposed with the development. Ensure that the Flowmaster calculations and improvement drawings are reflected with the correct cross section.

x		For 80' and greater streets, if a median island is proposed with the site, ensure that the street capacity calculations are reflected with a median island.
x		For 80' and greater streets, the actual 12' dry lane determination must be shown on the Q10 street capacity calculations. CNLV only requires this criterion to be met in the FUTURE condition. Please note that the dual left turn lane and center median island cannot be used to satisfy the 12' dry lane criterion. Therefore, a minimum of 19' on each half of the street must be achieved for the entire stretch of the site.
x		All drainage studies for sites located within the North Neighborhood Flood Control Master Plan (NNFCMP) area must analyze four (4) separate conditions. a. A pure existing condition analysis that quantifies the amount of flow impacting the site in the existing condition. This condition has existing improvements and curve numbers for both onsite and offsite basins. Offsite basins should generally follow contours or existing development drainage patterns. b. An interim condition, where the offsite basins are the same as in the pure existing condition and the onsite basins are developed. The flows in this condition are modeled in the proposed half-streets being constructed with the development and homes/buildings must be at or above the WSE in the street. c. The NNFCMP existing condition flows are analyzed assuming a full street section, the CCRFCD street flow criterion does not need to be met, and the adjacent finished floor elevations must be above the associated WSE. d. The NNFCMP future condition flows are analyzed assuming a full street section, all CCRFCD street flow criteria must be met, and the finished floor elevations must have the required freeboard above the associated WSE.
	n/a	For parcels impacted by a FEMA Special Flood Hazard Area, analyses of the floodzone, utilizing the FEMA effective flowrate must be completed for both pre- and post-development cases. The post-development analysis must tie into the effective SFHA in both width and water surface elevation.
x		For proposed storm drain connecting into other existing storm drain system, supporting documents must be provided for the beginning HGL used in the hydraulic modeling.
	n/a	For the purpose of establishing adequate finished floor elevations for those structures adjacent to the proposed drainage easement, the City requires that submerged weir calculations are submitted. As the sidewalks at the upstream entrance of the drainage easement will effectively act as a broad-crested weir with a submerged tailwater, the water surface elevations at the easement entrances must be calculated as such.
	n/a	The engineer must provide inlet control nomograph (see HCDDM) calculations for all proposed drop inlets to ensure that the storm sewer will have the capacity to convey the anticipated 100-year peak flow.
	n/a	The CNLV requires that all drop inlet sizing to be performed with the HEC-22 software which can be acquired from the Federal Highway Administration's website at http://www.fhwa.dot.gov/engineering/hydraulics/software.cfm
	n/a	Concrete headwalls are required at the inlet and outlet of all culvert installations. Flare end sections are acceptable for culvert less than 30-inch.

	n/a	Erosion protection and/or cut off walls may be required at the upstream and downstream of a culvert.
	n/a	For the ease of maintainability and constructability, all storm drain pipes must be designed with a soffit to soffit connections.
	n/a	Swales that are designed to carry the 100-year flow must maintain a minimum freeboard of six inches above the depth of flow. Provide hydraulic calculations for verification.
x		The soil's map must include both the off-site and on-site sub-basin delineations for all drainage conditions.

IV. Local Entity Criteria - City of North Las Vegas - HCDDM Section 1603		
Yes	No	
	n/a	Within the interior streets of a residential subdivision, the depth times velocity for the major storm event shall be less than or equal to 6.
	n/a	When downstream storm sewer facilities are not available, the City of North Las Vegas requires bubbler laterals for the conveyance of storm water under streets with right-of-way widths greater than or equal to 80 feet. The bubbler laterals must consist of a minimum 18-inch diameter reinforced concrete pipe. To accommodate the draining of the bubbler system prior to future downstream extension of the storm sewer system, a minimum 6-inch diameter PVC pipe must be daylighted downstream.
	n/a	The City of North Las Vegas does not permit the construction of permanent structures within a Federal Emergency Management Agency (FEMA) designated Special Flood Hazard Area (SFHA). Under this policy, any developer/builder proposing to place structures within a SFHA must meet the following requirements prior to the issuance of various permits and certificates-of-occupancy: a. Grading and off-site construction permits may be issued by the CNLV Department of Public Works once the improvement plans and drainage study have been approved and a copy of the completed Conditional Letter of Map Revision (CLOMR) application has been submitted to FEMA for processing. b. Building permits can be issued once a favorable CLOMR has been obtained from FEMA. c. Certificates-of-occupancy can be issued once a Letter of Map Revision (LOMR) has been obtained from FEMA.
	n/a	The City of North Las Vegas requires that stormwater drop inlet signage be affixed to any installed drop inlets. The plaque must read "Don't pollute - drains to Lake Mead" in English and Spanish. CNLV Quality Control/Offsite inspectors will verify that the signs are properly installed.
x		A minimum longitudinal street slope of 0.4 percent (0.004 ft/ft) shall be used. If the Engineer can demonstrate, to the satisfaction and approval of the City Engineer, severe topographic constraints or other mitigating factors, the design of streets with slopes less than 0.4 percent may be permitted.
	n/a	Side lot drainage easements are generally discouraged unless the engineer can demonstrate design constraints that render alternative site layout and drainage facility design options as impossible or impractical.

	n/a	All wall openings must be designed to pass the 100-year storm event flows using the assumption that the bottom 50% of the openings are obstructed.
x		When a storm drain system is proposed at a sump area, a non-damaging emergency surface flow path must be provided to convey the 100-year flows. Adjacent finished floor elevations must be adequately protected.
	n/a	For any ground-mounted air-conditioning pad that encroaches to within three (3) feet of a property line, the engineer must indicate on the plot plans how lot drainage will be accommodated beneath the pad. This can include, but is not limited to, the placement of a 4-inch diameter PVC pipe, with the inlet and outlet inverts of the pipe constructed to correspond with the flow line of the obstructed lot drainage swale.

Engineer's Stamp

Engineer in Responsible Charge Name (Printed)

Approved by CNLV Development and Flood Control *Date*

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE SUBMITTAL CHECKLIST

Project Name: Master Drainage Study Park Highlands West		Map ID:
Firm Name: Slater Hanifan Group (SHG)		Mark J. Failla, P.E., CFM
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: Crescent Bay Holdings		
7144 East Stetson Drive, Suite 410		
City: Scottsdale	State: AZ	Zip: 85251
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-14), 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.
	n/a	Revision box.
x		North arrow and bar scale.
x		Engineer's/consultant's address and phone number.
	n/a	Elevation datum and benchmark.
x		Legend for symbols and abbreviations.
	n/a	Cut/fill scarps, where applicable.
x		Street names, grades, widths.
	n/a	Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street.

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.
	n/a	Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.
	n/a	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.
	n/a	Right-of-way lines and widths, existing and proposed.
x		Existing improvements and their elevations.
x		Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points.
x		Concentration points and drainage flow direction with Q_{100} and V_{100} and D_{100} in streets.
x		Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows.
x		Location and cross-section of street capacity calculations.
	n/a	Cross-sectional detail for channels, including cutoff wall locations.
x		Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations.
	n/a	Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.
	n/a	Location and detail of existing, proposed, and future block wall openings. Minimum size 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	
	n/a	Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood Walls with 8-inch concrete masonry unit.
	n/a	Building and/or lot numbers.
x		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	
x		Flow split calculations and supporting documentation or reference for the method of flow split calculations used.
x		Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the Q_{100} and Q_{10} flows representing the worst case for interior and all perimeter streets. Q_{100} d x v $\leq$ 8. Q_{10} d x v $\leq$ 6 and 12 foot dry lane for rights-of-way $\geq$ 80 feet. Calculations must be labeled by street name as indicated on the Grading Plan.
x		A summary table of interior and exterior street capacity calculations showing the street name, Q_{100} flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.
	n/a	Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)
	n/a	Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.
	n/a	Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the Q_{100} weir height or flow depth, 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.
	n/a	Provide a 50 percent clogging factor in the capacity calculation for drop inlets.
x		Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation.
x		The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.

REFERENCE:	STANDARD FORM 2

CITY OF LAS VEGAS

MINIMUM DRAINAGE STUDY CRITERIA
STANDARD FORM 2 CHECKLIST SUPPLEMENT

(Revised 5/18/11)

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

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

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

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

II. GRADING PLAN INFORMATION		MASTER DRAINAGE STUDY (NO IP's PROVIDED)
Yes	No	
☐	☑	(1) 24" X 36" copy of the Grading Plan, (including all Detail Sheets) sealed by the engineer.
☐	☑	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.
☐	☑	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.)

CITY OF LAS VEGAS MINIMUM DRAINAGE STUDY CRITERIA CHECKLIST

II. GRADING PLAN INFORMATION		
Yes	No	
☐	☑	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.
☐	☑	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.
☐	☑	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.
☐	☑	Back of lot elevations and lot drainage pattern for all lots including common lots.
☐	☑	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.
☐	☑	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.)
☐	☑	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.
☐	☑	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	
☐	☑	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.
☐	☑	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.
☐	☑	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.
☐	☑	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.
☐	☑	Finished floor elevations for buildings adjacent to public drainage easements must be a minimum of 18 inches above the Q100 weir of submerged weir elevation, whichever is greater.

III. Local Entity Criteria - City of Las Vegas – Manual Section 1600		
Yes	No	
☐	☑	Lots with "B and C Type Drainage" that drain from one lot to another through a drainage easement shall be required to install an underground nuisance drainage system or a 2-foot valley gutter. 16" x 24" minimum block wall openings are required for both options.
☐	☑	Bubblers are required across 80 foot and greater ROW streets. When flows exceed 10 cfs, bubblers larger than 18 inches will be required up to a maximum of 36". Inlets must be sized to match the pipe size provided.

- Contact the Flood Control Section regarding the drainage study review fee. These fees are payable at the time of submittal.
- The Drainage Study must be conditionally approved prior to submitting improvement plans to the Civil and Planning Development of the Department of Building and Safety for review.

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

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5. Approved Plans for North Las Vegas 600 Acres Area 4 (CNLV No. 28978)
6. Approved Plans for North Las Vegas 600 Acres Area 7 (CNLV No. 29393)
7. Existing Storm Drain Modifications Decatur Boulevard, Las Vegas Wash Middle Branch Storm Drain Improvements, Decatur Boulevard & Elkhorn Road Improvement Plans (CLV No. 16529)
8. Technical Drainage Study for North Las Vegas 600-Acres Areas 8 and 9 (CNLV No. 36235)
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9. Technical Drainage Study for Grand Teton Regional Flood Control Facility (CNLV No. 45326)
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1 INTRODUCTION

1.1 Overview & Study Purpose

Crescent Bay Holdings, Inc. is proposing a 600 ± acre master planned community within the City of North Las Vegas, Nevada (CNLV) and directly adjacent to the City of Las Vegas, Nevada (CLV). The site is located near the southeast corner of Grand Teton Drive and Decatur Boulevard. The master planned community is identified as *Park Highlands West.* The Park Highlands West master planned community consists primarily of residential development, with some parcels appropriated for commercial development, parks and schools. The master plan also addresses development of roadways, and municipal and flood control improvements.

A previously approved Conceptual Drainage Study (by others) exists for the project site. See Section 1.2 of this report for further discussion. However, since approval of previous study, revisions have been made both onsite and offsite that impact the Park Highlands West project site. The purpose of this study is to address the revisions and serve as a replacement to the previous Conceptual Drainage Study (by others). The Master Drainage Study provides an overall conceptual hydrologic and hydraulic analysis for the project site in order to provide flood control recommendations to protect the property from onsite and offsite runoff in accordance with local storm water criteria. The study addresses the following:

- Research of previous drainage studies for the project area.
- An inventory of existing storm water facilities in the vicinity.
- Determination of FEMA flood plain designation for the project site.
- Identification of existing, proposed and/or future CCRFCD facilities in the vicinity of the project site.
- Interim and ultimate condition offsite drainage patterns and determination of 10-year and 100-year peak flow rates.
- Ultimate condition onsite drainage patterns and determination of 10-year and 100-year peak flow rates.
- Allowable discharge restrictions at downstream locations based on existing condition peak flows and/or peak flows established by prior studies.
- Conceptual design recommendations for master drainage infrastructure to control onsite and offsite stormwater runoff.

Please note that this study constitutes a master drainage study for the proposed site for use in site planning and conceptual design. No improvements are proposed at this time; only designation of onsite land use and drainage patterns, as well as recommendations for future drainage infrastructure. Future technical drainage studies and/or update studies will address development of individual parcels and drainage infrastructure when improvements are proposed.

1.2 Research of Previous Drainage Studies

The Park Highlands West project site was conceptually analyzed by a previously approved conceptual drainage study by others. The previously approved conceptual study and relevant update studies have been reviewed and portions have been utilized for reference

in preparation of this study. The previously approved conceptual study and relevant update studies are as follows:

1) *Conceptual Drainage Study for the North Las Vegas 600-Acre Site (*by G.C. Wallace, hereafter referred to as the CDS, CNLV No. 24576) approved by the CNLV on June 14, 2006.

2) *Update No. 1 to the Conceptual Drainage Study for the North Las Vegas 600-Acre Site* (by G.C. Wallace, hereafter referred to as the CDS Update No. 1, CNLV No. 27888) approved by CNLV on January 17, 2007.

3) *Update No. 2 to the Conceptual Drainage Study for the North Las Vegas 600-Acre Site* (by G.C. Wallace, hereafter referred to as the CDS Update No. 2, CNLV No. 28463) approved by CNLV on February 28, 2007.

In addition to the previous CDS and CDS Updates for the site, several technical studies (by others) have also been approved for the site. The Park Highlands West project site was divided into several "areas" (Area 1 thru Area 9) per the previously approved CDS. Approved technical drainage studies and improvement plans for each of the areas (hereafter generally referred to as the Area Studies) have been prepared for the site addressing technical design of each of the individual areas within the site. Please see Exhibit N located in Appendix A for reference to the areas. With these approved Area Studies, a large part of the onsite flood control improvements, including onsite storm drain and drop inlets, as well as rough graded roadways, have been constructed and are considered existing per this Master Drainage Study. See Section 1.8 for more detailed discussion of each of the Area Studies and improvement plan sets utilized for reference in preparation of this Master Drainage Study.

Since approval of the CDS and CDS Updates, as well as the Area Studies, several changes have been made both onsite and offsite that impact the Park Highlands West project site. Therefore, this Master Drainage Study is submitted to address these revisions and serves as a replacement to the currently approved CDS and CDS Updates associated with this site. The main revisions addressed with this Master Drainage Study include the following:

- Change in site ownership;
- Minor revisions to the site and land use plan resulting in revised onsite hydrologic analysis;
- Revised offsite hydrologic analysis;
- Incorporation of existing onsite storm drain and drop inlets constructed with the currently approved Area Studies;
- Revised CCRFCD Regional Facilities in Grand Teton Drive which include addition of an onsite detention basin at the southeast corner of Grand Teton Drive and Aviary Way, modifications to the CCRFCD Regional Facility in Grand Teton Drive from Decatur Boulevard to Aviary Way, and removal of the CCRFCD Regional Facilities in Grand Teton Drive (from Aviary Way to the Las Vegas Wash) and Decatur Boulevard (from Horse Drive to Grand Teton Drive);
- Revisions to portions of existing onsite storm drain facilities to accommodate the proposed detention basin;

- Addition of the existing CCRFCD Regional Facility in Decatur Boulevard which acts as a cutoff for flow from the west, negating the need for an onsite interim condition hydraulic analysis.

The majority of the revisions listed above have been addressed with a recent technical drainage study entitled *Technical Drainage Study for Park Highlands Grand Teton Regional Flood Control Facility* (by Slater Hanifan Group, hereafter referred to as the DB Study, CNLV No. 45326). This study addressed the revised offsite hydrology, the addition, removal and modifications to CCRFCD Regional Facilities in Grand Teton Drive and Decatur Boulevard and the onsite storm drain revisions related to the addition of the onsite detention basin. However, the DB Study did not address the minor revisions to the site and land use plan which require a re-analysis of ultimate condition onsite hydrology. Therefore, this Master Drainage Study incorporates the revisions proposed in the DB Study, as well as the revisions to the onsite hydrology required due to minor revisions to the site and land use plan.

1.3 Site Description

In the current condition, the Park Highlands West project site is partially undeveloped with sparse desert vegetation, and partially mass graded per the approved Area Studies. The project site is generally bound by Grand Teton Drive alignment to the north, Decatur Boulevard to the west, Dorrell Lane to the south, and Aliante Parkway to the east. The existing Aliante master planned community borders the Park Highlands West site to the east and south. The project site generally drains in a southeasterly direction. A vicinity map, identified as Exhibit A, is included in Appendix A for reference.

Per the Area Studies and site investigation, the majority of onsite storm drain and drop inlets are constructed and considered existing per this Master Drainage Study. The majority of the onsite roadways are rough graded to subgrade. Furthermore, the majority of municipal improvements, including water and sewer are constructed. CNLV has provided an exhibit illustrating the improvements that have been constructed within the Park Highlands West project site thus far and the exhibit has been included for reference in Appendix E.

1.4 FEMA Flood Zone Designation

The proposed project is not located within a FEMA designated Special Flood Hazard Area (SFHA) per review of Flood Insurance Rate Map (FIRM) Panel 32003C1765F, dated November 16, 2011. Exhibit B depicting the project location on the FEMA FIRM panel is included in Appendix A.

1.5 CCRFCD 2008 Master Plan Update

Per the 2008 CCRFCD Master Plan Update (hereafter referred to as the CCRFCD MPU, Reference 1), this project includes facilities identified as future regional facilities. The affected facilities currently depicted in the MPU are identified as GTEA 0360, 0355, 0347, 0263, 0161, 0093 and 0000. Note that per the DB Study various changes to the regional hydrologic analysis, routing patterns and regional facilities are proposed which have been incorporated into this Master Drainage Study. Per coordination with CNLV and CCRFCD, an MPU Amendment is required as part of this project and will be processed subsequent to conditional approval of this Master Study Drainage.

The project site has been identified on the current 2008 CCRFCD MPU Figures F-14 and H-14, identified as Exhibits C and D. The exhibits are included in Appendix A for reference.

1.6 City of North Las Vegas North Neighborhood Study

Existing and future condition drainage maps from the City of North Las Vegas North Neighborhood Study (hereafter referred to as the CNLV NN Study, Reference 2) were reviewed for comparison of peak flows identified by the CNLV NN Study to those proposed by this study at various locations. The exhibits are identified as Exhibits 1E, 2E, 1F and 2F, and are included in Appendix A.

1.7 City of Las Vegas Northwest Neighborhood Study Phase 2

Existing and future condition drainage maps from the City of Las Vegas Northwest Neighborhood Study Phase 2 (hereafter referred to as the CLV NWN Study, Reference 3) were reviewed for comparison of peak flows identified by the CLV NWN Study to those proposed by this study at various locations. The exhibits are identified as Exhibits 1G, 2G, 1H and 2H and are included in Appendix A.

1.8 Reference Studies

This document was prepared in coordination with various relevant documents, studies and improvement plans previously reviewed and approved by CNLV, CLV and CCRFCD. The following drainage studies were utilized in the preparation of this study. Relevant material was reviewed and is considered acceptable for reference with exceptions as noted in this report. Relevant reference material has been included in Appendix F and Appendix G.

1) *Update No. 2 to the Conceptual Drainage Study for the North Las Vegas 600-Acre Site* (by G.C. Wallace, hereafter referred to as the CDS Update No. 2, CNLV No. 28463) has been utilized as reference for the currently approved conceptual facilities for the Park Highlands West site.

2) *Improvement Plans for North Las Vegas 600 Acres Area 2* (by Carter Burgess, hereafter referred to as the Area 2 Plans, CNLV No. 28976) have been utilized to determine geometry and slope of proposed Area 2 roadways, as well as location, size and slopes of existing Area 2 storm drain improvements.

3) *Improvement Plans for North Las Vegas 600 Acres Area 3* (by Carter Burgess, hereafter referred to as the Area 3 Plans, CNLV No. 29254) have been utilized to determine geometry and slope of proposed Area 3 roadways, as well as location, size and slopes of existing Area 3 storm drain improvements.

4) *Improvement Plans for North Las Vegas 600 Acres Area 3 Arch Culvert* (by Slater Hanifan Group, hereafter referred to as the Area 3 Arch Plans, CNLV No. 42173) have been utilized to determine location, size and slope of existing Area 3 storm drain improvements for the facility extending from Farm Road south to the Aliante Golf Course Channel (Concentration Point PT2).

5) *Improvement Plans for North Las Vegas 600 Acres Area 4* (by Carter Burgess, hereafter referred to as the Area 4 Plans, CNLV No. 28978) have been utilized to determine geometry and slope of proposed Area 4 roadways, as well as location, size and slopes of existing Area 4 storm drain improvements.

6) *Improvement Plans for North Las Vegas 600 Acres Area 7* (by Carter Burgess, hereafter referred to as the Area 7 Plans, CNLV No. 29393) have been utilized to determine geometry and slope of proposed Area 7 roadways, as well as location, size and slopes of existing Area 7 storm drain improvements.

7) *Existing Storm Drain Modifications Decatur Boulevard, Las Vegas Wash Middle Branch Storm Drain Improvements, Decatur Boulevard & Elkhorn Road Improvement Plans* (by VTN Nevada, hereafter referred to as the Decatur Facility Plans, CLV No. 16529) have been utilized to confirm that the storm drain connection from Decatur Boulevard storm drain to the onsite storm drain in Virage Park Drive has been removed.

8) *Technical Drainage Study for North Las Vegas 600-Acres Areas 8 and 9* (by G.C. Wallace, hereafter referred to as the Area 8 & 9 Study, CNLV No. 36235) has been utilized to determine geometry and slope of proposed Area 8 and 9 roadways, as well as location, size and slopes of existing and proposed Area 8 and 9 storm drain improvements.

9) *Technical Drainage Study for Grand Teton Regional Flood Control Facility* (by Slater Hanifan Group, hereafter referred to as the DB Study, CNLV No. 45326) has been utilized to determine geometry and slope of proposed Grand Teton Drive improvements, as well as location, size and slopes of proposed Grand Teton Drive storm drain improvements. The DB Study has also been referenced to identify specific parameters relevant to the proposed onsite detention basin for incorporation into hydrologic and hydraulic modeling. Please note that the offsite hydrologic analysis provided herein is identical to that included in the DB Study.

10) *Technical Drainage Study for Nelson Ranch* (by Orion Engineering and Surveying, hereafter referred to as the Nelson Ranch Study, CNLV No. 14854) has been utilized to determine geometry and slope of proposed Grand Teton Drive improvements east of Aviary Way, as well as location, size and slopes of existing storm drain improvements in Grand Teton Drive east of Aviary Way.

11) Update to Conceptual Drainage Study for North Las Vegas 1905 Acre Site (Aliante) (by G.C. Wallace, hereafter referred to as the Aliante Study, CNLV No. 12601) has been referenced to establish the historic drianage patterns for the project site, as well as to establish allowable discharges at downstream concentration points for each of the four (4) discharge locations.

Table 1 summarizes additional drainage studies that are referenced. Review and reference of these studies is primarily relevant to the offsite hydrologic analysis impacting Grand Teton Drive. Specifically, the drainage maps and grading plans were reviewed to determine the drainage patterns (i.e. high points in roadways), drainage basin limits and street slopes. Additionally, some drainage studies were reviewed for the design flow rates in local storm drain facilities. Copies of these drainage studies are included with the electronic files located in Appendix G.

Table 1: Summary of Additional Referenced Drainage Studies			
Drainage Study Name	**Responsible Engineering Firm**	**Entity No.**	**Notes**
Anthony Saville Middle School	PBS&J	HTE 02-31503	Ref. Q in Torrey Pines SD between Racel and Grand Teton
Rainbow & Horse	Southwest Engineering	HTE 03-23410	
Grand Teton/Torrey Pines	VTN Nevada	HTE 04-10025	
Quarterhorse Estates Unit 3	VTN Nevada	HTE 04-32849	Ref. Q in Horse SD between Mustang and Jones
Mustang/Guy	Development Resource Consulting	HTE 05-14351	
Maverick Equestrian Estates	RedRock Engineering & Surveying	HTE 05-27902	
Horse-Maverick 15	G.C. Wallace	HTE 05-48673	Ref. Q in Horse SD between Mustang and Jones
Stratton 35	G.C. Wallace	HTE 06-33201	The site has been rough graded but not constructed. Ref. Q in Torrey Pines SD between Iron Mountain and Horse. Ref. Q in Iron Mountain SD between Mustang and Jones.
Parcel Map 189-92 & 191-92	EMS Engineering	HTE 93-07160	
Steeplechase Subdivision	L.R. Nelson Consulting Engineers	HTE 99-09886	
La Ventina	CVL Consulting	DS 3333	
Iron Mountain/Jones	Carter Burgess	DS 3220	Ref. Q in Jones SD between Sheleheda and Iron Mountain and the Q in Iron Mountain SD between Jones and Leon
La Cresenta	CVL Consulting	DS 3264	Ref. Q in Jones SD between Horse and Guy
Maverick/Racel	VTN Nevada	DS 3483	
Horse and Thom	Orion Engineering and Surveying	DS 3558	
Kitty McDonough Ward Elementary School	Martin & Martin	DS 3693	
Iron Mountain Ranch – Bradley Park	VTN Nevada	DS 3490	
Iron Mountain Substation	Nevada Power Company	DS 2098	
Decatur/Iron Mountain High School	PBS&J	DS 2986	
Grand Teton/Jones Northeast 40 Acres @ Iron Mountain Ranch	G.C. Wallace	DS 3084	Ref. Q in Jones SD between Grand Teton and Racel. Ref. Q in Grand Teton between Jones and Bradely
Iron Mountain Ranch	VTN Nevada	DS 2362	
Iron Mountain Ranch	VTN Nevada	DS 2847	

Table 1: Summary of Additional Referenced Drainage Studies

Drainage Study Name	Responsible Engineering Firm	Entity No.	Notes
Iron Mountain Ranch Village 1, Units 3 & 5	VTN Nevada	DS 2931	
Iron Mountain Ranch Village 1 Parcels 1, 2, & 3, Units 1, 2, & 3	VTN Nevada	DS 2510	Ref. Q in Grand Teton SD between Bradley and Decatur. Ref. Q in Decatur SD between Grand Teton and Whispering Sands.
Iron Mountain Ranch Village 1 Units 1, 2, 3, 4, & 6 and Village 2, Units 1, 2, & 3	VTN Nevada	DS 2848	
Iron Mountain Ranch Village 2 Parcel 5, Units 1, 2, & 3	VTN Nevada	DS 2521	
Iron Mountain Ranch Village 3	VTN Nevada	DS 3209	
Iron Mountain Ranch Village 4, Units 1 & 2	VTN Nevada	DS 2938	Ref. Q in Grand Teton SD between Thom and Decatur.
Iron Mountain Ranch Village 5	VTN Nevada	DS 3137	
Iron Mountain Ranch Village 6	VTN Nevada	DS 3085	Ref. Q in Horse SD between Bradley and Thom
Iron Mountain Ranch Village 7	VTN Nevada	DS 2942	Ref. Q in Decatur SD between Horse and Grand Teton
Iron Mountain Ranch Village 8	VTN Nevada	DS 3109	Ref. Q in Jones SD between Racel and Horse
Iron Mountain Ranch Village 9	VTN Nevada	DS 3160	
Iron Mountain Ranch Village 10	VTN Nevada	DS 3217	
Iron Mountain Ranch Village 11	VTN Nevada	DS 3363	
Iron Mountain Ranch Village 12	VTN Nevada	DS 3201	
Iron Mountain Ranch Village 12A	VTN Nevada	DS 3327	
Grand Teton/Valley NW 80	G.C. Wallace	14172	
Westwind Estates	Orion Engineering and Surveying	10294	Ref. Q in Horse SD between San Mateo and Aviary
Nelson Ranch	Orion Engineering and Surveying	14854	Ref. Q in Aviary SD between Moonlight Falls and Grand Teton. Ref. Q in Horse between Aviary and Aliante.

Table 1: Summary of Additional Referenced Drainage Studies			
Drainage Study Name	**Responsible Engineering Firm**	**Entity No.**	**Notes**
Las Vegas Wash Middle Branch Storm Drain Improvements, Decatur Boulevard & Elkhorn Road Improvement Plans	VTN Nevada	27037	CCRFCD Regional Facility in Decatur Boulevard that acts as cutoff for flow from the west.
Las Vegas Wash Middle Branch Storm Drain Improvements, Decatur Boulevard (Centennial Parkway to Elkhorn Road) and Elkhorn Road (Decatur Boulevard to Torrey Pines Drive) Improvement Plans	VTN Nevada	16529	CCRFCD Regional Facility in Decatur Boulevard that acts as cutoff for flow from the west.

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 4) and local entity criteria.

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 SCS Method routine within the U.S. Army Corp of Engineer's HEC-1 Flood Hydrograph Package program (version 4.1, June 1998) was utilized to model the drainage subbasins analyzed by this study.

Precipitation, Design Storm Distribution & DARF: Based on the CCRFCD Manual, the design storm shall be the 100-year, 6-hour storm event for regional storm drain, detention basin design and street flow evaluation. The 10-year, 6-hour storm event is also to be evaluated for street flow. The project site and the offsite watershed are located within the McCarran Rainfall Area. The precipitation values utilized for areas within the McCarran Rainfall Area are 1.58 and 2.77 inches for the 10-year and 100-year storm events, respectively. Since the overall watershed is less than 8 square miles, an SDN3 design storm distribution was utilized as referenced from Table 503 of the CCRFCD Manual. Additionally, Depth Area Reduction Factors (DARFs) are applied to the hydrologic analyses. Table 2 summarizes the area associated with each DARF. Note that the ranges are based on Table 502 from the CCRFCD Manual and are identical to the ranges used in

the 2008 Las Vegas Valley MPU. Relevant tables and figures from the CCRFCD Manual have been included in Appendix B.

Table 2: Summary of DARFs

Low Range (sq mi)	High Range (sq mi)	DARF
0.00	0.49	0.990
0.50	0.99	0.975
1.00	1.99	0.950
2.00	2.99	0.925
3.00	3.99	0.915
4.00	4.99	0.908
5.00	5.99	0.903
6.00	6.99	0.895
7.00	7.99	0.885
8.00	8.99	0.875
9.00	9.99	0.865
10.00	10.99	0.857
11.00	11.99	0.850
12.00	15.99	0.832
16.00	19.99	0.804
20.00	29.99	0.765
30.00	39.99	0.725
40.00	49.99	0.695
50.00	59.99	0.672
60.00	69.99	0.656
70.00	79.99	0.640
80.00	89.99	0.624

Land Use, Soils Data & Curve Number: The SCS curve number loss rate methodology was utilized to approximate infiltration for the drainage basins. The watershed lies within Soil Types 192, 305, 540 and 630 per the Las Vegas Valley Soil Survey. The 2008 Las Vegas Valley MPU Curve Number Matrix, as taken from GIS data provided by the CCRFCD, was utilized to determine the composite curve number for offsite drainage basins. The 2008 Las Vegas Valley MPU Curve Number Matrix accounts for areas within the Drought Ordinance boundary. Table 4-2 from the CCRFCD 2008 MPU was utilized for determining curve numbers for offsite drainage basins. The curve number for undeveloped offsite interim condition drainage basins was selected based on a land use of "Undeveloped Land, Open Desert". Exhibits I and J included in Appendix B depict soils types encompassing the interim and ultimate condition offsite watersheds, respectively.

Referenced Tables 602 and 602A from the CCRFCD Manual were utilized for determining curve numbers for onsite drainage basins. Curve numbers for the developed onsite drainage basins are based on land uses and densities specified by the latest land use plan provided by the developer, Crescent Bay Holdings. The land use plan exhibit and density spreadsheet are included in Appendix B for reference. For residential land uses, the maximum density is used to calculate the average lot size; the calculated average lot size is used to select the appropriate curve number. For residential densities with a calculated

average lot size 6,000 square feet or less, multi-family residential, and public facilities a curve number associated with commercial land use has been utilized. Roadways utilize a curve number for paved roads. A natural desert landscaping curve number is utilized for parks and open spaces. Curve number data and computations, including CCRFCD Manual reference tables, are included in Appendix B.

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. The lag time computations have been included in Appendix B.

Channel Routing: The Muskingum-Cunge Method was utilized in channel routing of hydrographs. The Muskingum-Cunge Method requires the following physical input parameters: reach length, longitudinal slope, roughness coefficient, base width, and side slope.

Detention Basin Routing: Detention basin routing was performed using the Modified Puls method within the USCOE HEC-1 computer program. The Elevation-Volume-Discharge relationship for the detention basin, as taken from the DB Study, was entered into the HEC-1 program routine in order to compute detention basin performance components such as peak storage, peak elevation and peak discharge.

2.3 Hydraulic Modeling

Detention Basin: Design of the proposed detention basin is in accordance with criteria set forth in Section 1200 of the CCRFCD Manual with noted exceptions indicated by the DB Study. The detention basin is designed in accordance with criteria set forth in Section 304.8 of the CCRFCD Manual for Multiple Use Facilities. Notably, the portion of the facility that will be identified for open field public use has been elevated above the peak 10-year storm event water surface elevation in the basin. Please note that generally at the conceptual design level, detention basin design is very conceptual in nature. However, since the technical design of the detention basin has already been addressed, the technical design characteristics determined with the DB Study have been utilized in this Master Drainage Study.

Per the DB Study, the proposed detention basin incorporates an orifice outlet controlled primary outlet structure designed per CCRFCD Manual Eqn. 1202. The outlet orifice was sized with the DB Study to limit peak 100-year discharge to that established by the Aliante Study at the ultimate discharge location into the downstream Aliante Golf Course Channel (at Concentration Point CP2). Orifice computations have not been recomputed with this Master Drainage Study. The stage-storage-discharge relationship established in the DB Study has been referenced with this Master Drainage Study.

Also per the DB Study, an overflow spillway discharging to Grand Teton Drive is proposed. Additionally, sediment loading (in accordance with CCRFCD Manual Section 1300) has been accounted for in the detention basin design. Lastly, water quality measures pursuant to recently adopted CCRFCD policy have been implemented in the design of the detention basin per the DB Study. Refer to the DB Study for further discussion and technical design of the proposed detention basin.

Street Flow Splits: Offsite street flow splits have been analyzed utilizing the Flowmaster Version 7.0 software by Haestad Methods. An equal flow depth method has been applied to quantify the flow conveyed in each street. For areas where only half streets are complete, the flow split has been determined based on the half street capacity. Flow in excess of the half street capacity has been assumed to split.

Street Flow Hydraulics: Street flows and capacities have been 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-ft. 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-ft. For 80-ft and greater right-of-ways, a 12-ft dry lane (not utilizing the center turning lane) must be provided in the 10-year storm event. Additionally, for intersections with an 80-ft right-of-way or greater, a maximum 100-year flow depth of 1-foot is allowed, and a maximum 10-year flow depth of 0.5-feet is allowed. Grand Teton Drive, Decatur Boulevard, Elkhorn Road, and Aliante Parkway are classified as 80-ft or greater width right-of-ways and are therefore subject to 10-year dry lane criteria.

Generally, at the Master Drainage Study conceptual design level, it is standard practice for Slater Hanifan Group to utilize general street sections and estimated slopes to determine street flow capacities. Furthermore, more stringent in-house street design criteria than that set forth in the CCRFCD is utilized in order to account for variation in street slopes and/or sections at the technical design level. However, since technical design of the streets within the Park Highlands West development has been completed per the approved Area Studies (by others), approved improvement plans have been referenced for street section and slopes in order to determine roadway capacities, and CCRFCD criteria was utilized to evaluate design.

Storm Drain: In general, storm drain has been designed to maximize street flows upstream while allowing for full 100-year flow capture prior to discharge from the site. Existing storm drain laterals and stubs, as well as proposed storm drain mainlines, have been analyzed utilizing Flowmaster Version 7.0 software by Haestad Methods. Due to the unique nature of this project (given that much of the onsite storm drain is existing and all of the onsite storm drain has been technically designed) the storm drain has been evaluated based on full flow diameter without upsizing and utilizing existing storm drain slopes.

Furthermore, four (4) of the mainline storm drain systems included as part of this Master Drainage Study have been analyzed utilizing the Water Surface and Pressure Gradient (WSPG & WSPGW) Hydraulic Analysis System software by the Los Angeles County Department of Public Works. Again, this is not generally the approach with a Master Drainage Study; however, since the systems have already been technically designed and constructed, and changes to the site plan have occurred that impact the flow rates to these facilities, the more detailed analysis was considered warranted. The systems analyzed with WSPG or WSPGW are as follows:

1) Farm Road – Decatur Boulevard to Aliante Golf Course Channel
2) Virage Park Drive East – Detention Basin Outflow to Farm Road
3) Virage Park Drive West – Aviary Way to Detention Basin Inflow

4) Grand Teton Drive – Decatur Boulevard to Detention Basin Inflow

As outlined in the CCRFCD Manual, storm drain facilities are designed to maintain a hydraulic gradient line (HGL) a minimum of 1-ft below above finished grade and limit the flow velocities in the facility to less than 25 ft/s. Drop inlet sizing is outside the scope of this Master Drainage Study and have not been assessed.

3 EXISTING/HISTORIC CONDITION

3.1 Discussion of Existing/Historic Condition

The existing/historic condition for the project site was analyzed with the Aliante Study and has been referenced with this Master Drainage Study. The Aliante Study establishes the allowable discharges at the proposed ultimate discharge locations. The allowable discharges, as determined with the Aliante Study, are summarized in Table 3 below. Refer to Appendix F relevant reference material from the Aliante Study.

Table 3: Allowable Discharge Summary
Established with the Aliante Study

Location	Aliante Study (Allowable)		This Study
	HEC-1 Node	Q_{100} (cfs)	HEC-1 Node
Linear Park at Aliante Parkway	4D	243	PT1
Aliante Golf Course Channel	IN6	512	PT2
Elkhorn Road	ULT7	107	PT3
Linear Park at Aviary Way	7A	550	PT4

4 INTERIM CONDITION

4.1 Definition of Interim Condition

The interim condition for the Park Highlands West project site assumes the following:

- Offsite watershed is in its current existing state, partially developed with residential subdivisions, schools and parks, and partially undeveloped desert terrain. Offsite surface flow drainage patterns are assumed to follow drainage patterns current to date.
- Onsite watershed is developed in accordance with the revised land use plan provided with this Master Drainage Study in Appendix B.
- Grand Teton Drive from Decatur Boulevard to Aliante Parkway is considered fully improved.
- All offsite flood control infrastructure as proposed by this project is considered constructed. The interim condition facilities in Grand Teton Drive west of Decatur (Facilities I1 and I2) are also considered in place. In addition, the future laterals and drop inlets along the north side of Grand Teton Drive are also considered constructed.

The only offsite infrastructure not constructed is the future CLV facilities west of Decatur Boulevard (Facilities F1 and F2).

- Onsite flood control infrastructure (detention basin, mainline storm drain, drop inlets and lateral storm drain) proposed by this project are installed.

Note that the interim condition is provided in order to determine the amount of interim condition flow that needs to be collected by interim Facilities I1 and I2. The interim condition does not control the final design of any of the permanent storm drain infrastructure.

4.2 Discussion of Interim Condition

Offsite: The offsite watershed primarily drains in a southeasterly direction. The northern limit of the watershed was defined based on existing CCRFCD Regional Facilities that route flows east away from the project site. The western limit of the watershed was defined by existing topography and residential development. The southern limit of the watershed was controlled by the existing Grand Teton Drive improvements. Within the offsite watershed, flow splits have been assessed at numerous intersection locations.

Note that the offsite drainage patterns provided in this report have been revised from those established by the CDS due to the following:

- The CDS referenced the NWN Study for offsite hydrology. Since, offsite development has been constructed that has altered the offsite drainage patterns and flow rates. The offsite drainage patterns provided in this report are based on technical designs of residential, roadway and storm drain improvements, as well as extensive field investigation of the offsite terrain.
- The CCRFCD Regional Facility in Decatur Boulevard from Whispering Sands to Dorrell Lane is considered in place per the referenced Decatur Facility Plans; therefore, Decatur Boulevard acts as a cutoff for flow from the west and no offsite flow from the west enters the project site.

The offsite drainage patterns presented herein are identical to those utilized in the DB Study. Note that per the DB Study, in the ultimate condition CLV is obligated to intercept one half of the total ultimate condition flow at the Decatur/Grand Teton intersection via future storm drain facilities. This project is obligated to provide sufficient interim condition infrastructure west of the intersection to meet intersection street flow criteria downstream. Therefore, interim facilities (Facilities I1 and I2) have been designed to collect sufficient flow to meet downstream street flow criteria in the interim condition.

Onsite: The onsite fully developed condition drainage patterns presented herein are similar to the previously approved CDS. However, the following revisions have been made based on the revised site and land use plan:

- Basins 2-9 and 4-4 are proposed as residential development instead of park based on the revised land use plan.
- The parcel boundary of Basins 2-11 and 2-12 has shifted north, the Basin 2-13 boundary has been modified, and Basin 3-2 has been added; however, drainage patterns in that area remain unchanged.
- The boundary for Basin 2-10 has been modified and Basin 4-7 has been added; however drainage patterns in that area remain unchanged.

- Basin 2-3 is proposed as a detention basin (per the approved DB Study) instead of residential development.

The onsite watershed drains primarily in a southeasterly direction without any flow splits. The onsite watershed is only impacted by the offsite watershed at one location, the intersection of Aviary Way and Grand Teton Drive. The offsite flows enter the onsite watershed via a storm drain facility into the proposed detention basin. As previously discussed, the offsite flow at the intersection of Decatur Boulevard and Whispering Sands Drive has been diverted south per the Decatur Facility Plans and no longer impacts the onsite watershed. In addition to the offsite watershed discharging into the proposed detention basin, four (4) onsite drainage basins also contribute flows to the proposed detention basin. The offsite flows (as discharged from the proposed detention basin) combine with a portion of onsite flows and discharge into the Aliante Golf Course Channel at Concentration Point PT2. There are three (3) additional discharge locations for onsite flow, including a linear park east of Aliante Parkway (PT1), Elkhorn Road (PT3), and a linear park east of Aviary Way (PT4).

The interim condition offsite flows entering the site are less than the ultimate condition. Therefore, all onsite storm drain has been designed utilizing the worst-case ultimate condition flows.

4.3 Summary of Interim Condition

Refer to Exhibit L, included in Appendix A, for an illustration of the interim condition offsite drainage basins and flow patterns, as well as summary tables of the flow rates and flow splits. Refer to Exhibit N also included in Appendix A, for a summary of onsite interim conditions flows at the concentration points. Note that the onsite basins have only been analyzed as fully developed; however, since offsite interim condition flows are impacting the site, the interim condition onsite concentration point flow rates differ from the ultimate condition onsite concentration points.

Allowable flows at each of the discharge locations have been established by the Aliante Study. Table 4 below provides a comparison of the allowable discharges as determined by the Aliante study to the interim condition flows determined with this Master Drainage Study.

Table 4: Interim Condition Discharge Comparison Summary

Aliante Study (Allowable) vs. This Study (Interim Condition)

Location	Aliante Study (Allowable)		This Study (Interim Condition)	
	HEC-1 Node	Q_{100} (cfs)	HEC-1 Node	Q_{100} (cfs)
Linear Park at Aliante Parkway	4D	243	PT1	232
Aliante Golf Course Channel	IN6	512	PT2	462
Elkhorn Road	ULT7	107	PT3	89
Linear Park at Aviary Way	7A	550	PT4	505

As illustrated in Table 4 above, the interim condition flow rates at each of the discharge locations are less than the allowable discharges at each location as determined with the

Aliante Study. Therefore, the interim condition analyzed for the Park Highlands West project site as results in no negative impacts to downstream properties. Please see relevant reference material from the Aliante Study included in Appendix F.

5 ULTIMATE CONDITION

5.1 Definition of Ultimate Condition

The ultimate condition is considered the same as the interim condition with the following exceptions:

- The offsite watershed is considered fully developed. Drainage patterns are in accordance with the CCRFCD MPU, except as modified by this study based on review of relevant studies and field investigation that warranted changes.
- Ultimate CLV facilities located west of Decatur Boulevard along Grand Teton Drive (Facilities F1 and F2) are constructed. These facilities will be capable of intercepting one-half of the entire ultimate condition 100-year peak surface flow at the intersection of Grand Teton Drive and Decatur Boulevard. The obligation of these future drop inlets is considered that of the CLV as determined in the DB Study.
- Regional Facility GTEA0360 (Decatur Boulevard facility from Horse Drive and Grand Teton Drive) is not anticipated to be constructed since the majority of the Decatur Boulevard roadway improvements are complete thru that stretch and adjacent developments have designed assuming the facility is not constructed.

In the ultimate condition, storm drain flow east of the Decatur Boulevard along Grand Teton Drive is greater than the interim condition. The ultimate condition was analyzed to ensure that the proposed storm drain will have adequate capacity and function for the worst case flow when the ultimate CLV inlets west of Decatur Boulevard along Grand Teton Drive are installed. The ultimate condition controls the mainline storm drain design in Grand Teton Drive, as well as the proposed detention basin and onsite storm drain infrastructure.

5.2 Discussion of Ultimate Condition

Offsite: Similar to the interim condition, the ultimate condition offsite watershed generally drains in a southeasterly direction. The northern limit of the watershed was defined based on existing and proposed Regional Flood Control Facilities as well as areas defined by the CCRFCD 2008 MPU that route flows east away from the project site. The western limit of the watershed was defined by existing residential development as well as areas defined by the CCRFCD 2008 MPU that route flows south away from the project site. The southern limit of the watershed was controlled by the existing Grand Teton Drive improvements. Within the offsite watershed, flow splits have been assessed at numerous intersection locations.

Onsite: The onsite watershed remains the same as the interim condition (as described in Section 4.2 above). However, in the ultimate condition, the larger offsite flows are collected in Grand Teton Drive and routed to the onsite detention basin. Therefore, the design of all onsite facilities is controlled by the higher ultimate condition flow rates.

5.3 Summary of Ultimate Condition

Refer to Exhibit M, included in Appendix A, for an illustration of the ultimate condition offsite drainage basins and flow patterns, as well as summary tables of the offsite flow rates and flow splits. Refer to Exhibit N, also included in Appendix A, for the ultimate condition onsite drainage basins and flow patterns, as well as summary tables of the flow rates.

As discussed, the ultimate condition flow rates result in the highest flows at each of the four (4) discharge locations. Allowable flows at each of the discharge locations have been established by the Aliante Study. Therefore, the Table 5 below provides a comparison of the allowable discharges as determined by the Aliante study to the ultimate condition flows determined with this Master Drainage Study.

Table 5: Ultimate Condition Discharge Comparison Summary

Aliante Study (Allowable) vs. This Study (Ultimate Condition)

Location	Aliante Study (Allowable)		This Study (Ultimate Condition)	
	HEC-1 Node	Q_{100} (cfs)	HEC-1 Node	Q_{100} (cfs)
Linear Park at Aliante Parkway	4D	243	PT1	232
Aliante Golf Course Channel	IN6	512	PT2	466
Elkhorn Road	ULT7	107	PT3	89
Linear Park at Aviary Way	7A	550	PT4	505

As illustrated in Table 5 above, the worst-case ultimate condition flow rates at each of the discharge locations is less than the allowable discharge at each location as determined with the Aliante Study. Therefore, development of the Park Highlands West project site as proposed results in no negative impacts to downstream properties. Please see relevant reference material from the Aliante Study included in Appendix F.

6 STREET FLOW HYDRAULICS

6.1 Summary of Street Flow Capacity Computations

Based on the street flow criteria set forth in Section 2.3 of this report, street flow capacities for the 100-year and 10-year storm events have been calculated for perimeter and onsite roadways. See Exhibit O included in Appendix A for reference to the street section locations. Also refer to Appendix D for street capacity Flowmaster calculations. Results are summarized in Tables 6 and 7. Note that where street flow capacities are exceeded, storm drain facilities have been extended to collect flow.

Table 6: 100-Year Street Flow Capacity Summary

Street Section	ROW Width (ft)	Slope (%)	Q (cfs)	Depth (ft)	Velocity (fps)	D x V	Control
1	90	1.04	336	1.15	6.96	8.0	D x V

Table 6: 100-Year Street Flow Capacity Summary							
Street Section	**ROW Width (ft)**	**Slope (%)**	**Q (cfs)**	**Depth (ft)**	**Velocity (fps)**	**D x V**	**Control**
2	90	0.50	389	1.37	5.83	8.0	D x V
3	70	1.00	243	1.19	6.73	8.0	D x V
4	90	1.04	336	1.15	6.96	8.0	D x V
5	52	0.45	273	1.34	5.96	8.0	D x V
6	52	0.80	249	1.15	6.95	8.0	D x V
7	52	0.50	268	1.31	6.13	8.0	D x V
8	52	0.91	243	1.11	7.19	8.0	D x V
9	70	0.50	282	1.40	5.69	8.0	D x V
10	70	1.09	285	1.09	7.34	8.0	D x V
11	70	0.53	330	1.32	6.06	8.0	D x V
12	70	0.51	335	1.33	6.02	8.0	D x V
13	70	0.75	310	1.20	6.66	8.0	D x V
14	70	0.55	329	1.31	6.13	8.0	D x V
15	70	0.60	323	1.28	6.27	8.0	D x V
16	52	0.48	271	1.32	6.07	8.0	D x V
17	52	2.12	203	0.89	8.99	8.0	D x V
18	49	0.60	273	1.24	6.45	8.0	D x V
19	70	0.53	329	1.32	6.06	8.0	D x V
20	70	0.53	329	1.32	6.06	8.0	D x V
21	70	1.24	279	1.06	7.57	8.0	D x V
22	70	0.50	335	1.34	5.98	8.0	D x V
23	*100	1.19	216	1.18	6.80	8.0	D x V
24	*90	0.53	190	1.35	5.92	8.0	D x V
25	90	0.42	394	1.43	5.60	8.0	D x V
26	90	1.01	338	1.15	6.92	8.0	D x V
27	*70	0.50	167	1.34	5.97	8.0	D x V
28	41	0.50	242	1.28	6.24	8.0	D x V
29	96	2.47	273	0.92	8.68	8.0	D x V
30	96	0.50	389	1.33	6.01	8.0	D x V

* Only Half Street Calculations were analyzed for these cross sections

Table 7: 10-Year Street Flow Capacity Summary							
Street Section	**ROW Width (ft)**	**Slope (%)**	**Q (cfs)**	**Depth (ft)**	**Velocity (fps)**	**D x V**	**Control**
1	90	1.04	53	0.65	3.97	2.6	Dry Lane
2	90	0.50	37	0.65	2.76	1.8	Dry Lane
3	70	1.00	136	1.00	5.39	5.4	Depth
4	90	1.04	53	0.65	3.97	2.6	Dry Lane
5	52	0.45	128	1.00	4.62	4.6	Depth
6	52	0.80	164	0.98	6.09	6.0	D x V

Table 7: 10-Year Street Flow Capacity Summary							
Street Section	ROW Width (ft)	Slope (%)	Q (cfs)	Depth (ft)	Velocity (fps)	D x V	Control
7	52	0.50	137	1.00	4.89	4.9	Depth
8	52	0.91	159	0.95	6.30	6.0	D x V
9	70	0.50	94	1.00	3.78	3.8	Depth
10	70	1.09	195	0.95	6.34	6.0	D x V
11	70	0.53	155	1.00	4.65	4.7	Depth
12	70	0.51	155	1.00	4.59	4.6	Depth
13	70	0.75	185	1.00	5.53	5.5	Depth
14	70	0.55	160	1.00	4.76	4.8	Depth
15	70	0.60	168	1.00	4.98	5.0	Depth
16	52	0.48	132	1.00	4.77	4.8	Depth
17	52	2.12	140	0.77	7.79	6.0	D x V
18	49	0.60	160	1.00	5.23	5.2	Depth
19	70	0.53	155	1.00	4.65	4.7	Depth
20	70	0.53	155	1.00	4.65	4.7	Depth
21	70	1.24	190	0.92	6.53	6.0	D x V
22	70	0.50	152	1.00	4.53	4.5	Depth
23	*100	1.19	60	0.78	4.87	3.8	Dry Lane
24	*90	0.53	11	0.55	2.50	1.4	Dry Lane
25	90	0.42	33	0.65	2.53	1.6	Dry Lane
26	90	1.01	52	0.65	3.92	2.5	Dry Lane
27	*70	0.50	76	1.00	4.53	4.5	Depth
28	41	0.50	134	1.00	4.96	5.0	Depth
29	96	2.47	118	0.71	7.06	5.0	Dry Lane
30	96	0.50	53	0.71	3.17	2.3	Dry Lane

* Only Half Street Calculations were analyzed for these cross sections

Upon review of Tables 6 and 7 above, the street flow proposed with the Park Highlands West development satisfies CCRFCD criteria for 100-year and 10-year depth and DxV parameters, as well as 10-year dry lane criteria, as set forth in Section 2.3 of this report.

7 RECOMMENDED DRAINAGE FACILITIES

7.1 Summary of Recommended Drainage Facilities

Exhibit P included in Appendix A provides a depiction and summary of conceptual flood control facilities recommended for the Park Highlands West project site. As discussed, many of the onsite facilities exist per the approved Area Studies. Sizing and analysis of the facilities was performed per criteria described in Section 2.3 of this report. Note that with the exception of interim Facilities I1 and I2, all recommended facilities are designed based on the worst-case ultimate condition design flows. Flood control facility computations are included in Appendix E.

7.2 CCRFCD Facility in Grand Teton Drive

The CCRFCD Regional Facility in Grand Teton Drive has been technically addressed with the DB Study. This Master Drainage Study matches the design proposed with the DB Study and proposes no revisions to the currently approved storm drain design in Grand Teton Drive. The information is shown on this Master Drainage Study for completeness and to illustrate the comprehensive conceptual plan for the area.

Note that interim Facilities I1 and I2 are designed to collect sufficient interim condition flow in order for downstream street flow criteria to be met. Per coordination with CLV and CNLV, and per the approved DB Study, future Facilities F1 and F2 will be constructed (by others) to collect the CLV obligation of ultimate condition flow (half of the surface flow at the intersection of Grand Teton Drive and Decatur Boulevard) in order for downstream flow criteria to be met in the ultimate condition. The worst-case ultimate condition WSPGW analysis for the CCRFCD Regional Facility is provided in Appendix E of this Master Plan Study and matches the analysis approved by the DB Study. The laterals and stubs have been analyzed based on full flow capacity. Note that per the Flowmaster full flow computations, Facilities P8 and P18 are undersized; however, per the approved DB Study technical analysis, the referenced improvement plans located in Appendix F illustrate that those facilities are indeed adequate to convey the required flow with the HGL a minimum of 1-foot below finished grade. Therefore, the facilities are considered adequate and are shown on Exhibit P as proposed in the DB Study. Refer to the DB Study for more detailed technical discussion concerning the facilities in Grand Teton Drive.

7.3 CCRFCD Onsite Detention Basin

The proposed onsite detention basin (Facility P39) is proposed at the southeast corner of the intersection of Grand Teton Drive and Aviary Way. The detention basin has been proposed as a CCRFCD Regional Facility to replace the extension of the Regional Facility in Grand Teton Drive. The detention basin is designed to capture the entire worst-case ultimate condition 100-year flow at the intersection of Grand Teton Drive and Aviary Way. Flow will enter the detention basin via the proposed storm drain system in Grand Teton Drive. The intention of the detention basin is to eliminate the need for the future extension to the east of the regional facility in Grand Teton Drive, as well as to attenuate flow such that the downstream allowable discharge is met at Concentration Point CP2 within the Aliante Golf Course Channel.

Contrary to most Master Drainage Studies, this detention basin has already been technically designed per the DB Study. Therefore, the technical design parameters for the detention basin have been referenced from the DB Study for use in analysis with this Master Drainage Study. See relevant reference material from the DB Study included in Appendix F. Table 8 provides a summary of the detention basin characteristics, which match exactly the detention basin characteristics determined with the DB Study. Refer to the DB Study for more detailed technical discussion concerning the proposed detention basin.

Table 8: Detention Basin Characteristics	
100-Year Storm Event	
Basin Attribute	**Design Parameter**
Contributing Area	3.19 mi^2
Peak Inflow	1,066 cfs (SDN3)
Orifice Dimension/Invert	54" / 2297.00
Outfall Conduit	72" RCP @ 0.003 ft/ft / 2295.50
Peak Water Surface Elevation	2307.02 ft
Peak Outflow	231 cfs
Peak Storage Volume	103 ac-ft
Sediment Storage Provided/Required	23 ac-ft / 1.56 ac-ft
Drain Time	13 Hr, 40 Min
10-Year Storm Event	
Basin Attribute	**Design Parameter**
Peak Inflow	370 cfs
Peak Outflow	141 cfs
Peak Water Surface Elevation	2302.14 ft
Peak Storage Volume	31 ac-ft
Overflow Spillway	
Basin Attribute	**Design Parameter**
Crest Length/Elevation	200 LF / 2308.5
Design Discharge Capacity/Elevation	1,700 cfs / 2310.5
Peak Storage Volume/Elevation	159 ac-ft / 2310.5

7.4 Onsite Storm Drain

As previously discussed, much of the onsite storm drain is constructed and in place per the approved Area Studies, and is shown as existing on Exhibit P. With the exception of onsite proposed Facilities P47 and P74, which are being proposed with this Master Drainage Study for the first time, all other proposed facilities have already been technically designed with approved technical drainage studies. Proposed Facilities P48 thru P65 have been addressed with the approved Area 8 & 9 Study. Proposed Facilities P35 thru P46 have been addressed with the DB Study. Therefore, no revisions in size are proposed to existing and or proposed facilities as design of the facilities has already been technically addressed. However, all facilities have been evaluated either per full flow capacity computations or with WSPG/WSPGW analyses in order to verify that the storm drain designs are still valid with the hydrologic revisions proposed herein.

The onsite facilities that have been evaluated utilizing WSPG/WSPGW are:

- Farm Road – Decatur Boulevard to Aliante Golf Course Channel (extending from upstream Facility E52 to downstream Facility E51)
- Virage Park Drive East – Detention Basin Outflow to Farm Road (extending from upstream Facility P40 to downstream Facility P46)
- Virage Park Drive West – Aviary Way to Detention Basin Inflow (extending from upstream Facility E17 to downstream Facility P38)

Note that all facilities re-evaluated using WSPG/WSPGW meet criteria as set forth in Section 2.3 of this report. WSPG/WSPGW analyses have been included in Appendix E.

For the remaining onsite facilities, existing and proposed, full flow capacity computation have been performed to ensure that the facilities are adequately sized. All onsite facilities have been found to be adequately sized per the full flow capacity computations with the following exceptions:

- Facility E81 – This facility appears undersized per the full flow capacity compuations. However, per the referenced Area 2 Plans, the HGL in the proposed facility per the technical design is minimum of 1-foot below finished grade; therefore, the facility is adequately sized and no revisions have been made.
- Facility E83 – This facility appears undersized per the full flow capacity compuations. However, per the referenced Area 3 Plans, the HGL in the proposed facility per the technical design is minimum of 1-foot below finished grade; therefore, the facility is adequately sized and no revisions have been made.
- Facilities P61 thru P63 - These facility appear undersized per the full flow capacity compuations. However, per the referenced Area 8 & 9 Study plans, the HGL in the proposed facility per the technical design is minimum of 1-foot below finished grade; therefore, the facility is adequately sized and no revisions have been made.
- Facilities P35 and P36 – These facility appear undersized per the full flow capacity compuations. However, per the referenced DB Study plans, the HGL in the proposed facility per the technical design is minimum of 1-foot below finished grade; therefore, the facility is adequately sized and no revisions have been made.

Note that no increase in design flow to the above mentioned facilities is proposed with this Master Drainage Study. See the referenced improvement plans included in Appendix F for referenced to the approved technical designs.

8 CONCLUSIONS & RECOMMENDATIONS

1. 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 and local entity criteria.

2. The proposed project site is not located in a FEMA designated Special Flood Hazard Area (SFHA) per review of Flood Insurance Rate Map (FIRM) Panel 32003C1765F, dated November 16, 2011.

3. The project is adjacent to proposed CCRFCD Regional Facilities in Decatur Boulevard and proposes revisions to the currently proposed CCRFCD Regional Facilities in Grand Teton Drive. Therefore, CCRFCD concurrence will be required and an amendment to the 2008 CCRFCD MPU will be required.

4. Allowable discharges as determined with the Aliante Study have not been exceeded as a result of development of the Park Highlands West project site. Therefore, runoff generated from or conveyed by the project will not adversely impact any downstream properties or facilities.

5. This Master Drainage Study is in conformance with several approved Technical Drainage Studies that have been performed for the Park Highlands West site.

6. Interim condition Facilities I1 and I2 proposed with this study will be replaced in the future with CLV future Facilities F1 and F2 (by others), per the approved DB Study.

9 REFERENCES

1. *Las Vegas Valley Flood Control Master Plan Update*. PBS&J, Louis Berger Group and Parsons Brinckerhoff, October 2008.

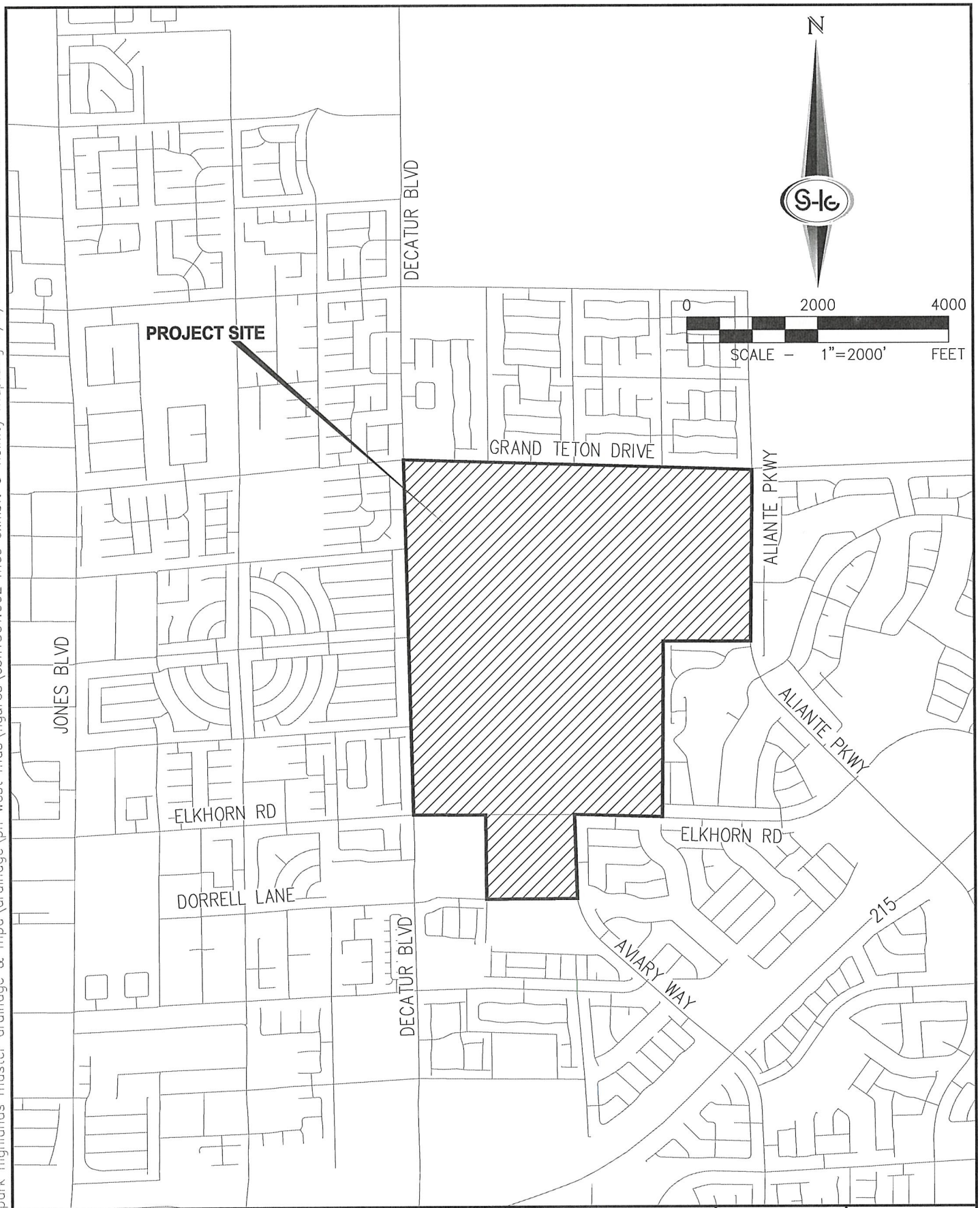
2. *City of North Las Vegas North Neighborhood Study*. PBS&J, July 2002.

3. *City of Las Vegas Northwest Neighborhood Study Phase 2*. PBS&J, September 1999.

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

APPENDIX A

Exhibits



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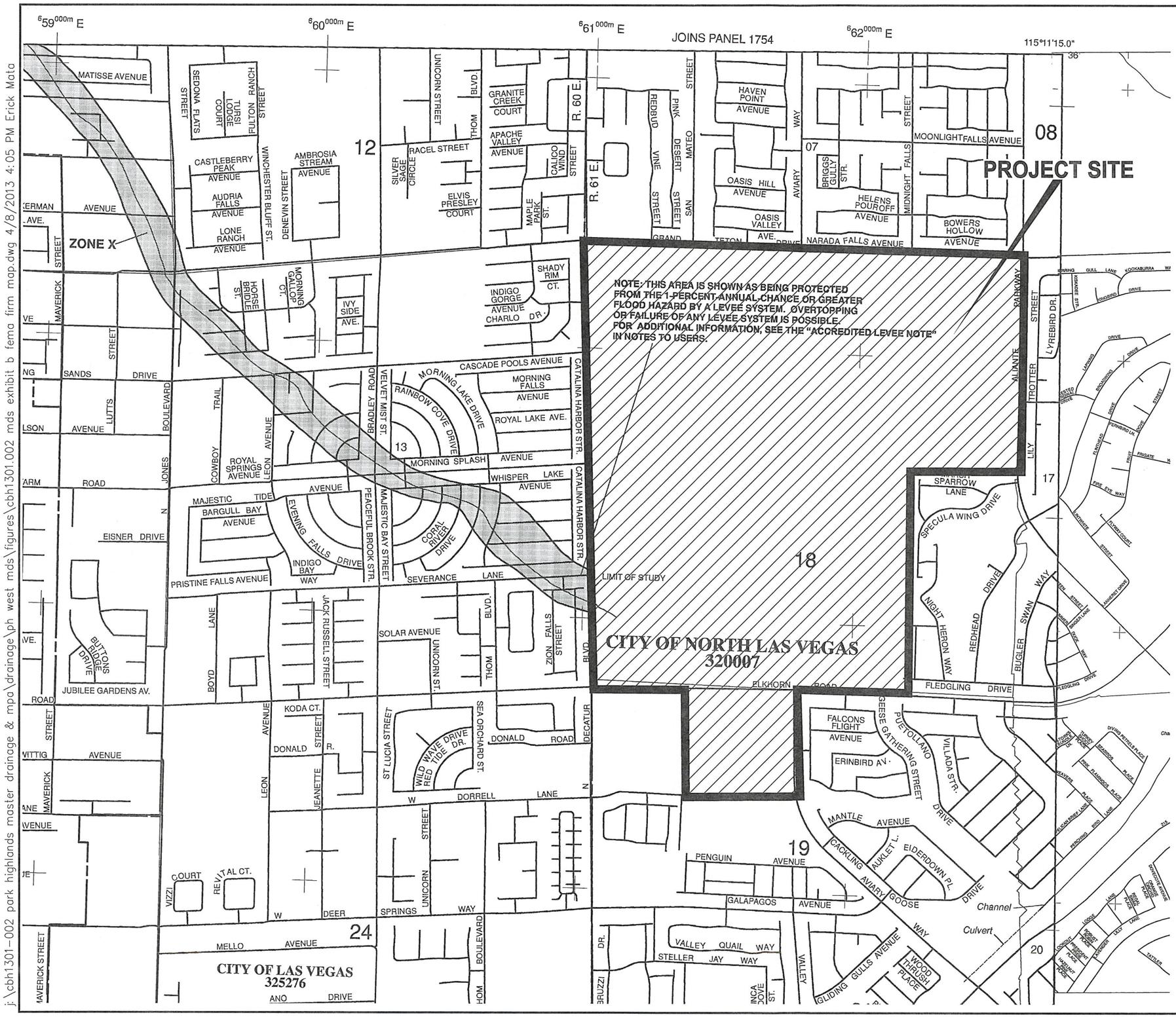
CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST

LOCATION MAP

DATE: APRIL 2013	PROJECT NO. CBH1301.002
DRAFTER: KC/ETM	
DESIGNER: KC/ETM	**EXHIBIT A**
CHECKED: KCR	SHEET 1 OF 1



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1765F

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA

AND INCORPORATED AREAS

PANEL 1765 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY	320003	1765	F
LAS VEGAS, CITY OF	325276	1765	F
NORTH LAS VEGAS, CITY OF	320007	1765	F

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
32003C1765F

MAP REVISED
NOVEMBER 16, 2011

Federal Emergency Management Agency

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST

FEMA FIRM MAP

DATE:	APRIL 2013
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DESIGNER:	KC/ETM
CHECKED:	KCR
PROJECT NO.	CBH1301.002

EXHIBIT B
SHEET 1 OF 1

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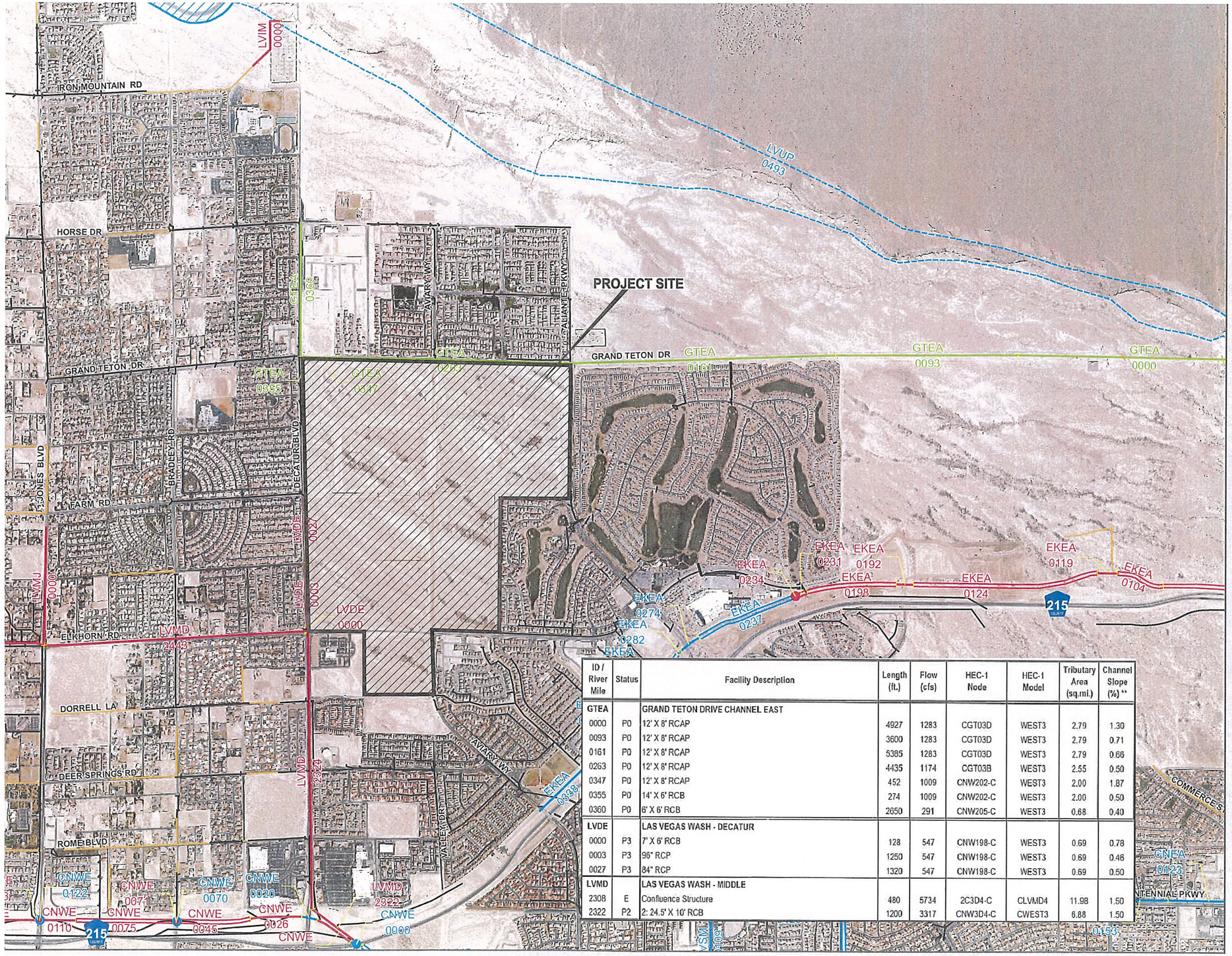

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
GTEA		GRAND TETON DRIVE CHANNEL EAST						
0000	P0	12' X 8' RCAP	4927	1283	CGT03D	WEST3	2.79	1.30
0093	P0	12' X 8' RCAP	3600	1283	CGT03D	WEST3	2.79	0.71
0161	P0	12' X 8' RCAP	5385	1283	CGT03D	WEST3	2.79	0.66
0263	P0	12' X 8' RCAP	4435	1174	CGT03B	WEST3	2.55	0.50
0347	P0	12' X 8' RCAP	452	1009	CNW202-C	WEST3	2.00	1.87
0355	P0	14' X 6' RCB	274	1009	CNW202-C	WEST3	2.00	0.50
0360	P0	6' X 6' RCB	2650	291	CNW205-C	WEST3	0.68	0.40
LVDE		LAS VEGAS WASH - DECATUR						
0000	P3	7' X 6' RCB	128	547	CNW198-C	WEST3	0.69	0.78
0003	P3	96" RCP	1250	547	CNW198-C	WEST3	0.69	0.46
0027	P3	84" RCP	1320	547	CNW198-C	WEST3	0.69	0.50
LVMD		LAS VEGAS WASH - MIDDLE						
2308	E	Confluence Structure	480	5734	2C3D4-C	CLVMD4	11.98	1.50
2322	P2	2: 24.5' X 10' RCB	1200	3317	CNW3D4-C	CWEST3	6.88	1.50

2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE F-14
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

N

0 500 1,000 2,000 3,000
Feet
Scale: 1 inch = 2,000 feet
Refer to Figure G-2 for Aerial Source(s)

US95 I-15 I-215

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

PBSJ PB

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST
CCRFCD 2008 MPU FACILITIES MAP

DATE: APRIL 2013
DRAFTER: KC/ETM
DESIGNER: KC/ETM
CHECKED: KCR
PROJECT NO.
CBH1301.002

EXHIBIT C
SHEET 1 OF 1

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2008
LAS VEGAS VALLEY
FLOOD CONTROL
MASTER PLAN UPDATE

FIGURE H-14
HYDROLOGIC SUMMARY

LEGEND

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

Flood Control Facilities

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

Type Hydrologic Soil Groups

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

Typical Land Use

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

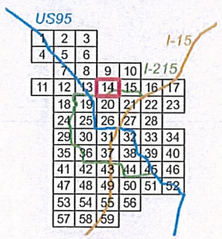
* Drought Ordinance Applied

N

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

Scale: 1 inch = 2,000 feet

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



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MASTER DRAINAGE STUDY PARK HIGHLANDS WEST
CCRFCD 2008 MPU HYDROLOGY MAP

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EXHIBIT D
SHEET 1 OF 1

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CITY OF NORTH LAS VEGAS

NORTH NEIGHBORHOOD STUDY

LEGEND

- Sub-basin Boundary
- NN100 — Basin ID
- (100yr./10yr.) — Contributing flow from the basin (cfs)
- Flow Arrow
- 250 / 500 / (300) / (800) — 10-Year Street Flow / 100-Year Street Flow / 10-Year Facility Flow / 100-Year Facility Flow
- (Flows in CFS)
- * — Flows with asterisks represent non-street, non-facility flows.

PHOTO DATE: OCTOBER 2001

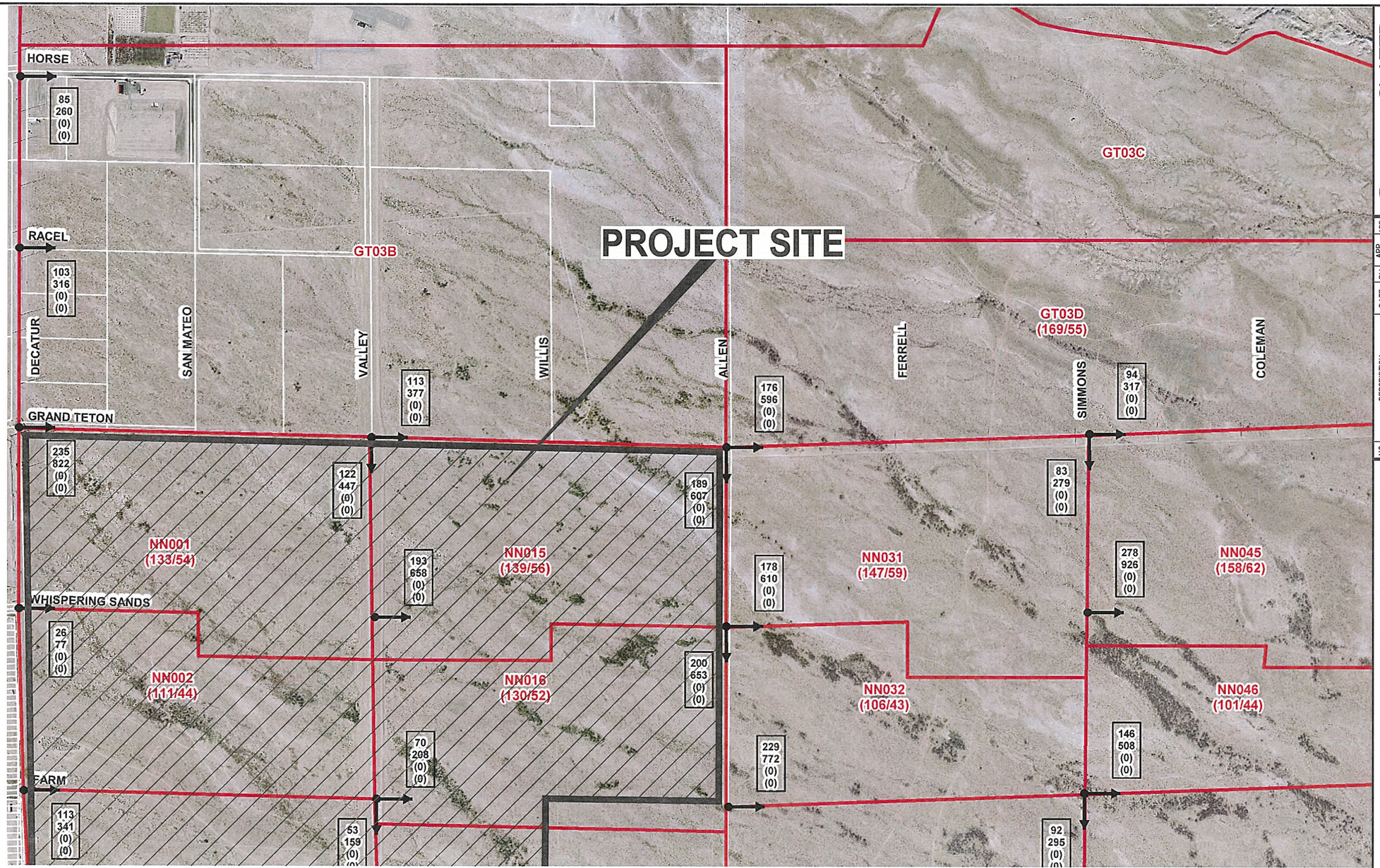
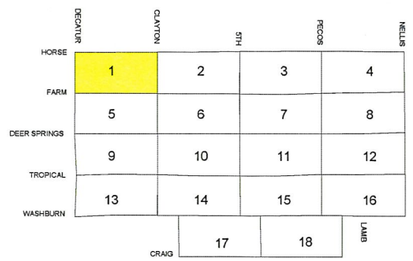


FIGURE E-1

EXISTING DRAINAGE CONDITIONS

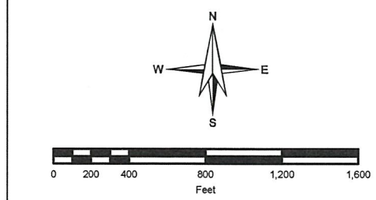
PBS&J
901 N Green Valley Pkwy, Suite 100
Henderson, Nevada 89074-7105
Phone: 702/263-7275
Fax: 702/263-7200

The Consultant of Choice



NOTE:
Existing conditions are based on future CN values with only existing local and CCRFCD facilities in place.

(X) - Existing condition flow not determined for this facility.



SCALE: 1 inch = 800 feet

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CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST
CNLV NORTH NEIGHBORHOOD STUDY E-1 MAP

DATE:	APRIL 2013
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PROJECT NO.	CBH1301.002

EXHIBIT 1E
SHEET 1 OF 1

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CITY OF NORTH LAS VEGAS

NORTH NEIGHBORHOOD STUDY

LEGEND

- Sub-basin Boundary
- NN100 — Basin ID
- (100yr./10yr.) — Contributing flow from the basin (cfs)
- Flow Arrow
- 250 / 500 / (300) / (800) — 10-Year Street Flow / 100-Year Street Flow / 10-Year Facility Flow / 100-Year Facility Flow

(Flows in CFS)

* Flows with asterisks represent non-street, non-facility flows.

PHOTO DATE: OCTOBER 2001

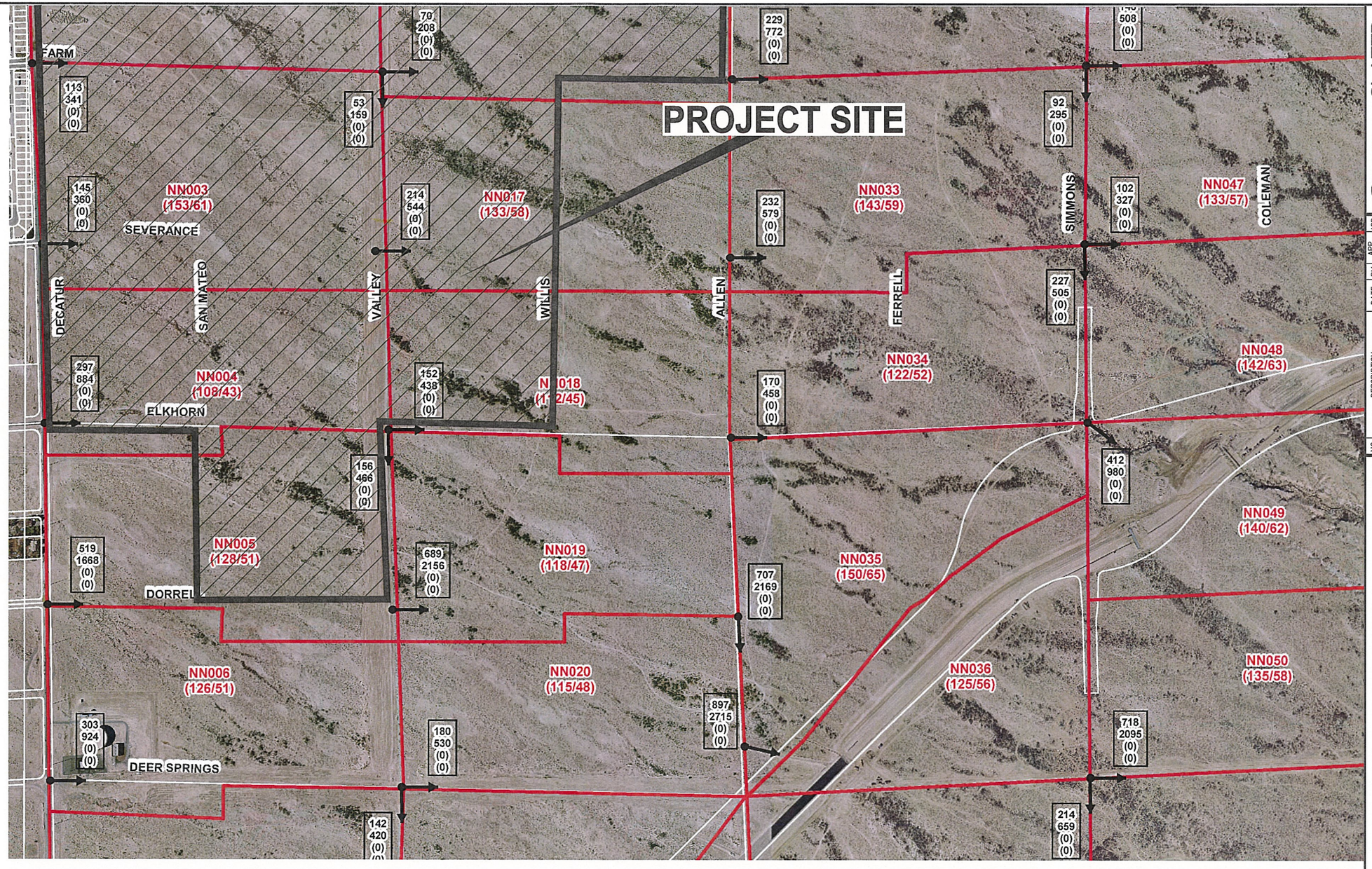

FIGURE E-5

EXISTING DRAINAGE CONDITIONS

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901 N Green Valley Pkwy, Suite 100
Henderson, Nevada 89074-7105
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Fax: 702/263-7200

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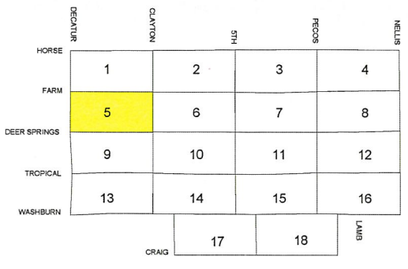

NOTE:
Existing conditions are based on future CN values with only existing local and CCRFCD facilities in place.

(X) - Existing condition flow not determined for this facility.

N W E S

0 200 400 800 1,200 1,600
Feet

SCALE: 1 inch = 800 feet

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CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST
CNLV NORTH NEIGHBORHOOD STUDY E-5 MAP

DATE: APRIL 2013
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PROJECT NO. CBH1301.002

EXHIBIT 2E
SHEET 1 OF 1

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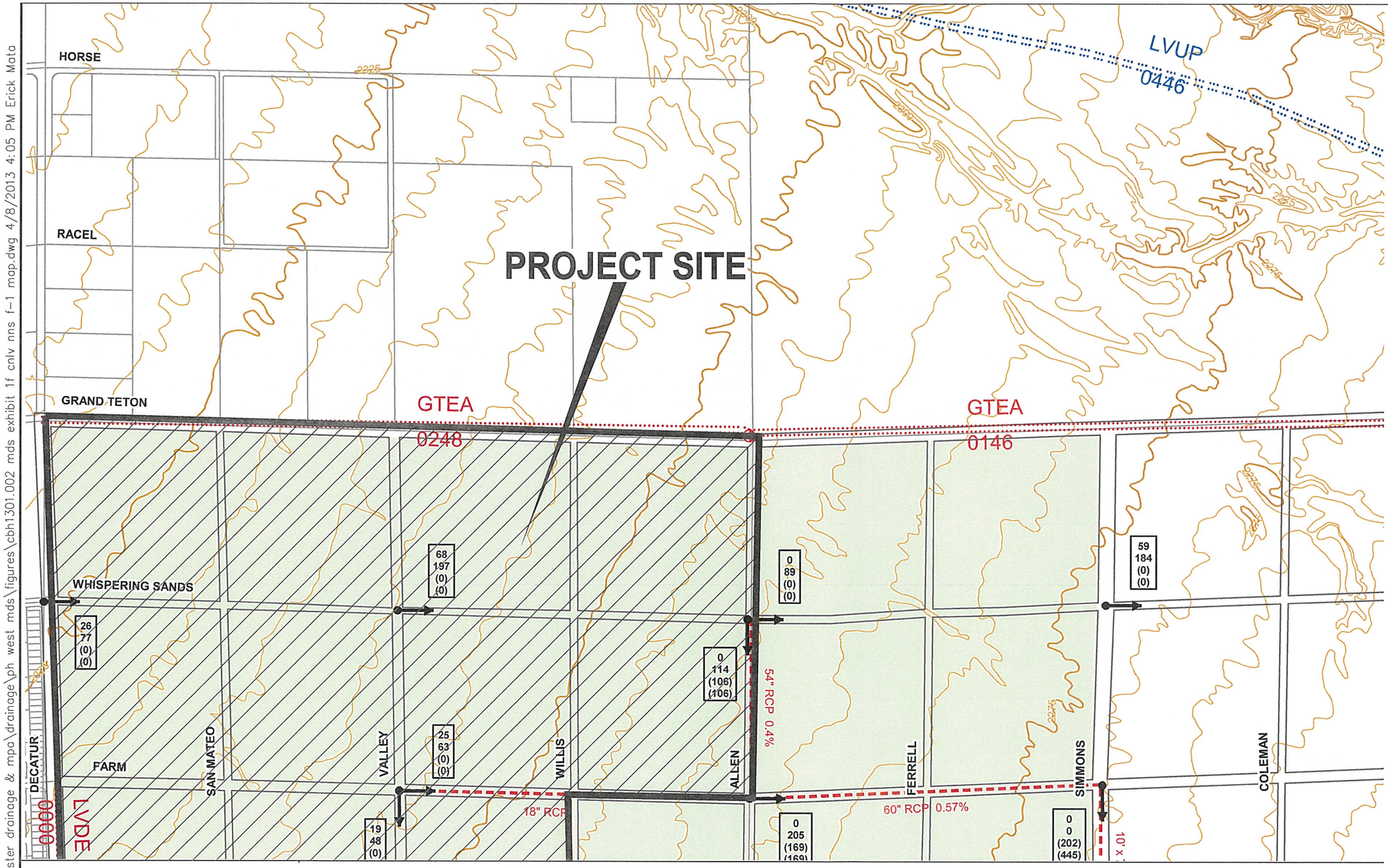


N
W E
S

0 200 400 800 1,200 1,600
Feet

SCALE: 1 inch = 800 feet

Flow Arrow

250	10-Year Street Flow
500	100-Year Street Flow
(300)	10-Year Facility Flow
(800)	100-Year Facility Flow

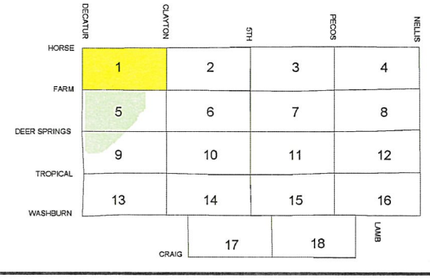
(Flows in CFS)

North Valley 1,905 Acre Study Area

NOTE:
Ultimate drainage conditions are based on future CN values with all flood control facilities in place.

100 Year Facility Flows with an asterisk (*) are flows from the Clark County Regional Flood Control District's 2002 Master Plan Update for the Las Vegas Valley.

(XX) - 10-year future flow not determined for this master planned facility.



CITY OF NORTH LAS VEGAS

NORTH NEIGHBORHOOD STUDY

LEGEND

- Existing Regional Basin
- Proposed Regional Basin
- Existing Regional Culvert
- Existing Regional Bridge
- Proposed Regional Culvert
- Proposed Regional Bridge
- Existing Local Culvert
- Existing Regional Pipeline
- Proposed Regional Pipeline
- Existing Regional Channel
- Proposed Regional Channel
- Existing Regional Dike
- Proposed Regional Dike
- Existing Local Pipeline
- Proposed Local Pipeline

FIGURE F-1

FUTURE DRAINAGE CONDITIONS

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST
CNLV NORTH NEIGHBORHOOD STUDY F-1 MAP

DATE:	APRIL 2013
DRAFTER:	KC/ETM
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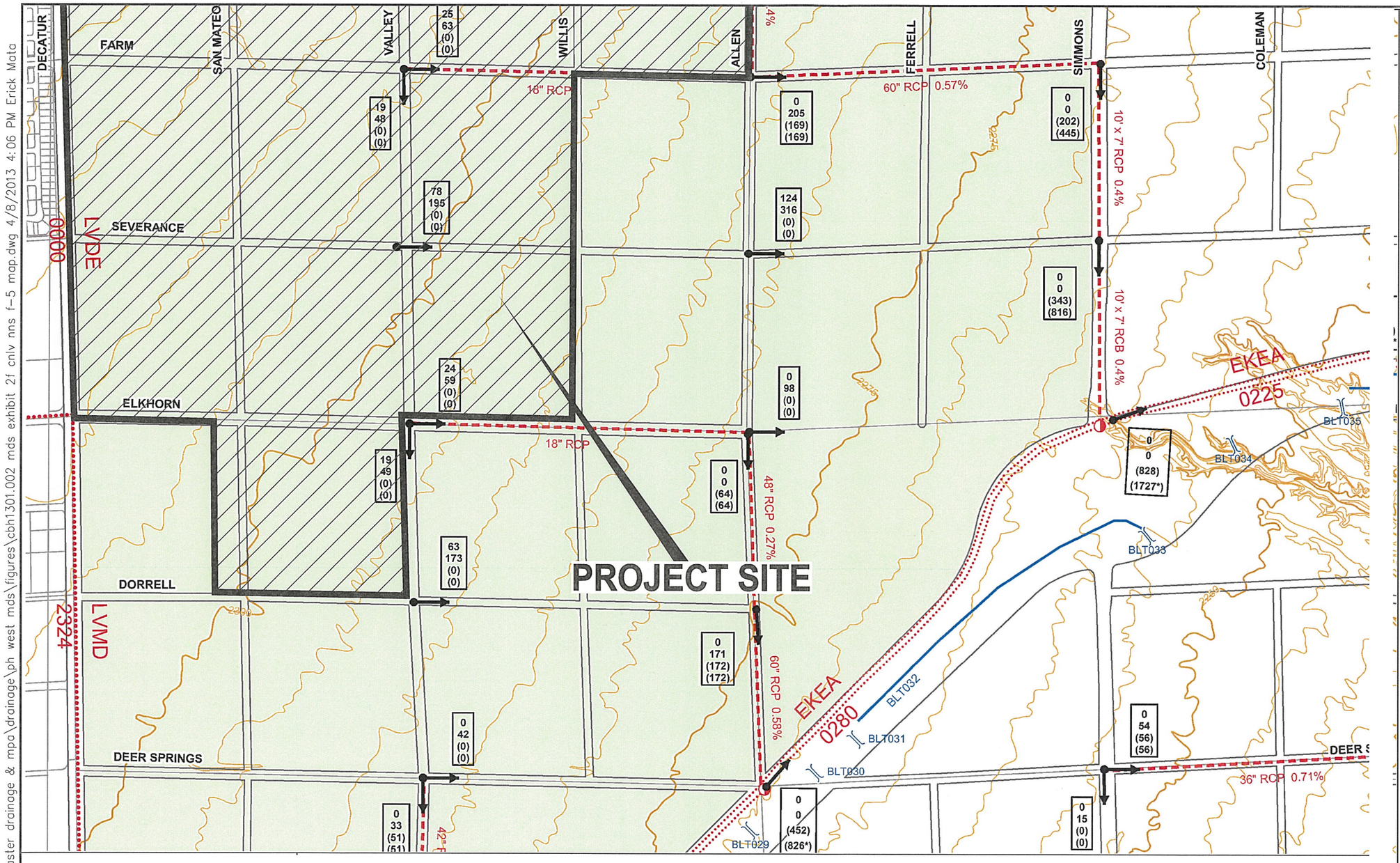
PROJECT NO.	CBH1301.002

EXHIBIT 1F
SHEET 1 OF 1



CITY OF NORTH LAS VEGAS

NORTH NEIGHBORHOOD STUDY

LEGEND

- Existing Regional Basin
- Proposed Regional Basin
- Existing Regional Culvert
- Existing Regional Bridge
- Proposed Regional Culvert
- Proposed Regional Bridge
- Existing Local Culvert
- Existing Regional Pipeline
- Proposed Regional Pipeline
- Existing Regional Channel
- Proposed Regional Channel
- Existing Regional Dike
- Proposed Regional Dike
- Existing Local Pipeline
- Proposed Local Pipeline

FIGURE F-5

FUTURE DRAINAGE CONDITIONS

N
W E
S

0 200 400 800 1,200 1,600
Feet

SCALE: 1 inch = 800 feet

Flow Arrow

250	10-Year Street Flow
500	100-Year Street Flow
(300)	10-Year Facility Flow
(800)	100-Year Facility Flow

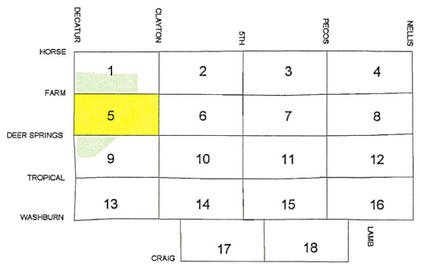
(Flows in CFS)

North Valley 1,905 Acre Study Area

NOTE:
Ultimate drainage conditions are based on future CN values with all flood control facilities in place.

100 Year Facility Flows with an asterisk (*) are flows from the Clark County Regional Flood Control District's 2002 Master Plan Update for the Las Vegas Valley.

(XX) - 10-year future flow not determined for this master planned facility.



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.

CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST

CNLV NORTH NEIGHBORHOOD STUDY F-5 MAP

PBS&J
901 N Green Valley Pkwy, Suite 100
Henderson, Nevada 89074-7105
Phone: 702/263-7275
Fax: 702/263-7200
The Consultant of Choice

DATE:	APRIL 2013
DRAFTER:	KC/ETM
DESIGNER:	KC/ETM
CHECKED:	KCR
PROJECT NO.	CBH1301.002

EXHIBIT 2F
SHEET 1 OF 1

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CITY OF LAS VEGAS NEVADA

NORTHWEST NEIGHBORHOOD STUDY PHASE 2

LEGEND

- SUB-BASIN BOUNDARY
- FLOW ARROW
- 250 — 10-YEAR STREET FLOW
- 500 — 100-YEAR STREET FLOW
- 300 — 10-YEAR FACILITY FLOW
- 800 — 100-YEAR FACILITY FLOW

(FLOWS IN CFS)

BWJS — Basin-ID

(13 / 59) — Contributing flow (10-Year / 100-Year) from the basin (cfs)

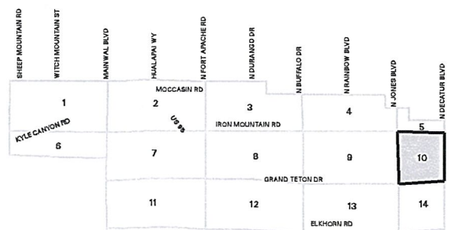
PHOTO DATE: SEPTEMBER 1998

FIGURE E-10



EXISTING DRAINAGE CONDITIONS

PBSJ
901 North Green Valley Parkway, Suite 100
Henderson, Nevada 89014-6139
Phone: 702/263-7275
Fax: 702/263-7200
ENGINEERING PLANNING GIS SURVEYING CONSTRUCTION SERVICES



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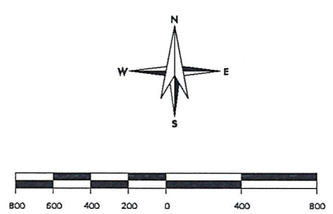
NOTE:
Existing conditions are based on future CN values with only existing local and CCRFCD facilities in place



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.

CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST

CLV NORTHWEST NEIGHBORHOOD STUDY PHASE 2 E-10 MAP

DATE:	APRIL 2013
DRAFTER:	KC/ETM
DESIGNER:	KC/ETM
CHECKED:	KCR
PROJECT NO.	CBH1301.002

EXHIBIT 1G

SHEET 1 OF 1

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CITY OF LAS VEGAS NEVADA

NORTHWEST NEIGHBORHOOD STUDY PHASE 2

LEGEND

SUB-BASIN BOUNDARY

FLOW ARROW

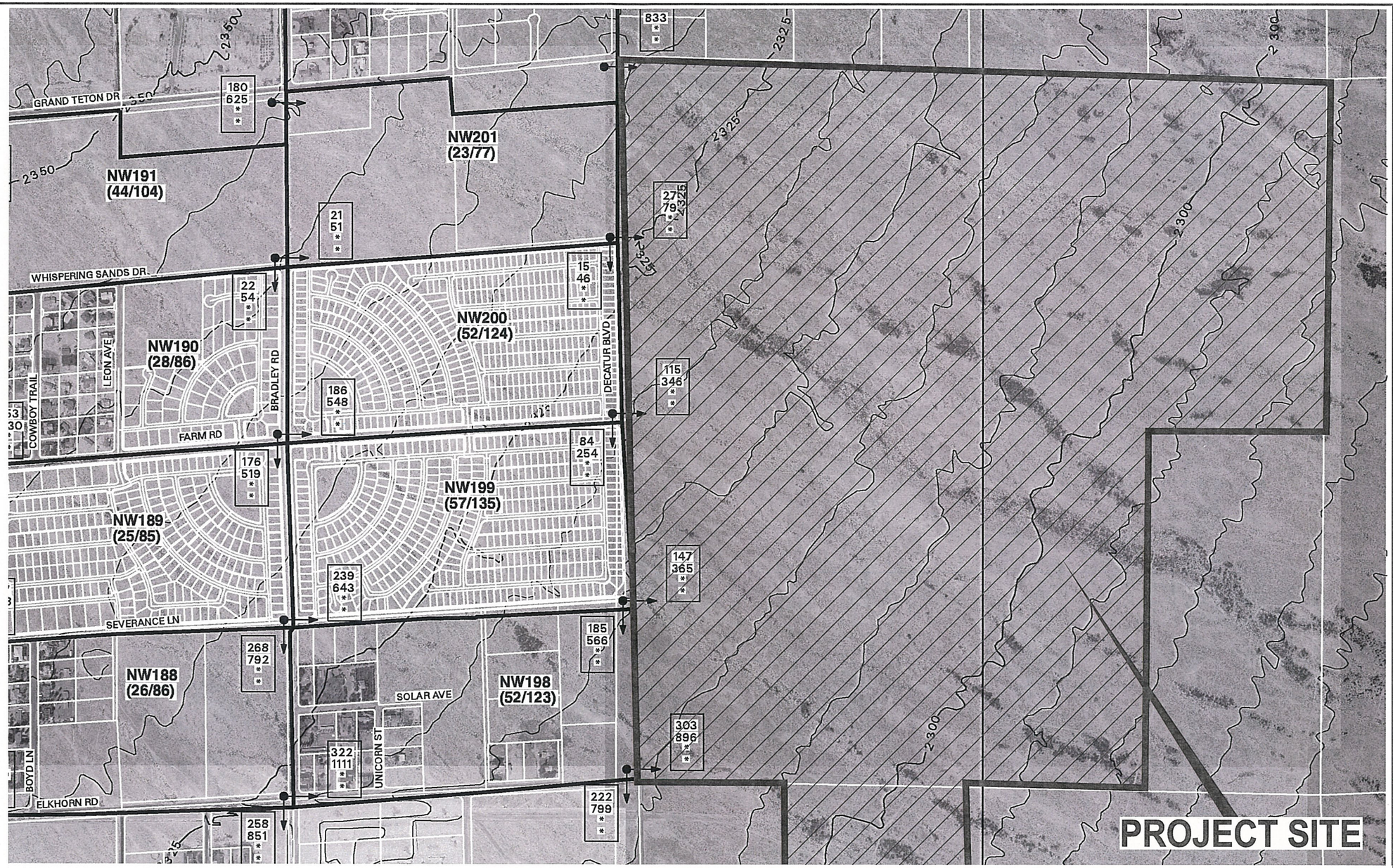
250	10-YEAR STREET FLOW
500	100-YEAR STREET FLOW
300	10-YEAR FACILITY FLOW
800	100-YEAR FACILITY FLOW

(FLOWS IN CFS)

BWJS	Basin-ID
(13 / 59)	Contributing flow (10-Year / 100-Year) from the basin (cfs)

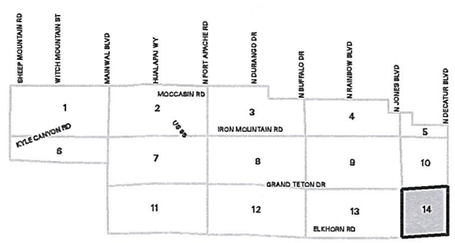
PHOTO DATE: SEPTEMBER 1998

FIGURE E-14



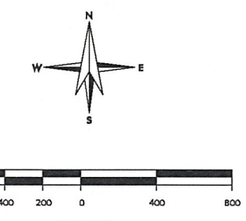
EXISTING DRAINAGE CONDITIONS

PBSJ
901 North Green Valley Parkway, Suite 100
Henderson, Nevada 89014-6139
Phone: 702/263-7275
Fax: 702/263-7200
ENGINEERING PLANNING GIS SURVEYING CONSTRUCTION SERVICES



/FILES8/NWTEMP/E14.MAP

NOTE:
Existing conditions are based on future CN values with only existing local and CCRFCD facilities in place



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.

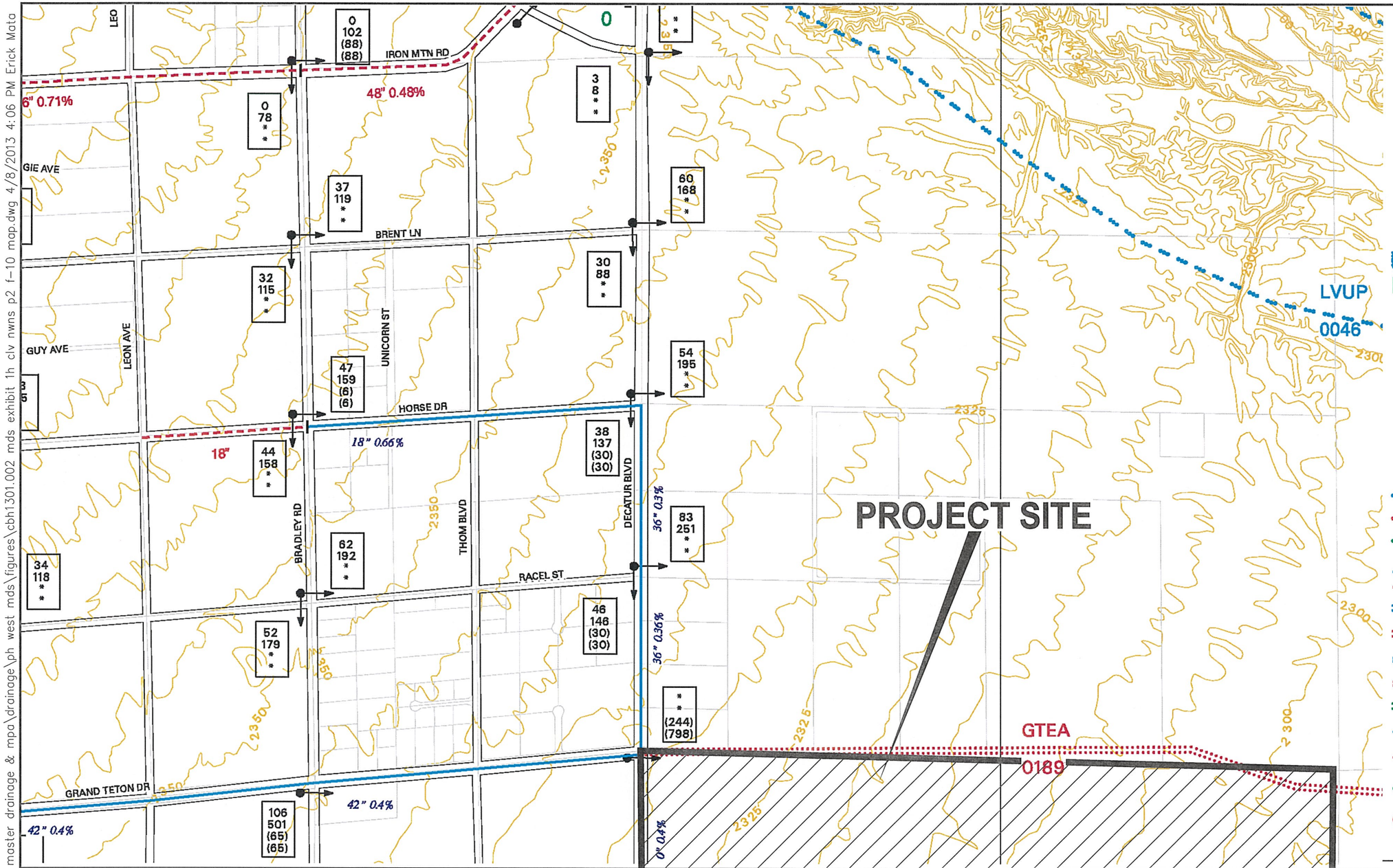
CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST
CLV NORTHWEST NEIGHBORHOOD STUDY PHASE 2 E-14 MAP

DATE:	APRIL 2013
DRAFTER:	KC/ETM
DESIGNER:	KC/ETM
CHECKED:	KCR
PROJECT NO.	CBH1301.002

EXHIBIT 2G
SHEET 1 OF 1

j:\cbh1301-002 park highlands master drainage & mpa\drainage\ph west mds\figures\cbh1301.002 mds exhibit 1h clv nwns p2 f-10 map.dwg 4/8/2013 4:06 PM Erick Mata



NORTHWEST NEIGHBORHOOD STUDY PHASE 2

LEGEND

- EXISTING REGIONAL DETENTION BASINS
- PROPOSED REGIONAL DETENTION BASINS (Not included in 1996 MPU)
- EXISTING REGIONAL BRIDGES
- PROPOSED REGIONAL BRIDGES
- PROPOSED REGIONAL BRIDGES (Not included in 1996 MPU)
- EXISTING LOCAL BRIDGES
- PROPOSED REGIONAL CULVERT
- EXISTING REGIONAL CULVERT
- EXISTING LOCAL CULVERT
- EXISTING REGIONAL PIPELINE
- PROPOSED REGIONAL PIPELINE
- PROPOSED REGIONAL PIPELINE (Not included in 1996 MPU)
- EXISTING LOCAL PIPELINE
- PROPOSED LOCAL PIPELINE
- EXISTING REGIONAL CHANNEL
- PROPOSED REGIONAL CHANNEL
- EXISTING LOCAL CHANNEL
- PROPOSED LOCAL CHANNEL
- PROPOSED REGIONAL CHANNEL (Not included in 1996 MPU)
- EXISTING REGIONAL DIKE/LEVEE
- PROPOSED REGIONAL DIKE/LEVEE
- PROPOSED REGIONAL DIKE/LEVEE (Not included in 1996 MPU)
- PROPOSED LOCAL DIKE/LEVEE

FIGURE F-10

N W E S

800 600 400 200 0 400 800
(IN FEET)
SCALE: 1 INCH = 800 FEET

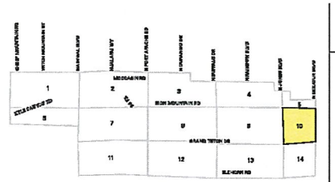
FLOW ARROW

250 10-YEAR STREET FLOW
500 100-YEAR STREET FLOW
(300) 10-YEAR FACILITY FLOW
(800) 100-YEAR FACILITY FLOW

(FLOWS IN CFS)

NOTE:
Ultimate drainage conditions are based on future CN values with all flood control facilities in place.
Regional facility identifiers were established based on the methodology used in the "1996 Clark County Regional Flood Control Master Plan Update for the Las Vegas Valley."

NOTE:
All regional facilities proposed in the "1996 Clark County Regional Flood Control Master Plan Update for the Las Vegas Valley" have been resized based on the flows developed in this study. In addition, many of these facilities have been changed from channels to reinforced concrete box culverts.



FUTURE DRAINAGE CONDITIONS

PBSJ
ENGINEERING PLANNING GIS SURVEYING CONSTRUCTION SERVICES
801 North Green Valley Parkway, Suite 100
Henderson, Nevada 89014-5139
Phone: 702/263-7275
Fax: 702/263-7200

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.

CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST
CLV NORTHWEST NEIGHBORHOOD STUDY PHASE 2 F-10 MAP

DATE: APRIL 2013
DRAFTER: KC/ETM
DESIGNER: KC/ETM
CHECKED: KCR

PROJECT NO.
CBH1301.002

EXHIBIT 1H
SHEET 1 OF 1

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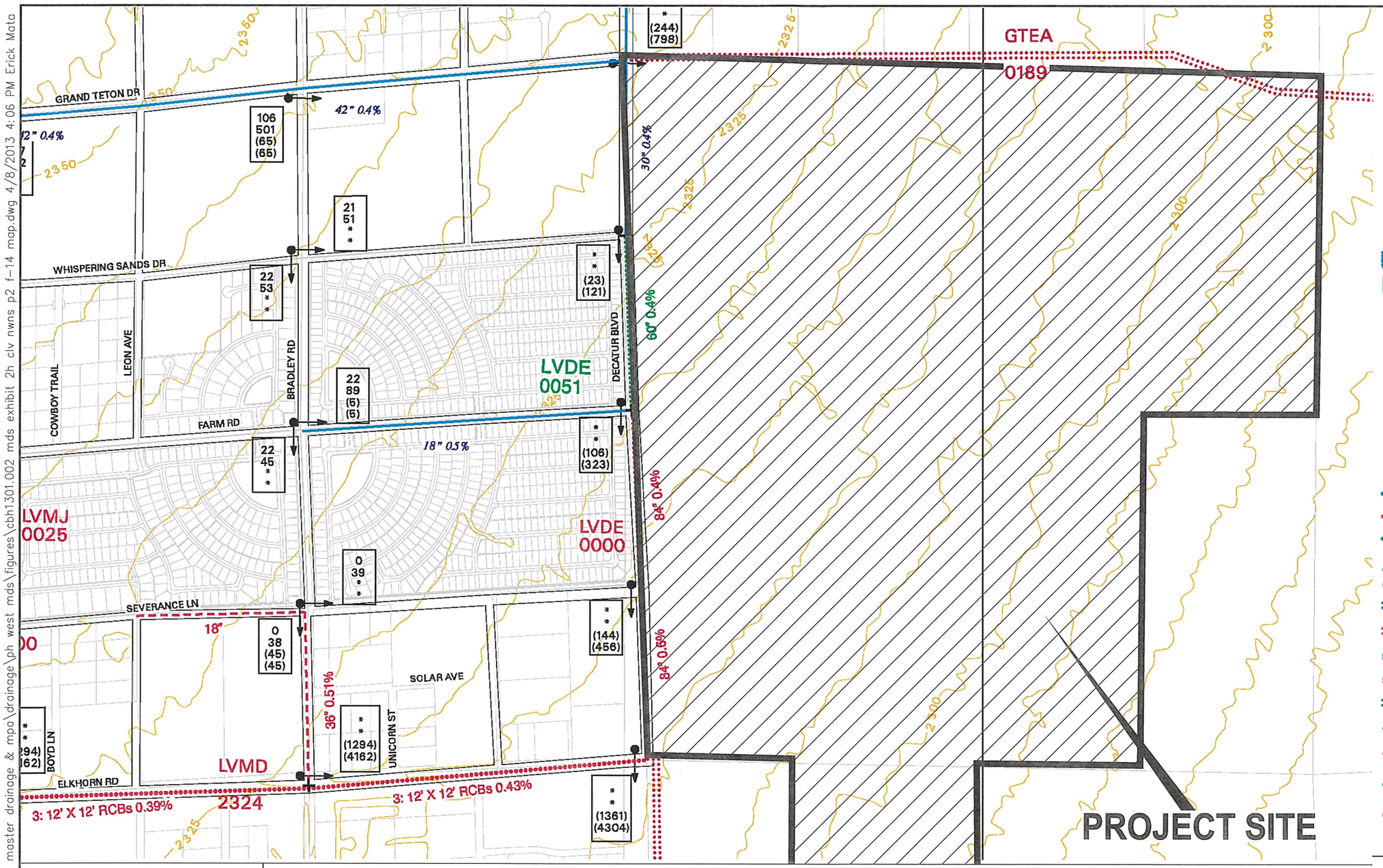

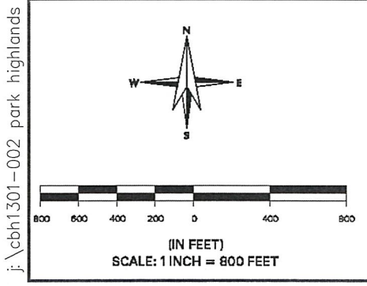

FLOW ARROW

250	10-YEAR STREET FLOW
500	100-YEAR STREET FLOW
(300)	10-YEAR FACILITY FLOW
(800)	100-YEAR FACILITY FLOW

(FLOWS IN CFS)

NOTE:

Ultimate drainage conditions are based on future CN values with all flood control facilities in place.
Regional facility identifiers were established based on the methodology used in the "1996 Clark County Regional Flood Control Master Plan Update for the Las Vegas Valley."

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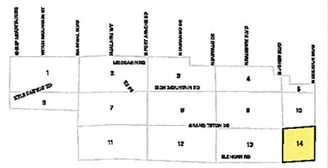


CITY OF LAS VEGAS NEVADA

NORTHWEST NEIGHBORHOOD STUDY PHASE 2

LEGEND

- EXISTING REGIONAL DETENTION BASINS
- PROPOSED REGIONAL DETENTION BASINS (Not included in 1996 MPU)
- EXISTING REGIONAL BRIDGES
- PROPOSED REGIONAL BRIDGES
- PROPOSED REGIONAL BRIDGES (Not included in 1996 MPU)
- EXISTING LOCAL BRIDGES
- PROPOSED REGIONAL CULVERT
- EXISTING REGIONAL CULVERT
- EXISTING LOCAL CULVERT
- EXISTING REGIONAL PIPELINE
- PROPOSED REGIONAL PIPELINE
- PROPOSED REGIONAL PIPELINE (Not included in 1996 MPU)
- EXISTING LOCAL PIPELINE
- PROPOSED LOCAL PIPELINE
- EXISTING REGIONAL CHANNEL
- PROPOSED REGIONAL CHANNEL
- EXISTING LOCAL CHANNEL
- PROPOSED LOCAL CHANNEL
- PROPOSED REGIONAL CHANNEL (Not included in 1996 MPU)
- EXISTING REGIONAL DIKE/LEVEE
- PROPOSED REGIONAL DIKE/LEVEE
- PROPOSED REGIONAL DIKE/LEVEE (Not included in 1996 MPU)
- PROPOSED LOCAL DIKE/LEVEE

FIGURE F-14

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.

CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST

CLV NORTHWEST NEIGHBORHOOD STUDY PHASE 2 F-14 MAP

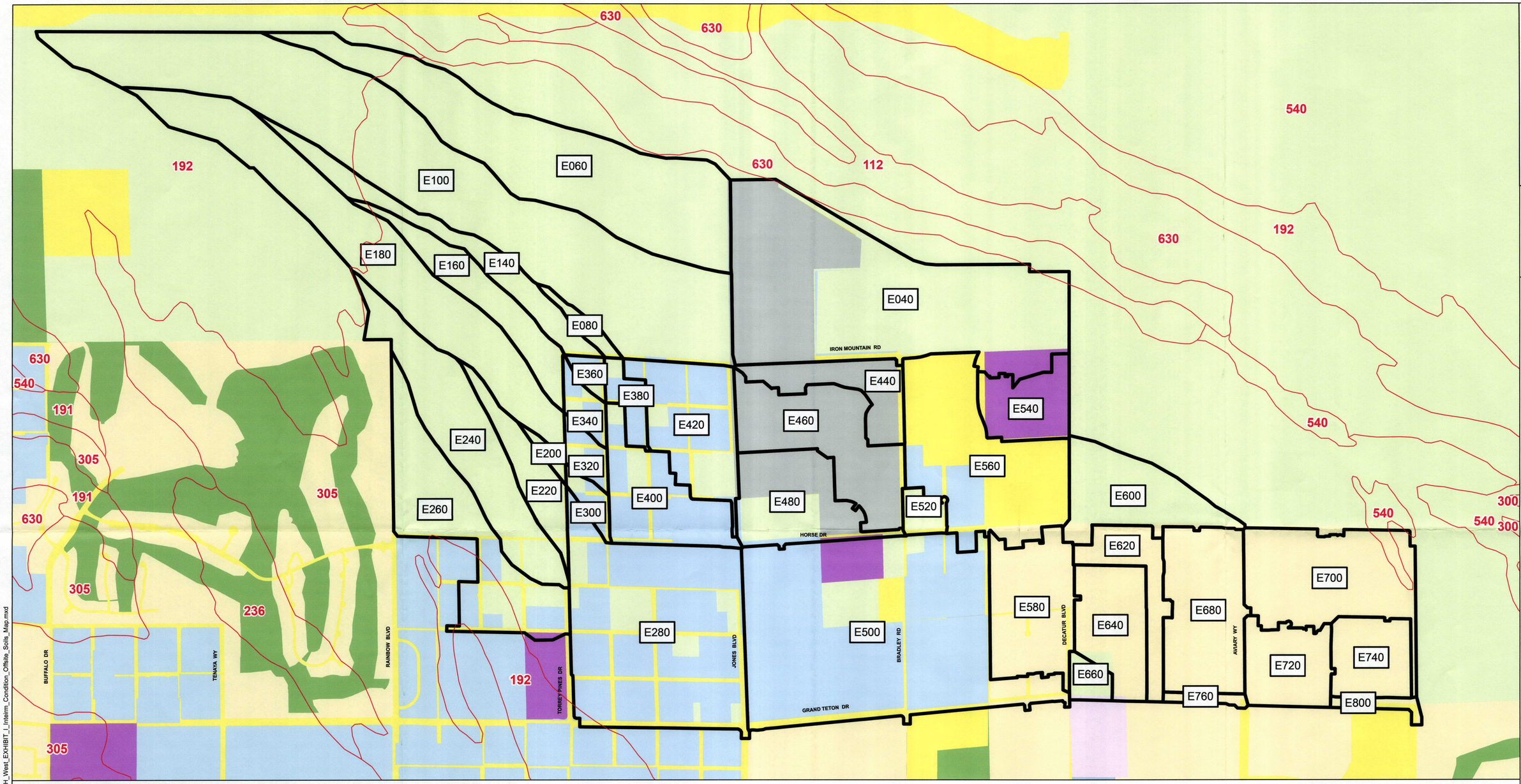
FUTURE DRAINAGE CONDITIONS

PBSJ
ENGINEERING PLANNING GIS SURVEYING CONSTRUCTION SERVICES
901 North Green Valley Parkway, Suite 100
Henderson, Nevada 89014-5139
Phone: 702/263-7276
Fax: 702/263-7200

DATE:	APRIL 2013
DRAFTER:	KC/ETM
DESIGNER:	KC/ETM
CHECKED:	KCR
PROJECT NO.	CBH1301.002

EXHIBIT 2H

SHEET 1 OF 1



Legend

- HYDROLOGIC SOIL GROUPS
- BASIN BOUNDARY

TYPICAL LAND USE

1	UNDEVELOPED LAND, OPEN DESERT
2	PARKS, GOLF COURSES
3	RURAL
4 / 14*	LOW DENSITY RESIDENTIAL
5 / 15*	MEDIUM DENSITY RESIDENTIAL
6 / 16*	HIGH DENSITY RESIDENTIAL
7 / 17*	PUBLIC FACILITY, RESIDENTIAL
8 / 18*	VERY HIGH DENSITY RESIDENTIAL
9 / 19*	COMMERCIAL, RETAIL, CASINO, HIGH RISE CONDOMINIUMS
10 / 20*	LIGHT INDUSTRIAL
11 / 21*	HEAVY INDUSTRIAL
12 / 22*	SCHOOLS
13	LAKES

N

700 350 0 700

1" = 700'

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. Arville Street, Suite 216, Las Vegas, NV 89118
Phone: (702) 284-5300 Fax: (702) 284-5399

CRESCENT BAY HOLDINGS
PARK HIGHLANDS WEST
INTERIM CONDITION OFFSITE SOILS MAP

DATE: MAY 2013
DRAFTED BY: KC
CHECKED BY: KCA/MJF
PROJECT NO.: CBH1301.002

EXHIBIT I

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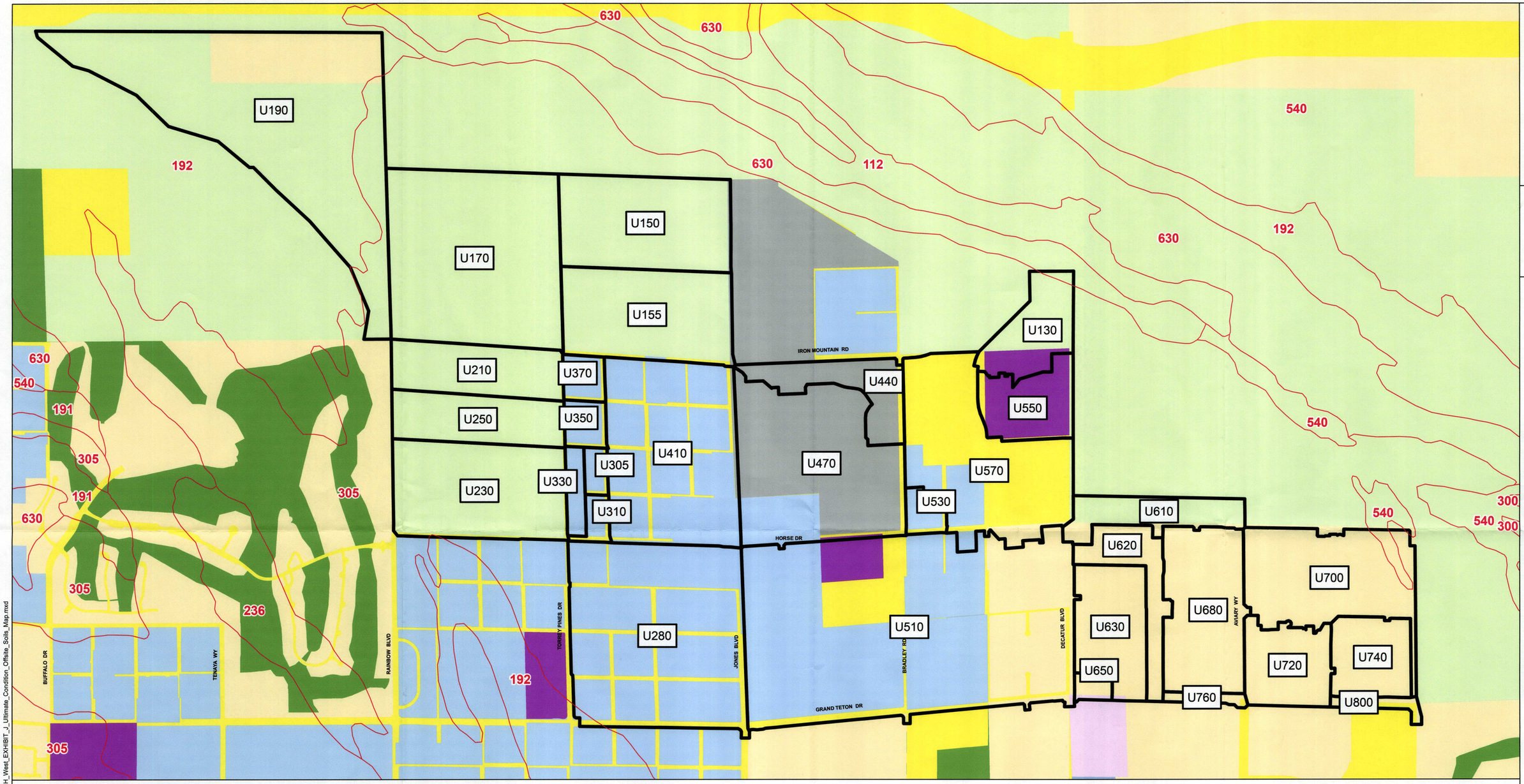


Legend

HYDROLOGIC SOIL GROUPS

BASIN BOUNDARY

TYPICAL LAND USE

1	UNDEVELOPED LAND, OPEN DESERT
2	PARKS, GOLF COURSES
3	RURAL
4 / 14*	LOW DENSITY RESIDENTIAL
5 / 15*	MEDIUM DENSITY RESIDENTIAL
6 / 16*	HIGH DENSITY RESIDENTIAL
7 / 17*	PUBLIC FACILITY, RESIDENTIAL
8 / 18*	VERY HIGH DENSITY RESIDENTIAL
9 / 19*	COMMERCIAL, RETAIL, CASINO, HIGH RISE CONDOMINIUMS
10 / 20*	LIGHT INDUSTRIAL
11 / 21*	HEAVY INDUSTRIAL
12 / 22*	SCHOOLS
13	LAKES

N

700 350 0 700

1" = 700'

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. Arville Street, Suite 216, Las Vegas, NV 89118
Phone: (702) 364-3000 Fax: (702) 364-3399

CRESCENT BAY HOLDINGS
PARK HIGHLANDS WEST
ULTIMATE CONDITION OFFSITE SOILS MAP

DATE: MAY 2013

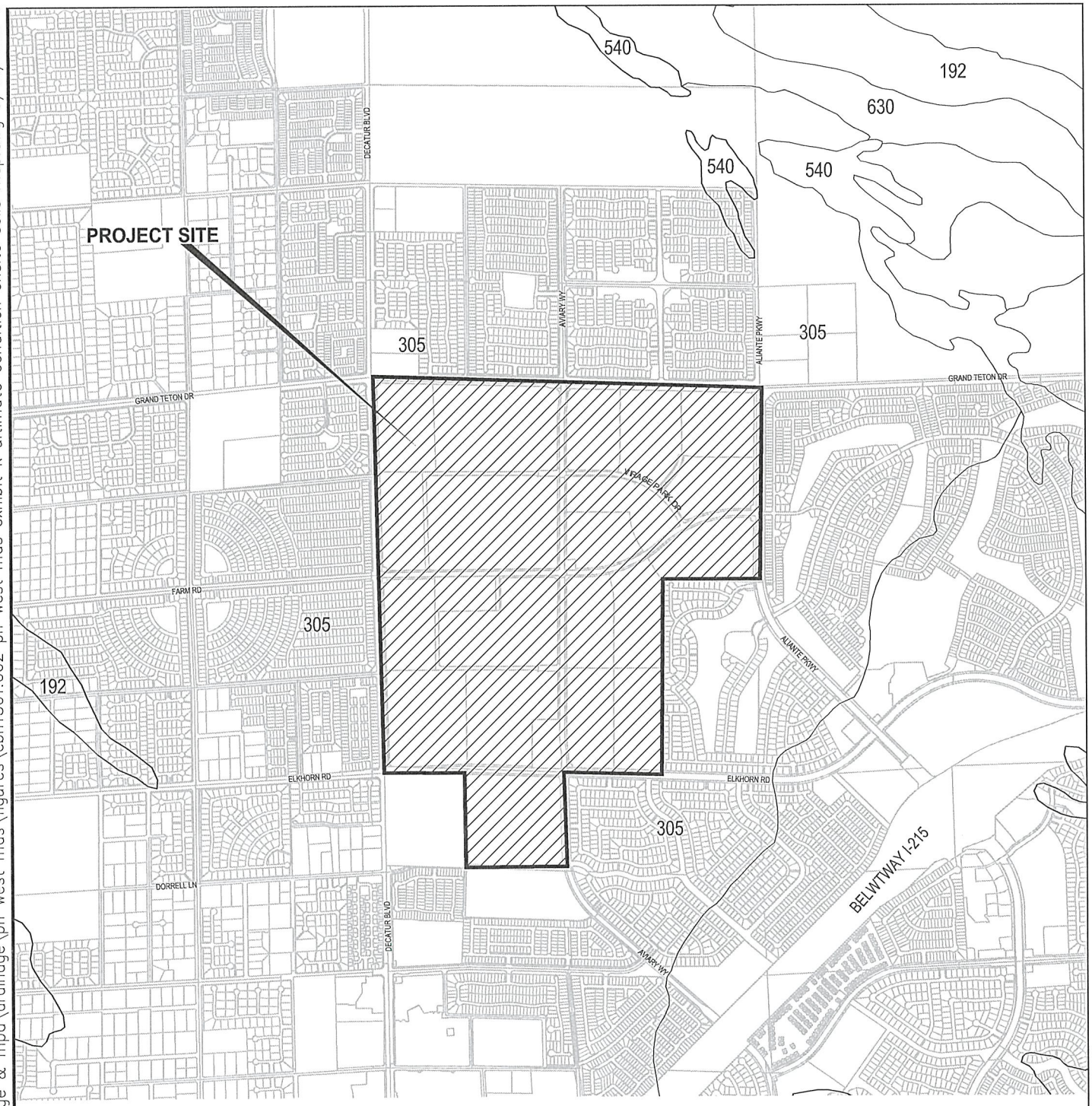
DRAFTED BY: KC

CHECKED BY: KCA/MJF

PROJECT NO.: CBH1301.002

EXHIBIT J

Path: J:\CBH1301-002 Park Highlands Master Drainage & MPA\GIS\PH West MDS\CBH1301_PH_West_EXHIBIT_J_Ultimate_Condition_Offsite_Soils_Map.mxd



SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

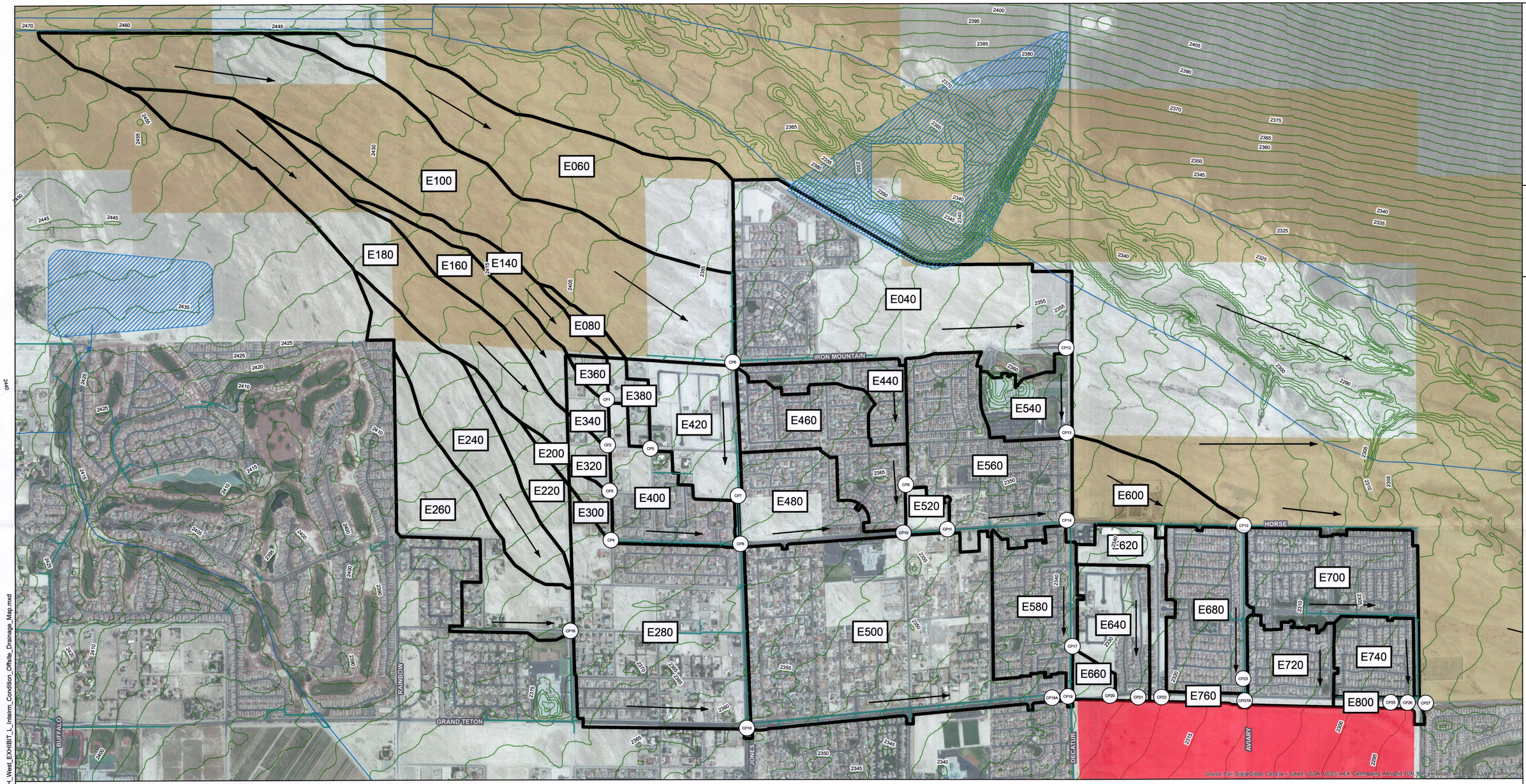
CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST

ULTIMATE CONDITION ONSITE SOILS MAP

DATE: MAY 2013	PROJECT NO. CBH1301.002
DRAFTER: KC/ETM	
DESIGNER: KC/ETM	**EXHIBIT K**
CHECKED: KCR/MJF	SHEET 1 OF 1

j:\cbh1301-002 park highlands master drainage & mpa\drainage\ph west mds\figures\cbh1301.002 ph west mds exhibit k ultimate condition onsite soils map.dwg 5/13/2013 1



SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. Arville Street, Suite 216, Las Vegas, NV 89118
Phone: (702) 284-5300 Fax: (702) 284-5399

CRESCENT BAY HOLDINGS
PARK HIGHLANDS WEST
INTERIM CONDITION OFFSITE DRAINAGE MAP

DATE: MAY 2013
DRAFTED BY: KC
CHECKED BY: KCA/MJF
PROJECT NO.: CBH1301.002

EXHIBIT L

Offsite Basin Flow Summary
Interim Condition

Basin ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
E140	43.23	35	11
E360	6.09	11	4
E160	41.04	42	14
E340	10.75	19	7
E180	137.09	93	28
E320	10.84	20	7
E200	3.76	6	2
E300	8.44	15	6
E080	6.94	10	4
E380	12.51	21	8
E060	165.62	128	42
E100	300.70	172	53
E420	61.25	94	35
E400	54.13	81	30
E440	33.50	38	12
E460	72.97	73	22
E480	55.88	67	21
E520	9.18	16	6
E040	231.37	210	68
E540	32.41	58	22
E560	112.82	168	72
E600	55.17	73	26
E240	84.90	85	29
E260	88.25	93	32
E580	62.74	100	41
E220	28.46	37	13
E280	178.05	199	68
E500	248.39	239	82
E660	8.95	16	6
E640	44.82	75	30
E620	30.19	53	22
E680	71.80	113	46
E760	4.87	10	4
E720	37.73	67	28
E800	6.08	14	6
E740	34.12	62	26
E700	86.51	122	50

Offsite Concentration Point Flow Summary
Interim Condition

Concentration Point ID	Area (sq mi)	DARF	Q_{100} (cfs)	Q_{10} (cfs)
CP1 E140 + E360	0.09	0.980	38	12
CP2 CP3 + E160E + E340	0.16	0.990	62	15
CP3 CP23 + E180 + E160S + E320	0.39	0.990	131	43
CP4 CP26 + E200 + E300	0.41	0.990	75	26
CP5 E080 + CP2 + E380	0.11	0.990	46	15
CP6 E060S + E100	0.73	0.975	226	74
CP7 CP6S + E420 + CP8E	0.93	0.975	126	40
CP8 CP5S + CP7S + CP3E + CP5E + CP6E + E400	1.35	0.950	213	85
CP9 E460 + E480	0.17	0.990	90	26
CP10 CP8E + CP9S + CP7E + E440	1.60	0.950	242	72
CP11 CP10S + CP9E + E520	1.62	0.950	166	43
CP12 E060S + CP6S + E040	1.09	0.950	319	110
CP13 CP12S + E540	1.14	0.950	146	116
CP14 CP11S+ CP12S + E440E + E560	2.20	0.925	262	154
CP15 CP14E + E620	2.29	0.925	262	133
CP16 E240S + E260	0.27	0.990	133	45
CP17 CP14S + E660	2.30	0.925	121	62
CP18 E220 + E240E + CP2E + CP6S + CP8S + E280	1.94	0.950	417	162
CP18A CP1E + CP16 + CP17E + E500	2.60	0.925	763	252
CP19 CP17S + CP18A	3.28	0.915	829	293
CP20 CP15E + CP18E + E660	3.30	0.915	833	294
CP21 CP20 + E640	3.37	0.915	862	304
CP22 CP21 + E620	3.41	0.915	881	311
CP23 CP15S + E680	2.29	0.925	123	46
CP23A CP22 + CP23 + E760	3.62	0.915	943	329
CP25 E720 + E800	0.07	0.990	79	33
CP26 CP25 + E740	0.12	0.990	141	59
CP27 CP26 + E700	0.26	0.990	248	101

Flow Split Summary
Interim Condition

Flow Split Location	Concentration Point / Basin ID	DARF	Flow Split ID	Q_{100} (cfs)	Q_{10} (cfs)
Maggie Avenue & Mustang Street	CP1	0.990	CP1E	17	5
			CP1S	21	7
Maggie Avenue & Torrey Pines Drive	E160	0.990	E160E	32	4
			E160S	10	10
Brent Lane & Mustang Street	CP2	0.990	CP2E	31	8
			CP2S	31	7
Guy Avenue & Mustang Street	CP3	0.990	CP3E	62	20
			CP3S	69	23
Horse Drive & Mustang Street	CP4	0.990	CP4E	23	7
			CP4S	52	19
Brent Lane & Maverick Street	CP5	0.990	CP5E	25	8
			CP5S	21	7
Shelsheda Avenue & Jones Boulevard	E060E	0.990	E060E	63	19
			E060S	65	23
Iron Mountain Road & Jones Boulevard	CP6	0.975	CP6E	136	60
			CP6S	90	14
Lutts Street & Jones Boulevard	CP7	0.975	CP7E	81	0
			CP7S	45	40
Horse Drive & Jones Boulevard	CP8	0.950	CP8E	88	29
			CP8S	125	56
Brent Lane & Bradley Road	E440	0.990	E440E	20	7
			E440S	18	5
Bradley Road North of Horse Drive	CP9	0.990	CP9E	49	0
			CP9S	41	26
Horse Drive & Bradley Road	CP10	0.950	CP10E	115	39
			CP10S	127	33
Horse Drive & Unicorn Street	CP11	0.950	CP11E	90	24
			CP11S	76	19
Iron Mountain Road & Decatur Boulevard	CP12	0.950	CP12E	180	0
			CP12S	139	110
Brent Lane & Decatur Boulevard	CP13	0.950	CP13E	7	0
			CP13S	139	116
Horse Drive & Decatur Boulevard	CP14	0.925	CP14E	232	124
			CP14S	30	30
Horse Drive & Aviary Way	CP15	0.925	CP15E	238	133
			CP15S	24	0
Meisenheimer Avenue & Torrey Pines Drive	E240	0.990	E240E	45	15
			E240S	40	14
Racel Street & Torrey Pines Drive	CP16	0.990	CP16E	66	23
			CP16S	67	22
Decatur Boulevard North of Grand Teton Drive	CP17	0.925	CP17E	0	0
			CP17S	121	62

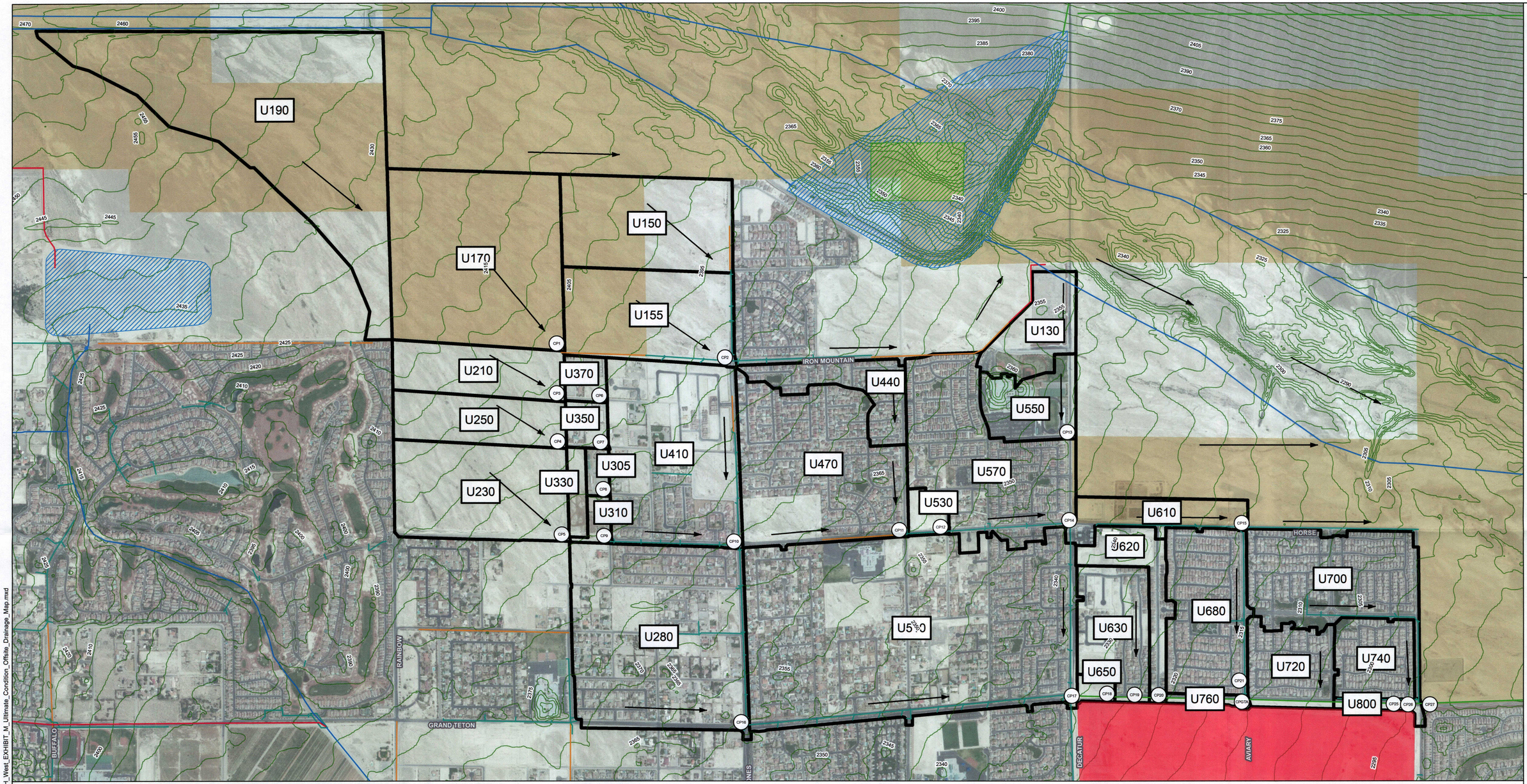
700 350 0 700 1,400
1" = 700'

N

Legend

- Project Site
- Basin Boundary
- Concentration Point
- Flow Direction
- Conservation Transfer Area (CTA)
- Existing Regional Facility
- Existing Local Facility
- Detention Basin
- Culvert or Bridge Crossing
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway

Path: J:\CBH1301-002 Park Highlands Master Drainage & MPA\GIS\PH West MDS\CBH1301_PH_West_EXHIBIT_L_Interim_Condition_Offsite_Drainage_Map.mxd



Offsite Basin Flow Summary
Ultimate Condition

Basin ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
U190	235.76	196	59
U170	161.35	152	51
U150	85.49	104	35
U155	82.81	104	35
U210	46.51	60	20
U250	44.65	57	19
U230	88.98	110	37
U330	9.06	15	6
U370	10.17	18	7
U350	10.42	19	7
U305	5.95	11	4
U310	6.55	13	5
U410	128.82	169	64
U440	33.49	38	12
U470	128.75	132	40
U530	8.38	15	5
U130	35.59	54	19
U550	34.20	55	20
U570	114.63	170	73
U610	30.65	40	14
U280	172.01	197	67
U510	312.63	324	118
U650	5.46	13	5
U630	47.03	82	33
U620	30.19	53	22
U680	71.80	113	46
U760	4.87	10	4
U720	37.73	67	28
U800	6.08	14	6
U740	34.12	62	26
U700	86.51	122	50

Offsite Concentration Point Flow Summary
Ultimate Condition

Concentration Point ID	Area (sq mi)	DARF	DARF Column	Q_{100} (cfs)	Q_{10} (cfs)
CP1 U190 + U170	0.62	0.975	2	339	109
CP2 CP1E + U150 + U155	0.88	0.975	2	294	92
CP3 CP2S + U210	0.69	0.975	2	186	64
CP4 CP3S + U250	0.76	0.975	2	155	52
CP5 CP4S + U230 + U330	0.92	0.975	2	194	65
CP6 CP5E + U370	0.71	0.975	2	100	32
CP7 CP6S + CP4E + U350	0.80	0.975	2	148	48
CP8 CP7S + U305	0.80	0.975	2	84	27
CP9 CP5 + CP8S + U310	0.97	0.975	2	246	82
CP10 CP2S + CP9E + CP9E + CP7E + CP6E + U410	1.43	0.950	3	410	134
CP11 CP10E + U440S + U470	1.69	0.950	3	278	79
CP12 CP11E + U530	1.70	0.950	3	164	48
CP13 U130S + U550	0.11	0.990	1	76	28
CP14 CP12E + CP13S + U440E + U570	1.99	0.950	3	224	98
CP15 CP14E + U610	2.03	0.925	4	186	77
CP16 CP6S + CP10S + U280	1.70	0.950	3	536	181
CP17 CP1S + CP1S + CP2S + CP4S + U510	2.74	0.925	4	957	336
CP18 CP17 + U650	2.75	0.925	4	969	337
CP19 CP18 + U630	2.83	0.925	4	989	344
CP20 CP19 + U620	2.87	0.925	4	1,008	349
CP21 CP15S + U680	2.15	0.925	4	102	46
CP22A CP20 + CP21 + U760	3.04	0.915	5	1,026	358
CP26 U720 + U800	0.07	0.990	1	79	33
CP25 CP25 + U740	0.12	0.990	1	141	59
CP27 CP26 + U700	0.26	0.990	1	248	101

Flow Split Summary
Ultimate Condition

Flow Split Location	Concentration Point / Basin ID	DARF	Flow Split ID	Q_{100} (cfs)	Q_{10} (cfs)
Iron Mountain Road & Torrey Pines Drive	CP1	0.975	CP1E	196	60
			CP1S	143	49
Sheleheda Avenue & Jones Boulevard	U150	0.990	U150E	60	20
			U150S	44	15
Iron Mountain Road & Jones Boulevard	CP2	0.975	CP2E	170	69
			CP2S	124	23
Maggie Avenue & Torrey Pines Drive	CP3	0.975	CP3E	85	29
			CP3S	101	35
Brent Lane & Torrey Pines Drive	CP4	0.975	CP4E	77	25
			CP4S	78	27
Maggie Avenue & Mustang Street	CP6	0.975	CP6E	45	14
			CP6S	55	18
Brent Lane & Mustang Street	CP7	0.975	CP7E	74	24
			CP7S	74	24
Guy Avenue & Mustang Street	CP8	0.975	CP8E	39	13
			CP8S	45	14
Horse Drive & Mustang Street	CP9	0.975	CP9E	89	26
			CP9S	157	56
Horse Drive & Jones Boulevard	CP10	0.950	CP10E	176	51
			CP10S	234	83
Brent Lane & Bradley Road	U440	0.990	U440E	21	7
			U440S	17	5
Horse Drive & Bradley Road	CP11	0.950	CP11E	160	46
			CP11S	118	33
Horse Drive & Unicorn Street	CP12	0.950	CP12E	89	27
			CP12S	75	21
Iron Mountain Road & Decatur Boulevard	U130	0.990	U130E	29	10
			U130S	25	9
Brent Lane & Decatur Boulevard	CP13	0.990	CP13E	44	17
			CP13S	32	11
Horse Drive & Decatur Boulevard	CP14	0.950	CP14E	194	68
			CP14S	30	30
Horse Drive & Aviary Way	CP15	0.925	CP15E	186	77
			CP15S	0	0

700 350 0 700
1" = 700'

N

Legend

- Concentration Point
- Project Site
- Basin Boundary
- Flow Direction
- Conservation Transfer Area (CTA)
- Existing Regional Facility
- Proposed Regional Facility
- Existing Local Facility
- Proposed Local Facility
- Detention Basin
- Culvert or Bridge Crossing
- Stormdrain
- Lined Channel
- Unlined Channel
- Levee/Dike
- Natural Wash/Floodway

SLATER HANIFAN GROUP
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Phone: (702) 284-5300 Fax: (702) 284-5399

CRESCENT BAY HOLDINGS
PARK HIGHLANDS WEST
ULTIMATE CONDITION OFFSITE DRAINAGE MAP

DATE: MAY 2013
DRAFTED BY: KC
CHECKED BY: KCA/MJF
PROJECT NO.: CBH1301.002

EXHIBIT M

Path: J:\CBH1301-002 Park Highlands Master Drainage & MPA\GIS\PH West MDS\CBH1301_PH_West_EXHIBIT_M_Ultimate_Condition_Offsite_Drainage_Map.mxd

Onsite Basin Flow Summary
Ultimate Condition

Basin ID	Area (ac)	Q_{100} (cfs)	Q_{10} (cfs)
2-3	20.9	40	15
2-1	23.5	56	28
2-2	47.5	96	44
2-14A	1.7	3	1
2-6	11.5	29	15
2-7	10.0	20	8
2-4	21.4	56	28
2-14B	1.6	3	1
2-5	57.0	115	53
2-5E	27.5	55	25
2-5W	29.5	60	28
2-9	10.0	24	11
2-10	10.4	25	12
2-8	18.3	48	24
2-11	16.3	43	22
2-12	17.4	39	17
2-13	17.5	39	18
1-1	22.0	57	29
AL1E	1.7	5	3
1-2	22.8	58	29
1-4	23.9	55	25
1-3	26.8	60	27
AL2E	1.6	5	3
4-1	23.0	60	30
4-6	2.5	5	2
4-7	29.7	64	29
4-4	7.0	17	8
4-2	35.0	86	43
4-3	34.7	75	34
U1020	5.9	14	7
4-5	41.6	100	50
U1040	11.8	32	17
U1060	3.9	10	5
U1080	16.2	42	21
3-1	23.0	59	30
3-2	13.4	31	14

LEGEND

- BASIN BOUNDARY
- I D — BASIN ID
- SUBBASIN BOUNDARY
- (I D) — SUBBASIN ID
- FLOW DIRECTION
- (I D) — CONCENTRATION POINT

AREA LEGEND

- AREA 1
- AREA 2
- AREA 3
- AREA 4
- AREA 5
- AREA 6
- AREA 7
- AREA 8
- AREA 9

N

0 400 800
SCALE – 1" = 400' FEET

Onsite Concentration Point Flow Summary
Interim Condition

Concentration Point ID	Area (sq mi)	DARF	DARF Column	Q_{100} (cfs)	Q_{10} (cfs)
CPGTA2 CPGTA + 2-3	3.65	0.915	5	951	331
2A 2-1 + 2-2 + 2-14A	0.11	0.990	1	155	72
2B CPGTA2 + 2A	3.77	0.915	5	993	344
DB1 DB1 outlet	3.77	0.915	5	231	142
2C DB1 + 2-6	3.78	0.915	5	231	142
2D 2C + 2-7	3.80	0.915	5	232	142
2E 2-4 + 2-14B	0.04	0.990	1	59	30
2F 2E + 2-5W + 2-9	0.14	0.990	1	142	67
2G 2F + 2-5E + 2-10	0.16	0.990	1	222	103
2H 2G + 2-8	0.19	0.990	1	270	127
2I 2D + 2H	3.99	0.915	5	357	190
2J 2-11 + 2-12	0.05	0.990	1	82	39
PT2 2I + 2J + 2-13	4.07	0.908	6	462	247
1A.1 1-1 + AL1E	0.04	0.990	1	61	31
1A A1.1 + 1-2	0.07	0.990	1	119	60
1B 1A + 1-4	0.11	0.990	1	167	80
PT1 1B + 1-3 + AL2E	0.15	0.990	1	232	109
4A 4-1 + 4-6 + 4-7	0.09	0.990	1	129	61
4B 4A + 4-4	0.10	0.990	1	146	69
4C 4-2 + 4-3	0.11	0.990	1	161	77
4D 4B + 4C + U1020	0.22	0.990	1	321	153
4H 4D + 4-5	0.28	0.990	1	421	203
4I U1040 + U1060 + U1080	0.05	0.990	1	84	43
PT4 4H + 4I	0.33	0.990	1	505	246
PT3 3-1 + 3-2	0.06	0.990	1	89	43

Onsite Concentration Point Flow Summary
Ultimate Condition

Concentration Point ID	Area (sq mi)	DARF	DARF Column	Q_{100} (cfs)	Q_{10} (cfs)
CPGTA2 CPGTA + 2-3	3.07	0.915	5	1,032	360
2A 2-1 + 2-2 + 2-14A	0.11	0.990	1	155	72
2B CPGTA2 + 2A	3.19	0.915	5	1,066	370
DB1 DB1 outlet	3.19	0.915	5	231	141
2C DB1 + 2-6	3.21	0.915	5	232	141
2D 2C + 2-7	3.22	0.915	5	232	142
2E 2-4 + 2-14B	0.04	0.990	1	59	30
2F 2E + 2-5W + 2-9	0.14	0.990	1	142	67
2G 2F + 2-5E + 2-10	0.16	0.990	1	222	103
2H 2G + 2-8	0.19	0.990	1	270	127
2I 2D + 2H	3.41	0.915	5	356	190
2J 2-11 + 2-12	0.05	0.990	1	82	39
PT2 2I + 2J + 2-13	3.49	0.915	5	466	246
1A.1 1-1 + AL1E	0.04	0.990	1	61	31
1A A1.1 + 1-2	0.07	0.990	1	119	60
1B 1A + 1-4	0.11	0.990	1	167	80
PT1 1B + 1-3 + AL2E	0.15	0.990	1	232	109
4A 4-1 + 4-6 + 4-7	0.09	0.990	1	129	61
4B 4A + 4-4	0.10	0.990	1	146	69
4C 4-2 + 4-3	0.11	0.990	1	161	77
4D 4B + 4C + U1020	0.22	0.990	1	321	153
4H 4D + 4-5	0.28	0.990	1	421	203
4I U1040 + U1060 + U1080	0.05	0.990	1	84	43
PT4 4H + 4I	0.33	0.990	1	505	246
PT3 3-1 + 3-2	0.06	0.990	1	89	43

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.

CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST
INTERIM & ULTIMATE CONDITION ONSITE DRAINAGE MAP

DATE: MAY 2013
DRAFTER: KC/ETM
DESIGNER: KC/ETM
CHECKED: KCR/MJF
PROJECT NO.
CBH1301.002

EXHIBIT N
SHEET 1 OF 1

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LEGEND

- BASIN BOUNDARY
- BASIN ID
- SUBBASIN BOUNDARY
- SUBBASIN ID
- CONCENTRATION POINT
- FLOWMASTER SECTION
- SLOPE AND FLOW DIRECTION

N

0 350 700

SCALE – 1" = 350' FEET

10-Year Street Flow Capacity Summary

Street Section	ROW Width (ft)	Slope (%)	Q (cfs)	Depth (ft)	Velocity (fps)	D x V	Control
1	90	1.04	53	0.65	3.97	2.6	Dry Lane
2	90	0.50	37	0.65	2.76	1.8	Dry Lane
3	70	1.00	136	1.00	5.39	5.4	Depth
4	90	1.04	53	0.65	3.97	2.6	Dry Lane
5	52	0.45	128	1.00	4.62	4.6	Depth
6	52	0.80	164	0.98	6.09	6.0	D x V
7	52	0.50	137	1.00	4.89	4.9	Depth
8	52	0.91	159	0.95	6.30	6.0	D x V
9	70	0.50	94	1.00	3.78	3.8	Depth
10	70	1.09	195	0.95	6.34	6.0	D x V
11	70	0.53	155	1.00	4.65	4.7	Depth
12	70	0.51	155	1.00	4.59	4.6	Depth
13	70	0.75	185	1.00	5.53	5.5	Depth
14	70	0.55	160	1.00	4.76	4.8	Depth
15	70	0.60	168	1.00	4.98	5.0	Depth
16	52	0.48	132	1.00	4.77	4.8	Depth
17	52	2.12	140	0.77	7.79	6.0	D x V
18	49	0.60	160	1.00	5.23	5.2	Depth
19	70	0.53	155	1.00	4.65	4.7	Depth
20	70	0.53	155	1.00	4.65	4.7	Depth
21	70	1.24	190	0.92	6.53	6.0	D x V
22	70	0.50	152	1.00	4.53	4.5	Depth
23	*100	1.19	60	0.78	4.87	3.8	Dry Lane
24	*90	0.53	11	0.55	2.50	1.4	Dry Lane
25	90	0.42	33	0.65	2.53	1.6	Dry Lane
26	90	1.01	52	0.65	3.92	2.5	Dry Lane
27	*70	0.50	76	1.00	4.53	4.5	Depth
28	41	0.50	134	1.00	4.96	5.0	Depth
29	96	2.47	118	0.71	7.06	5.0	Dry Lane
30	96	0.50	53	0.71	3.17	2.3	Dry Lane

* Only Half Street Calculations were analyzed for these cross sections

100-Year Street Flow Capacity Summary

Street Section	ROW Width (ft)	Slope (%)	Q (cfs)	Depth (ft)	Velocity (fps)	D x V	Control
1	90	1.04	336	1.15	6.96	8.0	D x V
2	90	0.50	389	1.37	5.83	8.0	D x V
3	70	1.00	243	1.19	6.73	8.0	D x V
4	90	1.04	336	1.15	6.96	8.0	D x V
5	52	0.45	273	1.34	5.96	8.0	D x V
6	52	0.80	249	1.15	6.95	8.0	D x V
7	52	0.50	268	1.31	6.13	8.0	D x V
8	52	0.91	243	1.11	7.19	8.0	D x V
9	70	0.50	282	1.40	5.69	8.0	D x V
10	70	1.09	285	1.09	7.34	8.0	D x V
11	70	0.53	330	1.32	6.06	8.0	D x V
12	70	0.51	335	1.33	6.02	8.0	D x V
13	70	0.75	310	1.20	6.66	8.0	D x V
14	70	0.55	329	1.31	6.13	8.0	D x V
15	70	0.60	323	1.28	6.27	8.0	D x V
16	52	0.48	271	1.32	6.07	8.0	D x V
17	52	2.12	203	0.89	8.99	8.0	D x V
18	49	0.60	273	1.24	6.45	8.0	D x V
19	70	0.53	329	1.32	6.06	8.0	D x V
20	70	0.53	329	1.32	6.06	8.0	D x V
21	70	1.24	279	1.06	7.57	8.0	D x V
22	70	0.50	335	1.34	5.98	8.0	D x V
23	*100	1.19	216	1.18	6.80	8.0	D x V
24	*90	0.53	190	1.35	5.92	8.0	D x V
25	90	0.42	394	1.43	5.60	8.0	D x V
26	90	1.01	338	1.15	6.92	8.0	D x V
27	*70	0.50	167	1.34	5.97	8.0	D x V
28	41	0.50	242	1.28	6.24	8.0	D x V
29	96	2.47	273	0.92	8.68	8.0	D x V
30	96	0.50	389	1.33	6.01	8.0	D x V

* Only Half Street Calculations were analyzed for these cross sections

TYPICAL CROSS SECTIONS UTILIZED

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.

CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST

STREET SECTIONS MAP

DATE: MAY 2013
DRAFTER: KC/ETM
DESIGNER: KC/ETM
CHECKED: KCR/MJF
PROJECT NO. CBH1301.002

EXHIBIT O
SHEET 1 OF 1

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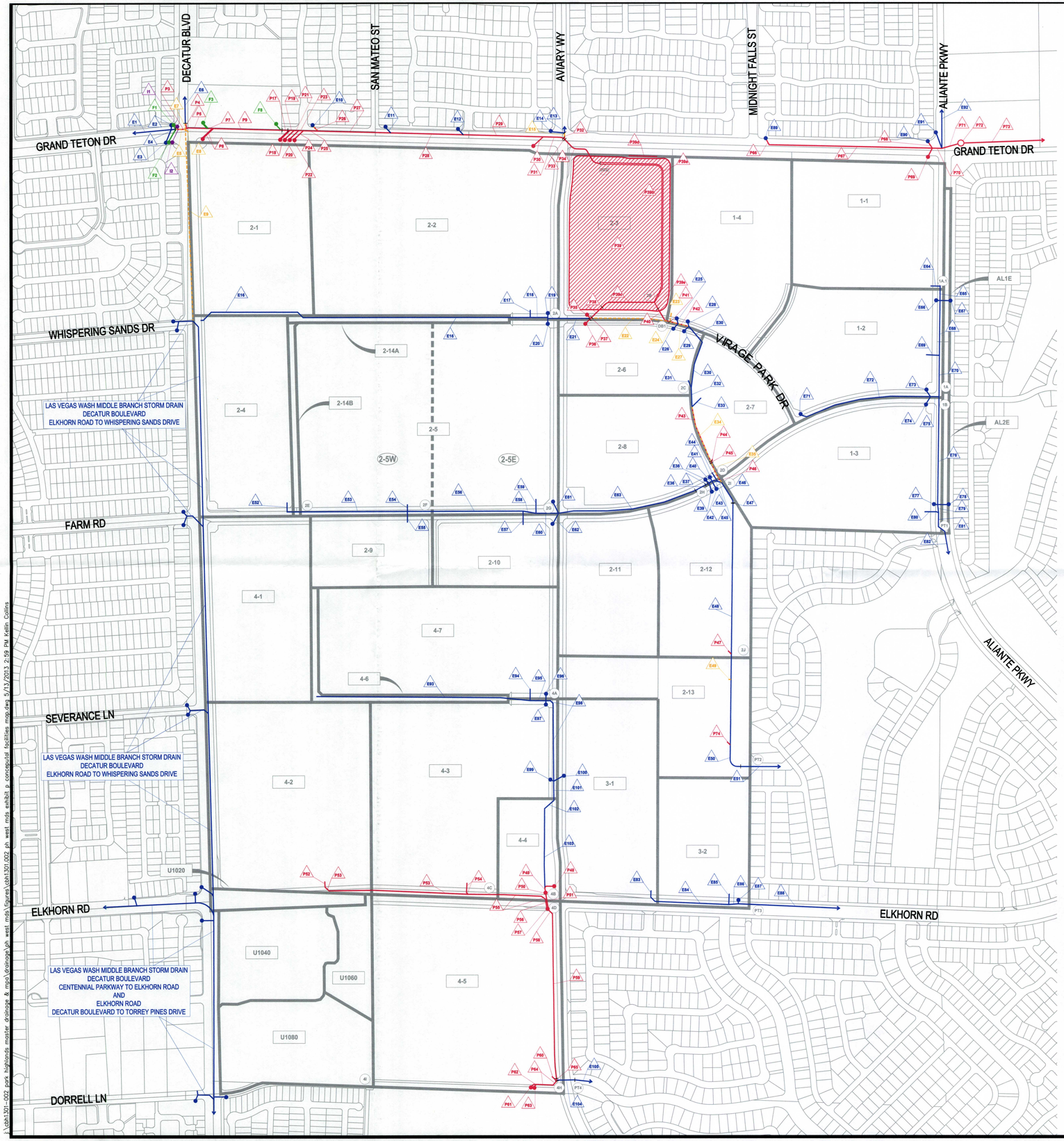

Existing Interim Facility Summary
Interim Condition

Facility ID	Facility Description (Type, Size & Slope)	Flow Breakdown/ Notes	Q_{100}/Q_{Total} Total (cfs)	Q_{100}/Q_{Total} Storm Drain (cfs)	Q_{100}/Q_{Total} Surface (cfs)
E2	6.0-ft Type Neenah R-3285-2-L Drop Inlet with 18-inch RCP Lateral @ 2.47% Slope	Concentration Point CP19 - Facility E1 & E6	180/718	24/28	156/688
E3	6.0-ft Type Neenah R-3285-2-L Drop Inlet with 24-inch Lateral @ 1.40% Slope	Bypass from Facility E2	156/688	22/27	134/661

Proposed Interim Facility Summary
Interim Condition

Facility ID	Facility Description (Type, Size & Slope)	Flow Breakdown/ Notes	Q_{100}/Q_{Total} Total (cfs)	Q_{100}/Q_{Total} Storm Drain (cfs)	Q_{100}/Q_{Total} Surface (cfs)
I1	34-ft Trench Drain (Neenah R-4999-LX)	Concentration Point CP19 - Facility E1, E2, E3 & E6	134/661	69/176	65/485
I2	12.5-ft Type CM Drop Inlet with 42-Inch RCP Lateral @ 2.34% Slope	Bypass from Facility I1	65/485	41/83	24/422

Existing Facility Summary
Ultimate Condition

Facility ID	Facility Description (Type, Size & Slope)	Flow Breakdown/ Notes	Q_{100}/Q_{Total} Total (cfs)	Q_{100}/Q_{Total} Storm Drain (cfs)	Q_{100}/Q_{Total} Surface (cfs)
E1	48-Inch RCP @ 0.54% Slope	Per CLV D58/D47	N/A	83/83	N/A
E2	6.0-ft Type Neenah R-3285-2-L Drop Inlet with 18-Inch RCP Lateral @ 2.47% Slope	To be Removed/Abandoned	-	-	-
E3	6.0-ft Type Neenah R-3285-2-L Drop Inlet with 24-Inch RCP Lateral @ 1.40% Slope	To be Removed/Abandoned	-	-	-
E4	48-Inch RCP @ 1.09% Slope	To be Removed/Abandoned	-	-	-
E5	48-Inch RCP @ 1.09% Slope	To be Removed/Abandoned	-	-	-
E6	36-Inch RCP @ 0.25@ Slope	Per CLV D58/D47	N/A	30/30	N/A
E7	36-Inch RCP @ 0.25% Slope	To be Removed/Abandoned	-	-	-
E8	54-Inch RCP Stub @ 0.20% Slope	To be Removed/Abandoned	-	-	-
E9	30-Inch RCP @ 0.25% Slope	To be Removed/Abandoned	-	-	-
E10	15.0-ft Type CM Drop Inlet with Lateral to be Removed/Replaced	Bypass from Facility P8 + the Difference between Concentration Points CP18 & CP19	7/97	7/54	0/43
E11	20.0-ft Type CM Drop Inlet with 36-Inch HDPE Lateral @ 1.00% Slope	Bypass from Facility E10 + the Difference between Concentration Points CP18 & CP20	9/82	5/51	0/11
E12	17.0-ft Type CM Drop Inlet with 30-Inch RCP Lateral @ 2.50% Slope	Bypass from Facility E11	9/11	9/11	0/0
E13	72-Inch RCP @ 5.31% Slope	Concentration Point CP21	46/102	46/102	0/0
E14	11.0-ft Modified Type C Drop Inlet with 18-Inch RCP Lateral @ 5.50% slope	Nuisance	Nuisance	Nuisance	0/0
E15	72-Inch RCP @ 5.31%	To be Removed/Abandoned	-	-	-
E16	30-Inch RCP @ Varying Slopes (0.50% to 5.71%)	Previous approaching flows has been diverted south in Regional facility	0/0	0/0	0/0
E17	42-Inch RCP Stub @ 0.50% Slope	Half of Basin 2-2	22/48	22/48	0/0
E18	48-Inch RCP @ 0.50% Slope	Concentration Point 2A	72/155	22/48	50/107
E19	2.5-ft Type CM Drop Inlet with 18-Inch RCP Lateral @ 0.50% Slope	Half of Bypass from Facility E18)	25/54	Nuisance	25/54
E20	2.5-ft Type CM Drop Inlet with 18-Inch RCP Lateral @ 0.50% Slope	Half of Bypass from Facility E18)	25/54	Nuisance	25/54
E21	48-Inch RCP @ 0.50% Slope	Concentration Point 2A	72/155	22/48	50/107
E22	48-Inch RCP @ 0.74% Slope	To be Removed/Abandoned	-	-	-
E23	42-Inch RCP Stub @ 0.50% Slope	To be Removed/Abandoned	-	-	-
E24	60-Inch RCP @ 0.40% Slope	To be Removed/Abandoned	-	-	-
E25	2.5-ft Type C Drop Inlet with 18-Inch RCP Lateral @ 5.50% Slope	Nuisance	Nuisance	Nuisance	0/0
E26	2.5-ft Type C Drop Inlet with 18-Inch RCP Lateral @ 5.50% Slope	Nuisance	Nuisance	Nuisance	0/0
E27	60-Inch RCP @ 0.40% Slope	To be Removed/Abandoned	-	-	-
E28	20.5-ft Type C Drop Inlet with 42-Inch RCP Lateral @ 5.50% Slope	Nuisance	Nuisance	Nuisance	0/0
E29	20.5-ft Type C Drop Inlet with 42-Inch RCP Lateral @ 5.50% Slope	Nuisance	Nuisance	Nuisance	0/0
E30	72-Inch RCP @ Varying Slopes (0.30% to 0.40%)	Concentration Point DB1	141/231	141/231	0/0
E31	36-Inch RCP Stub @ 0.50% Slope	Basin 2-6	15/29	15/29	0/0
E32	72-Inch RCP @ 0.30% Slope	Concentration Point 2C	141/232	141/232	0/0
E33	48-Inch RCP Stub @ 0.50% Slope	Basin 2-7	8/20	8/20	0/0
E34	48-Inch RCP @ 0.30% Slope	To be Removed/Abandoned	-	-	-
E35	48-Inch RCP @ 0.30% Slope	To be Removed/Abandoned	-	-	-
E36	60-Inch RCP @ 0.79% Slope	Concentration Point 2G	103/222	103/147	0/75
E37	Transition Structure	Concentration Point 2G	103/222	103/147	0/75
E38	21.0-ft Type CM Drop Inlet with 54-Inch RCP Lateral @ 0.50% Slope	Half of the Bypass from Facility E37	9/38	0/38	0/0
E39	21.0-ft Type CM Drop Inlet with 54-Inch RCP Lateral @ 0.50% Slope	Half of the Bypass from Facility E37	9/38	0/38	0/0
E40	14'x5' RCB @ 0.30% Slope	Concentration Point 2G	103/222	103/222	0/0
E41	21.0-ft Type CM Drop Inlet with 48-Inch RCP Lateral @ 0.50% Slope	Nuisance	Nuisance	Nuisance	0/0
E42	21.0-ft Type CM Drop Inlet with 48-Inch RCP Lateral @ 0.50% Slope	Nuisance	Nuisance	Nuisance	0/0
E43	14'x5' RCB @ 0.30% Slope	Concentration Point 2G	103/222	103/222	0/0
E44	48-Inch RCP Stub @ 0.50% Slope	Basin 2-8	24/48	24/48	0/0
E45	14'x5' RCB @ 0.30% Slope	Concentration Point 2H	127/270	127/270	0/0
E46	14'x5' RCB @ 0.30% Slope	Concentration Point 2I	190/356	190/356	0/0
E47	Transition Structure	Concentration Point 2I	190/356	190/356	0/0
E48	10'x5' Arch @ 0.30% Slope	Concentration Point 2I	190/356	190/356	0/0
E49	54-Inch RCP Stub @ 0.50% Slope	To be Removed/Abandoned	-	-	-
E50	10'x5' Arch @ 0.30% Slope	Concentration Point PT2	249/466	249/466	0/0
E51	Aliante Flood Channel	Concentration Point PT2	249/466	249/466	0/0
E52	36-Inch RCP Stub @ 0.50% Slope	Basin 2-4	28/57	28/28	0/29
E53	36-Inch RCP @ 0.40% Slope	Concentration Point 2E	30/59	28/28	2/31
E54	36-Inch RCP Stub @ 0.50% Slope	Subbasin 2-5W	28/60	28/28	0/32
E55	24-Inch RCP Stub @ 0.50% Slope	Basin 2-9	11/24	11/11	0/13
E56	54-Inch RCP @ 0.40% Slope	Concentration Point 2F	87/142	85/87	2/75
E57	36-Inch RCP Stub @ 0.50% Slope	Basin 2-10	13/25	13/25	0/0
E58	54-Inch RCP @ 1.41% Slope	Concentration Point 2F + Basin 2-10	79/167	79/92	0/75
E59	42-Inch RCP Stub @ 0.50% Slope	Subbasin 2-5E	25/55	25/55	0/0
E60	54-Inch RCP @ 0.36% Slope	Concentration Point 2G	103/222	103/147	0/75
E61	2.5-ft Type C Drop Inlet with 18-Inch RCP Lateral @ 5.50% Slope	Half of Bypass from Facility E60	9/38	Nuisance	0/38
E62	2.5-ft Type C Drop Inlet with 18-Inch RCP Lateral @ 5.50% Slope	Half of Bypass from Facility E60	9/38	Nuisance	0/38
E63	54-Inch RCP @ 0.79% Slope	Concentration Point 2G	103/222	103/147	0/75
E64	42-Inch RCP Stub @ 0.50% Slope	Basin 1-1	29/57	29/57	0/0
E65	42-Inch RCP @ 0.34% Slope	Basin 1-1	29/57	29/57	0/0
E66	5.5-ft Modified Type C Drop Inlet with 24-Inch RCP Lateral @ 0.50% Slope	Nuisance	Nuisance	Nuisance	0/0
E67	Drop Inlet and Lateral	Basin AL1E	3/5	3/5	0/0
E68	54-Inch RCP @ 0.34% Slope	Concentration Point 1A.1	31/81	31/81	0/0
E69	42-Inch RCP Stub @ 0.50% Slope	Basin 1-2	29/58	29/58	0/0
E70	60-Inch RCP @ 0.34% Slope	Concentration Point 1A	69/119	69/119	0/0
E71	11.5-ft Modified Type C Drop Inlet with 30-Inch RCP Lateral @ 5.50% Slope	Basin 1-4	25/55	21/21	4/34
E72	30-Inch RCP @ 0.50% Slope	Basin 1-4	25/55	21/21	4/34
E73	11.5-ft Modified Type C Drop Inlet with 30-Inch RCP Lateral @ 2.00% Slope	Bypass from Facility E72	4/34	4/34	0/0
E74	2.5-ft Type B Drop Inlet with 24-Inch RCP Lateral @ 2.00% Slope	Nuisance	Nuisance	Nuisance	0/0
E75	48-Inch RCP @ 0.50% Slope	Basin 1-4	25/55	25/55	0/0
E76	66-Inch RCP @ 0.34% Slope	Concentration Point 1B	80/167	80/167	0/0
E77	2.5-ft Type B Drop Inlet with 24-Inch RCP Lateral @ 0.50% Slope	Nuisance	Nuisance	Nuisance	0/0
E78	Drop Inlet and Lateral	Basin AL2E	3/5	3/5	0/0
E79	66-Inch RCP @ 0.38% Slope	Concentration Point 1B + Basin AL2E	83/172	83/172	0/0
E80	48-Inch RCP Stub @ 1.62% and 1.84% Slopes	Basin 1-3	27/60	27/60	0/0
E81	66-Inch RCP @ 0.38% Slope	Concentration Point PT1	109/232	109/232	0/0
E82	66-Inch RCP	Concentration Point PT1	109/232	109/232	0/0
E83	36-Inch RCP Stub @ 0.50% Slope	Basin 3-1	30/59	30/59	0/0
E84	42-Inch RCP @ 0.50% Slope	Basin 3-1	30/59	30/59	0/0
E85	36-Inch RCP Stub @ 0.50% Slope	Basin 3-2	14/31	14/31	0/0
E86	42-Inch RCP @ 1.01% Slope	Concentration Point PT3	43/89	43/89	0/0
E87	11.5-ft Modified Type C Drop Inlet with 24-Inch RCP Lateral @ 0.51% Slope	Nuisance	Nuisance	Nuisance	0/0
E88	48-Inch RCP @ 0.57% Slope	Concentration Point PT3	43/89	43/89	0/0
E89	14.5-ft Modified Type C Drop Inlet	Basin U720	29/87	28/28	0/38
E90	14.5-ft Modified Type C Drop Inlet	Concentration Point CP28 - Facility E89	31/112	31/71	0/41
E91	4-ft Type A Drop Inlet with 18-Inch RCP Lateral @ 5.25% Slope	Nuisance	Nuisance	Nuisance	0/0
E92	60-Inch RCP @ 0.36% Slope	Basin U700	50/122	50/122	0/0
E93	18-Inch RCP @ 0.40% Slope	Basin 4-1 + 4-6 + Half of Basin 4-7	47/87	Nuisance	47/87
E94	30-Inch RCP Stub @ 0.87% Slope	Half of Basin 4-7	14/32	14/32	0/0
E95	36-Inch RCP @ 0.30% Slope	Concentration Point 4A	61/129	14/32	47/97
E96	2.5-ft Type B Drop Inlet with 24-Inch RCP Lateral @ 5.50% Slope	Nuisance	Nuisance	Nuisance	0/0
E97	11.5-ft Modified Type C Drop Inlet with 36-Inch RCP Lateral @ 5.50% Slope	Bypass from Facility E95	47/97	47/47	0/50
E98	48-Inch RCP @ 0.30% Slope	Concentration Point 4A	61/129	61/79	0/50
E99	14.5-ft Modified Type C Drop Inlet with 30-Inch RCP Lateral 0.50% Slope	Half of Bypass from Facility E98	9/25	0/25	0/0
E100	14.5-ft Modified Type C Drop Inlet with 30-Inch RCP Lateral 0.50% Slope	Half of Bypass from Facility E98	9/25	0/25	0/0
E101	66-Inch RCP @ 0.30% Slope	Concentration Point 4A	61/129	61/129	0/0
E102	66-Inch RCP @ 0.30% and 0.41% Slopes	Concentration Point 4A	61/129	61/129	0/0
E103	66-Inch RCP @ 0.41% Slope	Concentration Point 4A	61/129	61/129	0/0
E104	Dual 8'x4' RCBs	Concentration Point PT4	249/505	249/464	0/41
E105	Linear Park	Concentration Point PT4	249/505	249/464	-

Future Facility Summary
Ultimate Condition

Facility ID	Facility Description (Type, Size & Slope)	Flow Breakdown/ Notes	Q_{100}/Q_{Total} Total (cfs)	Q_{100}/Q_{Total} Storm Drain (cfs)	Q_{100}/Q_{Total} Surface (cfs)
F1	Drop Inlet and Lateral (type, size & slope TBD)	Concentration Point CP17 - Facilities E1 & E6; Facilities F1 and F2 are anticipated to replace Facilities E2, E3 and E4.	223/944	223/422	0/422
F2	Drop Inlet and Lateral (type, size & slope TBD)				
F3	Drop Inlet with dual 36-Inch RCP Laterals	Half of the Bypass from Facility F1/F2	12/211	12/122 (0/61 per lateral)	0/89
		Facility ID F4 thru F7 are Not Used			
F8	Drop Inlet with 24-Inch RCP Lateral	Bypass from Facility F3 + the Difference between Concentration Points CP17 & CP18	1/91	1/24	0/67

Proposed Facility Summary
Ultimate Condition

Facility ID	Facility Description (Type, Size & Slope)	Flow Breakdown/ Notes	Q_{100}/Q_{Total} Total (cfs)	Q_{100}/Q_{Total} Storm Drain (cfs)	Q_{100}/Q_{Total} Surface (cfs)
		Facility ID P1 and P2 are Not Used			
P3	12'x9' RCB @ 1.14% Slope	Concentration Point CP17 - Facility E6	309/927	309/505	0/422
P4	36-Inch RCP @ 0.81% Slope	Facility E6	N/A	30/30	N/A
P5	12'x9' RCB @ 1.14% Slope	Concentration Point CP17	339/957	339/535	0/422
P7	12'x9' RCB @ 1.14% Slope	Concentration Point CP17	339/957	339/657	0/300
P8	Drop Inlet with Dual 36-Inch RCP Laterals @ Varying Slopes (0.50% to 15.09%)	Half of the Bypass from Facility F1/F2	12/211	12/122 (0/61 per lateral)	0/89
P9	12'x9' RCB @ 1.14% and 1.85% Slopes	Concentration Point CP17	339/999	339/779	0/180
		Facility ID P10 thru P16 are Not Used			
P17	Transition Structure @ 1.69% Slope	Concentration Point CP18	337/959	337/803	0/156
P18	Drop Inlet with Dual 24-Inch RCP Lateral @ Varying Slopes (0.50% to 18.45%)	Bypass from Facility P8	0/89	0/51 (0/25.5 per lateral)	0/38
P19	12'x7' Arch @ 0.45% Slope	Concentration Point CP18	337/959	337/854	0/105
P20	Drop Inlet with 24-inch RCP Lateral @ 0.50% and 18.58% Slopes	Bypass from Facility P18	0/37	0/13	0/25
P21	12'x7' Arch @ 0.45% Slope	Concentration Point CP18	337/959	337/867	0/92
P22	Drop Inlet with 24-inch RCP Lateral @ 0.50% and 18.38% Slopes	Bypass from Facility P20	0/25	0/10	0/15
P23	12'x7' Arch @ 0.45% Slope	Concentration Point CP18	337/959	337/877	0/82
P24	Drop Inlet with 24-inch RCP Lateral @ 0.50% and 18.70% Slopes	Bypass from Facility P22	0/15	0/7	0/8
P25	12'x7' Arch @ 0.45% Slope	Concentration Point CP19	344/989	337/884	7/105
P26	36-Inch RCP Lateral @ 13.30% Slope	Bypass from Facility P8 + the Difference between Concentration Points CP18 & CP19	7/97	7/54	0/43
P27	12'x7' Arch @ 0.45% Slope	Concentration Point CP20	349/1008	344/938	5/70
P28	12'x7' Arch @ 0.45% Slope	Concentration Point CP20	349/1008	349/989	0/19
P29	12'x7' Arch @ 0.45% Slope	Concentration Point CP20	349/1008	349/1000	0/8
P30	Drop Inlet with 18-Inch RCP Lateral @ 2.00% Slope	Bypass from Facility P24	0/8	0/8	0/0
P31	12'x7' Arch @ 0.45% Slope	Concentration Point CP20	349/1008	349/1008	0/0
P32	72-Inch RCP @ 0.50% Slopes	Concentration Point CP21	46/102	46/102	0/0
P33	Junction Structure	Concentration Point CP07A	359/1026	359/1026	0/0
P34	12'x7' Arch @ 0.30% Slopes	Concentration Point CP07A	359/1026	359/1026	0/0
P35	Drop Inlet with 30-Inch RCP Lateral @ 0.50% Slope	Half of (Concentration Point 2A - Facility E17)	25/53	25/53	0/0
P36	Drop Inlet with 30-Inch RCP Lateral @ 0.50% Slope	Half of (Concentration Point 2A - Facility E17)	25/53	25/53	0/0
P37	Junction Structure	Concentration Point 2A	72/155	72/155	0/0
P38	66-Inch RCP @ 0.51% Slope	Concentration Point 2A	72/155	72/155	0/0
P39	Detention Basin/Park	Concentration Point 2B	370/1089	370/1089	N/A
P39a	10-Year Conveyance Channel	Concentration Point CP02TA2	360/-	360/-	N/A
P39b	7.0-ft Wide Low Flow Channel	N/A	N/A	12/12	N/A
P39c	5.0-ft Wide Low Flow Channel	N/A	N/A	15/15	N/A
P39d	200.0-ft Spillway	N/A	N/A	N/A	N/A
P39e	54-Inch Orifice Plate & Trash Rack	Concentration Point DB1	141/231	141/231	0/0
P40	72-Inch RCP @ 0.35% Slope	Concentration Point DB1	141/231	141/231	0/0
P41	72-Inch RCP @ 0.30% Slope	Concentration Point DB1	141/231	141/231	0/0
P42	72-Inch RCP @ 0.30% Slope	Concentration Point DB1	141/231	141/231	0/0
P43	72-Inch RCP @ 0.32% Slope	Concentration Point 2C	141/232	141/232	0/0
P44	48-Inch RCP Stub @ 0.50% Slope	Basin 2-7	8/20	8/20	0/0
P45	Junction Structure	Concentration Point 2D	142/232	142/232	0/0
P46	6'x3' RCB @ 0.32% Slope	Concentration Point 2D	142/232	142/232	0/0
P47	48-Inch RCP Stub @ 0.50% Slope	Concentration Point 2J	39/82	39/82	0/0
P48	Drop Inlet with 18-Inch RCP Lateral at 0.50% Slope	Nuisance	Nuisance	Nuisance	0/0
P49	54"x88" Arch @ 0.41% Slope	Concentration Point 4A	61/129	61/129	0/0
P50	21-ft Modified Type C Drop Inlet	Half of (Bypass from Facility P56 + Basin 4-4)	4/51	4/51	0/0
P51	54"x88" Arch @ 0.41% Slope	Concentration Point 4A + Half of (Bypass from Facility P56 + Basin 4-4)	65/180	65/180	0/0
P52	36-Inch RCP Stub @ 0.50% Slope	Basin 4-2	43/86	43/43	0/43
P53	36-Inch RCP @ 0.67% Slope	Basin 4-2 + U1020	50/100	43/43	7/57
P54	36-Inch RCP Stub @ 0.50% Slope	Basin 4-3	34/75	34/34	0/41
P55	48-Inch RCP @ 0.58% Slope	Concentration Point 4C	77/161	77/77	0/84
P56	48-Inch RCP @ 0.41% Slope	Concentration Point 4C	77/161	77/77	0/84
P57	21-ft Modified Type C Drop Inlet	Half of (Bypass from Facility P56 + Basin 4-4)	4/51	4/51	0/0
P58	8'x4' RCB @ 0.41% Slope	Concentration Point 4D	153/321	153/321	0/0
P59	8'x4' RCB @ 0.42% Slope	Concentration Point 4D	153/321	153/321	0/0
P60	48-Inch RCP Stub @ 0.50% Slope	Basin 4-5	50/100	50/100	0/0
P61	5.5-ft Modified Type C Drop Inlet with 24-Inch RCP Lateral @ 1.00% Slope	Concentration Point 4I	43/84	24/24	19/60
P62	24-Inch RCP @ 0.50% Slope	Concentration Point 4I	43/84	24/24	19/60
P63	8.5-ft Modified Type C Drop Inlet with 18-Inch RCP Lateral @ 1.00% Slope	Bypass from Facility P61	19/60	19/19	0/41
P64	36-Inch RCP @ 0.50% Slope	Concentration Point 4I	43/84	43/43	0/41
P65	Junction Structure	Concentration Point PT4	249/505	249/464	0/41
P66	30-Inch RCP Lateral @ 0.50% Slope	Basin U720	29/87	28/28	0/38
P67	30-Inch RCP @ 0.50% Slope	Concentration Point CP28	59/141	28/28	31/112
P68	42-Inch Lateral @ 0.50% Slope	Bypass from Facility P67	31/112	31/71	0/41
P69	Drop Inlet with 18-Inch Lateral @ 0.50% Slope	Bypass from Facility P67	31/112	Nuisance	0/41
P70	48-Inch RCP @ 0.50% Slope	Concentration Point CP28	59/141	59/100	0/41
P71	72-Inch RCP @ 0.50% Slope	Concentration Point CP27	101/248	101/207	0/41
P72	Sump/Bubbler	Concentration Point CP27	101/248	101/207	0/41
P73	Earthen Roadside Swale @ 0.50% Slope	Concentration Point CP27	101/248	101/207	0/41
P74	36-Inch RCP Stub @ 0.50%	Basin 2-13	18/39	18/39	0/0

0 350 700
SCALE – 1" = 350' FEET

N

LEGEND

- STORM DRAIN FACILITY (RCP, RCB, DITCH, ETC.)
- STORM DRAIN FACILITY (DETENTION BASIN)
- STORM DRAIN FACILITY (DROP INLET)
- FACILITY ID
- EXISTING
- PROPOSED
- PROPOSED INTERIM
- FUTURE (BY OTHERS)
- EXISTING TO BE REMOVED OR ABANDONED
- SURFACE FLOW
- BASIN BOUNDARY
- BASIN ID
- SUBBASIN BOUNDARY
- SUBBASIN ID
- CONCENTRATION POINT

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NO. | DESCRIPTION | DATE | BY | APP. | APP. DATE

CRESCENT BAY HOLDINGS

MASTER DRAINAGE STUDY PARK HIGHLANDS WEST

CONCEPTUAL FACILITIES MAP

DATE: MAY 2013
DRAFTER: KC/ETM
DESIGNER: KC/ETM
CHECKED: KCR/MJF
PROJECT NO. CBH1301.002

EXHIBIT P
SHEET 1 OF 1

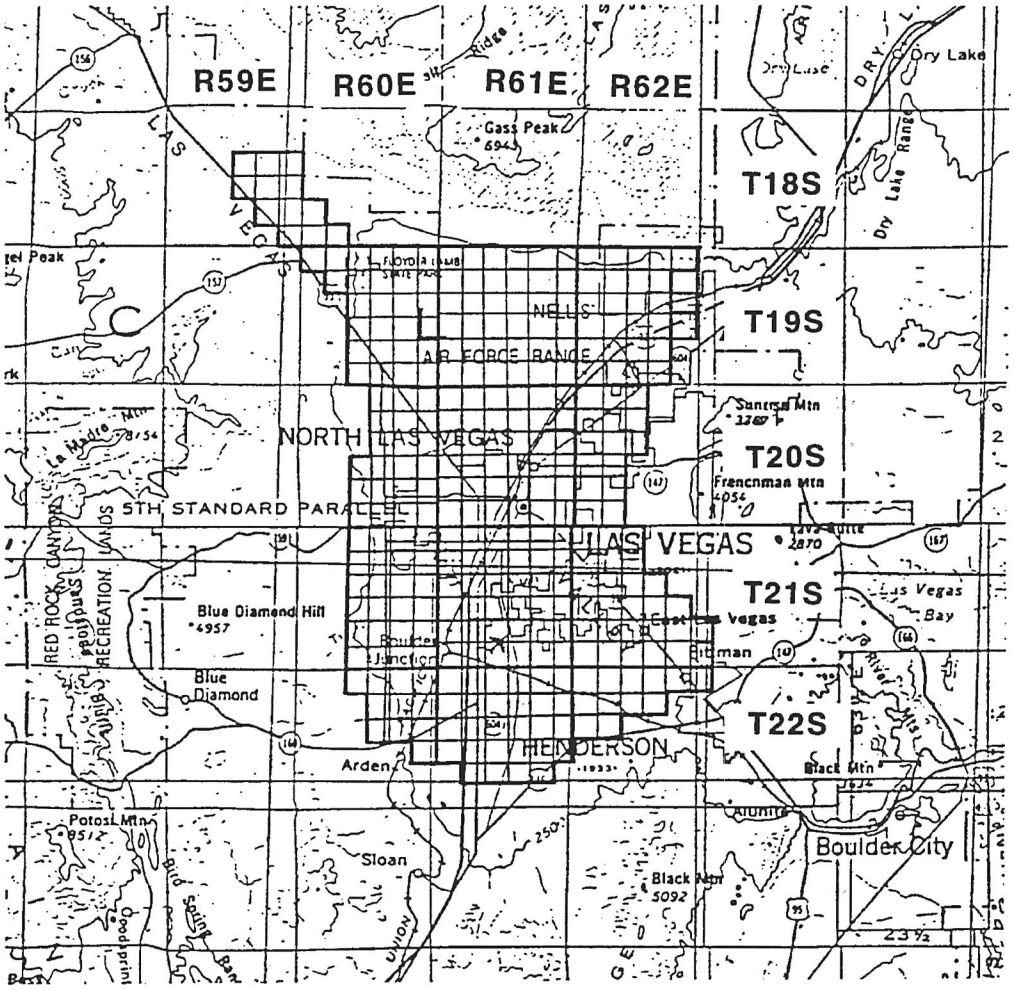
\cbh1301_002_park highlands master drainage & mpc\drainage\ph west mdsa\figures\cbh1301.002 ph west mdsa exhibit p conceptual facilities mop.dwg 5/13/2013 2:59 PM Kellin Collins

APPENDIX B

Precipitation, Curve Number and Lag Time Data

Precipitation Data

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

DEPTH-DURATION-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA

(IN INCHES)

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

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

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

3. Table 501 adjustments not required.

Revision	Date

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

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

Revision	Date

REFERENCE:

TABLE 503

Curve Number Data

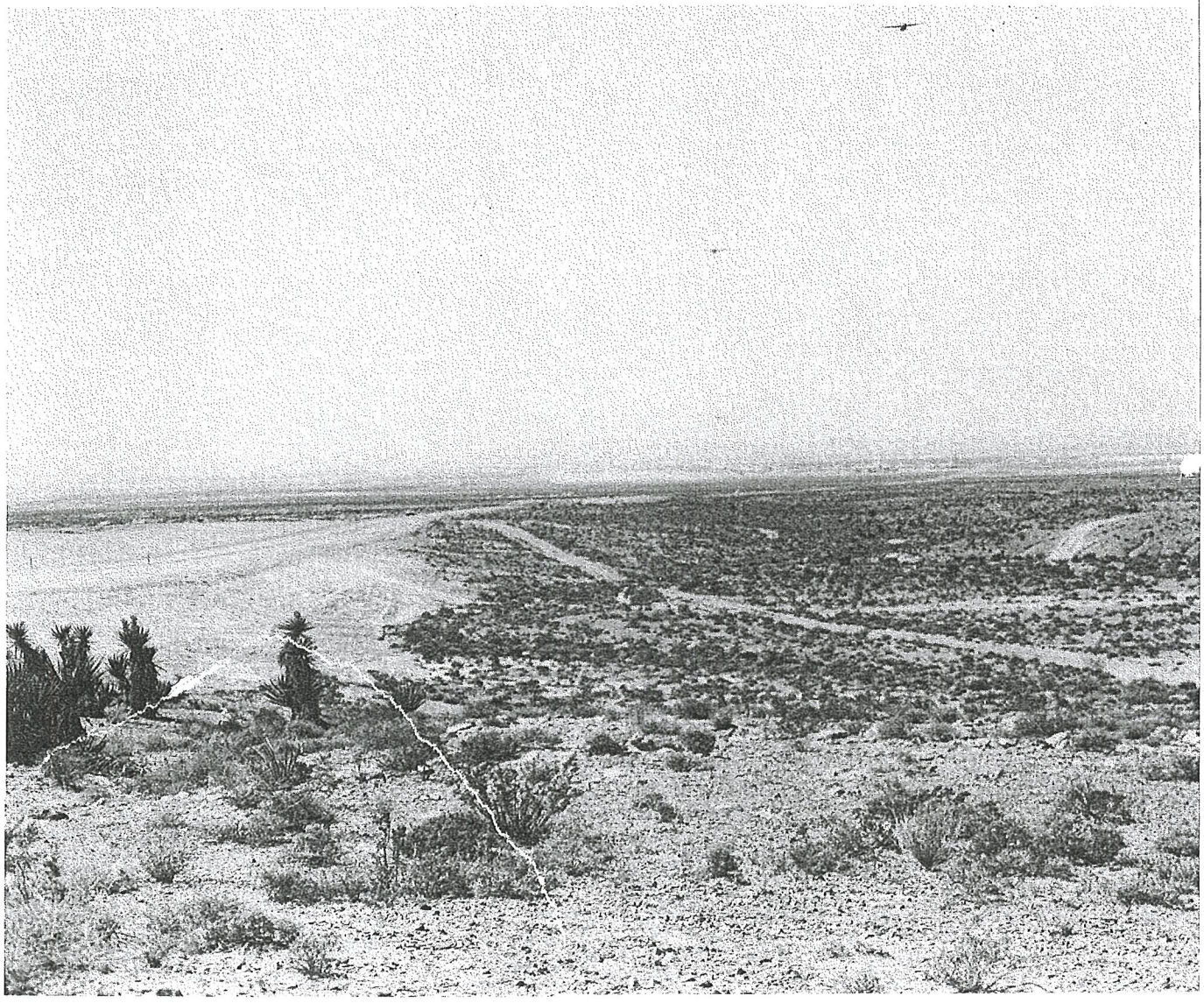
United States Department of Agriculture

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



sandy loam about 4 inches thick. The upper 7 inches of the underlying material is light yellowish brown extremely gravelly fine sandy loam, the next 6 inches is light yellowish brown very gravelly sandy loam, and the lower part to a depth of 61 inches is light yellowish brown extremely gravelly fine sandy loam. Pebbles cover 50 to 75 percent of the surface.

Included in this unit are about 5 percent Tencee soils on erosional fan remnants and 10 percent Arizo soils, flooded, in channels. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Dalian 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 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.

Septic tank absorption fields generally function well unless the density of housing is too high.

Roads are easily constructed and maintained.

The main limitation for lawns and landscaping is the pebbles on the surface and throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. 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 subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

191—Dalian very cobbly fine sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on fan skirts. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, about 85 percent of the surface is covered with a desert pavement of rock fragments. The surface layer is light yellowish brown very cobbly fine sandy loam about 5 inches thick. The underlying material to a depth of 60 inches or more is light yellowish brown very gravelly sandy loam to extremely gravelly fine sandy loam.

Included in this unit are about 10 percent Tencee soils on erosional fan remnants and 5 percent Arizo soils, flooded, in channels. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Dalian 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 moderate if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitations for lawns and landscaping are the cobbles and pebbles on the surface and throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. 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.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 2.

192—Dalian-McCullough complex, 0 to 4 percent slopes. This map unit is on fan skirts.

This unit is 55 percent Dalian very gravelly fine sandy loam, 0 to 4 percent slopes, and 35 percent McCullough very gravelly very fine sandy loam, gravelly substratum, 0 to 4 percent slopes. Both the Dalian and McCullough soils are on alluvial fan skirts. 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 Las Vegas soils on basin floor remnants and 5 percent Tencee soils on erosional fan remnants. Included areas make up about 10 percent of the total acreage.

The Dalian soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of pebbles. The surface layer is light yellowish brown very gravelly fine sandy loam about 5 inches thick. The underlying material to a depth of 60 inches or more is light yellowish brown very gravelly sandy loam.

Permeability of the Dalian 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

moderate if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The McCullough soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of pebbles. The surface layer is pale brown very gravelly very fine sandy loam about 5 inches thick. The subsoil and upper part of the substratum to a depth of 30 inches are light yellowish brown, stratified loam to sandy loam, the next 10 inches or more is light yellowish brown, stratified coarse sand to loamy fine sand, and the lower part to a depth of 60 inches or more is light yellowish brown extremely gravelly loamy sand.

Permeability of the McCullough soil is moderate. 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 high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

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 hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

If the McCullough soil is used for septic tank absorption fields, the limitation of restricted permeability can be overcome by increasing the size of the absorption field.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitation for lawns and landscaping in areas of the Dalian soil is the pebbles on the surface and throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. 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.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

200—Glencarb silt loam. This very deep, well drained soil is on recent alluvial flats. It formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is pale brown silt loam about 6 inches thick. The upper 10 inches of the underlying material is very pale brown clay loam, and the next 35 inches is very pale brown silty clay loam. The next layer to a depth of 54 inches is very pale brown very fine sandy loam. The lower part to a depth of 60 inches or more is a very pale brown silty clay loam.

Included in this unit are about 3 percent Bluepoint soils on sand sheets, 9 percent Land soils intermingled with the Glencarb soils on recent alluvial flats, and 3 percent McCarran soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Glencarb soil is moderately slow. Available water capacity is high. 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. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts below a depth of 6 inches.

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

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

The main limitation for septic tank absorption fields is restricted permeability of the soil. Poor permeability increases the possibility of failure of septic tank absorption fields. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

Most climatically adapted plants can be used for lawns and landscaping in this unit.

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

206—Glencarb silt loam, flooded. This very deep, well drained soil is on flood plains. The drainage has been altered by seepage. The soil formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is very pale brown silt loam about 8 inches thick. The underlying material to a depth of 60 inches or more is pink silt loam and silty clay loam.

Included in this unit are about 5 percent Aztec soils on erosional fan remnants and 5 percent Land soils on the flood plains. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Glencarb soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 3 to 5 feet from July through June. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to

plants. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Excessive irrigation can dissolve gypsum in the soil and cause subsidence. 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.

This map unit is in capability subclass VIIs, nonirrigated. The Las Vegas soil is in horticultural group 6, the McCarran soil is in horticultural group 4, and the Grapevine soil is in horticultural group 2.

305—Las Vegas-Destazo complex, 0 to 2 percent slopes. This map unit is on relict alluvial flats.

This unit is 60 percent Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes, and 25 percent Destazo fine sandy loam, 0 to 2 percent slopes. These soils are in a random pattern on a relict surface and are topographically indistinguishable. 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 Bluepoint soils on small sand sheets, 5 percent Glencarb soils on recent alluvial flats, and 5 percent Skyhaven soils on the relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Las Vegas soil is shallow and well drained. It formed in alluvium derived dominantly from limestone, dolomite, and some lacustrine sediment that has a high content of lime. Typically, about 25 percent of the surface is covered with a desert pavement of hardpan fragments and pebbles. The surface layer is very pale brown gravelly fine sandy loam about 2 inches thick. The upper 6 inches of the underlying material is very pale brown fine sandy loam, and the next 4 inches is very pale brown gravelly sandy clay loam and gravelly loam. An indurated, lime-cemented hardpan is at a depth of about 12 inches. Depth to the hardpan ranges from 3 to 14 inches.

Permeability of the Las Vegas soil is moderately slow above the hardpan. Available water capacity is very low. Effective rooting depth is 3 to 14 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The Destazo soil is very deep and well drained. It formed in alluvium derived dominantly from limestone, dolomite, and sediment that has a high content of lime. Typically, about 25 percent of the surface is covered with a desert pavement of pebbles and lime nodules. The surface layer is very pale brown fine sandy loam about 11 inches thick. The upper 40 inches of the underlying material is stratified very pale brown to white very gravelly to extremely gravelly sandy clay loam, averaging very gravelly sandy clay loam, and the lower part to a depth of 62 inches is light brown sandy loam.

Permeability of the 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 high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

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

The main limitations for construction of dwellings are the hazard of flooding and the limited depth to the hardpan in the Las Vegas soil. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavation for building sites is limited by the hardpan. Heavy equipment is needed for excavation.

The main limitations for septic tank absorption fields are the limited depth to the hardpan in the Las Vegas soil and the restricted permeability of the Destazo soil. Special design of septic tank absorption fields is needed. Heavy equipment is needed for excavation. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

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

The main limitations for lawns and landscaping are the limited depth to the hardpan in the Las Vegas soil and the moderate available water capacity of the Destazo soil. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. 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.

This map unit is in capability subclass VIIs, nonirrigated. The Las Vegas soil is in horticultural group 6, and the Destazo soil is in horticultural group 2.

307—Las Vegas-Skyhaven complex, 0 to 4 percent slopes. This map unit is on relict alluvial flats.

This unit is 60 percent Las Vegas gravelly fine sandy loam, 0 to 4 percent slopes, and 30 percent Skyhaven very fine sandy loam, 0 to 4 percent slopes. The Las Vegas and Skyhaven soils are in a random pattern on relict alluvial flats and are topographically indistinguishable. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

varies from one area to another. About 500 acres, east of Henderson, is mostly an Akela soil that has slopes of 8 to 15 percent. About 40 acres of Rock outcrop, gypsum, shown by symbols, is in an area in the northeastern corner of sec. 33, T. 21 S., R. 63 E.

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.

Rock outcrop consists of exposed areas of undifferentiated volcanic rock.

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

This unit is limited for roads because of the areas of Rock outcrop, steepness of slopes, and shallow depth to bedrock. Roads should be designed to minimize cuts. 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 Akela soil is in horticultural group 6.

540—Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on summits and side slopes of erosional fan remnants (fig. 1). It formed in alluvium derived from various kinds of rock that have a high content of lime.

Typically, 80 percent of the surface is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very gravelly fine sandy loam, averaging extremely gravelly fine sandy loam.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 10 percent Goodsprings soils on 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 Weiser soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the desert pavement is disturbed. Some pedons have an indurated, lime-cemented hardpan at a depth of 40 to 60 inches or more.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are 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 generally function well in this unit.

Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are the presence of pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. 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 subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

542—Weiser-Aztec complex, 2 to 8 percent slopes. This map unit is on erosional fan remnants.

This unit is 55 percent Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes, and 30 percent Aztec very gravelly fine sandy loam, 2 to 8 percent slopes. The Weiser soil is on summits and side slopes of the fan remnants, and the Aztec soil is on side slopes of the 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 and 10 percent Goodsprings soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Weiser soil is very deep and well drained. It formed in alluvium derived dominantly from limestone and dolomite. Typically, 95 percent of the surface is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very

The main limitations for lawns and landscaping are the presence of pebbles throughout the soil and the very low available water capacity of the Weiser soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. 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 subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

545—Weiser-Goodsprings complex, 2 to 4 percent slopes. This map unit is on erosional fan remnants.

This unit is 60 percent Weiser extremely gravelly fine sandy loam, 2 to 4 percent slopes, and 25 percent Goodsprings very gravelly fine sandy loam, 2 to 4 percent slopes. The Weiser and Goodsprings soils are on summits and shoulders of the 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 Las Vegas soils and 10 percent Skyhaven soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Weiser soil is very deep and well drained. It formed in alluvium derived dominantly from limestone and dolomite. Typically, 90 percent of the surface layer is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very gravelly fine sandy loam, averaging extremely gravelly fine sandy loam.

Permeability of the Weiser soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the desert pavement is disturbed.

The Goodsprings soil is shallow and well drained. It formed in alluvium derived from various kinds of rock. Typically, 90 percent of the surface is covered with a desert pavement of pebbles. The surface layer is light brown very gravelly fine sandy loam about 5 inches thick. The upper 10 inches of the underlying material is pink gravelly fine sandy loam, the next 37 inches is pinkish white, strongly lime-cemented hardpan, and the lower part to a depth of 60 inches or more is pink extremely gravelly loamy fine sand. Depth to the hardpan ranges from 9 to 20 inches.

Permeability of the Goodsprings soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 9 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the desert pavement 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 hardpan in areas of the Goodsprings soil. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

This map unit is in capability subclass VIIs, nonirrigated. The Weiser soil is in horticultural group 2, and the Goodsprings soil is in horticultural group 6.

600—Slickens. Slickens consists of accumulations of fine-textured material such as that separated in ore-mill operations. It is largely freshly ground rock that commonly has undergone chemical treatment during the milling process. Slickens is commonly confined in specially constructed basins.

This map unit is in capability subclass VIIIs, nonirrigated.

605—Dumps. Dumps consists of areas of smoothed or uneven accumulations of waste rock and general refuse.

This map unit is in capability subclass VIIIs, nonirrigated.

610—Pits, gravel. Pits, gravel, consists of open excavations from which soil material and gravel have been removed, exposing rock, a hardpan, or other material.

This map unit is in capability subclass VIIIs, nonirrigated.

615—Urban land. Urban land consists of areas covered by asphalt, concrete, and buildings or other urban structures.

This map unit is in capability subclass VIIIs, nonirrigated.

630—Badland. Badland is moderately steep to very steep barren land dissected by many intermittent drainage channels that have cut into soft geologic material. The areas ordinarily are not stony. Local relief generally ranges from 25 to 100 feet. Potential runoff is very high, and erosion is active. Some small included areas of identifiable soils support vegetation.

Table 4-2 Land Use Categories

Land Use Index Number	Description - Typical Land Uses	Impervious (%)	Open Landscaped Good Condition (%)	Open Desert Shrub Poor Condition *Natural Desert Landscaping* (%)
	Drought Ordinance Not Applied			
1	Undeveloped Land, Open Desert	0	0	100
2	Parks, Golf Courses	5	85	10
3	Rural, 0.5-1 units per acre (uses 1 unit/acre)	20	20	60
4	Low-Density Residential, 1-2 units per acre (uses 2 units/acre)	25	40	35
5	Medium-Density Residential, 2-4 units per acre (uses 3 units/acre)	29	71	0
6	High-Density Residential, 4-8 units per acre (uses 6 units/acre)	62	38	0
7	Public Facility and Residential, 8- 12 units/acre	72	28	0
8	Very High-Density Residential, 12 units/acre or more	85	15	0
9	Commercial, Retail, Casino, High Rise Condominiums	90	10	0
10	Light Industrial	70	15	15
11	Heavy Industrial	85	8	7
12	Schools	50	50	0
13	Lakes	0	0	0
	Drought Ordinance Applied			
14	Low-Density Residential, 1-2 units per acre (uses 2 units/acre)	25	20	55
15	Medium-Density Residential, 2-4 units per acre (uses 3 units/acre)	29	35	36
16	High-Density Residential, 4-8 units per acre (uses 6 units/acre)	62	19	19
17	Public Facility and Residential, 8- 12 units/acre	72	14	14
18	Very High-Density Residential, 12 units/acre or more	85	0	15
19	Commercial, Retail, Casino, High Rise Condominiums	90	0	10
20	Light Industrial	70	0	30
21	Heavy Industrial	85	0	15
22	Schools	50	30	20

The land use data used with the 2008 MPU is shown on the H-Maps of Volume 2. **Figure 4-1** shows the geographic comparison between the 2008 and 2002 MPU land use coverages in terms of percent imperviousness. The increase or decrease in impervious area represents an increase or decrease in the runoff potential for a given area.

PARK HIGHLANDS WEST
INTERIM CONDITION OFFSITE COMPOSITE CURVE NUMBER BREAKDOWN
CBH1301.002 West MDS Composite CN - Offsite.xlsx

CONDITION	BASIN ID	LAND USE INDEX NUMBER	SOIL MAP UNIT NUMBER	SUB REGION CN	SUB REGION AREA (AC)	BASIN AREA (AC)	PERCENT OF BASIN	CUMULATIVE PERCENT	AREA WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
Interim	E040	1	630	88	1.23	231.37	0.5%	0.5%	0.47	0.47	
Interim	E040	1	305	83	0.00	231.37	0.0%	0.5%	0.00	0.47	
Interim	E040	1	305	83	3.63	231.37	1.6%	2.1%	1.30	1.77	
Interim	E040	1	305	83	35.09	231.37	15.2%	17.3%	12.59	14.35	
Interim	E040	1	305	83	0.07	231.37	0.0%	17.3%	0.02	14.38	
Interim	E040	1	305	83	1.87	231.37	0.8%	18.1%	0.67	15.05	
Interim	E040	1	305	83	0.12	231.37	0.1%	18.2%	0.04	15.09	
Interim	E040	1	305	83	3.40	231.37	1.5%	19.6%	1.22	16.31	
Interim	E040	1	305	83	0.04	231.37	0.0%	19.6%	0.02	16.33	
Interim	E040	1	305	83	79.45	231.37	34.3%	54.0%	28.50	44.83	
Interim	E040	1	305	83	1.05	231.37	0.5%	54.4%	0.38	45.20	
Interim	E040	1	630	88	0.00	231.37	0.0%	54.4%	0.00	45.21	
Interim	E040	1	305	83	0.01	231.37	0.0%	54.4%	0.00	45.21	
Interim	E040	1	305	83	0.02	231.37	0.0%	54.4%	0.01	45.21	
Interim	E040	4	305	82	0.00	231.37	0.0%	54.4%	0.00	45.22	
Interim	E040	4	305	82	1.49	231.37	0.6%	55.1%	0.53	45.74	
Interim	E040	5	305	80	0.02	231.37	0.0%	55.1%	0.01	45.75	
Interim	E040	5	305	80	87.45	231.37	37.8%	92.9%	30.24	75.99	
Interim	E040	7	305	91	1.42	231.37	0.6%	93.5%	0.56	76.55	
Interim	E040	7	305	91	2.93	231.37	1.3%	94.8%	1.15	77.70	
Interim	E040	7	305	91	0.01	231.37	0.0%	94.8%	0.00	77.70	
Interim	E040	12	305	85	9.71	231.37	4.2%	99.0%	3.57	81.27	
Interim	E040	12	305	85	0.00	231.37	0.0%	99.0%	0.00	81.27	
Interim	E040	12	305	85	0.00	231.37	0.0%	99.0%	0.00	81.27	
Interim	E040	12	305	85	0.00	231.37	0.0%	99.0%	0.00	81.27	
Interim	E040	15	630	88	0.01	231.37	0.0%	99.0%	0.00	81.27	
Interim	E040	15	305	84	0.20	231.37	0.1%	99.1%	0.07	81.35	
Interim	E040	15	305	84	1.89	231.37	0.8%	99.9%	0.69	82.03	
Interim	E040	17	305	92	0.27	231.37	0.1%	100.0%	0.11	82.14	**82.1**
Interim	E060	1	192	78	12.58	165.62	7.6%	7.6%	5.93	5.93	
Interim	E060	1	192	78	1.87	165.62	1.1%	8.7%	0.88	6.81	
Interim	E060	1	192	78	0.10	165.62	0.1%	8.8%	0.05	6.86	
Interim	E060	1	305	83	0.06	165.62	0.0%	8.8%	0.03	6.89	
Interim	E060	1	305	83	0.21	165.62	0.1%	9.0%	0.10	6.99	
Interim	E060	1	305	83	0.03	165.62	0.0%	9.0%	0.01	7.01	
Interim	E060	1	305	83	149.20	165.62	90.1%	99.1%	74.77	81.78	
Interim	E060	5	305	80	1.11	165.62	0.7%	99.7%	0.54	82.31	
Interim	E060	14	305	85	0.10	165.62	0.1%	99.8%	0.05	82.37	
Interim	E060	14	305	85	0.01	165.62	0.0%	99.8%	0.01	82.37	
Interim	E060	14	305	85	0.00	165.62	0.0%	99.8%	0.00	82.37	
Interim	E060	15	305	84	0.31	165.62	0.2%	100.0%	0.16	82.53	
Interim	E060	15	305	84	0.03	165.62	0.0%	100.0%	0.01	82.54	**82.5**
Interim	E080	1	305	83	6.56	6.94	94.6%	94.6%	78.48	78.48	
Interim	E080	1	305	83	0.00	6.94	0.0%	94.6%	0.01	78.49	
Interim	E080	17	305	92	0.37	6.94	5.4%	100.0%	4.96	83.45	**83.5**
Interim	E100	1	192	78	30.96	300.70	10.3%	10.3%	8.03	8.03	
Interim	E100	1	192	78	80.36	300.70	26.7%	37.0%	20.85	28.88	
Interim	E100	1	192	78	0.08	300.70	0.0%	37.0%	0.02	28.90	
Interim	E100	1	305	83	0.24	300.70	0.1%	37.1%	0.07	28.96	
Interim	E100	1	305	83	185.13	300.70	61.6%	98.7%	51.10	80.06	
Interim	E100	5	305	80	0.12	300.70	0.0%	98.7%	0.03	80.09	
Interim	E100	14	305	85	0.03	300.70	0.0%	98.7%	0.01	80.10	
Interim	E100	14	305	85	0.00	300.70	0.0%	98.7%	0.00	80.10	
Interim	E100	14	305	85	0.45	300.70	0.1%	98.9%	0.13	80.23	
Interim	E100	14	305	85	0.10	300.70	0.0%	98.9%	0.03	80.26	
Interim	E100	15	305	84	1.46	300.70	0.5%	99.4%	0.41	80.67	
Interim	E100	17	305	92	1.77	300.70	0.6%	100.0%	0.54	81.21	**81.2**
Interim	E140	1	192	78	10.58	43.23	24.5%	24.5%	19.09	19.09	
Interim	E140	1	305	83	31.80	43.23	73.6%	98.1%	61.06	80.16	
Interim	E140	17	305	92	0.84	43.23	1.9%	100.0%	1.79	81.95	**81.9**
Interim	E160	1	192	78	0.61	41.04	1.5%	1.5%	1.15	1.15	
Interim	E160	1	305	83	39.59	41.04	96.5%	97.9%	80.07	81.22	
Interim	E160	14	305	85	0.00	41.04	0.0%	97.9%	0.00	81.22	
Interim	E160	17	305	92	0.84	41.04	2.1%	100.0%	1.89	83.11	**83.1**
Interim	E180	1	192	78	63.80	137.09	46.5%	46.5%	36.30	36.30	
Interim	E180	1	305	83	72.58	137.09	52.9%	99.5%	43.95	80.25	
Interim	E180	14	305	85	0.00	137.09	0.0%	99.5%	0.00	80.25	
Interim	E180	17	305	92	0.70	137.09	0.5%	100.0%	0.47	80.72	**80.7**
Interim	E200	1	305	83	3.44	3.76	91.7%	91.7%	76.07	76.07	
Interim	E200	1	305	83	0.00	3.76	0.0%	91.7%	0.03	76.10	
Interim	E200	17	305	92	0.31	3.76	8.3%	100.0%	7.65	83.75	**83.7**
Interim	E220	1	305	83	0.89	28.46	3.1%	3.1%	2.60	2.60	
Interim	E220	1	305	83	26.10	28.46	91.7%	94.8%	76.11	78.71	
Interim	E220	1	305	83	0.00	28.46	0.0%	94.8%	0.00	78.71	
Interim	E220	7	305	91	0.39	28.46	1.4%	96.2%	1.25	79.96	
Interim	E220	17	305	92	1.08	28.46	3.8%	100.0%	3.49	83.45	**83.5**

CONDITION	BASIN ID	LAND USE INDEX NUMBER	SOIL MAP UNIT NUMBER	SUB REGION CN	SUB REGION AREA (AC)	BASIN AREA (AC)	PERCENT OF BASIN	CUMULATIVE PERCENT	AREA WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
Interim	E240	1	305	83	0.00	84.90	0.0%	0.0%	0.00	0.00	
Interim	E240	1	305	83	9.02	84.90	10.6%	10.6%	8.82	8.82	
Interim	E240	1	305	83	2.35	84.90	2.8%	13.4%	2.29	11.12	
Interim	E240	1	305	83	0.46	84.90	0.5%	13.9%	0.44	11.56	
Interim	E240	1	305	83	71.80	84.90	84.6%	98.5%	70.19	81.75	
Interim	E240	1	305	83	0.00	84.90	0.0%	98.5%	0.00	81.75	
Interim	E240	7	305	91	0.14	84.90	0.2%	98.7%	0.15	81.90	
Interim	E240	14	305	85	0.00	84.90	0.0%	98.7%	0.00	81.90	
Interim	E240	17	305	92	1.14	84.90	1.3%	100.0%	1.23	83.13	**83.1**
Interim	E260	1	305	83	4.17	88.25	4.7%	4.7%	3.93	3.93	
Interim	E260	1	305	83	2.40	88.25	2.7%	7.4%	2.25	6.18	
Interim	E260	1	305	83	0.50	88.25	0.6%	8.0%	0.47	6.65	
Interim	E260	1	305	83	2.06	88.25	2.3%	10.3%	1.93	8.58	
Interim	E260	1	305	83	3.46	88.25	3.9%	14.3%	3.26	11.84	
Interim	E260	1	305	83	43.89	88.25	49.7%	64.0%	41.28	53.12	
Interim	E260	1	305	83	0.04	88.25	0.0%	64.0%	0.04	53.16	
Interim	E260	1	305	83	0.00	88.25	0.0%	64.0%	0.00	53.16	
Interim	E260	1	192	78	4.50	88.25	5.1%	69.1%	3.98	57.14	
Interim	E260	1	192	78	0.23	88.25	0.3%	69.4%	0.21	57.34	
Interim	E260	1	192	78	0.37	88.25	0.4%	69.8%	0.33	57.67	
Interim	E260	1	305	83	0.00	88.25	0.0%	69.8%	0.00	57.67	
Interim	E260	4	305	82	0.00	88.25	0.0%	69.8%	0.00	57.67	
Interim	E260	4	305	82	0.08	88.25	0.1%	69.9%	0.08	57.75	
Interim	E260	4	305	82	0.27	88.25	0.3%	70.2%	0.25	58.00	
Interim	E260	4	305	82	0.11	88.25	0.1%	70.4%	0.10	58.10	
Interim	E260	4	305	82	0.20	88.25	0.2%	70.6%	0.19	58.29	
Interim	E260	4	305	82	0.03	88.25	0.0%	70.6%	0.02	58.31	
Interim	E260	4	305	82	0.12	88.25	0.1%	70.7%	0.11	58.42	
Interim	E260	4	305	82	0.00	88.25	0.0%	70.8%	0.00	58.43	
Interim	E260	4	192	77	0.20	88.25	0.2%	71.0%	0.18	58.60	
Interim	E260	4	192	77	0.50	88.25	0.6%	71.5%	0.44	59.04	
Interim	E260	4	192	77	4.37	88.25	5.0%	76.5%	3.82	62.85	
Interim	E260	4	192	77	0.20	88.25	0.2%	76.7%	0.18	63.03	
Interim	E260	4	192	77	0.00	88.25	0.0%	76.7%	0.00	63.03	
Interim	E260	4	192	77	0.02	88.25	0.0%	76.8%	0.01	63.05	
Interim	E260	4	305	82	0.00	88.25	0.0%	76.8%	0.00	63.05	
Interim	E260	4	305	82	0.15	88.25	0.2%	76.9%	0.14	63.19	
Interim	E260	7	305	91	3.83	88.25	4.3%	81.3%	3.94	67.14	
Interim	E260	7	192	88	3.03	88.25	3.4%	84.7%	3.02	70.16	
Interim	E260	7	305	91	0.00	88.25	0.0%	84.7%	0.00	70.16	
Interim	E260	12	305	85	1.24	88.25	1.4%	86.1%	1.19	71.35	
Interim	E260	14	305	85	0.00	88.25	0.0%	86.1%	0.00	71.35	
Interim	E260	14	305	85	3.36	88.25	3.8%	89.9%	3.24	74.59	
Interim	E260	14	305	85	4.20	88.25	4.8%	94.7%	4.05	78.64	
Interim	E260	14	192	80	0.70	88.25	0.8%	95.5%	0.64	79.27	
Interim	E260	14	192	80	0.96	88.25	1.1%	96.6%	0.87	80.14	
Interim	E260	14	305	85	0.00	88.25	0.0%	96.6%	0.00	80.14	
Interim	E260	14	305	85	0.00	88.25	0.0%	96.6%	0.00	80.14	
Interim	E260	14	305	85	0.15	88.25	0.2%	96.7%	0.15	80.29	
Interim	E260	14	305	85	0.00	88.25	0.0%	96.7%	0.00	80.29	
Interim	E260	17	305	92	2.59	88.25	2.9%	99.7%	2.70	82.99	
Interim	E260	17	192	90	0.30	88.25	0.3%	100.0%	0.31	83.30	
Interim	E260	17	305	92	0.00	88.25	0.0%	100.0%	0.00	83.30	
Interim	E260	17	305	92	0.00	88.25	0.0%	100.0%	0.00	83.30	**83.3**
Interim	E280	1	305	83	9.29	178.05	5.2%	5.2%	4.33	4.33	
Interim	E280	1	305	83	3.31	178.05	1.9%	7.1%	1.54	5.87	
Interim	E280	1	305	83	3.00	178.05	1.7%	8.8%	1.40	7.27	
Interim	E280	1	305	83	0.75	178.05	0.4%	9.2%	0.35	7.62	
Interim	E280	1	305	83	1.05	178.05	0.6%	9.8%	0.49	8.11	
Interim	E280	1	305	83	1.08	178.05	0.6%	10.4%	0.50	8.62	
Interim	E280	1	305	83	4.24	178.05	2.4%	12.8%	1.98	10.59	
Interim	E280	1	305	83	0.08	178.05	0.0%	12.8%	0.04	10.63	
Interim	E280	1	305	83	0.00	178.05	0.0%	12.8%	0.00	10.63	
Interim	E280	4	305	82	31.49	178.05	17.7%	30.5%	14.50	25.13	
Interim	E280	4	305	82	0.00	178.05	0.0%	30.5%	0.00	25.14	
Interim	E280	4	305	82	0.00	178.05	0.0%	30.5%	0.00	25.14	
Interim	E280	4	305	82	0.00	178.05	0.0%	30.5%	0.00	25.14	
Interim	E280	4	305	82	15.97	178.05	9.0%	39.5%	7.35	32.49	
Interim	E280	4	305	82	8.62	178.05	4.8%	44.3%	3.97	36.46	
Interim	E280	4	305	82	7.40	178.05	4.2%	48.5%	3.41	39.87	
Interim	E280	4	305	82	15.28	178.05	8.6%	57.0%	7.04	46.91	
Interim	E280	4	305	82	8.93	178.05	5.0%	62.1%	4.11	51.02	
Interim	E280	4	305	82	8.79	178.05	4.9%	67.0%	4.05	55.07	
Interim	E280	4	305	82	14.73	178.05	8.3%	75.3%	6.78	61.85	
Interim	E280	4	305	82	4.38	178.05	2.5%	77.7%	2.02	63.87	
Interim	E280	4	305	82	8.10	178.05	4.5%	82.3%	3.73	67.60	
Interim	E280	4	192	77	0.00	178.05	0.0%	82.3%	0.00	67.60	
Interim	E280	4	192	77	0.75	178.05	0.4%	82.7%	0.32	67.93	
Interim	E280	6	305	88	0.06	178.05	0.0%	82.7%	0.03	67.96	
Interim	E280	7	305	91	25.09	178.05	14.1%	96.8%	12.82	80.78	
Interim	E280	7	192	88	0.69	178.05	0.4%	97.2%	0.34	81.12	
Interim	E280	7	305	91	0.00	178.05	0.0%	97.2%	0.00	81.12	
Interim	E280	14	305	85	4.89	178.05	2.7%	100.0%	2.34	83.46	
Interim	E280	17	305	92	0.06	178.05	0.0%	100.0%	0.03	83.49	**83.5**

CONDITION	BASIN ID	LAND USE INDEX NUMBER	SOIL MAP UNIT NUMBER	SUB REGION CN	SUB REGION AREA (AC)	BASIN AREA (AC)	PERCENT OF BASIN	CUMULATIVE PERCENT	AREA WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
Interim	E300	1	305	83	2.07	8.44	24.5%	24.5%	20.35	20.35	
Interim	E300	4	305	82	0.05	8.44	0.6%	25.1%	0.50	20.85	
Interim	E300	7	305	91	0.13	8.44	1.6%	26.7%	1.43	22.28	
Interim	E300	14	305	85	0.00	8.44	0.0%	26.7%	0.02	22.30	
Interim	E300	14	305	85	3.99	8.44	47.3%	74.0%	40.23	62.52	
Interim	E300	14	305	85	0.78	8.44	9.2%	83.2%	7.82	70.35	
Interim	E300	17	305	92	1.41	8.44	16.8%	100.0%	15.42	85.77	**85.8**
Interim	E320	1	305	83	2.40	10.84	22.1%	22.1%	18.35	18.35	
Interim	E320	1	305	83	0.26	10.84	2.4%	24.5%	2.01	20.36	
Interim	E320	14	305	85	2.68	10.84	24.7%	49.2%	20.99	41.35	
Interim	E320	14	305	85	3.73	10.84	34.4%	83.6%	29.21	70.57	
Interim	E320	17	305	92	1.78	10.84	16.4%	100.0%	15.11	85.68	**85.7**
Interim	E340	1	305	83	1.80	10.75	16.7%	16.7%	13.89	13.89	
Interim	E340	1	305	83	0.56	10.75	5.2%	21.9%	4.31	18.19	
Interim	E340	1	305	83	0.00	10.75	0.0%	21.9%	0.00	18.19	
Interim	E340	14	305	85	2.72	10.75	25.3%	47.2%	21.48	39.67	
Interim	E340	14	305	85	0.00	10.75	0.0%	47.2%	0.00	39.67	
Interim	E340	14	305	85	3.79	10.75	35.3%	82.4%	29.97	69.64	
Interim	E340	17	305	92	1.89	10.75	17.6%	100.0%	16.17	85.82	**85.8**
Interim	E360	1	305	83	1.66	6.09	27.3%	27.3%	22.63	22.63	
Interim	E360	1	305	83	0.00	6.09	0.0%	27.3%	0.01	22.64	
Interim	E360	14	305	85	0.02	6.09	0.2%	27.5%	0.21	22.85	
Interim	E360	14	305	85	3.45	6.09	56.7%	84.2%	48.15	71.01	
Interim	E360	17	305	92	0.97	6.09	15.8%	100.0%	14.58	85.59	**85.6**
Interim	E380	1	305	83	2.02	12.51	16.2%	16.2%	13.41	13.41	
Interim	E380	1	305	83	0.03	12.51	0.2%	16.4%	0.19	13.60	
Interim	E380	14	305	85	0.00	12.51	0.0%	16.4%	0.00	13.60	
Interim	E380	14	305	85	4.40	12.51	35.2%	51.6%	29.91	43.51	
Interim	E380	14	305	85	0.03	12.51	0.2%	51.8%	0.19	43.71	
Interim	E380	14	305	85	4.25	12.51	34.0%	85.8%	28.87	72.58	
Interim	E380	17	305	92	1.78	12.51	14.3%	100.0%	13.12	85.69	**85.7**
Interim	E400	1	305	83	4.47	54.13	8.3%	8.3%	6.85	6.85	
Interim	E400	1	305	83	2.02	54.13	3.7%	12.0%	3.10	9.95	
Interim	E400	4	305	82	3.00	54.13	5.5%	17.5%	4.55	14.50	
Interim	E400	4	305	82	0.13	54.13	0.2%	17.8%	0.20	14.70	
Interim	E400	7	305	91	0.78	54.13	1.4%	19.2%	1.32	16.02	
Interim	E400	7	305	91	0.03	54.13	0.0%	19.3%	0.04	16.06	
Interim	E400	14	305	85	8.62	54.13	15.9%	35.2%	13.53	29.59	
Interim	E400	14	305	85	18.05	54.13	33.3%	68.5%	28.34	57.94	
Interim	E400	14	305	85	5.77	54.13	10.7%	79.2%	9.06	67.00	
Interim	E400	14	305	85	2.22	54.13	4.1%	83.3%	3.48	70.48	
Interim	E400	14	305	85	4.45	54.13	8.2%	91.5%	6.98	77.46	
Interim	E400	14	305	85	0.13	54.13	0.2%	91.8%	0.20	77.67	
Interim	E400	14	305	85	0.12	54.13	0.2%	92.0%	0.19	77.86	
Interim	E400	14	305	85	0.03	54.13	0.0%	92.0%	0.04	77.90	
Interim	E400	17	305	92	4.20	54.13	7.8%	99.8%	7.14	85.04	
Interim	E400	17	305	92	0.12	54.13	0.2%	100.0%	0.21	85.25	**85.2**
Interim	E420	1	305	83	9.25	61.25	15.1%	15.1%	12.53	12.53	
Interim	E420	1	305	83	2.13	61.25	3.5%	18.6%	2.88	15.42	
Interim	E420	1	305	83	0.15	61.25	0.3%	18.8%	0.21	15.63	
Interim	E420	14	305	85	1.44	61.25	2.4%	21.2%	2.00	17.63	
Interim	E420	14	305	85	3.09	61.25	5.0%	26.2%	4.28	21.91	
Interim	E420	14	305	85	8.50	61.25	13.9%	40.1%	11.80	33.71	
Interim	E420	14	305	85	2.06	61.25	3.4%	43.5%	2.86	36.57	
Interim	E420	14	305	85	9.09	61.25	14.8%	58.3%	12.62	49.19	
Interim	E420	14	305	85	8.83	61.25	14.4%	72.7%	12.25	61.44	
Interim	E420	14	305	85	6.49	61.25	10.6%	83.3%	9.01	70.45	
Interim	E420	14	305	85	0.12	61.25	0.2%	83.5%	0.17	70.62	
Interim	E420	14	305	85	0.01	61.25	0.0%	83.5%	0.01	70.63	
Interim	E420	15	305	84	2.71	61.25	4.4%	88.0%	3.71	74.34	
Interim	E420	17	305	92	0.07	61.25	0.1%	88.1%	0.11	74.45	
Interim	E420	17	305	92	7.14	61.25	11.7%	99.7%	10.73	85.18	
Interim	E420	17	305	92	0.01	61.25	0.0%	99.8%	0.01	85.19	
Interim	E420	17	305	92	0.15	61.25	0.3%	100.0%	0.23	85.43	**85.4**
Interim	E440	4	305	82	0.01	33.50	0.0%	0.0%	0.03	0.03	
Interim	E440	5	305	80	21.33	33.50	63.7%	63.7%	50.94	50.97	
Interim	E440	5	305	80	9.57	33.50	28.6%	92.3%	22.86	73.83	
Interim	E440	7	305	91	1.38	33.50	4.1%	96.4%	3.76	77.58	
Interim	E440	7	305	91	1.19	33.50	3.6%	100.0%	3.24	80.82	
Interim	E440	15	305	84	0.00	33.50	0.0%	100.0%	0.01	80.84	**80.8**
Interim	E460	1	305	83	0.00	72.97	0.0%	0.0%	0.00	0.00	
Interim	E460	4	305	82	0.13	72.97	0.2%	0.2%	0.14	0.14	
Interim	E460	4	305	82	0.04	72.97	0.1%	0.2%	0.04	0.19	
Interim	E460	5	305	80	42.76	72.97	58.6%	58.8%	46.87	47.06	
Interim	E460	5	305	80	27.83	72.97	38.1%	97.0%	30.51	77.57	
Interim	E460	7	305	91	0.00	72.97	0.0%	97.0%	0.00	77.58	
Interim	E460	7	305	91	0.00	72.97	0.0%	97.0%	0.00	77.58	
Interim	E460	7	305	91	1.77	72.97	2.4%	99.4%	2.21	79.79	
Interim	E460	15	305	84	0.44	72.97	0.6%	100.0%	0.50	80.29	**80.3**

CONDITION	BASIN ID	LAND USE INDEX NUMBER	SOIL MAP UNIT NUMBER	SUB REGION CN	SUB REGION AREA (AC)	BASIN AREA (AC)	PERCENT OF BASIN	CUMULATIVE PERCENT	AREA WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
Interim	E480	1	305	83	18.17	55.88	32.5%	32.5%	27.00	27.00	
Interim	E480	1	305	83	0.36	55.88	0.6%	33.2%	0.53	27.53	
Interim	E480	4	305	82	2.61	55.88	4.7%	37.8%	3.83	31.36	
Interim	E480	4	305	82	0.02	55.88	0.0%	37.9%	0.03	31.39	
Interim	E480	4	305	82	0.01	55.88	0.0%	37.9%	0.02	31.40	
Interim	E480	5	305	80	11.73	55.88	21.0%	58.9%	16.79	48.19	
Interim	E480	5	305	80	19.27	55.88	34.5%	93.4%	27.59	75.78	
Interim	E480	7	305	91	0.10	55.88	0.2%	93.5%	0.16	75.94	
Interim	E480	7	305	91	0.01	55.88	0.0%	93.6%	0.01	75.95	
Interim	E480	7	305	91	1.16	55.88	2.1%	95.6%	1.88	77.84	
Interim	E480	12	305	85	1.15	55.88	2.0%	97.7%	1.74	79.58	
Interim	E480	14	305	85	1.04	55.88	1.9%	99.5%	1.58	81.16	
Interim	E480	14	305	85	0.01	55.88	0.0%	99.6%	0.02	81.17	
Interim	E480	15	305	84	0.25	55.88	0.4%	100.0%	0.37	81.55	**81.5**
Interim	E500	1	305	83	0.00	248.39	0.0%	0.0%	0.00	0.00	
Interim	E500	1	305	83	13.58	248.39	5.5%	5.5%	4.54	4.54	
Interim	E500	1	305	83	4.62	248.39	1.9%	7.3%	1.54	6.08	
Interim	E500	1	305	83	1.78	248.39	0.7%	8.0%	0.60	6.68	
Interim	E500	1	305	83	0.85	248.39	0.3%	8.4%	0.29	6.96	
Interim	E500	2	305	74	0.00	248.39	0.0%	8.4%	0.00	6.96	
Interim	E500	4	305	82	110.78	248.39	44.6%	53.0%	36.57	43.54	
Interim	E500	4	305	82	0.00	248.39	0.0%	53.0%	0.00	43.54	
Interim	E500	4	305	82	38.88	248.39	15.7%	68.6%	12.84	56.37	
Interim	E500	4	305	82	31.11	248.39	12.5%	81.2%	10.27	66.64	
Interim	E500	5	305	80	0.10	248.39	0.0%	81.2%	0.03	66.68	
Interim	E500	6	305	88	0.64	248.39	0.3%	81.5%	0.23	66.90	
Interim	E500	6	305	88	1.46	248.39	0.6%	82.1%	0.52	67.42	
Interim	E500	6	305	88	2.49	248.39	1.0%	83.1%	0.88	68.30	
Interim	E500	6	305	88	0.00	248.39	0.0%	83.1%	0.00	68.30	
Interim	E500	6	305	88	7.51	248.39	3.0%	86.1%	2.66	70.96	
Interim	E500	7	305	91	1.23	248.39	0.5%	86.6%	0.45	71.41	
Interim	E500	7	305	91	1.08	248.39	0.4%	87.0%	0.39	71.81	
Interim	E500	7	305	91	0.00	248.39	0.0%	87.0%	0.00	71.81	
Interim	E500	7	305	91	0.06	248.39	0.0%	87.0%	0.02	71.83	
Interim	E500	7	305	91	5.18	248.39	2.1%	89.1%	1.90	73.73	
Interim	E500	7	305	91	6.84	248.39	2.8%	91.9%	2.51	76.23	
Interim	E500	7	305	91	6.29	248.39	2.5%	94.4%	2.31	78.54	
Interim	E500	9	305	95	0.01	248.39	0.0%	94.4%	0.01	78.54	
Interim	E500	12	305	85	13.88	248.39	5.6%	100.0%	4.75	83.29	**83.3**
Interim	E520	1	305	83	5.42	9.18	59.0%	59.0%	49.00	49.00	
Interim	E520	1	305	83	0.00	9.18	0.0%	59.0%	0.01	49.01	
Interim	E520	4	305	82	0.02	9.18	0.2%	59.2%	0.14	49.15	
Interim	E520	4	305	82	1.27	9.18	13.8%	73.0%	11.32	60.46	
Interim	E520	4	305	82	0.00	9.18	0.1%	73.1%	0.04	60.51	
Interim	E520	7	305	91	2.47	9.18	26.9%	100.0%	24.51	85.01	**85.0**
Interim	E540	7	305	91	0.00	32.41	0.0%	0.0%	0.01	0.01	
Interim	E540	7	305	91	0.96	32.41	3.0%	3.0%	2.70	2.71	
Interim	E540	7	305	91	1.71	32.41	5.3%	8.3%	4.80	7.51	
Interim	E540	7	305	91	0.00	32.41	0.0%	8.3%	0.01	7.51	
Interim	E540	12	305	85	29.73	32.41	91.7%	100.0%	77.98	85.50	**85.5**
Interim	E560	1	305	83	0.00	112.82	0.0%	0.0%	0.00	0.00	
Interim	E560	1	305	83	0.10	112.82	0.1%	0.1%	0.07	0.08	
Interim	E560	4	305	82	12.33	112.82	10.9%	11.0%	8.96	9.04	
Interim	E560	4	305	82	7.91	112.82	7.0%	18.0%	5.75	14.79	
Interim	E560	4	305	82	2.10	112.82	1.9%	19.9%	1.52	16.31	
Interim	E560	6	305	88	5.40	112.82	4.8%	24.7%	4.21	20.52	
Interim	E560	7	305	91	7.25	112.82	6.4%	31.1%	5.85	26.37	
Interim	E560	7	305	91	0.00	112.82	0.0%	31.1%	0.00	26.37	
Interim	E560	7	305	91	38.26	112.82	33.9%	65.0%	30.86	57.23	
Interim	E560	7	305	91	35.71	112.82	31.7%	96.7%	28.80	86.03	
Interim	E560	7	305	91	0.09	112.82	0.1%	96.7%	0.07	86.10	
Interim	E560	7	305	91	3.55	112.82	3.2%	99.9%	2.87	88.97	
Interim	E560	12	305	85	0.13	112.82	0.1%	100.0%	0.10	89.06	**89.1**
Interim	E580	4	305	82	0.00	62.74	0.0%	0.0%	0.00	0.00	
Interim	E580	4	305	82	0.00	62.74	0.0%	0.0%	0.00	0.00	
Interim	E580	6	305	88	31.40	62.74	50.0%	50.0%	44.04	44.04	
Interim	E580	6	305	88	25.60	62.74	40.8%	90.8%	35.90	79.94	
Interim	E580	6	305	88	1.28	62.74	2.0%	92.9%	1.80	81.74	
Interim	E580	6	305	88	0.47	62.74	0.7%	93.6%	0.66	82.40	
Interim	E580	6	305	88	1.16	62.74	1.8%	95.5%	1.62	84.02	
Interim	E580	7	305	91	2.83	62.74	4.5%	100.0%	4.11	88.13	**88.1**
Interim	E600	1	305	83	1.11	55.17	2.0%	2.0%	1.67	1.67	
Interim	E600	1	305	83	0.02	55.17	0.0%	2.0%	0.03	1.70	
Interim	E600	1	305	83	0.05	55.17	0.1%	2.1%	0.08	1.77	
Interim	E600	1	305	83	47.42	55.17	86.0%	88.1%	71.34	73.11	
Interim	E600	4	305	82	0.00	55.17	0.0%	88.1%	0.00	73.11	
Interim	E600	6	305	88	0.64	55.17	1.2%	89.3%	1.03	74.14	
Interim	E600	6	305	88	0.87	55.17	1.6%	90.8%	1.39	75.53	
Interim	E600	6	305	88	2.28	55.17	4.1%	95.0%	3.63	79.17	
Interim	E600	7	305	91	0.02	55.17	0.0%	95.0%	0.03	79.19	
Interim	E600	7	305	91	0.00	55.17	0.0%	95.0%	0.00	79.19	
Interim	E600	16	305	90	1.50	55.17	2.7%	97.7%	2.44	81.63	
Interim	E600	16	305	90	1.26	55.17	2.3%	100.0%	2.06	83.69	**83.7**
Interim	E620	6	305	88	0.43	30.19	1.4%	1.4%	1.26	1.26	
Interim	E620	6	305	88	14.04	30.19	46.5%	47.9%	40.92	42.18	
Interim	E620	6	305	88	15.00	30.19	49.7%	97.6%	43.73	85.90	
Interim	E620	16	305	90	0.72	30.19	2.4%	100.0%	2.15	88.06	**88.1**

CONDITION	BASIN ID	LAND USE INDEX NUMBER	SOIL MAP UNIT NUMBER	SUB REGION CN	SUB REGION AREA (AC)	BASIN AREA (AC)	PERCENT OF BASIN	CUMULATIVE PERCENT	AREA WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
Interim	E640	1	305	83	2.28	44.82	5.1%	5.1%	4.22	4.22	
Interim	E640	6	305	88	0.55	44.82	1.2%	6.3%	1.08	5.30	
Interim	E640	6	305	88	32.85	44.82	73.3%	79.6%	64.49	69.79	
Interim	E640	6	305	88	8.78	44.82	19.6%	99.2%	17.24	87.04	
Interim	E640	9	305	95	0.36	44.82	0.8%	100.0%	0.76	87.79	**87.8**
Interim	E660	1	305	83	7.83	8.95	87.5%	87.5%	72.65	72.65	
Interim	E660	6	305	88	0.00	8.95	0.0%	87.5%	0.01	72.66	
Interim	E660	9	305	95	1.12	8.95	12.5%	100.0%	11.87	84.53	**84.5**
Interim	E680	6	305	88	71.73	71.80	99.9%	99.9%	87.91	87.91	
Interim	E680	16	305	90	0.07	71.80	0.1%	100.0%	0.08	88.00	**88.0**
Interim	E700	6	305	88	80.10	86.51	92.6%	92.6%	81.48	81.48	
Interim	E700	6	540	84	4.25	86.51	4.9%	97.5%	4.13	85.61	
Interim	E700	6	305	88	2.16	86.51	2.5%	100.0%	2.20	87.80	**87.8**
Interim	E720	17	305	92	0.01	37.73	0.0%	0.0%	0.02	0.02	
Interim	E720	7	305	91	0.00	37.73	0.0%	0.0%	0.00	0.02	
Interim	E720	16	305	90	1.28	37.73	3.4%	3.4%	3.04	3.06	
Interim	E720	7	305	91	0.00	37.73	0.0%	3.4%	0.00	3.06	
Interim	E720	6	305	88	1.39	37.73	3.7%	7.1%	3.24	6.30	
Interim	E720	7	305	91	0.05	37.73	0.1%	7.2%	0.13	6.43	
Interim	E720	6	305	88	35.00	37.73	92.8%	100.0%	81.64	88.07	**88.1**
Interim	E740	6	305	88	34.12	34.12	100.0%	100.0%	88.01	88.01	**88.0**
Interim	E760	6	305	88	0.00	4.87	0.0%	0.0%	0.00	0.00	
Interim	E760	6	305	88	2.05	4.87	42.1%	42.1%	37.02	37.02	
Interim	E760	6	305	88	2.37	4.87	48.7%	90.8%	42.87	79.89	
Interim	E760	7	305	91	0.19	4.87	3.9%	94.7%	3.56	83.45	
Interim	E760	16	305	90	0.00	4.87	0.0%	94.7%	0.00	83.45	
Interim	E760	16	305	90	0.11	4.87	2.2%	96.9%	1.94	85.39	
Interim	E760	17	305	92	0.15	4.87	3.1%	100.0%	2.89	88.29	**88.3**
Interim	E800	6	305	88	0.26	6.08	4.2%	4.2%	3.72	3.72	
Interim	E800	17	305	92	0.00	6.08	0.0%	4.3%	0.02	3.75	
Interim	E800	16	305	90	0.21	6.08	3.5%	7.7%	3.13	6.87	
Interim	E800	16	305	90	0.54	6.08	8.9%	16.7%	8.03	14.90	
Interim	E800	17	305	92	2.51	6.08	41.3%	58.0%	38.03	52.94	
Interim	E800	7	305	91	0.03	6.08	0.5%	58.5%	0.49	53.42	
Interim	E800	6	305	88	0.12	6.08	2.0%	60.5%	1.77	55.19	
Interim	E800	14	305	85	0.00	6.08	0.0%	60.5%	0.00	55.20	
Interim	E800	16	305	90	0.25	6.08	4.2%	64.7%	3.75	58.95	
Interim	E800	6	305	88	2.12	6.08	34.8%	99.5%	30.64	89.59	
Interim	E800	1	305	83	0.03	6.08	0.5%	100.0%	0.43	90.01	**90.0**

PARK HIGHLANDS WEST
ULTIMATE CONDITION OFFSITE COMPOSITE CURVE NUMBER BREAKDOWN
CBH1301.002 West MDS Composite CN - Offsite.xlsx

CONDITION	BASIN ID	LAND USE INDEX NUMBER	SOIL MAP UNIT NUMBER	SUB REGION CN	SUB REGION AREA (AC)	BASIN AREA (AC)	PERCENT OF BASIN	CUMULATIVE PERCENT	AREA WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
Ultimate	U130	1	630	88	0.33	35.59	0.9%	0.9%	0.81	0.81	
Ultimate	U130	1	630	88	1.11	35.59	3.1%	4.0%	2.74	3.55	
Ultimate	U130	1	305	83	0.00	35.59	0.0%	4.0%	0.00	3.55	
Ultimate	U130	1	305	83	1.80	35.59	5.1%	9.1%	4.19	7.75	
Ultimate	U130	1	305	83	1.52	35.59	4.3%	13.3%	3.53	11.28	
Ultimate	U130	1	305	83	20.23	35.59	56.8%	70.2%	47.18	58.46	
Ultimate	U130	1	305	83	0.00	35.59	0.0%	70.2%	0.01	58.47	
Ultimate	U130	1	305	83	0.04	35.59	0.1%	70.3%	0.10	58.56	
Ultimate	U130	7	305	91	0.85	35.59	2.4%	72.7%	2.16	60.73	
Ultimate	U130	12	305	85	9.71	35.59	27.3%	100.0%	23.20	83.93	
Ultimate	U130	12	305	85	0.00	35.59	0.0%	100.0%	0.00	83.93	**83.9**
Ultimate	U150	1	305	83	0.06	85.49	0.1%	0.1%	0.06	0.06	
Ultimate	U150	1	305	83	83.87	85.49	98.1%	98.2%	81.43	81.49	
Ultimate	U150	5	305	80	1.11	85.49	1.3%	99.5%	1.04	82.53	
Ultimate	U150	14	305	85	0.10	85.49	0.1%	99.6%	0.10	82.63	
Ultimate	U150	14	305	85	0.01	85.49	0.0%	99.6%	0.01	82.64	
Ultimate	U150	14	305	85	0.00	85.49	0.0%	99.6%	0.00	82.64	
Ultimate	U150	15	305	84	0.31	85.49	0.4%	100.0%	0.30	82.94	
Ultimate	U150	15	305	84	0.03	85.49	0.0%	100.0%	0.03	82.97	**83.0**
Ultimate	U155	1	305	83	77.72	82.81	93.8%	93.8%	77.89	77.89	
Ultimate	U155	5	305	80	0.12	82.81	0.1%	94.0%	0.11	78.01	
Ultimate	U155	14	305	85	0.10	82.81	0.1%	94.1%	0.11	78.11	
Ultimate	U155	14	305	85	0.03	82.81	0.0%	94.2%	0.03	78.15	
Ultimate	U155	14	305	85	0.41	82.81	0.5%	94.7%	0.42	78.57	
Ultimate	U155	14	305	85	0.00	82.81	0.0%	94.7%	0.00	78.57	
Ultimate	U155	15	305	84	1.46	82.81	1.8%	96.4%	1.48	80.05	
Ultimate	U155	17	305	92	2.97	82.81	3.6%	100.0%	3.30	83.35	**83.4**
Ultimate	U170	1	305	83	0.03	161.35	0.0%	0.0%	0.01	0.01	
Ultimate	U170	1	305	83	161.29	161.35	100.0%	100.0%	82.97	82.98	
Ultimate	U170	17	305	92	0.04	161.35	0.0%	100.0%	0.02	83.00	**83.0**
Ultimate	U190	1	192	78	155.33	235.76	65.9%	65.9%	51.39	51.39	
Ultimate	U190	1	192	78	0.43	235.76	0.2%	66.1%	0.14	51.53	
Ultimate	U190	1	305	83	0.17	235.76	0.1%	66.1%	0.06	51.59	
Ultimate	U190	1	305	83	33.32	235.76	14.1%	80.3%	11.73	63.32	
Ultimate	U190	16	192	88	46.08	235.76	19.5%	99.8%	17.20	80.52	
Ultimate	U190	16	305	90	0.45	235.76	0.2%	100.0%	0.17	80.69	**80.7**
Ultimate	U210	1	305	83	0.89	46.51	1.9%	1.9%	1.59	1.59	
Ultimate	U210	1	305	83	44.95	46.51	96.7%	98.6%	80.22	81.81	
Ultimate	U210	14	305	85	0.00	46.51	0.0%	98.6%	0.00	81.81	
Ultimate	U210	17	305	92	0.67	46.51	1.4%	100.0%	1.32	83.13	**83.1**
Ultimate	U230	1	305	83	2.00	88.98	2.2%	2.2%	1.86	1.86	
Ultimate	U230	1	305	83	83.10	88.98	93.4%	95.6%	77.51	79.38	
Ultimate	U230	4	305	82	0.03	88.98	0.0%	95.7%	0.02	79.40	
Ultimate	U230	4	305	82	0.12	88.98	0.1%	95.8%	0.11	79.51	
Ultimate	U230	4	192	77	0.03	88.98	0.0%	95.8%	0.02	79.54	
Ultimate	U230	7	305	91	1.30	88.98	1.5%	97.3%	1.33	80.87	
Ultimate	U230	7	192	88	0.04	88.98	0.0%	97.3%	0.04	80.91	
Ultimate	U230	14	305	85	0.00	88.98	0.0%	97.3%	0.00	80.91	
Ultimate	U230	14	305	85	0.00	88.98	0.0%	97.3%	0.00	80.91	
Ultimate	U230	14	305	85	0.00	88.98	0.0%	97.3%	0.00	80.91	
Ultimate	U230	17	305	92	2.36	88.98	2.7%	100.0%	2.44	83.36	**83.4**
Ultimate	U250	1	305	83	0.83	44.65	1.9%	1.9%	1.54	1.54	
Ultimate	U250	1	305	83	43.17	44.65	96.7%	98.5%	80.25	81.79	
Ultimate	U250	14	305	85	0.00	44.65	0.0%	98.6%	0.00	81.80	
Ultimate	U250	17	305	92	0.65	44.65	1.4%	100.0%	1.33	83.13	**83.1**
Ultimate	U280	4	305	82	18.04	172.01	10.5%	10.5%	8.60	8.60	
Ultimate	U280	4	305	82	18.48	172.01	10.7%	21.2%	8.81	17.41	
Ultimate	U280	4	305	82	8.62	172.01	5.0%	26.2%	4.11	21.52	
Ultimate	U280	4	305	82	31.49	172.01	18.3%	44.5%	15.01	36.53	
Ultimate	U280	4	305	82	0.00	172.01	0.0%	44.6%	0.00	36.53	
Ultimate	U280	4	305	82	0.00	172.01	0.0%	44.6%	0.00	36.53	
Ultimate	U280	4	305	82	0.00	172.01	0.0%	44.6%	0.00	36.53	
Ultimate	U280	4	305	82	17.77	172.01	10.3%	54.9%	8.47	45.00	
Ultimate	U280	4	305	82	8.62	172.01	5.0%	59.9%	4.11	49.11	
Ultimate	U280	4	305	82	7.40	172.01	4.3%	64.2%	3.53	52.64	
Ultimate	U280	4	305	82	18.28	172.01	10.6%	74.8%	8.72	61.36	
Ultimate	U280	4	305	82	8.93	172.01	5.2%	80.0%	4.26	65.61	
Ultimate	U280	4	305	82	8.79	172.01	5.1%	85.1%	4.19	69.80	
Ultimate	U280	4	192	77	0.00	172.01	0.0%	85.1%	0.00	69.80	
Ultimate	U280	4	192	77	0.75	172.01	0.4%	85.6%	0.33	70.14	
Ultimate	U280	6	305	88	0.06	172.01	0.0%	85.6%	0.03	70.17	
Ultimate	U280	7	305	91	24.08	172.01	14.0%	99.6%	12.74	82.91	
Ultimate	U280	7	192	88	0.69	172.01	0.4%	100.0%	0.35	83.26	**83.3**
Ultimate	U305	14	305	85	4.50	5.95	75.7%	75.7%	64.34	64.34	
Ultimate	U305	17	305	92	1.44	5.95	24.3%	100.0%	22.33	86.68	**86.7**
Ultimate	U310	4	305	82	0.00	6.55	0.0%	0.0%	0.02	0.02	
Ultimate	U310	4	305	82	0.05	6.55	0.8%	0.8%	0.64	0.67	
Ultimate	U310	7	305	91	1.09	6.55	16.7%	17.5%	15.22	15.89	
Ultimate	U310	14	305	85	0.00	6.55	0.0%	17.6%	0.03	15.91	
Ultimate	U310	14	305	85	4.39	6.55	67.1%	84.7%	57.04	72.95	
Ultimate	U310	17	305	92	1.00	6.55	15.3%	100.0%	14.10	87.05	**87.1**

CONDITION	BASIN ID	LAND USE INDEX NUMBER	SOIL MAP UNIT NUMBER	SUB REGION CN	SUB REGION AREA (AC)	BASIN AREA (AC)	PERCENT OF BASIN	CUMULATIVE PERCENT	AREA WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
Ultimate	U330	14	305	85	9.04	9.06	99.8%	99.8%	84.81	84.81	
Ultimate	U330	17	305	92	0.02	9.06	0.2%	100.0%	0.17	84.98	**85.0**
Ultimate	U350	14	305	85	0.00	10.42	0.0%	0.0%	0.00	0.00	
Ultimate	U350	14	305	85	0.00	10.42	0.0%	0.0%	0.00	0.00	
Ultimate	U350	14	305	85	0.00	10.42	0.0%	0.0%	0.00	0.01	
Ultimate	U350	14	305	85	8.53	10.42	81.8%	81.8%	69.57	69.57	
Ultimate	U350	17	305	92	1.89	10.42	18.2%	100.0%	16.72	86.29	**86.3**
Ultimate	U370	14	305	85	0.02	10.17	0.2%	0.2%	0.13	0.13	
Ultimate	U370	14	305	85	8.38	10.17	82.4%	82.6%	70.08	70.21	
Ultimate	U370	14	305	85	0.00	10.17	0.0%	82.6%	0.01	70.22	
Ultimate	U370	17	305	92	1.77	10.17	17.4%	100.0%	16.01	86.24	**86.2**
Ultimate	U410	4	305	82	3.13	128.82	2.4%	2.4%	1.99	1.99	
Ultimate	U410	7	305	91	0.81	128.82	0.6%	3.1%	0.57	2.57	
Ultimate	U410	14	305	85	8.72	128.82	6.8%	9.8%	5.75	8.32	
Ultimate	U410	14	305	85	29.94	128.82	23.2%	33.1%	19.75	28.07	
Ultimate	U410	14	305	85	8.85	128.82	6.9%	39.9%	5.84	33.91	
Ultimate	U410	14	305	85	8.91	128.82	6.9%	46.9%	5.88	39.79	
Ultimate	U410	14	305	85	0.12	128.82	0.1%	46.9%	0.08	39.87	
Ultimate	U410	14	305	85	8.49	128.82	6.6%	53.5%	5.60	45.47	
Ultimate	U410	14	305	85	8.48	128.82	6.6%	60.1%	5.60	51.07	
Ultimate	U410	14	305	85	9.15	128.82	7.1%	67.2%	6.04	57.11	
Ultimate	U410	14	305	85	8.82	128.82	6.8%	74.1%	5.82	62.93	
Ultimate	U410	14	305	85	8.61	128.82	6.7%	80.8%	5.68	68.61	
Ultimate	U410	14	305	85	8.62	128.82	6.7%	87.5%	5.69	74.30	
Ultimate	U410	15	305	84	2.70	128.82	2.1%	89.5%	1.76	76.06	
Ultimate	U410	17	305	92	0.07	128.82	0.1%	89.6%	0.05	76.11	
Ultimate	U410	17	305	92	13.41	128.82	10.4%	100.0%	9.57	85.68	**85.7**
Ultimate	U440	4	305	82	0.01	33.49	0.0%	0.0%	0.03	0.03	
Ultimate	U440	5	305	80	9.56	33.49	28.5%	28.6%	22.84	22.87	
Ultimate	U440	5	305	80	21.33	33.49	63.7%	92.3%	50.95	73.82	
Ultimate	U440	5	305	80	0.01	33.49	0.0%	92.3%	0.03	73.85	
Ultimate	U440	7	305	91	1.38	33.49	4.1%	96.4%	3.76	77.60	
Ultimate	U440	7	305	91	1.19	33.49	3.6%	100.0%	3.24	80.85	
Ultimate	U440	15	305	84	0.00	33.49	0.0%	100.0%	0.01	80.86	**80.9**
Ultimate	U470	4	305	82	0.01	128.75	0.0%	0.0%	0.01	0.01	
Ultimate	U470	4	305	82	20.78	128.75	16.1%	16.1%	13.23	13.24	
Ultimate	U470	4	305	82	0.27	128.75	0.2%	16.4%	0.17	13.41	
Ultimate	U470	4	305	82	0.04	128.75	0.0%	16.4%	0.03	13.44	
Ultimate	U470	5	305	80	47.09	128.75	36.6%	53.0%	29.26	42.70	
Ultimate	U470	5	305	80	54.47	128.75	42.3%	95.3%	33.85	76.54	
Ultimate	U470	7	305	91	0.00	128.75	0.0%	95.3%	0.00	76.54	
Ultimate	U470	7	305	91	0.35	128.75	0.3%	95.5%	0.25	76.79	
Ultimate	U470	7	305	91	0.09	128.75	0.1%	95.6%	0.07	76.86	
Ultimate	U470	7	305	91	0.00	128.75	0.0%	95.6%	0.00	76.86	
Ultimate	U470	7	305	91	3.57	128.75	2.8%	98.4%	2.53	79.38	
Ultimate	U470	12	305	85	1.14	128.75	0.9%	99.3%	0.75	80.13	
Ultimate	U470	14	305	85	0.26	128.75	0.2%	99.5%	0.17	80.30	
Ultimate	U470	15	305	84	0.68	128.75	0.5%	100.0%	0.44	80.75	**80.7**
Ultimate	U510	2	305	74	0.00	312.63	0.0%	0.0%	0.00	0.00	
Ultimate	U510	4	305	82	38.88	312.63	12.4%	12.4%	10.20	10.20	
Ultimate	U510	4	305	82	33.74	312.63	10.8%	23.2%	8.85	19.05	
Ultimate	U510	4	305	82	0.00	312.63	0.0%	23.2%	0.00	19.05	
Ultimate	U510	4	305	82	110.78	312.63	35.4%	58.7%	29.06	48.11	
Ultimate	U510	4	305	82	0.00	312.63	0.0%	58.7%	0.00	48.11	
Ultimate	U510	5	305	80	0.10	312.63	0.0%	58.7%	0.03	48.13	
Ultimate	U510	6	305	88	33.11	312.63	10.6%	69.3%	9.32	57.45	
Ultimate	U510	6	305	88	2.34	312.63	0.7%	70.0%	0.66	58.11	
Ultimate	U510	6	305	88	1.28	312.63	0.4%	70.4%	0.36	58.47	
Ultimate	U510	6	305	88	0.47	312.63	0.2%	70.6%	0.13	58.61	
Ultimate	U510	6	305	88	32.04	312.63	10.2%	80.8%	9.02	67.62	
Ultimate	U510	6	305	88	1.46	312.63	0.5%	81.3%	0.41	68.03	
Ultimate	U510	6	305	88	2.49	312.63	0.8%	82.1%	0.70	68.73	
Ultimate	U510	6	305	88	0.00	312.63	0.0%	82.1%	0.00	68.73	
Ultimate	U510	7	305	91	24.50	312.63	7.8%	89.9%	7.13	75.86	
Ultimate	U510	7	305	91	1.23	312.63	0.4%	90.3%	0.36	76.22	
Ultimate	U510	7	305	91	1.08	312.63	0.3%	90.7%	0.31	76.54	
Ultimate	U510	7	305	91	0.00	312.63	0.0%	90.7%	0.00	76.54	
Ultimate	U510	7	305	91	0.06	312.63	0.0%	90.7%	0.02	76.55	
Ultimate	U510	7	305	91	8.02	312.63	2.6%	93.3%	2.33	78.89	
Ultimate	U510	7	305	91	6.84	312.63	2.2%	95.5%	1.99	80.88	
Ultimate	U510	9	305	95	0.33	312.63	0.1%	95.6%	0.10	80.98	
Ultimate	U510	12	305	85	13.88	312.63	4.4%	100.0%	3.77	84.75	
Ultimate	U510	19	305	97	0.00	312.63	0.0%	100.0%	0.00	84.75	**84.8**
Ultimate	U530	4	305	82	0.00	8.38	0.0%	0.0%	0.04	0.04	
Ultimate	U530	4	305	82	0.02	8.38	0.2%	0.2%	0.15	0.19	
Ultimate	U530	4	305	82	6.54	8.38	78.1%	78.3%	64.04	64.22	
Ultimate	U530	7	305	91	1.82	8.38	21.7%	100.0%	19.76	83.98	**84.0**
Ultimate	U550	1	305	83	0.00	34.20	0.0%	0.0%	0.01	0.01	
Ultimate	U550	1	305	83	0.01	34.20	0.0%	0.0%	0.02	0.03	
Ultimate	U550	1	305	83	0.37	34.20	1.1%	1.1%	0.89	0.92	
Ultimate	U550	1	305	83	1.41	34.20	4.1%	5.2%	3.41	4.33	
Ultimate	U550	7	305	91	0.00	34.20	0.0%	5.2%	0.01	4.35	
Ultimate	U550	7	305	91	1.71	34.20	5.0%	10.2%	4.55	8.89	
Ultimate	U550	7	305	91	0.96	34.20	2.8%	13.0%	2.55	11.45	
Ultimate	U550	7	305	91	0.00	34.20	0.0%	13.0%	0.01	11.45	
Ultimate	U550	12	305	85	29.73	34.20	86.9%	100.0%	73.90	85.35	**85.4**

CONDITION	BASIN ID	LAND USE INDEX NUMBER	SOIL MAP UNIT NUMBER	SUB REGION CN	SUB REGION AREA (AC)	BASIN AREA (AC)	PERCENT OF BASIN	CUMULATIVE PERCENT	AREA WEIGHTED CN	CUMULATIVE CN	COMPOSITE CN
Ultimate	U570	1	305	83	1.08	114.63	0.9%	0.9%	0.78	0.78	
Ultimate	U570	1	305	83	0.67	114.63	0.6%	1.5%	0.49	1.27	
Ultimate	U570	4	305	82	2.20	114.63	1.9%	3.4%	1.57	2.84	
Ultimate	U570	4	305	82	12.33	114.63	10.8%	14.2%	8.82	11.66	
Ultimate	U570	4	305	82	7.92	114.63	6.9%	21.1%	5.66	17.33	
Ultimate	U570	6	305	88	5.43	114.63	4.7%	25.8%	4.17	21.50	
Ultimate	U570	7	305	91	7.25	114.63	6.3%	32.2%	5.75	27.25	
Ultimate	U570	7	305	91	0.00	114.63	0.0%	32.2%	0.00	27.25	
Ultimate	U570	7	305	91	35.71	114.63	31.2%	63.3%	28.35	55.60	
Ultimate	U570	7	305	91	38.27	114.63	33.4%	96.7%	30.38	85.98	
Ultimate	U570	7	305	91	0.09	114.63	0.1%	96.8%	0.07	86.05	
Ultimate	U570	7	305	91	3.55	114.63	3.1%	99.9%	2.82	88.87	
Ultimate	U570	12	305	85	0.13	114.63	0.1%	100.0%	0.10	88.97	**89.0**
Ultimate	U610	1	305	83	0.02	30.65	0.1%	0.1%	0.07	0.07	
Ultimate	U610	1	305	83	24.10	30.65	78.6%	78.7%	65.27	65.33	
Ultimate	U610	1	305	83	0.00	30.65	0.0%	78.7%	0.01	65.34	
Ultimate	U610	4	305	82	0.00	30.65	0.0%	78.7%	0.00	65.34	
Ultimate	U610	6	305	88	0.87	30.65	2.8%	81.6%	2.51	67.85	
Ultimate	U610	6	305	88	2.28	30.65	7.4%	89.0%	6.54	74.39	
Ultimate	U610	6	305	88	0.61	30.65	2.0%	91.0%	1.74	76.13	
Ultimate	U610	6	305	88	0.00	30.65	0.0%	91.0%	0.00	76.13	
Ultimate	U610	7	305	91	0.00	30.65	0.0%	91.0%	0.00	76.13	
Ultimate	U610	16	305	90	1.50	30.65	4.9%	95.9%	4.39	80.52	
Ultimate	U610	16	305	90	1.26	30.65	4.1%	100.0%	3.71	84.23	
Ultimate	U610	16	305	90	0.00	30.65	0.0%	100.0%	0.00	84.23	**84.2**
Ultimate	U620	6	305	88	14.04	30.19	46.5%	46.5%	40.92	40.92	
Ultimate	U620	6	305	88	15.00	30.19	49.7%	96.2%	43.73	84.65	
Ultimate	U620	6	305	88	0.43	30.19	1.4%	97.6%	1.26	85.90	
Ultimate	U620	16	305	90	0.72	30.19	2.4%	100.0%	2.15	88.06	**88.1**
Ultimate	U630	6	305	88	13.27	47.03	28.2%	28.2%	24.83	24.83	
Ultimate	U630	6	305	88	32.85	47.03	69.8%	98.1%	61.46	86.30	
Ultimate	U630	6	305	88	0.55	47.03	1.2%	99.2%	1.03	87.33	
Ultimate	U630	9	305	95	0.36	47.03	0.8%	100.0%	0.72	88.05	**88.0**
Ultimate	U650	6	305	88	4.44	5.46	81.3%	81.3%	71.51	71.51	
Ultimate	U650	9	305	95	1.02	5.46	18.7%	100.0%	17.80	89.31	**89.3**
Ultimate	U680	6	305	88	71.73	71.80	99.9%	99.9%	87.91	87.91	
Ultimate	U680	16	305	90	0.07	71.80	0.1%	100.0%	0.08	88.00	**88.0**
Ultimate	U700	6	305	88	80.10	86.51	92.6%	92.6%	81.48	81.48	
Ultimate	U700	6	540	84	4.25	86.51	4.9%	97.5%	4.13	85.61	
Ultimate	U700	6	305	88	2.16	86.51	2.5%	100.0%	2.20	87.80	**87.8**
Ultimate	U720	17	305	92	0.01	37.73	0.0%	0.0%	0.02	0.02	
Ultimate	U720	7	305	91	0.00	37.73	0.0%	0.0%	0.00	0.02	
Ultimate	U720	16	305	90	1.28	37.73	3.4%	3.4%	3.04	3.06	
Ultimate	U720	7	305	91	0.00	37.73	0.0%	3.4%	0.00	3.06	
Ultimate	U720	6	305	88	1.39	37.73	3.7%	7.1%	3.24	6.30	
Ultimate	U720	7	305	91	0.05	37.73	0.1%	7.2%	0.13	6.43	
Ultimate	U720	6	305	88	35.00	37.73	92.8%	100.0%	81.64	88.07	**88.1**
Ultimate	U740	6	305	88	34.12	34.12	100.0%	100.0%	88.01	88.01	**88.0**
Ultimate	U760	6	305	88	2.37	4.87	48.7%	48.7%	42.87	42.87	
Ultimate	U760	6	305	88	0.00	4.87	0.0%	48.7%	0.00	42.87	
Ultimate	U760	6	305	88	2.05	4.87	42.1%	90.8%	37.02	79.89	
Ultimate	U760	7	305	91	0.19	4.87	3.9%	94.7%	3.56	83.45	
Ultimate	U760	16	305	90	0.00	4.87	0.0%	94.7%	0.00	83.45	
Ultimate	U760	16	305	90	0.11	4.87	2.2%	96.9%	1.94	85.39	
Ultimate	U760	17	305	92	0.15	4.87	3.1%	100.0%	2.89	88.29	**88.3**
Ultimate	U800	6	305	88	0.26	6.08	4.2%	4.2%	3.72	3.72	
Ultimate	U800	17	305	92	0.00	6.08	0.0%	4.3%	0.02	3.75	
Ultimate	U800	16	305	90	0.21	6.08	3.5%	7.7%	3.13	6.87	
Ultimate	U800	16	305	90	0.54	6.08	8.9%	16.7%	8.03	14.90	
Ultimate	U800	17	305	92	2.51	6.08	41.3%	58.0%	38.03	52.94	
Ultimate	U800	7	305	91	0.03	6.08	0.5%	58.5%	0.49	53.42	
Ultimate	U800	6	305	88	0.12	6.08	2.0%	60.5%	1.77	55.19	
Ultimate	U800	14	305	85	0.00	6.08	0.0%	60.5%	0.00	55.20	
Ultimate	U800	16	305	90	0.25	6.08	4.2%	64.7%	3.75	58.95	
Ultimate	U800	6	305	88	2.12	6.08	34.8%	99.5%	30.64	89.59	
Ultimate	U800	1	305	83	0.03	6.08	0.5%	100.0%	0.43	90.01	**90.0**

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

	PARCEL	LAND USE	Density (units/acre)
West	1.0	Trail	n/a
	1.1	NC	0.0
	1.2	MDR	6.8
	1.3	HDR	20.4
	1.4	MDR	6.1
	1.5	Trail	n/a
	2.0	Trail	n/a
	2.1	Park	n/a
	2.2	MDR	6.2
	2.3	MHDR	6.8
	2.4	MHDR	6.8
	2.5	ES	n/a
	2.6	Park	n/a
	2.7	MU	20.0
	3.1	HDR	20.5
	3.2	MDR	6.0
	3.3	MDR	6.1
	3.4	MHDR	7.0
	3.5	MDR	6.4
	3.6	MDR	6.4
	4.1	MLDR	7.0
	4.2	MLDR	6.1
	4.3	MHDR	6.1
	4.4	MHDR	6.4
	4.5	MLDR	6.4
	5.1	MHDR	7.0

NC = Commercial
Trail = Open space
Park = Open space
ES = Commercial (Elementary School)
MU = Commercial (Mix Use)
MLDR = Medium-Low Denisty ≈ 6,000 sf lots
MDR = Medium Denisty Residential ≈ <6,000 sf lots
MHDR = Medium-High Density Residential ≈ <<6,000 sf lots
HDR = High Density Residential ≈ <<6,000 sf lots



0' 800' 1600' 2400'

Park Highlands

2013 Land Use Plan

April 25, 2013

GREEY | PICKETT
landscape architecture | community design

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SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

Soil & Curve Number Computation

Project Name: Park Highlands West
Date: May 2013
File Name: CBH1301.002 West MDS Composite CN - Onsite.xlsx
By: KC

Data: **Reference:**

Soil Type & Description		A	B	C	D
305	Las Vegas-Destazo complex, 0 to 2 percent slopes	5%	30%	5%	60%

Exhibit K
SCS Soil Data

Land Use (per Land Plan)	Land Use (per Design Manual)	A	B	C	D
Roadway	Roadway	98	98	98	98
Park or Trail	Open Space (poor)	68	79	86	89
Commercial, Mix Use or School	Commercial	89	92	94	95
Medium Low Density Residential	Residential (6,000 sf)	80	87	90	92
Medium Density Residential	Residential (<6,000 sf) (I)	81	88	91	93
Medium High or High Density Residential	Residential (<6,000 sf) (C)	89	92	94	95

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CALCULATED CN
1-1	305	100.0%	Residential (<6,000 sf) (C)	5%	30%	5%	60%	89	92	94	95	22.0	94
TOTAL PERCENT		100.0%									TOTAL AREA	22.0	**94**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CALCULATED CN
1-2	305	100.0%	Residential (<6,000 sf) (C)	5%	30%	5%	60%	89	92	94	95	22.8	94
TOTAL PERCENT		100.0%									TOTAL AREA	22.8	**94**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CALCULATED CN
1-3	305	100.0%	Residential (6,000 sf)	5%	30%	5%	60%	80	87	90	92	26.8	90
TOTAL PERCENT		100.0%									TOTAL AREA	26.8	**90**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CALCULATED CN
1-4	305	100.0%	Residential (<6,000 sf) (I)	5%	30%	5%	60%	81	88	91	93	23.9	91
TOTAL PERCENT		100.0%									TOTAL AREA	23.9	**91**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CALCULATED CN
AL1E	305	100.0%	Roadway	5%	30%	5%	60%	98	98	98	98	1.7	98
TOTAL PERCENT		100.0%									TOTAL AREA	1.7	**98**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CALCULATED CN
AL2E	305	100.0%	Roadway	5%	30%	5%	60%	98	98	98	98	1.6	98
TOTAL PERCENT		100.0%									TOTAL AREA	1.6	**98**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CALCULATED CN
2-1	305	100.0%	Residential (<6,000 sf) (C)	5%	30%	5%	60%	89	92	94	95	23.5	94
TOTAL PERCENT		100.0%									TOTAL AREA	23.5	**94**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CALCULATED CN
2-2	305	100.0%	Residential (<6,000 sf) (I)	5%	30%	5%	60%	81	88	91	93	47.5	91
TOTAL PERCENT		100.0%									TOTAL AREA	47.5	**91**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CALCULATED CN
2-3	305	100.0%	Open Space (poor)	5%	30%	5%	60%	68	79	86	89	20.9	85
TOTAL PERCENT		100.0%									TOTAL AREA	20.9	**85**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP A	B	C	D	LAND USE CN A	B	C	D	SUBAREA ACRES	CALCULATED CN
2-4	305	100.0%	Residential (<6,000 sf) (C)	5%	30%	5%	60%	89	92	94	95	21.4	94
TOTAL PERCENT		100.0%									TOTAL AREA	21.4	**94**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
2-5	305	100.0%	Residential (<6,000 sf) (I)	5%	30%	5%	60%	81	88	91	93	57.0	91
TOTAL PERCENT		100.0%									TOTAL AREA	57.0	**91**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
2-6	305	100.0%	Residential (<6,000 sf) (C)	5%	30%	5%	60%	89	92	94	95	11.5	94
TOTAL PERCENT		100.0%									TOTAL AREA	11.5	**94**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
2-7	305	100.0%	Open Space (poor)	5%	30%	5%	60%	68	79	86	89	10.0	85
TOTAL PERCENT		100.0%									TOTAL AREA	10.0	**85**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
2-8	305	100.0%	Commercial	5%	30%	5%	60%	89	92	94	95	18.3	94
TOTAL PERCENT		100.0%									TOTAL AREA	18.3	**94**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
2-9	305	100.0%	Residential (<6,000 sf) (I)	5%	30%	5%	60%	81	88	91	93	10.0	91
TOTAL PERCENT		100.0%									TOTAL AREA	10.0	**91**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
2-10	305	100.0%	Residential (<6,000 sf) (I)	5%	30%	5%	60%	81	88	91	93	10.4	91
TOTAL PERCENT		100.0%									TOTAL AREA	10.4	**91**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
2-11	305	100.0%	Residential (<6,000 sf) (C)	5%	30%	5%	60%	89	92	94	95	16.3	94
TOTAL PERCENT		100.0%									TOTAL AREA	16.3	**94**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
2-12	305	100.0%	Residential (6,000 sf)	5%	30%	5%	60%	80	87	90	92	17.4	90
TOTAL PERCENT		100.0%									TOTAL AREA	17.4	**90**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
2-13	305	72.0%	Residential (6,000 sf)	5%	30%	5%	60%	80	87	90	92	12.6	65
	305	28.0%	Residential (<6,000 sf) (C)	5%	30%	5%	60%	89	92	94	95	4.9	26
TOTAL PERCENT		100.0%									TOTAL AREA	17.5	**91**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
2-14A	305	100.0%	Open Space (poor)	5%	30%	5%	60%	68	79	86	89	1.7	85
TOTAL PERCENT		100.0%									TOTAL AREA	1.7	**85**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
2-14B	305	100.0%	Open Space (poor)	5%	30%	5%	60%	68	79	86	89	1.6	85
TOTAL PERCENT		100.0%									TOTAL AREA	1.6	**85**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
3-1	305	100.0%	Residential (<6,000 sf) (C)	5%	30%	5%	60%	89	92	94	95	23.0	94
TOTAL PERCENT		100.0%									TOTAL AREA	23.0	**94**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
3-2	305	100.0%	Residential (6,000 sf)	5%	30%	5%	60%	80	87	90	92	13.4	90
TOTAL PERCENT		100.0%									TOTAL AREA	13.4	**90**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
4-1	305	100.0%	Residential (<6,000 sf) (C)	5%	30%	5%	60%	89	92	94	95	23.0	94
TOTAL PERCENT		100.0%									TOTAL AREA	23.0	**94**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
4-2	305	100.0%	Residential (<6,000 sf) (C)	5%	30%	5%	60%	89	92	94	95	35.0	94
TOTAL PERCENT		100.0%									TOTAL AREA	35.0	**94**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
4-3	305	100.0%	Residential (<6,000 sf) (I)	5%	30%	5%	60%	81	88	91	93	34.7	91
TOTAL PERCENT		100.0%									TOTAL AREA	34.7	**91**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
4-4	305	100.0%	Residential (<6,000 sf) (I)	5%	30%	5%	60%	81	88	91	93	7.0	91
TOTAL PERCENT		100.0%									TOTAL AREA	7.0	**91**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
4-5	305	100.0%	Residential (<6,000 sf) (C)	5%	30%	5%	60%	89	92	94	95	41.6	94
TOTAL PERCENT		100.0%									TOTAL AREA	41.6	**94**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
4-6	305	100.0%	Open Space (poor)	5%	30%	5%	60%	68	79	86	89	2.5	85
TOTAL PERCENT		100.0%									TOTAL AREA	2.5	**85**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
4-7	305	100.0%	Residential (<6,000 sf) (I)	5%	30%	5%	60%	81	88	91	93	29.7	91
TOTAL PERCENT		100.0%									TOTAL AREA	29.7	**91**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
U1020	305	100.0%	Roadway	5%	30%	5%	60%	98	98	98	98	5.9	98
TOTAL PERCENT		100.0%									TOTAL AREA	5.9	**98**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
U1040	305	100.0%	Commercial	5%	30%	5%	60%	89	92	94	95	11.8	94
TOTAL PERCENT		100.0%									TOTAL AREA	11.8	**94**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
U1060	305	100.0%	Commercial	5%	30%	5%	60%	89	92	94	95	3.9	94
TOTAL PERCENT		100.0%									TOTAL AREA	3.9	**94**

BASIN ID	SOIL TYPE	SUBAREA PERCENT	LAND USE	HYDROLOGIC SOIL GROUP				LAND USE CN				SUBAREA ACRES	CALCULATED CN
				A	B	C	D	A	B	C	D		
U1070	305	100.0%	Commercial	5%	30%	5%	60%	89	92	94	95	16.2	94
TOTAL PERCENT		100.0%									TOTAL AREA	16.2	**94**

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Lag Time Data

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
STANDARD FORM 4

Project Name: Park Highlands West
Description: Interim Condition - Offsite
File Name: CBH1301.002 West MDS Standard Form 4.xlsx
By: K. Collins
Date: May 2013

BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
BASIN 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]
E140	E	81.9	0.691	43.23	0.0675	100	0.50	9.27	6420	0.60	1.15	2.28	50.60	59.87			0.599
E360	D	85.6	0.740	6.09	0.0095	300	1.00	11.23	765	0.65	1.63	2.47	6.91	18.13	1065	15.917	0.159
E160	E	83.1	0.707	41.04	0.0641	100	0.50	8.91	4570	0.65	1.19	2.37	35.60	44.52			0.445
E340	D	85.8	0.743	10.75	0.0168	300	1.00	11.14	995	0.80	1.81	2.74	7.63	18.77	1295	17.194	0.172
E180	E	80.7	0.675	137.09	0.2142	100	0.50	9.64	8630	0.70	1.24	2.46	61.82	71.46			0.715
E320	D	85.7	0.741	10.84	0.0169	300	1.00	11.19	930	0.65	1.63	2.47	8.02	19.21	1230	16.833	0.168
E200	E	83.7	0.715	3.76	0.0059	100	0.50	8.73	1100	0.90	1.40	2.79	9.52	18.26			0.183
E300	D	85.8	0.743	8.44	0.0132	100	1.00	6.43	1210	0.60	1.56	2.37	10.32	16.75	1310	17.278	0.168
E080	E	83.5	0.712	6.94	0.0108	100	0.50	8.79	1640	0.85	1.36	2.71	13.12	21.91			0.219
E380	D	85.7	0.741	12.51	0.0195	230	1.00	9.79	1625	0.60	1.56	2.37	13.24	23.03	1855	20.306	0.203
E060	E	82.5	0.699	165.62	0.2588	100	0.50	9.09	8185	0.70	1.24	2.46	58.80	67.90			0.679
E100	E	81.2	0.682	300.70	0.4698	100	0.50	9.48	12215	0.70	1.24	2.46	86.11	95.59			0.956
E420	D	85.4	0.737	61.25	0.0957	160	1.00	8.26	2560	0.55	1.50	2.27	20.69	28.95	2720	25.111	0.251
E400	D	85.2	0.735	54.13	0.0846	170	1.00	8.57	2700	0.50	1.43	2.16	22.78	31.35	2870	25.944	0.259
E440	D	80.8	0.677	33.50	0.0523	100	1.00	7.62	3320	0.60	1.56	2.37	25.15	32.78	3420	29.000	0.290
E460	D	80.3	0.670	72.97	0.1140	100	1.00	7.74	4495	0.60	1.56	2.37	33.42	41.16	4595	35.528	0.355
E480	D	81.5	0.686	55.88	0.0873	100	1.00	7.46	3095	0.40	1.28	1.94	28.87	36.33	3195	27.750	0.278
E520	E	85.0	0.732	9.18	0.0143	150	1.00	8.11	820	0.85	1.36	2.71	8.07	16.19			0.162
E040	E	82.1	0.694	231.37	0.3615	100	1.00	7.31	6420	0.80	1.32	2.63	43.82	51.13			0.511
E540	D	85.5	0.739	32.41	0.0506	100	0.50	8.20	1185	0.40	1.28	1.94	12.42	20.62	1285	17.139	0.171
E560	D	89.1	0.786	112.82	0.1763	100	1.00	5.65	4765	0.45	1.36	2.05	40.78	46.43	4865	37.028	0.370
E600	E	83.7	0.715	55.17	0.0862	100	1.00	6.93	2800	0.75	1.28	2.55	21.56	28.49			0.285
E240	E	83.1	0.707	84.90	0.1327	100	1.00	7.08	5630	0.75	1.28	2.55	40.08	47.16			0.472
E260	E	83.3	0.710	88.25	0.1379	100	1.00	7.03	5360	0.80	1.32	2.63	37.10	44.13			0.441
E580	D	88.1	0.773	62.74	0.0980	100	1.00	5.89	3430	0.45	1.36	2.05	29.94	35.83	3530	29.611	0.296
E220	E	83.5	0.712	28.46	0.0445	100	1.00	6.98	3190	0.95	1.44	2.87	21.42	28.40			0.284

BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
BASIN 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]
E280	D	83.5	0.712	178.05	0.2782	250	1.00	11.04	5140	0.50	1.43	2.16	41.57	52.61	5390	39.944	0.399
E500	D	83.3	0.710	248.39	0.3881	250	1.00	11.11	7130	0.50	1.43	2.16	56.90	68.02	7380	51.000	0.510
E660	E	84.5	0.725	8.95	0.0140	100	1.00	6.74	780	0.55	1.10	2.18	9.73	16.48			0.165
E640	D	87.8	0.769	44.82	0.0700	110	1.00	6.25	2825	0.55	1.50	2.27	22.64	28.89	2935	26.306	0.263
E620	D	88.1	0.773	30.19	0.0472	100	1.00	5.89	2520	0.55	1.50	2.27	20.40	26.29	2620	24.556	0.246
E680	D	88.0	0.772	71.80	0.1122	105	1.00	6.06	3555	0.50	1.43	2.16	29.37	35.42	3660	30.333	0.303
E700	D	87.8	0.769	86.51	0.1352	100	1.00	5.96	4790	0.55	1.50	2.27	37.07	43.03	4890	37.167	0.372
E720	D	88.1	0.773	37.73	0.0590	110	1.00	6.17	2215	0.50	1.43	2.16	19.04	25.22	2325	22.917	0.229
E740	D	88.0	0.772	34.12	0.0533	100	1.00	5.91	1940	0.50	1.43	2.16	16.93	22.84	2040	21.333	0.213
E760	E	88.3	0.776	4.87	0.0076	50	2.00	3.28	1230	0.50	1.05	2.08	13.82	17.09			0.171
E800	D	90.0	0.798	6.08	0.0095	50	2.00	3.05	1295	0.50	1.43	2.16	11.96	15.01	1345	17.472	0.150

[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

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
STANDARD FORM 4

Project Name: Park Highlands West
Description: Ultimate Condition - Offsite
File Name: CBH1301.002 West MDS Standard Form 4.xlsx
By: K. Collins
Date: May 2013

BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
BASIN 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]
U190	D	80.7	0.675	235.76	0.3684	400	1.00	15.29	7200	0.70	1.69	2.56	48.55	63.84	7600	52.222	0.522
U170	E	83.0	0.706	161.35	0.2521	100	1.00	7.10	5115	0.50	1.05	2.08	44.96	52.06			0.521
U150	D	83.0	0.706	85.49	0.1336	100	1.00	7.10	3890	0.50	1.43	2.16	31.95	39.05	3990	32.167	0.322
U155	D	83.4	0.711	82.81	0.1294	100	1.00	7.00	3755	0.60	1.56	2.37	28.21	35.22	3855	31.417	0.314
U210	D	83.1	0.707	46.51	0.0727	100	1.00	7.08	3300	0.60	1.56	2.37	25.01	32.09	3400	28.889	0.289
U250	D	83.1	0.707	44.65	0.0698	100	1.00	7.08	3300	0.60	1.56	2.37	25.01	32.09	3400	28.889	0.289
U230	D	83.4	0.711	88.98	0.1390	100	1.00	7.00	4010	0.65	1.63	2.47	28.83	35.83	4110	32.833	0.328
U330	D	85.0	0.732	9.06	0.0142	250	0.50	13.20	1330	0.50	1.43	2.16	12.23	25.42	1580	18.778	0.188
U370	D	86.2	0.748	10.17	0.0159	300	1.00	10.98	1230	0.50	1.43	2.16	11.46	22.44	1530	18.500	0.185
U350	D	86.3	0.749	10.42	0.0163	300	1.00	10.94	1240	0.50	1.43	2.16	11.53	22.47	1540	18.556	0.186
U305	D	86.7	0.754	5.95	0.0093	300	1.00	10.77	980	0.50	1.43	2.16	9.53	20.30	1280	17.111	0.171
U310	D	87.1	0.760	6.55	0.0102	300	1.00	10.61	980	0.50	1.43	2.16	9.53	20.14	1280	17.111	0.171
U410	D	85.7	0.741	128.82	0.2013	180	1.00	8.66	4385	0.50	1.43	2.16	35.76	44.42	4565	35.361	0.354
U440	D	80.9	0.678	33.49	0.0523	100	1.00	7.60	3320	0.60	1.56	2.37	25.15	32.75	3420	29.000	0.290
U470	D	80.7	0.675	128.75	0.2012	110	1.00	8.02	4495	0.60	1.56	2.37	33.42	41.44	4605	35.583	0.356
U530	D	84.0	0.719	8.38	0.0131	280	1.00	11.49	590	0.50	1.43	2.16	6.53	18.02	870	14.833	0.148
U130	D	83.9	0.717	35.59	0.0556	100	1.00	6.89	1745	0.45	1.36	2.05	16.26	23.14	1845	20.250	0.203
U550	D	85.4	0.737	34.20	0.0534	100	0.50	8.23	2145	0.40	1.28	1.94	20.69	28.92	2245	22.472	0.225
U570	D	89.0	0.785	114.63	0.1791	100	1.00	5.67	4765	0.45	1.36	2.05	40.78	46.45	4865	37.028	0.370
U610	E	84.2	0.721	30.65	0.0479	100	1.00	6.81	2535	0.50	1.05	2.08	24.28	31.09			0.311
U280	D	83.3	0.709	172.01	0.2688	250	1.00	11.13	4700	0.50	1.43	2.16	38.19	49.32	4950	37.500	0.375
U510	D	84.8	0.729	312.63	0.4885	250	1.00	10.55	7130	0.50	1.43	2.16	56.90	67.45	7380	51.000	0.510
U650	D	89.3	0.789	5.46	0.0085	100	1.00	5.60	530	0.75	1.75	2.65	4.95	10.55	630	13.500	0.106
U630	D	88.0	0.772	47.03	0.0735	100	1.00	5.91	2520	0.55	1.50	2.27	20.40	26.31	2620	24.556	0.246
U620	D	88.1	0.773	30.19	0.0472	100	1.00	5.89	2520	0.55	1.50	2.27	20.40	26.29	2620	24.556	0.246

BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
BASIN 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]
U680	D	88.0	0.772	71.80	0.1122	105	1.00	6.06	3555	0.50	1.43	2.16	29.37	35.42	3660	30.333	0.303
U700	D	87.8	0.769	86.51	0.1352	100	1.00	5.96	4790	0.55	1.50	2.27	37.07	43.03	4890	37.167	0.372
U720	D	88.1	0.773	37.73	0.0590	110	1.00	6.17	2215	0.50	1.43	2.16	19.04	25.22	2325	22.917	0.229
U740	D	88.0	0.772	34.12	0.0533	100	1.00	5.91	1940	0.50	1.43	2.16	16.93	22.84	2040	21.333	0.213
U760	D	88.3	0.776	4.87	0.0076	50	2.00	3.28	1230	0.50	1.43	2.16	11.46	14.73	1280	17.111	0.147
E800	D	90.0	0.798	6.08	0.0095	50	2.00	3.05	1295	0.50	1.43	2.16	11.96	15.01	1345	17.472	0.150

[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

SLATER HANIFAN GROUP
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File Name: CBH1301.002 West MDS Standard Form 4.xlsx
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BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc Check Urbanized Basins		Tlag
BASIN 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]
1-1	D	94	0.851	22.0	0.0344	100	1.00	4.49	1240	0.60	1.56	2.37	10.53	15.01	1340	17.444	0.150
1-2	D	94	0.851	22.8	0.0356	100	1.00	4.49	1320	0.60	1.56	2.37	11.09	15.58	1420	17.889	0.156
1-3	D	90	0.798	26.8	0.0419	100	1.00	5.44	1155	0.60	1.56	2.37	9.93	15.37	1255	16.972	0.154
1-4	D	91	0.811	23.9	0.0373	100	1.00	5.20	1240	0.60	1.56	2.37	10.53	15.73	1340	17.444	0.157
AL1E	D	98	0.904	1.7	0.0027	45	2.00	1.88	750	0.90	1.92	2.90	5.78	7.67	795	14.417	0.077
AL2E	D	98	0.904	1.6	0.0025	45	2.00	1.88	750	1.00	2.02	3.06	5.49	7.37	795	14.417	0.074
2-1	D	94	0.851	23.5	0.0367	330	1.00	8.15	1240	0.60	1.56	2.37	10.53	18.68	1570	18.722	0.187
2-2	D	91	0.811	47.5	0.0742	100	1.00	5.20	2060	0.60	1.56	2.37	16.30	21.49	2160	22.000	0.215
2-3	D	85	0.732	20.9	0.0327	100	1.00	6.62	1240	0.60	1.56	2.37	10.53	17.15	1340	17.444	0.172
2-4	D	94	0.851	21.4	0.0334	50	1.00	3.17	1240	0.60	1.56	2.37	10.53	13.70	1290	17.167	0.137
2-5	D	91	0.811	57.0	0.0891	100	1.00	5.20	2060	0.60	1.56	2.37	16.30	21.49	2160	22.000	0.215
2-6	D	94	0.851	11.5	0.0180	330	1.00	8.15	825	0.60	1.56	2.37	7.61	15.76	1155	16.417	0.158
2-7	D	85	0.732	10.0	0.0156	75	0.50	7.23	940	1.00	2.02	3.06	6.52	13.75	1015	15.639	0.137
2-8	D	94	0.851	18.3	0.0286	100	1.00	4.49	1155	0.60	1.56	2.37	9.93	14.42	1255	16.972	0.144
2-9	D	91	0.811	10.0	0.0156	100	1.00	5.20	925	0.60	1.56	2.37	8.31	13.51	1025	15.694	0.135
2-10	D	91	0.811	10.4	0.0163	100	1.00	5.20	885	0.60	1.56	2.37	8.03	13.23	985	15.472	0.132
2-11	D	94	0.851	16.3	0.0255	100	1.00	4.49	1030	0.60	1.56	2.37	9.05	13.54	1130	16.278	0.135
2-12	D	90	0.798	17.4	0.0272	100	1.00	5.44	1100	0.60	1.56	2.37	9.54	14.98	1200	16.667	0.150
2-13	D	91	0.811	17.5	0.0273	100	1.00	5.20	1500	0.60	1.56	2.37	12.36	17.56	1600	18.889	0.176
2-14A	D	85	0.732	1.7	0.0027	33	25.00	1.30	1490	0.60	1.56	2.37	12.29	13.59	1523	18.461	0.136
2-14B	D	85	0.732	1.6	0.0025	33	25.00	1.30	1350	0.60	1.56	2.37	11.30	12.60	1383	17.683	0.126
3-1	D	94	0.851	23.0	0.0359	50	1.00	3.17	1490	0.60	1.56	2.37	12.29	15.46	1540	18.556	0.155
3-2	D	90	0.798	13.4	0.0209	100	1.00	5.44	1000	0.60	1.56	2.37	8.84	14.28	1100	16.111	0.143
4-1	D	94	0.851	23.0	0.0359	50	1.00	3.17	1240	0.60	1.56	2.37	10.53	13.70	1290	17.167	0.137
4-2	D	94	0.851	35.0	0.0547	100	1.00	4.49	1650	0.60	1.56	2.37	13.41	17.90	1750	19.722	0.179
4-3	D	91	0.811	34.7	0.0542	100	1.00	5.20	1650	0.60	1.56	2.37	13.41	18.61	1750	19.722	0.186

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4-4	D	91	0.811	7.0	0.0109	100	1.00	5.20	755	0.60	1.56	2.37	7.12	12.32	855	14.750	0.123
4-5	D	94	0.851	41.6	0.0650	100	1.00	4.49	1730	0.60	1.56	2.37	13.97	18.46	1830	20.167	0.185
4-6	D	85	0.732	2.5	0.0039	25	33.00	1.03	2148	0.80	1.81	2.74	14.65	15.68	2173	22.072	0.157
4-7	D	91	0.811	29.7	0.0464	100	1.00	5.20	1690	0.60	1.56	2.37	13.69	18.89	1790	19.944	0.189
U1020	D	98	0.904	5.9	0.0092	70	2.00	2.35	1820	0.50	1.43	2.16	16.00	18.35	1890	20.500	0.183
U1040	D	94	0.851	11.8	0.0184	35	2.00	2.11	1245	0.50	1.43	2.16	11.57	13.68	1280	17.111	0.137
U1060	D	94	0.851	3.9	0.0061	100	1.00	4.49	654	0.60	1.56	2.37	6.41	10.89	754	14.189	0.109
U1080	D	94	0.851	16.2	0.0253	25	25.00	0.77	2150	0.60	1.56	2.37	16.93	17.69	2175	22.083	0.177

[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

Hydrologic Analyses

Flow Split Analyses: 10-Year & 100-Year Interim Condition

Park Highlands West
Interim Condition 10-Yr Event Flow Split Summary
CBH1301.002 West MDS Flow Split Summary Table.xlsx

Concentration Point/Basin	Flow Description	0.570	Notes
CP1	Total Approaching Flow	12	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	12	
	East Surface Flow	5	
	South Surface Flow	7	
	East Total Flow	5	Maggie Avenue
	South Total flow	7	Mustang Street
	Check	YES	
E160	Total Approaching Flow	14	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	14	
	East Surface Flow	4	
	South Surface Flow	10	Half street capacity
	East Total Flow	4	Over flow
	South Total flow	10	Torrey Pines Drive
	Check	YES	
CP2	Total Approaching Flow	15	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	15	
	East Surface Flow	8	
	South Surface Flow	7	
	East Total Flow	8	Brent Lane
	South Total flow	7	Mustang Street
	Check	YES	

Concentration Point/Basin	Flow Description	0.570	Notes
CP3	Total Approaching Flow	43	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	43	
	East Surface Flow	20	
	South Surface Flow	23	
	East Total Flow	20	Guy Avenue
	South Total flow	23	Mustang Street
	Check	YES	
CP4	Total Approaching Flow	26	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	26	
	East Surface Flow	7	
	South Surface Flow	19	
	East Total Flow	7	Horse Drive
	South Total flow	19	Mustang Street
	Check	YES	
CP5	Total Approaching Flow	15	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	15	
	East Surface Flow	8	
	South Surface Flow	7	
	East Total Flow	8	Brent Lane
	South Total flow	7	Maverick Street
	Check	YES	

Concentration Point/Basin	Flow Description	0.570	Notes
E060	Total Approaching Flow	42	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	42	
	East Surface Flow	19	
	South Surface Flow	23	
	East Total Flow	19	Sheleheda Avenue
	South Total flow	23	Jones Boulevard
	Check	YES	
CP6	Total Approaching Flow	74	
	East Pipe Flow	46	
	South Pipe Flow	0	
	Surface Flow	28	
	East Surface Flow	14	
	South Surface Flow	14	
	East Total Flow	60	Iron Mountain road
	South Total flow	14	Jones Boulevard
	Check	YES	
CP7	Total Approaching Flow	40	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	40	
	East Surface Flow	0	
	South Surface Flow	45	Half street capacity
	East Total Flow	0	Over flow
	South Total flow	40	Jones Boulevard
	Check	YES	

Concentration Point/Basin	Flow Description	0.570	Notes
CP8	Total Approaching Flow	85	
	East Pipe Flow	0	
	South Pipe Flow	23	
	Surface Flow	62	
	East Surface Flow	29	
	South Surface Flow	33	
	East Total Flow	29	Horse Drive
	South Total flow	56	Jones Boulevard
	Check	YES	
E440	Total Approaching Flow	12	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	12	
	East Surface Flow	7	
	South Surface Flow	5	
	East Total Flow	7	Brent Lane
	South Total flow	5	Bradley Road
	Check	YES	
CP9	Total Approaching Flow	26	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	26	
	East Surface Flow	0	
	South Surface Flow	41	Half street capacity
	East Total Flow	0	Over flow
	South Total flow	26	Bradley Road
	Check	YES	

Concentration Point/Basin	Flow Description	0.570	Notes
CP10	Total Approaching Flow	72	
	East Pipe Flow	6	
	South Pipe Flow	0	
	Surface Flow	66	
	East Surface Flow	33	
	South Surface Flow	33	
	East Total Flow	39	Horse Drive
	South Total flow	33	Bradley Road
	Check	YES	
CP11	Total Approaching Flow	43	
	East Pipe Flow	6	
	South Pipe Flow	0	
	Surface Flow	37	
	East Surface Flow	18	
	South Surface Flow	19	
	East Total Flow	24	Horse Drive
	South Total flow	19	Unicorn Street
	Check	YES	
CP12	Total Approaching Flow	110	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	110	
	East Surface Flow	0	
	South Surface Flow	139	Half street capacity
	East Total Flow	0	Over flow
	South Total flow	110	Decatur Boulevard
	Check	YES	

Concentration Point/Basin	Flow Description	0.570	Notes
CP13	Total Approaching Flow	116	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	116	
	East Surface Flow	0	
	South Surface Flow	139	Half street capacity
	East Total Flow	0	Over flow
	South Total flow	116	Decatur Boulevard
	Check	YES	
CP14	Total Approaching Flow	154	
	East Pipe Flow	0	
	South Pipe Flow	30	
	Surface Flow	124	
	East Surface Flow	124	
	South Surface Flow	0	HP in Decatur, all surface flow goes east.
	East Total Flow	124	Horse Drive
	South Total flow	30	Decatur Boulevard
	Check	YES	
CP15	Total Approaching Flow	133	
	East Pipe Flow	206	
	South Pipe Flow	0	
	Surface Flow	0	
	East Surface Flow	0	
	South Surface Flow	0	
	East Total Flow	133	Horse Drive
	South Total flow	0	Aviary Way
	Check	YES	

Concentration Point/Basin	Flow Description	0.570	Notes
E240	Total Approaching Flow	29	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	29	
	East Surface Flow	15	
	South Surface Flow	14	
	East Total Flow	15	Meisenheimer Avenue
	South Total flow	14	Torrey Pines Drive
	Check	YES	
CP16	Total Approaching Flow	45	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	45	
	East Surface Flow	23	
	South Surface Flow	22	
	East Total Flow	23	Racel Street
	South Total flow	22	Torrey Pines Drive
	Check	YES	
CP17	Total Approaching Flow	62	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	62	
	East Surface Flow	0	
	South Surface Flow	62	Half street capacity
	East Total Flow	0	Over flow
	South Total flow	62	Decatur Boulevard
	Check	YES	

Park Highlands West
Interim Condition 100-Yr Event Flow Split Summary
CBH1301.002 West MDS Flow Split Summary Table.xlsx

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	
CP1	Total Approaching Flow	38	37	35	34	33	33	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	38	37	35	34	33	33	
	East Surface Flow	17	17	16	15	15	15	
	South Surface Flow	21	20	19	19	18	18	
	East Total Flow	17	17	16	15	15	15	Maggie Avenue
	South Total flow	21	20	19	19	18	18	Mustang Street
	Check	YES	YES	YES	YES	YES	YES	
E160	Total Approaching Flow	42	41	40	38	37	37	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	42	41	40	38	37	37	
	East Surface Flow	32	31	30	28	27	27	
	South Surface Flow	10	10	10	10	10	10	Half street capacity
	East Total Flow	32	31	30	28	27	27	Over flow
	South Total flow	10	10	10	10	10	10	Torrey Pines Drive
	Check	YES	YES	YES	YES	YES	YES	
CP2	Total Approaching Flow	62	60	57	53	51	50	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	62	60	57	53	51	50	
	East Surface Flow	31	30	29	27	26	25	
	South Surface Flow	31	30	28	26	25	25	
	East Total Flow	31	30	29	27	26	25	Brent Lane
	South Total flow	31	30	28	26	25	25	Mustang Street
	Check	YES	YES	YES	YES	YES	YES	

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	
CP3	Total Approaching Flow	131	128	122	115	112	110	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	131	128	122	115	112	110	
	East Surface Flow	62	61	58	54	53	53	
	South Surface Flow	69	67	64	61	59	57	
	East Total Flow	62	61	58	54	53	53	Guy Avenue
	South Total flow	69	67	64	61	59	57	Mustang Street
	Check	YES	YES	YES	YES	YES	YES	
CP4	Total Approaching Flow	75	72	69	67	65	63	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	75	72	69	67	65	63	
	East Surface Flow	23	22	22	21	20	20	
	South Surface Flow	52	50	47	46	45	43	
	East Total Flow	23	22	22	21	20	20	Horse Drive
	South Total flow	52	50	47	46	45	43	Mustang Street
	Check	YES	YES	YES	YES	YES	YES	
CP5	Total Approaching Flow	46	45	44	43	42	42	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	46	45	44	43	42	42	
	East Surface Flow	25	24	24	23	22	22	
	South Surface Flow	21	21	20	20	20	20	
	East Total Flow	25	24	24	23	22	22	Brent Lane
	South Total flow	21	21	20	20	20	20	Maverick Street
	Check	YES	YES	YES	YES	YES	YES	

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	
E060	Total Approaching Flow	128	125	119	114	112	110	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	128	125	119	114	112	110	
	East Surface Flow	63	61	58	56	55	54	
	South Surface Flow	65	64	61	58	57	56	
	East Total Flow	63	61	58	56	55	54	Sheleheda Avenue
	South Total flow	65	64	61	58	57	56	Jones Boulevard
	Check	YES	YES	YES	YES	YES	YES	
CP6	Total Approaching Flow	232	226	215	204	200	196	
	East Pipe Flow	46	46	46	46	46	46	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	186	180	169	158	154	150	
	East Surface Flow	93	90	85	79	77	75	
	South Surface Flow	93	90	84	79	77	75	
	East Total Flow	139	136	131	125	123	121	Iron Mountain Road
	South Total flow	93	90	84	79	77	75	Jones Boulevard
	Check	YES	YES	YES	YES	YES	YES	
CP7	Total Approaching Flow	130	126	120	114	111	109	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	130	126	120	114	111	109	
	East Surface Flow	85	81	75	69	66	64	
	South Surface Flow	45	45	45	45	45	45	Half street capacity
	East Total Flow	85	81	75	69	66	64	Over flow
	South Total flow	45	45	45	45	45	45	Jones Boulevard
	Check	YES	YES	YES	YES	YES	YES	

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	
CP8	Total Approaching Flow	226	222	213	202	198	195	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	23	23	23	23	23	23	
	Surface Flow	203	199	190	179	175	172	
	East Surface Flow	93	92	88	82	81	78	
	South Surface Flow	110	107	102	97	94	94	
	East Total Flow	93	92	88	82	81	78	Horse Drive
	South Total flow	133	130	125	120	117	117	Jones Boulevard
	Check	YES	YES	YES	YES	YES	YES	
E440	Total Approaching Flow	38	37	35	34	33	33	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	38	37	35	34	33	33	
	East Surface Flow	20	20	19	18	18	18	
	South Surface Flow	18	17	16	16	15	15	
	East Total Flow	20	20	19	18	18	18	Brent Lane
	South Total flow	18	17	16	16	15	15	Bradley Road
	Check	YES	YES	YES	YES	YES	YES	
CP9	Total Approaching Flow	90	87	83	79	77	75	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	90	87	83	79	77	75	
	East Surface Flow	49	46	42	38	36	34	
	South Surface Flow	41	41	41	41	41	41	Half street capacity
	East Total Flow	49	46	42	38	36	34	Over flow
	South Total flow	41	41	41	41	41	41	Bradley Road
	Check	YES	YES	YES	YES	YES	YES	

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	
CP10	Total Approaching Flow	257	253	242	230	226	222	
	East Pipe Flow	6	6	6	6	6	6	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	251	247	236	224	220	216	
	East Surface Flow	116	114	109	105	103	100	
	South Surface Flow	135	133	127	119	117	116	
	East Total Flow	122	120	115	111	109	106	Horse Drive
	South Total flow	135	133	127	119	117	116	Bradley Road
	Check	YES	YES	YES	YES	YES	YES	
CP11	Total Approaching Flow	180	175	166	157	152	148	
	East Pipe Flow	6	6	6	6	6	6	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	174	169	160	151	146	142	
	East Surface Flow	91	90	85	79	76	74	
	South Surface Flow	83	79	75	72	70	68	
	East Total Flow	97	96	91	85	82	80	Horse Drive
	South Total flow	83	79	75	72	70	68	Unicorn Street
	Check	YES	YES	YES	YES	YES	YES	
CP12	Total Approaching Flow	338	331	319	308	304	301	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	338	331	319	308	304	301	
	East Surface Flow	199	192	180	169	165	162	
	South Surface Flow	139	139	139	139	139	139	Half street capacity
	East Total Flow	199	192	180	169	165	162	Over flow
	South Total flow	139	139	139	139	139	139	Decatur Boulevard
	Check	YES	YES	YES	YES	YES	YES	

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	
CP13	Total Approaching Flow	149	149	146	145	143	143	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	149	149	146	145	143	143	
	East Surface Flow	10	10	7	6	4	4	
	South Surface Flow	139	139	139	139	139	139	Half street capacity
	East Total Flow	10	10	7	6	4	4	Over flow
	South Total flow	139	139	139	139	139	139	Decatur Boulevard
	Check	YES	YES	YES	YES	YES	YES	
CP14	Total Approaching Flow	310	298	277	262	256	250	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	30	30	30	30	30	30	
	Surface Flow	280	268	247	232	226	220	
	East Surface Flow	280	268	247	232	226	220	
	South Surface Flow	0	0	0	0	0	0	HP in Decatur, all surface flow goes east.
	East Total Flow	280	268	247	232	226	220	Horse Drive
	South Total flow	30	30	30	30	30	30	Decatur Boulevard
	Check	YES	YES	YES	YES	YES	YES	
CP15	Total Approaching Flow	324	312	278	262	256	250	
	East Pipe Flow	206	206	206	206	206	206	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	118	106	72	56	50	44	
	East Surface Flow	64	57	40	32	29	25	
	South Surface Flow	54	49	32	24	21	19	
	East Total Flow	270	263	246	238	235	231	Horse Drive
	South Total flow	54	49	32	24	21	19	Aviary Way
	Check	YES	YES	YES	YES	YES	YES	

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	
E240	Total Approaching Flow	85	83	79	76	74	73	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	85	83	79	76	74	73	
	East Surface Flow	45	43	42	40	39	38	
	South Surface Flow	40	40	37	36	35	35	
	East Total Flow	45	43	42	40	39	38	Meisenheimer Avenue
	South Total flow	40	40	37	36	35	35	Torrey Pines Drive
	Check	YES	YES	YES	YES	YES	YES	
CP16	Total Approaching Flow	133	130	123	118	116	115	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	133	130	123	118	116	115	
	East Surface Flow	66	65	61	59	58	57	
	South Surface Flow	67	65	62	59	58	58	
	East Total Flow	66	65	61	59	58	57	Racel Street
	South Total flow	67	65	62	59	58	58	Torrey Pines Drive
	Check	YES	YES	YES	YES	YES	YES	
CP17	Total Approaching Flow	130	128	124	121	119	118	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	130	128	124	121	119	118	
	East Surface Flow	0	0	0	0	0	0	
	South Surface Flow	130	128	124	121	119	119	Half street capacity
	East Total Flow	0	0	0	0	0	0	Over flow
	South Total flow	130	128	124	121	119	118	Decatur Boulevard
	Check	YES	YES	YES	YES	YES	YES	

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	

Flow Split Analyses: 10-Year & 100-Year Ultimate Condition

Park Highlands West
Ultimate Condition 10-Yr Event Flow Split Summary
CBH1301.002 West MDS Flow Split Summary Table.xlsx

Concentration Point/Basin	Flow Description	0.570	Notes
CP1	Total Approaching Flow	109	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	109	
	East Surface Flow	60	
	South Surface Flow	49	
	East Total Flow	60	Iron Mountain Road
	South Total flow	49	Torrey Pines Drive
	Check	YES	
U150	Total Approaching Flow	35	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	35	
	East Surface Flow	20	
	South Surface Flow	15	
	East Total Flow	20	Sheleheda Avenue
	South Total flow	15	Jones Boulevard
	Check	YES	
CP2	Total Approaching Flow	92	
	East Pipe Flow	46	
	South Pipe Flow	0	
	Surface Flow	46	
	East Surface Flow	23	
	South Surface Flow	23	
	East Total Flow	69	Iron Mountain Drive
	South Total flow	23	Jones Boulevard
	Check	YES	

Concentration Point/Basin	Flow Description	0.570	Notes
CP3	Total Approaching Flow	64	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	64	
	East Surface Flow	29	
	South Surface Flow	35	
	East Total Flow	29	Maggie Avenue
	South Total flow	35	Torrey Pines Drive
	Check	YES	
CP4	Total Approaching Flow	52	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	52	
	East Surface Flow	25	
	South Surface Flow	27	
	East Total Flow	25	Brent Lane
	South Total flow	27	Torrey Pines Drive
	Check	YES	
CP6	Total Approaching Flow	32	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	32	
	East Surface Flow	14	
	South Surface Flow	18	
	East Total Flow	14	Maggie Avenue
	South Total flow	18	Mustang Street
	Check	YES	

Concentration Point/Basin	Flow Description	0.570	Notes
CP7	Total Approaching Flow	48	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	48	
	East Surface Flow	24	
	South Surface Flow	24	
	East Total Flow	24	Brent Lane
	South Total flow	24	Mustang Street
	Check	YES	
CP8	Total Approaching Flow	27	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	27	
	East Surface Flow	13	
	South Surface Flow	14	
	East Total Flow	13	Guy Avenue
	South Total flow	14	Mustang Street
	Check	YES	
CP9	Total Approaching Flow	82	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	82	
	East Surface Flow	26	
	South Surface Flow	56	
	East Total Flow	26	Horse Drive
	South Total flow	56	Mustang Street
	Check	YES	

Concentration Point/Basin	Flow Description	0.570	Notes
CP10	Total Approaching Flow	134	
	East Pipe Flow	0	
	South Pipe Flow	23	
	Surface Flow	111	
	East Surface Flow	51	
	South Surface Flow	60	
	East Total Flow	51	Horse Drive
	South Total flow	83	Jones Boulevard
	Check	YES	
U440	Total Approaching Flow	12	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	12	
	East Surface Flow	7	
	South Surface Flow	5	
	East Total Flow	7	Brent Lane
	South Total flow	5	Bradley Road
	Check	YES	
CP11	Total Approaching Flow	79	
	East Pipe Flow	6	
	South Pipe Flow	0	
	Surface Flow	73	
	East Surface Flow	40	
	South Surface Flow	33	
	East Total Flow	46	Horse Drive
	South Total flow	33	Bradley Road
	Check	YES	

Concentration Point/Basin	Flow Description	0.570	Notes
CP12	Total Approaching Flow	48	
	East Pipe Flow	6	
	South Pipe Flow	0	
	Surface Flow	42	
	East Surface Flow	21	
	South Surface Flow	21	
	East Total Flow	27	Horse Drive
	South Total flow	21	Unicorn Street
	Check	YES	
U130	Total Approaching Flow	19	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	19	
	East Surface Flow	10	
	South Surface Flow	9	
	East Total Flow	10	Iron Mountain Road
	South Total flow	9	Decatur Boulevard
	Check	YES	
CP13	Total Approaching Flow	28	
	East Pipe Flow	0	
	South Pipe Flow	0	
	Surface Flow	28	
	East Surface Flow	17	
	South Surface Flow	11	
	East Total Flow	17	Brent Lane
	South Total flow	11	Decatur Boulevard
	Check	YES	

Concentration Point/Basin	Flow Description	0.570	Notes
CP14	Total Approaching Flow	98	
	East Pipe Flow	0	
	South Pipe Flow	30	
	Surface Flow	68	
	East Surface Flow	68	
	South Surface Flow	0	
	East Total Flow	68	Horse Drive
	South Total flow	30	Decatur Boulevard
	Check	YES	
CP15	Total Approaching Flow	77	
	East Pipe Flow	321	
	South Pipe Flow	0	
	Surface Flow	0	
	East Surface Flow	0	
	South Surface Flow	0	
	East Total Flow	77	Horse Drive
	South Total flow	0	Aviary Way
	Check	YES	

Park Highlands West
Ultimate Condition 100-Yr Event Flow Split Summary
CBH1301.002 West MDS Flow Split Summary Table.xlsx

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	
CP1	Total Approaching Flow	348	339	323	308	302	297	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	348	339	323	308	302	297	
	East Surface Flow	200	196	187	179	175	172	
	South Surface Flow	148	143	136	129	127	125	
	East Total Flow	200	196	187	179	175	172	Iron Mountain Road
	South Total flow	148	143	136	129	127	125	Torrey Pines Drive
	Check	YES	YES	YES	YES	YES	YES	
U150	Total Approaching Flow	104	102	97	93	91	90	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	104	102	97	93	91	90	
	East Surface Flow	60	59	56	53	52	52	
	South Surface Flow	44	43	41	40	39	38	
	East Total Flow	60	59	56	53	52	52	Sheleheda Avenue
	South Total flow	44	43	41	40	39	38	Jones Boulevard
	Check	YES	YES	YES	YES	YES	YES	
CP2	Total Approaching Flow	302	294	277	258	250	244	
	East Pipe Flow	46	46	46	46	46	46	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	256	248	231	212	204	198	
	East Surface Flow	128	124	115	106	102	99	
	South Surface Flow	128	124	116	106	102	99	
	East Total Flow	174	170	161	152	148	145	Iron Mountain Drive
	South Total flow	128	124	116	106	102	99	Jones Boulevard
	Check	YES	YES	YES	YES	YES	YES	

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	
CP3	Total Approaching Flow	192	186	181	178	177	177	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	192	186	181	178	177	177	
	East Surface Flow	89	85	83	82	81	81	
	South Surface Flow	103	101	98	96	96	96	
	East Total Flow	89	85	83	82	81	81	Maggie Avenue
	South Total flow	103	101	98	96	96	96	Torrey Pines Drive
	Check	YES	YES	YES	YES	YES	YES	
CP4	Total Approaching Flow	158	155	151	147	146	145	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	158	155	151	147	146	145	
	East Surface Flow	79	77	75	73	73	72	
	South Surface Flow	79	78	76	74	73	73	
	East Total Flow	79	77	75	73	73	72	Brent Lane
	South Total flow	79	78	76	74	73	73	Torrey Pines Drive
	Check	YES	YES	YES	YES	YES	YES	
CP6	Total Approaching Flow	101	100	99	97	97	97	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	101	100	99	97	97	97	
	East Surface Flow	46	45	45	44	44	44	
	South Surface Flow	55	55	54	53	53	53	
	East Total Flow	46	45	45	44	44	44	Maggie Avenue
	South Total flow	55	55	54	53	53	53	Mustang Street
	Check	YES	YES	YES	YES	YES	YES	

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	
CP7	Total Approaching Flow	150	148	144	142	141	141	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	150	148	144	142	141	141	
	East Surface Flow	75	74	72	71	70	70	
	South Surface Flow	75	74	72	71	71	71	
	East Total Flow	75	74	72	71	70	70	Brent Lane
	South Total flow	75	74	72	71	71	71	Mustang Street
	Check	YES	YES	YES	YES	YES	YES	
CP8	Total Approaching Flow	85	84	82	81	81	81	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	85	84	82	81	81	81	
	East Surface Flow	40	39	39	38	38	38	
	South Surface Flow	45	45	43	43	43	43	
	East Total Flow	40	39	39	38	38	38	Guy Avenue
	South Total flow	45	45	43	43	43	43	Mustang Street
	Check	YES	YES	YES	YES	YES	YES	
CP9	Total Approaching Flow	251	246	236	225	219	215	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	251	246	236	225	219	215	
	East Surface Flow	91	89	85	80	78	76	
	South Surface Flow	160	157	151	145	141	139	
	East Total Flow	91	89	85	80	78	76	Horse Drive
	South Total flow	160	157	151	145	141	139	Mustang Street
	Check	YES	YES	YES	YES	YES	YES	

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	
CP10	Total Approaching Flow	452	437	410	365	359	351	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	23	23	23	23	23	23	
	Surface Flow	429	414	387	342	336	328	
	East Surface Flow	195	189	176	156	153	149	
	South Surface Flow	234	225	211	186	183	179	
	East Total Flow	195	189	176	156	153	149	Horse Drive
	South Total flow	257	248	234	209	206	202	Jones Boulevard
	Check	YES	YES	YES	YES	YES	YES	
U440	Total Approaching Flow	38	37	36	34	33	33	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	38	37	36	34	33	33	
	East Surface Flow	21	20	19	18	18	18	
	South Surface Flow	17	17	17	16	15	15	
	East Total Flow	21	20	19	18	18	18	Brent Lane
	South Total flow	17	17	17	16	15	15	Bradley Road
	Check	YES	YES	YES	YES	YES	YES	
CP11	Total Approaching Flow	298	292	278	265	259	252	
	East Pipe Flow	6	6	6	6	6	6	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	292	286	272	259	253	246	
	East Surface Flow	165	161	154	145	141	138	
	South Surface Flow	127	125	118	114	112	108	
	East Total Flow	171	167	160	151	147	144	Horse Drive
	South Total flow	127	125	118	114	112	108	Bradley Road
	Check	YES	YES	YES	YES	YES	YES	

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	
CP12	Total Approaching Flow	175	171	164	154	151	148	
	East Pipe Flow	6	6	6	6	6	6	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	169	165	158	148	145	142	
	East Surface Flow	89	87	83	77	75	74	
	South Surface Flow	80	78	75	71	70	68	
	East Total Flow	95	93	89	83	81	80	Horse Drive
	South Total flow	80	78	75	71	70	68	Unicorn Street
	Check	YES	YES	YES	YES	YES	YES	
U130	Total Approaching Flow	54	53	51	49	48	47	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	54	53	51	49	48	47	
	East Surface Flow	29	28	27	26	26	26	
	South Surface Flow	25	25	24	23	22	21	
	East Total Flow	29	28	27	26	26	26	Iron Mountain Road
	South Total flow	25	25	24	23	22	21	Decatur Boulevard
	Check	YES	YES	YES	YES	YES	YES	
CP13	Total Approaching Flow	76	74	70	67	65	64	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	76	74	70	67	65	64	
	East Surface Flow	44	43	41	38	37	37	
	South Surface Flow	32	31	29	29	28	27	
	East Total Flow	44	43	41	38	37	37	Brent Lane
	South Total flow	32	31	29	29	28	27	Decatur Boulevard
	Check	YES	YES	YES	YES	YES	YES	

Concentration Point/Basin	Flow Description	DARF						Notes
		0.990	0.975	0.950	0.925	0.915	0.908	
CP14	Total Approaching Flow	269	250	224	213	207	202	
	East Pipe Flow	0	0	0	0	0	0	
	South Pipe Flow	30	30	30	30	30	30	
	Surface Flow	239	220	194	183	177	172	
	East Surface Flow	239	220	194	183	177	172	
	South Surface Flow	0	0	0	0	0	0	
	East Total Flow	239	220	194	183	177	172	Horse Drive
	South Total flow	30	30	30	30	30	30	Decatur Boulevard
	Check	YES	YES	YES	YES	YES	YES	
CP15	Total Approaching Flow	250	235	198	186	181	177	
	East Pipe Flow	321	321	321	321	321	321	
	South Pipe Flow	0	0	0	0	0	0	
	Surface Flow	0	0	0	0	0	0	
	East Surface Flow	0	0	0	0	0	0	
	South Surface Flow	0	0	0	0	0	0	
	East Total Flow	250	235	198	186	181	177	Horse Drive
	South Total flow	0	0	0	0	0	0	Aviary Way
	Check	YES	YES	YES	YES	YES	YES	

HEC-1 Model: 10-Year Interim Condition

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   08MAY13  TIME  14:12:38   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    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

1 HEC-1 INPUT PAGE 1

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

              *DIAGRAM
    1         ID     SLATER HANIFAN GROUP, INC.
    2         ID     PARK HIGHLANDS WEST
    3         ID     MASTER DRAINAGE STUDY
    4         ID     INTERIM CONDITION
    5         ID
    6         ID     RETURN PERIOD ------- 10-YEAR
    7         ID     DISTRIBUTION -------- 6-HOUR SDN3
    8         ID     PROJECT NO. ---------- CBH1301.002
    9         ID     FILENAME ------------ INT10.H1
   10         ID     DATE ---------------- MAY 2013
   11         ID     MODELED BY ---------- KC/KCR
   12         ID
   13         ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
   14         ID        DRAINAGE AREA (MI^2)       DARF
   15         ID        10-YR EVENT               0.570
   16         ID
   17         IT       5       0       0     300
   18         IO       5       0       0
   19         IN       5       0       0
   20         JR    PREC   0.570
              *

   21         KK    E140
   22         BA   .0675
   23         PB    2.77
   24         PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
   25         PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
   26         PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
   27         PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
   28         PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
   29         PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
   30         PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
   31         PC   0.998   0.999   1.000
   32         LS       0    81.9
   33         UD   0.599
              *

   34         KK    E360
   35         BA   .0095
   36         LS       0    85.6
   37         UD   0.159
              *

   38         KK     CP1
   39         KM   COMBINE E140 AND E360 AT MAGGIE AND MUSTANG
   40         HC       2
              *

   41         KK    CP1S
   42         KM   CP1E IS THE FLOW DRAINING EAST IN MAGGIE
   43         KM   CP1S IS THE FLOW DRAINING SOUTH IN MUSTANG
   44         DT    CP1E
   45         DI      12
   46         DQ       5
              *
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1 HEC-1 INPUT PAGE 2

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

   47         KK    E160
   48         BA   .0641
   49         LS       0    83.1
   50         UD   0.445
              *

   51         KK   E160E
   52         KM   E160E IS THE FLOW DRAINING EAST IN MAGGIE
   53         KM   E160S IS THE FLOW DRAINING SOUTH IN TORREY PINES
   54         KM   FLOW IN TORREY PINES IS BASED ON 1/2 STREET CAPACITY, 10 CFS
   55         DT   E160S
   56         DI      14
   57         DQ      10
              *

   58         KK    E340
   59         BA   .0168
   60         LS       0    85.8
   61         UD   0.172
              *

   62         KK     CP2
   63         KM   COMBINE CP1S E160E AND E340 AT BRENT AND MUSTANG
   64         HC       3
              *

   65         KK    CP2S
   66         KM   CP2E IS THE FLOW DRAINING EAST IN BRENT
   67         KM   CP2S IS THE FLOW DRAINING SOUTH IN MUSTANG
   68         DT    CP2E
   69         DI      15
   70         DQ       8
              *

   71         KK    E180
   72         BA   .2142
   73         LS       0    80.7
   74         UD   0.715
```

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                *

  75            KK   E160S
  76            KM   RETRIEVE E160S
  77            DR   E160S
                *

  78            KK    E320
  79            BA   .0169
  80            LS       0    85.7
  81            UD   0.168
                *
1                                          HEC-1 INPUT                                                  PAGE  3

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

  82            KK     CP3
  83            KM   COMBINE CP2S E180 E160S AND E320 AT GUY AND MUSTANG
  84            HC       4
                *

  85            KK    CP3S
  86            KM   CP3E IS THE FLOW DRAINING EAST IN GUY
  87            KM   CP3S IS THE FLOW DRAINING SOUTH IN MUSTANG
  88            DT    CP3E
  89            DI      43
  90            DQ      20
                *

  91            KK    E200
  92            BA   .0059
  93            LS       0    83.7
  94            UD   0.183
                *

  95            KK    E300
  96            BA   .0132
  97            LS       0    85.8
  98            UD   0.168
                *

  99            KK     CP4
 100            KM   COMBINE CP3S E200 AND E300 AT HORSE AND MUSTANG
 101            HC       3
                *

 102            KK   SOUTH
 103            KM   CP4E IS THE FLOW DRAINING EAST IN HORSE
 104            KM   SOUTH IS THE FLOW DRAINING SOUTH IN MUSTANG
 105            KM   EXISTING SD IN HORSE IS FOR NUISANCE FLOW
 106            DT    CP4E
 107            DI      26
 108            DQ       7
                *

 109            KK    NONE
 110            KM   NONE IS ZERO FLOW
 111            KM   CP4S IS THE FLOW DRAINING SOUTH IN MUSTANG
 112            DT    CP4S
 113            DI      10     100
 114            DQ      10     100
                *

 115            KK    E080
 116            BA   .0108
 117            LS       0    83.5
 118            UD   0.219
                *
1                                          HEC-1 INPUT                                                  PAGE  4

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

 119            KK    CP1E
 120            KM   RETRIEVE CP1E
 121            DR    CP1E
                *

 122            KK    E380
 123            BA   .0195
 124            LS       0    85.7
 125            UD   0.203
                *

 126            KK     CP5
 127            KM   COMBINE E080 CP1E AND E380 AT BRENT AND MAVERICK
 128            HC       3
                *

 129            KK    CP5S
 130            KM   CP5S IS THE FLOW DRAINING SOUTH IN MAVERICK
 131            KM   CP5E IS THE FLOW DRAINING EAST IN BRENT
 132            DT    CP5E
 133            DI      15
 134            DQ       8
                *

 135            KK    E060
 136            BA   .2588
 137            LS       0    82.5
 138            UD   0.679
                *

 139            KK   E060S
 140            KM   E060S IS THE FLOW DRAINING SOUTH IN JONES
 141            KM   E060E IS THE FLOW DRAINING EAST IN SHELEHEDA
 142            KM   EXISTING SD IN  JONES IS FOR NUISANCE FLOW
 143            DT   E060E
 144            DI      42
 145            DQ      19
                *

 146            KK  RE060S
 147            KM   ROUTE TO CP6
 148            RD    1345   .0066   0.016       0    TRAP       0      50
                *

 149            KK    E100
 150            BA   .4698
 151            LS       0    81.2
 152            UD   0.956
                *
1                                          HEC-1 INPUT                                                  PAGE  5

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

 153            KK     CP6
 154            KM   COMBINE E060S AND E100 AT IRON MOUNTAIN AND JONES
 155            HC       2
                *

 156            KK    CP6S
 157            KM   CP6S IS THE FLOW DRAINING SOUTH IN JONES
 158            KM   CP6E IS THE FLOW DRAINING EAST IN IRON MOUNTAIN
 159            KM   EXISTING SD IN IRON MOUNTAIN CONVEYS 46 CFS EAST
```

```
 160          DT    CP6E
 161          DI      74
 162          DQ      60
              *

 163          KK   RCP6S
 164          KM   ROUTE TO CP7
 165          RD    2000   .0050   0.016       0    TRAP       0      50
              *

 166          KK    E420
 167          BA   .0957
 168          LS       0    85.4
 169          UD   0.251
              *

 170          KK    CP5E
 171          KM   RETRIEVE CP5E
 172          DR    CP5E
              *

 173          KK   RCP5E
 174          KM   ROUTE TO CP7
 175          RD    2010   .0058   0.016       0    TRAP       0      50
              *

 176          KK     CP7
 177          KM   COMBINE CP6S E420 AND CP5E AT GUY AND JONES
 178          HC       3
              *

 179          KK    CP7S
 180          KM   CP7S IS THE FLOW DRAINING SOUTH IN JONES
 181          KM   CP7E IS THE FLOW DRAINING EAST ONTO UNDEVELOPED LAND
 182          KM   EXISTING SD IN JONES IS FOR NUISANCCE FLOW
 183          KM   FLOW IN JONES IS BASED ON 1/2 STREET CAPACITY, 45 CFS
 184          DT    CP7E
 185          DI      40
 186          DQ       0
              *
```



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

 187          KK    CP2E
 188          KM   RETRIEVE CP2E
 189          DR    CP2E
              *

 190          KK   RCP2E
 191          KM   ROUTE TO CP8
 192          RD    3370   .0055   0.016       0    TRAP       0      50
              *

 193          KK    CP3E
 194          KM   RETRIEVE CP3E
 195          DR    CP3E
              *

 196          KK   RCP3E
 197          KM   ROUTE TO CP8
 198          RD    2680   .0055   0.016       0    TRAP       0      50
              *

 199          KK    CP4E
 200          KM   RETRIEVE CP4E
 201          DR    CP4E
              *

 202          KK   RCP4E
 203          KM   ROUTE TO CP8
 204          RD    1955   .0048   0.016       0    TRAP       0      50
              *

 205          KK   DUMMY
 206          KM   COMBINE CP5S CP7S CP2E CP3E AND CP4E
 207          HC       5
              *

 208          KK    E400
 209          BA   .0846
 210          LS       0    85.2
 211          UD   0.259
              *

 212          KK     CP8
 213          KM   COMBINE DUMMMY AND E400 AT HORSE AND JONES
 214          HC       2
              *

 215          KK    CP8E
 216          KM   CP8S IS THE FLOW DRAINING SOUTH IN JONES
 217          KM   CP8E IS THE FLOW DRAINING EAST IN HORSE
 218          KM   EXISTING SD IN JONES CONVEYS 23 CFS SOUTH
 219          DT    CP8S
 220          DI      85
 221          DQ      56
              *
```



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

 222          KK   RCP8E
 223          KM   ROUTE TO CP10
 224          RD    2530   .0080   0.016       0    TRAP       0      50
              *

 225          KK    E440
 226          BA   .0523
 227          LS       0    80.8
 228          UD   0.290
              *

 229          KK   E440S
 230          KM   E440S IS THE FLOW DRAINING SOUTH IN BRADLEY
 231          KM   E440E IS THE FLOW DRAINING EAST IN BRENT
 232          DT   E440E
 233          DI      12
 234          DQ       7
              *

 235          KK    E460
 236          BA   .1140
 237          LS       0    80.3
 238          UD   0.355
              *

 239          KK     CP9
 240          KM   COMBINE E440S AND E460 IN BRADLEY BETWEEN BRENT AND HORSE
 241          HC       2
              *

 242          KK    CP9S
 243          KM   CP9S IS THE FLOW DRAINING SOUTH IN BRADLEY
 244          KM   CP9E IS THE FLOW DRAINING EAST ONTO UNDEVELOPED LAND
```

```
 245          KM   FLOW IN BRADELY IS BASED ON 1/2 STREET CAPACITY, 41 CFS
 246          DT    CP9E
 247          DI      26
 248          DQ       0
              *

 249          KK    CP7E
 250          KM   RETRIEVE CP7E
 251          DR    CP7E
              *

 252          KK   RCP7E
 253          KM   ROUTE TO CP10
 254          RD    2690   .0080   0.016       0    TRAP       0      50
              *
1                                        HEC-1 INPUT                                                    PAGE  8

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

 255          KK    E480
 256          BA   .0873
 257          LS       0    81.5
 258          UD   0.278
              *

 259          KK    CP10
 260          KM   COMBINE CP8E CP9S CP7E AND E480 AT HORSE AND BRADLEY
 261          HC       4
              *

 262          KK   CP10E
 263          KM   CP10S IS THE FLOW DRAINING SOUTH IN BRADLEY
 264          KM   CP10E IS THE FLOW DRAINING EAST IN HORSE
 265          KM   EXISTING SD IN HORSE CONVEYS 6 CFS EAST
 266          DT   CP10S
 267          DI      72
 268          DQ      33
              *

 269          KK    CP9E
 270          KM   RETRIEVE CP9E
 271          DR    CP9E
              *

 272          KK    E520
 273          BA   .0143
 274          LS       0    85.0
 275          UD   0.162
              *

 276          KK    CP11
 277          KM   COMBINE CP10E CP9E AND E520 AT HORSE AND UNICORN
 278          HC       3
              *

 279          KK   CP11E
 280          KM   CP11S IS THE FLOW DRAINING SOUTH IN UNICORN
 281          KM   CP11E IS THE FLOW DRAINING EAST IN HORSE
 282          KM   EXISTING SD IN HORSE CONVEYS 6 CFS EAST
 283          DT   CP11S
 284          DI      43
 285          DQ      19
              *

 286          KK  RCP11E
 287          KM   ROUTE TO CP14
 288          RD    1825   .0080   0.016       0    TRAP       0      50
              *
1                                        HEC-1 INPUT                                                    PAGE  9

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

 289          KK   E060E
 290          KM   RETRIEVE E060E
 291          DR   E060E
              *

 292          KK  RE060E
 293          KM   ROUTE TO CP12
 294          RD    5370   .0050   0.016       0    TRAP       0      50
              *

 295          KK    CP6E
 296          KM   RETRIEVE CP6E
 297          DR    CP6E
              *

 298          KK   RCP6E
 299          KM   ROUTE TO CP12
 300          RD    5145   .0050   0.016       0    TRAP       0      50
              *

 301          KK    E040
 302          BA   .3615
 303          LS       0    82.1
 304          UD   0.511
              *

 305          KK    CP12
 306          KM   COMBINE E060E CP6E AND E040 AT IRON MOUNTAIN AND DECATUR
 307          HC       3
              *

 308          KK   CP12S
 309          KM   CP12S IS THE FLOW DRAINING SOUTH IN DECATUR
 310          KM   CP12E IS THE FLOW DRAINING EAST ONTO UNDEVELOPED LAND
 311          KM   FLOW IN DECATUR IS BASED ON 1/2 STREET CAPACITY, 139 CFS
 312          DT   CP12E
 313          DI     110
 314          DQ       0
              *

 315          KK  RCP12S
 316          KM   ROUTE TO CP13
 317          RD    1270   .0040   0.016       0    TRAP       0      50
              *

 318          KK    E540
 319          BA   .0506
 320          LS       0    85.5
 321          UD   0.171
              *
1                                        HEC-1 INPUT                                                    PAGE 10

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

 322          KK    CP13
 323          KM   COMBINE CP12S AND E540 AT BRENT AND DECATUR
 324          HC       2
              *

 325          KK   CP13S
 326          KM   S9 IS THE FLOW DRAINING SOUTH IN DECATUR
 327          KM   E9 IS THE FLOW DRAINING EAST ONTO UNDEVELOPED LAND
```

```
          KM   FLOW IN DECATUR IS BASED ON 1/2 STREET CAPACITY, 139 CFS
          DT   CP13E
          DI     116
          DQ       0
          *

          KK  RCP13S
          KM   ROUTE TO CP14
          RD    1290   .0040   0.016       0    TRAP       0      50
          *

          KK   E440E
          KM   RETRIEVE E440E
          DR   E440E
          *

          KK  RE440E
          KM   ROUTE TO CP14
          RD    3850   .0040   0.016       0    TRAP       0      50
          *

          KK    E560
          BA   .1763
          LS       0    89.1
          UD   0.370
          *

          KK    CP14
          KM   COMBINE CP11E CP13S E440E AND E560 AT HORSE AND DECATUR
          HC       4
          *

          KK   CP14E
          KM   CP14S IS THE FLOW DRAINING SOUTH IN DECATUR
          KM   CP14E IS THE FLOW DRAINING EAST IN HORSE
          KM   EXISTING SD IN DECATUR CONVEYS 30 CFS SOUTH
          KM   HIGH POINT IN DECATUR, ALL SURFACE FLOWS DRIAN EAST
          DT   CP14S
          DI     154
          DQ      30
          *
1                                   HEC-1 INPUT                                          PAGE 11

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

          KK  RCP14E
          KM   ROUTE TO CP15
          RD    2645   .0050   0.016       0    TRAP       0      50
          *

          KK    E600
          BA   .0862
          LS       0    83.7
          UD   0.285
          *

          KK    CP15
          KM   COMBINE CP14E AND E600 AT HORSE AND AVIARY
          HC       2
          *

          KK   CP15E
          KM   CP15S IS THE FLOW DRAINING SOUTH IN AVIARY
          KM   CP15E IS THE FLOW DRAINING EAST IN HORSE
          KM   EXISTING SD IN HORSE CONVEYS 206 CFS EAST
          DT   CP15S
          DI     113
          DQ       0
          *

          KK    E240
          BA   .1327
          LS       0    83.1
          UD   0.472
          *

          KK   E240S
          KM   E240S IS THE FLOW DRAINING SOUTH IN TORREY PINES
          KM   E240E IS THE FLOW DRAINING EAST IN MEISENHEIMER
          DT   E240E
          DI      29
          DQ      15
          *

          KK    E260
          BA   .1379
          LS       0    83.3
          UD   0.441
          *

          KK    CP16
          KM   COMBINE E240S AND E260 AT RACEL AND TORREY PINES
          HC       2
          *
1                                   HEC-1 INPUT                                          PAGE 12

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

          KK   CP16S
          KM   S9 IS THE FLOW DRAINING SOUTH IN TORREY PINES
          KM   E9 IS THE FLOW DRAINING EAST IN RACEL
          DT   CP16E
          DI      45
          DQ      23
          *

          KK   DUMMY
          HC       3
          *

          KK   CP14S
          KM   RETRIEVE CP14S
          DR   CP14S
          *

          KK  RCP14S
          KM   ROUTE TO CP17
          RD    2565   .0050   0.013       0    CIRC     2.5       0
          *

          KK    E580
          BA   .0980
          LS       0    88.1
          UD   0.296
          *

          KK    CP17
          KM   COMBINE CP14S AND E580 IN DECATUR BETWEEN HORSE AND GRAND TETON
          HC       2
          *

          KK   CP17S
          KM   CP17S IS THE FLOW DRAINING SOUTH IN DECATUR
          KM   CP17E IS THE FLOW DRAINING EAST ONTO UNDEVELOPED LAND
          KM   EXISTING SD IN DECATUR CONVEYS 30 CFS SOUTH
```

```
 415          KM   FLOW IN DECATUR IS BASED ON 1/2 STREET CAPACITY, 139 CFS
 416          DT   CP17E
 417          DI      62
 418          DQ       0
              *

 419          KK    E220
 420          BA   .0445
 421          LS       0    83.5
 422          UD   0.284
              *
1                                          HEC-1 INPUT                                                PAGE 13

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

 423          KK   RE220
 424          KM   ROUTE TO CP18
 425          RD    5085   .0050   0.016       0    TRAP       0      50
              *

 426          KK   E240E
 427          KM   RETRIEVE E240E
 428          DR   E240E
              *

 429          KK  RE240E
 430          KM   ROUTE TO CP18
 431          RD    4710   .0050   0.016       0    TRAP       0      50
              *

 432          KK   CP16E
 433          KM   RETRIEVE CP16E
 434          DR   CP16E
              *

 435          KK  RCP16E
 436          KM   ROUTE TO CP18
 437          RD    4030   .0050   0.016       0    TRAP       0      50
              *

 438          KK    CP4S
 439          KM   RETRIEVE CP4S
 440          DR    CP4S
              *

 441          KK   RCP4S
 442          KM   ROUTE TO CP18
 443          RD    4770   .0050   0.016       0    TRAP       0      50
              *

 444          KK    CP8S
 445          KM   RETRIEVE CP8S
 446          DR    CP8S
              *

 447          KK   RCP8S
 448          KM   ROUTE TO CP18
 449          RD    2755   .0050   0.016       0    TRAP       0      50
              *

 450          KK   DUMMY
 451          KM   COMBINE E220 E240E CP16E CP4S AND CP8S
 452          HC       5
              *
1                                          HEC-1 INPUT                                                PAGE 14

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

 453          KK    E280
 454          BA   .2782
 455          LS       0    83.5
 456          UD   0.399
              *

 457          KK    CP18
 458          KM   COMBINE DUMMY AND E280 AT GRAND TETON AND JONES
 459          HC       2
              *

 460          KK   RCP18
 461          KM   ROUTE TO CP19
 462          RD    4935   .0050   0.016       0    TRAP       0      50
              *

 463          KK   CP10S
 464          KM   RETRIEVE CP10S
 465          DR   CP10S
              *

 466          KK  RCP10S
 467          KM   ROUTE TO CP19
 468          RD    5215   .0050   0.016       0    TRAP       0      50
              *

 469          KK   CP11S
 470          KM   RETRIEVE CP11S
 471          DR   CP11S
              *

 472          KK  RCP11S
 473          KM   ROUTE TO CP19
 474          RD    4550   .0050   0.016       0    TRAP       0      50
              *

 475          KK    E500
 476          BA   .3881
 477          LS       0    83.3
 478          UD   0.510
              *

 479          KK   CP18A
 480          KM   COMBINE CP18 CP10S CP11S AND E500 IN GRAND TETON WEST OF DECATUR
 481          HC       4
              *

 482          KK    CP19
 483          KM   COMBINE CP17S AND CP18A AT GRAND TETON AND DECATUR
 484          HC       2
              *
1                                          HEC-1 INPUT                                                PAGE 15

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

 485          KK   CP17E
 486          KM   RETRIEVE CP17E
 487          DR   CP17E
              *

 488          KK   E660
 489          BA   .0140
 490          LS       0    84.5
 491          UD   0.165
              *
```

```
492           KK    CP20
493           KM   COMBINE CP19 CP17E AND E660 IN GRAND TETON BETWEEN DECATUR AND SAN MATEO
494           HC       3
              *

495           KK    E640
496           BA   .0700
497           LS       0    87.8
498           UD   0.263
              *

499           KK    CP21
500           KM   COMBINE CP20 AND E640 IN GRAND TETON BETWEEN DECATUR AND SAN MATEO
501           HC       2
              *

502           KK    E620
503           BA   .0472
504           LS       0    88.1
505           UD   0.246
              *

506           KK    CP22
507           KM   COMBINE CP21 AND E620 AT GRAND TETON AND SAN MATEO
508           HC       2
              *

509           KK   RCP22
510           KM   ROUTE TO CP24
511           RD    1230   .0050   0.016       0    TRAP       0      50
              *

512           KK   CP15S
513           KM   RETRIEVE CP15S
514           DR   CP15S
              *

515           KK  RCP15S
516           KM   ROUTE TO CP23
517           RD    2555   .0050   0.016       0    TRAP       0      50
              *
```



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

518           KK    E680
519           BA   .1122
520           LS       0    88.0
521           UD   0.303
              *

522           KK    CP23
523           KM   COMBINE CP15S AND E680 IN AVIARY JUST NORTH OF GRAND TETON
524           HC       2
              *

525           KK    E760
526           BA   .0076
527           LS       0    88.3
528           UD   0.171
              *

529           KK   CPGTA
530           KM   COMBINE CP22 CP23 AND E760 AT GRAND TETON AND AVIARY
531           HC       3
              *

532           KK     2-3
533           KM   PARK OR TRAIL
534           BA  0.0327
535           LS       0    86.0
536           UD   0.157
              *

537           KK  CPGTA2
538           KM   COMBINE CPGTA AND 2-3
539           HC       2
              *

540           KK     2-1
541           KM   NEIGHBORHOOD COMMERCIAL
542           BA  0.0367
543           LS       0    94.0
544           UD   0.187
              *

545           KK     2-2
546           KM   MEDIUM DENSITY
547           BA  0.0742
548           LS       0    91.0
549           UD   0.215
              *

550           KK   2-14A
551           KM   PARK OR TRAIL
552           BA  0.0027
553           LS       0    86.0
554           UD   0.135
              *
```



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

555           KK      2A
556           HC       3
              *

557           KK      2B
558           HC       2
              *

559           KK     DB1
560           KM   DETENTION BASIN 1
561           KO       2
562           RS       1    ELEV      -1
563           SV       0   0.339   3.015   9.712  18.977  29.349  42.004 102.301 126.116 159.117
564           SE  2297.0  2298.0  2299.0  2300.0  2301.0  2302.0  2303.0  2307.0  2308.5  2310.5
565           SQ       0      72     110     138     161     199     215     231     252    1975
566           SE  2297.0  2300.0  2301.0  2302.0  2303.0  2305.0  2306.0  2307.0  2308.5  2310.5
567           KO       1
              *

568           KK     2-6
569           KM   ELEMENTARY SCHOOL
570           BA  0.0180
571           LS       0    94.0
572           UD   0.158
              *

573           KK      2C
574           HC       2
              *

575           KK     2-7
576           KM   PARK OR TRAIL
```

```
577          BA  0.0156
578          LS       0    86.0
579          UD   0.137
             *

580          KK      2D
581          HC       2
             *

582          KK     2-4
583          KM   HIGH DENSITY
584          BA  0.0334
585          LS       0    94.0
586          UD   0.137
             *

587          KK   2-14B
588          KM   PARK OR TRAIL
589          BA  0.0025
590          LS       0    86.0
591          UD   0.100
             *
```



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

592          KK      2E
593          HC       2
             *

594          KK     2-5
595          KM   MEDIUM DENSITY
596          BA  0.0891
597          LS       0    91.0
598          UD   0.215
             *

599          KK    2-5W
600          DT    2-5E
601          DI       0     100
602          DQ       0      48
             *

603          KK     2-9
604          KM   MEDIUM DENSITY
605          BA  0.0156
606          LS       0    91.0
607          UD   0.135
             *

608          KK      2F
609          HC       3
             *

610          KK    2-5E
611          DR    2-5E
             *

612          KK    2-10
613          KM   MEDIUM DENSITY
614          BA  0.0163
615          LS       0    91.0
616          UD   0.132
             *

617          KK      2G
618          HC       3
             *

619          KK     2-8
620          KM   MIXED USE
621          BA  0.0286
622          LS       0    94.0
623          UD   0.144
             *
```



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

624          KK      2H
625          HC       2
             *

626          KK      2I
627          KM   FLOW IN STORM DRAIN
628          HC       2
             *

629          KK    2-11
630          KM   MEDIUM-HIGH DENSITY
631          BA  0.0255
632          LS       0    94.0
633          UD   0.135
             *

634          KK    2-12
635          KM   MEDIUM-LOW DENSITY
636          BA  0.0272
637          LS       0    90.0
638          UD   0.150
             *

639          KK      2J
640          KM   FLOW IN STORM DRAIN
641          HC       2
             *

642          KK   DUMMY
643          KM   FLOW IN STORM DRAIN
644          HC       2
             *

645          KK    2-13
646          KM   MEDIUM-LOW AND MEDIUM HIGH DENSITY
647          BA  0.0273
648          LS       0    91.0
649          UD   0.176
             *

650          KK     PT2
651          KM   FLOW IN STORM DRAIN
652          HC       2
             *

653          KK    E720
654          BA   .0590
655          LS       0    88.1
656          UD   0.229
             *
```



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

657          KK    E800
```

```
658           BA   .0095
659           LS      0    90.0
660           UD   0.150
              *

661           KK    CP25
662           KM   COMBINE E720 AND E800 IN GRAND TETON WEST OF ALIANTE
663           HC      2
              *

664           KK    E740
665           BA   .0533
666           LS      0    88.0
667           UD   0.213
              *

668           KK    CP26
669           KM   COMBINE CP25 AND E740 IN GRAND TETON WEST OF ALIANTE
670           HC      2
              *

671           KK    E700
672           BA   .1352
673           LS      0    87.8
674           UD   0.372
              *

675           KK    CP27
676           KM   COMBINE CP26 AND E700 AT GRAND TETON AND ALIANTE
677           HC      2
              *

678           KK     1-1
679           KM   MEDIUM HIGH DENSITY
680           BA   .0344
681           LS      0    94.0
682           UD   0.150
              *

683           KK    AL1E
684           KM   ROADWAY
685           BA   .0026
686           LS      0    98.0
687           UD   0.077
              *

688           KK    1A.1
689           KM   COMBINE 1-1 AND AL1E IN ALIANTE STORM DRAIN
690           HC      2
              *
```



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

691           KK    1A.1
692           KM   ROUTE TO PT1
693           RK     740  0.0034   0.013       0    CIRC     4.5
              *

694           KK     1-2
695           KM   MEDIUM HIGH DENSITY
696           BA   .0356
697           LS      0    94.0
698           UD   0.156
              *

699           KK      1A
700           KM   COMBINE PT3A AND 1-2 IN ALIANTE STORM DRAIN
701           HC      2
              *

702           KK     1-4
703           KM   MEDIUM DENSITY
704           BA   .0373
705           LS      0    91.0
706           UD   0.157
              *

707           KK    R1-4
708           KM   ROUTE TO 1-4
709           RD    1600   .0100   0.016       0    TRAP      45       1
              *

710           KK      1B
711           KM   COMBINE 1A AND 1-4 IN ALIANTE STORM DRAIN
712           HC      2
              *

713           KK     1-3
714           KM   MEDIUM LOW DENSITY
715           BA   .0419
716           LS      0    90.0
717           UD   0.154
              *

718           KK    AL2E
719           KM   ROADWAY
720           BA   .0025
721           LS      0    98.0
722           UD   0.076
              *

723           KK     PT1
724           KM   COMBINE 1B, 1-3 AND AL2E IN ALIANTE STORM DRAIN
725           HC      3
              *
```



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

726           KK     4-1
727           KM   HIGH DENSITY
728           BA   .0359
729           LS      0    94.0
730           UD   0.137
              *

731           KK     4-6
732           KM   PARK OR TRAIL
733           BA   .0039
734           LS      0    86.0
735           UD   0.156
              *

736           KK     4-7
737           KM   MEDIUM DENSITY
738           BA  0.0464
739           LS      0    91.0
740           UD   0.189
              *

741           KK      4A
742           KM   COMBINE 4-1, 4-6 AND 4-7 IN SEVERANCE STORM DRAIN
743           HC      3
              *
```

```
 744          KK     4-4
 745          KM   MEDIUM DENSITY
 746          BA   .0109
 747          LS       0    91.0
 748          UD   0.123
              *

 749          KK      4B
 750          KM   COMBINE 4A AND 4-4 IN AVIARY STORM DRAIN
 751          HC       2
              *

 752          KK     4-2
 753          KM   MEDIUM HIGH DENSITY
 754          BA   .0547
 755          LS       0    94.0
 756          UD   0.179
              *

 757          KK     4-3
 758          KM   MEDIUM DENSITY
 759          BA   .0542
 760          LS       0    91.0
 761          UD   0.186
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 762          KK      4C
 763          KM   COMBINE 4-2 AND 4-3 IN ELKHORN STORM DRAIN
 764          HC       2
              *

 765          KK   U1020
 766          BA   .0092
 767          LS       0    94.0
 768          UD   0.184
              *

 769          KK      4D
 770          KM   COMBINE 4B, 4C AND U1020 IN AVIARY STORM DRAIN
 771          HC       3
              *

 772          KK     4-5
 773          KM   MEDIUM HIGH DENSITY
 774          BA   .0650
 775          LS       0    94.0
 776          UD   0.185
              *

 777          KK      4H
 778          KM   COMBINE 4D AND 4-5 IN AVIARY STORM DRAIN
 779          HC       2
              *

 780          KK   U1040
 781          BA   .0185
 782          LS       0    95.0
 783          UD   0.136
              *

 784          KK   U1060
 785          BA   .0060
 786          LS       0    94.0
 787          UD   0.109
              *

 788          KK   U1080
 789          BA   .0254
 790          LS       0    94.0
 791          UD   0.150
              *

 792          KK      4I
 793          KM   COMBINE U1040, U1060 AND U1080 IN DORRELL STORM DRAIN
 794          HC       3
              *
1                                          HEC-1 INPUT                                          PAGE 24

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

 795          KK     PT4
 796          KM   COMBINE 4H AND 4I IN AVIARY/DORRELL STORM DRAIN
 797          HC       2
              *

 798          KK   DUMMY
 799          HC       5
              *

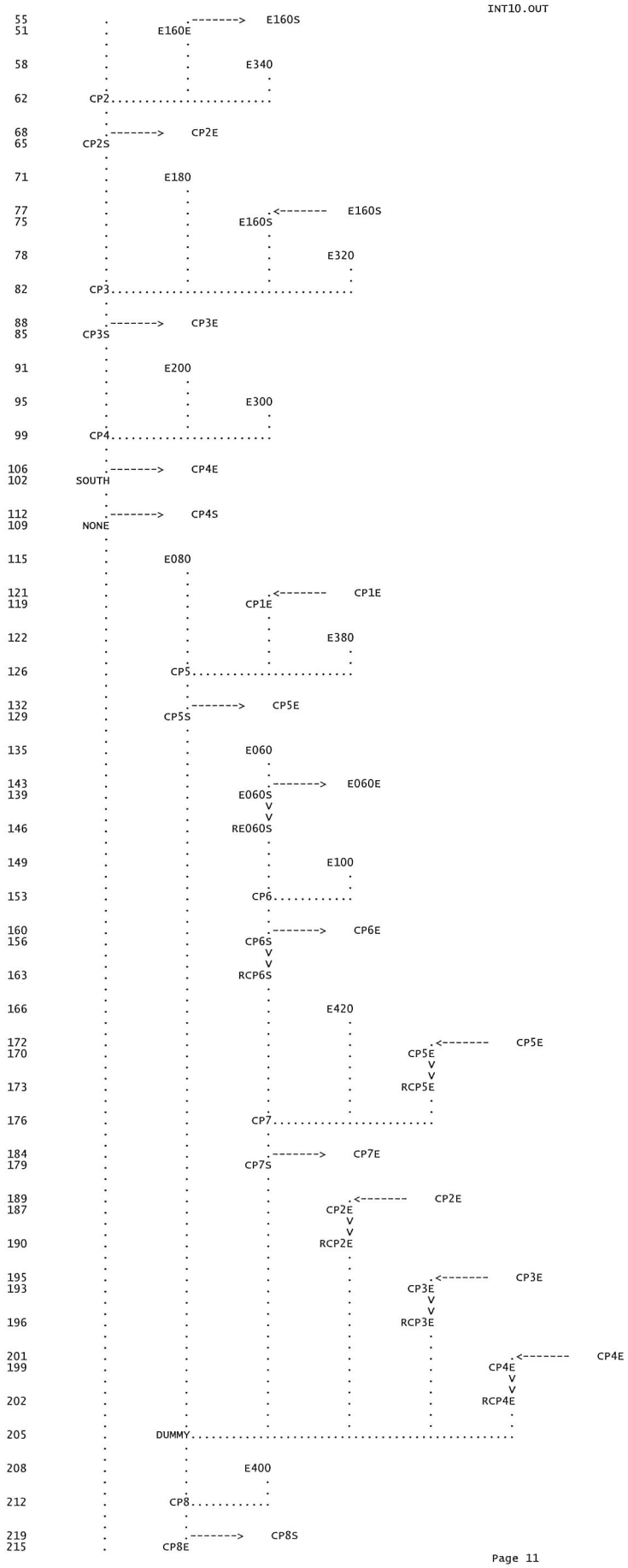
 800          KK     3-1
 801          KM   MEDIUM HIGH DENSITY
 802          BA   .0359
 803          LS       0    94.0
 804          UD   0.155
              *

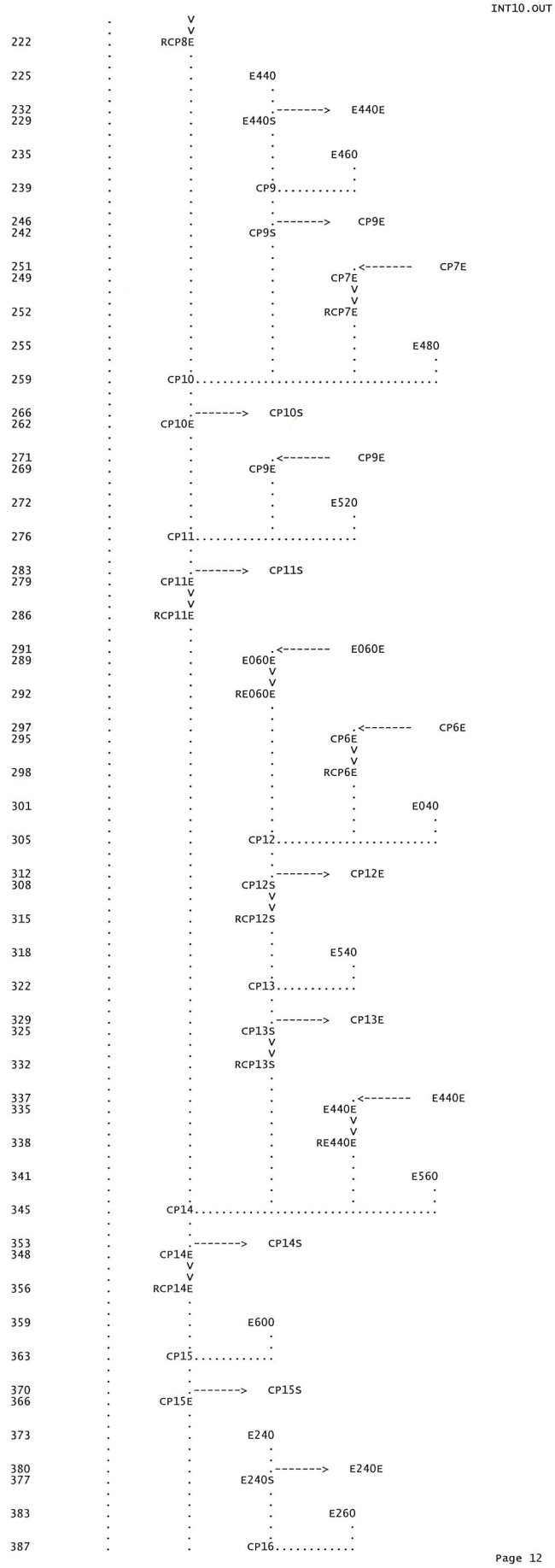
 805          KK     3-2
 806          KM   MEDIUM LOW DENSITY
 807          BA   .0209
 808          LS       0    90.0
 809          UD   0.143
              *

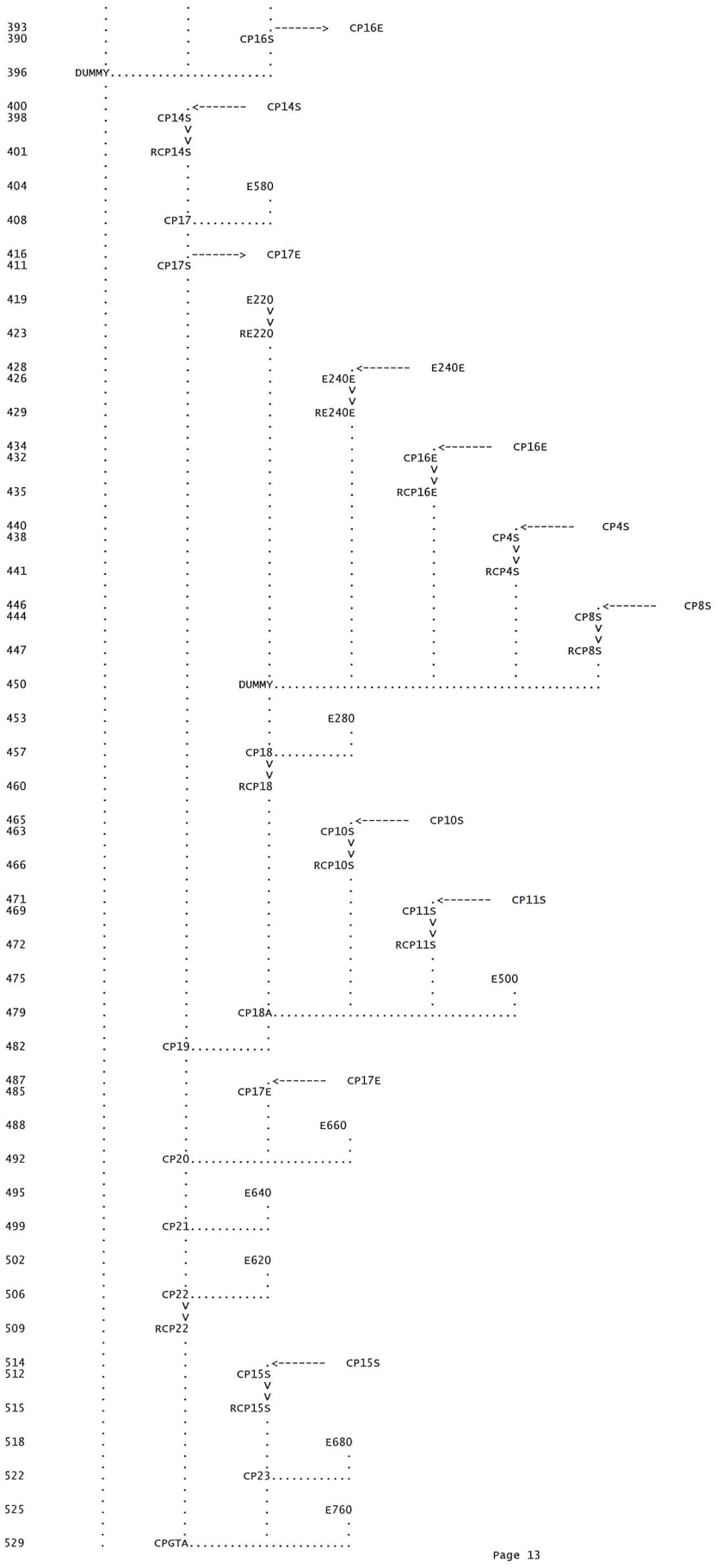
 810          KK     PT3
 811          KM   COMBINE 3-1 AND 3-2 IN ELKHORN STORM DRAIN
 812          HC       2
              *
 813          ZZ
1
             SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

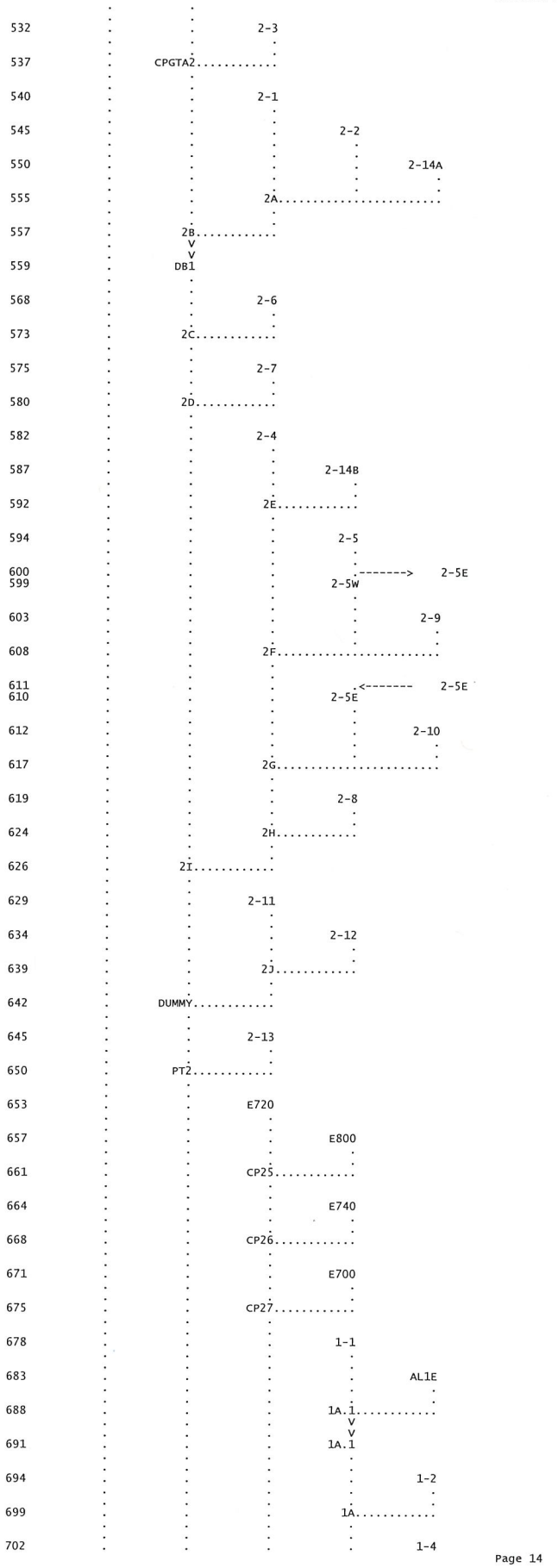
   NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

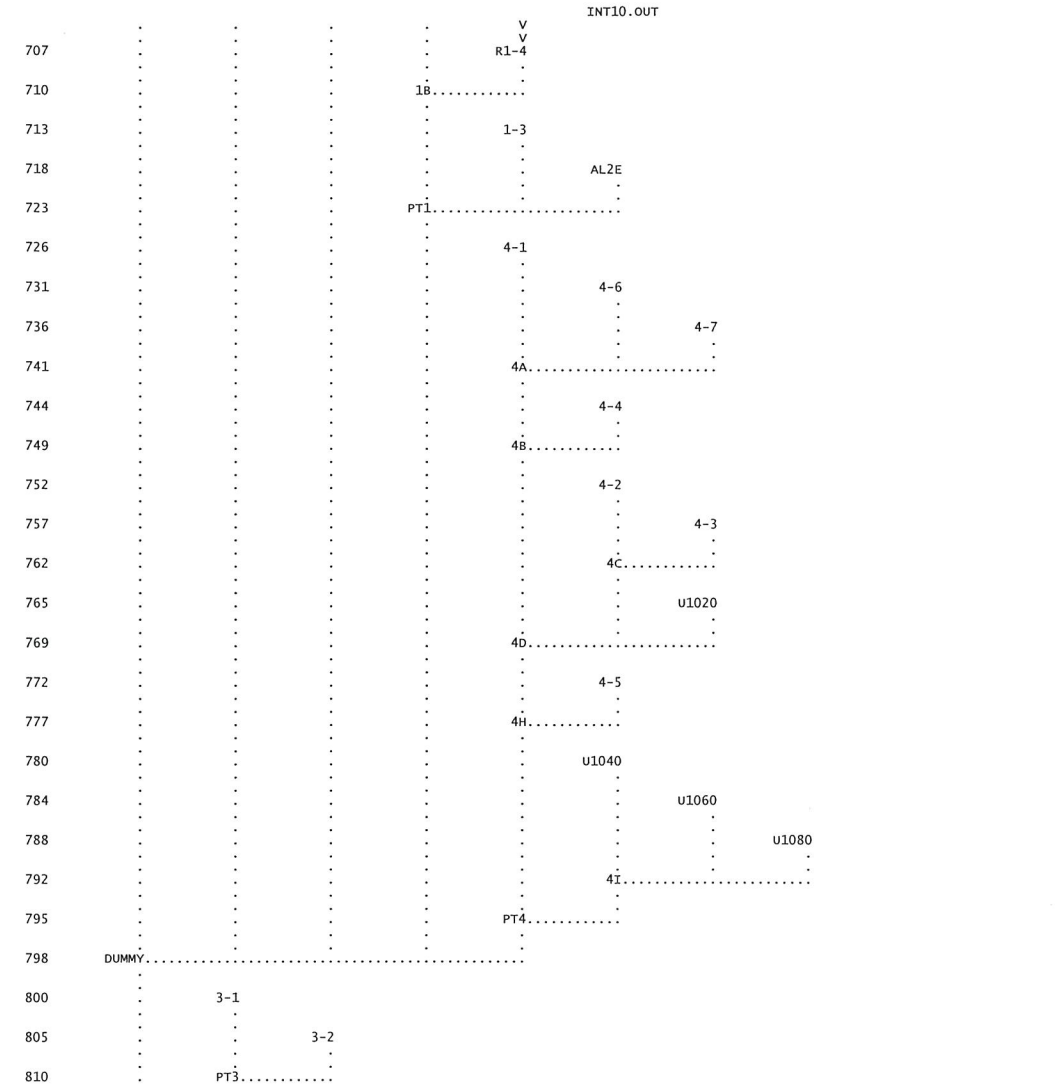
    21       E140
                .
                .
    34          .        E360
                .           .
                .           .
    38        CP1............
                .
                .
    44          .------->    CP1E
    41       CP1S
                .
                .
    47          .        E160
                .           .
                .           .
```


E160S
E160E
E340
CP2
CP2E
CP2S
E180
E160S
E320
CP3
CP3E
CP3S
E200
E300
CP4
CP4E
SOUTH
CP4S
NONE
E080
CP1E
E380
CP5
CP5E
CP5S
E060
E060E
E060S
RE060S
E100
CP6
CP6E
CP6S
RCP6S
E420
CP5E
RCP5E
CP7
CP7E
CP7S
CP2E
RCP2E
CP3E
RCP3E
CP4E
RCP4E
DUMMY
E400
CP8
CP8S
CP8E




393
390
CP16E
CP16S
396
DUMMY
400
398
CP14E
CP14S
401
RCP14S
404
E580
408
CP17
416
411
CP17E
CP17S
419
E220
423
RE220
428
426
E240E
429
RE240E
434
432
CP16E
435
RCP16E
440
438
CP4S
441
RCP4S
446
444
CP8S
447
RCP8S
450
DUMMY
453
E280
457
CP18
460
RCP18
465
463
CP10S
466
RCP10S
471
469
CP11S
472
RCP11S
475
E500
479
CP18A
482
CP19
487
485
CP17E
488
E660
492
CP20
495
E640
499
CP21
502
E620
506
CP22
509
RCP22
514
512
CP15S
515
RCP15S
518
E680
522
CP23
525
E760
529
CPGTA


532 2-3
537 CPGTA2
540 2-1
545 2-2
550 2-14A
555 2A
557 2B
559 DB1
568 2-6
573 2C
575 2-7
580 2D
582 2-4
587 2-14B
592 2E
594 2-5
600 2-5E
599 2-5W
603 2-9
608 2F
611 2-5E
610 2-5E
612 2-10
617 2G
619 2-8
624 2H
626 2I
629 2-11
634 2-12
639 2J
642 DUMMY
645 2-13
650 PT2
653 E720
657 E800
661 CP25
664 E740
668 CP26
671 E700
675 CP27
678 1-1
683 AL1E
688 1A.1
691 1A.1
694 1-2
699 1A
702 1-4



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN   1998                *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   08MAY13  TIME  14:12:38   *
*                                       *
*****************************************
```

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

SLATER HANIFAN GROUP, INC.
PARK HIGHLANDS WEST
MASTER DRAINAGE STUDY
INTERIM CONDITION

RETURN PERIOD ------- 10-YEAR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- CBH1301.002
FILENAME ------------ INT10.H1
DATE ---------------- MAY 2013
MODELED BY ---------- KC/KCR

SIX HOUR DEPTH-AREA REDUCTION FACTORS
DRAINAGE AREA (MI^2) DARF
10-YR EVENT   0.570

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

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

                    COMPUTATION INTERVAL     .08 HOURS
                        TOTAL TIME BASE   24.92 HOURS

           ENGLISH UNITS
                DRAINAGE AREA         SQUARE MILES
                PRECIPITATION DEPTH   INCHES
                LENGTH, ELEVATION     FEET
                FLOW                  CUBIC FEET PER SECOND
                STORAGE VOLUME        ACRE-FEET
```

```
             SURFACE AREA          ACRES
             TEMPERATURE           DEGREES FAHRENHEIT

    JP         MULTI-PLAN OPTION
                   NPLAN            1  NUMBER OF PLANS

    JR         MULTI-RATIO OPTION
                   RATIOS OF PRECIPITATION
                   .57


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


          **************
          *            *
559 KK    *       DB1  *
          *            *
          **************

561 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           2  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

567 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

             HYDROGRAPH ROUTING DATA

562 RS         STORAGE ROUTING
                   NSTPS           1  NUMBER OF SUBREACHES
                    ITYP        ELEV  TYPE OF INITIAL CONDITION
                  RSVRIC       -1.00  INITIAL CONDITION
                       X         .00 WORKING R AND D COEFFICIENT

563 SV           STORAGE          .0        .3       3.0       9.7      19.0      29.3      42.0     102.3     126.1     159.1

564 SE         ELEVATION     2297.00   2298.00   2299.00   2300.00   2301.00   2302.00   2303.00   2307.00   2308.50   2310.50

565 SQ         DISCHARGE          0.       72.      110.      138.      161.      199.      215.      231.      252.     1975.

566 SE         ELEVATION     2297.00   2300.00   2301.00   2302.00   2303.00   2305.00   2306.00   2307.00   2308.50   2310.50

                                                    ***

                                          COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00       .34      3.02      9.71     18.98     29.35     42.00     72.15     87.23    102.30
          OUTFLOW        .00     24.00     48.00     72.00    110.00    138.00    161.00    199.00    215.00    231.00
        ELEVATION    2297.00   2298.00   2299.00   2300.00   2301.00   2302.00   2303.00   2305.00   2306.00   2307.00

          STORAGE     126.12    159.12
          OUTFLOW     252.00   1975.00
        ELEVATION    2308.50   2310.50
```

****

HYDROGRAPH AT STATION DB1
PLAN 1, RATIO = .57

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2297.0	1		0820	101	95.	15.4	2300.6	1		1640	201	0.	.0	2297.0
1		0005	2	0.	.0	2297.0	1		0825	102	93.	14.8	2300.5	1		1645	202	0.	.0	2297.0
1		0010	3	0.	.0	2297.0	1		0830	103	90.	14.2	2300.5	1		1650	203	0.	.0	2297.0
1		0015	4	0.	.0	2297.0	1		0835	104	88.	13.6	2300.4	1		1655	204	0.	.0	2297.0
1		0020	5	0.	.0	2297.0	1		0840	105	86.	13.0	2300.4	1		1700	205	0.	.0	2297.0
1		0025	6	0.	.0	2297.0	1		0845	106	83.	12.5	2300.3	1		1705	206	0.	.0	2297.0
1		0030	7	0.	.0	2297.0	1		0850	107	81.	11.9	2300.2	1		1710	207	0.	.0	2297.0
1		0035	8	0.	.0	2297.0	1		0855	108	79.	11.4	2300.2	1		1715	208	0.	.0	2297.0
1		0040	9	0.	.0	2297.0	1		0900	109	77.	10.9	2300.1	1		1720	209	0.	.0	2297.0
1		0045	10	0.	.0	2297.0	1		0905	110	75.	10.4	2300.1	1		1725	210	0.	.0	2297.0
1		0050	11	0.	.0	2297.0	1		0910	111	73.	9.9	2300.0	1		1730	211	0.	.0	2297.0
1		0055	12	0.	.0	2297.0	1		0915	112	71.	9.4	2300.0	1		1735	212	0.	.0	2297.0
1		0100	13	0.	.0	2297.0	1		0920	113	69.	9.0	2299.9	1		1740	213	0.	.0	2297.0
1		0105	14	0.	.0	2297.0	1		0925	114	68.	8.5	2299.8	1		1745	214	0.	.0	2297.0
1		0110	15	0.	.0	2297.0	1		0930	115	66.	8.0	2299.8	1		1750	215	0.	.0	2297.0
1		0115	16	0.	.0	2297.0	1		0935	116	64.	7.6	2299.7	1		1755	216	0.	.0	2297.0
1		0120	17	0.	.0	2297.0	1		0940	117	63.	7.2	2299.6	1		1800	217	0.	.0	2297.0
1		0125	18	0.	.0	2297.0	1		0945	118	61.	6.7	2299.6	1		1805	218	0.	.0	2297.0
1		0130	19	1.	.0	2297.0	1		0950	119	60.	6.3	2299.5	1		1810	219	0.	.0	2297.0
1		0135	20	1.	.0	2297.0	1		0955	120	58.	5.9	2299.4	1		1815	220	0.	.0	2297.0
1		0140	21	1.	.0	2297.1	1		1000	121	57.	5.5	2299.4	1		1820	221	0.	.0	2297.0
1		0145	22	2.	.0	2297.1	1		1005	122	56.	5.2	2299.3	1		1825	222	0.	.0	2297.0
1		0150	23	2.	.0	2297.1	1		1010	123	54.	4.8	2299.3	1		1830	223	0.	.0	2297.0
1		0155	24	2.	.0	2297.1	1		1015	124	53.	4.4	2299.2	1		1835	224	0.	.0	2297.0
1		0200	25	2.	.0	2297.1	1		1020	125	52.	4.1	2299.2	1		1840	225	0.	.0	2297.0
1		0205	26	2.	.0	2297.1	1		1025	126	50.	3.7	2299.1	1		1845	226	0.	.0	2297.0
1		0210	27	2.	.0	2297.1	1		1030	127	49.	3.4	2299.1	1		1850	227	0.	.0	2297.0
1		0215	28	2.	.0	2297.1	1		1035	128	48.	3.0	2299.0	1		1855	228	0.	.0	2297.0
1		0220	29	3.	.0	2297.1	1		1040	129	45.	2.7	2298.9	1		1900	229	0.	.0	2297.0
1		0225	30	4.	.1	2297.2	1		1045	130	43.	2.4	2298.8	1		1905	230	0.	.0	2297.0
1		0230	31	5.	.1	2297.2	1		1050	131	40.	2.1	2298.7	1		1910	231	0.	.0	2297.0
1		0235	32	6.	.1	2297.2	1		1055	132	38.	1.9	2298.6	1		1915	232	0.	.0	2297.0
1		0240	33	6.	.1	2297.3	1		1100	133	35.	1.6	2298.5	1		1920	233	0.	.0	2297.0
1		0245	34	7.	.1	2297.3	1		1105	134	33.	1.4	2298.4	1		1925	234	0.	.0	2297.0
1		0250	35	8.	.1	2297.3	1		1110	135	31.	1.1	2298.3	1		1930	235	0.	.0	2297.0
1		0255	36	8.	.1	2297.4	1		1115	136	29.	.9	2298.2	1		1935	236	0.	.0	2297.0
1		0300	37	9.	.1	2297.4	1		1120	137	28.	.7	2298.2	1		1940	237	0.	.0	2297.0
1		0305	38	9.	.1	2297.4	1		1125	138	26.	.6	2298.1	1		1945	238	0.	.0	2297.0
1		0310	39	11.	.2	2297.5	1		1130	139	24.	.4	2298.0	1		1950	239	0.	.0	2297.0
1		0315	40	15.	.2	2297.6	1		1135	140	17.	.2	2297.7	1		1955	240	0.	.0	2297.0
1		0320	41	24.	.3	2298.0	1		1140	141	10.	.1	2297.4	1		2000	241	0.	.0	2297.0
1		0325	42	27.	.6	2298.1	1		1145	142	6.	.1	2297.3	1		2005	242	0.	.0	2297.0
1		0330	43	32.	1.2	2298.3	1		1150	143	4.	.1	2297.2	1		2010	243	0.	.0	2297.0
1		0335	44	40.	2.2	2298.7	1		1155	144	2.	.0	2297.1	1		2015	244	0.	.0	2297.0
1		0340	45	50.	3.5	2299.1	1		1200	145	1.	.0	2297.1	1		2020	245	0.	.0	2297.0
1		0345	46	55.	4.9	2299.3	1		1205	146	1.	.0	2297.0	1		2025	246	0.	.0	2297.0
1		0350	47	60.	6.5	2299.5	1		1210	147	1.	.0	2297.0	1		2030	247	0.	.0	2297.0
1		0355	48	66.	7.9	2299.7	1		1215	148	0.	.0	2297.0	1		2035	248	0.	.0	2297.0
1		0400	49	71.	9.3	2299.9	1		1220	149	0.	.0	2297.0	1		2040	249	0.	.0	2297.0
1		0405	50	76.	10.8	2300.1	1		1225	150	0.	.0	2297.0	1		2045	250	0.	.0	2297.0
1		0410	51	83.	12.4	2300.3	1		1230	151	0.	.0	2297.0	1		2050	251	0.	.0	2297.0
1		0415	52	90.	14.1	2300.5	1		1235	152	0.	.0	2297.0	1		2055	252	0.	.0	2297.0
1		0420	53	97.	15.8	2300.7	1		1240	153	0.	.0	2297.0	1		2100	253	0.	.0	2297.0
1		0425	54	103.	17.3	2300.8	1		1245	154	0.	.0	2297.0	1		2105	254	0.	.0	2297.0
1		0430	55	109.	18.8	2301.0	1		1250	155	0.	.0	2297.0	1		2110	255	0.	.0	2297.0
1		0435	56	113.	20.2	2301.1	1		1255	156	0.	.0	2297.0	1		2115	256	0.	.0	2297.0
1		0440	57	117.	21.6	2301.3	1		1300	157	0.	.0	2297.0	1		2120	257	0.	.0	2297.0
1		0445	58	121.	23.0	2301.4	1		1305	158	0.	.0	2297.0	1		2125	258	0.	.0	2297.0
1		0450	59	124.	24.2	2301.5	1		1310	159	0.	.0	2297.0	1		2130	259	0.	.0	2297.0
1		0455	60	127.	25.3	2301.6	1		1315	160	0.	.0	2297.0	1		2135	260	0.	.0	2297.0
1		0500	61	130.	26.4	2301.7	1		1320	161	0.	.0	2297.0	1		2140	261	0.	.0	2297.0
1		0505	62	133.	27.4	2301.8	1		1325	162	0.	.0	2297.0	1		2145	262	0.	.0	2297.0
1		0510	63	135.	28.2	2301.9	1		1330	163	0.	.0	2297.0	1		2150	263	0.	.0	2297.0
1		0515	64	137.	29.0	2302.0	1		1335	164	0.	.0	2297.0	1		2155	264	0.	.0	2297.0
1		0520	65	138.	29.6	2302.0	1		1340	165	0.	.0	2297.0	1		2200	265	0.	.0	2297.0

1	0525	66	139.	30.2	2302.1	*	1	1345	166	0.	.0	2297.0	*	1	2205	266	0.	.0	2297.0
1	0530	67	140.	30.6	2302.1	*	1	1350	167	0.	.0	2297.0	*	1	2210	267	0.	.0	2297.0
1	0535	68	141.	30.9	2302.1	*	1	1355	168	0.	.0	2297.0	*	1	2215	268	0.	.0	2297.0
1	0540	69	141.	31.2	2302.1	*	1	1400	169	0.	.0	2297.0	*	1	2220	269	0.	.0	2297.0
1	0545	70	142.	31.3	2302.2	*	1	1405	170	0.	.0	2297.0	*	1	2225	270	0.	.0	2297.0
1	0550	71	142.	31.3	2302.2	*	1	1410	171	0.	.0	2297.0	*	1	2230	271	0.	.0	2297.0
1	0555	72	142.	31.3	2302.2	*	1	1415	172	0.	.0	2297.0	*	1	2235	272	0.	.0	2297.0
1	0600	73	141.	31.2	2302.1	*	1	1420	173	0.	.0	2297.0	*	1	2240	273	0.	.0	2297.0
1	0605	74	141.	31.0	2302.1	*	1	1425	174	0.	.0	2297.0	*	1	2245	274	0.	.0	2297.0
1	0610	75	141.	30.8	2302.1	*	1	1430	175	0.	.0	2297.0	*	1	2250	275	0.	.0	2297.0
1	0615	76	140.	30.5	2302.1	*	1	1435	176	0.	.0	2297.0	*	1	2255	276	0.	.0	2297.0
1	0620	77	139.	30.1	2302.1	*	1	1440	177	0.	.0	2297.0	*	1	2300	277	0.	.0	2297.0
1	0625	78	139.	29.7	2302.0	*	1	1445	178	0.	.0	2297.0	*	1	2305	278	0.	.0	2297.0
1	0630	79	138.	29.2	2302.0	*	1	1450	179	0.	.0	2297.0	*	1	2310	279	0.	.0	2297.0
1	0635	80	136.	28.7	2301.9	*	1	1455	180	0.	.0	2297.0	*	1	2315	280	0.	.0	2297.0
1	0640	81	135.	28.2	2301.9	*	1	1500	181	0.	.0	2297.0	*	1	2320	281	0.	.0	2297.0
1	0645	82	133.	27.6	2301.8	*	1	1505	182	0.	.0	2297.0	*	1	2325	282	0.	.0	2297.0
1	0650	83	132.	27.0	2301.8	*	1	1510	183	0.	.0	2297.0	*	1	2330	283	0.	.0	2297.0
1	0655	84	130.	26.4	2301.7	*	1	1515	184	0.	.0	2297.0	*	1	2335	284	0.	.0	2297.0
1	0700	85	128.	25.8	2301.7	*	1	1520	185	0.	.0	2297.0	*	1	2340	285	0.	.0	2297.0
1	0705	86	127.	25.2	2301.6	*	1	1525	186	0.	.0	2297.0	*	1	2345	286	0.	.0	2297.0
1	0710	87	125.	24.5	2301.5	*	1	1530	187	0.	.0	2297.0	*	1	2350	287	0.	.0	2297.0
1	0715	88	123.	23.9	2301.5	*	1	1535	188	0.	.0	2297.0	*	1	2355	288	0.	.0	2297.0
1	0720	89	121.	23.2	2301.4	*	1	1540	189	0.	.0	2297.0	*	2	0000	289	0.	.0	2297.0
1	0725	90	120.	22.5	2301.3	*	1	1545	190	0.	.0	2297.0	*	2	0005	290	0.	.0	2297.0
1	0730	91	118.	21.9	2301.3	*	1	1550	191	0.	.0	2297.0	*	2	0010	291	0.	.0	2297.0
1	0735	92	116.	21.2	2301.2	*	1	1555	192	0.	.0	2297.0	*	2	0015	292	0.	.0	2297.0
1	0740	93	114.	20.5	2301.1	*	1	1600	193	0.	.0	2297.0	*	2	0020	293	0.	.0	2297.0
1	0745	94	112.	19.8	2301.1	*	1	1605	194	0.	.0	2297.0	*	2	0025	294	0.	.0	2297.0
1	0750	95	111.	19.2	2301.0	*	1	1610	195	0.	.0	2297.0	*	2	0030	295	0.	.0	2297.0
1	0755	96	108.	18.5	2301.0	*	1	1615	196	0.	.0	2297.0	*	2	0035	296	0.	.0	2297.0
1	0800	97	105.	17.9	2300.9	*	1	1620	197	0.	.0	2297.0	*	2	0040	297	0.	.0	2297.0
1	0805	98	103.	17.2	2300.8	*	1	1625	198	0.	.0	2297.0	*	2	0045	298	0.	.0	2297.0
1	0810	99	100.	16.6	2300.7	*	1	1630	199	0.	.0	2297.0	*	2	0050	299	0.	.0	2297.0
1	0815	100	98.	16.0	2300.7	*	1	1635	200	0.	.0	2297.0	*	2	0055	300	0.	.0	2297.0
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 142.	5.83		109.	32.	31.	31.
		(INCHES)	.843	.981	.981	.981
		(AC-FT)	54.	63.	63.	63.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)					
31.	5.83		20.	5.	5.	5.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)					
2302.16	5.83		2301.08	2298.21	2298.16	2298.16

CUMULATIVE AREA = 1.21 SQ MI

1

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1
					.57
HYDROGRAPH AT					
+	E140	.07	1	FLOW	11.
				TIME	4.08
HYDROGRAPH AT					
+	E360	.01	1	FLOW	4.
				TIME	3.58
2 COMBINED AT					
+	CP1	.08	1	FLOW	12.
				TIME	4.08
DIVERSION TO					
+	CP1E	.08	1	FLOW	5.
				TIME	4.08
HYDROGRAPH AT					
+	CP1S	.08	1	FLOW	7.
				TIME	4.08
HYDROGRAPH AT					
+	E160	.06	1	FLOW	14.
				TIME	3.92
DIVERSION TO					
+	E160S	.06	1	FLOW	10.
				TIME	3.92
HYDROGRAPH AT					
+	E160E	.06	1	FLOW	4.
				TIME	3.92
HYDROGRAPH AT					
+	E340	.02	1	FLOW	7.
				TIME	3.58
3 COMBINED AT					
+	CP2	.16	1	FLOW	15.
				TIME	3.83
DIVERSION TO					
+	CP2E	.16	1	FLOW	8.
				TIME	3.83
HYDROGRAPH AT					
+	CP2S	.16	1	FLOW	7.
				TIME	3.83
HYDROGRAPH AT					
+	E180	.21	1	FLOW	28.
				TIME	4.25
HYDROGRAPH AT					
+	E160S	.00	1	FLOW	10.
				TIME	3.92
HYDROGRAPH AT					
+	E320	.02	1	FLOW	7.
				TIME	3.58
4 COMBINED AT					
+	CP3	.39	1	FLOW	43.
				TIME	4.08
DIVERSION TO					
+	CP3E	.39	1	FLOW	20.
				TIME	4.08

HYDROGRAPH AT					
+	CP3S	.39	1	FLOW	23.
				TIME	4.08
HYDROGRAPH AT					
+	E200	.01	1	FLOW	2.
				TIME	3.67
HYDROGRAPH AT					
+	E300	.01	1	FLOW	6.
				TIME	3.58
3 COMBINED AT					
+	CP4	.41	1	FLOW	26.
				TIME	4.08
DIVERSION TO					
+	CP4E	.41	1	FLOW	7.
				TIME	4.08
HYDROGRAPH AT					
+	SOUTH	.41	1	FLOW	19.
				TIME	4.08
DIVERSION TO					
+	CP4S	.41	1	FLOW	19.
				TIME	4.08
HYDROGRAPH AT					
+	NONE	.41	1	FLOW	0.
				TIME	.00
HYDROGRAPH AT					
+	E080	.01	1	FLOW	4.
				TIME	3.67
HYDROGRAPH AT					
+	CP1E	.00	1	FLOW	5.
				TIME	4.08
HYDROGRAPH AT					
+	E380	.02	1	FLOW	8.
				TIME	3.67
3 COMBINED AT					
+	CP5	.03	1	FLOW	15.
				TIME	3.67
DIVERSION TO					
+	CP5E	.03	1	FLOW	8.
				TIME	3.67
HYDROGRAPH AT					
+	CP5S	.03	1	FLOW	7.
				TIME	3.67
HYDROGRAPH AT					
+	E060	.26	1	FLOW	42.
				TIME	4.17
DIVERSION TO					
+	E060E	.26	1	FLOW	19.
				TIME	4.17
HYDROGRAPH AT					
+	E060S	.26	1	FLOW	23.
				TIME	4.17
ROUTED TO					
+	RE060S	.26	1	FLOW	23.
				TIME	4.33
HYDROGRAPH AT					
+	E100	.47	1	FLOW	53.
				TIME	4.58
2 COMBINED AT					
+	CP6	.73	1	FLOW	74.
				TIME	4.50
DIVERSION TO					
+	CP6E	.73	1	FLOW	60.
				TIME	4.50
HYDROGRAPH AT					
+	CP6S	.73	1	FLOW	14.
				TIME	4.50
ROUTED TO					
+	RCP6S	.73	1	FLOW	14.
				TIME	4.67
HYDROGRAPH AT					
+	E420	.10	1	FLOW	35.
				TIME	3.67
HYDROGRAPH AT					
+	CP5E	.00	1	FLOW	8.
				TIME	3.67
ROUTED TO					
+	RCP5E	.00	1	FLOW	8.
				TIME	3.92
3 COMBINED AT					
+	CP7	.82	1	FLOW	40.
				TIME	3.75
DIVERSION TO					
+	CP7E	.82	1	FLOW	0.
				TIME	.00
HYDROGRAPH AT					
+	CP7S	.82	1	FLOW	40.
				TIME	3.75
HYDROGRAPH AT					
+	CP2E	.00	1	FLOW	8.
				TIME	3.83
ROUTED TO					
+	RCP2E	.00	1	FLOW	8.
				TIME	4.08
HYDROGRAPH AT					
+	CP3E	.00	1	FLOW	20.
				TIME	4.08
ROUTED TO					
+	RCP3E	.00	1	FLOW	20.
				TIME	4.33
HYDROGRAPH AT					
+	CP4E	.00	1	FLOW	7.
				TIME	4.08
ROUTED TO					

+	RCP4E	.00	1	FLOW	7.
				TIME	4.25
5 COMBINED AT					
+	DUMMY	.85	1	FLOW	64.
				TIME	4.00
HYDROGRAPH AT					
+	E400	.08	1	FLOW	30.
				TIME	3.75
2 COMBINED AT					
+	CP8	.94	1	FLOW	85.
				TIME	3.83
DIVERSION TO					
+	CP8S	.94	1	FLOW	56.
				TIME	3.83
HYDROGRAPH AT					
+	CP8E	.94	1	FLOW	29.
				TIME	3.83
ROUTED TO					
+	RCP8E	.94	1	FLOW	29.
				TIME	4.08
HYDROGRAPH AT					
+	E440	.05	1	FLOW	12.
				TIME	3.75
DIVERSION TO					
+	E440E	.05	1	FLOW	7.
				TIME	3.75
HYDROGRAPH AT					
+	E440S	.05	1	FLOW	5.
				TIME	3.75
HYDROGRAPH AT					
+	E460	.11	1	FLOW	22.
				TIME	3.83
2 COMBINED AT					
+	CP9	.17	1	FLOW	26.
				TIME	3.83
DIVERSION TO					
+	CP9E	.17	1	FLOW	0.
				TIME	.00
HYDROGRAPH AT					
+	CP9S	.17	1	FLOW	26.
				TIME	3.83
HYDROGRAPH AT					
+	CP7E	.00	1	FLOW	0.
				TIME	.00
ROUTED TO					
+	RCP7E	.00	1	FLOW	0.
				TIME	.00
HYDROGRAPH AT					
+	E480	.09	1	FLOW	21.
				TIME	3.75
4 COMBINED AT					
+	CP10	1.19	1	FLOW	72.
				TIME	3.83
DIVERSION TO					
+	CP10S	1.19	1	FLOW	33.
				TIME	3.83
HYDROGRAPH AT					
+	CP10E	1.19	1	FLOW	39.
				TIME	3.83
HYDROGRAPH AT					
+	CP9E	.00	1	FLOW	0.
				TIME	.00
HYDROGRAPH AT					
+	E520	.01	1	FLOW	6.
				TIME	3.58
3 COMBINED AT					
+	CP11	1.21	1	FLOW	43.
				TIME	3.83
DIVERSION TO					
+	CP11S	1.21	1	FLOW	19.
				TIME	3.83
HYDROGRAPH AT					
+	CP11E	1.21	1	FLOW	24.
				TIME	3.83
ROUTED TO					
+	RCP11E	1.21	1	FLOW	24.
				TIME	4.00
HYDROGRAPH AT					
+	E060E	.00	1	FLOW	19.
				TIME	4.17
ROUTED TO					
+	RE060E	.00	1	FLOW	19.
				TIME	4.67
HYDROGRAPH AT					
+	CP6E	.00	1	FLOW	60.
				TIME	4.50
ROUTED TO					
+	RCP6E	.00	1	FLOW	60.
				TIME	4.83
HYDROGRAPH AT					
+	E040	.36	1	FLOW	68.
				TIME	4.00
3 COMBINED AT					
+	CP12	.36	1	FLOW	110.
				TIME	4.83
DIVERSION TO					
+	CP12E	.36	1	FLOW	0.
				TIME	.00
HYDROGRAPH AT					
+	CP12S	.36	1	FLOW	110.
				TIME	4.83
ROUTED TO					
+	RCP12S	.36	1	FLOW	110.

				TIME	4.83
HYDROGRAPH AT					
+	E540	.05	1	FLOW	22.
				TIME	3.58
2 COMBINED AT					
+	CP13	.41	1	FLOW	116.
				TIME	4.83
DIVERSION TO					
+	CP13E	.41	1	FLOW	0.
				TIME	.00
HYDROGRAPH AT					
+	CP13S	.41	1	FLOW	116.
				TIME	4.83
ROUTED TO					
+	RCP13S	.41	1	FLOW	116.
				TIME	4.83
HYDROGRAPH AT					
+	E440E	.00	1	FLOW	7.
				TIME	3.75
ROUTED TO					
+	RE440E	.00	1	FLOW	7.
				TIME	4.33
HYDROGRAPH AT					
+	E560	.18	1	FLOW	72.
				TIME	3.83
4 COMBINED AT					
+	CP14	1.80	1	FLOW	154.
				TIME	4.92
DIVERSION TO					
+	CP14S	1.80	1	FLOW	30.
				TIME	4.92
HYDROGRAPH AT					
+	CP14E	1.80	1	FLOW	124.
				TIME	4.92
ROUTED TO					
+	RCP14E	1.80	1	FLOW	125.
				TIME	5.08
HYDROGRAPH AT					
+	E600	.09	1	FLOW	26.
				TIME	3.75
2 COMBINED AT					
+	CP15	1.88	1	FLOW	133.
				TIME	4.08
DIVERSION TO					
+	CP15S	1.88	1	FLOW	0.
				TIME	.00
HYDROGRAPH AT					
+	CP15E	1.88	1	FLOW	133.
				TIME	4.08
HYDROGRAPH AT					
+	E240	.13	1	FLOW	29.
				TIME	4.00
DIVERSION TO					
+	E240E	.13	1	FLOW	15.
				TIME	4.00
HYDROGRAPH AT					
+	E240S	.13	1	FLOW	14.
				TIME	4.00
HYDROGRAPH AT					
+	E260	.14	1	FLOW	32.
				TIME	3.92
2 COMBINED AT					
+	CP16	.27	1	FLOW	45.
				TIME	3.92
DIVERSION TO					
+	CP16E	.27	1	FLOW	23.
				TIME	3.92
HYDROGRAPH AT					
+	CP16S	.27	1	FLOW	22.
				TIME	3.92
3 COMBINED AT					
+	DUMMY	2.56	1	FLOW	153.
				TIME	4.08
HYDROGRAPH AT					
+	CP14S	.00	1	FLOW	30.
				TIME	4.92
ROUTED TO					
+	RCP14S	.00	1	FLOW	30.
				TIME	5.00
HYDROGRAPH AT					
+	E580	.10	1	FLOW	41.
				TIME	3.75
2 COMBINED AT					
+	CP17	.10	1	FLOW	62.
				TIME	3.83
DIVERSION TO					
+	CP17E	.10	1	FLOW	0.
				TIME	.00
HYDROGRAPH AT					
+	CP17S	.10	1	FLOW	62.
				TIME	3.83
HYDROGRAPH AT					
+	E220	.04	1	FLOW	13.
				TIME	3.75
ROUTED TO					
+	RE220	.04	1	FLOW	15.
				TIME	4.25
HYDROGRAPH AT					
+	E240E	.00	1	FLOW	15.
				TIME	4.00
ROUTED TO					
+	RE240E	.00	1	FLOW	15.
				TIME	4.50

HYDROGRAPH AT					
+	CP16E	.00	1	FLOW	23.
				TIME	3.92
ROUTED TO					
+	RCP16E	.00	1	FLOW	23.
				TIME	4.25
HYDROGRAPH AT					
+	CP4S	.00	1	FLOW	19.
				TIME	4.08
ROUTED TO					
+	RCP4S	.00	1	FLOW	19.
				TIME	4.17
HYDROGRAPH AT					
+	CP8S	.00	1	FLOW	56.
				TIME	3.83
ROUTED TO					
+	RCP8S	.00	1	FLOW	56.
				TIME	4.08
5 COMBINED AT					
+	DUMMY	.04	1	FLOW	120.
				TIME	4.25
HYDROGRAPH AT					
+	E280	.28	1	FLOW	68.
				TIME	3.92
2 COMBINED AT					
+	CP18	.32	1	FLOW	162.
				TIME	4.25
ROUTED TO					
+	RCP18	.32	1	FLOW	160.
				TIME	4.50
HYDROGRAPH AT					
+	CP10S	.00	1	FLOW	33.
				TIME	3.83
ROUTED TO					
+	RCP10S	.00	1	FLOW	36.
				TIME	4.25
HYDROGRAPH AT					
+	CP11S	.00	1	FLOW	19.
				TIME	3.83
ROUTED TO					
+	RCP11S	.00	1	FLOW	19.
				TIME	4.17
HYDROGRAPH AT					
+	E500	.39	1	FLOW	82.
				TIME	4.00
4 COMBINED AT					
+	CP18A	.71	1	FLOW	252.
				TIME	4.42
2 COMBINED AT					
+	CP19	.81	1	FLOW	293.
				TIME	4.25
HYDROGRAPH AT					
+	CP17E	.00	1	FLOW	0.
				TIME	.00
HYDROGRAPH AT					
+	E660	.01	1	FLOW	6.
				TIME	3.58
3 COMBINED AT					
+	CP20	.82	1	FLOW	294.
				TIME	4.25
HYDROGRAPH AT					
+	E640	.07	1	FLOW	30.
				TIME	3.67
2 COMBINED AT					
+	CP21	.89	1	FLOW	304.
				TIME	4.17
HYDROGRAPH AT					
+	E620	.05	1	FLOW	22.
				TIME	3.67
2 COMBINED AT					
+	CP22	.94	1	FLOW	311.
				TIME	4.17
ROUTED TO					
+	RCP22	.94	1	FLOW	311.
				TIME	4.25
HYDROGRAPH AT					
+	CP15S	.00	1	FLOW	0.
				TIME	.00
ROUTED TO					
+	RCP15S	.00	1	FLOW	0.
				TIME	.00
HYDROGRAPH AT					
+	E680	.11	1	FLOW	46.
				TIME	3.75
2 COMBINED AT					
+	CP23	.11	1	FLOW	46.
				TIME	3.75
HYDROGRAPH AT					
+	E760	.01	1	FLOW	4.
				TIME	3.58
3 COMBINED AT					
+	CPGTA	1.06	1	FLOW	329.
				TIME	4.25
HYDROGRAPH AT					
+	2-3	.03	1	FLOW	15.
				TIME	3.58
2 COMBINED AT					
+	CPGTA2	1.09	1	FLOW	331.
				TIME	4.25
HYDROGRAPH AT					
+	2-1	.04	1	FLOW	28.
				TIME	3.58

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 HYDROGRAPH AT
+                    2-2        .07     1   FLOW          44.
                                            TIME         3.67

 HYDROGRAPH AT
+                  2-14A        .00     1   FLOW           1.
                                            TIME         3.58

  3 COMBINED AT
+                     2A        .11     1   FLOW          72.
                                            TIME         3.58

  2 COMBINED AT
+                     2B       1.21     1   FLOW         344.
                                            TIME         4.25

 ROUTED TO
+                    DB1       1.21     1   FLOW         142.
                                            TIME         5.83

                                    ** PEAK STAGES IN FEET **
                                    1   STAGE     2302.16
                                            TIME         5.83

 HYDROGRAPH AT
+                    2-6        .02     1   FLOW          15.
                                            TIME         3.58

  2 COMBINED AT
+                     2C       1.22     1   FLOW         142.
                                            TIME         5.83

 HYDROGRAPH AT
+                    2-7        .02     1   FLOW           8.
                                            TIME         3.58

  2 COMBINED AT
+                     2D       1.24     1   FLOW         142.
                                            TIME         5.83

 HYDROGRAPH AT
+                    2-4        .03     1   FLOW          28.
                                            TIME         3.58

 HYDROGRAPH AT
+                  2-14B        .00     1   FLOW           1.
                                            TIME         3.58

  2 COMBINED AT
+                     2E        .04     1   FLOW          30.
                                            TIME         3.58

 HYDROGRAPH AT
+                    2-5        .09     1   FLOW          53.
                                            TIME         3.67

 DIVERSION TO
+                   2-5E        .09     1   FLOW          25.
                                            TIME         3.67

 HYDROGRAPH AT
+                   2-5W        .09     1   FLOW          28.
                                            TIME         3.67

 HYDROGRAPH AT
+                    2-9        .02     1   FLOW          11.
                                            TIME         3.58

  3 COMBINED AT
+                     2F        .14     1   FLOW          67.
                                            TIME         3.58

 HYDROGRAPH AT
+                   2-5E        .00     1   FLOW          25.
                                            TIME         3.67

 HYDROGRAPH AT
+                   2-10        .02     1   FLOW          12.
                                            TIME         3.58

  3 COMBINED AT
+                     2G        .16     1   FLOW         103.
                                            TIME         3.58

 HYDROGRAPH AT
+                    2-8        .03     1   FLOW          24.
                                            TIME         3.58

  2 COMBINED AT
+                     2H        .19     1   FLOW         127.
                                            TIME         3.58

  2 COMBINED AT
+                     2I       1.43     1   FLOW         190.
                                            TIME         3.58

 HYDROGRAPH AT
+                   2-11        .03     1   FLOW          22.
                                            TIME         3.58

 HYDROGRAPH AT
+                   2-12        .03     1   FLOW          17.
                                            TIME         3.58

  2 COMBINED AT
+                     2J        .05     1   FLOW          39.
                                            TIME         3.58

  2 COMBINED AT
+                  DUMMY       1.48     1   FLOW         229.
                                            TIME         3.58

 HYDROGRAPH AT
+                   2-13        .03     1   FLOW          18.
                                            TIME         3.58

  2 COMBINED AT
+                    PT2       1.51     1   FLOW         247.
                                            TIME         3.58

 HYDROGRAPH AT
+                   E720        .06     1   FLOW          28.
                                            TIME         3.67

 HYDROGRAPH AT
+                   E800        .01     1   FLOW           6.
                                            TIME         3.58

  2 COMBINED AT
+                   CP25        .07     1   FLOW          33.
                                            TIME         3.67

 HYDROGRAPH AT
+                   E740        .05     1   FLOW          26.
                                            TIME         3.67

  2 COMBINED AT
```

+	CP26	.12	1	FLOW	59.
				TIME	3.67
HYDROGRAPH AT					
+	E700	.14	1	FLOW	50.
				TIME	3.83
2 COMBINED AT					
+	CP27	.26	1	FLOW	101.
				TIME	3.75
HYDROGRAPH AT					
+	1-1	.03	1	FLOW	29.
				TIME	3.58
HYDROGRAPH AT					
+	AL1E	.00	1	FLOW	3.
				TIME	3.50
2 COMBINED AT					
+	1A.1	.04	1	FLOW	31.
				TIME	3.58
ROUTED TO					
+	1A.1	.04	1	FLOW	31.
				TIME	3.58
HYDROGRAPH AT					
+	1-2	.04	1	FLOW	29.
				TIME	3.58
2 COMBINED AT					
+	1A	.07	1	FLOW	60.
				TIME	3.58
HYDROGRAPH AT					
+	1-4	.04	1	FLOW	25.
				TIME	3.58
ROUTED TO					
+	R1-4	.04	1	FLOW	25.
				TIME	3.67
2 COMBINED AT					
+	1B	.11	1	FLOW	80.
				TIME	3.58
HYDROGRAPH AT					
+	1-3	.04	1	FLOW	27.
				TIME	3.58
HYDROGRAPH AT					
+	AL2E	.00	1	FLOW	3.
				TIME	3.50
3 COMBINED AT					
+	PT1	.15	1	FLOW	109.
				TIME	3.58
HYDROGRAPH AT					
+	4-1	.04	1	FLOW	30.
				TIME	3.58
HYDROGRAPH AT					
+	4-6	.00	1	FLOW	2.
				TIME	3.58
HYDROGRAPH AT					
+	4-7	.05	1	FLOW	29.
				TIME	3.58
3 COMBINED AT					
+	4A	.09	1	FLOW	61.
				TIME	3.58
HYDROGRAPH AT					
+	4-4	.01	1	FLOW	8.
				TIME	3.58
2 COMBINED AT					
+	4B	.10	1	FLOW	69.
				TIME	3.58
HYDROGRAPH AT					
+	4-2	.05	1	FLOW	43.
				TIME	3.58
HYDROGRAPH AT					
+	4-3	.05	1	FLOW	34.
				TIME	3.58
2 COMBINED AT					
+	4C	.11	1	FLOW	77.
				TIME	3.58
HYDROGRAPH AT					
+	U1020	.01	1	FLOW	7.
				TIME	3.58
3 COMBINED AT					
+	4D	.22	1	FLOW	153.
				TIME	3.58
HYDROGRAPH AT					
+	4-5	.06	1	FLOW	50.
				TIME	3.58
2 COMBINED AT					
+	4H	.28	1	FLOW	203.
				TIME	3.58
HYDROGRAPH AT					
+	U1040	.02	1	FLOW	17.
				TIME	3.58
HYDROGRAPH AT					
+	U1060	.01	1	FLOW	5.
				TIME	3.50
HYDROGRAPH AT					
+	U1080	.03	1	FLOW	21.
				TIME	3.58
3 COMBINED AT					
+	4I	.05	1	FLOW	43.
				TIME	3.58
2 COMBINED AT					
+	PT4	.33	1	FLOW	246.
				TIME	3.58
5 COMBINED AT					
+	DUMMY	4.81	1	FLOW	724.
				TIME	3.58
HYDROGRAPH AT					
+	3-1	.04	1	FLOW	30.

TIME 3.58

HYDROGRAPH AT
+ 3-2 .02 1 FLOW 14.
TIME 3.58

2 COMBINED AT
+ PT3 .06 1 FLOW 43.
TIME 3.58

1

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

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	INTERPOLATED TO COMPUTATION INTERVAL DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)
FOR PLAN = 1 RATIO= .00									
RE060S	MANE	4.75	22.80	256.50	.22	5.00	22.79	260.00	.22
CONTINUITY SUMMARY (AC-FT) - INFLOW= .3074E+01 EXCESS= .0000E+00 OUTFLOW= .3076E+01 BASIN STORAGE= .8120E-03 PERCENT ERROR= -.1									
FOR PLAN = 1 RATIO= .00									
RCP6S	MANE	5.00	14.02	280.00	.06	5.00	14.02	280.00	.06
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2302E+01 EXCESS= .0000E+00 OUTFLOW= .2303E+01 BASIN STORAGE= .1545E-02 PERCENT ERROR= -.1									
FOR PLAN = 1 RATIO= .00									
RCP5E	MANE	4.25	7.96	233.75	-1.00	5.00	7.89	235.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP2E	MANE	4.50	7.94	243.00	-1.00	5.00	7.94	245.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP3E	MANE	5.00	20.08	260.00	-1.00	5.00	20.08	260.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP4E	MANE	5.00	6.85	255.00	-1.00	5.00	6.85	255.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP8E	MANE	5.00	29.00	245.00	.09	5.00	29.00	245.00	.09
CONTINUITY SUMMARY (AC-FT) - INFLOW= .4699E+01 EXCESS= .0000E+00 OUTFLOW= .4702E+01 BASIN STORAGE= .1574E-02 PERCENT ERROR= -.1									
FOR PLAN = 1 RATIO= .00									
RCP7E	MANE	5.00	.00	.00	-1.00	5.00	.00	245.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP11E	MANE	5.00	23.78	240.00	.05	5.00	23.78	240.00	.05
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2898E+01 EXCESS= .0000E+00 OUTFLOW= .2900E+01 BASIN STORAGE= .1148E-02 PERCENT ERROR= -.1									
FOR PLAN = 1 RATIO= .00									
RE060E	MANE	4.75	19.28	280.25	-1.00	5.00	19.22	280.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP6E	MANE	5.00	60.03	290.00	-1.00	5.00	60.03	290.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP12S	MANE	5.00	110.34	290.00	1.04	5.00	110.34	290.00	1.04
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2001E+02 EXCESS= .0000E+00 OUTFLOW= .2001E+02 BASIN STORAGE= .9991E-03 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
RCP13S	MANE	5.00	116.05	290.00	.97	5.00	116.05	290.00	.97
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2143E+02 EXCESS= .0000E+00 OUTFLOW= .2143E+02 BASIN STORAGE= .9746E-03 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
RE440E	MANE	2.25	7.47	252.00	-1.00	5.00	6.69	260.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP14E	MANE	5.00	124.91	305.00	.26	5.00	124.91	305.00	.26
CONTINUITY SUMMARY (AC-FT) - INFLOW= .2532E+02 EXCESS= .0000E+00 OUTFLOW= .2532E+02 BASIN STORAGE= .1872E-02 PERCENT ERROR= .0									
FOR PLAN = 1 RATIO= .00									
RCP14S	MANE	5.00	30.13	300.00	-1.00	5.00	30.13	300.00	-1.00
FOR PLAN = 1 RATIO= .00									
RE220	MANE	4.00	15.34	256.00	.45	5.00	14.63	255.00	.45
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1053E+01 EXCESS= .0000E+00 OUTFLOW= .1063E+01 BASIN STORAGE= .3922E-02 PERCENT ERROR= -1.4									
FOR PLAN = 1 RATIO= .00									
RE240E	MANE	4.25	15.35	267.75	-1.00	5.00	14.53	270.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP16E	MANE	4.25	23.18	255.00	-1.00	5.00	23.18	255.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP4S	MANE	5.00	19.44	250.00	-1.00	5.00	19.44	250.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP8S	MANE	5.00	56.03	245.00	-1.00	5.00	56.03	245.00	-1.00

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          FOR PLAN = 1  RATIO=  .00
             RCP18  MANE          5.00    159.66    270.00      1.37      5.00    159.66    270.00        1.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2357E+02 EXCESS= .0000E+00 OUTFLOW= .2360E+02 BASIN STORAGE= .4241E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
            RCP10S  MANE          5.00     35.87    255.00     -1.00      5.00     35.87    255.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP11S  MANE          5.00     19.11    250.00     -1.00      5.00     19.11    250.00       -1.00


          FOR PLAN = 1  RATIO=  .00
             RCP22  MANE          3.98    310.69    254.65      1.05      5.00    310.66    255.00        1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5284E+02 EXCESS= .0000E+00 OUTFLOW= .5284E+02 BASIN STORAGE= .8757E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RCP15S  MANE          5.00       .00       .00     -1.00      5.00       .00    255.00       -1.00


          FOR PLAN = 1  RATIO=  .57
             1A.1  MANE           .58     30.83    215.71      1.03      5.00     30.55    215.00        1.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2038E+01 EXCESS= .0000E+00 OUTFLOW= .2038E+01 BASIN STORAGE= .2201E-11 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             R1-4  MANE          5.00     24.84    220.00       .81      5.00     24.84    220.00         .81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1601E+01 EXCESS= .0000E+00 OUTFLOW= .1604E+01 BASIN STORAGE= .2823E-02 PERCENT ERROR=   -.4


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

HEC-1 Model: 100-Year Interim Condition

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *             JUN   1998                *
 *           VERSION 4.1                 *
 *                                       *
 *  RUN DATE   08MAY13  TIME  14:12:53   *
 *                                       *
 *****************************************
```

```
*****************************************
*                                       *
*    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, INC.
    2         ID     PARK HIGHLANDS WEST
    3         ID     MASTER DRAINAGE STUDY
    4         ID     INTERIM CONDITION
    5         ID
    6         ID     RETURN PERIOD ------- 100-YEAR
    7         ID     DISTRIBUTION -------- 6-HOUR SDN3
    8         ID     PROJECT NO. --------- CBH1301.002
    9         ID     FILENAME ------------ INT100.H1
   10         ID     DATE ---------------- MAY 2013
   11         ID     MODELED BY ---------- KC/KCR
   12         ID
   13         ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
   14         ID        DRAINAGE AREA (MI^2)       DARF
   15         ID        0.00-0.49                  0.990
   16         ID        0.50-0.99                  0.975
   17         ID        1.00-1.99                  0.950
   18         ID        2.00-2.99                  0.925
   19         ID        3.00-3.99                  0.915
   20         ID        4.00-4.99                  0.908
   21         ID
   22         IT       5       0       0     300
   23         IO       5       0       0
   24         IN       5       0       0
   25         JR    PREC   0.990   0.975   0.950   0.925   0.915   0.908
              *
   26         KK    E140
   27         BA   .0675
   28         PB    2.77
   29         PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
   30         PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
   31         PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
   32         PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
   33         PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
   34         PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
   35         PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
   36         PC   0.998   0.999   1.000
   37         LS       0    81.9
   38         UD   0.599
              *
   39         KK    E360
   40         BA   .0095
   41         LS       0    85.6
   42         UD   0.159
              *
   43         KK     CP1
   44         KM   COMBINE E140 AND E360 AT MAGGIE AND MUSTANG
   45         HC       2
              *
```

1 HEC-1 INPUT PAGE 2

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

   46         KK    CP1S
   47         KM   CP1E IS THE FLOW DRAINING EAST IN MAGGIE
   48         KM   CP1S IS THE FLOW DRAINING SOUTH IN MUSTANG
   49         DT    CP1E
   50         DI      33      33      34      35      37      38
   51         DQ      15      15      15      16      17      17
              *
   52         KK    E160
   53         BA   .0641
   54         LS       0    83.1
   55         UD   0.445
              *
   56         KK   E160E
   57         KM   E160E IS THE FLOW DRAINING EAST IN MAGGIE
   58         KM   E160S IS THE FLOW DRAINING SOUTH IN TORREY PINES
   59         KM   FLOW IN TORREY PINES IS BASED ON 1/2 STREET CAPACITY, 10 CFS
   60         DT   E160S
   61         DI      37      37      38      40      41      42
   62         DQ      10      10      10      10      10      10
              *
   63         KK    E340
   64         BA   .0168
   65         LS       0    85.8
   66         UD   0.172
              *
   67         KK     CP2
   68         KM   COMBINE CP1S E160E AND E340 AT BRENT AND MUSTANG
   69         HC       3
              *
   70         KK    CP2S
   71         KM   CP2E IS THE FLOW DRAINING EAST IN BRENT
   72         KM   CP2S IS THE FLOW DRAINING SOUTH IN MUSTANG
   73         DT    CP2E
   74         DI      50      51      53      57      60      62
   75         DQ      25      26      27      29      30      31
              *
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  76          KK    E180
  77          BA   .2142
  78          LS       0    80.7
  79          UD   0.715
              *

  80          KK   E160S
  81          KM   RETRIEVE E160S
  82          DR   E160S
              *
1                                    HEC-1 INPUT                                          PAGE  3

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

  83          KK    E320
  84          BA   .0169
  85          LS       0    85.7
  86          UD   0.168
              *

  87          KK     CP3
  88          KM   COMBINE CP2S E180 E160S AND E320 AT GUY AND MUSTANG
  89          HC       4
              *

  90          KK    CP3S
  91          KM   CP3E IS THE FLOW DRAINING EAST IN GUY
  92          KM   CP3S IS THE FLOW DRAINING SOUTH IN MUSTANG
  93          DT    CP3E
  94          DI     110     112     115     122     128     131
  95          DQ      53      53      54      58      61      62
              *

  96          KK    E200
  97          BA   .0059
  98          LS       0    83.7
  99          UD   0.183
              *

 100          KK    E300
 101          BA   .0132
 102          LS       0    85.8
 103          UD   0.168
              *

 104          KK     CP4
 105          KM   COMBINE CP3S E200 AND E300 AT HORSE AND MUSTANG
 106          HC       3
              *

 107          KK   SOUTH
 108          KM   CP4E IS THE FLOW DRAINING EAST IN HORSE
 109          KM   SOUTH IS THE FLOW DRAINING SOUTH IN MUSTANG
 110          KM   EXISTING SD IN HORSE IS FOR NUISANCE FLOW
 111          DT    CP4E
 112          DI      63      65      67      69      72      75
 113          DQ      20      20      21      22      22      23
              *

 114          KK    NONE
 115          KM   NONE IS ZERO FLOW
 116          KM   CP4S IS THE FLOW DRAINING SOUTH IN MUSTANG
 117          DT    CP4S
 118          DI      10     100
 119          DQ      10     100
              *
1                                    HEC-1 INPUT                                          PAGE  4

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

 120          KK    E080
 121          BA   .0108
 122          LS       0    83.5
 123          UD   0.219
              *

 124          KK    CP1E
 125          KM   RETRIEVE CP1E
 126          DR    CP1E
              *

 127          KK    E380
 128          BA   .0195
 129          LS       0    85.7
 130          UD   0.203
              *

 131          KK     CP5
 132          KM   COMBINE E080 CP1E AND E380 AT BRENT AND MAVERICK
 133          HC       3
              *

 134          KK    CP5S
 135          KM   CP5S IS THE FLOW DRAINING SOUTH IN MAVERICK
 136          KM   CP5E IS THE FLOW DRAINING EAST IN BRENT
 137          DT    CP5E
 138          DI      42      42      43      44      45      46
 139          DQ      22      22      23      24      24      25
              *

 140          KK    E060
 141          BA   .2588
 142          LS       0    82.5
 143          UD   0.679
              *

 144          KK   E060S
 145          KM   E060S IS THE FLOW DRAINING SOUTH IN JONES
 146          KM   E060E IS THE FLOW DRAINING EAST IN SHELEHEDA
 147          KM   EXISTING SD IN  JONES IS FOR NUISANCE FLOW
 148          DT   E060E
 149          DI     110     112     114     119     125     128
 150          DQ      54      55      56      58      61      63
              *

 151          KK  RE060S
 152          KM   ROUTE TO CP6
 153          RD    1345   .0066   0.016       0    TRAP       0      50
              *
1                                    HEC-1 INPUT                                          PAGE  5

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

 154          KK    E100
 155          BA   .4698
 156          LS       0    81.2
 157          UD   0.956
              *

 158          KK     CP6
 159          KM   COMBINE E060S AND E100 AT IRON MOUNTAIN AND JONES
 160          HC       2
              *
```

```
 161          KK    CP6S
 162          KM   CP6S IS THE FLOW DRAINING SOUTH IN JONES
 163          KM   CP6E IS THE FLOW DRAINING EAST IN IRON MOUNTAIN
 164          KM   EXISTING SD IN IRON MOUNTAIN CONVEYS 46 CFS EAST
 165          DT    CP6E
 166          DI     196     200     204     215     226     232
 167          DQ     121     123     125     131     136     139
              *

 168          KK   RCP6S
 169          KM   ROUTE TO CP7
 170          RD    2000   .0050   0.016       0    TRAP       0      50
              *

 171          KK    E420
 172          BA   .0957
 173          LS       0    85.4
 174          UD   0.251
              *

 175          KK    CP5E
 176          KM   RETRIEVE CP5E
 177          DR    CP5E
              *

 178          KK   RCP5E
 179          KM   ROUTE TO CP7
 180          RD    2010   .0058   0.016       0    TRAP       0      50
              *

 181          KK     CP7
 182          KM   COMBINE CP6S E420 AND CP5E AT GUY AND JONES
 183          HC       3
              *

 184          KK    CP7S
 185          KM   CP7S IS THE FLOW DRAINING SOUTH IN JONES
 186          KM   CP7E IS THE FLOW DRAINING EAST ONTO UNDEVELOPED LAND
 187          KM   EXISTING SD IN JONES IS FOR NUISANCCE FLOW
 188          KM   FLOW IN JONES IS BASED ON 1/2 STREET CAPACITY, 45 CFS
 189          DT    CP7E
 190          DI     109     111     114     120     126     130
 191          DQ      64      66      69      75      81      85
              *
```



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

 192          KK    CP2E
 193          KM   RETRIEVE CP2E
 194          DR    CP2E
              *

 195          KK   RCP2E
 196          KM   ROUTE TO CP8
 197          RD    3370   .0055   0.016       0    TRAP       0      50
              *

 198          KK    CP3E
 199          KM   RETRIEVE CP3E
 200          DR    CP3E
              *

 201          KK   RCP3E
 202          KM   ROUTE TO CP8
 203          RD    2680   .0055   0.016       0    TRAP       0      50
              *

 204          KK    CP4E
 205          KM   RETRIEVE CP4E
 206          DR    CP4E
              *

 207          KK   RCP4E
 208          KM   ROUTE TO CP8
 209          RD    1955   .0048   0.016       0    TRAP       0      50
              *

 210          KK   DUMMY
 211          KM   COMBINE CP5S CP7S CP2E CP3E AND CP4E
 212          HC       5
              *

 213          KK    E400
 214          BA   .0846
 215          LS       0    85.2
 216          UD   0.259
              *

 217          KK     CP8
 218          KM   COMBINE DUMMMY AND E400 AT HORSE AND JONES
 219          HC       2
              *

 220          KK    CP8E
 221          KM   CP8S IS THE FLOW DRAINING SOUTH IN JONES
 222          KM   CP8E IS THE FLOW DRAINING EAST IN HORSE
 223          KM   EXISTING SD IN JONES CONVEYS 23 CFS SOUTH
 224          DT    CP8S
 225          DI     195     198     202     213     222     226
 226          DQ     117     117     120     125     130     133
              *
```



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

 227          KK   RCP8E
 228          KM   ROUTE TO CP10
 229          RD    2530   .0080   0.016       0    TRAP       0      50
              *

 230          KK    E440
 231          BA   .0523
 232          LS       0    80.8
 233          UD   0.290
              *

 234          KK   E440S
 235          KM   E440S IS THE FLOW DRAINING SOUTH IN BRADLEY
 236          KM   E440E IS THE FLOW DRAINING EAST IN BRENT
 237          DT   E440E
 238          DI      33      33      34      35      37      38
 239          DQ      18      18      18      19      20      20
              *

 240          KK    E460
 241          BA   .1140
 242          LS       0    80.3
 243          UD   0.355
              *

 244          KK     CP9
 245          KM   COMBINE E440S AND E460 IN BRADLEY BETWEEN BRENT AND HORSE
 246          HC       2
```

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                 *

          KK    CP9S
          KM   CP9S IS THE FLOW DRAINING SOUTH IN BRADLEY
          KM   CP9E IS THE FLOW DRAINING EAST ONTO UNDEVELOPED LAND
          KM   FLOW IN BRADELY IS BASED ON 1/2 STREET CAPACITY, 41 CFS
          DT    CP9E
          DI      75      77      79      83      87      90
          DQ      34      36      38      42      46      49
                 *

          KK    CP7E
          KM   RETRIEVE CP7E
          DR    CP7E
                 *

          KK   RCP7E
          KM   ROUTE TO CP10
          RD    2690   .0080   0.016       0    TRAP       0      50
                 *
1                                          HEC-1 INPUT                                                  PAGE  8

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

          KK    E480
          BA   .0873
          LS       0    81.5
          UD   0.278
                 *

          KK    CP10
          KM   COMBINE CP8E CP9S CP7E AND E480 AT HORSE AND BRADLEY
          HC       4
                 *

          KK   CP10E
          KM   CP10S IS THE FLOW DRAINING SOUTH IN BRADLEY
          KM   CP10E IS THE FLOW DRAINING EAST IN HORSE
          KM   EXISTING SD IN HORSE CONVEYS 6 CFS EAST
          DT   CP10S
          DI     222     226     230     242     253     257
          DQ     116     117     119     127     133     135
                 *

          KK    CP9E
          KM   RETRIEVE CP9E
          DR    CP9E
                 *

          KK    E520
          BA   .0143
          LS       0    85.0
          UD   0.162
                 *

          KK    CP11
          KM   COMBINE CP10E CP9E AND E520 AT HORSE AND UNICORN
          HC       3
                 *

          KK   CP11E
          KM   CP11S IS THE FLOW DRAINING SOUTH IN UNICORN
          KM   CP11E IS THE FLOW DRAINING EAST IN HORSE
          KM   EXISTING SD IN HORSE CONVEYS 6 CFS EAST
          DT   CP11S
          DI     148     152     157     166     175     180
          DQ      68      70      72      75      79      83
                 *

          KK  RCP11E
          KM   ROUTE TO CP14
          RD    1825   .0080   0.016       0    TRAP       0      50
                 *
1                                          HEC-1 INPUT                                                  PAGE  9

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

          KK   E060E
          KM   RETRIEVE E060E
          DR   E060E
                 *

          KK  RE060E
          KM   ROUTE TO CP12
          RD    5370   .0050   0.016       0    TRAP       0      50
                 *

          KK    CP6E
          KM   RETRIEVE CP6E
          DR    CP6E
                 *

          KK   RCP6E
          KM   ROUTE TO CP12
          RD    5145   .0050   0.016       0    TRAP       0      50
                 *

          KK    E040
          BA   .3615
          LS       0    82.1
          UD   0.511
                 *

          KK    CP12
          KM   COMBINE E060E CP6E AND E040 AT IRON MOUNTAIN AND DECATUR
          HC       3
                 *

          KK   CP12S
          KM   CP12S IS THE FLOW DRAINING SOUTH IN DECATUR
          KM   CP12E IS THE FLOW DRAINING EAST ONTO UNDEVELOPED LAND
          KM   FLOW IN DECATUR IS BASED ON 1/2 STREET CAPACITY, 139 CFS
          DT   CP12E
          DI     301     304     308     319     331     338
          DQ     162     165     169     180     192     199
                 *

          KK  RCP12S
          KM   ROUTE TO CP13
          RD    1270   .0040   0.016       0    TRAP       0      50
                 *

          KK    E540
          BA   .0506
          LS       0    85.5
          UD   0.171
                 *
1                                          HEC-1 INPUT                                                  PAGE 10

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

          KK    CP13
          KM   COMBINE CP12S AND E540 AT BRENT AND DECATUR
          HC       2
```

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                *

 330            KK   CP13S
 331            KM   S9 IS THE FLOW DRAINING SOUTH IN DECATUR
 332            KM   E9 IS THE FLOW DRAINING EAST ONTO UNDEVELOPED LAND
 333            KM   FLOW IN DECATUR IS BASED ON 1/2 STREET CAPACITY, 139 CFS
 334            DT   CP13E
 335            DI     143     143     145     146     149     149
 336            DQ       4       4       6       7      10      10
                *

 337            KK  RCP13S
 338            KM   ROUTE TO CP14
 339            RD    1290   .0040   0.016       0    TRAP       0      50
                *

 340            KK   E440E
 341            KM   RETRIEVE E440E
 342            DR   E440E
                *

 343            KK  RE440E
 344            KM   ROUTE TO CP14
 345            RD    3850   .0040   0.016       0    TRAP       0      50
                *

 346            KK    E560
 347            BA   .1763
 348            LS       0    89.1
 349            UD   0.370
                *

 350            KK    CP14
 351            KM   COMBINE CP11E CP13S E440E AND E560 AT HORSE AND DECATUR
 352            HC       4
                *

 353            KK   CP14E
 354            KM   CP14S IS THE FLOW DRAINING SOUTH IN DECATUR
 355            KM   CP14E IS THE FLOW DRAINING EAST IN HORSE
 356            KM   EXISTING SD IN DECATUR CONVEYS 30 CFS SOUTH
 357            KM   HIGH POINT IN DECATUR, ALL SURFACE FLOWS DRIAN EAST
 358            DT   CP14S
 359            DI     250     256     262     277     298     310
 360            DQ      30      30      30      30      30      30
                *
1                                          HEC-1 INPUT                                                    PAGE 11

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

 361            KK  RCP14E
 362            KM   ROUTE TO CP15
 363            RD    2645   .0050   0.016       0    TRAP       0      50
                *

 364            KK    E600
 365            BA   .0862
 366            LS       0    83.7
 367            UD   0.285
                *

 368            KK    CP15
 369            KM   COMBINE CP14E AND E600 AT HORSE AND AVIARY
 370            HC       2
                *

 371            KK   CP15E
 372            KM   CP15S IS THE FLOW DRAINING SOUTH IN AVIARY
 373            KM   CP15E IS THE FLOW DRAINING EAST IN HORSE
 374            KM   EXISTING SD IN HORSE CONVEYS 206 CFS EAST
 375            DT   CP15S
 376            DI     250     256     262     278     312     324
 377            DQ      19      21      24      32      49      54
                *

 378            KK    E240
 379            BA   .1327
 380            LS       0    83.1
 381            UD   0.472
                *

 382            KK   E240S
 383            KM   E240S IS THE FLOW DRAINING SOUTH IN TORREY PINES
 384            KM   E240E IS THE FLOW DRAINING EAST IN MEISENHEIMER
 385            DT   E240E
 386            DI      73      74      76      79      83      85
 387            DQ      38      39      40      42      43      45
                *

 388            KK    E260
 389            BA   .1379
 390            LS       0    83.3
 391            UD   0.441
                *

 392            KK    CP16
 393            KM   COMBINE E240S AND E260 AT RACEL AND TORREY PINES
 394            HC       2
                *
1                                          HEC-1 INPUT                                                    PAGE 12

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

 395            KK   CP16S
 396            KM   S9 IS THE FLOW DRAINING SOUTH IN TORREY PINES
 397            KM   E9 IS THE FLOW DRAINING EAST IN RACEL
 398            DT   CP16E
 399            DI     115     116     118     123     130     133
 400            DQ      57      58      59      61      65      66
                *

 401            KK   DUMMY
 402            HC       3
                *

 403            KK   CP14S
 404            KM   RETRIEVE CP14S
 405            DR   CP14S
                *

 406            KK  RCP14S
 407            KM   ROUTE TO CP17
 408            RD    2565   .0050   0.013       0    CIRC     2.5       0
                *

 409            KK    E580
 410            BA   .0980
 411            LS       0    88.1
 412            UD   0.296
                *

 413            KK    CP17
 414            KM   COMBINE CP14S AND E580 IN DECATUR BETWEEN HORSE AND GRAND TETON
 415            HC       2
                *
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 416          KK   CP17S
 417          KM   CP17S IS THE FLOW DRAINING SOUTH IN DECATUR
 418          KM   CP17E IS THE FLOW DRAINING EAST ONTO UNDEVELOPED LAND
 419          KM   EXISTING SD IN DECATUR CONVEYS 30 CFS SOUTH
 420          KM   FLOW IN DECATUR IS BASED ON 1/2 STREET CAPACITY, 139 CFS
 421          DT   CP17E
 422          DI     118     119     121     124     128     130
 423          DQ       0       0       0       0       0       0
              *

 424          KK    E220
 425          BA   .0445
 426          LS       0    83.5
 427          UD   0.284
              *
1                                          HEC-1 INPUT                                                  PAGE 13

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

 428          KK   RE220
 429          KM   ROUTE TO CP18
 430          RD    5085   .0050   0.016       0    TRAP       0      50
              *

 431          KK   E240E
 432          KM   RETRIEVE E240E
 433          DR   E240E
              *

 434          KK  RE240E
 435          KM   ROUTE TO CP18
 436          RD    4710   .0050   0.016       0    TRAP       0      50
              *

 437          KK   CP16E
 438          KM   RETRIEVE CP16E
 439          DR   CP16E
              *

 440          KK  RCP16E
 441          KM   ROUTE TO CP18
 442          RD    4030   .0050   0.016       0    TRAP       0      50
              *

 443          KK    CP4S
 444          KM   RETRIEVE CP4S
 445          DR    CP4S
              *

 446          KK   RCP4S
 447          KM   ROUTE TO CP18
 448          RD    4770   .0050   0.016       0    TRAP       0      50
              *

 449          KK    CP8S
 450          KM   RETRIEVE CP8S
 451          DR    CP8S
              *

 452          KK   RCP8S
 453          KM   ROUTE TO CP18
 454          RD    2755   .0050   0.016       0    TRAP       0      50
              *

 455          KK   DUMMY
 456          KM   COMBINE E220 E240E CP16E CP4S AND CP8S
 457          HC       5
              *
1                                          HEC-1 INPUT                                                  PAGE 14

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

 458          KK    E280
 459          BA   .2782
 460          LS       0    83.5
 461          UD   0.399
              *

 462          KK    CP18
 463          KM   COMBINE DUMMY AND E280 AT GRAND TETON AND JONES
 464          HC       2
              *

 465          KK   RCP18
 466          KM   ROUTE TO CP19
 467          RD    4935   .0050   0.016       0    TRAP       0      50
              *

 468          KK   CP10S
 469          KM   RETRIEVE CP10S
 470          DR   CP10S
              *

 471          KK  RCP10S
 472          KM   ROUTE TO CP19
 473          RD    5215   .0050   0.016       0    TRAP       0      50
              *

 474          KK   CP11S
 475          KM   RETRIEVE CP11S
 476          DR   CP11S
              *

 477          KK  RCP11S
 478          KM   ROUTE TO CP19
 479          RD    4550   .0050   0.016       0    TRAP       0      50
              *

 480          KK    E500
 481          BA   .3881
 482          LS       0    83.3
 483          UD   0.510
              *

 484          KK   CP18A
 485          KM   COMBINE CP18 CP10S CP11S AND E500 IN GRAND TETON WEST OF DECATUR
 486          HC       4
              *

 487          KK    CP19
 488          KM   COMBINE CP17S AND CP18A AT GRAND TETON AND DECATUR
 489          HC       2
              *
1                                          HEC-1 INPUT                                                  PAGE 15

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

 490          KK   CP17E
 491          KM   RETRIEVE CP17E
 492          DR   CP17E
              *

 493          KK   E660
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```
494          BA   .0140
495          LS      0    84.5
496          UD   0.165
             *

497          KK    CP20
498          KM   COMBINE CP19 CP17E AND E660 IN GRAND TETON BETWEEN DECATUR AND SAN MATEO
499          HC       3
             *

500          KK    E640
501          BA   .0700
502          LS      0    87.8
503          UD   0.263
             *

504          KK    CP21
505          KM   COMBINE CP20 AND E640 IN GRAND TETON BETWEEN DECATUR AND SAN MATEO
506          HC       2
             *

507          KK    E620
508          BA   .0472
509          LS      0    88.1
510          UD   0.246
             *

511          KK    CP22
512          KM   COMBINE CP21 AND E620 AT GRAND TETON AND SAN MATEO
513          HC       2
             *

514          KK   RCP22
515          KM   ROUTE TO CP24
516          RD    1230   .0050   0.016       0    TRAP       0      50
             *

517          KK   CP15S
518          KM   RETRIEVE CP15S
519          DR   CP15S
             *

520          KK  RCP15S
521          KM   ROUTE TO CP23
522          RD    2555   .0050   0.016       0    TRAP       0      50
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

523          KK    E680
524          BA   .1122
525          LS      0    88.0
526          UD   0.303
             *

527          KK    CP23
528          KM   COMBINE CP15S AND E680 IN AVIARY JUST NORTH OF GRAND TETON
529          HC       2
             *

530          KK    E760
531          BA   .0076
532          LS      0    88.3
533          UD   0.171
             *

534          KK   CPGTA
535          KM   COMBINE CP22 CP23 AND E760 AT GRAND TETON AND AVIARY
536          HC       3
             *

537          KK     2-3
538          KM   PARK OR TRAIL
539          BA  0.0327
540          LS      0    86.0
541          UD   0.157
             *

542          KK  CPGTA2
543          KM   COMBINE CPGTA AND 2-3
544          HC       2
             *

545          KK     2-1
546          KM   NEIGHBORHOOD COMMERCIAL
547          BA  0.0367
548          LS      0    94.0
549          UD   0.187
             *

550          KK     2-2
551          KM   MEDIUM DENSITY
552          BA  0.0742
553          LS      0    91.0
554          UD   0.215
             *

555          KK   2-14A
556          KM   PARK OR TRAIL
557          BA  0.0027
558          LS      0    86.0
559          UD   0.135
             *
```



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

560          KK      2A
561          HC       3
             *

562          KK      2B
563          HC       2
             *

564          KK     DB1
565          KM   DETENTION BASIN 1
566          KO       2
567          RS       1    ELEV      -1
568          SV       0   0.339   3.015   9.712  18.977  29.349  42.004 102.301 126.116 159.117
569          SE  2297.0  2298.0  2299.0  2300.0  2301.0  2302.0  2303.0  2307.0  2308.5  2310.5
570          SQ       0      72     110     138     161     199     215     231     252    1975
571          SE  2297.0  2300.0  2301.0  2302.0  2303.0  2305.0  2306.0  2307.0  2308.5  2310.5
572          KO       1
             *

573          KK     2-6
574          KM   ELEMENTARY SCHOOL
575          BA  0.0180
576          LS      0    94.0
577          UD   0.158
             *

578          KK      2C
```

```
 579          HC       2
              *

 580          KK     2-7
 581          KM   PARK OR TRAIL
 582          BA  0.0156
 583          LS       0    86.0
 584          UD   0.137
              *

 585          KK      2D
 586          HC       2
              *

 587          KK     2-4
 588          KM   HIGH DENSITY
 589          BA  0.0334
 590          LS       0    94.0
 591          UD   0.137
              *

 592          KK   2-14B
 593          KM   PARK OR TRAIL
 594          BA  0.0025
 595          LS       0    86.0
 596          UD   0.100
              *
1                                        HEC-1 INPUT                                          PAGE 18

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

 597          KK      2E
 598          HC       2
              *

 599          KK     2-5
 600          KM   MEDIUM DENSITY
 601          BA  0.0891
 602          LS       0    91.0
 603          UD   0.215
              *

 604          KK    2-5W
 605          DT    2-5E
 606          DI       0     100
 607          DQ       0      48
              *

 608          KK     2-9
 609          KM   MEDIUM DENSITY
 610          BA  0.0156
 611          LS       0    91.0
 612          UD   0.135
              *

 613          KK      2F
 614          HC       3
              *

 615          KK    2-5E
 616          DR    2-5E
              *

 617          KK    2-10
 618          KM   MEDIUM DENSITY
 619          BA  0.0163
 620          LS       0    91.0
 621          UD   0.132
              *

 622          KK      2G
 623          HC       3
              *

 624          KK     2-8
 625          KM   MIXED USE
 626          BA  0.0286
 627          LS       0    94.0
 628          UD   0.144
              *
1                                        HEC-1 INPUT                                          PAGE 19

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

 629          KK      2H
 630          HC       2
              *

 631          KK      2I
 632          KM   FLOW IN STORM DRAIN
 633          HC       2
              *

 634          KK    2-11
 635          KM   MEDIUM-HIGH DENSITY
 636          BA  0.0255
 637          LS       0    94.0
 638          UD   0.135
              *

 639          KK    2-12
 640          KM   MEDIUM-LOW DENSITY
 641          BA  0.0272
 642          LS       0    90.0
 643          UD   0.150
              *

 644          KK      2J
 645          KM   FLOW IN STORM DRAIN
 646          HC       2
              *

 647          KK   DUMMY
 648          KM   FLOW IN STORM DRAIN
 649          HC       2
              *

 650          KK    2-13
 651          KM   MEDIUM-LOW AND MEDIUM HIGH DENSITY
 652          BA  0.0273
 653          LS       0    91.0
 654          UD   0.176
              *

 655          KK     PT2
 656          KM   FLOW IN STORM DRAIN
 657          HC       2
              *

 658          KK    E720
 659          BA   .0590
 660          LS       0    88.1
 661          UD   0.229
              *
1                                        HEC-1 INPUT                                          PAGE 20
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 662          KK    E800
 663          BA   .0095
 664          LS       0    90.0
 665          UD   0.150
              *

 666          KK    CP25
 667          KM   COMBINE E720 AND E800 IN GRAND TETON WEST OF ALIANTE
 668          HC       2
              *

 669          KK    E740
 670          BA   .0533
 671          LS       0    88.0
 672          UD   0.213
              *

 673          KK    CP26
 674          KM   COMBINE CP25 AND E740 IN GRAND TETON WEST OF ALIANTE
 675          HC       2
              *

 676          KK    E700
 677          BA   .1352
 678          LS       0    87.8
 679          UD   0.372
              *

 680          KK    CP27
 681          KM   COMBINE CP26 AND E700 AT GRAND TETON AND ALIANTE
 682          HC       2
              *

 683          KK     1-1
 684          KM   MEDIUM HIGH DENSITY
 685          BA   .0344
 686          LS       0    94.0
 687          UD   0.150
              *

 688          KK    AL1E
 689          KM   ROADWAY
 690          BA   .0026
 691          LS       0    98.0
 692          UD   0.077
              *

 693          KK    1A.1
 694          KM   COMBINE 1-1 AND AL1E IN ALIANTE STORM DRAIN
 695          HC       2
              *
1                                        HEC-1 INPUT                                          PAGE 21

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

 696          KK    1A.1
 697          KM   ROUTE TO PT1
 698          RK     740  0.0034   0.013       0    CIRC     4.5
              *

 699          KK     1-2
 700          KM   MEDIUM HIGH DENSITY
 701          BA   .0356
 702          LS       0    94.0
 703          UD   0.156
              *

 704          KK      1A
 705          KM   COMBINE PT3A AND 1-2 IN ALIANTE STORM DRAIN
 706          HC       2
              *

 707          KK     1-4
 708          KM   MEDIUM DENSITY
 709          BA   .0373
 710          LS       0    91.0
 711          UD   0.157
              *

 712          KK    R1-4
 713          KM   ROUTE TO 1-4
 714          RD    1600   .0100   0.016       0    TRAP      45       1
              *

 715          KK      1B
 716          KM   COMBINE 1A AND 1-4 IN ALIANTE STORM DRAIN
 717          HC       2
              *

 718          KK     1-3
 719          KM   MEDIUM LOW DENSITY
 720          BA   .0419
 721          LS       0    90.0
 722          UD   0.154
              *

 723          KK    AL2E
 724          KM   ROADWAY
 725          BA   .0025
 726          LS       0    98.0
 727          UD   0.076
              *

 728          KK     PT1
 729          KM   COMBINE 1B, 1-3 AND AL2E IN ALIANTE STORM DRAIN
 730          HC       3
              *
1                                        HEC-1 INPUT                                          PAGE 22

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

 731          KK     4-1
 732          KM   HIGH DENSITY
 733          BA   .0359
 734          LS       0    94.0
 735          UD   0.137
              *

 736          KK     4-6
 737          KM   PARK OR TRAIL
 738          BA   .0039
 739          LS       0    86.0
 740          UD   0.156
              *

 741          KK     4-7
 742          KM   MEDIUM DENSITY
 743          BA  0.0464
 744          LS       0    91.0
 745          UD   0.189
              *
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```
 746          KK      4A
 747          KM   COMBINE 4-1, 4-6 AND 4-7 IN SEVERANCE STORM DRAIN
 748          HC       3
              *

 749          KK     4-4
 750          KM   MEDIUM DENSITY
 751          BA   .0109
 752          LS       0    91.0
 753          UD   0.123
              *

 754          KK      4B
 755          KM   COMBINE 4A AND 4-4 IN AVIARY STORM DRAIN
 756          HC       2
              *

 757          KK     4-2
 758          KM   MEDIUM HIGH DENSITY
 759          BA   .0547
 760          LS       0    94.0
 761          UD   0.179
              *

 762          KK     4-3
 763          KM   MEDIUM DENSITY
 764          BA   .0542
 765          LS       0    91.0
 766          UD   0.186
              *
1                                          HEC-1 INPUT                                                  PAGE 23

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


 767          KK      4C
 768          KM   COMBINE 4-2 AND 4-3 IN ELKHORN STORM DRAIN
 769          HC       2
              *

 770          KK   U1020
 771          BA   .0092
 772          LS       0    94.0
 773          UD   0.184
              *

 774          KK      4D
 775          KM   COMBINE 4B, 4C AND U1020 IN AVIARY STORM DRAIN
 776          HC       3
              *

 777          KK     4-5
 778          KM   MEDIUM HIGH DENSITY
 779          BA   .0650
 780          LS       0    94.0
 781          UD   0.185
              *

 782          KK      4H
 783          KM   COMBINE 4D AND 4-5 IN AVIARY STORM DRAIN
 784          HC       2
              *

 785          KK   U1040
 786          BA   .0185
 787          LS       0    95.0
 788          UD   0.136
              *

 789          KK   U1060
 790          BA   .0060
 791          LS       0    94.0
 792          UD   0.109
              *

 793          KK   U1080
 794          BA   .0254
 795          LS       0    94.0
 796          UD   0.150
              *

 797          KK      4I
 798          KM   COMBINE U1040, U1060 AND U1080 IN DORRELL STORM DRAIN
 799          HC       3
              *
1                                          HEC-1 INPUT                                                  PAGE 24

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


 800          KK     PT4
 801          KM   COMBINE 4H AND 4I IN AVIARY/DORRELL STORM DRAIN
 802          HC       2
              *

 803          KK   DUMMY
 804          HC       5
              *

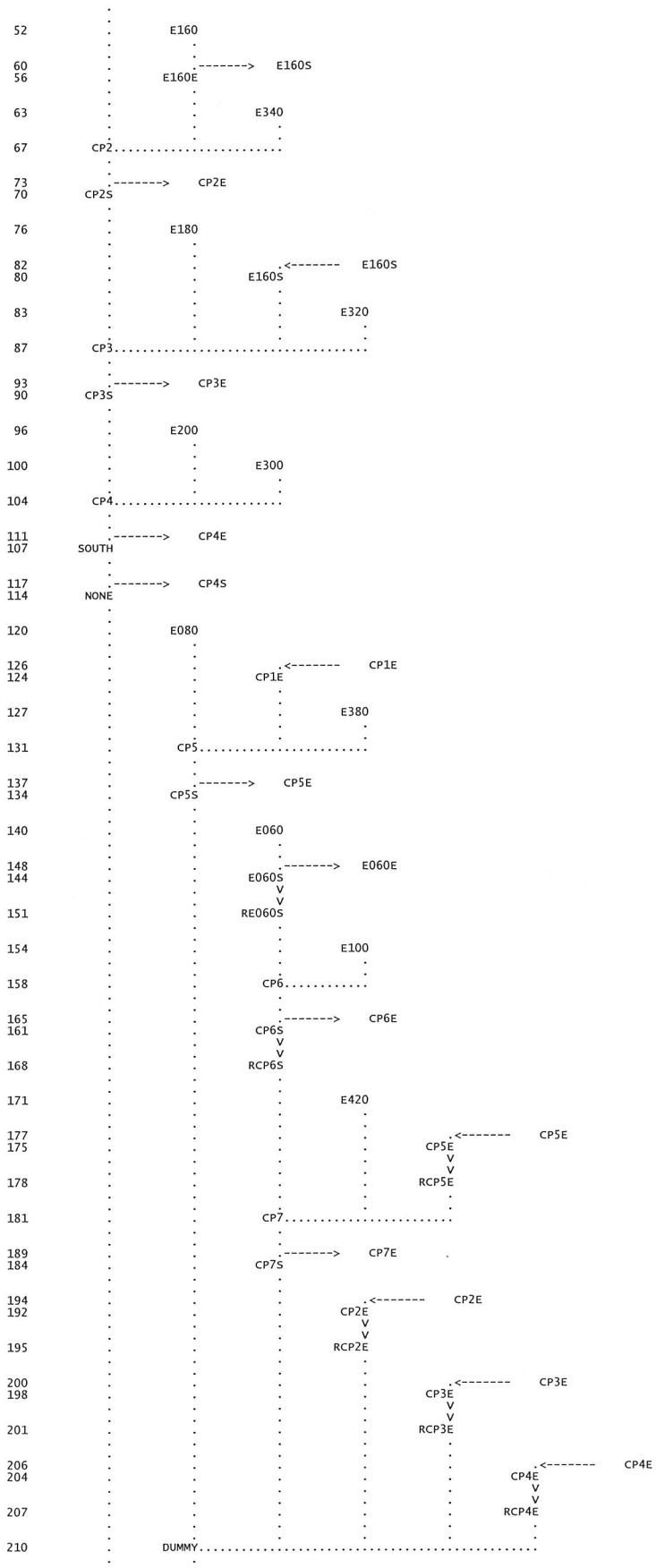
 805          KK     3-1
 806          KM   MEDIUM HIGH DENSITY
 807          BA   .0359
 808          LS       0    94.0
 809          UD   0.155
              *

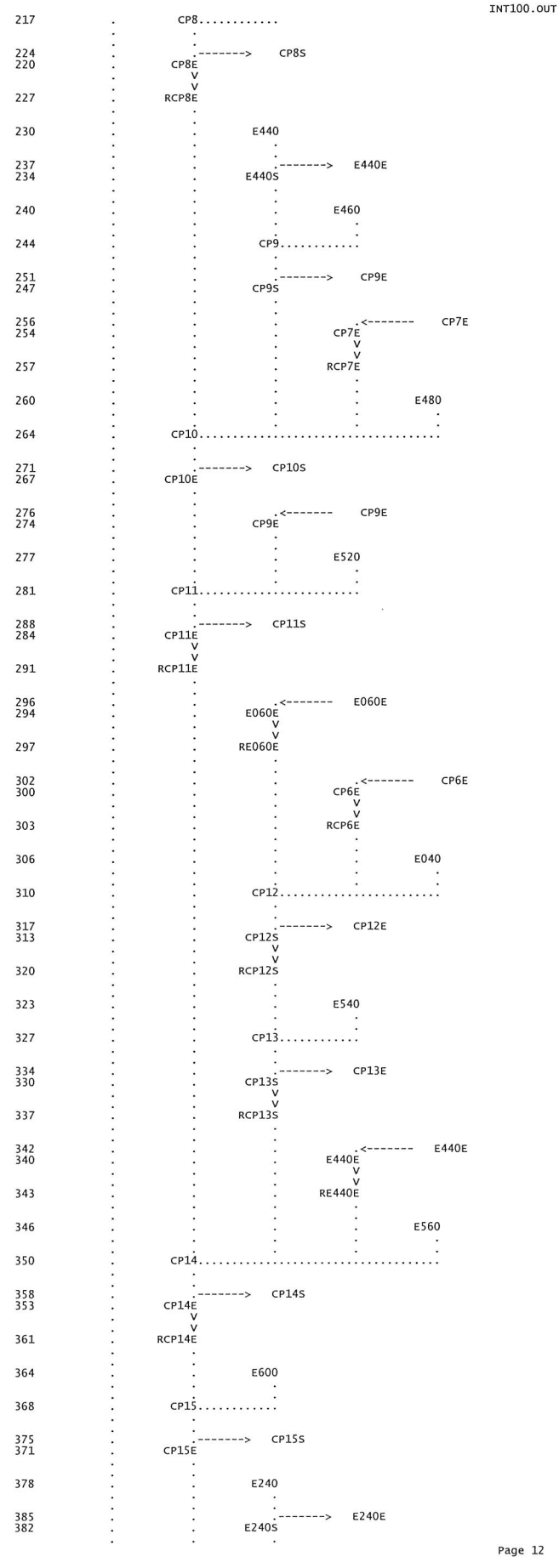
 810          KK     3-2
 811          KM   MEDIUM LOW DENSITY
 812          BA   .0209
 813          LS       0    90.0
 814          UD   0.143
              *

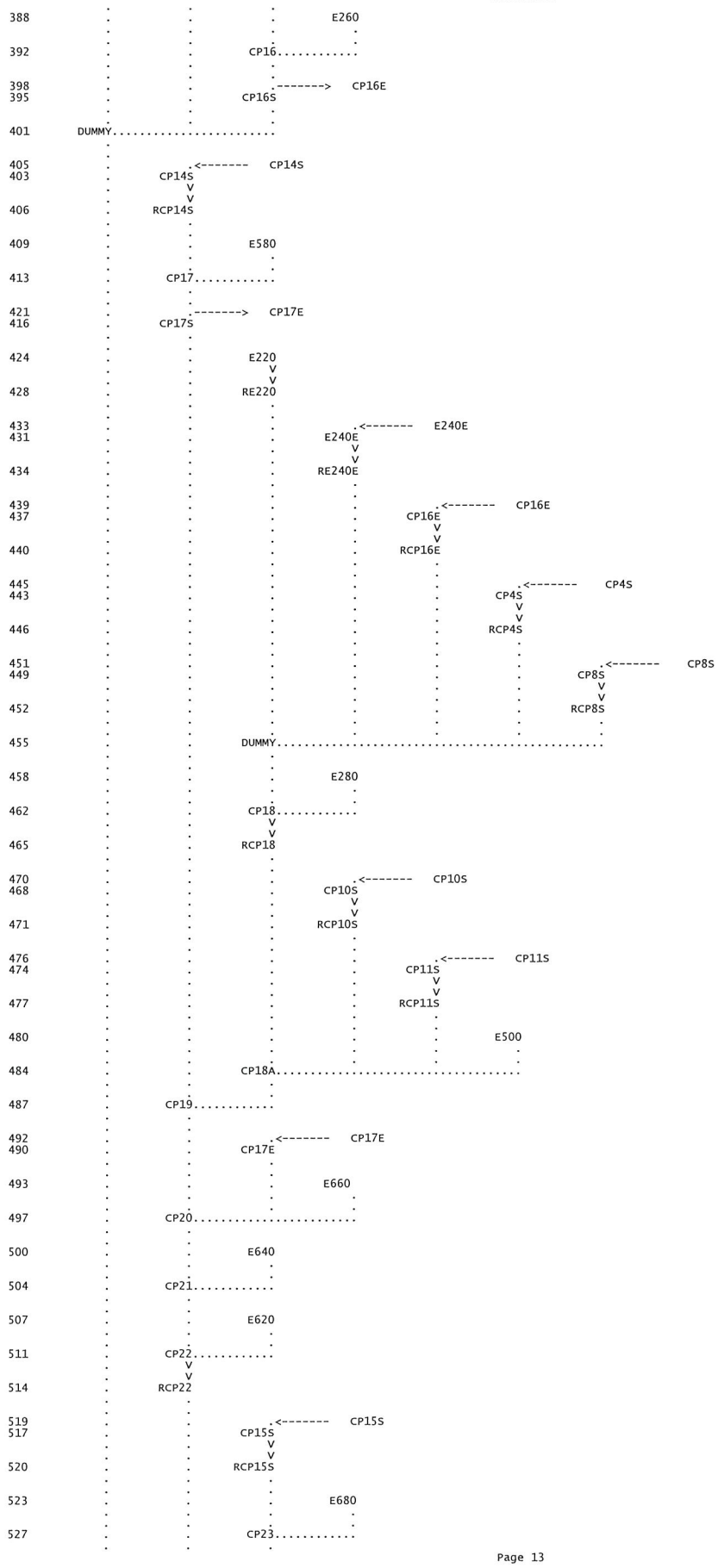
 815          KK     PT3
 816          KM   COMBINE 3-1 AND 3-2 IN ELKHORN STORM DRAIN
 817          HC       2
              *
 818          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    26        E140
                .
                .
    39          .        E360
                .           .
                .           .
    43         CP1............
                .
                .
    49          .------->    CP1E
    46        CP1S
```


52 E160
60
56 E160E
63 E340
67 CP2
73
70 CP2S
76 E180
82
80 E160S
83 E320
87 CP3
93
90 CP3S
96 E200
100 E300
104 CP4
111
107 SOUTH
117
114 NONE
120 E080
126
124 CP1E
127 E380
131 CP5
137
134 CP5S
140 E060
148
144 E060S
151 RE060S
154 E100
158 CP6
165
161 CP6S
168 RCP6S
171 E420
177
175 CP5E
178 RCP5E
181 CP7
189
184 CP7S
194
192 CP2E
195 RCP2E
200
198 CP3E
201 RCP3E
206
204 CP4E
207 RCP4E
210 DUMMY
213
E160S
CP5E
CP2E
CP3E
CP4E


CP8
CP8S
CP8E
RCP8E
E440
E440E
E440S
E460
CP9
CP9E
CP9S
CP7E
RCP7E
E480
CP10
CP10S
CP10E
CP9E
E520
CP11
CP11S
CP11E
RCP11E
E060E
E060E
RE060E
CP6E
RCP6E
E040
CP12
CP12E
CP12S
RCP12S
E540
CP13
CP13E
CP13S
RCP13S
E440E
E440E
RE440E
E560
CP14
CP14S
CP14E
RCP14E
E600
CP15
CP15S
CP15E
E240
E240E
E240S


388
E260
392
CP16
398
CP16E
395
CP16S
401
DUMMY
405
CP14S
403
CP14S
406
RCP14S
409
E580
413
CP17
421
CP17E
416
CP17S
424
E220
428
RE220
433
E240E
431
E240E
434
RE240E
439
CP16E
437
CP16E
440
RCP16E
445
CP4S
443
CP4S
446
RCP4S
451
CP8S
449
CP8S
452
RCP8S
455
DUMMY
458
E280
462
CP18
465
RCP18
470
CP10S
468
CP10S
471
RCP10S
476
CP11S
474
CP11S
477
RCP11S
480
E500
484
CP18A
487
CP19
492
CP17E
490
CP17E
493
E660
497
CP20
500
E640
504
CP21
507
E620
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RCP22
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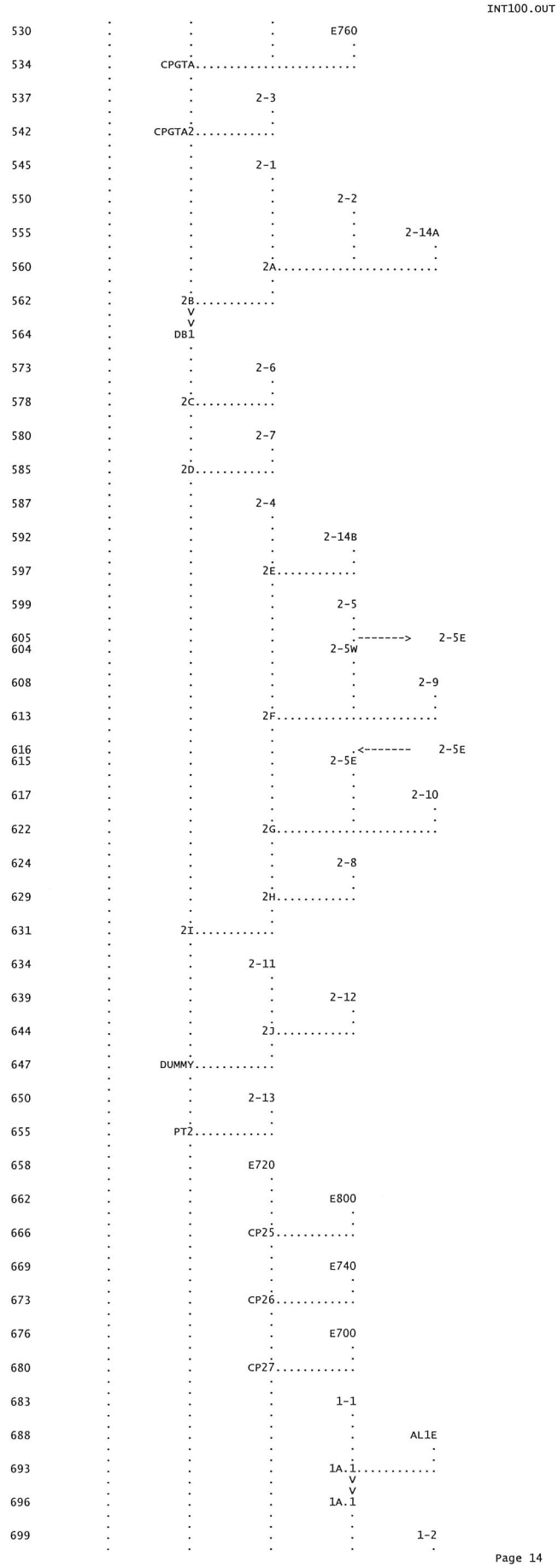
CP15S
517
CP15S
520
RCP15S
523
E680
527
CP23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CPGTA
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CPGTA2
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2-1
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2-2
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2-14A
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2A
562
2B
564
DB1
573
2-6
578
2C
580
2-7
585
2D
587
2-4
592
2-14B
597
2E
599
2-5
605
2-5E
604
2-5W
608
2-9
613
2F
616
2-5E
615
2-5E
617
2-10
622
2G
624
2-8
629
2H
631
2I
634
2-11
639
2-12
644
2J
647
DUMMY
650
2-13
655
PT2
658
E720
662
E800
666
CP25
669
E740
673
CP26
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E700
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CP27
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1-1
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AL1E
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1A.1
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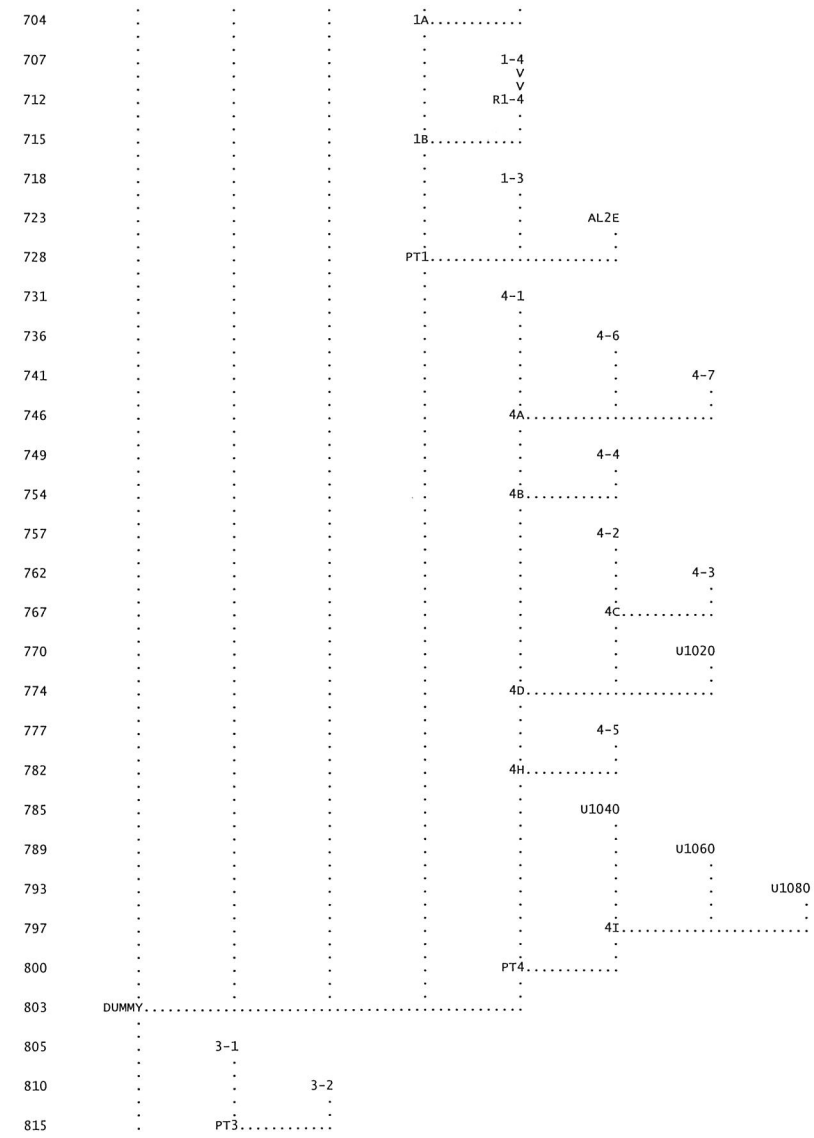
1A.1
699
1-2



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   08MAY13  TIME  14:12:53   *
*                                       *
*****************************************
```

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

SLATER HANIFAN GROUP, INC.
PARK HIGHLANDS WEST
MASTER DRAINAGE STUDY
INTERIM CONDITION

RETURN PERIOD ------- 100-YEAR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- CBH1301.002
FILENAME ------------ INT100.H1
DATE ---------------- MAY 2013
MODELED BY ---------- KC/KCR

SIX HOUR DEPTH-AREA REDUCTION FACTORS

DRAINAGE AREA (MI^2)	DARF
0.00-0.49	0.990
0.50-0.99	0.975
1.00-1.99	0.950
2.00-2.99	0.925
3.00-3.99	0.915
4.00-4.99	0.908

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	300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	2 0	ENDING DATE
NDTIME	0055	ENDING TIME
ICENT	19	CENTURY MARK

```
                COMPUTATION INTERVAL     .08 HOURS
                   TOTAL TIME BASE   24.92 HOURS

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

     JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                     .99       .98       .95       .93       .92       .91


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


            **************
            *            *
 564 KK     *       DB1  *
            *            *
            **************

 566 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           2  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

 572 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

 567 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC       -1.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

 568 SV            STORAGE          .0        .3       3.0       9.7      19.0      29.3      42.0     102.3     126.1     159.1

 569 SE          ELEVATION     2297.00   2298.00   2299.00   2300.00   2301.00   2302.00   2303.00   2307.00   2308.50   2310.50

 570 SQ          DISCHARGE          0.       72.      110.      138.      161.      199.      215.      231.      252.     1975.

 571 SE          ELEVATION     2297.00   2300.00   2301.00   2302.00   2303.00   2305.00   2306.00   2307.00   2308.50   2310.50

                                                      ***

                                          COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

            STORAGE        .00       .34      3.02      9.71     18.98     29.35     42.00     72.15     87.23    102.30
            OUTFLOW        .00     24.00     48.00     72.00    110.00    138.00    161.00    199.00    215.00    231.00
          ELEVATION    2297.00   2298.00   2299.00   2300.00   2301.00   2302.00   2303.00   2305.00   2306.00   2307.00

            STORAGE     126.12    159.12
            OUTFLOW     252.00   1975.00
          ELEVATION    2308.50   2310.50
```

****

HYDROGRAPH AT STATION DB1
PLAN 1, RATIO = .99

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2297.0	1		0820	101	217.	89.0	2306.1	1		1640	201	30.	1.0	2298.2
1		0005	2	0.	.0	2297.0	1		0825	102	215.	87.6	2306.0	1		1645	202	28.	.8	2298.2
1		0010	3	0.	.0	2297.0	1		0830	103	214.	86.1	2305.9	1		1650	203	26.	.6	2298.1
1		0015	4	0.	.0	2297.0	1		0835	104	212.	84.7	2305.8	1		1655	204	25.	.4	2298.0
1		0020	5	0.	.0	2297.0	1		0840	105	211.	83.2	2305.7	1		1700	205	19.	.3	2297.8
1		0025	6	1.	.0	2297.0	1		0845	106	209.	81.8	2305.6	1		1705	206	12.	.2	2297.5
1		0030	7	2.	.0	2297.1	1		0850	107	208.	80.4	2305.5	1		1710	207	7.	.1	2297.3
1		0035	8	3.	.0	2297.1	1		0855	108	206.	79.0	2305.5	1		1715	208	4.	.1	2297.2
1		0040	9	4.	.1	2297.2	1		0900	109	205.	77.6	2305.4	1		1720	209	3.	.0	2297.1
1		0045	10	5.	.1	2297.2	1		0905	110	203.	76.2	2305.3	1		1725	210	2.	.0	2297.1
1		0050	11	6.	.1	2297.2	1		0910	111	202.	74.8	2305.2	1		1730	211	1.	.0	2297.0
1		0055	12	5.	.1	2297.2	1		0915	112	200.	73.4	2305.1	1		1735	212	1.	.0	2297.0
1		0100	13	5.	.1	2297.2	1		0920	113	199.	72.1	2305.0	1		1740	213	0.	.0	2297.0
1		0105	14	5.	.1	2297.2	1		0925	114	197.	70.7	2304.9	1		1745	214	0.	.0	2297.0
1		0110	15	4.	.1	2297.2	1		0930	115	195.	69.3	2304.8	1		1750	215	0.	.0	2297.0
1		0115	16	4.	.1	2297.2	1		0935	116	194.	68.0	2304.7	1		1755	216	0.	.0	2297.0
1		0120	17	5.	.1	2297.2	1		0940	117	192.	66.7	2304.6	1		1800	217	0.	.0	2297.0
1		0125	18	5.	.1	2297.2	1		0945	118	190.	65.4	2304.6	1		1805	218	0.	.0	2297.0
1		0130	19	7.	.1	2297.3	1		0950	119	189.	64.1	2304.5	1		1810	219	0.	.0	2297.0
1		0135	20	9.	.1	2297.4	1		0955	120	187.	62.8	2304.4	1		1815	220	0.	.0	2297.0
1		0140	21	13.	.2	2297.5	1		1000	121	186.	61.5	2304.3	1		1820	221	0.	.0	2297.0
1		0145	22	17.	.2	2297.7	1		1005	122	184.	60.2	2304.2	1		1825	222	0.	.0	2297.0
1		0150	23	20.	.3	2297.9	1		1010	123	182.	59.0	2304.1	1		1830	223	0.	.0	2297.0
1		0155	24	24.	.3	2298.0	1		1015	124	181.	57.7	2304.0	1		1835	224	0.	.0	2297.0
1		0200	25	24.	.4	2298.0	1		1020	125	179.	56.5	2304.0	1		1840	225	0.	.0	2297.0
1		0205	26	24.	.4	2298.0	1		1025	126	178.	55.2	2303.9	1		1845	226	0.	.0	2297.0
1		0210	27	24.	.4	2298.0	1		1030	127	176.	54.0	2303.8	1		1850	227	0.	.0	2297.0
1		0215	28	25.	.4	2298.0	1		1035	128	175.	52.8	2303.7	1		1855	228	0.	.0	2297.0
1		0220	29	25.	.5	2298.0	1		1040	129	173.	51.6	2303.6	1		1900	229	0.	.0	2297.0
1		0225	30	26.	.5	2298.1	1		1045	130	172.	50.4	2303.6	1		1905	230	0.	.0	2297.0
1		0230	31	27.	.7	2298.1	1		1050	131	170.	49.3	2303.5	1		1910	231	0.	.0	2297.0
1		0235	32	28.	.8	2298.2	1		1055	132	169.	48.1	2303.4	1		1915	232	0.	.0	2297.0
1		0240	33	30.	1.0	2298.3	1		1100	133	167.	46.9	2303.3	1		1920	233	0.	.0	2297.0
1		0245	34	32.	1.2	2298.3	1		1105	134	166.	45.8	2303.3	1		1925	234	0.	.0	2297.0
1		0250	35	34.	1.4	2298.4	1		1110	135	164.	44.6	2303.2	1		1930	235	0.	.0	2297.0
1		0255	36	36.	1.7	2298.5	1		1115	136	163.	43.5	2303.1	1		1935	236	0.	.0	2297.0
1		0300	37	38.	1.9	2298.6	1		1120	137	162.	42.4	2303.0	1		1940	237	0.	.0	2297.0
1		0305	38	40.	2.2	2298.7	1		1125	138	160.	41.3	2302.9	1		1945	238	0.	.0	2297.0
1		0310	39	43.	2.5	2298.8	1		1130	139	158.	40.2	2302.9	1		1950	239	0.	.0	2297.0
1		0315	40	48.	3.0	2299.0	1		1135	140	156.	39.1	2302.8	1		1955	240	0.	.0	2297.0
1		0320	41	51.	3.8	2299.1	1		1140	141	154.	38.1	2302.7	1		2000	241	0.	.0	2297.0
1		0325	42	56.	5.3	2299.3	1		1145	142	152.	37.0	2302.6	1		2005	242	0.	.0	2297.0
1		0330	43	65.	7.6	2299.7	1		1150	143	150.	36.0	2302.5	1		2010	243	0.	.0	2297.0
1		0335	44	77.	11.0	2300.1	1		1155	144	148.	34.9	2302.4	1		2015	244	0.	.0	2297.0
1		0340	45	95.	15.2	2300.6	1		1200	145	146.	33.9	2302.4	1		2020	245	0.	.0	2297.0
1		0345	46	112.	19.9	2301.1	1		1205	146	145.	32.9	2302.3	1		2025	246	0.	.0	2297.0
1		0350	47	126.	24.9	2301.6	1		1210	147	143.	31.9	2302.2	1		2030	247	0.	.0	2297.0
1		0355	48	140.	30.5	2302.1	1		1215	148	141.	31.0	2302.1	1		2035	248	0.	.0	2297.0
1		0400	49	151.	36.6	2302.6	1		1220	149	139.	30.0	2302.1	1		2040	249	0.	.0	2297.0
1		0405	50	162.	43.2	2303.1	1		1225	150	137.	29.0	2302.0	1		2045	250	0.	.0	2297.0
1		0410	51	171.	49.7	2303.5	1		1230	151	135.	28.1	2301.9	1		2050	251	0.	.0	2297.0
1		0415	52	179.	56.0	2303.9	1		1235	152	132.	27.2	2301.8	1		2055	252	0.	.0	2297.0
1		0420	53	186.	62.0	2304.3	1		1240	153	130.	26.3	2301.7	1		2100	253	0.	.0	2297.0
1		0425	54	193.	67.5	2304.7	1		1245	154	127.	25.4	2301.6	1		2105	254	0.	.0	2297.0
1		0430	55	199.	72.5	2305.0	1		1250	155	125.	24.5	2301.5	1		2110	255	0.	.0	2297.0

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0435	56	204.	77.1	2305.3 *	1		1255	156	123.	23.7	2301.5 *	1		2115	256	0.	.0	2297.0
1		0440	57	209.	81.4	2305.6 *	1		1300	157	120.	22.8	2301.4 *	1		2120	257	0.	.0	2297.0
1		0445	58	213.	85.6	2305.9 *	1		1305	158	118.	22.0	2301.3 *	1		2125	258	0.	.0	2297.0
1		0450	59	217.	89.5	2306.2 *	1		1310	159	116.	21.2	2301.2 *	1		2130	259	0.	.0	2297.0
1		0455	60	222.	93.4	2306.4 *	1		1315	160	114.	20.4	2301.1 *	1		2135	260	0.	.0	2297.0
1		0500	61	225.	97.1	2306.7 *	1		1320	161	112.	19.6	2301.1 *	1		2140	261	0.	.0	2297.0
1		0505	62	229.	100.5	2306.9 *	1		1325	162	110.	18.9	2301.0 *	1		2145	262	0.	.0	2297.0
1		0510	63	232.	103.7	2307.1 *	1		1330	163	107.	18.1	2300.9 *	1		2150	263	0.	.0	2297.0
1		0515	64	235.	106.7	2307.3 *	1		1335	164	104.	17.4	2300.8 *	1		2155	264	0.	.0	2297.0
1		0520	65	237.	109.4	2307.4 *	1		1340	165	101.	16.7	2300.8 *	1		2200	265	0.	.0	2297.0
1		0525	66	239.	111.8	2307.6 *	1		1345	166	98.	16.0	2300.7 *	1		2205	266	0.	.0	2297.0
1		0530	67	241.	113.9	2307.7 *	1		1350	167	95.	15.4	2300.6 *	1		2210	267	0.	.0	2297.0
1		0535	68	243.	115.7	2307.8 *	1		1355	168	93.	14.7	2300.5 *	1		2215	268	0.	.0	2297.0
1		0540	69	244.	117.2	2307.9 *	1		1400	169	90.	14.1	2300.5 *	1		2220	269	0.	.0	2297.0
1		0545	70	245.	118.3	2308.0 *	1		1405	170	87.	13.5	2300.4 *	1		2225	270	0.	.0	2297.0
1		0550	71	246.	119.1	2308.1 *	1		1410	171	85.	12.9	2300.3 *	1		2230	271	0.	.0	2297.0
1		0555	72	246.	119.7	2308.1 *	1		1415	172	83.	12.3	2300.3 *	1		2235	272	0.	.0	2297.0
1		0600	73	247.	120.1	2308.1 *	1		1420	173	80.	11.7	2300.2 *	1		2240	273	0.	.0	2297.0
1		0605	74	247.	120.3	2308.1 *	1		1425	174	78.	11.2	2300.2 *	1		2245	274	0.	.0	2297.0
1		0610	75	247.	120.3	2308.1 *	1		1430	175	76.	10.7	2300.1 *	1		2250	275	0.	.0	2297.0
1		0615	76	247.	120.1	2308.1 *	1		1435	176	74.	10.2	2300.0 *	1		2255	276	0.	.0	2297.0
1		0620	77	246.	119.7	2308.1 *	1		1440	177	72.	9.7	2300.0 *	1		2300	277	0.	.0	2297.0
1		0625	78	246.	119.1	2308.1 *	1		1445	178	70.	9.2	2299.9 *	1		2305	278	0.	.0	2297.0
1		0630	79	245.	118.3	2308.0 *	1		1450	179	68.	8.7	2299.8 *	1		2310	279	0.	.0	2297.0
1		0635	80	244.	117.4	2308.0 *	1		1455	180	67.	8.2	2299.8 *	1		2315	280	0.	.0	2297.0
1		0640	81	243.	116.4	2307.9 *	1		1500	181	65.	7.8	2299.7 *	1		2320	281	0.	.0	2297.0
1		0645	82	243.	115.3	2307.8 *	1		1505	182	63.	7.3	2299.6 *	1		2325	282	0.	.0	2297.0
1		0650	83	241.	114.2	2307.7 *	1		1510	183	62.	6.9	2299.6 *	1		2330	283	0.	.0	2297.0
1		0655	84	240.	113.0	2307.7 *	1		1515	184	60.	6.5	2299.5 *	1		2335	284	0.	.0	2297.0
1		0700	85	239.	111.7	2307.6 *	1		1520	185	59.	6.1	2299.5 *	1		2340	285	0.	.0	2297.0
1		0705	86	238.	110.4	2307.5 *	1		1525	186	57.	5.7	2299.4 *	1		2345	286	0.	.0	2297.0
1		0710	87	237.	109.1	2307.4 *	1		1530	187	56.	5.3	2299.3 *	1		2350	287	0.	.0	2297.0
1		0715	88	236.	107.7	2307.3 *	1		1535	188	55.	4.9	2299.3 *	1		2355	288	0.	.0	2297.0
1		0720	89	235.	106.3	2307.3 *	1		1540	189	53.	4.5	2299.2 *	2		0000	289	0.	.0	2297.0
1		0725	90	233.	104.9	2307.2 *	1		1545	190	52.	4.2	2299.2 *	2		0005	290	0.	.0	2297.0
1		0730	91	232.	103.5	2307.1 *	1		1550	191	51.	3.8	2299.1 *	2		0010	291	0.	.0	2297.0
1		0735	92	231.	102.1	2307.0 *	1		1555	192	50.	3.5	2299.1 *	2		0015	292	0.	.0	2297.0
1		0740	93	229.	100.7	2306.9 *	1		1600	193	48.	3.1	2299.0 *	2		0020	293	0.	.0	2297.0
1		0745	94	228.	99.2	2306.8 *	1		1605	194	46.	2.8	2298.9 *	2		0025	294	0.	.0	2297.0
1		0750	95	226.	97.8	2306.7 *	1		1610	195	43.	2.5	2298.8 *	2		0030	295	0.	.0	2297.0
1		0755	96	225.	96.3	2306.6 *	1		1615	196	41.	2.2	2298.7 *	2		0035	296	0.	.0	2297.0
1		0800	97	223.	94.8	2306.5 *	1		1620	197	38.	1.9	2298.6 *	2		0040	297	0.	.0	2297.0
1		0805	98	222.	93.4	2306.4 *	1		1625	198	36.	1.7	2298.5 *	2		0045	298	0.	.0	2297.0
1		0810	99	220.	91.9	2306.3 *	1		1630	199	34.	1.4	2298.4 *	2		0050	299	0.	.0	2297.0
1		0815	100	218.	90.5	2306.2 *	1		1635	200	32.	1.2	2298.3 *	2		0055	300	0.	.0	2297.0

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR	
+ (CFS)	(HR)					
		(CFS)				
+ 247.	6.08	221.	91.	88.	88.	
		(INCHES)	1.702	2.807	2.807	2.807
		(AC-FT)	109.	181.	181.	181.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
120.	6.08	94.	30.	29.	29.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2308.13	6.08	2306.42	2300.73	2300.59	2300.59

CUMULATIVE AREA = 1.21 SQ MI

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HYDROGRAPH AT STATION DB1
PLAN 1, RATIO = .98

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2297.0 *	1		0820	101	213.	85.6	2305.9 *	1		1640	201	26.	.5	2298.1
1		0005	2	0.	.0	2297.0 *	1		0825	102	212.	84.2	2305.8 *	1		1645	202	24.	.4	2298.0
1		0010	3	0.	.0	2297.0 *	1		0830	103	210.	82.8	2305.7 *	1		1650	203	17.	.2	2297.7
1		0015	4	0.	.0	2297.0 *	1		0835	104	209.	81.3	2305.6 *	1		1655	204	10.	.1	2297.4
1		0020	5	0.	.0	2297.0 *	1		0840	105	207.	79.9	2305.5 *	1		1700	205	6.	.1	2297.3
1		0025	6	1.	.0	2297.0 *	1		0845	106	206.	78.5	2305.4 *	1		1705	206	4.	.1	2297.2
1		0030	7	1.	.0	2297.1 *	1		0850	107	204.	77.1	2305.3 *	1		1710	207	2.	.0	2297.1
1		0035	8	3.	.0	2297.1 *	1		0855	108	203.	75.7	2305.2 *	1		1715	208	1.	.0	2297.1
1		0040	9	4.	.1	2297.2 *	1		0900	109	201.	74.4	2305.1 *	1		1720	209	1.	.0	2297.0
1		0045	10	5.	.1	2297.2 *	1		0905	110	200.	73.0	2305.1 *	1		1725	210	1.	.0	2297.0
1		0050	11	5.	.1	2297.2 *	1		0910	111	198.	71.6	2305.0 *	1		1730	211	0.	.0	2297.0
1		0055	12	5.	.1	2297.2 *	1		0915	112	197.	70.3	2304.9 *	1		1735	212	0.	.0	2297.0
1		0100	13	5.	.1	2297.2 *	1		0920	113	195.	68.9	2304.8 *	1		1740	213	0.	.0	2297.0
1		0105	14	4.	.1	2297.2 *	1		0925	114	193.	67.6	2304.7 *	1		1745	214	0.	.0	2297.0
1		0110	15	4.	.1	2297.2 *	1		0930	115	192.	66.3	2304.6 *	1		1750	215	0.	.0	2297.0
1		0115	16	4.	.1	2297.2 *	1		0935	116	190.	65.0	2304.5 *	1		1755	216	0.	.0	2297.0
1		0120	17	4.	.1	2297.2 *	1		0940	117	188.	63.7	2304.4 *	1		1800	217	0.	.0	2297.0
1		0125	18	5.	.1	2297.2 *	1		0945	118	187.	62.4	2304.4 *	1		1805	218	0.	.0	2297.0
1		0130	19	6.	.1	2297.3 *	1		0950	119	185.	61.1	2304.3 *	1		1810	219	0.	.0	2297.0
1		0135	20	9.	.1	2297.4 *	1		0955	120	183.	59.8	2304.2 *	1		1815	220	0.	.0	2297.0
1		0140	21	12.	.2	2297.5 *	1		1000	121	182.	58.6	2304.1 *	1		1820	221	0.	.0	2297.0
1		0145	22	16.	.2	2297.7 *	1		1005	122	180.	57.3	2304.0 *	1		1825	222	0.	.0	2297.0
1		0150	23	20.	.3	2297.8 *	1		1010	123	179.	56.1	2303.9 *	1		1830	223	0.	.0	2297.0
1		0155	24	23.	.3	2297.9 *	1		1015	124	177.	54.9	2303.9 *	1		1835	224	0.	.0	2297.0
1		0200	25	24.	.3	2298.0 *	1		1020	125	176.	53.7	2303.8 *	1		1840	225	0.	.0	2297.0
1		0205	26	24.	.4	2298.0 *	1		1025	126	174.	52.5	2303.7 *	1		1845	226	0.	.0	2297.0
1		0210	27	24.	.4	2298.0 *	1		1030	127	173.	51.3	2303.6 *	1		1850	227	0.	.0	2297.0
1		0215	28	24.	.4	2298.0 *	1		1035	128	171.	50.1	2303.5 *	1		1855	228	0.	.0	2297.0
1		0220	29	25.	.4	2298.0 *	1		1040	129	170.	48.9	2303.5 *	1		1900	229	0.	.0	2297.0
1		0225	30	25.	.5	2298.1 *	1		1045	130	168.	47.7	2303.4 *	1		1905	230	0.	.0	2297.0
1		0230	31	26.	.6	2298.1 *	1		1050	131	167.	46.6	2303.3 *	1		1910	231	0.	.0	2297.0
1		0235	32	28.	.8	2298.2 *	1		1055	132	165.	45.4	2303.2 *	1		1915	232	0.	.0	2297.0
1		0240	33	29.	.9	2298.2 *	1		1100	133	164.	44.3	2303.2 *	1		1920	233	0.	.0	2297.0
1		0245	34	31.	1.1	2298.3 *	1		1105	134	162.	43.2	2303.1 *	1		1925	234	0.	.0	2297.0
1		0250	35	33.	1.3	2298.4 *	1		1110	135	161.	42.1	2303.0 *	1		1930	235	0.	.0	2297.0
1		0255	36	35.	1.5	2298.4 *	1		1115	136	159.	41.0	2302.9 *	1		1935	236	0.	.0	2297.0
1		0300	37	37.	1.8	2298.5 *	1		1120	137	157.	39.9	2302.8 *	1		1940	237	0.	.0	2297.0
1		0305	38	39.	2.0	2298.6 *	1		1125	138	155.	38.8	2302.7 *	1		1945	238	0.	.0	2297.0
1		0310	39	42.	2.3	2298.7 *	1		1130	139	153.	37.7	2302.7 *	1		1950	239	0.	.0	2297.0
1		0315	40	46.	2.8	2298.9 *	1		1135	140	151.	36.7	2302.6 *	1		1955	240	0.	.0	2297.0
1		0320	41	50.	3.6	2299.1 *	1		1140	141	149.	35.7	2302.5 *	1		2000	241	0.	.0	2297.0
1		0325	42	55.	5.0	2299.3 *	1		1145	142	148.	34.6	2302.4 *	1		2005	242	0.	.0	2297.0
1		0330	43	63.	7.3	2299.6 *	1		1150	143	146.	33.6	2302.3 *	1		2010	243	0.	.0	2297.0
1		0335	44	75.	10.6	2300.1 *	1		1155	144	144.	32.6	2302.3 *	1		2015	244	0.	.0	2297.0
1		0340	45	92.	14.6	2300.5 *	1		1200	145	142.	31.6	2302.2 *	1		2020	245	0.	.0	2297.0
1		0345	46	111.	19.2	2301.0 *	1		1205	146	140.	30.7	2302.1 *	1		2025	246	0.	.0	2297.0
1		0350	47	124.	24.1	2301.5 *	1		1210	147	139.	29.7	2302.0 *	1		2030	247	0.	.0	2297.0
1		0355	48	138.	29.5	2302.0 *	1		1215	148	136.	28.8	2301.9 *	1		2035	248	0.	.0	2297.0
1		0400	49	149.	35.4	2302.5 *	1		1220	149	134.	27.8	2301.9 *	1		2040	249	0.	.0	2297.0
1		0405	50	161.	41.8	2303.0 *	1		1225	150	131.	26.9	2301.8 *	1		2045	250	0.	.0	2297.0
1		0410	51	169.	48.1	2303.4 *	1		1230	151	129.	26.0	2301.7 *	1		2050	251	0.	.0	2297.0
1		0415	52	176.	54.2	2303.8 *	1		1235	152	127.	25.1	2301.6 *	1		2055	252	0.	.0	2297.0
1		0420	53	184.	60.0	2304.2 *	1		1240	153	124.	24.3	2301.5 *	1		2100	253	0.	.0	2297.0
1		0425	54	190.	65.3	2304.5 *	1		1245	154	122.	23.4	2301.4 *	1		2105	254	0.	.0	2297.0
1		0430	55	196.	70.1	2304.9 *	1		1250	155	120.	22.6	2301.3 *	1		2110	255	0.	.0	2297.0
1		0435	56	202.	74.5	2305.2 *	1		1255	156	118.	21.8	2301.3 *	1		2115	256	0.	.0	2297.0
1		0440	57	206.	78.8	2305.4 *	1		1300	157	115.	21.0	2301.2 *	1		2120	257	0.	.0	2297.0
1		0445	58	210.	82.8	2305.7 *	1		1305	158	113.	20.2	2301.1 *	1		2125	258	0.	.0	2297.0
1		0450	59	214.	86.7	2306.0 *	1		1310	159	111.	19.4	2301.0 *	1		2130	259	0.	.0	2297.0

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0455	60	218.	90.5	2306.2	1		1315	160	109.	18.7	2301.0	1		2135	260	0.	.0	2297.0
1		0500	61	222.	94.0	2306.5	1		1320	161	106.	17.9	2300.9	1		2140	261	0.	.0	2297.0
1		0505	62	226.	97.4	2306.7	1		1325	162	103.	17.2	2300.8	1		2145	262	0.	.0	2297.0
1		0510	63	229.	100.6	2306.9	1		1330	163	100.	16.5	2300.7	1		2150	263	0.	.0	2297.0
1		0515	64	232.	103.4	2307.1	1		1335	164	97.	15.8	2300.7	1		2155	264	0.	.0	2297.0
1		0520	65	234.	106.1	2307.2	1		1340	165	94.	15.2	2300.6	1		2200	265	0.	.0	2297.0
1		0525	66	236.	108.4	2307.4	1		1345	166	92.	14.5	2300.5	1		2205	266	0.	.0	2297.0
1		0530	67	238.	110.5	2307.5	1		1350	167	89.	13.9	2300.5	1		2210	267	0.	.0	2297.0
1		0535	68	240.	112.2	2307.6	1		1355	168	87.	13.3	2300.4	1		2215	268	0.	.0	2297.0
1		0540	69	241.	113.6	2307.7	1		1400	169	84.	12.7	2300.3	1		2220	269	0.	.0	2297.0
1		0545	70	242.	114.6	2307.8	1		1405	170	82.	12.1	2300.3	1		2225	270	0.	.0	2297.0
1		0550	71	243.	115.5	2307.8	1		1410	171	80.	11.6	2300.2	1		2230	271	0.	.0	2297.0
1		0555	72	243.	116.0	2307.9	1		1415	172	77.	11.0	2300.1	1		2235	272	0.	.0	2297.0
1		0600	73	243.	116.4	2307.9	1		1420	173	75.	10.5	2300.1	1		2240	273	0.	.0	2297.0
1		0605	74	244.	116.5	2307.9	1		1425	174	73.	10.0	2300.0	1		2245	274	0.	.0	2297.0
1		0610	75	244.	116.5	2307.9	1		1430	175	71.	9.5	2300.0	1		2250	275	0.	.0	2297.0
1		0615	76	243.	116.3	2307.9	1		1435	176	70.	9.0	2299.9	1		2255	276	0.	.0	2297.0
1		0620	77	243.	115.9	2307.9	1		1440	177	68.	8.5	2299.8	1		2300	277	0.	.0	2297.0
1		0625	78	242.	115.3	2307.8	1		1445	178	66.	8.1	2299.8	1		2305	278	0.	.0	2297.0
1		0630	79	242.	114.5	2307.8	1		1450	179	65.	7.6	2299.7	1		2310	279	0.	.0	2297.0
1		0635	80	241.	113.6	2307.7	1		1455	180	63.	7.2	2299.6	1		2315	280	0.	.0	2297.0
1		0640	81	240.	112.6	2307.6	1		1500	181	61.	6.8	2299.6	1		2320	281	0.	.0	2297.0
1		0645	82	239.	111.5	2307.6	1		1505	182	60.	6.3	2299.5	1		2325	282	0.	.0	2297.0
1		0650	83	238.	110.4	2307.5	1		1510	183	58.	5.9	2299.4	1		2330	283	0.	.0	2297.0
1		0655	84	237.	109.2	2307.4	1		1515	184	57.	5.5	2299.4	1		2335	284	0.	.0	2297.0
1		0700	85	236.	108.0	2307.4	1		1520	185	56.	5.2	2299.3	1		2340	285	0.	.0	2297.0
1		0705	86	235.	106.7	2307.3	1		1525	186	54.	4.8	2299.3	1		2345	286	0.	.0	2297.0
1		0710	87	234.	105.4	2307.2	1		1530	187	53.	4.4	2299.2	1		2350	287	0.	.0	2297.0
1		0715	88	233.	104.0	2307.1	1		1535	188	52.	4.0	2299.2	1		2355	288	0.	.0	2297.0
1		0720	89	231.	102.7	2307.0	1		1540	189	50.	3.7	2299.1	2		0000	289	0.	.0	2297.0
1		0725	90	230.	101.3	2306.9	1		1545	190	49.	3.4	2299.1	2		0005	290	0.	.0	2297.0
1		0730	91	228.	99.9	2306.8	1		1550	191	48.	3.0	2299.0	2		0010	291	0.	.0	2297.0
1		0735	92	227.	98.5	2306.7	1		1555	192	45.	2.7	2298.9	2		0015	292	0.	.0	2297.0
1		0740	93	225.	97.1	2306.7	1		1600	193	42.	2.4	2298.8	2		0020	293	0.	.0	2297.0
1		0745	94	224.	95.6	2306.6	1		1605	194	40.	2.1	2298.7	2		0025	294	0.	.0	2297.0
1		0750	95	222.	94.2	2306.5	1		1610	195	38.	1.8	2298.6	2		0030	295	0.	.0	2297.0
1		0755	96	221.	92.8	2306.4	1		1615	196	35.	1.6	2298.5	2		0035	296	0.	.0	2297.0
1		0800	97	219.	91.3	2306.3	1		1620	197	33.	1.4	2298.4	2		0040	297	0.	.0	2297.0
1		0805	98	218.	89.9	2306.2	1		1625	198	31.	1.1	2298.3	2		0045	298	0.	.0	2297.0
1		0810	99	216.	88.5	2306.1	1		1630	199	29.	.9	2298.2	2		0050	299	0.	.0	2297.0
1		0815	100	215.	87.0	2306.0	1		1635	200	28.	.7	2298.1	2		0055	300	0.	.0	2297.0

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)				
		(CFS)			
244.	6.08	217.	89.	85.	85.
		(INCHES) 1.676	2.732	2.732	2.732
		(AC-FT) 108.	176.	176.	176.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
(AC-FT)	(HR)				
117.	6.08	90.	29.	28.	28.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
(FEET)	(HR)				
2307.90	6.08	2306.20	2300.61	2300.48	2300.48

CUMULATIVE AREA = 1.21 SQ MI

HYDROGRAPH AT STATION DB1
PLAN 1, RATIO = .95

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2297.0	1		0820	101	207.	80.1	2305.5	1		1640	201	7.	.1	2297.3
1		0005	2	0.	.0	2297.0	1		0825	102	206.	78.7	2305.4	1		1645	202	4.	.1	2297.2
1		0010	3	0.	.0	2297.0	1		0830	103	204.	77.3	2305.3	1		1650	203	3.	.0	2297.1
1		0015	4	0.	.0	2297.0	1		0835	104	203.	75.9	2305.2	1		1655	204	2.	.0	2297.1
1		0020	5	0.	.0	2297.0	1		0840	105	202.	74.5	2305.2	1		1700	205	1.	.0	2297.0
1		0025	6	1.	.0	2297.0	1		0845	106	200.	73.2	2305.1	1		1705	206	1.	.0	2297.0
1		0030	7	1.	.0	2297.1	1		0850	107	199.	71.8	2305.0	1		1710	207	0.	.0	2297.0
1		0035	8	3.	.0	2297.1	1		0855	108	197.	70.5	2304.9	1		1715	208	0.	.0	2297.0
1		0040	9	4.	.1	2297.2	1		0900	109	195.	69.1	2304.8	1		1720	209	0.	.0	2297.0
1		0045	10	4.	.1	2297.2	1		0905	110	194.	67.8	2304.7	1		1725	210	0.	.0	2297.0
1		0050	11	5.	.1	2297.2	1		0910	111	192.	66.5	2304.6	1		1730	211	0.	.0	2297.0
1		0055	12	4.	.1	2297.2	1		0915	112	190.	65.2	2304.5	1		1735	212	0.	.0	2297.0
1		0100	13	4.	.1	2297.2	1		0920	113	189.	63.9	2304.5	1		1740	213	0.	.0	2297.0
1		0105	14	4.	.1	2297.1	1		0925	114	187.	62.6	2304.4	1		1745	214	0.	.0	2297.0
1		0110	15	3.	.0	2297.1	1		0930	115	185.	61.3	2304.3	1		1750	215	0.	.0	2297.0
1		0115	16	3.	.0	2297.1	1		0935	116	184.	60.1	2304.2	1		1755	216	0.	.0	2297.0
1		0120	17	4.	.1	2297.2	1		0940	117	182.	58.8	2304.1	1		1800	217	0.	.0	2297.0
1		0125	18	4.	.1	2297.2	1		0945	118	181.	57.5	2304.0	1		1805	218	0.	.0	2297.0
1		0130	19	6.	.1	2297.2	1		0950	119	179.	56.3	2303.9	1		1810	219	0.	.0	2297.0
1		0135	20	8.	.1	2297.3	1		0955	120	177.	55.1	2303.9	1		1815	220	0.	.0	2297.0
1		0140	21	11.	.2	2297.5	1		1000	121	176.	53.9	2303.8	1		1820	221	0.	.0	2297.0
1		0145	22	14.	.2	2297.6	1		1005	122	174.	52.7	2303.7	1		1825	222	0.	.0	2297.0
1		0150	23	18.	.3	2297.7	1		1010	123	173.	51.5	2303.6	1		1830	223	0.	.0	2297.0
1		0155	24	21.	.3	2297.9	1		1015	124	171.	50.3	2303.5	1		1835	224	0.	.0	2297.0
1		0200	25	22.	.3	2297.9	1		1020	125	170.	49.1	2303.5	1		1840	225	0.	.0	2297.0
1		0205	26	23.	.3	2297.9	1		1025	126	168.	47.9	2303.4	1		1845	226	0.	.0	2297.0
1		0210	27	23.	.3	2297.9	1		1030	127	167.	46.8	2303.3	1		1850	227	0.	.0	2297.0
1		0215	28	23.	.3	2297.9	1		1035	128	166.	45.6	2303.2	1		1855	228	0.	.0	2297.0
1		0220	29	24.	.3	2298.0	1		1040	129	164.	44.5	2303.2	1		1900	229	0.	.0	2297.0
1		0225	30	25.	.4	2298.0	1		1045	130	163.	43.4	2303.1	1		1905	230	0.	.0	2297.0
1		0230	31	26.	.5	2298.1	1		1050	131	161.	42.3	2303.0	1		1910	231	0.	.0	2297.0
1		0235	32	27.	.6	2298.1	1		1055	132	159.	41.2	2302.9	1		1915	232	0.	.0	2297.0
1		0240	33	28.	.8	2298.2	1		1100	133	157.	40.1	2302.8	1		1920	233	0.	.0	2297.0
1		0245	34	29.	1.0	2298.2	1		1105	134	156.	39.0	2302.8	1		1925	234	0.	.0	2297.0
1		0250	35	31.	1.1	2298.3	1		1110	135	154.	37.9	2302.7	1		1930	235	0.	.0	2297.0
1		0255	36	33.	1.3	2298.4	1		1115	136	152.	36.9	2302.6	1		1935	236	0.	.0	2297.0
1		0300	37	35.	1.5	2298.5	1		1120	137	150.	35.8	2302.5	1		1940	237	0.	.0	2297.0
1		0305	38	37.	1.8	2298.5	1		1125	138	148.	34.8	2302.4	1		1945	238	0.	.0	2297.0
1		0310	39	39.	2.0	2298.6	1		1130	139	146.	33.8	2302.4	1		1950	239	0.	.0	2297.0
1		0315	40	43.	2.5	2298.8	1		1135	140	144.	32.8	2302.3	1		1955	240	0.	.0	2297.0
1		0320	41	49.	3.2	2299.0	1		1140	141	142.	31.8	2302.2	1		2000	241	0.	.0	2297.0
1		0325	42	54.	4.6	2299.2	1		1145	142	141.	30.8	2302.1	1		2005	242	0.	.0	2297.0
1		0330	43	61.	6.7	2299.6	1		1150	143	139.	29.9	2302.0	1		2010	243	0.	.0	2297.0
1		0335	44	72.	9.8	2300.0	1		1155	144	137.	28.9	2302.0	1		2015	244	0.	.0	2297.0
1		0340	45	89.	13.7	2300.4	1		1200	145	134.	28.0	2301.9	1		2020	245	0.	.0	2297.0
1		0345	46	106.	18.1	2300.9	1		1205	146	132.	27.1	2301.8	1		2025	246	0.	.0	2297.0
1		0350	47	120.	22.7	2301.4	1		1210	147	129.	26.2	2301.7	1		2030	247	0.	.0	2297.0
1		0355	48	134.	27.8	2301.9	1		1215	148	127.	25.3	2301.6	1		2035	248	0.	.0	2297.0
1		0400	49	145.	33.5	2302.3	1		1220	149	125.	24.4	2301.5	1		2040	249	0.	.0	2297.0
1		0405	50	156.	39.5	2302.8	1		1225	150	122.	23.6	2301.4	1		2045	250	0.	.0	2297.0
1		0410	51	165.	45.5	2303.2	1		1230	151	120.	22.7	2301.4	1		2050	251	0.	.0	2297.0
1		0415	52	173.	51.2	2303.6	1		1235	152	118.	21.9	2301.3	1		2055	252	0.	.0	2297.0
1		0420	53	179.	56.6	2304.0	1		1240	153	116.	21.1	2301.2	1		2100	253	0.	.0	2297.0
1		0425	54	186.	61.7	2304.3	1		1245	154	114.	20.3	2301.1	1		2105	254	0.	.0	2297.0
1		0430	55	192.	66.2	2304.6	1		1250	155	112.	19.6	2301.1	1		2110	255	0.	.0	2297.0
1		0435	56	197.	70.5	2304.9	1		1255	156	109.	18.8	2301.0	1		2115	256	0.	.0	2297.0
1		0440	57	202.	74.6	2305.2	1		1300	157	106.	18.0	2300.9	1		2120	257	0.	.0	2297.0
1		0445	58	206.	78.4	2305.4	1		1305	158	103.	17.3	2300.8	1		2125	258	0.	.0	2297.0
1		0450	59	209.	82.0	2305.7	1		1310	159	100.	16.6	2300.7	1		2130	259	0.	.0	2297.0
1		0455	60	213.	85.6	2305.9	1		1315	160	98.	15.9	2300.7	1		2135	260	0.	.0	2297.0
1		0500	61	217.	89.1	2306.1	1		1320	161	95.	15.3	2300.6	1		2140	261	0.	.0	2297.0
1		0505	62	220.	92.3	2306.3	1		1325	162	92.	14.6	2300.5	1		2145	262	0.	.0	2297.0
1		0510	63	224.	95.4	2306.5	1		1330	163	90.	14.0	2300.5	1		2150	263	0.	.0	2297.0

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	0515	64	227.	98.1	2306.7	*	1	1335	164	87.	13.4	2300.4	*	1	2155	264	0.	.0	2297.0	
1	0520	65	229.	100.6	2306.9	*	1	1340	165	85.	12.8	2300.3	*	1	2200	265	0.	.0	2297.0	
1	0525	66	232.	102.9	2307.0	*	1	1345	166	82.	12.2	2300.3	*	1	2205	266	0.	.0	2297.0	
1	0530	67	233.	104.8	2307.2	*	1	1350	167	80.	11.7	2300.2	*	1	2210	267	0.	.0	2297.0	
1	0535	68	235.	106.4	2307.3	*	1	1355	168	78.	11.1	2300.2	*	1	2215	268	0.	.0	2297.0	
1	0540	69	236.	107.6	2307.3	*	1	1400	169	76.	10.6	2300.1	*	1	2220	269	0.	.0	2297.0	
1	0545	70	237.	108.6	2307.4	*	1	1405	170	74.	10.1	2300.0	*	1	2225	270	0.	.0	2297.0	
1	0550	71	237.	109.4	2307.4	*	1	1410	171	72.	9.6	2300.0	*	1	2230	271	0.	.0	2297.0	
1	0555	72	238.	109.9	2307.5	*	1	1415	172	70.	9.1	2299.9	*	1	2235	272	0.	.0	2297.0	
1	0600	73	238.	110.2	2307.5	*	1	1420	173	68.	8.6	2299.8	*	1	2240	273	0.	.0	2297.0	
1	0605	74	238.	110.4	2307.5	*	1	1425	174	66.	8.2	2299.8	*	1	2245	274	0.	.0	2297.0	
1	0610	75	238.	110.3	2307.5	*	1	1430	175	65.	7.7	2299.7	*	1	2250	275	0.	.0	2297.0	
1	0615	76	238.	110.0	2307.5	*	1	1435	176	63.	7.3	2299.6	*	1	2255	276	0.	.0	2297.0	
1	0620	77	237.	109.6	2307.5	*	1	1440	177	62.	6.8	2299.6	*	1	2300	277	0.	.0	2297.0	
1	0625	78	237.	109.0	2307.4	*	1	1445	178	60.	6.4	2299.5	*	1	2305	278	0.	.0	2297.0	
1	0630	79	236.	108.2	2307.4	*	1	1450	179	59.	6.0	2299.4	*	1	2310	279	0.	.0	2297.0	
1	0635	80	235.	107.3	2307.3	*	1	1455	180	57.	5.6	2299.4	*	1	2315	280	0.	.0	2297.0	
1	0640	81	235.	106.4	2307.3	*	1	1500	181	56.	5.2	2299.3	*	1	2320	281	0.	.0	2297.0	
1	0645	82	234.	105.3	2307.2	*	1	1505	182	55.	4.8	2299.3	*	1	2325	282	0.	.0	2297.0	
1	0650	83	233.	104.2	2307.1	*	1	1510	183	53.	4.5	2299.2	*	1	2330	283	0.	.0	2297.0	
1	0655	84	232.	103.0	2307.0	*	1	1515	184	52.	4.1	2299.2	*	1	2335	284	0.	.0	2297.0	
1	0700	85	230.	101.8	2307.0	*	1	1520	185	51.	3.8	2299.1	*	1	2340	285	0.	.0	2297.0	
1	0705	86	229.	100.5	2306.9	*	1	1525	186	49.	3.4	2299.1	*	1	2345	286	0.	.0	2297.0	
1	0710	87	228.	99.3	2306.8	*	1	1530	187	48.	3.1	2299.0	*	1	2350	287	0.	.0	2297.0	
1	0715	88	226.	98.0	2306.7	*	1	1535	188	46.	2.8	2298.9	*	1	2355	288	0.	.0	2297.0	
1	0720	89	225.	96.6	2306.6	*	1	1540	189	43.	2.4	2298.8	*	2	0000	289	0.	.0	2297.0	
1	0725	90	224.	95.3	2306.5	*	1	1545	190	40.	2.2	2298.7	*	2	0005	290	0.	.0	2297.0	
1	0730	91	222.	93.9	2306.4	*	1	1550	191	38.	1.9	2298.6	*	2	0010	291	0.	.0	2297.0	
1	0735	92	221.	92.6	2306.4	*	1	1555	192	36.	1.6	2298.5	*	2	0015	292	0.	.0	2297.0	
1	0740	93	219.	91.2	2306.3	*	1	1600	193	34.	1.4	2298.4	*	2	0020	293	0.	.0	2297.0	
1	0745	94	218.	89.8	2306.2	*	1	1605	194	32.	1.2	2298.3	*	2	0025	294	0.	.0	2297.0	
1	0750	95	216.	88.4	2306.1	*	1	1610	195	30.	1.0	2298.2	*	2	0030	295	0.	.0	2297.0	
1	0755	96	215.	87.0	2306.0	*	1	1615	196	28.	.8	2298.2	*	2	0035	296	0.	.0	2297.0	
1	0800	97	213.	85.6	2305.9	*	1	1620	197	26.	.6	2298.1	*	2	0040	297	0.	.0	2297.0	
1	0805	98	212.	84.2	2305.8	*	1	1625	198	25.	.4	2298.0	*	2	0045	298	0.	.0	2297.0	
1	0810	99	210.	82.8	2305.7	*	1	1630	199	18.	.3	2297.8	*	2	0050	299	0.	.0	2297.0	
1	0815	100	209.	81.5	2305.6	*	1	1635	200	11.	.2	2297.5	*	2	0055	300	0.	.0	2297.0	

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 238.	6.08	212.	85.	82.	82.
		(INCHES) 1.632	2.609	2.609	2.609
		(AC-FT) 105.	168.	168.	168.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
110.	6.08	85.	27.	26.	26.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2307.51	6.08	2305.85	2300.43	2300.30	2300.30

CUMULATIVE AREA = 1.21 SQ MI

HYDROGRAPH AT STATION DB1
PLAN 1, RATIO = .93

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	0000	1	0.	.0	2297.0	*	1	0820	101	202.	75.0	2305.2	*	1	1640	201	1.	.0	2297.0	
1	0005	2	0.	.0	2297.0	*	1	0825	102	201.	73.6	2305.1	*	1	1645	202	1.	.0	2297.0	
1	0010	3	0.	.0	2297.0	*	1	0830	103	199.	72.3	2305.0	*	1	1650	203	0.	.0	2297.0	
1	0015	4	0.	.0	2297.0	*	1	0835	104	197.	70.9	2304.9	*	1	1655	204	0.	.0	2297.0	
1	0020	5	0.	.0	2297.0	*	1	0840	105	196.	69.6	2304.8	*	1	1700	205	0.	.0	2297.0	
1	0025	6	0.	.0	2297.0	*	1	0845	106	194.	68.3	2304.7	*	1	1705	206	0.	.0	2297.0	
1	0030	7	1.	.0	2297.0	*	1	0850	107	192.	67.0	2304.7	*	1	1710	207	0.	.0	2297.0	
1	0035	8	2.	.0	2297.1	*	1	0855	108	191.	65.7	2304.6	*	1	1715	208	0.	.0	2297.0	
1	0040	9	3.	.0	2297.1	*	1	0900	109	189.	64.4	2304.5	*	1	1720	209	0.	.0	2297.0	
1	0045	10	4.	.1	2297.2	*	1	0905	110	188.	63.1	2304.4	*	1	1725	210	0.	.0	2297.0	
1	0050	11	4.	.1	2297.2	*	1	0910	111	186.	61.8	2304.3	*	1	1730	211	0.	.0	2297.0	
1	0055	12	4.	.1	2297.2	*	1	0915	112	184.	60.5	2304.2	*	1	1735	212	0.	.0	2297.0	
1	0100	13	3.	.0	2297.1	*	1	0920	113	183.	59.3	2304.1	*	1	1740	213	0.	.0	2297.0	
1	0105	14	3.	.0	2297.1	*	1	0925	114	181.	58.0	2304.1	*	1	1745	214	0.	.0	2297.0	
1	0110	15	3.	.0	2297.1	*	1	0930	115	180.	56.8	2304.0	*	1	1750	215	0.	.0	2297.0	
1	0115	16	3.	.0	2297.1	*	1	0935	116	178.	55.6	2303.9	*	1	1755	216	0.	.0	2297.0	
1	0120	17	3.	.0	2297.1	*	1	0940	117	177.	54.3	2303.8	*	1	1800	217	0.	.0	2297.0	
1	0125	18	4.	.1	2297.2	*	1	0945	118	175.	53.1	2303.7	*	1	1805	218	0.	.0	2297.0	
1	0130	19	5.	.1	2297.2	*	1	0950	119	174.	51.9	2303.7	*	1	1810	219	0.	.0	2297.0	
1	0135	20	7.	.1	2297.3	*	1	0955	120	172.	50.7	2303.6	*	1	1815	220	0.	.0	2297.0	
1	0140	21	10.	.1	2297.4	*	1	1000	121	171.	49.6	2303.5	*	1	1820	221	0.	.0	2297.0	
1	0145	22	13.	.2	2297.6	*	1	1005	122	169.	48.4	2303.4	*	1	1825	222	0.	.0	2297.0	
1	0150	23	16.	.2	2297.7	*	1	1010	123	168.	47.2	2303.3	*	1	1830	223	0.	.0	2297.0	
1	0155	24	19.	.3	2297.8	*	1	1015	124	166.	46.1	2303.3	*	1	1835	224	0.	.0	2297.0	
1	0200	25	20.	.3	2297.9	*	1	1020	125	165.	45.0	2303.2	*	1	1840	225	0.	.0	2297.0	
1	0205	26	21.	.3	2297.9	*	1	1025	126	163.	43.8	2303.1	*	1	1845	226	0.	.0	2297.0	
1	0210	27	21.	.3	2297.9	*	1	1030	127	162.	42.7	2303.0	*	1	1850	227	0.	.0	2297.0	
1	0215	28	21.	.3	2297.9	*	1	1035	128	160.	41.6	2303.0	*	1	1855	228	0.	.0	2297.0	
1	0220	29	22.	.3	2297.9	*	1	1040	129	158.	40.5	2302.9	*	1	1900	229	0.	.0	2297.0	
1	0225	30	24.	.4	2298.0	*	1	1045	130	156.	39.4	2302.8	*	1	1905	230	0.	.0	2297.0	
1	0230	31	25.	.5	2298.0	*	1	1050	131	154.	38.4	2302.7	*	1	1910	231	0.	.0	2297.0	
1	0235	32	26.	.6	2298.1	*	1	1055	132	152.	37.3	2302.6	*	1	1915	232	0.	.0	2297.0	
1	0240	33	27.	.7	2298.1	*	1	1100	133	151.	36.3	2302.5	*	1	1920	233	0.	.0	2297.0	
1	0245	34	28.	.8	2298.2	*	1	1105	134	149.	35.2	2302.5	*	1	1925	234	0.	.0	2297.0	
1	0250	35	30.	1.0	2298.2	*	1	1110	135	147.	34.2	2302.4	*	1	1930	235	0.	.0	2297.0	
1	0255	36	31.	1.2	2298.3	*	1	1115	136	145.	33.2	2302.3	*	1	1935	236	0.	.0	2297.0	
1	0300	37	33.	1.4	2298.4	*	1	1120	137	143.	32.2	2302.2	*	1	1940	237	0.	.0	2297.0	
1	0305	38	35.	1.5	2298.5	*	1	1125	138	141.	31.2	2302.1	*	1	1945	238	0.	.0	2297.0	
1	0310	39	37.	1.8	2298.5	*	1	1130	139	140.	30.3	2302.1	*	1	1950	239	0.	.0	2297.0	
1	0315	40	41.	2.2	2298.7	*	1	1135	140	138.	29.3	2302.0	*	1	1955	240	0.	.0	2297.0	
1	0320	41	47.	2.9	2299.0	*	1	1140	141	135.	28.4	2301.9	*	1	2000	241	0.	.0	2297.0	
1	0325	42	52.	4.2	2299.2	*	1	1145	142	133.	27.4	2301.8	*	1	2005	242	0.	.0	2297.0	
1	0330	43	59.	6.2	2299.5	*	1	1150	143	130.	26.5	2301.7	*	1	2010	243	0.	.0	2297.0	
1	0335	44	70.	9.2	2299.9	*	1	1155	144	128.	25.6	2301.6	*	1	2015	244	0.	.0	2297.0	
1	0340	45	85.	12.9	2300.3	*	1	1200	145	126.	24.8	2301.6	*	1	2020	245	0.	.0	2297.0	
1	0345	46	102.	17.0	2300.8	*	1	1205	146	123.	23.9	2301.5	*	1	2025	246	0.	.0	2297.0	
1	0350	47	117.	21.4	2301.2	*	1	1210	147	121.	23.1	2301.4	*	1	2030	247	0.	.0	2297.0	
1	0355	48	130.	26.2	2301.7	*	1	1215	148	119.	22.2	2301.3	*	1	2035	248	0.	.0	2297.0	
1	0400	49	142.	31.5	2302.2	*	1	1220	149	117.	21.4	2301.2	*	1	2040	249	0.	.0	2297.0	
1	0405	50	152.	37.3	2302.6	*	1	1225	150	114.	20.6	2301.2	*	1	2045	250	0.	.0	2297.0	
1	0410	51	162.	43.1	2303.1	*	1	1230	151	112.	19.9	2301.1	*	1	2050	251	0.	.0	2297.0	
1	0415	52	169.	48.5	2303.4	*	1	1235	152	110.	19.1	2301.0	*	1	2055	252	0.	.0	2297.0	
1	0420	53	176.	53.7	2303.8	*	1	1240	153	107.	18.3	2300.9	*	1	2100	253	0.	.0	2297.0	
1	0425	54	182.	58.5	2304.1	*	1	1245	154	104.	17.6	2300.9	*	1	2105	254	0.	.0	2297.0	
1	0430	55	187.	62.9	2304.4	*	1	1250	155	101.	16.9	2300.8	*	1	2110	255	0.	.0	2297.0	
1	0435	56	193.	67.1	2304.7	*	1	1255	156	99.	16.2	2300.7	*	1	2115	256	0.	.0	2297.0	
1	0440	57	197.	70.9	2304.9	*	1	1300	157	96.	15.5	2300.6	*	1	2120	257	0.	.0	2297.0	
1	0445	58	202.	74.5	2305.2	*	1	1305	158	93.	14.9	2300.6	*	1	2125	258	0.	.0	2297.0	
1	0450	59	205.	78.0	2305.4	*	1	1310	159	91.	14.3	2300.5	*	1	2130	259	0.	.0	2297.0	
1	0455	60	209.	81.4	2305.6	*	1	1315	160	88.	13.6	2300.4	*	1	2135	260	0.	.0	2297.0	
1	0500	61	212.	84.7	2305.8	*	1	1320	161	86.	13.0	2300.4	*	1	2140	261	0.	.0	2297.0	
1	0505	62	216.	87.8	2306.0	*	1	1325	162	83.	12.5	2300.3	*	1	2145	262	0.	.0	2297.0	
1	0510	63	219.	90.7	2306.2	*	1	1330	163	81.	11.9	2300.2	*	1	2150	263	0.	.0	2297.0	
1	0515	64	222.	93.4	2306.4	*	1	1335	164	79.	11.3	2300.2	*	1	2155	264	0.	.0	2297.0	
1	0520	65	224.	95.8	2306.6	*	1	1340	165	77.	10.8	2300.1	*	1	2200	265	0.	.0	2297.0	
1	0525	66	226.	97.8	2306.7	*	1	1345	166	74.	10.3	2300.1	*	1	2205	266	0.	.0	2297.0	
1	0530	67	228.	99.6	2306.8	*	1	1350	167	72.	9.8	2300.0	*	1	2210	267	0.	.0	2297.0	

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0535	68	230.	101.1	2306.9 *	1		1355	168	71.	9.3	2299.9 *	1		2215	268	0.	.0	2297.0
1		0540	69	231.	102.2	2307.0 *	1		1400	169	69.	8.8	2299.9 *	1		2220	269	0.	.0	2297.0
1		0545	70	232.	103.2	2307.1 *	1		1405	170	67.	8.3	2299.8 *	1		2225	270	0.	.0	2297.0
1		0550	71	232.	103.9	2307.1 *	1		1410	171	65.	7.9	2299.7 *	1		2230	271	0.	.0	2297.0
1		0555	72	233.	104.3	2307.1 *	1		1415	172	64.	7.4	2299.7 *	1		2235	272	0.	.0	2297.0
1		0600	73	233.	104.6	2307.1 *	1		1420	173	62.	7.0	2299.6 *	1		2240	273	0.	.0	2297.0
1		0605	74	233.	104.7	2307.2 *	1		1425	174	61.	6.6	2299.5 *	1		2245	274	0.	.0	2297.0
1		0610	75	233.	104.6	2307.1 *	1		1430	175	59.	6.2	2299.5 *	1		2250	275	0.	.0	2297.0
1		0615	76	233.	104.3	2307.1 *	1		1435	176	58.	5.8	2299.4 *	1		2255	276	0.	.0	2297.0
1		0620	77	232.	103.8	2307.1 *	1		1440	177	56.	5.4	2299.4 *	1		2300	277	0.	.0	2297.0
1		0625	78	232.	103.2	2307.1 *	1		1445	178	55.	5.0	2299.3 *	1		2305	278	0.	.0	2297.0
1		0630	79	231.	102.5	2307.0 *	1		1450	179	54.	4.6	2299.2 *	1		2310	279	0.	.0	2297.0
1		0635	80	230.	101.6	2307.0 *	1		1455	180	52.	4.3	2299.2 *	1		2315	280	0.	.0	2297.0
1		0640	81	229.	100.6	2306.9 *	1		1500	181	51.	3.9	2299.1 *	1		2320	281	0.	.0	2297.0
1		0645	82	228.	99.6	2306.8 *	1		1505	182	50.	3.5	2299.1 *	1		2325	282	0.	.0	2297.0
1		0650	83	227.	98.5	2306.7 *	1		1510	183	49.	3.2	2299.0 *	1		2330	283	0.	.0	2297.0
1		0655	84	226.	97.3	2306.7 *	1		1515	184	47.	2.9	2298.9 *	1		2335	284	0.	.0	2297.0
1		0700	85	224.	96.1	2306.6 *	1		1520	185	44.	2.6	2298.8 *	1		2340	285	0.	.0	2297.0
1		0705	86	223.	94.9	2306.5 *	1		1525	186	41.	2.3	2298.7 *	1		2345	286	0.	.0	2297.0
1		0710	87	222.	93.7	2306.4 *	1		1530	187	39.	2.0	2298.6 *	1		2350	287	0.	.0	2297.0
1		0715	88	220.	92.4	2306.3 *	1		1535	188	37.	1.7	2298.5 *	1		2355	288	0.	.0	2297.0
1		0720	89	219.	91.1	2306.3 *	1		1540	189	34.	1.5	2298.4 *	2		0000	289	0.	.0	2297.0
1		0725	90	218.	89.8	2306.2 *	1		1545	190	32.	1.3	2298.3 *	2		0005	290	0.	.0	2297.0
1		0730	91	216.	88.5	2306.1 *	1		1550	191	30.	1.0	2298.3 *	2		0010	291	0.	.0	2297.0
1		0735	92	215.	87.2	2306.0 *	1		1555	192	29.	.8	2298.2 *	2		0015	292	0.	.0	2297.0
1		0740	93	214.	85.8	2305.9 *	1		1600	193	27.	.7	2298.1 *	2		0020	293	0.	.0	2297.0
1		0745	94	212.	84.5	2305.8 *	1		1605	194	25.	.5	2298.1 *	2		0025	294	0.	.0	2297.0
1		0750	95	211.	83.1	2305.7 *	1		1610	195	22.	.3	2297.9 *	2		0030	295	0.	.0	2297.0
1		0755	96	209.	81.8	2305.6 *	1		1615	196	13.	.2	2297.6 *	2		0035	296	0.	.0	2297.0
1		0800	97	208.	80.4	2305.5 *	1		1620	197	8.	.1	2297.3 *	2		0040	297	0.	.0	2297.0
1		0805	98	206.	79.1	2305.5 *	1		1625	198	5.	.1	2297.2 *	2		0045	298	0.	.0	2297.0
1		0810	99	205.	77.7	2305.4 *	1		1630	199	3.	.0	2297.1 *	2		0050	299	0.	.0	2297.0
1		0815	100	203.	76.3	2305.3 *	1		1635	200	2.	.0	2297.1 *	2		0055	300	0.	.0	2297.0

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 233.	6.08	206.	81.	78.	78.
		(INCHES) 1.591	2.496	2.496	2.496
		(AC-FT) 102.	161.	161.	161.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
+ 105.	6.08	80.	25.	24.	24.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
+ 2307.15	6.08	2305.52	2300.26	2300.14	2300.14

CUMULATIVE AREA = 1.21 SQ MI

HYDROGRAPH AT STATION DB1
PLAN 1, RATIO = .92

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2297.0 *	1		0820	101	200.	73.0	2305.1 *	1		1640	201	1.	.0	2297.0
1		0005	2	0.	.0	2297.0 *	1		0825	102	198.	71.6	2305.0 *	1		1645	202	0.	.0	2297.0
1		0010	3	0.	.0	2297.0 *	1		0830	103	197.	70.3	2304.9 *	1		1650	203	0.	.0	2297.0
1		0015	4	0.	.0	2297.0 *	1		0835	104	195.	69.0	2304.8 *	1		1655	204	0.	.0	2297.0
1		0020	5	0.	.0	2297.0 *	1		0840	105	193.	67.7	2304.7 *	1		1700	205	0.	.0	2297.0
1		0025	6	0.	.0	2297.0 *	1		0845	106	192.	66.3	2304.6 *	1		1705	206	0.	.0	2297.0
1		0030	7	1.	.0	2297.0 *	1		0850	107	190.	65.0	2304.5 *	1		1710	207	0.	.0	2297.0
1		0035	8	2.	.0	2297.1 *	1		0855	108	188.	63.8	2304.4 *	1		1715	208	0.	.0	2297.0
1		0040	9	3.	.0	2297.1 *	1		0900	109	187.	62.5	2304.4 *	1		1720	209	0.	.0	2297.0
1		0045	10	4.	.1	2297.2 *	1		0905	110	185.	61.2	2304.3 *	1		1725	210	0.	.0	2297.0
1		0050	11	4.	.1	2297.2 *	1		0910	111	184.	59.9	2304.2 *	1		1730	211	0.	.0	2297.0
1		0055	12	4.	.1	2297.1 *	1		0915	112	182.	58.7	2304.1 *	1		1735	212	0.	.0	2297.0
1		0100	13	3.	.0	2297.1 *	1		0920	113	180.	57.4	2304.0 *	1		1740	213	0.	.0	2297.0
1		0105	14	3.	.0	2297.1 *	1		0925	114	179.	56.2	2303.9 *	1		1745	214	0.	.0	2297.0
1		0110	15	3.	.0	2297.1 *	1		0930	115	177.	55.0	2303.9 *	1		1750	215	0.	.0	2297.0
1		0115	16	3.	.0	2297.1 *	1		0935	116	176.	53.8	2303.8 *	1		1755	216	0.	.0	2297.0
1		0120	17	3.	.0	2297.1 *	1		0940	117	174.	52.6	2303.7 *	1		1800	217	0.	.0	2297.0
1		0125	18	4.	.1	2297.2 *	1		0945	118	173.	51.4	2303.6 *	1		1805	218	0.	.0	2297.0
1		0130	19	5.	.1	2297.2 *	1		0950	119	171.	50.2	2303.5 *	1		1810	219	0.	.0	2297.0
1		0135	20	7.	.1	2297.3 *	1		0955	120	170.	49.0	2303.5 *	1		1815	220	0.	.0	2297.0
1		0140	21	10.	.1	2297.4 *	1		1000	121	168.	47.9	2303.4 *	1		1820	221	0.	.0	2297.0
1		0145	22	13.	.2	2297.5 *	1		1005	122	167.	46.7	2303.3 *	1		1825	222	0.	.0	2297.0
1		0150	23	16.	.2	2297.7 *	1		1010	123	165.	45.6	2303.2 *	1		1830	223	0.	.0	2297.0
1		0155	24	18.	.3	2297.8 *	1		1015	124	164.	44.4	2303.2 *	1		1835	224	0.	.0	2297.0
1		0200	25	20.	.3	2297.8 *	1		1020	125	163.	43.3	2303.1 *	1		1840	225	0.	.0	2297.0
1		0205	26	20.	.3	2297.8 *	1		1025	126	161.	42.2	2303.0 *	1		1845	226	0.	.0	2297.0
1		0210	27	20.	.3	2297.8 *	1		1030	127	159.	41.1	2302.9 *	1		1850	227	0.	.0	2297.0
1		0215	28	20.	.3	2297.8 *	1		1035	128	157.	40.0	2302.8 *	1		1855	228	0.	.0	2297.0
1		0220	29	22.	.3	2297.9 *	1		1040	129	155.	38.9	2302.8 *	1		1900	229	0.	.0	2297.0
1		0225	30	24.	.4	2298.0 *	1		1045	130	153.	37.9	2302.7 *	1		1905	230	0.	.0	2297.0
1		0230	31	25.	.4	2298.0 *	1		1050	131	152.	36.8	2302.6 *	1		1910	231	0.	.0	2297.0
1		0235	32	26.	.5	2298.1 *	1		1055	132	150.	35.8	2302.5 *	1		1915	232	0.	.0	2297.0
1		0240	33	27.	.6	2298.1 *	1		1100	133	148.	34.7	2302.4 *	1		1920	233	0.	.0	2297.0
1		0245	34	28.	.8	2298.2 *	1		1105	134	146.	33.7	2302.3 *	1		1925	234	0.	.0	2297.0
1		0250	35	29.	.9	2298.2 *	1		1110	135	144.	32.7	2302.3 *	1		1930	235	0.	.0	2297.0
1		0255	36	31.	1.1	2298.3 *	1		1115	136	142.	31.8	2302.2 *	1		1935	236	0.	.0	2297.0
1		0300	37	32.	1.3	2298.4 *	1		1120	137	141.	30.8	2302.1 *	1		1940	237	0.	.0	2297.0
1		0305	38	34.	1.5	2298.4 *	1		1125	138	139.	29.8	2302.0 *	1		1945	238	0.	.0	2297.0
1		0310	39	36.	1.7	2298.5 *	1		1130	139	137.	28.9	2302.0 *	1		1950	239	0.	.0	2297.0
1		0315	40	40.	2.1	2298.7 *	1		1135	140	134.	27.9	2301.9 *	1		1955	240	0.	.0	2297.0
1		0320	41	46.	2.8	2298.9 *	1		1140	141	132.	27.0	2301.8 *	1		2000	241	0.	.0	2297.0
1		0325	42	52.	4.0	2299.1 *	1		1145	142	129.	26.1	2301.7 *	1		2005	242	0.	.0	2297.0
1		0330	43	59.	6.0	2299.4 *	1		1150	143	127.	25.2	2301.6 *	1		2010	243	0.	.0	2297.0
1		0335	44	69.	8.9	2299.9 *	1		1155	144	125.	24.4	2301.5 *	1		2015	244	0.	.0	2297.0
1		0340	45	84.	12.5	2300.3 *	1		1200	145	122.	23.5	2301.4 *	1		2020	245	0.	.0	2297.0
1		0345	46	100.	16.6	2300.7 *	1		1205	146	120.	22.7	2301.4 *	1		2025	246	0.	.0	2297.0
1		0350	47	115.	20.9	2301.2 *	1		1210	147	118.	21.9	2301.3 *	1		2030	247	0.	.0	2297.0
1		0355	48	128.	25.6	2301.6 *	1		1215	148	116.	21.1	2301.2 *	1		2035	248	0.	.0	2297.0
1		0400	49	141.	30.8	2302.1 *	1		1220	149	114.	20.3	2301.1 *	1		2040	249	0.	.0	2297.0
1		0405	50	151.	36.4	2302.6 *	1		1225	150	111.	19.5	2301.1 *	1		2045	250	0.	.0	2297.0
1		0410	51	161.	42.1	2303.0 *	1		1230	151	109.	18.7	2301.0 *	1		2050	251	0.	.0	2297.0
1		0415	52	168.	47.5	2303.4 *	1		1235	152	106.	18.0	2300.9 *	1		2055	252	0.	.0	2297.0
1		0420	53	174.	52.5	2303.7 *	1		1240	153	103.	17.3	2300.8 *	1		2100	253	0.	.0	2297.0
1		0425	54	180.	57.3	2304.0 *	1		1245	154	100.	16.6	2300.7 *	1		2105	254	0.	.0	2297.0
1		0430	55	186.	61.6	2304.3 *	1		1250	155	97.	15.9	2300.7 *	1		2110	255	0.	.0	2297.0
1		0435	56	191.	65.7	2304.6 *	1		1255	156	95.	15.2	2300.6 *	1		2115	256	0.	.0	2297.0
1		0440	57	196.	69.5	2304.8 *	1		1300	157	92.	14.6	2300.5 *	1		2120	257	0.	.0	2297.0
1		0445	58	200.	73.0	2305.1 *	1		1305	158	89.	14.0	2300.5 *	1		2125	258	0.	.0	2297.0
1		0450	59	203.	76.4	2305.3 *	1		1310	159	87.	13.4	2300.4 *	1		2130	259	0.	.0	2297.0
1		0455	60	207.	79.7	2305.5 *	1		1315	160	85.	12.8	2300.3 *	1		2135	260	0.	.0	2297.0
1		0500	61	210.	83.0	2305.7 *	1		1320	161	82.	12.2	2300.3 *	1		2140	261	0.	.0	2297.0
1		0505	62	214.	86.0	2305.9 *	1		1325	162	80.	11.6	2300.2 *	1		2145	262	0.	.0	2297.0
1		0510	63	217.	88.9	2306.1 *	1		1330	163	78.	11.1	2300.1 *	1		2150	263	0.	.0	2297.0
1		0515	64	219.	91.4	2306.3 *	1		1335	164	76.	10.6	2300.1 *	1		2155	264	0.	.0	2297.0
1		0520	65	222.	93.8	2306.4 *	1		1340	165	73.	10.1	2300.0 *	1		2200	265	0.	.0	2297.0
1		0525	66	224.	95.8	2306.6 *	1		1345	166	71.	9.6	2300.0 *	1		2205	266	0.	.0	2297.0
1		0530	67	226.	97.5	2306.7 *	1		1350	167	70.	9.1	2299.9 *	1		2210	267	0.	.0	2297.0
1		0535	68	227.	98.9	2306.8 *	1		1355	168	68.	8.6	2299.8 *	1		2215	268	0.	.0	2297.0
1		0540	69	229.	100.1	2306.9 *	1		1400	169	66.	8.1	2299.8 *	1		2220	269	0.	.0	2297.0
1		0545	70	230.	101.0	2306.9 *	1		1405	170	65.	7.7	2299.7 *	1		2225	270	0.	.0	2297.0
1		0550	71	230.	101.6	2307.0 *	1		1410	171	63.	7.2	2299.6 *	1		2230	271	0.	.0	2297.0

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0555	72	231.	102.1	2307.0	1		1415	172	62.	6.8	2299.6	1		2235	272	0.	.0	2297.0
1		0600	73	231.	102.4	2307.0	1		1420	173	60.	6.4	2299.5	1		2240	273	0.	.0	2297.0
1		0605	74	231.	102.4	2307.0	1		1425	174	59.	6.0	2299.4	1		2245	274	0.	.0	2297.0
1		0610	75	231.	102.3	2307.0	1		1430	175	57.	5.6	2299.4	1		2250	275	0.	.0	2297.0
1		0615	76	231.	102.0	2307.0	1		1435	176	56.	5.2	2299.3	1		2255	276	0.	.0	2297.0
1		0620	77	230.	101.5	2306.9	1		1440	177	54.	4.8	2299.3	1		2300	277	0.	.0	2297.0
1		0625	78	230.	100.9	2306.9	1		1445	178	53.	4.4	2299.2	1		2305	278	0.	.0	2297.0
1		0630	79	229.	100.1	2306.9	1		1450	179	52.	4.1	2299.2	1		2310	279	0.	.0	2297.0
1		0635	80	228.	99.3	2306.8	1		1455	180	51.	3.7	2299.1	1		2315	280	0.	.0	2297.0
1		0640	81	227.	98.3	2306.7	1		1500	181	49.	3.4	2299.1	1		2320	281	0.	.0	2297.0
1		0645	82	226.	97.3	2306.7	1		1505	182	48.	3.1	2299.0	1		2325	282	0.	.0	2297.0
1		0650	83	225.	96.2	2306.6	1		1510	183	45.	2.7	2298.9	1		2330	283	0.	.0	2297.0
1		0655	84	223.	95.1	2306.5	1		1515	184	43.	2.4	2298.8	1		2335	284	0.	.0	2297.0
1		0700	85	222.	93.9	2306.4	1		1520	185	40.	2.1	2298.7	1		2340	285	0.	.0	2297.0
1		0705	86	221.	92.7	2306.4	1		1525	186	38.	1.9	2298.6	1		2345	286	0.	.0	2297.0
1		0710	87	219.	91.4	2306.3	1		1530	187	36.	1.6	2298.5	1		2350	287	0.	.0	2297.0
1		0715	88	218.	90.2	2306.2	1		1535	188	33.	1.4	2298.4	1		2355	288	0.	.0	2297.0
1		0720	89	217.	88.9	2306.1	1		1540	189	31.	1.2	2298.3	2		0000	289	0.	.0	2297.0
1		0725	90	215.	87.6	2306.0	1		1545	190	29.	1.0	2298.2	2		0005	290	0.	.0	2297.0
1		0730	91	214.	86.3	2305.9	1		1550	191	28.	.8	2298.2	2		0010	291	0.	.0	2297.0
1		0735	92	213.	85.0	2305.9	1		1555	192	26.	.6	2298.1	2		0015	292	0.	.0	2297.0
1		0740	93	211.	83.7	2305.8	1		1600	193	25.	.4	2298.0	2		0020	293	0.	.0	2297.0
1		0745	94	210.	82.3	2305.7	1		1605	194	18.	.2	2297.7	2		0025	294	0.	.0	2297.0
1		0750	95	208.	81.0	2305.6	1		1610	195	11.	.2	2297.4	2		0030	295	0.	.0	2297.0
1		0755	96	207.	79.7	2305.5	1		1615	196	7.	.1	2297.3	2		0035	296	0.	.0	2297.0
1		0800	97	206.	78.3	2305.4	1		1620	197	4.	.1	2297.2	2		0040	297	0.	.0	2297.0
1		0805	98	204.	77.0	2305.3	1		1625	198	2.	.0	2297.1	2		0045	298	0.	.0	2297.0
1		0810	99	203.	75.6	2305.2	1		1630	199	1.	.0	2297.1	2		0050	299	0.	.0	2297.0
1		0815	100	201.	74.3	2305.1	1		1635	200	1.	.0	2297.0	2		0055	300	0.	.0	2297.0

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 231.	6.08	204.	79.	77.	77.
		(INCHES) 1.574	2.450	2.450	2.450
		(AC-FT) 101.	158.	158.	158.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
102.	6.08	78.	24.	23.	23.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2307.01	6.08	2305.39	2300.19	2300.07	2300.07

CUMULATIVE AREA = 1.21 SQ MI

HYDROGRAPH AT STATION DB1
PLAN 1, RATIO = .91

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2297.0	1		0820	101	198.	71.6	2305.0	1		1640	201	0.	.0	2297.0
1		0005	2	0.	.0	2297.0	1		0825	102	197.	70.2	2304.9	1		1645	202	0.	.0	2297.0
1		0010	3	0.	.0	2297.0	1		0830	103	195.	68.9	2304.8	1		1650	203	0.	.0	2297.0
1		0015	4	0.	.0	2297.0	1		0835	104	193.	67.6	2304.7	1		1655	204	0.	.0	2297.0
1		0020	5	0.	.0	2297.0	1		0840	105	192.	66.3	2304.6	1		1700	205	0.	.0	2297.0
1		0025	6	0.	.0	2297.0	1		0845	106	190.	65.0	2304.5	1		1705	206	0.	.0	2297.0
1		0030	7	1.	.0	2297.0	1		0850	107	188.	63.7	2304.4	1		1710	207	0.	.0	2297.0
1		0035	8	2.	.0	2297.1	1		0855	108	187.	62.5	2304.4	1		1715	208	0.	.0	2297.0
1		0040	9	3.	.0	2297.1	1		0900	109	185.	61.2	2304.3	1		1720	209	0.	.0	2297.0
1		0045	10	4.	.1	2297.2	1		0905	110	184.	59.9	2304.2	1		1725	210	0.	.0	2297.0
1		0050	11	4.	.1	2297.2	1		0910	111	182.	58.7	2304.1	1		1730	211	0.	.0	2297.0
1		0055	12	3.	.0	2297.1	1		0915	112	180.	57.4	2304.0	1		1735	212	0.	.0	2297.0
1		0100	13	3.	.0	2297.1	1		0920	113	179.	56.2	2303.9	1		1740	213	0.	.0	2297.0
1		0105	14	3.	.0	2297.1	1		0925	114	177.	55.0	2303.9	1		1745	214	0.	.0	2297.0
1		0110	15	2.	.0	2297.1	1		0930	115	176.	53.8	2303.8	1		1750	215	0.	.0	2297.0
1		0115	16	3.	.0	2297.1	1		0935	116	174.	52.6	2303.7	1		1755	216	0.	.0	2297.0
1		0120	17	3.	.0	2297.1	1		0940	117	173.	51.4	2303.6	1		1800	217	0.	.0	2297.0
1		0125	18	4.	.1	2297.2	1		0945	118	171.	50.2	2303.5	1		1805	218	0.	.0	2297.0
1		0130	19	5.	.1	2297.2	1		0950	119	170.	49.0	2303.5	1		1810	219	0.	.0	2297.0
1		0135	20	7.	.1	2297.3	1		0955	120	168.	47.8	2303.4	1		1815	220	0.	.0	2297.0
1		0140	21	9.	.1	2297.4	1		1000	121	167.	46.7	2303.3	1		1820	221	0.	.0	2297.0
1		0145	22	12.	.2	2297.5	1		1005	122	165.	45.6	2303.2	1		1825	222	0.	.0	2297.0
1		0150	23	15.	.2	2297.6	1		1010	123	164.	44.4	2303.2	1		1830	223	0.	.0	2297.0
1		0155	24	18.	.3	2297.7	1		1015	124	163.	43.3	2303.1	1		1835	224	0.	.0	2297.0
1		0200	25	19.	.3	2297.8	1		1020	125	161.	42.2	2303.0	1		1840	225	0.	.0	2297.0
1		0205	26	20.	.3	2297.8	1		1025	126	159.	41.1	2302.9	1		1845	226	0.	.0	2297.0
1		0210	27	19.	.3	2297.8	1		1030	127	157.	40.0	2302.8	1		1850	227	0.	.0	2297.0
1		0215	28	19.	.3	2297.8	1		1035	128	155.	38.9	2302.8	1		1855	228	0.	.0	2297.0
1		0220	29	21.	.3	2297.9	1		1040	129	153.	37.8	2302.7	1		1900	229	0.	.0	2297.0
1		0225	30	24.	.3	2298.0	1		1045	130	152.	36.8	2302.6	1		1905	230	0.	.0	2297.0
1		0230	31	25.	.4	2298.0	1		1050	131	150.	35.8	2302.5	1		1910	231	0.	.0	2297.0
1		0235	32	26.	.5	2298.1	1		1055	132	148.	34.7	2302.4	1		1915	232	0.	.0	2297.0
1		0240	33	27.	.6	2298.1	1		1100	133	146.	33.7	2302.3	1		1920	233	0.	.0	2297.0
1		0245	34	28.	.7	2298.2	1		1105	134	144.	32.7	2302.3	1		1925	234	0.	.0	2297.0
1		0250	35	29.	.9	2298.2	1		1110	135	142.	31.7	2302.2	1		1930	235	0.	.0	2297.0
1		0255	36	30.	1.1	2298.3	1		1115	136	141.	30.8	2302.1	1		1935	236	0.	.0	2297.0
1		0300	37	32.	1.2	2298.3	1		1120	137	139.	29.8	2302.0	1		1940	237	0.	.0	2297.0
1		0305	38	34.	1.4	2298.4	1		1125	138	137.	28.9	2302.0	1		1945	238	0.	.0	2297.0
1		0310	39	36.	1.6	2298.5	1		1130	139	134.	27.9	2301.9	1		1950	239	0.	.0	2297.0
1		0315	40	39.	2.0	2298.6	1		1135	140	132.	27.0	2301.8	1		1955	240	0.	.0	2297.0
1		0320	41	45.	2.7	2298.9	1		1140	141	129.	26.1	2301.7	1		2000	241	0.	.0	2297.0
1		0325	42	51.	3.9	2299.1	1		1145	142	127.	25.2	2301.6	1		2005	242	0.	.0	2297.0
1		0330	43	58.	5.8	2299.4	1		1150	143	125.	24.4	2301.5	1		2010	243	0.	.0	2297.0
1		0335	44	68.	8.7	2299.9	1		1155	144	122.	23.5	2301.4	1		2015	244	0.	.0	2297.0
1		0340	45	83.	12.3	2300.3	1		1200	145	120.	22.7	2301.4	1		2020	245	0.	.0	2297.0
1		0345	46	99.	16.3	2300.7	1		1205	146	118.	21.9	2301.3	1		2025	246	0.	.0	2297.0
1		0350	47	114.	20.6	2301.2	1		1210	147	116.	21.1	2301.2	1		2030	247	0.	.0	2297.0
1		0355	48	127.	25.1	2301.6	1		1215	148	113.	20.3	2301.1	1		2035	248	0.	.0	2297.0
1		0400	49	140.	30.3	2302.1	1		1220	149	111.	19.5	2301.0	1		2040	249	0.	.0	2297.0
1		0405	50	150.	35.9	2302.5	1		1225	150	109.	18.7	2301.0	1		2045	250	0.	.0	2297.0
1		0410	51	160.	41.5	2303.0	1		1230	151	106.	18.0	2300.9	1		2050	251	0.	.0	2297.0
1		0415	52	167.	46.8	2303.3	1		1235	152	103.	17.3	2300.8	1		2055	252	0.	.0	2297.0
1		0420	53	173.	51.8	2303.6	1		1240	153	100.	16.6	2300.7	1		2100	253	0.	.0	2297.0
1		0425	54	179.	56.4	2304.0	1		1245	154	97.	15.9	2300.7	1		2105	254	0.	.0	2297.0
1		0430	55	185.	60.7	2304.2	1		1250	155	95.	15.2	2300.6	1		2110	255	0.	.0	2297.0
1		0435	56	190.	64.7	2304.5	1		1255	156	92.	14.6	2300.5	1		2115	256	0.	.0	2297.0
1		0440	57	194.	68.5	2304.8	1		1300	157	89.	14.0	2300.5	1		2120	257	0.	.0	2297.0
1		0445	58	199.	72.0	2305.0	1		1305	158	87.	13.4	2300.4	1		2125	258	0.	.0	2297.0
1		0450	59	202.	75.3	2305.2	1		1310	159	85.	12.8	2300.3	1		2130	259	0.	.0	2297.0
1		0455	60	206.	78.6	2305.4	1		1315	160	82.	12.2	2300.3	1		2135	260	0.	.0	2297.0
1		0500	61	209.	81.8	2305.6	1		1320	161	80.	11.6	2300.2	1		2140	261	0.	.0	2297.0
1		0505	62	212.	84.8	2305.8	1		1325	162	78.	11.1	2300.1	1		2145	262	0.	.0	2297.0
1		0510	63	215.	87.6	2306.0	1		1330	163	75.	10.6	2300.1	1		2150	263	0.	.0	2297.0
1		0515	64	218.	90.1	2306.2	1		1335	164	73.	10.1	2300.0	1		2155	264	0.	.0	2297.0
1		0520	65	220.	92.4	2306.3	1		1340	165	71.	9.6	2300.0	1		2200	265	0.	.0	2297.0
1		0525	66	223.	94.3	2306.5	1		1345	166	70.	9.1	2299.9	1		2205	266	0.	.0	2297.0
1		0530	67	224.	96.0	2306.6	1		1350	167	68.	8.6	2299.8	1		2210	267	0.	.0	2297.0
1		0535	68	226.	97.4	2306.7	1		1355	168	66.	8.1	2299.8	1		2215	268	0.	.0	2297.0
1		0540	69	227.	98.5	2306.8	1		1400	169	65.	7.7	2299.7	1		2220	269	0.	.0	2297.0
1		0545	70	228.	99.4	2306.8	1		1405	170	63.	7.2	2299.6	1		2225	270	0.	.0	2297.0
1		0550	71	229.	100.1	2306.9	1		1410	171	62.	6.8	2299.6	1		2230	271	0.	.0	2297.0
1		0555	72	229.	100.5	2306.9	1		1415	172	60.	6.4	2299.5	1		2235	272	0.	.0	2297.0
1		0600	73	229.	100.8	2306.9	1		1420	173	59.	6.0	2299.4	1		2240	273	0.	.0	2297.0
1		0605	74	229.	100.9	2306.9	1		1425	174	57.	5.6	2299.4	1		2245	274	0.	.0	2297.0
1		0610	75	229.	100.7	2306.9	1		1430	175	56.	5.2	2299.3	1		2250	275	0.	.0	2297.0

1	0615	76	229.	100.4	2306.9	*	1	1435	176	54.	4.8	2299.3	*	1	2255	276	0.	.0	2297.0
1	0620	77	228.	99.9	2306.8	*	1	1440	177	53.	4.4	2299.2	*	1	2300	277	0.	.0	2297.0
1	0625	78	228.	99.3	2306.8	*	1	1445	178	52.	4.1	2299.2	*	1	2305	278	0.	.0	2297.0
1	0630	79	227.	98.6	2306.8	*	1	1450	179	51.	3.7	2299.1	*	1	2310	279	0.	.0	2297.0
1	0635	80	226.	97.7	2306.7	*	1	1455	180	49.	3.4	2299.1	*	1	2315	280	0.	.0	2297.0
1	0640	81	225.	96.7	2306.6	*	1	1500	181	48.	3.0	2299.0	*	1	2320	281	0.	.0	2297.0
1	0645	82	224.	95.7	2306.6	*	1	1505	182	45.	2.7	2298.9	*	1	2325	282	0.	.0	2297.0
1	0650	83	223.	94.6	2306.5	*	1	1510	183	43.	2.4	2298.8	*	1	2330	283	0.	.0	2297.0
1	0655	84	222.	93.5	2306.4	*	1	1515	184	40.	2.1	2298.7	*	1	2335	284	0.	.0	2297.0
1	0700	85	220.	92.3	2306.3	*	1	1520	185	38.	1.9	2298.6	*	1	2340	285	0.	.0	2297.0
1	0705	86	219.	91.2	2306.3	*	1	1525	186	35.	1.6	2298.5	*	1	2345	286	0.	.0	2297.0
1	0710	87	218.	89.9	2306.2	*	1	1530	187	33.	1.4	2298.4	*	1	2350	287	0.	.0	2297.0
1	0715	88	217.	88.7	2306.1	*	1	1535	188	31.	1.2	2298.3	*	1	2355	288	0.	.0	2297.0
1	0720	89	215.	87.4	2306.0	*	1	1540	189	29.	.9	2298.2	*	2	0000	289	0.	.0	2297.0
1	0725	90	214.	86.1	2305.9	*	1	1545	190	28.	.8	2298.2	*	2	0005	290	0.	.0	2297.0
1	0730	91	212.	84.8	2305.8	*	1	1550	191	26.	.6	2298.1	*	2	0010	291	0.	.0	2297.0
1	0735	92	211.	83.5	2305.8	*	1	1555	192	24.	.4	2298.0	*	2	0015	292	0.	.0	2297.0
1	0740	93	210.	82.2	2305.7	*	1	1600	193	18.	.2	2297.7	*	2	0020	293	0.	.0	2297.0
1	0745	94	208.	80.9	2305.6	*	1	1605	194	11.	.2	2297.4	*	2	0025	294	0.	.0	2297.0
1	0750	95	207.	79.6	2305.5	*	1	1610	195	7.	.1	2297.3	*	2	0030	295	0.	.0	2297.0
1	0755	96	205.	78.2	2305.4	*	1	1615	196	4.	.1	2297.2	*	2	0035	296	0.	.0	2297.0
1	0800	97	204.	76.9	2305.3	*	1	1620	197	2.	.0	2297.1	*	2	0040	297	0.	.0	2297.0
1	0805	98	203.	75.6	2305.2	*	1	1625	198	1.	.0	2297.1	*	2	0045	298	0.	.0	2297.0
1	0810	99	201.	74.2	2305.1	*	1	1630	199	1.	.0	2297.0	*	2	0050	299	0.	.0	2297.0
1	0815	100	200.	72.9	2305.0	*	1	1635	200	1.	.0	2297.0	*	2	0055	300	0.	.0	2297.0
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 229.	6.08		203.	78.	76.	76.
		(INCHES)	1.563	2.419	2.419	2.419
		(AC-FT)	101.	156.	156.	156.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
101.	6.08	77.	24.	23.	23.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2306.90	6.08	2305.30	2300.14	2300.03	2300.03

CUMULATIVE AREA = 1.21 SQ MI

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .99	RATIO 2 .98	RATIO 3 .95	RATIO 4 .93	RATIO 5 .92	RATIO 6 .91
HYDROGRAPH AT										
+	E140	.07	1	FLOW	35.	34.	33.	31.	31.	30.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	E360	.01	1	FLOW	11.	11.	11.	10.	10.	10.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	CP1	.08	1	FLOW	38.	37.	35.	34.	33.	33.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08
DIVERSION TO										
+	CP1E	.08	1	FLOW	17.	17.	16.	15.	15.	15.
				TIME	4.00	4.00	4.00	3.50	3.50	3.50
HYDROGRAPH AT										
+	CP1S	.08	1	FLOW	21.	20.	19.	19.	18.	18.
				TIME	4.00	4.00	4.00	4.08	4.08	4.08
HYDROGRAPH AT										
+	E160	.06	1	FLOW	42.	41.	40.	38.	37.	37.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO										
+	E160S	.06	1	FLOW	10.	10.	10.	10.	10.	10.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	E160E	.06	1	FLOW	32.	31.	30.	28.	27.	27.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	E340	.02	1	FLOW	19.	19.	18.	18.	17.	17.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	CP2	.16	1	FLOW	62.	60.	57.	53.	51.	50.
				TIME	3.83	3.83	3.83	3.83	3.83	3.92
DIVERSION TO										
+	CP2E	.16	1	FLOW	31.	30.	29.	27.	26.	25.
				TIME	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT										
+	CP2S	.16	1	FLOW	31.	30.	28.	26.	25.	25.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT										
+	E180	.21	1	FLOW	93.	91.	86.	82.	80.	79.
				TIME	4.17	4.17	4.17	4.17	4.25	4.25
HYDROGRAPH AT										
+	E160S	.00	1	FLOW	10.	10.	10.	10.	10.	10.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	E320	.02	1	FLOW	20.	19.	19.	18.	17.	17.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
4 COMBINED AT										
+	CP3	.39	1	FLOW	131.	128.	122.	115.	112.	110.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
DIVERSION TO										
+	CP3E	.39	1	FLOW	62.	61.	58.	54.	53.	53.
				TIME	4.08	4.08	4.08	4.08	4.08	3.58
HYDROGRAPH AT										
+	CP3S	.39	1	FLOW	69.	67.	64.	61.	59.	57.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	E200	.01	1	FLOW	6.	6.	6.	5.	5.	5.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	E300	.01	1	FLOW	15.	15.	15.	14.	14.	14.

				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	CP4	.41	1	FLOW	75.	72.	69.	67.	65.	63.
				TIME	4.08	4.08	4.00	4.00	4.00	4.00
DIVERSION TO										
+	CP4E	.41	1	FLOW	23.	22.	22.	21.	20.	20.
				TIME	4.08	4.08	4.00	4.00	3.58	3.67
HYDROGRAPH AT										
+	SOUTH	.41	1	FLOW	52.	50.	47.	46.	45.	43.
				TIME	4.08	4.08	4.00	4.00	4.00	4.00
DIVERSION TO										
+	CP4S	.41	1	FLOW	52.	50.	47.	46.	45.	43.
				TIME	4.08	4.08	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	NONE	.41	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	E080	.01	1	FLOW	10.	10.	9.	9.	9.	9.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	CP1E	.00	1	FLOW	17.	17.	16.	15.	15.	15.
				TIME	4.00	4.00	4.00	3.50	3.50	3.50
HYDROGRAPH AT										
+	E380	.02	1	FLOW	21.	20.	19.	19.	18.	18.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT										
+	CP5	.03	1	FLOW	46.	45.	44.	43.	42.	42.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO										
+	CP5E	.03	1	FLOW	25.	24.	24.	23.	22.	22.
				TIME	3.67	3.67	3.67	3.67	3.67	3.42
HYDROGRAPH AT										
+	CP5S	.03	1	FLOW	21.	21.	20.	20.	20.	20.
				TIME	3.58	3.67	3.58	3.67	3.67	3.67
HYDROGRAPH AT										
+	E060	.26	1	FLOW	128.	125.	119.	114.	112.	110.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17
DIVERSION TO										
+	E060E	.26	1	FLOW	63.	61.	58.	56.	55.	54.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT										
+	E060S	.26	1	FLOW	65.	64.	61.	58.	57.	56.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO										
+	RE060S	.26	1	FLOW	65.	64.	61.	58.	57.	56.
				TIME	4.25	4.25	4.25	4.25	4.25	4.25
HYDROGRAPH AT										
+	E100	.47	1	FLOW	172.	167.	159.	152.	149.	146.
				TIME	4.50	4.50	4.50	4.50	4.50	4.50
2 COMBINED AT										
+	CP6	.73	1	FLOW	232.	226.	215.	204.	200.	196.
				TIME	4.42	4.42	4.42	4.33	4.33	4.33
DIVERSION TO										
+	CP6E	.73	1	FLOW	139.	136.	131.	125.	123.	121.
				TIME	4.42	4.42	4.42	4.33	4.33	4.33
HYDROGRAPH AT										
+	CP6S	.73	1	FLOW	93.	90.	84.	79.	77.	75.
				TIME	4.42	4.42	4.42	4.33	4.33	4.33
ROUTED TO										
+	RCP6S	.73	1	FLOW	93.	90.	84.	79.	77.	75.
				TIME	4.50	4.50	4.50	4.50	4.50	4.50
HYDROGRAPH AT										
+	E420	.10	1	FLOW	94.	92.	88.	84.	83.	82.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	CP5E	.00	1	FLOW	25.	24.	24.	23.	22.	22.
				TIME	3.67	3.67	3.67	3.67	3.67	3.42
ROUTED TO										
+	RCP5E	.00	1	FLOW	24.	24.	24.	24.	24.	24.
				TIME	3.83	3.67	3.67	3.67	3.67	3.67
3 COMBINED AT										
+	CP7	.82	1	FLOW	130.	126.	120.	114.	111.	109.
				TIME	4.58	4.58	4.58	4.42	4.50	4.50
DIVERSION TO										
+	CP7E	.82	1	FLOW	85.	81.	75.	69.	66.	64.
				TIME	4.58	4.58	4.58	4.42	4.50	3.50
HYDROGRAPH AT										
+	CP7S	.82	1	FLOW	45.	45.	45.	45.	45.	45.
				TIME	3.67	3.67	3.67	4.33	4.42	4.50
HYDROGRAPH AT										
+	CP2E	.00	1	FLOW	31.	30.	29.	27.	26.	25.
				TIME	3.83	3.83	3.83	3.83	3.83	3.92
ROUTED TO										
+	RCP2E	.00	1	FLOW	32.	32.	29.	27.	27.	27.
				TIME	4.17	4.17	4.17	4.25	4.00	4.00
HYDROGRAPH AT										
+	CP3E	.00	1	FLOW	62.	61.	58.	54.	53.	53.
				TIME	4.08	4.08	4.08	4.08	4.08	3.58
ROUTED TO										
+	RCP3E	.00	1	FLOW	62.	60.	57.	55.	56.	56.
				TIME	4.25	4.25	4.33	3.83	3.83	3.83
HYDROGRAPH AT										
+	CP4E	.00	1	FLOW	23.	22.	22.	21.	20.	20.
				TIME	4.08	4.08	4.00	4.00	3.58	3.67
ROUTED TO										
+	RCP4E	.00	1	FLOW	23.	22.	22.	21.	21.	21.
				TIME	4.08	4.08	4.17	3.83	3.83	3.83
5 COMBINED AT										
+	DUMMY	.85	1	FLOW	164.	156.	152.	145.	144.	143.
				TIME	4.17	4.25	4.25	4.33	4.50	4.50
HYDROGRAPH AT										
+	E400	.08	1	FLOW	81.	79.	76.	72.	71.	70.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67

2 COMBINED AT										
+	CP8	.94	1	FLOW	226.	222.	213.	202.	198.	195.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO										
+	CP8S	.94	1	FLOW	133.	130.	125.	120.	117.	117.
				TIME	3.75	3.75	3.75	3.75	3.58	3.58
HYDROGRAPH AT										
+	CP8E	.94	1	FLOW	93.	92.	88.	82.	81.	78.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RCP8E	.94	1	FLOW	93.	91.	87.	82.	80.	77.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	E440	.05	1	FLOW	38.	37.	35.	34.	33.	33.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO										
+	E440E	.05	1	FLOW	20.	20.	19.	18.	18.	18.
				TIME	3.75	3.75	3.75	3.50	3.58	3.58
HYDROGRAPH AT										
+	E440S	.05	1	FLOW	18.	17.	16.	16.	15.	15.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	E460	.11	1	FLOW	73.	71.	68.	65.	63.	62.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT										
+	CP9	.17	1	FLOW	90.	87.	83.	79.	77.	75.
				TIME	3.75	3.83	3.83	3.75	3.75	3.75
DIVERSION TO										
+	CP9E	.17	1	FLOW	49.	46.	42.	38.	36.	34.
				TIME	3.75	3.83	3.83	3.75	3.75	3.75
HYDROGRAPH AT										
+	CP9S	.17	1	FLOW	41.	41.	41.	41.	41.	41.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	CP7E	.00	1	FLOW	85.	81.	75.	69.	66.	64.
				TIME	4.58	4.58	4.58	4.42	4.50	3.50
ROUTED TO										
+	RCP7E	.00	1	FLOW	87.	83.	75.	70.	70.	70.
				TIME	4.50	4.50	4.67	4.50	3.75	3.75
HYDROGRAPH AT										
+	E480	.09	1	FLOW	67.	65.	62.	59.	58.	57.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
4 COMBINED AT										
+	CP10	1.19	1	FLOW	257.	253.	242.	230.	226.	222.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO										
+	CP10S	1.19	1	FLOW	135.	133.	127.	119.	117.	116.
				TIME	3.83	3.83	3.83	3.83	3.83	3.67
HYDROGRAPH AT										
+	CP10E	1.19	1	FLOW	122.	120.	115.	111.	109.	106.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT										
+	CP9E	.00	1	FLOW	49.	46.	42.	38.	36.	34.
				TIME	3.75	3.83	3.83	3.75	3.75	3.75
HYDROGRAPH AT										
+	E520	.01	1	FLOW	16.	16.	15.	15.	14.	14.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	CP11	1.21	1	FLOW	180.	175.	166.	157.	152.	148.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
DIVERSION TO										
+	CP11S	1.21	1	FLOW	83.	81.	76.	72.	70.	68.
				TIME	3.83	3.83	3.83	3.83	3.83	3.67
HYDROGRAPH AT										
+	CP11E	1.21	1	FLOW	97.	95.	90.	85.	82.	80.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
ROUTED TO										
+	RCP11E	1.21	1	FLOW	97.	93.	84.	81.	79.	75.
				TIME	3.92	3.92	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	E060E	.00	1	FLOW	63.	61.	58.	56.	55.	54.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17
ROUTED TO										
+	RE060E	.00	1	FLOW	63.	61.	58.	57.	57.	57.
				TIME	4.50	4.50	4.50	4.17	4.17	4.17
HYDROGRAPH AT										
+	CP6E	.00	1	FLOW	139.	136.	131.	125.	123.	121.
				TIME	4.42	4.42	4.42	4.33	4.33	4.33
ROUTED TO										
+	RCP6E	.00	1	FLOW	141.	138.	134.	128.	128.	128.
				TIME	4.67	4.67	4.67	4.33	4.42	4.42
HYDROGRAPH AT										
+	E040	.36	1	FLOW	210.	204.	195.	186.	182.	180.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
3 COMBINED AT										
+	CP12	.36	1	FLOW	338.	331.	319.	308.	304.	301.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33
DIVERSION TO										
+	CP12E	.36	1	FLOW	199.	192.	180.	169.	165.	162.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33
HYDROGRAPH AT										
+	CP12S	.36	1	FLOW	139.	139.	139.	139.	139.	139.
				TIME	4.08	4.08	4.17	4.25	4.33	4.33
ROUTED TO										
+	RCP12S	.36	1	FLOW	139.	139.	139.	138.	137.	136.
				TIME	4.33	4.33	4.33	4.33	4.42	4.42
HYDROGRAPH AT										
+	E540	.05	1	FLOW	58.	57.	54.	52.	51.	51.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	CP13	.41	1	FLOW	149.	149.	146.	145.	143.	143.
				TIME	4.17	4.17	4.25	4.33	4.42	4.42

DIVERSION TO										
+	CP13E	.41	1	FLOW	10.	10.	7.	6.	4.	4.
				TIME	4.17	4.17	4.25	4.33	4.42	3.17
HYDROGRAPH AT										
+	CP13S	.41	1	FLOW	139.	139.	139.	139.	139.	139.
				TIME	4.17	4.17	4.25	4.33	4.42	4.42
ROUTED TO										
+	RCP13S	.41	1	FLOW	139.	139.	139.	138.	137.	136.
				TIME	4.33	4.42	4.42	4.42	4.50	4.50
HYDROGRAPH AT										
+	E440E	.00	1	FLOW	20.	20.	19.	18.	18.	18.
				TIME	3.75	3.75	3.75	3.50	3.58	3.58
ROUTED TO										
+	RE440E	.00	1	FLOW	21.	21.	21.	21.	21.	21.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	E560	.18	1	FLOW	168.	165.	159.	153.	151.	149.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
4 COMBINED AT										
+	CP14	1.80	1	FLOW	310.	298.	277.	262.	256.	250.
				TIME	4.08	3.92	3.92	3.92	3.92	3.92
DIVERSION TO										
+	CP14S	1.80	1	FLOW	30.	30.	30.	30.	30.	30.
				TIME	3.33	3.33	3.33	3.33	3.33	3.42
HYDROGRAPH AT										
+	CP14E	1.80	1	FLOW	280.	268.	247.	232.	226.	220.
				TIME	4.08	3.92	3.92	3.92	3.92	3.92
ROUTED TO										
+	RCP14E	1.80	1	FLOW	278.	267.	242.	228.	222.	218.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	E600	.09	1	FLOW	73.	71.	68.	65.	64.	63.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT										
+	CP15	1.88	1	FLOW	324.	312.	278.	262.	256.	250.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08
DIVERSION TO										
+	CP15S	1.88	1	FLOW	54.	49.	32.	24.	21.	19.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	CP15E	1.88	1	FLOW	270.	263.	246.	238.	235.	231.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	E240	.13	1	FLOW	85.	83.	79.	76.	74.	73.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO										
+	E240E	.13	1	FLOW	45.	43.	42.	40.	39.	38.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	E240S	.13	1	FLOW	40.	40.	37.	36.	35.	35.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	E260	.14	1	FLOW	93.	90.	86.	82.	81.	80.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
2 COMBINED AT										
+	CP16	.27	1	FLOW	133.	130.	123.	118.	116.	115.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
DIVERSION TO										
+	CP16E	.27	1	FLOW	66.	65.	61.	59.	58.	57.
				TIME	3.92	3.92	3.92	3.92	3.92	3.67
HYDROGRAPH AT										
+	CP16S	.27	1	FLOW	67.	65.	62.	59.	58.	58.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
3 COMBINED AT										
+	DUMMY	2.56	1	FLOW	334.	326.	302.	286.	278.	272.
				TIME	4.00	4.00	4.00	4.00	4.08	4.08
HYDROGRAPH AT										
+	CP14S	.00	1	FLOW	30.	30.	30.	30.	30.	30.
				TIME	3.33	3.33	3.33	3.33	3.33	3.42
ROUTED TO										
+	RCP14S	.00	1	FLOW	31.	31.	31.	32.	32.	32.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	E580	.10	1	FLOW	100.	98.	94.	91.	89.	88.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT										
+	CP17	.10	1	FLOW	130.	128.	124.	121.	119.	118.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO										
+	CP17E	.10	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	CP17S	.10	1	FLOW	130.	128.	124.	121.	119.	118.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	E220	.04	1	FLOW	37.	37.	35.	33.	33.	32.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RE220	.04	1	FLOW	38.	37.	36.	34.	33.	33.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	E240E	.00	1	FLOW	45.	43.	42.	40.	39.	38.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO										
+	RE240E	.00	1	FLOW	45.	44.	42.	42.	42.	42.
				TIME	4.33	4.33	4.33	4.08	4.08	4.08
HYDROGRAPH AT										
+	CP16E	.00	1	FLOW	66.	65.	61.	59.	58.	57.
				TIME	3.92	3.92	3.92	3.92	3.92	3.67
ROUTED TO										
+	RCP16E	.00	1	FLOW	67.	65.	61.	60.	60.	60.
				TIME	4.25	4.25	4.00	4.00	4.00	4.08
HYDROGRAPH AT										

+	CP4S	.00	1	FLOW	52.	50.	47.	46.	45.	43.
				TIME	4.08	4.08	4.00	4.00	4.00	4.00
ROUTED TO										
+	RCP4S	.00	1	FLOW	52.	50.	47.	45.	44.	42.
				TIME	4.33	4.33	4.33	4.33	4.42	4.42
HYDROGRAPH AT										
+	CP8S	.00	1	FLOW	133.	130.	125.	120.	117.	117.
				TIME	3.75	3.75	3.75	3.75	3.58	3.58
ROUTED TO										
+	RCP8S	.00	1	FLOW	134.	130.	126.	127.	128.	129.
				TIME	4.00	4.00	3.83	3.83	3.83	3.83
5 COMBINED AT										
+	DUMMY	.04	1	FLOW	313.	308.	296.	288.	283.	280.
				TIME	4.25	4.25	4.25	4.25	4.33	4.33
HYDROGRAPH AT										
+	E280	.28	1	FLOW	199.	194.	186.	178.	174.	172.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT										
+	CP18	.32	1	FLOW	464.	441.	417.	398.	391.	389.
				TIME	4.08	4.08	4.00	4.17	4.00	4.08
ROUTED TO										
+	RCP18	.32	1	FLOW	457.	440.	414.	401.	393.	386.
				TIME	4.33	4.33	4.33	4.33	4.33	4.33
HYDROGRAPH AT										
+	CP10S	.00	1	FLOW	135.	133.	127.	119.	117.	116.
				TIME	3.83	3.83	3.83	3.83	3.83	3.67
ROUTED TO										
+	RCP10S	.00	1	FLOW	136.	134.	132.	128.	126.	125.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	CP11S	.00	1	FLOW	83.	81.	76.	72.	70.	68.
				TIME	3.83	3.83	3.83	3.83	3.83	3.67
ROUTED TO										
+	RCP11S	.00	1	FLOW	82.	79.	75.	72.	71.	71.
				TIME	4.17	4.17	4.17	4.08	4.08	4.08
HYDROGRAPH AT										
+	E500	.39	1	FLOW	239.	233.	223.	213.	209.	206.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
4 COMBINED AT										
+	CP18A	.71	1	FLOW	849.	824.	788.	763.	753.	746.
				TIME	4.25	4.25	4.08	4.08	4.08	4.08
2 COMBINED AT										
+	CP19	.81	1	FLOW	922.	897.	867.	840.	829.	822.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	CP17E	.00	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	E660	.01	1	FLOW	16.	15.	15.	14.	14.	14.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	CP20	.82	1	FLOW	926.	901.	870.	843.	833.	826.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	E640	.07	1	FLOW	75.	73.	70.	67.	66.	66.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT										
+	CP21	.89	1	FLOW	959.	933.	901.	873.	862.	855.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	E620	.05	1	FLOW	53.	51.	50.	48.	47.	46.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT										
+	CP22	.94	1	FLOW	980.	953.	921.	892.	881.	874.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO										
+	RCP22	.94	1	FLOW	978.	949.	915.	880.	868.	858.
				TIME	4.08	4.08	4.08	4.08	4.08	4.17
HYDROGRAPH AT										
+	CP15S	.00	1	FLOW	54.	49.	32.	24.	21.	19.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08
ROUTED TO										
+	RCP15S	.00	1	FLOW	57.	49.	30.	21.	21.	21.
				TIME	4.25	4.25	4.33	4.42	3.75	3.75
HYDROGRAPH AT										
+	E680	.11	1	FLOW	113.	111.	107.	102.	101.	100.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT										
+	CP23	.11	1	FLOW	133.	131.	127.	123.	122.	120.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	E760	.01	1	FLOW	10.	10.	9.	9.	9.	9.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	CPGTA	1.06	1	FLOW	1066.	1034.	993.	956.	943.	933.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	2-3	.03	1	FLOW	40.	39.	37.	36.	35.	35.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	CPGTA2	1.09	1	FLOW	1075.	1043.	1002.	965.	951.	941.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	2-1	.04	1	FLOW	56.	55.	54.	52.	51.	51.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-2	.07	1	FLOW	96.	94.	91.	88.	87.	86.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	2-14A	.00	1	FLOW	3.	3.	3.	3.	3.	3.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	2A	.11	1	FLOW	155.	152.	147.	142.	140.	138.

				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	2B	1.21	1	FLOW	1121.	1088.	1047.	1008.	993.	983.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO										
+	DB1	1.21	1	FLOW	247.	244.	238.	233.	231.	229.
				TIME	6.08	6.08	6.08	6.08	6.08	6.08
			** PEAK STAGES IN FEET **							
			1	STAGE	2308.13	2307.90	2307.51	2307.15	2307.01	2306.90
				TIME	6.08	6.08	6.08	6.08	6.08	6.08
HYDROGRAPH AT										
+	2-6	.02	1	FLOW	29.	29.	28.	27.	27.	27.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	2C	1.22	1	FLOW	247.	244.	238.	233.	231.	230.
				TIME	6.08	6.08	6.08	6.08	6.08	6.08
HYDROGRAPH AT										
+	2-7	.02	1	FLOW	20.	19.	18.	18.	17.	17.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	2D	1.24	1	FLOW	247.	244.	239.	234.	232.	230.
				TIME	6.08	6.08	6.08	6.08	6.00	6.00
HYDROGRAPH AT										
+	2-4	.03	1	FLOW	56.	55.	53.	52.	51.	51.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-14B	.00	1	FLOW	3.	3.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	2E	.04	1	FLOW	59.	58.	56.	55.	54.	53.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-5	.09	1	FLOW	115.	113.	109.	106.	104.	103.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO										
+	2-5E	.09	1	FLOW	55.	54.	52.	51.	50.	49.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	2-5W	.09	1	FLOW	60.	59.	57.	55.	54.	54.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	2-9	.02	1	FLOW	24.	23.	23.	22.	22.	21.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	2F	.14	1	FLOW	142.	140.	135.	131.	129.	127.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-5E	.00	1	FLOW	55.	54.	52.	51.	50.	49.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	2-10	.02	1	FLOW	25.	24.	24.	23.	23.	22.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	2G	.16	1	FLOW	222.	218.	210.	203.	200.	198.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-8	.03	1	FLOW	48.	47.	45.	44.	43.	43.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	2H	.19	1	FLOW	270.	264.	256.	247.	244.	242.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	2I	1.43	1	FLOW	396.	388.	375.	362.	357.	354.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-11	.03	1	FLOW	43.	42.	41.	40.	39.	39.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-12	.03	1	FLOW	39.	39.	37.	36.	35.	35.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	2J	.05	1	FLOW	82.	81.	78.	75.	74.	74.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	DUMMY	1.48	1	FLOW	478.	468.	453.	438.	431.	427.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-13	.03	1	FLOW	39.	38.	37.	36.	35.	35.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	PT2	1.51	1	FLOW	517.	507.	490.	473.	467.	462.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	E720	.06	1	FLOW	67.	66.	63.	61.	60.	59.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	E800	.01	1	FLOW	14.	13.	13.	13.	12.	12.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	CP25	.07	1	FLOW	79.	77.	74.	72.	71.	70.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	E740	.05	1	FLOW	62.	60.	58.	56.	55.	54.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT										
+	CP26	.12	1	FLOW	141.	138.	133.	128.	126.	124.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	E700	.14	1	FLOW	122.	119.	115.	111.	109.	108.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT										
+	CP27	.26	1	FLOW	248.	242.	233.	224.	220.	218.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67

HYDROGRAPH AT										
+	1-1	.03	1	FLOW	57.	56.	54.	52.	52.	51.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	AL1E	.00	1	FLOW	5.	5.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	1A.1	.04	1	FLOW	61.	60.	58.	56.	56.	55.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO										
+	1A.1	.04	1	FLOW	60.	59.	58.	56.	55.	55.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	1-2	.04	1	FLOW	58.	57.	56.	54.	53.	53.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	1A	.07	1	FLOW	119.	117.	113.	110.	108.	107.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	1-4	.04	1	FLOW	55.	54.	52.	51.	50.	49.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO										
+	R1-4	.04	1	FLOW	53.	52.	51.	49.	48.	47.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT										
+	1B	.11	1	FLOW	167.	164.	159.	154.	152.	150.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	1-3	.04	1	FLOW	60.	59.	57.	55.	54.	54.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	AL2E	.00	1	FLOW	5.	5.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	PT1	.15	1	FLOW	232.	227.	220.	212.	210.	207.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-1	.04	1	FLOW	60.	59.	57.	56.	55.	54.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-6	.00	1	FLOW	5.	5.	4.	4.	4.	4.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-7	.05	1	FLOW	64.	63.	61.	58.	58.	57.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	4A	.09	1	FLOW	129.	126.	122.	118.	117.	116.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-4	.01	1	FLOW	17.	16.	16.	15.	15.	15.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	4B	.10	1	FLOW	146.	143.	138.	134.	132.	131.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-2	.05	1	FLOW	86.	84.	82.	79.	78.	77.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-3	.05	1	FLOW	75.	74.	71.	69.	68.	67.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	4C	.11	1	FLOW	161.	158.	153.	148.	146.	144.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	U1020	.01	1	FLOW	14.	14.	14.	13.	13.	13.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	4D	.22	1	FLOW	321.	315.	305.	295.	291.	288.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-5	.06	1	FLOW	100.	99.	96.	93.	91.	91.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	4H	.28	1	FLOW	421.	414.	401.	387.	382.	379.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	U1040	.02	1	FLOW	32.	31.	30.	30.	29.	29.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	U1060	.01	1	FLOW	10.	10.	10.	10.	9.	9.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	U1080	.03	1	FLOW	42.	41.	40.	39.	38.	38.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	4I	.05	1	FLOW	84.	82.	80.	78.	77.	76.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	PT4	.33	1	FLOW	505.	496.	481.	465.	459.	455.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
5 COMBINED AT										
+	DUMMY	4.81	1	FLOW	1542.	1507.	1445.	1385.	1365.	1351.
				TIME	3.67	3.67	3.67	3.58	3.58	3.58
HYDROGRAPH AT										
+	3-1	.04	1	FLOW	59.	58.	56.	54.	54.	53.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	3-2	.02	1	FLOW	31.	30.	29.	28.	27.	27.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	PT3	.06	1	FLOW	89.	88.	85.	82.	81.	80.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58

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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									
RE060S	MANE	1.75	65.04	252.00	.34	5.00	64.93	255.00	.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4711E+01 EXCESS= .0000E+00 OUTFLOW= .4714E+01 BASIN STORAGE= .1155E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RE060S	MANE	1.75	63.79	253.75	.32	5.00	63.73	255.00	.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4446E+01 EXCESS= .0000E+00 OUTFLOW= .4450E+01 BASIN STORAGE= .1002E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RE060S	MANE	1.50	60.97	255.00	.29	5.00	60.97	255.00	.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4023E+01 EXCESS= .0000E+00 OUTFLOW= .4025E+01 BASIN STORAGE= .1131E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RE060S	MANE	1.50	57.71	255.00	.26	5.00	57.71	255.00	.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3585E+01 EXCESS= .0000E+00 OUTFLOW= .3587E+01 BASIN STORAGE= .8472E-03 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RE060S	MANE	1.50	56.59	252.00	.25	5.00	56.58	255.00	.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3411E+01 EXCESS= .0000E+00 OUTFLOW= .3413E+01 BASIN STORAGE= .1237E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RE060S	MANE	1.50	55.68	255.00	.24	5.00	55.68	255.00	.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3285E+01 EXCESS= .0000E+00 OUTFLOW= .3287E+01 BASIN STORAGE= .1298E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RCP6S	MANE	1.75	93.03	271.25	.17	5.00	93.00	270.00	.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6722E+01 EXCESS= .0000E+00 OUTFLOW= .6729E+01 BASIN STORAGE= .2051E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RCP6S	MANE	1.75	89.76	269.50	.16	5.00	89.76	270.00	.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6194E+01 EXCESS= .0000E+00 OUTFLOW= .6202E+01 BASIN STORAGE= .1583E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RCP6S	MANE	1.50	84.01	270.00	.14	5.00	84.01	270.00	.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5349E+01 EXCESS= .0000E+00 OUTFLOW= .5357E+01 BASIN STORAGE= .1646E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00									
RCP6S	MANE	1.25	78.89	268.75	.12	5.00	78.87	270.00	.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4536E+01 EXCESS= .0000E+00 OUTFLOW= .4539E+01 BASIN STORAGE= .1666E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RCP6S	MANE	1.25	76.60	268.75	.11	5.00	76.56	270.00	.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4203E+01 EXCESS= .0000E+00 OUTFLOW= .4207E+01 BASIN STORAGE= .1480E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RCP6S	MANE	1.25	74.66	268.75	.10	5.00	74.53	270.00	.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3952E+01 EXCESS= .0000E+00 OUTFLOW= .3955E+01 BASIN STORAGE= .1894E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RCP5E	MANE	5.00	24.19	230.00	-1.00	5.00	24.19	230.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP5E	MANE	5.00	24.00	220.00	-1.00	5.00	24.00	220.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP5E	MANE	5.00	24.04	220.00	-1.00	5.00	24.04	220.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP5E	MANE	5.00	24.01	220.00	-1.00	5.00	24.01	220.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP5E	MANE	5.00	24.07	220.00	-1.00	5.00	24.07	220.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP5E	MANE	5.00	24.11	220.00	-1.00	5.00	24.11	220.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP2E	MANE	5.00	32.48	250.00	-1.00	5.00	32.48	250.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP2E	MANE	5.00	31.62	250.00	-1.00	5.00	31.62	250.00	-1.00
FOR PLAN = 1 RATIO= .00									
RCP2E	MANE	5.00	29.45	250.00	-1.00	5.00	29.45	250.00	-1.00

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 FOR PLAN = 1  RATIO=  .00
    RCP2E  MANE          5.00     27.31    255.00     -1.00      5.00     27.31    255.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP2E  MANE          5.00     27.01    240.00     -1.00      5.00     27.01    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP2E  MANE          5.00     27.09    240.00     -1.00      5.00     27.09    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP3E  MANE          5.00     62.08    255.00     -1.00      5.00     62.08    255.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP3E  MANE          5.00     60.36    255.00     -1.00      5.00     60.36    255.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP3E  MANE          5.00     57.37    260.00     -1.00      5.00     57.37    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP3E  MANE          5.00     55.47    230.00     -1.00      5.00     55.47    230.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP3E  MANE          5.00     55.58    230.00     -1.00      5.00     55.58    230.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP3E  MANE          5.00     55.66    230.00     -1.00      5.00     55.66    230.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP4E  MANE          5.00     23.01    245.00     -1.00      5.00     23.01    245.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP4E  MANE          5.00     22.41    245.00     -1.00      5.00     22.41    245.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP4E  MANE          5.00     22.20    250.00     -1.00      5.00     22.20    250.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP4E  MANE          5.00     20.84    230.00     -1.00      5.00     20.84    230.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP4E  MANE          5.00     20.88    230.00     -1.00      5.00     20.88    230.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP4E  MANE          5.00     20.73    230.00     -1.00      5.00     20.73    230.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP8E  MANE           .75     92.98    234.00       .14      5.00     92.79    235.00         .14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6768E+01 EXCESS= .0000E+00 OUTFLOW= .6777E+01 BASIN STORAGE= .1844E-02 PERCENT ERROR=   -.2

 FOR PLAN = 1  RATIO=  .00
    RCP8E  MANE           .75     91.60    234.00       .13      5.00     91.09    235.00         .13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6313E+01 EXCESS= .0000E+00 OUTFLOW= .6322E+01 BASIN STORAGE= .1614E-02 PERCENT ERROR=   -.2

 FOR PLAN = 1  RATIO=  .00
    RCP8E  MANE           .75     87.59    234.00       .11      5.00     87.06    235.00         .11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5412E+01 EXCESS= .0000E+00 OUTFLOW= .5419E+01 BASIN STORAGE= .1807E-02 PERCENT ERROR=   -.2

 FOR PLAN = 1  RATIO=  .00
    RCP8E  MANE           .75     81.98    234.75       .09      5.00     81.87    235.00         .09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4534E+01 EXCESS= .0000E+00 OUTFLOW= .4539E+01 BASIN STORAGE= .1663E-02 PERCENT ERROR=   -.2

 FOR PLAN = 1  RATIO=  .00
    RCP8E  MANE           .75     80.36    234.00       .08      5.00     80.11    235.00         .08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4185E+01 EXCESS= .0000E+00 OUTFLOW= .4190E+01 BASIN STORAGE= .2048E-02 PERCENT ERROR=   -.2

 FOR PLAN = 1  RATIO=  .00
    RCP8E  MANE           .75     77.50    234.75       .08      5.00     77.33    235.00         .08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3902E+01 EXCESS= .0000E+00 OUTFLOW= .3907E+01 BASIN STORAGE= .1911E-02 PERCENT ERROR=   -.2

 FOR PLAN = 1  RATIO=  .00
    RCP7E  MANE          5.00     86.53    270.00     -1.00      5.00     86.53    270.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP7E  MANE          5.00     82.62    270.00     -1.00      5.00     82.62    270.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP7E  MANE          5.00     75.47    280.00     -1.00      5.00     75.47    280.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP7E  MANE          5.00     69.74    270.00     -1.00      5.00     69.74    270.00       -1.00
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          FOR PLAN = 1  RATIO=  .00
             RCP7E  MANE          5.00     69.67    225.00     -1.00      5.00     69.67    225.00       -1.00


          FOR PLAN = 1  RATIO=  .00
             RCP7E  MANE          5.00     69.90    225.00     -1.00      5.00     69.90    225.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP11E  MANE           .75     96.78    235.50       .05      5.00     96.74    235.00         .05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3078E+01 EXCESS= .0000E+00 OUTFLOW= .3085E+01 BASIN STORAGE= .1111E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
            RCP11E  MANE           .75     93.70    236.25       .04      5.00     93.09    235.00         .04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2819E+01 EXCESS= .0000E+00 OUTFLOW= .2823E+01 BASIN STORAGE= .1122E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
            RCP11E  MANE           .75     88.79    237.00       .04      5.00     84.26    240.00         .04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2279E+01 EXCESS= .0000E+00 OUTFLOW= .2282E+01 BASIN STORAGE= .1020E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
            RCP11E  MANE           .75     84.45    237.00       .03      5.00     81.01    240.00         .03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1960E+01 EXCESS= .0000E+00 OUTFLOW= .1962E+01 BASIN STORAGE= .1339E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
            RCP11E  MANE           .75     82.11    237.00       .03      5.00     78.59    240.00         .03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1823E+01 EXCESS= .0000E+00 OUTFLOW= .1824E+01 BASIN STORAGE= .1183E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
            RCP11E  MANE           .75     79.02    237.00       .03      5.00     74.50    240.00         .03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1701E+01 EXCESS= .0000E+00 OUTFLOW= .1701E+01 BASIN STORAGE= .1064E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
            RE060E  MANE          5.00     63.49    270.00     -1.00      5.00     63.49    270.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RE060E  MANE          5.00     61.34    270.00     -1.00      5.00     61.34    270.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RE060E  MANE          5.00     58.07    270.00     -1.00      5.00     58.07    270.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RE060E  MANE          5.00     57.30    250.00     -1.00      5.00     57.30    250.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RE060E  MANE          5.00     57.01    250.00     -1.00      5.00     57.01    250.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RE060E  MANE          5.00     56.79    250.00     -1.00      5.00     56.79    250.00       -1.00


          FOR PLAN = 1  RATIO=  .00
             RCP6E  MANE          5.00    140.60    280.00     -1.00      5.00    140.60    280.00       -1.00


          FOR PLAN = 1  RATIO=  .00
             RCP6E  MANE          5.00    138.20    280.00     -1.00      5.00    138.20    280.00       -1.00


          FOR PLAN = 1  RATIO=  .00
             RCP6E  MANE          5.00    133.58    280.00     -1.00      5.00    133.58    280.00       -1.00


          FOR PLAN = 1  RATIO=  .00
             RCP6E  MANE          5.00    127.65    260.00     -1.00      5.00    127.65    260.00       -1.00


          FOR PLAN = 1  RATIO=  .00
             RCP6E  MANE          5.00    127.50    265.00     -1.00      5.00    127.50    265.00       -1.00


          FOR PLAN = 1  RATIO=  .00
             RCP6E  MANE          5.00    128.05    265.00     -1.00      5.00    128.05    265.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP12S  MANE          1.25    139.18    251.25       .86      5.00    139.00    265.00         .86

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1657E+02 EXCESS= .0000E+00 OUTFLOW= .1658E+02 BASIN STORAGE= .1277E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RCP12S  MANE          1.25    139.26    251.25       .82      5.00    139.00    265.00         .82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1589E+02 EXCESS= .0000E+00 OUTFLOW= .1589E+02 BASIN STORAGE= .1183E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RCP12S  MANE          1.50    139.17    256.50       .76      5.00    138.97    260.00         .76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1463E+02 EXCESS= .0000E+00 OUTFLOW= .1463E+02 BASIN STORAGE= .1367E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RCP12S  MANE          1.50    139.08    261.00       .69      5.00    138.34    260.00         .69
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .1337E+02 EXCESS= .0000E+00 OUTFLOW= .1337E+02 BASIN STORAGE= .9497E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP12S	MANE	1.75	138.27	262.50	.67	5.00	136.76	265.00	.67	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1287E+02 EXCESS= .0000E+00 OUTFLOW= .1287E+02 BASIN STORAGE= .1223E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP12S	MANE	1.75	136.93	264.25	.65	5.00	136.24	265.00	.65	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1252E+02 EXCESS= .0000E+00 OUTFLOW= .1252E+02 BASIN STORAGE= .1090E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP13S	MANE	2.50	139.44	257.50	.86	5.00	139.30	260.00	.86	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1891E+02 EXCESS= .0000E+00 OUTFLOW= .1891E+02 BASIN STORAGE= .1162E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP13S	MANE	2.50	139.98	257.50	.83	5.00	139.30	265.00	.83	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1825E+02 EXCESS= .0000E+00 OUTFLOW= .1825E+02 BASIN STORAGE= .1064E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP13S	MANE	2.50	139.27	265.00	.77	5.00	139.27	265.00	.77	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1692E+02 EXCESS= .0000E+00 OUTFLOW= .1693E+02 BASIN STORAGE= .1389E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP13S	MANE	2.75	138.98	266.75	.71	5.00	138.37	265.00	.71	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1558E+02 EXCESS= .0000E+00 OUTFLOW= .1558E+02 BASIN STORAGE= .1479E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP13S	MANE	2.75	138.81	266.75	.69	5.00	137.10	270.00	.68	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1506E+02 EXCESS= .0000E+00 OUTFLOW= .1506E+02 BASIN STORAGE= .1307E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP13S	MANE	2.75	136.76	269.50	.67	5.00	136.16	270.00	.67	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1467E+02 EXCESS= .0000E+00 OUTFLOW= .1467E+02 BASIN STORAGE= .1140E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RE440E	MANE	5.00	20.89	240.00	-1.00	5.00	20.89	240.00	-1.00	

FOR PLAN = 1 RATIO= .00

RE440E	MANE	5.00	20.90	240.00	-1.00	5.00	20.90	240.00	-1.00	

FOR PLAN = 1 RATIO= .00

RE440E	MANE	5.00	20.74	240.00	-1.00	5.00	20.74	240.00	-1.00	

FOR PLAN = 1 RATIO= .00

RE440E	MANE	5.00	21.04	240.00	-1.00	5.00	21.04	240.00	-1.00	

FOR PLAN = 1 RATIO= .00

RE440E	MANE	5.00	20.96	240.00	-1.00	5.00	20.96	240.00	-1.00	

FOR PLAN = 1 RATIO= .00

RE440E	MANE	5.00	20.86	240.00	-1.00	5.00	20.86	240.00	-1.00	

FOR PLAN = 1 RATIO= .00

RCP14E	MANE	2.25	280.78	240.75	.33	5.00	278.01	240.00	.33	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3129E+02 EXCESS= .0000E+00 OUTFLOW= .3130E+02 BASIN STORAGE= .2248E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP14E	MANE	2.00	267.06	240.00	.31	5.00	267.06	240.00	.31	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3011E+02 EXCESS= .0000E+00 OUTFLOW= .3012E+02 BASIN STORAGE= .2310E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP14E	MANE	2.00	243.41	244.00	.29	5.00	242.44	245.00	.29	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2779E+02 EXCESS= .0000E+00 OUTFLOW= .2780E+02 BASIN STORAGE= .2823E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP14E	MANE	2.00	228.66	244.00	.27	5.00	227.99	245.00	.27	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2567E+02 EXCESS= .0000E+00 OUTFLOW= .2569E+02 BASIN STORAGE= .2845E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP14E	MANE	2.00	222.75	244.00	.26	5.00	222.36	245.00	.26	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2485E+02 EXCESS= .0000E+00 OUTFLOW= .2486E+02 BASIN STORAGE= .2671E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP14E	MANE	1.75	217.52	245.00	.25	5.00	217.52	245.00	.25	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2422E+02 EXCESS= .0000E+00 OUTFLOW= .2423E+02 BASIN STORAGE= .2572E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP14S	MANE	5.00	31.04	210.00	-1.00	5.00	31.04	210.00	-1.00	

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 FOR PLAN = 1  RATIO=  .00
   RCP14S  MANE          5.00     31.19    210.00     -1.00      5.00     31.19    210.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP14S  MANE          5.00     31.43    210.00     -1.00      5.00     31.43    210.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP14S  MANE          5.00     31.73    210.00     -1.00      5.00     31.73    210.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP14S  MANE          5.00     31.82    210.00     -1.00      5.00     31.82    210.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP14S  MANE          5.00     31.86    210.00     -1.00      5.00     31.86    210.00       -1.00


 FOR PLAN = 1  RATIO=  .00
      RE220  MANE          5.00     38.46    245.00      1.28      5.00     38.46    245.00        1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3024E+01 EXCESS= .0000E+00 OUTFLOW= .3032E+01 BASIN STORAGE= .4469E-02 PERCENT ERROR=   -.4

 FOR PLAN = 1  RATIO=  .00
      RE220  MANE          5.00     37.49    245.00      1.24      5.00     37.49    245.00        1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2946E+01 EXCESS= .0000E+00 OUTFLOW= .2954E+01 BASIN STORAGE= .4423E-02 PERCENT ERROR=   -.4

 FOR PLAN = 1  RATIO=  .00
      RE220  MANE          5.00     35.83    245.00      1.19      5.00     35.83    245.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2818E+01 EXCESS= .0000E+00 OUTFLOW= .2826E+01 BASIN STORAGE= .4266E-02 PERCENT ERROR=   -.4

 FOR PLAN = 1  RATIO=  .00
      RE220  MANE          5.00     34.15    245.00      1.14      5.00     34.15    245.00        1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2690E+01 EXCESS= .0000E+00 OUTFLOW= .2698E+01 BASIN STORAGE= .4159E-02 PERCENT ERROR=   -.5

 FOR PLAN = 1  RATIO=  .00
      RE220  MANE          5.00     33.46    245.00      1.12      5.00     33.46    245.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2639E+01 EXCESS= .0000E+00 OUTFLOW= .2648E+01 BASIN STORAGE= .4128E-02 PERCENT ERROR=   -.5

 FOR PLAN = 1  RATIO=  .00
      RE220  MANE          5.00     32.97    245.00      1.10      5.00     32.97    245.00        1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2604E+01 EXCESS= .0000E+00 OUTFLOW= .2612E+01 BASIN STORAGE= .4106E-02 PERCENT ERROR=   -.5

 FOR PLAN = 1  RATIO=  .00
   RE240E  MANE          5.00     45.30    260.00     -1.00      5.00     45.30    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RE240E  MANE          5.00     43.80    260.00     -1.00      5.00     43.80    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RE240E  MANE          5.00     42.08    260.00     -1.00      5.00     42.08    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RE240E  MANE          5.00     41.67    245.00     -1.00      5.00     41.67    245.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RE240E  MANE          5.00     41.59    245.00     -1.00      5.00     41.59    245.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RE240E  MANE          5.00     41.52    245.00     -1.00      5.00     41.52    245.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP16E  MANE          5.00     67.04    255.00     -1.00      5.00     67.04    255.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP16E  MANE          5.00     65.26    255.00     -1.00      5.00     65.26    255.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP16E  MANE          5.00     60.95    240.00     -1.00      5.00     60.95    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP16E  MANE          5.00     59.90    240.00     -1.00      5.00     59.90    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP16E  MANE          5.00     59.72    240.00     -1.00      5.00     59.72    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP16E  MANE          5.00     59.64    245.00     -1.00      5.00     59.64    245.00       -1.00


 FOR PLAN = 1  RATIO=  .00
      RCP4S  MANE          1.75     51.83    255.50     -1.00      5.00     51.54    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
      RCP4S  MANE          1.75     52.65    246.75     -1.00      5.00     50.05    260.00       -1.00
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 FOR PLAN = 1  RATIO=  .00
    RCP4S  MANE          1.50     47.45    261.00     -1.00      5.00     47.26    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP4S  MANE          1.50     45.64    262.50     -1.00      5.00     45.35    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP4S  MANE          1.50     44.33    264.00     -1.00      5.00     43.91    265.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP4S  MANE          1.25     42.21    262.50     -1.00      5.00     41.81    265.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP8S  MANE          5.00    133.83    240.00     -1.00      5.00    133.83    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP8S  MANE          5.00    130.15    240.00     -1.00      5.00    130.15    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP8S  MANE          5.00    126.15    230.00     -1.00      5.00    126.15    230.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP8S  MANE          5.00    127.45    230.00     -1.00      5.00    127.45    230.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP8S  MANE          5.00    127.85    230.00     -1.00      5.00    127.85    230.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP8S  MANE          5.00    128.51    230.00     -1.00      5.00    128.51    230.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP18  MANE          5.00    456.52    260.00      3.78      5.00    456.52    260.00        3.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6497E+02 EXCESS= .0000E+00 OUTFLOW= .6499E+02 BASIN STORAGE= .3437E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RCP18  MANE          5.00    439.85    260.00      3.68      5.00    439.85    260.00        3.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6339E+02 EXCESS= .0000E+00 OUTFLOW= .6340E+02 BASIN STORAGE= .3397E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RCP18  MANE          5.00    414.22    260.00      3.54      5.00    414.22    260.00        3.54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6086E+02 EXCESS= .0000E+00 OUTFLOW= .6088E+02 BASIN STORAGE= .3292E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RCP18  MANE          5.00    400.90    260.00      3.40      5.00    400.90    260.00        3.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5848E+02 EXCESS= .0000E+00 OUTFLOW= .5850E+02 BASIN STORAGE= .4234E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RCP18  MANE          5.00    393.21    260.00      3.34      5.00    393.21    260.00        3.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5743E+02 EXCESS= .0000E+00 OUTFLOW= .5744E+02 BASIN STORAGE= .4197E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RCP18  MANE          5.00    386.21    260.00      3.29      5.00    386.21    260.00        3.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5665E+02 EXCESS= .0000E+00 OUTFLOW= .5667E+02 BASIN STORAGE= .4134E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
   RCP10S  MANE          5.00    135.63    240.00     -1.00      5.00    135.63    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP10S  MANE          5.00    133.58    240.00     -1.00      5.00    133.58    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP10S  MANE          5.00    132.14    240.00     -1.00      5.00    132.14    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP10S  MANE          5.00    127.99    240.00     -1.00      5.00    127.99    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP10S  MANE          5.00    126.33    240.00     -1.00      5.00    126.33    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP10S  MANE          5.00    125.17    240.00     -1.00      5.00    125.17    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP11S  MANE          5.00     82.01    250.00     -1.00      5.00     82.01    250.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP11S  MANE          5.00     78.64    250.00     -1.00      5.00     78.64    250.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP11S  MANE          5.00     74.52    250.00     -1.00      5.00     74.52    250.00       -1.00
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          FOR PLAN = 1  RATIO=  .00
            RCP11S  MANE          5.00     71.75    245.00     -1.00      5.00     71.75    245.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP11S  MANE          5.00     71.46    245.00     -1.00      5.00     71.46    245.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP11S  MANE          5.00     71.14    245.00     -1.00      5.00     71.14    245.00       -1.00


          FOR PLAN = 1  RATIO=  .00
             RCP22  MANE          2.99    978.25    244.90      3.00      5.00    978.25    245.00        3.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1503E+03 EXCESS= .0000E+00 OUTFLOW= .1503E+03 BASIN STORAGE= .8292E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP22  MANE          3.01    954.96    246.62      2.92      5.00    949.42    245.00        2.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1464E+03 EXCESS= .0000E+00 OUTFLOW= .1464E+03 BASIN STORAGE= .9349E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP22  MANE          3.03    919.72    245.70      2.79      5.00    914.95    245.00        2.79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1400E+03 EXCESS= .0000E+00 OUTFLOW= .1399E+03 BASIN STORAGE= .9374E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP22  MANE          3.06    888.77    247.66      2.67      5.00    880.30    245.00        2.67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1338E+03 EXCESS= .0000E+00 OUTFLOW= .1338E+03 BASIN STORAGE= .8739E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP22  MANE          3.07    873.58    248.45      2.62      5.00    867.62    245.00        2.62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1312E+03 EXCESS= .0000E+00 OUTFLOW= .1312E+03 BASIN STORAGE= .9542E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
             RCP22  MANE          3.07    866.57    245.90      2.58      5.00    858.17    250.00        2.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1295E+03 EXCESS= .0000E+00 OUTFLOW= .1295E+03 BASIN STORAGE= .8315E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RCP15S  MANE          5.00     56.61    255.00     -1.00      5.00     56.61    255.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP15S  MANE          5.00     49.12    255.00     -1.00      5.00     49.12    255.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP15S  MANE          5.00     30.49    260.00     -1.00      5.00     30.49    260.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP15S  MANE          5.00     21.31    265.00     -1.00      5.00     21.31    265.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP15S  MANE          5.00     20.72    225.00     -1.00      5.00     20.72    225.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP15S  MANE          5.00     20.78    225.00     -1.00      5.00     20.78    225.00       -1.00


          FOR PLAN = 1  RATIO=  .99
              1A.1  MANE           .59     60.69    215.63      2.13      5.00     60.38    215.00        2.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4204E+01 EXCESS= .0000E+00 OUTFLOW= .4205E+01 BASIN STORAGE= .2311E-11 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .98
              1A.1  MANE           .46     59.81    215.82      2.09      5.00     59.32    215.00        2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4125E+01 EXCESS= .0000E+00 OUTFLOW= .4126E+01 BASIN STORAGE= .2107E-11 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .95
              1A.1  MANE           .60     57.85    215.64      2.02      5.00     57.54    215.00        2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3994E+01 EXCESS= .0000E+00 OUTFLOW= .3994E+01 BASIN STORAGE= .2284E-11 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .93
              1A.1  MANE           .51     56.13    215.55      1.96      5.00     55.78    215.00        1.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3862E+01 EXCESS= .0000E+00 OUTFLOW= .3863E+01 BASIN STORAGE= .2160E-11 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .92
              1A.1  MANE           .59     55.30    215.78      1.93      5.00     55.05    215.00        1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3810E+01 EXCESS= .0000E+00 OUTFLOW= .3810E+01 BASIN STORAGE= .2221E-11 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .91
              1A.1  MANE           .59     54.86    215.50      1.91      5.00     54.56    215.00        1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3773E+01 EXCESS= .0000E+00 OUTFLOW= .3774E+01 BASIN STORAGE= .2124E-11 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
              R1-4  MANE          4.00     53.41    220.00      1.83      5.00     53.41    220.00        1.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3643E+01 EXCESS= .0000E+00 OUTFLOW= .3648E+01 BASIN STORAGE= .2570E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
```

R1-4	MANE	4.00	52.38	220.00	1.80	5.00	52.38	220.00	1.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3567E+01 EXCESS= .0000E+00 OUTFLOW= .3572E+01 BASIN STORAGE= .2548E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

R1-4	MANE	4.00	50.65	220.00	1.73	5.00	50.65	220.00	1.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3440E+01 EXCESS= .0000E+00 OUTFLOW= .3445E+01 BASIN STORAGE= .2511E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

R1-4	MANE	4.00	48.91	220.00	1.67	5.00	48.91	220.00	1.67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3314E+01 EXCESS= .0000E+00 OUTFLOW= .3319E+01 BASIN STORAGE= .2474E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

R1-4	MANE	4.00	48.22	220.00	1.64	5.00	48.22	220.00	1.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3264E+01 EXCESS= .0000E+00 OUTFLOW= .3269E+01 BASIN STORAGE= .2458E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

R1-4	MANE	4.25	47.12	221.00	1.62	5.00	46.84	220.00	1.62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3226E+01 EXCESS= .0000E+00 OUTFLOW= .3231E+01 BASIN STORAGE= .2588E-02 PERCENT ERROR= -.2

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

HEC-1 Model: 10-Year Ultimate Condition

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *             JUN  1998                 *
 *           VERSION 4.1                 *
 *                                       *
 *  RUN DATE   08MAY13  TIME  14:12:24   *
 *                                       *
 *****************************************
```

```
*****************************************
*                                       *
*    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, INC.
            2       ID     PARK HIGHLANDS WEST
            3       ID     MASTER DRAINAGE STUDY
            4       ID     ULTIMATE CONDITION
            5       ID
            6       ID     RETURN PERIOD ------- 10-YEAR
            7       ID     DISTRIBUTION -------- 6-HOUR SDN3
            8       ID     PROJECT NO. --------- CBH1301.002
            9       ID     FILENAME ------------ ULT10.H1
           10       ID     DATE ---------------- MAY 2013
           11       ID     MODELED BY ---------- KC/KCR
           12       ID
           13       ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
           14       ID        DRAINAGE AREA (MI^2)       DARF
           15       ID        10-YR EVENT               0.570
           16       ID
           17       IT       5       0       0     300
           18       IO       5       0       0
           19       IN       5       0       0
           20       JR    PREC   0.570
                    *

           21       KK    U19O
           22       BA   .3684
           23       PB    2.77
           24       PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
           25       PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
           26       PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
           27       PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
           28       PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
           29       PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
           30       PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
           31       PC   0.998   0.999   1.000
           32       LS       0    80.7
           33       UD   0.522
                    *

           34       KK    U17O
           35       BA   .2521
           36       LS       0    83.0
           37       UD   0.521
                    *

           38       KK     CP1
           39       KM   COMBINE U19O AND U12O AT IRON MOUNTAIN AND TORREY PINES
           40       HC       2
                    *

           41       KK    CP1E
           42       KM   CP1E IS THE FLOW DRAINING EAST IN IRON MOUNTAIN
           43       KM   CP1S IS THE FLOW DRAINING SOUTH IN TORREY PINES
           44       DT    CP1S
           45       DI     109
           46       DQ      49
                    *
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1 HEC-1 INPUT PAGE 2

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

           47       KK   RCP1E
           48       KM   ROUTE TO CP2
           49       RD    2480   .0050   0.016       0    TRAP       0      50
                    *

           50       KK    U15O
           51       BA   .1336
           52       LS       0    83.0
           53       UD   0.322
                    *

           54       KK   U15OS
           55       KM   U15OS IS THE FLOW DRAINING SOUTH IN JONES
           56       KM   U15OE IS THE FLOW DRAINING EAST IN SHELEHEDA
           57       KM   EXISTING SD IN JONES IS FOR NUISANCE FLOW
           58       DT   U15OE
           59       DI      35
           60       DQ      20
                    *

           61       KK   RU15OS
           62       KM   ROUTE TO CP2
           63       RD    1345   .0050   0.016       0    TRAP       0      50
                    *

           64       KK   U155
           65       BA   .1294
           66       LS       0    83.4
           67       UD   0.314
                    *

           68       KK     CP2
           69       KM   COMBINE CP1 U15OS AND U155 AT IRON MOUNTAIN AND JONES
           70       HC       3
                    *

           71       KK    CP2S
           72       KM   CP2S IS THE FLOW DRAINING SOUTH IN JONES
```

```
  73          KM   CP2E IS THE FLOW DRAINING EAST IN IRON MOUNTAIN
  74          KM   EXISTING SD IN IRON MOUNTAIN CONVEYS 46 CFS EAST
  75          DT    CP2E
  76          DI      92
  77          DQ      69
              *

  78          KK   RCP2S
  79          KM   ROUTE TO CP10
  80          RD    2695   .0050   0.016       0    TRAP       0      50
              *
1                                        HEC-1 INPUT                                                PAGE  3

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

  81          KK    CP1S
  82          KM   RETRIEVE CP1S
  83          DR    CP1S
              *

  84          KK    U210
  85          BA   .0727
  86          LS       0    83.1
  87          UD   0.289
              *

  88          KK     CP3
  89          KM   COMBINE CP1S AND U210 AT MAGGIE AND TORREY PINES
  90          HC       2
              *

  91          KK    CP3S
  92          KM   CP3S IS THE FLOW DRAINING SOUTH IN TORREY PINES
  93          KM   CP3E IS THE FLOW DRAINING EAST IN MAGGIE
  94          DT    CP3E
  95          DI      64
  96          DQ      29
              *

  97          KK    U250
  98          BA   .0698
  99          LS       0    83.1
 100          UD   0.289
              *

 101          KK     CP4
 102          KM   COMBINE CP3S AND U250 AT BRENT AND TORREY PINES
 103          HC       2
              *

 104          KK    CP4S
 105          KM   CP4S IS THE FLOW DRAINING SOUTH IN TORREY PINES
 106          KM   CP4E IS THE FLOW DRAINING EAST IN BRENT
 107          DT    CP4E
 108          DI      52
 109          DQ      25
              *

 110          KK   RCP4S
 111          KM   ROUTE TO CP5
 112          RD    1380   .0050   0.016       0    TRAP       0      50
              *

 113          KK    U230
 114          BA   .1390
 115          LS       0    83.4
 116          UD   0.328
              *
1                                        HEC-1 INPUT                                                PAGE  4

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

 117          KK    U330
 118          BA   .0142
 119          LS       0    85.0
 120          UD   0.188
              *

 121          KK     CP5
 122          KM   COMBINE CP4S U230 AND U330 AT HORSE AND TORREY PINES
 123          HC       3
              *

 124          KK    CP3E
 125          KM   RETRIEVE CP3E
 126          DR    CP3E
              *

 127          KK    U370
 128          BA   .0159
 129          LS       0    86.2
 130          UD   0.185
              *

 131          KK     CP6
 132          KM   COMBINE CP3E AND U370 AT MAGGIE AND MUSTANG
 133          HC       2
              *

 134          KK    CP6S
 135          KM   CP6S IS THE FLOW DRAINING SOUTH IN MUSTANG
 136          KM   CP6E IS THE FLOW DRAINING EAST IN MAGGIE
 137          DT    CP6E
 138          DI      32
 139          DQ      14
              *

 140          KK    CP4E
 141          KM   RETRIEVE CP4E
 142          DR    CP4E
              *

 143          KK    U350
 144          BA   .0163
 145          LS       0    86.3
 146          UD   0.186
              *

 147          KK     CP7
 148          KM   COMBINE CP6S CP4E AND U350 AT BRENT AND MUSTANG
 149          HC       3
              *
1                                        HEC-1 INPUT                                                PAGE  5

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

 150          KK    CP7S
 151          KM   CP7S IS THE FLOW DRAINING SOUTH IN MUSTANG
 152          KM   CP7E IS THE FLOW DRAINING EAST IN BRENT
 153          DT    CP7E
 154          DI      48
 155          DQ      24
              *
```

```
 156          KK    U305
 157          BA   .0093
 158          LS       0    86.7
 159          UD   0.171
              *

 160          KK     CP8
 161          KM   COMBINE CP7S AND U305 AT GUY AND MUSTANG
 162          HC       2
              *

 163          KK    CP8S
 164          KM   CP8S IS THE FLOW DRAINING SOUTH IN MUSTANG
 165          KM   CP8E IS THE FLOW DRAINING EAST IN GUY
 166          DT    CP8E
 167          DI      27
 168          DQ      13
              *

 169          KK    U310
 170          BA   .0102
 171          LS       0    87.1
 172          UD   0.171
              *

 173          KK     CP9
 174          KM   COMBINE CP5 CP8S AND U310 AT HORSE AND MUSTANG
 175          HC       3
              *

 176          KK    CP9E
 177          KM   CP9S IS THE FLOW DRAINING SOUTH IN MUSTANG
 178          KM   CP9E IS THE FLOW DRAINING EAST IN HORSE
 179          KM   EXISTING SD IN HORSE IS FOR NUISANCE FLOW
 180          DT    CP9S
 181          DI      82
 182          DQ      56
              *

 183          KK   RCP9E
 184          KM   ROUTE TO CP10
 185          RD    1950   .0050   0.016       0    TRAP       0      50
              *
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1 HEC-1 INPUT PAGE 6

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

 186          KK    CP6E
 187          KM   RETRIEVE CP6E
 188          DR    CP6E
              *

 189          KK   RCP6E
 190          KM   ROUTE TO CP10
 191          RD    4010   .0050   0.016       0    TRAP       0      50
              *

 192          KK    CP7E
 193          KM   RETRIEVE CP7E
 194          DR    CP7E
              *

 195          KK   RCP7E
 196          KM   ROUTE TO CP10
 197          RD    3370   .0050   0.016       0    TRAP       0      50
              *

 198          KK    CP8E
 199          KM   RETRIEVE CP8E
 200          DR    CP8E
              *

 201          KK   RCP8E
 202          KM   ROUTE TO CP10
 203          RD    2680    0050   0.016       0    TRAP       0      50
              *

 204          KK   DUMMY
 205          KM   COMBINE CP2S CP9E CP6E CP7E AND CP8E
 206          HC       5
              *

 207          KK    U410
 208          BA   .2013
 209          LS       0    85.7
 210          UD   0.354
              *

 211          KK    CP10
 212          KM   COMBINE DUMMY AND U410 AT HORSE AND JONES
 213          HC       2
              *

 214          KK   CP10E
 215          KM   CP10S IS THE FLOW DRAINING SOUTH IN JONES
 216          KM   CP10E IS THE FLOW DRAINING EAST IN HORSE
 217          KM   EXISTING SD IN JONES CONVEYS 23 CFS SOUTH
 218          DT   CP10S
 219          DI     134
 220          DQ      83
              *
```

1 HEC-1 INPUT PAGE 7

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

 221          KK  RCP10E
 222          KM   ROUTE TO CP11
 223          RD    2530   .0050   0.016       0    TRAP       0      50
              *

 224          KK    U440
 225          BA   .0523
 226          LS       0    80.9
 227          UD   0.290
              *

 228          KK   U440S
 229          KM   U440S IS THE FLOW DRAINING SOUTH IN BRADLEY
 230          KM   U440E IS THE FLOW DRAINING EAST IN BRENT
 231          DT   U440E
 232          DI      12
 233          DQ       7
              *

 234          KK  RU440S
 235          KM   ROUTE TO CP11
 236          RD    1345   .0050   0.016       0    TRAP       0      50
              *

 237          KK    U470
 238          BA   .2012
 239          LS       0    80.7
 240          UD   0.356
              *
```

```
 241          KK    CP11
 242          KM   COMBINE CP10E U440S AND U470 AT HORSE AND BRADLEY
 243          HC       3
              *

 244          KK   CP11E
 245          KM   CP11S IS THE FLOW DRAINING SOUTH IN BRADLEY
 246          KM   CP11E IS THE FLOW DRAINING EAST IN HORSE
 247          KM   EXISTING SD IN HORSE CONVEYS 6 CFS EAST
 248          DT   CP11S
 249          DI      79
 250          DQ      33
              *

 251          KK    U530
 252          BA   .0131
 253          LS       0    84.0
 254          UD   0.148
              *
1                                          HEC-1 INPUT                                                    PAGE  8

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

 255          KK    CP12
 256          KM   COMBINE CP11E AND U530 AT HORSE AND UNICORN
 257          HC       2
              *

 258          KK   CP12E
 259          KM   CP12S IS THE FLOW DRAINING SOUTH IN UNICORN
 260          KM   CP12E IS THE FLOW DRAINING EAST IN HORSE
 261          KM   EXISTING SD IN HORSE CONVEYS 6 CFS EAST
 262          DT   CP12S
 263          DI      48
 264          DQ      21
              *

 265          KK  RCP12E
 266          KM   ROUTE TO CP14
 267          RD    1825   .0050   0.016       0    TRAP       0      50
              *

 268          KK    U130
 269          BA   .0556
 270          LS       0    83.9
 271          UD   0.203
              *

 272          KK   U130S
 273          KM   U130S IS THE FLOW DRAINING SOUTH IN DECATUR
 274          KM   U130E IS THE FLOW DRAINING EAST IN IRON MOUNTAIN
 275          DT   U130E
 276          DI      19
 277          DQ      10
              *

 278          KK  RU130S
 279          KM   ROUTE TO CP13
 280          RD    1270   .0050   0.016       0    TRAP       0      50
              *

 281          KK    U550
 282          BA   .0534
 283          LS       0    85.4
 284          UD   0.225
              *

 285          KK    CP13
 286          KM   COMBINE U130S AND U550 AT BRENT AND DECATUR
 287          HC       2
              *
1                                          HEC-1 INPUT                                                    PAGE  9

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

 288          KK   CP13S
 289          KM   CP13S IS THE FLOW DRAINING SOUTH IN DECATUR
 290          KM   CP13E IS THE FLOW DRAINING EAST IN BRENT
 291          DT   CP13E
 292          DI      28
 293          DQ      17
              *

 294          KK  RCP13S
 295          KM   ROUTE TO CP14
 296          RD    1290   .0040   0.016       0    TRAP       0      50
              *

 297          KK   U440E
 298          KM   RETRIEVE U440E
 299          DR   U440E
              *

 300          KK  RU440E
 301          KM   ROUTE TO CP14
 302          RD    3850   .0040   0.016       0    TRAP       0      50
              *

 303          KK    U570
 304          BA   .1791
 305          LS       0    89.0
 306          UD   0.370
              *

 307          KK    CP14
 308          KM   COMBINE CP12E CP13S U440E AND U570 AT HORSE AND DECATUR
 309          HC       4
              *

 310          KK   CP14E
 311          KM   CP14S IS THE FLOW DRAINING SOUTH IN DECATUR
 312          KM   CP14E IS THE FLOW DRAINING EAST IN HORSE
 313          KM   EXISTING SD IN DECATUR CONVEYS 30 CFS SOUTH
 314          DT   CP14S
 315          DI      98
 316          DQ      30
              *

 317          KK  RCP14E
 318          KM   ROUTE TO CP15
 319          RD    2645   .0050   0.016       0    TRAP       0      50
              *

 320          KK    U610
 321          BA   .0479
 322          LS       0    84.2
 323          UD   0.311
              *
1                                          HEC-1 INPUT                                                    PAGE 10

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

 324          KK    CP15
 325          KM   COMBINE CP14E AND U610 AT HORSE AND AVIARY
```

```
326          HC       2
             *

327          KK   CP15E
328          KM   CP15S IS THE FLOW DRAINING SOUTH IN AVIARY
329          KM   CP15E IS THE FLOW DRAINING EAST IN HORSE
330          KM   ULTIMATE SD IN HORSE CONVEYS 321 CFS EAST
331          DT   CP15S
332          DI      77
333          DQ       0
             *

334          KK    CP9S
335          KM   RETRIEVE CP9S
336          DR    CP9S
             *

337          KK   RCP9S
338          KM   ROUTE TO CP16
339          RD    4770   .0050   0.016       0    TRAP       0      50
             *

340          KK   CP10S
341          KM   RETRIEVE CP10S
342          DR   CP10S
             *

343          KK  RCP10S
344          KM   ROUTE TO CP16
345          RD    2755   .0050   0.016       0    TRAP       0      50
             *

346          KK    U280
347          BA   .2688
348          LS       0    83.3
349          UD   0.375
             *

350          KK    CP16
351          KM   COMBINE CP9S CP10S AND U280 AT GRAND TETON AND JONES
352          HC       3
             *

353          KK   RCP16
354          KM   ROUTE TO CP17
355          RD    4900   .0050   0.016       0    TRAP       0      50
             *
1                                        HEC-1 INPUT                                                    PAGE 11

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

356          KK   CP11S
357          KM   RETRIEVE CP11S
358          DR   CP11S
             *

359          KK  RCP11S
360          KM   ROUTE TO CP17
361          RD    5215   .0050   0.016       0    TRAP       0      50
             *

362          KK   CP12S
363          KM   RETRIEVE CP12S
364          DR   CP12S
             *

365          KK  RCP12S
366          KM   ROUTE TO CP17
367          RD    4550   .0050   0.016       0    TRAP       0      50
             *

368          KK   CP14S
369          KM   RETRIEVE CP14S
370          DR   CP14S
             *

371          KK  RCP14S
372          KM   ROUTE TO CP17
373          RD    2565   .0050   0.013       0    CIRC     2.5       0
             *

374          KK    U510
375          BA   .4885
376          LS       0    84.8
377          UD   0.510
             *

378          KK    CP17
379          KM   COMBINE CP16 CP11S CP12S CP14S AND U510 AT GRAND TETON AND DECATUR
380          HC       5
             *

381          KK    U650
382          BA   .0085
383          LS       0    89.3
384          UD   0.106
             *

385          KK    CP18
386          KM   COMBINE CP17 AND U650 IN GRAND TETON BETWEEN DECATUR AND SAN MATEO
387          HC       2
             *
1                                        HEC-1 INPUT                                                    PAGE 12

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

388          KK    U630
389          BA   .0735
390          LS       0    88.0
391          UD   0.246
             *

392          KK    CP19
393          KM   COMBINE CP18 AND U630 IN GRAND TETON BETWEEN DECATUR AND SAN MATEO
394          HC       2
             *

395          KK    U620
396          BA   .0472
397          LS       0    88.1
398          UD   0.246
             *

399          KK    CP20
400          KM   COMBINE CP19 AND U620 AT GRAND TETON AND SAN MATEO
401          HC       2
             *

402          KK   RCP20
403          KM   ROUTE TO CP22
404          RD    1230   .0050   0.016       0    TRAP       0      50
             *

405          KK   CP15S
406          KM   RETRIEVE CP15S
```

```
                DR   CP15S
                *

                KK  RCP15S
                KM   ROUTE TO CP20
                RD    2555   .0050   0.016       0    TRAP       0      50
                *

                KK    U680
                BA   .1122
                LS       0    88.0
                UD   0.303
                *

                KK    CP21
                KM   COMBINE CP15S AND U680 IN AVIARY JUST NORTH OF GRAND TETON
                HC       2
                *

                KK    U760
                BA   .0076
                LS       0    88.3
                UD   0.147
                *
1                                                HEC-1 INPUT                                                PAGE 13

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

                KK   CPGTA
                KM   COMBINE CP20 CP21 AND U760 AT GRAND TETON AND AVIARY
                HC       3
                *

                KK     2-3
                KM   PARK OR TRAIL
                BA  0.0327
                LS       0    86.0
                UD   0.157
                *

                KK  CPGTA2
                KM   COMBINE CPGTA AND 2-3
                HC       2
                *

                KK     2-1
                KM   NEIGHBORHOOD COMMERCIAL
                BA  0.0367
                LS       0    94.0
                UD   0.187
                *

                KK     2-2
                KM   MEDIUM DENSITY
                BA  0.0742
                LS       0    91.0
                UD   0.215
                *

                KK   2-14A
                KM   PARK OR TRAIL
                BA  0.0027
                LS       0    86.0
                UD   0.135
                *

                KK      2A
                HC       3
                *

                KK      2B
                KO       2
                HC       2
                *

                KK     DB1
                KM   DETENTION BASIN 1
                KO       2
                RS       1    ELEV      -1
                SV       0   0.339   3.015   9.712  18.977  29.349  42.004 102.301 126.116 159.117
                SE  2297.0  2298.0  2299.0  2300.0  2301.0  2302.0  2303.0  2307.0  2308.5  2310.5
                SQ       0      72     110     138     161     199     215     231     252    1975
1                                                HEC-1 INPUT                                                PAGE 14

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

                SE  2297.0  2300.0  2301.0  2302.0  2303.0  2305.0  2306.0  2307.0  2308.5  2310.5
                KO       1
                *

                KK     2-6
                KM   ELEMENTARY SCHOOL
                BA  0.0180
                LS       0    94.0
                UD   0.158
                *

                KK      2C
                HC       2
                *

                KK     2-7
                KM   PARK OR TRAIL
                BA  0.0156
                LS       0    86.0
                UD   0.137
                *

                KK      2D
                HC       2
                *

                KK     2-4
                KM   HIGH DENSITY
                BA  0.0334
                LS       0    94.0
                UD   0.137
                *

                KK   2-14B
                KM   PARK OR TRAIL
                BA  0.0025
                LS       0    86.0
                UD   0.100
                *

                KK      2E
                HC       2
                *

                KK     2-5
                KM   MEDIUM DENSITY
                BA  0.0891
                LS       0    91.0
                UD   0.215
                *
```

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

  493     KK    2-5W
  494     DT    2-5E
  495     DI       0     100
  496     DQ       0      48
          *
  497     KK     2-9
  498     KM   MEDIUM DENSITY
  499     BA  0.0156
  500     LS       0    91.0
  501     UD   0.135
          *
  502     KK      2F
  503     HC       3
          *
  504     KK    2-5E
  505     DR    2-5E
          *
  506     KK    2-10
  507     KM   MEDIUM DENSITY
  508     BA  0.0163
  509     LS       0    91.0
  510     UD   0.132
          *
  511     KK      2G
  512     HC       3
          *
  513     KK     2-8
  514     KM   MIXED USE
  515     BA  0.0286
  516     LS       0    94.0
  517     UD   0.144
          *
  518     KK      2H
  519     HC       2
          *
  520     KK      2I
  521     KM   FLOW IN STORM DRAIN
  522     HC       2
          *
  523     KK    2-11
  524     KM   MEDIUM-HIGH DENSITY
  525     BA  0.0255
  526     LS       0    94.0
  527     UD   0.135
          *
```



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

  528     KK    2-12
  529     KM   MEDIUM-LOW DENSITY
  530     BA  0.0272
  531     LS       0    90.0
  532     UD   0.150
          *
  533     KK      2J
  534     KM   FLOW IN STORM DRAIN
  535     HC       2
          *
  536     KK   DUMMY
  537     KM   FLOW IN STORM DRAIN
  538     HC       2
          *
  539     KK    2-13
  540     KM   MEDIUM-LOW AND MEDIUM HIGH DENSITY
  541     BA  0.0273
  542     LS       0    91.0
  543     UD   0.176
          *
  544     KK     PT2
  545     KM   FLOW IN STORM DRAIN
  546     HC       2
          *
  547     KK    U720
  548     BA   .0590
  549     LS       0    88.1
  550     UD   0.229
          *
  551     KK    U800
  552     BA   .0095
  553     LS       0    90.0
  554     UD   0.150
          *
  555     KK    CP25
  556     KM   COMBINE U720 AND U800 IN GRAND TETON WEST OF ALIANTE
  557     HC       2
          *
  558     KK    U740
  559     BA   .0533
  560     LS       0    88.0
  561     UD   0.213
          *
```



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

  562     KK    CP26
  563     KM   COMBINE CP25 AND U740 IN GRAND TETON WEST OF ALIANTE
  564     HC       2
          *
  565     KK    U700
  566     BA   .1352
  567     LS       0    87.8
  568     UD   0.372
          *
  569     KK    CP27
  570     KM   COMBINE CP26 AND U700 AT GRAND TETON AND ALIANTE
  571     HC       2
          *
  572     KK     1-1
```

```
 573          KM   MEDIUM HIGH DENSITY
 574          BA   .0344
 575          LS       0    94.0
 576          UD   0.150
              *

 577          KK    AL1E
 578          KM   ROADWAY
 579          BA   .0026
 580          LS       0    98.0
 581          UD   0.077
              *

 582          KK    1A.1
 583          KM   COMBINE 1-1 AND AL1E IN ALIANTE STORM DRAIN
 584          HC       2
              *

 585          KK    1A.1
 586          KM   ROUTE TO PT1
 587          RK     740  0.0034   0.013       0    CIRC     4.5
              *

 588          KK     1-2
 589          KM   MEDIUM HIGH DENSITY
 590          BA   .0356
 591          LS       0    94.0
 592          UD   0.156
              *

 593          KK      1A
 594          KM   COMBINE PT3A AND 1-2 IN ALIANTE STORM DRAIN
 595          HC       2
              *
1                                          HEC-1 INPUT                                                  PAGE 18

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

 596          KK     1-4
 597          KM   MEDIUM DENSITY
 598          BA   .0373
 599          LS       0    91.0
 600          UD   0.157
              *

 601          KK    R1-4
 602          KM   ROUTE TO 1-4
 603          RD    1600   .0100   0.016       0    TRAP      45       1
              *

 604          KK      1B
 605          KM   COMBINE 1A AND 1-4 IN ALIANTE STORM DRAIN
 606          HC       2
              *

 607          KK     1-3
 608          KM   MEIDUM LOW DENSITY
 609          BA   .0419
 610          LS       0    90.0
 611          UD   0.154
              *

 612          KK    AL2E
 613          KM   ROADWAY
 614          BA   .0025
 615          LS       0    98.0
 616          UD   0.076
              *

 617          KK     PT1
 618          KM   COMBINE 1B, 1-3 AND AL2E IN ALIANTE STORM DRAIN
 619          HC       3
              *

 620          KK     4-1
 621          KM   HIGH DENSITY
 622          BA   .0359
 623          LS       0    94.0
 624          UD   0.137
              *

 625          KK     4-6
 626          KM   PARK OR TRAIL
 627          BA   .0039
 628          LS       0    86.0
 629          UD   0.156
              *
1                                          HEC-1 INPUT                                                  PAGE 19

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

 630          KK     4-7
 631          KM   MEDIUM DENSITY
 632          BA  0.0464
 633          LS       0    91.0
 634          UD   0.189
              *

 635          KK      4A
 636          KM   COMBINE 4-1, 4-6 AND 4-7 IN SEVERANCE STORM DRAIN
 637          HC       3
              *

 638          KK     4-4
 639          KM   MEDIUM DENSITY
 640          BA   .0109
 641          LS       0    91.0
 642          UD   0.123
              *

 643          KK      4B
 644          KM   COMBINE 4A AND 4-4 IN AVIARY STORM DRAIN
 645          HC       2
              *

 646          KK     4-2
 647          KM   MEDIUM HIGH DENSITY
 648          BA   .0547
 649          LS       0    94.0
 650          UD   0.179
              *

 651          KK     4-3
 652          KM   MEDIUM DENSITY
 653          BA   .0542
 654          LS       0    91.0
 655          UD   0.186
              *

 656          KK      4C
 657          KM   COMBINE 4-2 AND 4-3 IN ELKHORN STORM DRAIN
 658          HC       2
              *

 659          KK   U1020
```

```
660           BA   .0092
661           LS      0    94.0
662           UD   0.184
              *
```



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

663           KK      4D
664           KM   COMBINE 4B, 4C AND U1020 IN AVIARY STORM DRAIN
665           HC       3
              *

666           KK     4-5
667           KM   MEDIUM HIGH DENSITY
668           BA   .0650
669           LS      0    94.0
670           UD   0.185
              *

671           KK      4H
672           KM   COMBINE 4D AND 4-5 IN AVIARY STORM DRAIN
673           HC       2
              *

674           KK   U1040
675           BA   .0185
676           LS      0    95.0
677           UD   0.136
              *

678           KK   U1060
679           BA   .0060
680           LS      0    94.0
681           UD   0.109
              *

682           KK   U1080
683           BA   .0254
684           LS      0    94.0
685           UD   0.150
              *

686           KK      4I
687           KM   COMBINE U1040, U1060 AND U1080 IN DORRELL STORM DRAIN
688           HC       3
              *

689           KK     PT4
690           KM   COMBINE 4H AND 4I IN AVIARY/DORRELL STORM DRAIN
691           HC       2
              *

692           KK   DUMMY
693           HC       5
              *
```



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

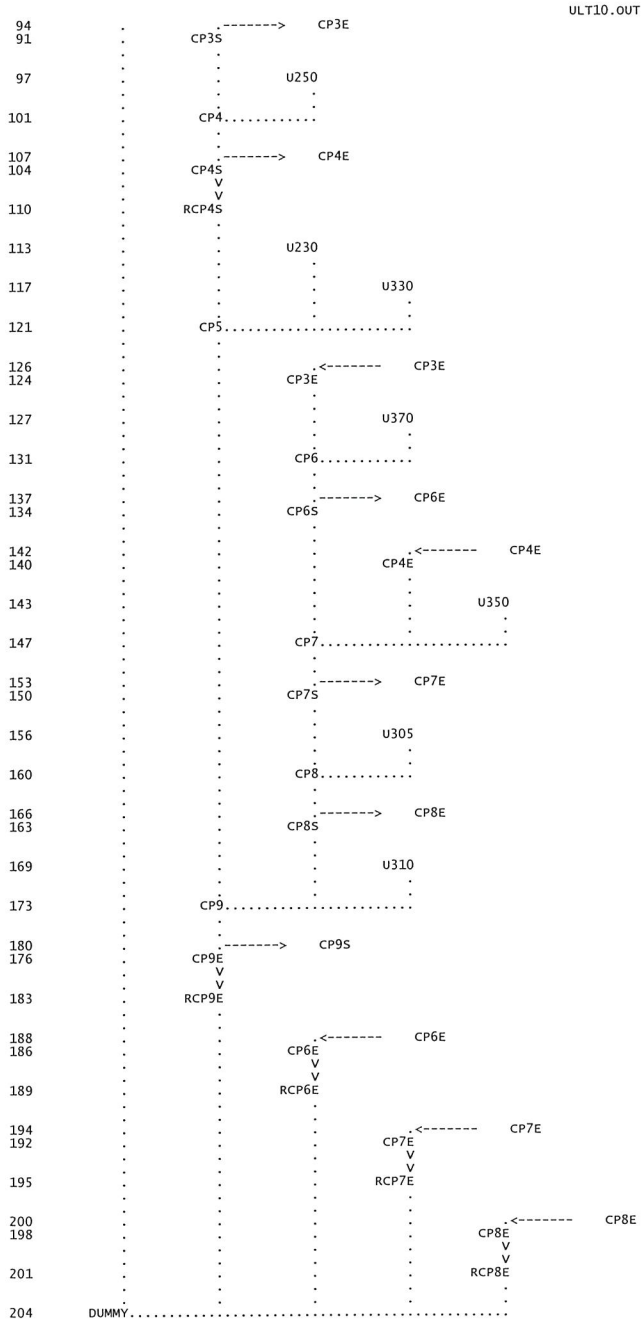
694           KK     3-1
695           KM   MEDIUM HIGH DENSITY
696           BA   .0359
697           LS      0    94.0
698           UD   0.155
              *

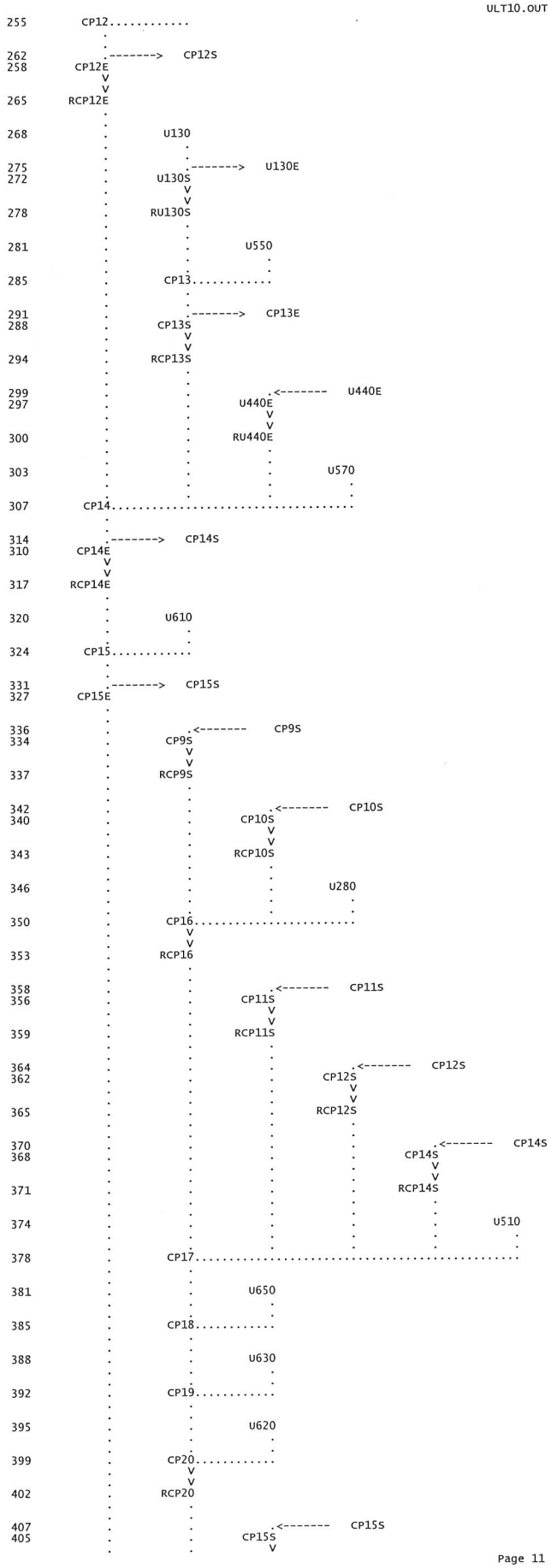
699           KK     3-2
700           KM   MEDIUM LOW DENSITY
701           BA   .0209
702           LS      0    90.0
703           UD   0.143
              *

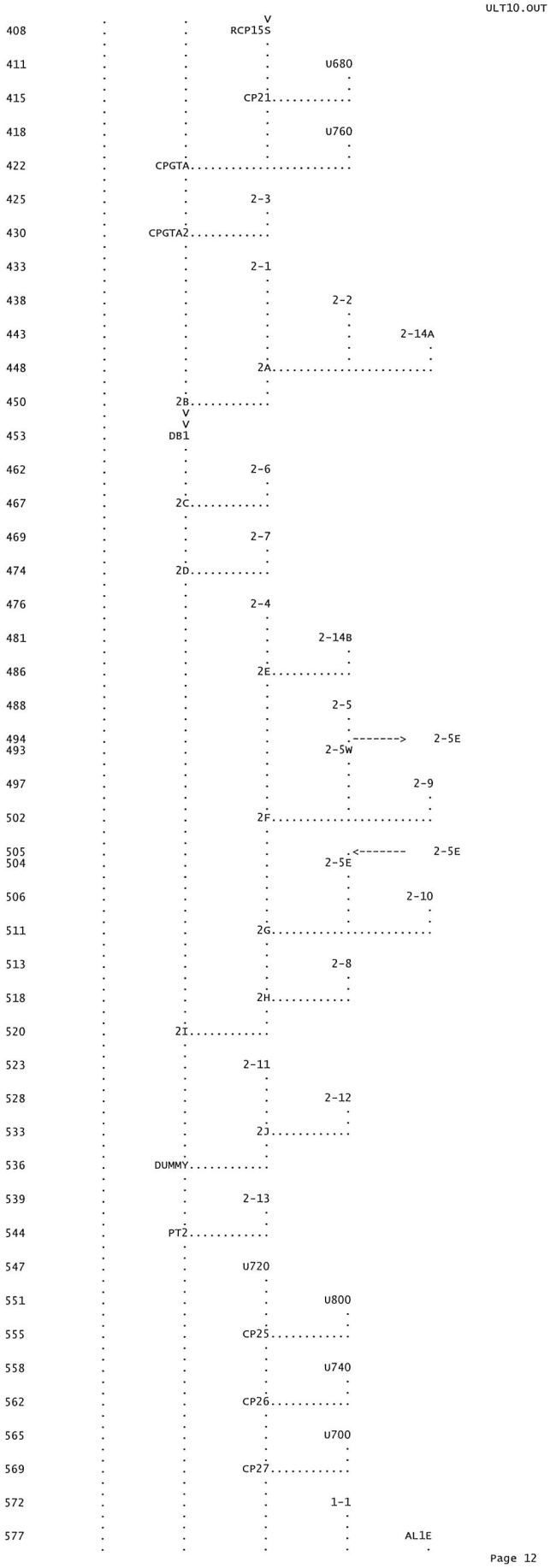
704           KK     PT3
705           KM   COMBINE 3-1 AND 3-2 IN ELKHORN STORM DRAIN
706           HC       2
              *
707           ZZ
```

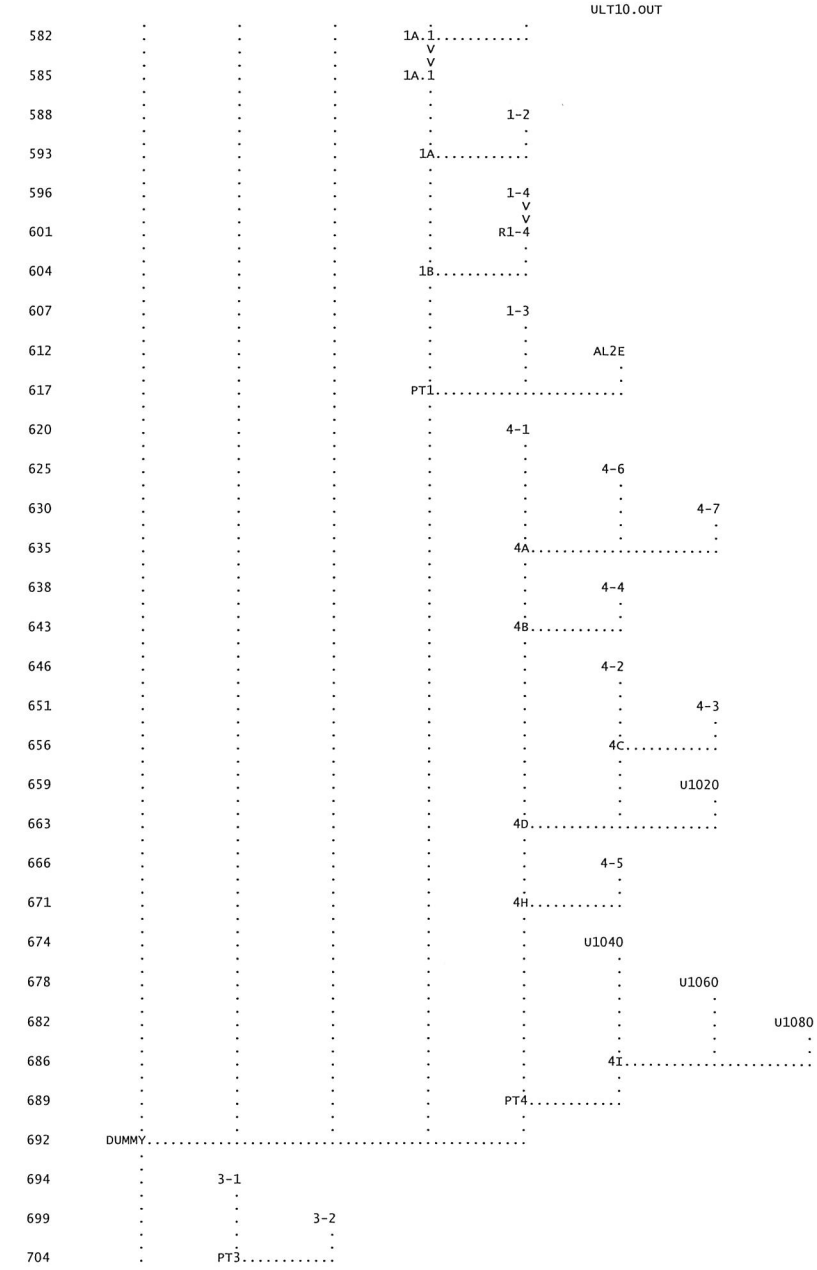
1

SCHEMATIC DIAGRAM OF STREAM NETWORK


CP3E
CP3S
U25O
CP4
CP4E
CP4S
RCP4S
U23O
U33O
CP5
CP3E
U37O
CP6
CP6E
CP6S
CP4E
U35O
CP7
CP7E
CP7S
U30S
CP8
CP8E
CP8S
U31O
CP9
CP9S
CP9E
RCP9E
CP6E
RCP6E
CP7E
RCP7E
CP8E
RCP8E
DUMMY
U41O
CP10
CP10S
CP10E
RCP10E
U44O
U44OE
U44OS
RU44OS
U47O
CP11
CP11S
CP11E
U53O


255 CP12
262 CP12S
258 CP12E
265 RCP12E
268 U130
275 U130E
272 U130S
278 RU130S
281 U550
285 CP13
291 CP13E
288 CP13S
294 RCP13S
299 U440E
297 U440E
300 RU440E
303 U570
307 CP14
314 CP14S
310 CP14E
317 RCP14E
320 U610
324 CP15
331 CP15S
327 CP15E
336 CP9S
334 CP9S
337 RCP9S
342 CP10S
340 CP10S
343 RCP10S
346 U280
350 CP16
353 RCP16
358 CP11S
356 CP11S
359 RCP11S
364 CP12S
362 CP12S
365 RCP12S
370 CP14S
368 CP14S
371 RCP14S
374 U510
378 CP17
381 U650
385 CP18
388 U630
392 CP19
395 U620
399 CP20
402 RCP20
407 CP15S
405 CP15S


RCP15S
U680
CP21
U760
CPGTA
2-3
CPGTA2
2-1
2-2
2-14A
2A
2B
DB1
2-6
2C
2-7
2D
2-4
2-14B
2E
2-5
2-5E
2-5W
2-9
2F
2-10
2G
2-8
2H
2I
2-11
2-12
2J
DUMMY
2-13
PT2
U720
U800
CP25
U740
CP26
U700
CP27
1-1
AL1E



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   08MAY13  TIME  14:12:24   *
*                                       *
*****************************************
```

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

SLATER HANIFAN GROUP, INC.
PARK HIGHLANDS WEST
MASTER DRAINAGE STUDY
ULTIMATE CONDITION

RETURN PERIOD ------- 10-YEAR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- CBH1301.002
FILENAME ------------ ULT10.H1
DATE ---------------- MAY 2013
MODELED BY ---------- KC/KCR

SIX HOUR DEPTH-AREA REDUCTION FACTORS
DRAINAGE AREA (MI^2) DARF
10-YR EVENT   0.570

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

    IT          HYDROGRAPH TIME DATA
                       NMIN          5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
```

```
                    NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE       2    0  ENDING DATE
                NDTIME          0055  ENDING TIME
                ICENT             19  CENTURY MARK

             COMPUTATION INTERVAL     .08 HOURS
                TOTAL TIME BASE   24.92 HOURS

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

 JP         MULTI-PLAN OPTION
                NPLAN              1  NUMBER OF PLANS

 JR         MULTI-RATIO OPTION
            RATIOS OF PRECIPITATION
            .57


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


          **************
          *            *
450 KK    *        2B  *
          *            *
          **************

451 KO         OUTPUT CONTROL VARIABLES
               IPRNT           2  PRINT CONTROL
               IPLOT           0  PLOT CONTROL
               QSCAL          0.  HYDROGRAPH PLOT SCALE

452 HC         HYDROGRAPH COMBINATION
               ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***
```

HYDROGRAPH AT STATION 2B
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .57

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	78.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	69.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	62.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	55.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	49.	1		1250	155	0.	1		1905	230	0.
1		0025	6	0.	1		0640	81	44.	1		1255	156	0.	1		1910	231	0.
1		0030	7	0.	1		0645	82	39.	1		1300	157	0.	1		1915	232	0.
1		0035	8	0.	1		0650	83	34.	1		1305	158	0.	1		1920	233	0.
1		0040	9	1.	1		0655	84	31.	1		1310	159	0.	1		1925	234	0.
1		0045	10	0.	1		0700	85	27.	1		1315	160	0.	1		1930	235	0.
1		0050	11	0.	1		0705	86	24.	1		1320	161	0.	1		1935	236	0.
1		0055	12	0.	1		0710	87	22.	1		1325	162	0.	1		1940	237	0.
1		0100	13	0.	1		0715	88	19.	1		1330	163	0.	1		1945	238	0.
1		0105	14	0.	1		0720	89	17.	1		1335	164	0.	1		1950	239	0.
1		0110	15	0.	1		0725	90	16.	1		1340	165	0.	1		1955	240	0.
1		0115	16	0.	1		0730	91	14.	1		1345	166	0.	1		2000	241	0.
1		0120	17	0.	1		0735	92	13.	1		1350	167	0.	1		2005	242	0.
1		0125	18	1.	1		0740	93	11.	1		1355	168	0.	1		2010	243	0.
1		0130	19	1.	1		0745	94	10.	1		1400	169	0.	1		2015	244	0.
1		0135	20	2.	1		0750	95	9.	1		1405	170	0.	1		2020	245	0.
1		0140	21	2.	1		0755	96	8.	1		1410	171	0.	1		2025	246	0.
1		0145	22	3.	1		0800	97	7.	1		1415	172	0.	1		2030	247	0.
1		0150	23	3.	1		0805	98	6.	1		1420	173	0.	1		2035	248	0.
1		0155	24	2.	1		0810	99	6.	1		1425	174	0.	1		2040	249	0.
1		0200	25	2.	1		0815	100	5.	1		1430	175	0.	1		2045	250	0.
1		0205	26	2.	1		0820	101	4.	1		1435	176	0.	1		2050	251	0.
1		0210	27	2.	1		0825	102	4.	1		1440	177	0.	1		2055	252	0.
1		0215	28	3.	1		0830	103	3.	1		1445	178	0.	1		2100	253	0.
1		0220	29	4.	1		0835	104	3.	1		1450	179	0.	1		2105	254	0.
1		0225	30	6.	1		0840	105	2.	1		1455	180	0.	1		2110	255	0.
1		0230	31	7.	1		0845	106	2.	1		1500	181	0.	1		2115	256	0.
1		0235	32	7.	1		0850	107	2.	1		1505	182	0.	1		2120	257	0.
1		0240	33	7.	1		0855	108	1.	1		1510	183	0.	1		2125	258	0.
1		0245	34	8.	1		0900	109	1.	1		1515	184	0.	1		2130	259	0.
1		0250	35	9.	1		0905	110	1.	1		1520	185	0.	1		2135	260	0.
1		0255	36	9.	1		0910	111	1.	1		1525	186	0.	1		2140	261	0.
1		0300	37	9.	1		0915	112	1.	1		1530	187	0.	1		2145	262	0.
1		0305	38	11.	1		0920	113	1.	1		1535	188	0.	1		2150	263	0.
1		0310	39	17.	1		0925	114	1.	1		1540	189	0.	1		2155	264	0.
1		0315	40	27.	1		0930	115	0.	1		1545	190	0.	1		2200	265	0.
1		0320	41	48.	1		0935	116	0.	1		1550	191	0.	1		2205	266	0.
1		0325	42	85.	1		0940	117	0.	1		1555	192	0.	1		2210	267	0.
1		0330	43	140.	1		0945	118	0.	1		1600	193	0.	1		2215	268	0.
1		0335	44	201.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	245.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	267.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	274.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	272.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	278.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	298.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	316.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	342.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.
1		0420	53	366.	1		1035	128	0.	1		1650	203	0.	1		2305	278	0.
1		0425	54	370.	1		1040	129	0.	1		1655	204	0.	1		2310	279	0.
1		0430	55	361.	1		1045	130	0.	1		1700	205	0.	1		2315	280	0.
1		0435	56	346.	1		1050	131	0.	1		1705	206	0.	1		2320	281	0.
1		0440	57	332.	1		1055	132	0.	1		1710	207	0.	1		2325	282	0.
1		0445	58	315.	1		1100	133	0.	1		1715	208	0.	1		2330	283	0.
1		0450	59	297.	1		1105	134	0.	1		1720	209	0.	1		2335	284	0.
1		0455	60	283.	1		1110	135	0.	1		1725	210	0.	1		2340	285	0.
1		0500	61	268.	1		1115	136	0.	1		1730	211	0.	1		2345	286	0.
1		0505	62	252.	1		1120	137	0.	1		1735	212	0.	1		2350	287	0.
1		0510	63	236.	1		1125	138	0.	1		1740	213	0.	1		2355	288	0.
1		0515	64	220.	1		1130	139	0.	1		1745	214	0.	2		0000	289	0.
1		0520	65	205.	1		1135	140	0.	1		1750	215	0.	2		0005	290	0.
1		0525	66	192.	1		1140	141	0.	1		1755	216	0.	2		0010	291	0.
1		0530	67	179.	1		1145	142	0.	1		1800	217	0.	2		0015	292	0.
1		0535	68	167.	1		1150	143	0.	1		1805	218	0.	2		0020	293	0.
1		0540	69	155.	1		1155	144	0.	1		1810	219	0.	2		0025	294	0.
1		0545	70	143.	1		1200	145	0.	1		1815	220	0.	2		0030	295	0.
1		0550	71	131.	1		1205	146	0.	1		1820	221	0.	2		0035	296	0.
1		0555	72	120.	1		1210	147	0.	1		1825	222	0.	2		0040	297	0.
1		0600	73	108.	1		1215	148	0.	1		1830	223	0.	2		0045	298	0.
1		0605	74	98.	1		1220	149	0.	1		1835	224	0.	2		0050	299	0.
1		0610	75	88.	1		1225	150	0.	1		1840	225	0.	2		0055	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			

```
+     370.      4.42                  122.         31.         30.         30.
                          (INCHES)     .985        .991        .991        .991
                           (AC-FT)      61.         61.         61.         61.

                          CUMULATIVE AREA =    1.15 SQ MI


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


               **************
               *            *
 453 KK        *       DB1  *
               *            *
               **************

 455 KO             OUTPUT CONTROL VARIABLES
                         IPRNT          2  PRINT CONTROL
                         IPLOT          0  PLOT CONTROL
                         QSCAL          0.  HYDROGRAPH PLOT SCALE

 461 KO             OUTPUT CONTROL VARIABLES
                         IPRNT          1  PRINT CONTROL
                         IPLOT          0  PLOT CONTROL
                         QSCAL          0.  HYDROGRAPH PLOT SCALE

                  HYDROGRAPH ROUTING DATA

 456 RS             STORAGE ROUTING
                         NSTPS          1  NUMBER OF SUBREACHES
                          ITYP       ELEV  TYPE OF INITIAL CONDITION
                        RSVRIC      -1.00  INITIAL CONDITION
                             X        .00 WORKING R AND D COEFFICIENT

 457 SV               STORAGE          .0        .3       3.0       9.7      19.0      29.3      42.0     102.3     126.1     159.1

 458 SE             ELEVATION     2297.00   2298.00   2299.00   2300.00   2301.00   2302.00   2303.00   2307.00   2308.50   2310.50

 459 SQ             DISCHARGE          0.       72.      110.      138.      161.      199.      215.      231.      252.     1975.

 460 SE             ELEVATION     2297.00   2300.00   2301.00   2302.00   2303.00   2305.00   2306.00   2307.00   2308.50   2310.50

                                                        ***

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                  STORAGE          .00       .34      3.02      9.71     18.98     29.35     42.00     72.15     87.23    102.30
                  OUTFLOW          .00     24.00     48.00     72.00    110.00    138.00    161.00    199.00    215.00    231.00
                ELEVATION      2297.00   2298.00   2299.00   2300.00   2301.00   2302.00   2303.00   2305.00   2306.00   2307.00

                  STORAGE       126.12    159.12
                  OUTFLOW       252.00   1975.00
                ELEVATION      2308.50   2310.50

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

                                                HYDROGRAPH AT STATION      DB1
                                                   PLAN 1,   RATIO =   .57

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

                                                                                                                                                     *
 DA MON HRMN ORD  OUTFLOW  STORAGE    STAGE *  DA MON HRMN ORD  OUTFLOW  STORAGE    STAGE *  DA MON HRMN ORD  OUTFLOW  STORAGE    STAGE
                                            *                                              *
  1     0000   1       0.        .0  2297.0 *   1     0820 101      90.      14.0  2300.5 *   1     1640 201       0.        .0  2297.0
  1     0005   2       0.        .0  2297.0 *   1     0825 102      87.      13.4  2300.4 *   1     1645 202       0.        .0  2297.0
  1     0010   3       0.        .0  2297.0 *   1     0830 103      85.      12.8  2300.3 *   1     1650 203       0.        .0  2297.0
  1     0015   4       0.        .0  2297.0 *   1     0835 104      83.      12.3  2300.3 *   1     1655 204       0.        .0  2297.0
  1     0020   5       0.        .0  2297.0 *   1     0840 105      80.      11.7  2300.2 *   1     1700 205       0.        .0  2297.0
  1     0025   6       0.        .0  2297.0 *   1     0845 106      78.      11.2  2300.2 *   1     1705 206       0.        .0  2297.0
  1     0030   7       0.        .0  2297.0 *   1     0850 107      76.      10.7  2300.1 *   1     1710 207       0.        .0  2297.0
  1     0035   8       0.        .0  2297.0 *   1     0855 108      74.      10.2  2300.1 *   1     1715 208       0.        .0  2297.0
  1     0040   9       0.        .0  2297.0 *   1     0900 109      72.       9.7  2300.0 *   1     1720 209       0.        .0  2297.0
  1     0045  10       0.        .0  2297.0 *   1     0905 110      70.       9.2  2299.9 *   1     1725 210       0.        .0  2297.0
  1     0050  11       0.        .0  2297.0 *   1     0910 111      69.       8.7  2299.9 *   1     1730 211       0.        .0  2297.0
  1     0055  12       0.        .0  2297.0 *   1     0915 112      67.       8.3  2299.8 *   1     1735 212       0.        .0  2297.0
  1     0100  13       0.        .0  2297.0 *   1     0920 113      65.       7.8  2299.7 *   1     1740 213       0.        .0  2297.0
  1     0105  14       0.        .0  2297.0 *   1     0925 114      64.       7.4  2299.7 *   1     1745 214       0.        .0  2297.0
  1     0110  15       0.        .0  2297.0 *   1     0930 115      62.       7.0  2299.6 *   1     1750 215       0.        .0  2297.0
  1     0115  16       0.        .0  2297.0 *   1     0935 116      61.       6.5  2299.5 *   1     1755 216       0.        .0  2297.0
  1     0120  17       0.        .0  2297.0 *   1     0940 117      59.       6.1  2299.5 *   1     1800 217       0.        .0  2297.0
  1     0125  18       0.        .0  2297.0 *   1     0945 118      58.       5.7  2299.4 *   1     1805 218       0.        .0  2297.0
  1     0130  19       1.        .0  2297.0 *   1     0950 119      56.       5.3  2299.3 *   1     1810 219       0.        .0  2297.0
  1     0135  20       1.        .0  2297.0 *   1     0955 120      55.       5.0  2299.3 *   1     1815 220       0.        .0  2297.0
  1     0140  21       1.        .0  2297.1 *   1     1000 121      54.       4.6  2299.2 *   1     1820 221       0.        .0  2297.0
  1     0145  22       2.        .0  2297.1 *   1     1005 122      52.       4.2  2299.2 *   1     1825 222       0.        .0  2297.0
  1     0150  23       2.        .0  2297.1 *   1     1010 123      51.       3.9  2299.1 *   1     1830 223       0.        .0  2297.0
  1     0155  24       2.        .0  2297.1 *   1     1015 124      50.       3.5  2299.1 *   1     1835 224       0.        .0  2297.0
  1     0200  25       2.        .0  2297.1 *   1     1020 125      49.       3.2  2299.0 *   1     1840 225       0.        .0  2297.0
  1     0205  26       2.        .0  2297.1 *   1     1025 126      47.       2.9  2298.9 *   1     1845 226       0.        .0  2297.0
  1     0210  27       2.        .0  2297.1 *   1     1030 127      44.       2.5  2298.8 *   1     1850 227       0.        .0  2297.0
  1     0215  28       2.        .0  2297.1 *   1     1035 128      41.       2.3  2298.7 *   1     1855 228       0.        .0  2297.0
  1     0220  29       3.        .0  2297.1 *   1     1040 129      39.       2.0  2298.6 *   1     1900 229       0.        .0  2297.0
  1     0225  30       4.        .1  2297.2 *   1     1045 130      36.       1.7  2298.5 *   1     1905 230       0.        .0  2297.0
  1     0230  31       5.        .1  2297.2 *   1     1050 131      34.       1.5  2298.4 *   1     1910 231       0.        .0  2297.0
  1     0235  32       6.        .1  2297.2 *   1     1055 132      32.       1.2  2298.3 *   1     1915 232       0.        .0  2297.0
  1     0240  33       6.        .1  2297.3 *   1     1100 133      30.       1.0  2298.3 *   1     1920 233       0.        .0  2297.0
  1     0245  34       7.        .1  2297.3 *   1     1105 134      28.        .8  2298.2 *   1     1925 234       0.        .0  2297.0
  1     0250  35       7.        .1  2297.3 *   1     1110 135      27.        .6  2298.1 *   1     1930 235       0.        .0  2297.0
  1     0255  36       8.        .1  2297.3 *   1     1115 136      25.        .5  2298.0 *   1     1935 236       0.        .0  2297.0
  1     0300  37       9.        .1  2297.4 *   1     1120 137      21.        .3  2297.9 *   1     1940 237       0.        .0  2297.0
  1     0305  38       9.        .1  2297.4 *   1     1125 138      13.        .2  2297.5 *   1     1945 238       0.        .0  2297.0
  1     0310  39      11.        .2  2297.5 *   1     1130 139       8.        .1  2297.3 *   1     1950 239       0.        .0  2297.0
  1     0315  40      15.        .2  2297.6 *   1     1135 140       5.        .1  2297.2 *   1     1955 240       0.        .0  2297.0
  1     0320  41      24.        .3  2298.0 *   1     1140 141       3.        .0  2297.1 *   1     2000 241       0.        .0  2297.0
  1     0325  42      27.        .6  2298.1 *   1     1145 142       2.        .0  2297.1 *   1     2005 242       0.        .0  2297.0
  1     0330  43      32.       1.2  2298.3 *   1     1150 143       1.        .0  2297.0 *   1     2010 243       0.        .0  2297.0
  1     0335  44      40.       2.1  2298.7 *   1     1155 144       1.        .0  2297.0 *   1     2015 244       0.        .0  2297.0
  1     0340  45      49.       3.4  2299.1 *   1     1200 145       0.        .0  2297.0 *   1     2020 245       0.        .0  2297.0
  1     0345  46      54.       4.8  2299.3 *   1     1205 146       0.        .0  2297.0 *   1     2025 246       0.        .0  2297.0
  1     0350  47      60.       6.2  2299.5 *   1     1210 147       0.        .0  2297.0 *   1     2030 247       0.        .0  2297.0
  1     0355  48      65.       7.7  2299.7 *   1     1215 148       0.        .0  2297.0 *   1     2035 248       0.        .0  2297.0
  1     0400  49      70.       9.1  2299.9 *   1     1220 149       0.        .0  2297.0 *   1     2040 249       0.        .0  2297.0
  1     0405  50      76.      10.6  2300.1 *   1     1225 150       0.        .0  2297.0 *   1     2045 250       0.        .0  2297.0
  1     0410  51      82.      12.2  2300.3 *   1     1230 151       0.        .0  2297.0 *   1     2050 251       0.        .0  2297.0
  1     0415  52      89.      13.8  2300.4 *   1     1235 152       0.        .0  2297.0 *   1     2055 252       0.        .0  2297.0
  1     0420  53      96.      15.6  2300.6 *   1     1240 153       0.        .0  2297.0 *   1     2100 253       0.        .0  2297.0
  1     0425  54     104.      17.5  2300.8 *   1     1245 154       0.        .0  2297.0 *   1     2105 254       0.        .0  2297.0
  1     0430  55     111.      19.3  2301.0 *   1     1250 155       0.        .0  2297.0 *   1     2110 255       0.        .0  2297.0
  1     0435  56     115.      20.9  2301.2 *   1     1255 156       0.        .0  2297.0 *   1     2115 256       0.        .0  2297.0
  1     0440  57     119.      22.4  2301.3 *   1     1300 157       0.        .0  2297.0 *   1     2120 257       0.        .0  2297.0
  1     0445  58     123.      23.8  2301.5 *   1     1305 158       0.        .0  2297.0 *   1     2125 258       0.        .0  2297.0
  1     0450  59     127.      25.1  2301.6 *   1     1310 159       0.        .0  2297.0 *   1     2130 259       0.        .0  2297.0
  1     0455  60     130.      26.2  2301.7 *   1     1315 160       0.        .0  2297.0 *   1     2135 260       0.        .0  2297.0
  1     0500  61     132.      27.2  2301.8 *   1     1320 161       0.        .0  2297.0 *   1     2140 261       0.        .0  2297.0
  1     0505  62     135.      28.1  2301.9 *   1     1325 162       0.        .0  2297.0 *   1     2145 262       0.        .0  2297.0
  1     0510  63     137.      28.8  2301.9 *   1     1330 163       0.        .0  2297.0 *   1     2150 263       0.        .0  2297.0
  1     0515  64     138.      29.4  2302.0 *   1     1335 164       0.        .0  2297.0 *   1     2155 264       0.        .0  2297.0
  1     0520  65     139.      30.0  2302.0 *   1     1340 165       0.        .0  2297.0 *   1     2200 265       0.        .0  2297.0
  1     0525  66     140.      30.4  2302.1 *   1     1345 166       0.        .0  2297.0 *   1     2205 266       0.        .0  2297.0
  1     0530  67     140.      30.7  2302.1 *   1     1350 167       0.        .0  2297.0 *   1     2210 267       0.        .0  2297.0
  1     0535  68     141.      30.9  2302.1 *   1     1355 168       0.        .0  2297.0 *   1     2215 268       0.        .0  2297.0
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1	0540	69	141.	31.0	2302.1	*	1	1400	169	0.	.0	2297.0	*	1	2220	269	0.	.0	2297.0
1	0545	70	141.	31.1	2302.1	*	1	1405	170	0.	.0	2297.0	*	1	2225	270	0.	.0	2297.0
1	0550	71	141.	31.1	2302.1	*	1	1410	171	0.	.0	2297.0	*	1	2230	271	0.	.0	2297.0
1	0555	72	141.	31.0	2302.1	*	1	1415	172	0.	.0	2297.0	*	1	2235	272	0.	.0	2297.0
1	0600	73	141.	30.8	2302.1	*	1	1420	173	0.	.0	2297.0	*	1	2240	273	0.	.0	2297.0
1	0605	74	140.	30.5	2302.1	*	1	1425	174	0.	.0	2297.0	*	1	2245	274	0.	.0	2297.0
1	0610	75	140.	30.2	2302.1	*	1	1430	175	0.	.0	2297.0	*	1	2250	275	0.	.0	2297.0
1	0615	76	139.	29.8	2302.0	*	1	1435	176	0.	.0	2297.0	*	1	2255	276	0.	.0	2297.0
1	0620	77	138.	29.4	2302.0	*	1	1440	177	0.	.0	2297.0	*	1	2300	277	0.	.0	2297.0
1	0625	78	137.	28.9	2302.0	*	1	1445	178	0.	.0	2297.0	*	1	2305	278	0.	.0	2297.0
1	0630	79	135.	28.3	2301.9	*	1	1450	179	0.	.0	2297.0	*	1	2310	279	0.	.0	2297.0
1	0635	80	134.	27.8	2301.8	*	1	1455	180	0.	.0	2297.0	*	1	2315	280	0.	.0	2297.0
1	0640	81	132.	27.2	2301.8	*	1	1500	181	0.	.0	2297.0	*	1	2320	281	0.	.0	2297.0
1	0645	82	130.	26.5	2301.7	*	1	1505	182	0.	.0	2297.0	*	1	2325	282	0.	.0	2297.0
1	0650	83	129.	25.9	2301.7	*	1	1510	183	0.	.0	2297.0	*	1	2330	283	0.	.0	2297.0
1	0655	84	127.	25.2	2301.6	*	1	1515	184	0.	.0	2297.0	*	1	2335	284	0.	.0	2297.0
1	0700	85	125.	24.6	2301.5	*	1	1520	185	0.	.0	2297.0	*	1	2340	285	0.	.0	2297.0
1	0705	86	123.	23.9	2301.5	*	1	1525	186	0.	.0	2297.0	*	1	2345	286	0.	.0	2297.0
1	0710	87	121.	23.2	2301.4	*	1	1530	187	0.	.0	2297.0	*	1	2350	287	0.	.0	2297.0
1	0715	88	120.	22.5	2301.3	*	1	1535	188	0.	.0	2297.0	*	1	2355	288	0.	.0	2297.0
1	0720	89	118.	21.8	2301.3	*	1	1540	189	0.	.0	2297.0	*	2	0000	289	0.	.0	2297.0
1	0725	90	116.	21.1	2301.2	*	1	1545	190	0.	.0	2297.0	*	2	0005	290	0.	.0	2297.0
1	0730	91	114.	20.4	2301.1	*	1	1550	191	0.	.0	2297.0	*	2	0010	291	0.	.0	2297.0
1	0735	92	112.	19.8	2301.1	*	1	1555	192	0.	.0	2297.0	*	2	0015	292	0.	.0	2297.0
1	0740	93	110.	19.1	2301.0	*	1	1600	193	0.	.0	2297.0	*	2	0020	293	0.	.0	2297.0
1	0745	94	108.	18.4	2300.9	*	1	1605	194	0.	.0	2297.0	*	2	0025	294	0.	.0	2297.0
1	0750	95	105.	17.7	2300.9	*	1	1610	195	0.	.0	2297.0	*	2	0030	295	0.	.0	2297.0
1	0755	96	102.	17.1	2300.8	*	1	1615	196	0.	.0	2297.0	*	2	0035	296	0.	.0	2297.0
1	0800	97	100.	16.4	2300.7	*	1	1620	197	0.	.0	2297.0	*	2	0040	297	0.	.0	2297.0
1	0805	98	97.	15.8	2300.7	*	1	1625	198	0.	.0	2297.0	*	2	0045	298	0.	.0	2297.0
1	0810	99	94.	15.2	2300.6	*	1	1630	199	0.	.0	2297.0	*	2	0050	299	0.	.0	2297.0
1	0815	100	92.	14.6	2300.5	*	1	1635	200	0.	.0	2297.0	*	2	0055	300	0.	.0	2297.0
						*							*						

****

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 141.	5.75	107.	31.	30.	30.
		(INCHES)	.863	.991	.991	.991
		(AC-FT)	53.	61.	61.	61.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
31.	5.75	20.	5.	5.	5.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2302.14	5.75	2301.01	2298.17	2298.12	2298.12

CUMULATIVE AREA = 1.15 SQ MI

1

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

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1
					.57
HYDROGRAPH AT					
+	U190	.37	1	FLOW	59.
				TIME	4.08
HYDROGRAPH AT					
+	U170	.25	1	FLOW	51.
				TIME	4.00
2 COMBINED AT					
+	CP1	.62	1	FLOW	109.
				TIME	4.00
DIVERSION TO					
+	CP1S	.62	1	FLOW	49.
				TIME	4.00
HYDROGRAPH AT					
+	CP1E	.62	1	FLOW	60.
				TIME	4.00
ROUTED TO					
+	RCP1E	.62	1	FLOW	60.
				TIME	4.25
HYDROGRAPH AT					
+	U150	.13	1	FLOW	35.
				TIME	3.83
DIVERSION TO					
+	U150E	.13	1	FLOW	20.
				TIME	3.83
HYDROGRAPH AT					
+	U150S	.13	1	FLOW	15.
				TIME	3.83
ROUTED TO					
+	RU150	.13	1	FLOW	15.
				TIME	3.92
HYDROGRAPH AT					
+	U155	.13	1	FLOW	35.
				TIME	3.75
3 COMBINED AT					
+	CP2	.88	1	FLOW	92.
				TIME	4.08
DIVERSION TO					
+	CP2E	.88	1	FLOW	69.
				TIME	4.08
HYDROGRAPH AT					
+	CP2S	.88	1	FLOW	23.
				TIME	4.08
ROUTED TO					
+	RCP2S	.88	1	FLOW	23.
				TIME	4.33
HYDROGRAPH AT					
+	CP1S	.00	1	FLOW	49.
				TIME	4.00
HYDROGRAPH AT					
+	U210	.07	1	FLOW	20.
				TIME	3.75
2 COMBINED AT					
+	CP3	.07	1	FLOW	64.
				TIME	3.92

DIVERSION TO					
+	CP3E	.07	1	FLOW	29.
				TIME	3.92
HYDROGRAPH AT					
+	CP3S	.07	1	FLOW	35.
				TIME	3.92
HYDROGRAPH AT					
+	U250	.07	1	FLOW	19.
				TIME	3.75
2 COMBINED AT					
+	CP4	.14	1	FLOW	52.
				TIME	3.83
DIVERSION TO					
+	CP4E	.14	1	FLOW	25.
				TIME	3.83
HYDROGRAPH AT					
+	CP4S	.14	1	FLOW	27.
				TIME	3.83
ROUTED TO					
+	RCP4S	.14	1	FLOW	27.
				TIME	4.00
HYDROGRAPH AT					
+	U230	.14	1	FLOW	37.
				TIME	3.83
HYDROGRAPH AT					
+	U330	.01	1	FLOW	6.
				TIME	3.67
3 COMBINED AT					
+	CP5	.30	1	FLOW	65.
				TIME	3.83
HYDROGRAPH AT					
+	CP3E	.00	1	FLOW	29.
				TIME	3.92
HYDROGRAPH AT					
+	U370	.02	1	FLOW	7.
				TIME	3.58
2 COMBINED AT					
+	CP6	.02	1	FLOW	32.
				TIME	3.92
DIVERSION TO					
+	CP6E	.02	1	FLOW	14.
				TIME	3.92
HYDROGRAPH AT					
+	CP6S	.02	1	FLOW	18.
				TIME	3.92
HYDROGRAPH AT					
+	CP4E	.00	1	FLOW	25.
				TIME	3.83
HYDROGRAPH AT					
+	U350	.02	1	FLOW	7.
				TIME	3.58
3 COMBINED AT					
+	CP7	.03	1	FLOW	48.
				TIME	3.83
DIVERSION TO					
+	CP7E	.03	1	FLOW	24.
				TIME	3.83
HYDROGRAPH AT					
+	CP7S	.03	1	FLOW	24.
				TIME	3.83
HYDROGRAPH AT					
+	U305	.01	1	FLOW	4.
				TIME	3.58
2 COMBINED AT					
+	CP8	.04	1	FLOW	27.
				TIME	3.75
DIVERSION TO					
+	CP8E	.04	1	FLOW	13.
				TIME	3.75
HYDROGRAPH AT					
+	CP8S	.04	1	FLOW	14.
				TIME	3.75
HYDROGRAPH AT					
+	U310	.01	1	FLOW	5.
				TIME	3.58
3 COMBINED AT					
+	CP9	.35	1	FLOW	82.
				TIME	3.83
DIVERSION TO					
+	CP9S	.35	1	FLOW	56.
				TIME	3.83
HYDROGRAPH AT					
+	CP9E	.35	1	FLOW	26.
				TIME	3.83
ROUTED TO					
+	RCP9E	.35	1	FLOW	26.
				TIME	4.00
HYDROGRAPH AT					
+	CP6E	.00	1	FLOW	14.
				TIME	3.92
ROUTED TO					
+	RCP6E	.00	1	FLOW	14.
				TIME	4.33
HYDROGRAPH AT					
+	CP7E	.00	1	FLOW	24.
				TIME	3.83
ROUTED TO					
+	RCP7E	.00	1	FLOW	24.
				TIME	4.08
HYDROGRAPH AT					
+	CP8E	.00	1	FLOW	13.
				TIME	3.75

ROUTED TO					
+	RCP8E	.00	1	FLOW	13.
				TIME	3.83
5 COMBINED AT					
+	DUMMY	1.23	1	FLOW	91.
				TIME	4.17
HYDROGRAPH AT					
+	U410	.20	1	FLOW	64.
				TIME	3.83
2 COMBINED AT					
+	CP10	1.43	1	FLOW	134.
				TIME	4.08
DIVERSION TO					
+	CP10S	1.43	1	FLOW	83.
				TIME	4.08
HYDROGRAPH AT					
+	CP10E	1.43	1	FLOW	51.
				TIME	4.08
ROUTED TO					
+	RCP10E	1.43	1	FLOW	51.
				TIME	4.25
HYDROGRAPH AT					
+	U440	.05	1	FLOW	12.
				TIME	3.75
DIVERSION TO					
+	U440E	.05	1	FLOW	7.
				TIME	3.75
HYDROGRAPH AT					
+	U440S	.05	1	FLOW	5.
				TIME	3.75
ROUTED TO					
+	RU440S	.05	1	FLOW	5.
				TIME	3.92
HYDROGRAPH AT					
+	U470	.20	1	FLOW	40.
				TIME	3.83
3 COMBINED AT					
+	CP11	1.69	1	FLOW	79.
				TIME	4.08
DIVERSION TO					
+	CP11S	1.69	1	FLOW	33.
				TIME	4.08
HYDROGRAPH AT					
+	CP11E	1.69	1	FLOW	46.
				TIME	4.08
HYDROGRAPH AT					
+	U530	.01	1	FLOW	5.
				TIME	3.58
2 COMBINED AT					
+	CP12	1.70	1	FLOW	48.
				TIME	4.08
DIVERSION TO					
+	CP12S	1.70	1	FLOW	21.
				TIME	4.08
HYDROGRAPH AT					
+	CP12E	1.70	1	FLOW	27.
				TIME	4.08
ROUTED TO					
+	RCP12E	1.70	1	FLOW	27.
				TIME	4.25
HYDROGRAPH AT					
+	U130	.06	1	FLOW	19.
				TIME	3.67
DIVERSION TO					
+	U130E	.06	1	FLOW	10.
				TIME	3.67
HYDROGRAPH AT					
+	U130S	.06	1	FLOW	9.
				TIME	3.67
ROUTED TO					
+	RU130S	.06	1	FLOW	9.
				TIME	3.83
HYDROGRAPH AT					
+	U550	.05	1	FLOW	20.
				TIME	3.67
2 COMBINED AT					
+	CP13	.11	1	FLOW	28.
				TIME	3.75
DIVERSION TO					
+	CP13E	.11	1	FLOW	17.
				TIME	3.75
HYDROGRAPH AT					
+	CP13S	.11	1	FLOW	11.
				TIME	3.75
ROUTED TO					
+	RCP13S	.11	1	FLOW	11.
				TIME	3.92
HYDROGRAPH AT					
+	U440E	.00	1	FLOW	7.
				TIME	3.75
ROUTED TO					
+	RU440E	.00	1	FLOW	7.
				TIME	4.33
HYDROGRAPH AT					
+	U570	.18	1	FLOW	73.
				TIME	3.83
4 COMBINED AT					
+	CP14	1.99	1	FLOW	98.
				TIME	3.92
DIVERSION TO					
+	CP14S	1.99	1	FLOW	30.
				TIME	3.92
HYDROGRAPH AT					

+	CP14E	1.99	1	FLOW	68.
				TIME	3.92
ROUTED TO					
+	RCP14E	1.99	1	FLOW	69.
				TIME	4.08
HYDROGRAPH AT					
+	U610	.05	1	FLOW	14.
				TIME	3.75
2 COMBINED AT					
+	CP15	2.03	1	FLOW	77.
				TIME	4.08
DIVERSION TO					
+	CP15S	2.03	1	FLOW	0.
				TIME	.00
HYDROGRAPH AT					
+	CP15E	2.03	1	FLOW	77.
				TIME	4.08
HYDROGRAPH AT					
+	CP9S	.00	1	FLOW	56.
				TIME	3.83
ROUTED TO					
+	RCP9S	.00	1	FLOW	56.
				TIME	4.17
HYDROGRAPH AT					
+	CP10S	.00	1	FLOW	83.
				TIME	4.08
ROUTED TO					
+	RCP10S	.00	1	FLOW	83.
				TIME	4.25
HYDROGRAPH AT					
+	U280	.27	1	FLOW	67.
				TIME	3.83
3 COMBINED AT					
+	CP16	.27	1	FLOW	181.
				TIME	4.17
ROUTED TO					
+	RCP16	.27	1	FLOW	185.
				TIME	4.42
HYDROGRAPH AT					
+	CP11S	.00	1	FLOW	33.
				TIME	4.08
ROUTED TO					
+	RCP11S	.00	1	FLOW	34.
				TIME	4.50
HYDROGRAPH AT					
+	CP12S	.00	1	FLOW	21.
				TIME	4.08
ROUTED TO					
+	RCP12S	.00	1	FLOW	22.
				TIME	4.42
HYDROGRAPH AT					
+	CP14S	.00	1	FLOW	30.
				TIME	3.92
ROUTED TO					
+	RCP14S	.00	1	FLOW	30.
				TIME	4.00
HYDROGRAPH AT					
+	U510	.49	1	FLOW	118.
				TIME	4.00
5 COMBINED AT					
+	CP17	.76	1	FLOW	336.
				TIME	4.33
HYDROGRAPH AT					
+	U650	.01	1	FLOW	5.
				TIME	3.58
2 COMBINED AT					
+	CP18	.77	1	FLOW	337.
				TIME	4.33
HYDROGRAPH AT					
+	U630	.07	1	FLOW	33.
				TIME	3.67
2 COMBINED AT					
+	CP19	.84	1	FLOW	344.
				TIME	4.33
HYDROGRAPH AT					
+	U620	.05	1	FLOW	22.
				TIME	3.67
2 COMBINED AT					
+	CP20	.89	1	FLOW	349.
				TIME	4.33
ROUTED TO					
+	RCP20	.89	1	FLOW	346.
				TIME	4.42
HYDROGRAPH AT					
+	CP15S	.00	1	FLOW	0.
				TIME	.00
ROUTED TO					
+	RCP15S	.00	1	FLOW	0.
				TIME	.00
HYDROGRAPH AT					
+	U680	.11	1	FLOW	46.
				TIME	3.75
2 COMBINED AT					
+	CP21	.11	1	FLOW	46.
				TIME	3.75
HYDROGRAPH AT					
+	U760	.01	1	FLOW	4.
				TIME	3.58
3 COMBINED AT					
+	CPGTA	1.01	1	FLOW	358.
				TIME	4.42
HYDROGRAPH AT					
+	2-3	.03	1	FLOW	15.

				TIME	3.58
2 COMBINED AT					
+	CPGTA2	1.04	1	FLOW	360.
				TIME	4.42
HYDROGRAPH AT					
+	2-1	.04	1	FLOW	28.
				TIME	3.58
HYDROGRAPH AT					
+	2-2	.07	1	FLOW	44.
				TIME	3.67
HYDROGRAPH AT					
+	2-14A	.00	1	FLOW	1.
				TIME	3.58
3 COMBINED AT					
+	2A	.11	1	FLOW	72.
				TIME	3.58
2 COMBINED AT					
+	2B	1.15	1	FLOW	370.
				TIME	4.42
ROUTED TO					
+	DB1	1.15	1	FLOW	141.
				TIME	5.75
			** PEAK STAGES IN FEET **		
			1	STAGE	2302.14
				TIME	5.75
HYDROGRAPH AT					
+	2-6	.02	1	FLOW	15.
				TIME	3.58
2 COMBINED AT					
+	2C	1.17	1	FLOW	141.
				TIME	5.75
HYDROGRAPH AT					
+	2-7	.02	1	FLOW	8.
				TIME	3.58
2 COMBINED AT					
+	2D	1.19	1	FLOW	142.
				TIME	5.83
HYDROGRAPH AT					
+	2-4	.03	1	FLOW	28.
				TIME	3.58
HYDROGRAPH AT					
+	2-14B	.00	1	FLOW	1.
				TIME	3.58
2 COMBINED AT					
+	2E	.04	1	FLOW	30.
				TIME	3.58
HYDROGRAPH AT					
+	2-5	.09	1	FLOW	53.
				TIME	3.67
DIVERSION TO					
+	2-5E	.09	1	FLOW	25.
				TIME	3.67
HYDROGRAPH AT					
+	2-5W	.09	1	FLOW	28.
				TIME	3.67
HYDROGRAPH AT					
+	2-9	.02	1	FLOW	11.
				TIME	3.58
3 COMBINED AT					
+	2F	.14	1	FLOW	67.
				TIME	3.58
HYDROGRAPH AT					
+	2-5E	.00	1	FLOW	25.
				TIME	3.67
HYDROGRAPH AT					
+	2-10	.02	1	FLOW	12.
				TIME	3.58
3 COMBINED AT					
+	2G	.16	1	FLOW	103.
				TIME	3.58
HYDROGRAPH AT					
+	2-8	.03	1	FLOW	24.
				TIME	3.58
2 COMBINED AT					
+	2H	.19	1	FLOW	127.
				TIME	3.58
2 COMBINED AT					
+	2I	1.37	1	FLOW	190.
				TIME	3.58
HYDROGRAPH AT					
+	2-11	.03	1	FLOW	22.
				TIME	3.58
HYDROGRAPH AT					
+	2-12	.03	1	FLOW	17.
				TIME	3.58
2 COMBINED AT					
+	2J	.05	1	FLOW	39.
				TIME	3.58
2 COMBINED AT					
+	DUMMY	1.42	1	FLOW	229.
				TIME	3.58
HYDROGRAPH AT					
+	2-13	.03	1	FLOW	18.
				TIME	3.58
2 COMBINED AT					
+	PT2	1.45	1	FLOW	246.
				TIME	3.58
HYDROGRAPH AT					
+	U720	.06	1	FLOW	28.
				TIME	3.67
HYDROGRAPH AT					
+	U800	.01	1	FLOW	6.
				TIME	3.58

2 COMBINED AT					
+	CP25	.07	1	FLOW	33.
				TIME	3.67
HYDROGRAPH AT					
+	U740	.05	1	FLOW	26.
				TIME	3.67
2 COMBINED AT					
+	CP26	.12	1	FLOW	59.
				TIME	3.67
HYDROGRAPH AT					
+	U700	.14	1	FLOW	50.
				TIME	3.83
2 COMBINED AT					
+	CP27	.26	1	FLOW	101.
				TIME	3.75
HYDROGRAPH AT					
+	1-1	.03	1	FLOW	29.
				TIME	3.58
HYDROGRAPH AT					
+	AL1E	.00	1	FLOW	3.
				TIME	3.50
2 COMBINED AT					
+	1A.1	.04	1	FLOW	31.
				TIME	3.58
ROUTED TO					
+	1A.1	.04	1	FLOW	31.
				TIME	3.58
HYDROGRAPH AT					
+	1-2	.04	1	FLOW	29.
				TIME	3.58
2 COMBINED AT					
+	1A	.07	1	FLOW	60.
				TIME	3.58
HYDROGRAPH AT					
+	1-4	.04	1	FLOW	25.
				TIME	3.58
ROUTED TO					
+	R1-4	.04	1	FLOW	25.
				TIME	3.67
2 COMBINED AT					
+	1B	.11	1	FLOW	80.
				TIME	3.58
HYDROGRAPH AT					
+	1-3	.04	1	FLOW	27.
				TIME	3.58
HYDROGRAPH AT					
+	AL2E	.00	1	FLOW	3.
				TIME	3.50
3 COMBINED AT					
+	PT1	.15	1	FLOW	109.
				TIME	3.58
HYDROGRAPH AT					
+	4-1	.04	1	FLOW	30.
				TIME	3.58
HYDROGRAPH AT					
+	4-6	.00	1	FLOW	2.
				TIME	3.58
HYDROGRAPH AT					
+	4-7	.05	1	FLOW	29.
				TIME	3.58
3 COMBINED AT					
+	4A	.09	1	FLOW	61.
				TIME	3.58
HYDROGRAPH AT					
+	4-4	.01	1	FLOW	8.
				TIME	3.58
2 COMBINED AT					
+	4B	.10	1	FLOW	69.
				TIME	3.58
HYDROGRAPH AT					
+	4-2	.05	1	FLOW	43.
				TIME	3.58
HYDROGRAPH AT					
+	4-3	.05	1	FLOW	34.
				TIME	3.58
2 COMBINED AT					
+	4C	.11	1	FLOW	77.
				TIME	3.58
HYDROGRAPH AT					
+	U1020	.01	1	FLOW	7.
				TIME	3.58
3 COMBINED AT					
+	4D	.22	1	FLOW	153.
				TIME	3.58
HYDROGRAPH AT					
+	4-5	.06	1	FLOW	50.
				TIME	3.58
2 COMBINED AT					
+	4H	.28	1	FLOW	203.
				TIME	3.58
HYDROGRAPH AT					
+	U1040	.02	1	FLOW	17.
				TIME	3.58
HYDROGRAPH AT					
+	U1060	.01	1	FLOW	5.
				TIME	3.50
HYDROGRAPH AT					
+	U1080	.03	1	FLOW	21.
				TIME	3.58
3 COMBINED AT					
+	4I	.05	1	FLOW	43.
				TIME	3.58

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  2 COMBINED AT
+                    PT4       .33     1   FLOW          246.
                                           TIME         3.58

  5 COMBINED AT
+                  DUMMY      4.23     1   FLOW          703.
                                           TIME         3.58

 HYDROGRAPH AT
+                    3-1       .04     1   FLOW           30.
                                           TIME         3.58

 HYDROGRAPH AT
+                    3-2       .02     1   FLOW           14.
                                           TIME         3.58

  2 COMBINED AT
+                    PT3       .06     1   FLOW           43.
                                           TIME         3.58
1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                    (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                    INTERPOLATED TO
                                                                  COMPUTATION INTERVAL
           ISTAQ    ELEMENT      DT       PEAK    TIME TO      VOLUME      DT       PEAK    TIME TO      VOLUME
                                                     PEAK                                     PEAK

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

          FOR PLAN = 1  RATIO=  .00
             RCP1E  MANE         4.25      59.77    250.75       .21      5.00      59.69    255.00         .21

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .6897E+01 EXCESS= .0000E+00 OUTFLOW= .6901E+01 BASIN STORAGE= .1911E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RU15O  MANE         3.75      15.01    236.25       .18      5.00      14.88    235.00         .18

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1298E+01 EXCESS= .0000E+00 OUTFLOW= .1298E+01 BASIN STORAGE= .9878E-03 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP2S  MANE         4.75      22.74    256.50       .06      5.00      22.69    260.00         .06

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2805E+01 EXCESS= .0000E+00 OUTFLOW= .2808E+01 BASIN STORAGE= .2198E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
             RCP4S  MANE         3.75      26.75    236.25       .38      5.00      26.72    240.00         .38

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2899E+01 EXCESS= .0000E+00 OUTFLOW= .2900E+01 BASIN STORAGE= .1067E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP9E  MANE         5.00      25.88    240.00       .14      5.00      25.88    240.00         .14

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2658E+01 EXCESS= .0000E+00 OUTFLOW= .2661E+01 BASIN STORAGE= .1455E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP6E  MANE         5.00      14.47    260.00     -1.00      5.00      14.47    260.00       -1.00


          FOR PLAN = 1  RATIO=  .00
             RCP7E  MANE         5.00      23.86    245.00     -1.00      5.00      23.86    245.00       -1.00


          FOR PLAN = 1  RATIO=  .00
             RCP8E  MANE          .61      12.86    226.23     -1.00      5.00      12.85    230.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP10E  MANE         5.00      50.74    255.00       .08      5.00      50.74    255.00         .08

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .6434E+01 EXCESS= .0000E+00 OUTFLOW= .6437E+01 BASIN STORAGE= .2038E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
            RU44OS  MANE         2.25       4.85    236.25       .15      5.00       4.80    235.00         .15

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .4105E+00 EXCESS= .0000E+00 OUTFLOW= .4107E+00 BASIN STORAGE= .9404E-03 PERCENT ERROR=   -.3

          FOR PLAN = 1  RATIO=  .00
            RCP12E  MANE         5.00      26.82    255.00       .04      5.00      26.82    255.00         .04

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .3644E+01 EXCESS= .0000E+00 OUTFLOW= .3646E+01 BASIN STORAGE= .1454E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
            RU13OS  MANE         4.00       9.18    228.00       .22      5.00       8.97    230.00         .22

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .6444E+00 EXCESS= .0000E+00 OUTFLOW= .6449E+00 BASIN STORAGE= .9329E-03 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
            RCP13S  MANE         4.50      10.95    234.00       .14      5.00      10.76    235.00         .14

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .8358E+00 EXCESS= .0000E+00 OUTFLOW= .8364E+00 BASIN STORAGE= .1028E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
            RU44OE  MANE         2.25       7.71    252.00     -1.00      5.00       6.74    260.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP14E  MANE         5.00      68.52    245.00       .08      5.00      68.52    245.00         .08

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .8089E+01 EXCESS= .0000E+00 OUTFLOW= .8092E+01 BASIN STORAGE= .1759E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP9S  MANE         5.00      55.85    250.00     -1.00      5.00      55.85    250.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP10S  MANE         5.00      82.51    255.00     -1.00      5.00      82.51    255.00       -1.00


          FOR PLAN = 1  RATIO=  .00
```

RCP16	MANE	5.00	184.88	265.00	1.57	5.00	184.88	265.00	1.57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2247E+02 EXCESS= .0000E+00 OUTFLOW= .2249E+02 BASIN STORAGE= .4033E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP11S	MANE	5.00	33.98	270.00	-1.00	5.00	33.98	270.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP12S	MANE	5.00	21.81	265.00	-1.00	5.00	21.81	265.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP14S	MANE	5.00	29.98	240.00	-1.00	5.00	29.98	240.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP20	MANE	3.87	347.89	262.96	1.07	5.00	345.75	265.00	1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5066E+02 EXCESS= .0000E+00 OUTFLOW= .5066E+02 BASIN STORAGE= .1005E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP15S	MANE	5.00	.00	.00	-1.00	5.00	.00	265.00	-1.00

FOR PLAN = 1 RATIO= .57

1A.1	MANE	.58	30.83	215.71	1.03	5.00	30.55	215.00	1.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2038E+01 EXCESS= .0000E+00 OUTFLOW= .2038E+01 BASIN STORAGE= .2201E-11 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

R1-4	MANE	5.00	24.84	220.00	.81	5.00	24.84	220.00	.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1601E+01 EXCESS= .0000E+00 OUTFLOW= .1604E+01 BASIN STORAGE= .2823E-02 PERCENT ERROR= -.4

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

HEC-1 Model: 100-Year Ultimate Condition

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN  1998                *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   08MAY13  TIME  16:49:22  *
*                                      *
****************************************
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```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*        609 SECOND STREET             *
*      DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104             *
*                                      *
****************************************
```

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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, INC.
            2       ID     PARK HIGHLANDS WEST
            3       ID     MASTER DRAINAGE STUDY
            4       ID     ULTIMATE CONDITION
            5       ID
            6       ID     RETURN PERIOD ------- 100-YEAR
            7       ID     DISTRIBUTION -------- 6-HOUR SDN3
            8       ID     PROJECT NO. --------- CBH1301.002
            9       ID     FILENAME ------------ ULT100.H1
           10       ID     DATE ---------------- MAY 2013
           11       ID     MODELED BY ---------- KC/KCR
           12       ID
           13       ID        SIX HOUR DEPTH-AREA REDUCTION FACTORS
           14       ID        DRAINAGE AREA (MIA2)       DARF
           15       ID        0.00-0.49                 0.990
           16       ID        0.50-0.99                 0.975
           17       ID        1.00-1.99                 0.950
           18       ID        2.00-2.99                 0.925
           19       ID        3.00-3.99                 0.915
           20       ID        4.00-4.99                 0.908
           21       ID
           22       IT      5       0       0     300
           23       IO      5       0       0
           24       IN      5       0       0
           25       JR    PREC   0.990   0.975   0.950   0.925   0.915   0.908
                    *

           26       KK    U190
           27       BA   .3684
           28       PB    2.77
           29       PC       0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
           30       PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
           31       PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
           32       PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
           33       PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
           34       PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
           35       PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
           36       PC   0.998   0.999   1.000
           37       LS       0    80.7
           38       UD   0.522
                    *

           39       KK    U170
           40       BA   .2521
           41       LS       0    83.0
           42       UD   0.521
                    *

           43       KK     CP1
           44       KM    COMBINE U190 AND U120 AT IRON MOUNTAIN AND TORREY PINES
           45       HC       2
                    *
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1 HEC-1 INPUT PAGE 2

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

           46       KK    CP1E
           47       KM    CP1E IS THE FLOW DRAINING EAST IN IRON MOUNTAIN
           48       KM    CP1S IS THE FLOW DRAINING SOUTH IN TORREY PINES
           49       DT    CP1S
           50       DI     297     302     308     323     339     348
           51       DQ     125     127     129     136     143     148
                    *

           52       KK    RCP1E
           53       KM    ROUTE TO CP2
           54       RD    2480   .0050   0.016       0    TRAP       0      50
                    *

           55       KK    U150
           56       BA   .1336
           57       LS       0    83.0
           58       UD   0.322
                    *

           59       KK    U150S
           60       KM    U150S IS THE FLOW DRAINING SOUTH IN JONES
           61       KM    U150E IS THE FLOW DRAINING EAST IN SHELEHEDA
           62       KM    EXISTING SD IN JONES IS FOR NUISANCE FLOW
           63       DT    U150E
           64       DI      90      91      93      97     102     104
           65       DQ      52      52      53      56      59      60
                    *

           66       KK    RU150S
           67       KM    ROUTE TO CP2
           68       RD    1345   .0050   0.016       0    TRAP       0      50
                    *

           69       KK    U155
           70       BA   .1294
           71       LS       0    83.4
           72       UD   0.314
                    *

           73       KK     CP2
           74       KM    COMBINE CP1 U150S AND U155 AT IRON MOUNTAIN AND JONES
```

```
  75          HC       3
              *

  76          KK    CP2S
  77          KM   CP2S IS THE FLOW DRAINING SOUTH IN JONES
  78          KM   CP2E IS THE FLOW DRAINING EAST IN IRON MOUNTAIN
  79          KM   EXISTING SD IN IRON MOUNTAIN CONVEYS 46 CFS EAST
  80          DT    CP2E
  81          DI     244     250     258     277     294     302
  82          DQ     145     148     152     161     170     174
              *
1                                     HEC-1 INPUT                                          PAGE  3

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

  83          KK   RCP2S
  84          KM   ROUTE TO CP10
  85          RD    2695   .0050   0.016       0    TRAP       0      50
              *

  86          KK    CP1S
  87          KM   RETRIEVE CP1S
  88          DR    CP1S
              *

  89          KK    U210
  90          BA   .0727
  91          LS        0    83.1
  92          UD   0.289
              *

  93          KK     CP3
  94          KM   COMBINE CP1S AND U210 AT MAGGIE AND TORREY PINES
  95          HC       2
              *

  96          KK    CP3S
  97          KM   CP3S IS THE FLOW DRAINING SOUTH IN TORREY PINES
  98          KM   CP3E IS THE FLOW DRAINING EAST IN MAGGIE
  99          DT    CP3E
 100          DI     177     177     178     181     186     192
 101          DQ      81      81      82      83      85      89
              *

 102          KK    U250
 103          BA   .0698
 104          LS        0    83.1
 105          UD   0.289
              *

 106          KK     CP4
 107          KM   COMBINE CP3S AND U250 AT BRENT AND TORREY PINES
 108          HC       2
              *

 109          KK    CP4S
 110          KM   CP4S IS THE FLOW DRAINING SOUTH IN TORREY PINES
 111          KM   CP4E IS THE FLOW DRAINING EAST IN BRENT
 112          DT    CP4E
 113          DI     145     146     147     151     155     158
 114          DQ      72      73      73      75      77      79
              *

 115          KK   RCP4S
 116          KM   ROUTE TO CP5
 117          RD    1380   .0050   0.016       0    TRAP       0      50
              *
1                                     HEC-1 INPUT                                          PAGE  4

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

 118          KK    U230
 119          BA   .1390
 120          LS        0    83.4
 121          UD   0.328
              *

 122          KK    U330
 123          BA   .0142
 124          LS        0    85.0
 125          UD   0.188
              *

 126          KK     CP5
 127          KM   COMBINE CP4S U230 AND U330 AT HORSE AND TORREY PINES
 128          HC       3
              *

 129          KK    CP3E
 130          KM   RETRIEVE CP3E
 131          DR    CP3E
              *

 132          KK    U370
 133          BA   .0159
 134          LS        0    86.2
 135          UD   0.185
              *

 136          KK     CP6
 137          KM   COMBINE CP3E AND U370 AT MAGGIE AND MUSTANG
 138          HC       2
              *

 139          KK    CP6S
 140          KM   CP6S IS THE FLOW DRAINING SOUTH IN MUSTANG
 141          KM   CP6E IS THE FLOW DRAINING EAST IN MAGGIE
 142          DT    CP6E
 143          DI      97      97      97      99     100     101
 144          DQ      44      44      44      45      45      46
              *

 145          KK    CP4E
 146          KM   RETRIEVE CP4E
 147          DR    CP4E
              *

 148          KK    U350
 149          BA   .0163
 150          LS        0    86.3
 151          UD   0.186
              *
1                                     HEC-1 INPUT                                          PAGE  5

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

 152          KK     CP7
 153          KM   COMBINE CP6S CP4E AND U350 AT BRENT AND MUSTANG
 154          HC       3
              *

 155          KK    CP7S
 156          KM   CP7S IS THE FLOW DRAINING SOUTH IN MUSTANG
 157          KM   CP7E IS THE FLOW DRAINING EAST IN BRENT
```

```
158          DT    CP7E
159          DI     141     141     142     144     148     150
160          DQ      70      70      71      72      74      75
             *

161          KK    U305
162          BA   .0093
163          LS       0    86.7
164          UD   0.171
             *

165          KK     CP8
166          KM   COMBINE CP7S AND U305 AT GUY AND MUSTANG
167          HC       2
             *

168          KK    CP8S
169          KM   CP8S IS THE FLOW DRAINING SOUTH IN MUSTANG
170          KM   CP8E IS THE FLOW DRAINING EAST IN GUY
171          DT    CP8E
172          DI      81      81      81      82      84      85
173          DQ      38      38      38      39      39      40
             *

174          KK    U310
175          BA   .0102
176          LS       0    87.1
177          UD   0.171
             *

178          KK     CP9
179          KM   COMBINE CP5 CP8S AND U310 AT HORSE AND MUSTANG
180          HC       3
             *

181          KK    CP9E
182          KM   CP9S IS THE FLOW DRAINING SOUTH IN MUSTANG
183          KM   CP9E IS THE FLOW DRAINING EAST IN HORSE
184          KM   EXISTING SD IN HORSE IS FOR NUISANCE FLOW
185          DT    CP9S
186          DI     215     219     225     236     246     251
187          DQ     139     141     145     152     157     160
             *
1                                          HEC-1 INPUT                                                    PAGE  6

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

188          KK   RCP9E
189          KM   ROUTE TO CP10
190          RD    1950   .0050   0.016       0    TRAP       0      50
             *

191          KK    CP6E
192          KM   RETRIEVE CP6E
193          DR    CP6E
             *

194          KK   RCP6E
195          KM   ROUTE TO CP10
196          RD    4010   .0050   0.016       0    TRAP       0      50
             *

197          KK    CP7E
198          KM   RETRIEVE CP7E
199          DR    CP7E
             *

200          KK   RCP7E
201          KM   ROUTE TO CP10
202          RD    3370   .0050   0.016       0    TRAP       0      50
             *

203          KK    CP8E
204          KM   RETRIEVE CP8E
205          DR    CP8E
             *

206          KK   RCP8E
207          KM   ROUTE TO CP10
208          RD    2680    0050   0.016       0    TRAP       0      50
             *

209          KK   DUMMY
210          KM   COMBINE CP2S CP9E CP6E CP7E AND CP8E
211          HC       5
             *

212          KK    U410
213          BA   .2013
214          LS       0    85.7
215          UD   0.354
             *

216          KK    CP10
217          KM   COMBINE DUMMY AND U410 AT HORSE AND JONES
218          HC       2
             *
1                                          HEC-1 INPUT                                                    PAGE  7

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

219          KK   CP10E
220          KM   CP10S IS THE FLOW DRAINING SOUTH IN JONES
221          KM   CP10E IS THE FLOW DRAINING EAST IN HORSE
222          KM   EXISTING SD IN JONES CONVEYS 23 CFS SOUTH
223          DT   CP10S
224          DI     351     359     365     410     437     452
225          DQ     202     206     209     234     248     257
             *

226          KK  RCP10E
227          KM   ROUTE TO CP11
228          RD    2530   .0050   0.016       0    TRAP       0      50
             *

229          KK    U440
230          BA   .0523
231          LS       0    80.9
232          UD   0.290
             *

233          KK   U440S
234          KM   U440S IS THE FLOW DRAINING SOUTH IN BRADLEY
235          KM   U440E IS THE FLOW DRAINING EAST IN BRENT
236          DT   U440E
237          DI      33      33      34      36      37      38
238          DQ      18      18      18      19      20      21
             *

239          KK  RU440S
240          KM   ROUTE TO CP11
241          RD    1345   .0050   0.016       0    TRAP       0      50
             *

242          KK    U470
```

```
 243          BA   .2012
 244          LS       0    80.7
 245          UD   0.356
              *

 246          KK    CP11
 247          KM   COMBINE CP10E U440S AND U470 AT HORSE AND BRADLEY
 248          HC       3
              *

 249          KK   CP11E
 250          KM   CP11S IS THE FLOW DRAINING SOUTH IN BRADLEY
 251          KM   CP11E IS THE FLOW DRAINING EAST IN HORSE
 252          KM   EXISTING SD IN HORSE CONVEYS 6 CFS EAST
 253          DT   CP11S
 254          DI     252     259     265     278     292     298
 255          DQ     108     112     114     118     125     127
              *
1                                        HEC-1 INPUT                                                    PAGE  8

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

 256          KK    U530
 257          BA   .0131
 258          LS       0    84.0
 259          UD   0.148
              *

 260          KK    CP12
 261          KM   COMBINE CP11E AND U530 AT HORSE AND UNICORN
 262          HC       2
              *

 263          KK   CP12E
 264          KM   CP12S IS THE FLOW DRAINING SOUTH IN UNICORN
 265          KM   CP12E IS THE FLOW DRAINING EAST IN HORSE
 266          KM   EXISTING SD IN HORSE CONVEYS 6 CFS EAST
 267          DT   CP12S
 268          DI     148     151     154     164     171     175
 269          DQ      68      70      71      75      78      80
              *

 270          KK  RCP12E
 271          KM   ROUTE TO CP14
 272          RD    1825   .0050   0.016       0    TRAP       0      50
              *

 273          KK    U130
 274          BA   .0556
 275          LS       0    83.9
 276          UD   0.203
              *

 277          KK   U130S
 278          KM   U130S IS THE FLOW DRAINING SOUTH IN DECATUR
 279          KM   U130E IS THE FLOW DRAINING EAST IN IRON MOUNTAIN
 280          DT   U130E
 281          DI      47      48      49      51      53      54
 282          DQ      26      26      26      27      28      29
              *

 283          KK  RU130S
 284          KM   ROUTE TO CP13
 285          RD    1270   .0050   0.016       0    TRAP       0      50
              *

 286          KK    U550
 287          BA   .0534
 288          LS       0    85.4
 289          UD   0.225
              *
1                                        HEC-1 INPUT                                                    PAGE  9

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

 290          KK    CP13
 291          KM   COMBINE U130S AND U550 AT BRENT AND DECATUR
 292          HC       2
              *

 293          KK   CP13S
 294          KM   CP13S IS THE FLOW DRAINING SOUTH IN DECATUR
 295          KM   CP13E IS THE FLOW DRAINING EAST IN BRENT
 296          DT   CP13E
 297          DI      64      65      67      70      74      76
 298          DQ      37      37      38      41      43      44
              *

 299          KK  RCP13S
 300          KM   ROUTE TO CP14
 301          RD    1290   .0040   0.016       0    TRAP       0      50
              *

 302          KK   U440E
 303          KM   RETRIEVE U440E
 304          DR   U440E
              *

 305          KK  RU440E
 306          KM   ROUTE TO CP14
 307          RD    3850   .0040   0.016       0    TRAP       0      50
              *

 308          KK    U570
 309          BA   .1791
 310          LS       0    89.0
 311          UD   0.370
              *

 312          KK    CP14
 313          KM   COMBINE CP12E CP13S U440E AND U570 AT HORSE AND DECATUR
 314          HC       4
              *

 315          KK   CP14E
 316          KM   CP14S IS THE FLOW DRAINING SOUTH IN DECATUR
 317          KM   CP14E IS THE FLOW DRAINING EAST IN HORSE
 318          KM   EXISTING SD IN DECATUR CONVEYS 30 CFS SOUTH
 319          DT   CP14S
 320          DI     202     207     213     224     250     269
 321          DQ      30      30      30      30      30      30
              *

 322          KK  RCP14E
 323          KM   ROUTE TO CP15
 324          RD    2645   .0050   0.016       0    TRAP       0      50
              *
1                                        HEC-1 INPUT                                                    PAGE 10

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

 325          KK    U610
 326          BA   .0479
 327          LS       0    84.2
```

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          UD   0.311
          *

          KK    CP15
          KM   COMBINE CP14E AND U610 AT HORSE AND AVIARY
          HC       2
          *

          KK   CP15E
          KM   CP15S IS THE FLOW DRAINING SOUTH IN AVIARY
          KM   CP15E IS THE FLOW DRAINING EAST IN HORSE
          KM   ULTIMATE SD IN HORSE CONVEYS 321 CFS EAST
          DT   CP15S
          DI     177     181     186     198     235     250
          DQ       0       0       0       0       0       0
          *

          KK    CP9S
          KM   RETRIEVE CP9S
          DR    CP9S
          *

          KK   RCP9S
          KM   ROUTE TO CP16
          RD    4770   .0050   0.016       0    TRAP       0      50
          *

          KK   CP10S
          KM   RETRIEVE CP10S
          DR   CP10S
          *

          KK  RCP10S
          KM   ROUTE TO CP16
          RD    2755   .0050   0.016       0    TRAP       0      50
          *

          KK    U280
          BA   .2688
          LS       0    83.3
          UD   0.375
          *

          KK    CP16
          KM   COMBINE CP9S CP10S AND U280 AT GRAND TETON AND JONES
          HC       3
          *
1                                    HEC-1 INPUT                                                    PAGE 11

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

          KK   RCP16
          KM   ROUTE TO CP17
          RD    4900   .0050   0.016       0    TRAP       0      50
          *

          KK   CP11S
          KM   RETRIEVE CP11S
          DR   CP11S
          *

          KK  RCP11S
          KM   ROUTE TO CP17
          RD    5215   .0050   0.016       0    TRAP       0      50
          *

          KK   CP12S
          KM   RETRIEVE CP12S
          DR   CP12S
          *

          KK  RCP12S
          KM   ROUTE TO CP17
          RD    4550   .0050   0.016       0    TRAP       0      50
          *

          KK   CP14S
          KM   RETRIEVE CP14S
          DR   CP14S
          *

          KK  RCP14S
          KM   ROUTE TO CP17
          RD    2565   .0050   0.013       0    CIRC     2.5       0
          *

          KK    U510
          BA   .4885
          LS       0    84.8
          UD   0.510
          *

          KK    CP17
          KM   COMBINE CP16 CP11S CP12S CP14S AND U510 AT GRAND TETON AND DECATUR
          HC       5
          *

          KK    U650
          BA   .0085
          LS       0    89.3
          UD   0.106
          *
1                                    HEC-1 INPUT                                                    PAGE 12

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

          KK    CP18
          KM   COMBINE CP17 AND U650 IN GRAND TETON BETWEEN DECATUR AND SAN MATEO
          HC       2
          *

          KK    U630
          BA   .0735
          LS       0    88.0
          UD   0.246
          *

          KK    CP19
          KM   COMBINE CP18 AND U630 IN GRAND TETON BETWEEN DECATUR AND SAN MATEO
          HC       2
          *

          KK    U620
          BA   .0472
          LS       0    88.1
          UD   0.246
          *

          KK    CP20
          KM   COMBINE CP19 AND U620 AT GRAND TETON AND SAN MATEO
          HC       2
          *

          KK   RCP20
          KM   ROUTE TO CP22
```

```
409          RD    1230   .0050   0.016       0    TRAP       0      50
             *

410          KK   CP15S
411          KM   RETRIEVE CP15S
412          DR   CP15S
             *

413          KK  RCP15S
414          KM   ROUTE TO CP20
415          RD    2555   .0050   0.016       0    TRAP       0      50
             *

416          KK    U680
417          BA   .1122
418          LS       0    88.0
419          UD   0.303
             *

420          KK    CP21
421          KM   COMBINE CP15S AND U680 IN AVIARY JUST NORTH OF GRAND TETON
422          HC       2
             *
```



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

423          KK    U760
424          BA   .0076
425          LS       0    88.3
426          UD   0.147
             *

427          KK   CPGTA
428          KM   COMBINE CP20 CP21 AND U760 AT GRAND TETON AND AVIARY
429          HC       3
             *

430          KK     2-3
431          KM   PARK OR TRAIL
432          BA  0.0327
433          LS       0    86.0
434          UD   0.157
             *

435          KK  CPGTA2
436          KM   COMBINE CPGTA AND 2-3
437          HC       2
             *

438          KK     2-1
439          KM   NEIGHBORHOOD COMMERCIAL
440          BA  0.0367
441          LS       0    94.0
442          UD   0.187
             *

443          KK     2-2
444          KM   MEDIUM DENSITY
445          BA  0.0742
446          LS       0    91.0
447          UD   0.215
             *

448          KK   2-14A
449          KM   PARK OR TRAIL
450          BA  0.0027
451          LS       0    86.0
452          UD   0.135
             *

453          KK      2A
454          HC       3
             *

455          KK      2B
456          KO       2
457          HC       2
             *
```



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

458          KK     DB1
459          KM   DETENTION BASIN 1
460          KO       2
461          RS       1    ELEV      -1
462          SV       0   0.339   3.015   9.712  18.977  29.349  42.004 102.301 126.116 159.117
463          SE  2297.0  2298.0  2299.0  2300.0  2301.0  2302.0  2303.0  2307.0  2308.5  2310.5
464          SQ       0      72     110     138     161     199     215     231     252    1975
465          SE  2297.0  2300.0  2301.0  2302.0  2303.0  2305.0  2306.0  2307.0  2308.5  2310.5
466          KO       1
             *

467          KK     2-6
468          KM   ELEMENTARY SCHOOL
469          BA  0.0180
470          LS       0    94.0
471          UD   0.158
             *

472          KK      2C
473          HC       2
             *

474          KK     2-7
475          KM   PARK OR TRAIL
476          BA  0.0156
477          LS       0    86.0
478          UD   0.137
             *

479          KK      2D
480          HC       2
             *

481          KK     2-4
482          KM   HIGH DENSITY
483          BA  0.0334
484          LS       0    94.0
485          UD   0.137
             *

486          KK   2-14B
487          KM   PARK OR TRAIL
488          BA  0.0025
489          LS       0    86.0
490          UD   0.100
             *

491          KK      2E
492          HC       2
             *
```

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

 493          KK     2-5
 494          KM   MEDIUM DENSITY
 495          BA  0.0891
 496          LS       0    91.0
 497          UD   0.215
              *
 498          KK    2-5W
 499          DT    2-5E
 500          DI       0     100
 501          DQ       0      48
              *
 502          KK     2-9
 503          KM   MEDIUM DENSITY
 504          BA  0.0156
 505          LS       0    91.0
 506          UD   0.135
              *
 507          KK      2F
 508          HC       3
              *
 509          KK    2-5E
 510          DR    2-5E
              *
 511          KK    2-10
 512          KM   MEDIUM DENSITY
 513          BA  0.0163
 514          LS       0    91.0
 515          UD   0.132
              *
 516          KK      2G
 517          HC       3
              *
 518          KK     2-8
 519          KM   MIXED USE
 520          BA  0.0286
 521          LS       0    94.0
 522          UD   0.144
              *
 523          KK      2H
 524          HC       2
              *
1                                        HEC-1 INPUT                                        PAGE 16

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

 525          KK      2I
 526          KM   FLOW IN STORM DRAIN
 527          HC       2
              *
 528          KK    2-11
 529          KM   MEDIUM-HIGH DENSITY
 530          BA  0.0255
 531          LS       0    94.0
 532          UD   0.135
              *
 533          KK    2-12
 534          KM   MEDIUM-LOW DENSITY
 535          BA  0.0272
 536          LS       0    90.0
 537          UD   0.150
              *
 538          KK      2J
 539          KM   FLOW IN STORM DRAIN
 540          HC       2
              *
 541          KK   DUMMY
 542          KM   FLOW IN STORM DRAIN
 543          HC       2
              *
 544          KK    2-13
 545          KM   MEDIUM-LOW AND MEDIUM HIGH DENSITY
 546          BA  0.0273
 547          LS       0    91.0
 548          UD   0.176
              *
 549          KK     PT2
 550          KM   FLOW IN STORM DRAIN
 551          HC       2
              *
 552          KK    U720
 553          BA   .0590
 554          LS       0    88.1
 555          UD   0.229
              *
 556          KK    U800
 557          BA   .0095
 558          LS       0    90.0
 559          UD   0.150
              *
1                                        HEC-1 INPUT                                        PAGE 17

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

 560          KK    CP25
 561          KM   COMBINE U720 AND U800 IN GRAND TETON WEST OF ALIANTE
 562          HC       2
              *
 563          KK    U740
 564          BA   .0533
 565          LS       0    88.0
 566          UD   0.213
              *
 567          KK    CP26
 568          KM   COMBINE CP25 AND U740 IN GRAND TETON WEST OF ALIANTE
 569          HC       2
              *
 570          KK    U700
 571          BA   .1352
 572          LS       0    87.8
 573          UD   0.372
              *
 574          KK    CP27
```

```
 575          KM   COMBINE CP26 AND U700 AT GRAND TETON AND ALIANTE
 576          HC       2
              *

 577          KK     1-1
 578          KM   MEDIUM HIGH DENSITY
 579          BA   .0344
 580          LS       0    94.0
 581          UD   0.150
              *

 582          KK    AL1E
 583          KM   ROADWAY
 584          BA   .0026
 585          LS       0    98.0
 586          UD   0.077
              *

 587          KK    1A.1
 588          KM   COMBINE 1-1 AND AL1E IN ALIANTE STORM DRAIN
 589          HC       2
              *

 590          KK   R1A.1
 591          KM   ROUTE TO PT1
 592          RK     740  0.0034   0.013       0    CIRC     4.5
              *
1                                        HEC-1 INPUT                                                PAGE 18

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

 593          KK     1-2
 594          KM   MEDIUM HIGH DENSITY
 595          BA   .0356
 596          LS       0    94.0
 597          UD   0.156
              *

 598          KK      1A
 599          KM   COMBINE PT3A AND 1-2 IN ALIANTE STORM DRAIN
 600          HC       2
              *

 601          KK     1-4
 602          KM   MEDIUM DENSITY
 603          BA   .0373
 604          LS       0    91.0
 605          UD   0.157
              *

 606          KK    R1-4
 607          KM   ROUTE TO 1-4
 608          RD    1600   .0100   0.016       0    TRAP      45       1
              *

 609          KK      1B
 610          KM   COMBINE 1A AND 1-4 IN ALIANTE STORM DRAIN
 611          HC       2
              *

 612          KK     1-3
 613          KM   MEDIUM LOW DENSITY
 614          BA   .0419
 615          LS       0    90.0
 616          UD   0.154
              *

 617          KK    AL2E
 618          KM   ROADWAY
 619          BA   .0025
 620          LS       0    98.0
 621          UD   0.076
              *

 622          KK     PT1
 623          KM   COMBINE 1B, 1-3 AND AL2E IN ALIANTE STORM DRAIN
 624          HC       3
              *

 625          KK     4-1
 626          KM   HIGH DENSITY
 627          BA   .0359
 628          LS       0    94.0
 629          UD   0.137
              *
1                                        HEC-1 INPUT                                                PAGE 19

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

 630          KK     4-6
 631          KM   PARK OR TRAIL
 632          BA   .0039
 633          LS       0    86.0
 634          UD   0.156
              *

 635          KK     4-7
 636          KM   MEDIUM DENSITY
 637          BA  0.0464
 638          LS       0    91.0
 639          UD   0.189
              *

 640          KK      4A
 641          KM   COMBINE 4-1, 4-6 AND 4-7 IN SEVERANCE STORM DRAIN
 642          HC       3
              *

 643          KK     4-4
 644          KM   MEDIUM DENSITY
 645          BA   .0109
 646          LS       0    91.0
 647          UD   0.123
              *

 648          KK      4B
 649          KM   COMBINE 4A AND 4-4 IN AVIARY STORM DRAIN
 650          HC       2
              *

 651          KK     4-2
 652          KM   MEDIUM HIGH DENSITY
 653          BA   .0547
 654          LS       0    94.0
 655          UD   0.179
              *

 656          KK     4-3
 657          KM   MEDIUM DENSITY
 658          BA   .0542
 659          LS       0    91.0
 660          UD   0.186
              *

 661          KK      4C
```

```
662           KM   COMBINE 4-2 AND 4-3 IN ELKHORN STORM DRAIN
663           HC       2
              *
```



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

664           KK   U1020
665           BA   .0092
666           LS       0    94.0
667           UD   0.184
              *

668           KK      4D
669           KM   COMBINE 4B, 4C AND U1020 IN AVIARY STORM DRAIN
670           HC       3
              *

671           KK     4-5
672           KM   MEDIUM HIGH DENSITY
673           BA   .0650
674           LS       0    94.0
675           UD   0.185
              *

676           KK      4H
677           KM   COMBINE 4D AND 4-5 IN AVIARY STORM DRAIN
678           HC       2
              *

679           KK   U1040
680           BA   .0185
681           LS       0    95.0
682           UD   0.136
              *

683           KK   U1060
684           BA   .0060
685           LS       0    94.0
686           UD   0.109
              *

687           KK   U1080
688           BA   .0254
689           LS       0    94.0
690           UD   0.150
              *

691           KK      4I
692           KM   COMBINE U1040, U1060 AND U1080 IN DORRELL STORM DRAIN
693           HC       3
              *

694           KK     PT4
695           KM   COMBINE 4H AND 4I IN AVIARY/DORRELL STORM DRAIN
696           HC       2
              *
```



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

697           KK   DUMMY
698           HC       5
              *

699           KK     3-1
700           KM   MEDIUM HIGH DENSITY
701           BA   .0359
702           LS       0    94.0
703           UD   0.155
              *

704           KK     3-2
705           KM   MEDIUM LOW DENSITY
706           BA   .0209
707           LS       0    90.0
708           UD   0.143
              *

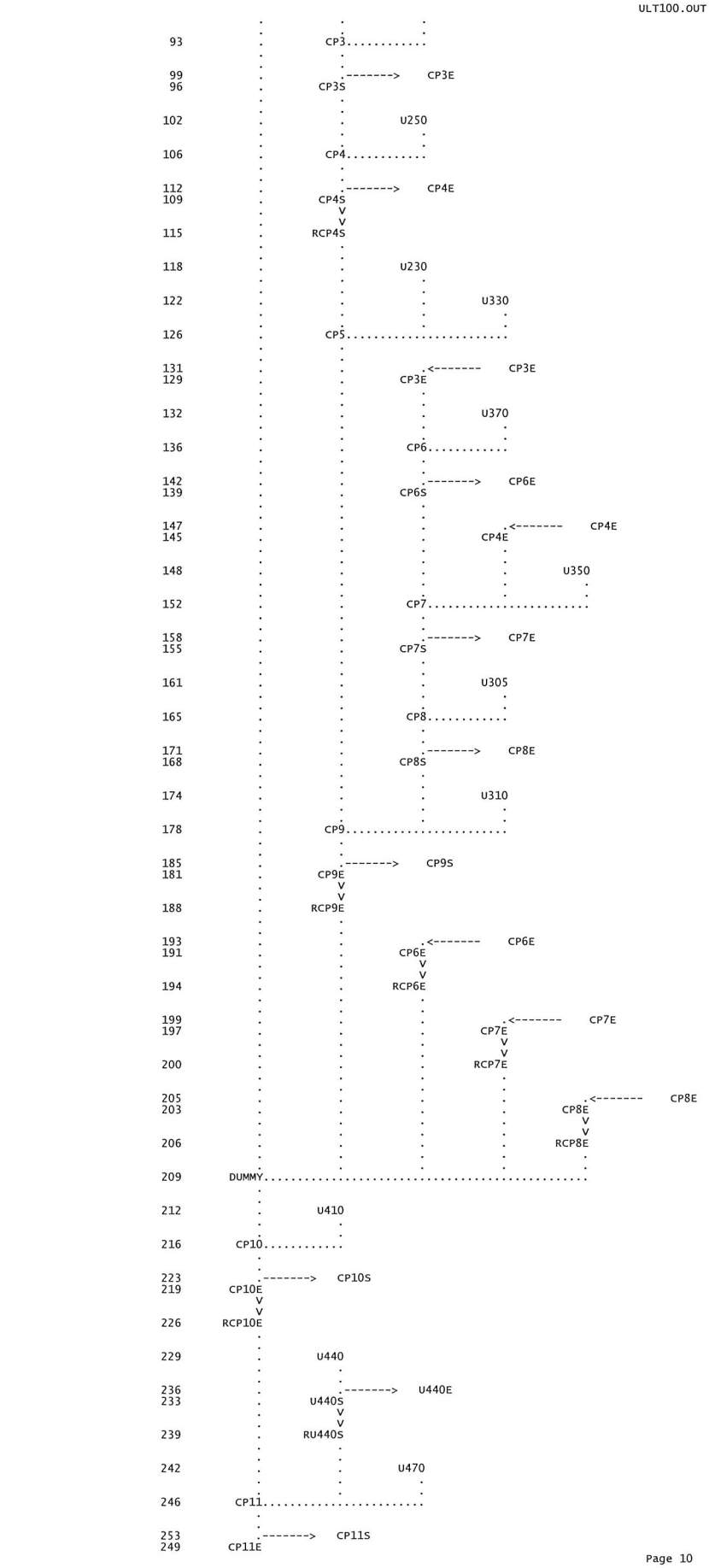
709           KK     PT3
710           KM   COMBINE 3-1 AND 3-2 IN ELKHORN STORM DRAIN
711           HC       2
              *

712           ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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CP3S
U250
CP4
CP4E
CP4S
RCP4S
U230
U330
CP5
CP3E
U370
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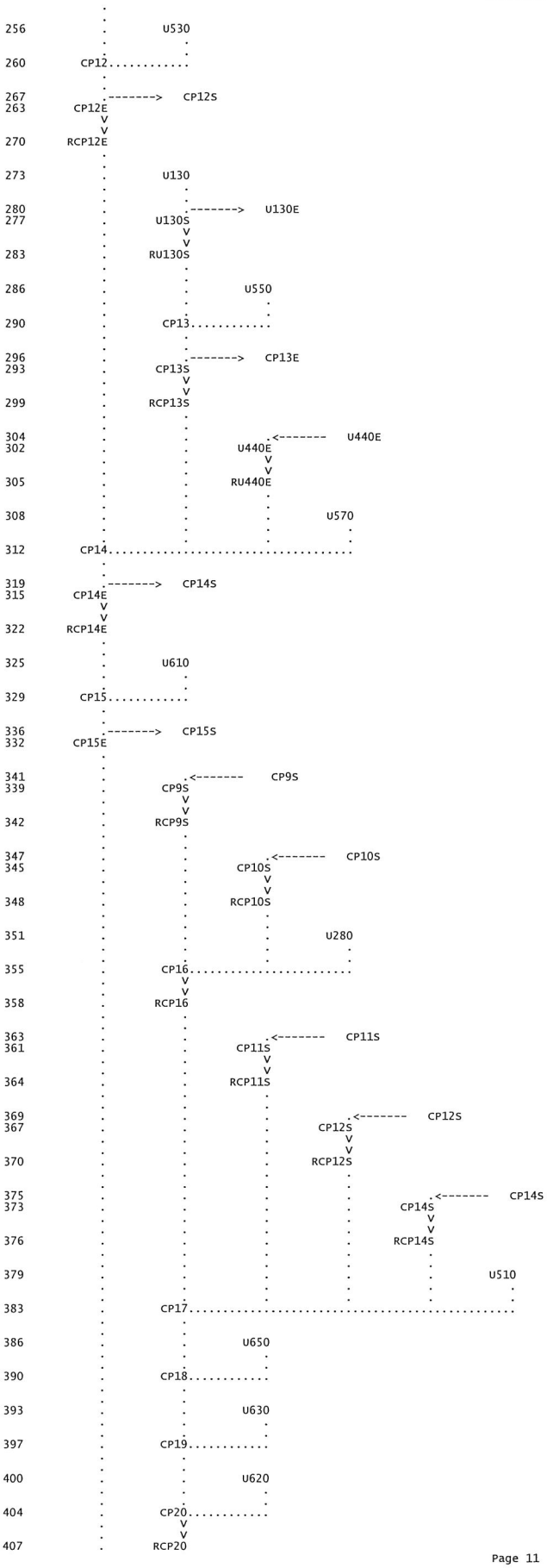
CP6E
CP6S
CP4E
U350
CP7
CP7E
CP7S
U305
CP8
CP8E
CP8S
U310
CP9
CP9S
CP9E
RCP9E
CP6E
RCP6E
CP7E
RCP7E
CP8E
RCP8E
DUMMY
U410
CP10
CP10S
CP10E
RCP10E
U440
U440E
U440S
RU440S
U470
CP11
CP11S
CP11E


256 U530
260 CP12
267 CP12S
263 CP12E
270 RCP12E
273 U130
280 U130E
277 U130S
283 RU130S
286 U550
290 CP13
296 CP13E
293 CP13S
299 RCP13S
304 U440E
302 U440E
305 RU440E
308 U570
312 CP14
319 CP14S
315 CP14E
322 RCP14E
325 U610
329 CP15
336 CP15S
332 CP15E
341 CP9S
339 CP9S
342 RCP9S
347 CP10S
345 CP10S
348 RCP10S
351 U280
355 CP16
358 RCP16
363 CP11S
361 CP11S
364 RCP11S
369 CP12S
367 CP12S
370 RCP12S
375 CP14S
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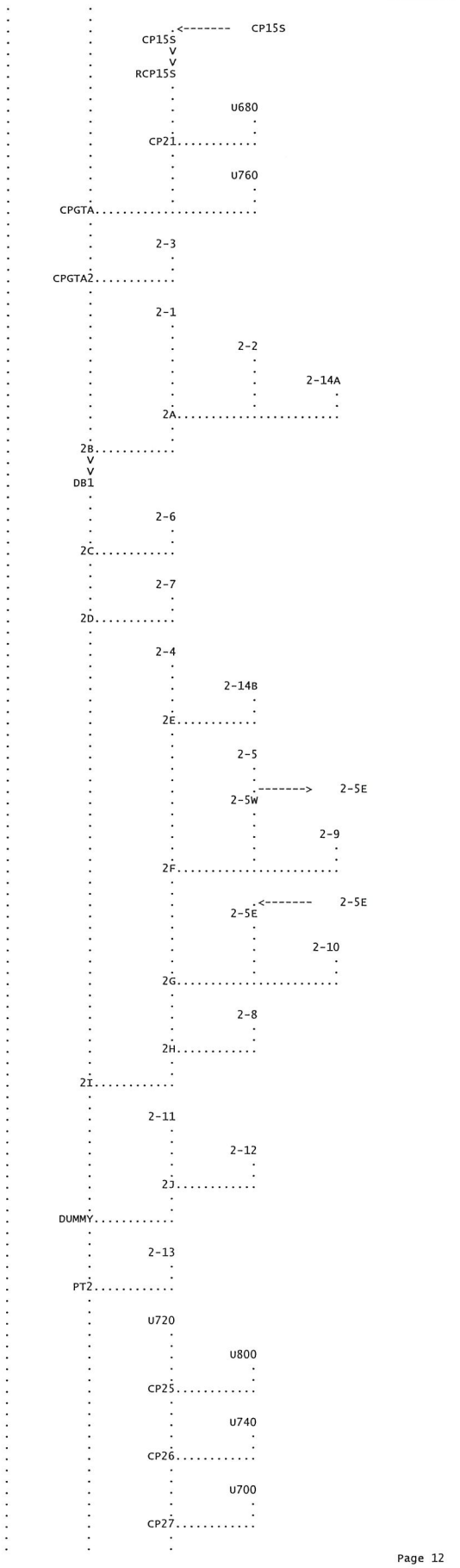
400 U620
404 CP20
407 RCP20


412
410 CP15S
413 RCP15S
416 U680
420 CP21
423 U760
427 CPGTA
430 2-3
435 CPGTA2
438 2-1
443 2-2
448 2-14A
453 2A
455 2B
458 DB1
467 2-6
472 2C
474 2-7
479 2D
481 2-4
486 2-14B
491 2E
493 2-5
499
498 2-5W
502 2-9
507 2F
510
509 2-5E
511 2-10
516 2G
518 2-8
523 2H
525 2I
528 2-11
533 2-12
538 2J
541 DUMMY
544 2-13
549 PT2
552 U720
556 U800
560 CP25
563 U740
567 CP26
570 U700
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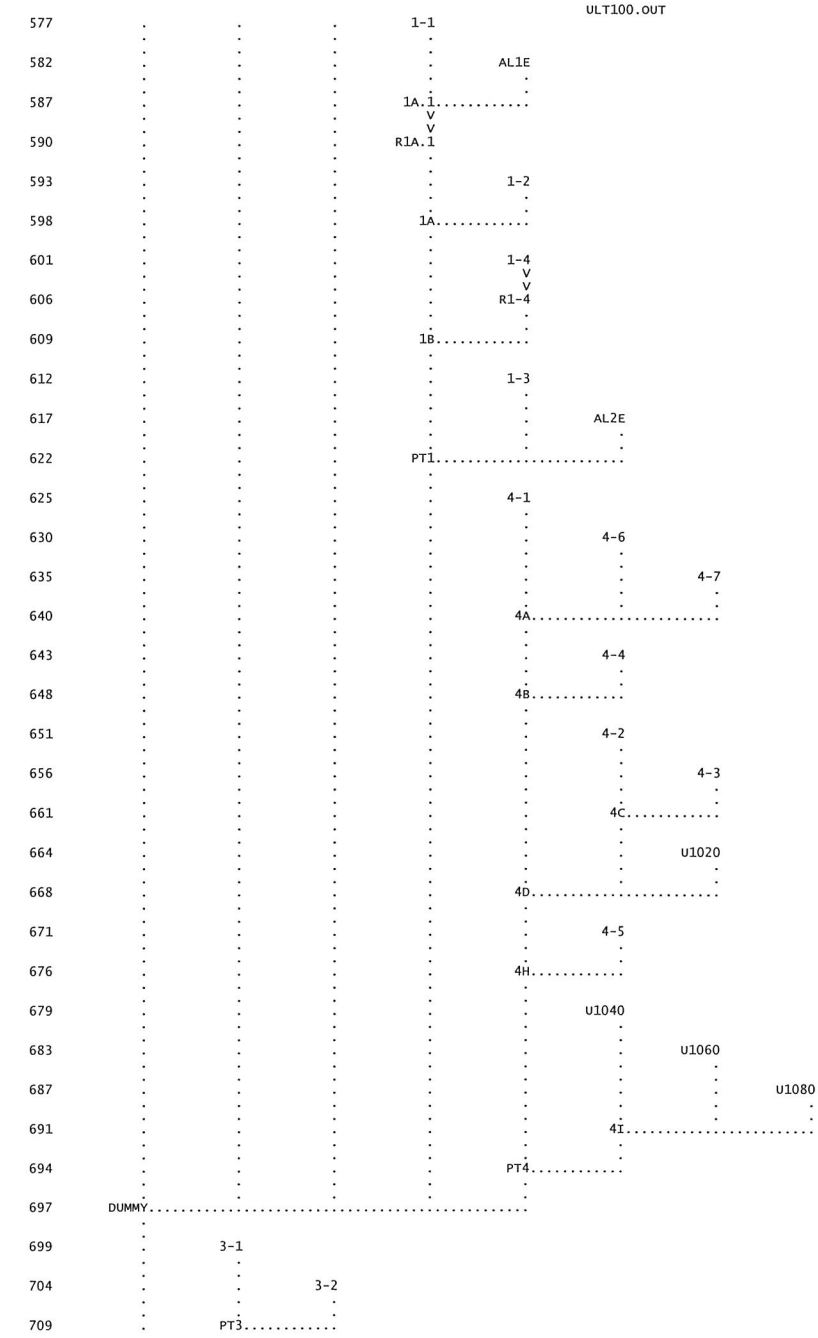
CP15S
2-5E
2-5E
2-5S



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN   1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   08MAY13  TIME  16:49:22   *
*                                       *
*****************************************
```

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

SLATER HANIFAN GROUP, INC.
PARK HIGHLANDS WEST
MASTER DRAINAGE STUDY
ULTIMATE CONDITION

RETURN PERIOD ------- 100-YEAR
DISTRIBUTION -------- 6-HOUR SDN3
PROJECT NO. --------- CBH1301.002
FILENAME ------------ ULT100.H1
DATE ---------------- MAY 2013
MODELED BY ---------- KC/KCR

SIX HOUR DEPTH-AREA REDUCTION FACTORS

DRAINAGE AREA (MI^2)	DARF
0.00-0.49	0.990
0.50-0.99	0.975
1.00-1.99	0.950
2.00-2.99	0.925
3.00-3.99	0.915
4.00-4.99	0.908

```
 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         300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2   0  ENDING DATE
                   NDTIME       0055  ENDING TIME
                    ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE    24.92 HOURS

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

    JP          MULTI-PLAN OPTION
                     NPLAN          1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                   .99       .98       .95       .93       .92       .91


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


              **************
              *            *
 455 KK       *     2B     *
              *            *
              **************

 456 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          2  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

 457 HC          HYDROGRAPH COMBINATION
                     ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                    ***

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

                                                HYDROGRAPH AT STATION       2B
                                                    SUM OF  2 HYDROGRAPHS
                                                  PLAN 1,   RATIO =   .99

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

   DA MON HRMN  ORD      FLOW    *    DA MON HRMN  ORD      FLOW    *    DA MON HRMN  ORD      FLOW    *    DA MON HRMN  ORD      FLOW
                                 *                                   *                                   *
    1     0000    1        0.   *     1     0615   76       175.   *     1     1230  151        0.   *     1     1845  226        0.
    1     0005    2        0.   *     1     0620   77       153.   *     1     1235  152        0.   *     1     1850  227        0.
    1     0010    3        0.   *     1     0625   78       133.   *     1     1240  153        0.   *     1     1855  228        0.
    1     0015    4        0.   *     1     0630   79       117.   *     1     1245  154        0.   *     1     1900  229        0.
    1     0020    5        1.   *     1     0635   80       103.   *     1     1250  155        0.   *     1     1905  230        0.
    1     0025    6        2.   *     1     0640   81        92.   *     1     1255  156        0.   *     1     1910  231        0.
    1     0030    7        4.   *     1     0645   82        81.   *     1     1300  157        0.   *     1     1915  232        0.
    1     0035    8        6.   *     1     0650   83        71.   *     1     1305  158        0.   *     1     1920  233        0.
    1     0040    9        7.   *     1     0655   84        62.   *     1     1310  159        0.   *     1     1925  234        0.
    1     0045   10        6.   *     1     0700   85        54.   *     1     1315  160        0.   *     1     1930  235        0.
    1     0050   11        5.   *     1     0705   86        46.   *     1     1320  161        0.   *     1     1935  236        0.
    1     0055   12        4.   *     1     0710   87        40.   *     1     1325  162        0.   *     1     1940  237        0.
    1     0100   13        4.   *     1     0715   88        36.   *     1     1330  163        0.   *     1     1945  238        0.
    1     0105   14        3.   *     1     0720   89        31.   *     1     1335  164        0.   *     1     1950  239        0.
    1     0110   15        4.   *     1     0725   90        27.   *     1     1340  165        0.   *     1     1955  240        0.
    1     0115   16        5.   *     1     0730   91        23.   *     1     1345  166        0.   *     1     2000  241        0.
    1     0120   17        6.   *     1     0735   92        20.   *     1     1350  167        0.   *     1     2005  242        0.
    1     0125   18        7.   *     1     0740   93        17.   *     1     1355  168        0.   *     1     2010  243        0.
    1     0130   19       10.   *     1     0745   94        14.   *     1     1400  169        0.   *     1     2015  244        0.
    1     0135   20       15.   *     1     0750   95        12.   *     1     1405  170        0.   *     1     2020  245        0.
    1     0140   21       20.   *     1     0755   96        10.   *     1     1410  171        0.   *     1     2025  246        0.
    1     0145   22       24.   *     1     0800   97         9.   *     1     1415  172        0.   *     1     2030  247        0.
    1     0150   23       27.   *     1     0805   98         8.   *     1     1420  173        0.   *     1     2035  248        0.
    1     0155   24       28.   *     1     0810   99         6.   *     1     1425  174        0.   *     1     2040  249        0.
    1     0200   25       27.   *     1     0815  100         5.   *     1     1430  175        0.   *     1     2045  250        0.
    1     0205   26       26.   *     1     0820  101         5.   *     1     1435  176        0.   *     1     2050  251        0.
    1     0210   27       26.   *     1     0825  102         4.   *     1     1440  177        0.   *     1     2055  252        0.
    1     0215   28       29.   *     1     0830  103         3.   *     1     1445  178        0.   *     1     2100  253        0.
    1     0220   29       36.   *     1     0835  104         3.   *     1     1450  179        0.   *     1     2105  254        0.
    1     0225   30       43.   *     1     0840  105         2.   *     1     1455  180        0.   *     1     2110  255        0.
    1     0230   31       49.   *     1     0845  106         2.   *     1     1500  181        0.   *     1     2115  256        0.
    1     0235   32       53.   *     1     0850  107         2.   *     1     1505  182        0.   *     1     2120  257        0.
    1     0240   33       57.   *     1     0855  108         1.   *     1     1510  183        0.   *     1     2125  258        0.
    1     0245   34       63.   *     1     0900  109         1.   *     1     1515  184        0.   *     1     2130  259        0.
    1     0250   35       69.   *     1     0905  110         1.   *     1     1520  185        0.   *     1     2135  260        0.
    1     0255   36       71.   *     1     0910  111         1.   *     1     1525  186        0.   *     1     2140  261        0.
    1     0300   37       72.   *     1     0915  112         1.   *     1     1530  187        0.   *     1     2145  262        0.
    1     0305   38       80.   *     1     0920  113         1.   *     1     1535  188        0.   *     1     2150  263        0.
    1     0310   39      100.   *     1     0925  114         0.   *     1     1540  189        0.   *     1     2155  264        0.
    1     0315   40      137.   *     1     0930  115         0.   *     1     1545  190        0.   *     1     2200  265        0.
    1     0320   41      205.   *     1     0935  116         0.   *     1     1550  191        0.   *     1     2205  266        0.
    1     0325   42      314.   *     1     0940  117         0.   *     1     1555  192        0.   *     1     2210  267        0.
    1     0330   43      460.   *     1     0945  118         0.   *     1     1600  193        0.   *     1     2215  268        0.
    1     0335   44      607.   *     1     0950  119         0.   *     1     1605  194        0.   *     1     2220  269        0.
    1     0340   45      710.   *     1     0955  120         0.   *     1     1610  195        0.   *     1     2225  270        0.
    1     0345   46      782.   *     1     1000  121         0.   *     1     1615  196        0.   *     1     2230  271        0.
    1     0350   47      871.   *     1     1005  122         0.   *     1     1620  197        0.   *     1     2235  272        0.
    1     0355   48     1001.   *     1     1010  123         0.   *     1     1625  198        0.   *     1     2240  273        0.
    1     0400   49     1135.   *     1     1015  124         0.   *     1     1630  199        0.   *     1     2245  274        0.
    1     0405   50     1201.   *     1     1020  125         0.   *     1     1635  200        0.   *     1     2250  275        0.
    1     0410   51     1190.   *     1     1025  126         0.   *     1     1640  201        0.   *     1     2255  276        0.
    1     0415   52     1145.   *     1     1030  127         0.   *     1     1645  202        0.   *     1     2300  277        0.
    1     0420   53     1083.   *     1     1035  128         0.   *     1     1650  203        0.   *     1     2305  278        0.
    1     0425   54     1008.   *     1     1040  129         0.   *     1     1655  204        0.   *     1     2310  279        0.
    1     0430   55      944.   *     1     1045  130         0.   *     1     1700  205        0.   *     1     2315  280        0.
    1     0435   56      894.   *     1     1050  131         0.   *     1     1705  206        0.   *     1     2320  281        0.
    1     0440   57      851.   *     1     1055  132         0.   *     1     1710  207        0.   *     1     2325  282        0.
    1     0445   58      805.   *     1     1100  133         0.   *     1     1715  208        0.   *     1     2330  283        0.
    1     0450   59      765.   *     1     1105  134         0.   *     1     1720  209        0.   *     1     2335  284        0.
    1     0455   60      734.   *     1     1110  135         0.   *     1     1725  210        0.   *     1     2340  285        0.
    1     0500   61      693.   *     1     1115  136         0.   *     1     1730  211        0.   *     1     2345  286        0.
    1     0505   62      648.   *     1     1120  137         0.   *     1     1735  212        0.   *     1     2350  287        0.
    1     0510   63      608.   *     1     1125  138         0.   *     1     1740  213        0.   *     1     2355  288        0.
    1     0515   64      569.   *     1     1130  139         0.   *     1     1745  214        0.   *     2     0000  289        0.
    1     0520   65      537.   *     1     1135  140         0.   *     1     1750  215        0.   *     2     0005  290        0.
    1     0525   66      509.   *     1     1140  141         0.   *     1     1755  216        0.   *     2     0010  291        0.
    1     0530   67      477.   *     1     1145  142         0.   *     1     1800  217        0.   *     2     0015  292        0.
    1     0535   68      442.   *     1     1150  143         0.   *     1     1805  218        0.   *     2     0020  293        0.
    1     0540   69      401.   *     1     1155  144         0.   *     1     1810  219        0.   *     2     0025  294        0.
    1     0545   70      356.   *     1     1200  145         0.   *     1     1815  220        0.   *     2     0030  295        0.
    1     0550   71      310.   *     1     1205  146         0.   *     1     1820  221        0.   *     2     0035  296        0.
    1     0555   72      271.   *     1     1210  147         0.   *     1     1825  222        0.   *     2     0040  297        0.
```

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0600	73	240.	1		1215	148	0.	1		1830	223	0.	2		0045	298	0.
1		0605	74	218.	1		1220	149	0.	1		1835	224	0.	2		0050	299	0.
1		0610	75	197.	1		1225	150	0.	1		1840	225	0.	2		0055	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)				
		(CFS)			
1201.	4.08	354.	89.	86.	86.
		(INCHES) 2.855	2.877	2.877	2.877
		(AC-FT) 175.	177.	177.	177.

CUMULATIVE AREA = 1.15 SQ MI

HYDROGRAPH AT STATION 2B
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .98

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	172.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	150.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	131.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	115.	1		1245	154	0.	1		1900	229	0.
1		0020	5	1.	1		0635	80	102.	1		1250	155	0.	1		1905	230	0.
1		0025	6	2.	1		0640	81	91.	1		1255	156	0.	1		1910	231	0.
1		0030	7	4.	1		0645	82	80.	1		1300	157	0.	1		1915	232	0.
1		0035	8	6.	1		0650	83	70.	1		1305	158	0.	1		1920	233	0.
1		0040	9	7.	1		0655	84	61.	1		1310	159	0.	1		1925	234	0.
1		0045	10	6.	1		0700	85	53.	1		1315	160	0.	1		1930	235	0.
1		0050	11	5.	1		0705	86	46.	1		1320	161	0.	1		1935	236	0.
1		0055	12	4.	1		0710	87	40.	1		1325	162	0.	1		1940	237	0.
1		0100	13	3.	1		0715	88	35.	1		1330	163	0.	1		1945	238	0.
1		0105	14	3.	1		0720	89	31.	1		1335	164	0.	1		1950	239	0.
1		0110	15	3.	1		0725	90	27.	1		1340	165	0.	1		1955	240	0.
1		0115	16	4.	1		0730	91	23.	1		1345	166	0.	1		2000	241	0.
1		0120	17	5.	1		0735	92	20.	1		1350	167	0.	1		2005	242	0.
1		0125	18	7.	1		0740	93	17.	1		1355	168	0.	1		2010	243	0.
1		0130	19	10.	1		0745	94	14.	1		1400	169	0.	1		2015	244	0.
1		0135	20	14.	1		0750	95	12.	1		1405	170	0.	1		2020	245	0.
1		0140	21	19.	1		0755	96	10.	1		1410	171	0.	1		2025	246	0.
1		0145	22	23.	1		0800	97	9.	1		1415	172	0.	1		2030	247	0.
1		0150	23	26.	1		0805	98	7.	1		1420	173	0.	1		2035	248	0.
1		0155	24	27.	1		0810	99	6.	1		1425	174	0.	1		2040	249	0.
1		0200	25	26.	1		0815	100	5.	1		1430	175	0.	1		2045	250	0.
1		0205	26	25.	1		0820	101	5.	1		1435	176	0.	1		2050	251	0.
1		0210	27	24.	1		0825	102	4.	1		1440	177	0.	1		2055	252	0.
1		0215	28	27.	1		0830	103	3.	1		1445	178	0.	1		2100	253	0.
1		0220	29	34.	1		0835	104	3.	1		1450	179	0.	1		2105	254	0.
1		0225	30	41.	1		0840	105	2.	1		1455	180	0.	1		2110	255	0.
1		0230	31	47.	1		0845	106	2.	1		1500	181	0.	1		2115	256	0.
1		0235	32	50.	1		0850	107	2.	1		1505	182	0.	1		2120	257	0.
1		0240	33	54.	1		0855	108	1.	1		1510	183	0.	1		2125	258	0.
1		0245	34	60.	1		0900	109	1.	1		1515	184	0.	1		2130	259	0.
1		0250	35	66.	1		0905	110	1.	1		1520	185	0.	1		2135	260	0.
1		0255	36	68.	1		0910	111	1.	1		1525	186	0.	1		2140	261	0.
1		0300	37	69.	1		0915	112	1.	1		1530	187	0.	1		2145	262	0.
1		0305	38	76.	1		0920	113	1.	1		1535	188	0.	1		2150	263	0.
1		0310	39	96.	1		0925	114	0.	1		1540	189	0.	1		2155	264	0.
1		0315	40	131.	1		0930	115	0.	1		1545	190	0.	1		2200	265	0.
1		0320	41	198.	1		0935	116	0.	1		1550	191	0.	1		2205	266	0.
1		0325	42	306.	1		0940	117	0.	1		1555	192	0.	1		2210	267	0.
1		0330	43	447.	1		0945	118	0.	1		1600	193	0.	1		2215	268	0.
1		0335	44	591.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	690.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	760.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	841.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	968.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	1105.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	1179.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	1168.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	1119.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.
1		0420	53	1055.	1		1035	128	0.	1		1650	203	0.	1		2305	278	0.
1		0425	54	979.	1		1040	129	0.	1		1655	204	0.	1		2310	279	0.
1		0430	55	918.	1		1045	130	0.	1		1700	205	0.	1		2315	280	0.
1		0435	56	877.	1		1050	131	0.	1		1705	206	0.	1		2320	281	0.
1		0440	57	839.	1		1055	132	0.	1		1710	207	0.	1		2325	282	0.
1		0445	58	795.	1		1100	133	0.	1		1715	208	0.	1		2330	283	0.
1		0450	59	754.	1		1105	134	0.	1		1720	209	0.	1		2335	284	0.
1		0455	60	720.	1		1110	135	0.	1		1725	210	0.	1		2340	285	0.
1		0500	61	680.	1		1115	136	0.	1		1730	211	0.	1		2345	286	0.
1		0505	62	635.	1		1120	137	0.	1		1735	212	0.	1		2350	287	0.
1		0510	63	596.	1		1125	138	0.	1		1740	213	0.	1		2355	288	0.
1		0515	64	559.	1		1130	139	0.	1		1745	214	0.	2		0000	289	0.
1		0520	65	528.	1		1135	140	0.	1		1750	215	0.	2		0005	290	0.
1		0525	66	501.	1		1140	141	0.	1		1755	216	0.	2		0010	291	0.
1		0530	67	469.	1		1145	142	0.	1		1800	217	0.	2		0015	292	0.
1		0535	68	435.	1		1150	143	0.	1		1805	218	0.	2		0020	293	0.
1		0540	69	394.	1		1155	144	0.	1		1810	219	0.	2		0025	294	0.
1		0545	70	349.	1		1200	145	0.	1		1815	220	0.	2		0030	295	0.
1		0550	71	305.	1		1205	146	0.	1		1820	221	0.	2		0035	296	0.
1		0555	72	266.	1		1210	147	0.	1		1825	222	0.	2		0040	297	0.
1		0600	73	237.	1		1215	148	0.	1		1830	223	0.	2		0045	298	0.
1		0605	74	216.	1		1220	149	0.	1		1835	224	0.	2		0050	299	0.
1		0610	75	195.	1		1225	150	0.	1		1840	225	0.	2		0055	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)				
		(CFS)			
1179.	4.08	346.	87.	84.	84.
		(INCHES) 2.791	2.813	2.813	2.813
		(AC-FT) 172.	173.	173.	173.

CUMULATIVE AREA = 1.15 SQ MI

HYDROGRAPH AT STATION 2B
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .95

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	167.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	146.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	128.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	113.	1		1245	154	0.	1		1900	229	0.
1		0020	5	1.	1		0635	80	100.	1		1250	155	0.	1		1905	230	0.
1		0025	6	2.	1		0640	81	88.	1		1255	156	0.	1		1910	231	0.
1		0030	7	3.	1		0645	82	78.	1		1300	157	0.	1		1915	232	0.
1		0035	8	5.	1		0650	83	68.	1		1305	158	0.	1		1920	233	0.
1		0040	9	6.	1		0655	84	59.	1		1310	159	0.	1		1925	234	0.
1		0045	10	5.	1		0700	85	51.	1		1315	160	0.	1		1930	235	0.
1		0050	11	4.	1		0705	86	44.	1		1320	161	0.	1		1935	236	0.

1	0055	12	3.	*	1	0710	87	39.	*	1	1325	162	0.	*	1	1940	237	0.	
1	0100	13	3.	*	1	0715	88	34.	*	1	1330	163	0.	*	1	1945	238	0.	
1	0105	14	2.	*	1	0720	89	30.	*	1	1335	164	0.	*	1	1950	239	0.	
1	0110	15	3.	*	1	0725	90	26.	*	1	1340	165	0.	*	1	1955	240	0.	
1	0115	16	4.	*	1	0730	91	23.	*	1	1345	166	0.	*	1	2000	241	0.	
1	0120	17	5.	*	1	0735	92	19.	*	1	1350	167	0.	*	1	2005	242	0.	
1	0125	18	6.	*	1	0740	93	16.	*	1	1355	168	0.	*	1	2010	243	0.	
1	0130	19	9.	*	1	0745	94	14.	*	1	1400	169	0.	*	1	2015	244	0.	
1	0135	20	13.	*	1	0750	95	12.	*	1	1405	170	0.	*	1	2020	245	0.	
1	0140	21	17.	*	1	0755	96	10.	*	1	1410	171	0.	*	1	2025	246	0.	
1	0145	22	21.	*	1	0800	97	9.	*	1	1415	172	0.	*	1	2030	247	0.	
1	0150	23	24.	*	1	0805	98	7.	*	1	1420	173	0.	*	1	2035	248	0.	
1	0155	24	25.	*	1	0810	99	6.	*	1	1425	174	0.	*	1	2040	249	0.	
1	0200	25	24.	*	1	0815	100	5.	*	1	1430	175	0.	*	1	2045	250	0.	
1	0205	26	22.	*	1	0820	101	4.	*	1	1435	176	0.	*	1	2050	251	0.	
1	0210	27	22.	*	1	0825	102	4.	*	1	1440	177	0.	*	1	2055	252	0.	
1	0215	28	25.	*	1	0830	103	3.	*	1	1445	178	0.	*	1	2100	253	0.	
1	0220	29	31.	*	1	0835	104	3.	*	1	1450	179	0.	*	1	2105	254	0.	
1	0225	30	38.	*	1	0840	105	2.	*	1	1455	180	0.	*	1	2110	255	0.	
1	0230	31	44.	*	1	0845	106	2.	*	1	1500	181	0.	*	1	2115	256	0.	
1	0235	32	47.	*	1	0850	107	2.	*	1	1505	182	0.	*	1	2120	257	0.	
1	0240	33	50.	*	1	0855	108	1.	*	1	1510	183	0.	*	1	2125	258	0.	
1	0245	34	56.	*	1	0900	109	1.	*	1	1515	184	0.	*	1	2130	259	0.	
1	0250	35	61.	*	1	0905	110	1.	*	1	1520	185	0.	*	1	2135	260	0.	
1	0255	36	63.	*	1	0910	111	1.	*	1	1525	186	0.	*	1	2140	261	0.	
1	0300	37	64.	*	1	0915	112	1.	*	1	1530	187	0.	*	1	2145	262	0.	
1	0305	38	71.	*	1	0920	113	1.	*	1	1535	188	0.	*	1	2150	263	0.	
1	0310	39	89.	*	1	0925	114	0.	*	1	1540	189	0.	*	1	2155	264	0.	
1	0315	40	123.	*	1	0930	115	0.	*	1	1545	190	0.	*	1	2200	265	0.	
1	0320	41	187.	*	1	0935	116	0.	*	1	1550	191	0.	*	1	2205	266	0.	
1	0325	42	289.	*	1	0940	117	0.	*	1	1555	192	0.	*	1	2210	267	0.	
1	0330	43	426.	*	1	0945	118	0.	*	1	1600	193	0.	*	1	2215	268	0.	
1	0335	44	564.	*	1	0950	119	0.	*	1	1605	194	0.	*	1	2220	269	0.	
1	0340	45	659.	*	1	0955	120	0.	*	1	1610	195	0.	*	1	2225	270	0.	
1	0345	46	723.	*	1	1000	121	0.	*	1	1615	196	0.	*	1	2230	271	0.	
1	0350	47	799.	*	1	1005	122	0.	*	1	1620	197	0.	*	1	2235	272	0.	
1	0355	48	916.	*	1	1010	123	0.	*	1	1625	198	0.	*	1	2240	273	0.	
1	0400	49	1055.	*	1	1015	124	0.	*	1	1630	199	0.	*	1	2245	274	0.	
1	0405	50	1135.	*	1	1020	125	0.	*	1	1635	200	0.	*	1	2250	275	0.	
1	0410	51	1128.	*	1	1025	126	0.	*	1	1640	201	0.	*	1	2255	276	0.	
1	0415	52	1081.	*	1	1030	127	0.	*	1	1645	202	0.	*	1	2300	277	0.	
1	0420	53	1017.	*	1	1035	128	0.	*	1	1650	203	0.	*	1	2305	278	0.	
1	0425	54	942.	*	1	1040	129	0.	*	1	1655	204	0.	*	1	2310	279	0.	
1	0430	55	888.	*	1	1045	130	0.	*	1	1700	205	0.	*	1	2315	280	0.	
1	0435	56	857.	*	1	1050	131	0.	*	1	1705	206	0.	*	1	2320	281	0.	
1	0440	57	821.	*	1	1055	132	0.	*	1	1710	207	0.	*	1	2325	282	0.	
1	0445	58	777.	*	1	1100	133	0.	*	1	1715	208	0.	*	1	2330	283	0.	
1	0450	59	735.	*	1	1105	134	0.	*	1	1720	209	0.	*	1	2335	284	0.	
1	0455	60	699.	*	1	1110	135	0.	*	1	1725	210	0.	*	1	2340	285	0.	
1	0500	61	660.	*	1	1115	136	0.	*	1	1730	211	0.	*	1	2345	286	0.	
1	0505	62	613.	*	1	1120	137	0.	*	1	1735	212	0.	*	1	2350	287	0.	
1	0510	63	573.	*	1	1125	138	0.	*	1	1740	213	0.	*	1	2355	288	0.	
1	0515	64	539.	*	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.	
1	0520	65	512.	*	1	1135	140	0.	*	1	1750	215	0.	*	2	0005	290	0.	
1	0525	66	489.	*	1	1140	141	0.	*	1	1755	216	0.	*	2	0010	291	0.	
1	0530	67	456.	*	1	1145	142	0.	*	1	1800	217	0.	*	2	0015	292	0.	
1	0535	68	423.	*	1	1150	143	0.	*	1	1805	218	0.	*	2	0020	293	0.	
1	0540	69	383.	*	1	1155	144	0.	*	1	1810	219	0.	*	2	0025	294	0.	
1	0545	70	338.	*	1	1200	145	0.	*	1	1815	220	0.	*	2	0030	295	0.	
1	0550	71	296.	*	1	1205	146	0.	*	1	1820	221	0.	*	2	0035	296	0.	
1	0555	72	259.	*	1	1210	147	0.	*	1	1825	222	0.	*	2	0040	297	0.	
1	0600	73	233.	*	1	1215	148	0.	*	1	1830	223	0.	*	2	0045	298	0.	
1	0605	74	212.	*	1	1220	149	0.	*	1	1835	224	0.	*	2	0050	299	0.	
1	0610	75	190.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.	

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)	(CFS)			
+ 1135.	4.08	333.	84.	81.	81.
		(INCHES) 2.689	2.710	2.710	2.710
		(AC-FT) 165.	167.	167.	167.

CUMULATIVE AREA = 1.15 SQ MI

HYDROGRAPH AT STATION 2B
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .93

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	163.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	142.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	124.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	110.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	98.	1		1250	155	0.	1		1905	230	0.
1		0025	6	1.	1		0640	81	86.	1		1255	156	0.	1		1910	231	0.
1		0030	7	3.	1		0645	82	76.	1		1300	157	0.	1		1915	232	0.
1		0035	8	5.	1		0650	83	66.	1		1305	158	0.	1		1920	233	0.
1		0040	9	5.	1		0655	84	58.	1		1310	159	0.	1		1925	234	0.
1		0045	10	5.	1		0700	85	50.	1		1315	160	0.	1		1930	235	0.
1		0050	11	3.	1		0705	86	43.	1		1320	161	0.	1		1935	236	0.
1		0055	12	3.	1		0710	87	38.	1		1325	162	0.	1		1940	237	0.
1		0100	13	2.	1		0715	88	34.	1		1330	163	0.	1		1945	238	0.
1		0105	14	2.	1		0720	89	29.	1		1335	164	0.	1		1950	239	0.
1		0110	15	2.	1		0725	90	26.	1		1340	165	0.	1		1955	240	0.
1		0115	16	3.	1		0730	91	22.	1		1345	166	0.	1		2000	241	0.
1		0120	17	4.	1		0735	92	19.	1		1350	167	0.	1		2005	242	0.
1		0125	18	5.	1		0740	93	16.	1		1355	168	0.	1		2010	243	0.
1		0130	19	8.	1		0745	94	14.	1		1400	169	0.	1		2015	244	0.
1		0135	20	12.	1		0750	95	12.	1		1405	170	0.	1		2020	245	0.
1		0140	21	16.	1		0755	96	10.	1		1410	171	0.	1		2025	246	0.
1		0145	22	19.	1		0800	97	8.	1		1415	172	0.	1		2030	247	0.
1		0150	23	22.	1		0805	98	7.	1		1420	173	0.	1		2035	248	0.
1		0155	24	22.	1		0810	99	6.	1		1425	174	0.	1		2040	249	0.
1		0200	25	22.	1		0815	100	5.	1		1430	175	0.	1		2045	250	0.
1		0205	26	20.	1		0820	101	4.	1		1435	176	0.	1		2050	251	0.
1		0210	27	20.	1		0825	102	4.	1		1440	177	0.	1		2055	252	0.
1		0215	28	23.	1		0830	103	3.	1		1445	178	0.	1		2100	253	0.
1		0220	29	29.	1		0835	104	3.	1		1450	179	0.	1		2105	254	0.
1		0225	30	35.	1		0840	105	2.	1		1455	180	0.	1		2110	255	0.
1		0230	31	40.	1		0845	106	2.	1		1500	181	0.	1		2115	256	0.
1		0235	32	43.	1		0850	107	2.	1		1505	182	0.	1		2120	257	0.
1		0240	33	46.	1		0855	108	1.	1		1510	183	0.	1		2125	258	0.
1		0245	34	52.	1		0900	109	1.	1		1515	184	0.	1		2130	259	0.
1		0250	35	56.	1		0905	110	1.	1		1520	185	0.	1		2135	260	0.
1		0255	36	58.	1		0910	111	1.	1		1525	186	0.	1		2140	261	0.
1		0300	37	59.	1		0915	112	1.	1		1530	187	0.	1		2145	262	0.
1		0305	38	66.	1		0920	113	0.	1		1535	188	0.	1		2150	263	0.
1		0310	39	83.	1		0925	114	0.	1		1540	189	0.	1		2155	264	0.
1		0315	40	115.	1		0930	115	0.	1		1545	190	0.	1		2200	265	0.
1		0320	41	176.	1		0935	116	0.	1		1550	191	0.	1		2205	266	0.
1		0325	42	274.	1		0940	117	0.	1		1555	192	0.	1		2210	267	0.
1		0330	43	405.	1		0945	118	0.	1		1600	193	0.	1		2215	268	0.
1		0335	44	538.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	627.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	687.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	755.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	865.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	1002.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0405	50	1087.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	1080.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	1029.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.
1		0420	53	974.	1		1035	128	0.	1		1650	203	0.	1		2305	278	0.
1		0425	54	913.	1		1040	129	0.	1		1655	204	0.	1		2310	279	0.
1		0430	55	861.	1		1045	130	0.	1		1700	205	0.	1		2315	280	0.
1		0435	56	827.	1		1050	131	0.	1		1705	206	0.	1		2320	281	0.
1		0440	57	797.	1		1055	132	0.	1		1710	207	0.	1		2325	282	0.
1		0445	58	758.	1		1100	133	0.	1		1715	208	0.	1		2330	283	0.
1		0450	59	713.	1		1105	134	0.	1		1720	209	0.	1		2335	284	0.
1		0455	60	675.	1		1110	135	0.	1		1725	210	0.	1		2340	285	0.
1		0500	61	637.	1		1115	136	0.	1		1730	211	0.	1		2345	286	0.
1		0505	62	592.	1		1120	137	0.	1		1735	212	0.	1		2350	287	0.
1		0510	63	553.	1		1125	138	0.	1		1740	213	0.	1		2355	288	0.
1		0515	64	522.	1		1130	139	0.	1		1745	214	0.	2		0000	289	0.
1		0520	65	496.	1		1135	140	0.	1		1750	215	0.	2		0005	290	0.
1		0525	66	474.	1		1140	141	0.	1		1755	216	0.	2		0010	291	0.
1		0530	67	446.	1		1145	142	0.	1		1800	217	0.	2		0015	292	0.
1		0535	68	410.	1		1150	143	0.	1		1805	218	0.	2		0020	293	0.
1		0540	69	369.	1		1155	144	0.	1		1810	219	0.	2		0025	294	0.
1		0545	70	325.	1		1200	145	0.	1		1815	220	0.	2		0030	295	0.
1		0550	71	285.	1		1205	146	0.	1		1820	221	0.	2		0035	296	0.
1		0555	72	252.	1		1210	147	0.	1		1825	222	0.	2		0040	297	0.
1		0600	73	228.	1		1215	148	0.	1		1830	223	0.	2		0045	298	0.
1		0605	74	208.	1		1220	149	0.	1		1835	224	0.	2		0050	299	0.
1		0610	75	186.	1		1225	150	0.	1		1840	225	0.	2		0055	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)				
1087.	4.08	320.	81.	78.	78.
	(INCHES)	2.583	2.602	2.602	2.602
	(AC-FT)	159.	160.	160.	160.

CUMULATIVE AREA = 1.15 SQ MI

HYDROGRAPH AT STATION 2B
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .92

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	161.	1		1230	151	0.	1		1845	226	0.
1		0005	2	0.	1		0620	77	140.	1		1235	152	0.	1		1850	227	0.
1		0010	3	0.	1		0625	78	123.	1		1240	153	0.	1		1855	228	0.
1		0015	4	0.	1		0630	79	108.	1		1245	154	0.	1		1900	229	0.
1		0020	5	0.	1		0635	80	97.	1		1250	155	0.	1		1905	230	0.
1		0025	6	1.	1		0640	81	85.	1		1255	156	0.	1		1910	231	0.
1		0030	7	3.	1		0645	82	75.	1		1300	157	0.	1		1915	232	0.
1		0035	8	5.	1		0650	83	65.	1		1305	158	0.	1		1920	233	0.
1		0040	9	5.	1		0655	84	57.	1		1310	159	0.	1		1925	234	0.
1		0045	10	4.	1		0700	85	49.	1		1315	160	0.	1		1930	235	0.
1		0050	11	3.	1		0705	86	43.	1		1320	161	0.	1		1935	236	0.
1		0055	12	2.	1		0710	87	38.	1		1325	162	0.	1		1940	237	0.
1		0100	13	2.	1		0715	88	33.	1		1330	163	0.	1		1945	238	0.
1		0105	14	2.	1		0720	89	29.	1		1335	164	0.	1		1950	239	0.
1		0110	15	2.	1		0725	90	25.	1		1340	165	0.	1		1955	240	0.
1		0115	16	3.	1		0730	91	22.	1		1345	166	0.	1		2000	241	0.
1		0120	17	4.	1		0735	92	19.	1		1350	167	0.	1		2005	242	0.
1		0125	18	5.	1		0740	93	16.	1		1355	168	0.	1		2010	243	0.
1		0130	19	8.	1		0745	94	13.	1		1400	169	0.	1		2015	244	0.
1		0135	20	12.	1		0750	95	11.	1		1405	170	0.	1		2020	245	0.
1		0140	21	15.	1		0755	96	10.	1		1410	171	0.	1		2025	246	0.
1		0145	22	19.	1		0800	97	8.	1		1415	172	0.	1		2030	247	0.
1		0150	23	21.	1		0805	98	7.	1		1420	173	0.	1		2035	248	0.
1		0155	24	21.	1		0810	99	6.	1		1425	174	0.	1		2040	249	0.
1		0200	25	21.	1		0815	100	5.	1		1430	175	0.	1		2045	250	0.
1		0205	26	20.	1		0820	101	4.	1		1435	176	0.	1		2050	251	0.
1		0210	27	19.	1		0825	102	4.	1		1440	177	0.	1		2055	252	0.
1		0215	28	22.	1		0830	103	3.	1		1445	178	0.	1		2100	253	0.
1		0220	29	28.	1		0835	104	3.	1		1450	179	0.	1		2105	254	0.
1		0225	30	34.	1		0840	105	2.	1		1455	180	0.	1		2110	255	0.
1		0230	31	39.	1		0845	106	2.	1		1500	181	0.	1		2115	256	0.
1		0235	32	41.	1		0850	107	2.	1		1505	182	0.	1		2120	257	0.
1		0240	33	45.	1		0855	108	1.	1		1510	183	0.	1		2125	258	0.
1		0245	34	50.	1		0900	109	1.	1		1515	184	0.	1		2130	259	0.
1		0250	35	55.	1		0905	110	1.	1		1520	185	0.	1		2135	260	0.
1		0255	36	56.	1		0910	111	1.	1		1525	186	0.	1		2140	261	0.
1		0300	37	57.	1		0915	112	1.	1		1530	187	0.	1		2145	262	0.
1		0305	38	64.	1		0920	113	0.	1		1535	188	0.	1		2150	263	0.
1		0310	39	80.	1		0925	114	0.	1		1540	189	0.	1		2155	264	0.
1		0315	40	112.	1		0930	115	0.	1		1545	190	0.	1		2200	265	0.
1		0320	41	171.	1		0935	116	0.	1		1550	191	0.	1		2205	266	0.
1		0325	42	267.	1		0940	117	0.	1		1555	192	0.	1		2210	267	0.
1		0330	43	398.	1		0945	118	0.	1		1600	193	0.	1		2215	268	0.
1		0335	44	528.	1		0950	119	0.	1		1605	194	0.	1		2220	269	0.
1		0340	45	615.	1		0955	120	0.	1		1610	195	0.	1		2225	270	0.
1		0345	46	674.	1		1000	121	0.	1		1615	196	0.	1		2230	271	0.
1		0350	47	738.	1		1005	122	0.	1		1620	197	0.	1		2235	272	0.
1		0355	48	843.	1		1010	123	0.	1		1625	198	0.	1		2240	273	0.
1		0400	49	977.	1		1015	124	0.	1		1630	199	0.	1		2245	274	0.
1		0405	50	1066.	1		1020	125	0.	1		1635	200	0.	1		2250	275	0.
1		0410	51	1065.	1		1025	126	0.	1		1640	201	0.	1		2255	276	0.
1		0415	52	1012.	1		1030	127	0.	1		1645	202	0.	1		2300	277	0.
1		0420	53	958.	1		1035	128	0.	1		1650	203	0.	1		2305	278	0.
1		0425	54	905.	1		1040	129	0.	1		1655	204	0.	1		2310	279	0.
1		0430	55	854.	1		1045	130	0.	1		1700	205	0.	1		2315	280	0.
1		0435	56	816.	1		1050	131	0.	1		1705	206	0.	1		2320	281	0.
1		0440	57	784.	1		1055	132	0.	1		1710	207	0.	1		2325	282	0.
1		0445	58	747.	1		1100	133	0.	1		1715	208	0.	1		2330	283	0.
1		0450	59	705.	1		1105	134	0.	1		1720	209	0.	1		2335	284	0.
1		0455	60	668.	1		1110	135	0.	1		1725	210	0.	1		2340	285	0.
1		0500	61	627.	1		1115	136	0.	1		1730	211	0.	1		2345	286	0.
1		0505	62	582.	1		1120	137	0.	1		1735	212	0.	1		2350	287	0.
1		0510	63	545.	1		1125	138	0.	1		1740	213	0.	1		2355	288	0.
1		0515	64	515.	1		1130	139	0.	1		1745	214	0.	2		0000	289	0.
1		0520	65	491.	1		1135	140	0.	1		1750	215	0.	2		0005	290	0.
1		0525	66	468.	1		1140	141	0.	1		1755	216	0.	2		0010	291	0.
1		0530	67	441.	1		1145	142	0.	1		1800	217	0.	2		0015	292	0.
1		0535	68	405.	1		1150	143	0.	1		1805	218	0.	2		0020	293	0.
1		0540	69	362.	1		1155	144	0.	1		1810	219	0.	2		0025	294	0.
1		0545	70	319.	1		1200	145	0.	1		1815	220	0.	2		0030	295	0.
1		0550	71	280.	1		1205	146	0.	1		1820	221	0.	2		0035	296	0.
1		0555	72	250.	1		1210	147	0.	1		1825	222	0.	2		0040	297	0.
1		0600	73	227.	1		1215	148	0.	1		1830	223	0.	2		0045	298	0.
1		0605	74	206.	1		1220	149	0.	1		1835	224	0.	2		0050	299	0.
1		0610	75	184.	1		1225	150	0.	1		1840	225	0.	2		0055	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)				
1066.	4.08	315.	79.	76.	76.
	(INCHES)	2.541	2.559	2.559	2.559
	(AC-FT)	156.	157.	157.	157.

CUMULATIVE AREA = 1.15 SQ MI

HYDROGRAPH AT STATION 2B
SUM OF 2 HYDROGRAPHS
PLAN 1, RATIO = .91

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1	0000	1	0.	*	1	0615	76	159.	*	1	1230	151	0.	*	1	1845	226	0.	
1	0005	2	0.	*	1	0620	77	139.	*	1	1235	152	0.	*	1	1850	227	0.	
1	0010	3	0.	*	1	0625	78	122.	*	1	1240	153	0.	*	1	1855	228	0.	
1	0015	4	0.	*	1	0630	79	108.	*	1	1245	154	0.	*	1	1900	229	0.	
1	0020	5	0.	*	1	0635	80	96.	*	1	1250	155	0.	*	1	1905	230	0.	
1	0025	6	1.	*	1	0640	81	85.	*	1	1255	156	0.	*	1	1910	231	0.	
1	0030	7	3.	*	1	0645	82	74.	*	1	1300	157	0.	*	1	1915	232	0.	
1	0035	8	4.	*	1	0650	83	65.	*	1	1305	158	0.	*	1	1920	233	0.	
1	0040	9	5.	*	1	0655	84	56.	*	1	1310	159	0.	*	1	1925	234	0.	
1	0045	10	4.	*	1	0700	85	49.	*	1	1315	160	0.	*	1	1930	235	0.	
1	0050	11	3.	*	1	0705	86	42.	*	1	1320	161	0.	*	1	1935	236	0.	
1	0055	12	2.	*	1	0710	87	37.	*	1	1325	162	0.	*	1	1940	237	0.	
1	0100	13	2.	*	1	0715	88	33.	*	1	1330	163	0.	*	1	1945	238	0.	
1	0105	14	2.	*	1	0720	89	29.	*	1	1335	164	0.	*	1	1950	239	0.	
1	0110	15	2.	*	1	0725	90	25.	*	1	1340	165	0.	*	1	1955	240	0.	
1	0115	16	3.	*	1	0730	91	22.	*	1	1345	166	0.	*	1	2000	241	0.	
1	0120	17	4.	*	1	0735	92	19.	*	1	1350	167	0.	*	1	2005	242	0.	
1	0125	18	5.	*	1	0740	93	16.	*	1	1355	168	0.	*	1	2010	243	0.	
1	0130	19	8.	*	1	0745	94	13.	*	1	1400	169	0.	*	1	2015	244	0.	
1	0135	20	11.	*	1	0750	95	11.	*	1	1405	170	0.	*	1	2020	245	0.	
1	0140	21	15.	*	1	0755	96	10.	*	1	1410	171	0.	*	1	2025	246	0.	
1	0145	22	18.	*	1	0800	97	8.	*	1	1415	172	0.	*	1	2030	247	0.	
1	0150	23	20.	*	1	0805	98	7.	*	1	1420	173	0.	*	1	2035	248	0.	
1	0155	24	21.	*	1	0810	99	6.	*	1	1425	174	0.	*	1	2040	249	0.	
1	0200	25	20.	*	1	0815	100	5.	*	1	1430	175	0.	*	1	2045	250	0.	
1	0205	26	19.	*	1	0820	101	4.	*	1	1435	176	0.	*	1	2050	251	0.	
1	0210	27	19.	*	1	0825	102	4.	*	1	1440	177	0.	*	1	2055	252	0.	
1	0215	28	21.	*	1	0830	103	3.	*	1	1445	178	0.	*	1	2100	253	0.	
1	0220	29	27.	*	1	0835	104	3.	*	1	1450	179	0.	*	1	2105	254	0.	
1	0225	30	33.	*	1	0840	105	2.	*	1	1455	180	0.	*	1	2110	255	0.	
1	0230	31	38.	*	1	0845	106	2.	*	1	1500	181	0.	*	1	2115	256	0.	
1	0235	32	40.	*	1	0850	107	2.	*	1	1505	182	0.	*	1	2120	257	0.	
1	0240	33	43.	*	1	0855	108	1.	*	1	1510	183	0.	*	1	2125	258	0.	
1	0245	34	49.	*	1	0900	109	1.	*	1	1515	184	0.	*	1	2130	259	0.	
1	0250	35	53.	*	1	0905	110	1.	*	1	1520	185	0.	*	1	2135	260	0.	
1	0255	36	55.	*	1	0910	111	1.	*	1	1525	186	0.	*	1	2140	261	0.	
1	0300	37	56.	*	1	0915	112	1.	*	1	1530	187	0.	*	1	2145	262	0.	
1	0305	38	62.	*	1	0920	113	0.	*	1	1535	188	0.	*	1	2150	263	0.	
1	0310	39	79.	*	1	0925	114	0.	*	1	1540	189	0.	*	1	2155	264	0.	
1	0315	40	110.	*	1	0930	115	0.	*	1	1545	190	0.	*	1	2200	265	0.	
1	0320	41	167.	*	1	0935	116	0.	*	1	1550	191	0.	*	1	2205	266	0.	
1	0325	42	263.	*	1	0940	117	0.	*	1	1555	192	0.	*	1	2210	267	0.	
1	0330	43	393.	*	1	0945	118	0.	*	1	1600	193	0.	*	1	2215	268	0.	
1	0335	44	520.	*	1	0950	119	0.	*	1	1605	194	0.	*	1	2220	269	0.	
1	0340	45	606.	*	1	0955	120	0.	*	1	1610	195	0.	*	1	2225	270	0.	
1	0345	46	664.	*	1	1000	121	0.	*	1	1615	196	0.	*	1	2230	271	0.	
1	0350	47	725.	*	1	1005	122	0.	*	1	1620	197	0.	*	1	2235	272	0.	
1	0355	48	828.	*	1	1010	123	0.	*	1	1625	198	0.	*	1	2240	273	0.	
1	0400	49	963.	*	1	1015	124	0.	*	1	1630	199	0.	*	1	2245	274	0.	
1	0405	50	1056.	*	1	1020	125	0.	*	1	1635	200	0.	*	1	2250	275	0.	
1	0410	51	1054.	*	1	1025	126	0.	*	1	1640	201	0.	*	1	2255	276	0.	
1	0415	52	999.	*	1	1030	127	0.	*	1	1645	202	0.	*	1	2300	277	0.	
1	0420	53	947.	*	1	1035	128	0.	*	1	1650	203	0.	*	1	2305	278	0.	
1	0425	54	898.	*	1	1040	129	0.	*	1	1655	204	0.	*	1	2310	279	0.	
1	0430	55	848.	*	1	1045	130	0.	*	1	1700	205	0.	*	1	2315	280	0.	
1	0435	56	811.	*	1	1050	131	0.	*	1	1705	206	0.	*	1	2320	281	0.	
1	0440	57	777.	*	1	1055	132	0.	*	1	1710	207	0.	*	1	2325	282	0.	
1	0445	58	739.	*	1	1100	133	0.	*	1	1715	208	0.	*	1	2330	283	0.	
1	0450	59	700.	*	1	1105	134	0.	*	1	1720	209	0.	*	1	2335	284	0.	
1	0455	60	663.	*	1	1110	135	0.	*	1	1725	210	0.	*	1	2340	285	0.	
1	0500	61	620.	*	1	1115	136	0.	*	1	1730	211	0.	*	1	2345	286	0.	
1	0505	62	574.	*	1	1120	137	0.	*	1	1735	212	0.	*	1	2350	287	0.	
1	0510	63	538.	*	1	1125	138	0.	*	1	1740	213	0.	*	1	2355	288	0.	
1	0515	64	510.	*	1	1130	139	0.	*	1	1745	214	0.	*	2	0000	289	0.	
1	0520	65	487.	*	1	1135	140	0.	*	1	1750	215	0.	*	2	0005	290	0.	
1	0525	66	464.	*	1	1140	141	0.	*	1	1755	216	0.	*	2	0010	291	0.	
1	0530	67	436.	*	1	1145	142	0.	*	1	1800	217	0.	*	2	0015	292	0.	
1	0535	68	400.	*	1	1150	143	0.	*	1	1805	218	0.	*	2	0020	293	0.	
1	0540	69	357.	*	1	1155	144	0.	*	1	1810	219	0.	*	2	0025	294	0.	
1	0545	70	315.	*	1	1200	145	0.	*	1	1815	220	0.	*	2	0030	295	0.	
1	0550	71	278.	*	1	1205	146	0.	*	1	1820	221	0.	*	2	0035	296	0.	
1	0555	72	248.	*	1	1210	147	0.	*	1	1825	222	0.	*	2	0040	297	0.	
1	0600	73	225.	*	1	1215	148	0.	*	1	1830	223	0.	*	2	0045	298	0.	
1	0605	74	205.	*	1	1220	149	0.	*	1	1835	224	0.	*	2	0050	299	0.	
1	0610	75	182.	*	1	1225	150	0.	*	1	1840	225	0.	*	2	0055	300	0.	

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)				
		(CFS)			
1056.	4.08	311.	78.	76.	76.
		(INCHES) 2.512	2.530	2.530	2.530
		(AC-FT) 154.	156.	156.	156.

CUMULATIVE AREA = 1.15 SQ MI

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458 KK      DB1

460 KO      OUTPUT CONTROL VARIABLES
              IPRNT          2  PRINT CONTROL
              IPLOT          0  PLOT CONTROL
              QSCAL          0.  HYDROGRAPH PLOT SCALE

466 KO      OUTPUT CONTROL VARIABLES
              IPRNT          1  PRINT CONTROL
              IPLOT          0  PLOT CONTROL
              QSCAL          0.  HYDROGRAPH PLOT SCALE

          HYDROGRAPH ROUTING DATA

461 RS      STORAGE ROUTING
              NSTPS          1  NUMBER OF SUBREACHES
              ITYP        ELEV  TYPE OF INITIAL CONDITION
              RSVRIC      -1.00  INITIAL CONDITION
              X            .00 WORKING R AND D COEFFICIENT

462 SV        STORAGE        .0       .3      3.0      9.7     19.0     29.3     42.0    102.3    126.1    159.1

463 SE        ELEVATION   2297.00  2298.00  2299.00  2300.00  2301.00  2302.00  2303.00  2307.00  2308.50  2310.50

464 SQ        DISCHARGE        0.      72.     110.     138.     161.     199.     215.     231.     252.    1975.
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465 SE ELEVATION 2297.00 2300.00 2301.00 2302.00 2303.00 2305.00 2306.00 2307.00 2308.50 2310.50

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.34	3.02	9.71	18.98	29.35	42.00	72.15	87.23	102.30
OUTFLOW	.00	24.00	48.00	72.00	110.00	138.00	161.00	199.00	215.00	231.00
ELEVATION	2297.00	2298.00	2299.00	2300.00	2301.00	2302.00	2303.00	2305.00	2306.00	2307.00
STORAGE	126.12	159.12								
OUTFLOW	252.00	1975.00								
ELEVATION	2308.50	2310.50								

HYDROGRAPH AT STATION DB1
PLAN 1, RATIO = .99

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2297.0	1		0820	101	214.	86.0	2305.9	1		1640	201	26.	.6	2298.1
1		0005	2	0.	.0	2297.0	1		0825	102	212.	84.5	2305.8	1		1645	202	25.	.4	2298.0
1		0010	3	0.	.0	2297.0	1		0830	103	211.	83.1	2305.7	1		1650	203	19.	.3	2297.8
1		0015	4	0.	.0	2297.0	1		0835	104	209.	81.7	2305.6	1		1655	204	11.	.2	2297.5
1		0020	5	0.	.0	2297.0	1		0840	105	208.	80.3	2305.5	1		1700	205	7.	.1	2297.3
1		0025	6	1.	.0	2297.0	1		0845	106	206.	78.8	2305.4	1		1705	206	4.	.1	2297.2
1		0030	7	2.	.0	2297.1	1		0850	107	205.	77.4	2305.4	1		1710	207	3.	.0	2297.1
1		0035	8	3.	.0	2297.1	1		0855	108	203.	76.0	2305.3	1		1715	208	2.	.0	2297.1
1		0040	9	4.	.1	2297.2	1		0900	109	202.	74.7	2305.2	1		1720	209	1.	.0	2297.0
1		0045	10	5.	.1	2297.2	1		0905	110	200.	73.3	2305.1	1		1725	210	1.	.0	2297.0
1		0050	11	6.	.1	2297.2	1		0910	111	199.	71.9	2305.0	1		1730	211	0.	.0	2297.0
1		0055	12	5.	.1	2297.2	1		0915	112	197.	70.6	2304.9	1		1735	212	0.	.0	2297.0
1		0100	13	5.	.1	2297.2	1		0920	113	195.	69.2	2304.8	1		1740	213	0.	.0	2297.0
1		0105	14	4.	.1	2297.2	1		0925	114	194.	67.9	2304.7	1		1745	214	0.	.0	2297.0
1		0110	15	4.	.1	2297.2	1		0930	115	192.	66.6	2304.6	1		1750	215	0.	.0	2297.0
1		0115	16	4.	.1	2297.2	1		0935	116	190.	65.2	2304.5	1		1755	216	0.	.0	2297.0
1		0120	17	4.	.1	2297.2	1		0940	117	189.	63.9	2304.5	1		1800	217	0.	.0	2297.0
1		0125	18	5.	.1	2297.2	1		0945	118	187.	62.6	2304.4	1		1805	218	0.	.0	2297.0
1		0130	19	6.	.1	2297.3	1		0950	119	185.	61.4	2304.3	1		1810	219	0.	.0	2297.0
1		0135	20	9.	.1	2297.4	1		0955	120	184.	60.1	2304.2	1		1815	220	0.	.0	2297.0
1		0140	21	12.	.2	2297.5	1		1000	121	182.	58.8	2304.1	1		1820	221	0.	.0	2297.0
1		0145	22	16.	.2	2297.7	1		1005	122	181.	57.6	2304.0	1		1825	222	0.	.0	2297.0
1		0150	23	20.	.3	2297.8	1		1010	123	179.	56.3	2304.0	1		1830	223	0.	.0	2297.0
1		0155	24	23.	.3	2298.0	1		1015	124	178.	55.1	2303.9	1		1835	224	0.	.0	2297.0
1		0200	25	24.	.4	2298.0	1		1020	125	176.	53.9	2303.8	1		1840	225	0.	.0	2297.0
1		0205	26	24.	.4	2298.0	1		1025	126	174.	52.7	2303.7	1		1845	226	0.	.0	2297.0
1		0210	27	24.	.4	2298.0	1		1030	127	173.	51.5	2303.6	1		1850	227	0.	.0	2297.0
1		0215	28	25.	.4	2298.0	1		1035	128	171.	50.3	2303.6	1		1855	228	0.	.0	2297.0
1		0220	29	25.	.5	2298.0	1		1040	129	170.	49.1	2303.5	1		1900	229	0.	.0	2297.0
1		0225	30	26.	.5	2298.1	1		1045	130	169.	48.0	2303.4	1		1905	230	0.	.0	2297.0
1		0230	31	27.	.7	2298.1	1		1050	131	167.	46.8	2303.3	1		1910	231	0.	.0	2297.0
1		0235	32	29.	.8	2298.2	1		1055	132	166.	45.7	2303.2	1		1915	232	0.	.0	2297.0
1		0240	33	30.	1.0	2298.3	1		1100	133	164.	44.5	2303.2	1		1920	233	0.	.0	2297.0
1		0245	34	32.	1.2	2298.3	1		1105	134	163.	43.4	2303.1	1		1925	234	0.	.0	2297.0
1		0250	35	34.	1.4	2298.4	1		1110	135	161.	42.3	2303.0	1		1930	235	0.	.0	2297.0
1		0255	36	36.	1.7	2298.5	1		1115	136	160.	41.2	2302.9	1		1935	236	0.	.0	2297.0
1		0300	37	38.	1.9	2298.6	1		1120	137	158.	40.1	2302.8	1		1940	237	0.	.0	2297.0
1		0305	38	40.	2.2	2298.7	1		1125	138	156.	39.0	2302.8	1		1945	238	0.	.0	2297.0
1		0310	39	43.	2.5	2298.8	1		1130	139	154.	38.0	2302.7	1		1950	239	0.	.0	2297.0
1		0315	40	48.	3.0	2299.0	1		1135	140	152.	36.9	2302.6	1		1955	240	0.	.0	2297.0
1		0320	41	51.	3.8	2299.1	1		1140	141	150.	35.9	2302.5	1		2000	241	0.	.0	2297.0
1		0325	42	56.	5.3	2299.3	1		1145	142	148.	34.8	2302.4	1		2005	242	0.	.0	2297.0
1		0330	43	64.	7.5	2299.7	1		1150	143	146.	33.8	2302.4	1		2010	243	0.	.0	2297.0
1		0335	44	76.	10.7	2300.1	1		1155	144	144.	32.8	2302.3	1		2015	244	0.	.0	2297.0
1		0340	45	92.	14.7	2300.5	1		1200	145	143.	31.8	2302.2	1		2020	245	0.	.0	2297.0
1		0345	46	110.	19.1	2301.0	1		1205	146	141.	30.9	2302.1	1		2025	246	0.	.0	2297.0
1		0350	47	124.	24.0	2301.5	1		1210	147	139.	29.9	2302.0	1		2030	247	0.	.0	2297.0
1		0355	48	138.	29.5	2302.0	1		1215	148	137.	28.9	2302.0	1		2035	248	0.	.0	2297.0
1		0400	49	150.	35.9	2302.5	1		1220	149	134.	28.0	2301.9	1		2040	249	0.	.0	2297.0
1		0405	50	162.	42.9	2303.1	1		1225	150	132.	27.1	2301.8	1		2045	250	0.	.0	2297.0
1		0410	51	171.	49.9	2303.5	1		1230	151	129.	26.2	2301.7	1		2050	251	0.	.0	2297.0
1		0415	52	180.	56.8	2304.0	1		1235	152	127.	25.3	2301.6	1		2055	252	0.	.0	2297.0
1		0420	53	188.	63.2	2304.4	1		1240	153	125.	24.4	2301.5	1		2100	253	0.	.0	2297.0
1		0425	54	195.	69.1	2304.8	1		1245	154	122.	23.6	2301.4	1		2105	254	0.	.0	2297.0
1		0430	55	201.	74.4	2305.2	1		1250	155	120.	22.8	2301.4	1		2110	255	0.	.0	2297.0
1		0435	56	207.	79.3	2305.5	1		1255	156	118.	21.9	2301.3	1		2115	256	0.	.0	2297.0
1		0440	57	211.	83.9	2305.8	1		1300	157	116.	21.1	2301.2	1		2120	257	0.	.0	2297.0
1		0445	58	216.	88.1	2306.1	1		1305	158	114.	20.3	2301.1	1		2125	258	0.	.0	2297.0
1		0450	59	220.	92.1	2306.3	1		1310	159	112.	19.6	2301.1	1		2130	259	0.	.0	2297.0
1		0455	60	224.	95.7	2306.6	1		1315	160	109.	18.8	2301.0	1		2135	260	0.	.0	2297.0
1		0500	61	228.	99.0	2306.8	1		1320	161	106.	18.1	2300.9	1		2140	261	0.	.0	2297.0
1		0505	62	231.	102.1	2307.0	1		1325	162	103.	17.3	2300.8	1		2145	262	0.	.0	2297.0
1		0510	63	233.	104.8	2307.2	1		1330	163	100.	16.6	2300.7	1		2150	263	0.	.0	2297.0
1		0515	64	235.	107.3	2307.3	1		1335	164	98.	16.0	2300.7	1		2155	264	0.	.0	2297.0
1		0520	65	237.	109.4	2307.4	1		1340	165	95.	15.3	2300.6	1		2200	265	0.	.0	2297.0
1		0525	66	239.	111.4	2307.6	1		1345	166	92.	14.7	2300.5	1		2205	266	0.	.0	2297.0
1		0530	67	241.	113.1	2307.7	1		1350	167	90.	14.0	2300.5	1		2210	267	0.	.0	2297.0
1		0535	68	242.	114.6	2307.8	1		1355	168	87.	13.4	2300.4	1		2215	268	0.	.0	2297.0
1		0540	69	243.	115.9	2307.9	1		1400	169	85.	12.8	2300.3	1		2220	269	0.	.0	2297.0
1		0545	70	244.	116.8	2307.9	1		1405	170	82.	12.2	2300.3	1		2225	270	0.	.0	2297.0
1		0550	71	244.	117.4	2308.0	1		1410	171	80.	11.7	2300.2	1		2230	271	0.	.0	2297.0
1		0555	72	245.	117.7	2308.0	1		1415	172	78.	11.1	2300.2	1		2235	272	0.	.0	2297.0
1		0600	73	245.	117.8	2308.0	1		1420	173	76.	10.6	2300.1	1		2240	273	0.	.0	2297.0
1		0605	74	245.	117.7	2308.0	1		1425	174	74.	10.1	2300.0	1		2245	274	0.	.0	2297.0
1		0610	75	244.	117.4	2308.0	1		1430	175	72.	9.6	2300.0	1		2250	275	0.	.0	2297.0
1		0615	76	244.	117.0	2307.9	1		1435	176	70.	9.1	2299.9	1		2255	276	0.	.0	2297.0
1		0620	77	244.	116.5	2307.9	1		1440	177	68.	8.6	2299.8	1		2300	277	0.	.0	2297.0
1		0625	78	243.	115.8	2307.9	1		1445	178	66.	8.2	2299.8	1		2305	278	0.	.0	2297.0
1		0630	79	242.	115.0	2307.8	1		1450	179	65.	7.7	2299.7	1		2310	279	0.	.0	2297.0
1		0635	80	241.	114.1	2307.7	1		1455	180	63.	7.3	2299.6	1		2315	280	0.	.0	2297.0
1		0640	81	241.	113.1	2307.7	1		1500	181	62.	6.9	2299.6	1		2320	281	0.	.0	2297.0
1		0645	82	240.	112.0	2307.6	1		1505	182	60.	6.4	2299.5	1		2325	282	0.	.0	2297.0
1		0650	83	239.	110.9	2307.5	1		1510	183	59.	6.0	2299.4	1		2330	283	0.	.0	2297.0
1		0655	84	238.	109.7	2307.5	1		1515	184	57.	5.6	2299.4	1		2335	284	0.	.0	2297.0
1		0700	85	236.	108.5	2307.4	1		1520	185	56.	5.2	2299.3	1		2340	285	0.	.0	2297.0
1		0705	86	235.	107.2	2307.3	1		1525	186	55.	4.9	2299.3	1		2345	286	0.	.0	2297.0
1		0710	87	234.	105.9	2307.2	1		1530	187	53.	4.5	2299.2	1		2350	287	0.	.0	2297.0
1		0715	88	233.	104.6	2307.1	1		1535	188	52.	4.1	2299.2	1		2355	288	0.	.0	2297.0
1		0720	89	232.	103.2	2307.1	1		1540	189	51.	3.8	2299.1	2		0000	289	0.	.0	2297.0
1		0725	90	230.	101.8	2307.0	1		1545	190	49.	3.4	2299.1	2		0005	290	0.	.0	2297.0
1		0730	91	229.	100.4	2306.9	1		1550	191	48.	3.1	2299.0	2		0010	291	0.	.0	2297.0
1		0735	92	227.	99.0	2306.8	1		1555	192	46.	2.8	2298.9	2		0015	292	0.	.0	2297.0
1		0740	93	226.	97.5	2306.7	1		1600	193	43.	2.5	2298.8	2		0020	293	0.	.0	2297.0
1		0745	94	224.	96.1	2306.6	1		1605	194	40.	2.2	2298.7	2		0025	294	0.	.0	2297.0
1		0750	95	223.	94.7	2306.5	1		1610	195	38.	1.9	2298.6	2		0030	295	0.	.0	2297.0
1		0755	96	221.	93.2	2306.4	1		1615	196	36.	1.6	2298.5	2		0035	296	0.	.0	2297.0
1		0800	97	220.	91.8	2306.3	1		1620	197	34.	1.4	2298.4	2		0040	297	0.	.0	2297.0
1		0805	98	218.	90.3	2306.2	1		1625	198	32.	1.2	2298.3	2		0045	298	0.	.0	2297.0
1		0810	99	217.	88.8	2306.1	1		1630	199	30.	1.0	2298.2	2		0050	299	0.	.0	2297.0
1		0815	100	215.	87.4	2306.0	1		1635	200	28.	.8	2298.2	2		0055	300	0.	.0	2297.0

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 245.	6.00	219.	89.	86.	86.
		(INCHES) 1.765	2.877	2.877	2.877
		(AC-FT) 108.	177.	177.	177.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
118.	6.00	92.	30.	28.	28.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2307.98	6.00	2306.29	2300.65	2300.51	2300.51

CUMULATIVE AREA = 1.15 SQ MI

HYDROGRAPH AT STATION DB1
PLAN 1, RATIO = .98

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2297.0
1		0005	2	0.	.0	2297.0
1		0010	3	0.	.0	2297.0
1		0015	4	0.	.0	2297.0
1		0020	5	0.	.0	2297.0
1		0025	6	1.	.0	2297.0
1		0030	7	1.	.0	2297.1
1		0035	8	3.	.0	2297.1
1		0040	9	4.	.1	2297.2
1		0045	10	5.	.1	2297.2
1		0050	11	5.	.1	2297.2
1		0055	12	5.	.1	2297.2
1		0100	13	4.	.1	2297.2
1		0105	14	4.	.1	2297.2
1		0110	15	4.	.0	2297.1
1		0115	16	4.	.1	2297.2
1		0120	17	4.	.1	2297.2
1		0125	18	5.	.1	2297.2
1		0130	19	6.	.1	2297.3
1		0135	20	8.	.1	2297.4
1		0140	21	12.	.2	2297.5
1		0145	22	15.	.2	2297.6
1		0150	23	19.	.3	2297.8
1		0155	24	22.	.3	2297.9
1		0200	25	24.	.3	2298.0
1		0205	26	24.	.3	2298.0
1		0210	27	24.	.3	2298.0
1		0215	28	24.	.4	2298.0
1		0220	29	25.	.4	2298.0
1		0225	30	25.	.5	2298.1
1		0230	31	26.	.6	2298.1
1		0235	32	28.	.8	2298.2
1		0240	33	29.	.9	2298.2
1		0245	34	31.	1.1	2298.3
1		0250	35	33.	1.3	2298.4
1		0255	36	35.	1.6	2298.5
1		0300	37	37.	1.8	2298.5
1		0305	38	39.	2.0	2298.6
1		0310	39	42.	2.3	2298.7
1		0315	40	46.	2.8	2298.9
1		0320	41	50.	3.6	2299.1
1		0325	42	55.	5.0	2299.3
1		0330	43	63.	7.2	2299.6
1		0335	44	74.	10.3	2300.1
1		0340	45	90.	14.1	2300.5
1		0345	46	108.	18.4	2300.9
1		0350	47	121.	23.2	2301.4
1		0355	48	136.	28.5	2301.9
1		0400	49	148.	34.7	2302.4
1		0405	50	160.	41.5	2303.0
1		0410	51	169.	48.4	2303.4
1		0415	52	178.	55.1	2303.9
1		0420	53	185.	61.3	2304.3
1		0425	54	193.	67.0	2304.7
1		0430	55	199.	72.2	2305.0
1		0435	56	204.	77.0	2305.3
1		0440	57	209.	81.5	2305.6
1		0445	58	213.	85.7	2305.9
1		0450	59	217.	89.5	2306.2
1		0455	60	221.	93.1	2306.4
1		0500	61	225.	96.4	2306.6
1		0505	62	228.	99.3	2306.8
1		0510	63	231.	102.0	2307.0
1		0515	64	233.	104.4	2307.1
1		0520	65	235.	106.5	2307.3
1		0525	66	236.	108.4	2307.4
1		0530	67	238.	110.2	2307.5
1		0535	68	239.	111.6	2307.6
1		0540	69	240.	112.8	2307.7
1		0545	70	241.	113.7	2307.7
1		0550	71	242.	114.3	2307.8
1		0555	72	242.	114.6	2307.8
1		0600	73	242.	114.7	2307.8
1		0605	74	242.	114.6	2307.8
1		0610	75	242.	114.3	2307.8
1		0615	76	241.	113.9	2307.7
1		0620	77	241.	113.4	2307.7
1		0625	78	240.	112.7	2307.7
1		0630	79	239.	111.9	2307.6
1		0635	80	239.	111.0	2307.5
1		0640	81	238.	110.0	2307.5
1		0645	82	237.	109.0	2307.4
1		0650	83	236.	107.9	2307.3
1		0655	84	235.	106.7	2307.3
1		0700	85	234.	105.5	2307.2
1		0705	86	233.	104.2	2307.1
1		0710	87	232.	102.9	2307.0
1		0715	88	230.	101.6	2307.0
1		0720	89	229.	100.2	2306.9
1		0725	90	227.	98.8	2306.8
1		0730	91	226.	97.4	2306.7
1		0735	92	224.	96.0	2306.6
1		0740	93	223.	94.6	2306.5
1		0745	94	221.	93.2	2306.4
1		0750	95	220.	91.8	2306.3
1		0755	96	218.	90.3	2306.2
1		0800	97	217.	88.9	2306.1
1		0805	98	215.	87.5	2306.0
1		0810	99	214.	86.1	2305.9
1		0815	100	212.	84.6	2305.8
1		0820	101	211.	83.2	2305.7
1		0825	102	209.	81.8	2305.6
1		0830	103	208.	80.4	2305.5
1		0835	104	206.	79.0	2305.5
1		0840	105	205.	77.6	2305.4
1		0845	106	203.	76.2	2305.3
1		0850	107	202.	74.8	2305.2
1		0855	108	200.	73.4	2305.1
1		0900	109	199.	72.1	2305.0
1		0905	110	197.	70.7	2304.9
1		0910	111	195.	69.4	2304.8
1		0915	112	194.	68.0	2304.7
1		0920	113	192.	66.7	2304.6
1		0925	114	190.	65.4	2304.6
1		0930	115	189.	64.1	2304.5
1		0935	116	187.	62.8	2304.4
1		0940	117	186.	61.5	2304.3
1		0945	118	184.	60.2	2304.2
1		0950	119	182.	59.0	2304.1
1		0955	120	181.	57.7	2304.0
1		1000	121	179.	56.5	2304.0
1		1005	122	178.	55.3	2303.9
1		1010	123	176.	54.0	2303.8
1		1015	124	175.	52.8	2303.7
1		1020	125	173.	51.6	2303.6
1		1025	126	172.	50.4	2303.6
1		1030	127	170.	49.3	2303.5
1		1035	128	169.	48.1	2303.4
1		1040	129	167.	46.9	2303.3
1		1045	130	166.	45.8	2303.3
1		1050	131	164.	44.7	2303.2
1		1055	132	163.	43.5	2303.1
1		1100	133	162.	42.4	2303.0
1		1105	134	160.	41.3	2302.9
1		1110	135	158.	40.2	2302.9
1		1115	136	156.	39.1	2302.8
1		1120	137	154.	38.1	2302.7
1		1125	138	152.	37.0	2302.6
1		1130	139	150.	36.0	2302.5
1		1135	140	148.	35.0	2302.4
1		1140	141	146.	33.9	2302.4
1		1145	142	145.	32.9	2302.3
1		1150	143	143.	31.9	2302.2
1		1155	144	141.	31.0	2302.1
1		1200	145	139.	30.0	2302.1
1		1205	146	137.	29.1	2302.0
1		1210	147	135.	28.1	2301.9
1		1215	148	132.	27.2	2301.8
1		1220	149	130.	26.3	2301.7
1		1225	150	127.	25.4	2301.6
1		1230	151	125.	24.5	2301.5
1		1235	152	123.	23.7	2301.5
1		1240	153	120.	22.9	2301.4
1		1245	154	118.	22.0	2301.3
1		1250	155	116.	21.2	2301.2
1		1255	156	114.	20.4	2301.1
1		1300	157	112.	19.7	2301.1
1		1305	158	110.	18.9	2301.0
1		1310	159	107.	18.1	2300.9
1		1315	160	104.	17.4	2300.8
1		1320	161	101.	16.7	2300.8
1		1325	162	98.	16.0	2300.7
1		1330	163	95.	15.4	2300.6
1		1335	164	93.	14.7	2300.5
1		1340	165	90.	14.1	2300.5
1		1345	166	87.	13.5	2300.4
1		1350	167	85.	12.9	2300.3
1		1355	168	83.	12.3	2300.3
1		1400	169	80.	11.8	2300.2
1		1405	170	78.	11.2	2300.2
1		1410	171	76.	10.7	2300.1
1		1415	172	74.	10.2	2300.0
1		1420	173	72.	9.7	2300.0
1		1425	174	70.	9.2	2299.9
1		1430	175	68.	8.7	2299.8
1		1435	176	67.	8.2	2299.8
1		1440	177	65.	7.8	2299.7
1		1445	178	63.	7.3	2299.6
1		1450	179	62.	6.9	2299.6
1		1455	180	60.	6.5	2299.5
1		1500	181	59.	6.1	2299.5
1		1505	182	58.	5.7	2299.4
1		1510	183	56.	5.3	2299.3
1		1515	184	55.	4.9	2299.3
1		1520	185	53.	4.5	2299.2
1		1525	186	52.	4.2	2299.2
1		1530	187	51.	3.8	2299.1
1		1535	188	50.	3.5	2299.1
1		1540	189	48.	3.1	2299.0
1		1545	190	46.	2.8	2298.9
1		1550	191	43.	2.5	2298.8
1		1555	192	41.	2.2	2298.7
1		1600	193	38.	1.9	2298.6
1		1605	194	36.	1.7	2298.5
1		1610	195	34.	1.4	2298.4
1		1615	196	32.	1.2	2298.3
1		1620	197	30.	1.0	2298.2
1		1625	198	28.	.8	2298.2
1		1630	199	26.	.6	2298.1
1		1635	200	25.	.4	2298.0
2		1640	201	20.	.3	2297.8
2		1645	202	12.	.2	2297.5
2		1650	203	7.	.1	2297.3
2		1655	204	4.	.1	2297.2
2		1700	205	3.	.0	2297.1
2		1705	206	2.	.0	2297.1
2		1710	207	1.	.0	2297.0
2		1715	208	1.	.0	2297.0
2		1720	209	0.	.0	2297.0
2		1725	210	0.	.0	2297.0
2		1730	211	0.	.0	2297.0
2		1735	212	0.	.0	2297.0
2		1740	213	0.	.0	2297.0
2		1745	214	0.	.0	2297.0
2		1750	215	0.	.0	2297.0
2		1755	216	0.	.0	2297.0
2		1800	217	0.	.0	2297.0
2		1805	218	0.	.0	2297.0
2		1810	219	0.	.0	2297.0
2		1815	220	0.	.0	2297.0
2		1820	221	0.	.0	2297.0
2		1825	222	0.	.0	2297.0
2		1830	223	0.	.0	2297.0
2		1835	224	0.	.0	2297.0
2		1840	225	0.	.0	2297.0
2		1845	226	0.	.0	2297.0
2		1850	227	0.	.0	2297.0
2		1855	228	0.	.0	2297.0
2		1900	229	0.	.0	2297.0
2		1905	230	0.	.0	2297.0
2		1910	231	0.	.0	2297.0
2		1915	232	0.	.0	2297.0
2		1920	233	0.	.0	2297.0
2		1925	234	0.	.0	2297.0
2		1930	235	0.	.0	2297.0
2		1935	236	0.	.0	2297.0
2		1940	237	0.	.0	2297.0
2		1945	238	0.	.0	2297.0
2		1950	239	0.	.0	2297.0
2		1955	240	0.	.0	2297.0
2		2000	241	0.	.0	2297.0
2		2005	242	0.	.0	2297.0
2		2010	243	0.	.0	2297.0
2		2015	244	0.	.0	2297.0
2		2020	245	0.	.0	2297.0
2		2025	246	0.	.0	2297.0
2		2030	247	0.	.0	2297.0
2		2035	248	0.	.0	2297.0
2		2040	249	0.	.0	2297.0
2		2045	250	0.	.0	2297.0
2		2050	251	0.	.0	2297.0
2		2055	252	0.	.0	2297.0
2		2100	253	0.	.0	2297.0
2		2105	254	0.	.0	2297.0
2		2110	255	0.	.0	2297.0
2		2115	256	0.	.0	2297.0
2		2120	257	0.	.0	2297.0
2		2125	258	0.	.0	2297.0
2		2130	259	0.	.0	2297.0
2		2135	260	0.	.0	2297.0
2		2140	261	0.	.0	2297.0
2		2145	262	0.	.0	2297.0
2		2150	263	0.	.0	2297.0
2		2155	264	0.	.0	2297.0
2		2200	265	0.	.0	2297.0
2		2205	266	0.	.0	2297.0
2		2210	267	0.	.0	2297.0
2		2215	268	0.	.0	2297.0
2		2220	269	0.	.0	2297.0
2		2225	270	0.	.0	2297.0
2		2230	271	0.	.0	2297.0
2		2235	272	0.	.0	2297.0
2		2240	273	0.	.0	2297.0
2		2245	274	0.	.0	2297.0
2		2250	275	0.	.0	2297.0
2		2255	276	0.	.0	2297.0
2		2300	277	0.	.0	2297.0
2		2305	278	0.	.0	2297.0
2		2310	279	0.	.0	2297.0
2		2315	280	0.	.0	2297.0
2		2320	281	0.	.0	2297.0
2		2325	282	0.	.0	2297.0
2		2330	283	0.	.0	2297.0
2		2335	284	0.	.0	2297.0
2		2340	285	0.	.0	2297.0
2		2345	286	0.	.0	2297.0
2		2350	287	0.	.0	2297.0
2		2355	288	0.	.0	2297.0
2		0000	289	0.	.0	2297.0
2		0005	290	0.	.0	2297.0
2		0010	291	0.	.0	2297.0
2		0015	292	0.	.0	2297.0
2		0020	293	0.	.0	2297.0
2		0025	294	0.	.0	2297.0
2		0030	295	0.	.0	2297.0
2		0035	296	0.	.0	2297.0
2		0040	297	0.	.0	2297.0
2		0045	298	0.	.0	2297.0
2		0050	299	0.	.0	2297.0
2		0055	300	0.	.0	2297.0

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW		
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
242.	6.00	216.	87.	84.	84.
		(INCHES) 1.742	2.813	2.813	2.813
		(AC-FT) 107.	173.	173.	173.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
115.	6.00	89.	28.	27.	27.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
(FEET)	(HR)				
2307.78	6.00	2306.11	2300.55	2300.42	2300.42

CUMULATIVE AREA = 1.15 SQ MI

HYDROGRAPH AT STATION DB1
PLAN 1, RATIO = .95

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2297.0
1		0005	2	0.	.0	2297.0
1		0010	3	0.	.0	2297.0
1		0015	4	0.	.0	2297.0
1		0020	5	0.	.0	2297.0
1		0025	6	1.	.0	2297.0
1		0030	7	1.	.0	2297.1
1		0035	8	3.	.0	2297.1
1		0040	9	4.	.1	2297.2
1		0045	10	5.	.1	2297.2
1		0050	11	5.	.1	2297.2
1		0055	12	4.	.1	2297.2
1		0100	13	4.	.1	2297.2
1		0105	14	3.	.0	2297.1
1		0110	15	3.	.0	2297.1
1		0115	16	3.	.0	2297.1
1		0120	17	4.	.1	2297.1
1		0125	18	4.	.1	2297.2
1		0130	19	6.	.1	2297.2
1		0135	20	8.	.1	2297.3
1		0140	21	11.	.2	2297.4
1		0145	22	14.	.2	2297.6
1		0150	23	17.	.2	2297.7
1		0155	24	20.	.3	2297.8
1		0200	25	22.	.3	2297.9
1		0205	26	22.	.3	2297.9
1		0210	27	22.	.3	2297.9
1		0215	28	23.	.3	2297.9
1		0220	29	24.	.4	2298.0
1		0225	30	25.	.4	2298.0
1		0230	31	26.	.5	2298.1
1		0235	32	27.	.7	2298.1
1		0240	33	28.	.8	2298.2
1		0245	34	30.	1.0	2298.2
1		0250	35	31.	1.2	2298.3
1		0255	36	33.	1.4	2298.4
1		0300	37	35.	1.6	2298.5
1		0305	38	37.	1.8	2298.5
1		0310	39	40.	2.1	2298.6
1		0315	40	44.	2.5	2298.8
1		0320	41	49.	3.3	2299.0
1		0325	42	53.	4.5	2299.2
1		0330	43	61.	6.6	2299.5
1		0335	44	71.	9.6	2300.0
1		0340	45	86.	13.2	2300.4
1		0345	46	103.	17.3	2300.8
1		0350	47	118.	21.8	2301.3
1		0355	48	131.	26.9	2301.8
1		0400	49	144.	32.7	2302.3
1		0405	50	156.	39.2	2302.8
1		0410	51	166.	45.9	2303.3
1		0415	52	174.	52.3	2303.7
1		0420	53	182.	58.3	2304.1
1		0425	54	188.	63.8	2304.4
1		0430	55	195.	68.8	2304.8
1		0435	56	200.	73.4	2305.1
1		0440	57	205.	77.8	2305.4
1		0445	58	209.	81.9	2305.6
1		0450	59	213.	85.7	2305.9
1		0455	60	217.	89.1	2306.1
1		0500	61	220.	92.3	2306.3
1		0505	62	223.	95.1	2306.5
1		0510	63	226.	97.7	2306.7
1		0515	64	228.	99.9	2306.8
1		0520	65	231.	102.0	2307.0
1		0525	66	232.	103.8	2307.1
1		0530	67	234.	105.5	2307.2
1		0535	68	235.	106.9	2307.3
1		0540	69	236.	108.1	2307.4
1		0545	70	237.	108.9	2307.4
1		0550	71	237.	109.5	2307.5
1		0555	72	238.	109.7	2307.5
1		0600	73	238.	109.8	2307.5
1		0605	74	238.	109.7	2307.5
1		0610	75	237.	109.4	2307.4
1		0615	76	237.	109.0	2307.4
1		0620	77	236.	108.5	2307.4
1		0625	78	236.	107.8	2307.3
1		0630	79	235.	107.0	2307.3
1		0635	80	234.	106.1	2307.2
1		0640	81	234.	105.1	2307.2
1		0645	82	233.	104.1	2307.1
1		0650	83	232.	103.0	2307.0
1		0655	84	231.	101.9	2307.0
1		0700	85	229.	100.7	2306.9
1		0705	86	228.	99.4	2306.8
1		0710	87	227.	98.1	2306.7
1		0715	88	225.	96.8	2306.6
1		0720	89	224.	95.5	2306.5
1		0725	90	222.	94.2	2306.5
1		0730	91	221.	92.8	2306.4
1		0735	92	219.	91.4	2306.3
1		0740	93	218.	90.1	2306.2
1		0745	94	217.	88.7	2306.1
1		0750	95	215.	87.3	2306.0
1		0755	96	214.	85.9	2305.9
1		0800	97	212.	84.5	2305.8
1		0805	98	211.	83.1	2305.7
1		0810	99	209.	81.7	2305.6
1		0815	100	208.	80.3	2305.5
1		0820	101	206.	78.9	2305.4
1		0825	102	205.	77.5	2305.4
1		0830	103	203.	76.1	2305.3
1		0835	104	202.	74.7	2305.2
1		0840	105	200.	73.4	2305.1
1		0845	106	199.	72.0	2305.0
1		0850	107	197.	70.7	2304.9
1		0855	108	195.	69.3	2304.8
1		0900	109	194.	68.0	2304.7
1		0905	110	192.	66.7	2304.6
1		0910	111	190.	65.4	2304.5
1		0915	112	189.	64.0	2304.5
1		0920	113	187.	62.8	2304.4
1		0925	114	186.	61.5	2304.3
1		0930	115	184.	60.2	2304.2
1		0935	116	182.	58.9	2304.1
1		0940	117	181.	57.7	2304.0
1		0945	118	179.	56.5	2304.0
1		0950	119	178.	55.2	2303.9
1		0955	120	176.	54.0	2303.8
1		1000	121	175.	52.8	2303.7
1		1005	122	173.	51.6	2303.6
1		1010	123	172.	50.4	2303.6
1		1015	124	170.	49.3	2303.5
1		1020	125	169.	48.1	2303.4
1		1025	126	167.	46.9	2303.3
1		1030	127	166.	45.8	2303.3
1		1035	128	164.	44.6	2303.2
1		1040	129	163.	43.5	2303.1
1		1045	130	162.	42.4	2303.0
1		1050	131	160.	41.3	2302.9
1		1055	132	158.	40.2	2302.9
1		1100	133	156.	39.1	2302.8
1		1105	134	154.	38.1	2302.7
1		1110	135	152.	37.0	2302.6
1		1115	136	150.	36.0	2302.5
1		1120	137	148.	34.9	2302.4
1		1125	138	146.	33.9	2302.4
1		1130	139	144.	32.9	2302.3
1		1135	140	143.	31.9	2302.2
1		1140	141	141.	31.0	2302.1
1		1145	142	139.	30.0	2302.1
1		1150	143	137.	29.0	2302.0
1		1155	144	135.	28.1	2301.9
1		1200	145	132.	27.2	2301.8
1		1205	146	130.	26.3	2301.7
1		1210	147	127.	25.4	2301.6
1		1215	148	125.	24.5	2301.5
1		1220	149	123.	23.7	2301.5
1		1225	150	120.	22.8	2301.4
1		1230	151	118.	22.0	2301.3
1		1235	152	116.	21.2	2301.2
1		1240	153	114.	20.4	2301.1
1		1245	154	112.	19.6	2301.1
1		1250	155	110.	18.9	2301.0
1		1255	156	107.	18.1	2300.9
1		1300	157	104.	17.4	2300.8
1		1305	158	101.	16.7	2300.8
1		1310	159	98.	16.0	2300.7
1		1315	160	95.	15.4	2300.6
1		1320	161	93.	14.7	2300.5
1		1325	162	90.	14.1	2300.5
1		1330	163	87.	13.5	2300.4
1		1335	164	85.	12.9	2300.3
1		1340	165	83.	12.3	2300.3
1		1345	166	80.	11.7	2300.2
1		1350	167	78.	11.2	2300.2
1		1355	168	76.	10.7	2300.1
1		1400	169	74.	10.2	2300.0
1		1405	170	72.	9.6	2300.0
1		1410	171	70.	9.2	2299.9
1		1415	172	68.	8.7	2299.8
1		1420	173	67.	8.2	2299.8
1		1425	174	65.	7.8	2299.7
1		1430	175	63.	7.3	2299.6
1		1435	176	62.	6.9	2299.6
1		1440	177	60.	6.5	2299.5
1		1445	178	59.	6.1	2299.5
1		1450	179	57.	5.7	2299.4
1		1455	180	56.	5.3	2299.3
1		1500	181	55.	4.9	2299.3
1		1505	182	53.	4.5	2299.2
1		1510	183	52.	4.2	2299.2
1		1515	184	51.	3.8	2299.1
1		1520	185	50.	3.5	2299.1
1		1525	186	48.	3.1	2299.0
1		1530	187	46.	2.8	2298.9
1		1535	188	43.	2.5	2298.8
1		1540	189	41.	2.2	2298.7
1		1545	190	38.	1.9	2298.6
1		1550	191	36.	1.7	2298.5
1		1555	192	34.	1.4	2298.4
1		1600	193	32.	1.2	2298.3
1		1605	194	30.	1.0	2298.2
1		1610	195	28.	.8	2298.2
1		1615	196	26.	.6	2298.1
1		1620	197	25.	.4	2298.0
1		1625	198	19.	.3	2297.8
1		1630	199	12.	.2	2297.5
1		1635	200	7.	.1	2297.3
1		1640	201	4.	.1	2297.2
1		1645	202	3.	.0	2297.1
1		1650	203	2.	.0	2297.1
1		1655	204	1.	.0	2297.0
1		1700	205	1.	.0	2297.0
1		1705	206	0.	.0	2297.0
1		1710	207	0.	.0	2297.0
1		1715	208	0.	.0	2297.0
1		1720	209	0.	.0	2297.0
1		1725	210	0.	.0	2297.0
1		1730	211	0.	.0	2297.0
1		1735	212	0.	.0	2297.0
1		1740	213	0.	.0	2297.0
1		1745	214	0.	.0	2297.0
1		1750	215	0.	.0	2297.0
1		1755	216	0.	.0	2297.0
1		1800	217	0.	.0	2297.0
1		1805	218	0.	.0	2297.0
1		1810	219	0.	.0	2297.0
1		1815	220	0.	.0	2297.0
1		1820	221	0.	.0	2297.0
1		1825	222	0.	.0	2297.0
1		1830	223	0.	.0	2297.0
1		1835	224	0.	.0	2297.0
1		1840	225	0.	.0	2297.0
1		1845	226	0.	.0	2297.0
1		1850	227	0.	.0	2297.0
1		1855	228	0.	.0	2297.0
1		1900	229	0.	.0	2297.0
1		1905	230	0.	.0	2297.0
1		1910	231	0.	.0	2297.0
1		1915	232	0.	.0	2297.0
1		1920	233	0.	.0	2297.0
1		1925	234	0.	.0	2297.0
1		1930	235	0.	.0	2297.0
1		1935	236	0.	.0	2297.0
1		1940	237	0.	.0	2297.0
1		1945	238	0.	.0	2297.0
1		1950	239	0.	.0	2297.0
1		1955	240	0.	.0	2297.0
2		0000	241	0.	.0	2297.0
2		0005	242	0.	.0	2297.0
2		0010	243	0.	.0	2297.0
2		0015	244	0.	.0	2297.0
2		0020	245	0.	.0	2297.0
2		0025	246	0.	.0	2297.0
2		0030	247	0.	.0	2297.0
2		0035	248	0.	.0	2297.0
2		0040	249	0.	.0	2297.0
2		0045	250	0.	.0	2297.0
2		0050	251	0.	.0	2297.0
2		0055	252	0.	.0	2297.0
2		0100	253	0.	.0	2297.0
2		0105	254	0.	.0	2297.0
2		0110	255	0.	.0	2297.0
2		0115	256	0.	.0	2297.0
2		0120	257	0.	.0	2297.0
2		0125	258	0.	.0	2297.0
2		0130	259	0.	.0	2297.0
2		0135	260	0.	.0	2297.0
2		0140	261	0.	.0	2297.0
2		0145	262	0.	.0	2297.0
2		0150	263	0.	.0	2297.0
2		0155	264	0.	.0	2297.0
2		0200	265	0.	.0	2297.0
2		0205	266	0.	.0	2297.0
2		0210	267	0.	.0	2297.0
2		0215	268	0.	.0	2297.0
2		0220	269	0.	.0	2297.0
2		0225	270	0.	.0	2297.0
2		0230	271	0.	.0	2297.0
2		0235	272	0.	.0	2297.0
2		0240	273	0.	.0	2297.0
2		0245	274	0.	.0	2297.0
2		0250	275	0.	.0	2297.0
2		0255	276	0.	.0	2297.0
2		0300	277	0.	.0	2297.0
2		0305	278	0.	.0	2297.0
2		0310	279	0.	.0	2297.0
2		0315	280	0.	.0	2297.0
2		0320	281	0.	.0	2297.0
2		0325	282	0.	.0	2297.0
2		0330	283	0.	.0	2297.0
2		0335	284	0.	.0	2297.0
2		0340	285	0.	.0	2297.0
2		0345	286	0.	.0	2297.0
2		0350	287	0.	.0	2297.0
2		0355	288	0.	.0	2297.0
2		0000	289	0.	.0	2297.0
2		0005	290	0.	.0	2297.0
2		0010	291	0.	.0	2297.0
2		0015	292	0.	.0	2297.0
2		0020	293	0.	.0	2297.0
2		0025	294	0.	.0	2297.0
2		0030	295	0.	.0	2297.0
2		0035	296	0.	.0	2297.0
2		0040	297	0.	.0	2297.0
2		0045	298	0.	.0	2297.0
2		0050	299	0.	.0	2297.0
2		0055	300	0.	.0	2297.0

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)				
238.	6.00	211.	84.	81.	81.
	(INCHES)	1.705	2.710	2.710	2.710
	(AC-FT)	105.	167.	167.	167.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
(AC-FT)	(HR)				
110.	6.00	85.	27.	26.	26.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
(FEET)	(HR)				

2307.47 6.00 2305.83 2300.40 2300.28 2300.28

CUMULATIVE AREA = 1.15 SQ MI

HYDROGRAPH AT STATION DB1
PLAN 1, RATIO = .93

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2297.0	1		0820	101	201.	74.4	2305.1	1		1640	201	1.	.0	2297.0
1		0005	2	0.	.0	2297.0	1		0825	102	200.	73.0	2305.1	1		1645	202	1.	.0	2297.0
1		0010	3	0.	.0	2297.0	1		0830	103	198.	71.7	2305.0	1		1650	203	0.	.0	2297.0
1		0015	4	0.	.0	2297.0	1		0835	104	197.	70.3	2304.9	1		1655	204	0.	.0	2297.0
1		0020	5	0.	.0	2297.0	1		0840	105	195.	69.0	2304.8	1		1700	205	0.	.0	2297.0
1		0025	6	0.	.0	2297.0	1		0845	106	193.	67.7	2304.7	1		1705	206	0.	.0	2297.0
1		0030	7	1.	.0	2297.0	1		0850	107	192.	66.4	2304.6	1		1710	207	0.	.0	2297.0
1		0035	8	2.	.0	2297.1	1		0855	108	190.	65.1	2304.5	1		1715	208	0.	.0	2297.0
1		0040	9	3.	.0	2297.1	1		0900	109	188.	63.8	2304.4	1		1720	209	0.	.0	2297.0
1		0045	10	4.	.1	2297.2	1		0905	110	187.	62.5	2304.4	1		1725	210	0.	.0	2297.0
1		0050	11	4.	.1	2297.2	1		0910	111	185.	61.2	2304.3	1		1730	211	0.	.0	2297.0
1		0055	12	4.	.1	2297.2	1		0915	112	184.	59.9	2304.2	1		1735	212	0.	.0	2297.0
1		0100	13	3.	.0	2297.1	1		0920	113	182.	58.7	2304.1	1		1740	213	0.	.0	2297.0
1		0105	14	3.	.0	2297.1	1		0925	114	180.	57.4	2304.0	1		1745	214	0.	.0	2297.0
1		0110	15	3.	.0	2297.1	1		0930	115	179.	56.2	2303.9	1		1750	215	0.	.0	2297.0
1		0115	16	3.	.0	2297.1	1		0935	116	177.	55.0	2303.9	1		1755	216	0.	.0	2297.0
1		0120	17	3.	.0	2297.1	1		0940	117	176.	53.8	2303.8	1		1800	217	0.	.0	2297.0
1		0125	18	4.	.1	2297.2	1		0945	118	174.	52.6	2303.7	1		1805	218	0.	.0	2297.0
1		0130	19	5.	.1	2297.2	1		0950	119	173.	51.4	2303.6	1		1810	219	0.	.0	2297.0
1		0135	20	7.	.1	2297.3	1		0955	120	171.	50.2	2303.5	1		1815	220	0.	.0	2297.0
1		0140	21	10.	.1	2297.4	1		1000	121	170.	49.0	2303.5	1		1820	221	0.	.0	2297.0
1		0145	22	13.	.2	2297.5	1		1005	122	168.	47.8	2303.4	1		1825	222	0.	.0	2297.0
1		0150	23	16.	.2	2297.7	1		1010	123	167.	46.7	2303.3	1		1830	223	0.	.0	2297.0
1		0155	24	18.	.3	2297.8	1		1015	124	165.	45.5	2303.2	1		1835	224	0.	.0	2297.0
1		0200	25	20.	.3	2297.8	1		1020	125	164.	44.4	2303.2	1		1840	225	0.	.0	2297.0
1		0205	26	20.	.3	2297.8	1		1025	126	163.	43.3	2303.1	1		1845	226	0.	.0	2297.0
1		0210	27	20.	.3	2297.8	1		1030	127	161.	42.2	2303.0	1		1850	227	0.	.0	2297.0
1		0215	28	21.	.3	2297.9	1		1035	128	159.	41.1	2302.9	1		1855	228	0.	.0	2297.0
1		0220	29	23.	.3	2297.9	1		1040	129	157.	40.0	2302.8	1		1900	229	0.	.0	2297.0
1		0225	30	24.	.4	2298.0	1		1045	130	155.	38.9	2302.8	1		1905	230	0.	.0	2297.0
1		0230	31	25.	.5	2298.0	1		1050	131	153.	37.8	2302.7	1		1910	231	0.	.0	2297.0
1		0235	32	26.	.6	2298.1	1		1055	132	152.	36.8	2302.6	1		1915	232	0.	.0	2297.0
1		0240	33	27.	.7	2298.1	1		1100	133	150.	35.7	2302.5	1		1920	233	0.	.0	2297.0
1		0245	34	29.	.8	2298.2	1		1105	134	148.	34.7	2302.4	1		1925	234	0.	.0	2297.0
1		0250	35	30.	1.0	2298.3	1		1110	135	146.	33.7	2302.3	1		1930	235	0.	.0	2297.0
1		0255	36	32.	1.2	2298.3	1		1115	136	144.	32.7	2302.3	1		1935	236	0.	.0	2297.0
1		0300	37	33.	1.4	2298.4	1		1120	137	142.	31.7	2302.2	1		1940	237	0.	.0	2297.0
1		0305	38	35.	1.6	2298.5	1		1125	138	141.	30.8	2302.1	1		1945	238	0.	.0	2297.0
1		0310	39	37.	1.8	2298.6	1		1130	139	139.	29.8	2302.0	1		1950	239	0.	.0	2297.0
1		0315	40	41.	2.2	2298.7	1		1135	140	137.	28.8	2302.0	1		1955	240	0.	.0	2297.0
1		0320	41	47.	2.9	2299.0	1		1140	141	134.	27.9	2301.9	1		2000	241	0.	.0	2297.0
1		0325	42	52.	4.1	2299.2	1		1145	142	132.	27.0	2301.8	1		2005	242	0.	.0	2297.0
1		0330	43	59.	6.1	2299.5	1		1150	143	129.	26.1	2301.7	1		2010	243	0.	.0	2297.0
1		0335	44	69.	8.9	2299.9	1		1155	144	127.	25.2	2301.6	1		2015	244	0.	.0	2297.0
1		0340	45	83.	12.4	2300.3	1		1200	145	125.	24.4	2301.5	1		2020	245	0.	.0	2297.0
1		0345	46	99.	16.3	2300.7	1		1205	146	122.	23.5	2301.4	1		2025	246	0.	.0	2297.0
1		0350	47	114.	20.5	2301.1	1		1210	147	120.	22.7	2301.4	1		2030	247	0.	.0	2297.0
1		0355	48	127.	25.3	2301.6	1		1215	148	118.	21.8	2301.3	1		2035	248	0.	.0	2297.0
1		0400	49	141.	30.8	2302.1	1		1220	149	116.	21.0	2301.2	1		2040	249	0.	.0	2297.0
1		0405	50	152.	37.0	2302.6	1		1225	150	113.	20.3	2301.1	1		2045	250	0.	.0	2297.0
1		0410	51	163.	43.3	2303.1	1		1230	151	111.	19.5	2301.0	1		2050	251	0.	.0	2297.0
1		0415	52	170.	49.5	2303.5	1		1235	152	109.	18.7	2301.0	1		2055	252	0.	.0	2297.0
1		0420	53	178.	55.2	2303.9	1		1240	153	106.	18.0	2300.9	1		2100	253	0.	.0	2297.0
1		0425	54	184.	60.4	2304.2	1		1245	154	103.	17.3	2300.8	1		2105	254	0.	.0	2297.0
1		0430	55	190.	65.2	2304.5	1		1250	155	100.	16.6	2300.7	1		2110	255	0.	.0	2297.0
1		0435	56	196.	69.7	2304.8	1		1255	156	97.	15.9	2300.7	1		2115	256	0.	.0	2297.0
1		0440	57	201.	73.9	2305.1	1		1300	157	95.	15.2	2300.6	1		2120	257	0.	.0	2297.0
1		0445	58	205.	77.9	2305.4	1		1305	158	92.	14.6	2300.5	1		2125	258	0.	.0	2297.0
1		0450	59	209.	81.5	2305.6	1		1310	159	89.	14.0	2300.5	1		2130	259	0.	.0	2297.0
1		0455	60	212.	84.9	2305.8	1		1315	160	87.	13.3	2300.4	1		2135	260	0.	.0	2297.0
1		0500	61	216.	87.9	2306.0	1		1320	161	84.	12.8	2300.3	1		2140	261	0.	.0	2297.0
1		0505	62	219.	90.7	2306.2	1		1325	162	82.	12.2	2300.3	1		2145	262	0.	.0	2297.0
1		0510	63	221.	93.1	2306.4	1		1330	163	80.	11.6	2300.2	1		2150	263	0.	.0	2297.0
1		0515	64	224.	95.3	2306.5	1		1335	164	78.	11.1	2300.1	1		2155	264	0.	.0	2297.0
1		0520	65	226.	97.2	2306.7	1		1340	165	75.	10.6	2300.1	1		2200	265	0.	.0	2297.0
1		0525	66	227.	99.0	2306.8	1		1345	166	73.	10.0	2300.0	1		2205	266	0.	.0	2297.0
1		0530	67	229.	100.6	2306.9	1		1350	167	71.	9.5	2300.0	1		2210	267	0.	.0	2297.0
1		0535	68	231.	102.0	2307.0	1		1355	168	70.	9.1	2299.9	1		2215	268	0.	.0	2297.0
1		0540	69	232.	103.0	2307.0	1		1400	169	68.	8.6	2299.8	1		2220	269	0.	.0	2297.0
1		0545	70	232.	103.8	2307.1	1		1405	170	66.	8.1	2299.8	1		2225	270	0.	.0	2297.0
1		0550	71	233.	104.3	2307.1	1		1410	171	65.	7.7	2299.7	1		2230	271	0.	.0	2297.0
1		0555	72	233.	104.6	2307.1	1		1415	172	63.	7.2	2299.6	1		2235	272	0.	.0	2297.0
1		0600	73	233.	104.6	2307.1	1		1420	173	62.	6.8	2299.6	1		2240	273	0.	.0	2297.0
1		0605	74	233.	104.5	2307.1	1		1425	174	60.	6.4	2299.5	1		2245	274	0.	.0	2297.0
1		0610	75	233.	104.3	2307.1	1		1430	175	59.	6.0	2299.4	1		2250	275	0.	.0	2297.0
1		0615	76	232.	103.9	2307.1	1		1435	176	57.	5.6	2299.4	1		2255	276	0.	.0	2297.0
1		0620	77	232.	103.3	2307.1	1		1440	177	56.	5.2	2299.3	1		2300	277	0.	.0	2297.0
1		0625	78	231.	102.6	2307.0	1		1445	178	54.	4.8	2299.3	1		2305	278	0.	.0	2297.0
1		0630	79	231.	101.9	2307.0	1		1450	179	53.	4.4	2299.2	1		2310	279	0.	.0	2297.0
1		0635	80	230.	101.0	2306.9	1		1455	180	52.	4.1	2299.2	1		2315	280	0.	.0	2297.0
1		0640	81	229.	100.0	2306.9	1		1500	181	51.	3.7	2299.1	1		2320	281	0.	.0	2297.0
1		0645	82	228.	99.0	2306.8	1		1505	182	49.	3.4	2299.1	1		2325	282	0.	.0	2297.0
1		0650	83	226.	98.0	2306.7	1		1510	183	48.	3.0	2299.0	1		2330	283	0.	.0	2297.0
1		0655	84	225.	96.8	2306.6	1		1515	184	45.	2.7	2298.9	1		2335	284	0.	.0	2297.0
1		0700	85	224.	95.7	2306.6	1		1520	185	43.	2.4	2298.8	1		2340	285	0.	.0	2297.0
1		0705	86	223.	94.4	2306.5	1		1525	186	40.	2.1	2298.7	1		2345	286	0.	.0	2297.0
1		0710	87	221.	93.2	2306.4	1		1530	187	38.	1.9	2298.6	1		2350	287	0.	.0	2297.0
1		0715	88	220.	91.9	2306.3	1		1535	188	35.	1.6	2298.5	1		2355	288	0.	.0	2297.0
1		0720	89	219.	90.6	2306.2	1		1540	189	33.	1.4	2298.4	2		0000	289	0.	.0	2297.0
1		0725	90	217.	89.3	2306.1	1		1545	190	31.	1.2	2298.3	2		0005	290	0.	.0	2297.0
1		0730	91	216.	88.0	2306.1	1		1550	191	29.	.9	2298.2	2		0010	291	0.	.0	2297.0
1		0735	92	214.	86.6	2306.0	1		1555	192	28.	.8	2298.2	2		0015	292	0.	.0	2297.0
1		0740	93	213.	85.3	2305.9	1		1600	193	26.	.6	2298.1	2		0020	293	0.	.0	2297.0
1		0745	94	212.	83.9	2305.8	1		1605	194	24.	.4	2298.0	2		0025	294	0.	.0	2297.0
1		0750	95	210.	82.6	2305.7	1		1610	195	17.	.2	2297.7	2		0030	295	0.	.0	2297.0
1		0755	96	209.	81.2	2305.6	1		1615	196	11.	.2	2297.4	2		0035	296	0.	.0	2297.0
1		0800	97	207.	79.8	2305.5	1		1620	197	6.	.1	2297.3	2		0040	297	0.	.0	2297.0
1		0805	98	206.	78.5	2305.4	1		1625	198	4.	.1	2297.2	2		0045	298	0.	.0	2297.0
1		0810	99	204.	77.1	2305.3	1		1630	199	2.	.0	2297.1	2		0050	299	0.	.0	2297.0
1		0815	100	203.	75.7	2305.2	1		1635	200	1.	.0	2297.1	2		0055	300	0.	.0	2297.0

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 233.	6.00		207.	81.	78.	78.
		(INCHES)	1.666	2.602	2.602	2.602
		(AC-FT)	102.	160.	160.	160.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
105.	6.00	80.	25.	24.	24.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2307.15	6.00	2305.53	2300.25	2300.13	2300.13

CUMULATIVE AREA = 1.15 SQ MI

HYDROGRAPH AT STATION DB1
PLAN 1, RATIO = .92

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	2297.0	1		0820	101	199.	72.6	2305.0	1		1640	201	0.	.0	2297.0
1		0005	2	0.	.0	2297.0	1		0825	102	198.	71.3	2304.9	1		1645	202	0.	.0	2297.0
1		0010	3	0.	.0	2297.0	1		0830	103	196.	69.9	2304.9	1		1650	203	0.	.0	2297.0
1		0015	4	0.	.0	2297.0	1		0835	104	195.	68.6	2304.8	1		1655	204	0.	.0	2297.0
1		0020	5	0.	.0	2297.0	1		0840	105	193.	67.3	2304.7	1		1700	205	0.	.0	2297.0
1		0025	6	0.	.0	2297.0	1		0845	106	191.	66.0	2304.6	1		1705	206	0.	.0	2297.0
1		0030	7	1.	.0	2297.0	1		0850	107	190.	64.7	2304.5	1		1710	207	0.	.0	2297.0
1		0035	8	2.	.0	2297.1	1		0855	108	188.	63.4	2304.4	1		1715	208	0.	.0	2297.0
1		0040	9	3.	.0	2297.1	1		0900	109	186.	62.1	2304.3	1		1720	209	0.	.0	2297.0
1		0045	10	4.	.1	2297.2	1		0905	110	185.	60.8	2304.2	1		1725	210	0.	.0	2297.0
1		0050	11	4.	.1	2297.2	1		0910	111	183.	59.6	2304.2	1		1730	211	0.	.0	2297.0
1		0055	12	3.	.0	2297.1	1		0915	112	182.	58.3	2304.1	1		1735	212	0.	.0	2297.0
1		0100	13	3.	.0	2297.1	1		0920	113	180.	57.1	2304.0	1		1740	213	0.	.0	2297.0
1		0105	14	3.	.0	2297.1	1		0925	114	178.	55.8	2303.9	1		1745	214	0.	.0	2297.0
1		0110	15	2.	.0	2297.1	1		0930	115	177.	54.6	2303.8	1		1750	215	0.	.0	2297.0
1		0115	16	3.	.0	2297.1	1		0935	116	175.	53.4	2303.8	1		1755	216	0.	.0	2297.0
1		0120	17	3.	.0	2297.1	1		0940	117	174.	52.2	2303.7	1		1800	217	0.	.0	2297.0
1		0125	18	4.	.1	2297.2	1		0945	118	172.	51.0	2303.6	1		1805	218	0.	.0	2297.0
1		0130	19	5.	.1	2297.2	1		0950	119	171.	49.8	2303.5	1		1810	219	0.	.0	2297.0
1		0135	20	7.	.1	2297.3	1		0955	120	169.	48.7	2303.4	1		1815	220	0.	.0	2297.0
1		0140	21	9.	.1	2297.4	1		1000	121	168.	47.5	2303.4	1		1820	221	0.	.0	2297.0
1		0145	22	12.	.2	2297.5	1		1005	122	166.	46.4	2303.3	1		1825	222	0.	.0	2297.0
1		0150	23	15.	.2	2297.6	1		1010	123	165.	45.2	2303.2	1		1830	223	0.	.0	2297.0
1		0155	24	18.	.2	2297.7	1		1015	124	164.	44.1	2303.1	1		1835	224	0.	.0	2297.0
1		0200	25	19.	.3	2297.8	1		1020	125	162.	43.0	2303.1	1		1840	225	0.	.0	2297.0
1		0205	26	19.	.3	2297.8	1		1025	126	161.	41.8	2303.0	1		1845	226	0.	.0	2297.0
1		0210	27	19.	.3	2297.8	1		1030	127	159.	40.7	2302.9	1		1850	227	0.	.0	2297.0
1		0215	28	20.	.3	2297.8	1		1035	128	157.	39.7	2302.8	1		1855	228	0.	.0	2297.0
1		0220	29	22.	.3	2297.9	1		1040	129	155.	38.6	2302.7	1		1900	229	0.	.0	2297.0
1		0225	30	24.	.4	2298.0	1		1045	130	153.	37.5	2302.6	1		1905	230	0.	.0	2297.0
1		0230	31	25.	.4	2298.0	1		1050	131	151.	36.5	2302.6	1		1910	231	0.	.0	2297.0
1		0235	32	26.	.5	2298.1	1		1055	132	149.	35.5	2302.5	1		1915	232	0.	.0	2297.0
1		0240	33	27.	.7	2298.1	1		1100	133	147.	34.4	2302.4	1		1920	233	0.	.0	2297.0
1		0245	34	28.	.8	2298.2	1		1105	134	145.	33.4	2302.3	1		1925	234	0.	.0	2297.0
1		0250	35	30.	1.0	2298.2	1		1110	135	144.	32.4	2302.2	1		1930	235	0.	.0	2297.0
1		0255	36	31.	1.1	2298.3	1		1115	136	142.	31.4	2302.2	1		1935	236	0.	.0	2297.0
1		0300	37	33.	1.3	2298.4	1		1120	137	140.	30.5	2302.1	1		1940	237	0.	.0	2297.0
1		0305	38	34.	1.5	2298.4	1		1125	138	138.	29.5	2302.0	1		1945	238	0.	.0	2297.0
1		0310	39	37.	1.7	2298.5	1		1130	139	136.	28.6	2301.9	1		1950	239	0.	.0	2297.0
1		0315	40	40.	2.1	2298.7	1		1135	140	133.	27.6	2301.8	1		1955	240	0.	.0	2297.0
1		0320	41	46.	2.8	2298.9	1		1140	141	131.	26.7	2301.7	1		2000	241	0.	.0	2297.0
1		0325	42	51.	4.0	2299.1	1		1145	142	129.	25.8	2301.7	1		2005	242	0.	.0	2297.0
1		0330	43	58.	5.9	2299.4	1		1150	143	126.	25.0	2301.6	1		2010	243	0.	.0	2297.0
1		0335	44	68.	8.7	2299.8	1		1155	144	124.	24.1	2301.5	1		2015	244	0.	.0	2297.0
1		0340	45	82.	12.1	2300.3	1		1200	145	122.	23.3	2301.4	1		2020	245	0.	.0	2297.0
1		0345	46	97.	15.9	2300.7	1		1205	146	119.	22.4	2301.3	1		2025	246	0.	.0	2297.0
1		0350	47	113.	20.0	2301.1	1		1210	147	117.	21.6	2301.3	1		2030	247	0.	.0	2297.0
1		0355	48	125.	24.7	2301.5	1		1215	148	115.	20.8	2301.2	1		2035	248	0.	.0	2297.0
1		0400	49	139.	30.0	2302.1	1		1220	149	113.	20.0	2301.1	1		2040	249	0.	.0	2297.0
1		0405	50	150.	36.1	2302.5	1		1225	150	111.	19.3	2301.0	1		2045	250	0.	.0	2297.0
1		0410	51	161.	42.3	2303.0	1		1230	151	108.	18.5	2300.9	1		2050	251	0.	.0	2297.0
1		0415	52	169.	48.3	2303.4	1		1235	152	105.	17.8	2300.9	1		2055	252	0.	.0	2297.0
1		0420	53	176.	53.9	2303.8	1		1240	153	102.	17.1	2300.8	1		2100	253	0.	.0	2297.0
1		0425	54	183.	59.1	2304.1	1		1245	154	99.	16.4	2300.7	1		2105	254	0.	.0	2297.0
1		0430	55	189.	63.9	2304.5	1		1250	155	97.	15.7	2300.6	1		2110	255	0.	.0	2297.0
1		0435	56	194.	68.3	2304.7	1		1255	156	94.	15.0	2300.6	1		2115	256	0.	.0	2297.0
1		0440	57	199.	72.5	2305.0	1		1300	157	91.	14.4	2300.5	1		2120	257	0.	.0	2297.0
1		0445	58	203.	76.4	2305.3	1		1305	158	89.	13.8	2300.4	1		2125	258	0.	.0	2297.0
1		0450	59	207.	79.9	2305.5	1		1310	159	86.	13.2	2300.4	1		2130	259	0.	.0	2297.0
1		0455	60	211.	83.2	2305.7	1		1315	160	84.	12.6	2300.3	1		2135	260	0.	.0	2297.0
1		0500	61	214.	86.2	2305.9	1		1320	161	81.	12.0	2300.2	1		2140	261	0.	.0	2297.0
1		0505	62	217.	88.9	2306.1	1		1325	162	79.	11.5	2300.2	1		2145	262	0.	.0	2297.0
1		0510	63	219.	91.3	2306.3	1		1330	163	77.	10.9	2300.1	1		2150	263	0.	.0	2297.0
1		0515	64	222.	93.4	2306.4	1		1335	164	75.	10.4	2300.1	1		2155	264	0.	.0	2297.0
1		0520	65	224.	95.3	2306.5	1		1340	165	73.	9.9	2300.0	1		2200	265	0.	.0	2297.0
1		0525	66	225.	97.1	2306.7	1		1345	166	71.	9.4	2300.0	1		2205	266	0.	.0	2297.0
1		0530	67	227.	98.7	2306.8	1		1350	167	69.	8.9	2299.9	1		2210	267	0.	.0	2297.0
1		0535	68	229.	100.0	2306.8	1		1355	168	67.	8.5	2299.8	1		2215	268	0.	.0	2297.0
1		0540	69	230.	101.1	2306.9	1		1400	169	66.	8.0	2299.7	1		2220	269	0.	.0	2297.0
1		0545	70	231.	101.8	2307.0	1		1405	170	64.	7.5	2299.7	1		2225	270	0.	.0	2297.0
1		0550	71	231.	102.3	2307.0	1		1410	171	63.	7.1	2299.6	1		2230	271	0.	.0	2297.0
1		0555	72	231.	102.5	2307.0	1		1415	172	61.	6.7	2299.5	1		2235	272	0.	.0	2297.0
1		0600	73	231.	102.6	2307.0	1		1420	173	60.	6.3	2299.5	1		2240	273	0.	.0	2297.0
1		0605	74	231.	102.5	2307.0	1		1425	174	58.	5.9	2299.4	1		2245	274	0.	.0	2297.0
1		0610	75	231.	102.2	2307.0	1		1430	175	57.	5.5	2299.4	1		2250	275	0.	.0	2297.0
1		0615	76	231.	101.8	2307.0	1		1435	176	55.	5.1	2299.3	1		2255	276	0.	.0	2297.0
1		0620	77	230.	101.3	2306.9	1		1440	177	54.	4.7	2299.3	1		2300	277	0.	.0	2297.0
1		0625	78	229.	100.6	2306.9	1		1445	178	53.	4.3	2299.2	1		2305	278	0.	.0	2297.0
1		0630	79	228.	99.8	2306.8	1		1450	179	51.	4.0	2299.1	1		2310	279	0.	.0	2297.0
1		0635	80	227.	99.0	2306.8	1		1455	180	50.	3.6	2299.1	1		2315	280	0.	.0	2297.0
1		0640	81	226.	98.0	2306.7	1		1500	181	49.	3.3	2299.0	1		2320	281	0.	.0	2297.0
1		0645	82	225.	97.0	2306.7	1		1505	182	47.	3.0	2299.0	1		2325	282	0.	.0	2297.0
1		0650	83	224.	96.0	2306.6	1		1510	183	45.	2.6	2298.9	1		2330	283	0.	.0	2297.0
1		0655	84	223.	94.8	2306.5	1		1515	184	42.	2.3	2298.7	1		2335	284	0.	.0	2297.0
1		0700	85	222.	93.7	2306.4	1		1520	185	39.	2.1	2298.6	1		2340	285	0.	.0	2297.0
1		0705	86	221.	92.5	2306.3	1		1525	186	37.	1.8	2298.5	1		2345	286	0.	.0	2297.0
1		0710	87	219.	91.2	2306.3	1		1530	187	35.	1.5	2298.5	1		2350	287	0.	.0	2297.0
1		0715	88	218.	90.0	2306.2	1		1535	188	33.	1.3	2298.4	1		2355	288	0.	.0	2297.0
1		0720	89	217.	88.7	2306.1	1		1540	189	31.	1.1	2298.3	2		0000	289	0.	.0	2297.0
1		0725	90	215.	87.4	2306.0	1		1545	190	29.	.9	2298.2	2		0005	290	0.	.0	2297.0
1		0730	91	214.	86.1	2305.9	1		1550	191	27.	.7	2298.1	2		0010	291	0.	.0	2297.0
1		0735	92	212.	84.7	2305.8	1		1555	192	26.	.5	2298.1	2		0015	292	0.	.0	2297.0
1		0740	93	211.	83.4	2305.7	1		1600	193	24.	.3	2298.0	2		0020	293	0.	.0	2297.0
1		0745	94	210.	82.1	2305.7	1		1605	194	15.	.2	2297.6	2		0025	294	0.	.0	2297.0
1		0750	95	208.	80.7	2305.6	1		1610	195	9.	.1	2297.4	2		0030	295	0.	.0	2297.0
1		0755	96	207.	79.4	2305.5	1		1615	196	5.	.1	2297.2	2		0035	296	0.	.0	2297.0
1		0800	97	205.	78.0	2305.4	1		1620	197	3.	.0	2297.1	2		0040	297	0.	.0	2297.0
1		0805	98	204.	76.6	2305.3	1		1625	198	2.	.0	2297.1	2		0045	298	0.	.0	2297.0
1		0810	99	202.	75.3	2305.2	1		1630	199	1.	.0	2297.1	2		0050	299	0.	.0	2297.0
1		0815	100	201.	73.9	2305.1	1		1635	200	1.	.0	2297.0	2		0055	300	0.	.0	2297.0

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 231.	6.00		205.	79.	76.	76.
		(INCHES)	1.651	2.559	2.559	2.559
		(AC-FT)	101.	157.	157.	157.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)					
103.	6.00		78.	24.	24.	24.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)					
2307.02	6.00		2305.42	2300.18	2300.07	2300.07

CUMULATIVE AREA = 1.15 SQ MI

PLAN 1, RATIO = .91

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	0000		1	0.	.0	2297.0	1	0820		101	198.	71.4	2304.9	1	1640		201	0.	.0	2297.0
1	0005		2	0.	.0	2297.0	1	0825		102	196.	70.0	2304.9	1	1645		202	0.	.0	2297.0
1	0010		3	0.	.0	2297.0	1	0830		103	195.	68.7	2304.8	1	1650		203	0.	.0	2297.0
1	0015		4	0.	.0	2297.0	1	0835		104	193.	67.4	2304.7	1	1655		204	0.	.0	2297.0
1	0020		5	0.	.0	2297.0	1	0840		105	191.	66.1	2304.6	1	1700		205	0.	.0	2297.0
1	0025		6	0.	.0	2297.0	1	0845		106	190.	64.8	2304.5	1	1705		206	0.	.0	2297.0
1	0030		7	1.	.0	2297.0	1	0850		107	188.	63.5	2304.4	1	1710		207	0.	.0	2297.0
1	0035		8	2.	.0	2297.1	1	0855		108	187.	62.2	2304.3	1	1715		208	0.	.0	2297.0
1	0040		9	3.	.0	2297.1	1	0900		109	185.	61.0	2304.3	1	1720		209	0.	.0	2297.0
1	0045		10	4.	.1	2297.2	1	0905		110	183.	59.7	2304.2	1	1725		210	0.	.0	2297.0
1	0050		11	4.	.1	2297.2	1	0910		111	182.	58.5	2304.1	1	1730		211	0.	.0	2297.0
1	0055		12	3.	.0	2297.1	1	0915		112	180.	57.2	2304.0	1	1735		212	0.	.0	2297.0
1	0100		13	3.	.0	2297.1	1	0920		113	179.	56.0	2303.9	1	1740		213	0.	.0	2297.0
1	0105		14	2.	.0	2297.1	1	0925		114	177.	54.8	2303.8	1	1745		214	0.	.0	2297.0
1	0110		15	2.	.0	2297.1	1	0930		115	176.	53.5	2303.8	1	1750		215	0.	.0	2297.0
1	0115		16	2.	.0	2297.1	1	0935		116	174.	52.3	2303.7	1	1755		216	0.	.0	2297.0
1	0120		17	3.	.0	2297.1	1	0940		117	173.	51.2	2303.6	1	1800		217	0.	.0	2297.0
1	0125		18	3.	.0	2297.1	1	0945		118	171.	50.0	2303.5	1	1805		218	0.	.0	2297.0
1	0130		19	5.	.1	2297.2	1	0950		119	170.	48.8	2303.5	1	1810		219	0.	.0	2297.0
1	0135		20	6.	.1	2297.3	1	0955		120	168.	47.6	2303.4	1	1815		220	0.	.0	2297.0
1	0140		21	9.	.1	2297.4	1	1000		121	167.	46.5	2303.3	1	1820		221	0.	.0	2297.0
1	0145		22	12.	.2	2297.5	1	1005		122	165.	45.3	2303.2	1	1825		222	0.	.0	2297.0
1	0150		23	15.	.2	2297.6	1	1010		123	164.	44.2	2303.1	1	1830		223	0.	.0	2297.0
1	0155		24	17.	.2	2297.7	1	1015		124	162.	43.1	2303.1	1	1835		224	0.	.0	2297.0
1	0200		25	18.	.3	2297.8	1	1020		125	161.	42.0	2303.0	1	1840		225	0.	.0	2297.0
1	0205		26	19.	.3	2297.8	1	1025		126	159.	40.9	2302.9	1	1845		226	0.	.0	2297.0
1	0210		27	19.	.3	2297.8	1	1030		127	157.	39.8	2302.8	1	1850		227	0.	.0	2297.0
1	0215		28	19.	.3	2297.8	1	1035		128	155.	38.7	2302.7	1	1855		228	0.	.0	2297.0
1	0220		29	21.	.3	2297.9	1	1040		129	153.	37.7	2302.7	1	1900		229	0.	.0	2297.0
1	0225		30	24.	.4	2298.0	1	1045		130	151.	36.6	2302.6	1	1905		230	0.	.0	2297.0
1	0230		31	25.	.4	2298.0	1	1050		131	149.	35.6	2302.5	1	1910		231	0.	.0	2297.0
1	0235		32	26.	.5	2298.1	1	1055		132	147.	34.5	2302.4	1	1915		232	0.	.0	2297.0
1	0240		33	27.	.6	2298.1	1	1100		133	146.	33.5	2302.3	1	1920		233	0.	.0	2297.0
1	0245		34	28.	.8	2298.2	1	1105		134	144.	32.5	2302.3	1	1925		234	0.	.0	2297.0
1	0250		35	29.	.9	2298.2	1	1110		135	142.	31.6	2302.2	1	1930		235	0.	.0	2297.0
1	0255		36	31.	1.1	2298.3	1	1115		136	140.	30.6	2302.1	1	1935		236	0.	.0	2297.0
1	0300		37	32.	1.2	2298.3	1	1120		137	139.	29.6	2302.0	1	1940		237	0.	.0	2297.0
1	0305		38	34.	1.4	2298.4	1	1125		138	136.	28.7	2301.9	1	1945		238	0.	.0	2297.0
1	0310		39	36.	1.7	2298.5	1	1130		139	134.	27.7	2301.8	1	1950		239	0.	.0	2297.0
1	0315		40	39.	2.1	2298.6	1	1135		140	131.	26.8	2301.8	1	1955		240	0.	.0	2297.0
1	0320		41	45.	2.7	2298.9	1	1140		141	129.	25.9	2301.7	1	2000		241	0.	.0	2297.0
1	0325		42	51.	3.9	2299.1	1	1145		142	126.	25.1	2301.6	1	2005		242	0.	.0	2297.0
1	0330		43	58.	5.8	2299.4	1	1150		143	124.	24.2	2301.5	1	2010		243	0.	.0	2297.0
1	0335		44	68.	8.5	2299.8	1	1155		144	122.	23.4	2301.4	1	2015		244	0.	.0	2297.0
1	0340		45	81.	11.8	2300.2	1	1200		145	120.	22.5	2301.3	1	2020		245	0.	.0	2297.0
1	0345		46	96.	15.6	2300.6	1	1205		146	117.	21.7	2301.3	1	2025		246	0.	.0	2297.0
1	0350		47	112.	19.7	2301.1	1	1210		147	115.	20.9	2301.2	1	2030		247	0.	.0	2297.0
1	0355		48	124.	24.2	2301.5	1	1215		148	113.	20.1	2301.1	1	2035		248	0.	.0	2297.0
1	0400		49	138.	29.5	2302.0	1	1220		149	111.	19.3	2301.0	1	2040		249	0.	.0	2297.0
1	0405		50	149.	35.4	2302.5	1	1225		150	108.	18.6	2301.0	1	2045		250	0.	.0	2297.0
1	0410		51	160.	41.6	2303.0	1	1230		151	105.	17.9	2300.9	1	2050		251	0.	.0	2297.0
1	0415		52	168.	47.6	2303.4	1	1235		152	102.	17.1	2300.8	1	2055		252	0.	.0	2297.0
1	0420		53	175.	53.1	2303.7	1	1240		153	100.	16.4	2300.7	1	2100		253	0.	.0	2297.0
1	0425		54	181.	58.2	2304.1	1	1245		154	97.	15.8	2300.7	1	2105		254	0.	.0	2297.0
1	0430		55	187.	63.0	2304.4	1	1250		155	94.	15.1	2300.6	1	2110		255	0.	.0	2297.0
1	0435		56	193.	67.4	2304.7	1	1255		156	92.	14.5	2300.5	1	2115		256	0.	.0	2297.0
1	0440		57	198.	71.5	2305.0	1	1300		157	89.	13.8	2300.4	1	2120		257	0.	.0	2297.0
1	0445		58	202.	75.3	2305.2	1	1305		158	86.	13.2	2300.4	1	2125		258	0.	.0	2297.0
1	0450		59	206.	78.9	2305.4	1	1310		159	84.	12.7	2300.3	1	2130		259	0.	.0	2297.0
1	0455		60	210.	82.1	2305.7	1	1315		160	82.	12.1	2300.3	1	2135		260	0.	.0	2297.0
1	0500		61	213.	85.1	2305.9	1	1320		161	79.	11.5	2300.2	1	2140		261	0.	.0	2297.0
1	0505		62	216.	87.7	2306.0	1	1325		162	77.	11.0	2300.1	1	2145		262	0.	.0	2297.0
1	0510		63	218.	90.1	2306.2	1	1330		163	75.	10.5	2300.1	1	2150		263	0.	.0	2297.0
1	0515		64	220.	92.2	2306.3	1	1335		164	73.	10.0	2300.0	1	2155		264	0.	.0	2297.0
1	0520		65	222.	94.1	2306.5	1	1340		165	71.	9.5	2300.0	1	2200		265	0.	.0	2297.0
1	0525		66	224.	95.8	2306.6	1	1345		166	69.	9.0	2299.9	1	2205		266	0.	.0	2297.0
1	0530		67	226.	97.4	2306.7	1	1350		167	68.	8.5	2299.8	1	2210		267	0.	.0	2297.0
1	0535		68	227.	98.7	2306.8	1	1355		168	66.	8.0	2299.8	1	2215		268	0.	.0	2297.0
1	0540		69	228.	99.7	2306.8	1	1400		169	64.	7.6	2299.7	1	2220		269	0.	.0	2297.0
1	0545		70	229.	100.5	2306.9	1	1405		170	63.	7.2	2299.6	1	2225		270	0.	.0	2297.0
1	0550		71	230.	100.9	2306.9	1	1410		171	61.	6.7	2299.6	1	2230		271	0.	.0	2297.0
1	0555		72	230.	101.2	2306.9	1	1415		172	60.	6.3	2299.5	1	2235		272	0.	.0	2297.0
1	0600		73	230.	101.2	2306.9	1	1420		173	58.	5.9	2299.4	1	2240		273	0.	.0	2297.0
1	0605		74	230.	101.1	2306.9	1	1425		174	57.	5.5	2299.4	1	2245		274	0.	.0	2297.0
1	0610		75	229.	100.8	2306.9	1	1430		175	56.	5.1	2299.3	1	2250		275	0.	.0	2297.0
1	0615		76	229.	100.4	2306.9	1	1435		176	54.	4.7	2299.3	1	2255		276	0.	.0	2297.0
1	0620		77	228.	99.9	2306.8	1	1440		177	53.	4.4	2299.2	1	2300		277	0.	.0	2297.0
1	0625		78	228.	99.2	2306.8	1	1445		178	52.	4.0	2299.1	1	2305		278	0.	.0	2297.0
1	0630		79	227.	98.5	2306.7	1	1450		179	50.	3.7	2299.1	1	2310		279	0.	.0	2297.0
1	0635		80	226.	97.6	2306.7	1	1455		180	49.	3.3	2299.0	1	2315		280	0.	.0	2297.0
1	0640		81	225.	96.7	2306.6	1	1500		181	48.	3.0	2299.0	1	2320		281	0.	.0	2297.0
1	0645		82	224.	95.7	2306.6	1	1505		182	45.	2.7	2298.9	1	2325		282	0.	.0	2297.0
1	0650		83	223.	94.6	2306.5	1	1510		183	42.	2.4	2298.8	1	2330		283	0.	.0	2297.0
1	0655		84	222.	93.5	2306.4	1	1515		184	40.	2.1	2298.7	1	2335		284	0.	.0	2297.0
1	0700		85	220.	92.3	2306.3	1	1520		185	37.	1.8	2298.6	1	2340		285	0.	.0	2297.0
1	0705		86	219.	91.1	2306.3	1	1525		186	35.	1.6	2298.5	1	2345		286	0.	.0	2297.0
1	0710		87	218.	89.9	2306.2	1	1530		187	33.	1.3	2298.4	1	2350		287	0.	.0	2297.0
1	0715		88	217.	88.6	2306.1	1	1535		188	31.	1.1	2298.3	1	2355		288	0.	.0	2297.0
1	0720		89	215.	87.4	2306.0	1	1540		189	29.	.9	2298.2	2	0000		289	0.	.0	2297.0
1	0725		90	214.	86.1	2305.9	1	1545		190	27.	.7	2298.1	2	0005		290	0.	.0	2297.0
1	0730		91	212.	84.8	2305.8	1	1550		191	26.	.5	2298.1	2	0010		291	0.	.0	2297.0
1	0735		92	211.	83.5	2305.7	1	1555		192	24.	.4	2298.0	2	0015		292	0.	.0	2297.0
1	0740		93	210.	82.1	2305.7	1	1600		193	16.	.2	2297.7	2	0020		293	0.	.0	2297.0
1	0745		94	208.	80.8	2305.6	1	1605		194	10.	.1	2297.4	2	0025		294	0.	.0	2297.0
1	0750		95	207.	79.4	2305.5	1	1610		195	6.	.1	2297.2	2	0030		295	0.	.0	2297.0
1	0755		96	205.	78.1	2305.4	1	1615		196	4.	.1	2297.1	2	0035		296	0.	.0	2297.0
1	0800		97	204.	76.7	2305.3	1	1620		197	2.	.0	2297.1	2	0040		297	0.	.0	2297.0
1	0805		98	202.	75.4	2305.2	1	1625		198	1.	.0	2297.1	2	0045		298	0.	.0	2297.0
1	0810		99	201.	74.1	2305.1	1	1630		199	1.	.0	2297.0	2	0050		299	0.	.0	2297.0
1	0815		100	200.	72.7	2305.0	1	1635		200	0.	.0	2297.0	2	0055		300	0.	.0	2297.0

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 230.	6.00	203.	78.	76.	76.
		(INCHES) 1.640	2.530	2.530	2.530
		(AC-FT) 101.	156.	156.	156.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (AC-FT)	(HR)				
101.	6.00	77.	24.	23.	23.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	24.92-HR
+ (FEET)	(HR)				
2306.93	6.00	2305.34	2300.14	2300.03	2300.03

CUMULATIVE AREA = 1.15 SQ MI

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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 .99	RATIO 2 .98	RATIO 3 .95	RATIO 4 .93	RATIO 5 .92	RATIO 6 .91
HYDROGRAPH AT										
+	U190	.37	1	FLOW	196.	191.	182.	173.	170.	167.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	U170	.25	1	FLOW	152.	148.	141.	135.	132.	130.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
2 COMBINED AT										
+	CP1	.62	1	FLOW	348.	339.	323.	308.	302.	297.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO										
+	CP1S	.62	1	FLOW	148.	143.	136.	129.	127.	125.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	CP1E	.62	1	FLOW	200.	196.	187.	179.	175.	172.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO										
+	RCP1E	.62	1	FLOW	199.	194.	185.	177.	172.	169.
				TIME	4.08	4.08	4.08	4.08	4.08	4.17
HYDROGRAPH AT										
+	U150	.13	1	FLOW	104.	102.	97.	93.	91.	90.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO										
+	U150E	.13	1	FLOW	60.	59.	56.	53.	52.	52.
				TIME	3.75	3.75	3.75	3.75	3.58	3.58
HYDROGRAPH AT										
+	U150S	.13	1	FLOW	44.	43.	41.	40.	39.	38.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RU150	.13	1	FLOW	43.	42.	40.	38.	37.	36.
				TIME	3.83	3.83	3.92	3.92	3.83	3.92
HYDROGRAPH AT										
+	U155	.13	1	FLOW	104.	102.	97.	93.	91.	90.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
3 COMBINED AT										
+	CP2	.88	1	FLOW	302.	294.	277.	258.	250.	244.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO										
+	CP2E	.88	1	FLOW	174.	170.	161.	152.	148.	145.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	CP2S	.88	1	FLOW	128.	124.	116.	106.	102.	99.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO										
+	RCP2S	.88	1	FLOW	126.	122.	115.	105.	100.	97.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT										
+	CP1S	.00	1	FLOW	148.	143.	136.	129.	127.	125.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	U210	.07	1	FLOW	60.	58.	56.	53.	52.	52.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT										
+	CP3	.07	1	FLOW	192.	186.	181.	178.	177.	177.
				TIME	3.92	3.92	3.75	3.75	3.75	3.75
DIVERSION TO										
+	CP3E	.07	1	FLOW	89.	85.	83.	82.	81.	81.
				TIME	3.92	3.92	3.75	3.75	3.75	3.50
HYDROGRAPH AT										
+	CP3S	.07	1	FLOW	103.	101.	98.	96.	96.	96.
				TIME	3.92	3.92	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	U250	.07	1	FLOW	57.	56.	53.	51.	50.	49.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT										
+	CP4	.14	1	FLOW	158.	155.	151.	147.	146.	145.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO										
+	CP4E	.14	1	FLOW	79.	77.	75.	73.	73.	72.
				TIME	3.75	3.75	3.75	3.75	3.75	3.58
HYDROGRAPH AT										
+	CP4S	.14	1	FLOW	79.	78.	76.	74.	73.	73.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RCP4S	.14	1	FLOW	79.	78.	76.	74.	73.	72.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT										
+	U230	.14	1	FLOW	110.	107.	102.	98.	96.	94.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	U330	.01	1	FLOW	15.	15.	14.	14.	13.	13.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	CP5	.30	1	FLOW	199.	194.	187.	179.	175.	173.
				TIME	3.75	3.75	3.75	3.75	3.75	3.83
HYDROGRAPH AT										
+	CP3E	.00	1	FLOW	89.	85.	83.	82.	81.	81.
				TIME	3.92	3.92	3.75	3.75	3.75	3.50
HYDROGRAPH AT										
+	U370	.02	1	FLOW	18.	18.	17.	16.	16.	16.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	CP6	.02	1	FLOW	101.	100.	99.	97.	97.	97.
				TIME	3.67	3.67	3.67	3.58	3.58	3.58
DIVERSION TO										
+	CP6E	.02	1	FLOW	46.	45.	45.	44.	44.	44.
				TIME	3.67	3.67	3.67	3.58	3.58	3.33
HYDROGRAPH AT										
+	CP6S	.02	1	FLOW	55.	55.	54.	53.	53.	53.
				TIME	3.67	3.67	3.67	3.58	3.58	3.58
HYDROGRAPH AT										
+	CP4E	.00	1	FLOW	79.	77.	75.	73.	73.	72.

				TIME	3.75	3.75	3.75	3.75	3.75	3.58
HYDROGRAPH AT										
+	U350	.02	1	FLOW	19.	18.	17.	17.	16.	16.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	CP7	.03	1	FLOW	150.	148.	144.	142.	141.	141.
				TIME	3.67	3.67	3.67	3.58	3.58	3.58
DIVERSION TO										
+	CP7E	.03	1	FLOW	75.	74.	72.	71.	70.	70.
				TIME	3.67	3.67	3.67	3.58	3.58	3.58
HYDROGRAPH AT										
+	CP7S	.03	1	FLOW	75.	74.	72.	71.	71.	71.
				TIME	3.67	3.67	3.67	3.58	3.58	3.58
HYDROGRAPH AT										
+	U305	.01	1	FLOW	11.	11.	11.	10.	10.	10.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	CP8	.04	1	FLOW	85.	84.	82.	81.	81.	81.
				TIME	3.67	3.67	3.58	3.58	3.58	3.58
DIVERSION TO										
+	CP8E	.04	1	FLOW	40.	39.	39.	38.	38.	38.
				TIME	3.67	3.67	3.58	3.58	3.50	3.50
HYDROGRAPH AT										
+	CP8S	.04	1	FLOW	45.	45.	43.	43.	43.	43.
				TIME	3.67	3.67	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	U310	.01	1	FLOW	13.	12.	12.	11.	11.	11.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	CP9	.35	1	FLOW	251.	246.	236.	225.	219.	215.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO										
+	CP9S	.35	1	FLOW	160.	157.	152.	145.	141.	139.
				TIME	3.75	3.75	3.75	3.75	3.75	3.67
HYDROGRAPH AT										
+	CP9E	.35	1	FLOW	91.	89.	84.	80.	78.	76.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RCP9E	.35	1	FLOW	89.	86.	81.	76.	74.	72.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	CP6E	.00	1	FLOW	46.	45.	45.	44.	44.	44.
				TIME	3.67	3.67	3.67	3.58	3.58	3.33
ROUTED TO										
+	RCP6E	.00	1	FLOW	47.	47.	48.	48.	49.	49.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	CP7E	.00	1	FLOW	75.	74.	72.	71.	70.	70.
				TIME	3.67	3.67	3.67	3.58	3.58	3.58
ROUTED TO										
+	RCP7E	.00	1	FLOW	85.	85.	85.	81.	80.	78.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	CP8E	.00	1	FLOW	40.	39.	39.	38.	38.	38.
				TIME	3.67	3.67	3.58	3.58	3.50	3.50
ROUTED TO										
+	RCP8E	.00	1	FLOW	40.	39.	39.	38.	38.	38.
				TIME	3.67	3.67	3.58	3.58	3.58	3.58
5 COMBINED AT										
+	DUMMY	1.23	1	FLOW	340.	326.	304.	275.	267.	262.
				TIME	4.08	4.08	4.08	4.17	4.17	4.17
HYDROGRAPH AT										
+	U410	.20	1	FLOW	169.	165.	158.	152.	149.	147.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT										
+	CP10	1.43	1	FLOW	452.	437.	410.	366.	359.	351.
				TIME	4.08	4.08	4.08	3.83	3.83	3.92
DIVERSION TO										
+	CP10S	1.43	1	FLOW	257.	248.	234.	210.	206.	202.
				TIME	4.08	4.08	4.08	3.83	3.83	3.92
HYDROGRAPH AT										
+	CP10E	1.43	1	FLOW	195.	189.	176.	157.	153.	149.
				TIME	4.08	4.08	4.08	3.83	3.83	3.92
ROUTED TO										
+	RCP10E	1.43	1	FLOW	188.	182.	171.	155.	152.	147.
				TIME	4.25	4.25	4.25	4.00	4.00	4.00
HYDROGRAPH AT										
+	U440	.05	1	FLOW	38.	37.	36.	34.	33.	33.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
DIVERSION TO										
+	U440E	.05	1	FLOW	21.	20.	19.	18.	18.	18.
				TIME	3.75	3.75	3.75	3.50	3.58	3.58
HYDROGRAPH AT										
+	U440S	.05	1	FLOW	17.	17.	17.	16.	15.	15.
				TIME	3.67	3.75	3.75	3.75	3.75	3.75
ROUTED TO										
+	RU440S	.05	1	FLOW	17.	17.	17.	15.	14.	14.
				TIME	3.83	3.83	3.83	3.83	3.83	3.92
HYDROGRAPH AT										
+	U470	.20	1	FLOW	132.	129.	123.	117.	114.	113.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
3 COMBINED AT										
+	CP11	1.69	1	FLOW	298.	292.	278.	265.	259.	252.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO										
+	CP11S	1.69	1	FLOW	127.	125.	118.	114.	112.	108.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	CP11E	1.69	1	FLOW	171.	167.	160.	151.	147.	144.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	U530	.01	1	FLOW	15.	14.	14.	13.	13.	13.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58

2 COMBINED AT										
+	CP12	1.70	1	FLOW	175.	171.	164.	154.	151.	148.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
DIVERSION TO										
+	CP12S	1.70	1	FLOW	80.	78.	75.	71.	70.	68.
				TIME	4.00	4.00	4.00	4.00	4.00	3.92
HYDROGRAPH AT										
+	CP12E	1.70	1	FLOW	95.	93.	89.	83.	81.	80.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO										
+	RCP12E	1.70	1	FLOW	95.	92.	88.	82.	78.	74.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	U130	.06	1	FLOW	54.	53.	51.	49.	48.	47.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO										
+	U130E	.06	1	FLOW	29.	28.	27.	26.	26.	26.
				TIME	3.67	3.67	3.67	3.50	3.50	3.50
HYDROGRAPH AT										
+	U130S	.06	1	FLOW	25.	25.	24.	23.	22.	21.
				TIME	3.58	3.67	3.67	3.67	3.67	3.67
ROUTED TO										
+	RU130S	.06	1	FLOW	25.	25.	24.	22.	21.	21.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	U550	.05	1	FLOW	55.	53.	51.	49.	48.	48.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT										
+	CP13	.11	1	FLOW	76.	74.	70.	67.	65.	64.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75
DIVERSION TO										
+	CP13E	.11	1	FLOW	44.	43.	41.	38.	37.	37.
				TIME	3.67	3.67	3.75	3.75	3.75	3.58
HYDROGRAPH AT										
+	CP13S	.11	1	FLOW	32.	31.	29.	29.	28.	27.
				TIME	3.67	3.67	3.75	3.75	3.75	3.75
ROUTED TO										
+	RCP13S	.11	1	FLOW	32.	31.	29.	29.	28.	26.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
HYDROGRAPH AT										
+	U440E	.00	1	FLOW	21.	20.	19.	18.	18.	18.
				TIME	3.75	3.75	3.75	3.50	3.58	3.58
ROUTED TO										
+	RU440E	.00	1	FLOW	21.	21.	21.	21.	21.	21.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
HYDROGRAPH AT										
+	U570	.18	1	FLOW	170.	167.	161.	155.	152.	151.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
4 COMBINED AT										
+	CP14	1.99	1	FLOW	269.	250.	224.	213.	207.	202.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08
DIVERSION TO										
+	CP14S	1.99	1	FLOW	30.	30.	30.	30.	30.	30.
				TIME	3.33	3.33	3.33	3.33	3.42	3.42
HYDROGRAPH AT										
+	CP14E	1.99	1	FLOW	239.	220.	194.	183.	177.	172.
				TIME	4.00	4.00	4.08	4.08	4.08	4.08
ROUTED TO										
+	RCP14E	1.99	1	FLOW	232.	217.	184.	172.	168.	164.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25
HYDROGRAPH AT										
+	U610	.05	1	FLOW	40.	39.	38.	36.	35.	35.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT										
+	CP15	2.03	1	FLOW	250.	235.	198.	186.	181.	177.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25
DIVERSION TO										
+	CP15S	2.03	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	CP15E	2.03	1	FLOW	250.	235.	198.	186.	181.	177.
				TIME	4.17	4.17	4.25	4.25	4.25	4.25
HYDROGRAPH AT										
+	CP9S	.00	1	FLOW	160.	157.	152.	145.	141.	139.
				TIME	3.75	3.75	3.75	3.75	3.75	3.67
ROUTED TO										
+	RCP9S	.00	1	FLOW	164.	162.	159.	155.	152.	150.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
HYDROGRAPH AT										
+	CP10S	.00	1	FLOW	257.	248.	234.	210.	206.	202.
				TIME	4.08	4.08	4.08	3.83	3.83	3.92
ROUTED TO										
+	RCP10S	.00	1	FLOW	248.	236.	223.	209.	208.	207.
				TIME	4.25	4.25	4.33	4.00	3.83	3.83
HYDROGRAPH AT										
+	U280	.27	1	FLOW	197.	192.	184.	176.	173.	170.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
3 COMBINED AT										
+	CP16	.27	1	FLOW	558.	549.	536.	525.	519.	514.
				TIME	3.92	3.92	3.92	3.92	3.92	3.92
ROUTED TO										
+	RCP16	.27	1	FLOW	563.	555.	541.	522.	514.	510.
				TIME	4.08	4.08	4.08	4.08	4.17	4.17
HYDROGRAPH AT										
+	CP11S	.00	1	FLOW	127.	125.	118.	114.	112.	108.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
ROUTED TO										
+	RCP11S	.00	1	FLOW	127.	123.	116.	112.	111.	111.
				TIME	4.33	4.33	4.33	4.08	4.08	4.17
HYDROGRAPH AT										
+	CP12S	.00	1	FLOW	80.	78.	75.	71.	70.	68.
				TIME	4.00	4.00	4.00	4.00	4.00	3.92

ROUTED TO										
+	RCP12S	.00	1	FLOW	89.	88.	86.	79.	80.	80.
				TIME	4.25	4.25	4.25	4.33	4.33	4.33
HYDROGRAPH AT										
+	CP14S	.00	1	FLOW	30.	30.	30.	30.	30.	30.
				TIME	3.33	3.33	3.33	3.33	3.42	3.42
ROUTED TO										
+	RCP14S	.00	1	FLOW	31.	31.	31.	32.	32.	32.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	U510	.49	1	FLOW	324.	316.	303.	290.	285.	281.
				TIME	4.00	4.00	4.00	4.00	4.00	4.00
5 COMBINED AT										
+	CP17	.76	1	FLOW	1049.	1030.	997.	957.	942.	931.
				TIME	4.17	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	U650	.01	1	FLOW	13.	12.	12.	11.	11.	11.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	CP18	.77	1	FLOW	1051.	1032.	999.	959.	943.	933.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	U630	.07	1	FLOW	82.	80.	77.	74.	73.	72.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT										
+	CP19	.84	1	FLOW	1083.	1064.	1030.	989.	973.	961.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
HYDROGRAPH AT										
+	U620	.05	1	FLOW	53.	51.	50.	48.	47.	46.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT										
+	CP20	.89	1	FLOW	1104.	1084.	1050.	1008.	991.	980.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO										
+	RCP20	.89	1	FLOW	1097.	1077.	1039.	995.	980.	971.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT										
+	CP15S	.00	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
ROUTED TO										
+	RCP15S	.00	1	FLOW	0.	0.	0.	0.	0.	0.
				TIME	.00	.00	.00	.00	.00	.00
HYDROGRAPH AT										
+	U680	.11	1	FLOW	113.	111.	107.	102.	101.	100.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
2 COMBINED AT										
+	CP21	.11	1	FLOW	113.	111.	107.	102.	101.	100.
				TIME	3.75	3.75	3.75	3.75	3.75	3.75
HYDROGRAPH AT										
+	U760	.01	1	FLOW	10.	10.	10.	9.	9.	9.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	CPGTA	1.01	1	FLOW	1147.	1126.	1087.	1041.	1026.	1015.
				TIME	4.17	4.17	4.17	4.17	4.17	4.17
HYDROGRAPH AT										
+	2-3	.03	1	FLOW	40.	39.	37.	36.	35.	35.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	CPGTA2	1.04	1	FLOW	1155.	1134.	1094.	1047.	1032.	1022.
				TIME	4.08	4.08	4.17	4.17	4.17	4.17
HYDROGRAPH AT										
+	2-1	.04	1	FLOW	56.	55.	54.	52.	51.	51.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-2	.07	1	FLOW	96.	94.	91.	88.	87.	86.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	2-14A	.00	1	FLOW	3.	3.	3.	3.	3.	3.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	2A	.11	1	FLOW	155.	152.	147.	142.	140.	138.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	2B	1.15	1	FLOW	1201.	1179.	1135.	1087.	1066.	1056.
				TIME	4.08	4.08	4.08	4.08	4.08	4.08
ROUTED TO										
+	DB1	1.15	1	FLOW	245.	242.	238.	233.	231.	230.
				TIME	6.00	6.00	6.00	6.00	6.00	6.00
			**	PEAK STAGES IN FEET **						
			1	STAGE	2307.98	2307.78	2307.47	2307.15	2307.02	2306.93
				TIME	6.00	6.00	6.00	6.00	6.00	6.00
HYDROGRAPH AT										
+	2-6	.02	1	FLOW	29.	29.	28.	27.	27.	27.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	2C	1.17	1	FLOW	245.	242.	238.	233.	232.	230.
				TIME	5.92	5.92	5.92	5.92	5.92	5.92
HYDROGRAPH AT										
+	2-7	.02	1	FLOW	20.	19.	18.	18.	17.	17.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	2D	1.19	1	FLOW	245.	243.	238.	234.	232.	231.
				TIME	5.92	5.92	5.92	5.92	5.92	5.92
HYDROGRAPH AT										
+	2-4	.03	1	FLOW	56.	55.	53.	52.	51.	51.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-14B	.00	1	FLOW	3.	3.	3.	3.	3.	3.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	2E	.04	1	FLOW	59.	58.	56.	55.	54.	53.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58

HYDROGRAPH AT

+	2-5	.09	1	FLOW	115.	113.	109.	106.	104.	103.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
DIVERSION TO										
+	2-5E	.09	1	FLOW	55.	54.	52.	51.	50.	49.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	2-5W	.09	1	FLOW	60.	59.	57.	55.	54.	54.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	2-9	.02	1	FLOW	24.	23.	23.	22.	22.	21.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	2F	.14	1	FLOW	142.	140.	135.	131.	129.	127.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-5E	.00	1	FLOW	55.	54.	52.	51.	50.	49.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	2-10	.02	1	FLOW	25.	24.	24.	23.	23.	22.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	2G	.16	1	FLOW	222.	218.	210.	203.	200.	198.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-8	.03	1	FLOW	48.	47.	45.	44.	43.	43.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	2H	.19	1	FLOW	270.	264.	256.	247.	244.	242.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	2I	1.37	1	FLOW	395.	387.	374.	361.	356.	353.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-11	.03	1	FLOW	43.	42.	41.	40.	39.	39.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-12	.03	1	FLOW	39.	39.	37.	36.	35.	35.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	2J	.05	1	FLOW	82.	81.	78.	75.	74.	74.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	DUMMY	1.42	1	FLOW	477.	467.	452.	437.	431.	426.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	2-13	.03	1	FLOW	39.	38.	37.	36.	35.	35.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	PT2	1.45	1	FLOW	516.	505.	489.	472.	466.	461.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	U720	.06	1	FLOW	67.	66.	63.	61.	60.	59.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	U800	.01	1	FLOW	14.	13.	13.	13.	12.	12.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	CP25	.07	1	FLOW	79.	77.	74.	72.	71.	70.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	U740	.05	1	FLOW	62.	60.	58.	56.	55.	54.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT										
+	CP26	.12	1	FLOW	141.	138.	133.	128.	126.	124.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	U700	.14	1	FLOW	122.	119.	115.	111.	109.	108.
				TIME	3.83	3.83	3.83	3.83	3.83	3.83
2 COMBINED AT										
+	CP27	.26	1	FLOW	248.	242.	233.	224.	220.	218.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
HYDROGRAPH AT										
+	1-1	.03	1	FLOW	57.	56.	54.	52.	52.	51.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	AL1E	.00	1	FLOW	5.	5.	5.	5.	5.	5.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
2 COMBINED AT										
+	1A.1	.04	1	FLOW	61.	60.	58.	56.	56.	55.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO										
+	R1A.1	.04	1	FLOW	60.	59.	58.	56.	55.	55.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	1-2	.04	1	FLOW	58.	57.	56.	54.	53.	53.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	1A	.07	1	FLOW	119.	117.	113.	110.	108.	107.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	1-4	.04	1	FLOW	55.	54.	52.	51.	50.	49.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
ROUTED TO										
+	R1-4	.04	1	FLOW	53.	52.	51.	49.	48.	47.
				TIME	3.67	3.67	3.67	3.67	3.67	3.67
2 COMBINED AT										
+	1B	.11	1	FLOW	167.	164.	159.	154.	152.	150.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	1-3	.04	1	FLOW	60.	59.	57.	55.	54.	54.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	AL2E	.00	1	FLOW	5.	5.	5.	5.	5.	5.

				TIME	3.50	3.50	3.50	3.50	3.50	3.50
3 COMBINED AT										
+	PT1	.15	1	FLOW	232.	227.	220.	212.	210.	207.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-1	.04	1	FLOW	60.	59.	57.	56.	55.	54.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-6	.00	1	FLOW	5.	5.	4.	4.	4.	4.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-7	.05	1	FLOW	64.	63.	61.	58.	58.	57.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	4A	.09	1	FLOW	129.	126.	122.	118.	117.	116.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-4	.01	1	FLOW	17.	16.	16.	15.	15.	15.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	4B	.10	1	FLOW	146.	143.	138.	134.	132.	131.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-2	.05	1	FLOW	86.	84.	82.	79.	78.	77.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-3	.05	1	FLOW	75.	74.	71.	69.	68.	67.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	4C	.11	1	FLOW	161.	158.	153.	148.	146.	144.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	U1020	.01	1	FLOW	14.	14.	14.	13.	13.	13.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	4D	.22	1	FLOW	321.	315.	305.	295.	291.	288.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	4-5	.06	1	FLOW	100.	99.	96.	93.	91.	91.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	4H	.28	1	FLOW	421.	414.	401.	387.	382.	379.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	U1040	.02	1	FLOW	32.	31.	30.	30.	29.	29.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	U1060	.01	1	FLOW	10.	10.	10.	10.	9.	9.
				TIME	3.50	3.50	3.50	3.50	3.50	3.50
HYDROGRAPH AT										
+	U1080	.03	1	FLOW	42.	41.	40.	39.	38.	38.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
3 COMBINED AT										
+	4I	.05	1	FLOW	84.	82.	80.	78.	77.	76.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	PT4	.33	1	FLOW	505.	496.	481.	465.	459.	455.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
5 COMBINED AT										
+	DUMMY	4.23	1	FLOW	1508.	1477.	1427.	1377.	1358.	1344.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	3-1	.04	1	FLOW	59.	58.	56.	54.	54.	53.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
HYDROGRAPH AT										
+	3-2	.02	1	FLOW	31.	30.	29.	28.	27.	27.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58
2 COMBINED AT										
+	PT3	.06	1	FLOW	89.	88.	85.	82.	81.	80.
				TIME	3.58	3.58	3.58	3.58	3.58	3.58

1

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

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .00									
RCP1E	MANE	1.50	199.16	246.00	.37	5.00	198.58	245.00	.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1218E+02 EXCESS= .0000E+00 OUTFLOW= .1219E+02 BASIN STORAGE= .2040E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RCP1E	MANE	1.50	194.72	247.50	.35	5.00	193.91	245.00	.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1154E+02 EXCESS= .0000E+00 OUTFLOW= .1155E+02 BASIN STORAGE= .2543E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RCP1E	MANE	1.50	186.12	247.50	.32	5.00	185.27	245.00	.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1044E+02 EXCESS= .0000E+00 OUTFLOW= .1045E+02 BASIN STORAGE= .2185E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RCP1E	MANE	1.50	177.74	247.50	.28	5.00	176.54	245.00	.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9349E+01 EXCESS= .0000E+00 OUTFLOW= .9357E+01 BASIN STORAGE= .1968E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RCP1E	MANE	1.50	173.54	247.50	.27	5.00	172.20	245.00	.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8932E+01 EXCESS= .0000E+00 OUTFLOW= .8942E+01 BASIN STORAGE= .2479E-02 PERCENT ERROR= -.1

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          FOR PLAN = 1  RATIO=  .00
             RCP1E  MANE          1.25    170.56    247.50       .26      5.00    168.89    250.00          .26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8647E+01 EXCESS= .0000E+00 OUTFLOW= .8653E+01 BASIN STORAGE= .1793E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RU150  MANE          1.00     43.78    232.00       .22      5.00     43.29    230.00          .21

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1563E+01 EXCESS= .0000E+00 OUTFLOW= .1564E+01 BASIN STORAGE= .1132E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RU150  MANE          1.00     42.55    232.00       .21      5.00     42.13    230.00          .20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1479E+01 EXCESS= .0000E+00 OUTFLOW= .1481E+01 BASIN STORAGE= .1107E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
             RU150  MANE           .75     40.81    232.50       .19      5.00     40.27    235.00          .19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1351E+01 EXCESS= .0000E+00 OUTFLOW= .1351E+01 BASIN STORAGE= .9748E-03 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RU150  MANE           .75     39.33    231.75       .17      5.00     38.25    235.00          .17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1210E+01 EXCESS= .0000E+00 OUTFLOW= .1210E+01 BASIN STORAGE= .1274E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RU150  MANE           .75     38.23    231.75       .16      5.00     36.88    230.00          .16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1145E+01 EXCESS= .0000E+00 OUTFLOW= .1146E+01 BASIN STORAGE= .1158E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RU150  MANE           .75     37.00    231.75       .15      5.00     35.66    235.00          .15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1096E+01 EXCESS= .0000E+00 OUTFLOW= .1097E+01 BASIN STORAGE= .1046E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP2S  MANE           .75    126.72    249.00       .11      5.00    126.37    250.00          .11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5163E+01 EXCESS= .0000E+00 OUTFLOW= .5166E+01 BASIN STORAGE= .2604E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP2S  MANE           .75    122.35    249.00       .10      5.00    122.19    250.00          .10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4816E+01 EXCESS= .0000E+00 OUTFLOW= .4818E+01 BASIN STORAGE= .2263E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP2S  MANE           .75    114.62    249.75       .09      5.00    114.57    250.00          .09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4149E+01 EXCESS= .0000E+00 OUTFLOW= .4149E+01 BASIN STORAGE= .2452E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP2S  MANE           .75    105.06    250.50       .07      5.00    104.78    250.00          .07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3365E+01 EXCESS= .0000E+00 OUTFLOW= .3367E+01 BASIN STORAGE= .2223E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP2S  MANE           .50    101.08    251.50       .07      5.00    100.31    250.00          .06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3070E+01 EXCESS= .0000E+00 OUTFLOW= .3063E+01 BASIN STORAGE= .2389E-02 PERCENT ERROR=    .2

          FOR PLAN = 1  RATIO=  .00
             RCP2S  MANE           .50     97.74    251.50       .06      5.00     96.82    250.00          .06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2903E+01 EXCESS= .0000E+00 OUTFLOW= .2896E+01 BASIN STORAGE= .2400E-02 PERCENT ERROR=    .1

          FOR PLAN = 1  RATIO=  .00
             RCP4S  MANE          1.00     78.69    231.00       .51      5.00     78.69    230.00          .52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3886E+01 EXCESS= .0000E+00 OUTFLOW= .3887E+01 BASIN STORAGE= .1135E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP4S  MANE          1.00     77.77    230.00       .48      5.00     77.77    230.00          .49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3656E+01 EXCESS= .0000E+00 OUTFLOW= .3659E+01 BASIN STORAGE= .9282E-03 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP4S  MANE           .75     75.79    230.25       .43      5.00     75.79    230.00          .44

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3286E+01 EXCESS= .0000E+00 OUTFLOW= .3287E+01 BASIN STORAGE= .1029E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP4S  MANE           .75     73.73    229.50       .39      5.00     73.66    230.00          .39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2941E+01 EXCESS= .0000E+00 OUTFLOW= .2942E+01 BASIN STORAGE= .1030E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP4S  MANE           .75     72.53    229.50       .37      5.00     72.51    230.00          .37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2810E+01 EXCESS= .0000E+00 OUTFLOW= .2810E+01 BASIN STORAGE= .1298E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP4S  MANE           .75     72.16    230.25       .36      5.00     72.14    230.00          .36

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2735E+01 EXCESS= .0000E+00 OUTFLOW= .2736E+01 BASIN STORAGE= .1137E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
             RCP9E  MANE           .75     89.87    233.25       .15      5.00     88.74    235.00          .15
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .2859E+01 EXCESS= .0000E+00 OUTFLOW= .2858E+01 BASIN STORAGE= .1397E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP9E	MANE	.75	87.47	232.50	.14	5.00	85.80	235.00	.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2635E+01 EXCESS= .0000E+00 OUTFLOW= .2634E+01 BASIN STORAGE= .1815E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP9E	MANE	.75	82.19	234.00	.12	5.00	81.18	235.00	.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2149E+01 EXCESS= .0000E+00 OUTFLOW= .2148E+01 BASIN STORAGE= .1680E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP9E	MANE	.50	77.41	234.00	.10	5.00	76.47	235.00	.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1810E+01 EXCESS= .0000E+00 OUTFLOW= .1804E+01 BASIN STORAGE= .1918E-02 PERCENT ERROR= .2

FOR PLAN = 1 RATIO= .00

RCP9E	MANE	.50	75.00	233.50	.09	5.00	73.86	235.00	.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1678E+01 EXCESS= .0000E+00 OUTFLOW= .1674E+01 BASIN STORAGE= .1712E-02 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .00

RCP9E	MANE	.50	72.58	234.00	.08	5.00	71.65	235.00	.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1571E+01 EXCESS= .0000E+00 OUTFLOW= .1566E+01 BASIN STORAGE= .1511E-02 PERCENT ERROR= .2

FOR PLAN = 1 RATIO= .00

RCP6E	MANE	5.00	46.73	225.00	-1.00	5.00	46.73	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP6E	MANE	5.00	47.09	225.00	-1.00	5.00	47.09	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP6E	MANE	5.00	47.71	225.00	-1.00	5.00	47.71	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP6E	MANE	5.00	48.32	225.00	-1.00	5.00	48.32	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP6E	MANE	5.00	48.57	225.00	-1.00	5.00	48.57	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP6E	MANE	5.00	48.75	225.00	-1.00	5.00	48.75	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP7E	MANE	5.00	84.98	225.00	-1.00	5.00	84.98	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP7E	MANE	5.00	85.39	225.00	-1.00	5.00	85.39	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP7E	MANE	5.00	84.52	225.00	-1.00	5.00	84.52	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP7E	MANE	5.00	81.15	225.00	-1.00	5.00	81.15	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP7E	MANE	5.00	79.59	225.00	-1.00	5.00	79.59	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP7E	MANE	5.00	78.39	225.00	-1.00	5.00	78.39	225.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP8E	MANE	.46	40.20	220.35	-1.00	5.00	40.14	220.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP8E	MANE	.46	39.19	220.39	-1.00	5.00	39.19	220.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP8E	MANE	.46	39.00	215.63	-1.00	5.00	38.92	215.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP8E	MANE	.46	38.32	210.80	-1.00	5.00	38.14	215.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP8E	MANE	.46	38.31	211.00	-1.00	5.00	38.00	215.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP8E	MANE	.46	38.31	211.00	-1.00	5.00	38.00	215.00	-1.00

FOR PLAN = 1 RATIO= .00

RCP10E	MANE	1.25	190.67	253.75	.15	5.00	187.65	255.00	.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1124E+02 EXCESS= .0000E+00 OUTFLOW= .1125E+02 BASIN STORAGE= .1720E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP10E	MANE	1.25	184.52	253.75	.14	5.00	182.13	255.00	.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1064E+02 EXCESS= .0000E+00 OUTFLOW= .1065E+02 BASIN STORAGE= .2096E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP10E	MANE	1.00	172.26	254.00	.13	5.00	170.77	255.00	.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9735E+01 EXCESS= .0000E+00 OUTFLOW= .9740E+01 BASIN STORAGE= .1706E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP10E	MANE	.75	155.36	240.00	.11	5.00	155.36	240.00	.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8705E+01 EXCESS= .0000E+00 OUTFLOW= .8704E+01 BASIN STORAGE= .2380E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP10E	MANE	.75	152.00	240.75	.10	5.00	151.98	240.00	.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7939E+01 EXCESS= .0000E+00 OUTFLOW= .7937E+01 BASIN STORAGE= .2259E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP10E	MANE	1.00	148.02	241.00	.10	5.00	147.39	240.00	.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7606E+01 EXCESS= .0000E+00 OUTFLOW= .7610E+01 BASIN STORAGE= .1871E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RU440S	MANE	.75	17.02	229.50	.22	5.00	17.02	230.00	.22

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6137E+00 EXCESS= .0000E+00 OUTFLOW= .6138E+00 BASIN STORAGE= .1134E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RU440S	MANE	1.00	17.06	230.00	.21	5.00	17.06	230.00	.21

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5859E+00 EXCESS= .0000E+00 OUTFLOW= .5864E+00 BASIN STORAGE= .1110E-02 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .00

RU440S	MANE	1.00	16.60	232.00	.19	5.00	16.52	230.00	.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5308E+00 EXCESS= .0000E+00 OUTFLOW= .5315E+00 BASIN STORAGE= .9713E-03 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .00

RU440S	MANE	1.00	15.58	233.00	.17	5.00	15.18	230.00	.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4626E+00 EXCESS= .0000E+00 OUTFLOW= .4636E+00 BASIN STORAGE= .1004E-02 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .00

RU440S	MANE	.75	14.92	232.50	.16	5.00	14.39	230.00	.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4343E+00 EXCESS= .0000E+00 OUTFLOW= .4348E+00 BASIN STORAGE= .1191E-02 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .00

RU440S	MANE	.75	14.44	232.50	.15	5.00	13.95	235.00	.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4166E+00 EXCESS= .0000E+00 OUTFLOW= .4172E+00 BASIN STORAGE= .9607E-03 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .00

RCP12E	MANE	.75	94.54	245.25	.04	5.00	94.50	245.00	.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4033E+01 EXCESS= .0000E+00 OUTFLOW= .4035E+01 BASIN STORAGE= .1251E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP12E	MANE	.75	92.32	245.25	.04	5.00	92.30	245.00	.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3624E+01 EXCESS= .0000E+00 OUTFLOW= .3624E+01 BASIN STORAGE= .1717E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

RCP12E	MANE	.75	87.83	246.00	.03	5.00	87.67	245.00	.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2866E+01 EXCESS= .0000E+00 OUTFLOW= .2866E+01 BASIN STORAGE= .1779E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

RCP12E	MANE	.50	82.11	245.50	.02	5.00	81.96	245.00	.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2245E+01 EXCESS= .0000E+00 OUTFLOW= .2241E+01 BASIN STORAGE= .1754E-02 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .00

RCP12E	MANE	.50	78.60	246.50	.02	5.00	77.57	245.00	.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1699E+01 EXCESS= .0000E+00 OUTFLOW= .1694E+01 BASIN STORAGE= .1478E-02 PERCENT ERROR= .2

FOR PLAN = 1 RATIO= .00

RCP12E	MANE	.50	76.61	246.50	.02	5.00	74.23	245.00	.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1560E+01 EXCESS= .0000E+00 OUTFLOW= .1556E+01 BASIN STORAGE= .1816E-02 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .00

RU130S	MANE	.75	25.04	223.50	.24	5.00	24.95	225.00	.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7186E+00 EXCESS= .0000E+00 OUTFLOW= .7188E+00 BASIN STORAGE= .1182E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

RU130S	MANE	1.00	24.91	224.00	.23	5.00	24.81	225.00	.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6842E+00 EXCESS= .0000E+00 OUTFLOW= .6852E+00 BASIN STORAGE= .9951E-03 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .00

RU130S	MANE	.75	23.72	224.25	.21	5.00	23.71	225.00	.21

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6210E+00 EXCESS= .0000E+00 OUTFLOW= .6214E+00 BASIN STORAGE= .9174E-03 PERCENT ERROR= -.2

```
          FOR PLAN = 1  RATIO=  .00
            RU130S  MANE          .75     22.25    225.00       .19      5.00     22.25    225.00         .19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5565E+00 EXCESS= .0000E+00 OUTFLOW= .5568E+00 BASIN STORAGE= .1173E-02 PERCENT ERROR=   -.3

          FOR PLAN = 1  RATIO=  .00
            RU130S  MANE          .75     21.36    225.75       .18      5.00     21.36    225.00         .18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5270E+00 EXCESS= .0000E+00 OUTFLOW= .5274E+00 BASIN STORAGE= .9167E-03 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .00
            RU130S  MANE          .75     20.75    225.75       .17      5.00     20.74    225.00         .17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5080E+00 EXCESS= .0000E+00 OUTFLOW= .5084E+00 BASIN STORAGE= .1166E-02 PERCENT ERROR=   -.3

          FOR PLAN = 1  RATIO=  .00
            RCP13S  MANE          .75     31.70    228.75       .14      5.00     31.56    230.00         .14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8183E+00 EXCESS= .0000E+00 OUTFLOW= .8170E+00 BASIN STORAGE= .1035E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RCP13S  MANE          .75     30.84    229.50       .13      5.00     30.77    230.00         .13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7689E+00 EXCESS= .0000E+00 OUTFLOW= .7675E+00 BASIN STORAGE= .9829E-03 PERCENT ERROR=    .1

          FOR PLAN = 1  RATIO=  .00
            RCP13S  MANE          .75     29.14    229.50       .12      5.00     29.10    230.00         .12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6835E+00 EXCESS= .0000E+00 OUTFLOW= .6824E+00 BASIN STORAGE= .1407E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RCP13S  MANE          .75     28.68    229.50       .11      5.00     28.68    230.00         .11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6247E+00 EXCESS= .0000E+00 OUTFLOW= .6230E+00 BASIN STORAGE= .1239E-02 PERCENT ERROR=    .1

          FOR PLAN = 1  RATIO=  .00
            RCP13S  MANE          .75     27.60    230.25       .10      5.00     27.56    230.00         .10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5867E+00 EXCESS= .0000E+00 OUTFLOW= .5853E+00 BASIN STORAGE= .1141E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RCP13S  MANE          .75     26.49    231.00       .10      5.00     26.42    230.00         .10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5556E+00 EXCESS= .0000E+00 OUTFLOW= .5546E+00 BASIN STORAGE= .1065E-02 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .00
            RU440E  MANE         5.00     20.99    240.00     -1.00      5.00     20.99    240.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RU440E  MANE         5.00     20.79    240.00     -1.00      5.00     20.79    240.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RU440E  MANE         5.00     20.69    240.00     -1.00      5.00     20.69    240.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RU440E  MANE         5.00     21.00    240.00     -1.00      5.00     21.00    240.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RU440E  MANE         5.00     20.99    240.00     -1.00      5.00     20.99    240.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RU440E  MANE         5.00     20.90    240.00     -1.00      5.00     20.90    240.00       -1.00


          FOR PLAN = 1  RATIO=  .00
            RCP14E  MANE         2.00    231.61    250.00       .14      5.00    231.61    250.00         .14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1506E+02 EXCESS= .0000E+00 OUTFLOW= .1507E+02 BASIN STORAGE= .2454E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
            RCP14E  MANE         2.00    217.18    250.00       .14      5.00    217.18    250.00         .14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1438E+02 EXCESS= .0000E+00 OUTFLOW= .1439E+02 BASIN STORAGE= .2351E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
            RCP14E  MANE         2.00    185.35    254.00       .12      5.00    184.14    255.00         .12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1283E+02 EXCESS= .0000E+00 OUTFLOW= .1283E+02 BASIN STORAGE= .2146E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
            RCP14E  MANE         2.00    173.53    254.00       .11      5.00    172.33    255.00         .11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1168E+02 EXCESS= .0000E+00 OUTFLOW= .1169E+02 BASIN STORAGE= .1766E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
            RCP14E  MANE         1.75    168.78    253.75       .10      5.00    167.96    255.00         .10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1091E+02 EXCESS= .0000E+00 OUTFLOW= .1091E+02 BASIN STORAGE= .1839E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .00
            RCP14E  MANE         1.75    164.28    253.75       .10      5.00    163.75    255.00         .10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1063E+02 EXCESS= .0000E+00 OUTFLOW= .1063E+02 BASIN STORAGE= .2540E-02 PERCENT ERROR=   -.1
```

```
 FOR PLAN = 1  RATIO=  .00
    RCP9S  MANE          5.00    164.07    235.00     -1.00      5.00    164.07    235.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP9S  MANE          5.00    161.57    235.00     -1.00      5.00    161.57    235.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP9S  MANE          5.00    158.96    235.00     -1.00      5.00    158.96    235.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP9S  MANE          5.00    154.89    235.00     -1.00      5.00    154.89    235.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP9S  MANE          5.00    151.97    235.00     -1.00      5.00    151.97    235.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP9S  MANE          5.00    149.83    235.00     -1.00      5.00    149.83    235.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP10S  MANE          5.00    248.04    255.00     -1.00      5.00    248.04    255.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP10S  MANE          5.00    235.83    255.00     -1.00      5.00    235.83    255.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP10S  MANE          5.00    223.19    260.00     -1.00      5.00    223.19    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP10S  MANE          5.00    208.91    240.00     -1.00      5.00    208.91    240.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP10S  MANE          5.00    207.70    230.00     -1.00      5.00    207.70    230.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP10S  MANE          5.00    207.03    230.00     -1.00      5.00    207.03    230.00       -1.00


 FOR PLAN = 1  RATIO=  .00
    RCP16  MANE          5.00    562.50    245.00      5.39      5.00    562.50    245.00        5.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7727E+02 EXCESS= .0000E+00 OUTFLOW= .7729E+02 BASIN STORAGE= .3886E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RCP16  MANE          5.00    555.42    245.00      5.28      5.00    555.42    245.00        5.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7567E+02 EXCESS= .0000E+00 OUTFLOW= .7569E+02 BASIN STORAGE= .3825E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RCP16  MANE          5.00    541.32    245.00      5.10      5.00    541.32    245.00        5.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7315E+02 EXCESS= .0000E+00 OUTFLOW= .7317E+02 BASIN STORAGE= .3760E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RCP16  MANE          5.00    522.35    245.00      4.92      5.00    522.35    245.00        4.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7050E+02 EXCESS= .0000E+00 OUTFLOW= .7052E+02 BASIN STORAGE= .3694E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RCP16  MANE          5.00    514.24    250.00      4.85      5.00    514.24    250.00        4.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6951E+02 EXCESS= .0000E+00 OUTFLOW= .6952E+02 BASIN STORAGE= .3668E-02 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
    RCP16  MANE          5.00    509.94    250.00      4.80      5.00    509.94    250.00        4.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6883E+02 EXCESS= .0000E+00 OUTFLOW= .6885E+02 BASIN STORAGE= .3635E-02 PERCENT ERROR=    .0


 FOR PLAN = 1  RATIO=  .00
   RCP11S  MANE          5.00    127.19    260.00     -1.00      5.00    127.19    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP11S  MANE          5.00    123.34    260.00     -1.00      5.00    123.34    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP11S  MANE          5.00    115.97    260.00     -1.00      5.00    115.97    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP11S  MANE          5.00    111.56    245.00     -1.00      5.00    111.56    245.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP11S  MANE          5.00    110.87    245.00     -1.00      5.00    110.87    245.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP11S  MANE          5.00    110.53    250.00     -1.00      5.00    110.53    250.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP12S  MANE          5.00     88.78    255.00     -1.00      5.00     88.78    255.00       -1.00
```

```
 FOR PLAN = 1  RATIO=  .00
   RCP12S  MANE          5.00     88.19    255.00     -1.00      5.00     88.19    255.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP12S  MANE          5.00     86.17    255.00     -1.00      5.00     86.17    255.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP12S  MANE          5.00     79.16    260.00     -1.00      5.00     79.16    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP12S  MANE          5.00     79.61    260.00     -1.00      5.00     79.61    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP12S  MANE          5.00     79.53    260.00     -1.00      5.00     79.53    260.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP14S  MANE          5.00     30.99    210.00     -1.00      5.00     30.99    210.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP14S  MANE          5.00     31.14    210.00     -1.00      5.00     31.14    210.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP14S  MANE          5.00     31.40    210.00     -1.00      5.00     31.40    210.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP14S  MANE          5.00     31.69    210.00     -1.00      5.00     31.69    210.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP14S  MANE          5.00     31.75    210.00     -1.00      5.00     31.75    210.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP14S  MANE          5.00     31.64    210.00     -1.00      5.00     31.64    210.00       -1.00


 FOR PLAN = 1  RATIO=  .00
      RCP20  MANE          2.90   1097.83    249.30      3.23      5.00   1096.67    250.00        3.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1526E+03 EXCESS= .0000E+00 OUTFLOW= .1526E+03 BASIN STORAGE= .8746E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
      RCP20  MANE          2.91   1079.36    247.54      3.15      5.00   1076.73    250.00        3.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1492E+03 EXCESS= .0000E+00 OUTFLOW= .1492E+03 BASIN STORAGE= .8611E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
      RCP20  MANE          2.94   1041.01    249.54      3.04      5.00   1039.50    250.00        3.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1437E+03 EXCESS= .0000E+00 OUTFLOW= .1437E+03 BASIN STORAGE= .8985E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
      RCP20  MANE          2.97    997.46    249.12      2.92      5.00    994.80    250.00        2.92

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1380E+03 EXCESS= .0000E+00 OUTFLOW= .1380E+03 BASIN STORAGE= .8491E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
      RCP20  MANE          2.98    982.29    247.18      2.87      5.00    980.39    250.00        2.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1357E+03 EXCESS= .0000E+00 OUTFLOW= .1357E+03 BASIN STORAGE= .8654E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
      RCP20  MANE          2.99    974.62    247.89      2.84      5.00    970.69    250.00        2.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1341E+03 EXCESS= .0000E+00 OUTFLOW= .1341E+03 BASIN STORAGE= .9700E-03 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .00
   RCP15S  MANE          5.00       .00       .00     -1.00      5.00       .00    250.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP15S  MANE          5.00       .00       .00     -1.00      5.00       .00    250.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP15S  MANE          5.00       .00       .00     -1.00      5.00       .00    250.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP15S  MANE          5.00       .00       .00     -1.00      5.00       .00    250.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP15S  MANE          5.00       .00       .00     -1.00      5.00       .00    250.00       -1.00


 FOR PLAN = 1  RATIO=  .00
   RCP15S  MANE          5.00       .00       .00     -1.00      5.00       .00    250.00       -1.00


 FOR PLAN = 1  RATIO=  .99
      R1A.1  MANE           .59     60.69    215.63      2.13      5.00     60.38    215.00        2.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4204E+01 EXCESS= .0000E+00 OUTFLOW= .4205E+01 BASIN STORAGE= .2311E-11 PERCENT ERROR=    .0

 FOR PLAN = 1  RATIO=  .98
      R1A.1  MANE           .46     59.81    215.82      2.09      5.00     59.32    215.00        2.09
```

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4125E+01 EXCESS= .0000E+00 OUTFLOW= .4126E+01 BASIN STORAGE= .2107E-11 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .95

R1A.1	MANE	.60	57.85	215.64	2.02	5.00	57.54	215.00	2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3994E+01 EXCESS= .0000E+00 OUTFLOW= .3994E+01 BASIN STORAGE= .2284E-11 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .93

R1A.1	MANE	.51	56.13	215.55	1.96	5.00	55.78	215.00	1.96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3862E+01 EXCESS= .0000E+00 OUTFLOW= .3863E+01 BASIN STORAGE= .2160E-11 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .92

R1A.1	MANE	.59	55.30	215.78	1.93	5.00	55.05	215.00	1.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3810E+01 EXCESS= .0000E+00 OUTFLOW= .3810E+01 BASIN STORAGE= .2221E-11 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .91

R1A.1	MANE	.59	54.86	215.50	1.91	5.00	54.56	215.00	1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3773E+01 EXCESS= .0000E+00 OUTFLOW= .3774E+01 BASIN STORAGE= .2124E-11 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00

R1-4	MANE	4.00	53.41	220.00	1.83	5.00	53.41	220.00	1.84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3643E+01 EXCESS= .0000E+00 OUTFLOW= .3648E+01 BASIN STORAGE= .2570E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

R1-4	MANE	4.00	52.38	220.00	1.80	5.00	52.38	220.00	1.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3567E+01 EXCESS= .0000E+00 OUTFLOW= .3572E+01 BASIN STORAGE= .2548E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

R1-4	MANE	4.00	50.65	220.00	1.73	5.00	50.65	220.00	1.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3440E+01 EXCESS= .0000E+00 OUTFLOW= .3445E+01 BASIN STORAGE= .2511E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

R1-4	MANE	4.00	48.91	220.00	1.67	5.00	48.91	220.00	1.67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3314E+01 EXCESS= .0000E+00 OUTFLOW= .3319E+01 BASIN STORAGE= .2474E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

R1-4	MANE	4.00	48.22	220.00	1.64	5.00	48.22	220.00	1.65

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3264E+01 EXCESS= .0000E+00 OUTFLOW= .3269E+01 BASIN STORAGE= .2458E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00

R1-4	MANE	4.25	47.12	221.00	1.62	5.00	46.84	220.00	1.62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3226E+01 EXCESS= .0000E+00 OUTFLOW= .3231E+01 BASIN STORAGE= .2588E-02 PERCENT ERROR= -.2

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

MASTER DRAINAGE STUDY

Park Highlands West
(A.K.A. North Las Vegas 600-Acre Site)
VOLUME 2 OF 2
City of North Las Vegas, Nevada

Job No.: CBH1301.002
Date: May 2013

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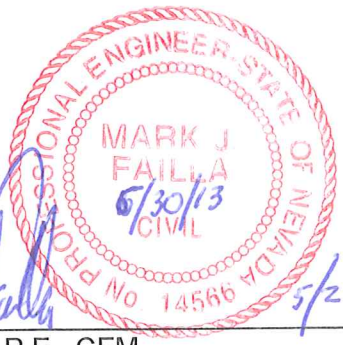


5/29/13

Mark J. Failla, P.E., CFM
NV Professional Engineer No. 14566

Assisted by: Kylie Anderson, P.E.
Kellin Collins, P.E.
Erick Mata, E.I.

APPENDIX D

Street Hydraulic Computations

Street Capacity Summary Table

Street Flow Capacity Summary

10 - Yr Interim Condition

Street Section	R/W Width (ft)	Slope (%)	Q (cfs)	Depth (ft)	Velocity (fps)	Vxd
1	90	1.04	53	0.65	3.97	2.58
2	90	0.50	37	0.65	2.76	1.79
3	70	1.00	136	1.00	5.39	5.39
4	90	1.04	53	0.65	3.97	2.58
5	52	0.45	128	1.00	4.62	4.62
6	52	0.80	164	0.98	6.09	5.97
7	52	0.50	137	1.00	4.89	4.89
8	52	0.91	159	0.95	6.30	5.99
9	70	0.50	94	1.00	3.78	3.78
10	70	1.09	195	0.95	6.34	6.02
11	70	0.53	155	1.00	4.65	4.65
12	70	0.51	155	1.00	4.59	4.59
13	70	0.75	185	1.00	5.53	5.53
14	70	0.55	160	1.00	4.76	4.76
15	70	0.60	168	1.00	4.98	4.98
16	52	0.48	132	1.00	4.77	4.77
17	52	2.12	140	0.77	7.79	6.00
18	49	0.60	160	1.00	5.23	5.23
19	70	0.53	155	1.00	4.65	4.65
20	70	0.53	155	1.00	4.65	4.65
21	70	1.24	190	0.92	6.53	6.01
22	70	0.50	152	1.00	4.53	4.53
23	*100	1.19	60	0.78	4.87	3.80
24	*90	0.53	11	0.55	2.50	1.38
25	90	0.42	33	0.65	2.53	1.64
26	90	1.01	52	0.65	3.92	2.55
27	*70	0.50	76	1.00	4.53	4.53
28	41	0.50	134	1.00	4.96	4.96
29	96	2.47	118	0.71	7.06	5.01
30	96	0.50	53	0.71	3.17	2.25

* Only Half Street Calculations were analyzed for these cross sections

Street Flow Capacity Summary

100 - Yr Interim Condition

Street Section	R/W Width (ft)	Slope (%)	Q (cfs)	Depth (ft)	Velocity (fps)	Vxd
1	90	1.04	336	1.15	6.96	8.00
2	90	0.50	389	1.37	5.83	7.99
3	70	1.00	243	1.19	6.73	8.01
4	90	1.04	336	1.15	6.96	8.00
5	52	0.45	273	1.34	5.96	7.99
6	52	0.80	249	1.15	6.95	7.99
7	52	0.50	268	1.31	6.13	8.03
8	52	0.91	243	1.11	7.19	7.98
9	70	0.50	282	1.40	5.69	7.97
10	70	1.09	285	1.09	7.34	8.00
11	70	0.53	330	1.32	6.06	8.00
12	70	0.51	335	1.33	6.02	8.01
13	70	0.75	310	1.20	6.66	7.99
14	70	0.55	329	1.31	6.13	8.03
15	70	0.60	323	1.28	6.27	8.03
16	52	0.48	271	1.32	6.07	8.01
17	52	2.12	203	0.89	8.99	8.00
18	49	0.60	273	1.24	6.45	8.00
19	70	0.53	329	1.32	6.06	8.00
20	70	0.53	329	1.32	6.06	8.00
21	70	1.24	279	1.06	7.57	8.02
22	70	0.50	335	1.34	5.98	8.01
23	*100	1.19	216	1.18	6.80	8.02
24	*90	0.53	190	1.35	5.92	7.99
25	90	0.42	394	1.43	5.60	8.01
26	90	1.01	338	1.15	6.92	7.96
27	*70	0.50	167	1.34	5.97	8.00
28	41	0.50	242	1.28	6.24	7.99
29	96	2.47	273	0.92	8.68	7.99
30	96	0.50	389	1.33	6.01	7.99

* Only Half Street Calculations were analyzed for these cross sections

10-Year Street Flow Capacity Flowmaster Computations

SECTION 1 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION1 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.0400	%
Discharge	53.00	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	0.015	
Water Surface Elevation	0.65	ft
Elevation Range	0.00 to 1.30	
Flow Area	13.4	ft²
Wetted Perimeter	53.21	ft
Top Width	51.85	ft
Actual Depth	0.65	ft
Critical Elevation	0.72	ft
Critical Slope	0.5240	%
Velocity	3.97	ft/s
Velocity Head	0.24	ft
Specific Energy	0.89	ft
Froude Number	1.38	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.14846544 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+38.00	0.016
0+38.00	0+52.00	0.013
0+52.00	0+88.00	0.016
0+88.00	0+90.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89

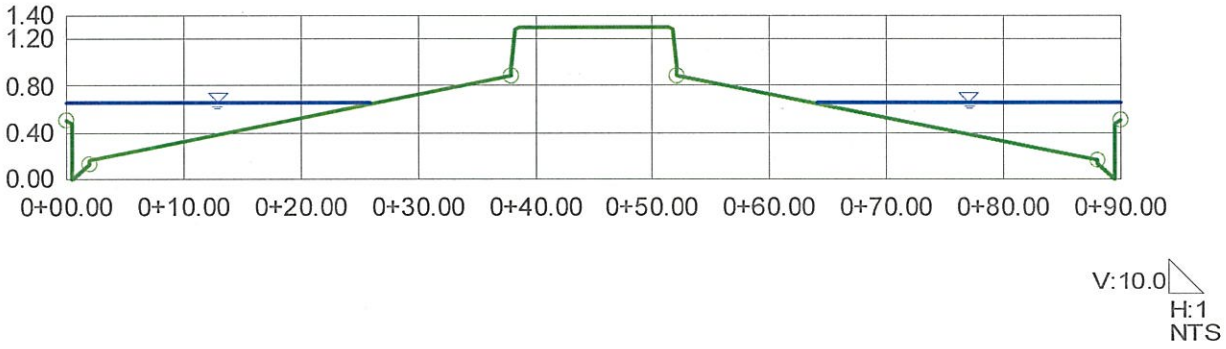
SECTION 1 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+38.01	0.97
0+38.26	1.28
0+38.68	1.30
0+51.32	1.30
0+51.74	1.28
0+51.99	0.97
0+52.00	0.89
0+88.00	0.17
0+88.00	0.13
0+89.50	0.00
0+89.50	0.48
0+90.00	0.50

SECTION 1 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION1 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	1.0400	%
Water Surface Elevation	0.65	ft
Elevation Range	0.00 to 1.30	
Discharge	53.00	cfs



SECTION 2 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION2 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5000	%
Discharge	37.00	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	0.015	
Water Surface Elevation	0.65	ft
Elevation Range	0.00 to 1.30	
Flow Area	13.4	ft²
Wetted Perimeter	53.34	ft
Top Width	51.98	ft
Actual Depth	0.65	ft
Critical Elevation	0.64	ft
Critical Slope	0.5511	%
Velocity	2.76	ft/s
Velocity Head	0.12	ft
Specific Energy	0.77	ft
Froude Number	0.96	
Flow Type	Subcritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.14980799 ft.
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+38.00	0.016
0+38.00	0+52.00	0.013
0+52.00	0+88.00	0.016
0+88.00	0+90.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89

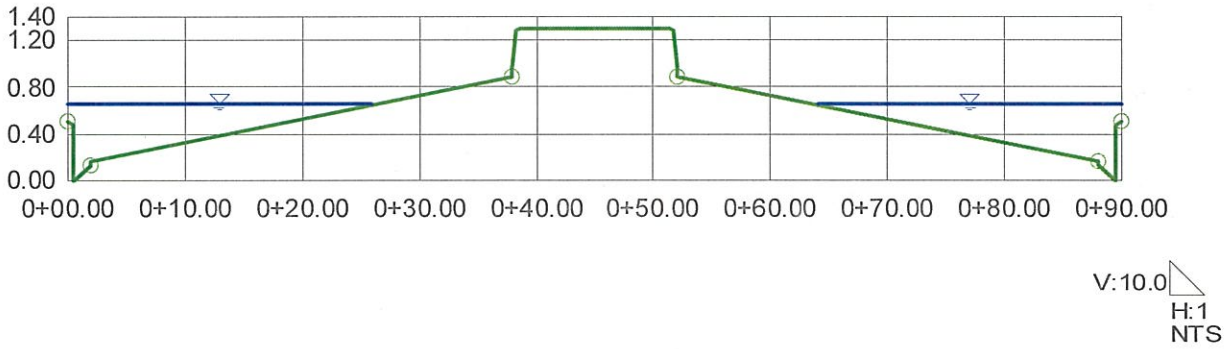
SECTION 2 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+38.01	0.97
0+38.26	1.28
0+38.68	1.30
0+51.32	1.30
0+51.74	1.28
0+51.99	0.97
0+52.00	0.89
0+88.00	0.17
0+88.00	0.13
0+89.50	0.00
0+89.50	0.48
0+90.00	0.50

SECTION 2 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION2 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.5000	%
Water Surface Elevation	0.65	ft
Elevation Range	0.00 to 1.30	
Discharge	37.00	cfs



SECTION 3 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION3 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.0000	%
Discharge	136.00	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	0.015	
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 1.32	
Flow Area	25.2	ft²
Wetted Perimeter	60.07	ft
Top Width	58.04	ft
Actual Depth	1.00	ft
Critical Elevation	1.12	ft
Critical Slope	0.4482	%
Velocity	5.39	ft/s
Velocity Head	0.45	ft
Specific Energy	1.45	ft
Froude Number	1.44	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.50326819 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.70
0+00.50	0.68
0+00.50	0.20
0+02.00	0.33
0+02.00	0.37
0+29.00	0.91

SECTION 3 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.99
0+29.26	1.30
0+29.68	1.32
0+40.32	1.32
0+40.74	1.30
0+40.99	0.99
0+41.00	0.91
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

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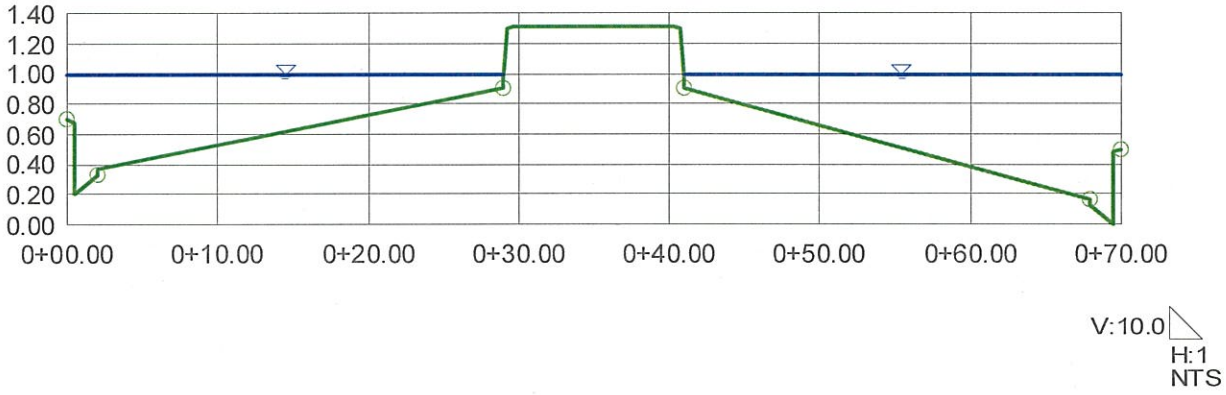
SECTION 3 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION3 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	1.0000	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 1.32	
Discharge	136.00	cfs



SECTION 4 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION4 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.0400	%
Discharge	53.00	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	0.015	
Water Surface Elevation	0.65	ft
Elevation Range	0.00 to 1.30	
Flow Area	13.4	ft²
Wetted Perimeter	53.21	ft
Top Width	51.85	ft
Actual Depth	0.65	ft
Critical Elevation	0.72	ft
Critical Slope	0.5240	%
Velocity	3.97	ft/s
Velocity Head	0.24	ft
Specific Energy	0.89	ft
Froude Number	1.38	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.14846544 ft.
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+38.00	0.016
0+38.00	0+52.00	0.013
0+52.00	0+88.00	0.016
0+88.00	0+90.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89

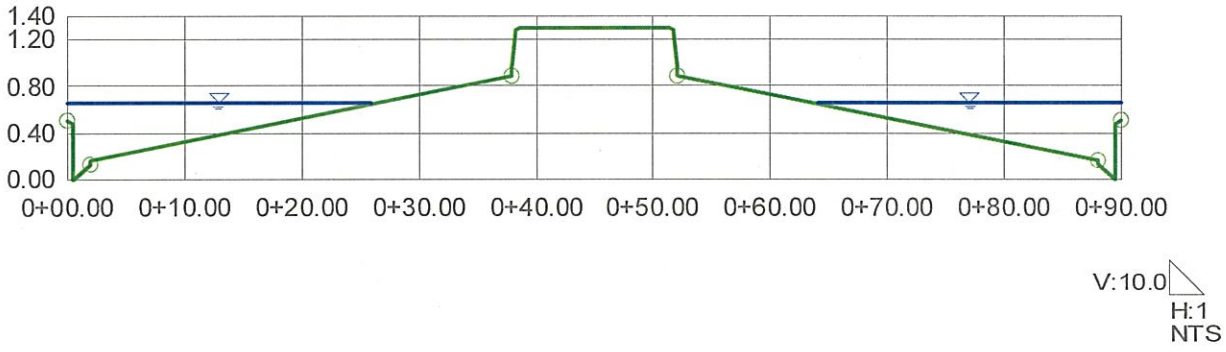
SECTION 4 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+38.01	0.97
0+38.26	1.28
0+38.68	1.30
0+51.32	1.30
0+51.74	1.28
0+51.99	0.97
0+52.00	0.89
0+88.00	0.17
0+88.00	0.13
0+89.50	0.00
0+89.50	0.48
0+90.00	0.50

SECTION 4 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION4 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	1.0400	%
Water Surface Elevation	0.65	ft
Elevation Range	0.00 to 1.30	
Discharge	53.00	cfs



SECTION 5 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION5 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.4500	%
Discharge	128.00	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	0.014	
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 0.95	
Flow Area	27.7	ft²
Wetted Perimeter	54.49	ft
Top Width	52.00	ft
Actual Depth	1.00	ft
Critical Elevation	1.04	ft
Critical Slope	0.3540	%
Velocity	4.62	ft/s
Velocity Head	0.33	ft
Specific Energy	1.33	ft
Froude Number	1.11	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.49783638 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+20.50	0.016
0+20.50	0+31.50	0.013
0+31.50	0+50.00	0.016
0+50.00	0+52.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54
0+20.51	0.62

SECTION 5 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+20.76	0.93
0+21.18	0.95
0+30.82	0.95
0+31.24	0.93
0+31.49	0.62
0+31.50	0.54
0+50.00	0.17
0+50.00	0.13
0+51.50	0.00
0+51.50	0.48
0+52.00	0.50

SECTION 5 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION5 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.014	
Channel Slope	0.4500	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 0.95	
Discharge	128.00	cfs



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SECTION 6 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION6 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.8000	%
Discharge	164.00	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	0.014	
Water Surface Elevation	0.98	ft
Elevation Range	0.00 to 0.95	
Flow Area	26.9	ft²
Wetted Perimeter	54.46	ft
Top Width	52.00	ft
Actual Depth	0.98	ft
Critical Elevation	1.14	ft
Critical Slope	0.3318	%
Velocity	6.09	ft/s
Velocity Head	0.58	ft
Specific Energy	1.56	ft
Froude Number	1.49	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.48280403 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+20.50	0.016
0+20.50	0+31.50	0.013
0+31.50	0+50.00	0.016
0+50.00	0+52.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54
0+20.51	0.62

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SECTION 6 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+20.76	0.93
0+21.18	0.95
0+30.82	0.95
0+31.24	0.93
0+31.49	0.62
0+31.50	0.54
0+50.00	0.17
0+50.00	0.13
0+51.50	0.00
0+51.50	0.48
0+52.00	0.50

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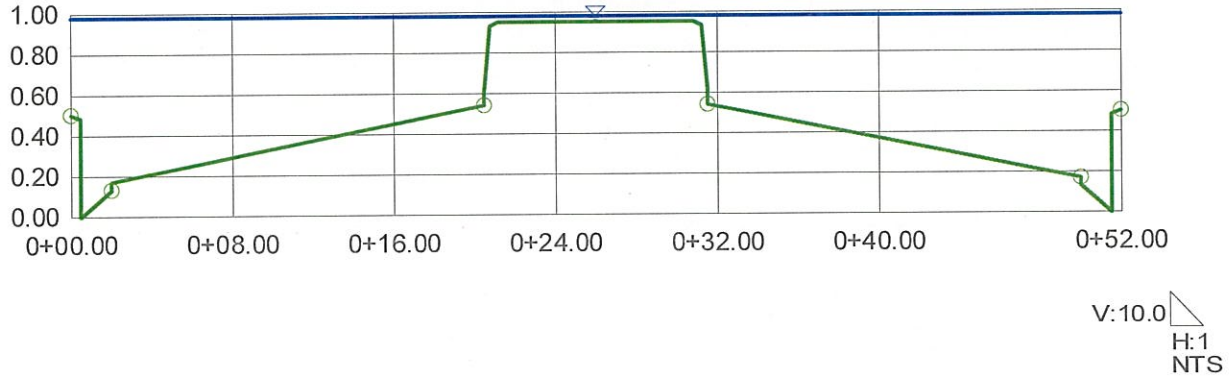
SECTION 6 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION6 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.014	
Channel Slope	0.8000	%
Water Surface Elevation	0.98	ft
Elevation Range	0.00 to 0.95	
Discharge	164.00	cfs



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SECTION 7 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION7 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5000	%
Discharge	137.00	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	0.014	
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 0.95	
Flow Area	28.0	ft²
Wetted Perimeter	54.51	ft
Top Width	52.00	ft
Actual Depth	1.00	ft
Critical Elevation	1.06	ft
Critical Slope	0.3507	%
Velocity	4.89	ft/s
Velocity Head	0.37	ft
Specific Energy	1.38	ft
Froude Number	1.17	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.50365701 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+20.50	0.016
0+20.50	0+31.50	0.013
0+31.50	0+50.00	0.016
0+50.00	0+52.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54
0+20.51	0.62

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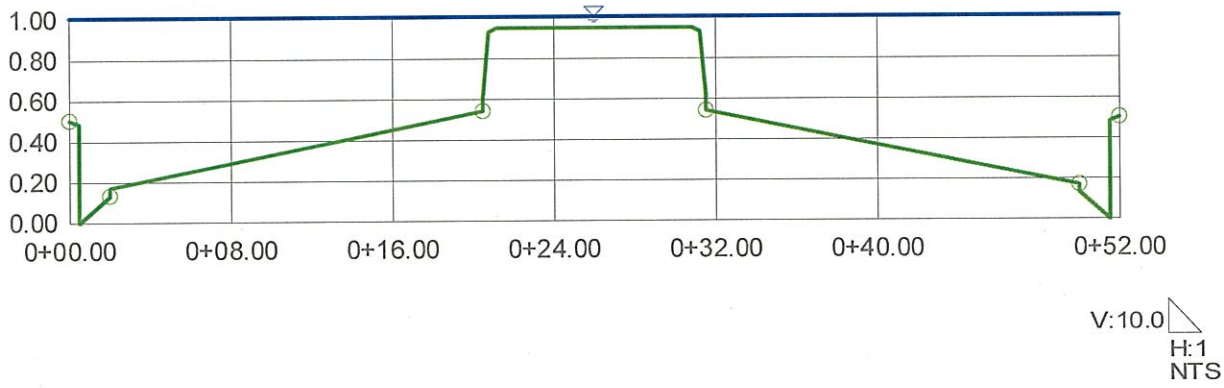
SECTION 7 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+20.76	0.93
0+21.18	0.95
0+30.82	0.95
0+31.24	0.93
0+31.49	0.62
0+31.50	0.54
0+50.00	0.17
0+50.00	0.13
0+51.50	0.00
0+51.50	0.48
0+52.00	0.50

SECTION 7 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION7 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.014	
Channel Slope	0.5000	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 0.95	
Discharge	137.00	cfs



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SECTION 8 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION8 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.9100	%
Discharge	159.00	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	0.013	
Water Surface Elevation	0.95	ft
Elevation Range	0.00 to 0.95	
Flow Area	25.2	ft²
Wetted Perimeter	54.40	ft
Top Width	52.00	ft
Actual Depth	0.95	ft
Critical Elevation	1.13	ft
Critical Slope	0.3214	%
Velocity	6.30	ft/s
Velocity Head	0.62	ft
Specific Energy	1.57	ft
Froude Number	1.59	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.45000068 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+20.50	0.016
0+20.50	0+31.50	0.013
0+31.50	0+50.00	0.016
0+50.00	0+52.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54
0+20.51	0.62

SECTION 8 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+20.76	0.93
0+21.18	0.95
0+30.82	0.95
0+31.24	0.93
0+31.49	0.62
0+31.50	0.54
0+50.00	0.17
0+50.00	0.13
0+51.50	0.00
0+51.50	0.48
0+52.00	0.50

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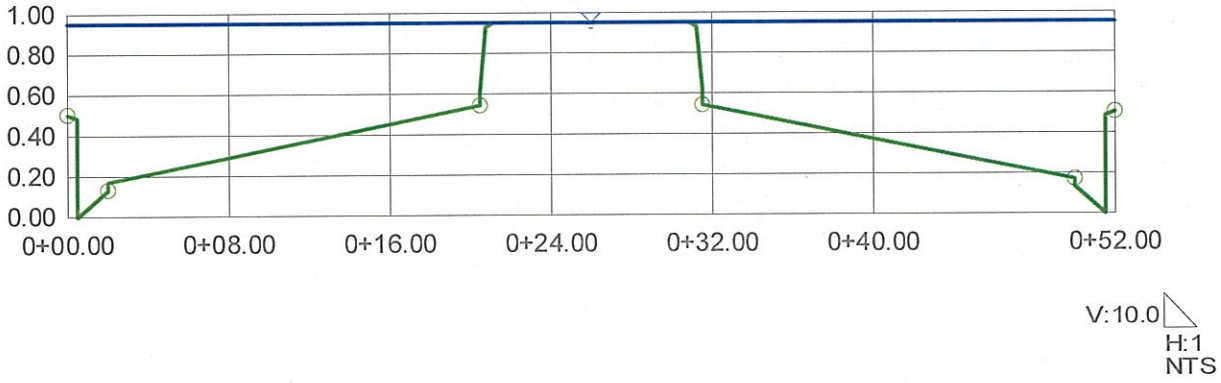
SECTION 8 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION8 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.9100	%
Water Surface Elevation	0.95	ft
Elevation Range	0.00 to 0.95	
Discharge	159.00	cfs



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SECTION 9 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION9 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5000	%
Discharge	94.00	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	0.015	
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 1.32	
Flow Area	24.9	ft²
Wetted Perimeter	60.04	ft
Top Width	58.03	ft
Actual Depth	1.00	ft
Critical Elevation	1.00	ft
Critical Slope	0.4822	%
Velocity	3.78	ft/s
Velocity Head	0.22	ft
Specific Energy	1.22	ft
Froude Number	1.02	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.49715469 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.70
0+00.50	0.68
0+00.50	0.20
0+02.00	0.33
0+02.00	0.37
0+29.00	0.91

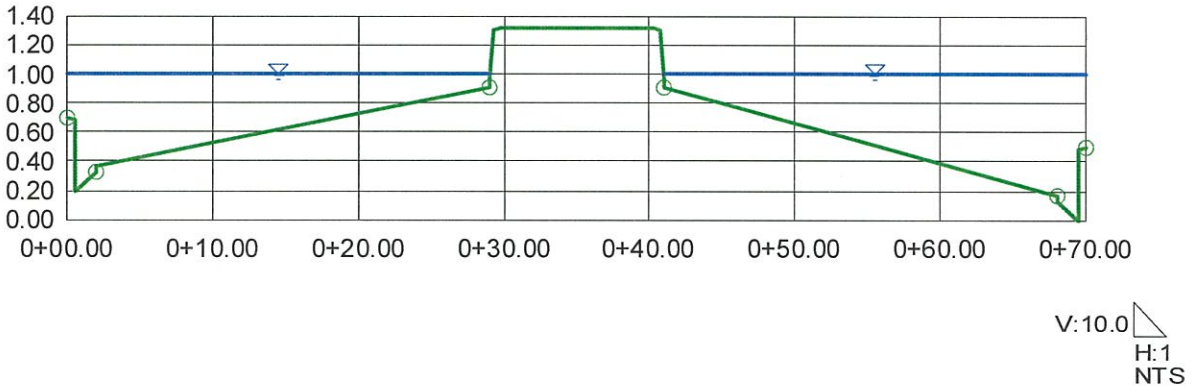
SECTION 9 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.99
0+29.26	1.30
0+29.68	1.32
0+40.32	1.32
0+40.74	1.30
0+40.99	0.99
0+41.00	0.91
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 9 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION9 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.5000	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 1.32	
Discharge	94.00	cfs



SECTION 10 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION10 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.0900	%
Discharge	195.00	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	0.95	ft
Elevation Range	0.00 to 1.12	
Flow Area	30.8	ft²
Wetted Perimeter	60.54	ft
Top Width	58.28	ft
Actual Depth	0.95	ft
Critical Elevation	1.16	ft
Critical Slope	0.4377	%
Velocity	6.34	ft/s
Velocity Head	0.62	ft
Specific Energy	1.58	ft
Froude Number	1.54	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.45171293 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71

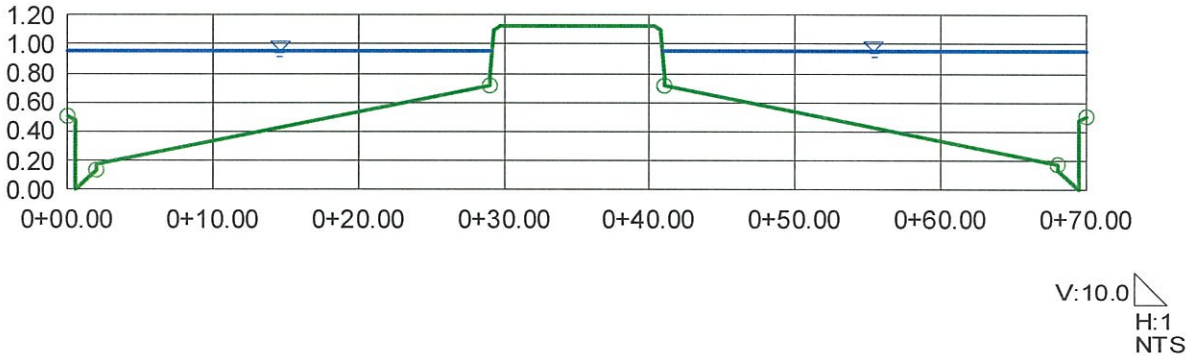
SECTION 10 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 10 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION10 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.0900	%
Water Surface Elevation	0.95	ft
Elevation Range	0.00 to 1.12	
Discharge	195.00	cfs



SECTION 11 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION11 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5300	%
Discharge	155.00	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	1.00	ft
Elevation Range	0.00 to 1.12	
Flow Area	33.4	ft²
Wetted Perimeter	60.75	ft
Top Width	58.35	ft
Actual Depth	1.00	ft
Critical Elevation	1.03	ft
Critical Slope	0.4447	%
Velocity	4.65	ft/s
Velocity Head	0.34	ft
Specific Energy	1.33	ft
Froude Number	1.08	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.4959232 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71

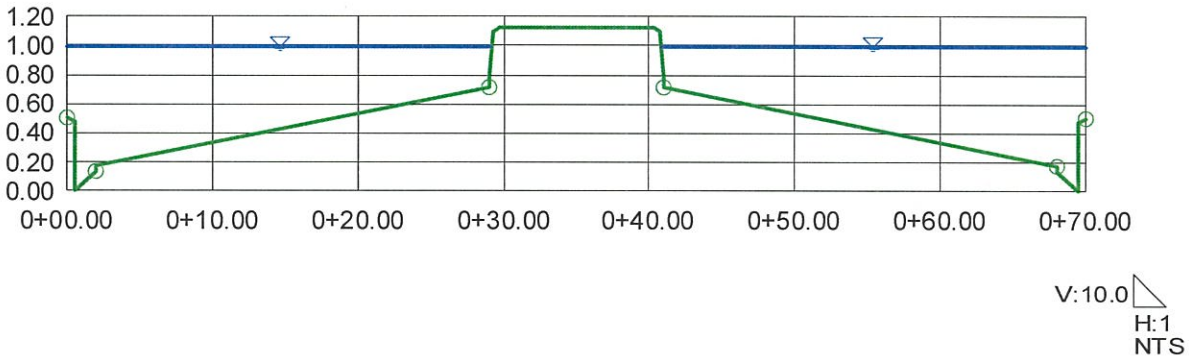
SECTION 11 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 11 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION11 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.5300	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 1.12	
Discharge	155.00	cfs



SECTION 12 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION12 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5100	%
Discharge	155.00	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	1.00	ft
Elevation Range	0.00 to 1.12	
Flow Area	33.8	ft²
Wetted Perimeter	60.78	ft
Top Width	58.36	ft
Actual Depth	1.00	ft
Critical Elevation	1.03	ft
Critical Slope	0.4449	%
Velocity	4.59	ft/s
Velocity Head	0.33	ft
Specific Energy	1.33	ft
Froude Number	1.06	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.50271287 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71

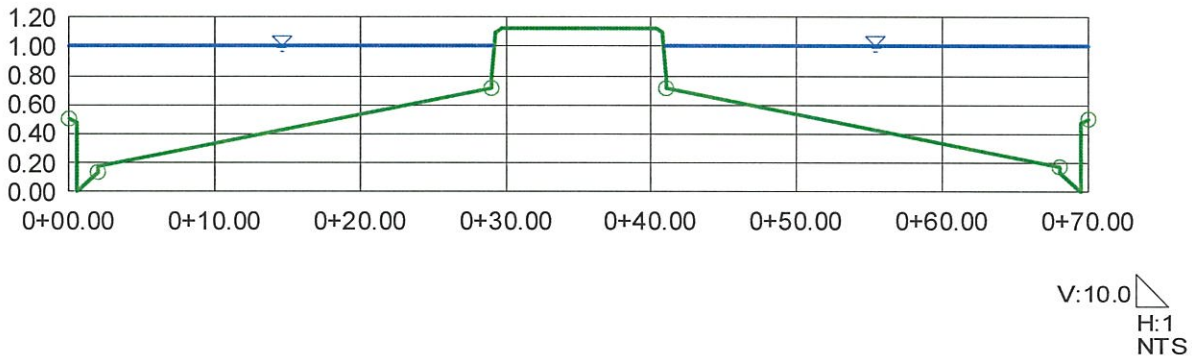
SECTION 12 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 12 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION12 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.5100	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 1.12	
Discharge	155.00	cfs



SECTION 13 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION13 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.7500	%
Discharge	185.00	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	1.00	ft
Elevation Range	0.00 to 1.12	
Flow Area	33.4	ft²
Wetted Perimeter	60.75	ft
Top Width	58.35	ft
Actual Depth	1.00	ft
Critical Elevation	1.14	ft
Critical Slope	0.4432	%
Velocity	5.53	ft/s
Velocity Head	0.48	ft
Specific Energy	1.47	ft
Froude Number	1.29	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.49709408 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71

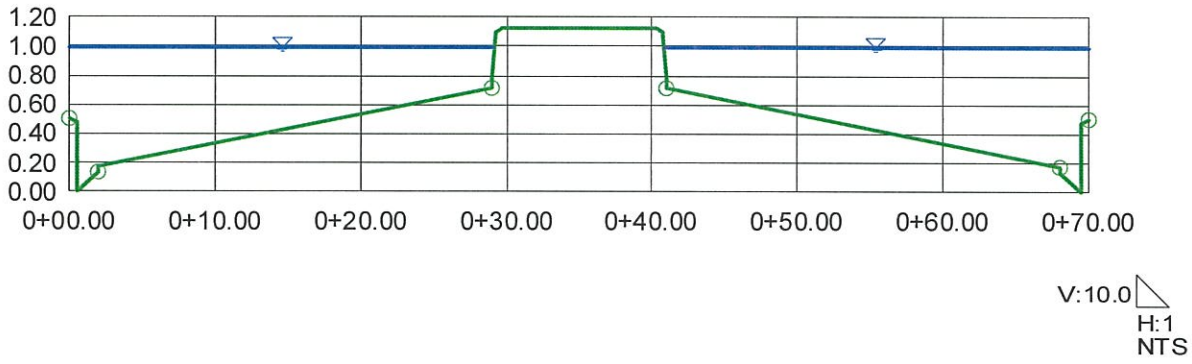
SECTION 13 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 13 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION13 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.7500	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 1.12	
Discharge	185.00	cfs



SECTION 14 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION14 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5500	%
Discharge	160.00	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	1.00	ft
Elevation Range	0.00 to 1.12	
Flow Area	33.6	ft²
Wetted Perimeter	60.77	ft
Top Width	58.36	ft
Actual Depth	1.00	ft
Critical Elevation	1.04	ft
Critical Slope	0.4419	%
Velocity	4.76	ft/s
Velocity Head	0.35	ft
Specific Energy	1.35	ft
Froude Number	1.10	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.50058456 ft.
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71

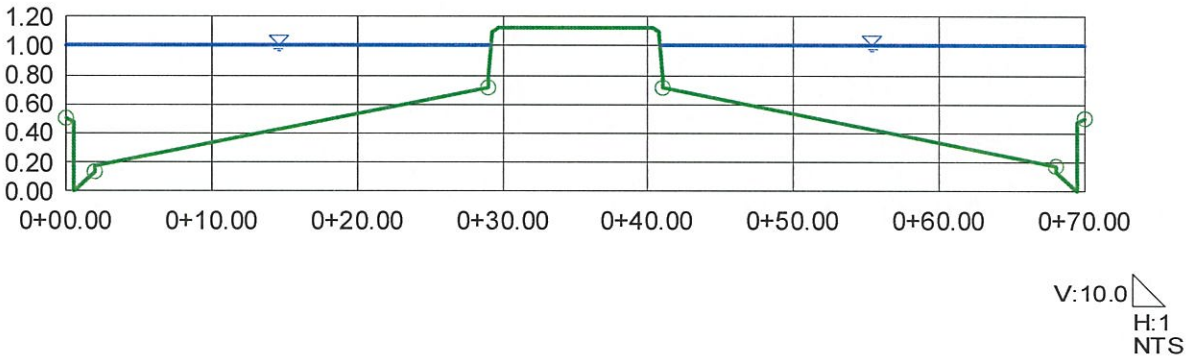
SECTION 14 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 14 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION14 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.5500	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 1.12	
Discharge	160.00	cfs



SECTION 15 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION15 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.6000	%
Discharge	168.00	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	1.00	ft
Elevation Range	0.00 to 1.12	
Flow Area	33.7	ft²
Wetted Perimeter	60.77	ft
Top Width	58.36	ft
Actual Depth	1.00	ft
Critical Elevation	1.06	ft
Critical Slope	0.4374	%
Velocity	4.98	ft/s
Velocity Head	0.39	ft
Specific Energy	1.39	ft
Froude Number	1.15	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.50245707 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71

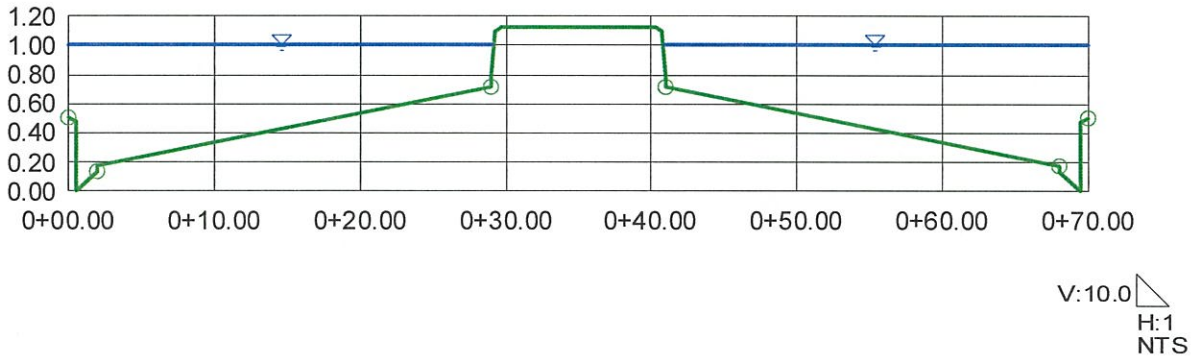
SECTION 15 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 15 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION15 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.6000	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 1.12	
Discharge	168.00	cfs



SECTION 16 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION16 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.4800	%
Discharge	132.00	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	0.014	
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 0.95	
Flow Area	27.7	ft²
Wetted Perimeter	54.49	ft
Top Width	52.00	ft
Actual Depth	1.00	ft
Critical Elevation	1.05	ft
Critical Slope	0.3516	%
Velocity	4.77	ft/s
Velocity Head	0.35	ft
Specific Energy	1.35	ft
Froude Number	1.15	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.49726738 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+20.50	0.016
0+20.50	0+31.50	0.013
0+31.50	0+50.00	0.016
0+50.00	0+52.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54
0+20.51	0.62

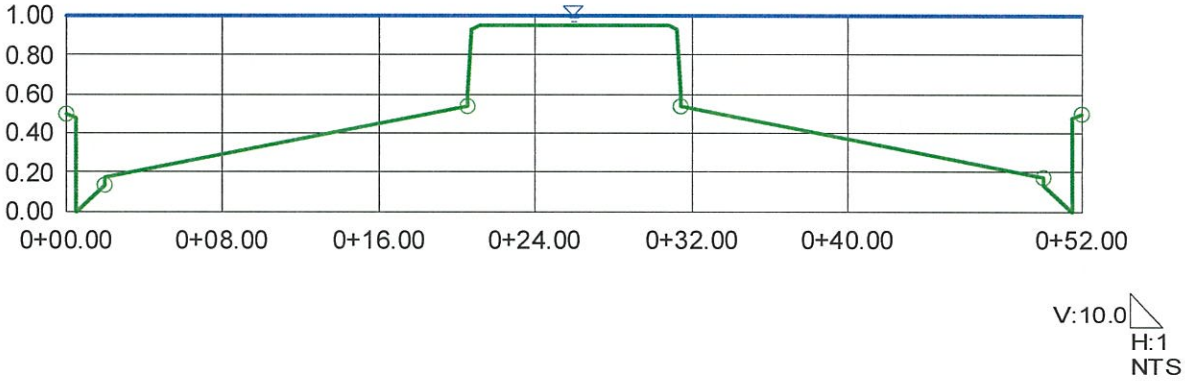
SECTION 16 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+20.76	0.93
0+21.18	0.95
0+30.82	0.95
0+31.24	0.93
0+31.49	0.62
0+31.50	0.54
0+50.00	0.17
0+50.00	0.13
0+51.50	0.00
0+51.50	0.48
0+52.00	0.50

SECTION 16 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION16 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.014	
Channel Slope	0.4800	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 0.95	
Discharge	132.00	cfs



SECTION 17 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION17 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	2.1200	%
Discharge	140.00	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	0.015	
Water Surface Elevation	0.77	ft
Elevation Range	0.00 to 0.95	
Flow Area	18.0	ft²
Wetted Perimeter	43.17	ft
Top Width	41.27	ft
Actual Depth	0.77	ft
Critical Elevation	1.07	ft
Critical Slope	0.4396	%
Velocity	7.79	ft/s
Velocity Head	0.94	ft
Specific Energy	1.72	ft
Froude Number	2.08	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.27456484 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+20.50	0.016
0+20.50	0+31.50	0.013
0+31.50	0+50.00	0.016
0+50.00	0+52.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54

SECTION 17 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+20.51	0.62
0+20.76	0.93
0+21.18	0.95
0+30.82	0.95
0+31.24	0.93
0+31.49	0.62
0+31.50	0.54
0+50.00	0.17
0+50.00	0.13
0+51.50	0.00
0+51.50	0.48
0+52.00	0.50

SECTION 17 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION17 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	2.1200	%
Water Surface Elevation	0.77	ft
Elevation Range	0.00 to 0.95	
Discharge	140.00	cfs



SECTION 18 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION18 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.6000	%
Discharge	160.00	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	1.00	ft
Elevation Range	0.00 to 0.62	
Flow Area	30.6	ft²
Wetted Perimeter	51.06	ft
Top Width	49.00	ft
Actual Depth	1.00	ft
Critical Elevation	1.07	ft
Critical Slope	0.4265	%
Velocity	5.23	ft/s
Velocity Head	0.43	ft
Specific Energy	1.43	ft
Froude Number	1.17	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.5006327 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+47.00	0.016
0+47.00	0+49.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+24.50	0.62
0+47.00	0.17
0+47.00	0.13
0+48.50	0.00

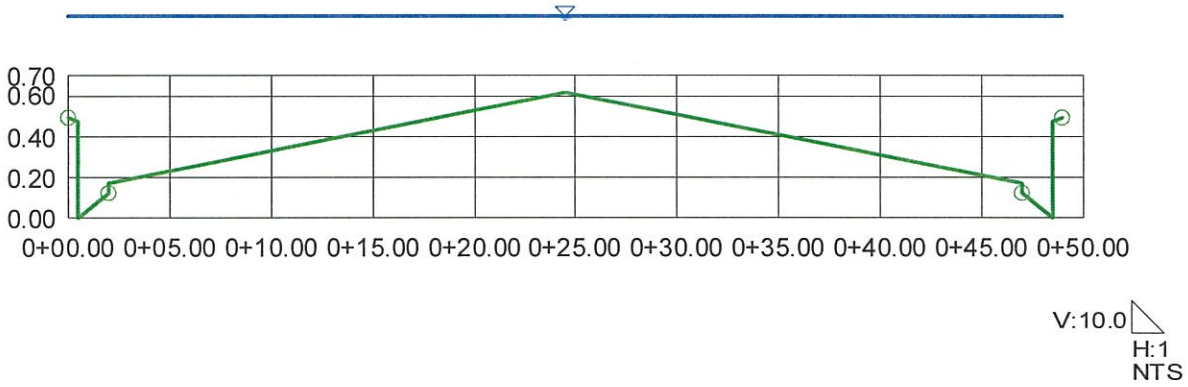
SECTION 18 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+48.50	0.48
0+49.00	0.50

SECTION 18 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION18 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.6000	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 0.62	
Discharge	160.00	cfs



SECTION 19 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION19 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5300	%
Discharge	155.00	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	1.00	ft
Elevation Range	0.00 to 1.12	
Flow Area	33.4	ft²
Wetted Perimeter	60.75	ft
Top Width	58.35	ft
Actual Depth	1.00	ft
Critical Elevation	1.03	ft
Critical Slope	0.4447	%
Velocity	4.65	ft/s
Velocity Head	0.34	ft
Specific Energy	1.33	ft
Froude Number	1.08	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.4959232 ft.
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71

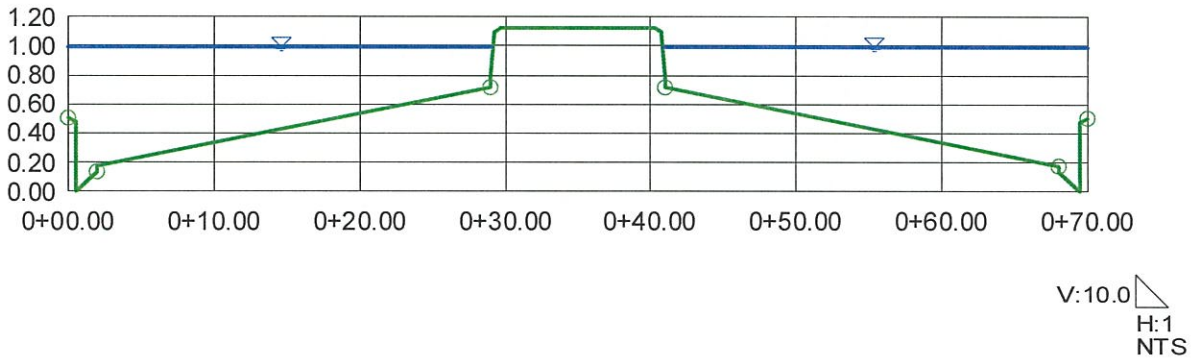
SECTION 19 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 19 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION19 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.5300	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 1.12	
Discharge	155.00	cfs



SECTION 20 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION20 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5300	%
Discharge	155.00	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	1.00	ft
Elevation Range	0.00 to 1.12	
Flow Area	33.4	ft²
Wetted Perimeter	60.75	ft
Top Width	58.35	ft
Actual Depth	1.00	ft
Critical Elevation	1.03	ft
Critical Slope	0.4447	%
Velocity	4.65	ft/s
Velocity Head	0.34	ft
Specific Energy	1.33	ft
Froude Number	1.08	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.4959232 ft.
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71

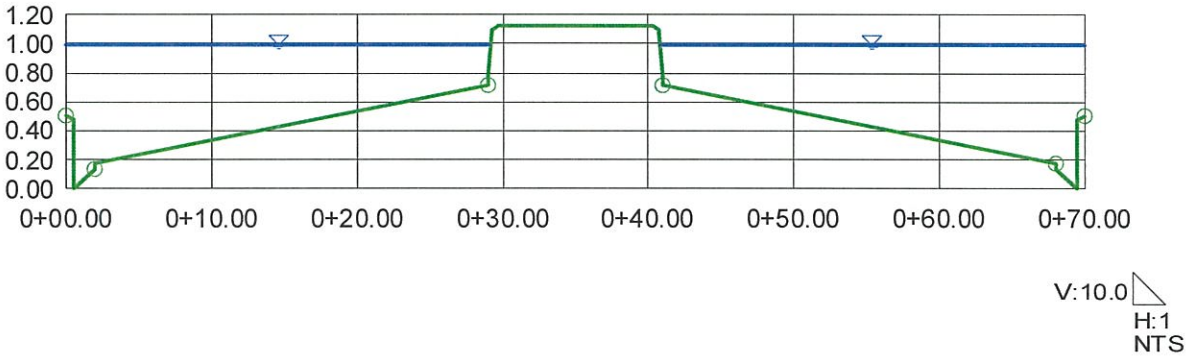
SECTION 20 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 20 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION20 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.5300	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 1.12	
Discharge	155.00	cfs



SECTION 21 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION21 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.2400	%
Discharge	190.00	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	0.92	ft
Elevation Range	0.00 to 1.12	
Flow Area	29.1	ft²
Wetted Perimeter	60.41	ft
Top Width	58.23	ft
Actual Depth	0.92	ft
Critical Elevation	1.12	ft
Critical Slope	0.4268	%
Velocity	6.53	ft/s
Velocity Head	0.66	ft
Specific Energy	1.58	ft
Froude Number	1.63	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.42313684 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71

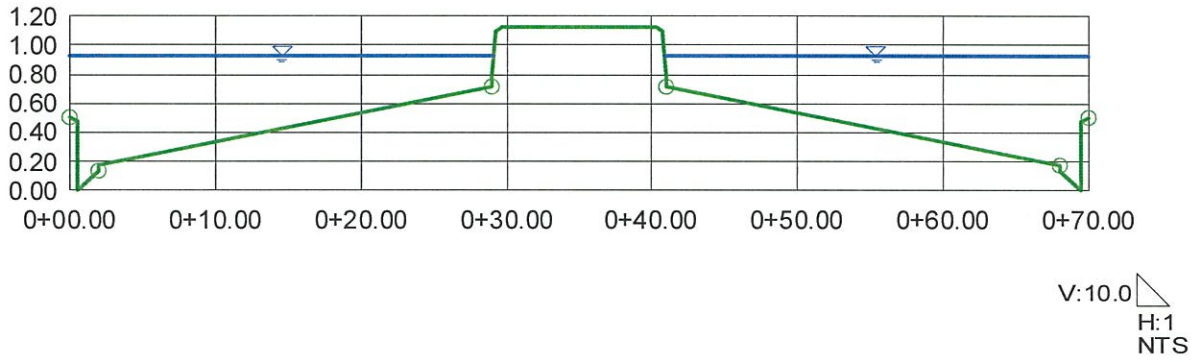
SECTION 21 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 21 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION21 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.2400	%
Water Surface Elevation	0.92	ft
Elevation Range	0.00 to 1.12	
Discharge	190.00	cfs



SECTION 22 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION22 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5000	%
Discharge	152.00	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	1.00	ft
Elevation Range	0.00 to 1.12	
Flow Area	33.6	ft²
Wetted Perimeter	60.76	ft
Top Width	58.36	ft
Actual Depth	1.00	ft
Critical Elevation	1.02	ft
Critical Slope	0.4467	%
Velocity	4.53	ft/s
Velocity Head	0.32	ft
Specific Energy	1.32	ft
Froude Number	1.05	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.49929883 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71

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SECTION 22 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

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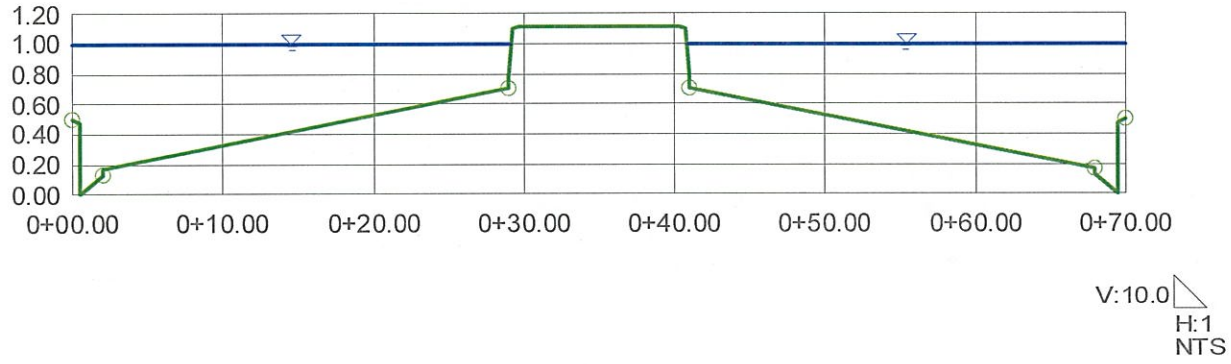
SECTION 22 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION22 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.5000	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 1.12	
Discharge	152.00	cfs



SECTION 23 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION23 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.1900	%
Discharge	60.00	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	0.015	
Water Surface Elevation	0.78	ft
Elevation Range	0.00 to 1.53	
Flow Area	12.3	ft²
Wetted Perimeter	38.99	ft
Top Width	38.18	ft
Actual Depth	0.78	ft
Critical Elevation	0.90	ft
Critical Slope	0.4934	%
Velocity	4.87	ft/s
Velocity Head	0.37	ft
Specific Energy	1.15	ft
Froude Number	1.51	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.28376313 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+58.00	0.016
0+58.00	0+58.68	0.013

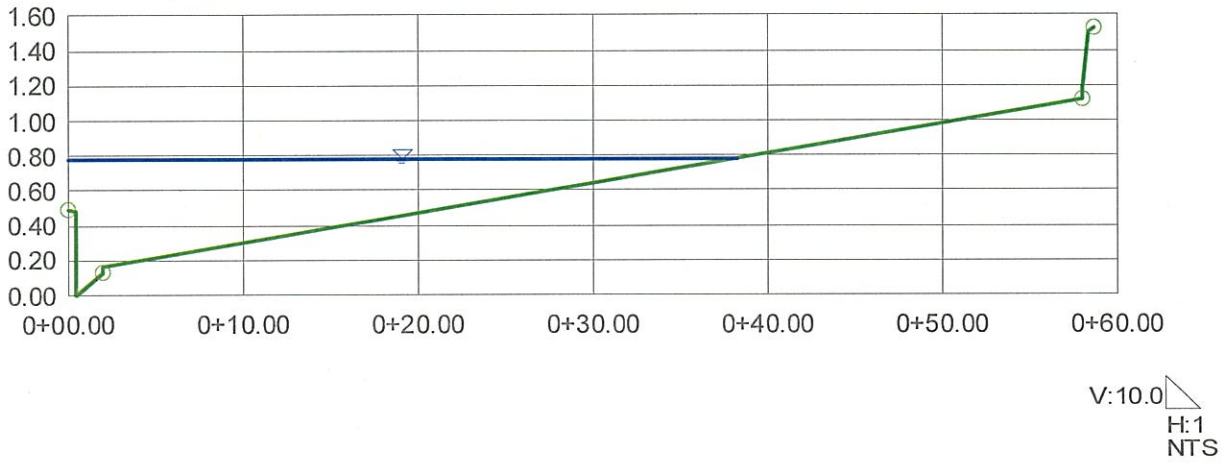
Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+58.00	1.12
0+58.01	1.20
0+58.26	1.51
0+58.68	1.53

SECTION 23 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION23 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.015
Channel Slope	1.1900 %
Water Surface Elevation	0.78 ft
Elevation Range	0.00 to 1.53
Discharge	60.00 cfs



SECTION 24 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION24 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5300	%
Discharge	11.00	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	0.015	
Water Surface Elevation	0.55	ft
Elevation Range	0.00 to 1.30	
Flow Area	4.4	ft²
Wetted Perimeter	21.68	ft
Top Width	21.09	ft
Actual Depth	0.55	ft
Critical Elevation	0.55	ft
Critical Slope	0.5750	%
Velocity	2.50	ft/s
Velocity Head	0.10	ft
Specific Energy	0.65	ft
Froude Number	0.96	
Flow Type	Subcritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.51887317e-1 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+38.00	0.016
0+38.00	0+38.68	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89
0+38.01	0.97
0+38.26	1.28
0+38.68	1.30

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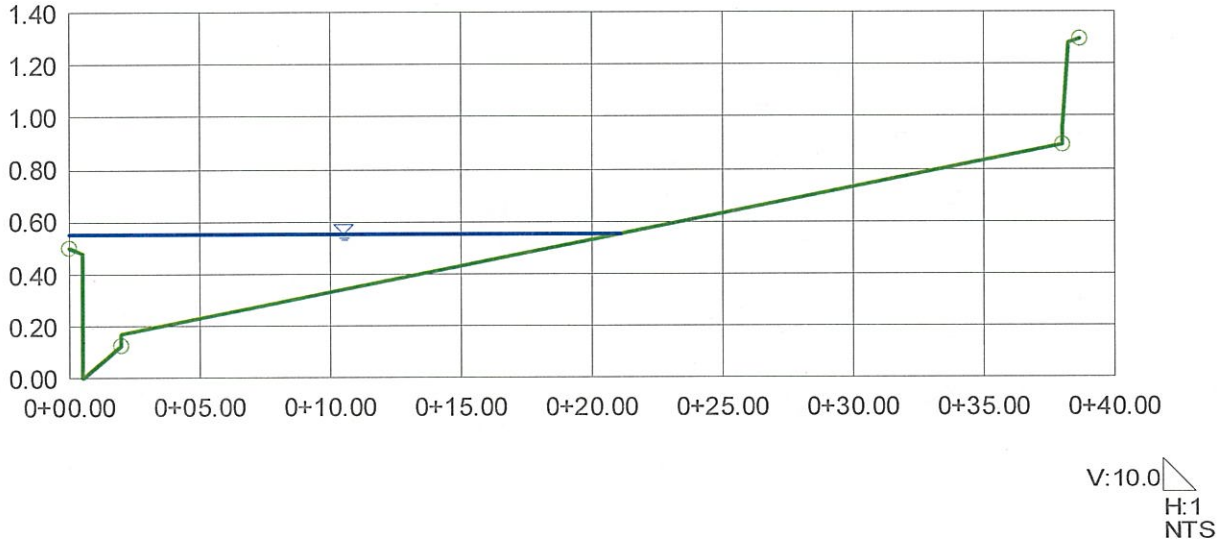
SECTION 24 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION24 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.5300	%
Water Surface Elevation	0.55	ft
Elevation Range	0.00 to 1.30	
Discharge	11.00	cfs



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SECTION 25 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION25 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Channel Slope	0.4200	%
Water Surface Elevation	0.65	ft

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	0.015	
Elevation Range	0.00 to 1.39	
Discharge	33.97	cfs
Flow Area	13.4	ft²
Wetted Perimeter	53.36	ft
Top Width	52.00	ft
Actual Depth	0.65	ft
Critical Elevation	0.62	ft
Critical Slope	0.5557	%
Velocity	2.53	ft/s
Velocity Head	0.10	ft
Specific Energy	0.75	ft
Froude Number	0.88	
Flow Type	Subcritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.15 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+38.00	0.016
0+38.00	0+52.00	0.013
0+52.00	0+88.00	0.016
0+88.00	0+90.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89

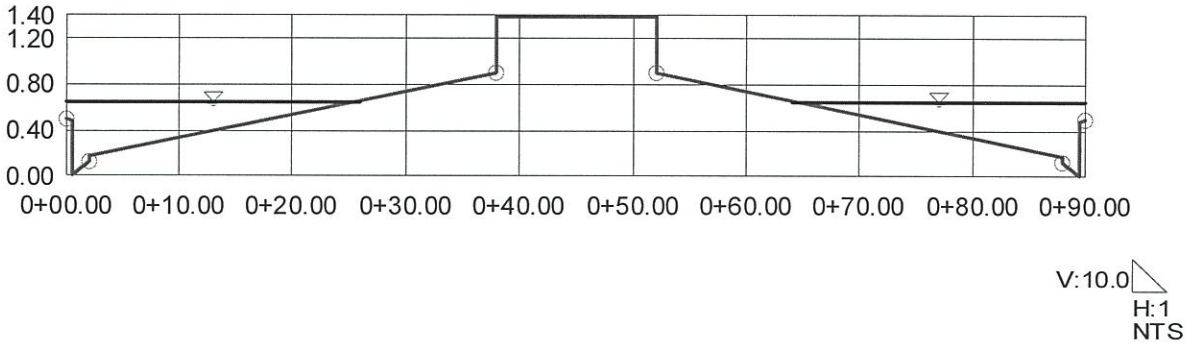
SECTION 25 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+38.00	1.39
0+52.00	1.39
0+52.00	0.89
0+88.00	0.17
0+88.00	0.13
0+89.50	0.00
0+89.50	0.48
0+90.00	0.50

SECTION 25 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION25 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.4200	%
Water Surface Elevation	0.65	ft
Elevation Range	0.00 to 1.39	
Discharge	33.97	cfs



SECTION 26 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION26 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Channel Slope	1.0100	%
Water Surface Elevation	0.65	ft

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	0.015	
Elevation Range	0.00 to 1.39	
Discharge	52.67	cfs
Flow Area	13.4	ft²
Wetted Perimeter	53.36	ft
Top Width	52.00	ft
Actual Depth	0.65	ft
Critical Elevation	0.72	ft
Critical Slope	0.5239	%
Velocity	3.92	ft/s
Velocity Head	0.24	ft
Specific Energy	0.89	ft
Froude Number	1.36	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.15 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+38.00	0.016
0+38.00	0+52.00	0.013
0+52.00	0+88.00	0.016
0+88.00	0+90.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89

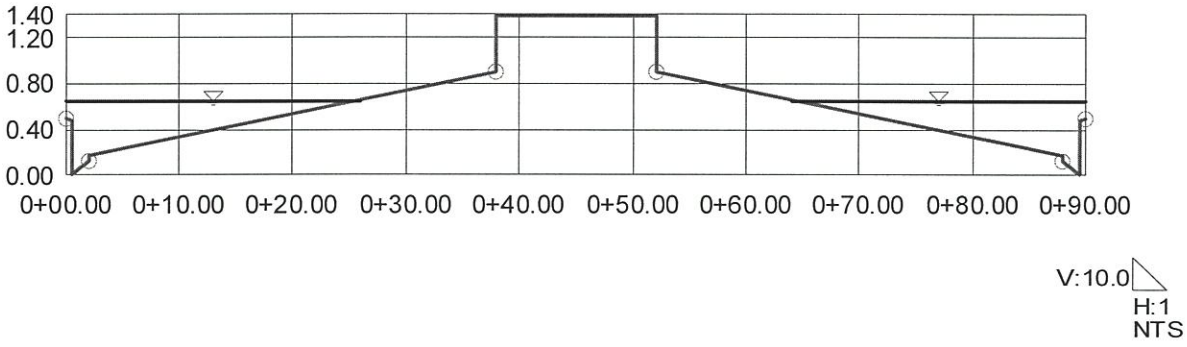
SECTION 26 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+38.00	1.39
0+52.00	1.39
0+52.00	0.89
0+88.00	0.17
0+88.00	0.13
0+89.50	0.00
0+89.50	0.48
0+90.00	0.50

SECTION 26 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION26 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.015	
Channel Slope	1.0100	%
Water Surface Elevation	0.65	ft
Elevation Range	0.00 to 1.39	
Discharge	52.67	cfs



SECTION 27 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION27 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Channel Slope	0.5000	%
Water Surface Elevation	1.00	ft

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	
Elevation Range	0.00 to 1.12	
Discharge	76.16	cfs
Flow Area	16.8	ft²
Wetted Perimeter	30.38	ft
Top Width	29.18	ft
Actual Depth	1.00	ft
Critical Elevation	1.02	ft
Critical Slope	0.4464	%
Velocity	4.53	ft/s
Velocity Head	0.32	ft
Specific Energy	1.32	ft
Froude Number	1.05	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.5 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+35.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12

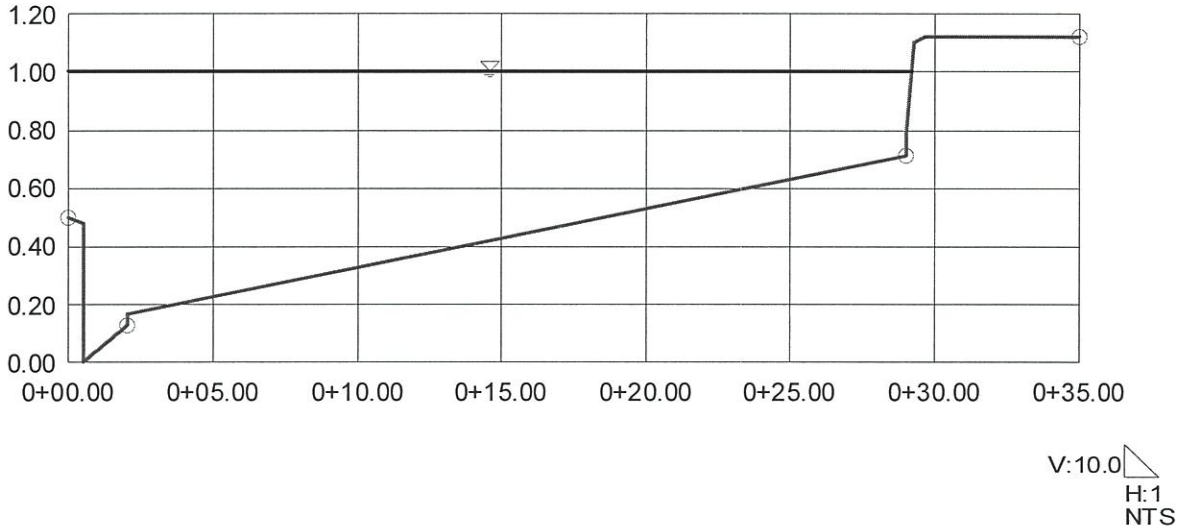
SECTION 27 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+35.00	1.12

SECTION 27 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION27 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.5000	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 1.12	
Discharge	76.16	cfs



SECTION 28 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION28 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Channel Slope	0.5000	%
Water Surface Elevation	1.00	ft

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	
Elevation Range	0.00 to 0.54	
Discharge	134.91	cfs
Flow Area	27.2	ft²
Wetted Perimeter	43.06	ft
Top Width	41.00	ft
Actual Depth	1.00	ft
Critical Elevation	1.03	ft
Critical Slope	0.4270	%
Velocity	4.96	ft/s
Velocity Head	0.38	ft
Specific Energy	1.38	ft
Froude Number	1.07	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.5 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+39.00	0.016
0+39.00	0+41.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54
0+39.00	0.17
0+39.00	0.13
0+40.50	0.00

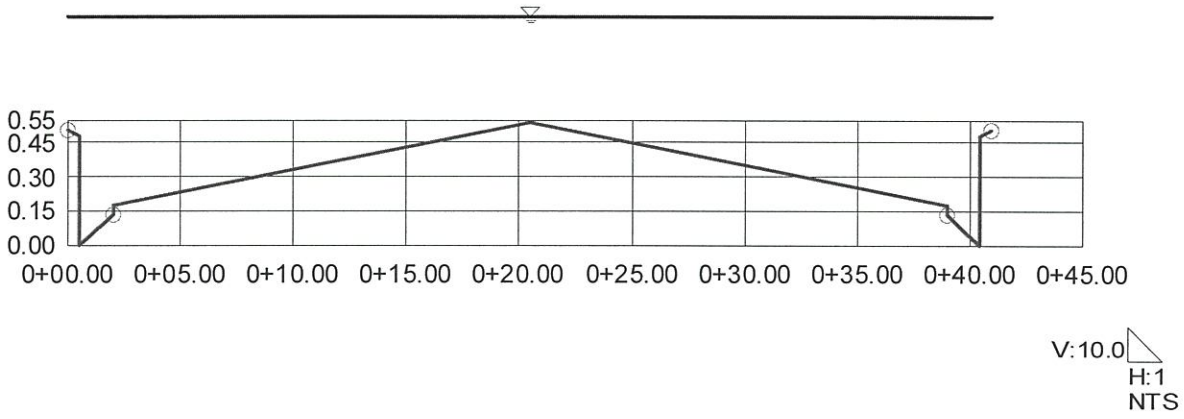
SECTION 28 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+40.50	0.48
0+41.00	0.50

SECTION 28 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION28 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.5000	%
Water Surface Elevation	1.00	ft
Elevation Range	0.00 to 0.54	
Discharge	134.91	cfs



SECTION 29 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION29 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Channel Slope	2.4700	%
Water Surface Elevation	0.71	ft

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	0.014	
Elevation Range	0.00 to 1.45	
Discharge	118.08	cfs
Flow Area	16.7	ft²
Wetted Perimeter	59.48	ft
Top Width	58.00	ft
Actual Depth	0.71	ft
Critical Elevation	0.94	ft
Critical Slope	0.4108	%
Velocity	7.06	ft/s
Velocity Head	0.77	ft
Specific Energy	1.48	ft
Froude Number	2.32	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.21 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+55.00	0.016
0+55.00	0+94.00	0.013
0+94.00	0+96.00	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+41.00	0.95
0+41.00	1.45

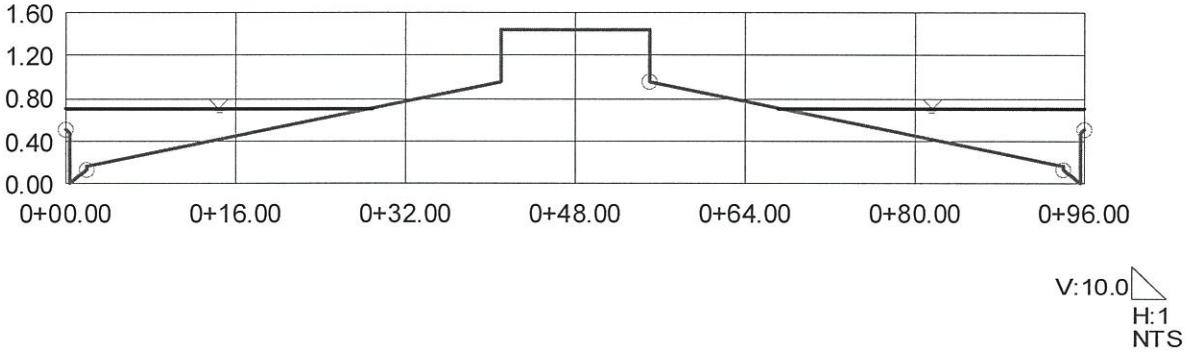
SECTION 29 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+48.00	1.45
0+55.00	1.45
0+55.00	0.95
0+94.00	0.17
0+94.00	0.13
0+95.50	0.00
0+95.50	0.48
0+96.00	0.50

SECTION 29 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION29 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.014	
Channel Slope	2.4700	%
Water Surface Elevation	0.71	ft
Elevation Range	0.00 to 1.45	
Discharge	118.08	cfs



SECTION 30 10-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION30 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data	
Channel Slope	0.5000 %
Water Surface Elevation	0.71 ft

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	0.014	
Elevation Range	0.00 to 1.45	
Discharge	53.13	cfs
Flow Area	16.7	ft²
Wetted Perimeter	59.48	ft
Top Width	58.00	ft
Actual Depth	0.71	ft
Critical Elevation	0.72	ft
Critical Slope	0.4589	%
Velocity	3.17	ft/s
Velocity Head	0.16	ft
Specific Energy	0.87	ft
Froude Number	1.04	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.21 ft.
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+55.00	0.016
0+55.00	0+94.00	0.013
0+94.00	0+96.00	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+41.00	0.95
0+41.00	1.45

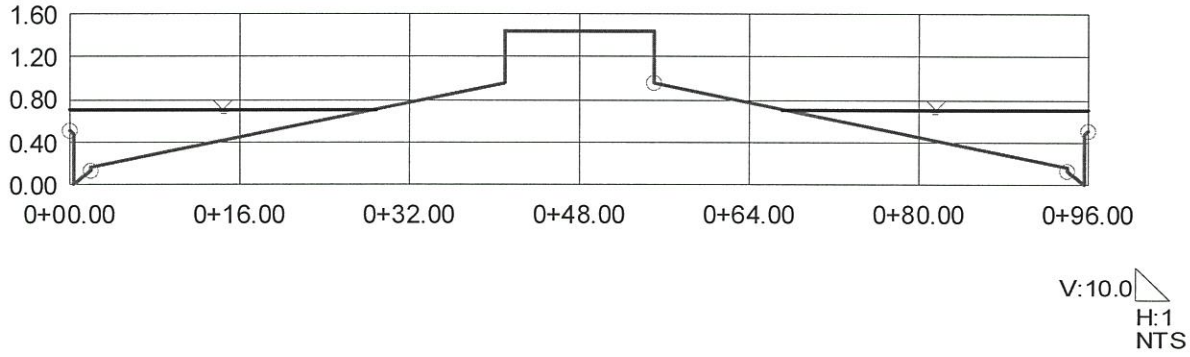
SECTION 30 10-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+48.00	1.45
0+55.00	1.45
0+55.00	0.95
0+94.00	0.17
0+94.00	0.13
0+95.50	0.00
0+95.50	0.48
0+96.00	0.50

SECTION 30 10-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION30 10-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.014	
Channel Slope	0.5000	%
Water Surface Elevation	0.71	ft
Elevation Range	0.00 to 1.45	
Discharge	53.13	cfs



100-Year Street Flow Capacity Flowmaster Computations

SECTION 1 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION1 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.0400	%
Discharge	336.00	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	1.15	ft
Elevation Range	0.00 to 1.30	
Flow Area	48.3	ft²
Wetted Perimeter	78.97	ft
Top Width	76.30	ft
Actual Depth	1.15	ft
Critical Elevation	1.39	ft
Critical Slope	0.4125	%
Velocity	6.96	ft/s
Velocity Head	0.75	ft
Specific Energy	1.90	ft
Froude Number	1.54	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.64597394 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+38.00	0.016
0+38.00	0+52.00	0.013
0+52.00	0+88.00	0.016
0+88.00	0+90.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89

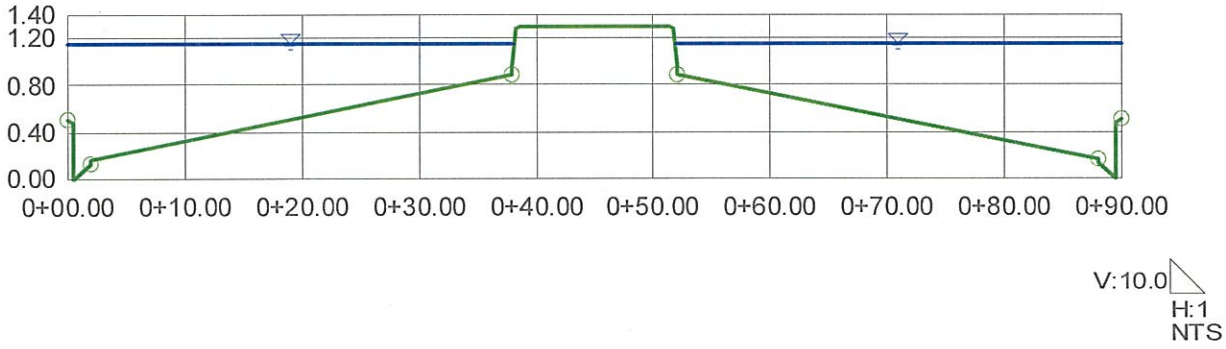
SECTION 1 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+38.01	0.97
0+38.26	1.28
0+38.68	1.30
0+51.32	1.30
0+51.74	1.28
0+51.99	0.97
0+52.00	0.89
0+88.00	0.17
0+88.00	0.13
0+89.50	0.00
0+89.50	0.48
0+90.00	0.50

SECTION 1 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION1 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.0400	%
Water Surface Elevation	1.15	ft
Elevation Range	0.00 to 1.30	
Discharge	336.00	cfs



SECTION 2 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION2 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5000	%
Discharge	389.00	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	0.014	
Water Surface Elevation	1.37	ft
Elevation Range	0.00 to 1.30	
Flow Area	66.7	ft²
Wetted Perimeter	93.25	ft
Top Width	90.00	ft
Actual Depth	1.37	ft
Critical Elevation	1.47	ft
Critical Slope	0.3383	%
Velocity	5.83	ft/s
Velocity Head	0.53	ft
Specific Energy	1.90	ft
Froude Number	1.19	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.87412349 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+38.00	0.016
0+38.00	0+52.00	0.013
0+52.00	0+88.00	0.016
0+88.00	0+90.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89
0+38.01	0.97

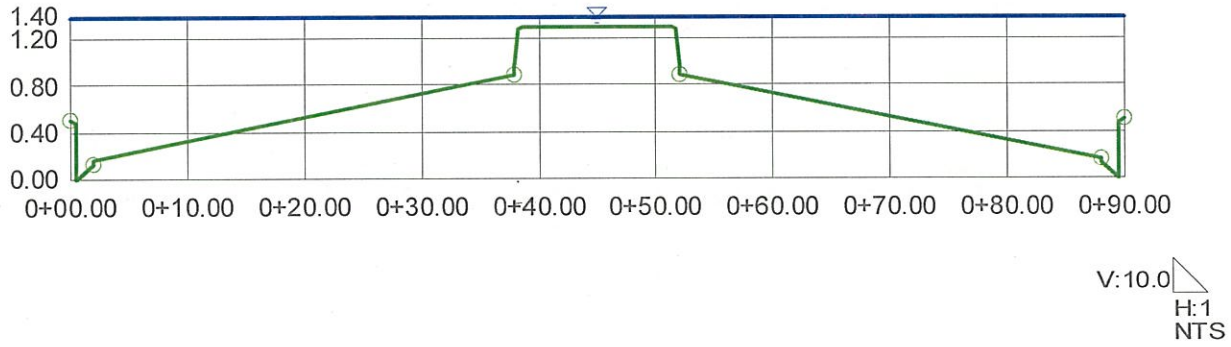
SECTION 2 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+38.26	1.28
0+38.68	1.30
0+51.32	1.30
0+51.74	1.28
0+51.99	0.97
0+52.00	0.89
0+88.00	0.17
0+88.00	0.13
0+89.50	0.00
0+89.50	0.48
0+90.00	0.50

SECTION 2 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION2 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.014	
Channel Slope	0.5000	%
Water Surface Elevation	1.37	ft
Elevation Range	0.00 to 1.30	
Discharge	389.00	cfs



SECTION 3 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION3 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.0000	%
Discharge	243.00	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	1.19	ft
Elevation Range	0.00 to 1.32	
Flow Area	36.1	ft²
Wetted Perimeter	60.92	ft
Top Width	58.34	ft
Actual Depth	1.19	ft
Critical Elevation	1.42	ft
Critical Slope	0.4194	%
Velocity	6.73	ft/s
Velocity Head	0.70	ft
Specific Energy	1.89	ft
Froude Number	1.51	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.69036998 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.70
0+00.50	0.68
0+00.50	0.20
0+02.00	0.33
0+02.00	0.37
0+29.00	0.91

SECTION 3 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.99
0+29.26	1.30
0+29.68	1.32
0+40.32	1.32
0+40.74	1.30
0+40.99	0.99
0+41.00	0.91
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

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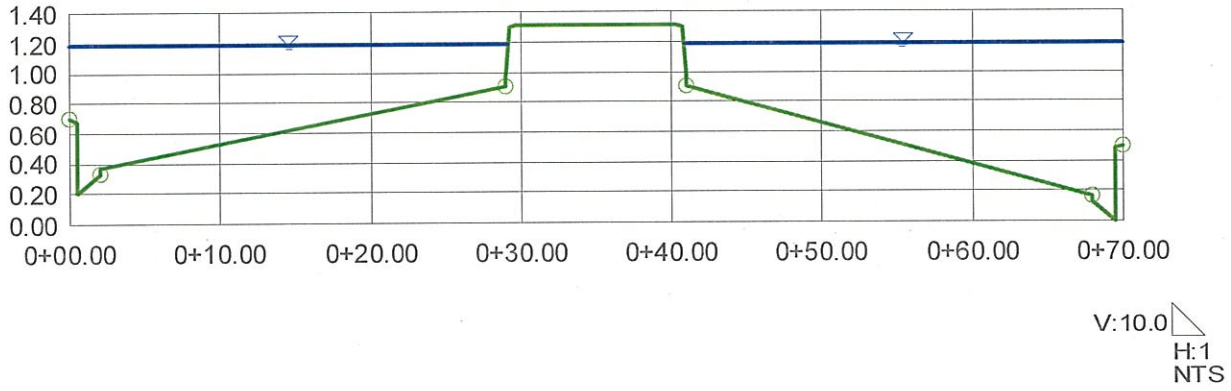
SECTION 3 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION3 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.0000	%
Water Surface Elevation	1.19	ft
Elevation Range	0.00 to 1.32	
Discharge	243.00	cfs



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SECTION 4 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION4 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.0400	%
Discharge	336.00	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	1.15	ft
Elevation Range	0.00 to 1.30	
Flow Area	48.3	ft²
Wetted Perimeter	78.97	ft
Top Width	76.30	ft
Actual Depth	1.15	ft
Critical Elevation	1.39	ft
Critical Slope	0.4125	%
Velocity	6.96	ft/s
Velocity Head	0.75	ft
Specific Energy	1.90	ft
Froude Number	1.54	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.64597394 ft.
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+38.00	0.016
0+38.00	0+52.00	0.013
0+52.00	0+88.00	0.016
0+88.00	0+90.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89

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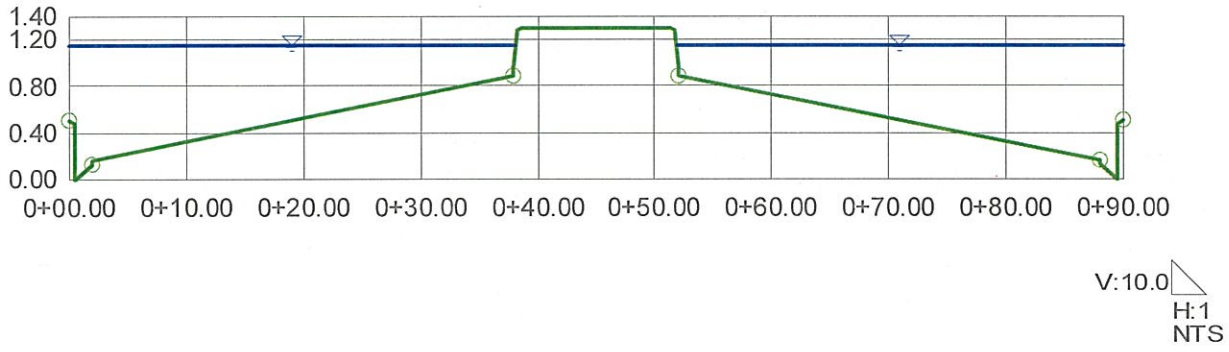
SECTION 4 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+38.01	0.97
0+38.26	1.28
0+38.68	1.30
0+51.32	1.30
0+51.74	1.28
0+51.99	0.97
0+52.00	0.89
0+88.00	0.17
0+88.00	0.13
0+89.50	0.00
0+89.50	0.48
0+90.00	0.50

SECTION 4 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION4 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.0400	%
Water Surface Elevation	1.15	ft
Elevation Range	0.00 to 1.30	
Discharge	336.00	cfs



SECTION 5 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION5 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.4500	%
Discharge	273.00	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	0.015	
Water Surface Elevation	1.34	ft
Elevation Range	0.00 to 0.95	
Flow Area	45.8	ft²
Wetted Perimeter	55.19	ft
Top Width	52.00	ft
Actual Depth	1.34	ft
Critical Elevation	1.41	ft
Critical Slope	0.3504	%
Velocity	5.96	ft/s
Velocity Head	0.55	ft
Specific Energy	1.90	ft
Froude Number	1.12	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.84489425 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+20.50	0.016
0+20.50	0+31.50	0.013
0+31.50	0+50.00	0.016
0+50.00	0+52.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54
0+20.51	0.62

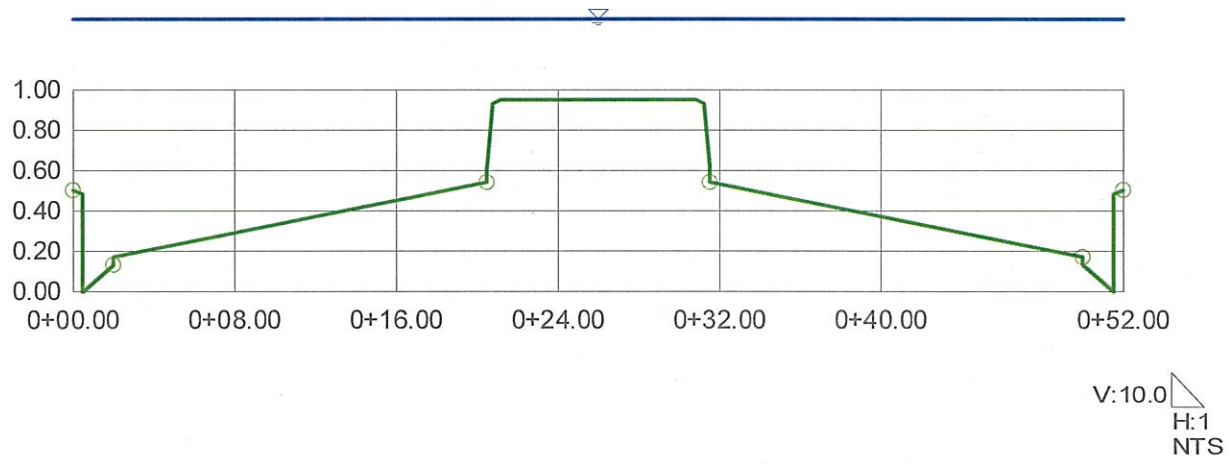
SECTION 5 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+20.76	0.93
0+21.18	0.95
0+30.82	0.95
0+31.24	0.93
0+31.49	0.62
0+31.50	0.54
0+50.00	0.17
0+50.00	0.13
0+51.50	0.00
0+51.50	0.48
0+52.00	0.50

SECTION 5 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION5 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.015
Channel Slope	0.4500 %
Water Surface Elevation	1.34 ft
Elevation Range	0.00 to 0.95
Discharge	273.00 cfs



SECTION 6 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION6 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.8000	%
Discharge	249.00	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	0.014	
Water Surface Elevation	1.15	ft
Elevation Range	0.00 to 0.95	
Flow Area	35.9	ft²
Wetted Perimeter	54.81	ft
Top Width	52.00	ft
Actual Depth	1.15	ft
Critical Elevation	1.36	ft
Critical Slope	0.3406	%
Velocity	6.95	ft/s
Velocity Head	0.75	ft
Specific Energy	1.90	ft
Froude Number	1.47	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.65418411 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+20.50	0.016
0+20.50	0+31.50	0.013
0+31.50	0+50.00	0.016
0+50.00	0+52.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54
0+20.51	0.62

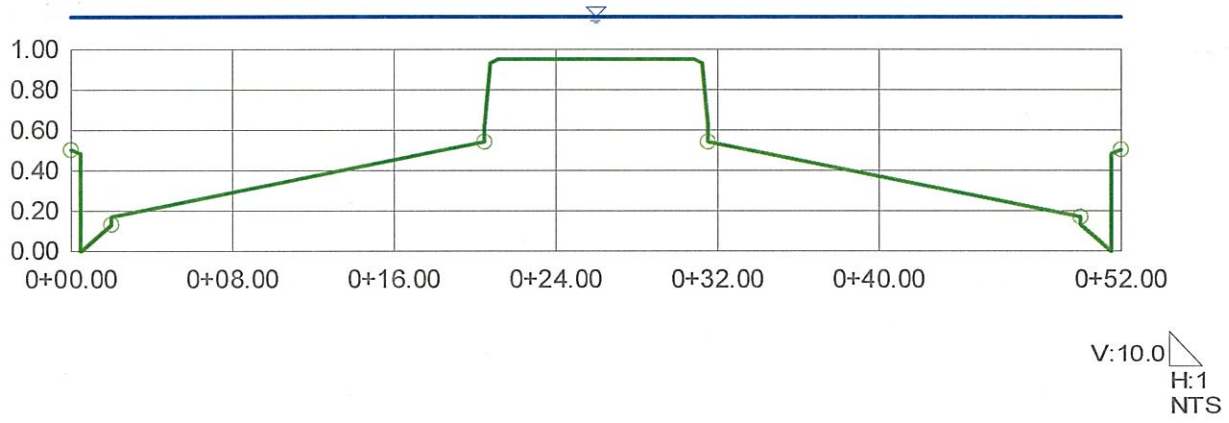
SECTION 6 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+20.76	0.93
0+21.18	0.95
0+30.82	0.95
0+31.24	0.93
0+31.49	0.62
0+31.50	0.54
0+50.00	0.17
0+50.00	0.13
0+51.50	0.00
0+51.50	0.48
0+52.00	0.50

SECTION 6 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION6 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.014	
Channel Slope	0.8000	%
Water Surface Elevation	1.15	ft
Elevation Range	0.00 to 0.95	
Discharge	249.00	cfs



SECTION 7 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION7 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5000	%
Discharge	268.00	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	0.015	
Water Surface Elevation	1.31	ft
Elevation Range	0.00 to 0.95	
Flow Area	43.7	ft²
Wetted Perimeter	55.11	ft
Top Width	52.00	ft
Actual Depth	1.31	ft
Critical Elevation	1.40	ft
Critical Slope	0.3495	%
Velocity	6.13	ft/s
Velocity Head	0.58	ft
Specific Energy	1.89	ft
Froude Number	1.18	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.80608383 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+20.50	0.016
0+20.50	0+31.50	0.013
0+31.50	0+50.00	0.016
0+50.00	0+52.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54
0+20.51	0.62

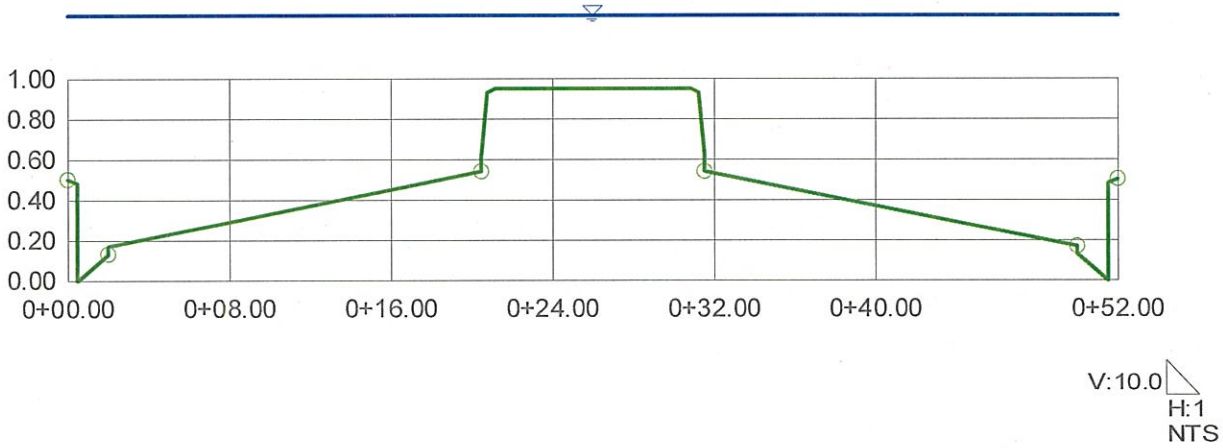
SECTION 7 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+20.76	0.93
0+21.18	0.95
0+30.82	0.95
0+31.24	0.93
0+31.49	0.62
0+31.50	0.54
0+50.00	0.17
0+50.00	0.13
0+51.50	0.00
0+51.50	0.48
0+52.00	0.50

SECTION 7 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION7 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.015
Channel Slope	0.5000 %
Water Surface Elevation	1.31 ft
Elevation Range	0.00 to 0.95
Discharge	268.00 cfs



SECTION 8 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION8 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.9100	%
Discharge	243.00	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	0.014	
Water Surface Elevation	1.11	ft
Elevation Range	0.00 to 0.95	
Flow Area	33.8	ft²
Wetted Perimeter	54.73	ft
Top Width	52.00	ft
Actual Depth	1.11	ft
Critical Elevation	1.34	ft
Critical Slope	0.3369	%
Velocity	7.19	ft/s
Velocity Head	0.80	ft
Specific Energy	1.92	ft
Froude Number	1.57	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.61483939 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+20.50	0.016
0+20.50	0+31.50	0.013
0+31.50	0+50.00	0.016
0+50.00	0+52.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54
0+20.51	0.62

SECTION 8 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+20.76	0.93
0+21.18	0.95
0+30.82	0.95
0+31.24	0.93
0+31.49	0.62
0+31.50	0.54
0+50.00	0.17
0+50.00	0.13
0+51.50	0.00
0+51.50	0.48
0+52.00	0.50

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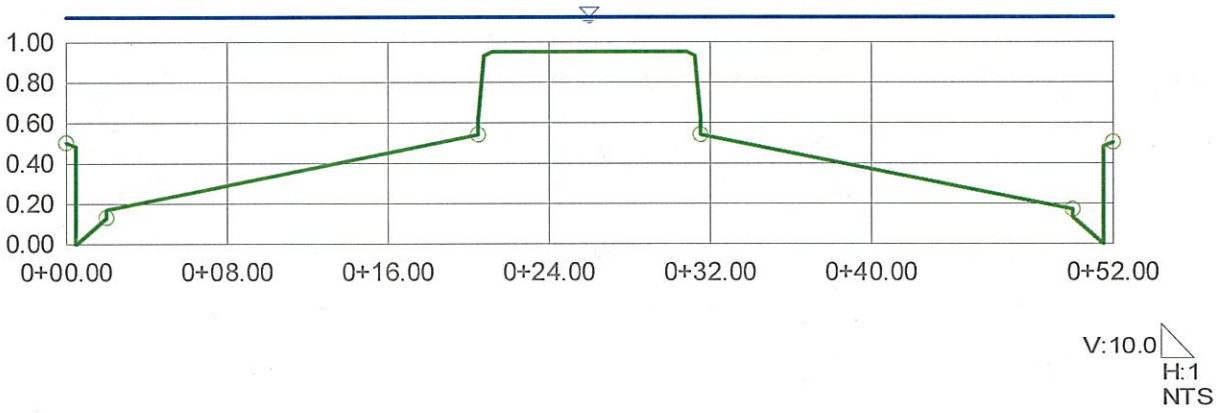
SECTION 8 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION8 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.014	
Channel Slope	0.9100	%
Water Surface Elevation	1.11	ft
Elevation Range	0.00 to 0.95	
Discharge	243.00	cfs



SECTION 9 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION9 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5000	%
Discharge	282.00	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	0.014	
Water Surface Elevation	1.40	ft
Elevation Range	0.00 to 1.32	
Flow Area	49.6	ft²
Wetted Perimeter	73.11	ft
Top Width	70.00	ft
Actual Depth	1.40	ft
Critical Elevation	1.49	ft
Critical Slope	0.3395	%
Velocity	5.69	ft/s
Velocity Head	0.50	ft
Specific Energy	1.91	ft
Froude Number	1.19	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.90349543 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.70
0+00.50	0.68
0+00.50	0.20
0+02.00	0.33
0+02.00	0.37
0+29.00	0.91
0+29.01	0.99

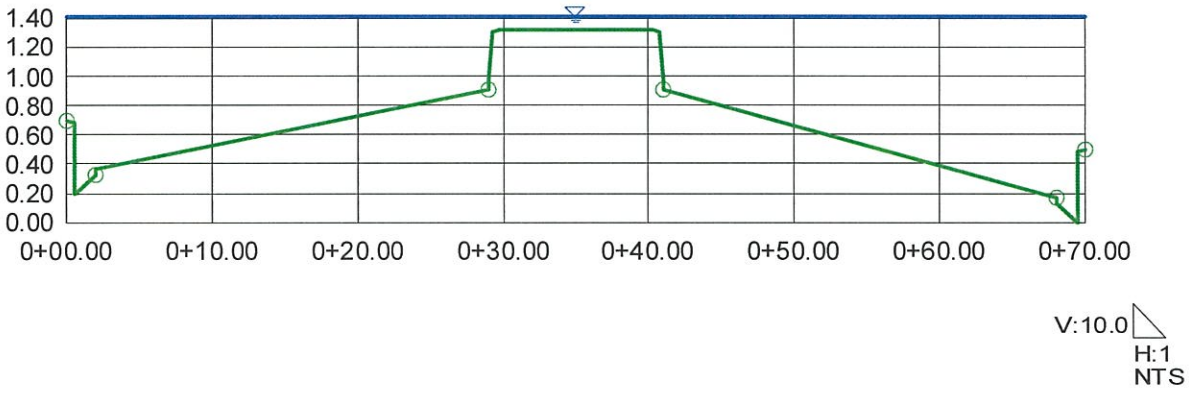
SECTION 9 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.26	1.30
0+29.68	1.32
0+40.32	1.32
0+40.74	1.30
0+40.99	0.99
0+41.00	0.91
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 9 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION9 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.014	
Channel Slope	0.5000	%
Water Surface Elevation	1.40	ft
Elevation Range	0.00 to 1.32	
Discharge	282.00	cfs



SECTION 10 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION10 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.0900	%
Discharge	285.00	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	1.09	ft
Elevation Range	0.00 to 1.12	
Flow Area	38.9	ft²
Wetted Perimeter	61.17	ft
Top Width	58.50	ft
Actual Depth	1.09	ft
Critical Elevation	1.34	ft
Critical Slope	0.4063	%
Velocity	7.34	ft/s
Velocity Head	0.84	ft
Specific Energy	1.93	ft
Froude Number	1.59	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.58998288 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71

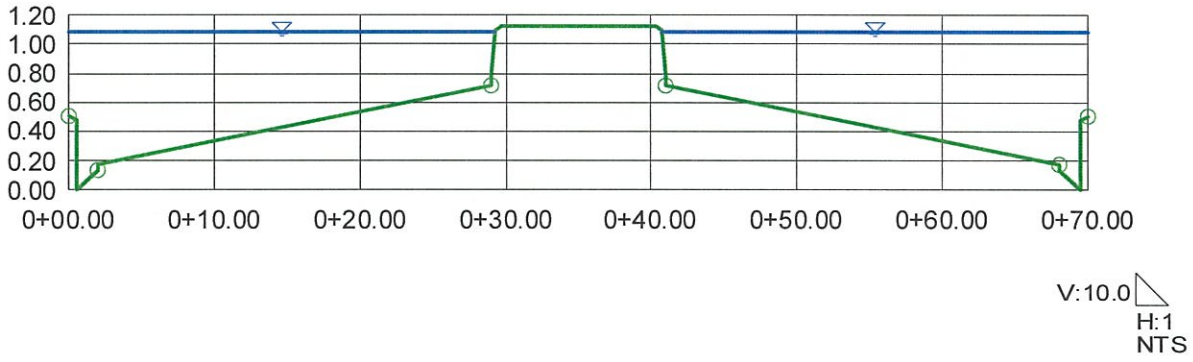
SECTION 10 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 10 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION10 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.0900	%
Water Surface Elevation	1.09	ft
Elevation Range	0.00 to 1.12	
Discharge	285.00	cfs



SECTION 11 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION11 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5300	%
Discharge	330.00	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	0.015	
Water Surface Elevation	1.32	ft
Elevation Range	0.00 to 1.12	
Flow Area	54.4	ft²
Wetted Perimeter	73.14	ft
Top Width	70.00	ft
Actual Depth	1.32	ft
Critical Elevation	1.42	ft
Critical Slope	0.3467	%
Velocity	6.06	ft/s
Velocity Head	0.57	ft
Specific Energy	1.89	ft
Froude Number	1.21	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.81710736 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71
0+29.01	0.79

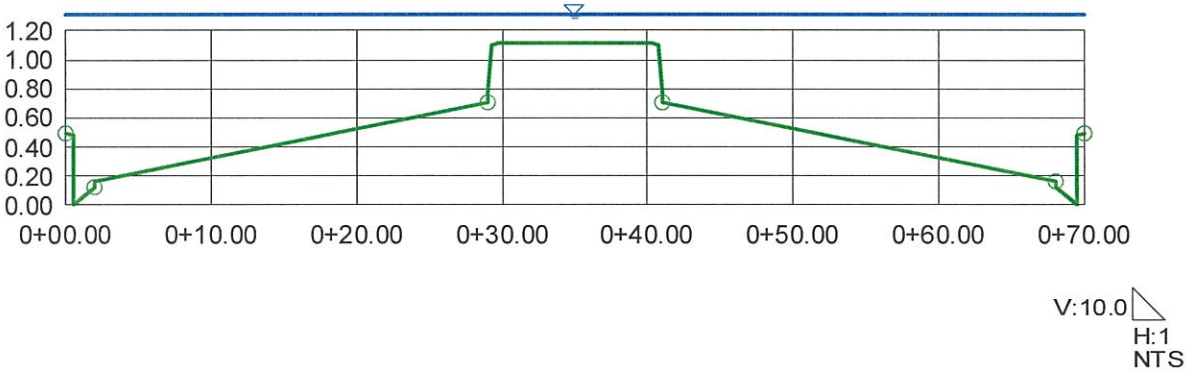
SECTION 11 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 11 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION11 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.5300	%
Water Surface Elevation	1.32	ft
Elevation Range	0.00 to 1.12	
Discharge	330.00	cfs



SECTION 12 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION12 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5100	%
Discharge	335.00	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	0.015	
Water Surface Elevation	1.33	ft
Elevation Range	0.00 to 1.12	
Flow Area	55.6	ft²
Wetted Perimeter	73.17	ft
Top Width	70.00	ft
Actual Depth	1.33	ft
Critical Elevation	1.43	ft
Critical Slope	0.3474	%
Velocity	6.02	ft/s
Velocity Head	0.56	ft
Specific Energy	1.90	ft
Froude Number	1.19	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.83463136 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71
0+29.01	0.79

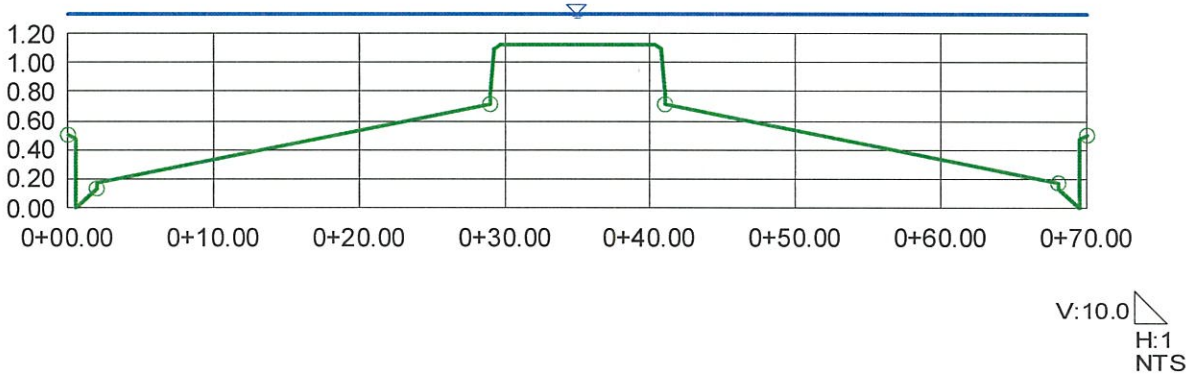
SECTION 12 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 12 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION12 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.5100	%
Water Surface Elevation	1.33	ft
Elevation Range	0.00 to 1.12	
Discharge	335.00	cfs



SECTION 13 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION13 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.7500	%
Discharge	310.00	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	0.014	
Water Surface Elevation	1.20	ft
Elevation Range	0.00 to 1.12	
Flow Area	46.5	ft²
Wetted Perimeter	72.91	ft
Top Width	70.00	ft
Actual Depth	1.20	ft
Critical Elevation	1.39	ft
Critical Slope	0.3351	%
Velocity	6.66	ft/s
Velocity Head	0.69	ft
Specific Energy	1.89	ft
Froude Number	1.44	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.70428162 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71
0+29.01	0.79

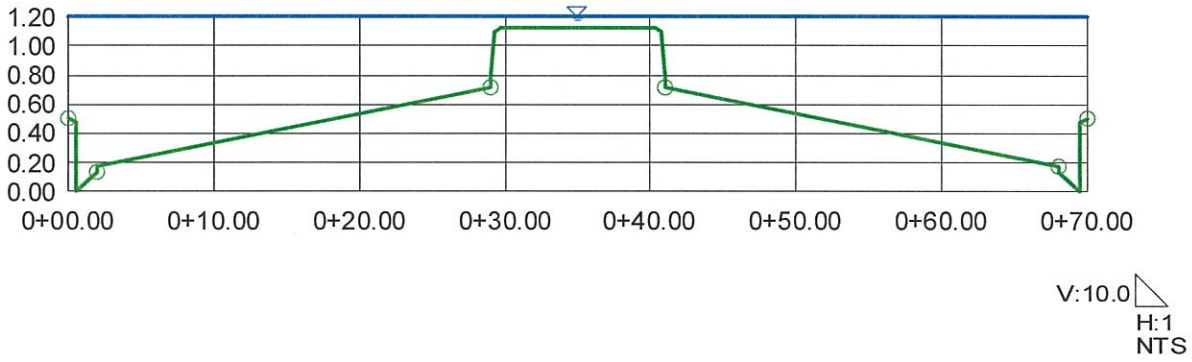
SECTION 13 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 13 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION13 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.014	
Channel Slope	0.7500	%
Water Surface Elevation	1.20	ft
Elevation Range	0.00 to 1.12	
Discharge	310.00	cfs



SECTION 14 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION14 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5500	%
Discharge	329.00	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	0.015	
Water Surface Elevation	1.31	ft
Elevation Range	0.00 to 1.12	
Flow Area	53.7	ft²
Wetted Perimeter	73.11	ft
Top Width	70.00	ft
Actual Depth	1.31	ft
Critical Elevation	1.42	ft
Critical Slope	0.3457	%
Velocity	6.13	ft/s
Velocity Head	0.58	ft
Specific Energy	1.89	ft
Froude Number	1.23	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.80624404 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71
0+29.01	0.79

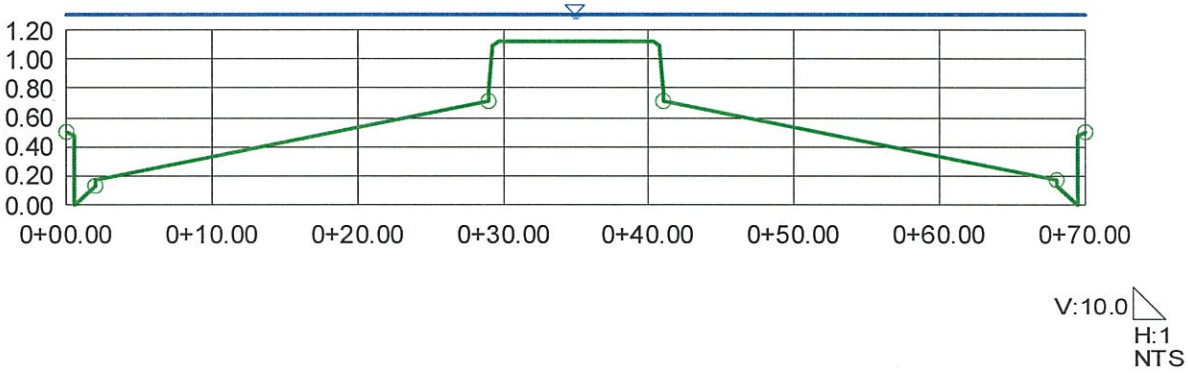
SECTION 14 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 14 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION14 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.5500	%
Water Surface Elevation	1.31	ft
Elevation Range	0.00 to 1.12	
Discharge	329.00	cfs



SECTION 15 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION15 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.6000	%
Discharge	323.00	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	0.015	
Water Surface Elevation	1.28	ft
Elevation Range	0.00 to 1.12	
Flow Area	51.5	ft²
Wetted Perimeter	73.05	ft
Top Width	70.00	ft
Actual Depth	1.28	ft
Critical Elevation	1.41	ft
Critical Slope	0.3434	%
Velocity	6.27	ft/s
Velocity Head	0.61	ft
Specific Energy	1.89	ft
Froude Number	1.29	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.77570257 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71
0+29.01	0.79

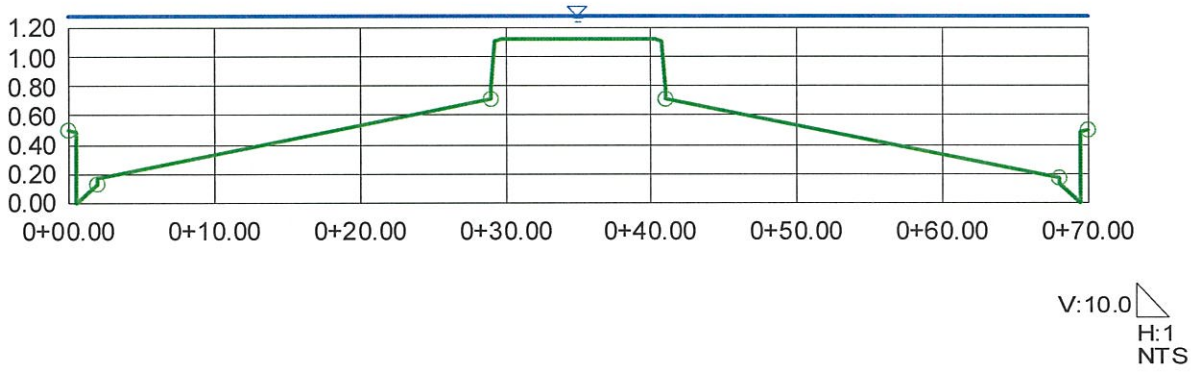
SECTION 15 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 15 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION15 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.6000	%
Water Surface Elevation	1.28	ft
Elevation Range	0.00 to 1.12	
Discharge	323.00	cfs



SECTION 16 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION16 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.4800	%
Discharge	271.00	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	0.015	
Water Surface Elevation	1.32	ft
Elevation Range	0.00 to 0.95	
Flow Area	44.6	ft²
Wetted Perimeter	55.14	ft
Top Width	52.00	ft
Actual Depth	1.32	ft
Critical Elevation	1.41	ft
Critical Slope	0.3498	%
Velocity	6.07	ft/s
Velocity Head	0.57	ft
Specific Energy	1.90	ft
Froude Number	1.16	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.82309687 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+20.50	0.016
0+20.50	0+31.50	0.013
0+31.50	0+50.00	0.016
0+50.00	0+52.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54
0+20.51	0.62

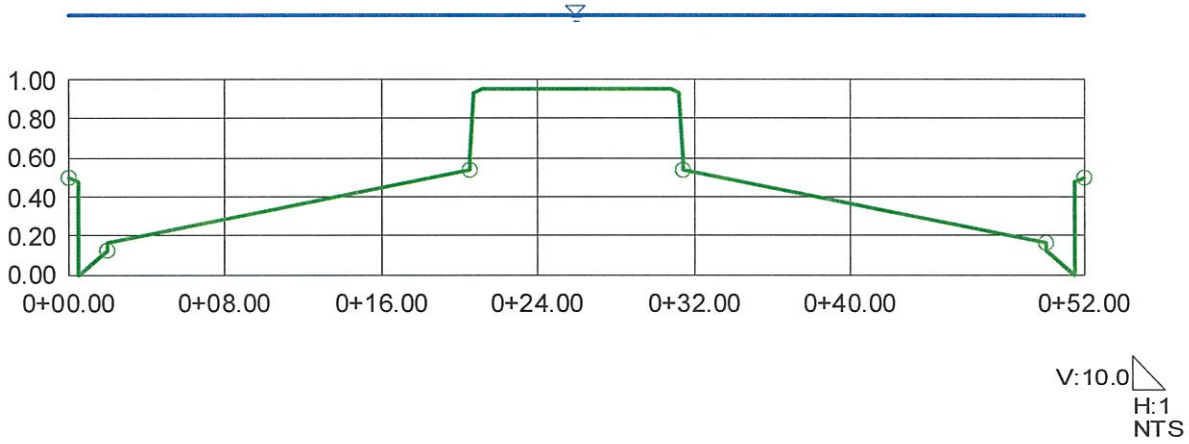
SECTION 16 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+20.76	0.93
0+21.18	0.95
0+30.82	0.95
0+31.24	0.93
0+31.49	0.62
0+31.50	0.54
0+50.00	0.17
0+50.00	0.13
0+51.50	0.00
0+51.50	0.48
0+52.00	0.50

SECTION 16 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION16 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.4800	%
Water Surface Elevation	1.32	ft
Elevation Range	0.00 to 0.95	
Discharge	271.00	cfs



SECTION 17 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION17 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	2.1200	%
Discharge	203.00	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	0.89	ft
Elevation Range	0.00 to 0.95	
Flow Area	22.6	ft²
Wetted Perimeter	43.68	ft
Top Width	41.45	ft
Actual Depth	0.89	ft
Critical Elevation	1.24	ft
Critical Slope	0.4098	%
Velocity	8.99	ft/s
Velocity Head	1.26	ft
Specific Energy	2.14	ft
Froude Number	2.15	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.38629745 ft.
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+20.50	0.016
0+20.50	0+31.50	0.013
0+31.50	0+50.00	0.016
0+50.00	0+52.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54

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SECTION 17 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+20.51	0.62
0+20.76	0.93
0+21.18	0.95
0+30.82	0.95
0+31.24	0.93
0+31.49	0.62
0+31.50	0.54
0+50.00	0.17
0+50.00	0.13
0+51.50	0.00
0+51.50	0.48
0+52.00	0.50

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SECTION 17 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION17 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	2.1200	%
Water Surface Elevation	0.89	ft
Elevation Range	0.00 to 0.95	
Discharge	203.00	cfs



SECTION 18 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION18 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.6000	%
Discharge	273.00	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	1.24	ft
Elevation Range	0.00 to 0.62	
Flow Area	42.3	ft²
Wetted Perimeter	51.54	ft
Top Width	49.00	ft
Actual Depth	1.24	ft
Critical Elevation	1.36	ft
Critical Slope	0.3851	%
Velocity	6.45	ft/s
Velocity Head	0.65	ft
Specific Energy	1.89	ft
Froude Number	1.22	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.74012716 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+47.00	0.016
0+47.00	0+49.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+24.50	0.62
0+47.00	0.17
0+47.00	0.13
0+48.50	0.00

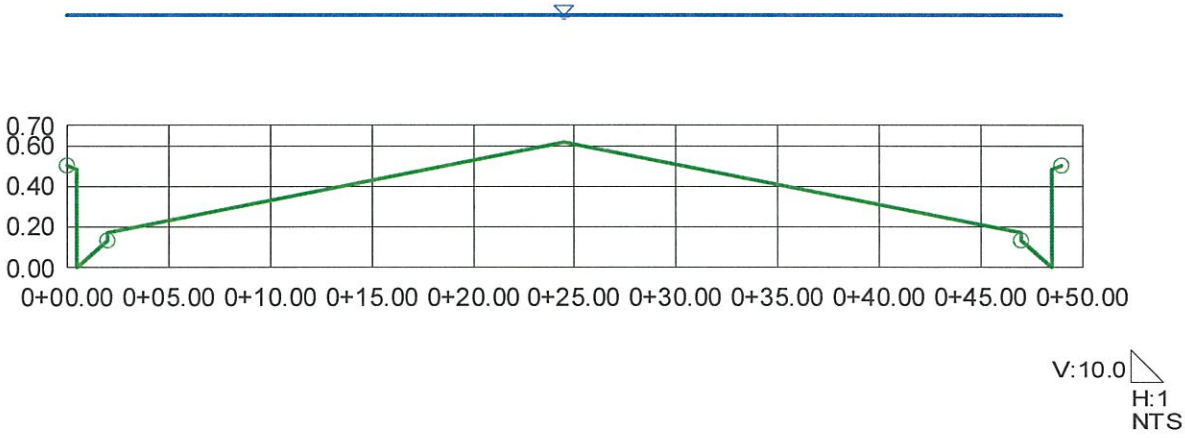
SECTION 18 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+48.50	0.48
0+49.00	0.50

SECTION 18 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION18 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.6000	%
Water Surface Elevation	1.24	ft
Elevation Range	0.00 to 0.62	
Discharge	273.00	cfs



SECTION 19 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION19 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5300	%
Discharge	329.00	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	0.015	
Water Surface Elevation	1.32	ft
Elevation Range	0.00 to 1.12	
Flow Area	54.3	ft²
Wetted Perimeter	73.13	ft
Top Width	70.00	ft
Actual Depth	1.32	ft
Critical Elevation	1.42	ft
Critical Slope	0.3467	%
Velocity	6.06	ft/s
Velocity Head	0.57	ft
Specific Energy	1.89	ft
Froude Number	1.21	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.81557053 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71
0+29.01	0.79

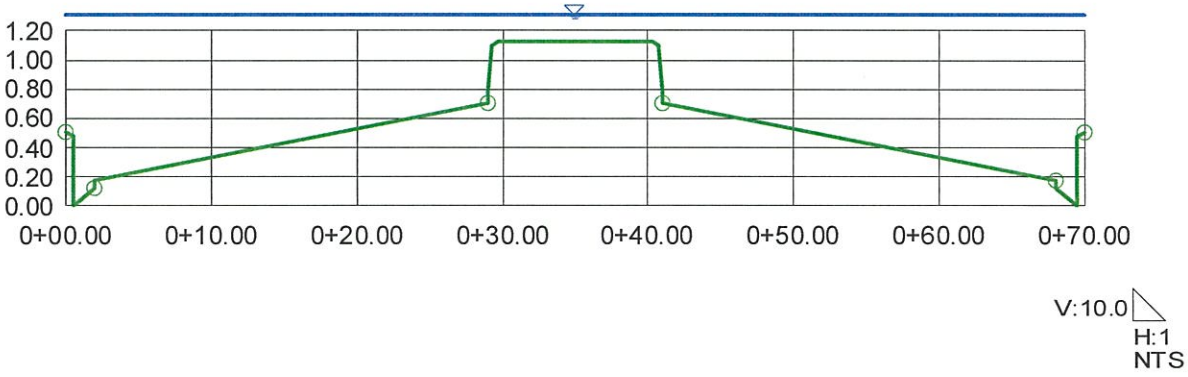
SECTION 19 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 19 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION19 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.5300	%
Water Surface Elevation	1.32	ft
Elevation Range	0.00 to 1.12	
Discharge	329.00	cfs



SECTION 20 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION20 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5300	%
Discharge	329.00	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	0.015	
Water Surface Elevation	1.32	ft
Elevation Range	0.00 to 1.12	
Flow Area	54.3	ft²
Wetted Perimeter	73.13	ft
Top Width	70.00	ft
Actual Depth	1.32	ft
Critical Elevation	1.42	ft
Critical Slope	0.3467	%
Velocity	6.06	ft/s
Velocity Head	0.57	ft
Specific Energy	1.89	ft
Froude Number	1.21	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.81557053 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71
0+29.01	0.79

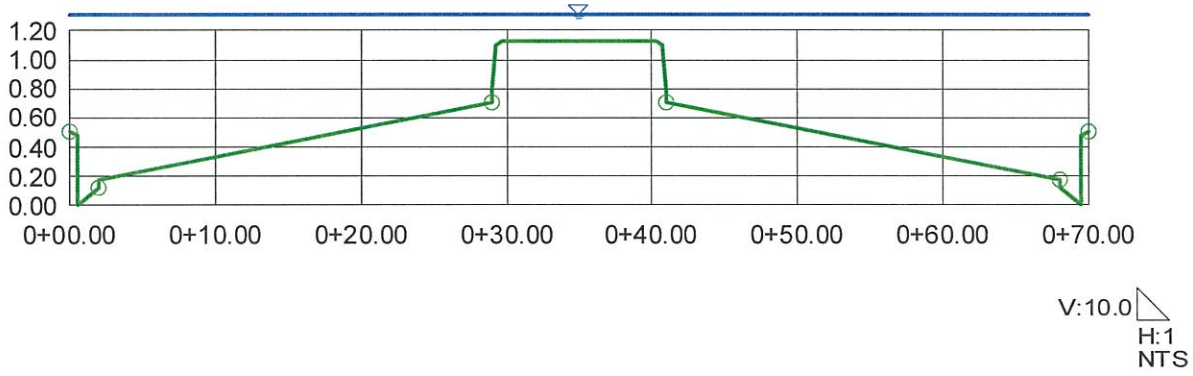
SECTION 20 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 20 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION20 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.5300	%
Water Surface Elevation	1.32	ft
Elevation Range	0.00 to 1.12	
Discharge	329.00	cfs



SECTION 21 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION21 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.2400	%
Discharge	279.00	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	1.06	ft
Elevation Range	0.00 to 1.12	
Flow Area	36.9	ft²
Wetted Perimeter	61.02	ft
Top Width	58.45	ft
Actual Depth	1.06	ft
Critical Elevation	1.33	ft
Critical Slope	0.4083	%
Velocity	7.57	ft/s
Velocity Head	0.89	ft
Specific Energy	1.95	ft
Froude Number	1.68	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.55593861 ft.
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71

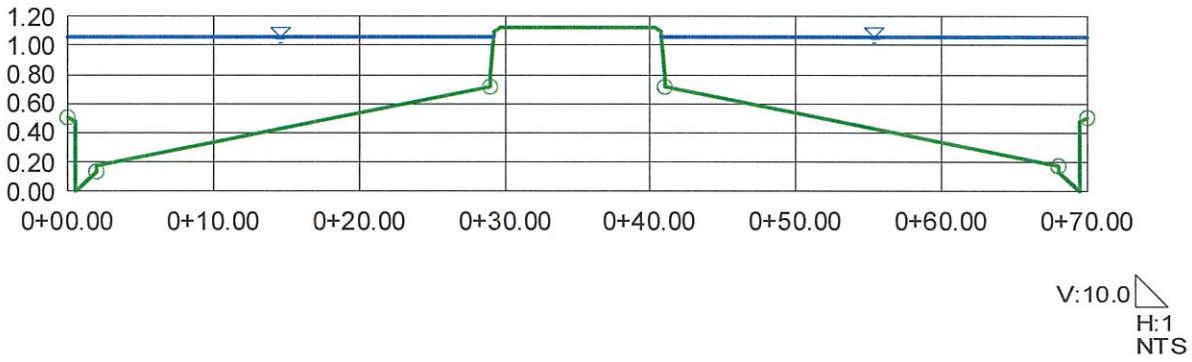
SECTION 21 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 21 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION21 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.2400	%
Water Surface Elevation	1.06	ft
Elevation Range	0.00 to 1.12	
Discharge	279.00	cfs



SECTION 22 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION22 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5000	%
Discharge	335.00	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	0.015	
Water Surface Elevation	1.34	ft
Elevation Range	0.00 to 1.12	
Flow Area	56.0	ft²
Wetted Perimeter	73.18	ft
Top Width	70.00	ft
Actual Depth	1.34	ft
Critical Elevation	1.43	ft
Critical Slope	0.3479	%
Velocity	5.98	ft/s
Velocity Head	0.56	ft
Specific Energy	1.90	ft
Froude Number	1.18	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.83975306 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+41.00	0.013
0+41.00	0+68.00	0.016
0+68.00	0+70.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71
0+29.01	0.79

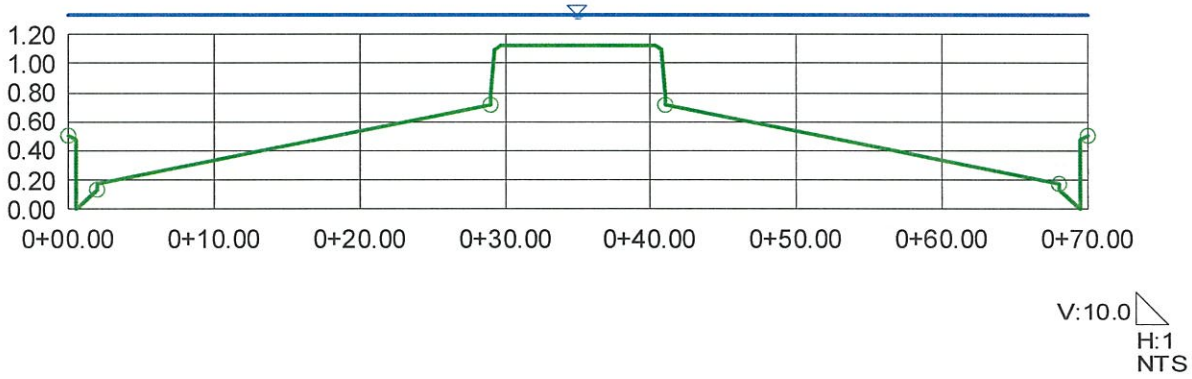
SECTION 22 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+29.26	1.10
0+29.68	1.12
0+40.32	1.12
0+40.74	1.10
0+40.99	0.79
0+41.00	0.71
0+68.00	0.17
0+68.00	0.13
0+69.50	0.00
0+69.50	0.48
0+70.00	0.50

SECTION 22 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION22 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.5000	%
Water Surface Elevation	1.34	ft
Elevation Range	0.00 to 1.12	
Discharge	335.00	cfs



SECTION 23 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION23 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.1900	%
Discharge	216.00	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	1.18	ft
Elevation Range	0.00 to 1.53	
Flow Area	31.8	ft²
Wetted Perimeter	59.27	ft
Top Width	58.01	ft
Actual Depth	1.18	ft
Critical Elevation	1.38	ft
Critical Slope	0.4102	%
Velocity	6.80	ft/s
Velocity Head	0.72	ft
Specific Energy	1.90	ft
Froude Number	1.62	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.67622398 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+58.00	0.016
0+58.00	0+58.68	0.013

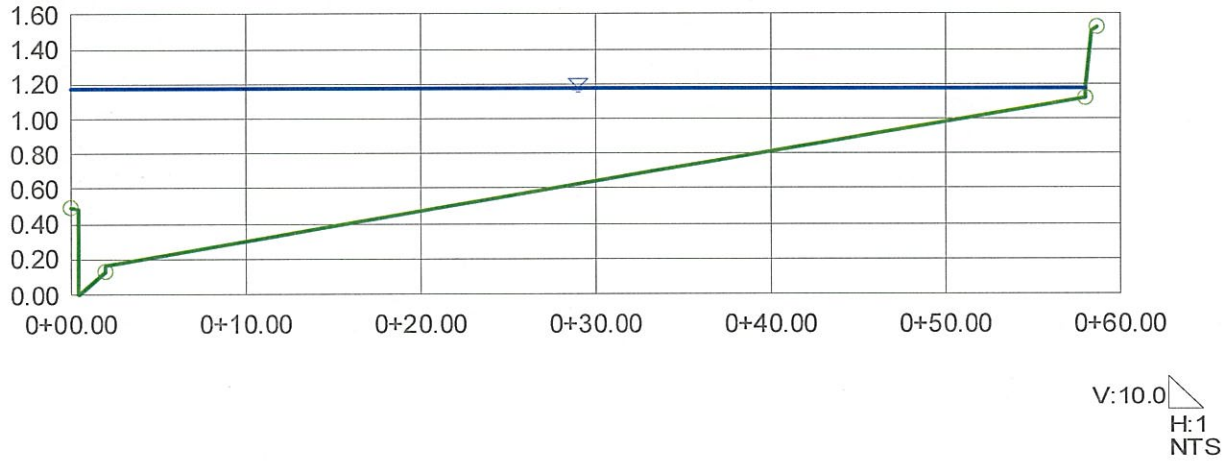
Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+58.00	1.12
0+58.01	1.20
0+58.26	1.51
0+58.68	1.53

SECTION 23 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION23 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.1900	%
Water Surface Elevation	1.18	ft
Elevation Range	0.00 to 1.53	
Discharge	216.00	cfs



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Slater Hanifan Group
37 Brookside Road Waterbury, CT 06708 USA +1-203-755-1666

SECTION 24 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION24 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5300	%
Discharge	190.00	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	1.35	ft
Elevation Range	0.00 to 1.30	
Flow Area	32.1	ft²
Wetted Perimeter	40.34	ft
Top Width	38.68	ft
Actual Depth	1.35	ft
Critical Elevation	1.43	ft
Critical Slope	0.3929	%
Velocity	5.92	ft/s
Velocity Head	0.55	ft
Specific Energy	1.90	ft
Froude Number	1.15	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.85296569 ft.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+38.00	0.016
0+38.00	0+38.68	0.013

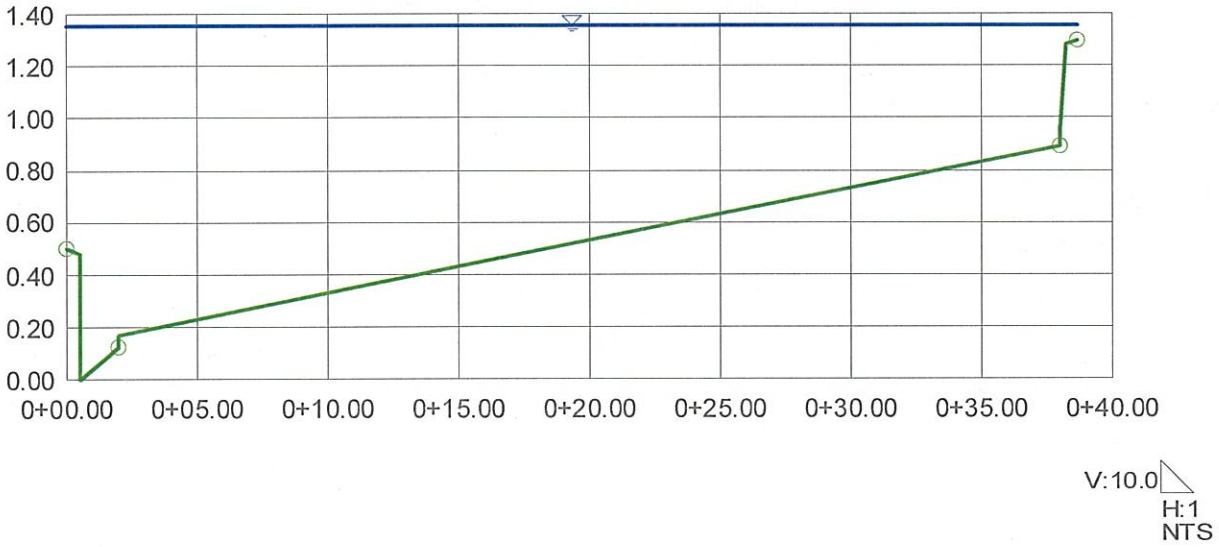
Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89
0+38.01	0.97
0+38.26	1.28
0+38.68	1.30

SECTION 24 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION24 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.5300	%
Water Surface Elevation	1.35	ft
Elevation Range	0.00 to 1.30	
Discharge	190.00	cfs



SECTION 25 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION25 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.4200	%
Discharge	394.00	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	0.014	
Water Surface Elevation	1.43	ft
Elevation Range	0.00 to 1.39	
Flow Area	70.4	ft²
Wetted Perimeter	93.93	ft
Top Width	90.00	ft
Actual Depth	1.43	ft
Critical Elevation	1.49	ft
Critical Slope	0.3296	%
Velocity	5.60	ft/s
Velocity Head	0.49	ft
Specific Energy	1.92	ft
Froude Number	1.12	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.92981944 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+38.00	0.016
0+38.00	0+52.00	0.013
0+52.00	0+88.00	0.016
0+88.00	0+90.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89
0+38.00	1.39

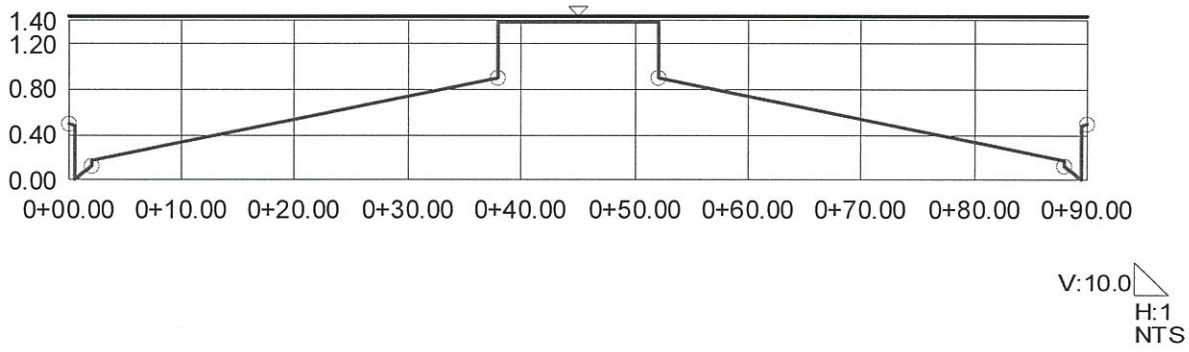
SECTION 25 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+52.00	1.39
0+52.00	0.89
0+88.00	0.17
0+88.00	0.13
0+89.50	0.00
0+89.50	0.48
0+90.00	0.50

SECTION 25 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION25 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.014	
Channel Slope	0.4200	%
Water Surface Elevation	1.43	ft
Elevation Range	0.00 to 1.39	
Discharge	394.00	cfs



SECTION 26 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION26 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	1.0100	%
Discharge	338.00	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	1.15	ft
Elevation Range	0.00 to 1.39	
Flow Area	48.9	ft²
Wetted Perimeter	78.90	ft
Top Width	76.00	ft
Actual Depth	1.15	ft
Critical Elevation	1.41	ft
Critical Slope	0.4159	%
Velocity	6.92	ft/s
Velocity Head	0.74	ft
Specific Energy	1.90	ft
Froude Number	1.52	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.654129 ft.
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+38.00	0.016
0+38.00	0+52.00	0.013
0+52.00	0+88.00	0.016
0+88.00	0+90.00	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+38.00	0.89

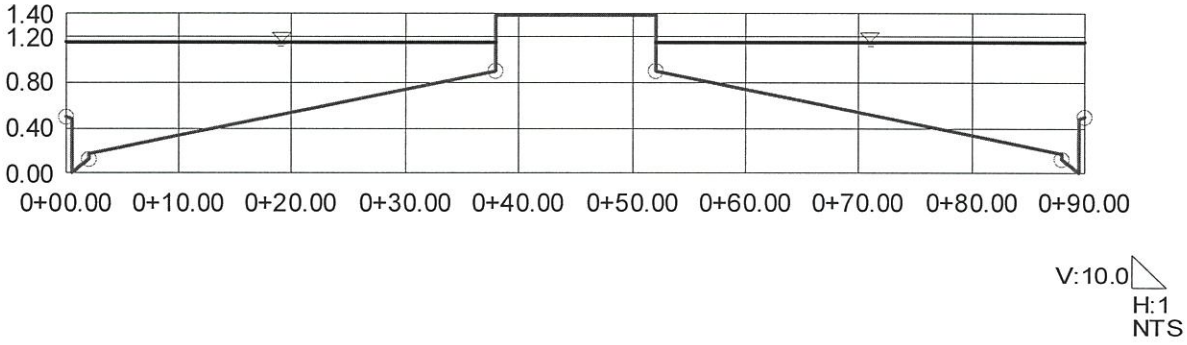
SECTION 26 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+38.00	1.39
0+52.00	1.39
0+52.00	0.89
0+88.00	0.17
0+88.00	0.13
0+89.50	0.00
0+89.50	0.48
0+90.00	0.50

SECTION 26 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION26 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	1.0100	%
Water Surface Elevation	1.15	ft
Elevation Range	0.00 to 1.39	
Discharge	338.00	cfs



SECTION 27 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION27 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5000	%
Discharge	167.00	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	0.015	
Water Surface Elevation	1.34	ft
Elevation Range	0.00 to 1.12	
Flow Area	28.0	ft²
Wetted Perimeter	36.81	ft
Top Width	35.00	ft
Actual Depth	1.34	ft
Critical Elevation	1.43	ft
Critical Slope	0.3496	%
Velocity	5.97	ft/s
Velocity Head	0.55	ft
Specific Energy	1.89	ft
Froude Number	1.18	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.83853006 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+29.00	0.016
0+29.00	0+35.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+29.00	0.71
0+29.01	0.79
0+29.26	1.10
0+29.68	1.12

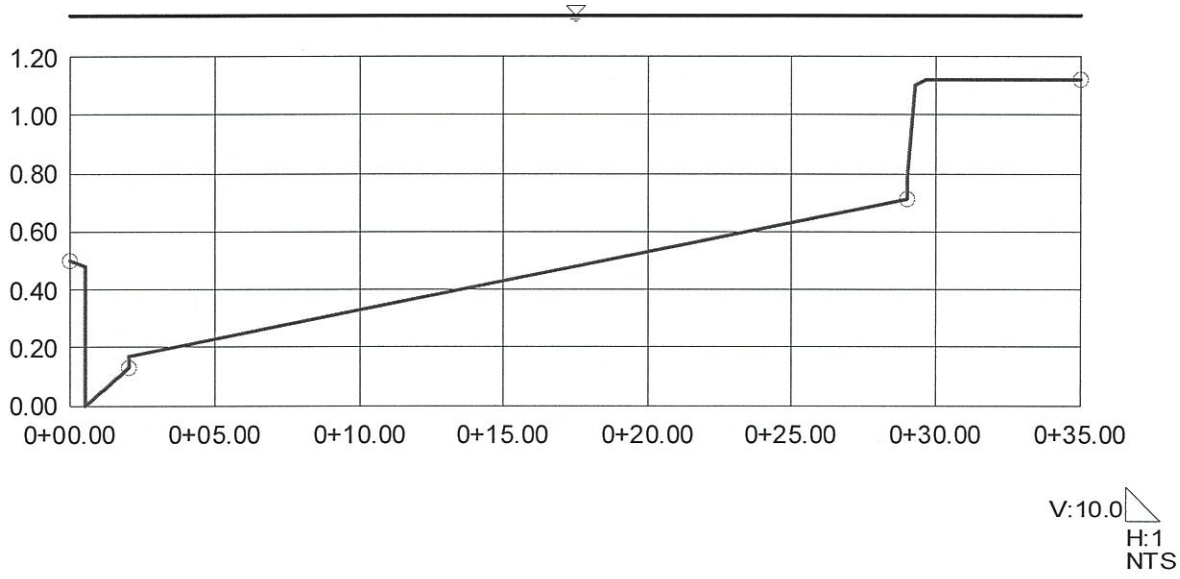
SECTION 27 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+35.00	1.12

SECTION 27 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION27 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.5000	%
Water Surface Elevation	1.34	ft
Elevation Range	0.00 to 1.12	
Discharge	167.00	cfs



SECTION 28 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION28 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5000	%
Discharge	242.00	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	1.28	ft
Elevation Range	0.00 to 0.54	
Flow Area	38.8	ft²
Wetted Perimeter	43.63	ft
Top Width	41.00	ft
Actual Depth	1.28	ft
Critical Elevation	1.36	ft
Critical Slope	0.3820	%
Velocity	6.24	ft/s
Velocity Head	0.61	ft
Specific Energy	1.89	ft
Froude Number	1.13	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.78303635 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+39.00	0.016
0+39.00	0+41.00	0.013

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+20.50	0.54
0+39.00	0.17
0+39.00	0.13
0+40.50	0.00

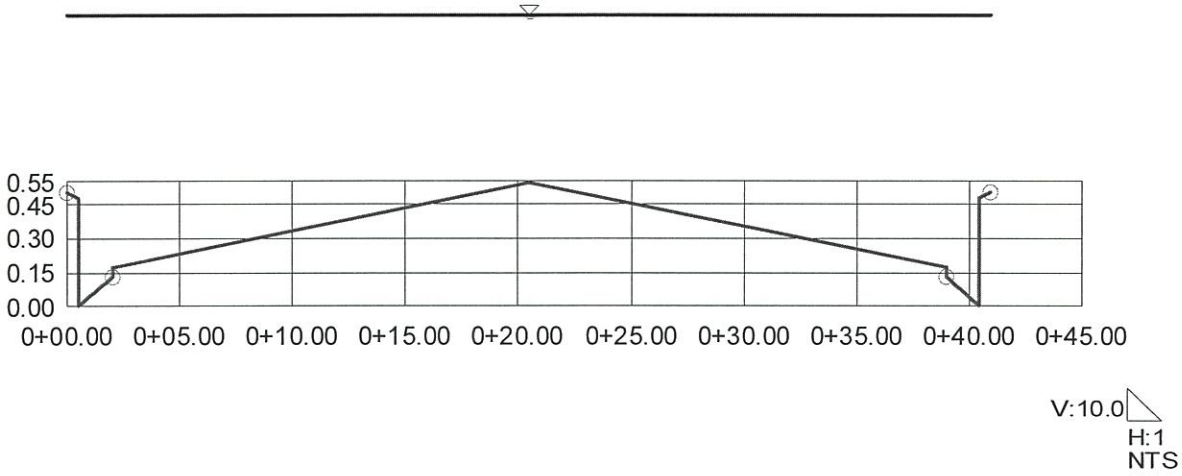
SECTION 28 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+40.50	0.48
0+41.00	0.50

SECTION 28 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION28 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.5000	%
Water Surface Elevation	1.28	ft
Elevation Range	0.00 to 0.54	
Discharge	242.00	cfs



SECTION 29 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION29 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	2.4700	%
Discharge	273.00	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	0.014	
Water Surface Elevation	0.92	ft
Elevation Range	0.00 to 1.45	
Flow Area	31.4	ft²
Wetted Perimeter	81.33	ft
Top Width	79.41	ft
Actual Depth	0.92	ft
Critical Elevation	1.24	ft
Critical Slope	0.3516	%
Velocity	8.68	ft/s
Velocity Head	1.17	ft
Specific Energy	2.10	ft
Froude Number	2.43	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.42412033 ft.
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+55.00	0.016
0+55.00	0+94.00	0.013
0+94.00	0+96.00	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+41.00	0.95
0+41.00	1.45

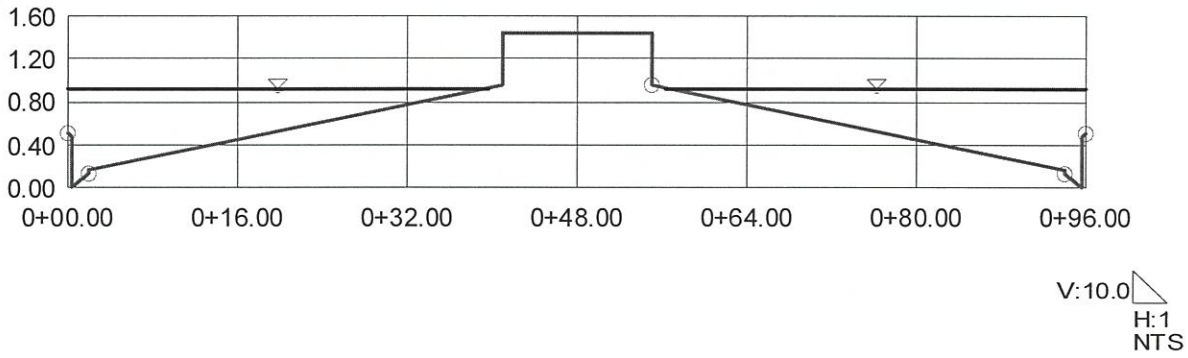
SECTION 29 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+48.00	1.45
0+55.00	1.45
0+55.00	0.95
0+94.00	0.17
0+94.00	0.13
0+95.50	0.00
0+95.50	0.48
0+96.00	0.50

SECTION 29 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION29 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.014	
Channel Slope	2.4700	%
Water Surface Elevation	0.92	ft
Elevation Range	0.00 to 1.45	
Discharge	273.00	cfs



SECTION 30 100-YR
Worksheet for Irregular Channel

Project Description	
Worksheet	SECTION30 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.5000	%
Discharge	389.00	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	0.015	
Water Surface Elevation	1.33	ft
Elevation Range	0.00 to 1.45	
Flow Area	64.8	ft²
Wetted Perimeter	85.49	ft
Top Width	82.00	ft
Actual Depth	1.33	ft
Critical Elevation	1.43	ft
Critical Slope	0.3407	%
Velocity	6.01	ft/s
Velocity Head	0.56	ft
Specific Energy	1.89	ft
Froude Number	1.19	
Flow Type	Supercritical	

Calculation Messages:
Water elevation exceeds lowest end station by 0.83077244 ft.
Flow is divided.

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+55.00	0.016
0+55.00	0+94.00	0.013
0+94.00	0+96.00	0.016

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+41.00	0.95
0+41.00	1.45

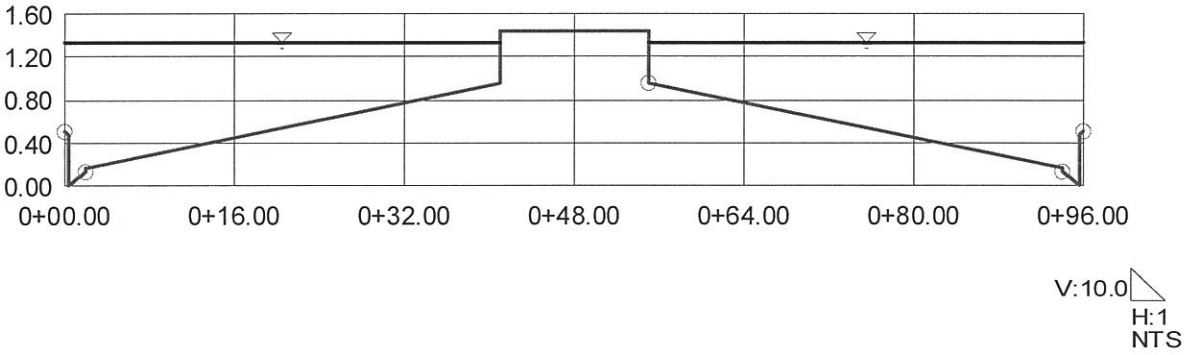
SECTION 30 100-YR
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+48.00	1.45
0+55.00	1.45
0+55.00	0.95
0+94.00	0.17
0+94.00	0.13
0+95.50	0.00
0+95.50	0.48
0+96.00	0.50

SECTION 30 100-YR
Cross Section for Irregular Channel

Project Description	
Worksheet	SECTION30 100-YR
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.015	
Channel Slope	0.5000	%
Water Surface Elevation	1.33	ft
Elevation Range	0.00 to 1.45	
Discharge	389.00	cfs



APPENDIX E

Flood Control Facility Computations

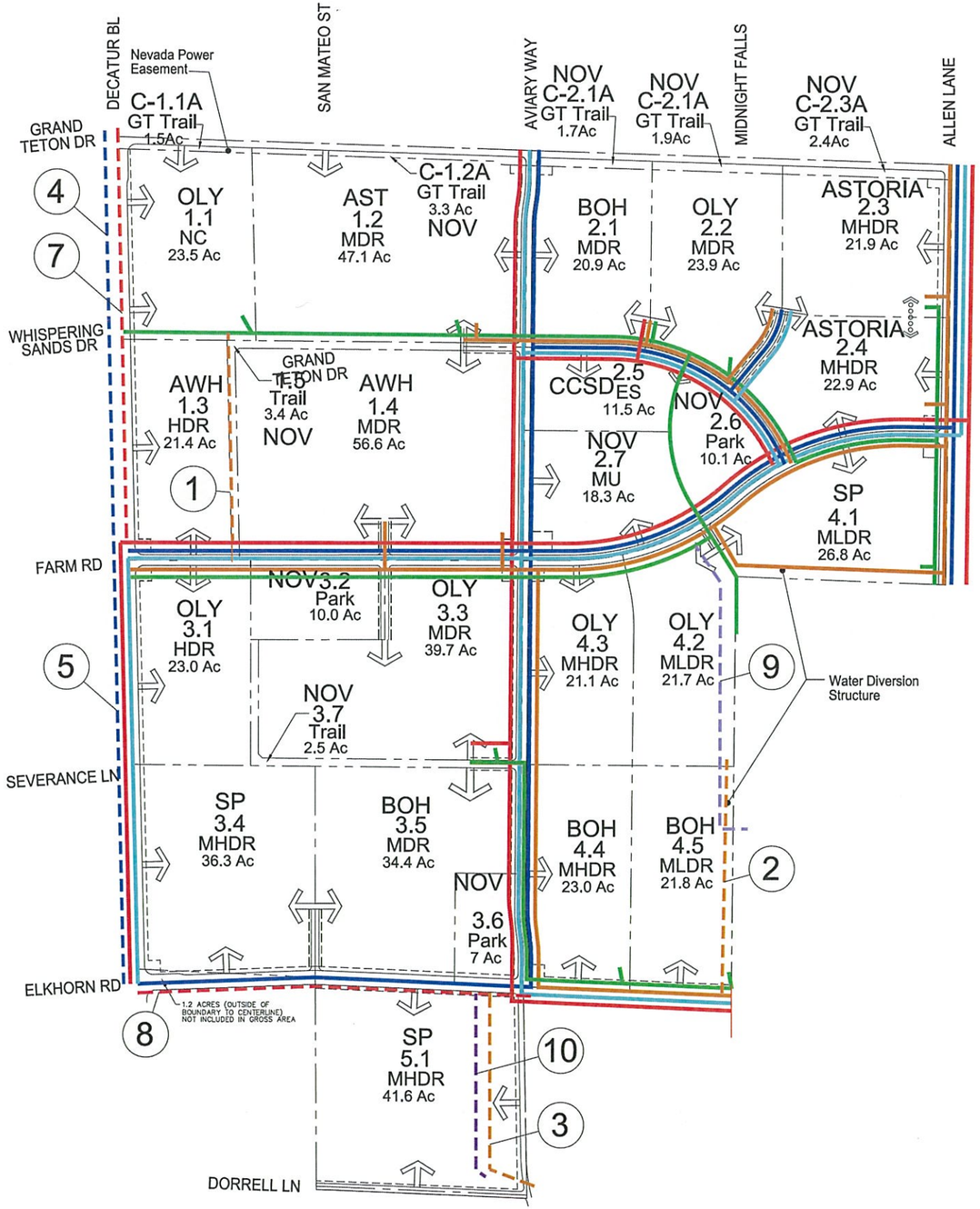
Existing Utility Exhibit

EXISTING CONSTRUCTION

- EXIST. POTABLE WATER/ REUSE WATER
- EXIST. SANITARY SEWER
- EXIST. STORM DRAIN
- EXIST. EMBARQ
- EXIST. NV ENERGY

PROPOSED CONSTRUCTION

#	Description
1	Sewer thru Trail 1.5 servicing Parcel 1.1
2	Sewer thru Parcel 4.5 servicing Parcel 4.2
3	Sewer servicing Parcels 3.4,3.5,5.1
4	Water lines (in Decatur) to Parcel 1.1 & 1.3
5	Water lines (in Decatur) to Parcel 3.1 & 3.4
6	Water lines (in Elkhorn) adjacent 4.4 & 4.5
7	NV Energy & Dry utility conduit to 1.1 & 1.3
8	NV Energy & Dry utility conduit (in Elkhorn) to 3.4 & 3.5
9	Drainage facility thru Parcel 4.2 and 4.5 (arch culvert)
10	Earth Channel thru Parcel 5.1



UTILITY EXHIBIT

NOT TO SCALE

MARCH 8, 2010

Stub Full Flow Hydraulic Computations

Stubs for Connection to Proposed Development Range in Size and Slope

Sub Size Varies from 24-Inch RCP to 48-Inch RCP
Lateral Slope Varies from 0.50% to 1.62%

Stub Summary		
Size (RCP)	Slope (%)	Flow Flow Capacity (cfs)
24	0.50	16
30	0.50	29
30	0.87	38
36	0.50	47
42	0.50	71
48	0.50	101
48	1.62	182

Stub - 24-Inch RCP
Worksheet for Circular Channel

Project Description	
Worksheet	Stub - 24-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

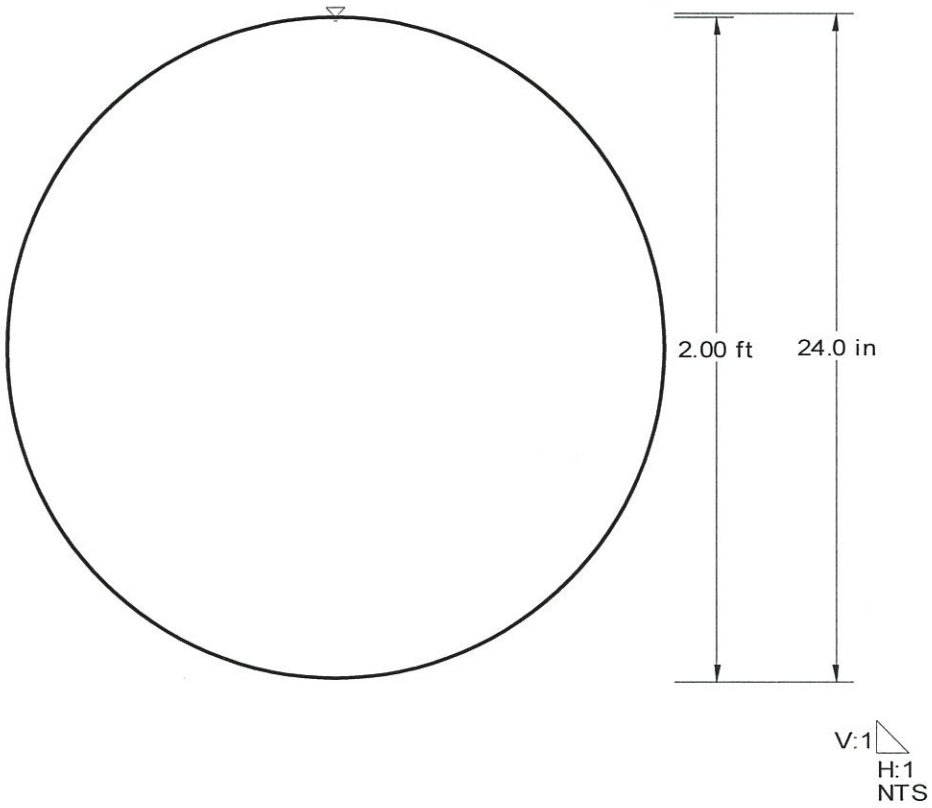
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	24.0	in

Results		
Depth	2.00	ft
Discharge	16.00	cfs
Flow Area	3.1	ft²
Wetted Perimeter	6.28	ft
Top Width	0.00	ft
Critical Depth	1.44	ft
Percent Full	100.0	%
Critical Slope	0.66	%
Velocity	5.09	ft/s
Velocity Head	0.40	ft
Specific Energy	2.40	ft
Froude Number	0.00	
Maximum Discharge	17.21	cfs
Discharge Full	16.00	cfs
Slope Full	0.50	%
Flow Type	N/A	

Stub - 24-Inch RCP
Cross Section for Circular Channel

Project Description	
Worksheet	Stub - 24-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	2.00	ft
Diameter	24.0	in
Discharge	16.00	cfs



Stub - 30-Inch RCP
Worksheet for Circular Channel

Project Description	
Worksheet	Stub - 30-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

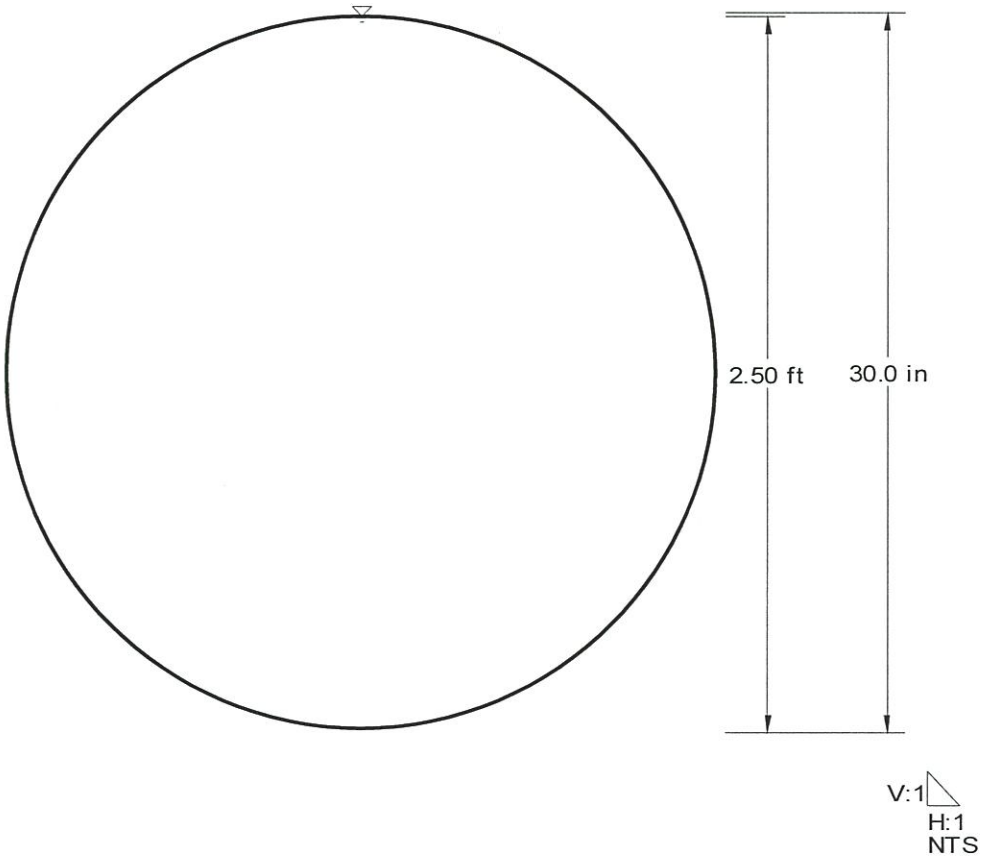
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	30.0	in

Results		
Depth	2.50	ft
Discharge	29.00	cfs
Flow Area	4.9	ft²
Wetted Perimeter	7.85	ft
Top Width	0.00	ft
Critical Depth	1.84	ft
Percent Full	100.0	%
Critical Slope	0.63	%
Velocity	5.91	ft/s
Velocity Head	0.54	ft
Specific Energy	3.04	ft
Froude Number	0.00	
Maximum Discharge	31.20	cfs
Discharge Full	29.00	cfs
Slope Full	0.50	%
Flow Type	N/A	

Stub - 30-Inch RCP
Cross Section for Circular Channel

Project Description	
Worksheet	Stub - 30-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	2.50	ft
Diameter	30.0	in
Discharge	29.00	cfs



Stub - 30-Inch RCP
Worksheet for Circular Channel

Project Description	
Worksheet	Stub - 30-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

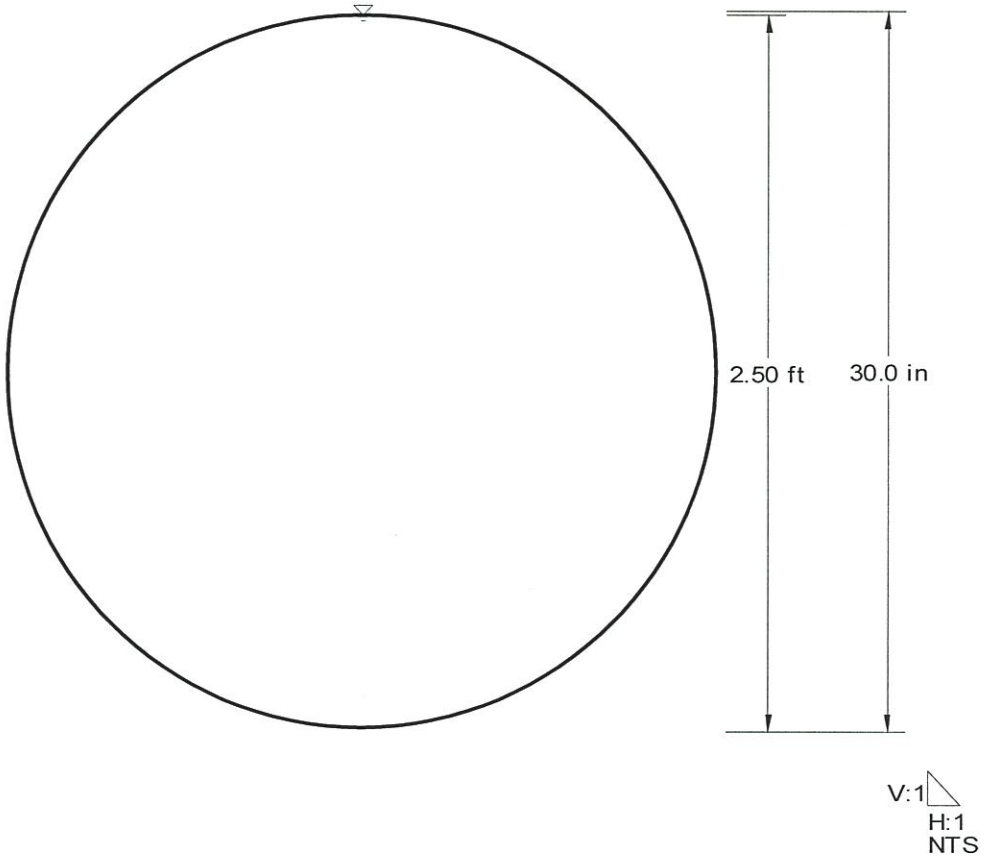
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.87	%
Diameter	30.0	in

Results		
Depth	2.50	ft
Discharge	38.26	cfs
Flow Area	4.9	ft²
Wetted Perimeter	7.85	ft
Top Width	0.00	ft
Critical Depth	2.09	ft
Percent Full	100.0	%
Critical Slope	0.84	%
Velocity	7.79	ft/s
Velocity Head	0.94	ft
Specific Energy	3.44	ft
Froude Number	0.00	
Maximum Discharge	41.15	cfs
Discharge Full	38.26	cfs
Slope Full	0.87	%
Flow Type	N/A	

Stub - 30-Inch RCP
Cross Section for Circular Channel

Project Description	
Worksheet	Stub - 30-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.87	%
Depth	2.50	ft
Diameter	30.0	in
Discharge	38.26	cfs



Stub - 36-Inch RCP
Worksheet for Circular Channel

Project Description	
Worksheet	Stub - 36-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

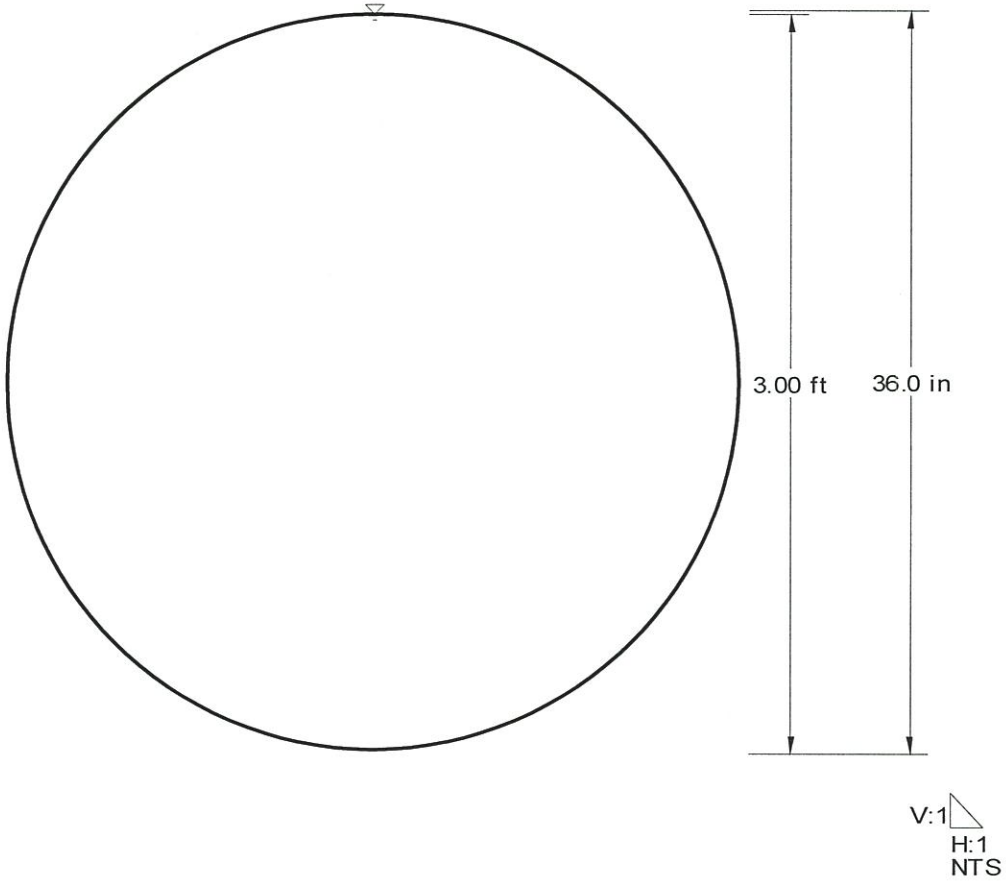
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	36.0	in

Results		
Depth	3.00	ft
Discharge	47.16	cfs
Flow Area	7.1	ft²
Wetted Perimeter	9.42	ft
Top Width	0.00	ft
Critical Depth	2.24	ft
Percent Full	100.0	%
Critical Slope	0.61	%
Velocity	6.67	ft/s
Velocity Head	0.69	ft
Specific Energy	3.69	ft
Froude Number	0.00	
Maximum Discharge	50.73	cfs
Discharge Full	47.16	cfs
Slope Full	0.50	%
Flow Type	N/A	

Stub - 36-Inch RCP
Cross Section for Circular Channel

Project Description	
Worksheet	Stub - 36-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	3.00	ft
Diameter	36.0	in
Discharge	47.16	cfs



Stub - 42-Inch RCP
Worksheet for Circular Channel

Project Description	
Worksheet	Stub - 42-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

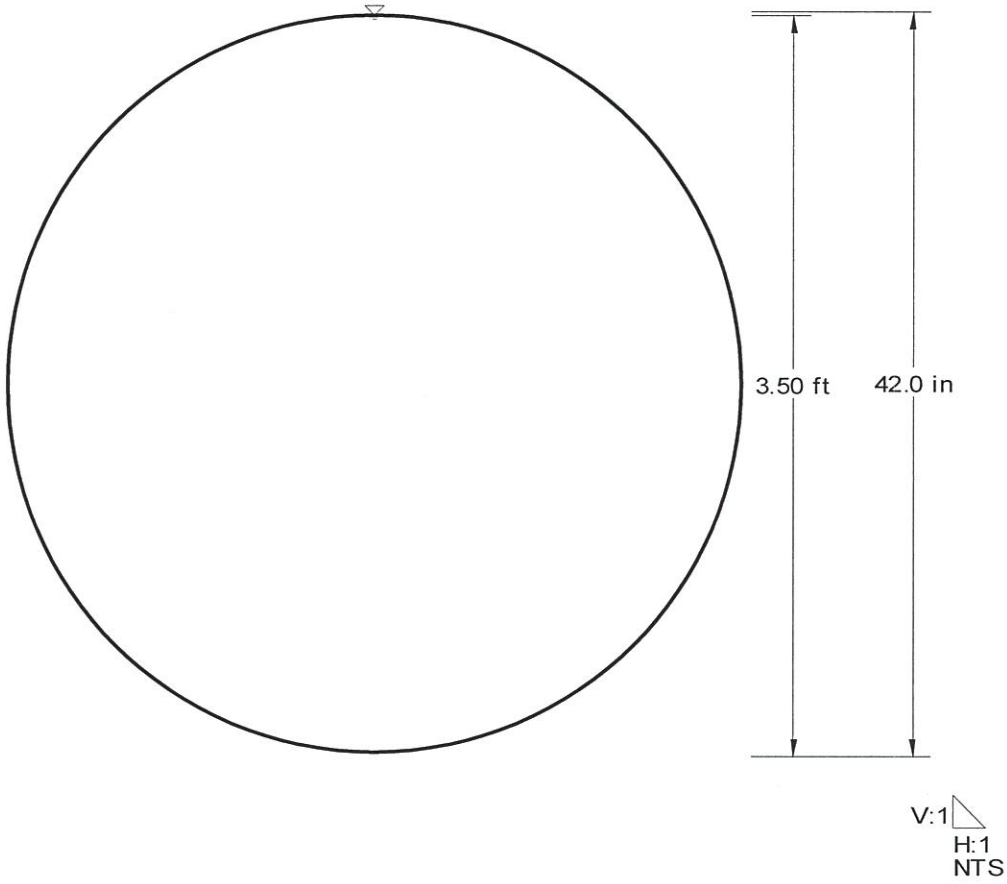
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	42.0	in

Results		
Depth	3.50	ft
Discharge	71.14	cfs
Flow Area	9.6	ft²
Wetted Perimeter	11.00	ft
Top Width	0.00	ft
Critical Depth	2.64	ft
Percent Full	100.0	%
Critical Slope	0.59	%
Velocity	7.39	ft/s
Velocity Head	0.85	ft
Specific Energy	4.35	ft
Froude Number	0.00	
Maximum Discharge	76.52	cfs
Discharge Full	71.14	cfs
Slope Full	0.50	%
Flow Type	N/A	

Stub - 42-Inch RCP
Cross Section for Circular Channel

Project Description	
Worksheet	Stub - 42-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	3.50	ft
Diameter	42.0	in
Discharge	71.14	cfs



Stub - 48-Inch RCP
Worksheet for Circular Channel

Project Description	
Worksheet	Stub - 48-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

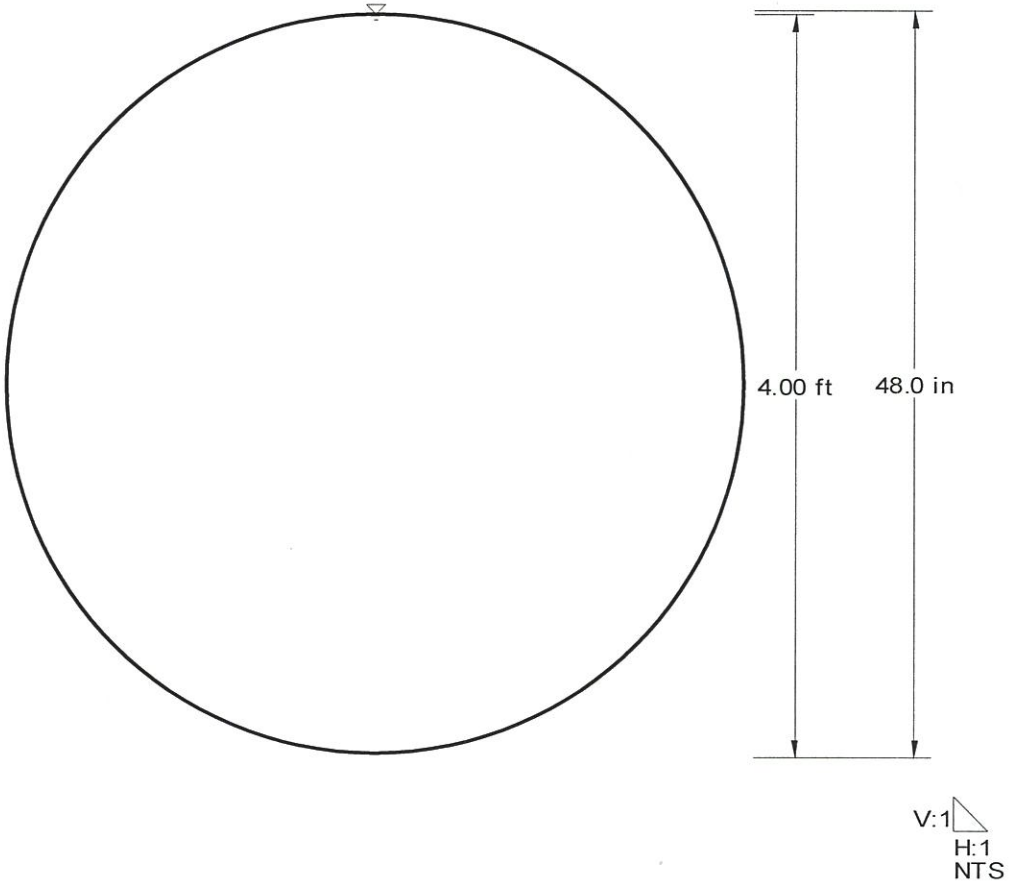
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	48.0	in

Results		
Depth	4.00	ft
Discharge	101.57	cfs
Flow Area	12.6	ft²
Wetted Perimeter	12.57	ft
Top Width	0.00	ft
Critical Depth	3.05	ft
Percent Full	100.0	%
Critical Slope	0.58	%
Velocity	8.08	ft/s
Velocity Head	1.02	ft
Specific Energy	5.02	ft
Froude Number	0.00	
Maximum Discharge	109.25	cfs
Discharge Full	101.57	cfs
Slope Full	0.50	%
Flow Type	N/A	

Stub - 48-Inch RCP
Cross Section for Circular Channel

Project Description	
Worksheet	Stub - 48-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	4.00	ft
Diameter	48.0	in
Discharge	101.57	cfs



Stub - 48-Inch RCP
Worksheet for Circular Channel

Project Description	
Worksheet	Stub - 48-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

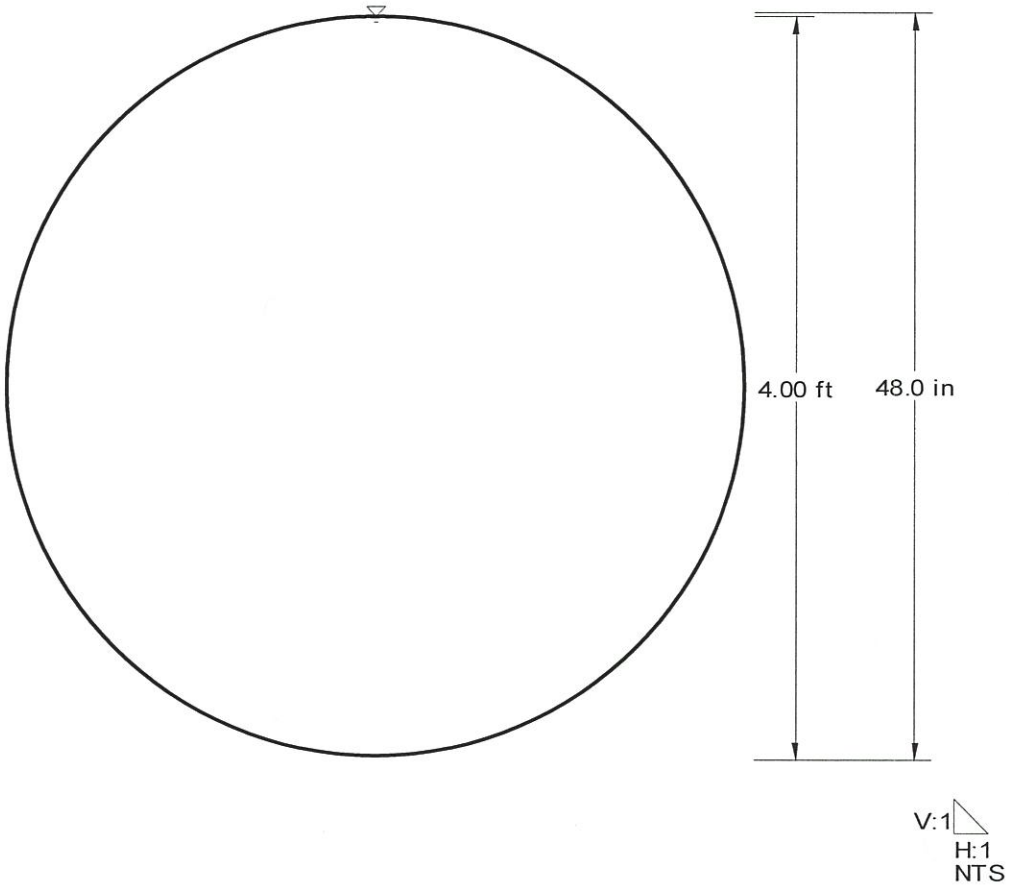
Input Data		
Mannings Coefficient	0.013	
Channel Slope	1.62	%
Diameter	48.0	in

Results		
Depth	4.00	ft
Discharge	182.82	cfs
Flow Area	12.6	ft²
Wetted Perimeter	12.57	ft
Top Width	0.00	ft
Critical Depth	3.79	ft
Percent Full	100.0	%
Critical Slope	1.40	%
Velocity	14.55	ft/s
Velocity Head	3.29	ft
Specific Energy	7.29	ft
Froude Number	0.00	
Maximum Discharge	196.66	cfs
Discharge Full	182.82	cfs
Slope Full	1.62	%
Flow Type	N/A	

Stub - 48-Inch RCP
Cross Section for Circular Channel

Project Description	
Worksheet	Stub - 48-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	1.62	%
Depth	4.00	ft
Diameter	48.0	in
Discharge	182.82	cfs



Lateral Full Flow Rating Tables

Laterals Connecting to Drop Inlets Range in Size and Slope

Lateral Size Varies from 18-Inch RCP to 54-Inch RCP
Lateral Slope Varies from 0.25% to 13.3%

Lateral - 18-Inch RCP
Rating Table for Circular Channel

Project Description	
Worksheet	Lateral - 18-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data	
Mannings Coefficient	0.013
Diameter	18.0 in

Attribute	Minimum	Maximum	Increment
Channel Slope (%)	0.00	3.00	0.25

Channel Slope (%)	Discharge (cfs)	Depth (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.00	N/A	N/A	N/A	N/A	N/A	N/A
0.25	5.25	1.50	2.97	1.8	4.71	0.00
0.50	7.43	1.50	4.20	1.8	4.71	0.00
0.75	9.10	1.50	5.15	1.8	4.71	0.00
1.00	10.50	1.50	5.94	1.8	4.71	0.00
1.25	11.74	1.50	6.65	1.8	4.71	0.00
1.50	12.86	1.50	7.28	1.8	4.71	0.00
1.75	13.90	1.50	7.86	1.8	4.71	0.00
2.00	14.85	1.50	8.41	1.8	4.71	0.00
2.25	15.76	1.50	8.92	1.8	4.71	0.00
2.50	16.61	1.50	9.40	1.8	4.71	0.00
2.75	17.42	1.50	9.86	1.8	4.71	0.00
3.00	18.19	1.50	10.30	1.8	4.71	0.00

Lateral - 24-Inch RCP
Rating Table for Circular Channel

Project Description	
Worksheet	Lateral - 24-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data	
Mannings Coefficient	0.013
Diameter	24.0 in

Attribute	Minimum	Maximum	Increment
Channel Slope (%)	0.50	3.00	0.50

Channel Slope (%)	Discharge (cfs)	Depth (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.50	16.00	2.00	5.09	3.1	6.28	0.00
1.00	22.62	2.00	7.20	3.1	6.28	0.00
1.50	27.71	2.00	8.82	3.1	6.28	0.00
2.00	31.99	2.00	10.18	3.1	6.28	0.00
2.50	35.77	2.00	11.39	3.1	6.28	0.00
3.00	39.18	2.00	12.47	3.1	6.28	0.00

Lateral - 30-Inch RCP
Rating Table for Circular Channel

Project Description	
Worksheet	Lateral - 30-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data	
Mannings Coefficient	0.013
Diameter	30.0 in

Attribute	Minimum	Maximum	Increment
Channel Slope (%)	0.50	3.00	0.50

Channel Slope (%)	Discharge (cfs)	Depth (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.50	29.00	2.50	5.91	4.9	7.85	0.00
1.00	41.01	2.50	8.36	4.9	7.85	0.00
1.50	50.23	2.50	10.23	4.9	7.85	0.00
2.00	58.00	2.50	11.82	4.9	7.85	0.00
2.50	64.85	2.50	13.21	4.9	7.85	0.00
3.00	71.04	2.50	14.47	4.9	7.85	0.00

Lateral - 36-Inch RCP
Rating Table for Circular Channel

Project Description	
Worksheet	Lateral - 36-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data	
Mannings Coefficient	0.013
Diameter	36.0 in

Attribute	Minimum	Maximum	Increment
Channel Slope (%)	0.50	13.50	0.50

Channel Slope (%)	Discharge (cfs)	Depth (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.50	47.16	3.00	6.67	7.1	9.42	0.00
1.00	66.69	3.00	9.44	7.1	9.42	0.00
1.50	81.68	3.00	11.56	7.1	9.42	0.00
2.00	94.32	3.00	13.34	7.1	9.42	0.00
2.50	105.45	3.00	14.92	7.1	9.42	0.00
3.00	115.52	3.00	16.34	7.1	9.42	0.00
3.50	124.77	3.00	17.65	7.1	9.42	0.00
4.00	133.39	3.00	18.87	7.1	9.42	0.00
4.50	141.48	3.00	20.02	7.1	9.42	0.00
5.00	149.13	3.00	21.10	7.1	9.42	0.00
5.50	156.41	3.00	22.13	7.1	9.42	0.00
6.00	163.37	3.00	23.11	7.1	9.42	0.00
6.50	170.04	3.00	24.06	7.1	9.42	0.00
7.00	176.46	3.00	24.96	7.1	9.42	0.00
7.50	182.65	3.00	25.84	7.1	9.42	0.00
8.00	188.64	3.00	26.69	7.1	9.42	0.00
8.50	194.45	3.00	27.51	7.1	9.42	0.00
9.00	200.08	3.00	28.31	7.1	9.42	0.00
9.50	205.57	3.00	29.08	7.1	9.42	0.00
10.00	210.91	3.00	29.84	7.1	9.42	0.00
10.50	216.12	3.00	30.57	7.1	9.42	0.00
11.00	221.20	3.00	31.29	7.1	9.42	0.00
11.50	226.17	3.00	32.00	7.1	9.42	0.00
12.00	231.04	3.00	32.69	7.1	9.42	0.00
12.50	235.80	3.00	33.36	7.1	9.42	0.00
13.00	240.47	3.00	34.02	7.1	9.42	0.00
13.50	245.05	3.00	34.67	7.1	9.42	0.00

Lateral - 42-Inch RCP
Rating Table for Circular Channel

Project Description	
Worksheet	Lateral - 42-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data	
Mannings Coefficient	0.013
Diameter	42.0 in

Attribute	Minimum	Maximum	Increment
Channel Slope (%)	0.50	3.00	0.50

Channel Slope (%)	Discharge (cfs)	Depth (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.50	71.14	3.50	7.39	9.6	11.00	0.00
1.00	100.60	3.50	10.46	9.6	11.00	0.00
1.50	123.21	3.50	12.81	9.6	11.00	0.00
2.00	142.28	3.50	14.79	9.6	11.00	0.00
2.50	159.07	3.50	16.53	9.6	11.00	0.00
3.00	174.25	3.50	18.11	9.6	11.00	0.00

Lateral - 48-Inch RCP
Rating Table for Circular Channel

Project Description	
Worksheet	Lateral - 48-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data	
Mannings Coefficient	0.013
Diameter	48.0 in

Attribute	Minimum	Maximum	Increment
Channel Slope (%)	0.50	3.00	0.50

Channel Slope (%)	Discharge (cfs)	Depth (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.50	101.57	4.00	8.08	12.6	12.57	0.00
1.00	143.64	4.00	11.43	12.6	12.57	0.00
1.50	175.92	4.00	14.00	12.6	12.57	0.00
2.00	203.13	4.00	16.16	12.6	12.57	0.00
2.50	227.11	4.00	18.07	12.6	12.57	0.00
3.00	248.78	4.00	19.80	12.6	12.57	0.00

Lateral - 54-Inch RCP
Rating Table for Circular Channel

Project Description	
Worksheet	Lateral - 54-Inch RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data	
Mannings Coefficient	0.013
Diameter	54.0 in

Attribute	Minimum	Maximum	Increment
Channel Slope (%)	0.50	3.00	0.50

Channel Slope (%)	Discharge (cfs)	Depth (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.50	139.04	4.50	8.74	15.9	14.14	0.00
1.00	196.64	4.50	12.36	15.9	14.14	0.00
1.50	240.83	4.50	15.14	15.9	14.14	0.00
2.00	278.09	4.50	17.49	15.9	14.14	0.00
2.50	310.91	4.50	19.55	15.9	14.14	0.00
3.00	340.59	4.50	21.41	15.9	14.14	0.00

Mainline Full Flow Hydraulic Computations

Facility E65
Worksheet for Circular Channel

Project Description	
Worksheet	Facility E65
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

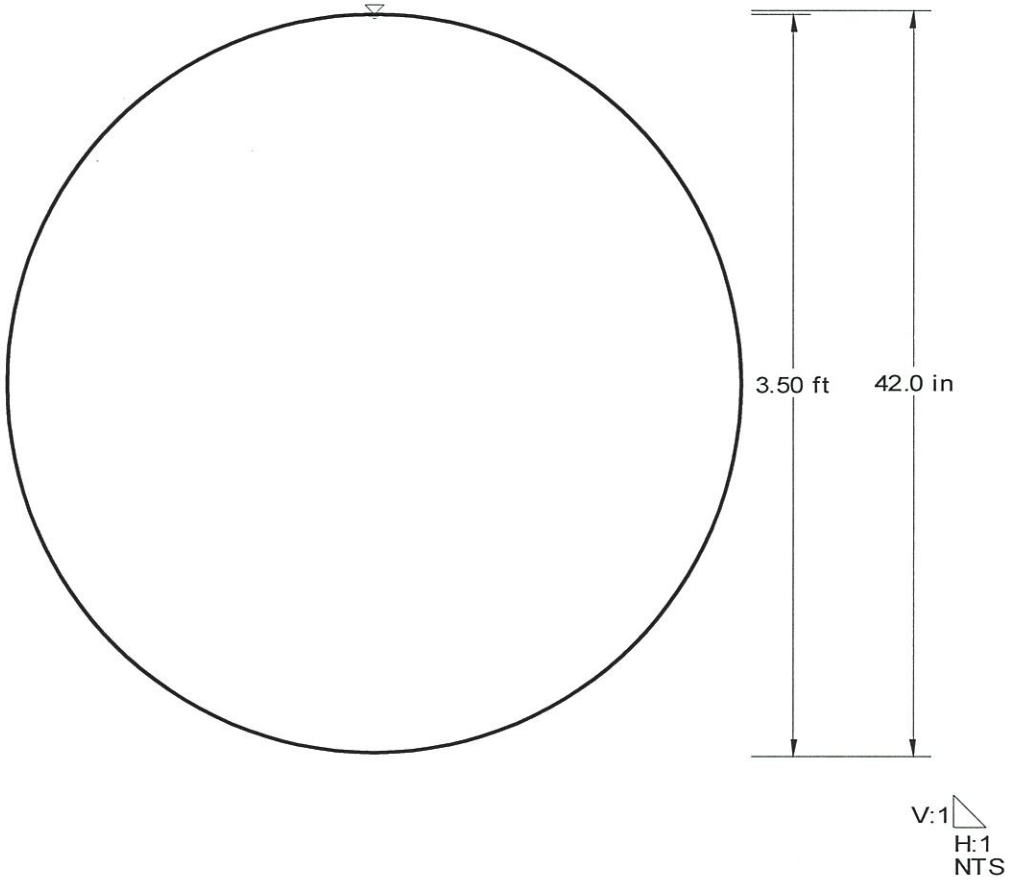
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.34	%
Diameter	42.0	in

Results		
Depth	3.50	ft
Discharge	58.66	cfs
Flow Area	9.6	ft²
Wetted Perimeter	11.00	ft
Top Width	0.00	ft
Critical Depth	2.40	ft
Percent Full	100.0	%
Critical Slope	0.51	%
Velocity	6.10	ft/s
Velocity Head	0.58	ft
Specific Energy	4.08	ft
Froude Number	0.00	
Maximum Discharge	63.10	cfs
Discharge Full	58.66	cfs
Slope Full	0.34	%
Flow Type	N/A	

Facility E65
Cross Section for Circular Channel

Project Description	
Worksheet	Facility E65
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.34	%
Depth	3.50	ft
Diameter	42.0	in
Discharge	58.66	cfs



Facility E68
Worksheet for Circular Channel

Project Description	
Worksheet	Facility E68
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

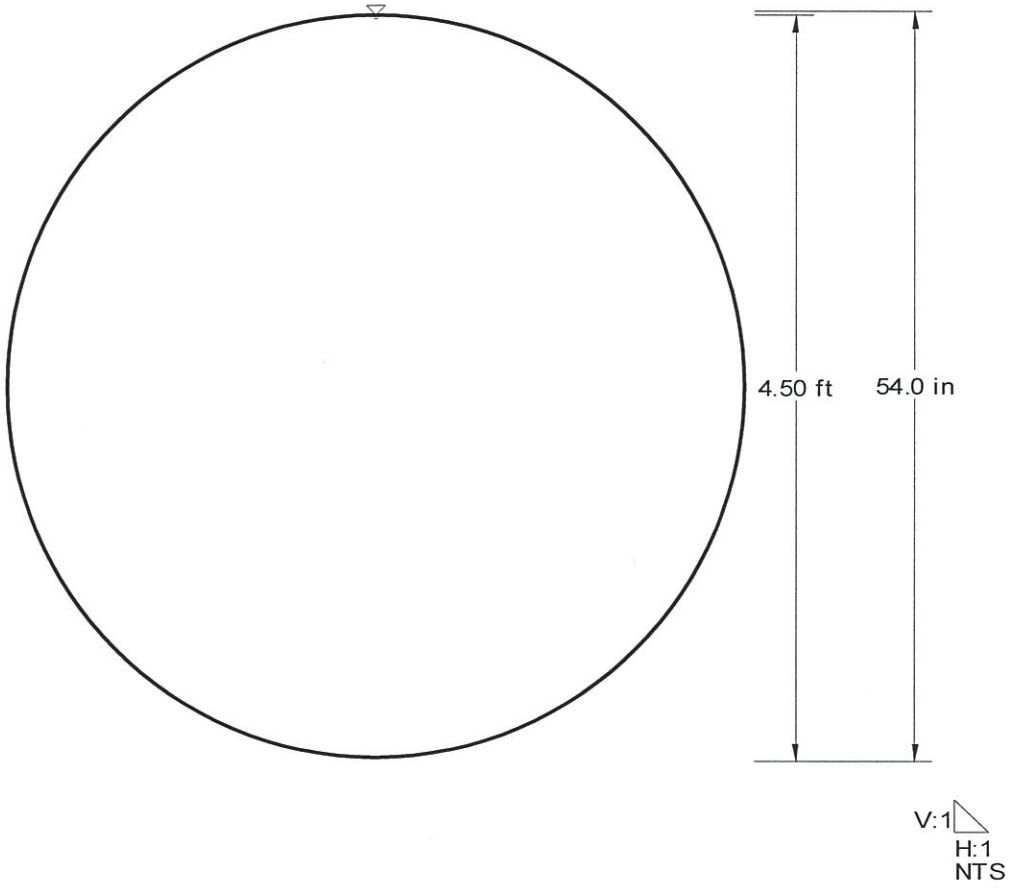
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.34	%
Diameter	54.0	in

Results		
Depth	4.50	ft
Discharge	114.66	cfs
Flow Area	15.9	ft²
Wetted Perimeter	14.14	ft
Top Width	0.00	ft
Critical Depth	3.15	ft
Percent Full	100.0	%
Critical Slope	0.48	%
Velocity	7.21	ft/s
Velocity Head	0.81	ft
Specific Energy	5.31	ft
Froude Number	0.00	
Maximum Discharge	123.34	cfs
Discharge Full	114.66	cfs
Slope Full	0.34	%
Flow Type	N/A	

Facility E68
Cross Section for Circular Channel

Project Description	
Worksheet	Facility E68
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.34	%
Depth	4.50	ft
Diameter	54.0	in
Discharge	114.66	cfs



Facility E70
Worksheet for Circular Channel

Project Description	
Worksheet	Facility E70
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

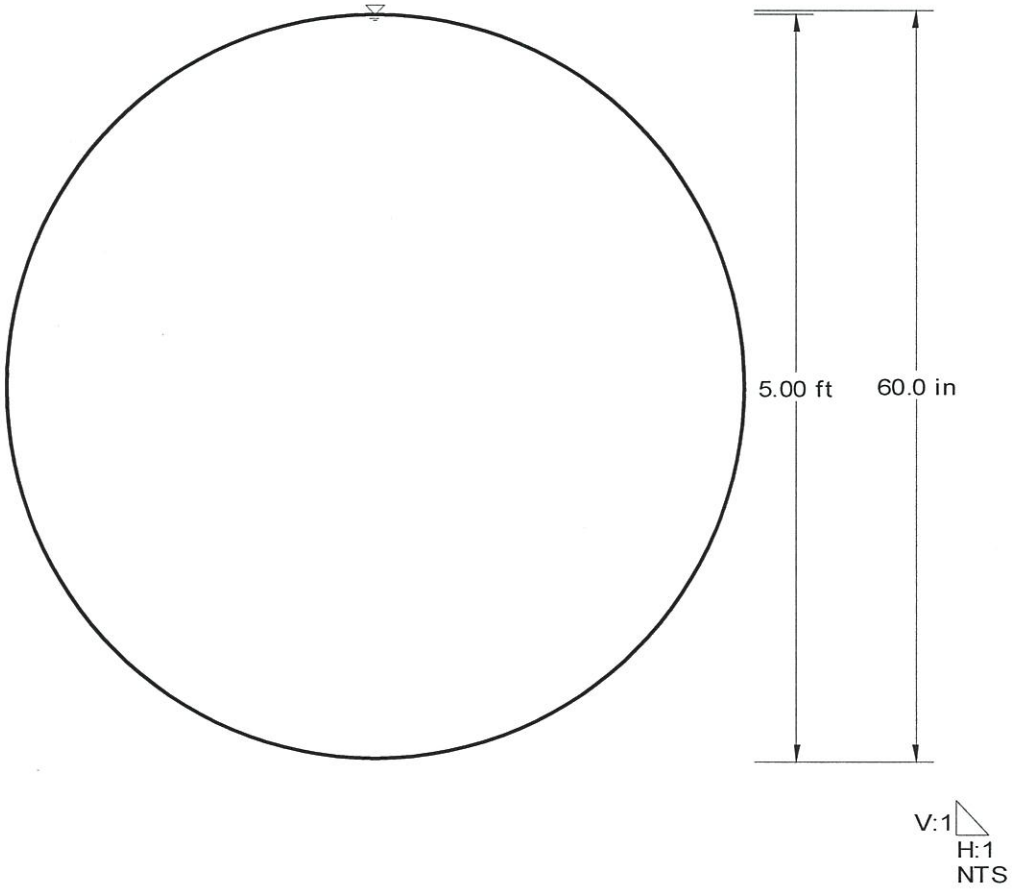
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.34	%
Diameter	60.0	in

Results		
Depth	5.00	ft
Discharge	151.85	cfs
Flow Area	19.6	ft²
Wetted Perimeter	15.71	ft
Top Width	0.00	ft
Critical Depth	3.53	ft
Percent Full	100.0	%
Critical Slope	0.47	%
Velocity	7.73	ft/s
Velocity Head	0.93	ft
Specific Energy	5.93	ft
Froude Number	0.00	
Maximum Discharge	163.35	cfs
Discharge Full	151.85	cfs
Slope Full	0.34	%
Flow Type	N/A	

Facility E70
Cross Section for Circular Channel

Project Description	
Worksheet	Facility E70
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.34	%
Depth	5.00	ft
Diameter	60.0	in
Discharge	151.85	cfs



Facility E72
Worksheet for Circular Channel

Project Description	
Worksheet	Facility E72
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

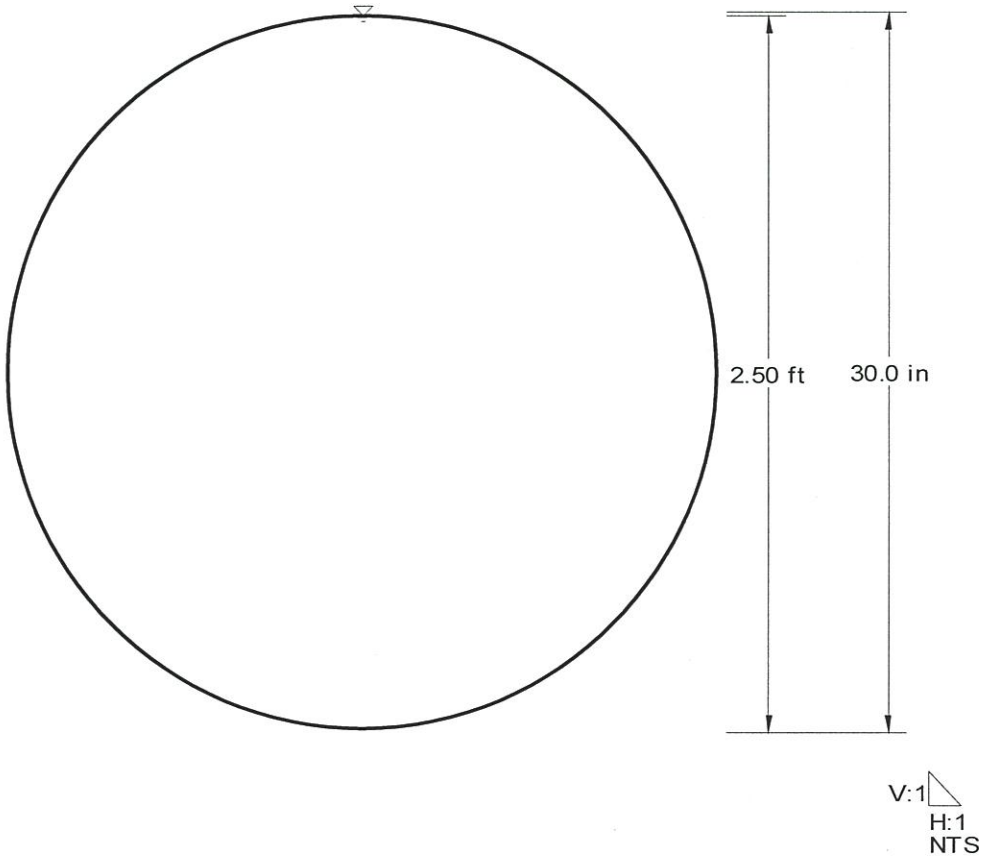
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	30.0	in

Results		
Depth	2.50	ft
Discharge	29.00	cfs
Flow Area	4.9	ft²
Wetted Perimeter	7.85	ft
Top Width	0.00	ft
Critical Depth	1.84	ft
Percent Full	100.0	%
Critical Slope	0.63	%
Velocity	5.91	ft/s
Velocity Head	0.54	ft
Specific Energy	3.04	ft
Froude Number	0.00	
Maximum Discharge	31.20	cfs
Discharge Full	29.00	cfs
Slope Full	0.50	%
Flow Type	N/A	

Facility E72
Cross Section for Circular Channel

Project Description	
Worksheet	Facility E72
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	2.50	ft
Diameter	30.0	in
Discharge	29.00	cfs



Facility E75
Worksheet for Circular Channel

Project Description	
Worksheet	Facility E75
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

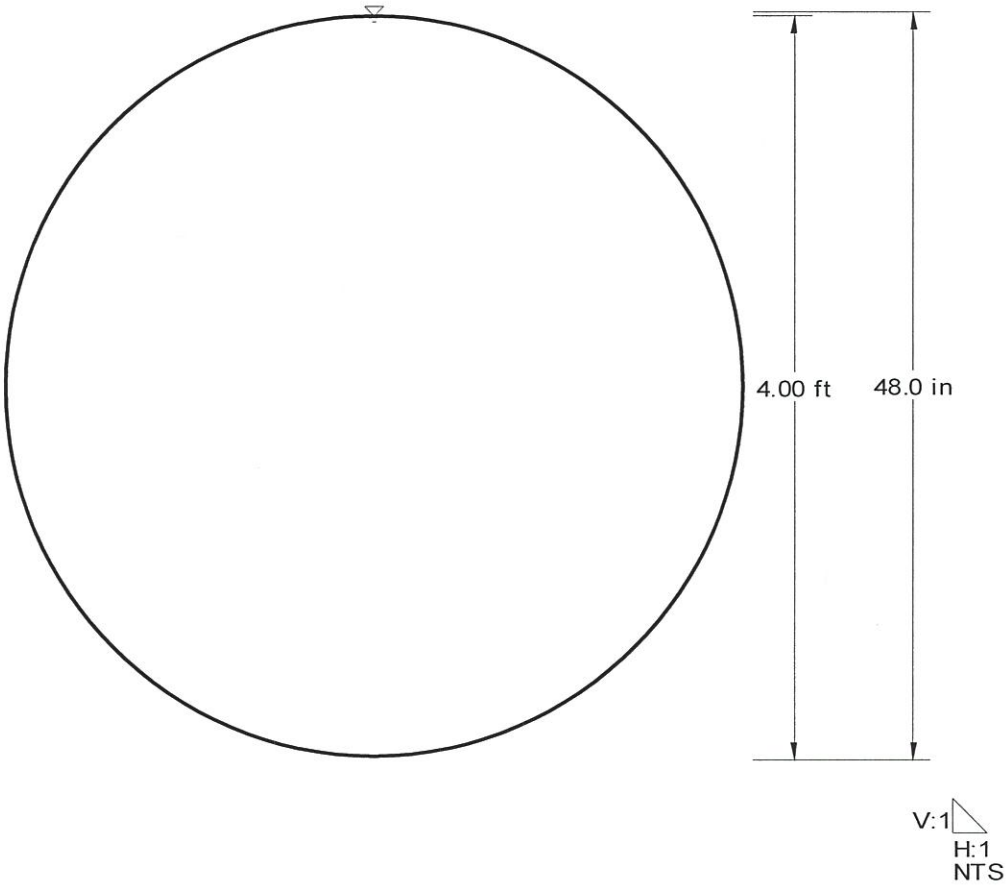
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	48.0	in

Results		
Depth	4.00	ft
Discharge	101.57	cfs
Flow Area	12.6	ft²
Wetted Perimeter	12.57	ft
Top Width	0.00	ft
Critical Depth	3.05	ft
Percent Full	100.0	%
Critical Slope	0.58	%
Velocity	8.08	ft/s
Velocity Head	1.02	ft
Specific Energy	5.02	ft
Froude Number	0.00	
Maximum Discharge	109.25	cfs
Discharge Full	101.57	cfs
Slope Full	0.50	%
Flow Type	N/A	

Facility E75
Cross Section for Circular Channel

Project Description	
Worksheet	Facility E75
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	4.00	ft
Diameter	48.0	in
Discharge	101.57	cfs



Facility E76
Worksheet for Circular Channel

Project Description	
Worksheet	Facility E76
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

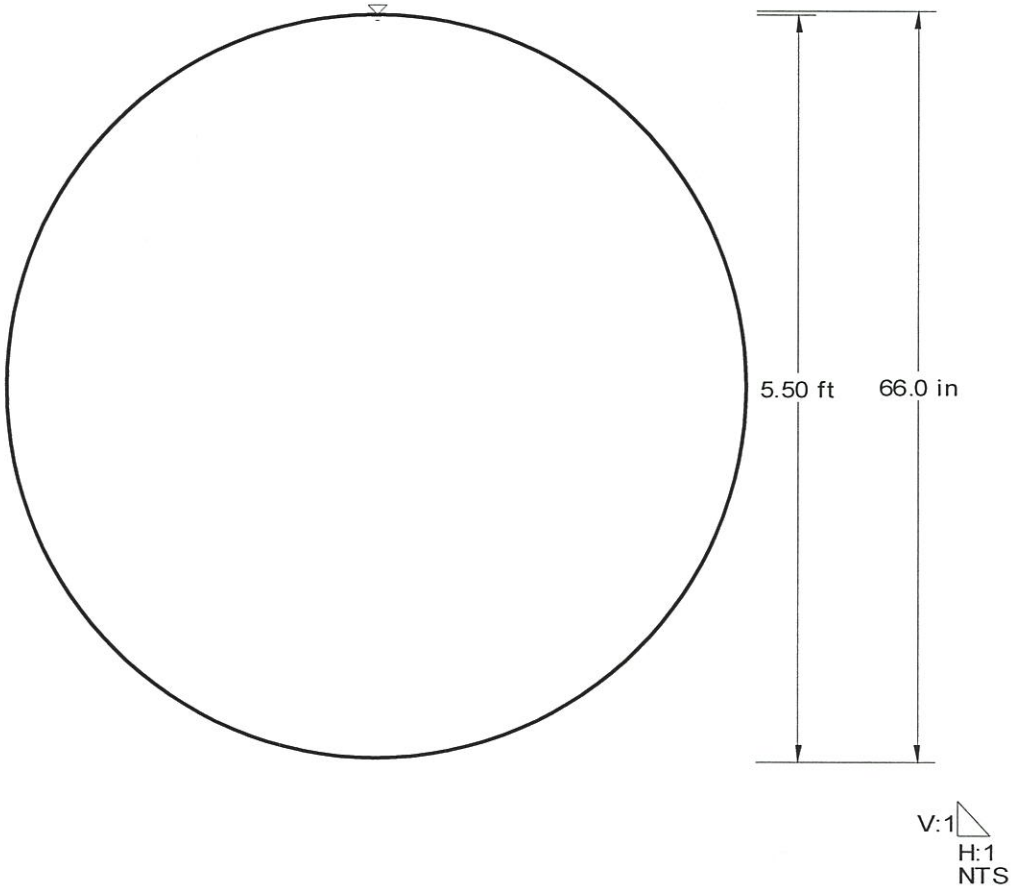
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.34	%
Diameter	66.0	in

Results		
Depth	5.50	ft
Discharge	195.80	cfs
Flow Area	23.8	ft²
Wetted Perimeter	17.28	ft
Top Width	0.00	ft
Critical Depth	3.92	ft
Percent Full	100.0	%
Critical Slope	0.46	%
Velocity	8.24	ft/s
Velocity Head	1.06	ft
Specific Energy	6.56	ft
Froude Number	0.00	
Maximum Discharge	210.62	cfs
Discharge Full	195.80	cfs
Slope Full	0.34	%
Flow Type	N/A	

Facility E76
Cross Section for Circular Channel

Project Description	
Worksheet	Facility E76
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.34	%
Depth	5.50	ft
Diameter	66.0	in
Discharge	195.80	cfs



Facility E79 & E81
Worksheet for Circular Channel

Project Description	
Worksheet	Facility E79 & E81
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

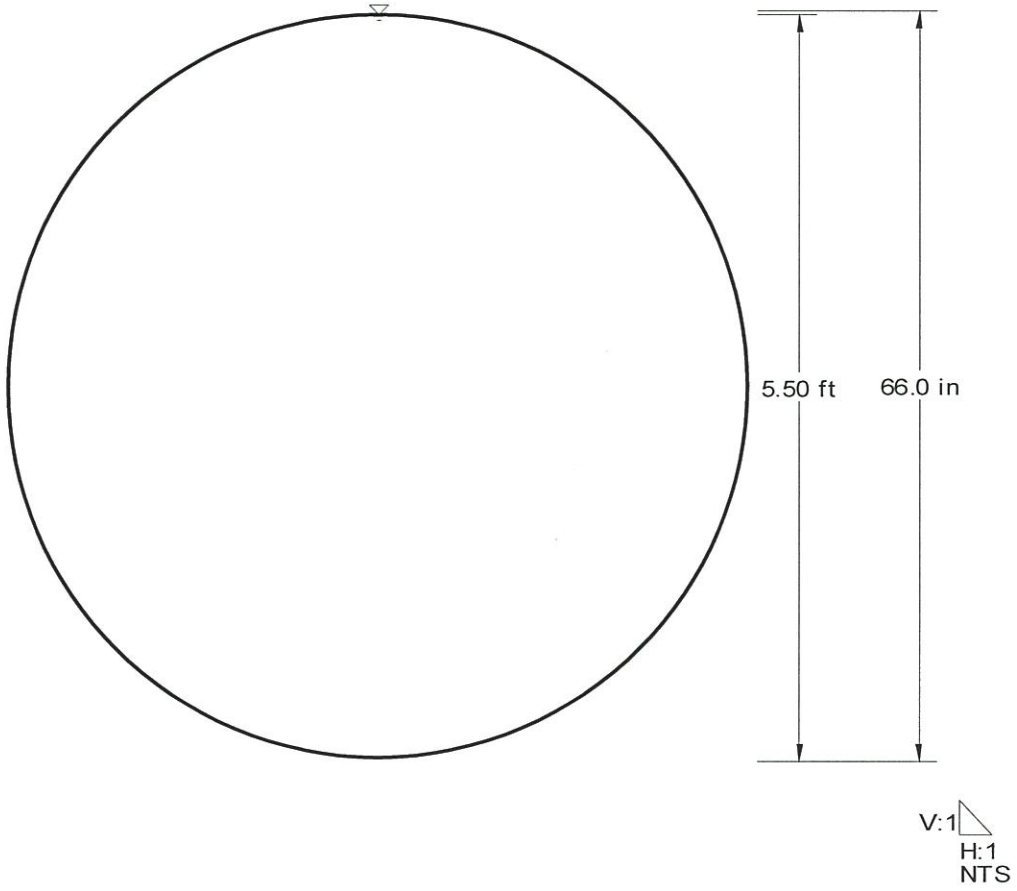
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.38	%
Diameter	66.0	in

Results		
Depth	5.50	ft
Discharge	207.00	cfs
Flow Area	23.8	ft²
Wetted Perimeter	17.28	ft
Top Width	0.00	ft
Critical Depth	4.03	ft
Percent Full	100.0	%
Critical Slope	0.48	%
Velocity	8.71	ft/s
Velocity Head	1.18	ft
Specific Energy	6.68	ft
Froude Number	0.00	
Maximum Discharge	222.67	cfs
Discharge Full	207.00	cfs
Slope Full	0.38	%
Flow Type	N/A	

Facility E79 & E81
Cross Section for Circular Channel

Project Description	
Worksheet	Facility E79 & E81
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.38	%
Depth	5.50	ft
Diameter	66.0	in
Discharge	207.00	cfs



Facility E84
Worksheet for Circular Channel

Project Description	
Worksheet	Facility E84
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

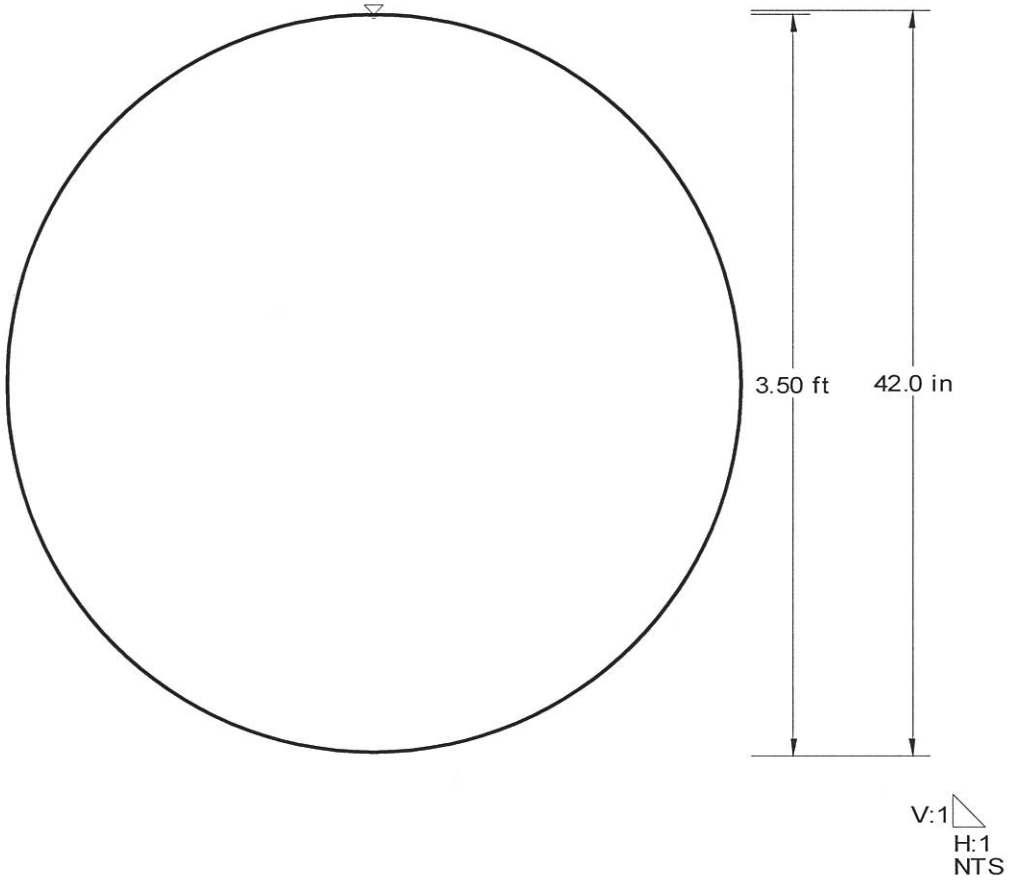
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	42.0	in

Results		
Depth	3.50	ft
Discharge	71.14	cfs
Flow Area	9.6	ft²
Wetted Perimeter	11.00	ft
Top Width	0.00	ft
Critical Depth	2.64	ft
Percent Full	100.0	%
Critical Slope	0.59	%
Velocity	7.39	ft/s
Velocity Head	0.85	ft
Specific Energy	4.35	ft
Froude Number	0.00	
Maximum Discharge	76.52	cfs
Discharge Full	71.14	cfs
Slope Full	0.50	%
Flow Type	N/A	

Facility E84
Cross Section for Circular Channel

Project Description	
Worksheet	Facility E84
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	3.50	ft
Diameter	42.0	in
Discharge	71.14	cfs



Facility E86
Worksheet for Circular Channel

Project Description	
Worksheet	Facility E86
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

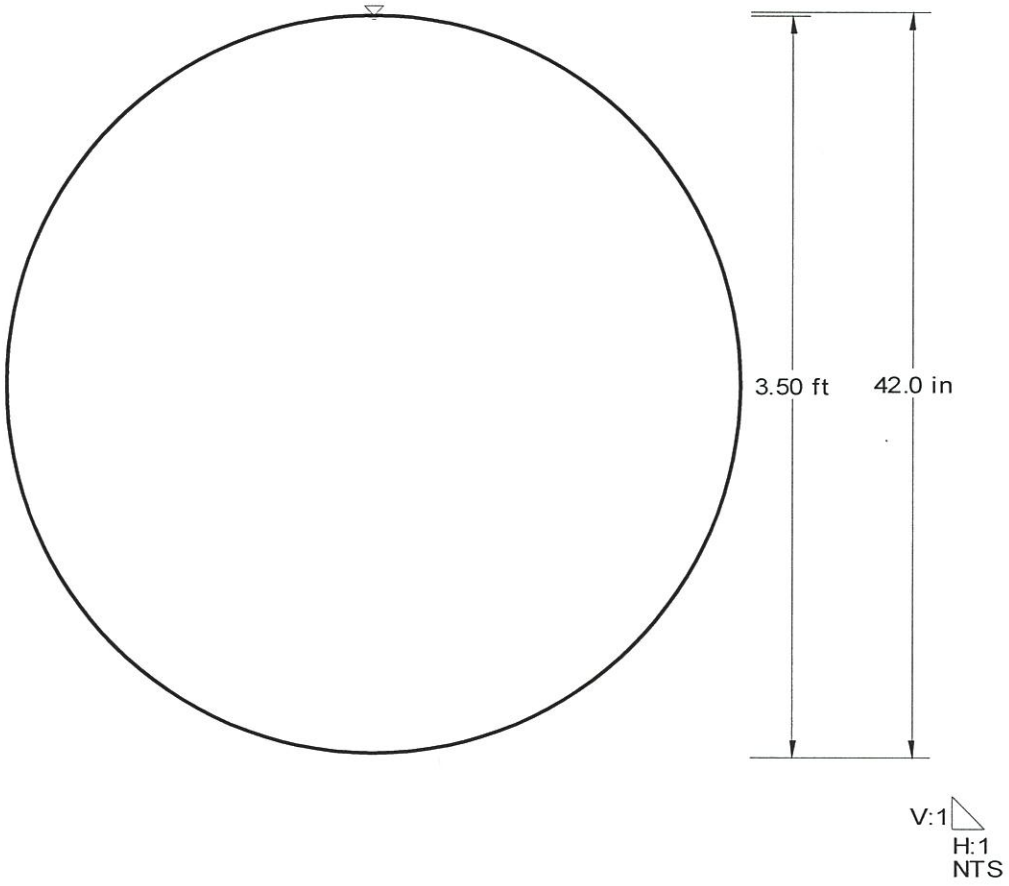
Input Data		
Mannings Coefficient	0.013	
Channel Slope	1.01	%
Diameter	42.0	in

Results		
Depth	3.50	ft
Discharge	101.11	cfs
Flow Area	9.6	ft²
Wetted Perimeter	11.00	ft
Top Width	0.00	ft
Critical Depth	3.08	ft
Percent Full	100.0	%
Critical Slope	0.91	%
Velocity	10.51	ft/s
Velocity Head	1.72	ft
Specific Energy	5.22	ft
Froude Number	0.00	
Maximum Discharge	108.76	cfs
Discharge Full	101.11	cfs
Slope Full	1.01	%
Flow Type	N/A	

Facility E86
Cross Section for Circular Channel

Project Description	
Worksheet	Facility E86
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	1.01	%
Depth	3.50	ft
Diameter	42.0	in
Discharge	101.11	cfs



Facility E95
Worksheet for Circular Channel

Project Description	
Worksheet	Facility E95
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

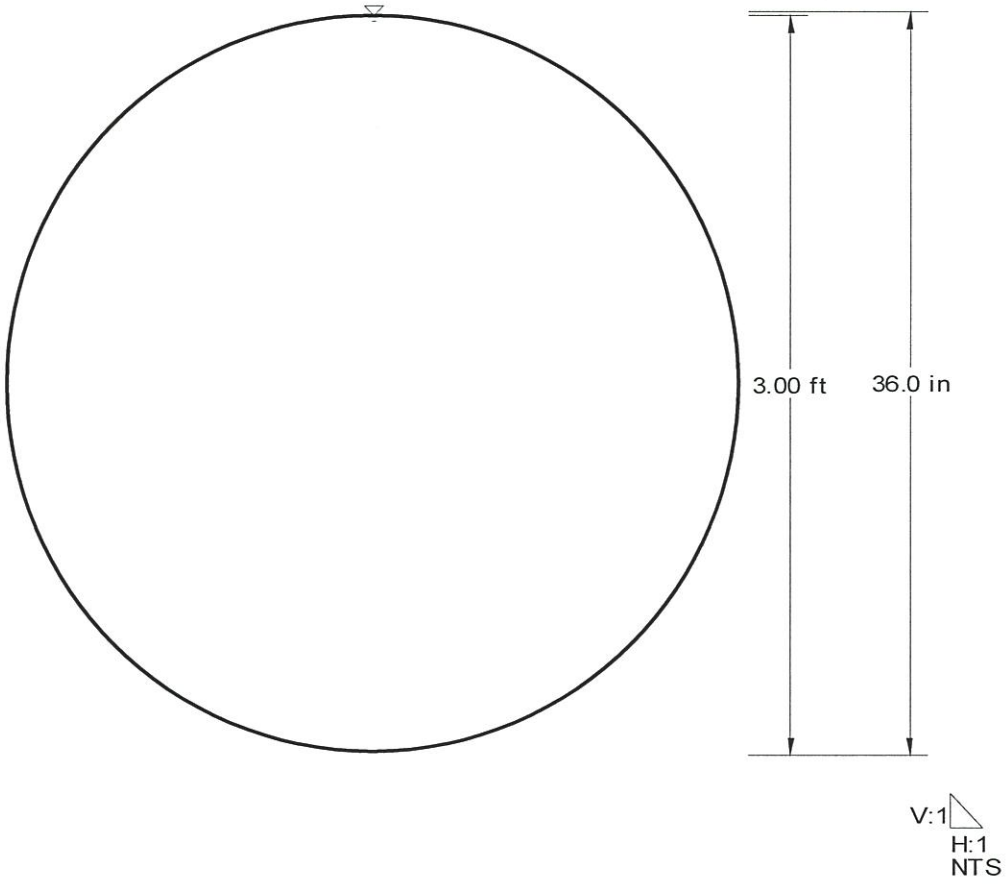
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.30	%
Diameter	36.0	in

Results		
Depth	3.00	ft
Discharge	36.53	cfs
Flow Area	7.1	ft²
Wetted Perimeter	9.42	ft
Top Width	0.00	ft
Critical Depth	1.97	ft
Percent Full	100.0	%
Critical Slope	0.51	%
Velocity	5.17	ft/s
Velocity Head	0.42	ft
Specific Energy	3.42	ft
Froude Number	0.00	
Maximum Discharge	39.30	cfs
Discharge Full	36.53	cfs
Slope Full	0.30	%
Flow Type	N/A	

Facility E95
Cross Section for Circular Channel

Project Description	
Worksheet	Facility E95
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.30	%
Depth	3.00	ft
Diameter	36.0	in
Discharge	36.53	cfs



Facility E98
Worksheet for Circular Channel

Project Description	
Worksheet	Facility E98
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

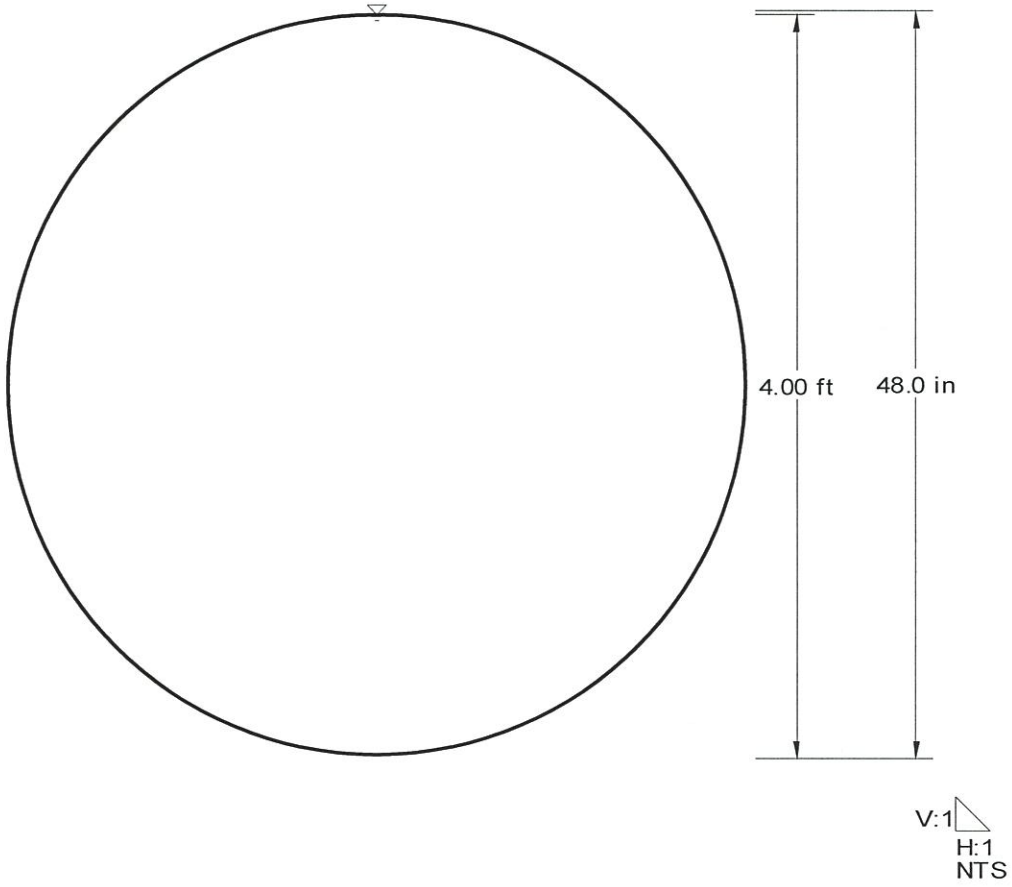
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.30	%
Diameter	48.0	in

Results		
Depth	4.00	ft
Discharge	78.67	cfs
Flow Area	12.6	ft²
Wetted Perimeter	12.57	ft
Top Width	0.00	ft
Critical Depth	2.69	ft
Percent Full	100.0	%
Critical Slope	0.48	%
Velocity	6.26	ft/s
Velocity Head	0.61	ft
Specific Energy	4.61	ft
Froude Number	0.00	
Maximum Discharge	84.63	cfs
Discharge Full	78.67	cfs
Slope Full	0.30	%
Flow Type	N/A	

Facility E98
Cross Section for Circular Channel

Project Description	
Worksheet	Facility E98
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.30	%
Depth	4.00	ft
Diameter	48.0	in
Discharge	78.67	cfs



Facility E101 & E102
Worksheet for Circular Channel

Project Description	
Worksheet	Facility E101 & E102
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

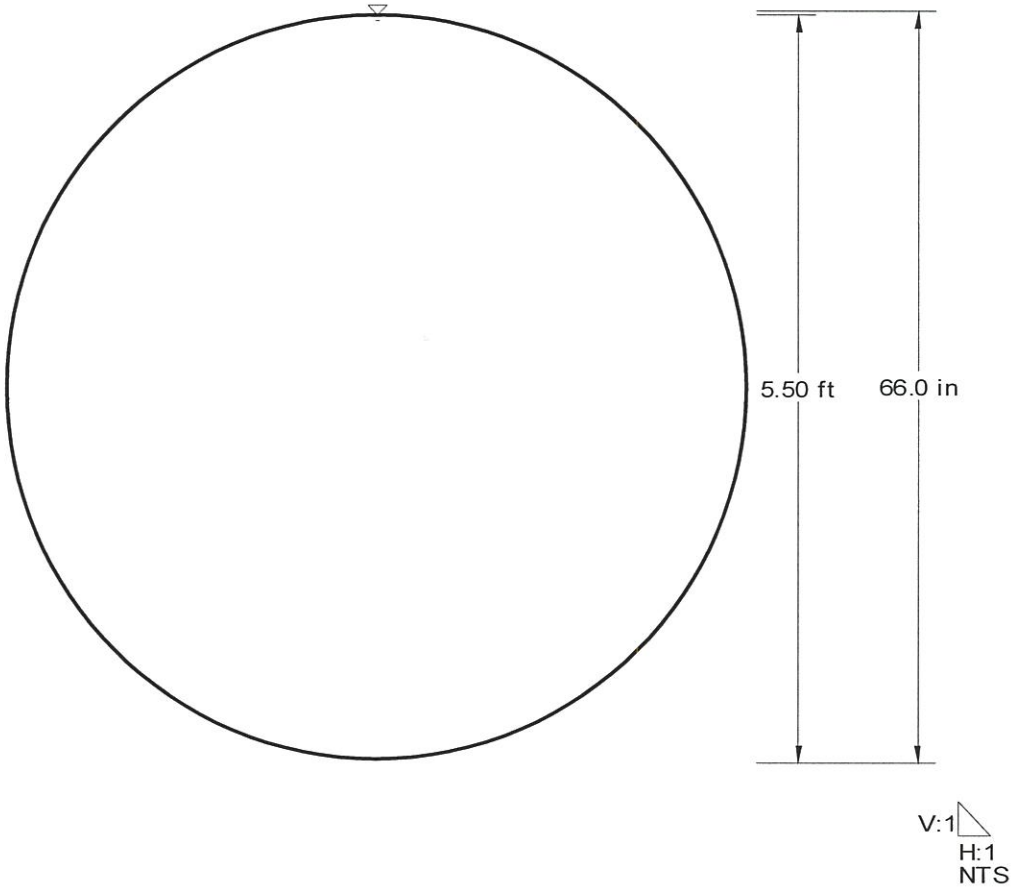
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.30	%
Diameter	66.0	in

Results		
Depth	5.50	ft
Discharge	183.92	cfs
Flow Area	23.8	ft²
Wetted Perimeter	17.28	ft
Top Width	0.00	ft
Critical Depth	3.80	ft
Percent Full	100.0	%
Critical Slope	0.44	%
Velocity	7.74	ft/s
Velocity Head	0.93	ft
Specific Energy	6.43	ft
Froude Number	0.00	
Maximum Discharge	197.84	cfs
Discharge Full	183.92	cfs
Slope Full	0.30	%
Flow Type	N/A	

Facility E101 & E102
Cross Section for Circular Channel

Project Description	
Worksheet	Facility E101 & E102
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.30	%
Depth	5.50	ft
Diameter	66.0	in
Discharge	183.92	cfs



Facility E103
Worksheet for Circular Channel

Project Description	
Worksheet	Facility E103
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

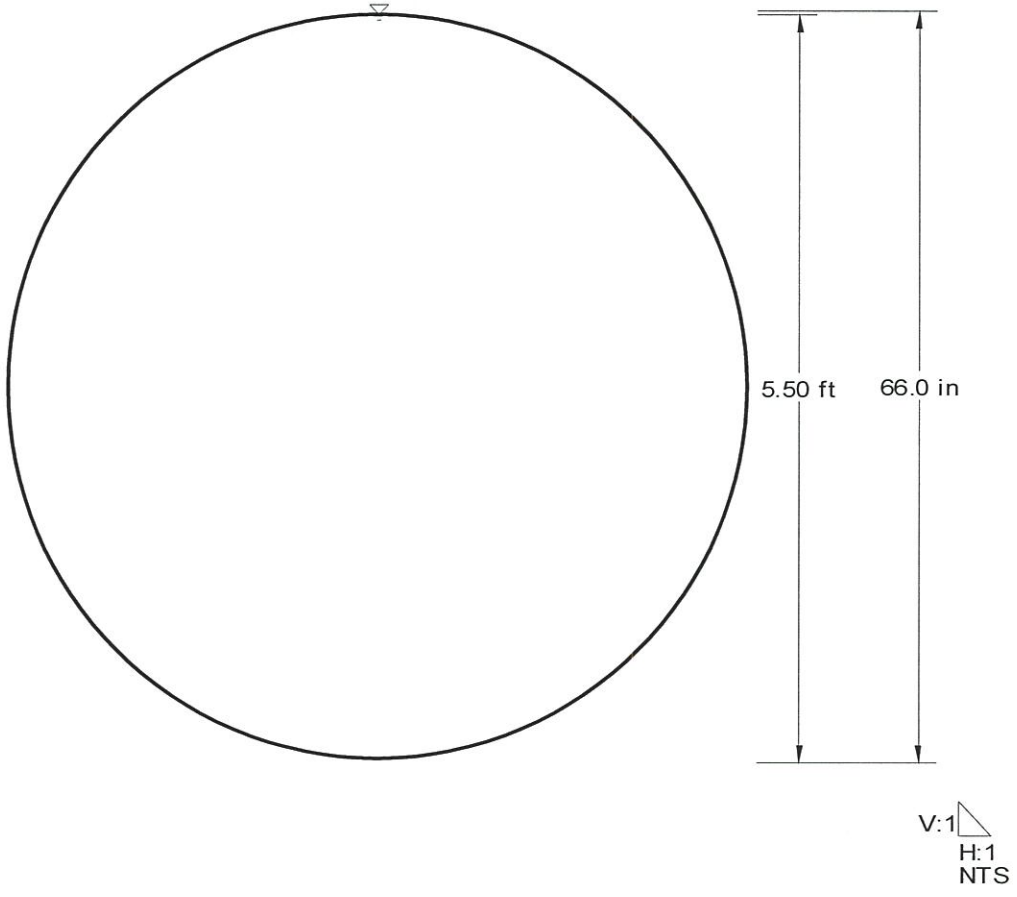
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.41	%
Diameter	66.0	in

Results		
Depth	5.50	ft
Discharge	215.01	cfs
Flow Area	23.8	ft²
Wetted Perimeter	17.28	ft
Top Width	0.00	ft
Critical Depth	4.10	ft
Percent Full	100.0	%
Critical Slope	0.50	%
Velocity	9.05	ft/s
Velocity Head	1.27	ft
Specific Energy	6.77	ft
Froude Number	0.00	
Maximum Discharge	231.29	cfs
Discharge Full	215.01	cfs
Slope Full	0.41	%
Flow Type	N/A	

Facility E103
Cross Section for Circular Channel

Project Description	
Worksheet	Facility E103
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.41	%
Depth	5.50	ft
Diameter	66.0	in
Discharge	215.01	cfs



Facility P4
Worksheet for Circular Channel

Project Description	
Worksheet	Facility P4
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

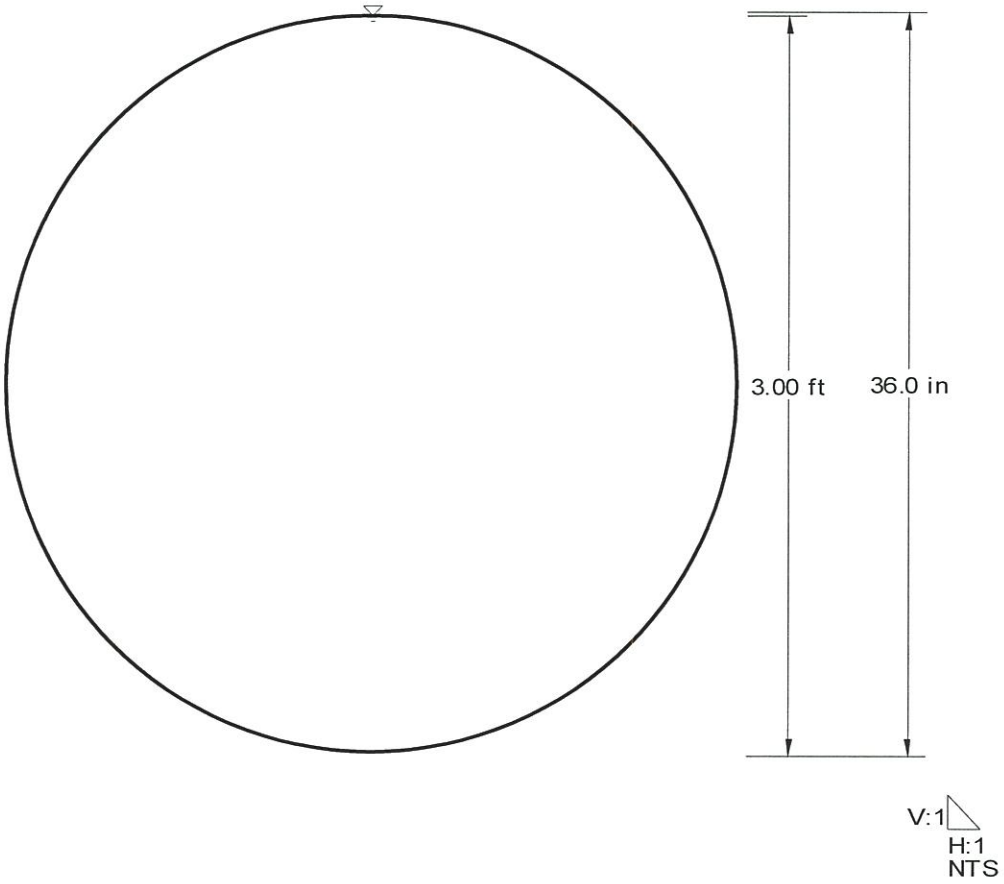
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.61	%
Diameter	36.0	in

Results		
Depth	3.00	ft
Discharge	52.09	cfs
Flow Area	7.1	ft²
Wetted Perimeter	9.42	ft
Top Width	0.00	ft
Critical Depth	2.35	ft
Percent Full	100.0	%
Critical Slope	0.67	%
Velocity	7.37	ft/s
Velocity Head	0.84	ft
Specific Energy	3.84	ft
Froude Number	0.00	
Maximum Discharge	56.03	cfs
Discharge Full	52.09	cfs
Slope Full	0.61	%
Flow Type	N/A	

Facility P4
Cross Section for Circular Channel

Project Description	
Worksheet	Facility P4
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.61	%
Depth	3.00	ft
Diameter	36.0	in
Discharge	52.09	cfs



Facility P32
Worksheet for Circular Channel

Project Description	
Worksheet	Facility P32
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

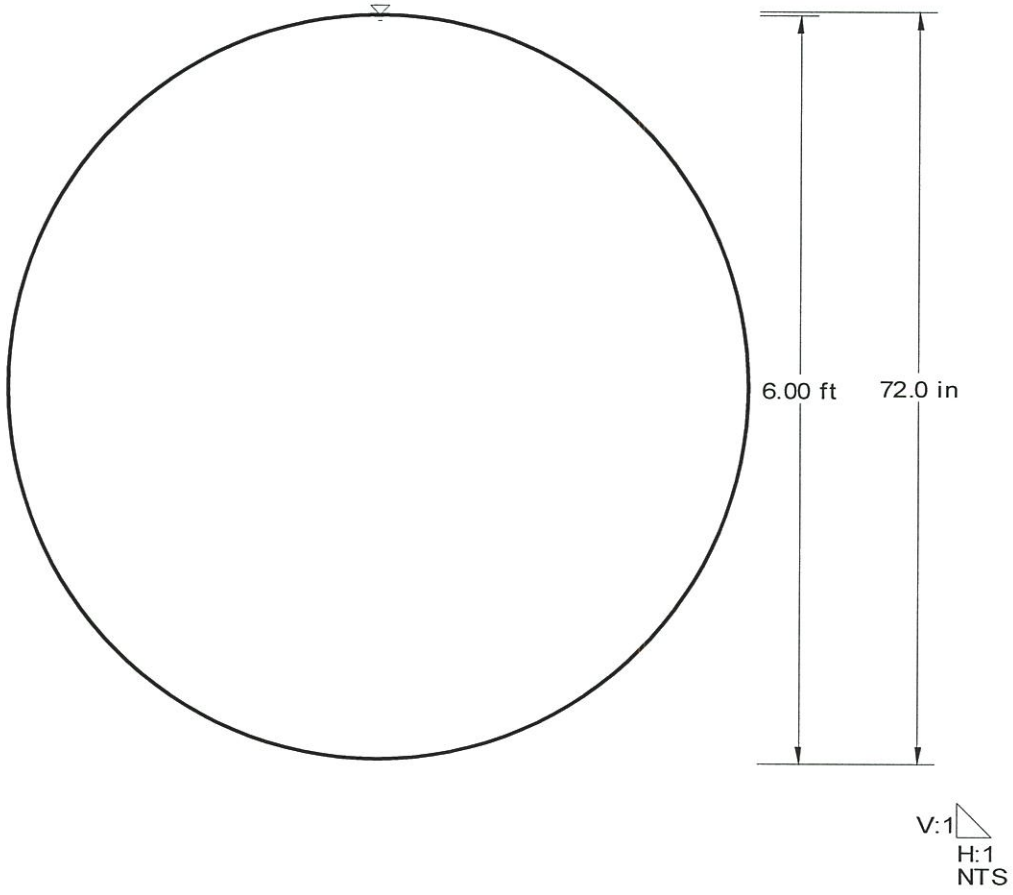
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	72.0	in

Results		
Depth	6.00	ft
Discharge	299.45	cfs
Flow Area	28.3	ft²
Wetted Perimeter	18.85	ft
Top Width	0.00	ft
Critical Depth	4.73	ft
Percent Full	100.0	%
Critical Slope	0.54	%
Velocity	10.59	ft/s
Velocity Head	1.74	ft
Specific Energy	7.74	ft
Froude Number	0.00	
Maximum Discharge	322.12	cfs
Discharge Full	299.45	cfs
Slope Full	0.50	%
Flow Type	N/A	

Facility P32
Cross Section for Circular Channel

Project Description	
Worksheet	Facility P32
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	6.00	ft
Diameter	72.0	in
Discharge	299.45	cfs



Facility P49 & P51
Worksheet for Irregular Channel

Project Description	
Worksheet	Facility P49 & P51
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Channel Slope	0.41	%
Water Surface Elevation	4.50	ft

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	0.013	
Elevation Range	0.00 to 4.50	
Discharge	312.19	cfs
Flow Area	26.5	ft²
Wetted Perimeter	13.02	ft
Top Width	7.33	ft
Actual Depth	4.50	ft
Critical Elevation	4.71	ft
Critical Slope	0.35	%
Velocity	11.76	ft/s
Velocity Head	2.15	ft
Specific Energy	6.65	ft
Froude Number	1.09	
Flow Type	Supercritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00.00	0+07.33	0.013

Natural Channel Points

Station (ft)	Elevation (ft)
0+00.00	4.50
0+00.00	4.00
0+00.03	3.50
0+00.12	3.00
0+00.27	2.50
0+00.49	2.00
0+00.92	1.35
0+01.38	0.88
0+01.83	0.54
0+02.75	0.13
0+03.67	0.00
0+04.58	0.13
0+05.50	0.54
0+05.96	0.88

Facility P49 & P51
Worksheet for Irregular Channel

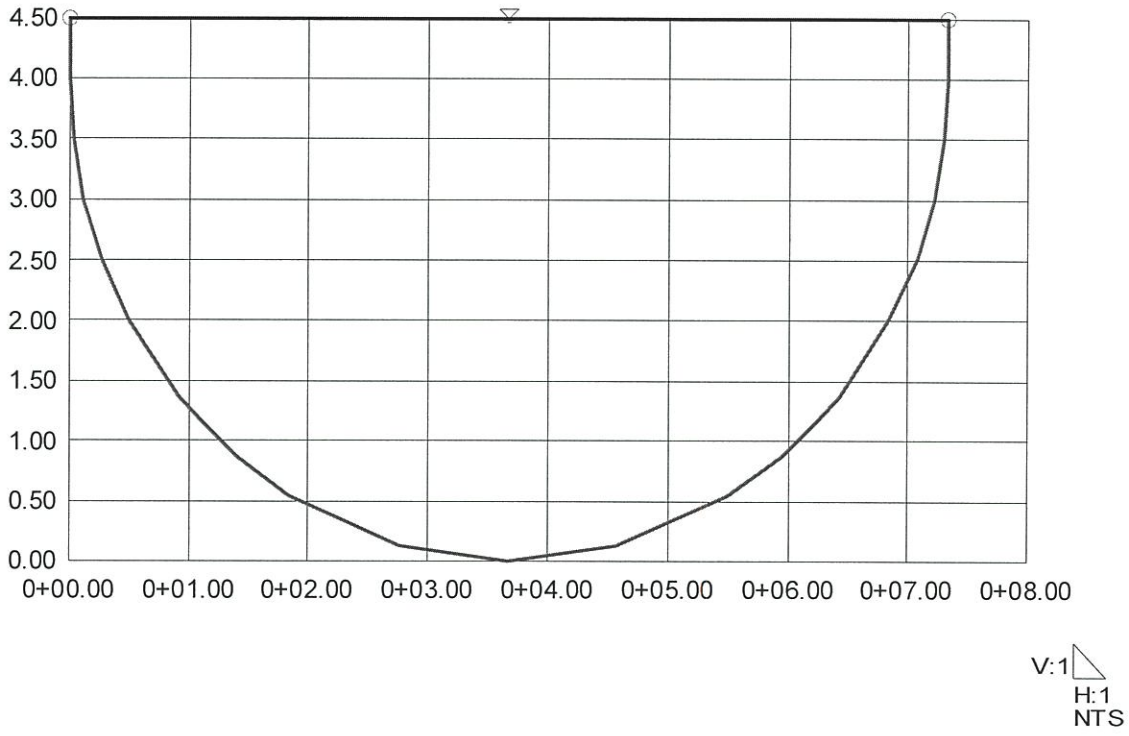
Natural Channel Points	
Station (ft)	Elevation (ft)
0+06.42	1.35
0+06.84	2.00
0+07.07	2.50
0+07.22	3.00
0+07.30	3.50
0+07.33	4.00
0+07.33	4.50

Notes: Upside-down 54"x88" Arch

Facility P49 & P51
Cross Section for Irregular Channel

Project Description	
Worksheet	Facility P49 & P51
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.41	%
Water Surface Elevation	4.50	ft
Elevation Range	0.00 to 4.50	
Discharge	312.19	cfs



Facility P53
Worksheet for Circular Channel

Project Description	
Worksheet	Facility P53
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

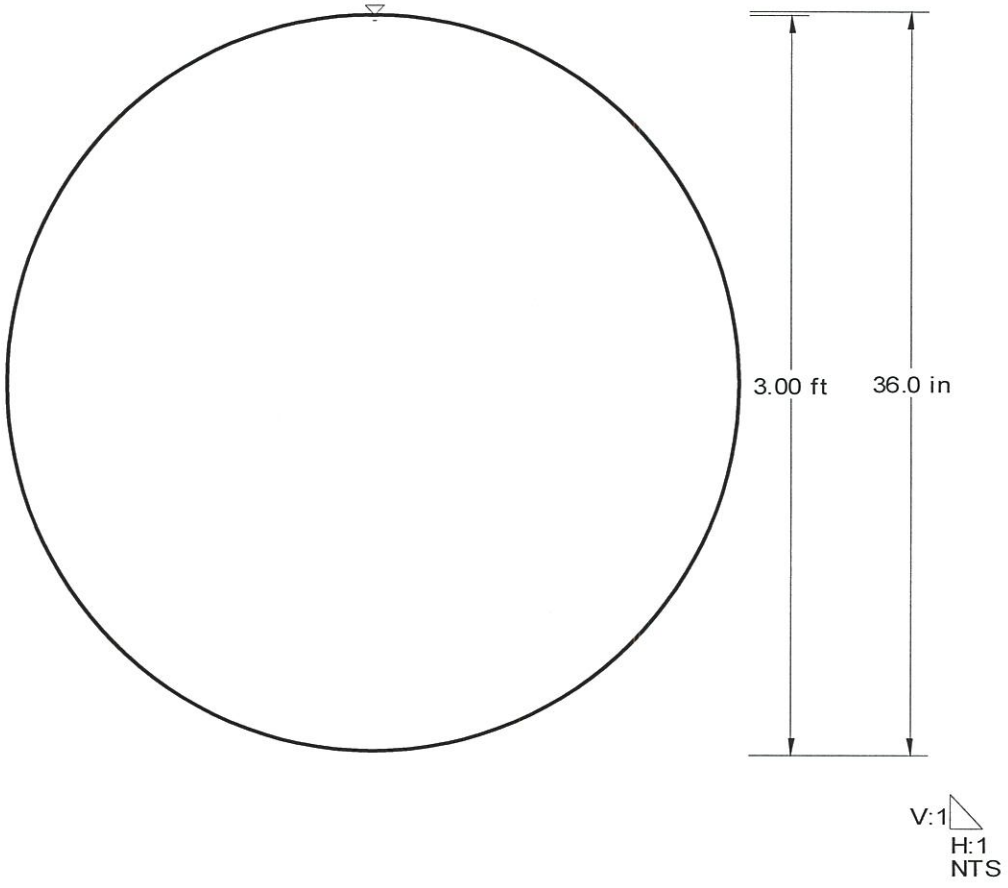
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.67	%
Diameter	36.0	in

Results		
Depth	3.00	ft
Discharge	54.59	cfs
Flow Area	7.1	ft²
Wetted Perimeter	9.42	ft
Top Width	0.00	ft
Critical Depth	2.40	ft
Percent Full	100.0	%
Critical Slope	0.70	%
Velocity	7.72	ft/s
Velocity Head	0.93	ft
Specific Energy	3.93	ft
Froude Number	0.00	
Maximum Discharge	58.72	cfs
Discharge Full	54.59	cfs
Slope Full	0.67	%
Flow Type	N/A	

Facility P53
Cross Section for Circular Channel

Project Description	
Worksheet	Facility P53
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.67	%
Depth	3.00	ft
Diameter	36.0	in
Discharge	54.59	cfs



Facility P55
Worksheet for Circular Channel

Project Description	
Worksheet	Facility P55
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

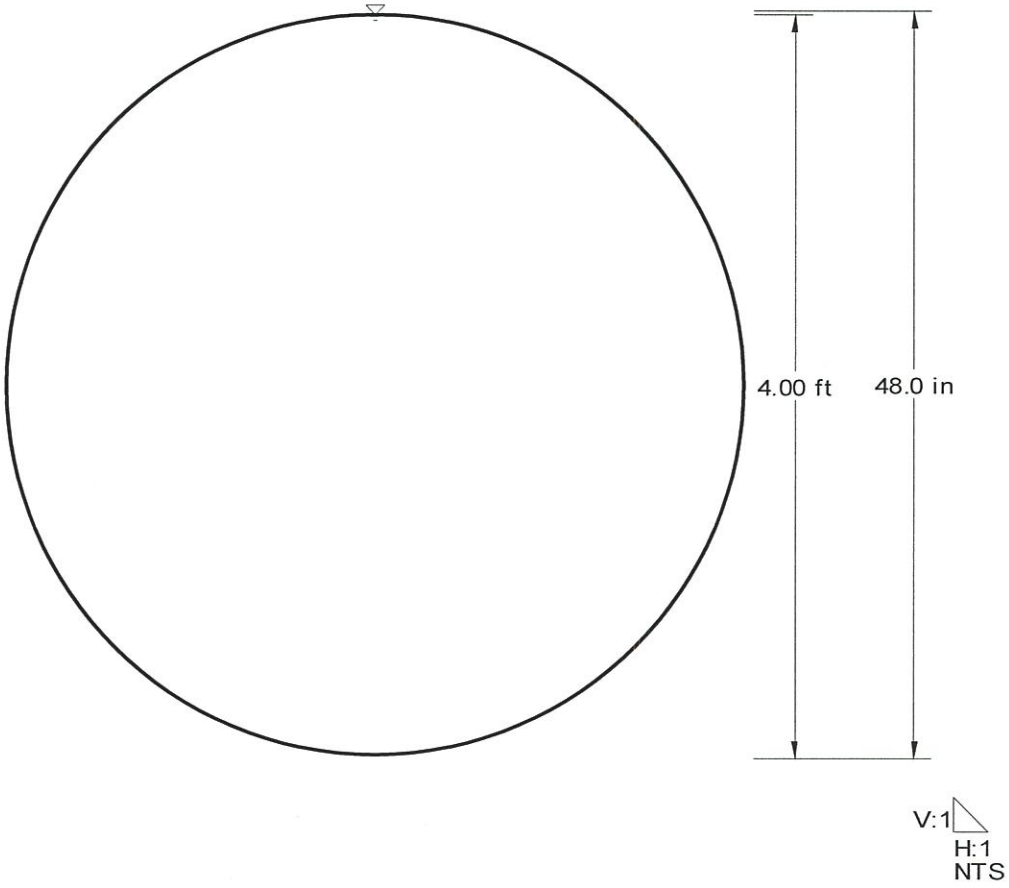
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.58	%
Diameter	48.0	in

Results		
Depth	4.00	ft
Discharge	109.39	cfs
Flow Area	12.6	ft²
Wetted Perimeter	12.57	ft
Top Width	0.00	ft
Critical Depth	3.16	ft
Percent Full	100.0	%
Critical Slope	0.62	%
Velocity	8.70	ft/s
Velocity Head	1.18	ft
Specific Energy	5.18	ft
Froude Number	0.00	
Maximum Discharge	117.67	cfs
Discharge Full	109.39	cfs
Slope Full	0.58	%
Flow Type	N/A	

Facility P55
Cross Section for Circular Channel

Project Description	
Worksheet	Facility P55
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.58	%
Depth	4.00	ft
Diameter	48.0	in
Discharge	109.39	cfs



Facility P56
Worksheet for Circular Channel

Project Description	
Worksheet	Facility P56
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

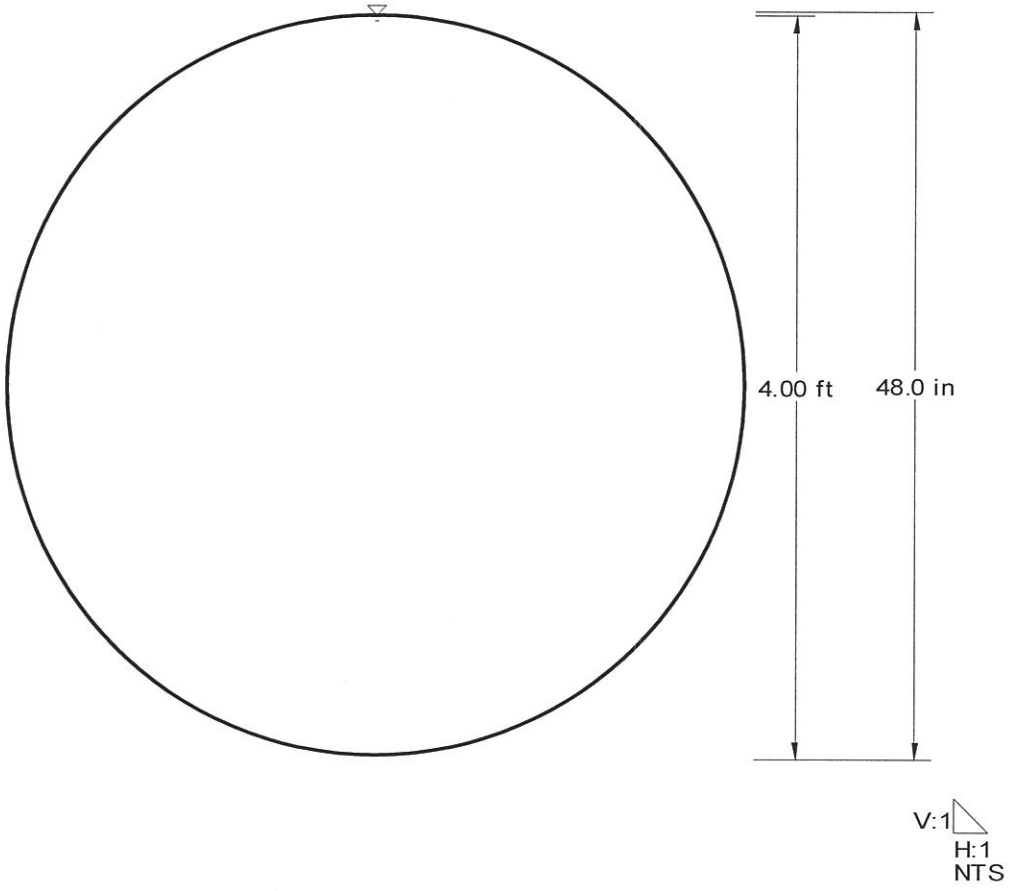
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.41	%
Diameter	48.0	in

Results		
Depth	4.00	ft
Discharge	91.97	cfs
Flow Area	12.6	ft²
Wetted Perimeter	12.57	ft
Top Width	0.00	ft
Critical Depth	2.91	ft
Percent Full	100.0	%
Critical Slope	0.53	%
Velocity	7.32	ft/s
Velocity Head	0.83	ft
Specific Energy	4.83	ft
Froude Number	0.00	
Maximum Discharge	98.93	cfs
Discharge Full	91.97	cfs
Slope Full	0.41	%
Flow Type	N/A	

Facility P56
Cross Section for Circular Channel

Project Description	
Worksheet	Facility P56
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data	
Mannings Coefficient	0.013
Channel Slope	0.41 %
Depth	4.00 ft
Diameter	48.0 in
Discharge	91.97 cfs



Facility P58
Worksheet for Rectangular Channel

Project Description	
Worksheet	Facility P58
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Discharge

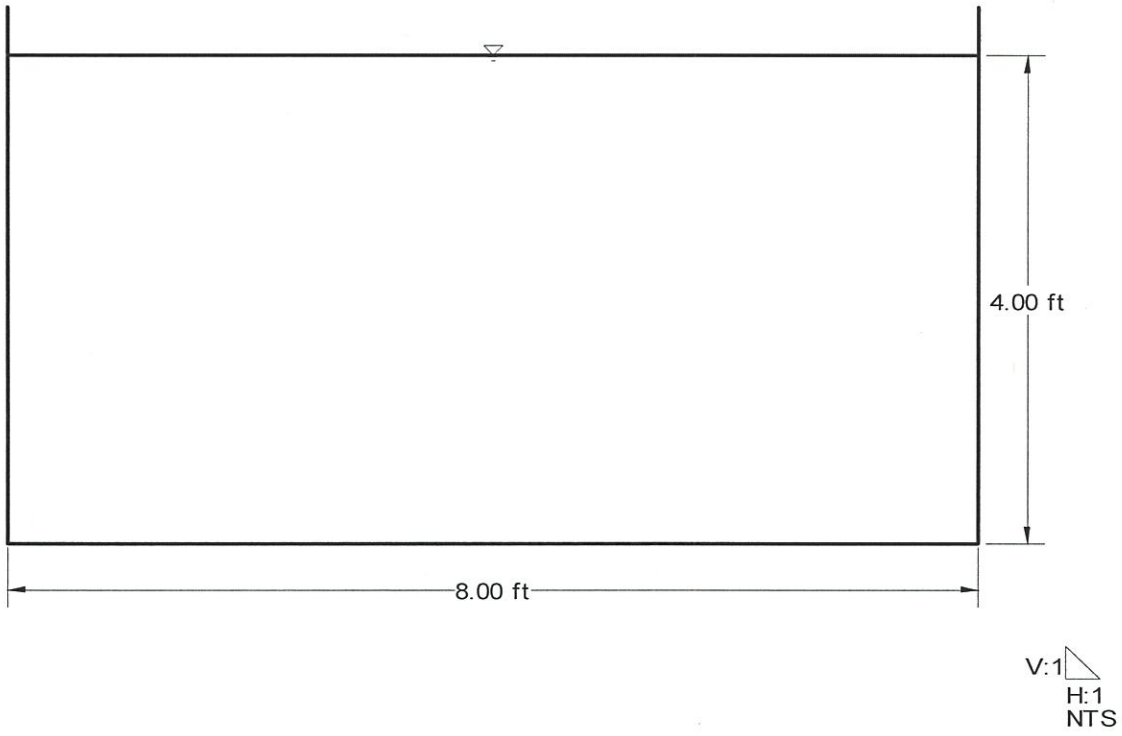
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.41	%
Depth	4.00	ft
Bottom Width	8.00	ft

Results		
Discharge	371.78	cfs
Flow Area	32.0	ft²
Wetted Perimeter	16.00	ft
Top Width	8.00	ft
Critical Depth	4.06	ft
Critical Slope	0.39	%
Velocity	11.62	ft/s
Velocity Head	2.10	ft
Specific Energy	6.10	ft
Froude Number	1.02	
Flow Type	Supercritical	

Facility P58
Cross Section for Rectangular Channel

Project Description	
Worksheet	Facility P58
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.41	%
Depth	4.00	ft
Bottom Width	8.00	ft
Discharge	371.78	cfs



Facility P59
Worksheet for Rectangular Channel

Project Description	
Worksheet	Facility P59
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Discharge

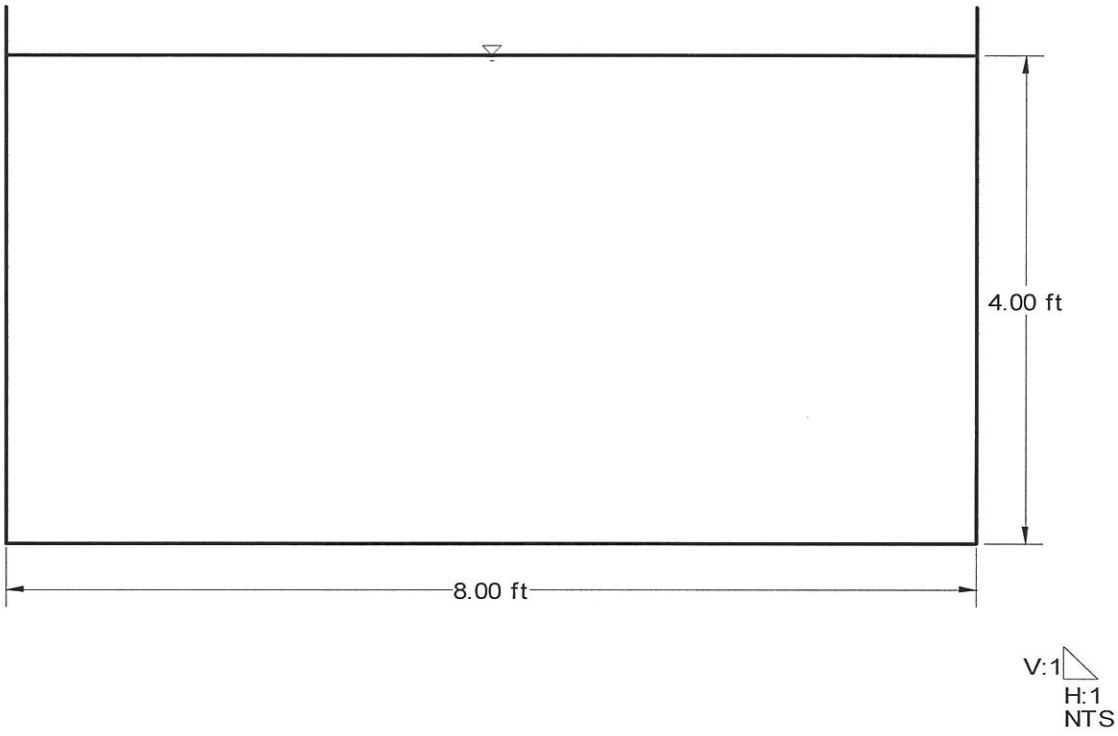
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.42	%
Depth	4.00	ft
Bottom Width	8.00	ft

Results		
Discharge	376.28	cfs
Flow Area	32.0	ft²
Wetted Perimeter	16.00	ft
Top Width	8.00	ft
Critical Depth	4.10	ft
Critical Slope	0.39	%
Velocity	11.76	ft/s
Velocity Head	2.15	ft
Specific Energy	6.15	ft
Froude Number	1.04	
Flow Type	Supercritical	

Facility P59
Cross Section for Rectangular Channel

Project Description	
Worksheet	Facility P59
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.42	%
Depth	4.00	ft
Bottom Width	8.00	ft
Discharge	376.28	cfs



Facility P62
Worksheet for Circular Channel

Project Description	
Worksheet	Facility P62
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

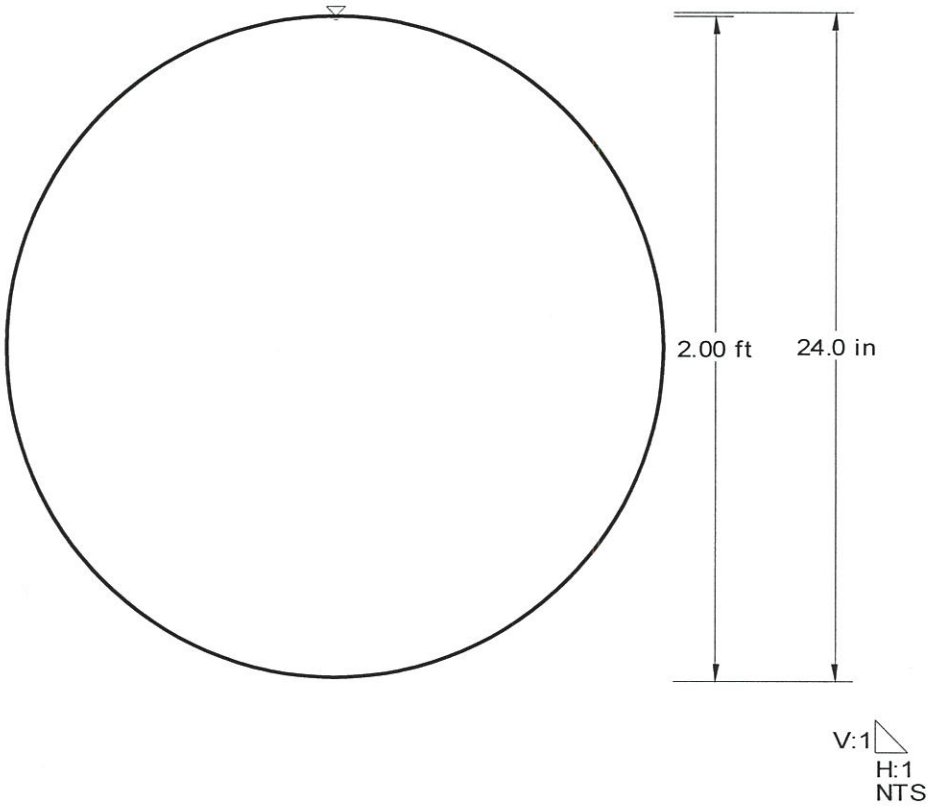
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	24.0	in

Results		
Depth	2.00	ft
Discharge	16.00	cfs
Flow Area	3.1	ft²
Wetted Perimeter	6.28	ft
Top Width	0.00	ft
Critical Depth	1.44	ft
Percent Full	100.0	%
Critical Slope	0.66	%
Velocity	5.09	ft/s
Velocity Head	0.40	ft
Specific Energy	2.40	ft
Froude Number	0.00	
Maximum Discharge	17.21	cfs
Discharge Full	16.00	cfs
Slope Full	0.50	%
Flow Type	N/A	

Facility P62
Cross Section for Circular Channel

Project Description	
Worksheet	Facility P62
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	2.00	ft
Diameter	24.0	in
Discharge	16.00	cfs



Facility P64
Worksheet for Circular Channel

Project Description	
Worksheet	Facility P64
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

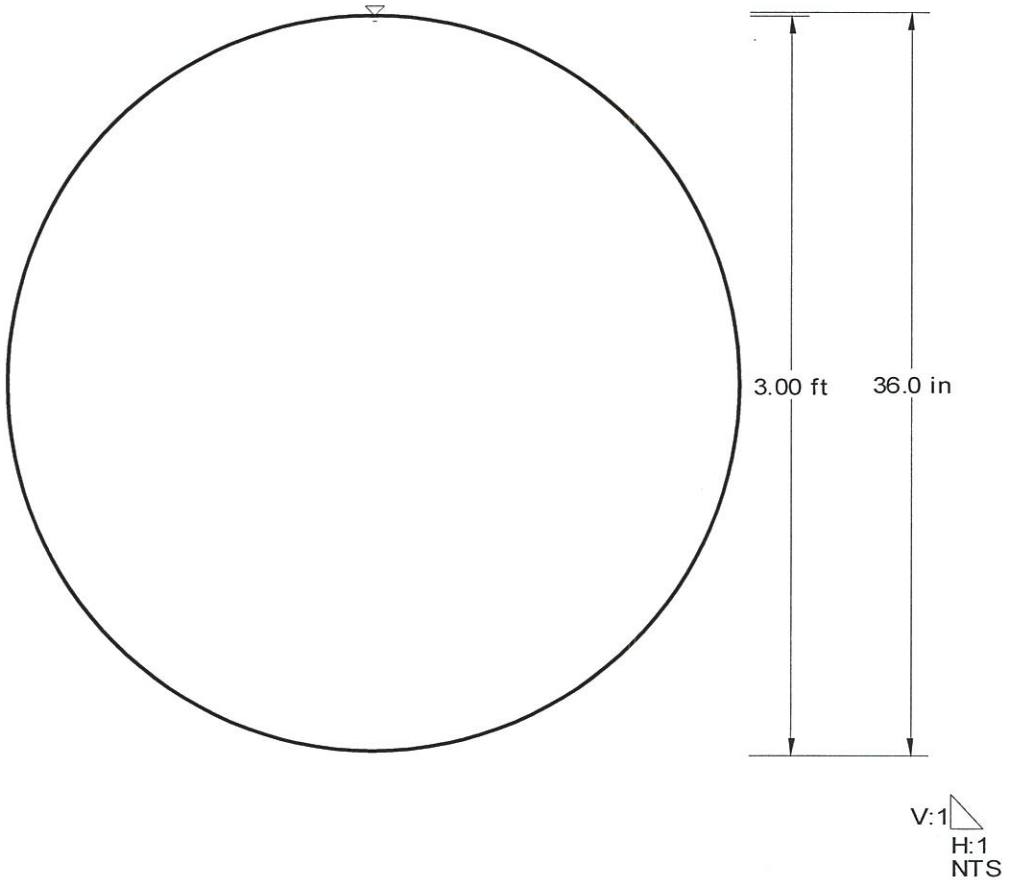
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	36.0	in

Results		
Depth	3.00	ft
Discharge	47.16	cfs
Flow Area	7.1	ft²
Wetted Perimeter	9.42	ft
Top Width	0.00	ft
Critical Depth	2.24	ft
Percent Full	100.0	%
Critical Slope	0.61	%
Velocity	6.67	ft/s
Velocity Head	0.69	ft
Specific Energy	3.69	ft
Froude Number	0.00	
Maximum Discharge	50.73	cfs
Discharge Full	47.16	cfs
Slope Full	0.50	%
Flow Type	N/A	

Facility P64
Cross Section for Circular Channel

Project Description	
Worksheet	Facility P64
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	3.00	ft
Diameter	36.0	in
Discharge	47.16	cfs



Facility P67
Worksheet for Circular Channel

Project Description	
Worksheet	Facility P67
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

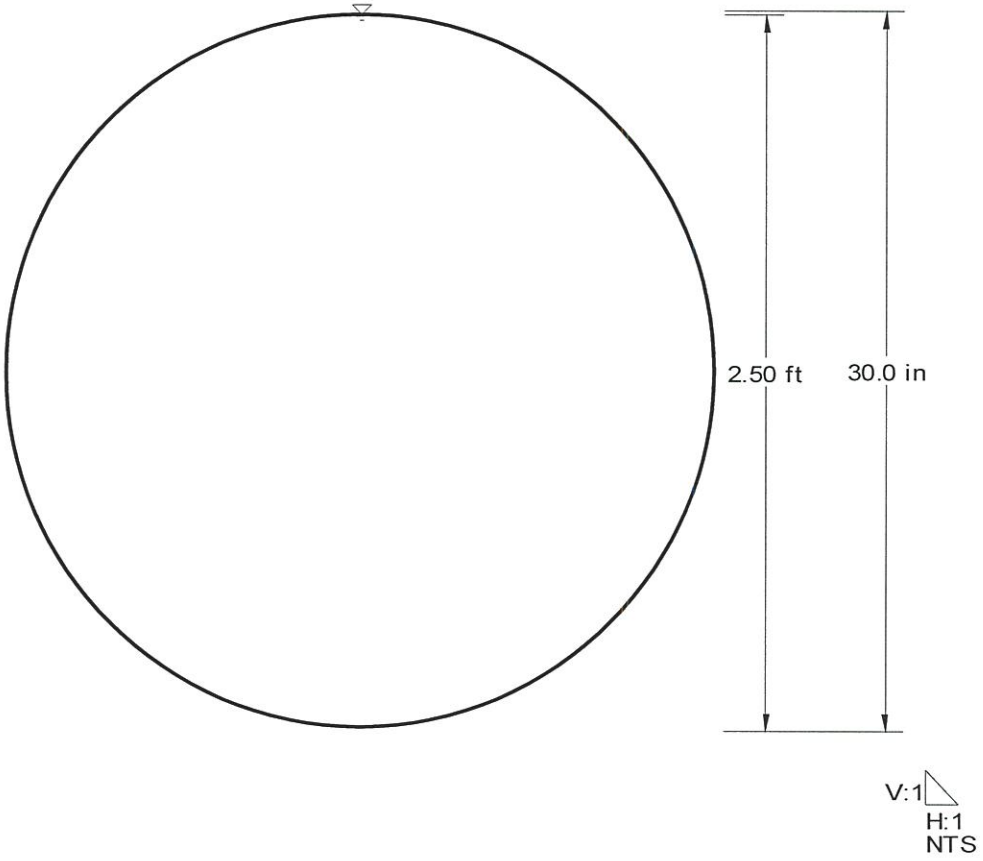
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	30.0	in

Results		
Depth	2.50	ft
Discharge	29.00	cfs
Flow Area	4.9	ft²
Wetted Perimeter	7.85	ft
Top Width	0.00	ft
Critical Depth	1.84	ft
Percent Full	100.0	%
Critical Slope	0.63	%
Velocity	5.91	ft/s
Velocity Head	0.54	ft
Specific Energy	3.04	ft
Froude Number	0.00	
Maximum Discharge	31.20	cfs
Discharge Full	29.00	cfs
Slope Full	0.50	%
Flow Type	N/A	

Facility P67
Cross Section for Circular Channel

Project Description	
Worksheet	Facility P67
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	2.50	ft
Diameter	30.0	in
Discharge	29.00	cfs



Facility P70
Worksheet for Circular Channel

Project Description	
Worksheet	Facility P70
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

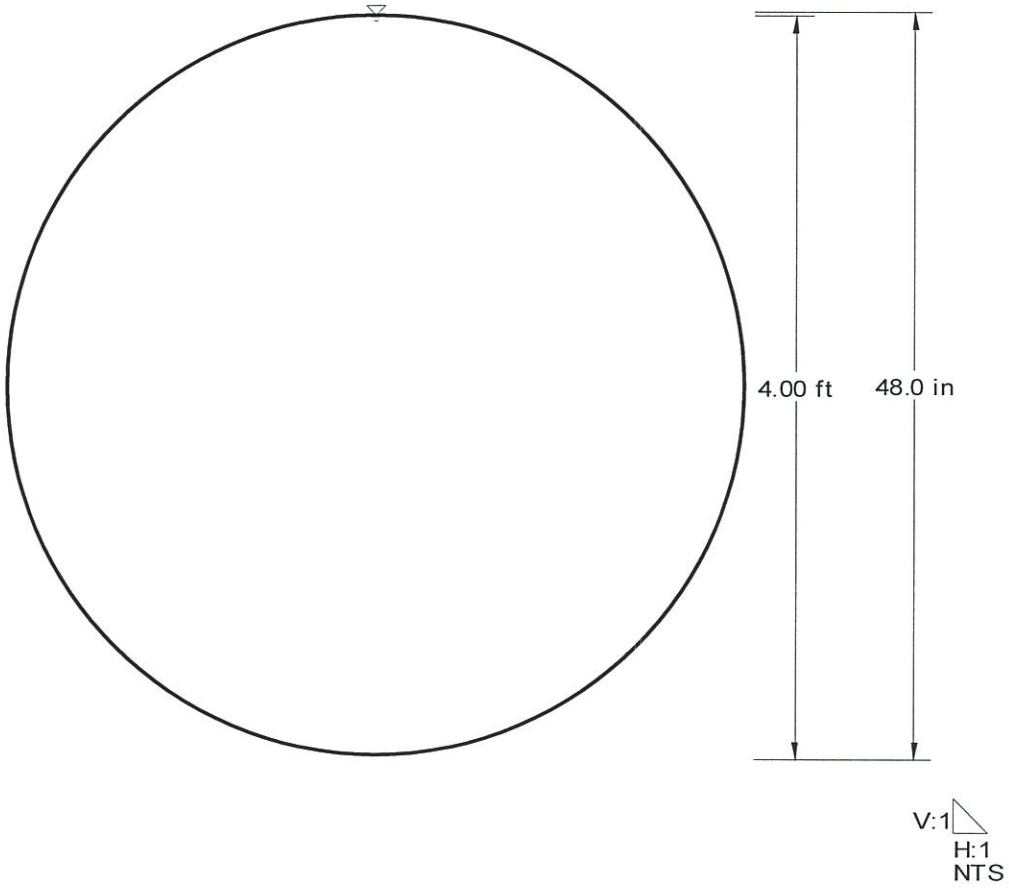
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	48.0	in

Results		
Depth	4.00	ft
Discharge	101.57	cfs
Flow Area	12.6	ft²
Wetted Perimeter	12.57	ft
Top Width	0.00	ft
Critical Depth	3.05	ft
Percent Full	100.0	%
Critical Slope	0.58	%
Velocity	8.08	ft/s
Velocity Head	1.02	ft
Specific Energy	5.02	ft
Froude Number	0.00	
Maximum Discharge	109.25	cfs
Discharge Full	101.57	cfs
Slope Full	0.50	%
Flow Type	N/A	

Facility P70
Cross Section for Circular Channel

Project Description	
Worksheet	Facility P70
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	4.00	ft
Diameter	48.0	in
Discharge	101.57	cfs



Facility P71
Worksheet for Circular Channel

Project Description	
Worksheet	Facility P71
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

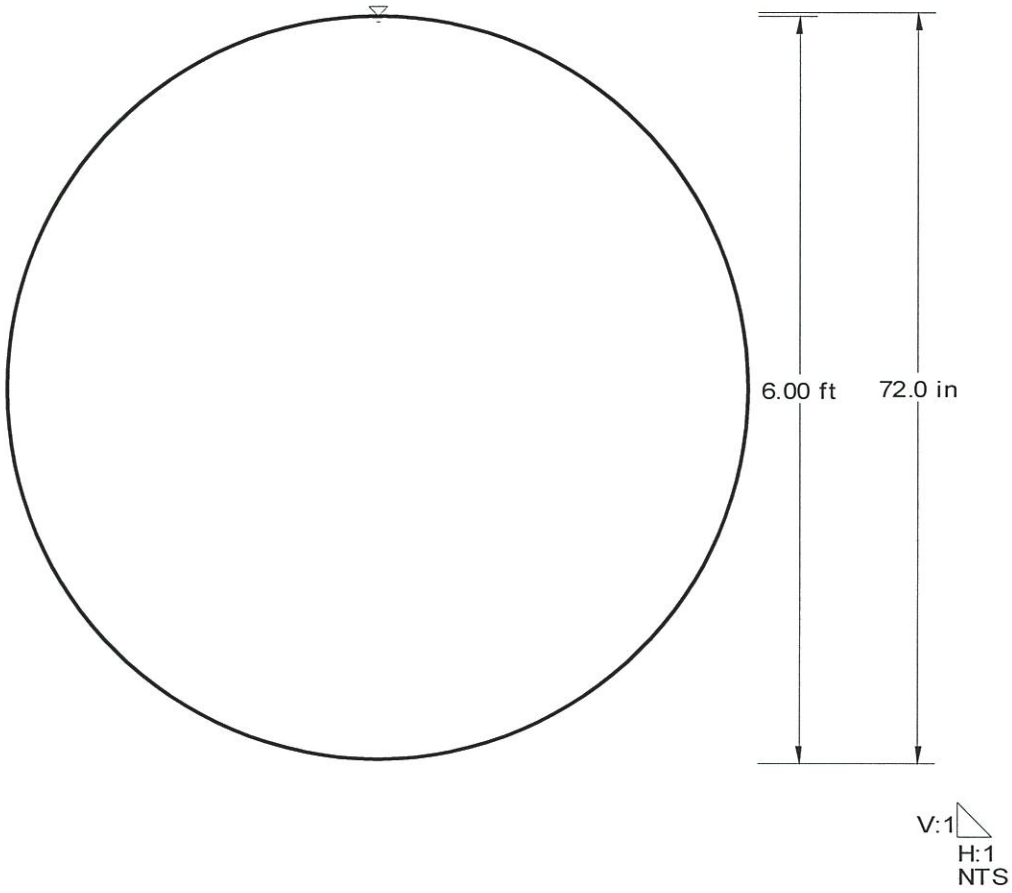
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	72.0	in

Results		
Depth	6.00	ft
Discharge	299.45	cfs
Flow Area	28.3	ft²
Wetted Perimeter	18.85	ft
Top Width	0.00	ft
Critical Depth	4.73	ft
Percent Full	100.0	%
Critical Slope	0.54	%
Velocity	10.59	ft/s
Velocity Head	1.74	ft
Specific Energy	7.74	ft
Froude Number	0.00	
Maximum Discharge	322.12	cfs
Discharge Full	299.45	cfs
Slope Full	0.50	%
Flow Type	N/A	

Facility P71
Cross Section for Circular Channel

Project Description	
Worksheet	Facility P71
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	6.00	ft
Diameter	72.0	in
Discharge	299.45	cfs



Facility P73
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Facility P73
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Discharge

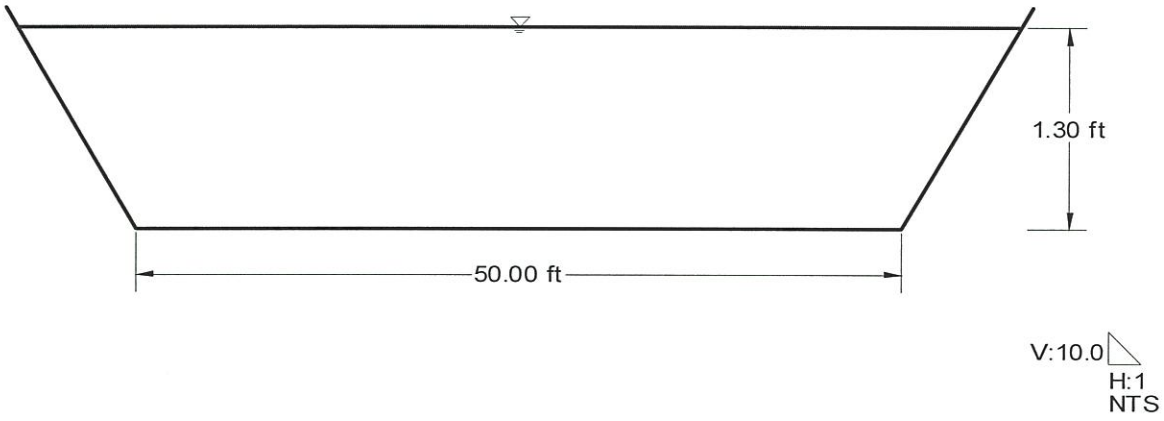
Input Data		
Mannings Coefficient	0.022	
Channel Slope	0.50	%
Depth	1.30	ft
Left Side Slope	6.00	H : V
Right Side Slope	6.00	H : V
Bottom Width	50.00	ft

Results		
Discharge	392.01	cfs
Flow Area	75.1	ft²
Wetted Perimeter	65.82	ft
Top Width	65.60	ft
Critical Depth	1.18	ft
Critical Slope	0.70	%
Velocity	5.22	ft/s
Velocity Head	0.42	ft
Specific Energy	1.72	ft
Froude Number	0.86	
Flow Type	Subcritical	

Facility P73
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Facility P73
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Mannings Coefficient	0.022	
Channel Slope	0.50	%
Depth	1.30	ft
Left Side Slope	6.00	H : V
Right Side Slope	6.00	H : V
Bottom Width	50.00	ft
Discharge	392.01	cfs



Facility P74
Worksheet for Circular Channel

Project Description	
Worksheet	Facility P74
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

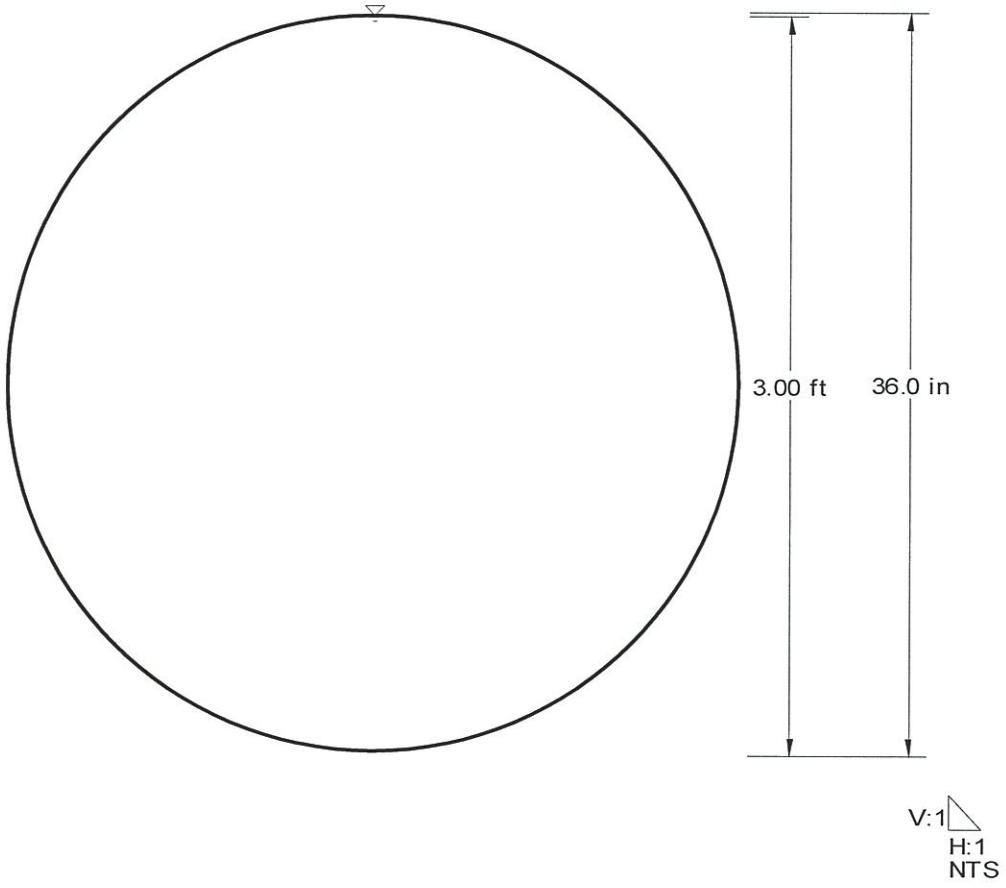
Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Diameter	36.0	in

Results		
Depth	3.00	ft
Discharge	47.16	cfs
Flow Area	7.1	ft²
Wetted Perimeter	9.42	ft
Top Width	0.00	ft
Critical Depth	2.24	ft
Percent Full	100.0	%
Critical Slope	0.61	%
Velocity	6.67	ft/s
Velocity Head	0.69	ft
Specific Energy	3.69	ft
Froude Number	0.00	
Maximum Discharge	50.73	cfs
Discharge Full	47.16	cfs
Slope Full	0.50	%
Flow Type	N/A	

Facility P74
Cross Section for Circular Channel

Project Description	
Worksheet	Facility P74
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Section Data		
Mannings Coefficient	0.013	
Channel Slope	0.50	%
Depth	3.00	ft
Diameter	36.0	in
Discharge	47.16	cfs



Mainline WSPGW Analyses

Farm Road – Decatur Boulevard to Aliante Golf Course Channel
Virage Park Drive East – Detention Basin Outflow to Farm Road
Virage Park West – Aviary to Detention Basin Inflow
Grand Teton Drive – Decatur Boulevard to Detention Basin Inflow

Farm Road – Decatur Boulevard to Aliante Golf Course Channel

```
0
T1 PARK HIGHLANDS WEST
T2 FARM ROAD - DECATUR BOULEVARD TO ALAINTE GOLF COURSE CHANNEL
T3 ULTIMATE CONDITION 05/08/2013
SO      0.012284.21  1                          2287.34
R      24.012284.28  1       .013
R     102.542284.52  1       .013                          50.00 90.00
JX    202.542284.82  1  7    .013     35.0         2284.82         45.00
JX    780.592286.55  1  5    .013     75.0         2286.03         45.00
R    1909.042289.94  1       .013
R    1937.582290.02  1       .013                          50.00 33.00
TS   1943.532290.04  2       .013
R    1950.202290.06  2       .013
R    2074.472290.68  2       .013                                        45.00
JX   2074.482290.68  2  5    .013     86.0         2290.68         45.00
JX   2103.182290.79  2  5    .013     48.0         2291.24         45.00
R    2132.182290.86  2       .013                                        42.00
JX   2144.082290.89  2  5  5.013       .1     0.12291.342291.34 90.00 90.00
JX   2166.582290.96  2  4  4.013     37.5    37.52291.162291.16 60.00 60.00
R    2179.282291.00  2       .013
TS   2197.282291.14  3       .013
R    2275.512291.78  3       .013                                        10.00 1
R    2280.512292.28  3       .013
R    2508.822294.04  4       .013                                        10.00 1
R    2734.822295.74  4       .013                                        10.00 1
R    2918.122297.11  4       .013                                         4.00 1
R    3155.022298.89  4       .013                                        10.00 1
R    3258.622299.67  4       .013                                        10.00 1
JX   3417.622300.24  4  6    .013     55.0         2301.25         90.00
JX   3508.702301.54  4     7.013              25.0        2303.04         90.00
R    3780.302302.63  4       .013                                              1
R    4051.802303.72  4       .013                                              1
JX   4320.802304.81  4  7  8.013     28.0    11.02306.322307.31 90.00 90.00
R    4325.802306.31  4       .013
R    4608.302307.44  7       .013                                              1
R    4890.802308.56  7       .013                                              1
R    5173.302309.70  7       .013                                        90.00 1
R    5238.502310.03  7       .013
SH   5238.502310.03  7
CD   1  3              5.00    9.10
CD   2  3              5.00   14.00
CD   3  4              5.00
CD   4  4              4.50
CD   5  4              4.00
CD   6  4              3.50
CD   7  4              3.00
CD   8  4              2.00
```

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0
Q              28.0
```

DATE: 5/10/2013
TIME: 13:13

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	1	3	0	0.00	5.00	9.10	0.00	0.00	0.00										
CD	2	3	0	0.00	5.00	14.00	0.00	0.00	0.00										
CD	3	4			5.00														
CD	4	4			4.50														
CD	5	4			4.00														
CD	6	4			3.50														
CD	7	4			3.00														
CD	8	4			2.00														

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

PARK HIGHLANDS WEST

HEADING LINE NO 2 IS -

FARM ROAD - DECATUR BOULEVARD TO ALAINTE GOLF COURSE CHANNEL

HEADING LINE NO 3 IS -

ULTIMATE CONDITION 05/08/2013

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET

U/S DATA	STATION	INVERT	SECT	W S ELEV
	0.01	2284.21	1	2287.34

ELEMENT NO 2 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	24.01	2284.28	1	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	102.54	2284.52	1	0.013	50.00	90.00	0.00	0

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
	202.54	2284.82	1	7	0	0.013	35.0	0.0	2284.82	0.00	45.00	0.00

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
	780.59	2286.55	1	5	0	0.013	75.0	0.0	2286.03	0.00	45.00	0.00

ELEMENT NO 6 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1909.04	2289.94	1	0.013	0.00	0.00	0.00	0

ELEMENT NO 7 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1937.58	2290.02	1	0.013	50.00	33.00	0.00	0

ELEMENT NO 8 IS A TRANSITION

U/S DATA	STATION	INVERT	SECT	N
	1943.53	2290.04	2	0.013

ELEMENT NO 9 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1950.20	2290.06	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 10 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	2074.47	2290.68	2	0.013	0.00	0.00	45.00	0

ELEMENT NO 11 IS A JUNCTION

	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
U/S DATA	2074.48	2290.68	2	5	0	0.013	86.0	0.0	2290.68		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 ♀

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 12 IS A JUNCTION

	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
U/S DATA	2103.18	2290.79	2	5	0	0.013	48.0	0.0	2291.24		0.00	45.00	0.00

ELEMENT NO 13 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	2132.18	2290.86	2	0.013	0.00	0.00	42.00	0

ELEMENT NO 14 IS A JUNCTION

	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
U/S DATA	2144.08	2290.89	2	5	5	0.013	0.1	0.1	2291.34	2291.34	90.00	90.00

ELEMENT NO 15 IS A JUNCTION

	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
U/S DATA	2166.58	2290.96	2	4	4	0.013	37.5	37.5	2291.16	2291.16	60.00	60.00

ELEMENT NO 16 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	2179.28	2291.00	2	0.013	0.00	0.00	0.00	0

ELEMENT NO 17 IS A TRANSITION

	STATION	INVERT	SECT	N
U/S DATA	2197.28	2291.14	3	0.013

ELEMENT NO 18 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	2275.51	2291.78	3	0.013	0.00	0.00	10.00	1

ELEMENT NO 19 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	2280.51	2292.28	3	0.013	0.00	0.00	0.00	0

WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS

ELEMENT NO 20 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	2508.82	2294.04	4	0.013	0.00	0.00	10.00	1

ELEMENT NO 21 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	2734.82	2295.74	4	0.013	0.00	0.00	10.00	1♀

F 0 5 1 5 P PAGE NO 4

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 22 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	2918.12	2297.11	4	0.013	0.00	0.00	4.00	1

ELEMENT NO 23 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	3155.02	2298.89	4	0.013	0.00	0.00	10.00	1

ELEMENT NO 24 IS A REACH

	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	3258.62	2299.67	4	0.013	0.00	0.00	10.00	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	3417.62	2300.24	4	6	0	0.013	55.0	0.0	2301.25		0.00	90.00	0.00

ELEMENT NO 26 IS A JUNCTION

	STATION	INVERT ELEV	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
U/S DATA	3508.70	2301.54	4	0	7	0.013	0.0	25.0	0.00	2303.04	0.00	90.00

ELEMENT NO 27 IS A REACH

	STATION	INVERT ELEV	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	3780.30	2302.63	4	0.013	0.00	0.00	0.00	1

ELEMENT NO 28 IS A REACH

	STATION	INVERT ELEV	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	4051.80	2303.72	4	0.013	0.00	0.00	0.00	1

ELEMENT NO 29 IS A JUNCTION

	STATION	INVERT ELEV	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
U/S DATA	4320.80	2304.81	4	7	8	0.013	28.0	11.0	2306.32	2307.31	90.00	90.00

ELEMENT NO 30 IS A REACH

	STATION	INVERT ELEV	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	4325.80	2306.31	4	0.013	0.00	0.00	0.00	0

WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS

ELEMENT NO 31 IS A REACH

	STATION	INVERT ELEV	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	4608.30	2307.44	7	0.013	0.00	0.00	0.00	1♀

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 32 IS A REACH

	STATION	INVERT ELEV	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	4890.80	2308.56	7	0.013	0.00	0.00	0.00	1

ELEMENT NO 33 IS A REACH

	STATION	INVERT ELEV	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	5173.30	2309.70	7	0.013	0.00	0.00	90.00	1

ELEMENT NO 34 IS A REACH

	STATION	INVERT ELEV	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
U/S DATA	5238.50	2310.03	7	0.013	0.00	0.00	0.00	0

ELEMENT NO 35 IS A SYSTEM HEADWORKS

	STATION	INVERT ELEV	SECT	W S ELEV
U/S DATA	5238.50	2310.03	7	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

WATER SURFACE PROFILE LISTING

PARK HIGHLANDS WEST
FARM ROAD - DECATUR BOULEVARD TO ALAINTE GOLF COURSE CHANNEL
ULTIMATE CONDITION 05/08/2013

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		
0.01	2284.21	4.337	2288.547	466.2	11.81	2.167	2290.714	0.00	4.337	5.00	9.10	0.00	0	0.00
24.00	0.00292					.003475	0.08		4.735			0.00		
24.01	2284.28	4.539	2288.819	466.2	11.29	1.978	2290.797	0.00	4.337	5.00	9.10	0.00	0	0.00
78.53	0.00306					.003195	0.25		4.652			0.00		
102.54	2284.52	4.612	2289.132	466.2	11.11	1.916	2291.048	0.00	4.337	5.00	9.10	0.00	0	0.00
JUNCT STR	0.00300					.003413	0.34					0.00		
202.54	2284.82	5.328	2290.148	431.2	9.53	1.410	2291.558	0.00	4.117	5.00	9.10	0.00	0	0.00
JUNCT STR	0.00299					.003112	1.80					0.00		
780.59	2286.55	6.075	2292.625	356.2	7.87	0.962	2293.587	0.00	3.625	5.00	9.10	0.00	0	0.00

1128.45	0.00300					.002524	2.85			3.833			0.00		
1909.04	2289.94	5.534	2295.474	356.2	7.87	0.962	2296.436	0.00	3.625		5.00	9.10	0.00	0	0.00
28.54	0.00280					.002524	0.07			3.932			0.00		
1937.58	2290.02	5.643	2295.663	356.2	7.87	0.962	2296.625	0.00	3.625		5.00	9.10	0.00	0	0.00
TRANS STR	0.00336					.001706	0.01						0.00		
1943.53	2290.04	6.246	2296.286	356.2	5.11	0.405	2296.691	0.00	2.720		5.00	14.00	0.00	0	0.00
6.67	0.00300					.000888	0.01			2.636			0.00		
1950.20	2290.06	6.232	2296.292	356.2	5.11	0.405	2296.697	0.00	2.720		5.00	14.00	0.00	0	0.00
124.27	0.00499					.000888	0.11			2.223			0.00		
2074.47	2290.68	5.782	2296.462	356.2	5.11	0.405	2296.867	0.00	2.720		5.00	14.00	0.00	0	0.00
JUNCT STR	0.00000					.000700	0.00						0.00		
2074.48	2290.68	5.941	2296.621	270.2	3.87	0.233	2296.854	0.00	2.262		5.00	14.00	0.00	0	0.00
JUNCT STR	0.00383					.000428	0.01						0.00		

WATER SURFACE PROFILE LISTING

PARK HIGHLANDS WEST
FARM ROAD - DECATUR BOULEVARD TO ALAINTE GOLF COURSE CHANNEL
ULTIMATE CONDITION 05/08/2013

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		
2103.18	2290.79	5.936	2296.726	222.2	3.19	0.158	2296.884	0.00	1.986		5.00	14.00	0.00	0	0.00
29.00	0.00241					.000346	0.01			2.069			0.00		
2132.18	2290.86	5.898	2296.758	222.2	3.19	0.158	2296.916	0.00	1.986		5.00	14.00	0.00	0	0.00
JUNCT STR	0.00252					.000345	0.00						0.00		
2144.08	2290.89	5.873	2296.763	222.0	3.18	0.157	2296.920	0.00	1.984		5.00	14.00	0.00	0	0.00
JUNCT STR	0.00311					.000248	0.01						0.00		
2166.58	2290.96	5.945	2296.905	147.0	2.11	0.069	2296.974	0.00	1.508		5.00	14.00	0.00	0	0.00
12.70	0.00315					.000151	0.00			1.449			0.00		
2179.28	2291.00	5.907	2296.907	147.0	2.11	0.069	2296.976	0.00	1.508		5.00	14.00	0.00	0	0.00
TRANS STR	0.00778					.001669	0.03						0.00		
2197.28	2291.14	5.156	2296.296	147.0	7.49	0.870	2297.166	0.00	3.476		5.00	0.00	0.00	0	0.00
41.69	0.00818					.003167	0.13			2.861			0.00		
2238.97	2291.48	5.000	2296.481	147.0	7.49	0.870	2297.351	0.00	3.476		5.00	0.00	0.00	0	0.00
36.54	0.00818					.002958	0.11			2.861			0.00		
2275.51	2291.78	4.781	2296.561	147.0	7.60	0.898	2297.459	0.00	3.476		5.00	0.00	0.00	0	0.00
2.57	0.10000					.002803	0.01			1.430			0.00		
2278.08	2292.04	4.441	2296.478	147.0	7.97	0.987	2297.465	0.00	3.476		5.00	0.00	0.00	0	0.00
1.56	0.10000					.002952	0.00			1.430			0.00		

2279.64	2292.19	4.191	2296.384	147.0	8.36	1.086	2297.470	0.00	3.476		5.00	0.00	0.00	0	0.00
0.87	0.10000					.003181	0.00			1.430			0.00		
2280.51	2292.28	4.023	2296.303	147.0	9.80	1.491	2297.794	0.00	3.560		4.50	0.00	0.00	0	0.00
11.04	0.00771					.004989	0.06			3.191			0.00		

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		
2291.55	2292.36	3.959	2296.324	147.0	9.92	1.528	2297.852	0.00	3.560		4.50	0.00	0.00	0	0.00
HYDRAULIC JUMP													0.00		
2291.55	2292.36	3.191	2295.556	147.0	12.19	2.307	2297.863	0.00	3.560		4.50	0.00	0.00	0	0.00
40.28	0.00771					.007709	0.31			3.191			0.00		
2331.83	2292.68	3.191	2295.867	147.0	12.19	2.307	2298.174	0.00	3.560		4.50	0.00	0.00	0	0.00
176.99	0.00771					.007615	1.35			3.191			0.00		
2508.82	2294.04	3.222	2297.262	147.0	12.06	2.260	2299.522	0.00	3.560		4.50	0.00	0.00	0	0.00
58.55	0.00752					.007522	0.44			3.222			0.00		
2567.37	2294.48	3.222	2297.702	147.0	12.06	2.260	2299.962	0.00	3.560		4.50	0.00	0.00	0	0.00
167.45	0.00752					.007498	1.26			3.222			0.00		
2734.82	2295.74	3.230	2298.970	147.0	12.03	2.248	2301.218	0.00	3.560		4.50	0.00	0.00	0	0.00
19.88	0.00747					.007475	0.15			3.230			0.00		
2754.70	2295.89	3.230	2299.119	147.0	12.03	2.248	2301.367	0.00	3.560		4.50	0.00	0.00	0	0.00
163.42	0.00747					.007496	1.22			3.230			0.00		
2918.12	2297.11	3.223	2300.333	147.0	12.06	2.258	2302.591	0.00	3.560		4.50	0.00	0.00	0	0.00
67.34	0.00751					.007516	0.51			3.223			0.00		
2985.46	2297.62	3.223	2300.839	147.0	12.06	2.258	2303.097	0.00	3.560		4.50	0.00	0.00	0	0.00
169.56	0.00751					.007436	1.26			3.223			0.00		
3155.02	2298.89	3.251	2302.141	147.0	11.95	2.217	2304.358	0.00	3.560		4.50	0.00	0.00	0	0.00
89.26	0.00753					.006998	0.62			3.220			0.00		
3244.28	2299.56	3.392	2302.954	147.0	11.43	2.028	2304.982	0.00	3.560		4.50	0.00	0.00	0	0.00
14.34	0.00753					.006310	0.09			3.220			0.00		

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		

3258.62	2299.67	3.560	2303.230	147.0	10.89	1.842	2305.072	0.00	3.560		4.50	0.00	0.00	0	0.00
JUNCT STR	0.00359					.004085	0.65						0.00		
3417.62	2300.24	5.898	2306.138	92.0	5.78	0.520	2306.658	0.00	2.814		4.50	0.00	0.00	0	0.00
JUNCT STR	0.01427					.001675	0.15						0.00		
3508.70	2301.54	5.239	2306.779	67.0	4.21	0.276	2307.055	0.00	2.385		4.50	0.00	0.00	0	0.00
263.71	0.00401					.001154	0.30			2.350			0.00		
3772.41	2302.60	4.500	2307.098	67.0	4.21	0.276	2307.374	0.00	2.385		4.50	0.00	0.00	0	0.00
7.89	0.00401					.001119	0.01			2.350			0.00		
3780.30	2302.63	4.476	2307.106	67.0	4.22	0.276	2307.382	0.00	2.385		4.50	0.00	0.00	0	0.00
124.71	0.00402					.001054	0.13			2.350			0.00		
3905.01	2303.13	4.079	2307.210	67.0	4.42	0.304	2307.514	0.00	2.385		4.50	0.00	0.00	0	0.00
71.43	0.00402					.001052	0.08			2.350			0.00		
3976.44	2303.42	3.837	2307.255	67.0	4.64	0.334	2307.589	0.00	2.385		4.50	0.00	0.00	0	0.00
57.59	0.00402					.001139	0.07			2.350			0.00		
4034.03	2303.65	3.638	2307.287	67.0	4.86	0.367	2307.654	0.00	2.385		4.50	0.00	0.00	0	0.00
17.77	0.00402					.001211	0.02			2.350			0.00		
4051.80	2303.72	3.576	2307.296	67.0	4.94	0.379	2307.675	0.00	2.385		4.50	0.00	0.00	0	0.00
JUNCT STR	0.00405					.000742	0.20						0.00		
4320.80	2304.81	3.324	2308.134	28.0	2.22	0.077	2308.211	0.00	1.513		4.50	0.00	0.00	0	0.00
0.46	0.30000					.000268	0.00			0.500			0.00		
4321.26	2304.95	3.178	2308.127	28.0	2.33	0.084	2308.211	0.00	1.513		4.50	0.00	0.00	0	0.00
0.42	0.30000					.000300	0.00			0.500			0.00		

WATER SURFACE PROFILE LISTING

PARK HIGHLANDS WEST
FARM ROAD - DECATUR BOULEVARD TO ALAINTE GOLF COURSE CHANNEL
ULTIMATE CONDITION 05/08/2013

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		
4321.68	2305.07	3.044	2308.118	28.0	2.45	0.093	2308.211	0.00	1.513		4.50	0.00	0.00	0	0.00
0.39	0.30000					.000336	0.00			0.500			0.00		
4322.07	2305.19	2.919	2308.109	28.0	2.56	0.102	2308.211	0.00	1.513		4.50	0.00	0.00	0	0.00
0.36	0.30000					.000379	0.00			0.500			0.00		
4322.43	2305.30	2.801	2308.099	28.0	2.69	0.112	2308.211	0.00	1.513		4.50	0.00	0.00	0	0.00
0.33	0.30000					.000428	0.00			0.500			0.00		
4322.76	2305.40	2.691	2308.088	28.0	2.82	0.124	2308.212	0.00	1.513		4.50	0.00	0.00	0	0.00
0.30	0.30000					.000483	0.00			0.500			0.00		

4323.06	2305.49	2.587	2308.076	28.0	2.96	0.136	2308.212	0.00	1.513		4.50	0.00	0.00	0	0.00
0.29	0.30000					.000547	0.00			0.500			0.00		
4323.35	2305.57	2.488	2308.062	28.0	3.10	0.150	2308.212	0.00	1.513		4.50	0.00	0.00	0	0.00
0.26	0.30000					.000620	0.00			0.500			0.00		
4323.61	2305.65	2.394	2308.048	28.0	3.25	0.164	2308.212	0.00	1.513		4.50	0.00	0.00	0	0.00
0.24	0.30000					.000702	0.00			0.500			0.00		
4323.85	2305.73	2.305	2308.031	28.0	3.41	0.181	2308.212	0.00	1.513		4.50	0.00	0.00	0	0.00
0.23	0.30000					.000797	0.00			0.500			0.00		
4324.08	2305.79	2.220	2308.013	28.0	3.58	0.199	2308.212	0.00	1.513		4.50	0.00	0.00	0	0.00
0.20	0.30000					.000905	0.00			0.500			0.00		
4324.28	2305.86	2.139	2307.994	28.0	3.75	0.219	2308.213	0.00	1.513		4.50	0.00	0.00	0	0.00
0.19	0.30000					.001029	0.00			0.500			0.00		
4324.47	2305.91	2.062	2307.972	28.0	3.94	0.241	2308.213	0.00	1.513		4.50	0.00	0.00	0	0.00
0.10	0.30000					.001139	0.00			0.500			0.00		

WATER SURFACE PROFILE LISTING

PARK HIGHLANDS WEST
FARM ROAD - DECATUR BOULEVARD TO ALAINTE GOLF COURSE CHANNEL
ULTIMATE CONDITION 05/08/2013

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		
4324.57	2305.94	2.018	2307.958	28.0	4.05	0.255	2308.213	0.00	1.513		4.50	0.00	0.00	0	0.00
HYDRAULIC JUMP													0.00		
4324.57	2305.94	1.111	2307.051	28.0	9.17	1.304	2308.355	0.00	1.513		4.50	0.00	0.00	0	0.00
0.03	0.30000					.011353	0.00			0.500			0.00		
4324.60	2305.95	1.111	2307.061	28.0	9.17	1.304	2308.365	0.00	1.513		4.50	0.00	0.00	0	0.00
0.28	0.30000					.010638	0.00			0.500			0.00		
4324.88	2306.03	1.149	2307.183	28.0	8.74	1.186	2308.369	0.00	1.513		4.50	0.00	0.00	0	0.00
0.24	0.30000					.009302	0.00			0.500			0.00		
4325.12	2306.11	1.188	2307.293	28.0	8.33	1.078	2308.371	0.00	1.513		4.50	0.00	0.00	0	0.00
0.19	0.30000					.008138	0.00			0.500			0.00		
4325.31	2306.16	1.230	2307.392	28.0	7.94	0.980	2308.372	0.00	1.513		4.50	0.00	0.00	0	0.00
0.16	0.30000					.007121	0.00			0.500			0.00		
4325.47	2306.21	1.272	2307.482	28.0	7.57	0.891	2308.373	0.00	1.513		4.50	0.00	0.00	0	0.00
0.12	0.30000					.006232	0.00			0.500			0.00		
4325.59	2306.25	1.317	2307.564	28.0	7.22	0.810	2308.374	0.00	1.513		4.50	0.00	0.00	0	0.00
0.09	0.30000					.005456	0.00			0.500			0.00		
4325.68	2306.28	1.363	2307.638	28.0	6.88	0.736	2308.374	0.00	1.513		4.50	0.00	0.00	0	0.00

0.07	0.30000					.004776	0.00			0.500			0.00		
4325.75	2306.30	1.410	2307.706	28.0	6.57	0.669	2308.375	0.00	1.513		4.50	0.00	0.00	0	0.00
0.04	0.30000					.004183	0.00			0.500			0.00		
4325.79	2306.31	1.460	2307.767	28.0	6.26	0.608	2308.375	0.00	1.513		4.50	0.00	0.00	0	0.00
0.01	0.30000					.003660	0.00			0.500			0.00		

WATER SURFACE PROFILE LISTING

PARK HIGHLANDS WEST
FARM ROAD - DECATUR BOULEVARD TO ALAINTE GOLF COURSE CHANNEL
ULTIMATE CONDITION 05/08/2013

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		
4325.80	2306.31	1.513	2307.823	28.0	5.96	0.552	2308.375	0.00	1.513		4.50	0.00	0.00	0	0.00
4325.80	2306.31	1.712	2308.022	28.0	6.72	0.701	2308.723	0.00	1.712		3.00	0.00	0.00	0	0.00
14.70	0.00400					.004299	0.06			1.785			0.00		
4340.50	2306.37	1.780	2308.149	28.0	6.40	0.637	2308.786	0.00	1.712		3.00	0.00	0.00	0	0.00
66.58	0.00400					.004019	0.27			1.785			0.00		
4407.08	2306.64	1.785	2308.420	28.0	6.39	0.633	2309.053	0.00	1.712		3.00	0.00	0.00	0	0.00
201.22	0.00400					.004004	0.81			1.785			0.00		
4608.30	2307.44	1.785	2309.225	28.0	6.39	0.633	2309.858	0.00	1.712		3.00	0.00	0.00	0	0.00
33.60	0.00396					.003988	0.13			1.790			0.00		
4641.90	2307.57	1.790	2309.363	28.0	6.37	0.629	2309.992	0.00	1.712		3.00	0.00	0.00	0	0.00
248.90	0.00396					.003970	0.99			1.790			0.00		
4890.80	2308.56	1.790	2310.350	28.0	6.37	0.629	2310.979	0.00	1.712		3.00	0.00	0.00	0	0.00
50.02	0.00404					.004006	0.20			1.780			0.00		
4940.82	2308.76	1.780	2310.542	28.0	6.41	0.638	2311.180	0.00	1.712		3.00	0.00	0.00	0	0.00
232.48	0.00404					.004039	0.94			1.780			0.00		
5173.30	2309.70	1.780	2311.480	28.0	6.41	0.638	2312.118	0.00	1.712		3.00	0.00	0.00	0	0.00
2.17	0.00506					.004303	0.01			1.657			0.00		
5175.47	2309.71	1.712	2311.423	28.0	6.72	0.701	2312.124	0.00	1.712		3.00	0.00	0.00	0	0.00
HYDRAULIC JUMP													0.00		
5175.47	2309.71	1.657	2311.368	28.0	6.99	0.759	2312.127	0.00	1.712		3.00	0.00	0.00	0	0.00
48.61	0.00506					.005067	0.25			1.657			0.00		
5224.08	2309.96	1.657	2311.614	28.0	6.99	0.759	2312.373	0.00	1.712		3.00	0.00	0.00	0	0.00

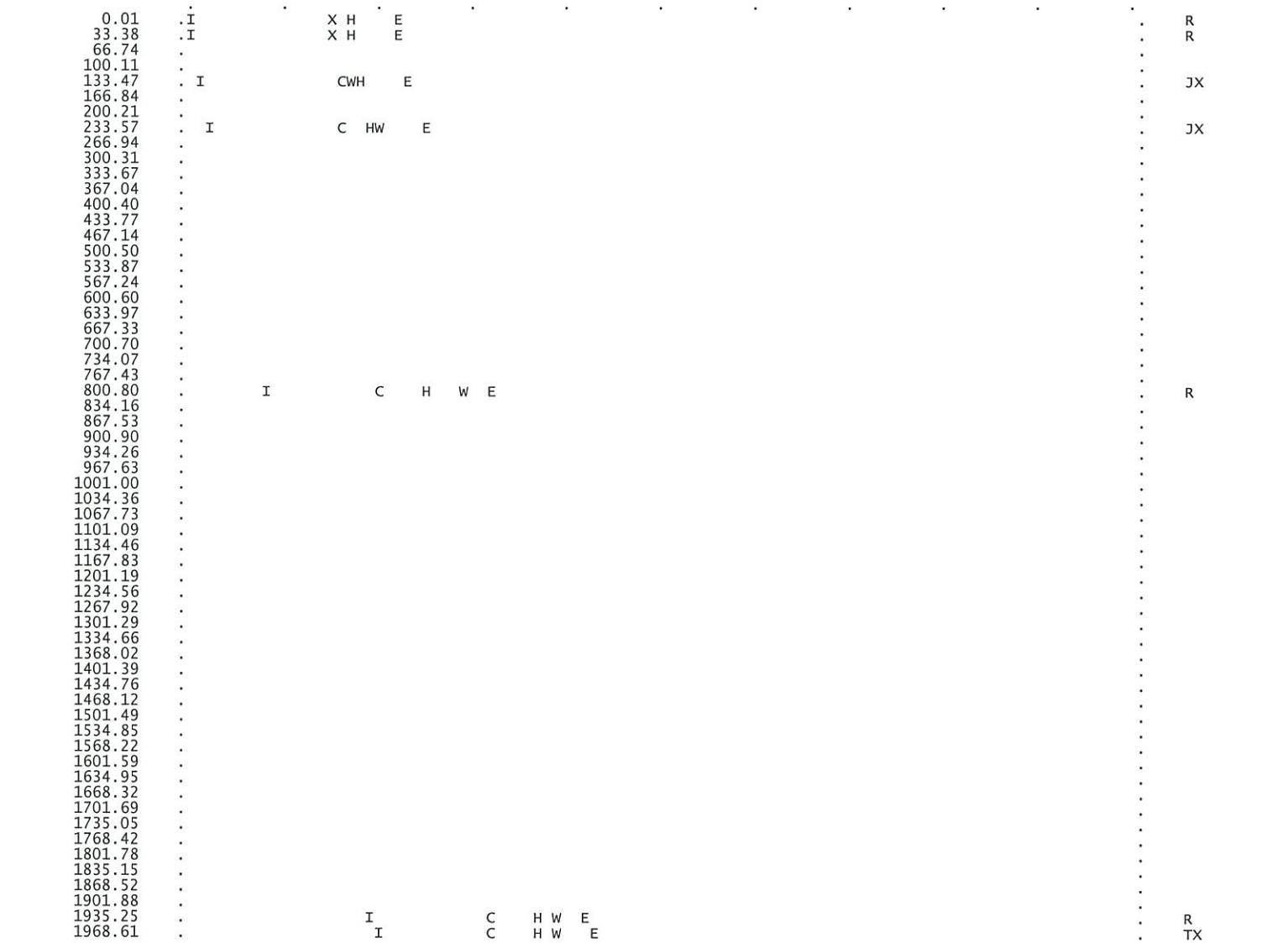
WATER SURFACE PROFILE LISTING

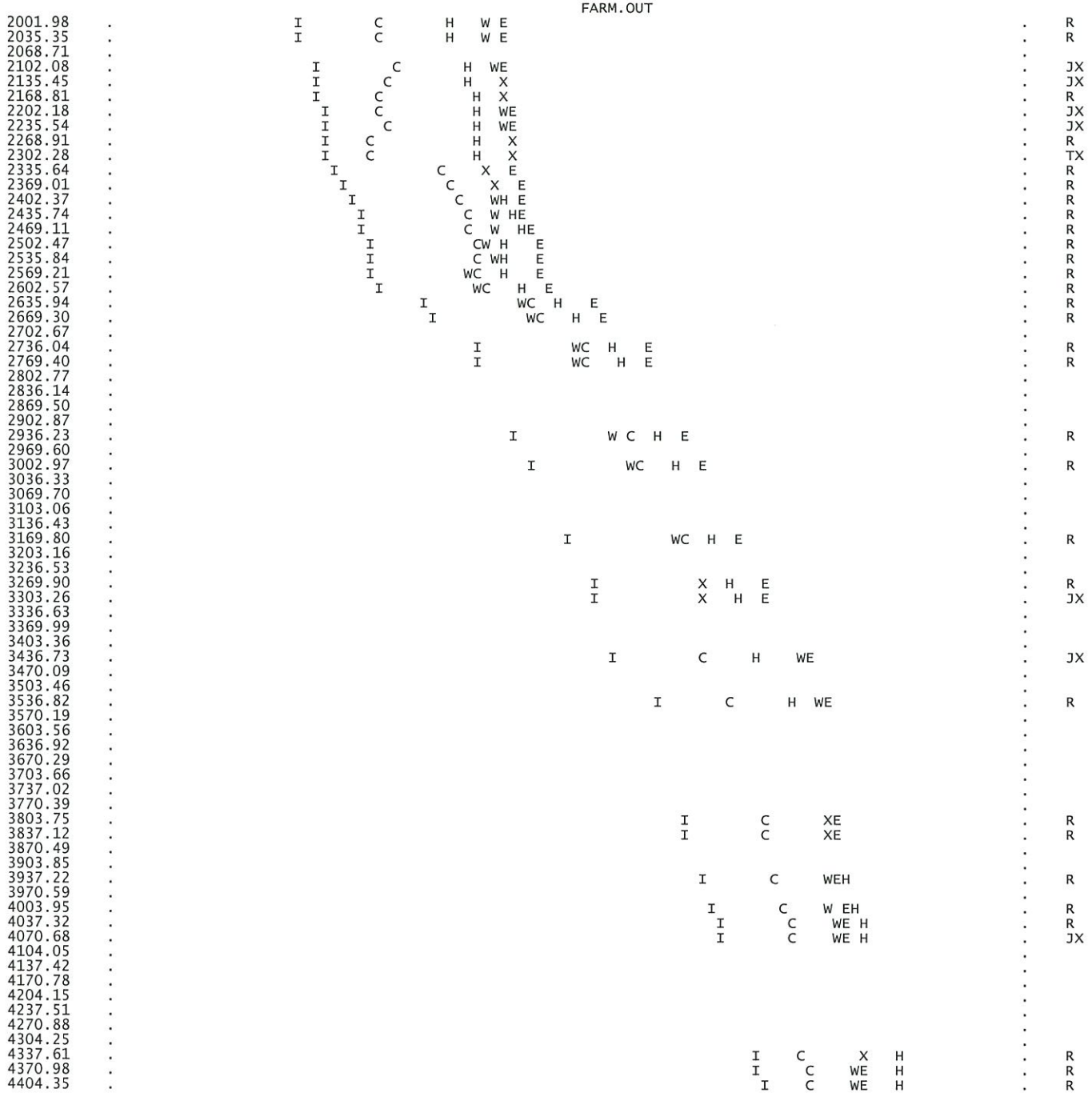
PARK HIGHLANDS WEST
FARM ROAD - DECATUR BOULEVARD TO ALAINTE GOLF COURSE CHANNEL
ULTIMATE CONDITION 05/08/2013

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		
14.42	0.00506						.004816	0.07			1.657		0.00		
5238.50	2310.03	1.712	2311.742	28.0	6.72	0.701	2312.443	0.00	1.712	3.00	0.00	0.00	0	0.00

PARK HIGHLANDS WEST
FARM ROAD - DECATUR BOULEVARD TO ALAINTE GOLF COURSE CHANNEL
ULTIMATE CONDITION 05/08/2013

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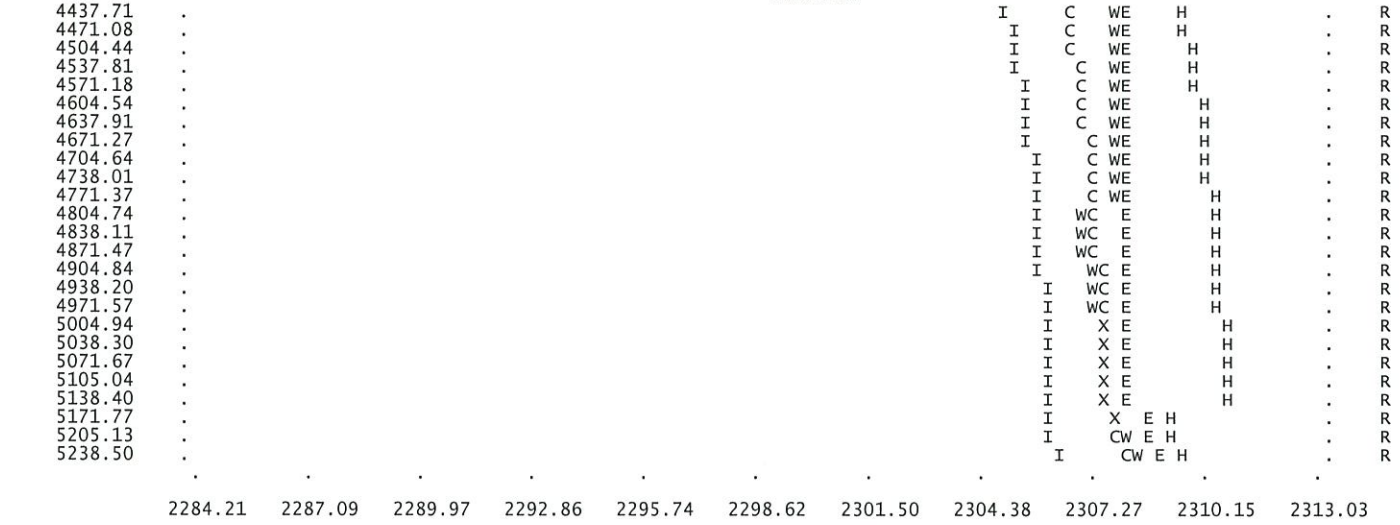
2035.35 . I C H W E . R
2068.71 .
2102.08 . I C H WE . JX
2135.45 . I C H X . JX
2168.81 . I C H X . R
2202.18 . I C H WE . JX
2235.54 . I C H WE . JX
2268.91 . I C H X . R
2302.28 . I C H X . TX
2335.64 . I C X E . R
2369.01 . I C X E . R
2402.37 . I C WH E . R
2435.74 . I C W HE . R
2469.11 . I C W HE . R
2502.47 . I CW H E . R
2535.84 . I C WH E . R
2569.21 . I WC H E . R
2602.57 . I WC H E . R
2635.94 . I WC H E . R
2669.30 . I WC H E . R
2702.67 .
2736.04 . I WC H E . R
2769.40 . I WC H E . R
2802.77 .
2836.14 .
2869.50 .
2902.87 .
2936.23 . I W C H E . R
2969.60 .
3002.97 . I WC H E . R
3036.33 .
3069.70 .
3103.06 .
3136.43 .
3169.80 . I WC H E . R
3203.16 .
3236.53 .
3269.90 . I X H E . R
3303.26 . I X H E . JX
3336.63 .
3369.99 .
3403.36 .
3436.73 . I C H WE . JX
3470.09 .
3503.46 .
3536.82 . I C H WE . R
3570.19 .
3603.56 .
3636.92 .
3670.29 .
3703.66 .
3737.02 .
3770.39 .
3803.75 . I C XE . R
3837.12 . I C XE . R
3870.49 .
3903.85 .
3937.22 . I C WEH . R
3970.59 .
4003.95 . I C W EH . R
4037.32 . I C WE H . R
4070.68 . I C WE H . JX
4104.05 .
4137.42 .
4170.78 .
4204.15 .
4237.51 .
4270.88 .
4304.25 .
4337.61 . I C X H . R
4370.98 . I C WE H . R
4404.35 . I C WE H . R



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†

Virage Park Drive East – Detention Basin Outflow to Farm Road

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                                                                    VPDE.WSW
T1  PARK HIGHLAND WEST                                                      0
T2  VIRAGE PARK DRIVE EAST - DETENTION BASIN OUTFLOW TO FARM ROAD
T3  ULTIMATE CONDITION 05/08/2013
SO  -6970.3302290.680 11      .013               2296.621
R   -6950.8222290.742 11      .013
R   -6887.3362290.946 11      .013                      400.000   9.000    .000
R   -6833.8112291.117 11      .013
JX  -6821.6252291.156 10  6   .013    0.001         2292.020         45.0
R   -6547.9702292.020 10      .013                                      12.000
R   -6413.4402292.450 10      .013                                       9.000
JX  -6413.4402292.450 10  6   .013    0.001         2292.600         57.0
R   -6278.9102292.900 10      .013                                      10.000
JX  -6278.9102292.900 10  4   .013    1.000         2295.900        -20.0
R   -6114.1302293.400 10      .013                                      12.000
R   -5949.7102294.000 10      .013                                     -59.000
R   -5799.3002294.610 10      .013                                     -37.000
JX  -5799.3002294.610 10  5  5.013    0.001  0.001  2297.1002297.100 27.0-90.0
R   -5721.6002294.840 10      .013
JX  -5721.6002294.840 10  1  1.013    0.001  0.001  2299.4002299.400 45.0-45.0
R   -5625.0002295.130 10      .013                                      52.000
R   -5518.0002295.500 10      .013
SH  -5518.0002295.500 10      .013               2307.020
CD   1  4   1    .000   1.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
CD   3  4   1    .000   2.500     .000  .000  .000   .00
CD   4  4   1    .000   3.000     .000  .000  .000   .00
CD   5  4   1    .000   3.500     .000  .000  .000   .00
CD   6  4   1    .000   4.000     .000  .000  .000   .00
CD   7  4   1    .000   4.500     .000  .000  .000   .00
CD   8  4   1    .000   5.000     .000  .000  .000   .00
CD   9  4   1    .000   5.500     .000  .000  .000   .00
CD  10  4   1    .000   6.000     .000  .000  .000   .00
CD  11  3   0    .000   5.000    6.000  .000  .000   .00
Q           231.000   .0
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PARK HIGHLAND WEST
VIRAGE PARK DRIVE EAST - DETENTION BASIN OUTFLOW TO FARM ROAD
ULTIMATE CONDITION 05/08/2013

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-6970.330	2290.680	5.941	2296.621	232.01	7.73	.93	2297.55	.00	3.59	6.00	5.000	6.000	.00	0 .0
19.508	.0032					.0030	.06	5.94	.61	4.15	.013	.00	.00	BOX
-6950.822	2290.742	5.938	2296.680	232.01	7.73	.93	2297.61	.00	3.59	6.00	5.000	6.000	.00	0 .0
63.486	.0032					.0030	.19	.00	.61	4.13	.013	.00	.00	BOX
-6887.336	2290.946	5.985	2296.931	232.01	7.73	.93	2297.86	.00	3.59	6.00	5.000	6.000	.00	0 .0
53.525	.0032					.0030	.16	5.99	.61	4.14	.013	.00	.00	BOX
-6833.811	2291.117	5.976	2297.093	232.01	7.73	.93	2298.02	.00	3.59	6.00	5.000	6.000	.00	0 .0
JUNCT STR	.0032					.0028	.03	5.98	.61		.013	.00	.00	BOX
---------- WARNING - Junction Analysis - Change in Channel Type ----------														
-6821.625	2291.156	5.839	2296.995	232.01	8.27	1.06	2298.06	.00	4.17	1.94	6.000	.000	.00	1 .0
273.655	.0032					.0026	.72	5.84	.38	4.79	.013	.00	.00	PIPE
-6547.970	2292.020	5.661	2297.681	232.01	8.39	1.09	2298.77	.00	4.17	2.77	6.000	.000	.00	1 .0
134.530	.0032					.0026	.35	5.66	.47	4.76	.013	.00	.00	PIPE
JUNCT STR	.0000					.0026	.00	5.56	.51		.013	.00	.00	PIPE
-6413.440	2292.450	5.555	2298.005	232.00	8.49	1.12	2299.12	.00	4.17	3.14	6.000	.000	.00	1 .0
134.530	.0033					.0026	.35	5.55	.51	4.66	.013	.00	.00	PIPE

PARK HIGHLAND WEST
VIRAGE PARK DRIVE EAST - DETENTION BASIN OUTFLOW TO FARM ROAD
ULTIMATE CONDITION 05/08/2013

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-6278.910	2292.900	5.419	2298.319	232.00	8.63	1.16	2299.48	.00	4.17	3.55	6.000	.000	.00	1 .0
JUNCT STR	.0000					.0026	.00	5.42	.55		.013	.00	.00	PIPE
-6278.910	2292.900	5.447	2298.347	231.00	8.57	1.14	2299.49	.00	4.16	3.47	6.000	.000	.00	1 .0
164.780	.0030					.0026	.43	5.45	.54	4.87	.013	.00	.00	PIPE
-6114.130	2293.400	5.349	2298.749	231.00	8.68	1.17	2299.92	.00	4.16	3.73	6.000	.000	.00	1 .0
164.420	.0036					.0027	.45	5.35	.57	4.46	.013	.00	.00	PIPE
-5949.710	2294.000	5.105	2299.105	231.00	9.01	1.26	2300.37	.00	4.16	4.28	6.000	.000	.00	1 .0
123.287	.0041					.0029	.36	5.10	.65	4.27	.013	.00	.00	PIPE
-5826.423	2294.500	4.840	2299.340	231.00	9.45	1.39	2300.73	.00	4.16	4.74	6.000	.000	.00	1 .0

27.124	.0041					.0031	.08	4.84	.73	4.27	.013	.00	.00	PIPE		
JUNCT STR	.0000					.0031	.00	4.78	.75		.013	.00	.00	PIPE		
-5799.300	2294.610	4.782	2299.393	231.00	9.56	1.42	2300.81	.00	4.16	4.83	6.000	.000	.00	1	.0	
77.700	.0030					.0031	.24	4.78	.75	4.93	.013	.00	.00	PIPE		
JUNCT STR	.0000					.0031	.00	4.81	.74		.013	.00	.00	PIPE		
-5721.600	2294.840	4.811	2299.651	231.00	9.51	1.40	2301.05	.00	4.16	4.78	6.000	.000	.00	1	.0	
96.600	.0030					.0031	.30	4.81	.74	4.90	.013	.00	.00	PIPE		

Program Package Serial Number: 1704

WATER SURFACE PROFILE LISTING Date: 5-10-2013 Time: 9:40:30

PARK HIGHLAND WEST
VIRAGE PARK DRIVE EAST - DETENTION BASIN OUTFLOW TO FARM ROAD
ULTIMATE CONDITION 05/08/2013

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-5625.000	2295.130	4.830	2299.960	231.00	9.47	1.39	2301.35	.00	4.16	4.75	6.000	.000	.00	1	.0	
107.000	.0035					.0031	.33	4.83	.74	4.57	.013	.00	.00	PIPE		
-5518.000	2295.500	4.749	2300.249	231.00	9.62	1.44	2301.69	.00	4.16	4.87	6.000	.000	.00	1	.0	

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Virage Park West – Aviary to Detention Basin Inflow

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T1  PARK HIGHLAND WEST                                                    0
T2  VIRAGE PARK DRIVE WEST - AVIARY WAY TO DETENTION BASIN INFLOW
T3  ULTIMATE CONDITION 05/08/2013
SO   1662.8002300.240  9      .013              2307.020
R    1764.8002300.760  9      .013
JX   1784.8002300.834  6  4  4.013   53.000   53.0002303.3002303.350 90.0   .0  45.000
R    2065.4002302.910  6      .013                                              1
R    2199.2002303.570  6      .013                                  .000  90.000 1
JX   2199.2002304.080  5  3   .013    0.001         2305.080          0.0   .0
R    2252.7002304.350  5      .013
SH   2252.7002304.350  5      .013
CD   1  4   1    .000   1.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
CD   3  4   1    .000   2.500     .000  .000  .000   .00
CD   4  4   1    .000   3.000     .000  .000  .000   .00
CD   5  4   1    .000   3.500     .000  .000  .000   .00
CD   6  4   1    .000   4.000     .000  .000  .000   .00
CD   7  4   1    .000   4.500     .000  .000  .000   .00
CD   8  4   1    .000   5.000     .000  .000  .000   .00
CD   9  4   1    .000   5.500     .000  .000  .000   .00
CD  10  4   1    .000   6.000     .000  .000  .000   .00
Q           49.000   .0
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WATER SURFACE PROFILE LISTING Date: 5- 8-2013 Time: 2:48:35

PARK HIGHLAND WEST
VIRAGE PARK DRIVE WEST - AVIARY WAY TO DETENTION BASIN INFLOW
ULTIMATE CONDITION 05/08/2013

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1662.800	2300.240	6.780	2307.020	155.00	6.52	.66	2307.68	.00	3.47	.00	5.500	.000	.00	1 .0
102.000	.0051					.0021	.22	6.78	.00	3.22	.013	.00	.00	PIPE
1764.800	2300.760	6.477	2307.237	155.00	6.52	.66	2307.90	.00	3.47	.00	5.500	.000	.00	1 .0
JUNCT STR	.0037					.0016	.03	.00	.00		.013	.00	.00	PIPE
1784.800	2300.834	7.159	2307.993	49.00	3.90	.24	2308.23	.00	2.10	.00	4.000	.000	.00	1 .0
280.600	.0074					.0012	.33	7.16	.00	1.75	.013	.00	.00	PIPE
2065.400	2302.910	5.422	2308.332	49.00	3.90	.24	2308.57	.00	2.10	.00	4.000	.000	.00	1 .0
133.800	.0049					.0012	.16	5.42	.00	1.97	.013	.00	.00	PIPE
2199.200	2303.570	4.999	2308.569	49.00	3.90	.24	2308.81	.00	2.10	.00	4.000	.000	.00	1 .0
JUNCT STR	.0000					.0018	.00	5.00	.00		.013	.00	.00	PIPE
2199.200	2304.080	4.325	2308.406	49.00	5.09	.40	2308.81	.00	2.19	.00	3.500	.000	.00	1 .0
53.500	.0050					.0024	.13	4.33	.00	2.13	.013	.00	.00	PIPE
2252.700	2304.350	4.182	2308.532	49.00	5.09	.40	2308.94	.00	2.19	.00	3.500	.000	.00	1 .0

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Grand Teton Drive – Decatur Boulevard to Detention Basin Inflow

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T1 PARK HIGHLANDS WEST
T2 GRAND TETON DRIVE - DECATUR BOULEVARD TO DETENTION BASIN INFLOW
T3 ULTIMATE CONDITION 05/08/2013
SO  -3978.6502300.790 12      .013                2307.02
R   -3963.6502300.840 12      .013
R   -3912.3552300.990 12      .013                        50.000  58.780    .000
R   -3841.7562301.200 12      .013                        25.000 -58.780    .000
R   -3816.1092301.280 12      .013
R   -3764.0282301.430 12      .013                        50.000  45.000    .000
R   -3724.7582301.550 12      .013
R   -3655.1602301.760 12      .013                        50.000  -4.000    .000
R   -3651.9102301.770 12      .013                        50.000 -12.000    .000
JX  -3640.9202301.800 12      .013   18.000         2301.770         45.0   .000
R   -3640.9202301.800 12      .013                        50.000 -28.670    .000
R   -3615.8942301.880 12      .013
R   -3601.1502301.980 12      .013
JX  -3601.1502301.980 12  1   .013    8.000         2304.270        -45.0
R   -2930.6702305.000 12      .013
JX  -2930.6702305.000 12  4   .013   11.000         2305.100         45.0
R   -2421.4902307.290 12      .013
JX  -2421.4902307.290 12  4   .013   51.000         2307.700         45.0
R   -1906.0002309.620 12      .013
JX  -1906.0002309.620 12  4   .013   54.000         2310.280         45.0
R   -1803.0002310.070 12      .013
JX  -1803.0002310.070 12  2   .013    7.000         2311.820        -45.0
R   -1770.5002310.220 12      .013
JX  -1770.5002310.220 12  2   .013   10.000         2311.970        -45.0
R   -1738.0002310.370 12      .013
JX  -1738.0002310.370 12  2   .013   13.000         2312.120        -45.0
R   -1708.0002310.500 12      .013
JX  -1708.0002310.500 12  2   .013   25.500         2312.250        -45.0
R   -1701.6302310.530 12      .013
JX  -1701.6302310.530 12  2   .013   25.500         2312.280        -45.0
R   -1700.0002310.540 12      .013
JX  -1660.0002311.310 11  2   .013   24.000         2312.920         45.0
R   -1630.0002311.890 11      .013
R   -1300.0002318.270 11      .013
R   -1172.0002319.720 11      .013
JX  -1172.0002319.720 11  3   .013   61.000         2320.930        -45.0
R   -1164.0002319.810 11      .013
JX  -1164.0002319.810 11  3   .013   61.000         2321.020        -45.0
R   -1134.0002320.160 11      .013
JX  -1134.0002320.160 11  3   .013   61.000         2321.360         45.0
R   -1126.0002320.250 11      .013
JX  -1126.0002320.250 11  3   .013   61.000         2321.450         45.0
R    -991.5002321.770 11      .013
JX   -991.5002321.770 11  4   .013   30.000         2321.770         45.0
SH   -991.5002321.770 11      .013
CD   1  4   1    .000   1.500     .000  .000  .000   .00
CD   2  4   1    .000   2.000     .000  .000  .000   .00
CD   3  4   1    .000   2.500     .000  .000  .000   .00
CD   4  4   1    .000   3.000     .000  .000  .000   .00
CD   5  4   1    .000   3.500     .000  .000  .000   .00
CD   6  4   1    .000   4.000     .000  .000  .000   .00
CD   7  4   1    .000   4.500     .000  .000  .000   .00
CD   8  4   1    .000   5.000     .000  .000  .000   .00
CD   9  4   1    .000   5.500     .000  .000  .000   .00
CD  10  4   1    .000   6.000     .000  .000  .000   .00
CD  11  1   0    .000   5.000   12.000  .000  .000   .00
CD  12  6   0      0.0      0.0     0.0     0.0     0.0    0.0
PTS 1221   .000   .000 12.000   .000 12.000  3.990 11.790  5.000 11.480  5.530
PTS      11.000  6.000 10.480  6.300 10.000  6.460  9.000  6.700  8.000  6.870
PTS       7.000  6.970  6.000  7.000  5.000  6.970  4.000  6.870  3.000  6.700
PTS       2.000  6.460  1.520  6.300  1.000  6.000   .520  5.530   .210  5.000
PTS        .000  4.010
Q          505.000   .0
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PARK HIGHLANDS WEST
GRAND TETON DRIVE - DECATUR BOULEVARD TO DETENTION BASIN INFLOW
ULTIMATE CONDITION 05/08/2013

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT) / SF Ave	Water Elev / HF	Q (CFS) / SE Dpth	Vel (FPS) / Froude N	Vel Head / Norm Dp	Energy Grd.El. / "N"	Super Elev / X-Fall	Critical Depth / ZR	Flow Top Width / Type Ch	Height/ Dia.-FT /	Base Wt or I.D. /	ZL /	No Wth Prs/Pip /
-3978.650	2300.790	6.230	2307.020	1026.00	14.07	3.08	2310.10	.00	5.88	9.20		12		0 .0
15.000	.0033					.0037	.06	6.23	.88	6.460	.013			IR-COV
-3963.650	2300.840	6.256	2307.096	1026.00	14.03	3.06	2310.15	.64	5.88	9.11		12		0 .0
51.295	.0029					.0037	.19	6.90	.87	6.460	.013			IR-COV
-3912.355	2300.990	6.396	2307.386	1026.00	13.80	2.96	2310.34	.00	5.88	8.39		12		0 .0
33.568	.0030					.0036	.12	6.40	.82	6.460	.013			IR-COV
-3878.787	2301.090	6.460	2307.550	1026.00	13.70	2.91	2310.46	.00	5.88	8.00		12		0 .0
37.031	.0030					.0036	.13	6.46	.79	6.460	.013			IR-COV
-3841.756	2301.200	6.460	2307.660	1026.00	13.70	2.91	2310.57	7.00	5.88	8.00		12		0 .0
25.647	.0031					.0037	.09	7.00	.79	6.460	.013			IR-COV
-3816.109	2301.280	6.460	2307.740	1026.00	13.70	2.91	2310.65	.00	5.88	8.00		12		0 .0
52.081	.0029					.0037	.19	6.46	.79	6.460	.013			IR-COV
-3764.028	2301.430	6.460	2307.890	1026.00	13.70	2.91	2310.80	.54	5.88	8.00		12		0 .0
39.270	.0031					.0037	.14	7.00	.79	6.460	.013			IR-COV
-3724.758	2301.550	6.460	2308.010	1026.00	13.70	2.91	2310.92	.00	5.88	8.00		12		0 .0
69.598	.0030					.0037	.25	6.46	.79	6.460	.013			IR-COV
-3655.160	2301.760	6.460	2308.220	1026.00	13.70	2.91	2311.13	7.00	5.88	8.00		12		0 .0
3.250	.0031					.0037	.01	7.00	.79	6.460	.013			IR-COV

PARK HIGHLANDS WEST
GRAND TETON DRIVE - DECATUR BOULEVARD TO DETENTION BASIN INFLOW
ULTIMATE CONDITION 05/08/2013

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT) / SF Ave	Water Elev / HF	Q (CFS) / SE Dpth	Vel (FPS) / Froude N	Vel Head / Norm Dp	Energy Grd.El. / "N"	Super Elev / X-Fall	Critical Depth / ZR	Flow Top Width / Type Ch	Height/ Dia.-FT /	Base Wt or I.D. /	ZL /	No Wth Prs/Pip /
-3651.910	2301.770	6.460	2308.230	1026.00	13.70	2.91	2311.14	.51	5.88	8.00		12		0 .0
10.990	.0027					.0037	.04	6.97	.79	6.460	.013			IR-COV
-3640.920	2301.800	6.460	2308.260	1026.00	13.70	2.91	2311.17	.00	5.88	8.00		12		0 .0
JUNCT STR	.0000					.0038	.00	7.00	.79		.013			IR-COV
---------- WARNING - Junction Analysis - Irregular Channel----------														
-3640.920	2301.800	6.828	2308.628	1008.00	13.05	2.64	2311.27	7.00	5.82	4.49		12		0 .0
25.026	.0032					.0038	.09	7.00	.55	6.460	.013			IR-COV

-3615.894	2301.880	6.828	2308.708	1008.00	13.05	2.64	2311.35	.00	5.82	4.49		12	0 .0
14.744	.0068					.0038	.06	6.83	.55	4.695	.013		IR-COV
-3601.150	2301.980	6.760	2308.740	1008.00	13.11	2.67	2311.41	.00	5.82	5.29		12	0 .0
JUNCT STR	.0000					.0038	.00	6.76	.61		.013		IR-COV

---------- WARNING - Junction Analysis - Irregular Channel----------

-3601.150	2301.980	6.868	2308.848	1000.00	12.92	2.59	2311.44	.00	5.80	4.03		12	0 .0
315.482	.0045					.0038	1.18	6.87	.52	5.491	.013		IR-COV
-3285.668	2303.401	6.331	2309.732	1000.00	13.55	2.85	2312.58	.00	5.80	8.77		12	0 .0
65.039	.0045					.0035	.23	6.33	.82	5.491	.013		IR-COV

Program Package Serial Number: 1704

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PARK HIGHLANDS WEST
GRAND TETON DRIVE - DECATUR BOULEVARD TO DETENTION BASIN INFLOW
ULTIMATE CONDITION 05/08/2013

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-3220.629	2303.694	6.117	2309.811	1000.00	13.92	3.01	2312.82	.00	5.80	9.59		12		0 .0
HYDRAULIC JUMP														
-3220.629	2303.694	5.491	2309.184	1000.00	15.31	3.64	2312.82	.00	5.80	11.01		12		0 .0
164.218	.0045					.0045	.74	5.49	1.11	5.491	.013			IR-COV
-3056.411	2304.434	5.499	2309.933	1000.00	15.28	3.63	2313.56	.00	5.80	11.00		12		0 .0
125.741	.0045					.0043	.53	5.50	1.10	5.491	.013			IR-COV
-2930.670	2305.000	5.798	2310.798	1000.00	14.57	3.30	2314.09	.00	5.80	10.41		12		0 .0
JUNCT STR	.0000					.0034	.00	5.80	1.00		.013			IR-COV

---------- WARNING - Junction Analysis - Irregular Channel----------

-2930.670	2305.000	6.428	2311.428	989.00	13.25	2.73	2314.16	.00	5.76	8.19		12	0 .0
99.905	.0045					.0034	.34	6.43	.77	5.443	.013		IR-COV
-2830.765	2305.449	6.101	2311.550	989.00	13.80	2.96	2314.51	.00	5.76	9.65		12	0 .0
HYDRAULIC JUMP													
-2830.765	2305.449	5.443	2310.892	989.00	15.26	3.62	2314.51	.00	5.76	11.06		12	0 .0
60.870	.0045					.0045	.27	5.44	1.11	5.443	.013		IR-COV
-2769.895	2305.723	5.443	2311.166	989.00	15.26	3.62	2314.78	.00	5.76	11.06		12	0 .0
240.260	.0045					.0045	1.07	5.44	1.11	5.443	.013		IR-COV

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PARK HIGHLANDS WEST
GRAND TETON DRIVE - DECATUR BOULEVARD TO DETENTION BASIN INFLOW
ULTIMATE CONDITION 05/08/2013

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-2529.634	2306.804	5.468	2312.272	989.00	15.20	3.59	2315.86	.00	5.76	11.03		12		0 .0
108.144	.0045					.0042	.46	5.47	1.10	5.443	.013			IR-COV
-2421.490	2307.290	5.764	2313.054	989.00	14.49	3.26	2316.31	.00	5.76	10.48		12		0 .0
JUNCT STR	.0000					.0034	.00	5.76	1.00		.013			IR-COV
-2421.490	2307.290	6.926	2314.217	938.00	12.09	2.27	2316.48	.00	5.61	2.87		12		0 .0
273.825	.0045					.0034	.94	6.93	.41	5.198	.013			IR-COV
-2147.665	2308.528	6.353	2314.881	938.00	12.68	2.49	2317.38	.00	5.61	8.64		12		0 .0
88.582	.0045					.0031	.27	6.35	.76	5.198	.013			IR-COV
-2059.083	2308.928	5.986	2314.914	938.00	13.29	2.74	2317.66	.00	5.61	10.03		12		0 .0
8.029	.0045					.0033	.03	5.99	.88	5.198	.013			IR-COV
-2051.053	2308.965	5.945	2314.910	938.00	13.37	2.78	2317.69	.00	5.61	10.11		12		0 .0
HYDRAULIC JUMP														
-2051.053	2308.965	5.271	2314.236	938.00	14.92	3.45	2317.69	.00	5.61	11.26		12		0 .0
90.905	.0045					.0043	.39	5.27	1.11	5.198	.013			IR-COV
-1960.149	2309.375	5.324	2314.699	938.00	14.78	3.39	2318.09	.00	5.61	11.20		12		0 .0
54.149	.0045					.0040	.22	5.32	1.09	5.198	.013			IR-COV

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PARK HIGHLANDS WEST
GRAND TETON DRIVE - DECATUR BOULEVARD TO DETENTION BASIN INFLOW
ULTIMATE CONDITION 05/08/2013

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1906.000	2309.620	5.606	2315.227	938.00	14.09	3.08	2318.31	.00	5.61	10.80		12		0 .0
JUNCT STR	.0000					.0029	.00	5.61	1.00		.013			IR-COV
-1906.000	2309.620	6.814	2316.434	884.00	11.45	2.04	2318.47	.00	5.42	4.66		12		0 .0
25.274	.0044					.0029	.07	6.81	.50	5.025	.013			IR-COV
-1880.726	2309.730	6.759	2316.490	884.00	11.49	2.05	2318.54	.00	5.42	5.30		12		0 .0
HYDRAULIC JUMP														
-1880.726	2309.730	4.203	2313.933	884.00	17.53	4.77	2318.71	.00	5.42	11.91		12		0 .0
77.726	.0044					.0075	.58	4.20	1.50	5.025	.013			IR-COV
-1803.000	2310.070	4.037	2314.107	884.00	18.25	5.17	2319.28	.00	5.42	11.98		12		0 .0
JUNCT STR	.0000					.0081	.00	4.04	1.60		.013			IR-COV
-1803.000	2310.070	3.939	2314.009	877.00	18.55	5.35	2319.35	.00	5.40	12.00		12		0 .0
32.500	.0046					.0085	.28	3.94	1.65	4.891	.013			IR-COV

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1770.500	2310.220	3.868	2314.088	877.00	18.89	5.54	2319.63	.00	5.40	12.00		12	0	.0
JUNCT STR	.0000					.0090	.00	3.87	1.69		.013			IR-COV

---------- WARNING - Junction Analysis - Irregular Channel----------

Program Package Serial Number: 1704

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PARK HIGHLANDS WEST
GRAND TETON DRIVE - DECATUR BOULEVARD TO DETENTION BASIN INFLOW
ULTIMATE CONDITION 05/08/2013

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1770.500	2310.220	3.745	2313.965	867.00	19.29	5.78	2319.75	.00	5.36	12.00		12	0	.0
32.500	.0046					.0096	.31	3.74	1.76	4.845	.013			IR-COV
-1738.000	2310.370	3.670	2314.040	867.00	19.69	6.02	2320.06	.00	5.36	12.00		12	0	.0
JUNCT STR	.0000					.0103	.00	3.67	1.81		.013			IR-COV

---------- WARNING - Junction Analysis - Irregular Channel----------

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1738.000	2310.370	3.528	2313.898	854.00	20.17	6.32	2320.22	.00	5.31	12.00		12	0	.0
30.000	.0043					.0111	.33	3.53	1.89	4.910	.013			IR-COV
-1708.000	2310.500	3.453	2313.953	854.00	20.61	6.60	2320.55	.00	5.31	12.00		12	0	.0
JUNCT STR	.0000					.0122	.00	3.45	1.95		.013			IR-COV

---------- WARNING - Junction Analysis - Irregular Channel----------

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1708.000	2310.500	3.228	2313.728	828.50	21.39	7.10	2320.83	.00	5.22	12.00		12	0	.0
6.370	.0047					.0131	.08	3.23	2.10	4.647	.013			IR-COV
-1701.630	2310.530	3.213	2313.743	828.50	21.49	7.17	2320.91	.00	5.22	12.00		12	0	.0
JUNCT STR	.0000					.0141	.00	3.21	2.11		.013			IR-COV

---------- WARNING - Junction Analysis - Irregular Channel----------

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PARK HIGHLANDS WEST
GRAND TETON DRIVE - DECATUR BOULEVARD TO DETENTION BASIN INFLOW
ULTIMATE CONDITION 05/08/2013

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1701.630	2310.530	3.011	2313.541	803.00	22.22	7.67	2321.21	.00	5.12	12.00		12	0	.0
1.630	.0061					.0150	.02	3.01	2.26	4.120	.013			IR-COV
-1700.000	2310.540	3.008	2313.548	803.00	22.25	7.69	2321.23	.00	5.12	12.00		12	0	.0
JUNCT STR	.0193					.0155	.62	3.01	2.26		.013			IR-COV

---------- WARNING - Junction Analysis - Irregular Channel----------

---------- WARNING - Junction Analysis - Change in Channel Type ----------

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1660.000	2311.310	2.880	2314.190	779.00	22.54	7.89	2322.08	.00	5.08	12.00	5.000	12.000	.00	0 .0
30.000	.0193					.0158	.47	2.88	2.34	2.70	.013	.00	.00	TRAP
-1630.000	2311.890	2.903	2314.793	779.00	22.36	7.76	2322.56	.00	5.08	12.00	5.000	12.000	.00	0 .0
89.732	.0193					.0149	1.34	2.90	2.31	2.70	.013	.00	.00	TRAP

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1540.268	2313.625	3.000	2316.624	779.00	21.64	7.27	2323.90	.00	5.08	12.00	5.000	12.000	.00	0 .0
85.534	.0193					.0133	1.14	3.00	2.20	2.70	.013	.00	.00	TRAP
-1454.733	2315.278	3.146	2318.424	779.00	20.64	6.61	2325.04	.00	5.08	12.00	5.000	12.000	.00	0 .0
57.945	.0193					.0116	.67	3.15	2.05	2.70	.013	.00	.00	TRAP

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PARK HIGHLANDS WEST
GRAND TETON DRIVE - DECATUR BOULEVARD TO DETENTION BASIN INFLOW
ULTIMATE CONDITION 05/08/2013

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1396.788	2316.399	3.299	2319.698	779.00	19.67	6.01	2325.71	.00	5.08	12.00	5.000	12.000	.00	0 .0
41.877	.0193					.0101	.42	3.30	1.91	2.70	.013	.00	.00	TRAP
-1354.911	2317.208	3.461	2320.669	779.00	18.76	5.46	2326.13	.00	5.08	12.00	5.000	12.000	.00	0 .0
31.260	.0193					.0088	.28	3.46	1.78	2.70	.013	.00	.00	TRAP
-1323.651	2317.813	3.629	2321.442	779.00	17.89	4.97	2326.41	.00	5.08	12.00	5.000	12.000	.00	0 .0
23.651	.0193					.0077	.18	3.63	1.65	2.70	.013	.00	.00	TRAP
-1300.000	2318.270	3.807	2322.077	779.00	17.05	4.52	2326.59	.00	5.08	12.00	5.000	12.000	.00	0 .0
2.657	.0113					.0072	.02	3.81	1.54	3.25	.013	.00	.00	TRAP
-1297.343	2318.300	3.815	2322.115	779.00	17.02	4.50	2326.61	.00	5.08	12.00	5.000	12.000	.00	0 .0
48.312	.0113					.0067	.32	3.81	1.54	3.25	.013	.00	.00	TRAP
-1249.030	2318.847	4.001	2322.848	779.00	16.23	4.09	2326.94	.00	5.08	12.00	5.000	12.000	.00	0 .0
32.379	.0113					.0059	.19	4.00	1.43	3.25	.013	.00	.00	TRAP
-1216.651	2319.214	4.196	2323.410	779.00	15.47	3.72	2327.13	.00	5.08	12.00	5.000	12.000	.00	0 .0
21.538	.0113					.0051	.11	4.20	1.33	3.25	.013	.00	.00	TRAP
-1195.113	2319.458	4.401	2323.859	779.00	14.75	3.38	2327.24	.00	5.08	12.00	5.000	12.000	.00	0 .0
13.553	.0113					.0045	.06	4.40	1.24	3.25	.013	.00	.00	TRAP
-1181.560	2319.612	4.616	2324.227	779.00	14.06	3.07	2327.30	.00	5.08	12.00	5.000	12.000	.00	0 .0
7.322	.0113					.0040	.03	4.62	1.15	3.25	.013	.00	.00	TRAP

Program Package Serial Number: 1704
WATER SURFACE PROFILE LISTING Date: 5- 8-2013 Time: 2:46:18

PARK HIGHLANDS WEST
GRAND TETON DRIVE - DECATUR BOULEVARD TO DETENTION BASIN INFLOW
ULTIMATE CONDITION 05/08/2013

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1174.238	2319.695	4.841	2324.535	779.00	13.41	2.79	2327.33	.00	5.08	12.00	5.000	12.000	.00	0 .0
2.238	.0113					.0035	.01	4.84	1.07	3.25	.013	.00	.00	TRAP

-1172.000	2319.720	5.078	2324.798	779.00	12.78	2.54	2327.34	.00	5.08	12.00	5.000	12.000	.00	0	.0	
JUNCT STR	.0000					.0024	.00	5.08	1.00		.013	.00	.00	TRAP		
-1172.000	2319.720	6.238	2325.958	718.00	9.59	1.43	2327.39	.00	4.81	12.00	5.000	12.000	.00	0	.0	
8.000	.0113					.0016	.01	6.24	.68	3.07	.013	.00	.00	TRAP		
-1164.000	2319.810	6.091	2325.901	718.00	9.82	1.50	2327.40	.00	4.81	12.00	5.000	12.000	.00	0	.0	
JUNCT STR	.0000					.0014	.00	6.09	.70		.013	.00	.00	TRAP		
-1164.000	2319.810	6.493	2326.303	657.00	8.43	1.10	2327.41	.00	4.53	12.00	5.000	12.000	.00	0	.0	
18.462	.0117					.0013	.02	6.49	.58	2.86	.013	.00	.00	TRAP		
-1145.538	2320.025	6.191	2326.216	657.00	8.84	1.21	2327.43	.00	4.53	12.00	5.000	12.000	.00	0	.0	
11.538	.0117					.0014	.02	6.19	.63	2.86	.013	.00	.00	TRAP		
-1134.000	2320.160	5.990	2326.150	657.00	9.14	1.30	2327.45	.00	4.53	12.00	5.000	12.000	.00	0	.0	
JUNCT STR	.0000					.0013	.00	5.99	.66		.013	.00	.00	TRAP		
-1134.000	2320.160	6.320	2326.480	596.00	7.86	.96	2327.44	.00	4.25	12.00	5.000	12.000	.00	0	.0	
8.000	.0113					.0011	.01	6.32	.55	2.70	.013	.00	.00	TRAP		
-1126.000	2320.250	6.202	2326.452	596.00	8.01	1.00	2327.45	.00	4.25	12.00	5.000	12.000	.00	0	.0	
JUNCT STR	.0000					.0010	.00	6.20	.57		.013	.00	.00	TRAP		

PARK HIGHLANDS WEST
GRAND TETON DRIVE - DECATUR BOULEVARD TO DETENTION BASIN INFLOW
ULTIMATE CONDITION 05/08/2013

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1126.000	2320.250	6.414	2326.664	535.00	6.95	.75	2327.41	.00	3.95	12.00	5.000	12.000	.00	0 .0
21.432	.0113					.0009	.02	6.41	.48	2.51	.013	.00	.00	TRAP
-1104.568	2320.492	6.116	2326.608	535.00	7.29	.83	2327.43	.00	3.95	12.00	5.000	12.000	.00	0 .0
19.602	.0113					.0010	.02	6.12	.52	2.51	.013	.00	.00	TRAP
-1084.966	2320.714	5.831	2326.545	535.00	7.65	.91	2327.45	.00	3.95	12.00	5.000	12.000	.00	0 .0
17.749	.0113					.0011	.02	5.83	.56	2.51	.013	.00	.00	TRAP
-1067.217	2320.914	5.560	2326.474	535.00	8.02	1.00	2327.47	.00	3.95	12.00	5.000	12.000	.00	0 .0
15.856	.0113					.0013	.02	5.56	.60	2.51	.013	.00	.00	TRAP
-1051.361	2321.094	5.301	2326.395	535.00	8.41	1.10	2327.49	.00	3.95	12.00	5.000	12.000	.00	0 .0
13.903	.0113					.0015	.02	5.30	.64	2.51	.013	.00	.00	TRAP
-1037.458	2321.251	5.054	2326.305	535.00	8.82	1.21	2327.51	.00	3.95	12.00	5.000	12.000	.00	0 .0
11.864	.0113					.0017	.02	5.05	.69	2.51	.013	.00	.00	TRAP
-1025.594	2321.385	4.819	2326.204	535.00	9.25	1.33	2327.53	.00	3.95	12.00	5.000	12.000	.00	0 .0
7.863	.0113					.0019	.01	4.82	.74	2.51	.013	.00	.00	TRAP
-1017.731	2321.474	4.642	2326.116	535.00	9.60	1.43	2327.55	.00	3.95	12.00	5.000	12.000	.00	0 .0

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
HYDRAULIC JUMP														
-1017.731	2321.474	3.334	2324.808	535.00	13.37	2.78	2327.58	.00	3.95	12.00	5.000	12.000	.00	0 .0
8.624	.0113					.0048	.04	3.33	1.29	2.51	.013	.00	.00	TRAP

PARK HIGHLANDS WEST
GRAND TETON DRIVE - DECATUR BOULEVARD TO DETENTION BASIN INFLOW
ULTIMATE CONDITION 05/08/2013

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-1009.107	2321.571	3.425	2324.996	535.00	13.02	2.63	2327.63	.00	3.95	12.00	5.000	12.000	.00	0 .0
10.292	.0113					.0043	.04	3.42	1.24	2.51	.013	.00	.00	TRAP
-998.815	2321.687	3.592	2325.279	535.00	12.41	2.39	2327.67	.00	3.95	12.00	5.000	12.000	.00	0 .0
5.589	.0113					.0038	.02	3.59	1.15	2.51	.013	.00	.00	TRAP
-993.227	2321.750	3.767	2325.518	535.00	11.83	2.17	2327.69	.00	3.95	12.00	5.000	12.000	.00	0 .0
1.727	.0113					.0033	.01	3.77	1.07	2.51	.013	.00	.00	TRAP
-991.500	2321.770	3.952	2325.722	535.00	11.28	1.98	2327.70	.00	3.95	12.00	5.000	12.000	.00	0 .0
JUNCT STR	.0000					.0023	.00	3.95	1.00		.013	.00	.00	TRAP
-991.500	2321.770	4.887	2326.657	505.00	8.61	1.15	2327.81	.00	3.80	12.00	5.000	12.000	.00	0 .0

♀

APPENDIX F

Reference Material

Update # 2 to the Conceptual Drainage Study for North Las Vegas 600 Acre Site (CNLV No. 28463)

Approval Letters

Mayor
Michael L. Montandon

Council Members
William E. Robinson
Stephanie S. Smith
Shari Buck
Robert L. Eliason

CITY OF
NORTH LAS VEGAS
Your Community of Choice

City Manager
Gregory E. Rose

Public Works Department - Majed A. Al-Ghafry, Director
2266 Civic Center Drive • North Las Vegas, Nevada 89030
Telephone: (702) 633-1200 • Fax: (702) 649-4696 • TDD: (800) 326-6868
www.cityofnorthlasvegas.com

February 28, 2007

A. Kumar Sathappan, P.E.

G.C. Wallace, Inc.
1555 South Rainbow Boulevard
Las Vegas, Nevada 89146

Re: Addendum #2 to the 2nd Update to the Conceptual Drainage Study for North Las Vegas 600-Acre Site
CNLV No. 28463

Dear Kumar:

Staff has reviewed the above referenced study, dated February 20, 2007, and found it to meet the minimum accepted standards for a technical drainage study.

Please be advised that all land surface area disturbances over 1 acre and/or adjacent to a water way must submit a "Notice of Intent" to discharge to the Nevada Division of Environmental Protection, which certifies that a stormwater pollution prevention plan has been developed and is maintained on site. For more information, including forms and applications, see http://ndep.nv.gov/bwpc/storm01.htm.

Acceptance of this drainage study does not imply approval of the grading plan or the structural calculations associated with the drainage for this site. A detailed review of the grading plan is performed by staff during the improvement plan review process.

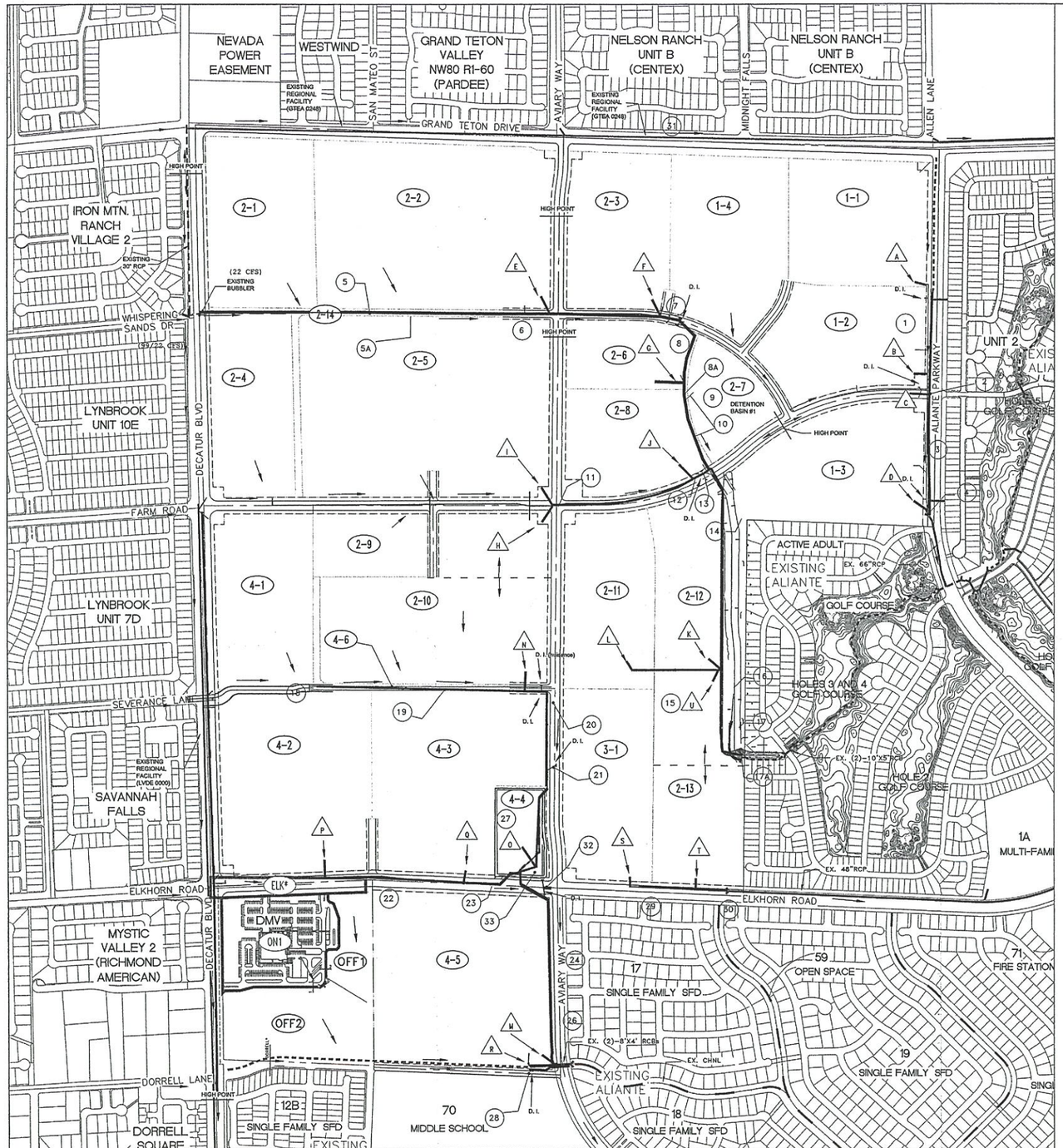
Any future changes in the proposed design (or design assumptions) as outlined in the approved drainage study and the attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the City of North Las Vegas (CNLV) Development and Flood Control 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 CNLV 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.

The City assumes no responsibility for the information, data, and conclusions presented in this report. If you have any questions concerning this matter, please contact me at 633-2771.

Sincerely,

Kent Chang, P.E.
Senior Engineer
Development and Flood Control Division

Drainage Exhibits



NORTH

GRAPHIC SCALE

400 0 200 400

(IN FEET)

1 inch = 400 ft.

FACILITIES SUMMARY

FACILITY	HEC1 NODE	ULTIMATE CONDITONS FLOW (CFS)	INTERIM CONDITIONS FLOW (CFS)	FACILITY DESCRIPTION	REMARKS
1	1-1	57	57	42-inch RCP	
2	1A	120	120	54-inch RCP	
3	1B	167	167	66-inch RCP	
4	PT1	232	232	66-inch RCP	Match existing facility.
5	2A	22	22	30-inch RCP	Match existing facility.
5A	2A	86	86	10' Bottom Width 2.2' Deep Trapezoidal Channel w/3:1 SS	Drainage Easement
6	2A	71	71	48-inch RCP	
7	2B	117	117	60-inch RCP	
8	2C	203	203	72-inch RCP	
8A	2C	232	232	72-inch RCP	
9	DB#1	251	251		8 Acre-Feet Detention Basin
10	DOUT1	95	95	48-inch RCP	48" outflow w ith 42" restrictor plate
11	2E	86	86	54-inch RCP	
12	2F	133	133	60-inch RCP	
13*	2I	258	394	11'x5' RCB	
14*	2J	327	488	8'x6' Rectangular Chnl.	
15	2-11	55	55	42-inch RCP	
16	2K	104	104	54-inch RCP	
17*	2L	420	530	8'x6' Rectangular Chnl.	
17A*	PT2	435	531	8'x6' Rectangular Chnl.	
18*	4A	95	455	10' Bottom Width 4.7' Deep Lined Trapezoidal Channel w/3:1 SS	Drainage Easement
18A	N/A	N/A	N/A	18-inch RCP	Nuisance Flow Only
19	4A	29	29	36-inch RCP	
20	SD2	71	71	48-inch RCP	
21	4A	124	153	66-inch RCP	
22	4-2	87	87	54-inch RCP	
23	4C	161	161	66-inch RCP	
24	4G	311	228	8'X5' RCB	
25*	-	-	-	Not Used	
26*	4H	102	363	8'x5' RCB	Tie into existing facility
27	4B	N/A	436		Est. 39 ac-ft detention basin
28*	4I	43	-	48-inch RCP	Designed for 10-yr Ultimate flow
29	3-1	61	61	42-inch RCP	
30	3A	94	94	48-inch RCP	Match existing facility.
31	N/A	1042	1042	12'x8" RCB	Regional Facility GTEA 0248
32	ELK*	14	14	30-inch RCP	
33	DOUT3A	NA	220	54-inch RCP	Detention basin outflow pipe

*Interim Conditions Design used

STORM DRAIN LATERAL SUMMARY

DESIGN POINT	LOCATION	ACTUAL FLOW (CFS)	DESCRIPTION	REMARKS
A	1-1	57	42-inch RCP	est. @ 1% slope
B	1-2	59	42-inch RCP	est. @ 1% slope
C	1-4	56	42-inch RCP	est. @ 1% slope
D	1-3	61	42-inch RCP	est. @ 1% slope
E	2-2	49	36-inch RCP	est. @ 1% slope
F	2-3	49	36-inch RCP	est. @ 1% slope
G	2-6	30	30-inch RCP	est. @ 1% slope
H	2-10	39	36-inch RCP	est. @ 1% slope
I	2-5	37	36-inch RCP	est. @ 1% slope
J	2-8	48	36-inch RCP	est. @ 1% slope
K	2-12	49	36-inch RCP	est. @ 1% slope
L	2-11	55	42-inch RCP	est. @ 1% slope
M*	4-5	102	60-inch RCP	est. @ 0.3% slope
N	2-10	29	30-inch RCP	est. @ 1% slope
O	4-4	14	24-inch RCP	est. @ 1% slope
P	4-2	87	48-inch RCP	est. @ 1% slope
Q	4-3	76	48-inch RCP	est. @ 1% slope
R*	4-5	102	8'x5' RCB	est. @ 0.3% slope
S	3-1	61	42-inch RCP	est. @ 1% slope
T	2-13	33	30-inch RCP	est. @ 1% slope
U	2-13	16	24-inch RCP	est. @ 1% slope

*Interim flows used to calculate facility size, Interim flow (M = 124 cfs and R = 363 cfs).

The actual flow shown for storm drains at design points M and R is the ultimate condition flow from 4-5.

LEGEND

- PROPOSED FACILITY
- (1) FACILITY DESIGN POINT
- A LATERAL DESIGN POINT
- FLOW DIRECTION
- (1-1) SUBBASIN DESIGNATION
- EXISTING FACILITY
- REGIONAL FACILITY
- PT1 DISCHARGE POINT
- 456/123 100-YR RUNOFF/10-YR RUNOFF

REV	DATE	DESCRIPTION	DATE	ASEN. APP.	DATE	GOV. APP.

DESIGN:
DRAWN:
CHECK:
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 01-25-07
PLOT TIME: 08:23:27

DATE:

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD LAS VEGAS, NEVADA 89146
TELEPHONE (702) 804-8000 FAX (702) 804-8008
H:\00\00820-00-120\GDW\Hydro\RTC\Figure 8R-2-RTC.dwg
bgustavson

UPDATE 2 TO THE CONCEPTUAL DRAINAGE STUDY
NORTH LAS VEGAS – 600 ACRE SITE
FIGURE 8R
PROPOSED FACILITIES MAP

SHEET
FIG 8R
OF SHTS

RTC-UP2-CDS-NLV 600-Acre Site

Approved Plans for
North Las Vegas 600 Acres Area 2 (CNLV No. 28976)

PARK HIGHLANDS

IMPROVEMENT PLANS FOR

NORTH LAS VEGAS 600 ACRES

AREA 2

CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA

OWNER:
NOVEMBER 2005 LAND INVESTORS, LLC/DRHI INC
11411 SOUTHERN HIGHLANDS PKWY, SUITE 300
LAS VEGAS NEVADA 89141
702-616-3800
702-616-3833 FAX

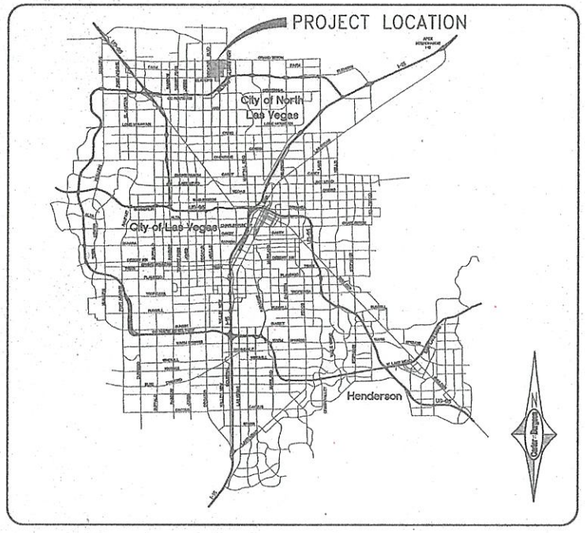
DEVELOPER:
NOVEMBER 2005 LAND INVESTORS, LLC/DRHI INC
11411 SOUTHERN HIGHLANDS PKWY, SUITE 300
LAS VEGAS NEVADA 89141
702-616-3800
702-616-3833 FAX

ENGINEER:
Carter :: Burgess
Consultants in Planning, Engineering,
Construction Management, and Related Services
6655 Bermuda Road, Las Vegas, NV. 89119
(702) 938-5400 Fax (702) 938-5454

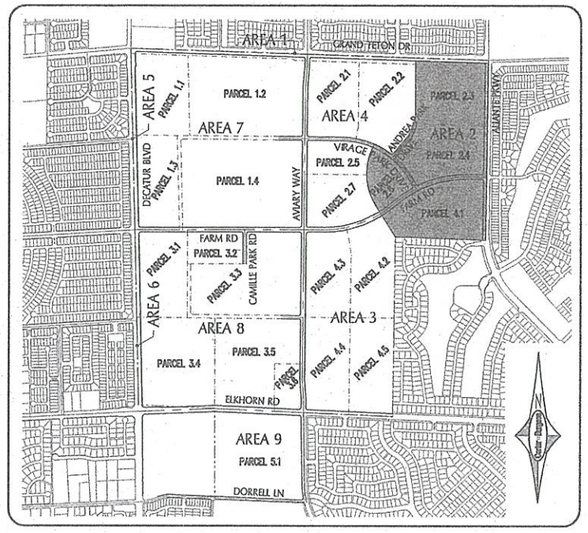
GEOTECH ENGINEER
PREPARED BY: CHRIS GEOTECHNICAL, INC.
PROJECT NUMBER: C-06-022
DATE: April 25, 2006
REVISED DATE: July 14, 2006

CUT TOTAL: 73,155
FILL TOTAL: 0
NET: 73,155

SERVICES:
SANITARY SEWER:____ CITY OF NORTH LAS VEGAS
WATER:____ CITY OF NORTH LAS VEGAS
POWER:____ NEVADA POWER COMPANY
GAS:____ SOUTHWEST GAS CORPORATION
TELEPHONE:____ EMBARQ
CABLE T.V.:____ COX COMMUNICATIONS
REFUSE:____ REPUBLIC SERVICES OF SOUTHERN NEVADA



VICINITY MAP
N.T.S.



SITE LOCATION
N.T.S.

BENCHMARK
NLV9117NWS
NAVD 88 ELEVATION PUBLISHED 11/1/2005
699.432 METERS, 2294.83 FEET
ELEVATION USED FOR THESE PLANS, PRE-REVISION
699.511 METERS, 2294.98 FEET
RIVET AND 3" ROUND ALUMINUM DISK, STAMPED NORTH LAS VEGAS BM NO. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARINGS
SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

LEGAL DESCRIPTION
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, AND 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

SHEET INDEX

SHEET NO.	DESCRIPTION
1. C-01	COVER SHEET
2. C-02	GENERAL NOTES
3. C-03	OVERALL AREA MAP
4. HCP-01	HORIZONTAL CONTROL PLAN
5. MU-STM-01	MASTER UTILITY – STORM DRAIN
6. MU-SAN-01	MASTER UTILITY – SANITARY SEWER
7. MU-WTR-01	MASTER UTILITY – POTABLE AND REUSE WATER
8. PP-STM-01	ROADWAY & STORM P/P, ALIANTE PKWY, STA: 10+00 – 17+00
9. PP-STM-02	ROADWAY & STORM P/P, ALIANTE PKWY, STA: 17+00 – 24+00
10. PP-STM-03	ROADWAY & STORM P/P, ALIANTE PKWY, STA: 24+00 – 31+00
11. PP-STM-04	ROADWAY & STORM P/P, ALIANTE PKWY, STA: 31+00 – 36+80.95
12. PP-STM-05	ROADWAY & STORM P/P, VIRAGE PARK DR, STA: 20+00 – 24+50
13. PP-STM-06	ROADWAY & STORM P/P, VIRAGE PARK DR, STA: 24+50 – 29+62.55
14. PP-STM-07	ROADWAY & STORM P/P, FARM RD, STA: 45+25.01 – 52+00
15. PP-STM-08	ROADWAY & STORM P/P, FARM RD, STA: 52+00 – 59+00
16. PP-STM-09	ROADWAY & STORM P/P, FARM RD, STA: 59+00 – 64+31.27
17. PP-STM-10	ROADWAY & STORM P/P, ANDREA PARK DR, STA: 10+00 – 16+19.72
18. PP-STM-11	OFFSITE STORM P/P, STA:1+00 – 7+00 OPEN CHANNEL
19. PP-STM-12	OFFSITE STORM P/P, STA:7+00 – 14+00 OPEN CHANNEL
20. PP-STM-13	OFFSITE STORM P/P, STA:14+00 – 19+00 OPEN CHANNEL
21. PP-STM-14	OFFSITE STORM P/P, STA:19+00 – 23+30.21 OPEN CHANNEL
22. PP-STM-15	OFFSITE STORM P/P, STA:1+00 – 8+00 PARK
23. PP-STM-16	OFFSITE STORM P/P, STA:8+00 – 12+00 PARK
24. PP-UTL-01	WATER & SEWER P/P, ALIANTE PKWY, STA: 10+00 – 17+00
25. PP-UTL-02	WATER & SEWER P/P, ALIANTE PKWY, STA: 17+00 – 24+00
26. PP-UTL-03	WATER & SEWER P/P, ALIANTE PKWY, STA: 24+00 – 31+00
27. PP-UTL-04	WATER & SEWER P/P, ALIANTE PKWY, STA: 31+00 – 36+80.95
28. PP-UTL-05	WATER & SEWER P/P, VIRAGE PARK DR, STA: 20+00 – 24+50
29. PP-UTL-06	WATER & SEWER P/P, VIRAGE PARK DR, STA: 24+50 – 29+62.55
30. PP-UTL-07	WATER & SEWER P/P, FARM RD, STA: 45+25.01 – 52+00
31. PP-UTL-08	WATER & SEWER P/P, FARM RD, STA: 52+00.00 – 59+00
32. PP-UTL-09	WATER & SEWER P/P, FARM RD, STA: 59+00.00 – 64+31.27
33. PP-UTL-10	WATER & SEWER P/P, ANDREA PARK DR, STA: 10+00.00 – 16+19.72
34. PP-UTL-11	REMOVED FROM THIS SET
35. PP-UTL-12	REMOVED FROM THIS SET
36. PP-UTL-13	PLAN AND PROFILE, – OFFSITE SEWER, STA 00+00 TO STA 7+00
37. PP-UTL-14	PLAN AND PROFILE, – OFFSITE SEWER, STA 7+00 TO STA 14+00
38. PP-UTL-15	PLAN AND PROFILE, – OFFSITE SEWER, STA 14+00 TO STA 19+00

SHEET INDEX

SHEET NO.	DESCRIPTION
39. STM-LAT-01	STORM DRAIN LATERAL PROFILES
40. STM-LAT-02	STORM DRAIN LATERAL PROFILES
41. SAN-LAT-01	SANITARY SEWER LATERAL PROFILES
42. WTR-LAT-01	WATER LATERAL PROFILES
43. WTR-LAT-02	WATER LATERAL PROFILES
44. WTR-LAT-03	WATER LATERAL PROFILES
45. D-01	STREET SECTIONS
46. D-02	GRAND TETON/ALIANTE INTERSECTION DETAILS
47. T-01	SIGNAGE AND STRIPING PLAN
48. T-02	SIGNAGE AND STRIPING PLAN
49. T-03	SIGNAGE AND STRIPING PLAN
50. T-04	SIGNAGE AND STRIPING PLAN
51. T-05	SIGNAGE AND STRIPING PLAN
52. SD-01	JUNCTION STRUCTURES – GENERAL NOTES, QUANTITIES & TYPICAL DETAILS
53. SD-02	JUNCTION STRUCTURES – ALIANTE PKWY – STA 36+32.15 – SDMH #2-12
54. SD-03	JUNCTION STRUCTURES – ALIANTE PKWY – STA 35+05.53 – SDMH #2-13
55. SD-04	JUNCTION STRUCTURES – ALIANTE PKWY – STA 33+17.53 – SDMH #2-15
56. SD-05	JUNCTION STRUCTURES – ALIANTE PKWY – STA 30+19.26 – SDMH #2-16
57. SD-06	JUNCTION STRUCTURES – ALIANTE PKWY – STA 27+28.62 – SDMH #2-17
58. SD-07	JUNCTION STRUCTURES – PARK 2.6 – STA 6+64.73 – SDMH #2-26
59. SD-08	JUNCTION STRUCTURES – PARK 2.6 – STA 8+06.32 – SDMH #2-27
60. SD-09	JUNCTION STRUCTURES – PARK 2.6 – STA 9+64.04 – SDMH #2-28
61. SD-10	JUNCTION STRUCTURES – PARK 2.6 – STA 11+28.46 – SDMH #2-29
62. E-01	ELECTRICAL – SYMBOLS AND LEGEND
63. E-2.0	ELECTRICAL – ALIANTE PKWY – STREETLIGHTING PLAN
64. E-2.1	ELECTRICAL – FARM RD – STREETLIGHTING PLAN
65. E-2.2	ELECTRICAL – VIRAGE PARK DR AND ANDREA PARK DR – STREETLIGHTING PLAN
66. E-2.3	ELECTRICAL – ALIANTE PKWY – SINGLE LINE DIAGRAM AND CALCULATIONS
67. E-2.4	ELECTRICAL – ALIANTE PKWY – PANEL SCHEDULES AND CALCULATIONS
68. E-2.5	ELECTRICAL – VIRAGE PARK DR, ANDREA PARK DR AND FARM RD. – PANEL SCHEDULES AND CALCULATIONS
69. TS-01	TRAFFIC SIGNALIZATION – ALIANTE PKWY AND FARM ROAD
70. TS-02	TRAFFIC SIGNALIZATION – ALIANTE PKWY AND FARM ROAD
71. G-01	GRADING PARCEL 2.6
72. CP-01	CORROSION CONTROL DETAILS
73. CP-02	CORROSION CONTROL DETAILS
74. CP-03	CORROSION CONTROL SPECIFICATIONS

DISCLAIMER NOTE:
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Avoid overhead power line contact. It's costly. Call before you Overhead 1-702-227-2929 (NEVADA POWER COMPANY AND SOUTH SURBURBAN RETAINED)

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

APPROVALS

DR. QIONG LIU, P.E. PTOE — 9/7/07 DATE
DEPUTY DIRECTOR/CITY ENGINEER, PUBLIC WORKS DEPARTMENT

JENNIFER E. DOODY, P.E. — 9/7/07 DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

RANDAL D. CAGLE — 7/12/07 DATE
MANAGER OF REAL PROPERTY SERVICES

CARLTON URBAN, P.E. — 7.9.07 DATE
TRANSPORTATION SERVICES ADMINISTRATOR

UTILITIES DEPARTMENT–ENGINEERING SERVICES DIVISION — 7/2/07 DATE
APPROVAL OF THESE PLANS SHALL NOT BE CONSTRUED TO BE A PERMIT FOR CONSTRUCTION, A COMMITMENT TO SUPPLY WATER AND/OR SEWER SERVICE OR AN APPROVAL OF ANY VIOLATION OF CNLV WATER AND/OR SEWER SERVICE RULES AND REGULATIONS OR DESIGN AND CONSTRUCTION STANDARDS.

C.N.L.V. FIRE DEPARTMENT — 7/3/07 DATE

N/A
SOUTHERN NEVADA WATER AUTHORITY — DATE
SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

COX COMMUNICATIONS LAS VEGAS, INC. Michelle Thompson — 10-15-07 DATE

EMBARQ — 06.21.07 DATE
THE AFFIXED EMBARQ APPROVAL DOES NOT ASSURE 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.

NEVADA POWER COMPANY — 6-21-07 DATE
NEVADA POWER COMPANY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NEVADA POWER COMPANY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISION'S RULES AND REGULATIONS.

SOUTHWEST GAS CORPORATION — 21 June 07 DATE

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

Carter :: Burgess
6655 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services
(702) 938-5400 Fax: (702) 938-5454

COVER SHEET

NORTH LAS VEGAS 600 ACRES AREA 2

DRAWN BY: JAH
DESIGNED BY: JAH
CHECKED BY: GW
SCALE: N/A N/A
PROJECT NO: 28028

PROFESSIONAL ENGINEER – STATE OF NEVADA – GLENN B. WATANABE – No. 10035 – EXP. 06/30/09 – CIVIL

SHEET C-01
01 OF 74 SHEETS
DRAWING NO. 28976

Drawing Name: L:\2A\1\01 NEW SITE\DESIGN\APPROVED_COP\Improvement Plans\1SHEET-C-01.dwg User: jhatchcock@cgi Jan 19, 2007 - 3:37pm

Avoid overhead power line contact. It's costly. Call before you Overhead 1-702-227-2929 NEVADA POWER ENVIRONMENT AND SAFETY SERVICES REPRESENT

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

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BENCHMARK

NLV9117NWS
NAVD 88 ELEV. PUBLISHED 11/01/06 699.482 METERS, 2294.88 FEET. ELEVATION USED FOR THESE PLANS.
PRE-REVISION 699.511 METERS, 2294.98 FEET. RIVET AND 2" ROUND ALUMINUM DISC, STAMPED NORTH LAS VEGAS BM No. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARINGS

SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

LEGAL DESCRIPTION

GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, AND 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

GEOTECH ENGINEER

PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NUMBER: E-06-022
DATE: April 26, 2006
REVISED DATE: July 14, 2006

CUT TOTAL: 20,896
FILL TOTAL: 15,794
NET: 5,102

SECTION 1

SUN CITY ALIANTE SUBDIVISION
ALIANTE PARKWAY EXISTING IMPROVEMENTS
FOR NORTH VALLEY ENTERPRISES
PER C.C. WALLACE, INC. PLANS DATED 7-20-04

REMOVE & DISPOSE OF EXISTING TYPE "A" CURB
STA. 19+10.50 7.28' LT. TO
STA. 22+80.99 7.22' LT.

MATCHLINE STA. 17+00.00
SEE SHEET PP-STM-01

MATCHLINE STA. 24+00.00
SEE SHEET PP-STM-03

PARCEL 2.3

PARCEL 2.4

ALIANTE PARKWAY
(PUBLIC)

EXISTING GRADE AT CENTERLINE (ALIANTE PKWY)

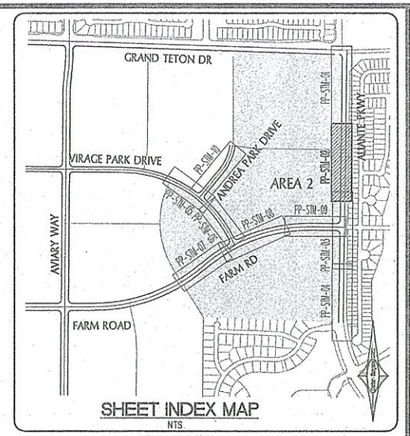
PROPOSED FINISHED GRADE AT CENTERLINE (ALIANTE PKWY) (PROFILE AS PER APPROVED PLANS BY C.C. WALLACE)

EXISTING GRADE @ ℄ — DESIGN GRADE @ ℄

100 YR HGL

EXISTING 15"PVC SS

* Existing Storm Drain Location Size & Slope



SHEET INDEX MAP
NTS

IMPROVEMENTS

1. CONSTRUCT "L" TYPE CURB & GUTTER, (PER USD No. 216)
2. CONSTRUCT "A" TYPE CURB, (PER USD No. 219)
3. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER USD No. 235, CASE II)
4. INSTALL A.C. PAVEMENT, (PER STREET SECTIONS)
5. 2' SAWCUT AND MATCH EXISTING ASPHALT PAVING, CURB AND GUTTER
6. CONSTRUCT 8' VALLEY GUTTER USD NO. 235
7. CONSTRUCT TYPICAL BUS TURN-OUT, (PER USD No. 234.1)
8. CONSTRUCT SIDEWALK, (PER USD No. 234)
9. ASPHALT PATCH, LIMITS TO BE DETERMINED BY CNLV INSPECTOR
10. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER USD No. 235, CASE I)

LEGEND:

PROPOSED ASPHALT | REMOVE AND REPLACE AC | PROPOSED SIDEWALK

STORM DRAIN:

1. INSTALL TYPE I MANHOLE, (PER USD No. 403. TO CONFORM TO USD No. 401 & 402)
2. INSTALL TYPE II MANHOLE, (PER USD No. 405, TO CONFORM TO USD No. 401 & 402)
3. INSTALL TYPE III MANHOLE, (PER USD No. 406, TO CONFORM TO USD No. 401 & 402)
4. CONSTRUCT MODIFIED TYPE "C" DROP INLET, (PER DETAIL, SHEET D-02)
5. INSTALL RCP END SECTION, (PER NDOT R-2.3.1)
6. INSTALL TEMPORARY PLUG AND CAP FOR FUTURE PHASE
7. REMOVE EX. END SECTION, CONNECT TO EX. RCP, (CONTRACTOR TO VERIFY SIZE, INVERT AND LOCATION PRIOR TO CONSTRUCTION)
8. ADJUST EXISTING FACILITY TO GRADE
9. INSTALL TYPE 1A MANHOLE (PER USD No.404 TO CONFORM TO USD No. 401 & 402)

Carter-Burgess

30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:
JENNIFER E. DOODY, P.E.
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION
DATE 9/17/07

PROFESSIONAL ENGINEER — STATE OF NEVADA — GLENN B. WATANABE — No. 15005 — CIVIL — 5/6/07

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter-Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5600 Fax (702) 938-5454

ROADWAY & STORM P/P
ALIANTE PKWY
STA 17+00 TO STA 24+00
NORTH LAS VEGAS
600 ACRES
AREA 2

DRAWN BY:
DESIGNED BY:
CHECKED BY: GBW
SCALE: 1" = 30' / 1" = 6'
PROJECT NO.: 24594

SHEET
PP-STM-02
9 OF 74 SHEETS
DRAWING NO.
28976

Drawing Name: L:\24594 - NLV SITE\DESIGN\IMPROVMTS\AREA_02\Improvement Plans\11594-02-PP-STM-01_04.dwg User: mwnga Sep 13, 2007 - 7:35am

Avoid overhead power line contact. It's costly. Call before you Overhead 1-702-227-2929 NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

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

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BENCHMARK
NLV9117NWS
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PRE-REVISION 699.511 METERS, 2294.98 FEET. RIVET AND 2" ROUND ALUMINUM DISC, STAMPED NORTH LAS VEGAS BM No. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARINGS
SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

LEGAL DESCRIPTION
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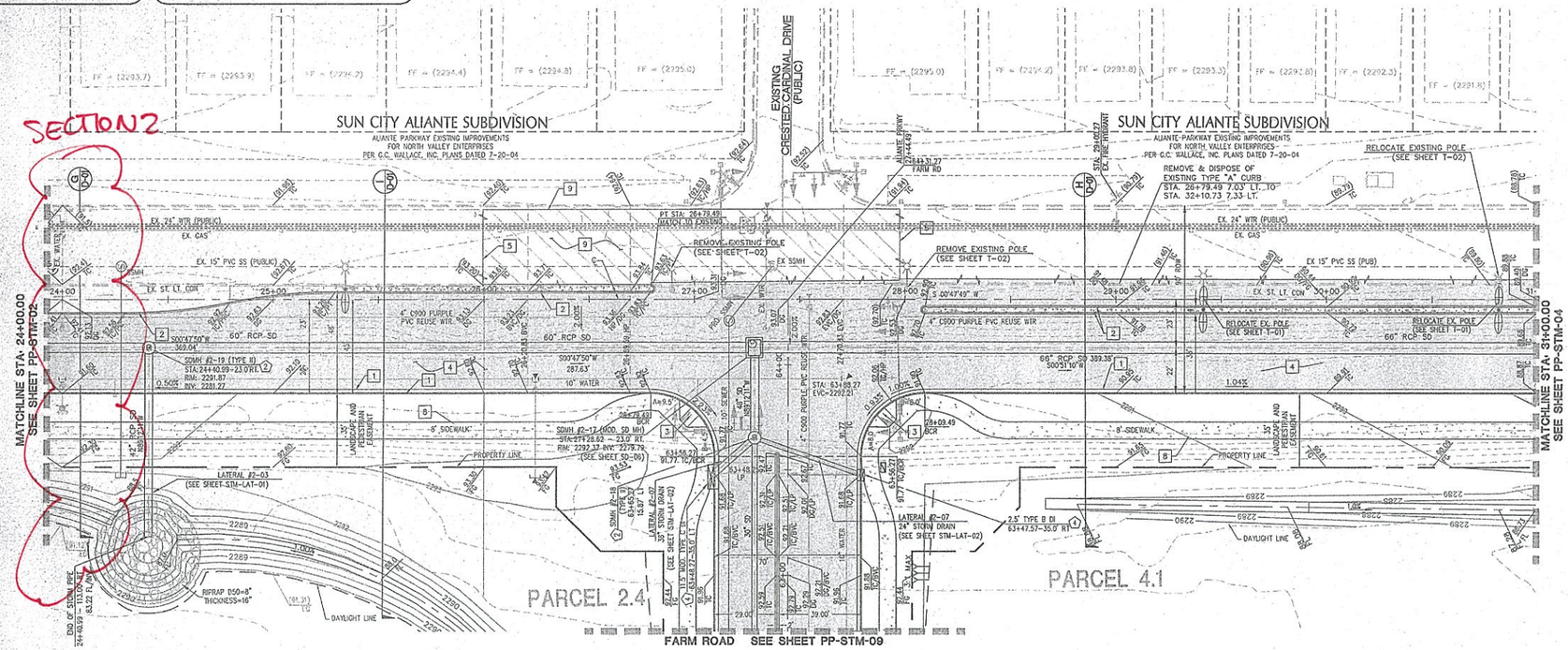
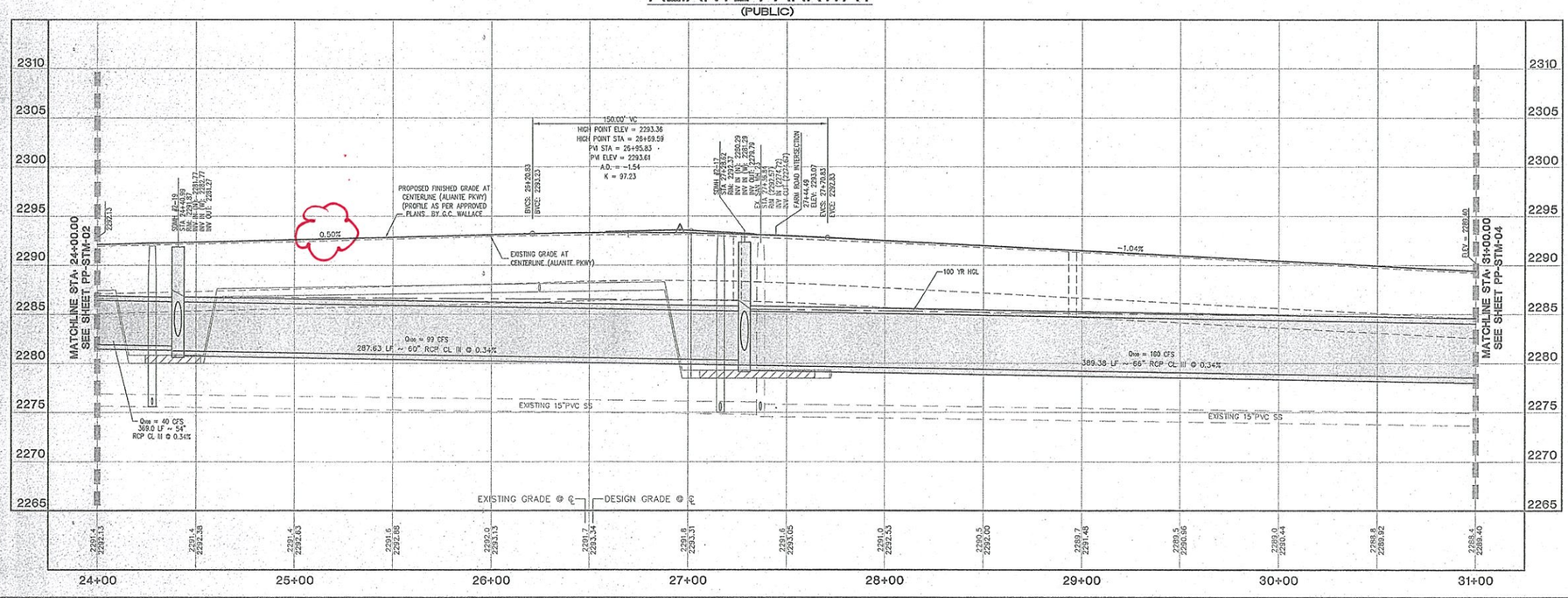
GEOTECH ENGINEER
PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NUMBER: E-06-022
DATE: April 26, 2006
REVISED DATE: July 14, 2006

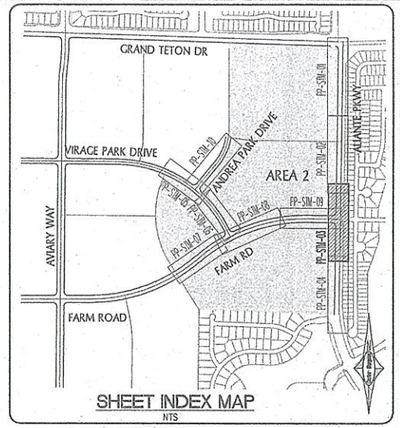
CUT TOTAL: 20,896
FILL TOTAL: 15,794
NET: 5,102

SECTION 2



ALIANTE PARKWAY
(PUBLIC)





IMPROVEMENTS:
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2. CONSTRUCT "A" TYPE CURB, (PER USD No. 219)
3. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER USD No. 235, CASE II)
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LEGEND:
PROPOSED ASPHALT | REMOVE AND REPLACE AC | PROPOSED SIDEWALK

STORM DRAIN:
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*Existing Storm Drain Location Size & Slope

Carter-Burgess
30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:
JENNIFER E. DODDY, P.E.
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION
DATE 9/17/07

REVISION	BY	DATE	KEY

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter-Burgess
6655 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services
(702) 938-5400 Fax (702) 938-5454

ROADWAY & STORM P/P
ALIANTE PKWY
STA 24+00 TO STA 31+00
NORTH LAS VEGAS
600 ACRES
AREA 2

DRAWN BY: CSW
DESIGNED BY:
CHECKED BY: GBW
PROJECT NO: 21594
SCALE: 1" = 30'

GLENN B. WATANABE
Exp. 06/30/08
CIVIL
No. 18025
STATE OF NEVADA
PROFESSIONAL ENGINEER
9/17/07

SHEET
PP-STM-03
10 OF 74 SHEETS
DRAWING NO.
28976

Drawing Name: L:\21594 - NLV SITE\DESIGN\MPR\MSTR\VEGA_02\Improvement Plans\1594-02-PP-STM-01_04.dwg User: mengp Sep 13, 2007 - 7:30am

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1-702-227-2929
NEVADA POWER DEPARTMENT AND SAFETY SERVICES CORPORATION

Avoid cutting underground utility lines. It's costly.
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1-800-227-2600

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BENCHMARK

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GEOTECH ENGINEER

PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NUMBER: E-06-022
DATE: April 28, 2006
REVISED DATE: July 14, 2006

CUT TOTAL: 20,888
FILL TOTAL: 15,794
NET: 5,102

SUN CITY ALIANTE SUBDIVISION
ALIANTE PARKWAY EXISTING IMPROVEMENTS FOR NORTH VALLEY ENTERPRISES PER G.C. WALLACE, INC. PLANS DATED 7-20-04

SECTION 4

MATCHLINE STA. 31+00.00 SEE SHEET PP-STM-03

REMOVE & DISPOSE OF EXISTING TYPE "A" CURB STA. 29+79.49 7.33 LT. TO STA. 32+10.73 7.33 LT.

REMOVE & DISPOSE OF EXISTING TYPE "A" CURB

TIE NEW TYPE "A" CURB TO EXISTING TYPE "A" CURB

EX. 24" WTR (PUBLIC) · EX. GAS · EX. 15" SS (PUB) · EX. SSMH · EX. ST. LT. CON · EX. 15" PVC SS (PUBLIC) · EX. ST. LT. CONDUIT · EX. 24" WATER · EX. 66" RCP SD · REUSE WATER SYSTEM · EX. 15"SS

SDMH #2-16 (MOD. SD MH)
STA-31+18.00 — 23.0' RT.
RIM: 2288.76 INV: 2278.47
(SEE SHEET SD-05)

SDMH #2-12 (MOD. SD MH)
35+32.15 — 14' RT.
RIM: 2286.34 INV: 2276.66
(SEE SHEET SD-02)
CONTRACTOR TO FIELD VERIFY INVERT ELEV. AT EXISTING PIPE.

SDMH #2-13 (MOD. SD MH)
35+05.53 — 23.8' RT
RIM: 2285.15 INV: 2277.15
(SEE SHEET SD-03)

SDMH #2-15a (MOD. SD MH)
35+28.53 — 14' RT.
RIM: 2285.64 INV: 2276.97
(SEE SHEET SD-03)

S 00°52'04" W 587.53' · S 00°47'49" W · S 89°58'37" E 51.05' · S 89°58'37" E 77.07'

66" RCP SD · 4" CONC PURPLE PVC REUSE WTR · 10" PVC SS (PUBLIC)

LATERAL #2-04 (SEE SHEET STM-LAT-01) 24" RCP SD

8' SIDEWALK · REMOVE AND DISPOSE OF EXISTING SD PIPE AND HEADWALL · TIE TO EXISTING SIDEWALK

PROPERTY LINE · LANDSCAPE AND PEDESTRIAN EASEMENT · DAYLIGHT LINE

3:1 MAX 2.00% MIN

STORM DRAIN B SS 22

PARCEL 4.1

CLUB ALIANTE

LIMITS OF CONSTRUCTION STA 36+80.95

FUTURE PARCEL ENTRY

LATERAL #2-05 48" RCP STORM DRAIN (SEE SHEET STM-LAT-01) · RIPRAP D50=8" THICKNESS=16" · END OF STORM PIPE INV. 2281.13

ALIANTE PARKWAY
(PUBLIC)

EXISTING GRADE @ ℄ · DESIGN GRADE @ ℄

200.00' VC
LOW POINT ELEV = 2285.62
LOW POINT STA = 35+05.78
PVI STA = 35+20.83
PVI ELEV = 2285.02
A.D. = 2.45
K = 81.59

EVCS: 34+20.83 · EVCE: 2286.08 · EVCS: 36+20.83 · EVCE: 2286.43 · GRADE BREAK

-1.04% · 1.41% · 0.80% · (1.53%)

EXISTING GRADE AT CENTERLINE (ALIANTE PKWY) · 100 YR HGL · PROPOSED FINISHED GRADE AT CENTERLINE (ALIANTE PKWY) (PROFILE AS PER APPROVED PLANS BY G.C. WALLACE

387.53 LF ~ 66" RCP CL III @ 0.34% Q100 = 160 CFS

EXISTING 24" PVC WTR

31.05 LF ~ 66" RCP CL III @ 0.38% Q100 = 171 CFS

77.07 LF ~ 66" RCP CL III @ 0.38% Q100 = 232 CFS

136.5 LF ~ EX. 66" RCP @ 0.30%

EXISTING 15"PVC SS

33+91.21 EXISTING 24" VALVE BOX · 34+03.27 EXISTING 24"x8"

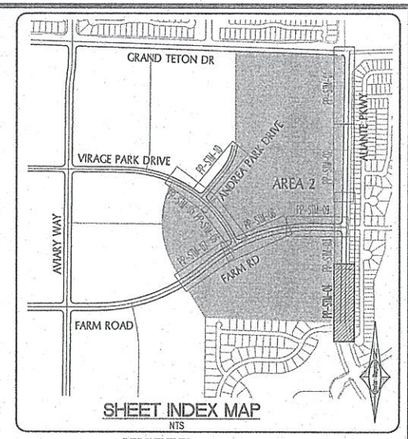
35+68.88 24"X12" TEE

EXISTING 24" WTR

2305 2300 2295 2290 2285 2280 2275 2270 2265 2260

31+00 32+00 33+00 34+00 35+00 36+00 37+00 38+00

*Existing Storm Drain Location Size & Slope



IMPROVEMENTS

1. CONSTRUCT "L" TYPE CURB & GUTTER, (PER USD No. 216)
2. CONSTRUCT "A" TYPE CURB, (PER USD No. 219)
3. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER USD No. 235, CASE II)
4. INSTALL A.C. PAVEMENT, (PER STREET SECTIONS)
5. 2' SAWCUT AND MATCH EXISTING ASPHALT PAVING, CURB AND GUTTER
6. CONSTRUCT 8' VALLEY GUTTER USD NO. 235
7. CONSTRUCT TYPICAL BUS TURN-OUT, (PER USD No. 234.1)
8. CONSTRUCT SIDEWALK, (PER USD No. 234)
9. ASPHALT PATCH, LIMITS TO BE DETERMINED BY CNLV INSPECTOR
10. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER USD No. 235, CASE I)

LEGEND:

PROPOSED ASPHALT · REMOVE AND REPLACE AC · PROPOSED SIDEWALK

STORM DRAIN:

1. INSTALL TYPE I MANHOLE, (PER USD No. 403, TO CONFORM TO USD No. 401 & 402)
2. INSTALL TYPE II MANHOLE, (PER USD No. 405, TO CONFORM TO USD No. 401 & 402)
3. INSTALL TYPE III MANHOLE, (PER USD No. 406, TO CONFORM TO USD No. 401 & 402)
4. CONSTRUCT MODIFIED TYPE "C" DROP INLET, (PER DETAIL, TO CONFORM TO USD No. 413)
5. INSTALL RCP END SECTION, (PER NDOT R-2.3.1)
6. INSTALL TEMPORARY PLUG AND CAP FOR FUTURE PHASE
7. REMOVE EX. END SECTION, CONNECT TO EX. RCP, (CONTRACTOR TO VERIFY SIZE, INVERT AND LOCATION PRIOR TO CONSTRUCTION)
8. ADJUST EXISTING FACILITY TO GRADE
9. INSTALL TYPE 1A MANHOLE (PER USD No.404 TO CONFORM TO USD No. 401 & 402)

Carter Burgess

(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:
JENNIFER E. BOOTH, P.E.
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION
DATE 9/17/07

REVISION · BY · DATE · REV

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter-Burgess
6655 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services
(702) 839-5400 Fax (702) 839-5454

ROADWAY & STORM P/P
ALIANTE PKWY
STA 31+00 TO STA 36+80.95
NORTH LAS VEGAS
600 ACRES
AREA 2

DRAWN BY: · DESIGNED BY: · CHECKED BY: GBW · PROJECT NO: 24159.1 · SCALE: 1" = 30' 1" = 6'

PROFESSIONAL ENGINEER — STATE OF NEVADA — GLENN B. WATANABE — EXP. 06/30/08 — CIVIL — No. 10026

SHEET PP-STM-04
11 OF 74 SHEETS
DRAWING NO. 28976

Drawing Name: L:\241594 - NLV SITE\DESIGN\IMPRVMTS\AREA_02\Improvement Plans\1594-02-PP-STM-01_04.dwg User: mmsp Sep 13, 2007 - 7:35am

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DISCLAIMER:

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BENCHMARK

NLV9117NWS
NAVD 88 ELEV. PUBLISHED 11/01/06 699.482 METERS, 2294.88 FEET. ELEVATION USED FOR THESE PLANS, PRC-REVISION 699.511 METERS, 2294.98 FEET. RIVET AND 2" ROUND ALUMINUM DISC, STAMPED NORTH LAS VEGAS BM No. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARINGS

SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

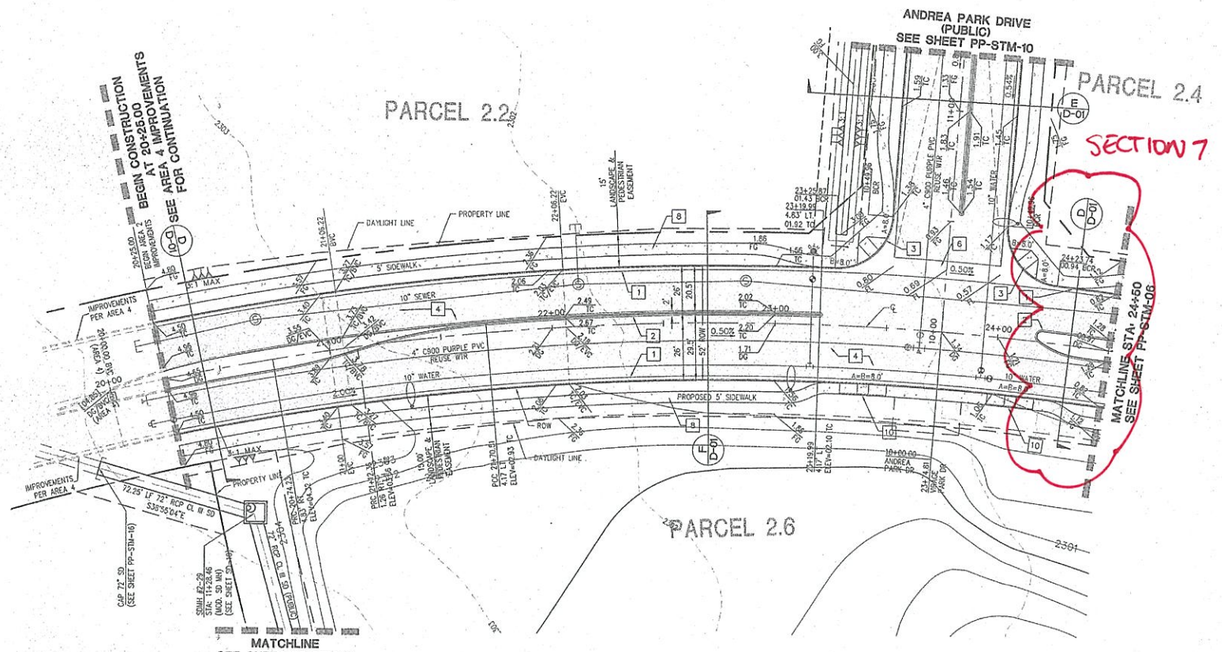
LEGAL DESCRIPTION

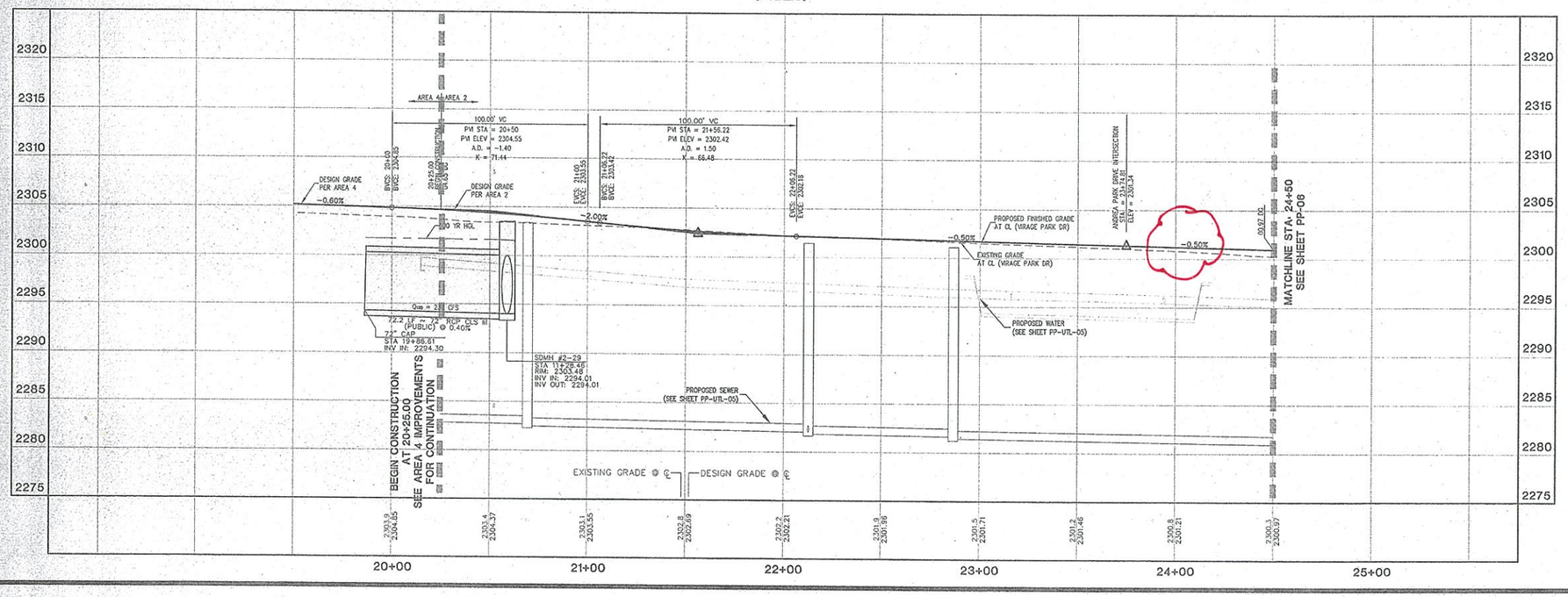
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, AND 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

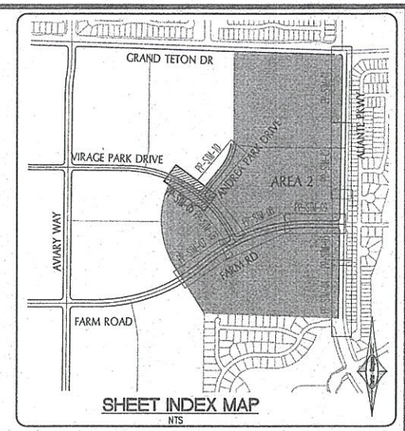
GEOTECH ENGINEER

PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NUMBER: E-06-022
DATE: April 26, 2006
REVISED DATE: July 14, 2006

CUT TOTAL: 20,896
FILL TOTAL: 15,794
NET: 5,102







IMPROVEMENTS:

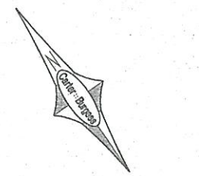
1. CONSTRUCT "L" TYPE CURB & GUTTER, (PER USD No. 216)
2. CONSTRUCT "A" TYPE CURB, (PER USD No. 219)
3. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER USD No. 235, CASE II)
4. INSTALL A.C. PAVEMENT, (PER STREET SECTIONS)
5. 2' SAWCUT AND MATCH EXISTING ASPHALT PAVING, CURB AND GUTTER
6. CONSTRUCT 8' VALLEY GUTTER USD NO. 235
7. CONSTRUCT TYPICAL BUS TURN-OUT, (PER USD No. 234.1)
8. CONSTRUCT SIDEWALK, (PER USD No. 234)
9. ASPHALT PATCH, LIMITS TO BE DETERMINED BY CNLV INSPECTOR
10. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER USD No. 235, CASE I)

LEGEND:

PROPOSED ASPHALT | REMOVE AND REPLACE AC | PROPOSED SIDEWALK

STORM DRAIN:

1. INSTALL TYPE I MANHOLE, (PER USD No. 403. TO CONFORM TO USD No. 401 & 402)
2. INSTALL TYPE II MANHOLE, (PER USD No. 405, TO CONFORM TO USD No. 401 & 402)
3. INSTALL TYPE III MANHOLE, (PER USD No. 408, TO CONFORM TO USD No. 401 & 402)
4. CONSTRUCT MODIFIED TYPE "C" DROP INLET, (PER DETAIL, SHEET D-02)
5. INSTALL RCP END SECTION, (PER NDOT R-2.3.1)
6. INSTALL TEMPORARY PLUG AND CAP FOR FUTURE PHASE
7. REMOVE EX. END SECTION, CONNECT TO EX. RCP, (CONTRACTOR TO VERIFY SIZE, INVERT AND LOCATION PRIOR TO CONSTRUCTION)
8. ADJUST EXISTING FACILITY TO GRADE
9. INSTALL TYPE 1A MANHOLE (PER USD No.404 TO CONFORM TO USD No. 401 & 402)



APPROVAL:

9/17/07
JENNIFER E. DOODY, P.E. DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

CarterBurgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax: (702) 939-5454

ROADWAY & STORM P/P
VIRAGE PARK DRIVE
STA 20+00 TO STA 24+50
NORTH LAS VEGAS
600 ACRES
AREA 2

DRAWN BY:
DESIGNED BY:
CHECKED BY: GBR
PROJECT NO: 241594
SCALE: 1" = 30' 1" = 6'

PROFESSIONAL ENGINEER-STATE OF NEVADA
GLENN B. PATAHOE
EXP. 06/30/09
CIVIL
No. 16005
9/13/07

SHEET
PP-STM-05
12 OF 74 SHEETS
DRAWING NO.
28976

Drawing Name: L:\241594 - KEY SITE\DESIGN\MAPMTS\MSTL001.DGN (Improvement Plans) \\191-02-PP-STM-05(P-50.dwg) User: sadchews3(pm) Sep 13, 2007 - 8:10am

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DISCLAIMER:

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BENCHMARK

NLV9117NWS
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BASIS OF BEARINGS

SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

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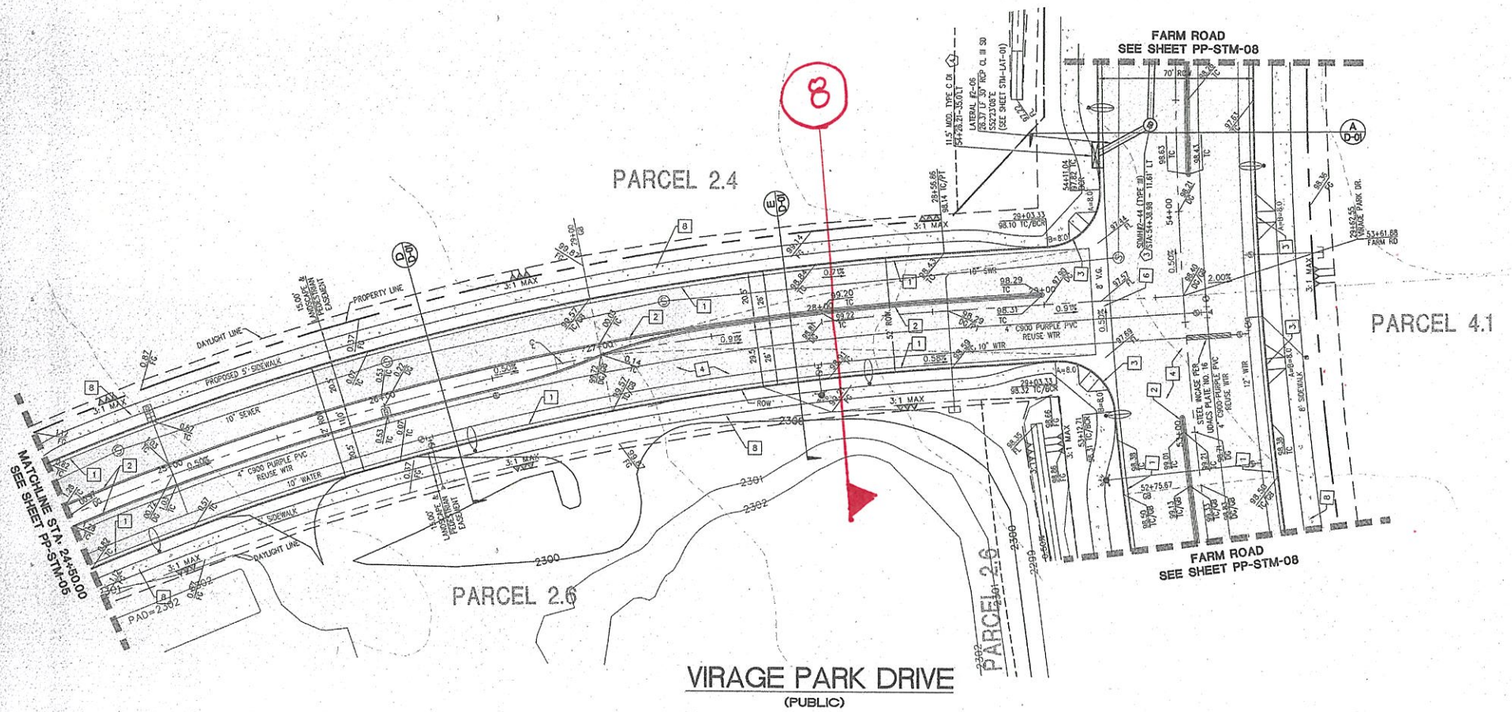
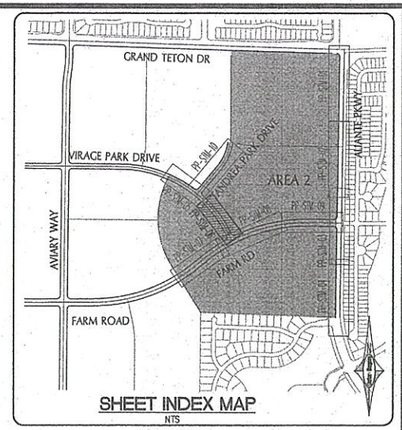
GEOTECH ENGINEER

PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NUMBER: E-06-022
DATE: April 26, 2006
REVISED DATE: July 14, 2008

CUT TOTAL: 20,896
FILL TOTAL: 15,794
NET: 5,102





IMPROVEMENTS:

1. CONSTRUCT "L" TYPE CURB & GUTTER, (PER USD No. 216)
2. CONSTRUCT "A" TYPE CURB, (PER USD No. 219)
3. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER USD No. 235, CASE II)
4. INSTALL A.C. PAVEMENT, (PER STREET SECTIONS)
5. 2' SAWCUT AND MATCH EXISTING ASPHALT PAVING, CURB AND GUTTER
6. CONSTRUCT 8' VALLEY GUTTER USD NO. 235
7. CONSTRUCT TYPICAL BUS TURN-OUT, (PER USD No. 234.1)
8. CONSTRUCT SIDEWALK, (PER USD No. 234)
9. ASPHALT PATCH, LIMITS TO BE DETERMINED BY CNLV INSPECTOR
10. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER USD No. 235, CASE I)

LEGEND:

PROPOSED ASPHALT | REMOVE AND REPLACE AC | PROPOSED SIDEWALK

STORM DRAIN:

1. INSTALL TYPE I MANHOLE, (PER USD No. 403. TO CONFORM TO USD No. 401 & 402)
2. INSTALL TYPE II MANHOLE, (PER USD No. 405, TO CONFORM TO USD No. 401 & 402)
3. INSTALL TYPE III MANHOLE, (PER USD No. 406, TO CONFORM TO USD No. 401 & 402)
4. CONSTRUCT MODIFIED TYPE "C" DROP INLET, (PER DETAIL, SHEET D-02)
5. INSTALL RCP END SECTION, (PER NDOT R-2.3.1)
6. INSTALL TEMPORARY PLUG AND CAP FOR FUTURE PHASE
7. REMOVE EX. END SECTION, CONNECT TO EX. RCP, (CONTRACTOR TO VERIFY SIZE, INVERT AND LOCATION PRIOR TO CONSTRUCTION)
8. ADJUST EXISTING FACILITY TO GRADE
9. INSTALL TYPE 1A MANHOLE (PER USD No.404 TO CONFORM TO USD No. 401 & 402)

Carter:Burgess

30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:

JENNIFER E. DOBOY, P.E. DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

REV	DATE	BY	REVISION

NOVEMBER 2006 LAND INVESTORS, LLC/DRH, INC.

Carter:Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 FAX (702) 938-5454

ROADWAY & STORM P/P
VIRAGE PARK DRIVE
STA 24+50 TO STA 29+62.55
NORTH LAS VEGAS
600 ACRES
AREA 2

DRAWN BY:
DESIGNED BY:
CHECKED BY: GW
PROJECT NO: 24594
SCALE: 1" = 30' 1" = 6'

PROFESSIONAL ENGINEER-STATE OF NEVADA
GLENN B. WATANABE
EXP. 06/30/08
CIVIL
No. 10025
9/19/07

SHEET
PP-STM-06
13 OF 74 SHEETS

DRAWING NO.
28976

Drawing Name: L:\24594...\XC-SITE\DESIGN\MPRAMS\MRSA_00\Horizontal Plans\594-00-PP-STM-05_to-08.dwg Sep 13, 2007 - 8:11am User: scschwesinger

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BENCHMARK

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BASIS OF BEARINGS

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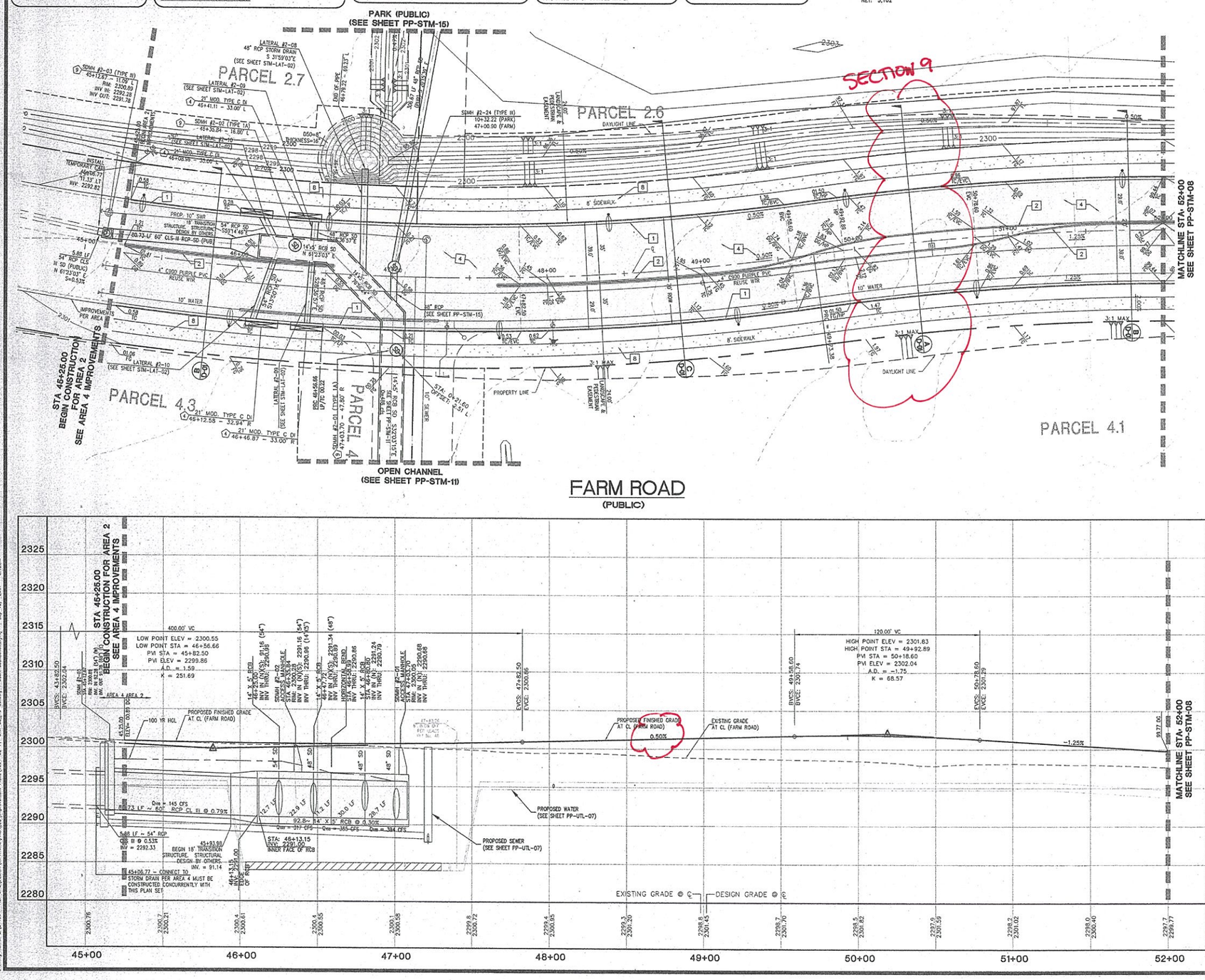
GEOTECH ENGINEER

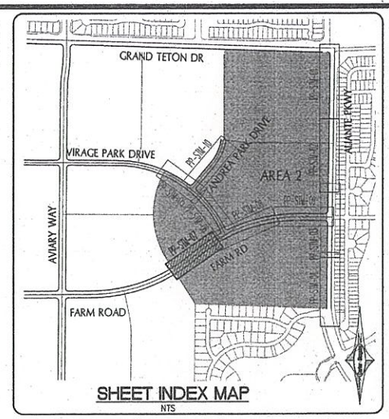
PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NUMBER: E-06-022
DATE: April 26, 2006
REVISED DATE: July 14, 2006

CUT TOTAL: 20,886
FILL TOTAL: 15,784
NET: 5,102

NOTE:

STRUCTURAL DESIGNS OF THE 14' X 5' RCB AND LATERAL CONNECTION POINTS WILL BE PROVIDED BY GENEVA PIPE.





SHEET INDEX MAP

NTS

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8. ADJUST EXISTING FACILITY TO GRADE
9. INSTALL TYPE 1A MANHOLE (PER USD No.404 TO CONFORM TO USD No. 401 & 402)

* Existing Storm Drain Location Size & Slope



30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:

9/17/07
JENNIFER E. BOODY, P.E. DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

Carter-Burgess
6655 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services
(702) 938-3400 Fax: (702) 938-5454

ROADWAY & STORM P/P
FARM ROAD
STA 45+25.01 TO STA 52+00
NORTH LAS VEGAS
600 ACRES
AREA 2

DRAWN BY:
DESIGNED BY:
CHECKED BY: GM
PROJECT NO: 241594
SCALE: 1" = 30' 1" = 6'

PROFESSIONAL ENGINEER - STATE OF NEVADA
GLENN M. WARNABE
EXP. 06/30/08
CIVIL
No. 16005

SHEET
PP-STM-07
14 OF 74 SHEETS
DRAWING NO.
28976

Drawing Name: L:\241594 - NLV SITE\DESIGN\IMPRMTS\AREA_02\Improvement Plans\1594-02-PP-STM-05(_10-50.dwg Date: sodachaw\jamy Sep 13, 2007 - 8:12am

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BENCHMARK

NLV9117KNWS
NAVD 88 ELEV. PUBLISHED 11/01/06 699.482 METERS, 2294.88 FEET. ELEVATION USED FOR THESE PLANS, PRE-REVISION 699.511 METERS, 2294.58 FEET. RIVET AND 2" ROUND ALUMINUM DISC, STAMPED NORTH LAS VEGAS BM No. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARINGS

SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

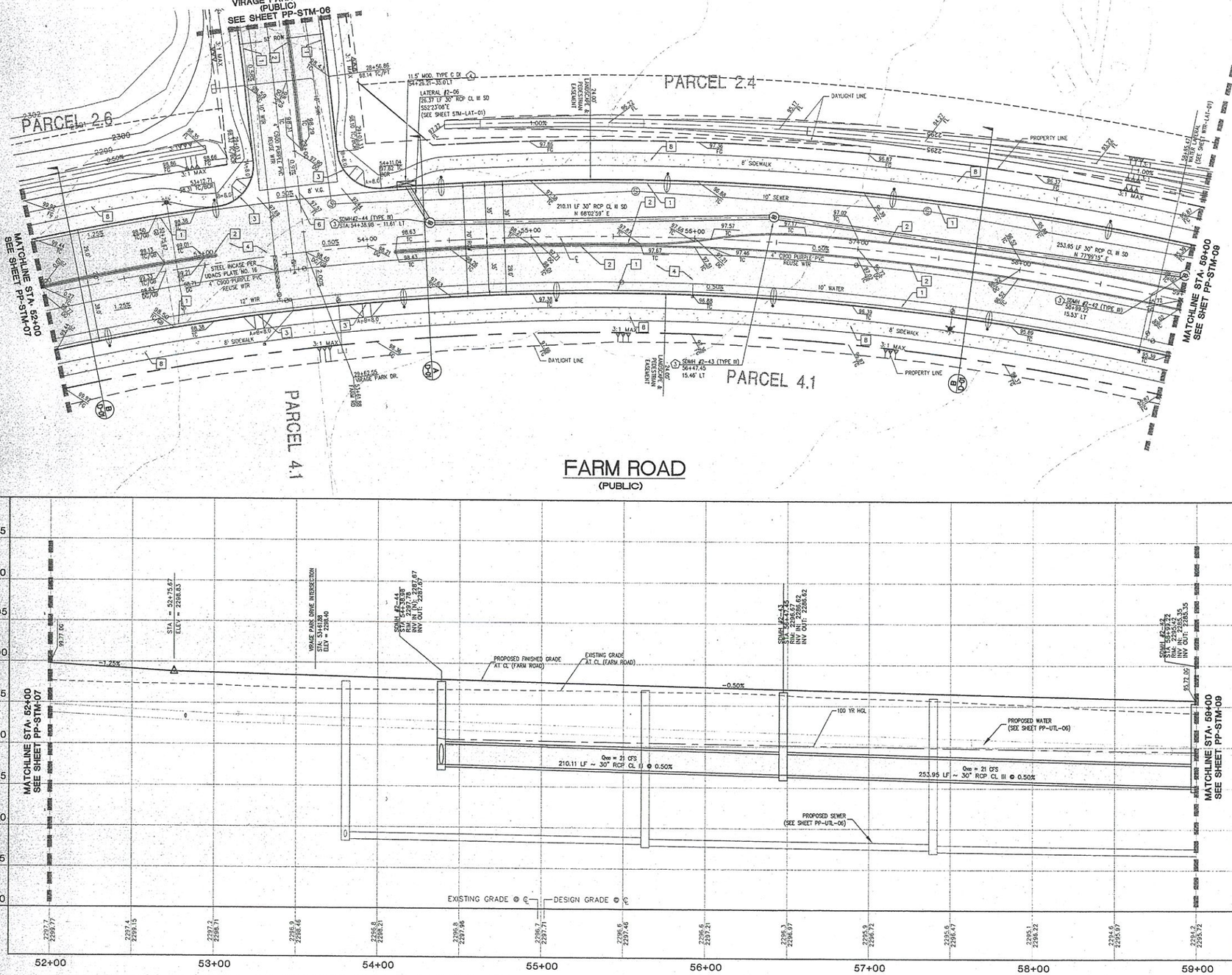
LEGAL DESCRIPTION

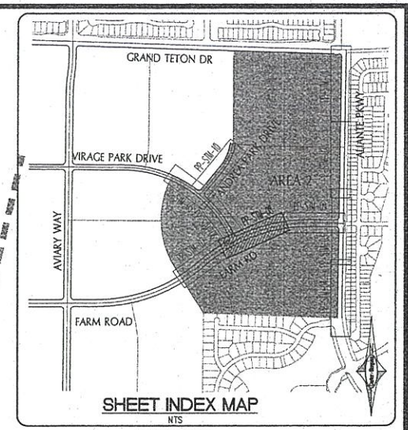
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, AND 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

GEOTECH ENGINEER

PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NUMBER: E-06-022
DATE: April 26, 2006
REVISED DATE: July 14, 2006

CUT TOTAL: 20,896
FILL TOTAL: 15,794
NET: 5,102





IMPROVEMENTS:

1. CONSTRUCT "L" TYPE CURB & GUTTER, (PER USD No. 216)
2. CONSTRUCT "A" TYPE CURB, (PER USD No. 219)
3. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER USD No. 235, CASE II)
4. INSTALL A.C. PAVEMENT, (PER STREET SECTIONS)
5. 2' SAWCUT AND MATCH EXISTING ASPHALT PAVING, CURB AND GUTTER
6. CONSTRUCT 8' VALLEY GUTTER USD NO. 235
7. CONSTRUCT TYPICAL BUS TURN-OUT, (PER USD No. 234.1)
8. CONSTRUCT SIDEWALK, (PER USD No. 234)
9. ASPHALT PATCH, LIMITS TO BE DETERMINED BY CNLV INSPECTOR
10. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER USD No. 235, CASE I)

LEGEND:

PROPOSED ASPHALT | REMOVE AND REPLACE AC | PROPOSED SIDEWALK

STORM DRAIN:

1. INSTALL TYPE I MANHOLE, (PER USD No. 403. TO CONFORM TO USD No. 401 & 402)
2. INSTALL TYPE II MANHOLE, (PER USD No. 405, TO CONFORM TO USD No. 401 & 402)
3. INSTALL TYPE III MANHOLE, (PER USD No. 406, TO CONFORM TO USD No. 401 & 402)
4. CONSTRUCT MODIFIED TYPE "C" DROP INLET, (PER DETAIL, SHEET D-02)
5. INSTALL RCP END SECTION, (PER NDOT R-2.3.1)
6. INSTALL TEMPORARY PLUG AND CAP FOR FUTURE PHASE
7. REMOVE EX. END SECTION, CONNECT TO EX. RCP. (CONTRACTOR TO VERIFY SIZE, INVERT AND LOCATION PRIOR TO CONSTRUCTION)
8. ADJUST EXISTING FACILITY TO GRADE
9. INSTALL TYPE 1A MANHOLE (PER USD No.404 TO CONFORM TO USD No. 401 & 402)

*Existing Storm Drain Location Size & Slope



30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:

JENNIFER E. GOODY, P.E. — DATE 9/7/07
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

PROFESSIONAL ENGINEER — STATE OF NEVADA — GLENN D. WATANABE — REG. 06/30/08 — CIVIL — No. 16025

REVISION | BY | DATE | REV

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 638-5400 Fax (702) 638-5454

ROADWAY & STORM P/P
FARM ROAD
STA 52+00 TO STA 59+00
NORTH LAS VEGAS
600 ACRES
AREA 2

DRAWN BY:
DESIGNED BY:
CHECKED BY: GDW
PROJECT NO: 5415194
SCALE: 1" = 30' 1" = 6'

SHEET
PP-STM-08
15 OF 74 SHEETS
DRAWING NO.
28976

Drawing Name: L:\241594 NLV SITE\DESIGN\WRFMATS\AREA_02\Improvement Plans\1594-02-PP-STM-00_10-50.dwg User: scbackhaus@pbs Jan 13, 2007 - 8:14am

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NEVADA POWER EMBARGMENT AND SAFETY SERVICES (NEVATRIM)

Avoid cutting underground utility lines. It's costly.
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DISCLAIMER:

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BENCHMARK

NLV9117NWS
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BASIS OF BEARINGS

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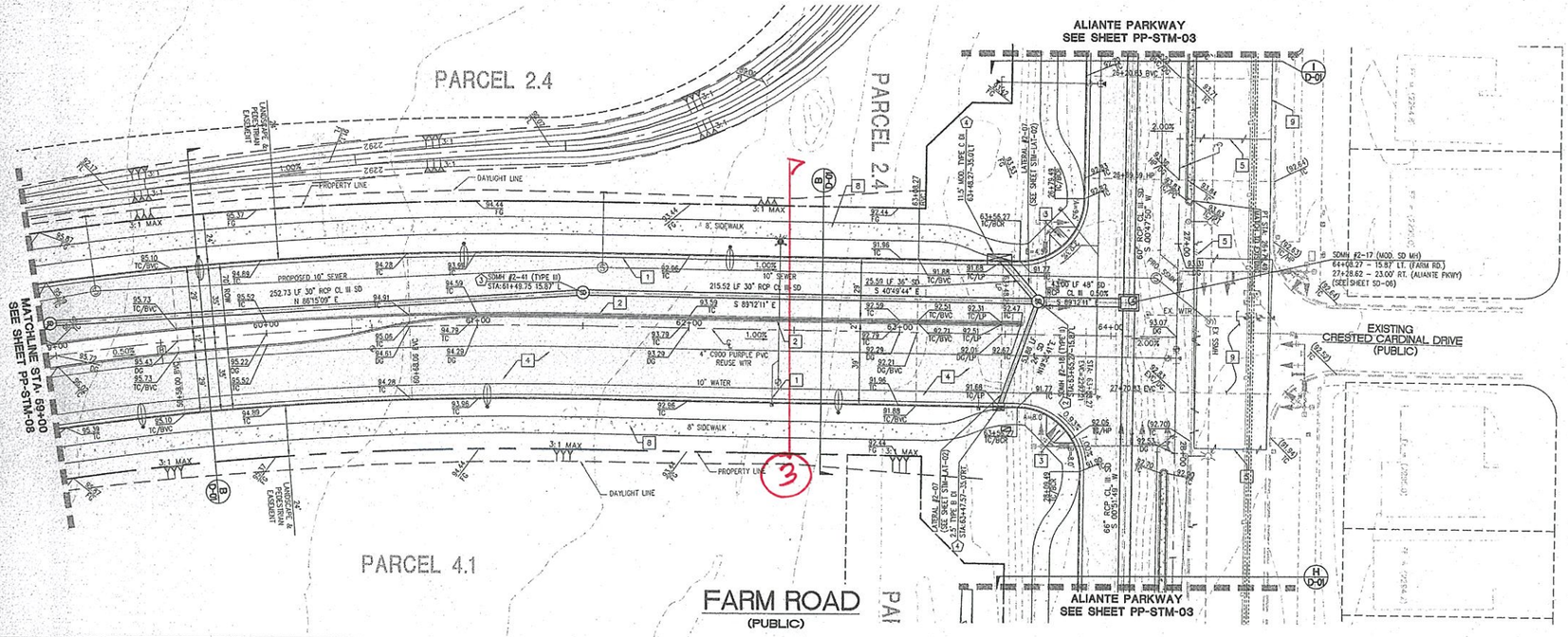
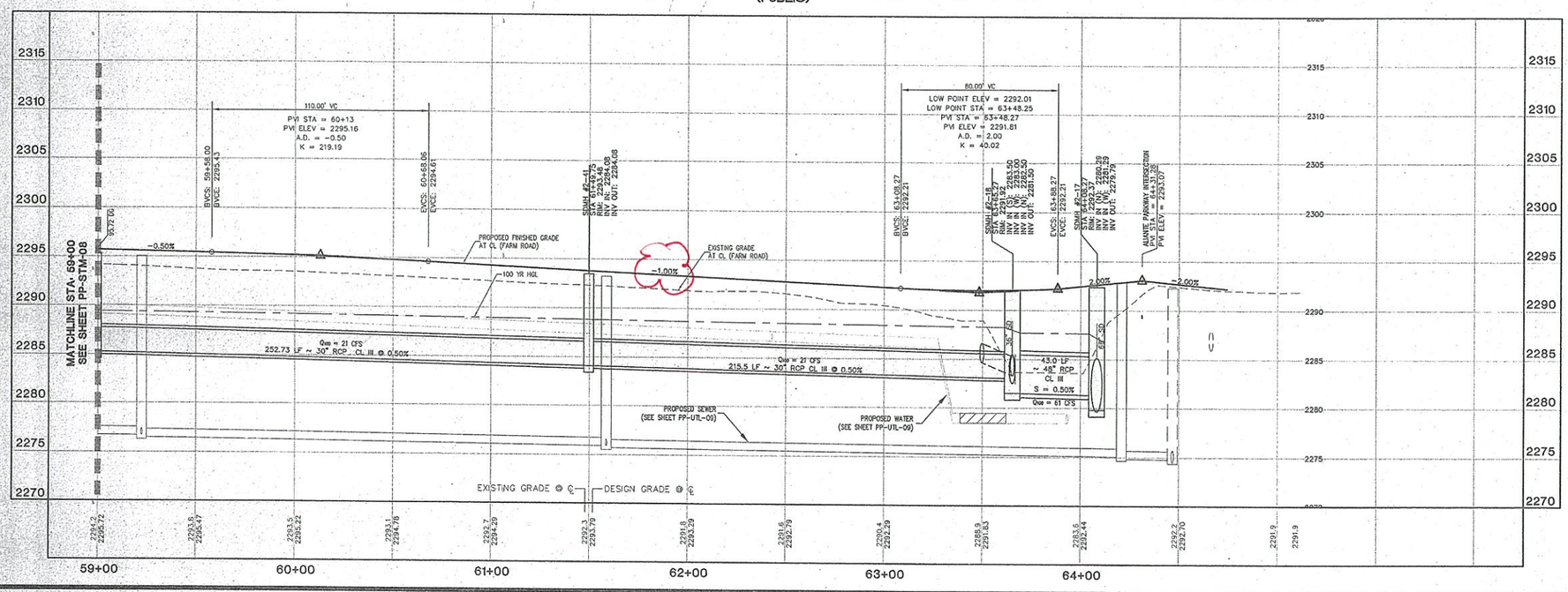
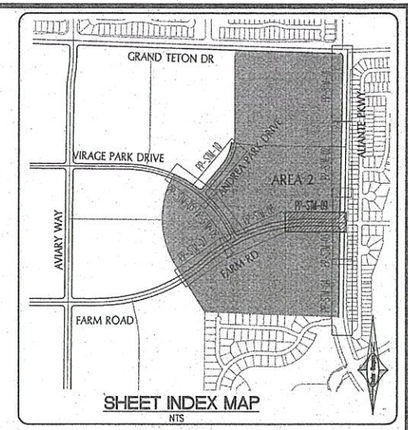
GEOTECH ENGINEER

PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NUMBER: E-06-022
DATE: April 26, 2006
REVISED DATE: July 14, 2006

CUT TOTAL: 20,896
FILL TOTAL: 15,794
NET: 5,102







SHEET INDEX MAP

NTS

IMPROVEMENTS:

1. CONSTRUCT "L" TYPE CURB & GUTTER, (PER USD No. 216)
2. CONSTRUCT "A" TYPE CURB, (PER USD No. 219)
3. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER USD No. 235, CASE II)
4. INSTALL A.C. PAVEMENT, (PER STREET SECTIONS)
5. 2' SAWCUT AND MATCH EXISTING ASPHALT PAVING, CURB AND GUTTER
6. CONSTRUCT 8' VALLEY GUTTER USD NO. 235
7. CONSTRUCT TYPICAL BUS TURN-OUT, (PER USD No. 234.1)
8. CONSTRUCT SIDEWALK, (PER USD No. 234)
9. ASPHALT PATCH, LIMITS TO BE DETERMINED BY CNLV INSPECTOR
10. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER USD No. 235, CASE I)

LEGEND:

PROPOSED ASPHALT | REMOVE AND REPLACE AC | PROPOSED SIDEWALK

STORM DRAIN:

1. INSTALL TYPE I MANHOLE, (PER USD No. 403. TO CONFORM TO USD No. 401 & 402)
2. INSTALL TYPE II MANHOLE, (PER USD No. 405, TO CONFORM TO USD No. 401 & 402)
3. INSTALL TYPE III MANHOLE, (PER USD No. 406, TO CONFORM TO USD No. 401 & 402)
4. CONSTRUCT MODIFIED TYPE "C" DROP INLET, (PER DETAIL, SHEET D-02)
5. INSTALL RCP END SECTION, (PER NDOT R-2.3.1)
6. INSTALL TEMPORARY PLUG AND CAP FOR FUTURE PHASE
7. REMOVE EX. END SECTION, CONNECT TO EX. RCP, (CONTRACTOR TO VERIFY SIZE, INVERT AND LOCATION PRIOR TO CONSTRUCTION)
8. ADJUST EXISTING FACILITY TO GRADE
9. INSTALL TYPE 1A MANHOLE (PER USD No.404 TO CONFORM TO USD No. 401 & 402)

* Existing Storm Drain Location Size & Slope

(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:

Jennifer E. Goddy 9/17/07
JENNIFER E. GODDY, P.E. DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

REV	DATE	BY	REVISION

NOVEMBER, 2005 LAND INVESTORS, LLC/DRH, INC.

Carter Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax (702) 938-5464

ROADWAY & STORM P/P FARM ROAD STA 59+00 TO STA 64+31.27

NORTH LAS VEGAS
600 ACRES
AREA 2

DRAWN BY:
DESIGNED BY:
CHECKED BY: GBW
PROJECT NO.: 21594
SCALE: 1" = 30' / 1" = 6'

PROFESSIONAL ENGINEER-STATE OF NEVADA
GLENN B. WATANABE
EXP. 06/30/09
CIVIL
No. 10025

SHEET
PP-STM-09
16 OF 74 SHEETS
DRAWING NO.
28976

Drawing Name: LY21594 - NLV SITE\DESIGN\WORKING\S_AREA_001\Improvement Plans\21594-202-PP-STM-05_10-09.dwg Sep 13, 2007 - 8:15am User: rockstchen4ym

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PROJECT NUMBER: E-06-022
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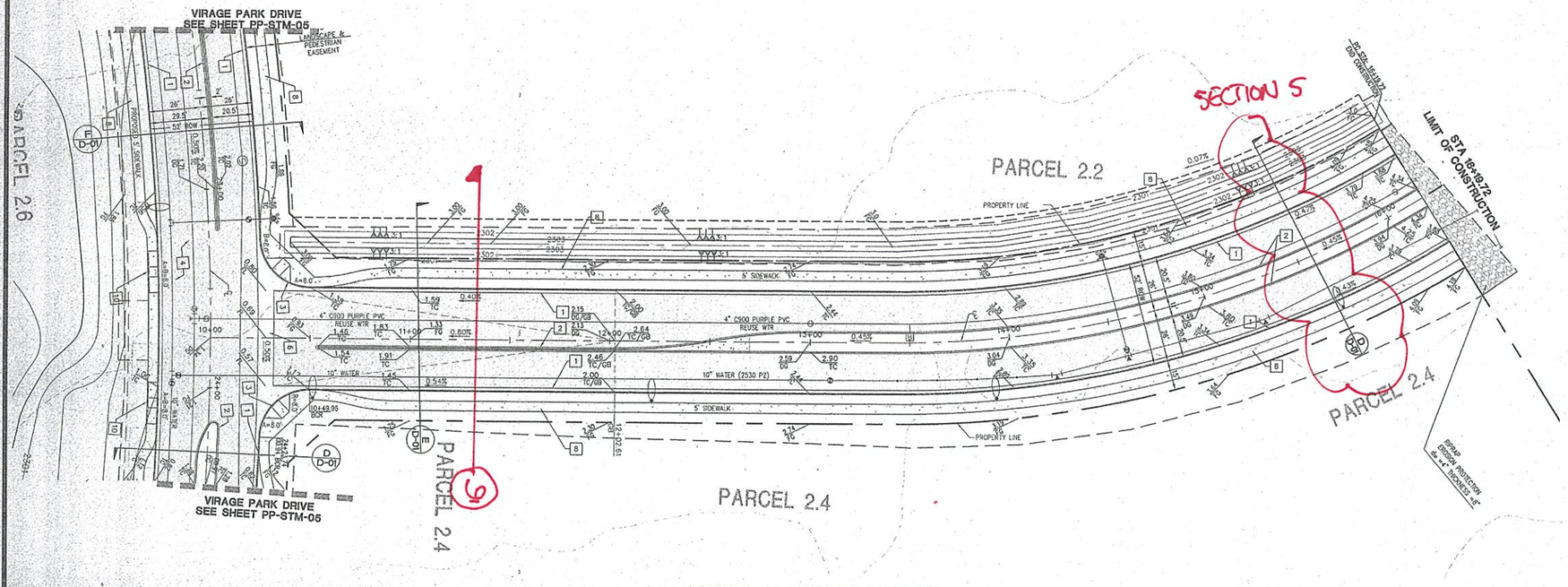

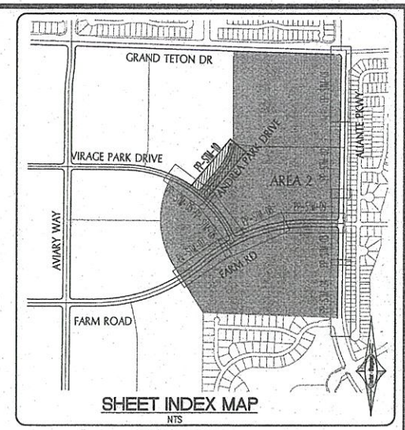

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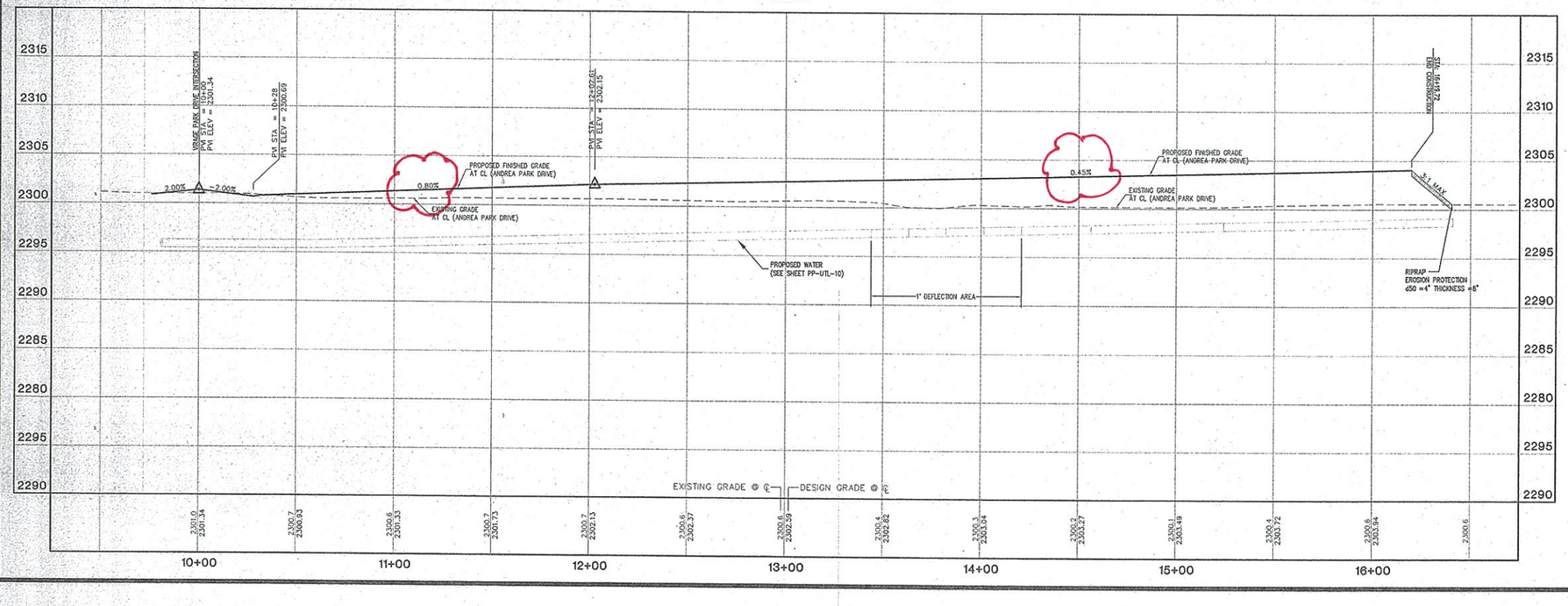
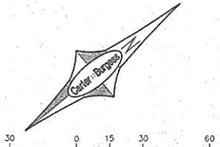
8. ADJUST EXISTING FACILITY TO GRADE
9. INSTALL TYPE 1A MANHOLE (PER USD No.404 TO CONFORM TO USD No. 401 & 402)

ANDREA PARK DRIVE
(PUBLIC)





APPROVAL:

9/17/07
JENNIFER E. DOODY, P.E. — DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

GLENN B. WATANABE — EXP. 06/30/08 — CIVIL — No. 16025 — STATE OF NEVADA — PROFESSIONAL ENGINEER

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax (702) 938-5454

REV	DATE	BY	REVISION

ROADWAY & STORM P/P
ANDREA PARK WAY
STA 10+00 TO STA 16+19.72
NORTH LAS VEGAS
600 ACRES
AREA 2

DRAWN BY:
DESIGNED BY:
CHECKED BY: GBW
PROJECT NO: 241594
SCALE: 1" = 30' 1" = 6'

SHEET PP-STM-10
17 OF 74 SHEETS
DRAWING NO. 28976

Drawing Name: L:\241594 - NLV SITE\DESIGN\IMPROVMTS\AREA_02\Improvement Plans\1594-02-PP-STM-05_10-50.dwg User: sadaschewskym Sep 13, 2007 - 8:17am

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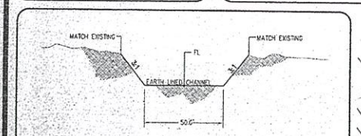
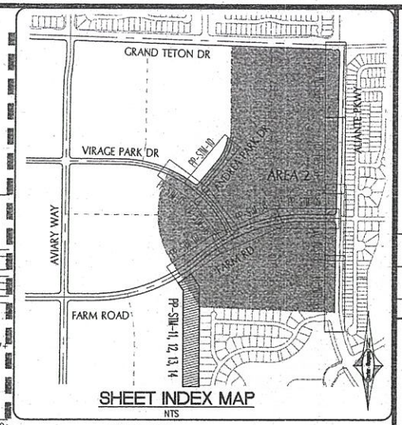


1 50-FT TRAPEZOIDAL CHANNEL DETAIL
NTS

OPEN CHANNEL



SHEET INDEX MAP
NTS

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2. CONSTRUCT "A" TYPE CURB, (PER CC STD. DWG. No. 219)
3. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER CC STD. DWG. No. 235, CASE II)
4. INSTALL A.C. PAVEMENT, (PER STREET SECTIONS)
5. 2' SAWCUT AND MATCH EXISTING ASPHALT PAVING, CURB AND GUTTER
6. NOT USED AT TIME OF SUBMITTAL
7. CONSTRUCT TYPICAL BUS TURN-OUT, (PER CC STD. DWG. No. 234.1)
8. CONSTRUCT SIDEWALK, (PER CC STD. DWG. No. 234)

LEGEND:

PROPOSED ASPHALT | EXISTING ASPHALT

STORM DRAIN:

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4. CONSTRUCT MODIFIED TYPE "C" DROP INLET, (PER DETAIL, TO CONFORM TO USD No. 413)
5. INSTALL RCP END SECTION, (PER NDOT R-2.3.1)
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*Existing Storm Drain Location Size & Slope

Carter::Burgess

30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:

JENNIFER E. BOODY, P.E.
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION
DATE 9/17/07

NOVEMBER 2005 LAND INVESTORS LLC/DRHI, INC

OFFSITE STORM P/P
STA: 1+00 TO STA: 7+00
OPEN CHANNEL
NORTH LAS VEGAS
600 ACRES
AREA 2

Carter::Burgess
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax: (702) 938-5464
Consultants in Planning, Engineering, Construction Management, and Related Services

REV	DATE	BY	REVISION

DRAWN BY:
DESIGNED BY:
CHECKED BY:
PROJECT NO: 241594
SCALE: 1" = 30' HORZ. 1" = 6' VERT.

PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER—STATE OF NEVADA
GLENN T. WATANABE
No. 16025
CIVIL

SHEET
PP-STM-11
18 OF 74 SHEETS
DRAWING NO.
28976

LX:\241594_NLV SITE\DESIGN\IMPROVMTS\AREA_02\Improvement Plans\1594-02-PP-STM-11-14.dwg 9/28/2007 2:07:06 PM PDT

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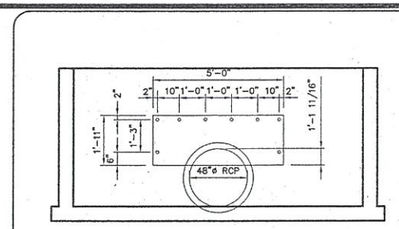
NAVD 88 ELEV. PUBLISHED 11/01/06 699.482 METERS, 2294.68 FEET. ELEVATION USED FOR THESE PLANS, PRE-REVISION 699.511 METERS, 2294.98 FEET. RIVET AND 2" ROUND ALUMINUM DISC, STAMPED NORTH LAS VEGAS BM No. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARINGS

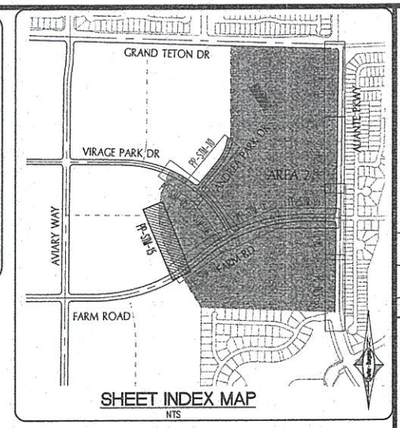
SOUTH 87°28'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

LEGAL DESCRIPTION

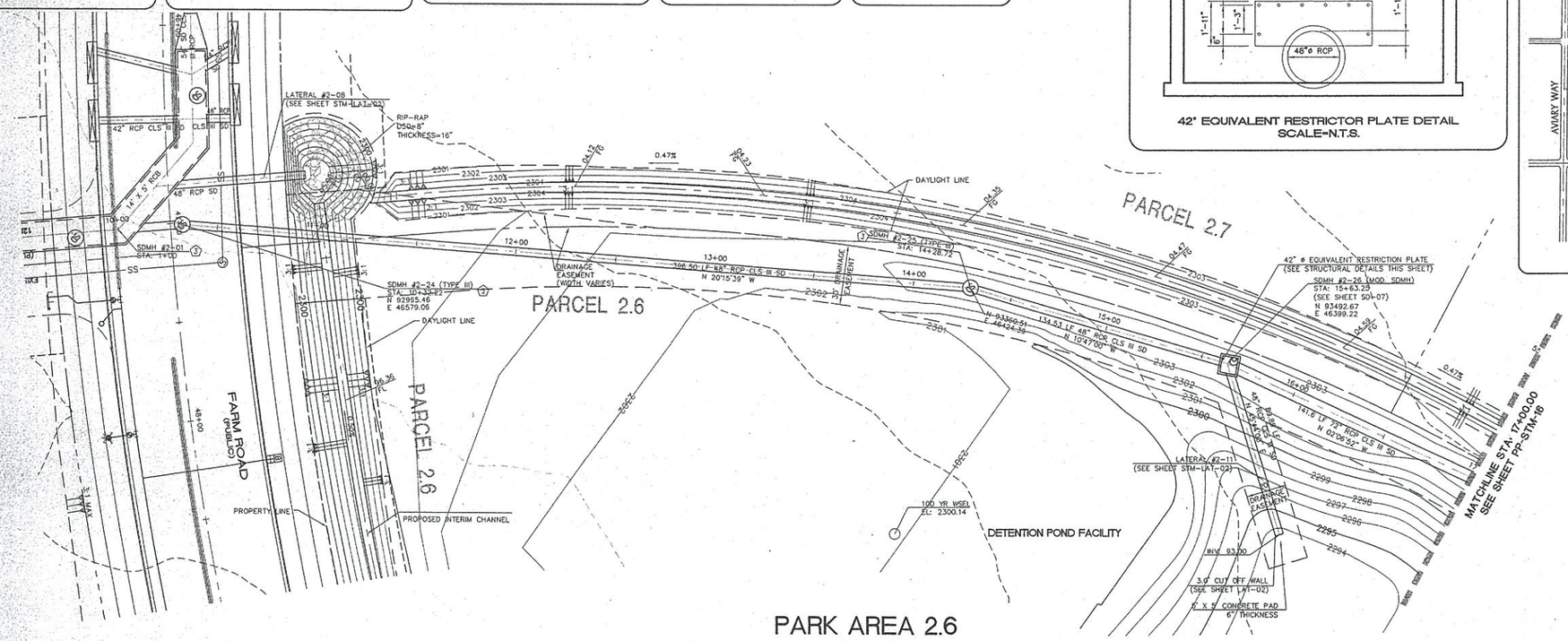
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, AND 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.



42" EQUIVALENT RESTRICTOR PLATE DETAIL
SCALE=N.T.S.



SHEET INDEX MAP
NTS



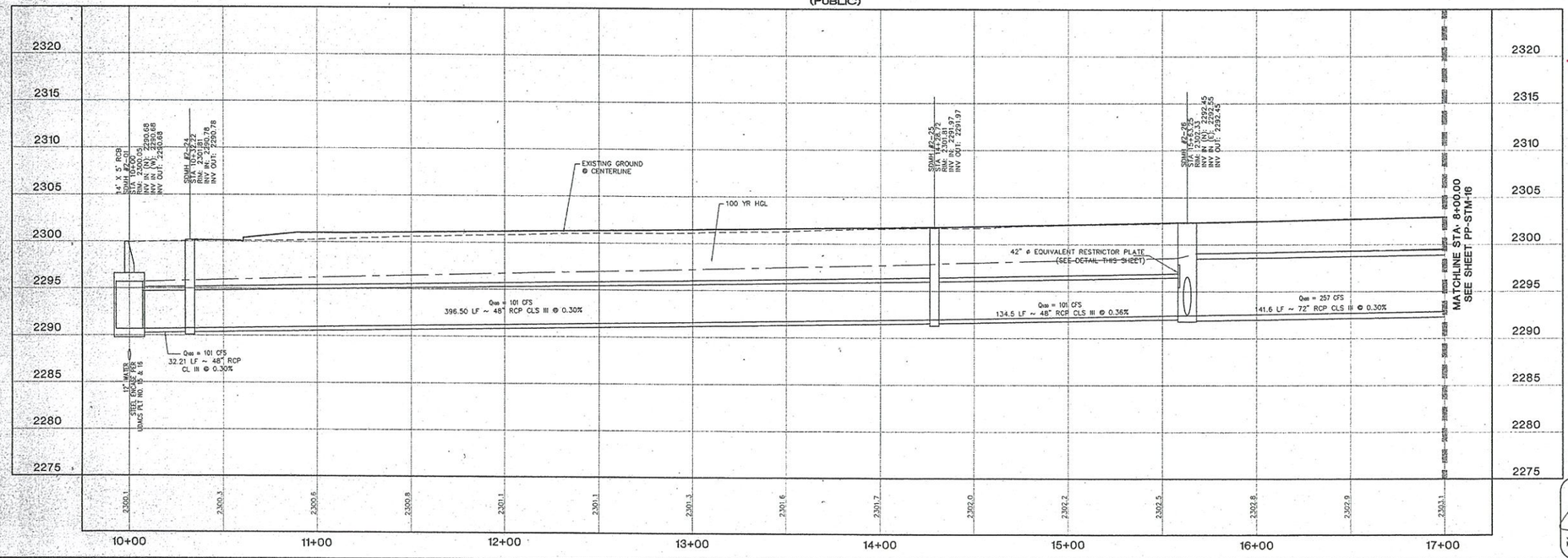
IMPROVEMENTS:

1. CONSTRUCT "L" TYPE CURB & GUTTER, (PER CC STD. DWG. No. 216)
2. CONSTRUCT "A" TYPE CURB, (PER CC STD. DWG. No. 219)
3. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER CC STD. DWG. No. 235, CASE II)
4. INSTALL A.C. PAVEMENT, (PER STREET SECTIONS)
5. 2' SAWCUT AND MATCH EXISTING ASPHALT PAVING, CURB AND GUTTER
6. NOT USED AT TIME OF SUBMITTAL
7. CONSTRUCT TYPICAL BUS TURN-OUT, (PER CC STD. DWG. No. 234.1)
8. CONSTRUCT SIDEWALK, (PER CC STD. DWG. No. 234)

STORM DRAIN:

1. INSTALL TYPE I MANHOLE, (PER USD No. 403. TO CONFORM TO USD No. 401 & 402)
2. INSTALL TYPE II MANHOLE, (PER USD No. 405, TO CONFORM TO USD No. 401 & 402)
3. INSTALL TYPE III MANHOLE, (PER USD No. 406, TO CONFORM TO USD No. 401 & 402)
4. CONSTRUCT MODIFIED TYPE "G" DROP INLET, (PER DETAIL, TO CONFORM TO USD No. 413)
5. INSTALL RCP END SECTION, (PER NDOT R-2.3.1)
6. INSTALL TEMPORARY PLUG AND CAP FOR FUTURE PHASE
7. REMOVE EX. END SECTION, CONNECT TO EX. RCP, (CONTRACTOR TO VERIFY SIZE, INVERT AND LOCATION PRIOR TO CONSTRUCTION)
8. ADJUST EXISTING FACILITY TO GRADE
9. INSTALL TYPE 1A MANHOLE (PER USD No.404 TO CONFORM TO USD No. 401 & 402)

PARK AREA 2.6
(PUBLIC)



*Existing Storm Drain Location Size & Slope

(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:
JENNIFER E. DOOCY, P.E. MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION
DATE 9/17/07

PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER-STATE OF NEVADA
GLENN B. WATANABE
EXP. 06/30/08
CIVIL
No. 11200

SHEET
PP-STM-15
22 OF 74 SHEETS
DRAWING NO.
26976

NOVEMBER 2006 LAND INVESTORS LLC/DRHI, INC

Carter::Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
8655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax: (702) 938-5454

REVISION	REV.	DATE	BY

OFFSITE STORM P/P
STA: 10+00 TO STA: 17+00
PARK

NORTH LAS VEGAS
600 ACRES
AREA 2

DRAWN BY:
DESIGNED BY:
CHECKED BY: GBW
PROJECT NO: 241594
SCALE: 1" = 30' HORIZ. 1" = 6' VERT.

L:\241594 - NLV SITE\DESIGN\IMPRVMTS\AREA_02\Improvement Plans\1594-02-PP-STM-15-16.dwg 3/28/2007 2:33:02 PM PDT

Avoid overhead power line (primary, 4 k. volts). Call before you Overhead 1-702-227-2929 NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

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

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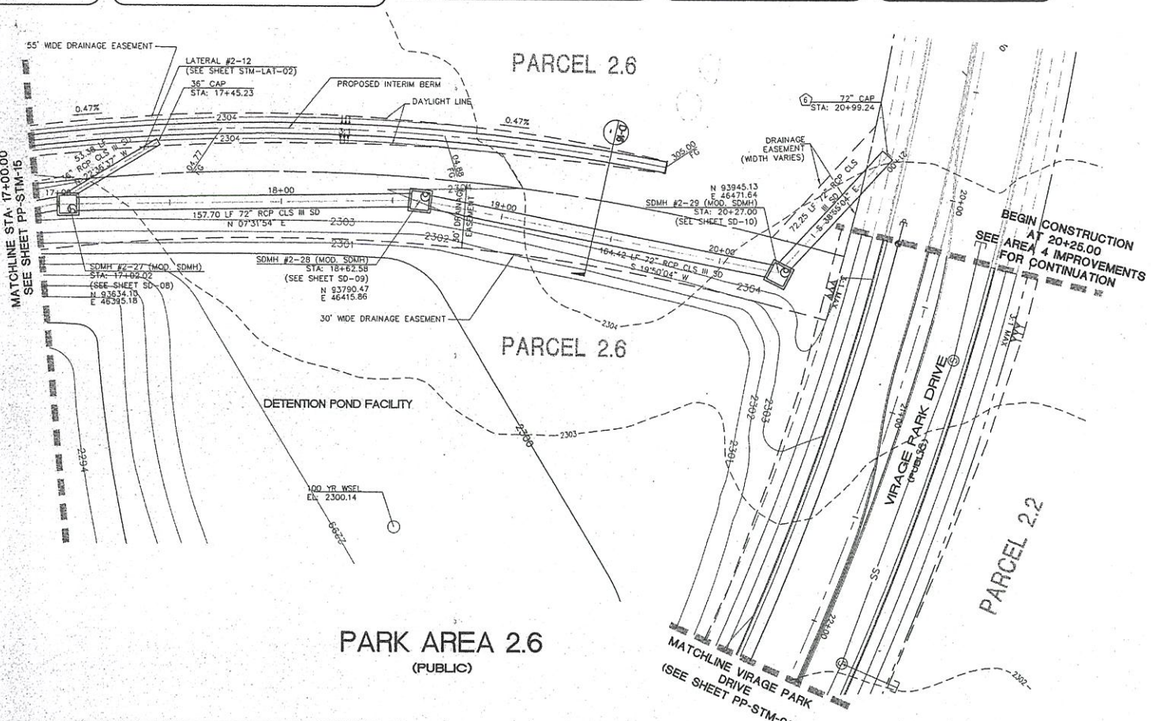
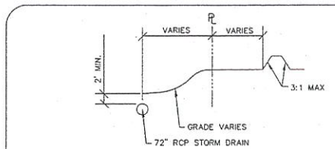
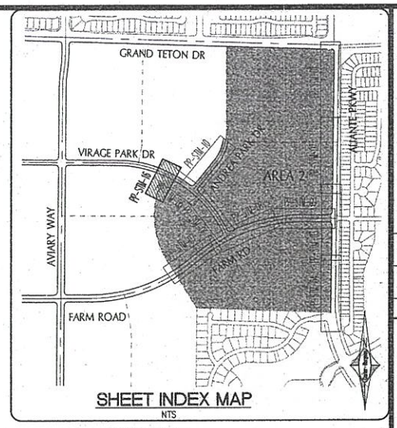




D-16 DRAINAGE EASEMENT - GRADING SECTION



SHEET INDEX MAP
NTS

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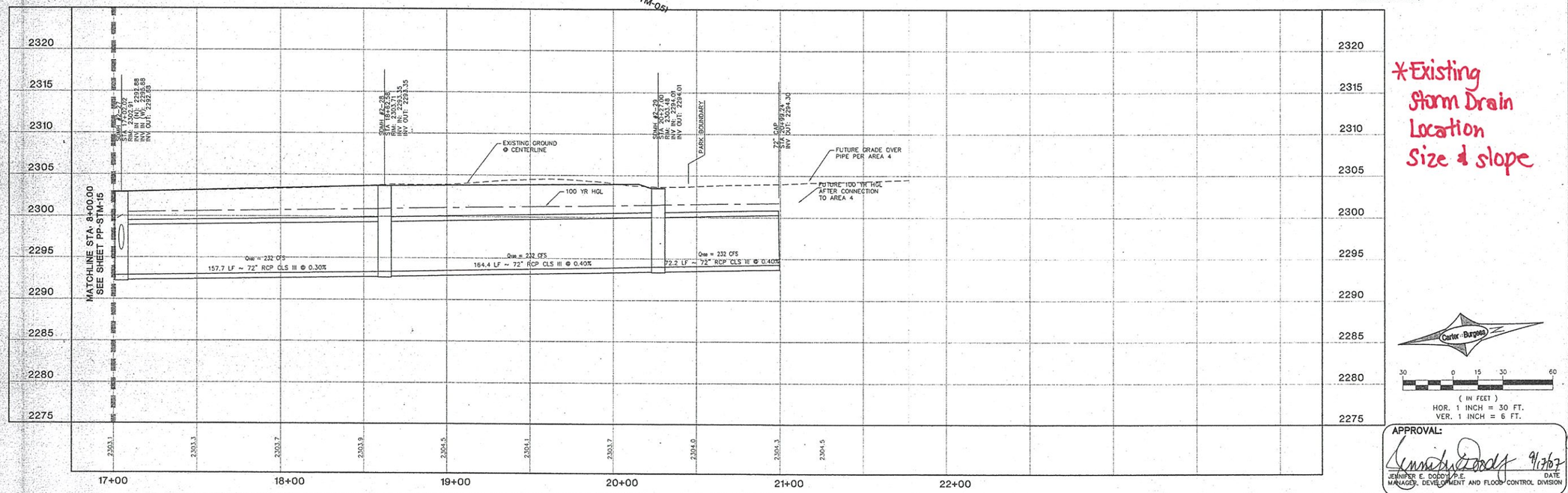
9. INSTALL TYPE 1A MANHOLE (PER USD No.404 TO CONFORM TO USD No. 401 & 402)



*Existing Storm Drain Location Size & slope

Carter::Burgess

30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:

JENNIFER E. DODDS, P.E.
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION
9/17/07
DATE

NOVEMBER 2005 LAND INVESTORS LLC/DRHI, INC

Carter::Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
8655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax (702) 938-5454

REVISION	REV	DATE	BY

OFFSITE STORM P/P
STA: 17+00 TO STA: 22+99.24
PARK

NORTH LAS VEGAS
600 ACRES
AREA 2

DRAWN BY:
DESIGNED BY: GBW
CHECKED BY: GBW
PROJECT NO: 241594
SCALE: 1" = 30' HORIZ. 1" = 6' VERT.

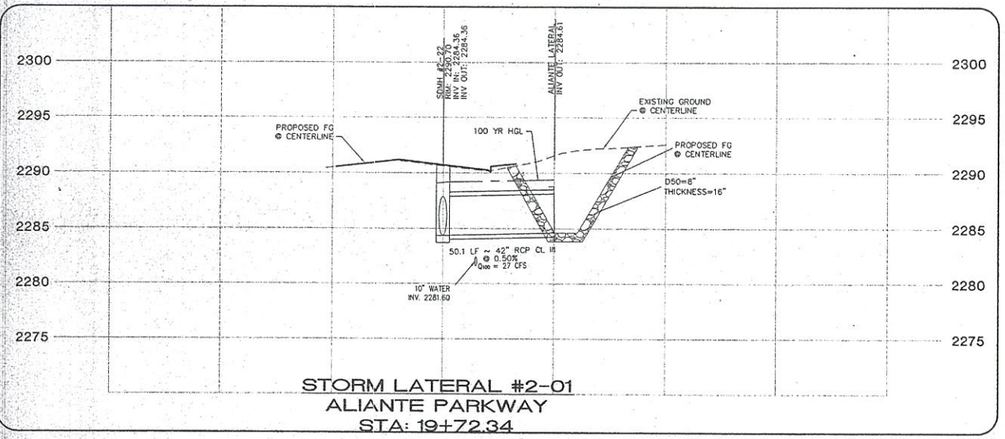
PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER - STATE OF NEVADA
GLENN B. WATANABE
EXP: 06/30/08
CIVIL
No. 16022

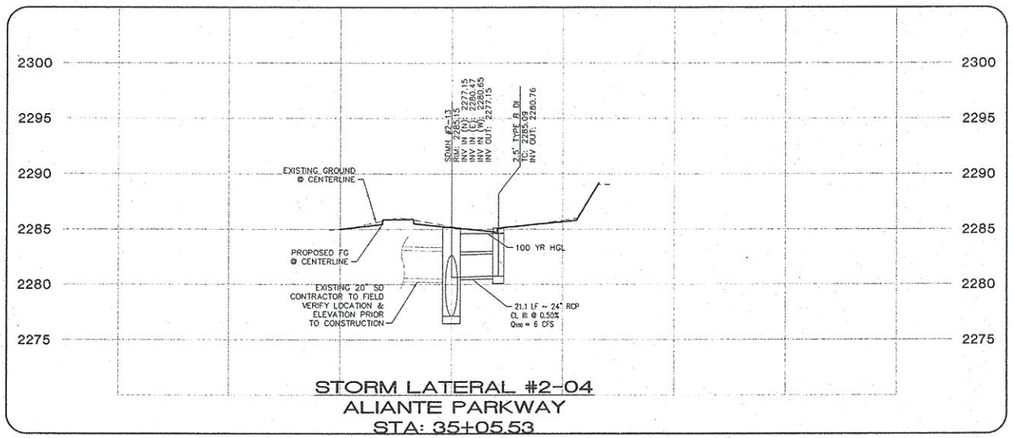
SHEET
PP-STM-16
23 OF 74 SHEETS

DRAWING NO.
28976

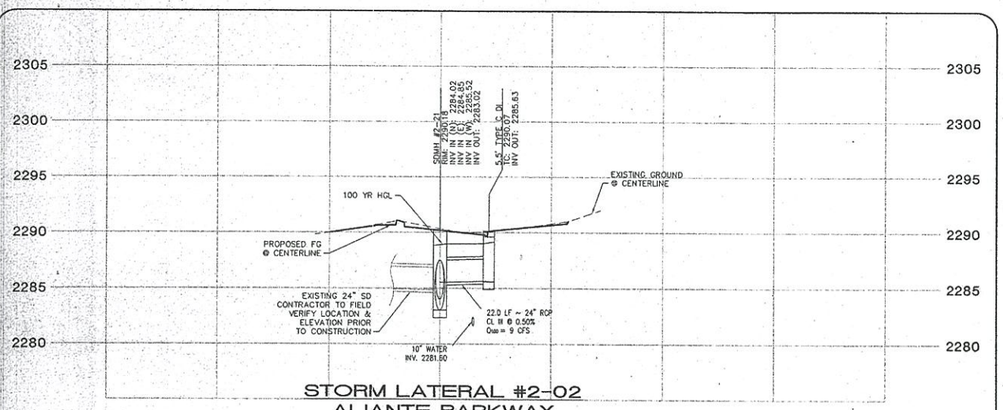
LN\241594 NLV SITE\DESIGN\MPR\MTS\AREA_2\6\Improvement Plans\1594-02-PP-STM-15-16.dwg 9/28/2007 2:33:02 PM PDT



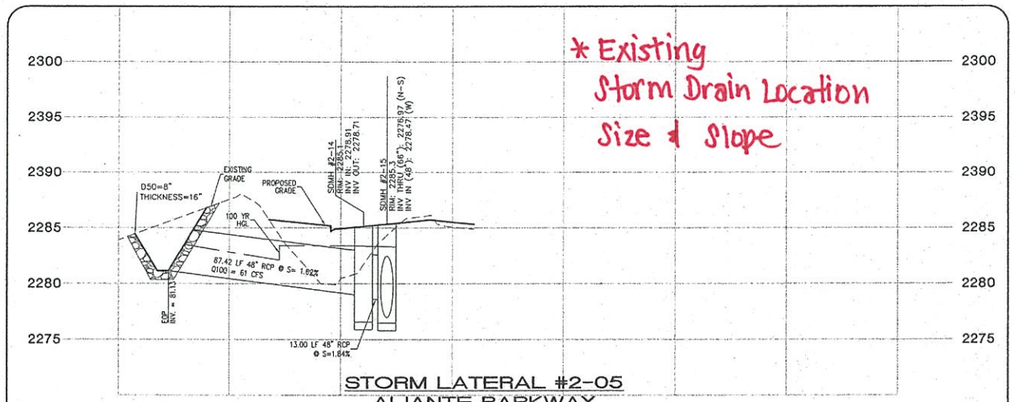
STORM LATERAL #2-01
ALIANTE PARKWAY
STA: 19+72.34



STORM LATERAL #2-04
ALIANTE PARKWAY
STA: 35+05.53

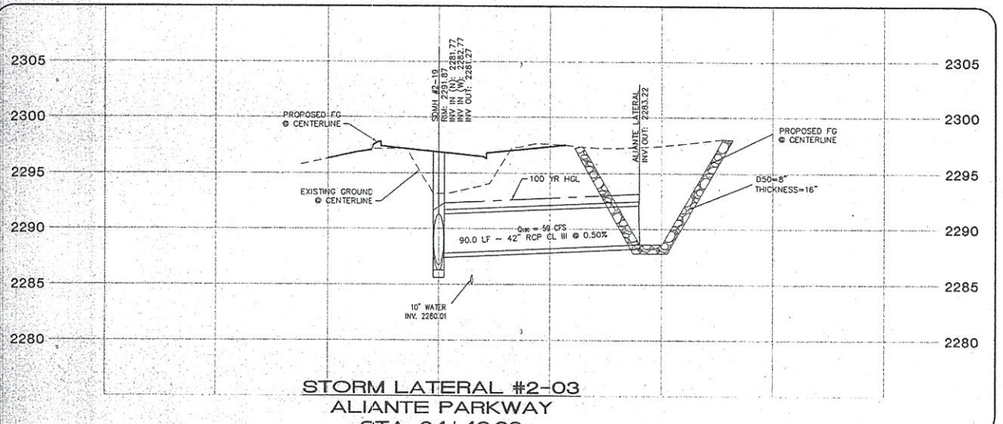


STORM LATERAL #2-02
ALIANTE PARKWAY
STA: 20+71.95

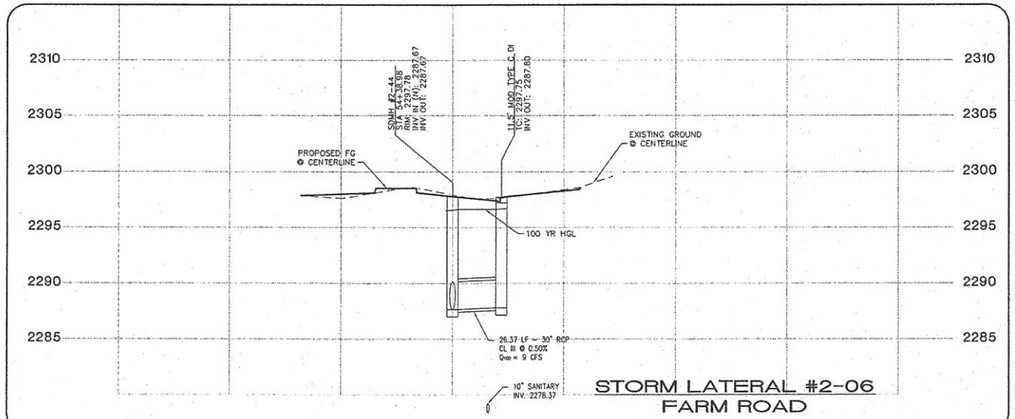


STORM LATERAL #2-05
ALIANTE PARKWAY
STA: 35+46.85

* Existing
Storm Drain Location
Size & Slope



STORM LATERAL #2-03
ALIANTE PARKWAY
STA: 24+40.99



STORM LATERAL #2-06
FARM ROAD
STA: 54+38.98

30 0 15 30 60
(IN FEET)
1 INCH = 30 HORZ
1 INCH = 6 VERT

Avoid overhead power line contact, it's costly.
Call before you Overhead
1-702-227-2929
NEVADA POWER COMPANY dba SIERRA PACIFIC POWER COMPANY
SAFETY SERVICES DEPARTMENT

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1-800-227-2600

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REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter-Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 839-5400 Fax (702) 839-5454

STORM DRAIN
LATERAL PROFILES

NORTH LAS VEGAS
600 ACRES
AREA 2

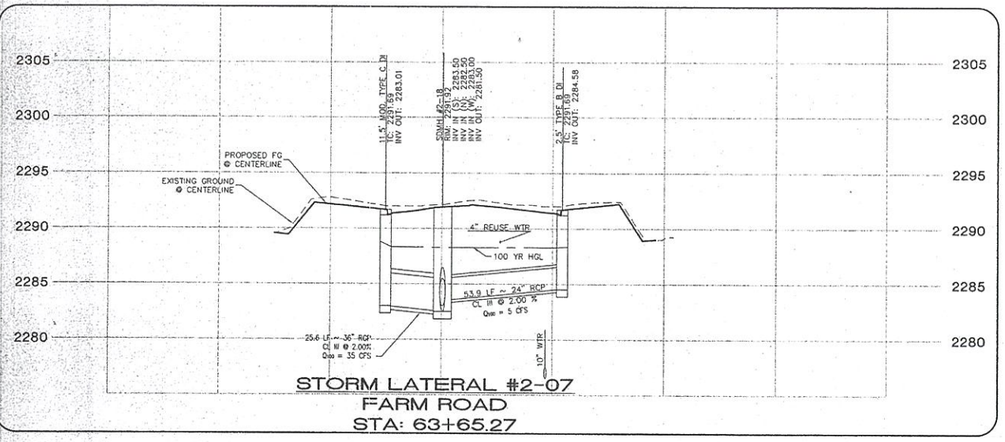
DRAWN BY:
DESIGNED BY:
CHECKED BY: GBW
PROJECT NO: 21054
SCALE: 1" = 30' 1" = 6'

PROFESSIONAL ENGINEER - STATE OF NEVADA
GLENN B. WATANABE
EXP. 06/30/08
CIVIL
No. 10225

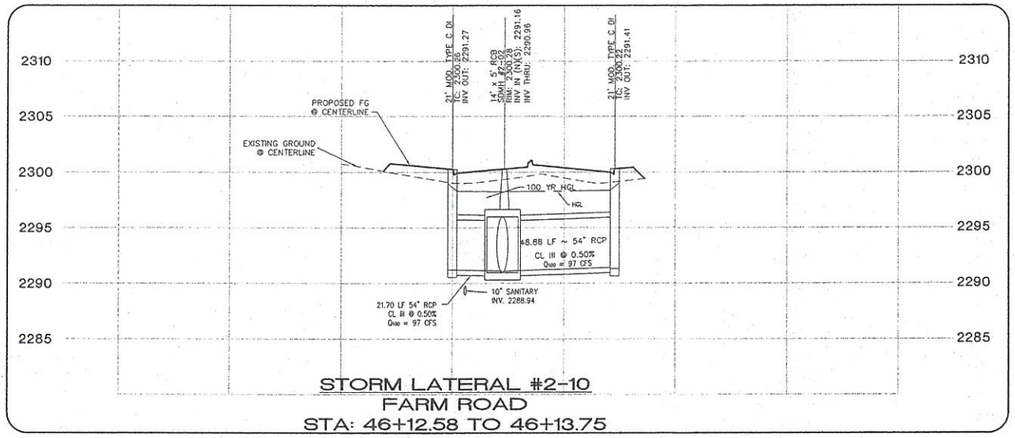
SHEET
STM-LAT-01
39 OF 74 SHEETS

DRAWING NO.
28976

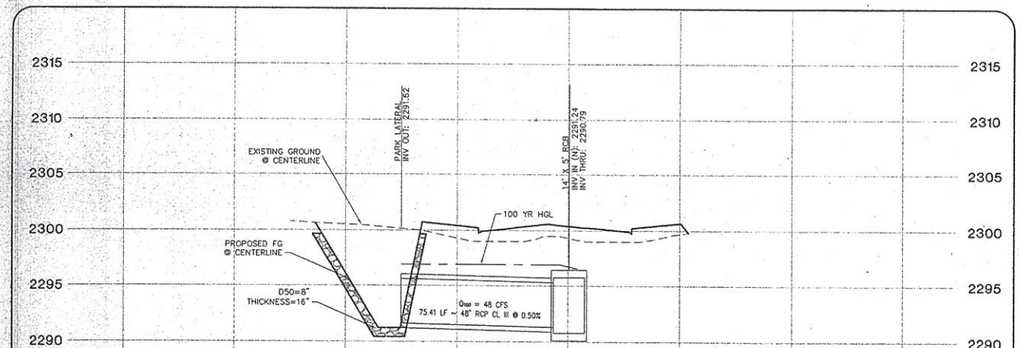
Drawing Name: E:\241054 NLV DEVELOPMENT\AREA 02\Improvement Plans\1054-02-STM-LAT-01_02.dwg User: sackschewitz Sep 13, 2007 - 8:14am



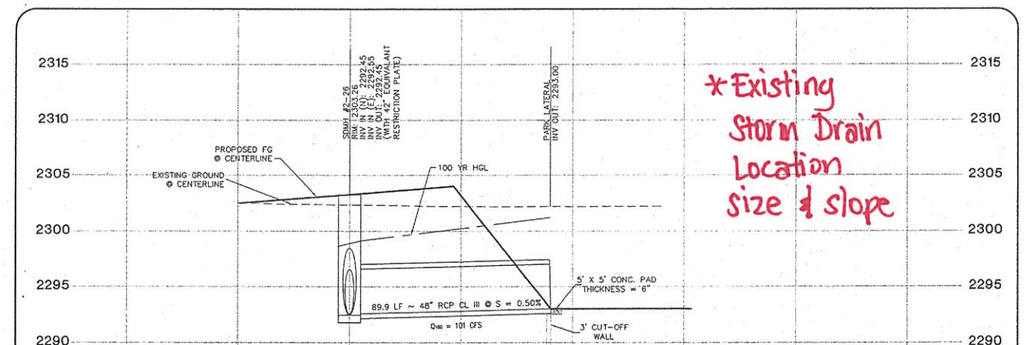
STORM LATERAL #2-07
FARM ROAD
STA: 63+65.27



STORM LATERAL #2-10
FARM ROAD
STA: 46+12.58 TO 46+13.75

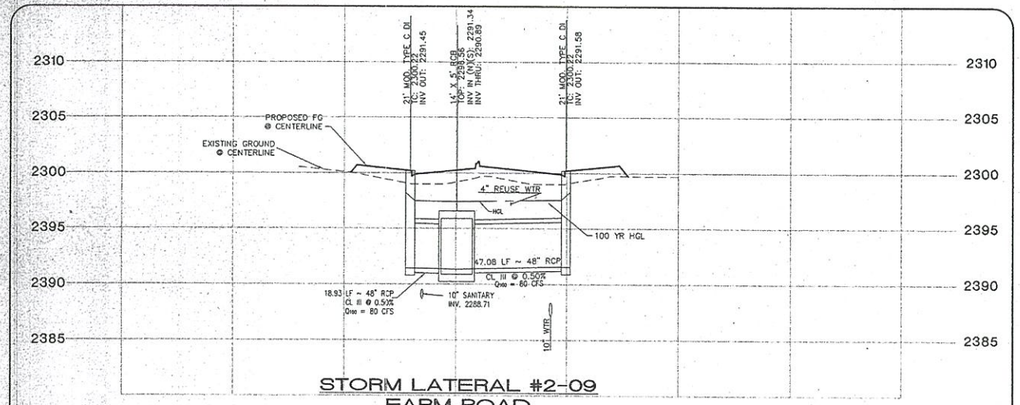


STORM LATERAL #2-08
FARM ROAD
STA: 46+80.80

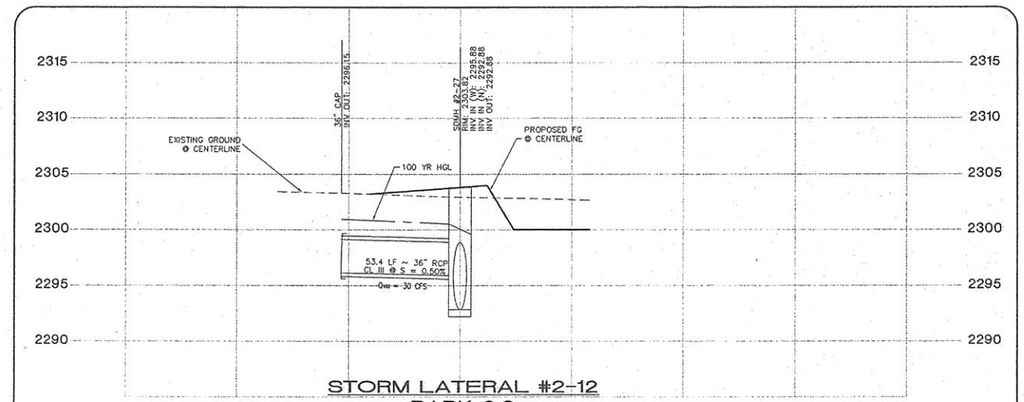


*Existing Storm Drain Location size & slope

STORM LATERAL #2-11
PARK 2.6
STA: 16+23.57



STORM LATERAL #2-09
FARM ROAD
STA: 46+35.84 TO 46+46.87



STORM LATERAL #2-12
PARK 2.6
STA: 17+04.20

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NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

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30 0 15 30 60
(IN FEET)
1 INCH = 30 HORZ
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REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

Carter=Burgess
6655 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services
(702) 938-5400 Fax (702) 938-5454

STORM DRAIN
LATERAL PROFILES

NORTH LAS VEGAS
600 ACRES
AREA 2

DRAWN BY: cm
DESIGNED BY:
CHECKED BY: GBW
PROJECT NO: 241594
SCALE: 1" = 30' 1" = 6'

PROFESSIONAL ENGINEER-STATE OF NEVADA
GLENN B. WATANABE
No. 15027
EXP. 06/30/08
CIVIL

SHEET
STM-LAT-02
40 OF 74 SHEETS
DRAWING NO.
28976

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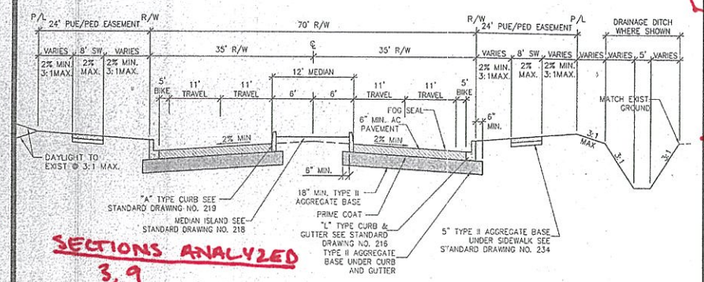
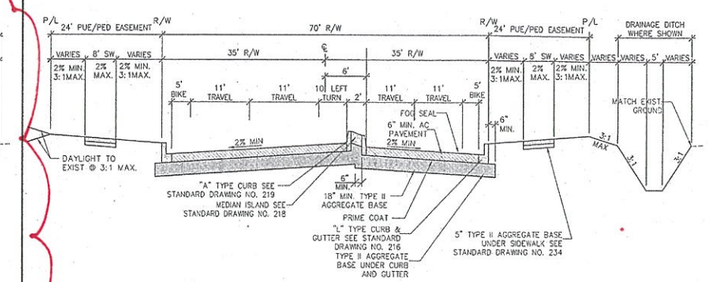
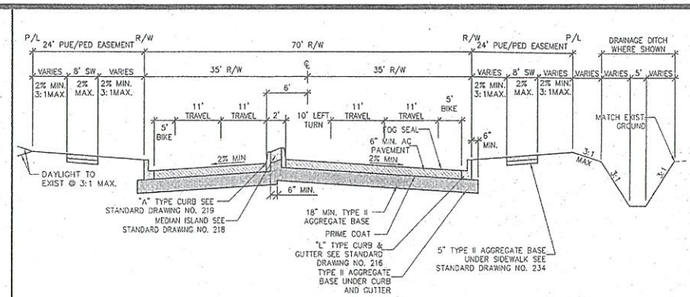


SECTIONS ANALYZED
3, 9

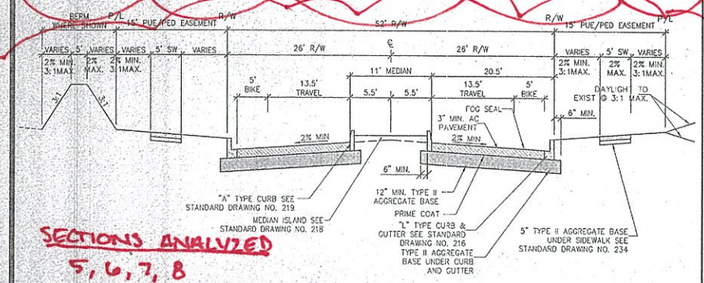
A D-01 **70' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
FARM ROAD (PUBLIC)



B D-01 **70' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
FARM ROAD (PUBLIC) LEFT TURN LANE - NORTH OF CENTERLINE

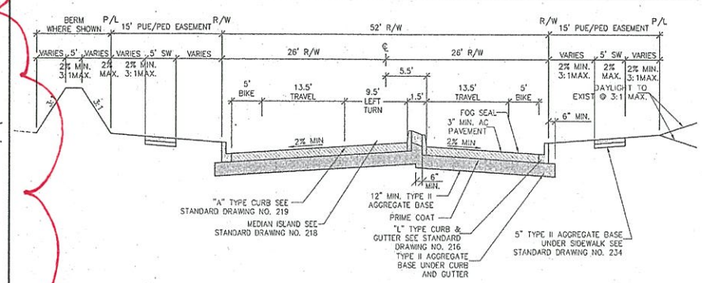


C D-01 **70' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
FARM ROAD (PUBLIC) LEFT TURN LANE - SOUTH OF CENTERLINE

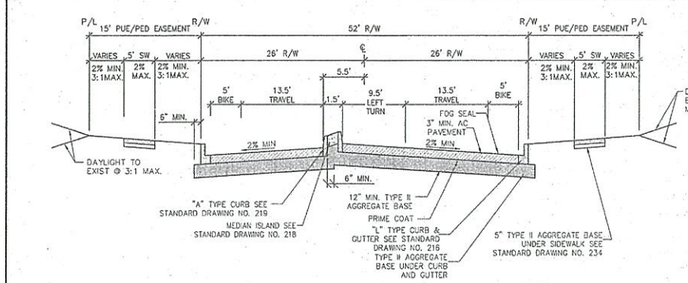


SECTIONS ANALYZED
5, 6, 7, 8

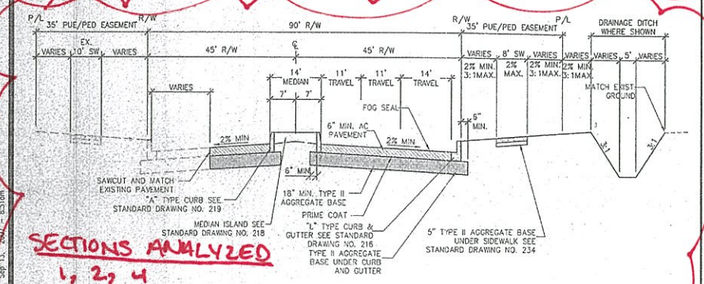
D D-01 **52' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
VIRAGE PARK DRIVE (PUBLIC), ANDREA PARK DRIVE (PUBLIC),



E D-01 **52' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
ANDREA PARK DRIVE (PUBLIC), VIRAGE PARK DRIVE (PUBLIC),
LEFT TURN LANE - NORTH OF CENTERLINE

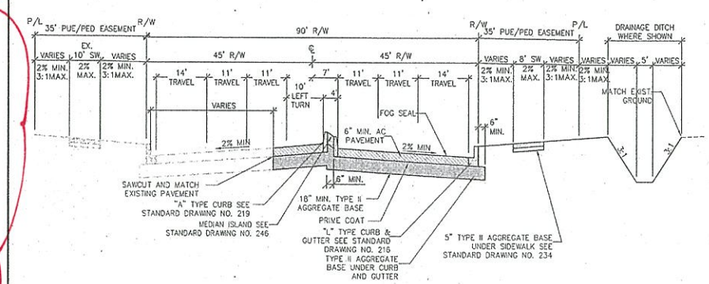


F D-01 **52' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
ANDREA PARK DRIVE (PUBLIC), VIRAGE PARK DRIVE (PUBLIC),
LEFT TURN LANE - SOUTH OF CENTERLINE

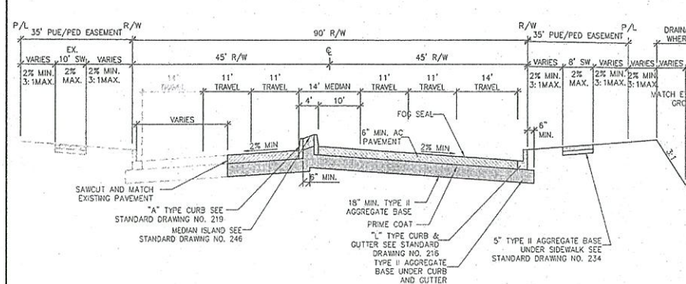


SECTIONS ANALYZED
1, 2, 4

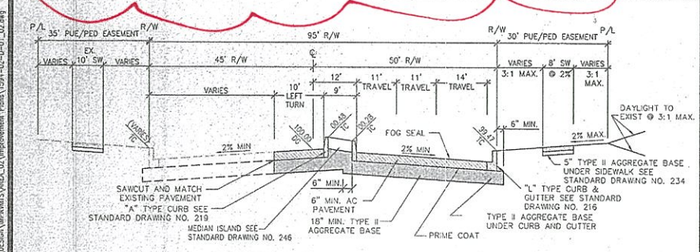
G D-01 **90' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
ALIANTE PARKWAY (PUBLIC)



H D-01 **90' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
ALIANTE PARKWAY (PUBLIC) LEFT TURN LANE - WEST OF CENTERLINE



I D-01 **90' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
ALIANTE PARKWAY (PUBLIC) LEFT TURN LANE - EAST OF CENTERLINE



J D-01 **95' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
ALIANTE PARKWAY (PUBLIC) LEFT TURN LANE - WEST OF CENTERLINE

NOTE:
SEE PLAN & PROFILE SHEETS FOR BERM, SWALE & DAYLIGHT INFORMATION.

NOTE:
THE OFF-SITE PAVEMENT SECTIONS SHOWN ON THE PLANS MUST BE DESIGNED IN ACCORDANCE WITH THE STANDARD SPECIFICATION SECTION 401 USING THE AASHTO MODEL. THE NEW SECTION MUST BE BASED ON THE ACTUAL DAILY TRAFFIC COUNTS PROVIDED BY THE CITY AND R-VALUE TEST RESULTS PERFORMED SUBSEQUENT TO GRADING.

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter-Burgess
6655 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services
(702) 938-5400 Fax (702) 938-5454

TYPICAL STREET SECTIONS

NORTH LAS VEGAS
600 ACRES
AREA 2

DRAWN BY:
DESIGNED BY:
CHECKED BY: GBW
PROJECT NO: 041594
SCALE: N/A

PROFESSIONAL ENGINEER - STATE OF NEVADA
GLENN B. WATANABE
EXP. 06/30/06
CIVIL
No. 16205

SHEET
D-01
45 OF 74 SHEETS
DRAWING NO.

Drawing Name: L:\041594 - ALV SITE\DESIGN\APPROVED_DGN_DP\Improvement Plans\041594-GC-D-01_D2.dwg User: aadams Sep 13, 2006 - 8:51am

Approved Plans for
North Las Vegas 600 Acres Area 3 (CNLV No. 29254)

PARK HIGHLANDS

IMPROVEMENT PLANS FOR

NORTH LAS VEGAS 600 ACRES

AREA 3

CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA

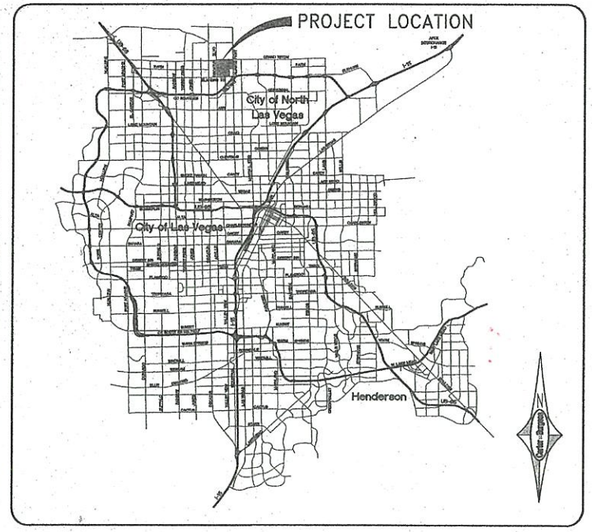
OWNER:
NOVEMBER 2005 LAND INVESTORS, LLC/DRHI INC
11411 SOUTHERN HIGHLANDS PKWY, SUITE 300
LAS VEGAS NEVADA 89141
702-616-3800
702-616-3833 FAX

DEVELOPER:
NOVEMBER 2005 LAND INVESTORS, LLC/DRHI INC
11411 SOUTHERN HIGHLANDS PKWY, SUITE 300
LAS VEGAS NEVADA 89141
702-616-3800
702-616-3833 FAX

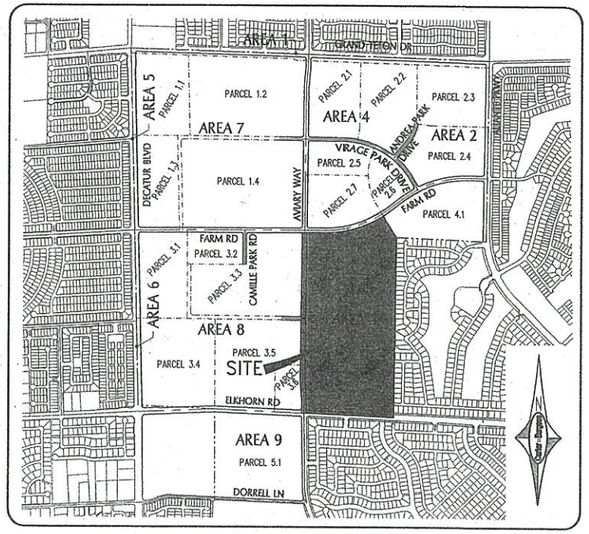
ENGINEER:
Carter:Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road, Las Vegas, NV. 89119
(702) 938-5400 Fax (702) 938-5454

GEOTECH ENGINEER
PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NUMBER: E-06-022
DATE: April 26, 2006
REVISED DATE: July 26, 2007
CUT TOTAL: 20,896
FILL TOTAL: 15,794
NET: 5,102

SERVICES:
SANITARY SEWER: CITY OF NORTH LAS VEGAS
WATER: CITY OF NORTH LAS VEGAS
POWER: NEVADA POWER COMPANY
GAS: SOUTHWEST GAS CORPORATION
TELEPHONE: EMBARQ
CABLE T.V.: COX COMMUNICATIONS
REFUSE: REPUBLIC SERVICES OF SOUTHERN NEVADA



VICINITY MAP
N.T.S.



SITE LOCATION
N.T.S.

BENCHMARK
MLV9117NWS
NAVD 88 ELEVATION PUBLISHED 11/1/2006
699.482 METERS, 2294.88 FEET
ELEVATION USED FOR THESE PLANS, PRE-REVISION
699.511 METERS, 2294.98 FEET
RIVET AND 2" ROUND ALUMINUM DISK, STAMPED NORTH LAS VEGAS BM NO. MLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BOR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARINGS
SOUTH 87°28'30" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

LEGAL DESCRIPTION
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, AND 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

SHEET INDEX

SHEET NO.	DESCRIPTION
1. C-01	COVER SHEET
2. C-02	GENERAL NOTES
3. C-03	OVERALL AREA MAP
4. HCP-01	HORIZONTAL CONTROL PLAN
5. MU-STM-01	MASTER UTILITY – STORM DRAIN
6. MU-SAN-01	MASTER UTILITY – SANITARY SEWER
7. MU-WTR-01	MASTER UTILITY – WATER
8. PP-STM-01	ROADWAY & STORM P/P, AVIARY WAY, STA: 35+00 TO STA: 42+00
9. PP-STM-02	ROADWAY & STORM P/P, AVIARY WAY, STA: 42+00 TO STA: 49+00
10. PP-STM-03	ROADWAY & STORM P/P, AVIARY WAY, STA: 49+00 TO STA: 56+00
11. PP-STM-04	ROADWAY & STORM P/P, AVIARY WAY, STA: 56+00 TO STA: 63+04.49
12. PP-STM-05	ROADWAY & STORM P/P, ELKHORN ROAD, STA: 34+00 TO STA: 41+00
13. PP-STM-06	ROADWAY & STORM P/P, ELKHORN ROAD, STA: 41+00 TO STA: 48+00
14. PP-STM-07	STORM P/P, INTERIM CHANNEL, STA: 8+00 TO STA: 13+00
15. PP-STM-08	STORM P/P, INTERIM CHANNEL, STA: 13+00 TO STA: 20+00
16. PP-STM-09	STORM P/P, INTERIM CHANNEL, STA: 20+00 TO STA: 27+00
17. PP-STM-10	STORM P/P, INTERIM CHANNEL, STA: 27+00 TO STA: 30+73.53
18. PP-STM-11	STORM P/P, ELKHORN ROAD-(EX. ACCESS RD), STA: 30+00 TO STA: 34+00
19. PP-STM-12	STORM P/P, TRAIL-03 36" RCP, STA: 8+00 TO STA: 13+00
20. PP-UTL-01	WATER & SEWER P/P, AVIARY WAY, STA: 35+50 TO STA: 42+50
21. PP-UTL-02	WATER & SEWER P/P, AVIARY WAY, STA: 42+50 TO STA: 49+50
22. PP-UTL-03	WATER & SEWER P/P, AVIARY WAY, STA: 49+50 TO STA: 56+50
23. PP-UTL-04	WATER & SEWER P/P, AVIARY WAY, STA: 56+50 TO STA: 63+03.87
24. PP-UTL-05	WATER & SEWER P/P, ELKHORN ROAD, STA: 34+00 TO STA: 41+00
25. PP-UTL-06	WATER & SEWER P/P, ELKHORN ROAD, STA: 41+00 TO STA: 47+95
26. PP-UTL-07	WATER & SEWER P/P, SNWA LOW POINT DRAIN FARM RD. & AVIARY WAY
27. WTR-DET-01	WATER DETAILS, SNWA LOW POINT DRAIN
28. STM-LAT-01	STORM SEWER LATERAL PROFILES
29. STM-LAT-02	STORM SEWER LATERAL PROFILES
30. SAN-LAT-01	SANITARY SEWER LATERAL PROFILES
31. WTR-LAT-01	WATER LATERALS
32. WTR-LAT-02	WATER LATERALS
33. WTR-LAT-03	WATER LATERALS
34. D-01	STREET & CHANNEL SECTIONS
35. D-02	STREET SECTIONS & DETAILS
36. SD-01	JUNCTION STRUCTURE
37. SD-02	JUNCTION STRUCTURE
38. SD-03	JUNCTION STRUCTURE
39. SD-04	JUNCTION STRUCTURE
40. SD-05	JUNCTION STRUCTURE
41. T-01	SIGNAGE AND STRIPING, AVIARY WAY, STA: 35+50 TO STA: 49+50
42. T-02	SIGNAGE AND STRIPING, AVIARY WAY, STA: 49+50 TO STA: 63+03.87
43. T-03	SIGNAGE AND STRIPING, ELKHORN ROAD, STA: 34+00 TO STA: 47+95
44. TS-01	TRAFFIC
45. TS-02	TRAFFIC
46. E-01	ELECTRICAL SYMBOLS & LEGEND
47. E-3.0	ELECTRICAL – STREET LIGHTING PLAN – AVIARY WAY
48. E-3.1	ELECTRICAL – STREET LIGHTING PLAN – ELKHORN ROAD
49. E-3.2	ELECTRICAL – SINGLE-LINE DIAGRAM & CALCULATIONS
50. E-3.3	ELECTRICAL – PANEL SCHEDULES & CALCULATIONS
51. CP-01	CATHODIC PROTECTION – TEST STATION RELOCATION DETAILS
52. CP-02	CATHODIC PROTECTION – TEST STATION RELOCATION DETAILS
53. CP-03	CORROSION CONTROL – DETAILS
54. CP-04	CORROSION CONTROL – DETAILS
55. CP-05	CORROSION CONTROL – SPECIFICATIONS
56. PP-INT-01	INTERIM GRADING PLAN & PROFILE FARM ROAD STA: 10+00.00 TO STA: 17+00.00
57. PP-INT-02	INTERIM GRADING PLAN & PROFILE FARM ROAD STA: 17+00.00 TO STA: 24+00.00
58. PP-INT-03	INTERIM GRADING PLAN & PROFILE FARM ROAD STA: 24+00.00 TO STA: 31+00.00
59. PP-INT-04	INTERIM GRADING PLAN & PROFILE FARM ROAD STA: 31+00.00 TO STA: 34+59.11

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

Avoid overhead power line contact. It's costly.
Call before you Overhead
1-702-227-2929
NEVADA POWER DISTRICT FOR SAFETY DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
811
Know what's below. Call before you dig.
811 UNDERGROUND SERVICE ALERT (USA)

APPROVALS

DR. QIONG LIU, PE- PTOE — DATE 3/6/08
DEPUTY DIRECTOR/CITY ENGINEER, PUBLIC WORKS DEPARTMENT

JENNIFER E. DOODY, P.E. — DATE 3/6/08
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

RANDALL D. CAGLE — DATE 3/6/08
MANAGER OF REAL PROPERTY SERVICES

CARLTON URBAN, P.E. — DATE 3/6/08
TRANSPORTATION SERVICES ADMINISTRATOR

UTILITIES DEPARTMENT-ENGINEERING SERVICES DIVISION — DATE 01/22/08
APPROVAL OF THESE PLANS SHALL NOT BE CONSTRUED TO BE A PERMIT FOR CONSTRUCTION, A COMMITMENT TO SUPPLY WATER AND/OR SEWER SERVICE OR AN APPROVAL OF ANY VIOLATION OF ONLY WATER AND/OR SEWER SERVICE RULES AND REGULATIONS OR DESIGN AND CONSTRUCTION STANDARDS.

C.N.L.V. FIRE DEPARTMENT — DATE 1/23/08

SOUTHERN NEVADA WATER AUTHORITY — DATE 24DEC07
SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

COX COMMUNICATIONS LAS VEGAS, INC. — DATE 12/4/07

EMBARQ — DATE 12/4/07
THE ATTACHED EMBARQ APPROVAL DOES NOT ASSURE 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.

NEVADA POWER COMPANY — DATE 12/10/07
NEVADA POWER COMPANY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NEVADA POWER COMPANY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISION'S RULES AND REGULATIONS.

SOUTHWEST GAS CORPORATION — DATE 12/13/07

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

Carter:Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax (702) 938-5454

COVER SHEET

NORTH LAS VEGAS 600 ACRES AREA 3

DRAWN BY:
DESIGNED BY: 11-05-07
CHECKED BY: GW 11-05-07
PROJECT NO: 29254.1
SCALE: N/A N/A

JOHN P. MENG CIVIL EXP. 12/31/09 No.17540 STATE OF NEVADA PROFESSIONAL ENGINEER 1/7/08

SHEET C-01
01 OF 59 SHEETS
DRAWING NO. 29254

DUPES

Drawing Name: L:\241594 - NLV SITE\DESIGN\WPWORK\AREA_03\Improvement Plans\01 1594-03-01.dwg Date: Dec 06, 2007 - 4:45pm User: lsadashewsky

Avoid overhead power line contact. It's costly. **Call before you Overhead** 1-702-227-2929 NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

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

DISCLAIMER:

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

BENCHMARK

NAVD 88 ELEV. PUBLISHED 11/01/06 699.482 METERS, 2294.88 FEET. ELEVATION USED FOR THESE PLANS, PRE-REVISION 699.511 METERS, 2294.98 FEET. RIVET AND 2" ROUND ALUMINUM DISC, STAMPED NORTH LAS VEGAS BM No. NLV9117WMS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARINGS

SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

LEGAL DESCRIPTION

GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, AND 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

SNWA CONSTRUCTION NOTES:

(15) ADJUST EX. FACILITY TO GRADE AND/OR EXTEND TO LOCATION SHOWN.

(16) EXTEND/RELO. EX. SNWA/CNLV HARDWARE (IN CONFORMANCE W/ SNWA/UDACS CONSTRUCTION STANDARDS, RESPECTIVELY). EXTEND/RELO EX. TEST STATIONS PER SHEET CP-01 & CP-02.

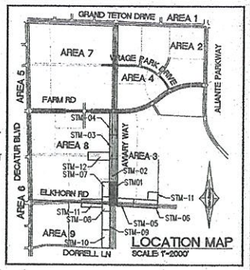
SNWA NOTES:

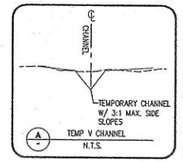
1. SNWA FIBER OPTIC CONDUIT FOLLOWS ALONG THE WEST SIDE OF THE SNWA PIPELINE.
2. CAUTION: SNWA TEST LEADS ARE SHALLOW.
3. ALL REPAIRS, REPLACEMENTS, RELOCATIONS AND/OR EXTENSIONS MUST BE DESIGNED AND MONITORED BY A NACE INTERNATIONAL-CERTIFIED CATHODIC PROTECTION SPECIALIST AND WITNESSED AND APPROVED BY SNWA CATHODIC PROTECTION TECHNICIAN PRIOR TO ACCEPTING THE INSTALLATION. CONTRACTOR SHALL PROVIDE ALL MATERIALS FOR ALL REPAIRS, REPLACEMENTS, RELOCATIONS, AND/OR EXTENSIONS. MATERIALS PROVIDED BY CONTRACTOR SHALL BE APPROVED BY SNWA PRIOR TO ACCEPTING THE INSTALLATION.

STORM CONSTRUCTION NOTES:

– ALL RCP TO BE CLASS III, UNLESS OTHEWISE NOTED.
– NOT ALL NOTES USED ON THIS SHEET –

(1) INSTALL 60" TYPE I MANHOLE CCAUSD No. 403. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
(2) INSTALL TYPE II MANHOLE PER CCAUSD No. 405. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
(3) INSTALL TYPE III MANHOLE PER CCAUSD No. 408. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
(4) INSTALL MODIFIED TYPE "C" DROP INLET, PER CCAUSD No. 412A
(5) INSTALL RCP END SECTION PER NDOT R-2.2.1, SEE SHEET D-02.
(6) INSTALL TEMPORARY PLUG & CAP FOR FUTURE PHASE.
(7) REMOVE EXISTING END SECTION & CONNECT TO EXISTING RCP. CONTRACTOR TO VERIFY SIZE, INVERT & LOCATION PRIOR TO CONSTRUCTION.
(8) INSTALL TYPE 1A MANHOLE PER CCAUSD No. 404.





SNWA SHEET REFERENCE NOTE:

FOR 72" SNWA TRANSMISSION MAIN (CONTRACT NO 140-A AND 170-B), FIBER OPTIC CONDUIT AND ALL OTHER SNWA APPURTENANCES SEE SHEETS PP-UTL-01, PP-UTL-02, PP-UTL-03, PP-UTL-04, PP-UTL-05, PP-UTL-06, SAN-LAT-01, WTR-LAT-02, & WTR-LAT-03 THIS SET .

CONSTRUCTION NOTES:

– ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH "CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS (CCAUSD)" LATEST EDITION AND/OR REGULATING ENTITY HAVING JURISDICTION.
– NOT ALL NOTES USED ON THIS SHEET –

1. CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD No. 216.
2. CONSTRUCT "A" TYPE CURB PER CCAUSD No. 219.
3. INSTALL A.C. PAVEMENT PER STREET SECTIONS.
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SNWA CONSTRUCTION NOTE

CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS AND CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS, AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY, DEVELOPMENT PLAN REVIEW, AT (702) 862-3444 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITY.

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY — DATE: 24 DEC 07

CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION

MANAGER, JENNIFER E. DOODY, P.E. — DATE: 3/6/08

GRADING PLAN CERTIFICATION

JOHN P. MENG — PE # 17540 — DATE: 12/7/07

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

INTERIM CHANNEL – SEE SHT. PP-STM-11 FOR CONTINATION

INTERIM CHANNEL – SEE SHT. PP-STM-08 FOR CONTINUATION

CAUTION HIGH PRESURE GAS LINES

PARCEL 5.1

TOP OF BERM ELEV. 2299.6(MIN)

35.0' EX. PAVED ACCESS ROAD

TOP OF BERM ELEV. 2299.6(MIN)

FUTURE AREA 10 IMPROVEMENTS

RIP-RAP BED D50=+", DEPTH=12"

17'x 7.5' 4-SIDED CONCRETE HEADWALL

STORM LATERAL #03-05 (SEE SHEET STM-LAT-01)

STA: 33+85.75 O/S: 55.00 LT. 97.07 TC/BCR

SNWA STA 143+56 SNWA TEST STATION SEE SNWA NOTE 2

D.I.-03-06 STA: 37+40.59 TC: 97.07 L=5.5' INV: 93.08

CORROSION CNTRL TEST STATION #12 STA: 34+00.00

STA: 33+85.75 BEG. ELKHORN RD. STREET IMPROVEMENTS

EX. SNWA LOW POINT DRAIN TO BE TRENCH WIDEN PER AREA 9 IMPROVEMENTS

CAUTION HIGH PRESURE GAS LINES

EX. 10" STEEL GAS

EX. 10" PVC W(PUB)

STA: 35+92.30 BEG. AVIARY WAY STREET IMPROVEMENTS & PLASTER CONTINUATION

ELKHORN RD. – SEE SHT. PP-STM-05 FOR CONTINUATION

PARK PARCEL 3.6

DAYLIGHT LINE

R=50.03' L=41.27' Tan=21.89' Δ=47°15'55"

FOR INTERIM CHANNEL INFORMATION SEE SHEET PP-STM-7 TO PP-STM-11

STA: 38+17.84 O/S: 45.00 RT. 97.46 TC/PT

STA: 38+80.71 O/S: 45.00 RT. 97.77 TC/PRC

STA: 39+46.10 O/S: 35.00 RT. 98.30 TC/PCC

STA: 39+10.17 O/S: 40.51 RT. 98.03 TC/PRC

STA: 39+46.15 O/S: 35.00 RT. 98.45 TC/PRC

STA: 40+81.41 O/S: 5.33 LT. 99.61 TC/PCC

STA: 41+34.46 O/S: 35.00 LT. 99.24 TC/PT

EX. SNWA ESMT

12" PVC WTR

10" PVC SWR

4" REUSE WIR

EX. 72" MLCP SNWA PIPE

EX. 36" MLCP WTR

MATCHLINE STA: 42+00.00 SEE SHT. PP-STM-02

STA: 38+17.84 O/S: 45.00 RT. 97.46 TC/PT

STA: 38+80.61 O/S: 4.67 RT. 98.14 TC/PRC

STA: 39+76.15 98.48 TC/PRC

STA: 40+17.55 O/S: 0.90 RT. 99.41 TC/PCC

STA: 41+34.46 O/S: 5.33 LT. 99.87 TC/PT

STA: 37+31.33 O/S: 5.33 RT. 98.00 TC/PCC

STA: 37+33.31 O/S: 4.69 RT. 98.05 TC/PCC

STA: 37+28.24 O/S: 45.00 LT

EX. WTR VAULT

STA: 37+33.31 97.23 TC/BCR

STA: 34+63.80 ELKHORN RD.

STA: 36+40.53 AVIARY WAY

24' LANDSCAPING AND PEDESTRIAN EASEMENT

PARCEL 4.4

FUT. SIDEWALK, SEE LANDSCAPE ARCHT. PLANS

SEE WTR LAT #03-06 SHEET WTR-LAT-01

SEE DETAIL 3 SHEET WTR-LAT-03

SEE DETAIL 1(2A) & 3 SHEET WTR-LAT-03

22

GAS NOTE:

CALL SOUTHWEST GAS AT 365-2296 FOR STANDBY WHEN EXCAVATIG OVER OR NEAR HIGI PREASURE GAS LINES

SNWA NOTE:

LANDSCAPE AND IRRIGATION PLANS (BY OTHERS) SHALL BE SUBMITTED AND APPROVED BY SNWA.

AVIARY WAY

(PUBLIC)

Carter::Burgess

30 0 15 30 60

(IN FEET)
1 INCH = 30' HOR.
1 INCH = 6' VERT.

LEGEND:

PROP. ASPHALT | PROP. SIDEWALK | PROP. RIP-RAP

GEOTECHNICAL NOTE:

PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC., DATED: APRIL 26, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.

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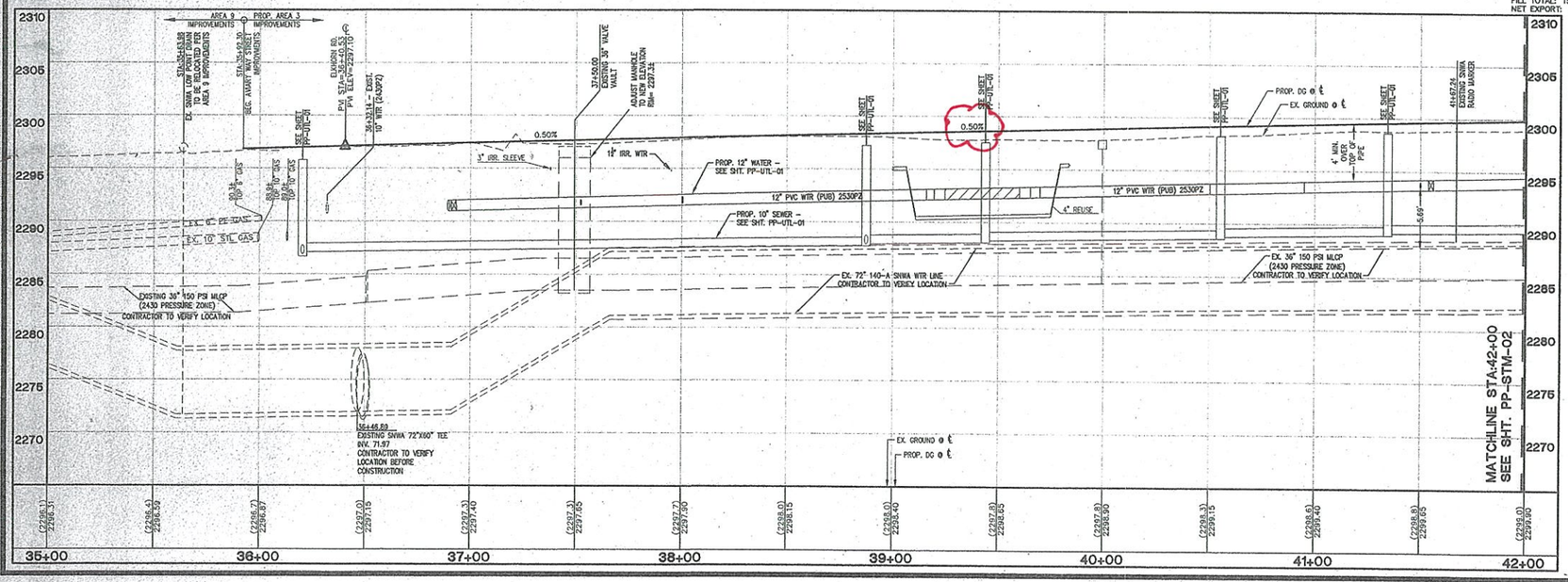

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter::Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax (702) 938-5464

ROADWAY & STORM P/P
AVIARY WAY
STA: 35+00.00 TO STA: 42+00.00
NORTH LAS VEGAS
600 ACRES
AREA 3

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT NO:	SCALE:
MC	CBW	CBW	24155A	1" = 30' 1" = 6'
11-05-07	11-05-07	11-05-07		

PROFESSIONAL ENGINEER STATE OF NEVADA JOHN P. MENG CIVIL EXP. 12/31/09 No.17540

SHEET PP-STM-01
8 OF 59 SHEETS
DRAWING NO. 29254

Drawing Name: L:\24155A - NV SITE\DESIGN\MSP\MSP\VAREA_03\Improvement_Plans\09-1594-03-PP-01-04.dwg User: sasipcheeseng Dec. 06, 2007 - 5:16pm

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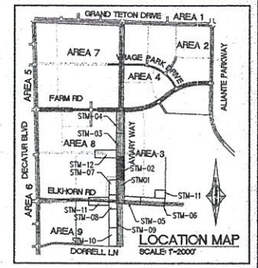

LOCATION MAP
SCALE: 1"=2000'

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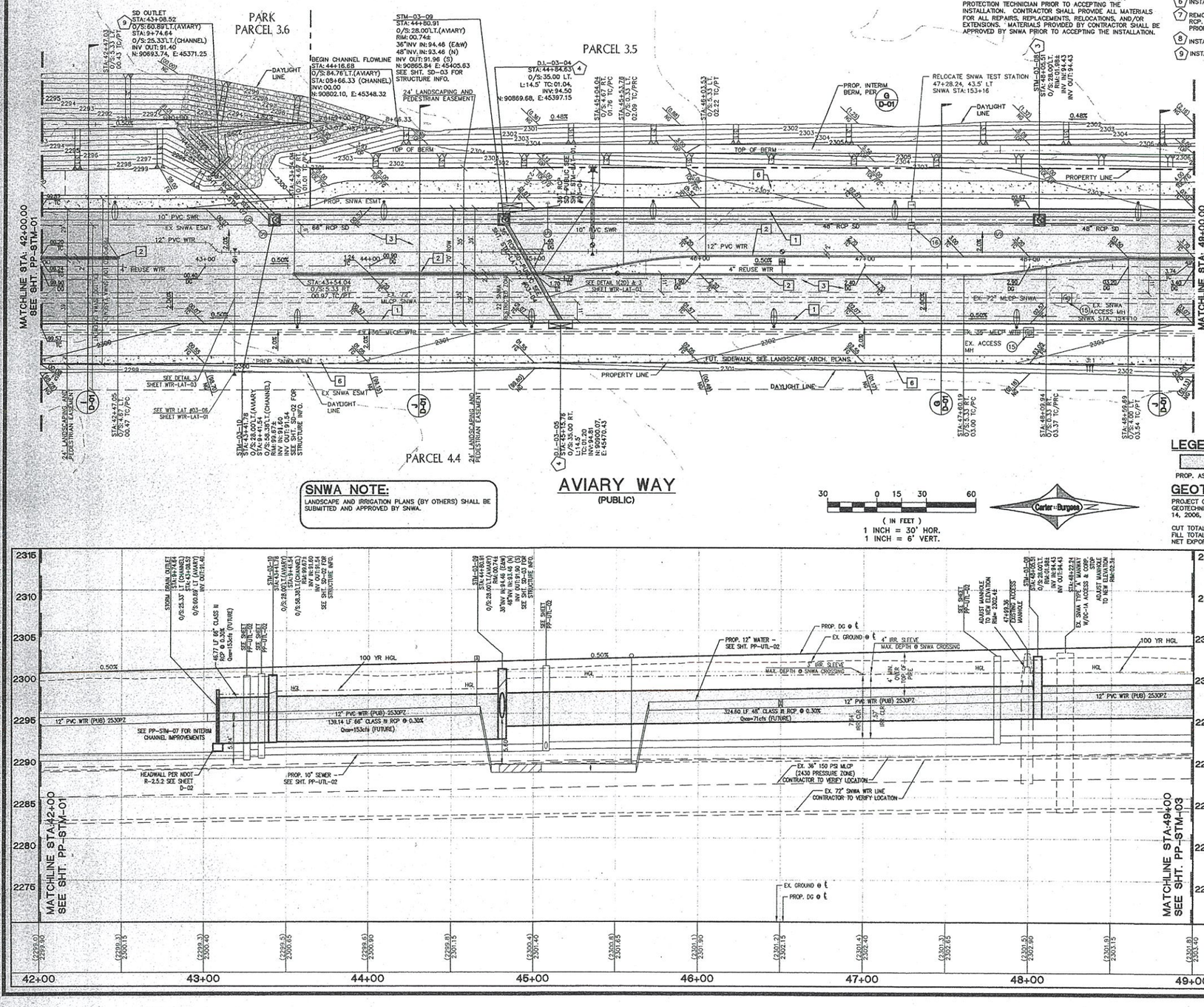

LEGEND:

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NET EXPORT: 5,102

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STORM DRAIN OUTFALL STA: 39+79.67 O/S: 25.33' LT. (CHANNEL) INV OUT: 91.40 O/S: 60.89' LT. (AVIARY)
STM-03-10 STA: 43+41.78 O/S: 28.00' LT. (AVIARY) O/S: 58.38' LT. (CHANNEL) RIM: 99.87± INV OUT: 91.54 SEE SHT. SD-02 FOR STRUCTURE INFO.
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SEE SHEET PP-UTL-02
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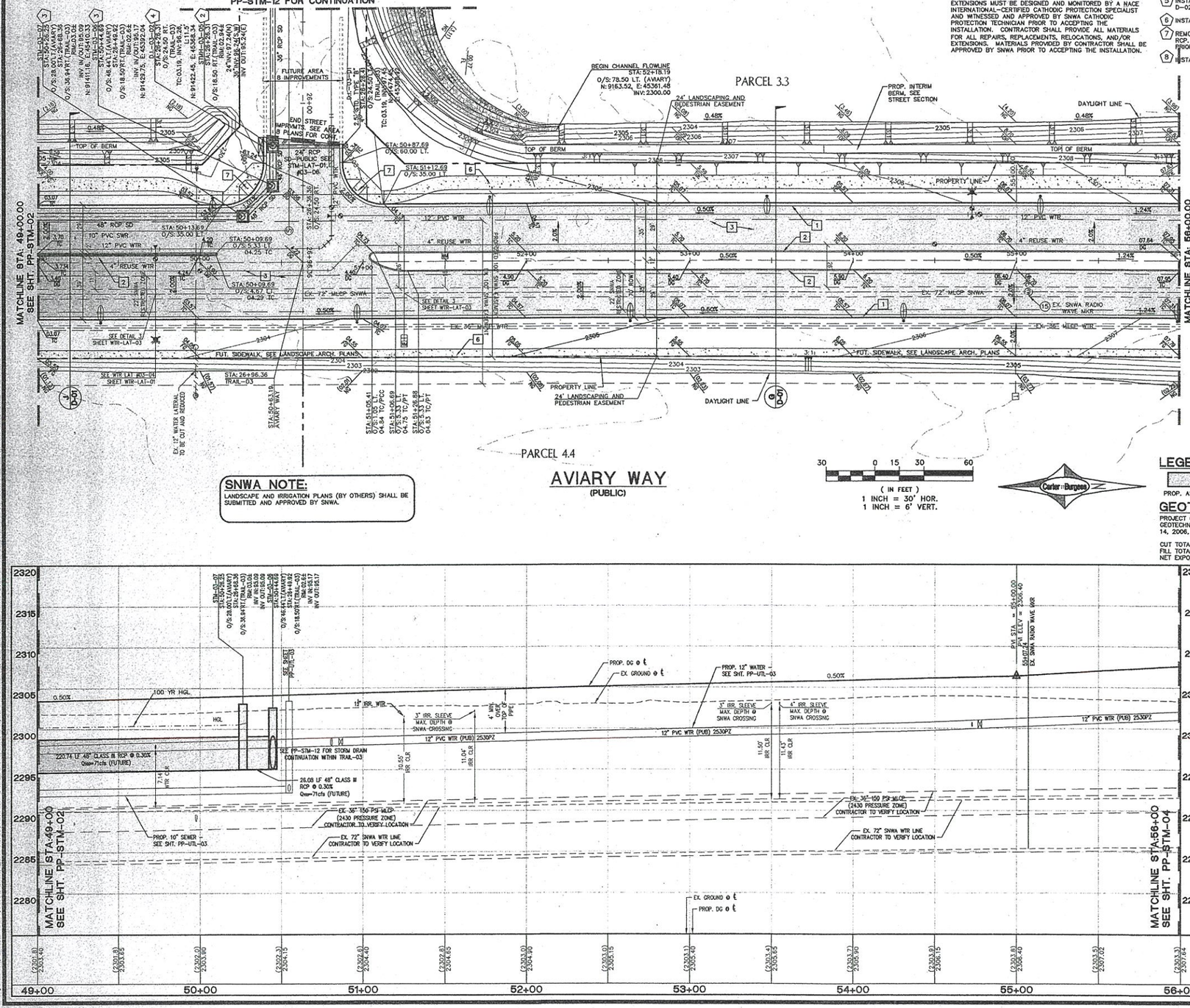

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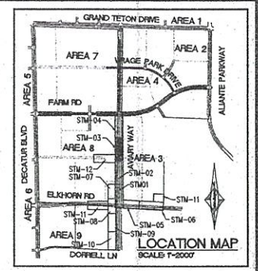

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6. ALL CONSTRUCTION SURVEY CONTROL SHALL BE DONE BY A LICENSED PROFESSIONAL LAND SURVEYOR IN ACCORDANCE WITH APPLICABLE STATUTES AND CODES. THE CONTRACTOR SHALL PROVIDE COMPETENT RESOURCES TO ASSURE BUILDING PAD AND BUILDING FLOOR ELEVATIONS CONFORM TO THOSE SHOWN ON THE CONSTRUCTION DRAWINGS. FURTHERMORE, THE CONTRACTOR SHALL PROVIDE THE CITY OF NORTH LAS VEGAS BUILDING DEPARTMENT WITH:
   A. CERTIFICATION OF "BUILDING FLOOR ELEVATIONS" IN CRITICAL DRAINAGE AREAS.
   B. CERTIFICATES OF "BUILDING PAD ELEVATIONS" IN NONCRITICAL AREAS.
7. THE CONTRACTOR SHALL CERTIFY TO THE CITY OF NORTH LAS VEGAS CONSTRUCTION SERVICES DIVISION THAT ALL FILLS, FOUNDATIONS AND SUBGRADES MEET THE MINIMUM COMPACTION REQUIREMENTS. CERTIFICATION SHALL BE MADE PRIOR TO POURING CONCRETE.

LEGEND:

PROP. ASPHALT | PROP. SIDEWALK | PROP. RIP–RAP

GEOTECHNICAL NOTE:

PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC., DATED: APRIL 26, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.

CUT TOTAL: 20,896
FILL TOTAL: 15,794
NET EXPORT: 5,102

*Existing storm drain location size & slope

SNWA CONSTRUCTION NOTE

CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS AND CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS, AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY, DEVELOPMENT PLAN REVIEW, AT (702) 862–3444 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITY.

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

M. Dishaw 24 DEC 07
SOUTHERN NEVADA WATER AUTHORITY DATE:

CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION

Jennifer E. Doody 12/6/07
MANAGER, JENNIFER E. DOODY, P.E. DATE:

GRADING PLAN CERTIFICATION

JOHN P. MENG PE # 17540 12/7/07 DATE:

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REVISION | BY | DATE

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter•Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road Las Vegas, NV 89119 (702) 938-5400 Fax (702) 938-5454

ROADWAY & STORM P/P
AVIARY WAY
STA: 49+00.00 TO STA: 56+00.00
NORTH LAS VEGAS
600 ACRES
AREA 3

DRAWN BY: MEL 11-05-07
DESIGNED BY: JAH 11-05-07
CHECKED BY: GBW 11-05-07
SCALE: 1" = 30'
PROJECT NO: 61154

JOHN P. MENG CIVIL EXP. 12/31/09 No. 17540 PROFESSIONAL ENGINEER STATE OF NEVADA 12/7/07

SHEET PP-STM-03
10 OF 59 SHEETS
DRAWING NO. 29254

Drawing Name: L:\261584 - NLV SITE\DESIGN\WPRMTS\AREA_03\Improvement Plans\DR 1594-03-PP-STM-01-04.dwg User: jackschneider[1] Dec 06, 2007 - 5:19pm

Avoid overhead power line contact, it's costly.
Call before you Overhead 1-702-227-2929
NEVADA POWER DISTRIBUTION AND SAFETY SERVICES DEPARTMENT

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

DISCLAIMER:

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BENCHMARK

NAVD 88 ELEV. PUBLISHED 11/01/06 699.482 METERS, 2294.83 FEET. ELEVATION USED FOR THESE PLANS, PRE-REVISION 699.511 METERS, 2294.93 FEET. RIVET AND 2" ROUND ALUMINUM DISC, STAMPED NORTH LAS VEGAS BM No. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARINGS

SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

LEGAL DESCRIPTION

GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, AND 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

LEGEND:

PROP. ASPHALT | PROP. SIDEWALK | PROP. RIP-RAP

GEOTECHNICAL NOTE:

PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC., DATED: APRIL 28, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.

CUT TOTAL: 20,895
FILL TOTAL: 15,794
NET EXPORT: 5,102

SNWA CONSTRUCTION NOTES:

(15) ADJUST EX. FACILITY TO GRADE AND/OR EXTEND TO LOCATION SHOWN.

(16) EXTEND/RELO. EX. SNWA/CNLV HARDWARE (IN CONFORMANCE W/ SNWA/UDACS CONSTRUCTION STANDARDS, RESPECTIVELY). EXTEND/RELO EX. TEST STATIONS PER SHEET CP-01 & CP-02.

SNWA NOTES:

1. SNWA FIBER OPTIC CONDUIT FOLLOWS ALONG THE WEST SIDE OF THE SNWA PIPELINE.
2. CAUTION: SNWA TEST LEADS ARE SHALLOW.
3. ALL REPAIRS, REPLACEMENTS, RELOCATIONS AND/OR EXTENSIONS MUST BE DESIGNED AND MONITORED BY A NACE INTERNATIONAL-CERTIFIED CATHODIC PROTECTION SPECIALIST AND WITNESSED AND APPROVED BY SNWA CATHODIC PROTECTION TECHNICIAN PRIOR TO ACCEPTING THE INSTALLATION. CONTRACTOR SHALL PROVIDE ALL MATERIALS FOR ALL REPAIRS, REPLACEMENTS, RELOCATIONS, AND/OR EXTENSIONS. MATERIALS PROVIDED BY CONTRACTOR SHALL BE APPROVED BY SNWA PRIOR TO ACCEPTING THE INSTALLATION.

STORM CONSTRUCTION NOTES:

– ALL RCP TO BE CLASS III, UNLESS OTHERWISE NOTED.
– NOT ALL NOTES USED ON THIS SHEET –

1. INSTALL 60" TYPE I MANHOLE CCAUSD No. 403. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
2. INSTALL TYPE II MANHOLE PER CCAUSD No. 405. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
3. INSTALL TYPE III MANHOLE PER CCAUSD No. 406. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
4. INSTALL MODIFIED TYPE "C" DROP INLET, PER CCAUSD No. 412A
5. INSTALL RCP END SECTION PER NDOT R-2.2.1, SEE SHEET D-02.
6. INSTALL TEMPORARY PLUG & CAP FOR FUTURE PHASE.
7. REMOVE EXISTING END SECTION & CONNECT TO EXISTING RCP. CONTRACTOR TO VERIFY SIZE, INVERT & LOCATION PRIOR TO CONSTRUCTION.
8. INSTALL TYPE 1A MANHOLE PER CCAUSD No. 404.



SNWA SHEET REFERENCE NOTE:

FOR 72" SNWA TRANSMISSION MAIN (CONTRACT NO 140-A AND 170-B), FIBER OPTIC CONDUIT AND ALL OTHER SNWA APPURTENANCES SEE SHEETS PP-UTL-01, PP-UTL-02, PP-UTL-03, PP-UTL-04, PP-UTL-05, PP-UTL-08, SAN-LAT-01, WTR-LAT-02, & WTR-LAT-03 THIS SET.

CONSTRUCTION NOTES:

– ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH "CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS (CCAUSD)" LATEST EDITION AND/OR REGULATING ENTITY HAVING JURISDICTION.
– NOT ALL NOTES USED ON THIS SHEET –

1. CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD No. 216.
2. CONSTRUCT "A" TYPE CURB PER CCAUSD No. 219.
3. INSTALL A.C. PAVEMENT PER STREET SECTIONS.
4. SAWCUT & MATCH EXISTING ASPHALT PAVING, CURB & GUTTER.
5. CONSTRUCT TYPICAL BUS TURN-OUT PER CCAUSD No. 234.1.
6. CONSTRUCT SIDEWALK PER CCAUSD No. 234.
7. CONSTRUCT CASE II SIDEWALK RAMP W/ TRUNCATED DOMES PER CCAUSD No. 235, CASE II.
8. RELOCATE EXISTING FIBER OPTIC LINE, SEE "E" SERIES SHEETS FOR NEW LOCATION.

GENERAL GRADING AND DRAINAGE NOTES:

1. PURSUANT TO CITY OF NORTH LAS VEGAS ORDINANCE NUMBER 1172, THE CONTRACTOR IS REQUIRED TO SECURE A GRADING PERMIT PRIOR TO COMMENCING WORK.
2. THE CONTRACTOR SHALL SECURE A PERMIT FOR ANY OFF-SITE CONSTRUCTION.
3. THE CONTRACTORS OPERATIONS SHALL NOT TRESPASS BEYOND THE PROJECT PROPERTY LINES UNLESS A PERMIT OR WRITTEN AUTHORIZATION HAS BEEN OBTAINED FROM THE PROPERTY OWNER(S) INVOLVED. COPIES OF SUCH WRITTEN AUTHORIZATION SHALL BE FURNISHED TO THE CITY OF NORTH LAS VEGAS' REPRESENTATIVE PRIOR TO START OF CONSTRUCTION.
4. THE CITY OF NORTH LAS VEGAS CONSTRUCTION SERVICES SHALL BE NOTIFIED ONE (1) WORKING DAY BEFORE ANY ON-SITE CONSTRUCTION WORK BEGINS.
5. AN APPROVED GRADING AND DRAINAGE PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE APPROVED PLAN WILL REQUIRE SUBMITTAL OF A FORMAL REVISED PLAN FOR REVIEW AND APPROVAL.
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   B. CERTIFICATES OF "BUILDING PAD ELEVATIONS" IN NONCRITICAL AREAS.
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CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS AND CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS, AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY, DEVELOPMENT PLAN REVIEW, AT (702) 862-3444 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITY.

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SOUTHERN NEVADA WATER AUTHORITY — DATE: 24 DEC 07

CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION

MANAGER, JENNIFER V.E. DOODY, P.E. — DATE: 3/6/08

GRADING PLAN CERTIFICATION

JOHN P. MENG — PE # 17540 — DATE: 12/7/07

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

SNWA NOTE:
LANDSCAPE AND IRRIGATION PLANS (BY OTHERS) SHALL BE SUBMITTED AND APPROVED BY SNWA.

SECTION 21

MATCHLINE STA: 56+00.00
SEE SHT. PP-STM-03

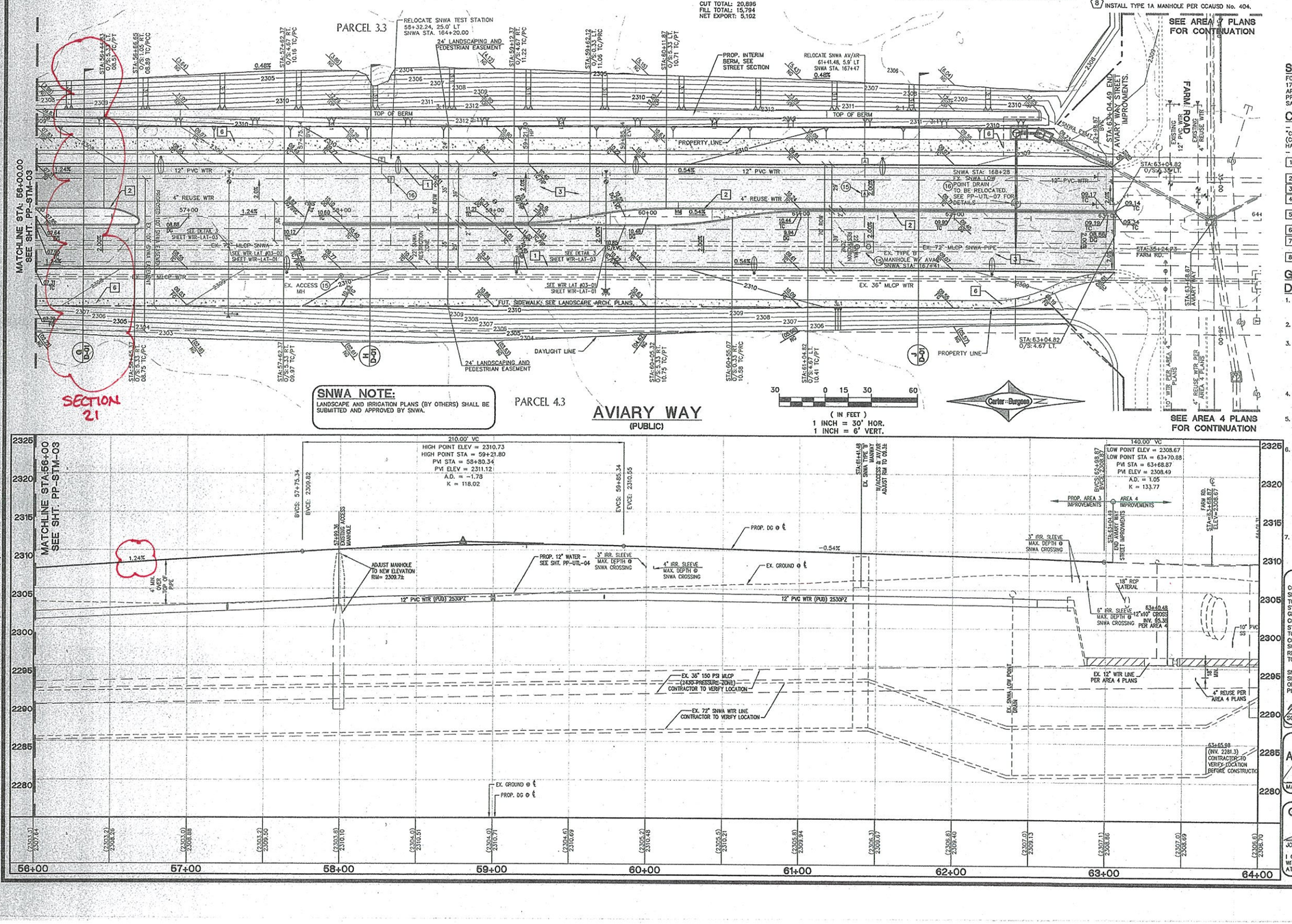
PARCEL 3.3 | PARCEL 4.3

AVIARY WAY
(PUBLIC)

SEE AREA 7 PLANS FOR CONTINUATION

SEE AREA 4 PLANS FOR CONTINUATION

(IN FEET)
1 INCH = 30' HOR.
1 INCH = 6' VERT.



Carter-Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road Las Vegas, NV 89119
(702) 838-5460 Fax (702) 838-5464

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

ROADWAY & STORM P/P
AVIARY WAY
STA: 56+00.00 TO STA: 63+04.49
NORTH LAS VEGAS
600 ACRES
AREA 3

REV	DATE	BY	REVISION

DRAWN BY: BDL — 11-06-07
DESIGNED BY: AAH — 11-06-07
CHECKED BY: CBW — 11-06-07
SCALE: 1" = 30" / 1" = 6"
PROJECT NO: 21594

JOHN P. MENG — CIVIL — EXP. 12/31/09 — No. 17540 — STATE OF NEVADA — PROFESSIONAL ENGINEER — 12/7/07

SHEET
PP-STM-04
11 OF 59 SHEETS
DRAWING NO.
29254

Drawing Name: L:\21594\ - NLV SHTS\DESIGN\IMPRVMTS\AREA_03\Improvement Plans\06-1594-03-PP-01-04.dwg Date: Dec 06, 2007 - 5:22pm User: rsolomonestrym

Avoid overhead power line contact. It's costly.
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1-702-227-2929
NEVADA POWER DEPARTMENT AND SAFETY SERVICES DEPARTMENT

Avoid cutting underground utility lines. It's costly.
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BENCHMARK

NAVD 88 ELEV. PUBLISHED 11/01/06 699.492 METERS, 2294.88 FEET. ELEVATION USED FOR THESE PLANS, PRE-REVISION 699.511 METERS, 2294.98 FEET. RIVET AND 2" ROUND ALUMINUM DISC, STAMPED NORTH LAS VEGAS BM No. NLV911TM95, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARINGS

SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

LEGAL DESCRIPTION

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LEGEND:

PROP. ASPHALT | PROP. SIDEWALK | PROP. RIP-RAP

GEOTECHNICAL NOTE:

PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC., DATED: APRIL 28, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.

CUT TOTAL: 20,896
FILL TOTAL: 15,794
NET EXPORT: 5,102

SNWA NOTES:

1. SNWA FIBER OPTIC CONDUIT FOLLOWS ALONG THE WEST SIDE OF THE SNWA PIPELINE.

2. CAUTION: SNWA TEST LEADS ARE SHALLOW.

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15 ADJUST EX. FACILITY TO GRADE AND/OR EXTEND TO LOCATION SHOWN.

16 EXTEND/RELO. EX. SNWA/CNLV HARDWARE (IN CONFORMANCE W/ SNWA/UDACS CONSTRUCTION STANDARDS, RESPECTIVELY). EXTEND/RELO EX. TEST STATIONS PER SHEET CP-01 & CP-02.

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7. REMOVE EXISTING END SECTION & CONNECT TO EXISTING RCP. CONTRACTOR TO VERIFY SIZE, INVERT & LOCATION PRIOR TO CONSTRUCTION.
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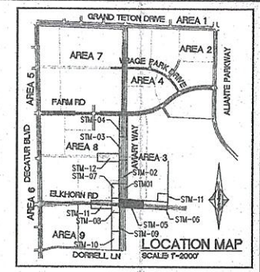

LOCATION MAP
SCALE: 1"=2000'

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   B. CERTIFICATES OF "BUILDING PAD ELEVATIONS" IN NONCRITICAL AREAS.
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SOUTHERN NEVADA WATER AUTHORITY — DATE: 24DEC07

CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION

MANAGER, JENNIFER E. DOODY, P.E. — DATE: 3/6/08

GRADING PLAN CERTIFICATION

JOHN P. MENG — PE # 17540 — DATE: 12/7/07

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

AVIARY RD. SEE SHT. PP-STM-01 FOR CONTINUATION

INTERIM CHANNEL - SEE SHT. PP-STM-09 FOR CONTINUATION

INTERIM CHANNEL - SEE SHT. PP-STM-09 FOR CONTINUATION

PARCEL 4.4

ASTORIA AT ALIANTE | PARCEL 17
ELKHORN ROAD EXISTING IMPROVEMENTS
FOR ASTORIA NLV, LLC.
PER G.C. WALLACE, INC. PLANS DATED 2-24-03

REMOVE EX. STREETLIGHTS AND FOUNDATIONS ALONG SOUTH SIDE OF ELKHORN RD.

ELKHORN ROAD
(PUBLIC)

SECTION 23

EAGLES ROOST ST.
(PUBLIC)

MATCHLINE STA:41+00.00
SEE SHT. PP-STM-06

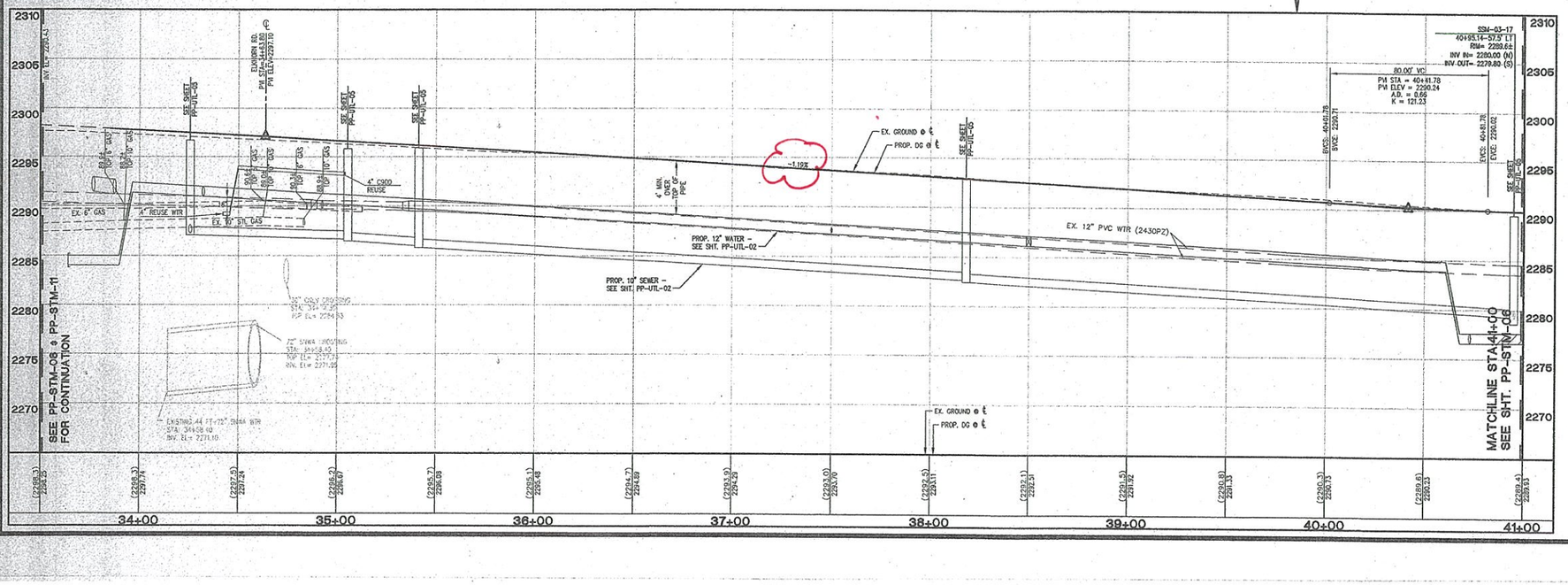
STA: 35+23.50 BEG. AVIARY WAY STREET IMPROVEMENTS. SEE AREA 9 PLANS FOR CONTINUATION

CAUTION: HIGH PREASURE GAS LINES

GAS NOTE:

CALL SOUTHWEST GAS AT 365-2296 FOR STANDBY WHEN EXCAVATIO OVER OR NEAR HIGI PREASURE GAS LINES

(IN FEET)
1 INCH = 30' HOR.
1 INCH = 6' VERT.



REV	DATE	BY	REVISION

NOVEMBER 2006 LAND INVESTORS, LLC/DRH, INC.

Carter-Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5600 Fax: (702) 938-5454

ROADWAY & STORM P/P
ELKHORN ROAD
STA: 34+00.00 TO STA: 41+00.00
NORTH LAS VEGAS
600 ACRES
AREA 3

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT NO:	SCALE:
MS	CSW	CSW	24159A	1" = 30' 1" = 6'
11-06-07	11-06-07	11-06-07		

JOHN P. MENG CIVIL EXP. 12/31/09 No.17540 — 12/7/07

SHEET
PP-STM-05
12 OF 59 SHEETS

DRAWING NO.
29254

Drawing Name: L:\24159A - ALV SHEDESIGN\IMPRVMTS\PSA\24159A-Improvement Prints\PP\ 1591-03-PP-06-06.dwg User: sscholnick(mjm) Dec 06, 2007 - 1:32pm

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LEGEND:

PROP. ASPHALT | PROP. SIDEWALK | PROP. RIP-RAP

GEOTECHNICAL NOTE:

PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC. DATED: APRIL 26, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.

CUT TOTAL: 20,896
FILL TOTAL: 15,794
NET EXPORT: 5,102

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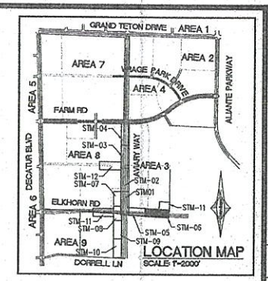

LOCATION MAP
SCALE: 1"=2000'

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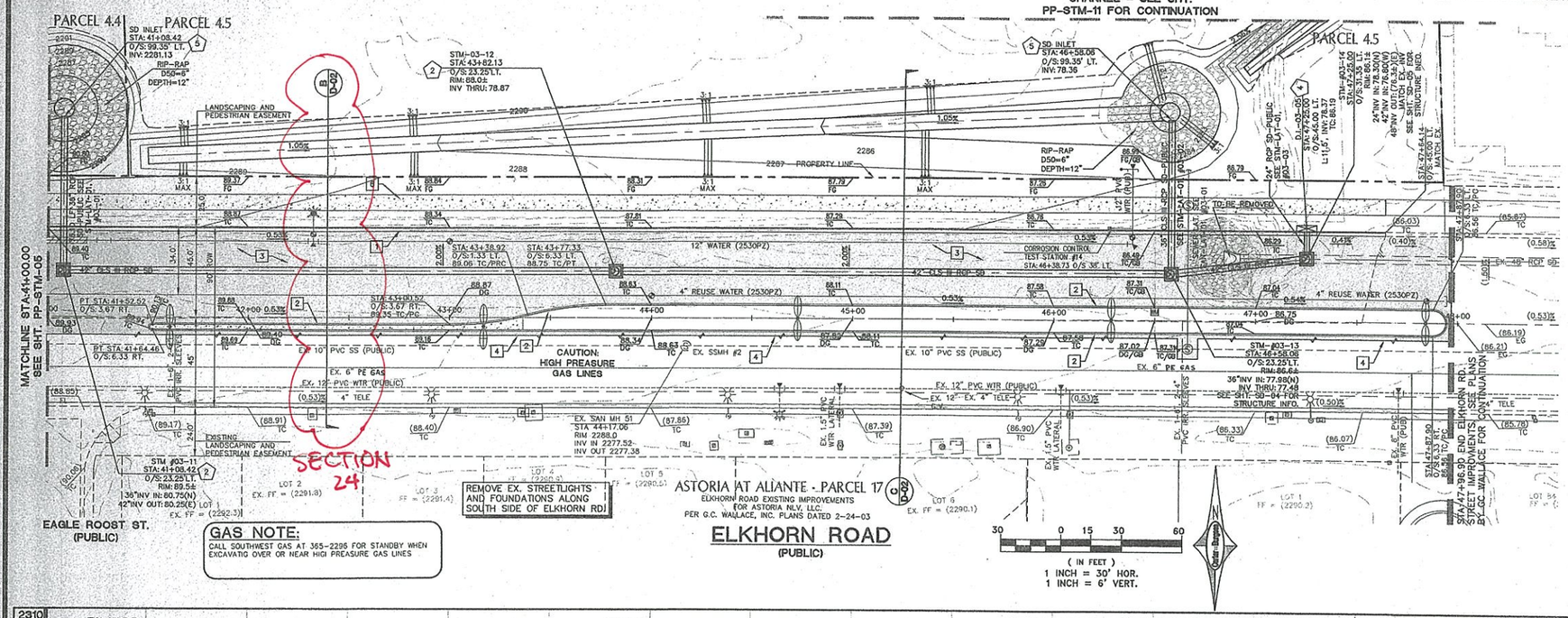
CHANNEL – SEE SHT. PP–STM–11 FOR CONTINUATION
PARCEL 4.4
PARCEL 4.5
MATCHLINE STA:41+00.00 SEE SHT. PP–STM–05
SD INLET STA: 41+08.42 O/S: 99.35' LT. INV: 2281.13
RIP–RAP D50=6" DEPTH=12"
LANDSCAPING AND PEDESTRIAN EASEMENT
STM–03–12 STA: 43+82.13 O/S: 23.25' LT. RIM: 88.0± INV THRU: 78.87
PROPERTY LINE
SD INLET STA: 46+58.06 O/S: 99.35' LT. INV: 78.35
STM–03–14 STA: 47+25.00 O/S: 31.35' LT. RIM: 86.1± 24"INV IN: 78.30(N) 24"INV OUT: 78.13(S) 42"INV IN: 76.80(W)
STM–03–13 STA: 46+58.06 O/S: 23.25' LT. RIM: 86.6± 36"INV IN: 77.98(N) INV THRU: 77.48
SEE SHT. SD–04 FOR STRUCTURE INFO.
24" RCP SD–PUBLIC DJ–03–05 STA: 47+25.00 O/S: 45.00 LT. L1/L1' INV: 76.80 TC: 86.19
STA: 47+64.14 O/S: 45.00 LT. TC: 87.79
EX. 12" PVC WTR (PUBLIC)
EX. 10" PVC SS (PUBLIC)
EX. 6" PE GAS
EX. 4" TELE
EX. SSMH #2
EX. SAN MH 51 STA: 44+17.06 RIM 2288.0 INV IN 2277.52 INV OUT 2277.38
CAUTION HIGH PREASURE GAS LINES
12" WATER (2530PZ)
4" REUSE WATER (2530PZ)
CORROSION CONTROL TEST STATION #14 STA: 46+38.73 O/S 36' LT.
EX. 42" CLS II RCP
EX. 48" RCP
EX. 24" RCP
EX. 18" RCP
EX. 15" RCP
EX. 12" RCP
EX. 10" RCP
EX. 8" RCP
EX. 6" RCP
EX. 4" RCP
EX. 3" RCP
EX. 2" RCP
EX. 1" RCP
EX. 0.5" RCP
EX. 0.25" RCP
EX. 0.125" RCP
EX. 0.0625" RCP
EX. 0.03125" RCP
EX. 0.015625" RCP
EX. 0.0078125" RCP
EX. 0.00390625" RCP
EX. 0.001953125" RCP
EX. 0.0009765625" RCP
EX. 0.00048828125" RCP
EX. 0.000244140625" RCP
EX. 0.0001220703125" RCP
EX. 0.00006103515625" RCP
EX. 0.000030517578125" RCP
EX. 0.0000152587890625" RCP
EX. 0.00000762939453125" RCP
EX. 0.000003814697265625" RCP
EX. 0.0000019073486328125" RCP
EX. 0.00000095367431640625" RCP
EX. 0.000000476837158203125" RCP
EX. 0.0000002384185791015625" RCP
EX. 0.00000011920928955078125" RCP
EX. 0.000000059604644775390625" RCP
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EX. 0.0000000000000000000000000032" RCP
EX. 0.0000000000000000000000000016" RCP
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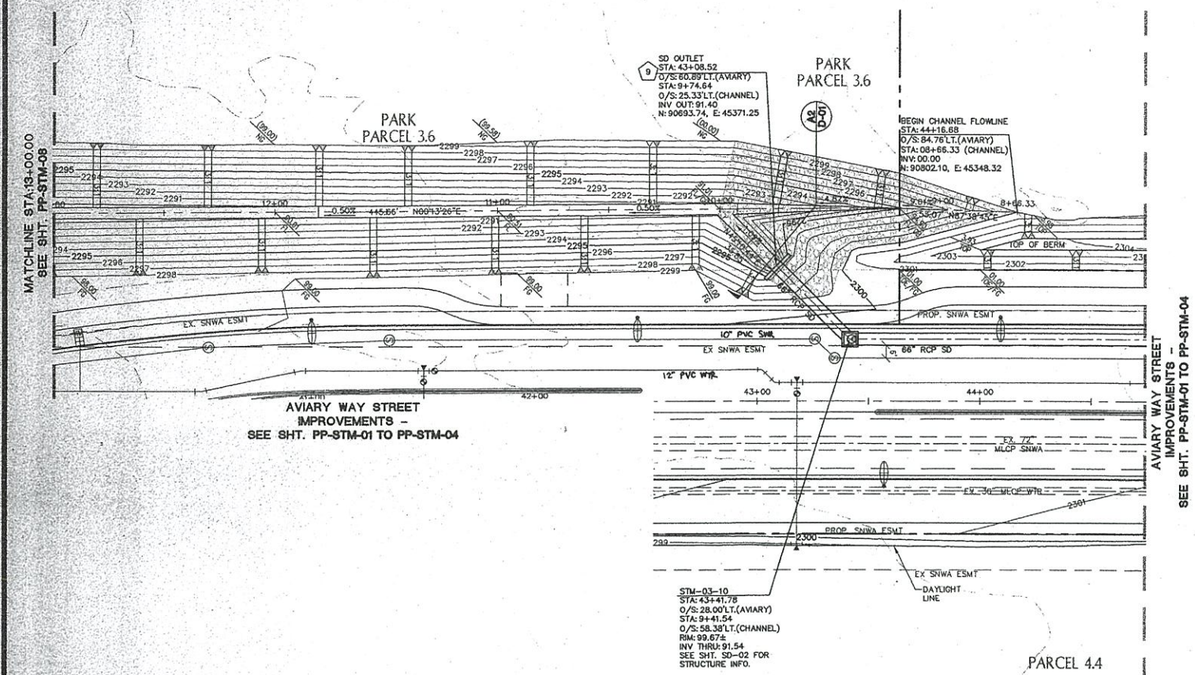
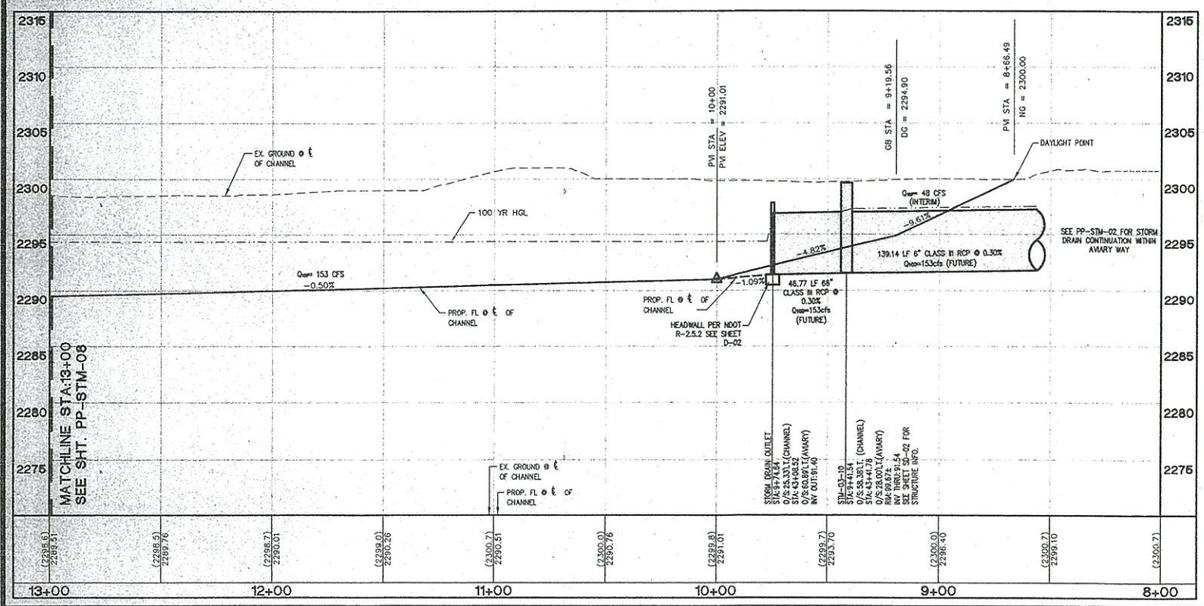


INTERIM CHANNEL
(PUBLIC)



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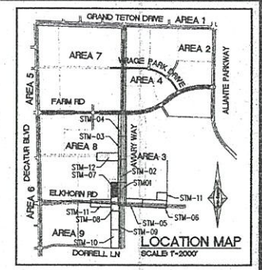

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CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS AND CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS, AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY, DEVELOPMENT PLAN REVIEW, AT (702) 862-3444 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITY.

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY — DATE: 24 DEC 07

CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION

MANAGER, JENNIFER E. BOODY, P.E. — DATE: 3/6/08

GRADING PLAN CERTIFICATION

JOHN P. MENG PE # 17540 — DATE: 12/20/07

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

Carter Burgess

30 0 15 30 60
(IN FEET)
1 INCH = 30' HOR.
1 INCH = 6' VERT.

*Existing storm drain location, size & slope

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter-Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 898-5400 Fax: (702) 898-5454

STORM P/P
INTERIM CHANNEL
STA: 8+00.00 TO STA: 13+00.00
NORTH LAS VEGAS
600 ACRES
AREA 3

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT NO:	SCALE:
DBL	DBL	GBW	21594	1" = 30'
11-05-07	11-05-07	11-05-07		

JOHN P. MENG CIVIL EXP. 12/31/09 No.17540 PROFESSIONAL ENGINEER STATE OF NEVADA

SHEET
PP-STM-07
14 OF 59 SHEETS
DRAWING NO.
29254

Drawing Name: L:\21594 - NLV SITE\DESIGN\MPP\MTS\MEGA_001\Improvement Plans\09-1594-03-PP-STM-07.dwg User: jacobshewbridgm Dec 19, 2007 - 4:59pm

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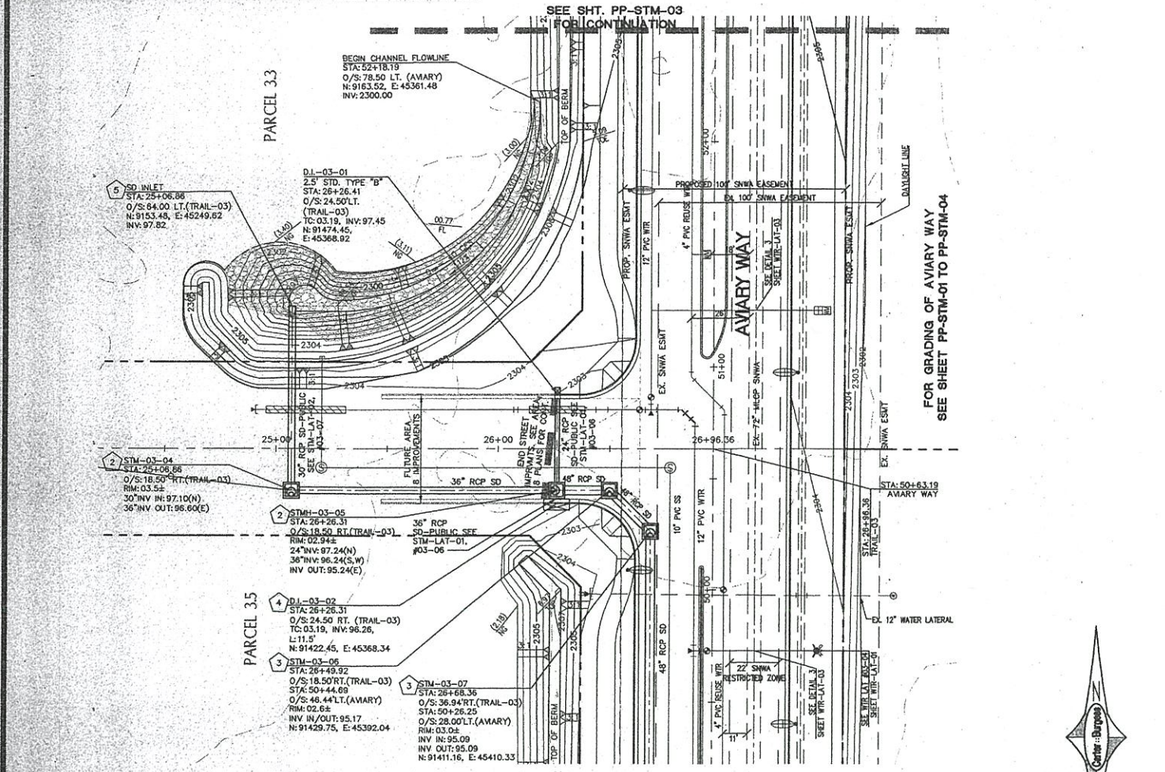
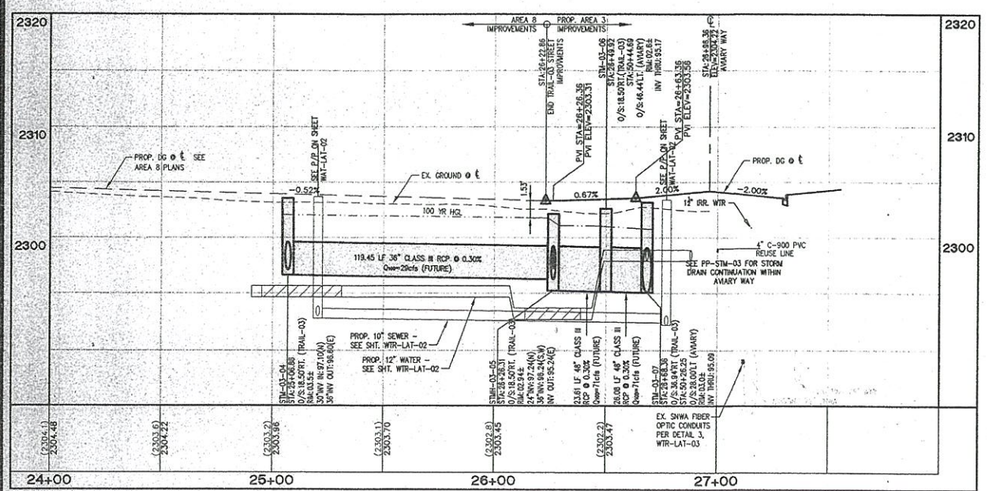
SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

LEGAL DESCRIPTION

GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, AND 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.



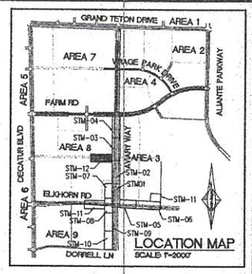


*Existing storm drain location, size & slope

STORM CONSTRUCTION NOTES:

– ALL RCP TO BE CLASS III, UNLESS OTHEWISE NOTED.
– NOT ALL NOTES USED ON THIS SHEET –

1. INSTALL 60" TYPE I MANHOLE CCAUSD No. 403. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
2. INSTALL TYPE II MANHOLE PER CCAUSD No. 405. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
3. INSTALL TYPE III MANHOLE PER CCAUSD No. 406. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
4. INSTALL MODIFIED TYPE "C" DROP INLET, PER CCAUSD No. 412A
5. INSTALL RCP END SECTION PER NDOT R-2.2.1, SEE SHEET D-02.
6. INSTALL TEMPORARY PLUG & CAP FOR FUTURE PHASE.
7. REMOVE EXISTING END SECTION & CONNECT TO EXISTING RCP. CONTRACTOR TO VERIFY SIZE, INVERT & LOCATION PRIOR TO CONSTRUCTION.
8. INSTALL TYPE 1A MANHOLE PER CCAUSD No. 404.



LEGEND:

PROP. ASPHALT | PROP. SIDEWALK | PROP. RIP-RAP

GEOTECHNICAL NOTE:

PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC., DATED: APRIL 26, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.

CUT TOTAL: 20,896
FILL TOTAL: 15,794
NET EXPORT: 5,102

NOTE:

THIS SHEET IS FOR THE DESIGN OF THE INTERIM CHANNEL. SEE SHEET PP-STM-01 TO PP-STM-04 FOR AVIARY WAY ROADWAY & DRAINAGE DESIGN. ALL ROADWAY INFORMATION ON THIS SHEET IS FOR MATCHING PURPOSES ONLY.

SNWA NOTES:

1. SNWA FIBER OPTIC CONDUIT FOLLOWS ALONG THE WEST SIDE OF THE SNWA PIPELINE.
2. CAUTION: SNWA TEST LEADS ARE SHALLOW.
3. ALL REPAIRS, REPLACEMENTS, RELOCATIONS AND/OR EXTENSIONS MUST BE DESIGNED AND MONITORED BY A NACE INTERNATIONAL–CERTIFIED CATHODIC PROTECTION SPECIALIST AND WITNESSED AND APPROVED BY SNWA CATHODIC PROTECTION TECHNICIAN PRIOR TO ACCEPTING THE INSTALLATION. CONTRACTOR SHALL PROVIDE ALL MATERIALS FOR ALL REPAIRS, REPLACEMENTS, RELOCATIONS, AND/OR EXTENSIONS. MATERIALS PROVIDED BY CONTRACTOR SHALL BE APPROVED BY SNWA PRIOR TO ACCEPTING THE INSTALLATION.

SNWA SHEET REFERENCE NOTE:

FOR 72" SNWA TRANSMISSION MAIN (CONTRACT NO 140–A AND 170–B), FIBER OPTIC CONDUIT AND ALL OTHER SNWA APPURTENANCES SEE SHEETS PP–UTL–01, PP–UTL–02, PP–UTL–03, PP–UTL–04, PP–UTL–05, PP–UTL–06, SAN–LAT–01, WTR–LAT–02, & WTR–LAT–03 THIS SET .

CONSTRUCTION NOTES:

– ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH "CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS (CCAUSD)" LATEST EDITION AND/OR REGULATING ENTITY HAVING JURISDICTION.
– NOT ALL NOTES USED ON THIS SHEET –

1. CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD No. 216.
2. CONSTRUCT "A" TYPE CURB PER CCAUSD No. 219.
3. INSTALL A.C. PAVEMENT PER STREET SECTIONS.
4. SAWCUT & MATCH EXISTING ASPHALT PAVING, CURB & GUTTER.
5. CONSTRUCT TYPICAL BUS TURN–OUT PER CCAUSD No. 234.1.
6. CONSTRUCT SIDEWALK PER CCAUSD No. 235.
7. CONSTRUCT CASE II SIDEWALK RAMP W/ TRUNCATED DOMES PER CCAUSD No. 235, CASE II.
8. RELOCATE EXISTING FIBER OPTIC LINE, SEE "E" SERIES SHEETS FOR NEW LOCATION.

GENERAL GRADING AND DRAINAGE NOTES:

1. PURSUANT TO CITY OF NORTH LAS VEGAS ORDINANCE NUMBER 1172, THE CONTRACTOR IS REQUIRED TO SECURE A GRADING PERMIT PRIOR TO COMMENCING WORK.
2. THE CONTRACTOR SHALL SECURE A PERMIT FOR ANY OFF–SITE CONSTRUCTION.
3. THE CONTRACTORS OPERATIONS SHALL NOT TRESPASS BEYOND THE PROJECT PROPERTY LINES UNLESS A PERMIT OR WRITTEN AUTHORIZATION HAS BEEN OBTAINED FROM THE PROPERTY OWNER(S) INVOLVED. COPIES OF SUCH WRITTEN AUTHORIZATION SHALL BE FURNISHED TO THE CITY OF NORTH LAS VEGAS' REPRESENTATIVE PRIOR TO START OF CONSTRUCTION.
4. THE CITY OF NORTH LAS VEGAS CONSTRUCTION SERVICES SHALL BE NOTIFIED ONE (1) WORKING DAY BEFORE ANY ON–SITE CONSTRUCTION WORK BEGINS.
5. AN APPROVED GRADING AND DRAINAGE PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE APPROVED PLAN WILL REQUIRE SUBMITTAL OF A FORMAL REVISED PLAN FOR REVIEW AND APPROVAL.
6. ALL CONSTRUCTION SURVEY CONTROL SHALL BE DONE BY A LICENSED PROFESSIONAL LAND SURVEYOR IN ACCORDANCE WITH APPLICABLE STATUTES AND CODES. THE CONTRACTOR SHALL PROVIDE COMPETENT RESOURCES TO ASSURE BUILDING PAD AND BUILDING FLOOR ELEVATIONS CONFORM TO THOSE SHOWN ON THE CONSTRUCTION DRAWINGS. FURTHERMORE, THE CONTRACTOR SHALL PROVIDE THE CITY OF NORTH LAS VEGAS BUILDING DEPARTMENT WITH:
   A. CERTIFICATION OF "BUILDING FLOOR ELEVATIONS" IN CRITICAL DRAINAGE AREAS.
   B. CERTIFICATES OF "BUILDING PAD ELEVATIONS" IN NONCRITICAL AREAS.
7. THE CONTRACTOR SHALL CERTIFY TO THE CITY OF NORTH LAS VEGAS CONSTRUCTION SERVICES DIVISION THAT ALL FILLS, FOUNDATIONS AND SUBGRADES MEET THE MINIMUM COMPACTION REQUIREMENTS. CERTIFICATION SHALL BE MADE PRIOR TO POURING CONCRETE.

SNWA CONSTRUCTION NOTE

CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS AND CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS, AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY, DEVELOPMENT PLAN REVIEW, AT (702) 862–3444 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITY.

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY — DATE: 24 Dec 07

CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION

MANAGER JENNIFER E. GOODY, P.E. — DATE: 3/6/08

GRADING PLAN CERTIFICATION

JOHN P. MENG — PE #: 17540 — DATE: 12/7/07

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REV	DATE	BY	REVISION

NOVEMBER 2006 LAND INVESTORS, LLC/DRH, INC.

CarterBurgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 838-5400 Fax (702) 838-5454

STORM P/P
TRAIL-03 36" RCP
STA: 8+00.00 TO STA: 13+00.00
NORTH LAS VEGAS
600 ACRES
AREA 3

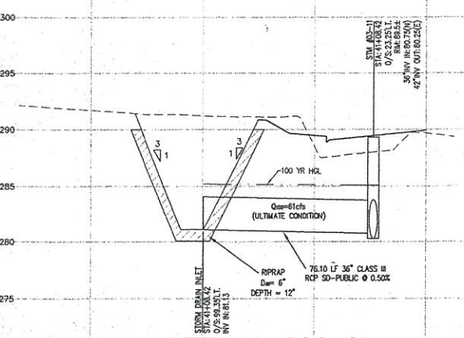
DRAWN BY:	DESIGNED BY:	CHECKED BY:	SCALE:
DRL	DRL	GMP	1" = 30' 1" = 6'
11-06-07	11-06-07	11-06-07	

PROJECT NO: 241994

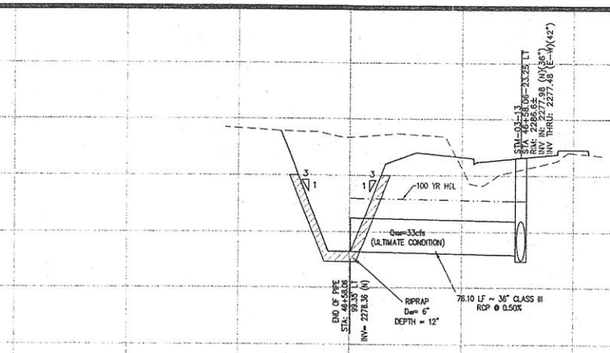
PROFESSIONAL ENGINEER STATE OF NEVADA JOHN P. MENG CIVIL EXP. 12/31/08 No. 17540 12/7/07

SHEET
PP-STM-12
19 OF 59 SHEETS
DRAWING NO.
29254

Drawing Name: L:\241994 - NLV SITE\DESIGN\WORKMTS\XREGA_003 improvement Plans\09 - 1994-03-PP-07-12.dwg Users: jessica.wong Dec 06, 2007 - 5:48pm



STORM LATERAL #03-01
ELKHORN RD. STA: 41+08.42



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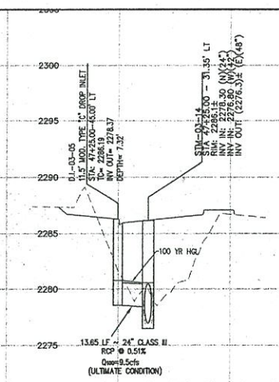
ELKHORN RD. STA: 46+58.06



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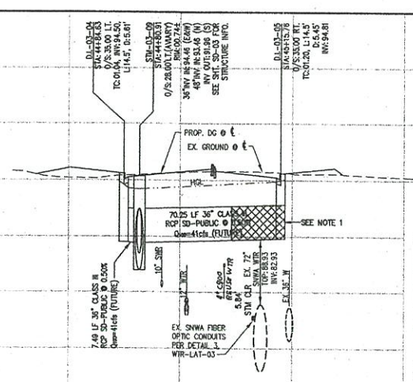
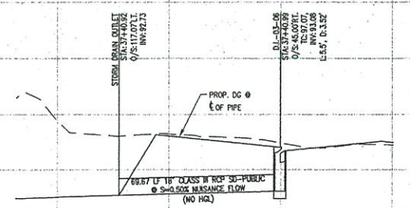
ELKHORN RD. STA: 47+25.00



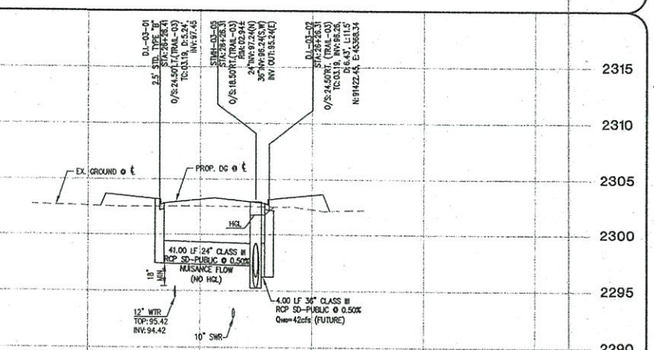
STORM LATERAL #03-04
AVIARY WAY STA: 44+80.91

NOTE:

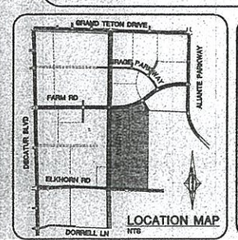
1) PRECAST REINFORCED CONCRETE SECTIONS, APPROVED ELASTOMETRIC JOINT SEALANT SHALL BE INSTALLED FOR A DISTANCE OF 10' FROM THE OUTSIDE EDGE OF THE SNWA PIPELINE IN BOTH DIRECTIONS, WITH PROVISIONS TO INSURE AGAINST DIFFERENTIAL SETTLEMENT OF THE STORM DRAIN.
2) SNWA FIBER OPTIC CONDUIT RUNS ALONG THE WEST SIDE OF THE SNWA PIPELINE.
3) CAUTION SNWA TEST LEADS ARE SHALLOW
4) SNWA FACILITIES MUST BE POTHOLED TO DETERMINE VERTICAL AND HORIZONTAL LOCATION PRIOR TO CONSTRUCTION.



STORM LATERAL #03-05
AVIARY WAY STA: 37+40.99



STORM LATERAL #03-06
TRAIL 03 STA: 26+26.36 (SEE SHEET PP-STM-12)



LOCATION MAP
NTS

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Avoid overhead power line contact. It's easy. Call before you Overhead 1-702-227-2929

Avoid cutting underground utility lines. It's easy. Call before you Dig 811 1-800-227-2600

BENCHMARK

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SOUTH 87°29'38" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 51 OF PARCEL MAPS.

LEGAL DESCRIPTION

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30 0 15 30 60
(IN FEET)
1 INCH = 30 HORZ
1 INCH = 6 VERT

*Existing storm drain location, size & slope

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J. Bishar 24 DEC 07
SOUTHERN NEVADA WATER AUTHORITY DATE

GRADING PLAN CERTIFICATION

JOHN P. MENG PE # 17540 12/7/07 DATE

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REVISION

REV	DATE	BY

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter-Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax (702) 938-5454

STORM DRAIN LATERALS

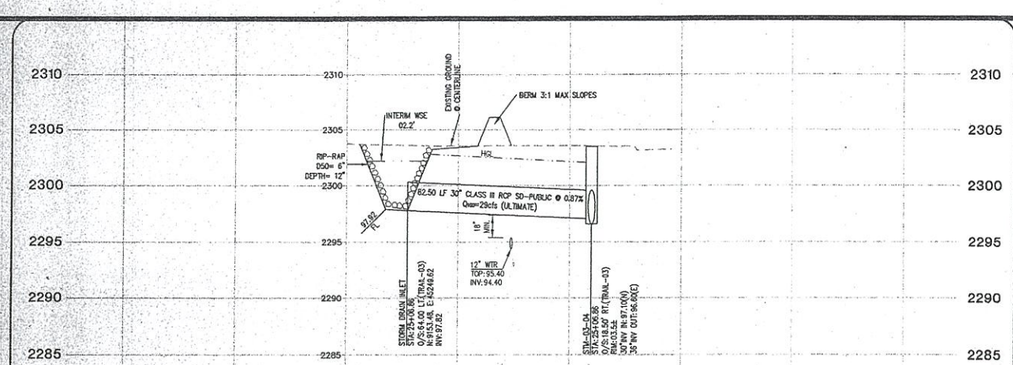
NORTH LAS VEGAS
600 ACRES
AREA 3

DRAWN BY:
DESIGNED BY:
CHECKED BY: GBW
PROJECT NO: 24164
SCALE: 1" = 30'

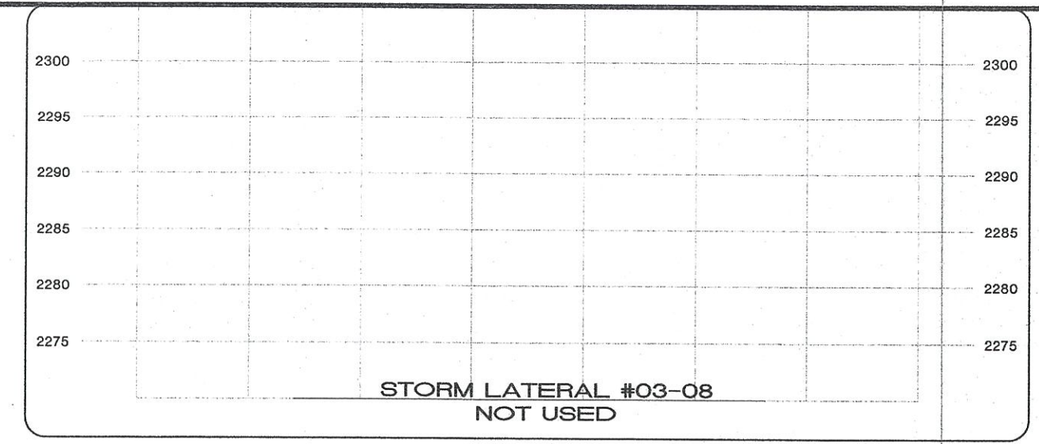
JOHN P. MENG
CIVIL
EXP. 12/31/09
No. 17540
12/7/07

SHEET
STM-LAT-01
28 OF 59 SHEETS
DRAWING NO.
29254

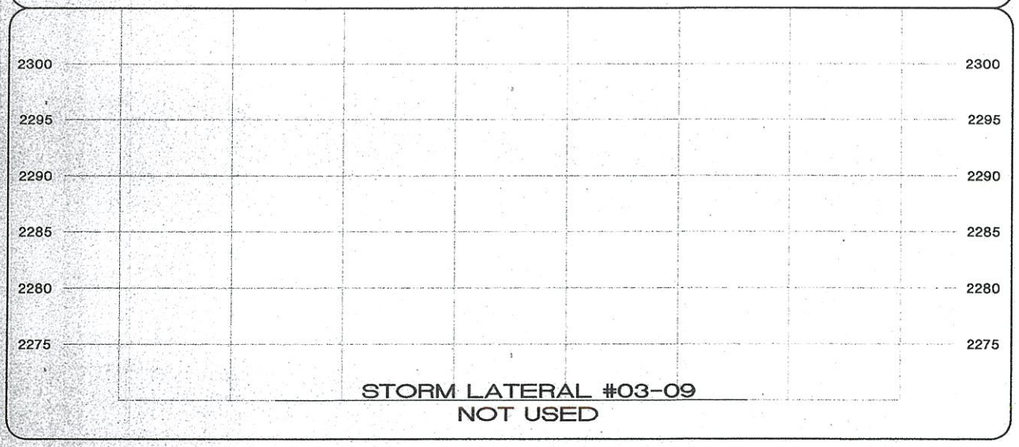
Drawing Name: U:\24164 - NLV - SITE\DESIGN\APPARTS\ASCA_CD\Improvement Plans\11-1564-03-STM-LAT-01.dwg Date: 12/06/2007 - 6:03pm



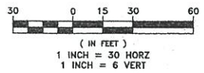
STORM LATERAL #03-07
TRAIL 03 STA: 25+06.86 (SEE SHEET PP-STM-12)



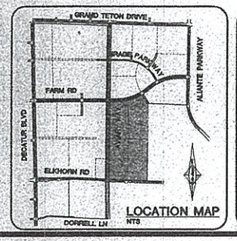
STORM LATERAL #03-08
NOT USED



STORM LATERAL #03-09
NOT USED



* Existing storm drain location, size & slope



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GRADING PLAN CERTIFICATION

JOHN P. MENG — PE # 17540 — 12/7/07 DATE

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REV	DATE	BY	REVISION

NOVEMBER 2006 LAND INVESTORS, LLC/DRH, INC.

Carter-Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
8655 Bermuda Road
Las Vegas, NV 8919
(702) 938-5400 Fax (702) 938-5454

STORM DRAIN LATERALS

NORTH LAS VEGAS
600 ACRES
AREA 3

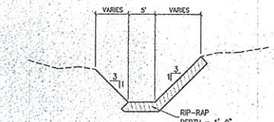
DRAWN BY:
DESIGNED BY:
CHECKED BY: GM
PROJECT NO: 21594
SCALE: 1" = 30' / 1" = 6'

PROFESSIONAL ENGINEER — STATE OF NEVADA — JOHN P. MENG — No.17540 — CIVIL — EXP. 12/31/09 — 12/7/07

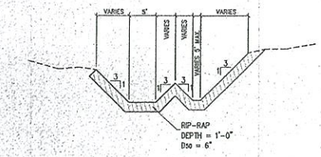
SHEET
STM-LAT-02
29 OF 59 SHEETS

DRAWING NO.
29254

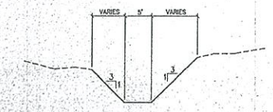
Drawing Name: 413415\94 AKV SITE\DESIGN\UFRWD\SVREA_03\Improvement Plans\111-194-03-STM-LAT-01.dwg User: zackbrashears Dec 06, 2007 - 8:03am



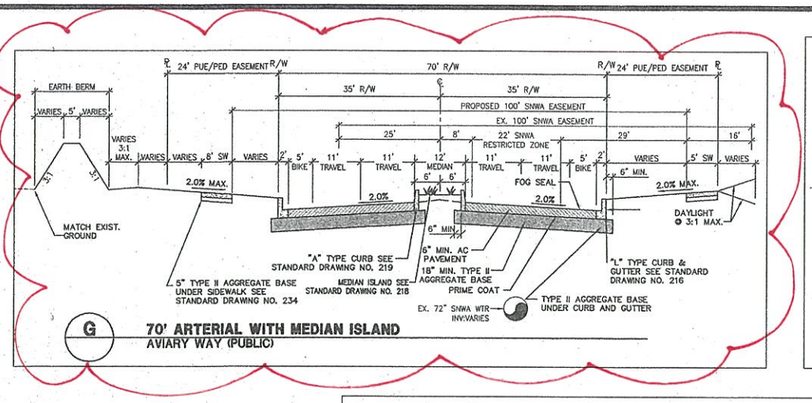
CHANNEL DETAIL - AVIARY WAY (A1)
NTS



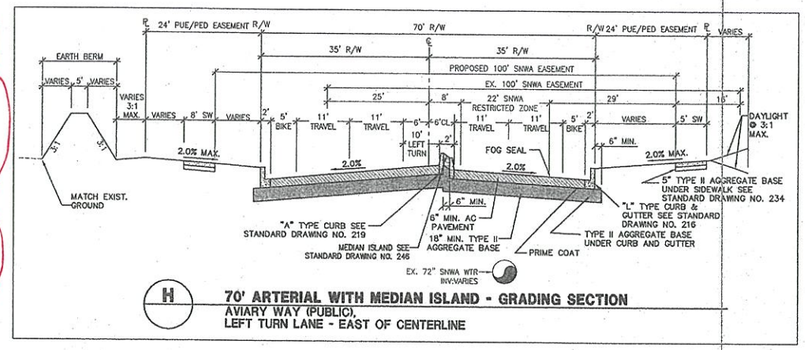
CHANNEL DETAIL - AVIARY WAY (A2)
NTS



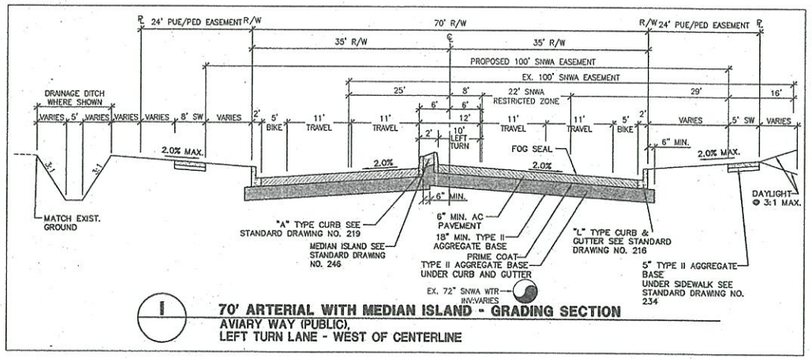
CHANNEL DETAIL - AVIARY WAY (A3)
NTS



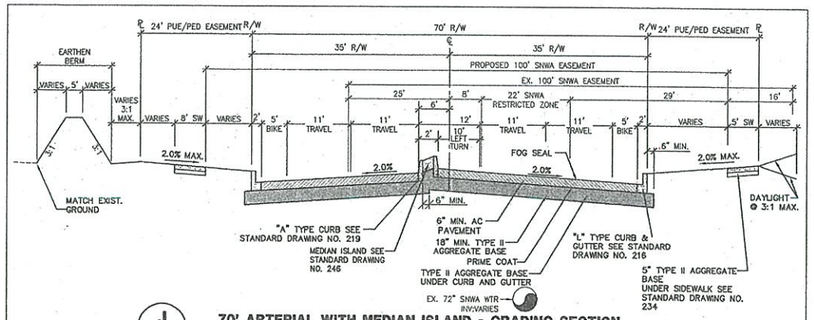
G **70' ARTERIAL WITH MEDIAN ISLAND**
AVIARY WAY (PUBLIC)



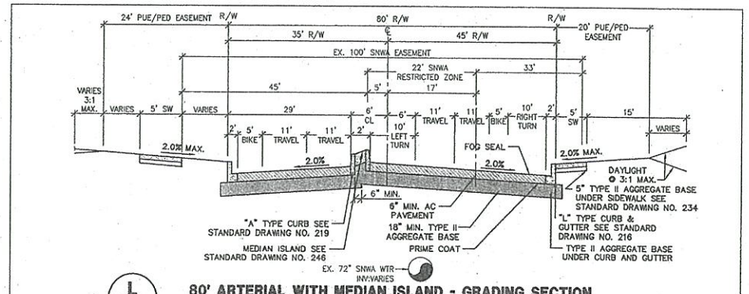
H **70' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
AVIARY WAY (PUBLIC),
LEFT TURN LANE - EAST OF CENTERLINE



I **70' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
AVIARY WAY (PUBLIC),
LEFT TURN LANE - WEST OF CENTERLINE



J **70' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
AVIARY WAY (PUBLIC),
LEFT TURN LANE - WEST OF CENTERLINE



L **80' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
AVIARY WAY (PUBLIC),
LEFT AND RIGHT TURN LANE - WEST OF CENTERLINE

GENERAL NOTES:

1. STRUCTURAL SECTIONS SHOWN ARE BASED ON PRELIMINARY VALUES REQUIRED FOR BONDING PURPOSES BY CNLV. ACTUAL STRUCTURAL SECTIONS WILL BE BASED ON SOILS TESTING DURING TIME OF CONSTRUCTION

2. THE OFF-SITE PAVEMENT SECTIONS SHOWN ON THE PLANS MUST BE DESIGNED IN ACCORDANCE WITH THE STANDARD SPECIFICATION SECTION 401 USING THE "AASHTO" MODEL. THE NEW SECTION MUST BE BASED ON THE ACTUAL DAILY TRAFFIC COUNTS PROVIDED BY THE CITY AND R-VALUE TEST RESULTS PERFORMED SUBSEQUENT TO GRADING.

SNWA CONSTRUCTION NOTE

CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS AND CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS, AND AV/ARS MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY, DEVELOPMENT PLAN REVIEW, AT (702) 862-3444 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITY.

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

Y. DISHARI 12/20/07
SOUTHERN NEVADA WATER AUTHORITY DATE

REVISION | BY | DATE | REV

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter Burgess
6659 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services (702) 938-3400 Fax (702) 938-5454

STREET GRADING SECTIONS & CHANNEL SECTIONS

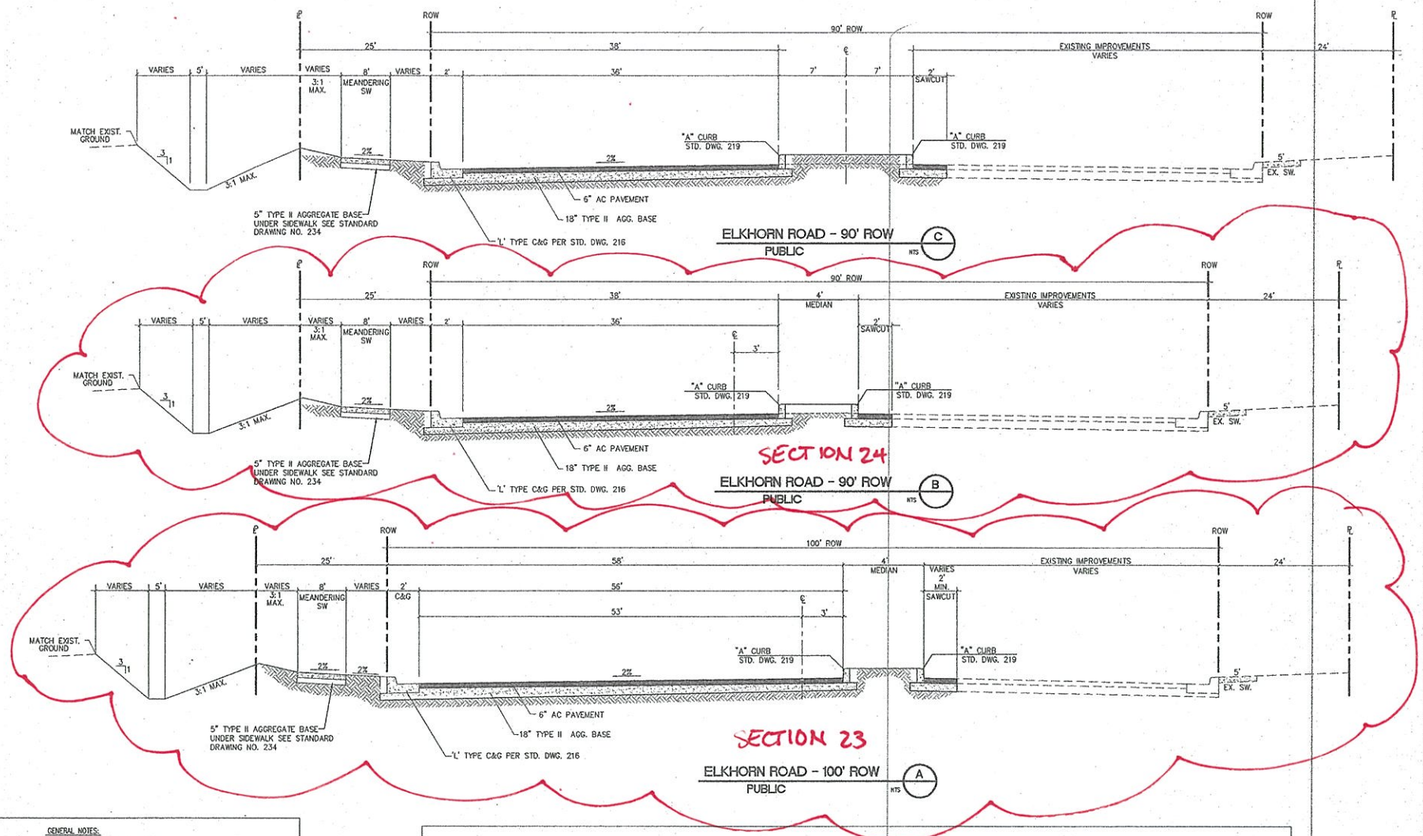
NORTH LAS VEGAS 600 ACRES AREA 3

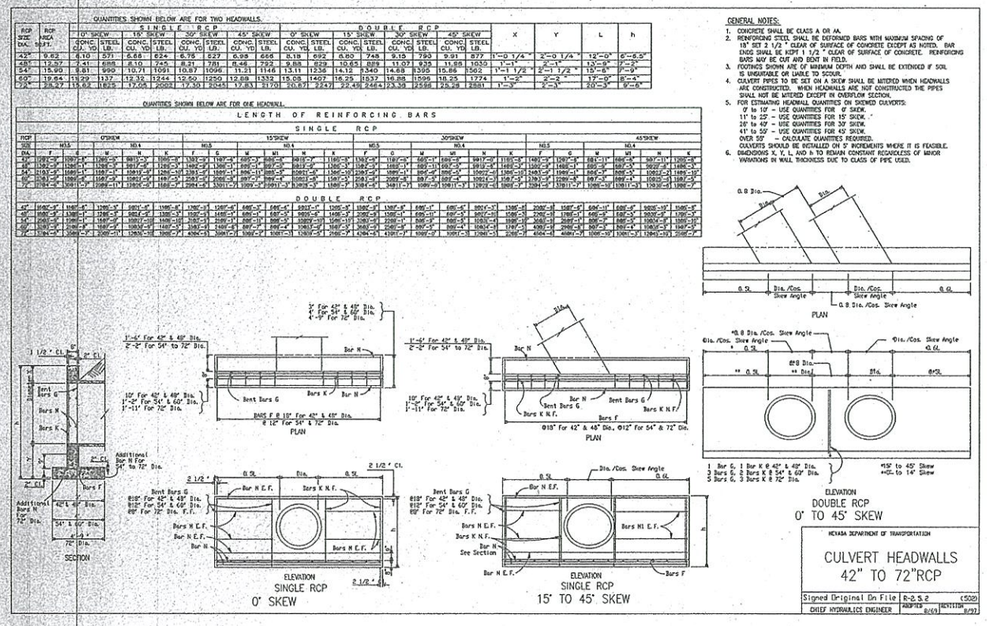
DRAWN BY:
DESIGNED BY:
CHECKED BY: GW
PROJECT NO: 29254
SCALE: N/A N/A

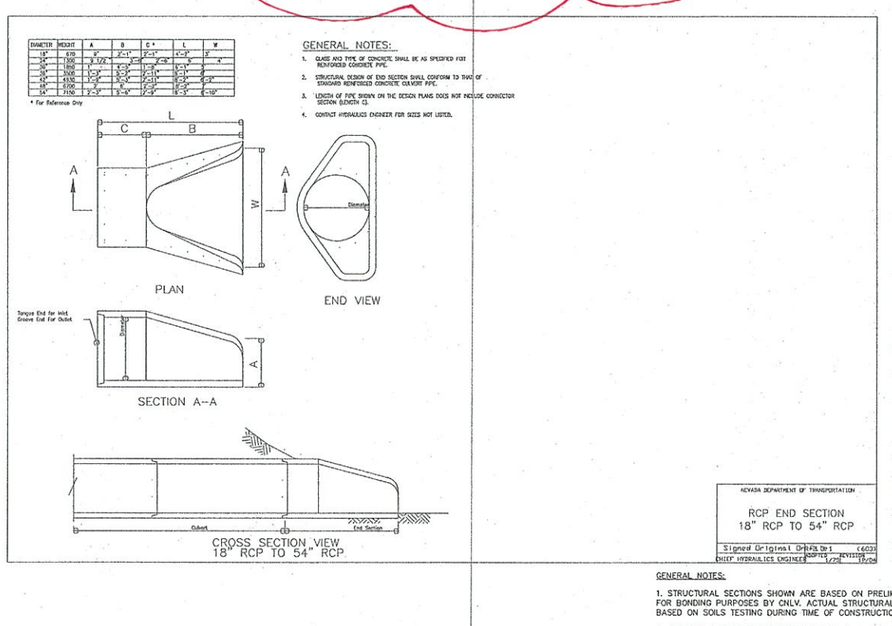
PROFESSIONAL ENGINEER-STATE OF NEVADA JOHN P. MENG CIVIL EXP. 12/31/09 No.17540 12/7/07

SHEET D-01
34 OF 59 SHEETS
DRAWING NO. 29254

Drawing Name: L:\241594_INS_SITE\DESIGN\MAPPING\AREA_03\Improvement Plans\1x 1594-03-pl-01.dwg User: mcdonheesilynj Dec 06, 2007 - 6:15pm







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REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter-Burgess
6655 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services
(702) 938-5600 Fax (702) 938-5654

STREET GRADING SECTIONS

NORTH LAS VEGAS
600 ACRES
AREA 3

DRAWN BY:
DESIGNED BY:
CHECKED BY:
QUAP
SCALE: N/A N/A
PROJECT NO: 241594

PROFESSIONAL ENGINEER STATE OF NEVADA JOHN P. MENG CIVIL EXP. 12/31/08 No.17540

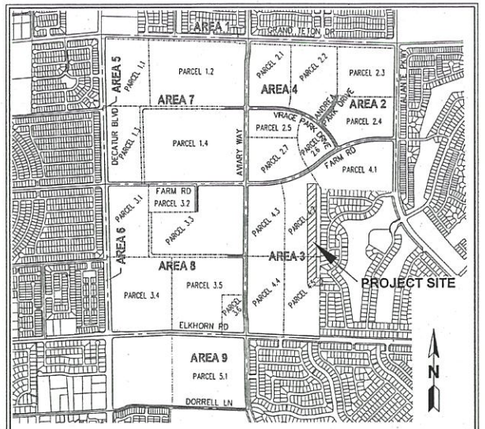
SHEET D-02
35 OF 59 SHEETS

DRAWING NO. 29254

Drawing Name: LV241594 - NLV SHEETS\DESIGN\PRV\PRVSVEGAS.DWG (improvement) Plotted: 14 - 1594-03-P-01.dwg Layout: sections&awings(2) Jan 10, 2006 - 10:37am

Approved Plans for

North Las Vegas 600 Acres Area 3 Arch Culvert (CNLV No. 42173)



VICINITY MAP

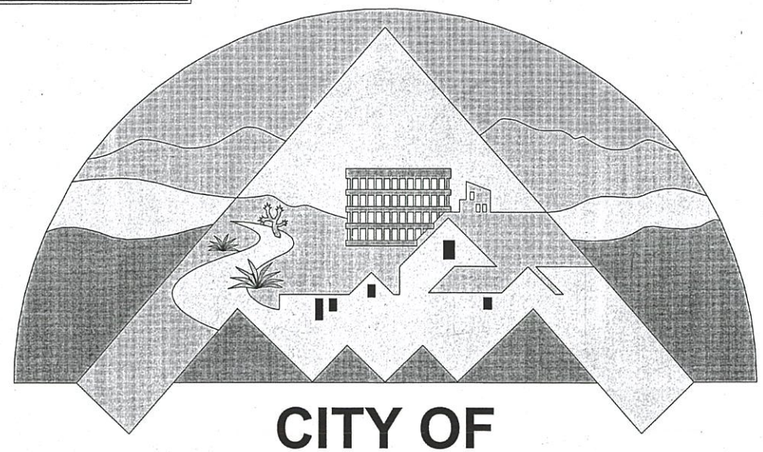
NOT TO SCALE

SHEET INDEX		
Sheet Number		DESCRIPTION
1	C-1	COVER SHEET
2	C-2	GENERAL NOTES
3	PP-1	PLAN AND PROFILE - 1
4	PP-2	PLAN AND PROFILE - 2
5	PP-3	PLAN AND PROFILE - 3
6	S1	GENERAL NOTES
7	S2	PLAN VIEW
8	S3	DETAILS
9	S4	DETAILS

PARK HIGHLANDS℠

NORTH LAS VEGAS 600 ACRE SITE
AREA 3 ARCH CULVERT

PART OF A.P.N. 124-18-714-002 & 124-18-816-002
5.89 GROSS ACRES



CITY OF NORTH LAS VEGAS

FLOOD ZONE:

THIS SITE LIES WITHIN ZONE "X" DETERMINED TO BE OUTSIDE OF THE 500 YEAR FLOODPLAIN AS DETERMINED BY FIRM MAP PANEL NUMBER 1765 OF 4090 REVISED SEPTEMBER 27, 2002.

OWNER

NOVEMBER 2005 LAND INVESTORS, LLC/DRH INC
11411 SOUTHERN HIGHLANDS PKWY, SUITE 300
LAS VEGAS NEVADA 89141
702-616-3800
702-616-3833 FAX

DEVELOPER

NOVEMBER 2005 LAND INVESTORS, LLC/DRH INC
11411 SOUTHERN HIGHLANDS PKWY, SUITE 300
LAS VEGAS NEVADA 89141
702-616-3800
702-616-3833 FAX

ENGINEER

SLATER HANIFAN GROUP, INC.
5740 S. ARVILLE STREET #216,
LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

UTILITY SERVICE BY

WATER:	CITY OF NORTH LAS VEGAS
SEWER:	CITY OF NORTH LAS VEGAS
GARBAGE:	REPUBLIC SERVICES OF NEVADA
POWER:	NEVADA ENERGY
TELEPHONE:	EMBARQ
NATURAL GAS:	SOUTHWEST GAS COMPANY

GEOTECH ENGINEER

PREPARED BY: NOVA ENGINEERING AND ENVIRONMENTAL
PROJECT NUMBER: E-06-022
DATE: APRIL 28, 2006
REVISED DATE: NOVEMBER 5, 2010

CUT TOTAL: 1,450
FILL TOTAL: 48,590
NET: 47,140

LEGAL DESCRIPTION

BEING A PORTION OF THE "PROJECT O WEST PARCEL", LOTS "4.2" & "4.5" AS SHOWN BY MAP THEREOF ON FILE IN BOOK 134 PAGE 82 OF PLATS IN THE COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA. LYING WITHIN SECTION 18 TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.B, CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

BENCHMARK

NLV9117NWS
NAVD 88 ELEVATION PUBLISHED 11/1/2006
699.482 METERS, 2294.88 FEET
ELEVATION USED FOR THESE PLANS, PRE-REVISION
699.511 METERS, 2294.98 FEET
RIVET AND 2" ROUND ALUMINUM DISK, STAMPED: NORTH LAS VEGAS BM NO. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARING

SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

APPROVALS:

DR. QIONG LIU, M.E., P.E. — DIRECTOR, PUBLIC WORKS DEPARTMENT — 12/1/11 DATE

JENNIFER BOODY, P.E. — MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION — 11/29/11 DATE

LORENA CANDELARIO, SR/WA — MANAGER, REAL PROPERTY SERVICES DIVISION — 5/17/11 DATE

UTILITIES DEPARTMENT - ENGINEERING SERVICES DIVISION — 3/4/11 DATE

Approval of these plans shall not be construed to be a permit for construction, a commitment to supply water and/or sewer service, or an approval of any violation of CNLV water and/or sewer service rules and regulations or design and construction standards.

NEVADA ENERGY — 3-01-11 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 CORPORATION — 2/28/11 DATE

CENTURYLINK — RICK NOSTRAVISH — 3/1/11 DATE

"THE AFFIXED CENTURYLINK 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 STATUES AND / OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS."

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

*NOTE:

IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.





SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

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.

NORTH LAS VEGAS, NV

NOVEMBER 2005 LAND INVESTORS, L.L.C.

NORTH LAS VEGAS 600 ACRE SITE AREA 3 ARCH CULVERT

COVER SHEET

SECTION 18
TOWNSHIP 19
RANGE 61

DATE: 11/11/10
DRAFTER: BRM
DESIGNER: BRM
CHECKED: JS
PROJECT NO. OLY-1001

PROFESSIONAL ENGINEER STATE OF NEVADA
BENJAMIN R. MORRIS
Exp. 12-31-11
CIVIL
No. 18051
3-1-11

C-1
SHEET 1 OF 9

CNLV#42173

105201 # 13-1-11

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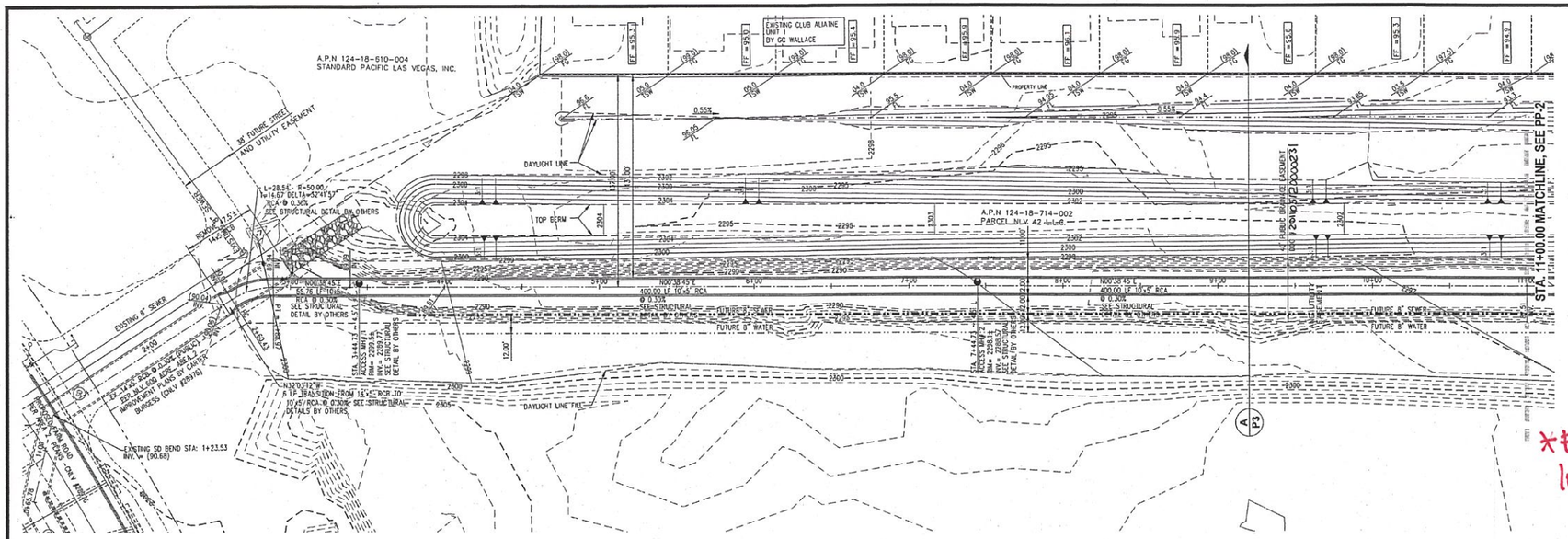


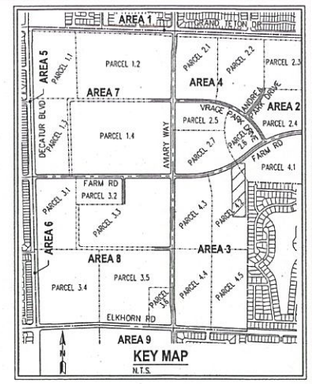
PLAN - 10'x5' CONCRETE ARCH

SCALE: 1"=40'

SCALE - 1"=40' FEET

PROFILE - 10'x5' CONCRETE ARCH

HOR.: 1"=40'
VERT.: 1"=4'



*Existing storm drain location, size & slope

DISCLAIMER NOTE:

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

BENCHMARK:

NLV9117NWS, BEING A RIVET & 2" ROUND ALUM. DISK, STAMPED NORTH LAS VEGAS BM NO. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. & ALIANTE PKWY.
2294.88 FT, 699.482 M (NAVD 88, PUBLISHED 11/01/06)
2294.98 FT, 699.511 M (ELEVATION USED FOR THESE PLANS, PRE-REVISION)

BASIS OF BEARINGS:

SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

CITY OF NORTH LAS VEGAS UTILITY DEPARTMENT DISCLAIMER

A STATEMENT OF UNDERSTANDING BETWEEN THE CITY OF NORTH LAS VEGAS UTILITY DEPARTMENT (CITY) AND ANY AND ALL SUBSEQUENT USERS OF INFORMATION CONTAINED HEREFROM:

THE PLANS AND SUPPORTING INFORMATION IS FURNISHED BY THE CITY, AND IS ACCEPTED/USED BY THE RECIPIENT WITH THE UNDERSTANDING THAT THE CITY MAKES NO WARRANTIES, EXPRESS OR IMPLIED, CONCERNING THE ACCURACY, COMPLETENESS, RELIABILITY, OR SUITABILITY OF SAID PLANS OR ANY SUPPORTING DATA AND FURTHER UNDERSTANDS THAT ALL USERS ARE ACTING AT THEIR OWN RISK. THE CITY SHALL BE UNDER NO LIABILITY WHATSOEVER RESULTING FROM ANY USE OF THIS INFORMATION.

THIS INFORMATION SHOULD NOT BE RELIED UPON AS THE SOLE BASIS FOR EXISTING WATER AND/OR SEWER LOCATIONS. THE ENGINEER SHALL CHECK AND VERIFY ALL DIMENSIONS AND LOCATIONS OF EXISTING UTILITIES.

CONTACT CNLV UTILITIES @ 633-1277 24 HOURS PRIOR TO BEGINNING ANY WORK FOR SCHEDULING INSPECTIONS AND APPROVALS.

CITY OF NORTH LAS VEGAS UTILITIES DEPARTMENT

UTILITIES DEPARTMENT- ENGINEERING SERVICES DIVISION — DATE: 2/24/11

APPROVAL OF THESE PLANS SHALL NOT BE CONSTRUED TO BE A PERMIT FOR CONSTRUCTIO... A COMMITMENT TO SUPPLY WATER AND/OR SEWER SERVICE, OR AN APPROVAL OF ANY VIOLATION OF CNLV WATER AND/OR SEWER SERVICE RULES AND REGULATIONS OR DESIGN AND CONSTRUCTION STANDARDS.

CERTIFICATION:

THIS PLAN COMPLIES WITH THE APPROVED DRAINAGE STUDY APPLICATION # CNLV No. 41331, ON FILE WITH THE CITY OF NORTH LAS VEGAS.

3.22.11 — DATE — BENJAMIN R. MORRIS

APPROVAL:

JENNIFER J. DOODY, P.E. — MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION — 11/21/11 DATE

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

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811
OR 1-800-227-2600
AND CLARK COUNTY TRAFFIC OPERATIONS 1-702-455-7544

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.

NORTH LAS VEGAS, NV

NOVEMBER 2005 LAND INVESTORS, L.L.C.

NORTH LAS VEGAS 600 ACRE SITE AREA 3 ARCH CULVERT

PLAN AND PROFILE - 1+00 TO 11+00

SECTION 18
TOWNSHIP 19
RANGE 61

DATE: 11/11/10
DRAFTER: BRM
DESIGNER: BRM
CHECKED: JS

PROJECT NO.
OLY-1001

PROFESSIONAL ENGINEER — STATE OF NEVADA — BENJAMIN R. MORRIS — Exp. 12-31-11 — CIVIL — No. 18051 — 3.22.11

PP-1
SHEET 3 OF 9

CNLV#42173

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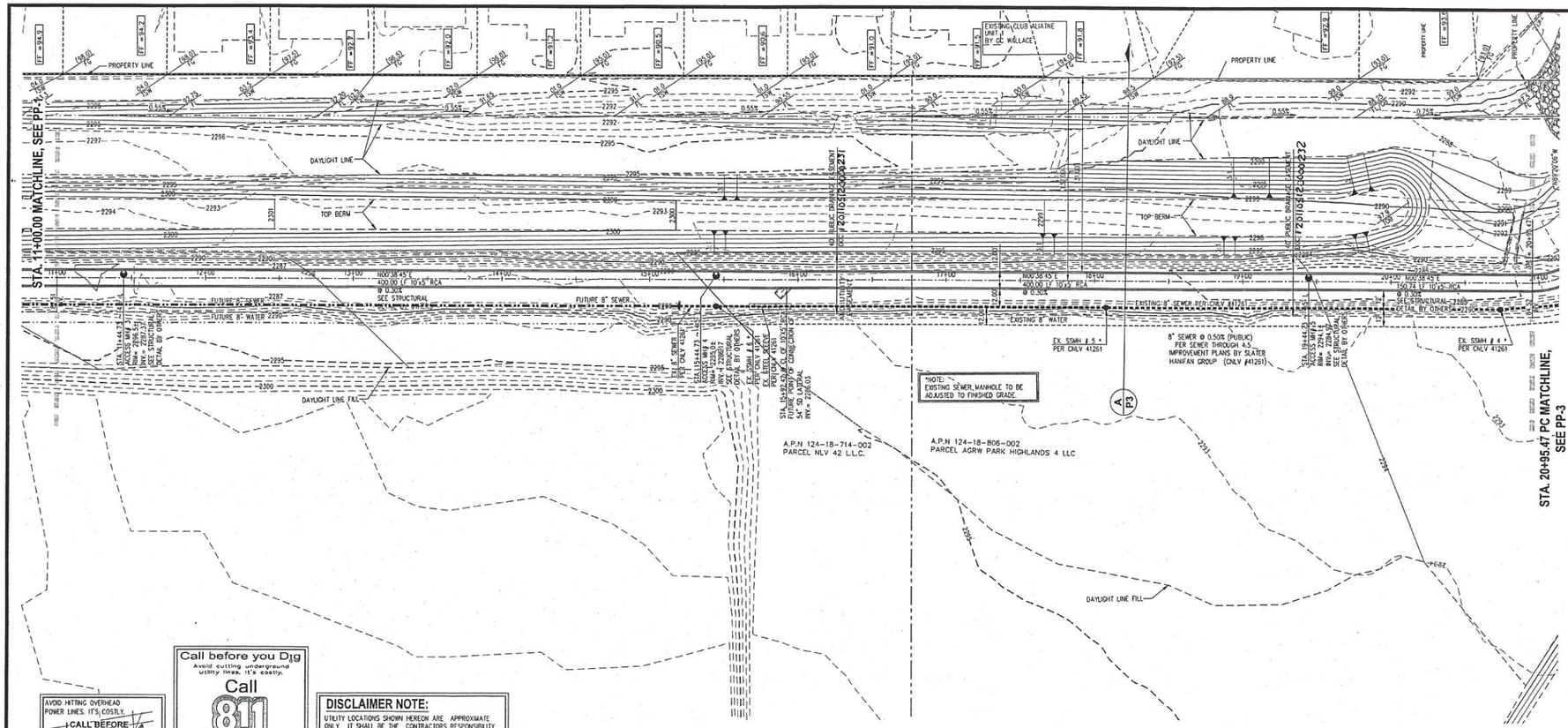
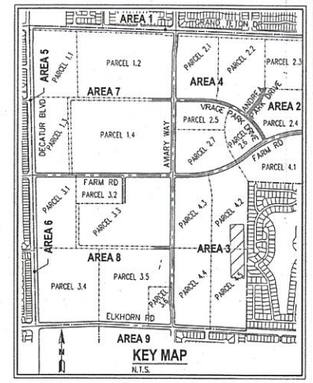
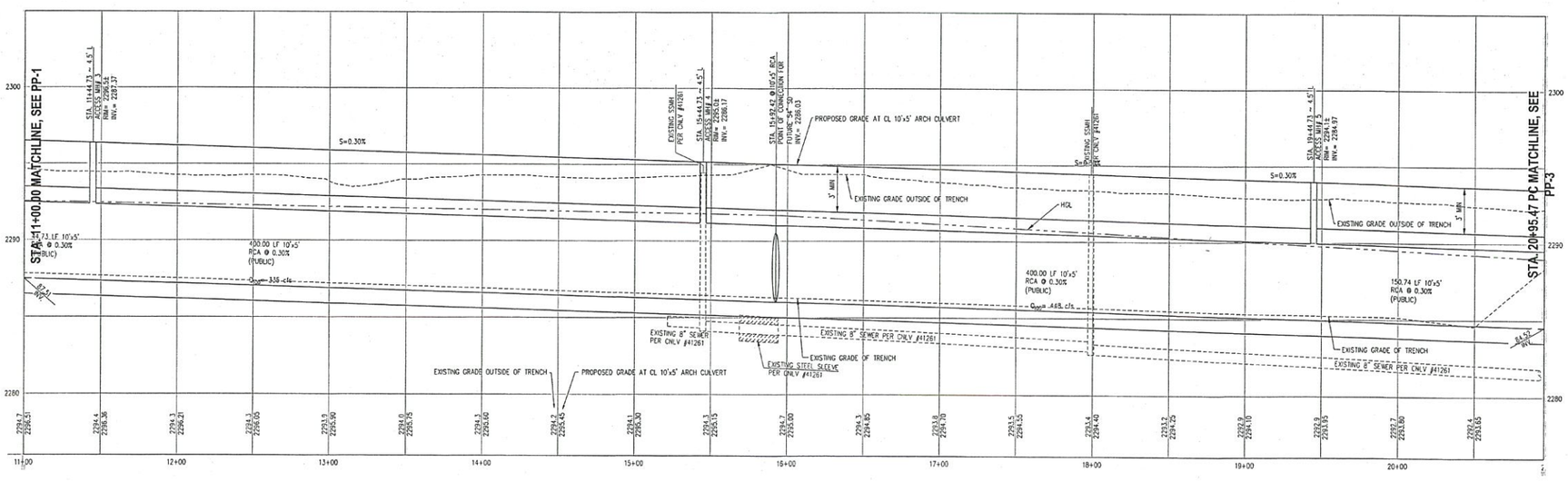




*Existing storm drain location, size & slope



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CONTACT CNLV UTILITIES @ 633-1277 24 HOURS PRIOR TO BEGINNING ANY WORK FOR SCHEDULING INSPECTIONS AND APPROVALS.

CITY OF NORTH LAS VEGAS U"ILITIES DEPARTMENT

UTILITIES DEPARTMENT - ENGINEERING SERVICES DIVISION — DATE: 3/24/11

APPROVAL OF THE E PLANS SHALL NOT BE CONSTRUED TO BE A PERMIT FOR CONSTRUCTION. A COMMITMENT TO SUPPLY WATER AND/OR SEWER SERVICE, OR AN APPROVAL OF ANY MODIFICATION OF CNLV WATER AND/OR SEWER SERVICE RULES AND REGULATIONS OR DESIGN AND CONSTRUCTION STANDARDS.

CERTIFICATION:

THIS PLAN COMPLIES WITH THE APPROVED DRAINAGE STUDY APPLICATION # CNLV No. 41331, ON FILE WITH THE CITY OF NORTH LAS VEGAS.

3.22.11 — DATE — BENJAMIN R. MORRIS

PROFESSIONAL ENGINEER - STATE OF NEVADA — BENJAMIN R. MORRIS — Exp. 12-31-11 — CIVIL — No. 18051 — 3.22.11

APPROVAL:

JENNIFER WOODY, P.E. MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION — 11/22/11 DATE

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.

NORTH LAS VEGAS, NV

NOVEMBER 2005 LAND INVESTORS, L.L.C.

NORTH LAS VEGAS 600 ACRE SITE AREA 3 ARCH CULVERT

PLAN AND PROFILE - 11+00 TO 20+95.47

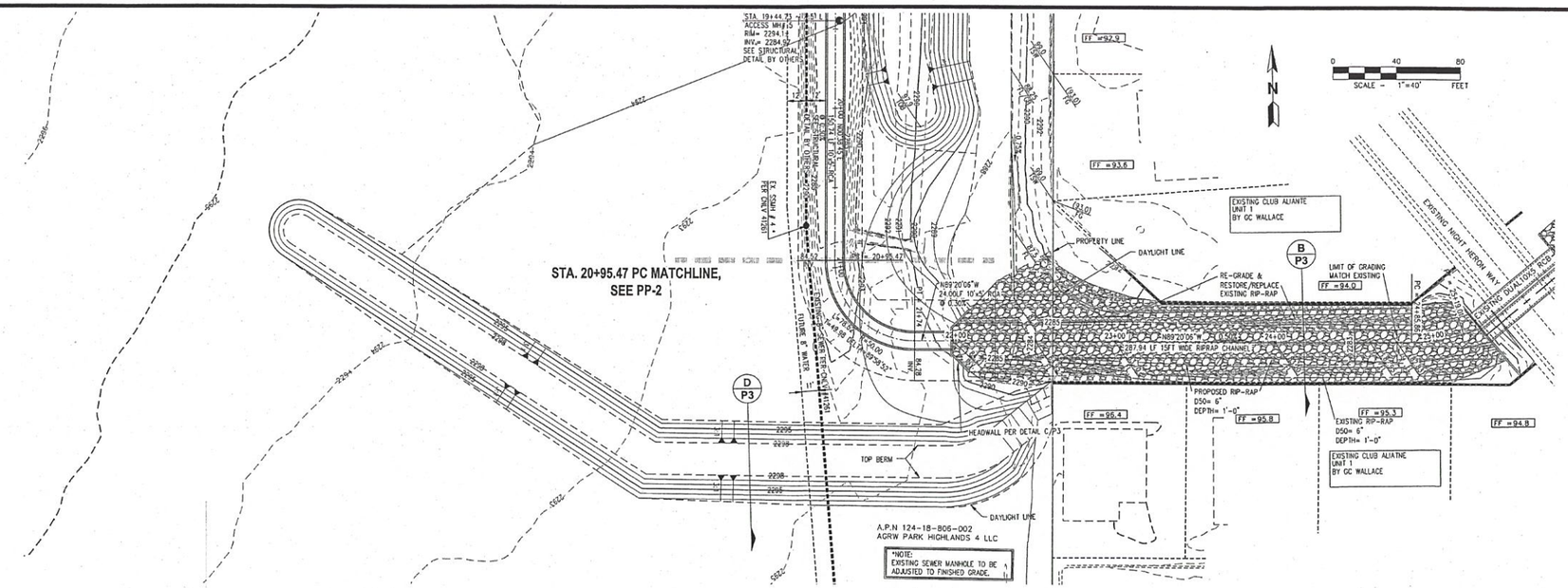
SECTION 18
TOWNSHIP 19
RANGE 61

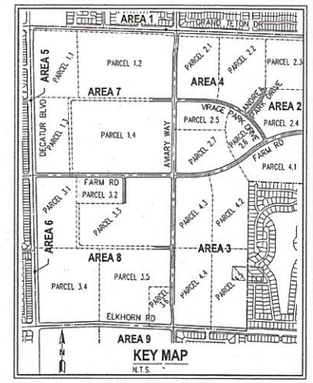
DATE: 11/11/10
DRAFTER: BRM
DESIGNER: BRM
CHECKED: JS
PROJECT NO. OLY-1001

PP-2
SHEET 4 OF 9

CNLV#42173

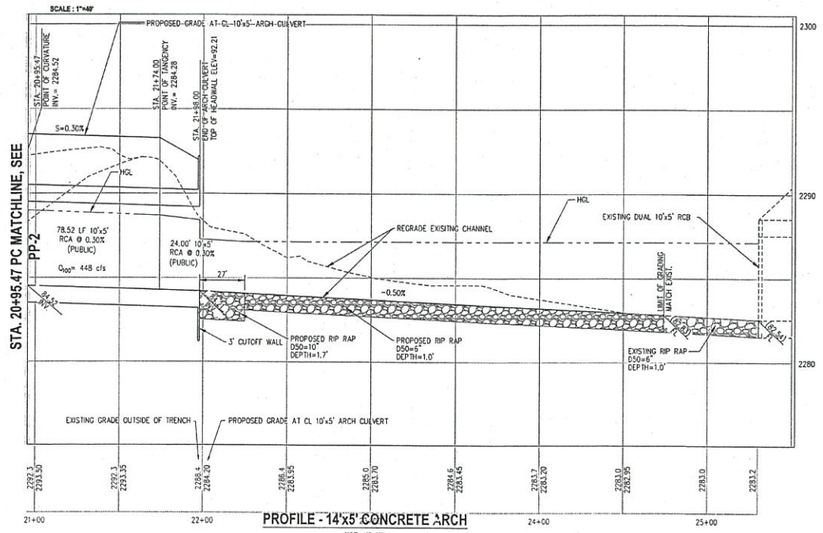
J:\dsh1001 park highlands\dwg\improv\cont\oly-1001-00-sd-pp2.dwg 3/22/2011 8:36 AM Ben Morris



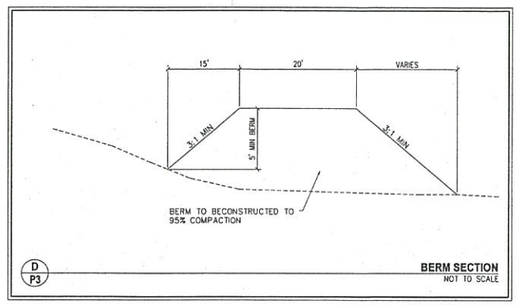


*Existing storm drain location, size & slope

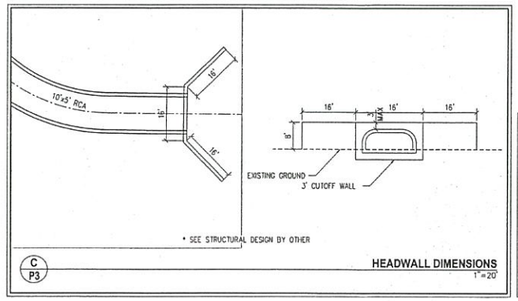
PLAN - 10'x5' CONCRETE ARCH



PROFILE - 14'x5' CONCRETE ARCH
HOR.: 1"=40'
VERT.: 1"=4'



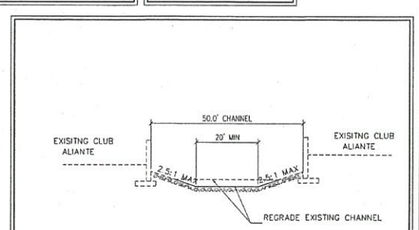
D P3 **BERM SECTION** NOT TO SCALE



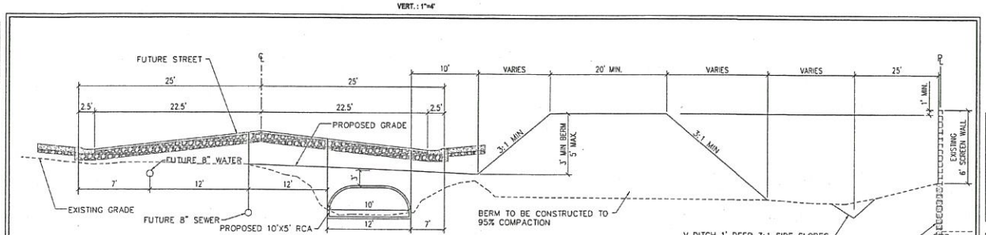
C P3 **HEADWALL DIMENSIONS** 1"=20'

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

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811
OR
1-800-227-2600
AND
CLARK COUNTY TRAFFIC OPERATIONS
1-702-455-7544



B P3 **CHANNEL SECTION** NOT TO SCALE



A P3 **PRELIMINARY FUTURE STREET** NOT TO SCALE

DISCLAIMER NOTE:

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

BENCHMARK:

NLV9117NWS, BEING A RIVET & 2" ROUND ALUM. DISK, STAMPED NORTH LAS VEGAS BM NO. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. & ALIANTE PKWY.
2294.88 FT., 699.482 M (NAVD 88, PUBLISHED 11/01/06)
2294.98 FT, 699.5... M (...ELEVATION USED FOR THESE PLANS, PRE-REVISION)

BASIS OF BEARINGS:

SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

CITY OF NORTH LAS VEGAS UTILITY DEPARTMENT DISCLAIMER

A STATEMENT OF UNDERSTANDING BETWEEN THE CITY OF NORTH LAS VEGAS UTILITY DEPARTMENT (CITY) AND ANY AND ALL SUBSEQUENT USERS OF INFORMATION CONTAINED HEREFROM:

THE PLANS AND SUPPORTING INFORMATION IS FURNISHED BY THE CITY, AND IS ACCEPTED/USED BY THE RECIPIENT WITH THE UNDERSTANDING THAT THE CITY MAKES NO WARRANTIES, EXPRESS OR IMPLIED, CONCERNING THE ACCURACY, COMPLETENESS, RELIABILITY, OR SUITABILITY OF SAID PLANS OR ANY SUPPORTING DATA AND FURTHER UNDERSTANDS THAT ALL USERS ARE ACTING AT THEIR OWN RISK. THE CITY SHALL BE UNDER NO LIABILITY WHATSOEVER RESULTING FROM ANY USE OF THIS INFORMATION.

THIS INFORMATION SHOULD NOT BE RELIED UPON AS THE SOLE BASIS FOR EXISTING WATER AND/OR SEWER LOCATIONS. THE ENGINEER SHALL CHECK AND VERIFY ALL DIMENSIONS AND LOCATIONS OF EXISTING UTILITIES.

CONTACT CNLV UTILITIES @ 633-1277 24 HOURS PRIOR TO BEGINNING ANY WORK FOR SCHEDULING INSPECTIONS AND APPROVALS.

CITY OF NORTH LAS VEGAS UTILITIES DEPARTMENT

E. B. 3/24/11
UTILITIES DEPARTMENT - ENGINEERING SERVICES DIVISION — DATE:

APPROVAL OF THESE PLANS SHALL NOT BE CONSTRUED TO BE A PERMIT FOR CONSTRUCTION, A COMMITMENT TO SUPPLY WATER AND/OR SEWER SERVICE, OR AN APPROVAL OF ANY VIOLATION OF CNLV WATER AND/OR SEWER SERVICE RULES AND REGULATIONS OR DESIGN AND CONSTRUCTION STANDARDS.

CERTIFICATION:

THIS PLAN COMPLIES WITH THE APPROVED DRAINAGE STUDY APPLICATION # CNLV No. 41331, ON FILE WITH THE CITY OF NORTH LAS VEGAS.

3.22.11 — DATE
BENJAMIN R. MORRIS

APPROVAL:

JENNIFER GOODY, P.E.
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION
11/29/11 — DATE

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.

NORTH LAS VEGAS, NV

NOVEMBER 2005 LAND INVESTORS, L.L.C.
NORTH LAS VEGAS 600 ACRE SITE AREA 3 ARCH CULVERT
PLAN AND PROFILE - 20+95.47 TO 25+00

SECTION 18
TOWNSHIP 19
RANGE 61

DATE: 11/11/10
DRAFTER: BRM
DESIGNER: BRM
CHECKED: JS
PROJECT NO. OLY-1001

PROFESSIONAL ENGINEER - STATE OF NEVADA
BENJAMIN R. MORRIS
Exp. 12-31-11
CIVIL
No. 18051
3.22.11

PP-3
SHEET 5 OF 9

CNLV#42173

J:\vs\1001 park highlands\dwg\improv\civil-1001-001-ss-pop.dwg 3/22/2011 8:36 AM Ben Morris

Approved Plans for
North Las Vegas 600 Acres Area 4 (CNLV No. 28978)

PARK HIGHLANDS

IMPROVEMENT PLANS FOR
NORTH LAS VEGAS 600 ACRES
AREA 4
CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA
APN: 124-18-101-001 , 78.53 ACRES

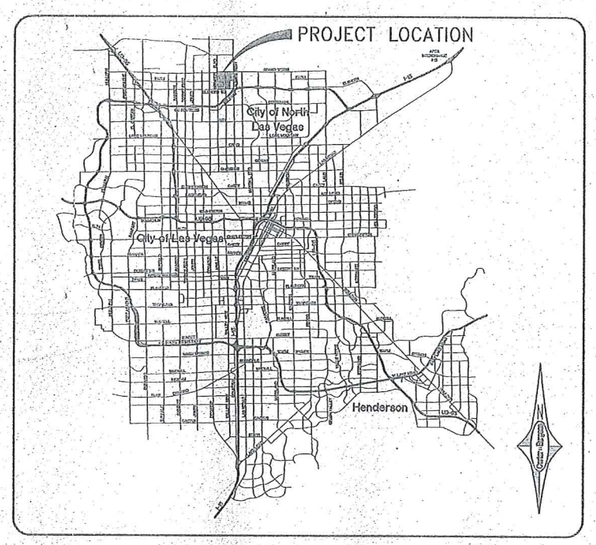
OWNER:
NOVEMBER 2005 LAND INVESTORS, LLC/DRHI INC
11411 SOUTHERN HIGHLANDS PKWY, SUITE 300
LAS VEGAS NEVADA 89141
702-616-3800
702-616-3833 FAX

DEVELOPER:
NOVEMBER 2005 LAND INVESTORS, LLC/DRHI INC
11411 SOUTHERN HIGHLANDS PKWY, SUITE 300
LAS VEGAS NEVADA 89141
702-616-3800
702-616-3833 FAX

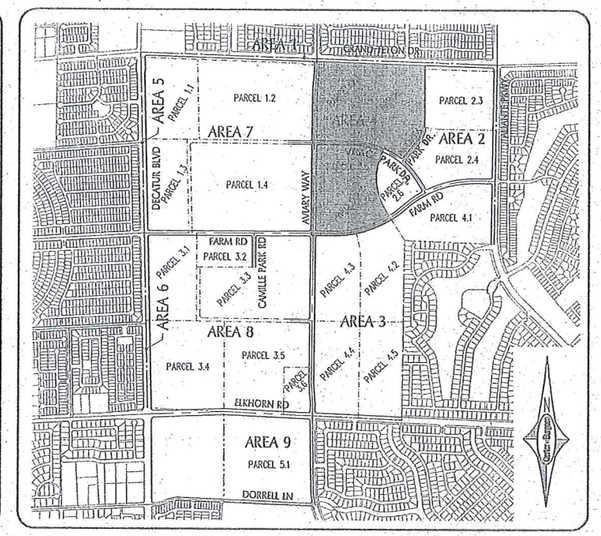
ENGINEER:
Carter::Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road, Las Vegas, NV. 89119
(702) 938-5400 Fax (702) 938-5454

GEOTECH ENGINEER
PREPARED BY: GUDIS GEOTECHNICAL, INC.
PROJECT NUMBER: E-05-022
DATE: April 28, 2005
REVISED DATE: July 24, 2007
CUT TOTAL: 3694 CY
FILL TOTAL: 227 CY
NET: 3467 CY

SERVICES:
SANITARY SEWER: CITY OF NORTH LAS VEGAS
WATER: CITY OF NORTH LAS VEGAS
POWER: NEVADA POWER COMPANY
GAS: SOUTHWEST GAS CORPORATION
TELEPHONE: EMBARQ
CABLE T.V.: COX COMMUNICATIONS
REFUSE: REPUBLIC SERVICES OF SOUTHERN NEVADA



VICINITY MAP
N.T.S.



SITE LOCATION
N.T.S.

SHEET INDEX

SHEET NO.		DESCRIPTION
1.	C-01	COVER SHEET
2.	C-02	GENERAL NOTES
3.	HCP-01	HORIZONTAL CONTROL
4.	MU-STM-01	MASTER UTILITY – STORM DRAIN
5.	MU-SAN-01	MASTER UTILITY – SANITARY SEWER
6.	MU-WTR-01	MASTER UTILITY – WATER
7.	PP-STM-01	ROADWAY & STORM P/P, AVIARY WAY, STA: 62+80 TO STA: 69+50
8.	PP-STM-02	ROADWAY & STORM P/P, AVIARY WAY, STA: 69+50 TO STA: 76+50
9.	PP-STM-03	ROADWAY & STORM P/P, AVIARY WAY, STA: 76+50 TO STA: 83+50
10.	PP-STM-04	ROADWAY & STORM P/P, AVIARY WAY, STA: 83+50 TO STA: 89+98.35
11.	PP-STM-05	ROADWAY & STORM P/P, VIRAGE PARK DR., STA: 10+00 TO STA: 15+00
12.	PP-STM-06	ROADWAY & STORM P/P, VIRAGE PARK DR., STA: 15+00 TO STA: 21+00
13.	PP-STM-07	ROADWAY & STORM P/P, FARM ROAD, STA: 33+50.94 TO STA: 40+00
14.	PP-STM-08	ROADWAY & STORM P/P, FARM ROAD, STA: 40+00 TO STA: 45+25
15.	PP-UTL-01	WATER & SEWER P/P, AVIARY WAY, STA: 62+80 TO STA: 69+50
16.	PP-UTL-02	WATER & SEWER P/P, AVIARY WAY, STA: 69+50 TO STA: 76+50
17.	PP-UTL-03	WATER & SEWER P/P, AVIARY WAY, STA: 76+50 TO STA: 83+50
18.	PP-UTL-04	WATER & SEWER P/P, AVIARY WAY, STA: 83+50 TO STA: 89+98.35
19.	PP-UTL-05	WATER & SEWER P/P, VIRAGE PARK DR., STA: 10+00 TO STA: 15+00
20.	PP-UTL-06	WATER & SEWER P/P, VIRAGE PARK DR., STA: 15+00 TO STA: 21+00
21.	PP-UTL-07	WATER & SEWER P/P, FARM ROAD, STA: 33+50.94 TO STA: 40+00
22.	PP-UTL-08	WATER & SEWER P/P, FARM ROAD, STA: 40+00 TO STA: 45+25
23.	PP-UTL-09	WATER & SEWER P/P, SNWA LOW POINT DRAIN AVIARY WAY & GRAND TETON DR.

SHEET INDEX

SHEET NO.		DESCRIPTION
24.	STM-LAT-01	STORM DRAIN LATERAL PROFILES, VIRAGE PARK DRIVE & FARM ROAD
25.	STM-LAT-02	STORM DRAIN LATERAL PROFILES, FARM ROAD
26.	SAN-LAT-01	SANITARY SEWER LATERAL PROFILES
27.	WTR-LAT-01	WATER LATERAL PROFILES
28.	WTR-LAT-02	WATER LATERAL PROFILES
29.	WTR-LAT-03	WATER LATERAL PROFILES, SNWA DETAILS
30.	WTR-DET-01	WATER DETAILS, SNWA LOW POINT DRAIN
31.	D-01	STREET SECTIONS
32.	T-01	SIGNAGE AND STRIPING PLAN, AVIARY WAY, STA: 62+80 TO STA: 76+50
33.	T-02	SIGNAGE AND STRIPING PLAN, AVIARY WAY, STA: 76+50 TO STA: 89+98.35
34.	T-03	SIGNAGE AND STRIPING PLAN, VIRAGE PARK DRIVE, STA: 10+00 TO STA: 20+25
35.	T-04	SIGNAGE AND STRIPING PLAN, FARM ROAD, STA: 35+25 TO STA: 45+25
36.	SD-01	JUNCTION STRUCTURE – VIRAGE PARK DRIVE – STA 19+19.36 – SDMH #4-07
37.	SD-02	JUNCTION STRUCTURE – GENERAL NOTES & DETAILS
38.	SD-03	JUNCTION STRUCTURE – FARM ROAD – STA 35+24.72 – SDMH #4-05
39.	TS-01	TRAFFIC SIGNALIZATION AVIARY WAY AND FARM ROAD
40.	TS-02	TRAFFIC SIGNALIZATION AVIARY WAY AND FARM ROAD
41.	TS-03	TRAFFIC SIGNALIZATION AVIARY WAY AND VIRAGE PARK DRIVE
42.	TS-04	TRAFFIC SIGNALIZATION AVIARY WAY AND VIRAGE PARK DRIVE
43.	E-01	ELECTRICAL PLAN 1
44.	E-4.0	ELECTRICAL – STREET LIGHTING PLAN – AVIARY WAY
45.	E-4.1	ELECTRICAL – STREET LIGHTING PLAN – FARM RD./VIRAGE PARKWAY
46.	E-4.2	ELECTRICAL – SINGLE-LINE DIAGRAM AND CALCULATIONS
47.	E-4.3	ELECTRICAL – PANEL SCHEDULES AND CALCULATIONS – AVIARY WAY
48.	CP-01	CATHODIC PROTECTION – TEST STATION RELOCATION DETAILS
49.	CP-02	CATHODIC PROTECTION – TEST STATION RELOCATION DETAILS

BENCHMARK
NLV91170US
NAVD 88 ELEVATION PUBLISHED 11/1/2005
693.402 METERS, 2274.03 FEET
ELEVATION USED FOR THESE PLANS, PRE-REVISION
693.511 METERS, 2274.33 FEET
RIVET AND 2" ROUND ALUMINUM DISC, STAMPED NORTH LAS VEGAS BM NO. NLV91170US, SET IN THE TOP OF CURB, LOCATED APPROX. 23 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND AUANTE PKWY.

BASIS OF BEARINGS
SOUTH 87°23'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 106, PAGE 61 OF PARCEL MAPS.

LEGAL DESCRIPTION
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, AND 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

APPROVALS

DR. QIONG WU, P.E. PTOE — DEPUTY DIRECTOR/CITY ENGINEER, PUBLIC WORKS DEPARTMENT — 10/23/07 DATE

JENNIFER E. DOODY, P.E. — MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION — 10/23/07 DATE

RANDAL D. CAGLE — MANAGER OF REAL PROPERTY SERVICES — 10/22/07 DATE

CARLTON URBAN, P.E. — TRANSPORTATION SERVICES ADMINISTRATOR — 10/23/07 DATE

UTILITIES DEPARTMENT–ENGINEERING SERVICES DIVISION — 10/17/07 DATE
APPROVAL OF THESE PLANS SHALL NOT BE CONSTRUED TO BE A PERMIT FOR CONSTRUCTION, A COMMITMENT TO SUPPLY WATER AND/OR SEWER SERVICE OR AN APPROVAL OF ANY VIOLATION OF CNLV WATER AND/OR SEWER SERVICE RULES AND REGULATIONS OR DESIGN AND CONSTRUCTION STANDARDS.

CLV. FIRE DEPARTMENT — 10/22/07 DATE

SNWA PROJECT MANAGER — 10-10-07 DATE
SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED FIRE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

COX COMMUNICATIONS LAS VEGAS INC. — 5-8-07 DATE

EMBARQ TELEPHONE / NEVADA — 5.8.07 DATE
THE ATTACHED EMBARQ 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 STATUES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

NEVADA POWER COMPANY — 8/8/07 DATE
NEVADA POWER COMPANY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NEVADA POWER COMPANY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

SOUTHWEST GAS CORPORATION — 10-4-07 DATE

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

Avoid overhead power line contact. It's easy. Call before you Overhead 1-702-227-2600

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

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

Carter::Burgess
6655 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services
(702) 938-5400 Fax: (702) 938-5454

COVER SHEET
NORTH LAS VEGAS 600 ACRES AREA 4

DRAWN BY:
DESIGNED BY: JMH
CHECKED BY: CBW
PROJECT NO: 241954
SCALE: N/A N/A

MARK J. FAKLER CIVIL DP. 6/30/09 No.9911 PROFESSIONAL ENGINEER STATE OF NEVADA

SHEET C-01
1 OF 49 SHEETS
DRAWING NO. 28978

DUPES

Drawing Name: 10\241954-NLV\DESIGN\PLANS\NEVADA\Improvement Plans\1954-04-C1.dwg - User: dmendez - May 07, 2007 - 3:23pm

Avoid overhead power line contact. It's easy. Call before you Overhead 1-702-227-2929 NEVADA POWER CORPORATION AND SWIFT SERVICES CORPORATION

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

DISCLAIMER:

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

BENCHMARK

NLV9117NWS
NAVD 88 ELEV. PUBLISHED 11/01/06 699.482 METERS, 2294.88 FEET. ELEVATION USED FOR THESE PLANS.
PRE-REVISION 699.511 METERS, 2294.98 FEET. RIVET AND 2" ROUND ALUMINUM DISC, STAMPED NORTH LAS VEGAS BM No. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARINGS

SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

LEGAL DESCRIPTION

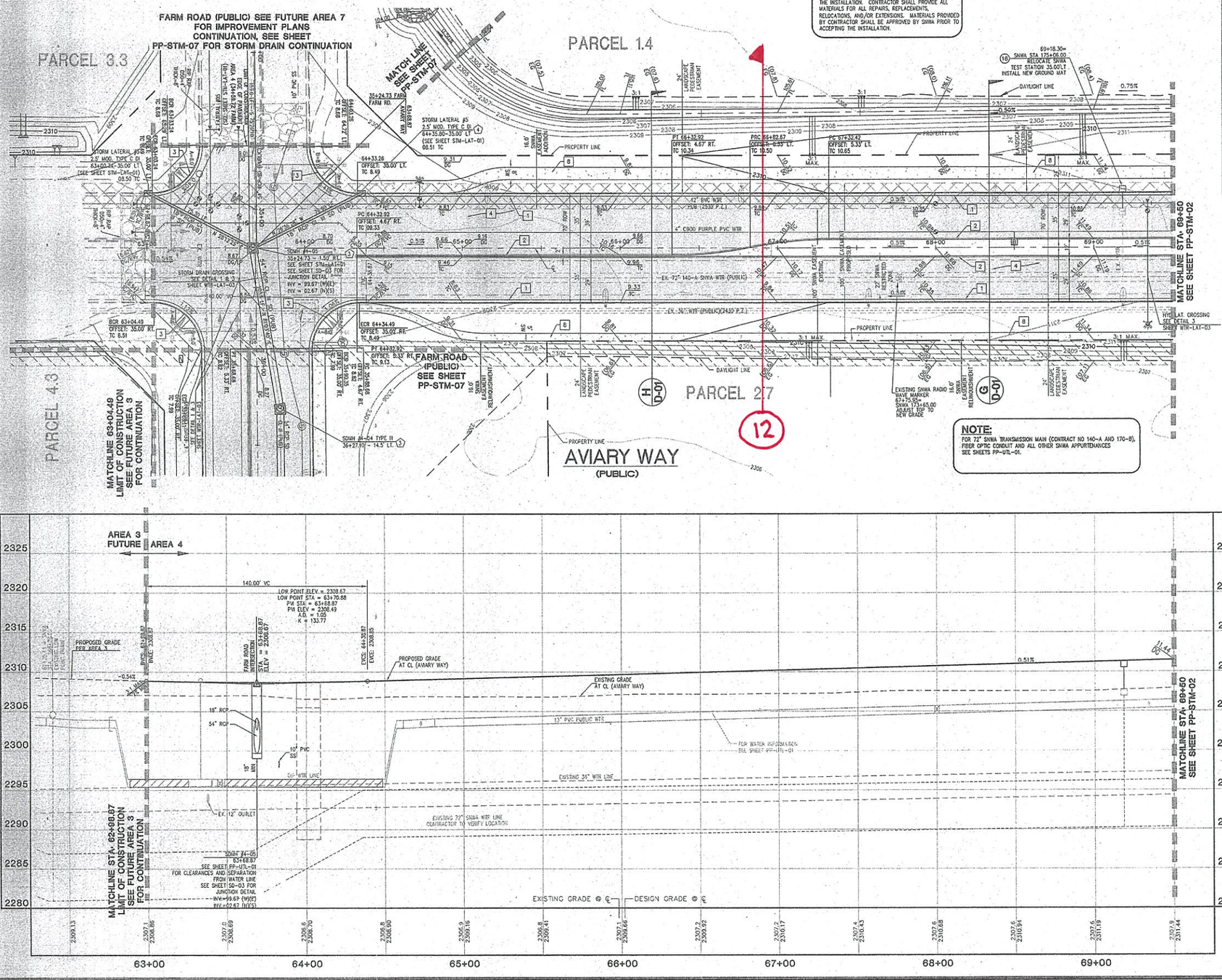
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, AND 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

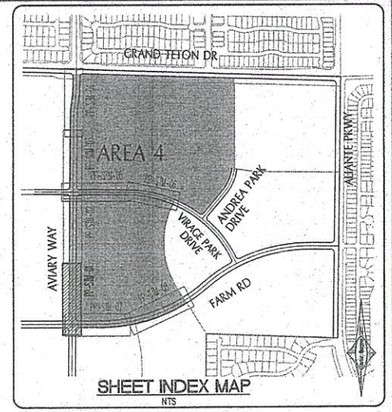
SNWA NOTE

1. SNWA FIBER OPTIC CONDUIT FOLLOWS ALONG THE WEST SIDE OF THE SNWA PIPELINE.
2. CAUTION: SNWA TEST LEADS ARE SHALLOW.
3. ALL REPAIRS, REPLACEMENTS, RELOCATIONS AND/OR EXTENSIONS MUST BE DESIGNED AND MONITORED BY A NACE INTERNATIONAL-CERTIFIED CATHODIC PROTECTION SPECIALIST AND WITNESSED AND APPROVED BY SNWA CATHODIC PROTECTION TECHNICIAN PRIOR TO ACCEPTING THE INSTALLATION. CONTRACTOR SHALL PROVIDE ALL MATERIALS FOR ALL REPAIRS, REPLACEMENTS, RELOCATIONS, AND/OR EXTENSIONS. MATERIALS PROVIDED BY CONTRACTOR SHALL BE APPROVED BY SNWA PRIOR TO ACCEPTING THE INSTALLATION.

SNWA CONSTRUCTION NOTES:

15. ADJUST EXISTING FACILITY TO GRADE
16. EXTEND/RELO. EX. SNWA/CNLV HARDWARE (IN CONFORMANCE WITH SNWA/LOCACE CONSTRUCTION STANDARDS, RESPECTIVELY). EXTEND/RELO EX. TEST STATIONS PER SHEET CP-01 AND CP-02.
17. FOR ALL WATER/SEWER/REUSE PLANS, PROFILES AND DETAILS, SEE SHEETS PP-UTL-01 THROUGH PP-UTL-09.
18. FOR ALL STORM DRAINAGE PLANS, PROFILES AND DETAILS, SEE SHEETS PP-STM-01 THROUGH PP-STM-05.





IMPROVEMENTS:

1. CONSTRUCT "L" TYPE CURB & GUTTER, (PER CC STD. DWG. No. 216)
2. CONSTRUCT "A" TYPE CURB, (PER CC STD. DWG. No. 219)
3. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER CC STD. DWG. No. 235, CASE II)
4. INSTALL A.C. PAVEMENT, (PER STREET SECTIONS)
5. 2' SAWCUT AND MATCH EXISTING ASPHALT PAVING, CURB AND GUTTER
6. CONSTRUCT COMMERCIAL AND INDUSTRIAL DRIVEWAY, (PER CC STD. DWG. No. 226, CASE I)
7. CONSTRUCT TYPICAL BUS TURN-OUT, (PER CC STD. DWG. No. 234.1)
8. CONSTRUCT MEANDERING SIDEWALK, (PER CC STD. DWG. No. 234)

LEGEND:

PROPOSED ASPHALT | SIDEWALK

STORM DRAIN:

1. INSTALL 60" TYPE I MANHOLE, (PER USD DWG. No. 403. TO CONFORM TO USD DWG. No. 401 & 402)
2. INSTALL TYPE II MANHOLE, (PER USD DWG. No. 405, TO CONFORM TO USD DWG. No. 401 & 402)
3. INSTALL TYPE III MANHOLE, (PER USD DWG. No. 406, TO CONFORM TO USD DWG. No. 401 & 402)
4. CONSTRUCT MODIFIED TYPE "C" DROP INLET, (PER DETAIL, ON SHEET STM-LAT-02)
5. INSTALL RCP END SECTION, (PER NDOT R-2.3.1)
6. INSTALL TEMPORARY PLUG AND CAP FOR FUTURE PHASE
7. REMOVE EX. END SECTION, CONNECT TO EX. RCP, (CONTRACTOR TO VERIFY SIZE, INVERT AND LOCATION PRIOR TO CONSTRUCTION)
8. ADJUST EXISTING FACILITY TO GRADE

SNWA CONSTRUCTION NOTE

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Valerie A. Schmidt 10-1-07
SOUTHERN NEVADA WATER AUTHORITY DATE

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE (#27769) AT THE CITY OF NORTH LAS VEGAS.

GLENN B. WATANABE, PE No. 16025 DATE: 10/23/07

Carter Burgess

30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:

Jennifer E. Doody 10/23/07
JENNIFER E. DOODY, P.E. DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

Carter-Burgess
6655 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services
(702) 895-5400 FAX (702) 895-5454

ROADWAY & STORM P/P
AVIARY WAY
STA 62+80 TO STA 69+50
NORTH LAS VEGAS
600 ACRES
AREA 4

DRAWN BY:
DESIGNED BY:
CHECKED BY: GSW
PROJECT NO: 218994
SCALE: 1" = 30' 1" = 6'

SHEET PP-STM-01
7 OF 49 SHEETS
DRAWING NO. 28978

Drawing Name: LV-218994-RDW-PP-STM-01.dgn Xrefs: SHEET-SIGN-MAP.dwg, TITLE.dwg, Underground_Plant.dwg Plotted: Sep 25, 2007 - 10:26am

Avoid overhead power line contact. It's costly.
Call before you Overhead
1-702-227-2929
(EXCEPT POWER DISTRIBUTION AND SATELLITE SERVICE EQUIPMENT)

Avoid cutting underground utility lines. It's costly.
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BENCHMARK

NLV5117NWG
NAVD 88 ELEV. PUBLISHED 11/01/06 609.482 METERS, 2294.85 FEET. ELEVATION USED FOR THESE PLANS, PRE-REVISION 699.511 METERS, 2294.98 FEET. RIVET AND 2" ROUND ALUMINUM DISC, STAMPED NORTH LAS VEGAS BM No. NLV5117NWG, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARINGS

SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

LEGAL DESCRIPTION

GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, AND 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

SNWA NOTE

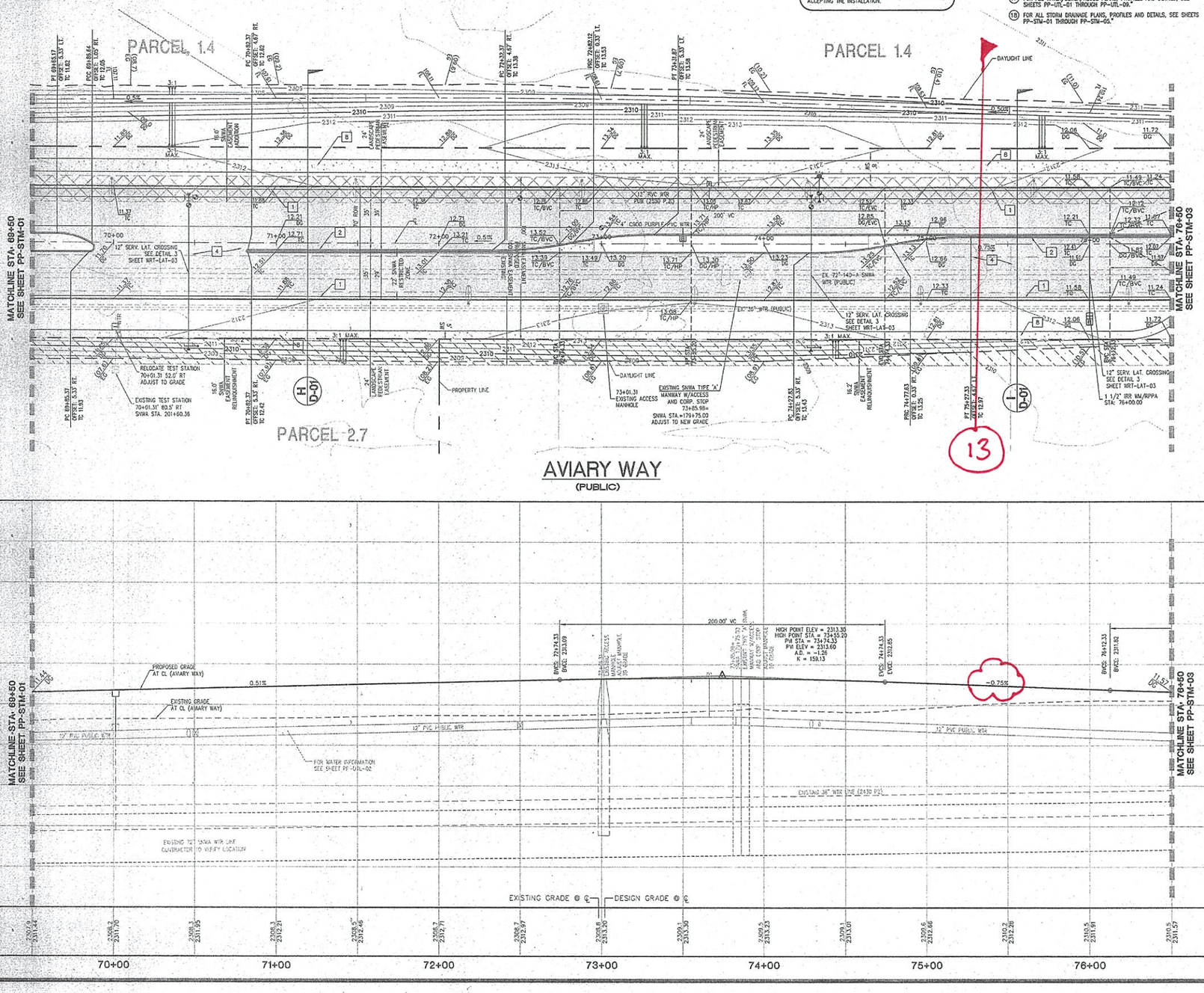
1. SNWA FIBER OPTIC CONDUIT FOLLOWS ALONG THE WEST SIDE OF THE SNWA PIPELINE.

2. CAUTION: SNWA TEST LEADS ARE SHALLOW.

3. ALL REPAIRS, REPLACEMENTS, RELOCATIONS AND/OR EXTENSIONS MUST BE DESIGNED AND MONITORED BY A NACE INTERNATIONAL-CERTIFIED CATHODIC PROTECTION SPECIALIST AND WITNESSED AND APPROVED BY SNWA CATHODIC PROTECTION TECHNICIAN PRIOR TO ACCEPTING THE INSTALLATION. CONTRACTOR SHALL PROVIDE ALL MATERIALS FOR ALL REPAIRS, REPLACEMENTS, RELOCATIONS, AND/OR EXTENSIONS. MATERIALS PROVIDED BY CONTRACTOR SHALL BE APPROVED BY SNWA PRIOR TO ACCEPTING THE INSTALLATION.

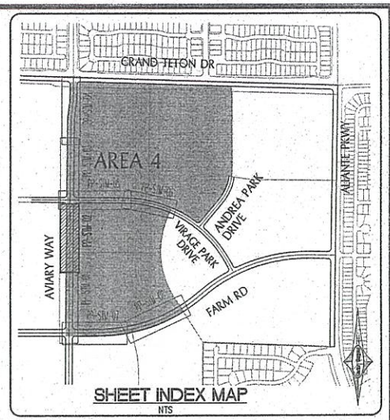
NOTE:

FOR 72" SNWA TRANSMISSION MAIN (CONTRACT NO 140-A AND 170-B), FIBER OPTIC CONDUIT AND ALL OTHER SNWA APPURTENANCES SEE SHEETS PP-UTL-02.



SNWA CONSTRUCTION NOTES

(15) ADJUST EXISTING FACILITY TO GRADE
(16) EXTEND/RELO. EX. SNWA/CNLV HARDWARE (IN CONFORMANCE WITH SNWA/SDACS CONSTRUCTION STANDARDS, RESPECTIVELY). EXTEND/RELO EX. TEST STATIONS PER SHEET CP-01 AND CP-02.
(17) FOR ALL WATER/SEWER/REUSE PLANS, PROFILES AND DETAILS, SEE SHEETS PP-UTL-01 THROUGH PP-UTL-04."
(18) FOR ALL STORM DRAINAGE PLANS, PROFILES AND DETAILS, SEE SHEETS PP-STM-01 THROUGH PP-STM-05."



IMPROVEMENTS:

1. CONSTRUCT "L" TYPE CURB & GUTTER, (PER CC STD. DWG. No. 216)
2. CONSTRUCT "A" TYPE CURB, (PER CC STD. DWG. No. 219)
3. DEPRESS CURB, CONSTRUCT RAMP USING ARMOR TILE TRUNCATED DOMES, (PER CC STD. DWG. No. 235, CASE II)
4. INSTALL A.C. PAVEMENT, (PER STREET SECTIONS)
5. 2' SAWCUT AND MATCH EXISTING ASPHALT PAVING, CURB AND GUTTER
6. CONSTRUCT COMMERCIAL AND INDUSTRIAL DRIVEWAY, (PER CC STD. DWG. No. 226, CASE I)
7. CONSTRUCT TYPICAL BUS TURN-OUT, (PER CC STD. DWG. No. 234.1)
8. CONSTRUCT MEANDERING SIDEWALK, (PER CC STD. DWG. No. 234)

LEGEND:

PROPOSED ASPHALT — SIDEWALK

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Valerie B. Stonerock 10-1-07
SOUTHERN NEVADA WATER AUTHORITY DATE

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10/23/07
GLENN B. WATANABE, PE No. 16025 DATE:

Carter Burgess

30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:

10/26/07
JENNIFER E. DOODY, P.E. DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

13

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

Carter-Burgess
6655 Bermuda Road
Las Vegas, NV 89119
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(702) 939-5400 Fax (702) 939-5454

ROADWAY & STORM P/P
AVIARY WAY
STA 69+50 TO STA 76+50
NORTH LAS VEGAS
600 ACRES
AREA 4

DRAWN BY:
DESIGNED BY:
CHECKED BY: GBW
SCALE: 1" = 30'
PROJECT NO: 218991

SHEET
PP-STM-02
8 OF 49 SHEETS
DRAWING NO.
28978

Drawing Name: L:\247054 - NLV SITE\DESIGN\WORKING\WOD_04\Improvement Plans\[1914-R1-PP-STM-02].dwg User: acosta Sep 20, 2007 - 10:36am

Call before you Dig — 1-702-227-2929 (Overhead) / 1-800-227-2600 (Underground)

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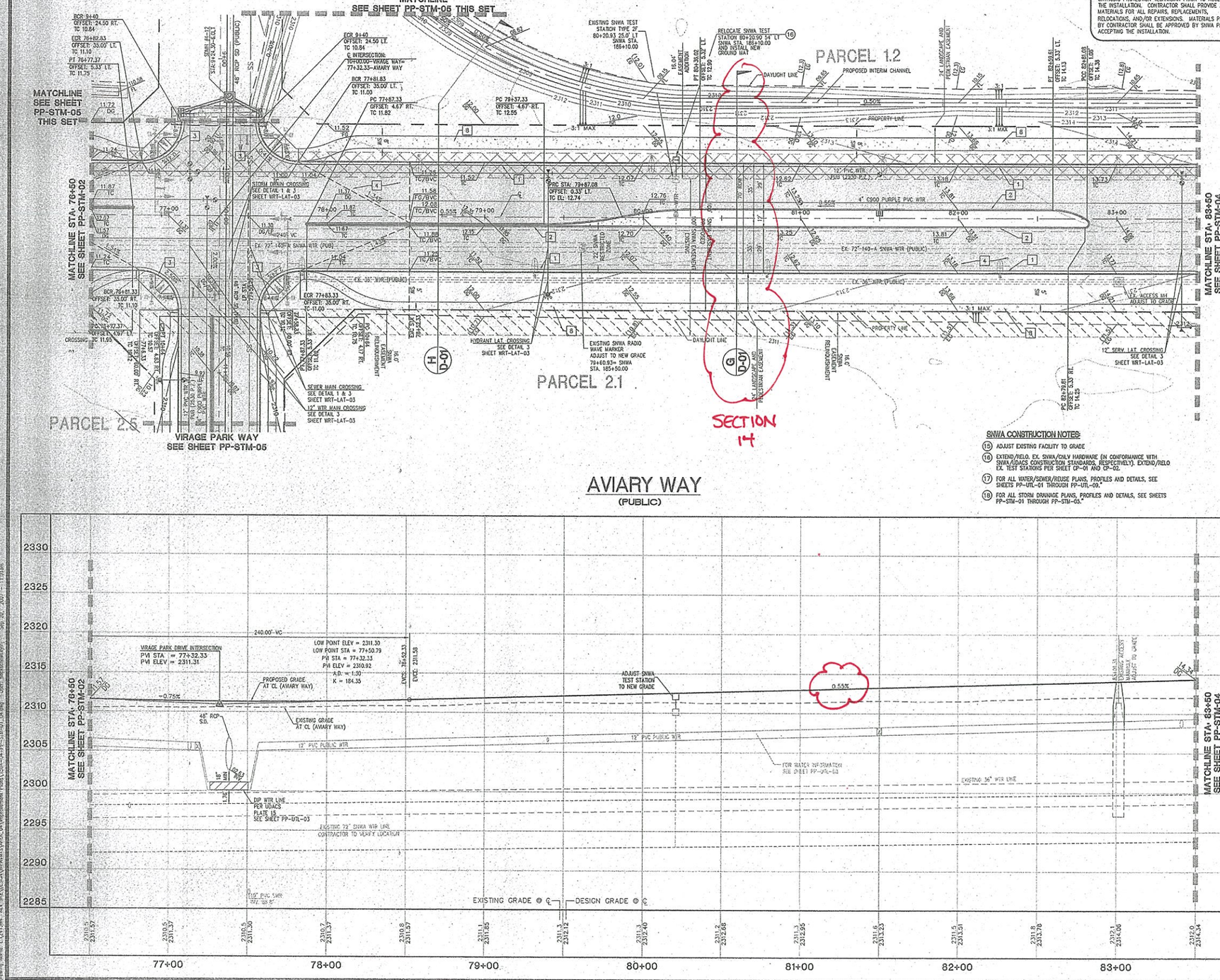

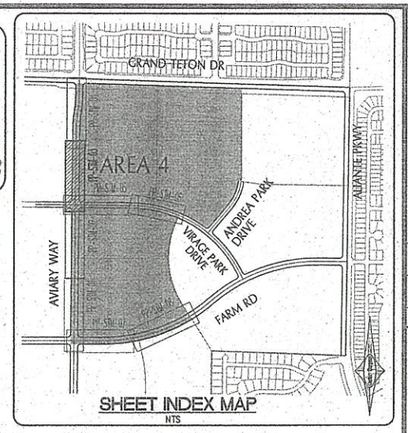

SHEET INDEX MAP
NTS

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Valerie A. Stapelfeldt 10-1-07
SOUTHERN NEVADA WATER AUTHORITY — DATE

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GLENN B. WATANABE, PE No. 16025 — DATE: 10/23/07

Carter-Burgess

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(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:

JENNIFER E. DOODY, P.E. — DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

REVISION

REV	DATE	BY

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

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ROADWAY & STORM P/P
AVIARY WAY
STA. 76+50 TO STA. 83+50
NORTH LAS VEGAS
600 ACRES
AREA 4

DRAWN BY:
DESIGNED BY:
CHECKED BY:
DATE:
PROJECT NO: 24594
SCALE: 1" = 30' 1" = 6'

SHEET
PP-STM-03
9 OF 49 SHEETS

DRAWING NO.
28978

Drawing Name: U:\24594 - NLV SNWS\CAD\APPROVALS\AREA_04\Improvement Plans\USW-04-PP-STM-01.dwg Sep 30, 2007 - 11:01am

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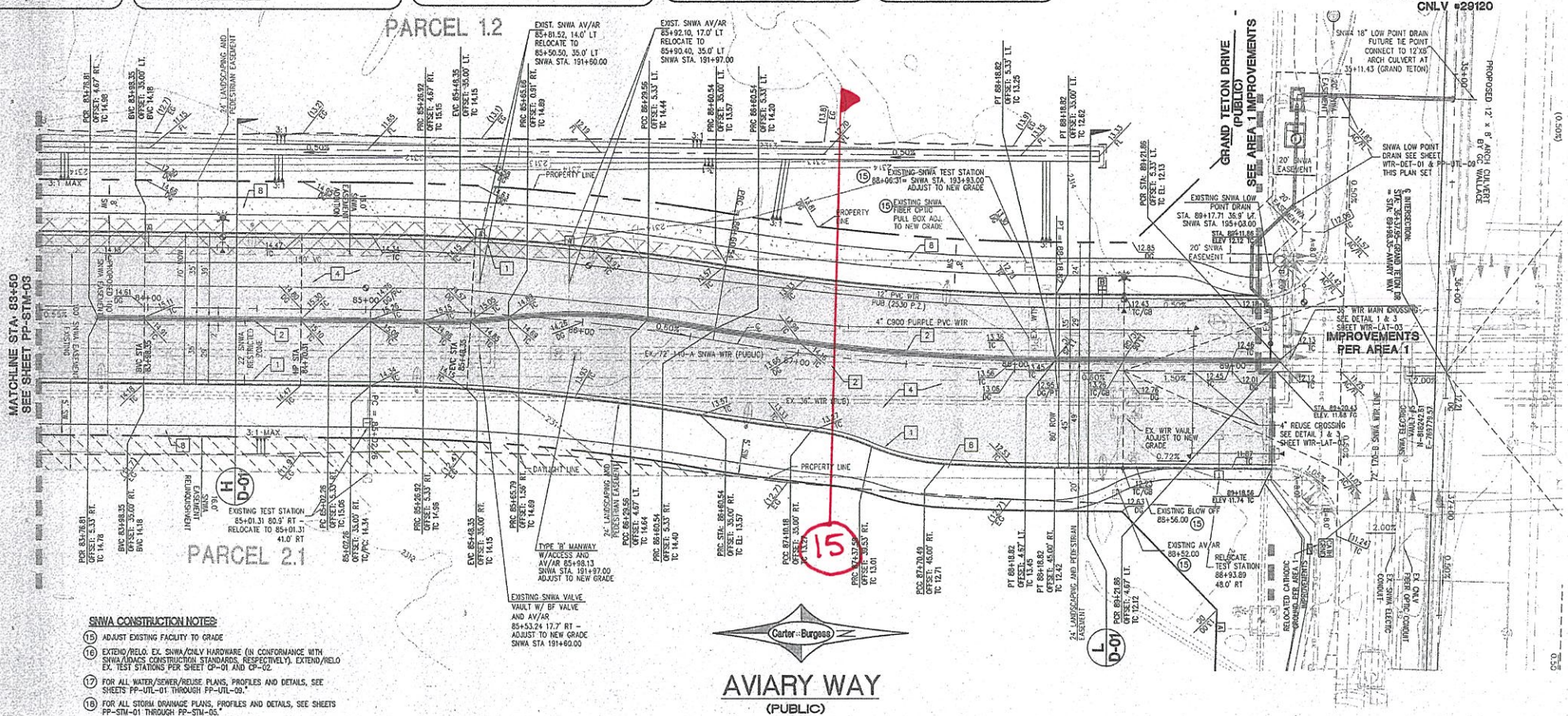
PARCEL 1.2
PARCEL 2.1
MATCHLINE STA. 83+50
SEE SHEET PP-STM-03
GRAND TETON DRIVE (PUBLIC)
SEE AREA 1 IMPROVEMENTS
CNLV #29120
AVIARY WAY
(PUBLIC)
PROPERTY LINE
EXISTING TEST STATION 85+01.31 80.5' RT – RELOCATE TO 85+01.31 41.0' RT
EXISTING SNWA VALVE VAULT W/ BF VALVE AND AV/AR 85+53.24 17.7' RT – ADJUST TO NEW GRADE SNWA STA 191+60.00
TYPE 'B' MANWAY W/ACCESS AND AV/AR 85+98.13 SNWA STA. 191+97.00 ADJUST TO NEW GRADE
EX. 72" 170-A SNWA WTR (PUBLIC)
EX. 36" WTR (PUBLIC)
4" C900 PURPLE PVC WTR
12" PVC WTR PUB (253.0' P.)
EXISTING TEST STATION 88+06.31 SNWA STA. 193+93.00 ADJUST TO NEW GRADE
EXISTING SNWA FIBER OPTIC PULL BOX ADJ. TO NEW GRADE
EXISTING SNWA LOW POINT DRAIN STA. 89+17.71 35.9' LT SNWA STA. 195+03.00
SNWA 18" LOW POINT DRAIN FUTURE 18" POINT CONNECT TO 12'X8' ARCH CULVERT AT 35+11.43 (GRAND TETON)
SNWA LOW POINT DRAIN SEE SHEET WTR-DET-01 & PP-UTL-02 THIS PLAN SET
20' SNWA EASEMENT
EX. WTR VAULT ADJUST TO NEW GRADE
4" REUSE CROSSING SEE DETAIL 1 & 3 SHEET WTR-LAT-03
EXISTING BLOW OFF 85+56.00
EXISTING AV/AR 88+52.00
RELOCATE TEST STATION 88+93.89 48.0' RT
EX. 8" SNWA WTR LINE
EX. 12" SNWA WTR LINE
EX. 2" DOS-B SNWA WTR LINE
EX. 6" SNWA WTR LINE
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EX. 12

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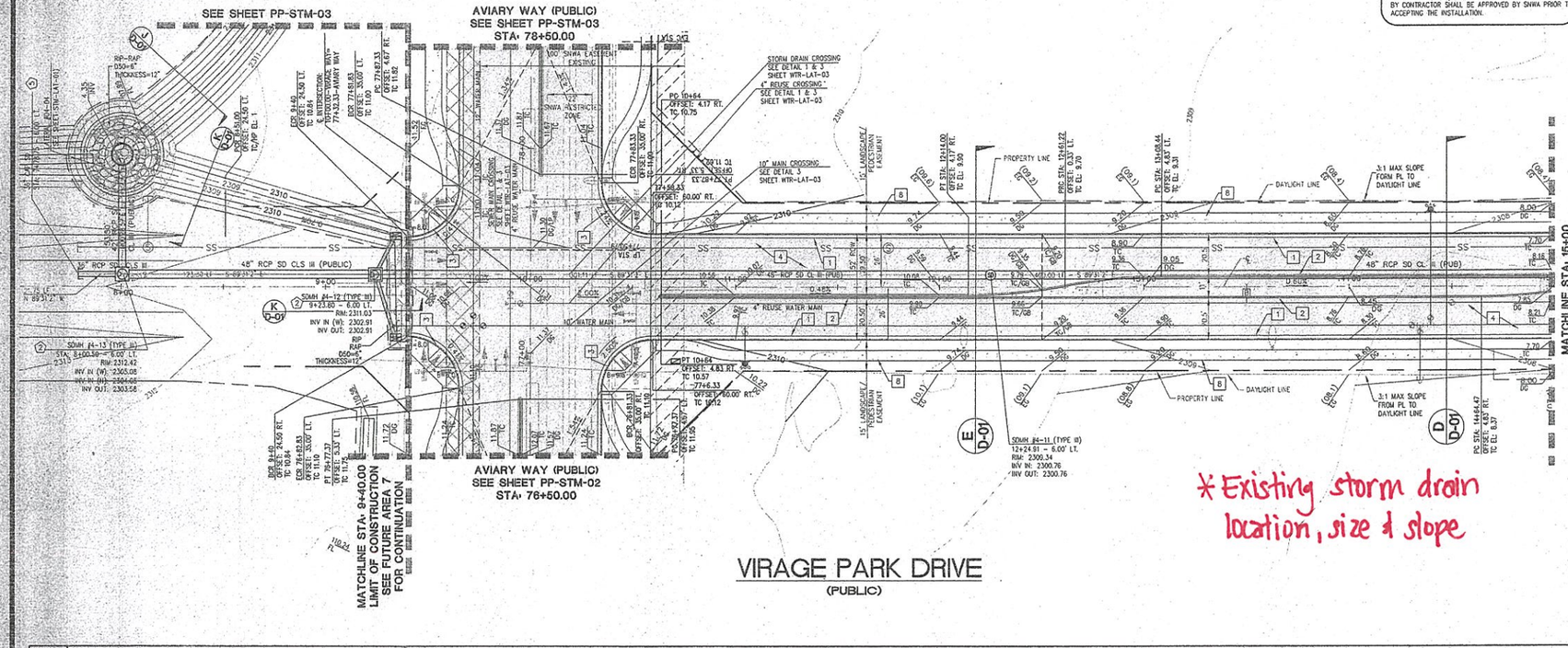

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NLV9117NWS
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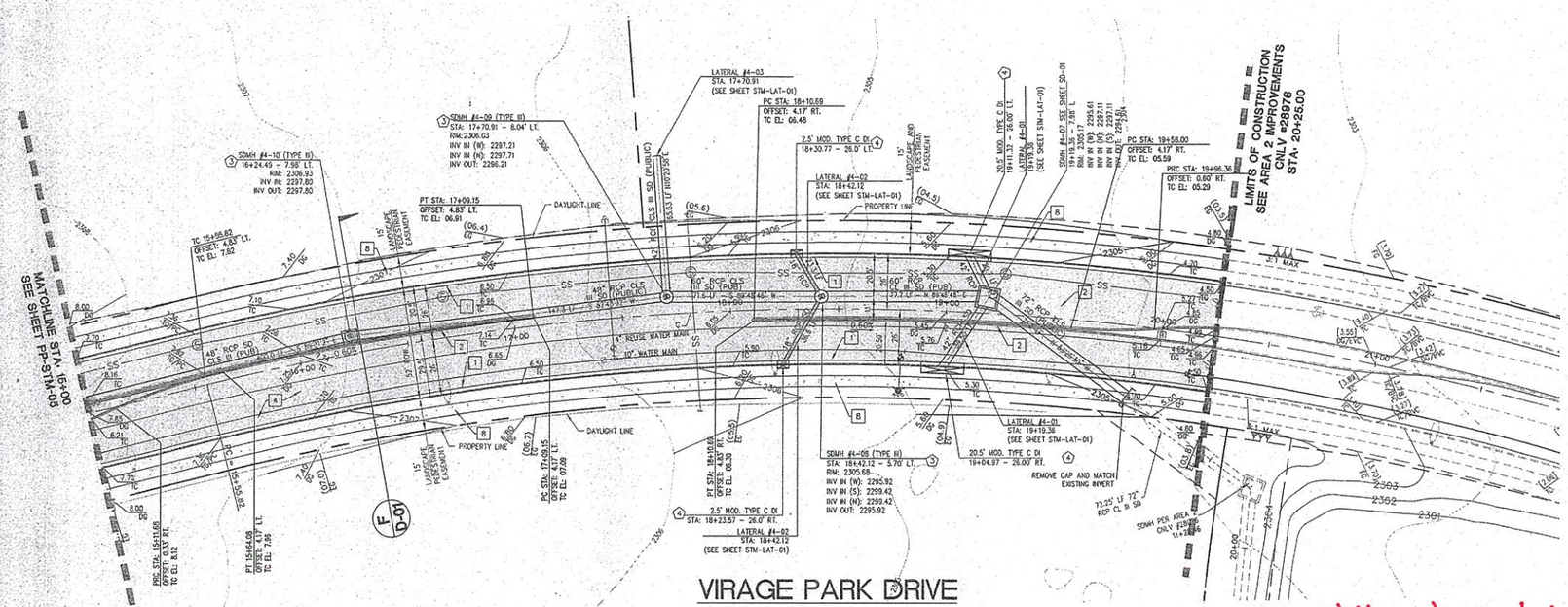
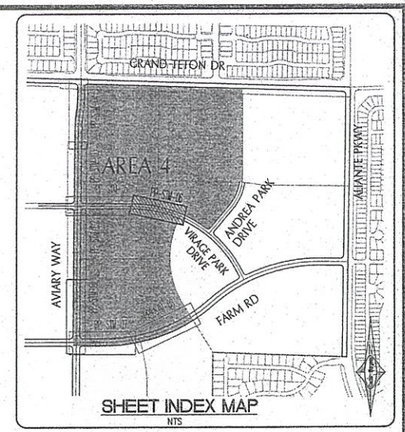


*Existing storm drain location, size & slope



SHEET INDEX MAP
NTS

IMPROVEMENTS:

1. CONSTRUCT "L" TYPE CURB & GUTTER, (PER CC STD. DWG. No. 216)
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LEGEND:

PROPOSED ASPHALT — SIDEWALK

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10-1-07
SOUTHERN NEVADA WATER AUTHORITY — DATE

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE (#27769) AT THE CITY OF NORTH LAS VEGAS.

10/23/07
GLENN B. WATANABE, PE No. 16025 — DATE:

30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

APPROVAL:

10/23/07
JENNIFER E. DOODY, P.E. — DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

CarterBurgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax: (702) 938-5454

ROADWAY & STORM P/P
VIRAGE PARK DRIVE
STA 15+00 TO STA 21+00
NORTH LAS VEGAS
600 ACRES
AREA 4

DRAWN BY:
DESIGNED BY:
CHECKED BY: GBW
PROJECT NO: 21584
SCALE: 1" = 30'

SHEET
PP-STM-06
12 OF 49 SHEETS
DRAWING NO.
28978

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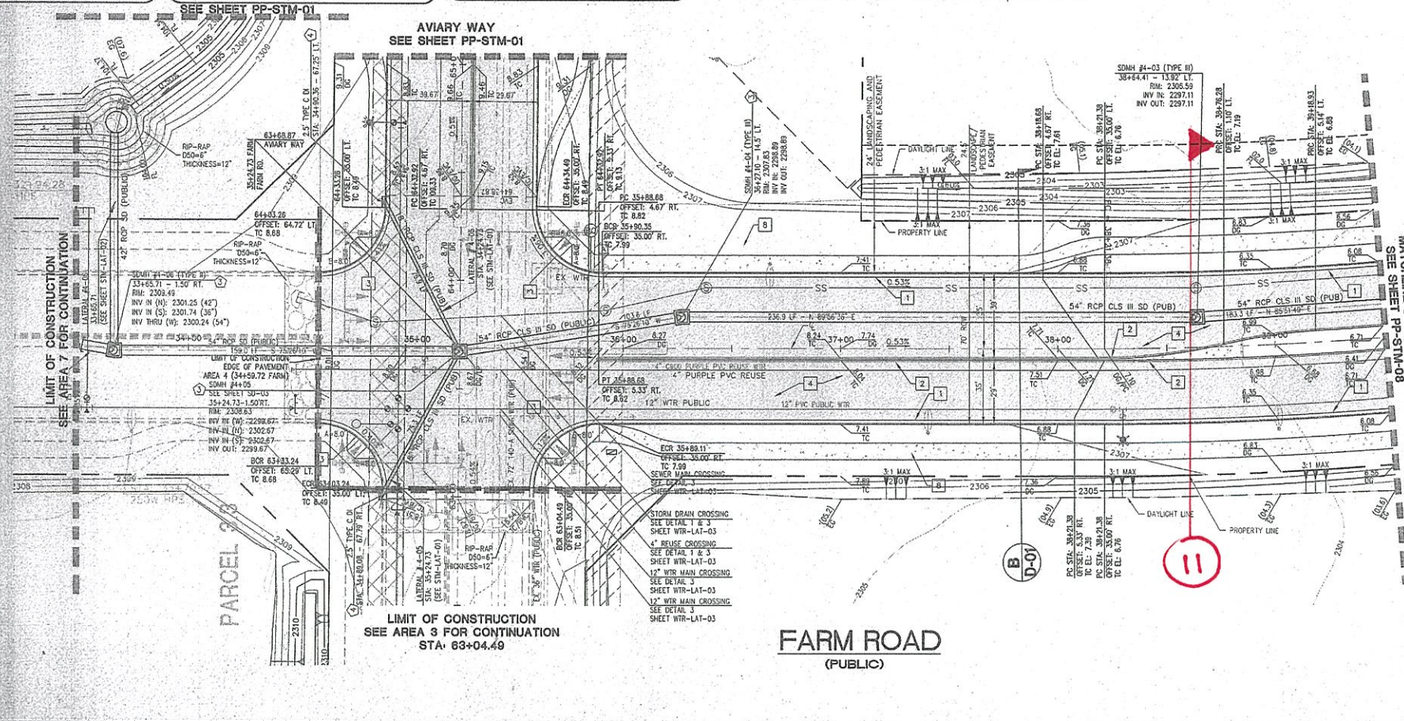

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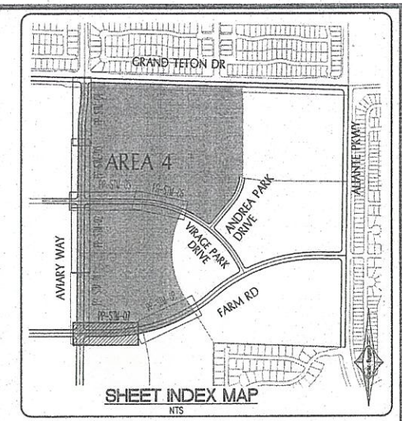

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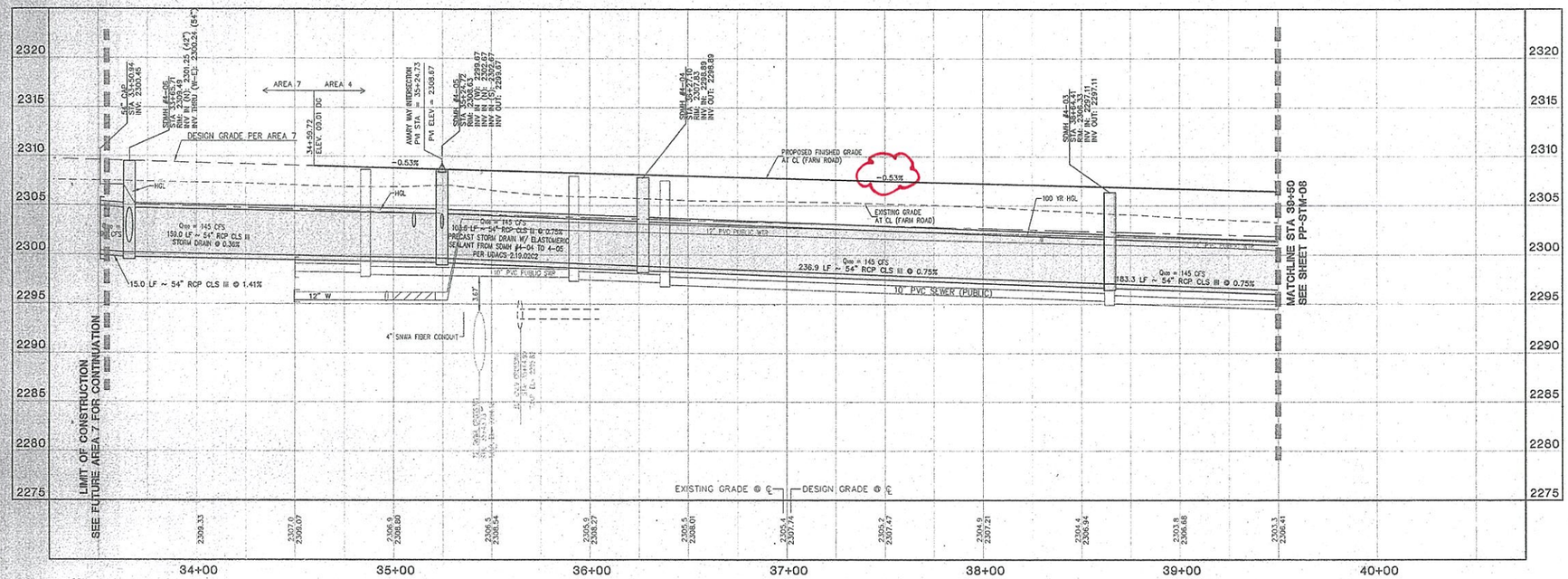
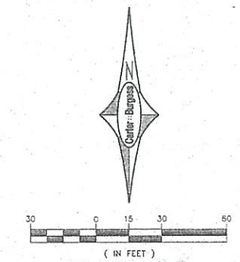
SOUTHERN NEVADA WATER AUTHORITY — DATE: 10-1-07

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE (if applicable) IN THE HYDROLOGY SECTION OF CLARK COUNTY, NEVADA.

GLENN B. WATANABE, PE No. 16025 — DATE: 10/23/07





APPROVAL:
JENNIFER E. DOODY, P.E. — DATE: 10/23/07
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

REVISION | BY | DATE

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

Carter-Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-9400 Fax (702) 938-5464

ROADWAY & STORM P/P
FARM ROAD
STA 33+50.94 TO STA 40+00.00
NORTH LAS VEGAS
600 ACRES
AREA 4

DRAWN BY:
DESIGNED BY:
CHECKED BY: GBW
SCALE: 1" = 30' / 1" = 6'
PROJECT NO: 2415594

SHEET PP-STM-07
13 OF 49 SHEETS
DRAWING NO. 28978

Drawing Name: U:\2415294\...\PP-STM-07.dwg

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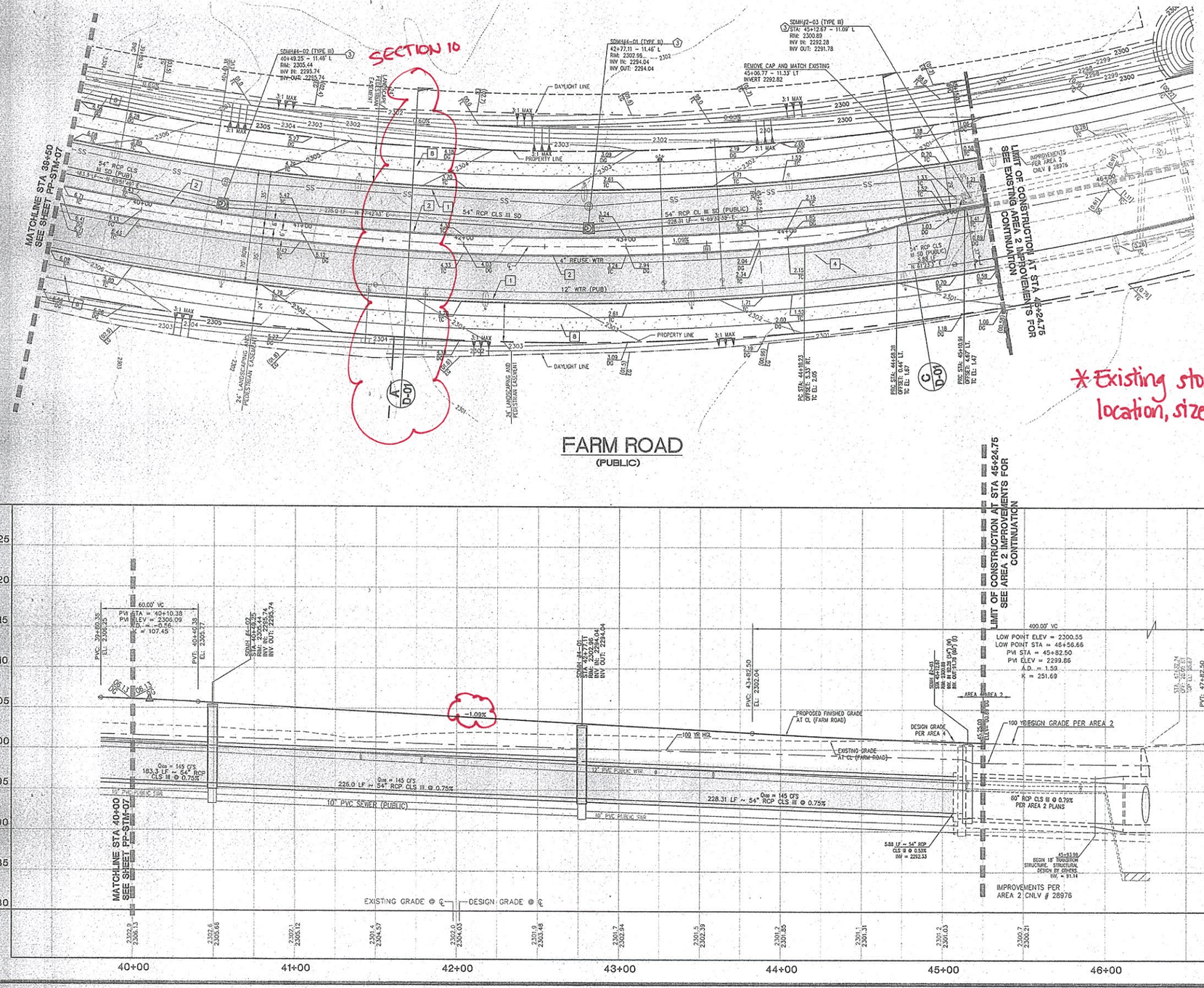

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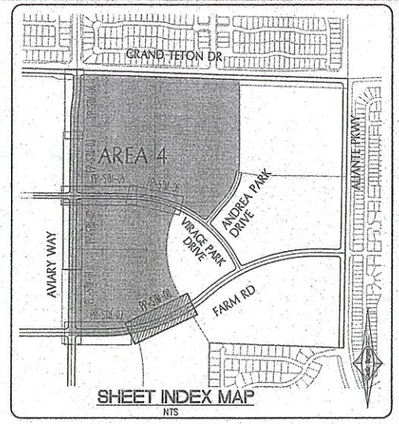

SHEET INDEX MAP
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Valerie A. Schmitt 10-1-07
SOUTHERN NEVADA WATER AUTHORITY — DATE

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10/23/07
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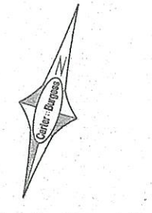

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(IN FEET)
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APPROVAL:
Jennifer E. Doody 10/23/07
JENNIFER E. DOODY, P.E. — DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

REV	DATE	BY	REVISION

NOVEMBER 2006 LAND INVESTORS, LLC/DRHI, INC.

Carter Burgess
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ROADWAY & STORM P/P
FARM ROAD
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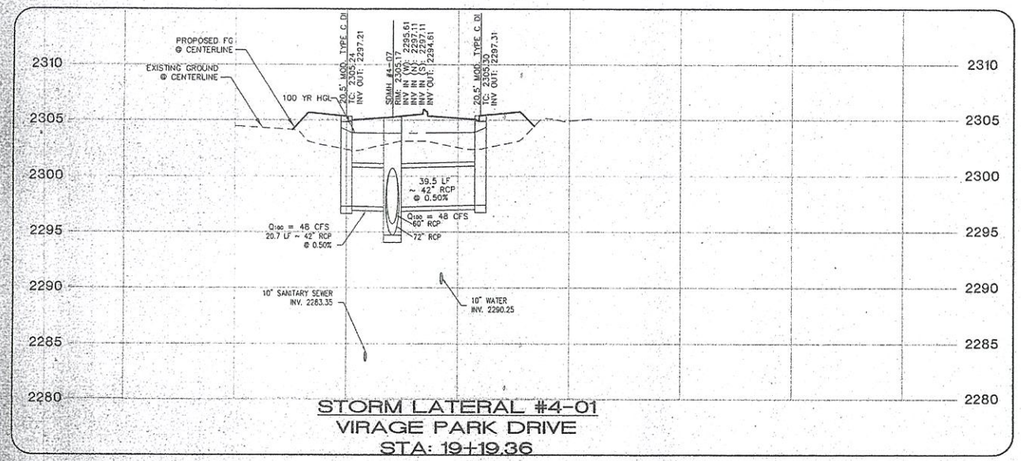
NORTH LAS VEGAS
600 ACRES
AREA 4

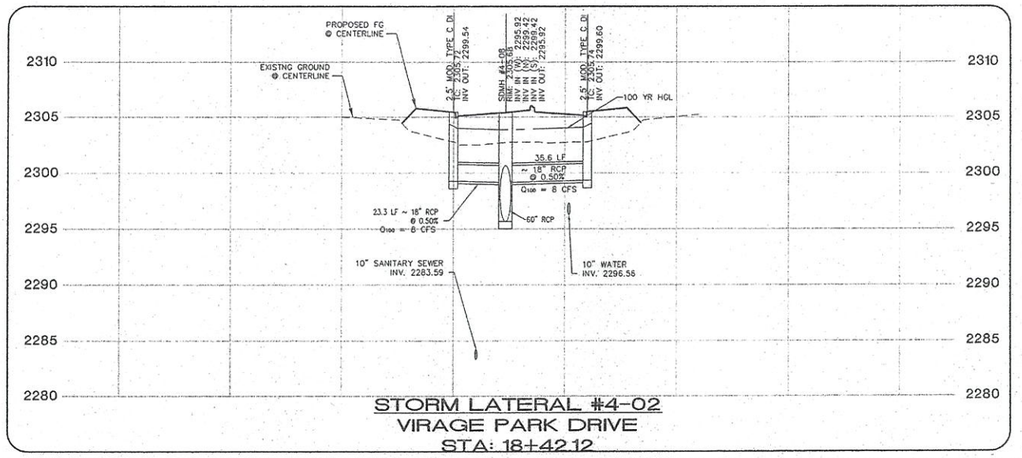
DRAWN BY:
DESIGNED BY:
CHECKED BY: GBW
PROJECT NO: 218094
SCALE: 1" = 30' 1" = 6'

GLENN B. WATANABE No. 16025 CIVIL STATE OF NEVADA
9-14-07

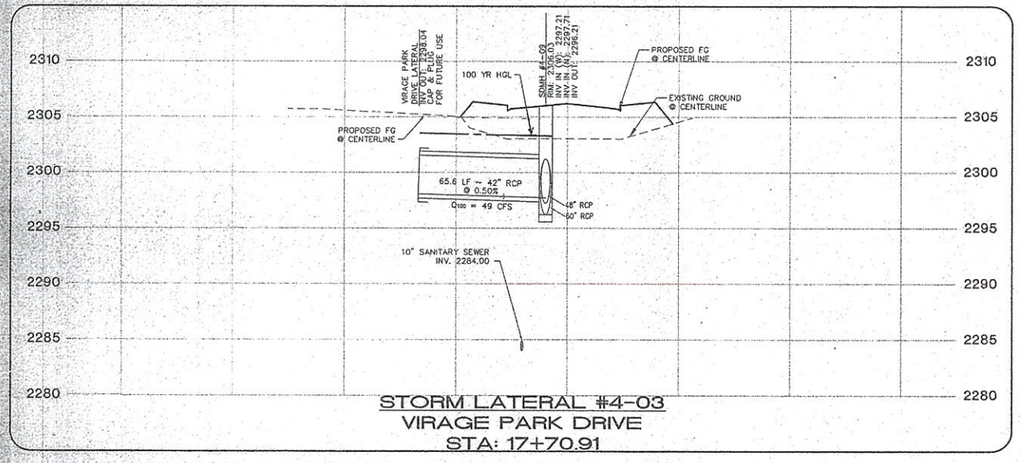
SHEET PP-STM-08
14 OF 49 SHEETS
DRAWING NO. 28978



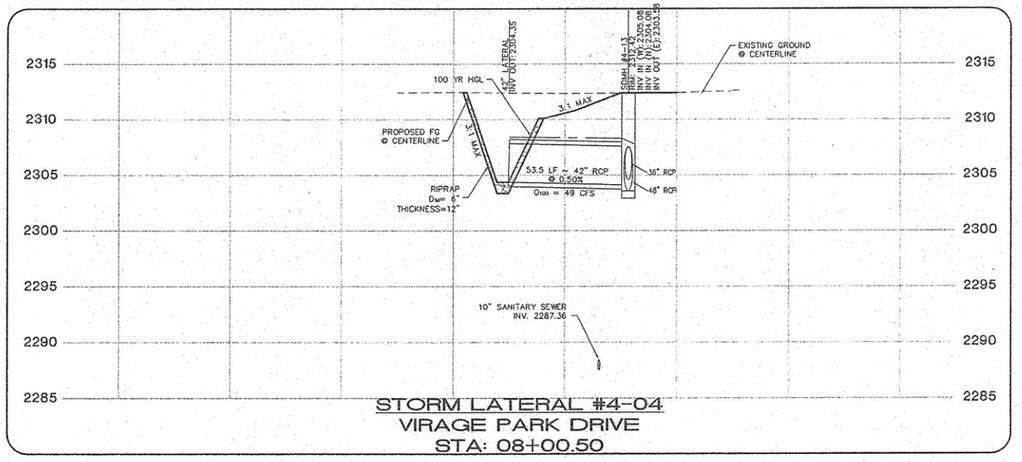
STORM LATERAL #4-01
VIRAGE PARK DRIVE
STA: 19+19.36



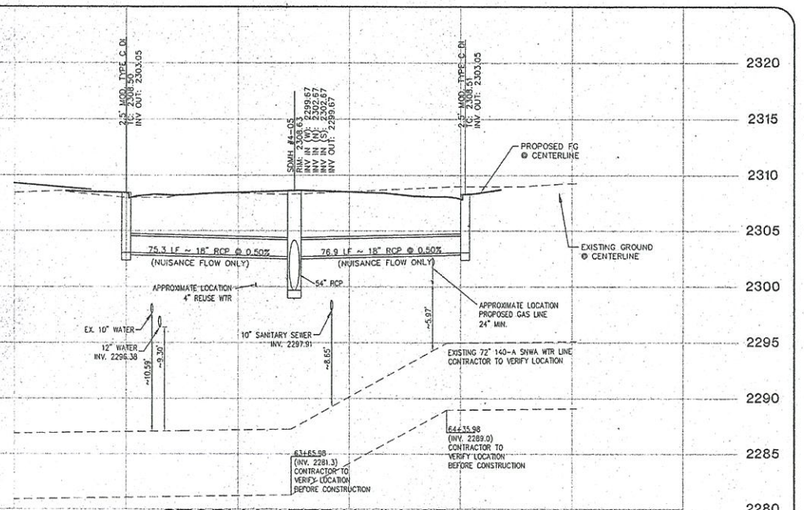
STORM LATERAL #4-02
VIRAGE PARK DRIVE
STA: 18+42.12



STORM LATERAL #4-03
VIRAGE PARK DRIVE
STA: 17+70.91



STORM LATERAL #4-04
VIRAGE PARK DRIVE
STA: 08+00.50



STORM LATERAL #4-05
FARM ROAD (NUISANCE FLOW)
STA: 35+24.73

* Existing Storm drain location, size & slope

SNWA CONSTRUCTION NOTE

CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANHAYS AND CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS, AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY, DEVELOPMENT PLAN REVIEW, AT 702-862-3444 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITY.

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

Valerie Semenza 10-4-07
SOUTHERN NEVADA WATER AUTHORITY DATE

I CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF NORTH LAS VEGAS.

GLENN B. WATANABE, PE No. 16025 DATE:

SNWA NOTE

1. SNWA FIBER OPTIC CONDUIT FOLLOWS ALONG THE WEST SIDE OF THE SNWA PIPELINE.
2. CAUTION: SNWA TEST LEADS ARE SHALLOW.
3. ALL REPAIRS, REPLACEMENTS, RELOCATIONS AND/OR EXTENSIONS MUST BE DESIGNED AND MONITORED BY A NACE INTERNATIONAL-CERTIFIED CATHODIC PROTECTION SPECIALIST AND WITNESSED AND APPROVED BY SNWA CATHODIC PROTECTION TECHNICIAN PRIOR TO ACCEPTING THE INSTALLATION. CONTRACTOR SHALL PROVIDE ALL MATERIALS FOR ALL REPAIRS, REPLACEMENTS, RELOCATIONS, AND/OR EXTENSIONS. MATERIALS PROVIDED BY CONTRACTOR SHALL BE APPROVED BY SNWA PRIOR TO ACCEPTING THE INSTALLATION.

30 0 15 30 60
(IN FEET)
1 INCH = 30 HORZ
1 INCH = 6 VERT

DISCLAIMER:

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BENCHMARK

NAVD 88 ELEV. PUBLISHED 11/01/05 699.482 METERS, 2294.88 FEET. ELEVATION USED FOR THESE PLANS. PRE-REVISION 699.511 METERS, 2294.98 FEET. RIVET AND 2" ROUND ALUMINUM DISC, STAMPED NORTH LAS VEGAS BM No. NLVS117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 20 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. AND ALANTE PKWY.

BASIS OF BEARINGS

SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

LEGAL DESCRIPTION

GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, AND 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

1-702-633-1264
CITY OF NORTH LAS VEGAS TRAFFIC OPERATIONS

1-702-455-7511
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Avoid overhead power line contact. It's easy. Call before you Overhead 1-702-593-6111 NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

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

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

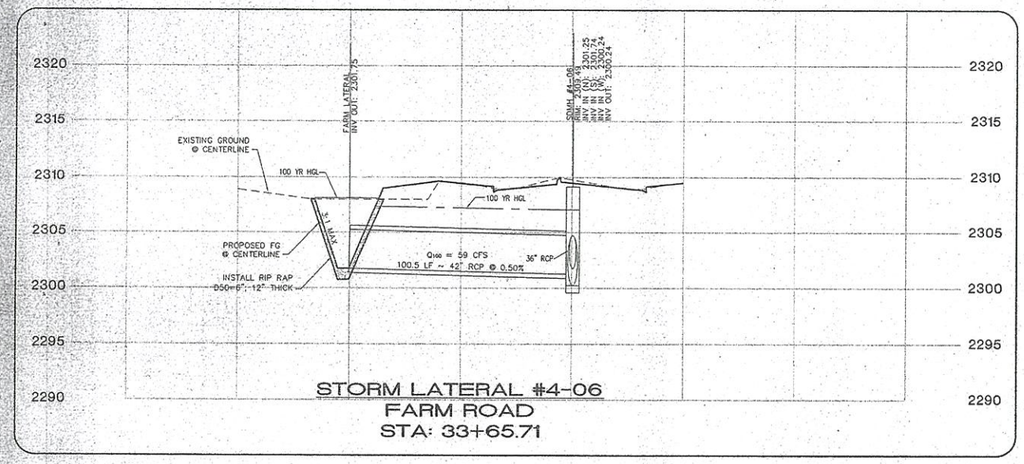
Carter-Burgess
6655 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services
(702) 839-5400 Fax (702) 839-5454

STORM DRAIN
LATERAL PROFILES
VIRAGE PARK DRIVE & FARM ROAD
NORTH LAS VEGAS
600 ACRES
AREA 4

DRAWN BY:
DESIGNED BY:
CHECKED BY: GBW
PROJECT NO: 24585
SCALE: 1" = 30' 1" = 6'

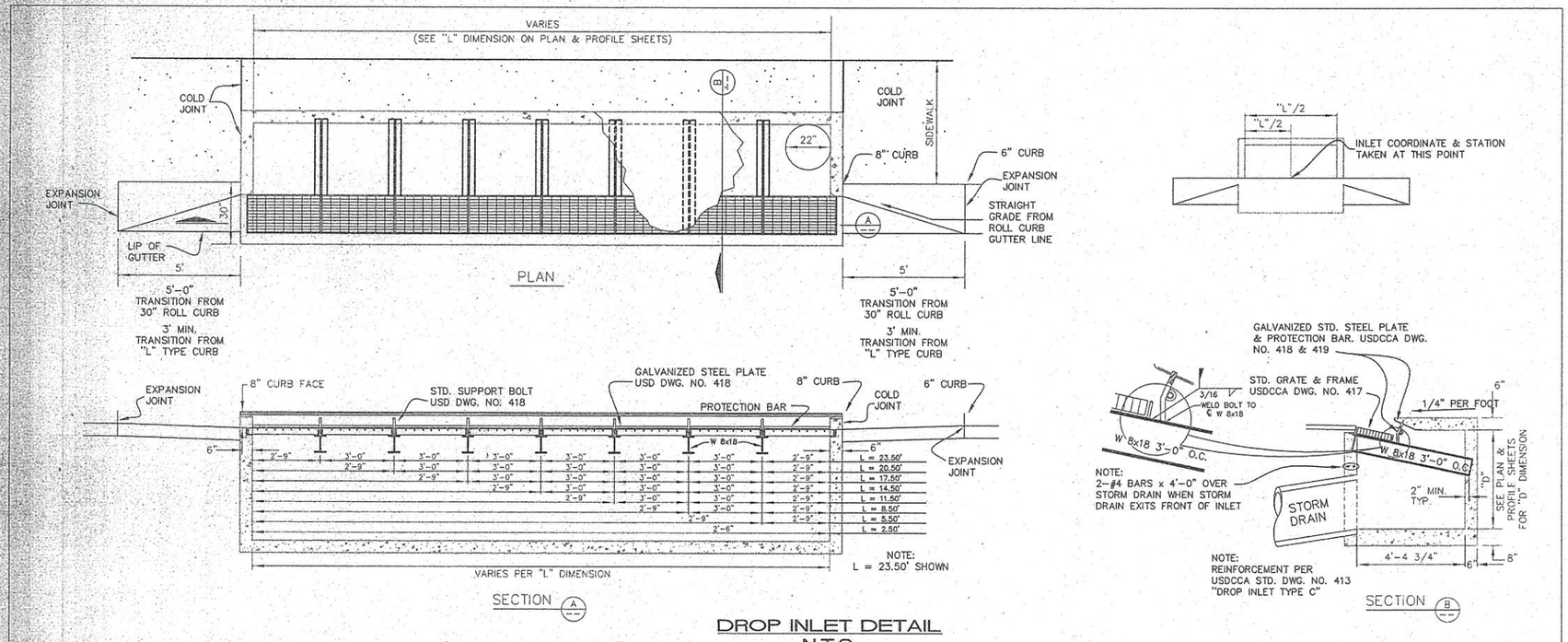
GLENN B. WATANABE No. 16025 CIVIL NEVADA
PROFESSIONAL ENGINEER
10/26/07

SHEET
STM-LAT-01
24 OF 49 SHEETS
DRAWING NO.
28978



STORM LATERAL #4-06
FARM ROAD
STA: 33+65.71

*Existing storm drain location, size & slope



DROP INLET DETAIL
N.T.S.

1-702-633-1264
CITY OF NORTH LAS VEGAS TRAFFIC OPERATIONS

1-702-455-7511
FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

Call before you Overhead
1-702-593-6111
NEVADA POWER DISTRIBUTION AND SAFETY SERVICES DEPARTMENT

Call before you Dig
1-800-227-2600

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30 0 15 30 60
(IN FEET)
1 INCH = 30 HORZ
1 INCH = 6 VERT

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

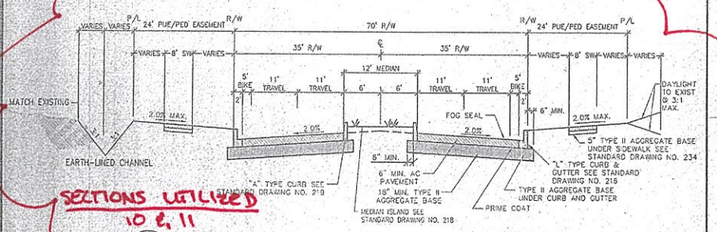
Carter-Burgess
6655 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services
(702) 938-0400 Fax (702) 938-5454

STORM DRAIN
LATERAL PROFILES
FARM ROAD

NORTH LAS VEGAS
600 ACRES
AREA 4

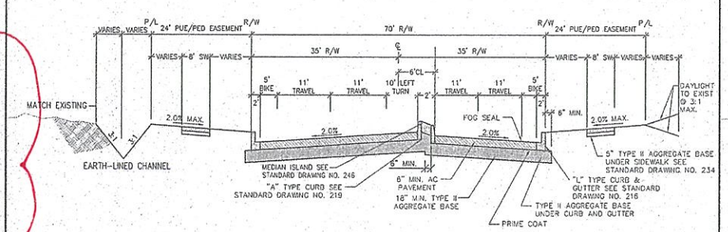
DRAWN BY:
DESIGNED BY:
CHECKED BY: GMW
PROJECT NO: 211551
SCALE: 1" = 30' 1" = 6'

SHEET
STM-LAT-02
25 OF 49 SHEETS
DRAWING NO.
28978

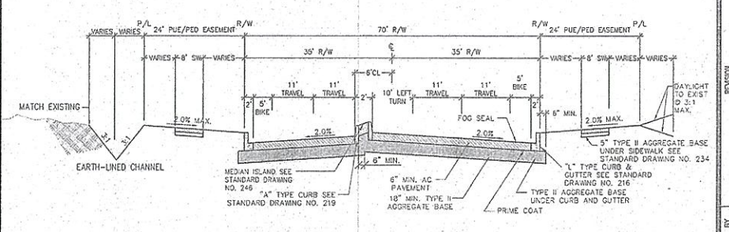


SECTIONS UTILIZED
10 & 11

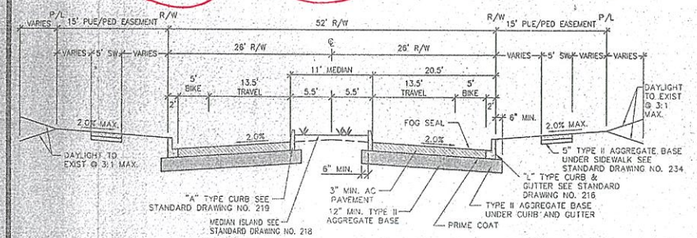
A D-01 **70' COLLECTOR WITH MEDIAN ISLAND - GRADING SECTION**
FARM ROAD (PUBLIC)



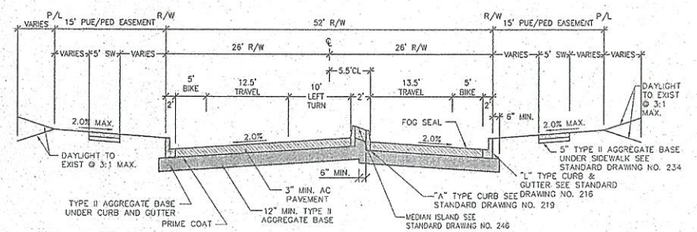
B D-01 **70' COLLECTOR WITH MEDIAN ISLAND - GRADING SECTION**
FARM ROAD (PUBLIC) LEFT TURN LANE - NORTH OF CENTERLINE



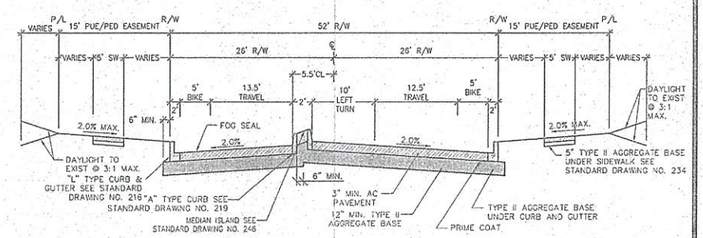
C D-01 **70' COLLECTOR WITH MEDIAN ISLAND - GRADING SECTION**
FARM ROAD (PUBLIC) LEFT TURN LANE - SOUTH OF CENTERLINE



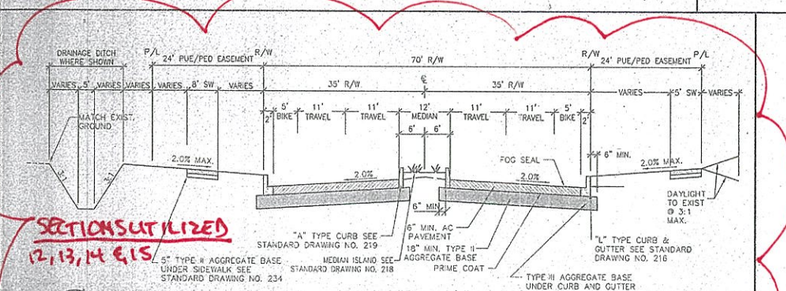
D D-01 **52' COLLECTOR WITH MEDIAN ISLAND**
VIRAGE PARK DRIVE (PUBLIC)



E D-01 **52' COLLECTOR WITH MEDIAN ISLAND - GRADING SECTION**
VIRAGE PARK DRIVE (PUBLIC),
LEFT TURN LANE - NORTH OF CENTERLINE

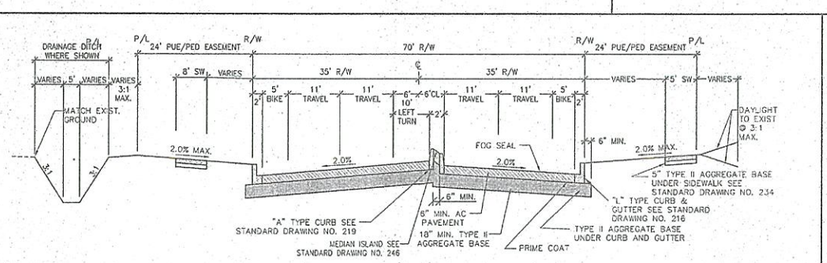


F D-01 **52' COLLECTOR WITH MEDIAN ISLAND - GRADING SECTION**
VIRAGE PARK DRIVE (PUBLIC),
LEFT TURN LANE - SOUTH OF CENTERLINE

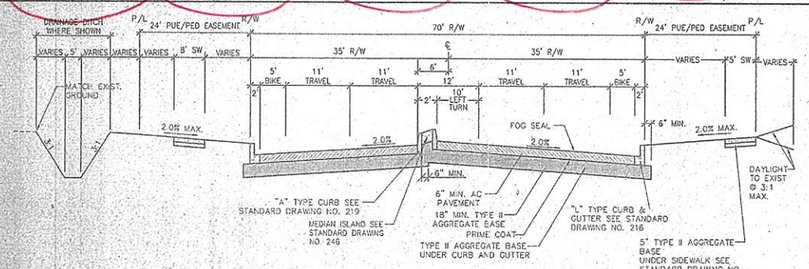


SECTIONS UTILIZED
12, 13, 14 & 15

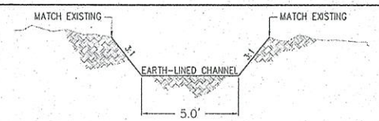
G D-01 **70' COLLECTOR WITH MEDIAN ISLAND**
AVIARY WAY (PUBLIC)



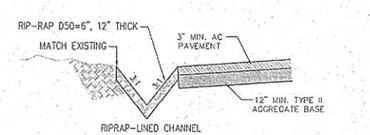
H D-01 **70' COLLECTOR WITH MEDIAN ISLAND - GRADING SECTION**
AVIARY WAY (PUBLIC),
LEFT TURN LANE - EAST OF CENTERLINE



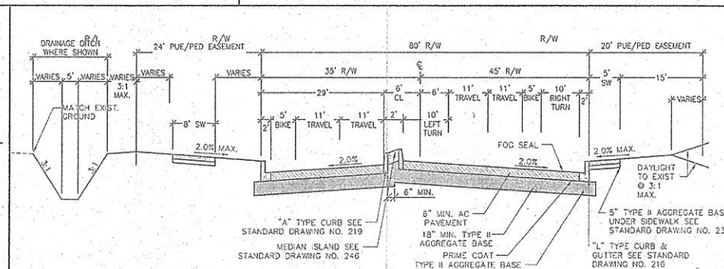
I D-01 **70' COLLECTOR WITH MEDIAN ISLAND - GRADING SECTION**
AVIARY WAY (PUBLIC),
LEFT TURN LANE - WEST OF CENTERLINE



J D-01 **5-FT TRAPEZOIDAL CHANNEL**
NTS



K D-01 **"V" CHANNEL**
NTS



L D-01 **80' COLLECTOR WITH MEDIAN ISLAND - GRADING SECTION**
AVIARY WAY (PUBLIC),
LEFT AND RIGHT TURN LANE - WEST OF CENTERLINE

NOTE:
THE OFF-SITE PAVEMENT SECTIONS SHOWN ON THE PLANS MUST BE DESIGNED IN ACCORDANCE WITH THE STANDARD SPECIFICATION SECTION 401 USING THE AASHTO MODEL. THE NEW SECTION MUST BE BASED ON THE ACTUAL DAILY TRAFFIC COUNTS PROVIDED BY THE CITY AND R-VALUE TEST RESULTS PERFORMED SUBSEQUENT TO GRADING.

GENERAL NOTES:

1. A.C. PAVEMENT TO BE 1/2" MAXIMUM ABOVE LIP OF GUTTER AFTER COMPACTION EXCEPT FOR THE GUTTER WITH DEPRESSED LIP.
2. THE GRADE BREAK OCCURING IN THE CROSS SECTION SHALL FALL BETWEEN DRIVINGLANES.

REVISION | BY | DATE | REV

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

Carter-Burgess
6555 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services
(702) 933-5400 Fax: (702) 933-5454

STREET SECTIONS

NORTH LAS VEGAS
600 ACRES
AREA 4

DRAWN BY:
DESIGNED BY:
CHECKED BY: GBW
SCALE: N/A N/A
PROJECT NO: 215594

REGISTERED PROFESSIONAL ENGINEER GLENN B. WATANABE No. 16745 CIVIL STATE OF NEVADA
9/29/06

SHEET D-01
31 OF 49 SHEETS
DRAWING NO. 28978

Drawing Name: 215594 NLV SECTIONS.dgn PW:WIS_MCLAY\Documents Plots: 1/1 Date: 09-20-2007 11:30:04 User: jackiebrownell

Approved Plans for
North Las Vegas 600 Acres Area 7 (CNLV No. 29393)

PARK HIGHLANDS

IMPROVEMENT PLANS FOR
NORTH LAS VEGAS 600 ACRES
AREA 7
CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA

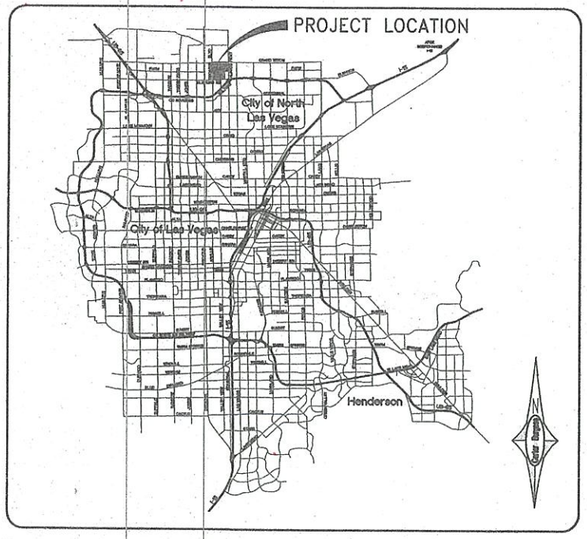
OWNER:
NOVEMBER 2005 LAND INVESTORS, LLC/DRHI INC
11411 SOUTHERN HIGHLANDS PKWY, SUITE 300
LAS VEGAS NEVADA 89141
702-616-3800
702-616-3833 FAX

DEVELOPER:
NOVEMBER 2005 LAND INVESTORS, LLC/DRHI INC
11411 SOUTHERN HIGHLANDS PKWY, SUITE 300
LAS VEGAS NEVADA 89141
702-616-3800
702-616-3833 FAX

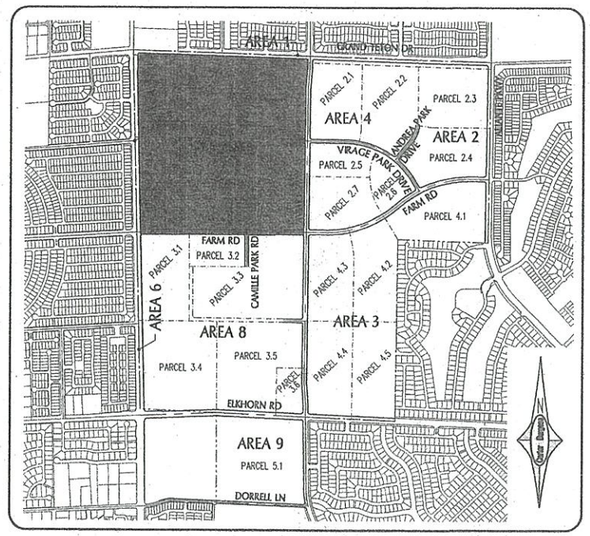
ENGINEER:
Carter Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road, Las Vegas, NV. 89119
(702) 938-5400 Fax (702) 938-5454

GEOTECH ENGINEER
PREPARED BY: OWENS GEOTECHNICAL, INC.
PROJECT NUMBER: E-06-022
DATE: April 26, 2006
REVISED DATE: July 26, 2007
CUT TOTAL: 20,896
FILL TOTAL: 15,794
NET: 5,102

SERVICES:
SANITARY SEWER:..... CITY OF NORTH LAS VEGAS
WATER:..... CITY OF NORTH LAS VEGAS
POWER:..... NEVADA POWER COMPANY
GAS:..... SOUTHWEST GAS CORPORATION
TELEPHONE:..... EMBARQ
CABLE T.V.:..... COX COMMUNICATIONS
REFUSE:..... REPUBLIC SERVICES OF SOUTHERN NEVADA



VICINITY MAP
N.T.S.



SITE LOCATION
N.T.S.

BENCHMARK
NLV9117NWS
NAVD 88 ELEVATION PUBLISHED 11/1/2005
699.482 METERS, 2294.88 FEET
ELEVATION USED FOR THESE PLANS, PRE-REVISION
699.511 METERS, 2294.98 FEET
RIVET AND 2" ROUND ALUMINUM DISK, STAMPED NORTH LAS VEGAS BM NO. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BOR AT THE INTERSECTION OF GRAND TETON DR. AND ALIANTE PKWY.

BASIS OF BEARINGS
SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

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SHEET INDEX

SHEET NO.		DESCRIPTION
1	C-01	COVER SHEET
2	C-02	GENERAL NOTES
3	C-03	QUANTITIES SHEET
4	HCP-01	HORIZONTAL CONTROL PLAN
5	MU-STM-01	MASTER UTILITY - STORM DRAIN
6	MU-SAN-01	MASTER UTILITY - SANITARY SEWER
7	MU-WTR-01	MASTER UTILITY - WATER
8	PP-STM-01	STORM PLAN AND PROFILE, FARM ROAD, STA: 10+00.00 TO STA: 17+00.00
9	PP-STM-02	STORM PLAN AND PROFILE, FARM ROAD, STA: 17+00.00 TO STA: 24+00.00
10	PP-STM-03	STORM PLAN AND PROFILE, FARM ROAD, STA: 24+00.00 TO STA: 31+00.00
11	PP-STM-04	STORM PLAN AND PROFILE, FARM ROAD, STA: 31+00.00 TO STA: 34+59.11
12	PP-STM-05	STORM PLAN AND PROFILE, TRAIL 01, STA: 01+00.00 TO STA: 07+00.00
13	PP-STM-06	STORM PLAN AND PROFILE, TRAIL 01, STA: 07+00.00 TO STA: 14+00.00
14	PP-STM-07	STORM PLAN AND PROFILE, TRAIL 01, STA: 14+00.00 TO STA: 21+00.00
15	PP-STM-08	STORM PLAN AND PROFILE, TRAIL 01, STA: 21+00.00 TO STA: 24+48.12
16	PP-STM-09	STORM PLAN AND PROFILE, TRAIL 02, STA: 01+00.00 TO STA: 08+00.00
17	PP-STM-10	STORM PLAN AND PROFILE, TRAIL 02, STA: 08+00.00 TO STA: 14+81.50
18	PP-UTL-01	WATER & SEWER P/P, FARM ROAD, STA: 10+00.00 TO STA: 17+00.00
19	PP-UTL-02	WATER & SEWER P/P, FARM ROAD, STA: 17+00.00 TO STA: 24+00.00
20	PP-UTL-03	WATER & SEWER P/P, FARM ROAD, STA: 24+00.00 TO STA: 31+00.00
21	PP-UTL-04	WATER & SEWER P/P, FARM ROAD, STA: 31+00.00 TO STA: 34+59.11
22	STM-LAT-01	STORM DRAIN LATERAL PROFILES
23	SAN-LAT-01	SANITARY SEWER LATERAL PROFILES
24	WTR-LAT-01	WATER LATERAL PROFILES
25	WTR-LAT-02	WATER LATERAL PROFILES
26	D-01	TYPICAL STREET SECTIONS
27	T-01	SIGNAGE AND STRIPING PLAN, FARM ROAD, STA: 10+00.00 TO STA: 24+00.00
28	T-02	SIGNAGE AND STRIPING PLAN, FARM ROAD, STA: 24+00.00 TO STA: 34+60.00
29	E-01	ELECTRICAL - SYMBOLS AND LEGENDS
30	E-7.0	ELECTRICAL - STREET LIGHTING PLAN, FARM ROAD
31	E-7.1	ELECTRICAL - SINGLE LINE DIAGRAM AND CALCULATIONS
32	E-7.2	ELECTRICAL - PANEL SCHEDULES AND CALCULATIONS

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Avoid contact power line conduct, it is costly.
Call before you Overhead
1-702-227-2929
NEVADA POWER COMPANY AND SURETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
811 Know what's below. Call before you dig.
811 UNDERGROUND SERVICE ALERT (USA)

APPROVALS

DR. QIONG LIU, P.E. PTOE — DATE 3/6/08
DEPUTY DIRECTOR/CITY ENGINEER, PUBLIC WORKS DEPARTMENT

JENNIFER E. DOODY, P.E. — DATE 3/6/08
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

RANDAL D. CHEEK — DATE 3/6/08
MANAGER OF REAL PROPERTY SERVICES

CARLTON URBAN, P.E. — DATE 3/6/08
TRANSPORTATION SERVICES ADMINISTRATOR

UTILITIES DEPARTMENT-ENGINEERING SERVICES DIVISION — DATE 01/18/08
APPROVAL OF THESE PLANS SHALL NOT BE CONSTRUED TO BE A PERMIT FOR CONSTRUCTION, A COMMITMENT TO SUPPLY WATER AND/OR SEWER SERVICE OR AN APPROVAL OF ANY VIOLATION OF ONLY WATER AND/OR SEWER SERVICE RULES AND REGULATIONS OR DESIGN AND CONSTRUCTION STANDARDS.

C.N.L.V. FIRE DEPARTMENT — DATE 1/22/08

N/A
SOUTHERN NEVADA WATER AUTHORITY — DATE
SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

Mickelle Dwyer 11-20-07
COMMUNICATIONS LAS VEGAS, INC. — DATE

Michael R. Emerson 11-20-07
EMBARQ — 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.

Armando Romo Jr. 11-28-07
NEVADA POWER COMPANY — DATE
NEVADA POWER COMPANY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCIATED WITH THIS PROJECT. NEVADA POWER COMPANY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

Ronald A. Carroll 11-19-07
SOUTHWEST GAS CORPORATION — DATE

REV | DATE | BY | REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

Carter Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax (702) 938-5454

COVER SHEET

NORTH LAS VEGAS 600 ACRES AREA 7

DRAWN BY: AAH
DESIGNED BY: JAH
CHECKED BY: GBW
PROJECT NO: 23883A
SCALE: N/A N/A

PROFESSIONAL ENGINEER - STATE OF NEVADA
JOHN P. MENG CIVIL EXP. 12/31/09 No.17540

SHEET C-01
1 OF 32 SHEETS
DRAWING NO. 23883

Drawing Name: L:\NV\1841 - NLV SITE\DESIGN\IMPRVMTS\NEA_07\Improvement Plans\101594-07-c01.dwg User: sadachevskaya Nov 19, 2007 - 11:00am

Avoid overhead power line contact. It's easy.

Call before you Overhead
1-702-227-2929
NEVADA POWER ENVIRONMENT AND SAFETY BUSINESS DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
811
Know what's below. Call before you dig.
811 UNDERGROUND SERVICE ALERT (USA)

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BENCHMARK:
NLV9117NWS, BEING A RIVET & 2" ROUND ALUM. DISK, STAMPED NORTH LAS VEGAS BM NO. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. & ALIANTE PKWY.
2294.88 FT, 699.482 M (NAVD 88, PUBLISHED 11/01/06)
2294.98 FT, 699.511 M (ELEVATION USED FOR THESE PLANS, PRE-REVISION)

LEGAL DESCRIPTION:
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, & 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

BASIS OF BEARINGS:
SOUTH 87°29'30" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
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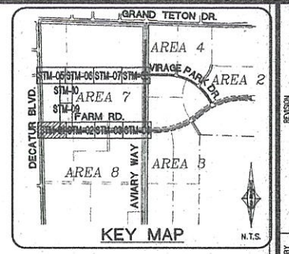
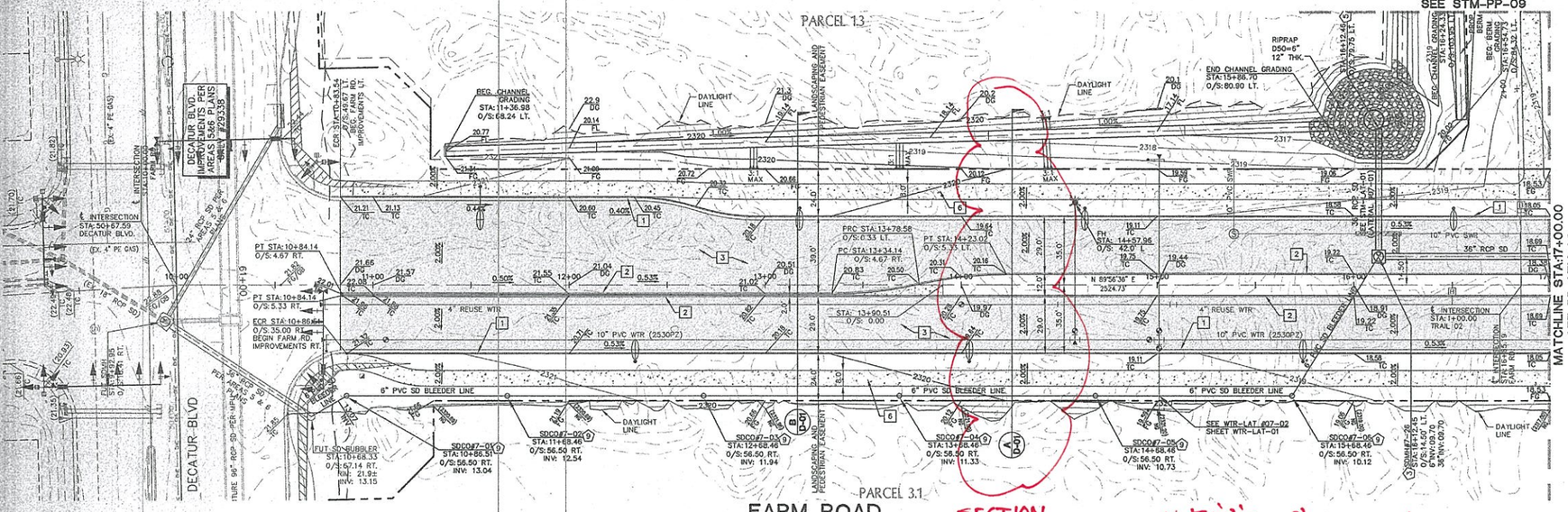
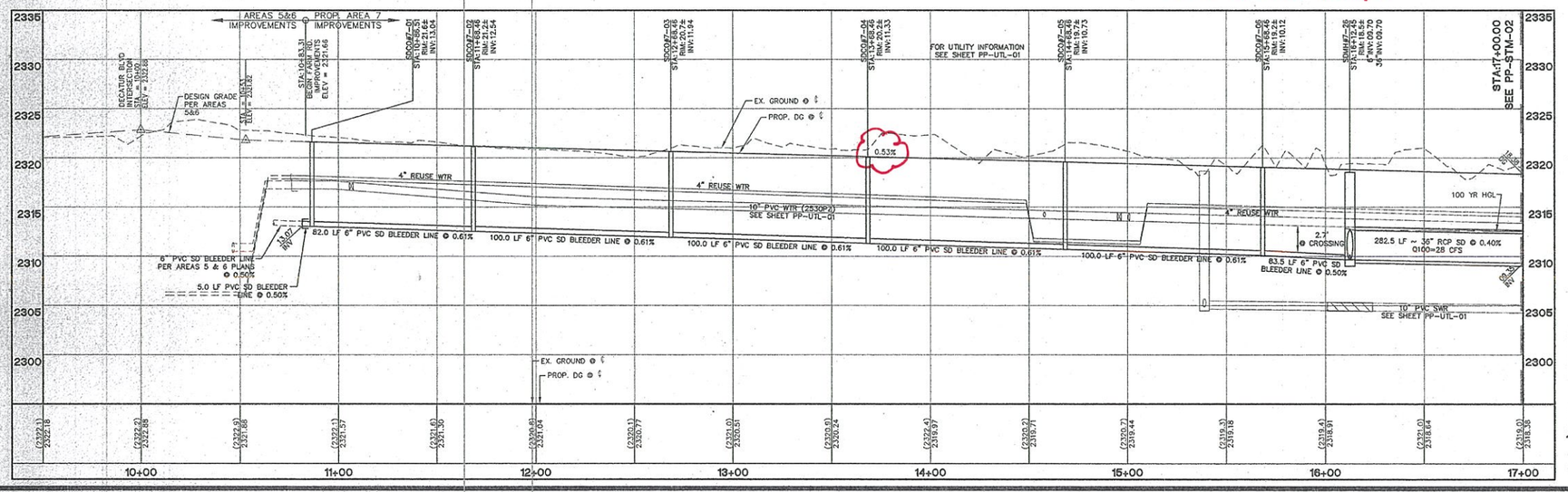


KEY MAP





LEGEND:

PROP. ASPHALT | PROP. SIDEWALK | PROP. RIP-RAP

GEOTECHNICAL NOTE:

PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC., DATED: APRIL 26, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.
CUT TOTAL: 20,898
FILL TOTAL: 15,794
NET EXPORT: 5,102

STORM CONSTRUCTION NOTES:

– ALL RCP TO BE CLASS III, UNLESS OTHEWISE NOTED.
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1. INSTALL 60" TYPE I MANHOLE CCAUSD No. 403. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
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7. REMOVE EX. END SECTION OR CAP & CONNECT TO EX. RCP PIPE. CONTRACTOR TO VERIFY SIZE, INVERT & LOCATION PRIOR TO CONSTRUCTION.
8. INSTALL 48" TYPE 1 MANHOLE PER CCAUSD No. 403 W/ BEEHIVE BUBBLER FRAME & GRATE PER CCAUSD No. 416.
9. INSTALL CLEANOUT.

CONSTRUCTION NOTES:

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2. CONSTRUCT "A" TYPE CURB PER CCAUSD No. 219.
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CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION
MANAGER, JENNIFER E. DOODY, P.E. — DATE: 8/14/08

GRADING PLAN CERTIFICATION
JOHN P. MENG — PE #: 17540 — DATE: 8/14/08
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REV	DATE	BY	REVISION

NOVEMBER 2006
LAND INVESTORS, LLC/DRHI, INC.

Carter Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-0400 Fax: (702) 938-5454

STORM PLAN AND PROFILE
FARM ROAD
STA: 10+00.00 TO STA: 17+00.00
NORTH LAS VEGAS
600 ACRES
AREA 7

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT NO:	SCALE:
MPC	JAN	CMH	215994	1" = 30' 1" = 6'
10-15-06	10-15-06	10-14-06		

PROFESSIONAL ENGINEER - STATE OF NEVADA
JOHN P. MENG
CIVIL
EXP. 12/31/09
No. 17540
8/14/08

SHEET
PP-STM-01
8 OF 32 SHEETS

DRAWING NO.
29993

Drawing Name: U:\215994_NLV SITE\DESIGN\SURVEY\STM_AREA_07\Improvement Plans\06 12-14-07 PP-STM-01.DGN (Orig.) User: jacksc Saved: [illegible] Jan 07, 2008 - 1:46pm

Avoid underground power line overhead. It's costly.

Call before you Overhead 1-702-227-2929
SEVEN POWER EMPLOYMENT AND SAFETY DISTRICT DEPARTMENT

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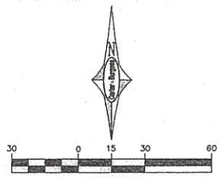
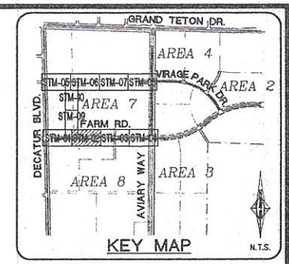
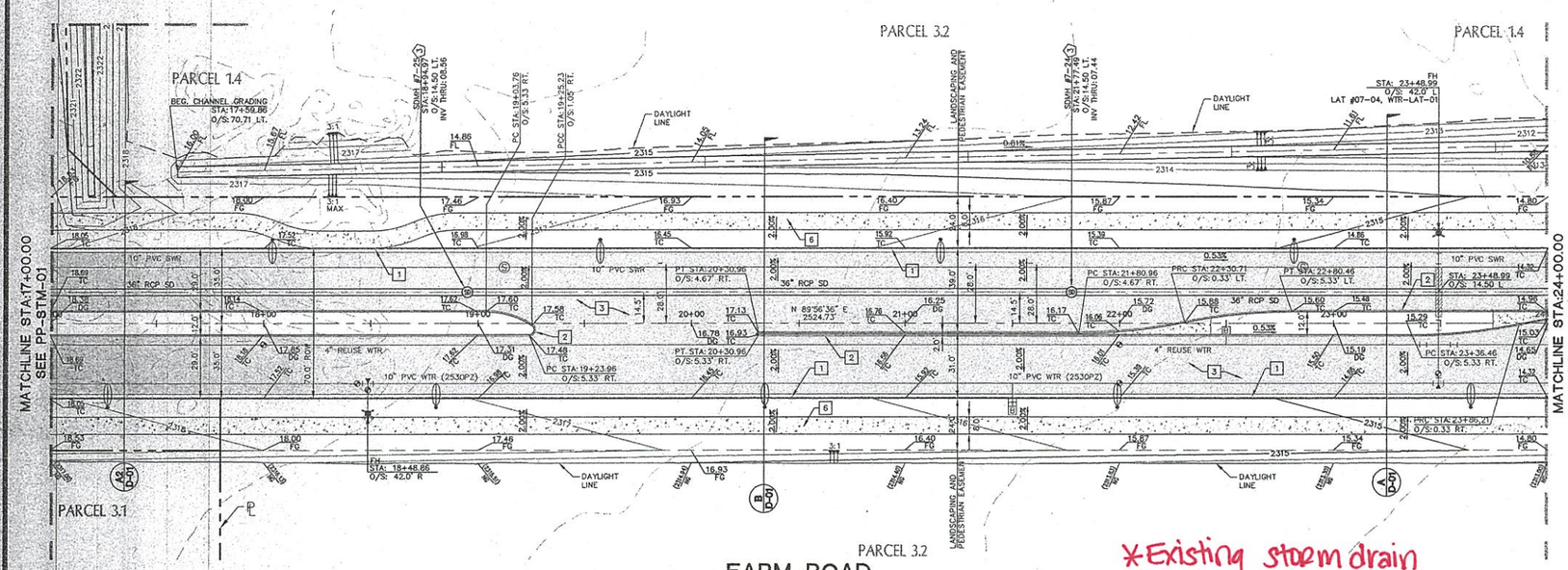
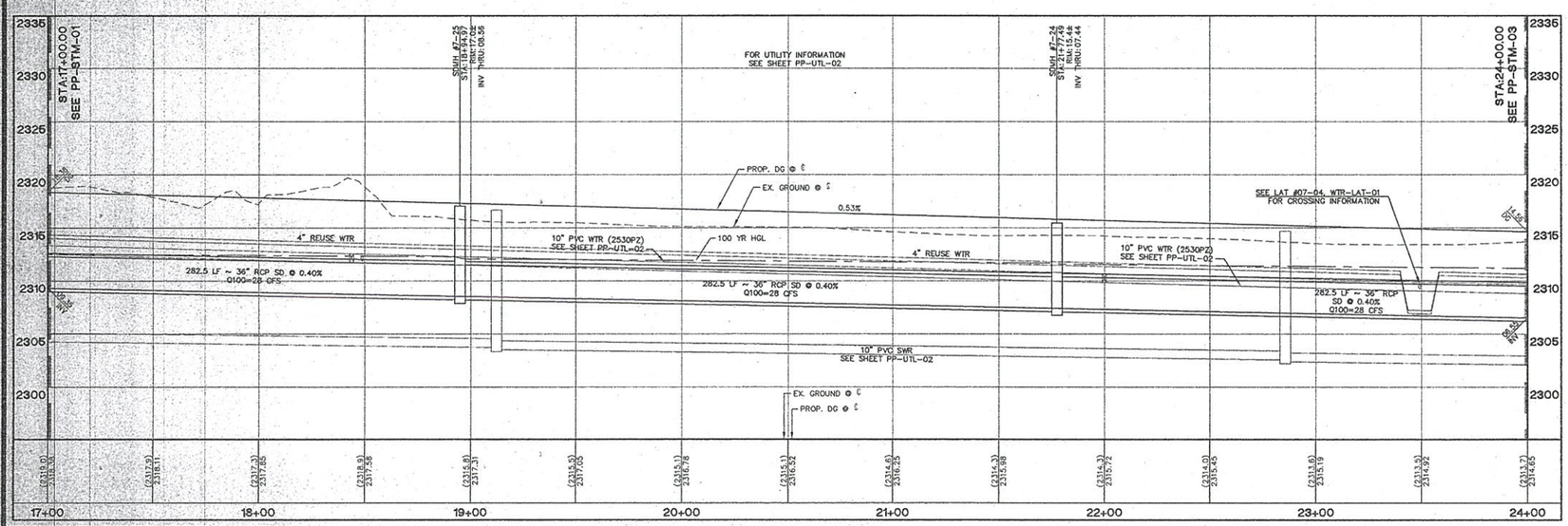






*Existing storm drain location, size & slope



LEGEND:

PROP. ASPHALT | PROP. SIDEWALK | PROP. RIP-RAP

GEOTECHNICAL NOTE:

PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC., DATED: APRIL 26, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.
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CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION
MANAGER, JENNIFER E. DOODY, P.E. — DATE: 3/16/08

GRADING PLAN CERTIFICATION
JOHN P. MENG — PE # 17540 — DATE: 1/7/08
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REV	DATE	BY	REVISION

NOVEMBER 2006 LAND INVESTORS, LLC/DRHI, INC.

Carter-Burgess
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax (702) 938-5454
Consultants in Planning, Engineering, Construction Management, and Related Services

STORM PLAN AND PROFILE
FARM ROAD
STA: 17+00.00 TO STA: 24+00.00
NORTH LAS VEGAS
600 ACRES
AREA 7

DRAWN BY:	DESIGNED BY:	CHECKED BY:	SCALE:
BEL	JAH	GDM	1" = 30' H 1" = 6' V
10-16-06	10-16-06	10-16-06	

PROJECT NO: 21164

PROFESSIONAL ENGINEER STATE OF NEVADA — JOHN P. MENG — CIVIL — EXP. 12/31/09 — No. 17540 — 1/7/08

SHEET: PP-STM-02
9 OF 32 SHEETS
DRAWING NO. 29393

Call before you Overhead
1-702-227-2929
NEVADA POWER, SPRINGBRIDGE AND SAFETY SERVICES REPAIRING

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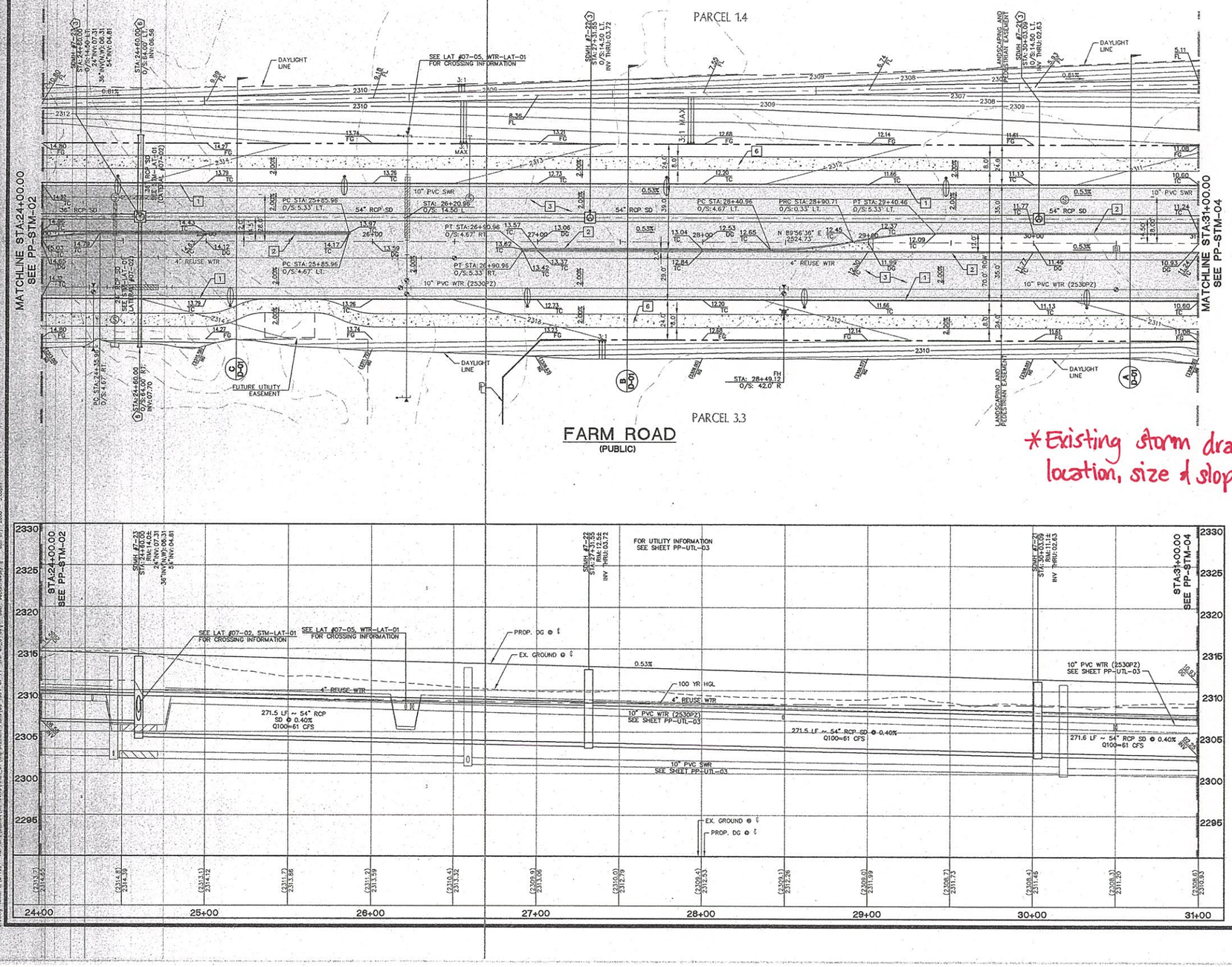

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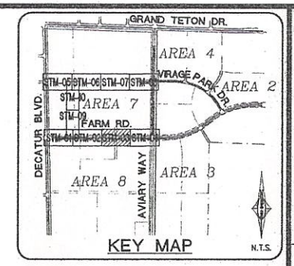

KEY MAP

LEGEND:

PROP. ASPHALT | PROP. SIDEWALK | PROP. RIP-RAP

GEOTECHNICAL NOTE:

PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL INC., DATED: APRIL 26, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.
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– NOT ALL NOTES USED ON THIS SHEET –

1. CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD No. 216.
2. CONSTRUCT "A" TYPE CURB PER CCAUSD No. 219.
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4. SAWCUT & MATCH EXISTING ASPHALT PAVING, CURB & GUTTER.
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6. CONSTRUCT MEANDERING SIDEWALK PER CCAUSD No. 234.
7. CONSTRUCT CASE II SIDEWALK RAMP W/ TRUNCATED DOMES PER CCAUSD No. 235, CASE II.

GENERAL GRADING AND DRAINAGE NOTES:

1. PURSUANT TO CITY OF NORTH LAS VEGAS ORDINANCE NUMBER 1172, THE CONTRACTOR IS REQUIRED TO SECURE A GRADING PERMIT PRIOR TO COMMENCING WORK.
2. THE CONTRACTOR SHALL SECURE A PERMIT FOR ANY OFF-SITE CONSTRUCTION.
3. THE CONTRACTORS OPERATIONS SHALL NOT TRESPASS BEYOND THE PROJECT PROPERTY LINES UNLESS A PERMIT OR WRITTEN AUTHORIZATION HAS BEEN OBTAINED FROM THE PROPERTY OWNER(S) INVOLVED. COPIES OF SUCH WRITTEN AUTHORIZATION SHALL BE FURNISHED TO THE CITY OF NORTH LAS VEGAS' REPRESENTATIVE PRIOR TO START OF CONSTRUCTION.
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5. AN APPROVED GRADING AND DRAINAGE PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE APPROVED PLAN WILL REQUIRE SUBMITTAL OF A FORMAL REVISED PLAN FOR REVIEW AND APPROVAL.
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   B. CERTIFICATES OF "BUILDING PAD ELEVATIONS" IN NONCRITICAL AREAS.
7. THE CONTRACTOR SHALL CERTIFY TO THE CITY OF NORTH LAS VEGAS CONSTRUCTION SERVICES DIVISION THAT ALL FILLS, FOUNDATIONS AND SUBGRADES MEET THE MINIMUM COMPACTION REQUIREMENTS. CERTIFICATION SHALL BE MADE PRIOR TO POURING CONCRETE.

CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION
MANAGER, JENNIFER J. DOODY, P.E. — DATE: 3/16/06

GRADING PLAN CERTIFICATION
JOHN P. MENG — PE #: 17540 — DATE: 11/7/06
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

* Existing storm drain location, size & slope

REV	DATE	BY	REVISION

NOVEMBER 2006 LAND INVESTORS, LLC/DRHI, INC.

CarterBurgess
6655 Berrnicke Road
Las Vegas, NV 89119
(702) 938-5400 Fax (702) 938-5454
Consultants in Planning, Engineering, Construction Management, and Related Services

STORM PLAN AND PROFILE
FARM ROAD
STA: 24+00.00 TO STA: 31+00.00
NORTH LAS VEGAS
600 ACRES
AREA 7

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT NO:	SCALE:
MSL	JAH	GBW	21594	1" = 30'
10-16-06	10-16-06	10-16-06		H 1" = 30' V 1" = 6'

PROFESSIONAL ENGINEER - STATE OF NEVADA
JOHN P. MENG
CIVIL
EXP. 12/31/07
No. 17540
11/7/06

SHEET
PP-STM-03
10 OF 32 SHEETS
DRAWING NO.
29393

Avoid overhead power line contact. It's deadly!

Call before you Overhead 1-702-227-2929
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.

811 Know what's Below. Call before you dig.
811 UNDERGROUND SERVICE ALERT (USA)

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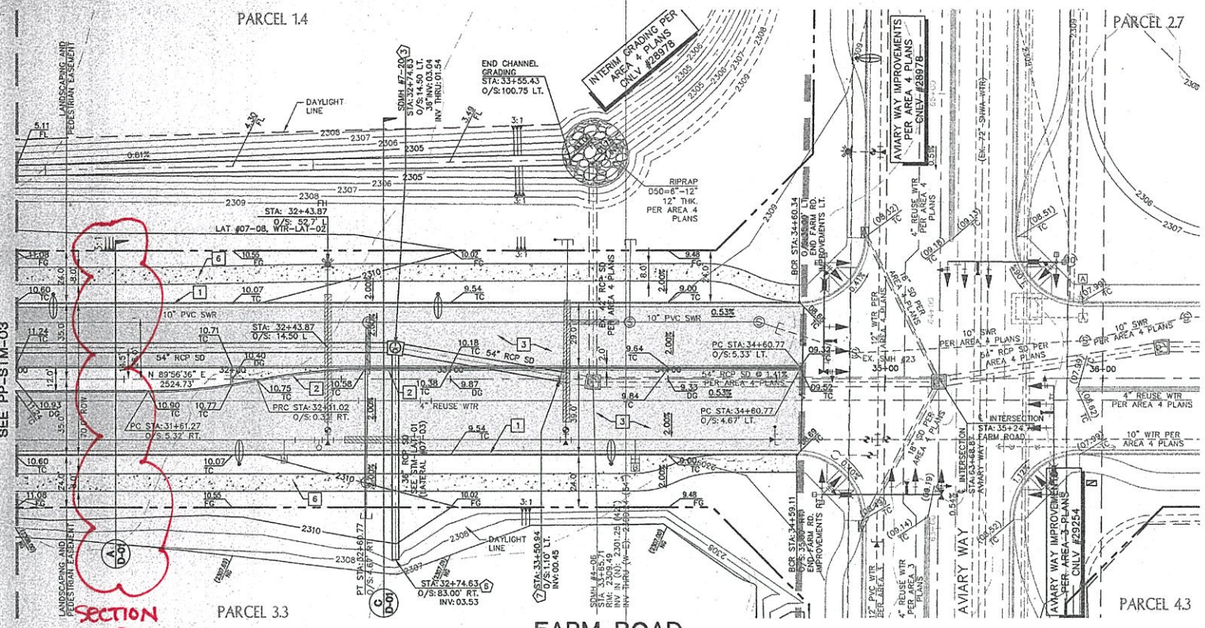
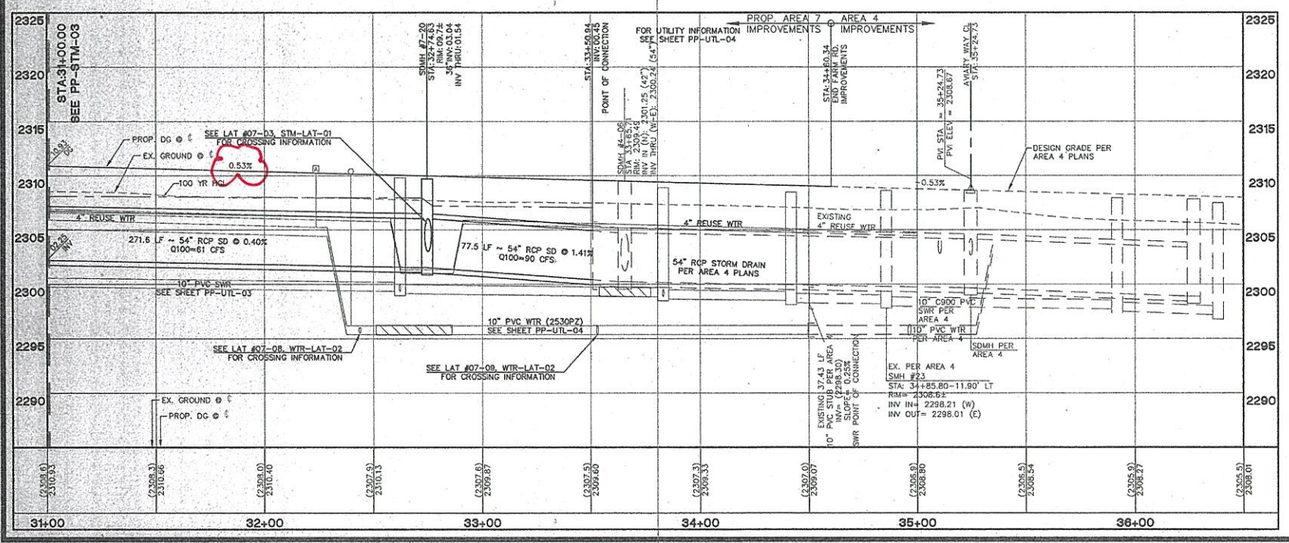
BENCHMARK:
NLV9117NWS, BEING A RIVET & 2" ROUND ALUM. DISK, STAMPED NORTH LAS VEGAS BM NO. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. & ALIANTE PKWY.
2294.88 FT, 699.482 M (NAVD 88, PUBLISHED 11/01/06)
2294.98 FT, 699.511 M (ELEVATION USED FOR THESE PLANS, PRE-REVISION)

LEGAL DESCRIPTION:
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, & 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

BASIS OF BEARINGS:
SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.





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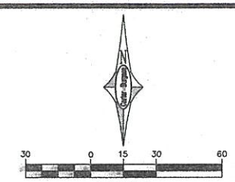

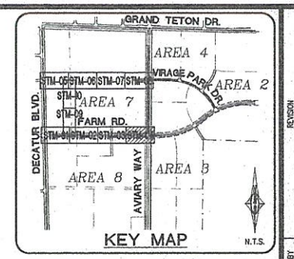

LEGEND:
PROP. ASPHALT | PROP. SIDEWALK | PROP. RIP-RAP

GEOTECHNICAL NOTE:
PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC., DATED: APRIL 26, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.
CUT TOTAL: 20,898
FILL TOTAL: 15,794
NET EXPORT: 5,102

STORM CONSTRUCTION NOTES:
– ALL RCP TO BE CLASS III, UNLESS OTHEWISE NOTED.
– NOT ALL NOTES USED ON THIS SHEET –
1. INSTALL 60" TYPE I MANHOLE CCAUSD No. 403. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
2. INSTALL TYPE II MANHOLE PER CCAUSD No. 405. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
3. INSTALL TYPE III MANHOLE PER CCAUSD No. 406. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
4. INSTALL MODIFIED TYPE "C" DROP INLET, SEE SHEET D-02. DROP INLET TO CONFORM TO CCAUSD No. 413
5. INSTALL RCP END SECTION PER NDOT R-2.3.1.
6. INSTALL TEMPORARY PLUG & CAP FOR FUTURE PHASE.
7. REMOVE EX. END SECTION OR CAP & CONNECT TO EX. RCP PIPE. CONTRACTOR TO VERIFY SIZE, INVERT & LOCATION PRIOR TO CONSTRUCTION.
8. INSTALL 48" TYPE 1 MANHOLE PER CCAUSD No. 403 W/ BEEHIVE BUBBLER FRAME & GRATE PER CCAUSD No. 416.
9. INSTALL CLEANOUT.

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CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION
MANAGER, JENNIFER E. DOODY, P.E. DATE: 3/2/09

GRADING PLAN CERTIFICATION
JOHN P. MENG PE #: 17540 1/7/09 DATE:
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REV	DATE	BY	REVISION

NOVEMBER 2006 LAND INVESTORS, LLC/DRHI, INC.

Carter•Burgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 369-5400 FAX (702) 896-5454

STORM PLAN AND PROFILE
FARM ROAD
STA: 31+00 TO STA: 34+59.11
NORTH LAS VEGAS
600 ACRES
AREA 7

DRAWN BY:	DATE:	SCALE:
BMS	10-16-06	1" = 30'
DESIGNED BY:	10-16-06	1" = 6'
JAM		
CHECKED BY:	10-16-06	
GM		
PROJECT NO:		
245594		

PROFESSIONAL ENGINEER – STATE OF NEVADA – JOHN P. MENG – CIVIL – EXP. 12/31/09 – No. 17540 – 1/7/09

SHEET
PP-STM-04
11 OF 32 SHEETS
DRAWING NO.
29393

Drawing Name: D:\241294\...\PP_STM_04.dwg User: stockenengang Jan 07, 2009 - 3:51pm

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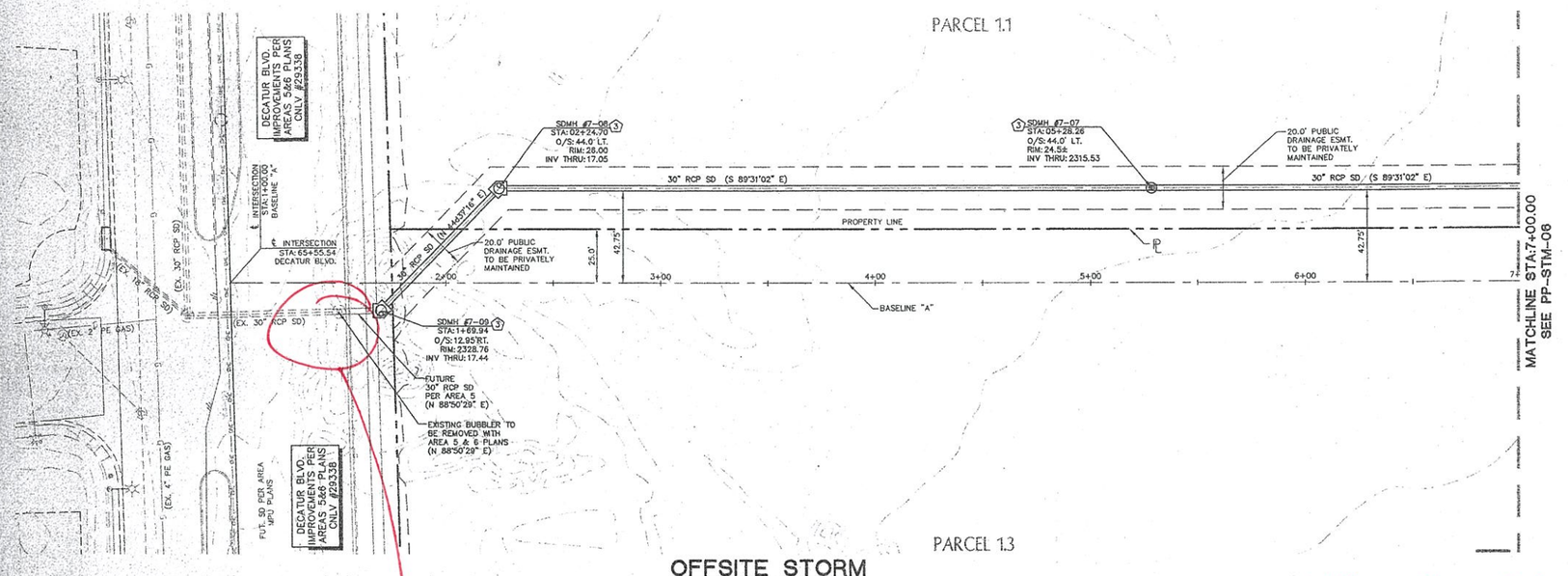
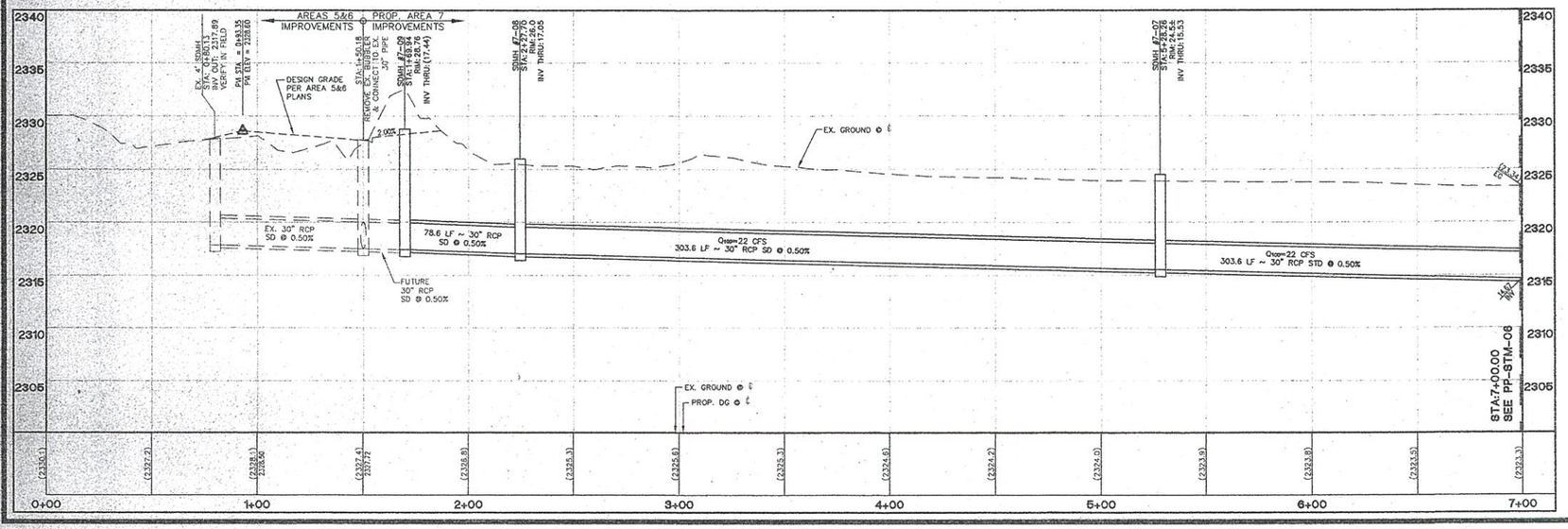
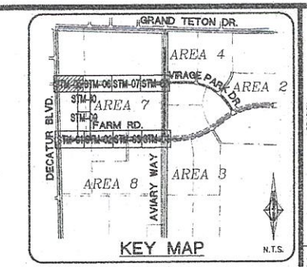


OFFSITE STORM

Note, there is no longer a connection here

*Existing storm drain location, size & slope





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CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION
MANAGER, JENNIFER L. DOODY, P.E. — DATE: 3/6/08

GRADING PLAN CERTIFICATION
JOHN P. MENG — PE #: 17540 — DATE: 12/12/07
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REVISION | BY | DATE | REV

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

CarterBurgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax (702) 938-5454

STORM PLAN AND PROFILE
TRAIL 01
STA: 1+00.00 TO STA: 7+00.00
NORTH LAS VEGAS
600 ACRES
AREA 7

DRAWN BY:	DESIGNED BY:	CHECKED BY:	SCALE:	PROJECT NO.
MCL 10-16-06	JMM 10-16-06	CBW 10-16-06	1" = 30' 1" = 6'	241594

PROFESSIONAL ENGINEER - STATE OF NEVADA
JOHN P. MENG
CIVIL
EXP. 12/31/09
No. 17540
12/12/07

SHEET: PP-STM-05
12 OF 32 SHEETS
DRAWING NO. 29393

Avoid trenching near a live overhead, it's costly.

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NEVADA POWER (ENERGYNEXT) AND SIERRA PACIFIC (NV ENERGY)

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Know what's below. Call before you dig
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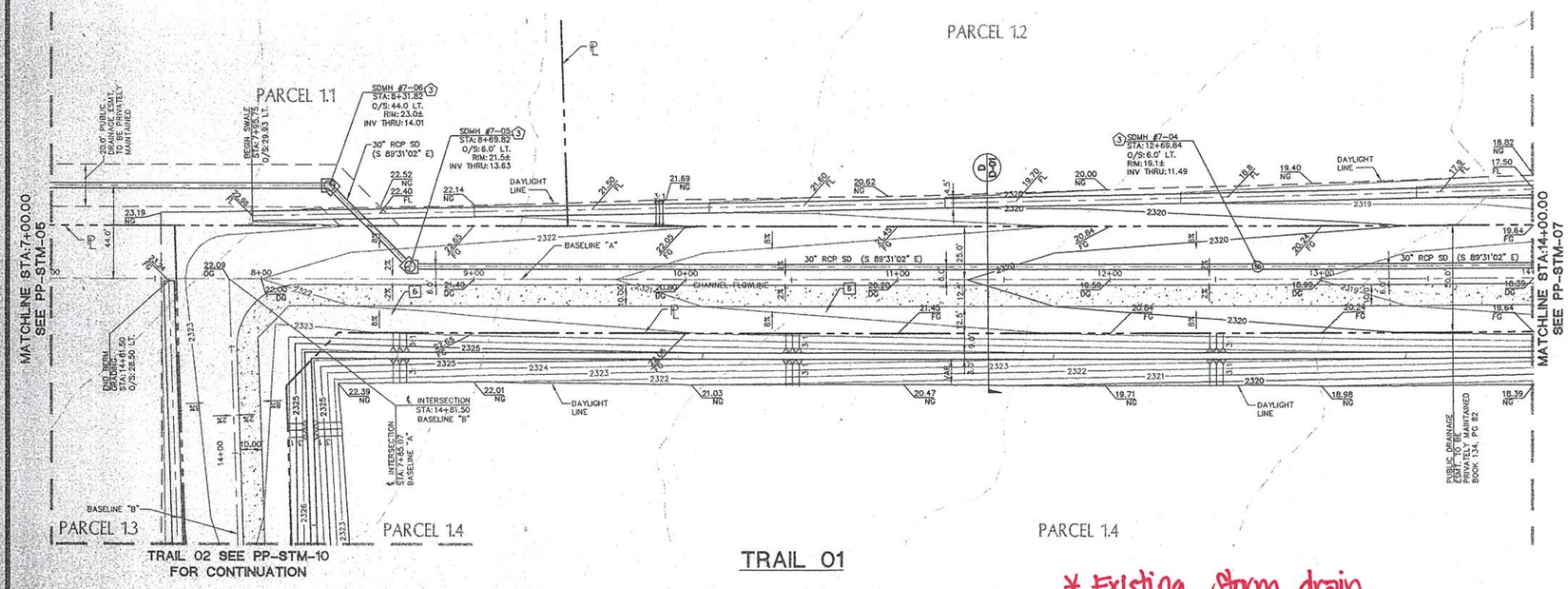
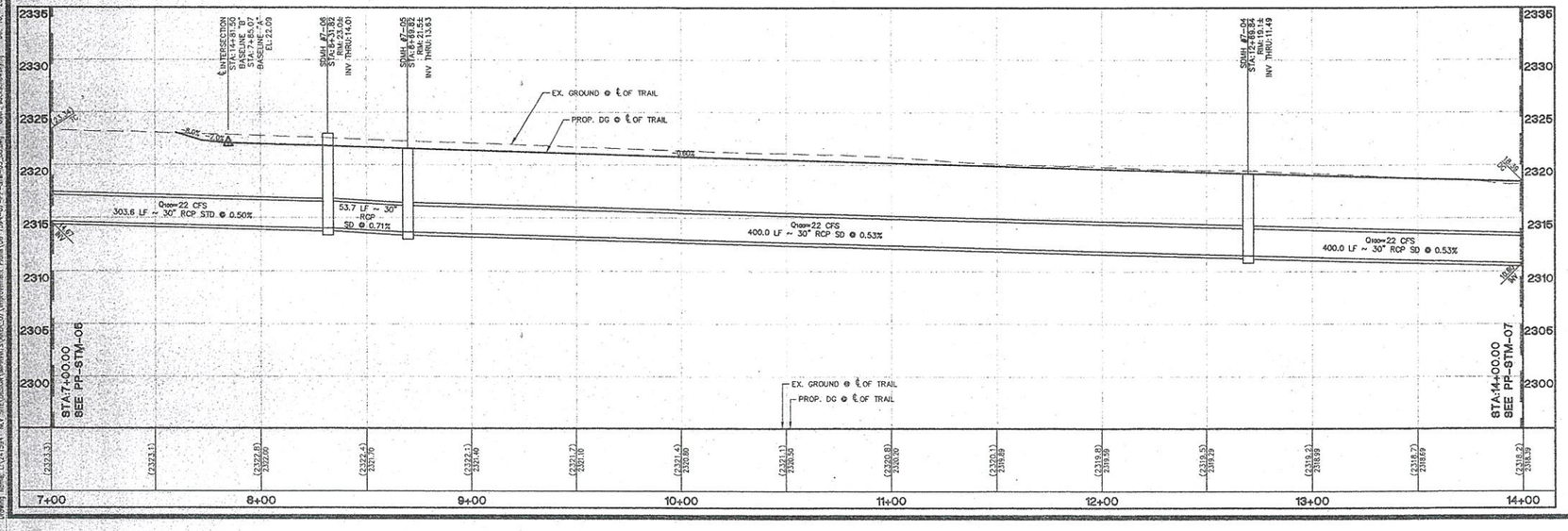


TRAIL 01



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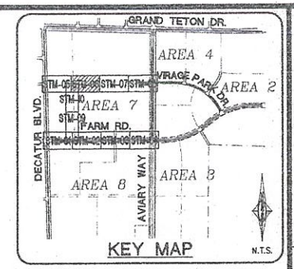

LEGEND:

PROP. ASPHALT | PROP. SIDEWALK | PROP. RIP-RAP

GEOTECHNICAL NOTE:

PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC., DATED: APRIL 28, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.
CUT TOTAL: 20,896
FILL TOTAL: 15,794
NET EXPORT: 5,102

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4. INSTALL MODIFIED TYPE "C" DROP INLET, SEE SHEET D-02. DROP INLET TO CONFORM TO CCAUSD No. 413
5. INSTALL RCP END SECTION PER NDOT R-2.3.1.
6. INSTALL TEMPORARY PLUG & CAP FOR FUTURE PHASE.
7. REMOVE EX. END SECTION OR CAP & CONNECT TO EX. RCP PIPE. CONTRACTOR TO VERIFY SIZE, INVERT & LOCATION PRIOR TO CONSTRUCTION.
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9. INSTALL CLEANOUT.

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1. CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD No. 216.
2. CONSTRUCT "A" TYPE CURB PER CCAUSD No. 219.
3. INSTALL A.C. PAVEMENT PER STREET SECTIONS.
4. SAWCUT & MATCH EXISTING ASPHALT PAVING, CURB & GUTTER.
5. CONSTRUCT TYPICAL BUS TURN-OUT PER CCAUSD No. 234.1.
6. CONSTRUCT MEANDERING SIDEWALK PER CCAUSD No. 234.
7. CONSTRUCT CASE II SIDEWALK RAMP W/ TRUNCATED DOMES PER CCAUSD No. 235, CASE II.

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1. PURSUANT TO CITY OF NORTH LAS VEGAS ORDINANCE NUMBER 1172, THE CONTRACTOR IS REQUIRED TO SECURE A GRADING PERMIT PRIOR TO COMMENCING WORK.
2. THE CONTRACTOR SHALL SECURE A PERMIT FOR ANY OFF-SITE CONSTRUCTION.
3. THE CONTRACTORS OPERATIONS SHALL NOT TRESPASS BEYOND THE PROJECT PROPERTY LINES UNLESS A PERMIT OR WRITTEN AUTHORIZATION HAS BEEN OBTAINED FROM THE PROPERTY OWNER(S) INVOLVED. COPIES OF SUCH WRITTEN AUTHORIZATION SHALL BE FURNISHED TO THE CITY OF NORTH LAS VEGAS' REPRESENTATIVE PRIOR TO START OF CONSTRUCTION.
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5. AN APPROVED GRADING AND DRAINAGE PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE APPROVED PLAN WILL REQUIRE SUBMITTAL OF A FORMAL REVISED PLAN FOR REVIEW AND APPROVAL.
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CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION
MANAGER, JENNIFER E. DOODY, P.E. — DATE: 3/6/08

GRADING PLAN CERTIFICATION
JOHN P. MENG — PE # 17540 — DATE: 12/12/07
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

CarterBurgess
Consultants in Planning, Engineering, Construction Management, and Related Services
6605 Bermuda Road
Las Vegas, NV 89119
(702) 839-5400 Fax (702) 839-5454

STORM PLAN AND PROFILE
TRAIL 01
STA: 7+00.00 TO STA: 14+00.00
NORTH LAS VEGAS
600 ACRES
AREA 7

DRAWN BY: MCL | DESIGNED BY: MRA | CHECKED BY: GBW | 10-16-06 | 10-16-06 | 10-16-06 | PROJECT NO: 210594 | SCALE: 1" = 30' 1" = 6'

PROFESSIONAL ENGINEER-STATE OF NEVADA — JOHN P. MENG — CIVIL — EXP. 12/31/09 — No. 17540

SHEET PP-STM-06
13 OF 32 SHEETS
DRAWING NO. 29393

Avoid overhead power line contact. It's costly.

Call before you Overhead
1-702-227-2929
NEVADA POWER COMPANY AND SIERRA PACIFIC POWER COMPANY

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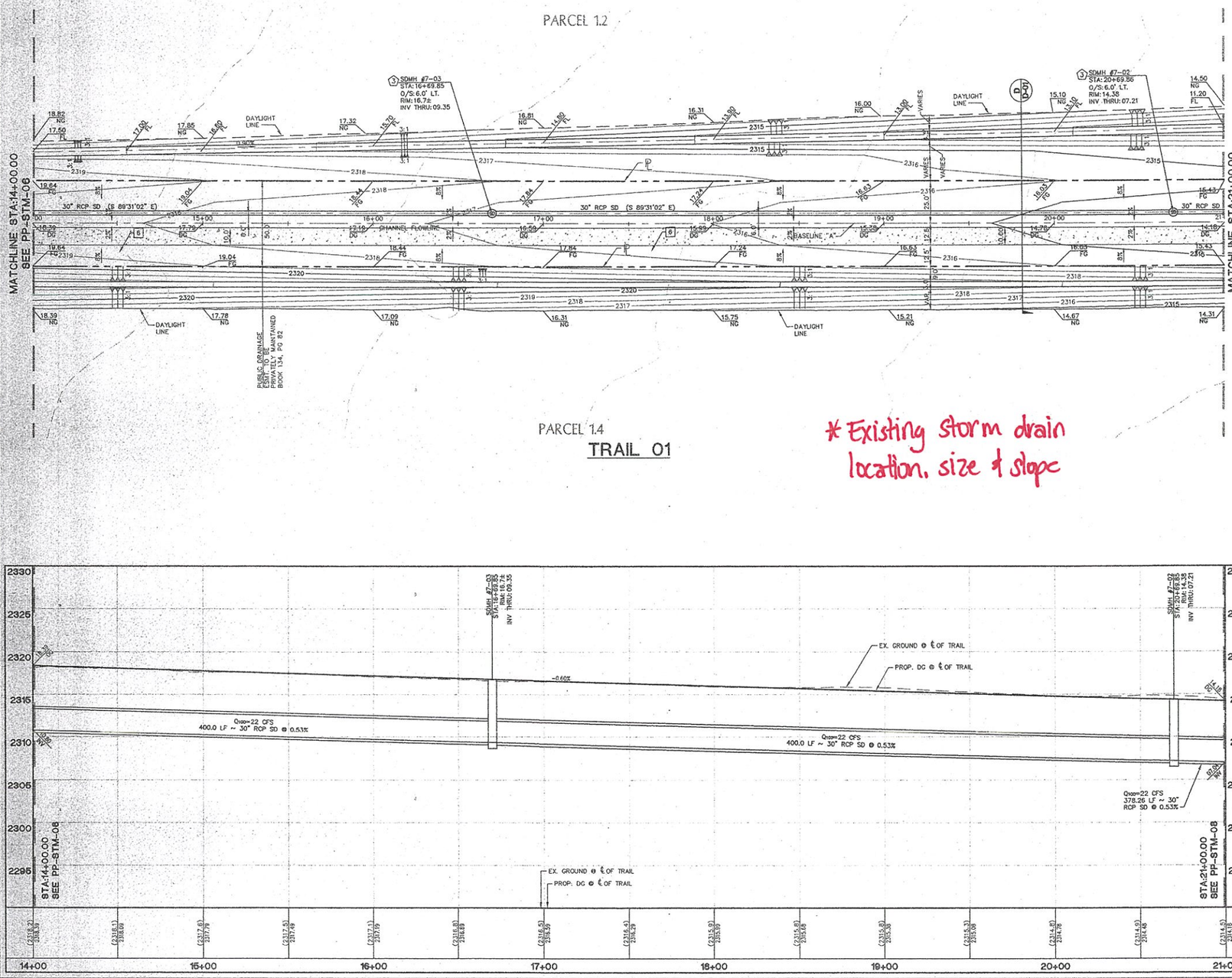
NLV9117NWS, BEING A RIVET & 2" ROUND ALUM. DISK, STAMPED NORTH LAS VEGAS BM NO. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. & ALIANTE PKWY.
2294.88 FT, 699.482 M (NAVD 88, PUBLISHED 11/01/06)
2294.98 FT, 699.511 M (ELEVATION USED FOR THESE PLANS, PRE-REVISON)

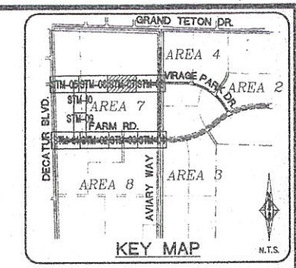
LEGAL DESCRIPTION:
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, & 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

BASIS OF BEARINGS:
SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.



* Existing storm drain location, size & slope



LEGEND:

PROP. ASPHALT | PROP. SIDEWALK | PROP. RIP-RAP

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REVISION | BY | DATE | REV

NOVEMBER 2006 LAND INVESTORS, LLC/DRHI, INC.

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6655 Bermuda Road
Las Vegas, NV 89119
(702) 839-3400 Fax (702) 839-5454

STORM PLAN AND PROFILE
TRAIL 01
STA: 14+00.00 TO STA: 21+00.00
NORTH LAS VEGAS
600 ACRES
AREA 7

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT NO:	SCALE:
MPC	JAH	BMR	241594	1" = 30' 1" = 6'
10-16-06	10-16-06	10-16-06		

PROFESSIONAL ENGINEER STATE OF NEVADA
JOHN P. MENG CIVIL EXP. 12/31/09
No. 17540

SHEET
PP-STM-07
14 OF 32 SHEETS
DRAWING NO.
29393

Drawing Name: J:\241594 - NLV_SITE\DESIGN\WORKING AREA_07\Improvement_Plans\06-1594-07-PP-STM-05_06.dwg User: jackson.gregory Dec 10, 2007 - 6:11pm

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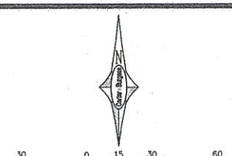
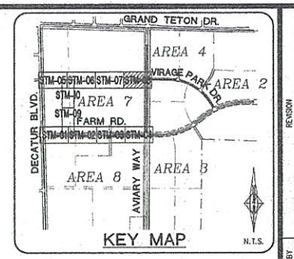
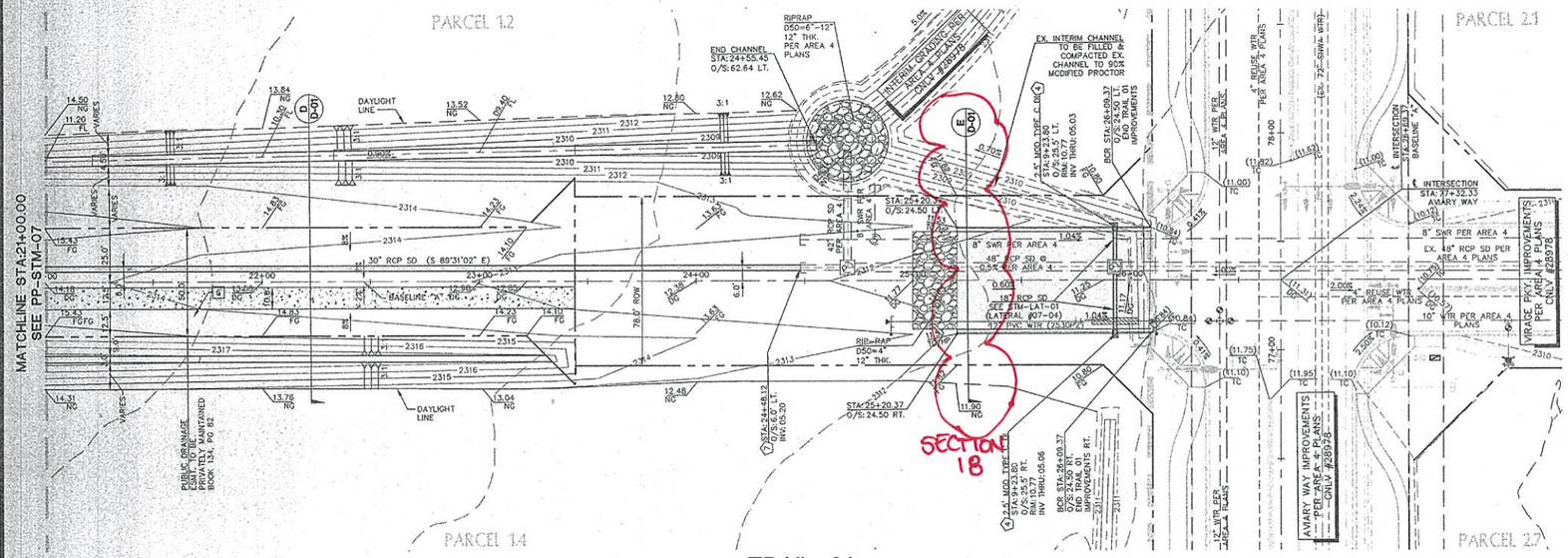




KEY MAP



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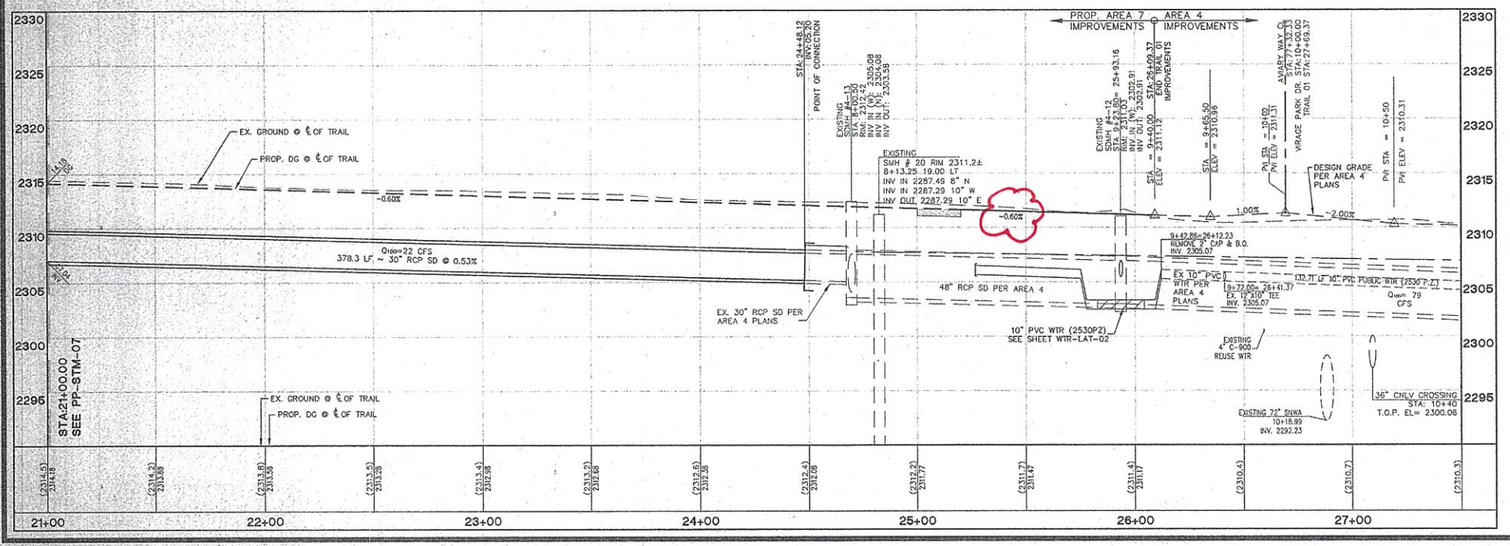

TRAIL 01

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MANAGER, JENNIFER E. DOCOT, PE. DATE: 3/6/08

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TRAIL 01
STA: 21+00.00 TO STA: 24+48.12
NORTH LAS VEGAS
600 ACRES
AREA 7

DRAWN BY: MDL	10-16-06	SCALE:	1" = 30' 1" = 6'
DESIGNED BY: JAH	10-16-06		
CHECKED BY: MJF	10-16-06		
		PROJECT NO: 24109A	

PROFESSIONAL ENGINEER STATE OF NEVADA MARK J. FAKLER CIVIL EXP. 6/30/09 No. 9911 2/18/08

SHEET PP-STM-08
15 OF 32 SHEETS
DRAWING NO. 29393

Drawing Name: L:\24109A\ - TULY SITE\DESIGN\WORK\DEVAREA_07\Improvement Plans\08-1924-07I-PP-STM-06_08.dwg User: jackschlesinger Feb 18, 2008 - 3:51pm

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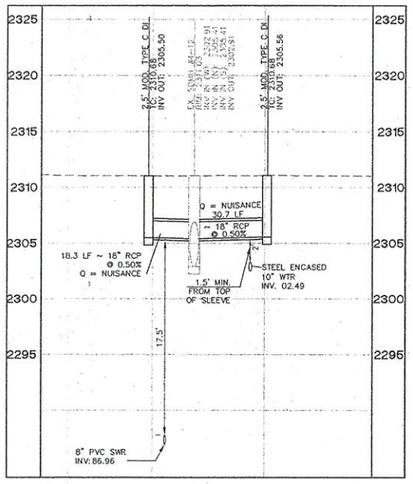
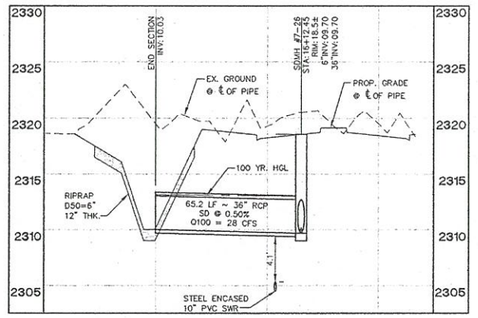
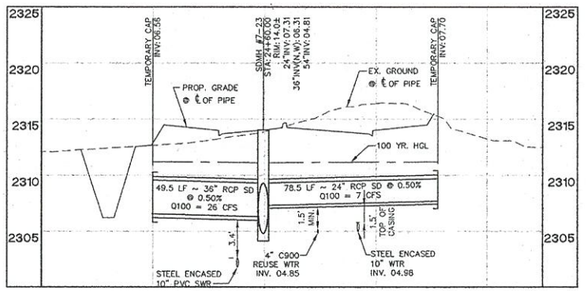


STORM LATERAL #07-04
VIRAGE PARK DRIVE STA: 9+23.80=
TRAIL 01 STA: 25+93.16

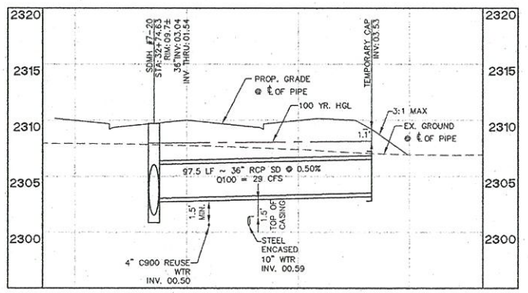
*Existing storm drain location, size & slope



STORM LATERAL #07-01
FARM ROAD STA: 16+12.45



STORM LATERAL #07-02
FARM ROAD STA: 24+60.00



STORM LATERAL #07-03
FARM ROAD STA: 32+74.63

30 0 15 30 60
(IN FEET)
1 INCH = 30 HORZ
1 INCH = 6 VERT

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

Carter Burgess
Consultants in Planning, Engineering, Construction Management, Land Related Services
6655 Bermuda Road
Las Vegas, NV 89119
(702) 938-5400 Fax (702) 938-5454

STORM DRAIN LATERAL PROFILES

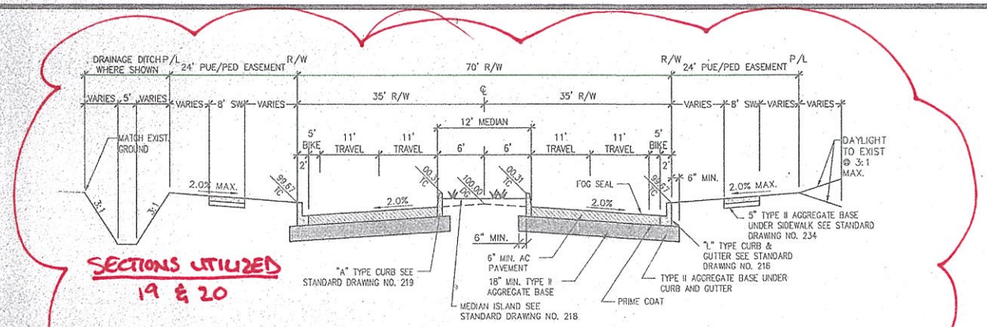
NORTH LAS VEGAS
600 ACRES
AREA 7

DRAWN BY:
DESIGNED BY:
CHECKED BY: GRW
PROJECT NO: 241994
SCALE: 1" = 30'

MARK J. FAKLER
CIVIL
Exp. 6/30/09
No. 9911
STATE OF NEVADA
PROFESSIONAL ENGINEER
11/6/08

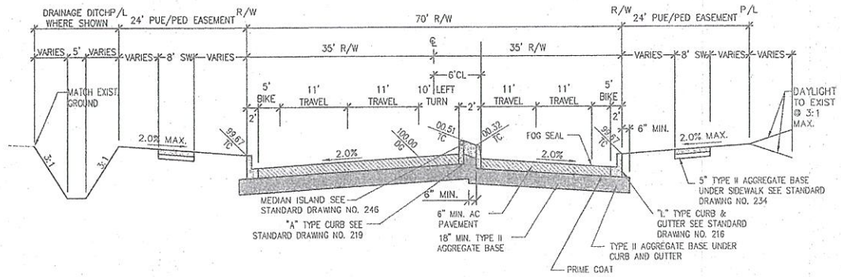
SHEET
STM-LAT-01
22 OF 32 SHEETS
DRAWING NO.
29393

Drawing Name: L:\241994 - NLV SITE\DESIGN\WORKFILES\ASD_CAD\Improvement_Plans\07-1561-427-STM-LAT-01.dwg User: acksgrewing Feb 18, 2008 - 9:31pm

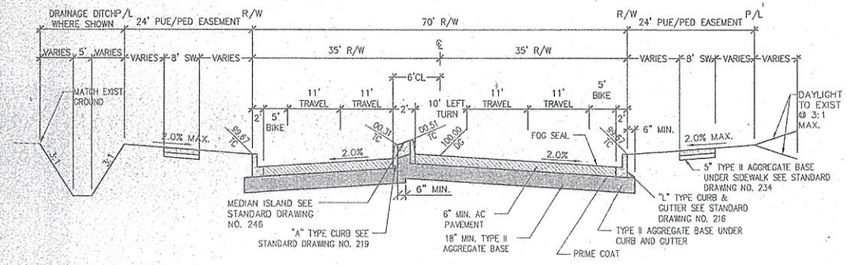


SECTIONS UTILIZED
19 & 20

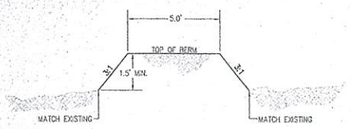
A D-01 **70' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
FARM ROAD (PUBLIC)



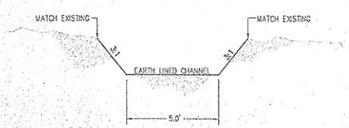
B D-01 **70' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
FARM ROAD (PUBLIC) LEFT TURN LANE - NORTH OF CENTERLINE



C D-01 **70' ARTERIAL WITH MEDIAN ISLAND - GRADING SECTION**
FARM ROAD (PUBLIC) LEFT TURN LANE - SOUTH OF CENTERLINE

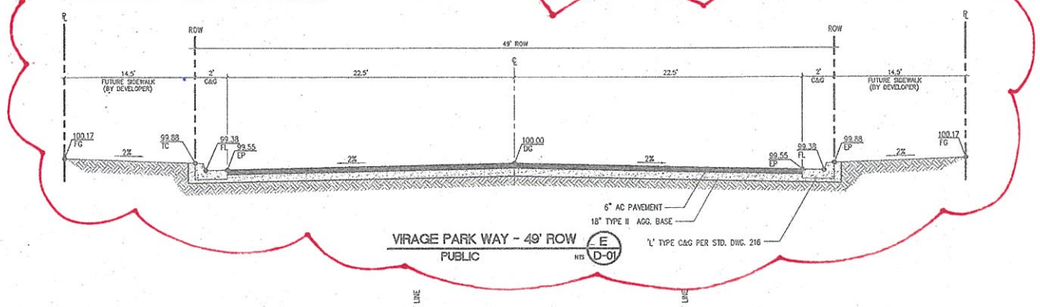


F D-01 **5-FT TRAPEZOIDAL BERM DETAIL**
NTS

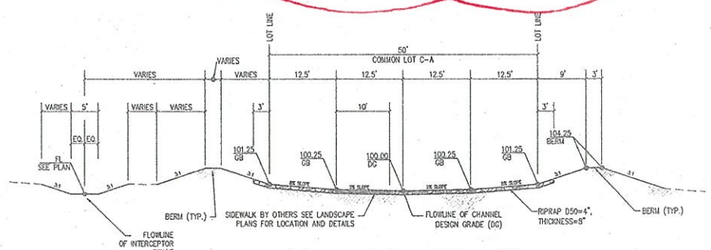


G D-01 **5-FT TRAPEZOIDAL CHANNEL DETAIL**
NTS

SECTION 18 UTILIZED



VIRAGE PARK WAY - 49' ROW
PUBLIC
NTS **E** D-01



TRAIL 01 AND TRAIL 02 CHANNEL DETAIL **D** D-01
CHANNEL COMPACTION - MINIMUM 90% STANDARD PROCTOR NTS

NOTE:
THE OFF-SITE PAVEMENT SECTIONS SHOWN ON THE PLANS MUST BE DESIGNED IN ACCORDANCE WITH THE STANDARD SPECIFICATION SECTION 401 USING THE AASHTO MODEL. THE NEW SECTION MUST BE BASED ON THE ACTUAL DAILY TRAFFIC COUNTS PROVIDED BY THE CITY AND R-VALUE TEST RESULTS PERFORMED SUBSEQUENT TO GRADING.

REVISION | REV | DATE | BY

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

CarterBurgess
6655 Bermuda Road
Las Vegas, NV 89119
Consultants in Planning, Engineering, Construction Management, and Related Services
(702) 938-5400 Fax (702) 938-5454

TYPICAL STREET SECTIONS

NORTH LAS VEGAS
600 ACRES
AREA 7

DRAWN BY:	DESIGNED BY:	CHECKED BY:	SCALE:
MDL	MH	GW	N/A
10-16-06	10-16-06	10-16-06	N/A

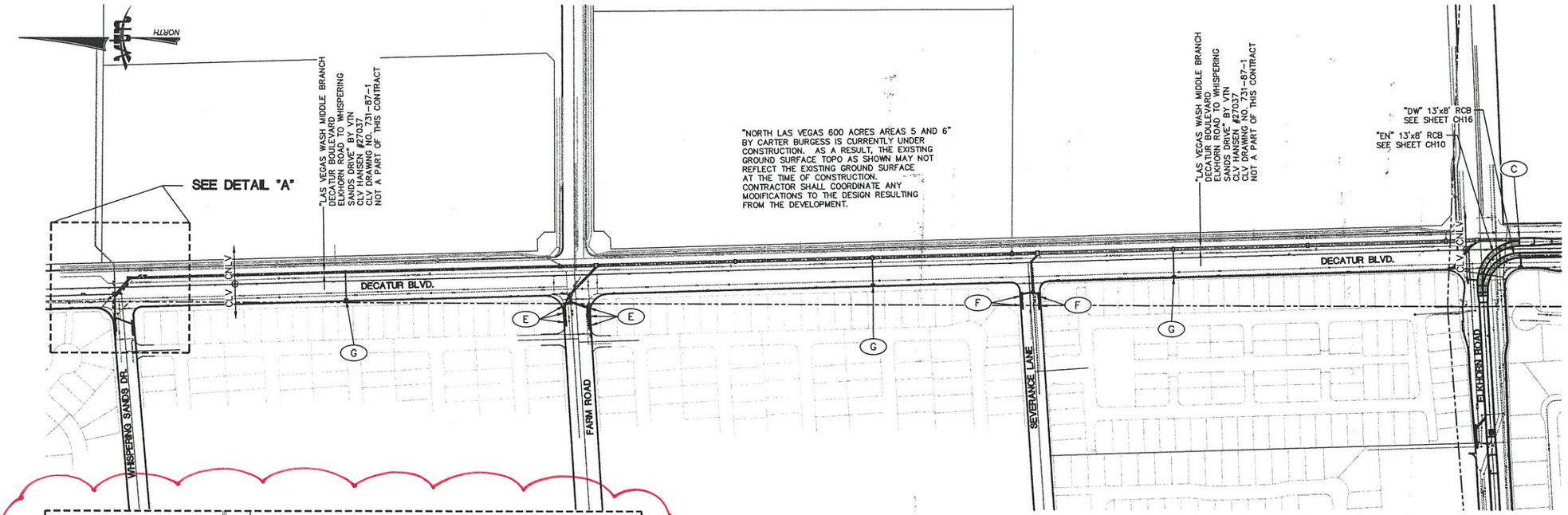
PROJECT NO: 21594

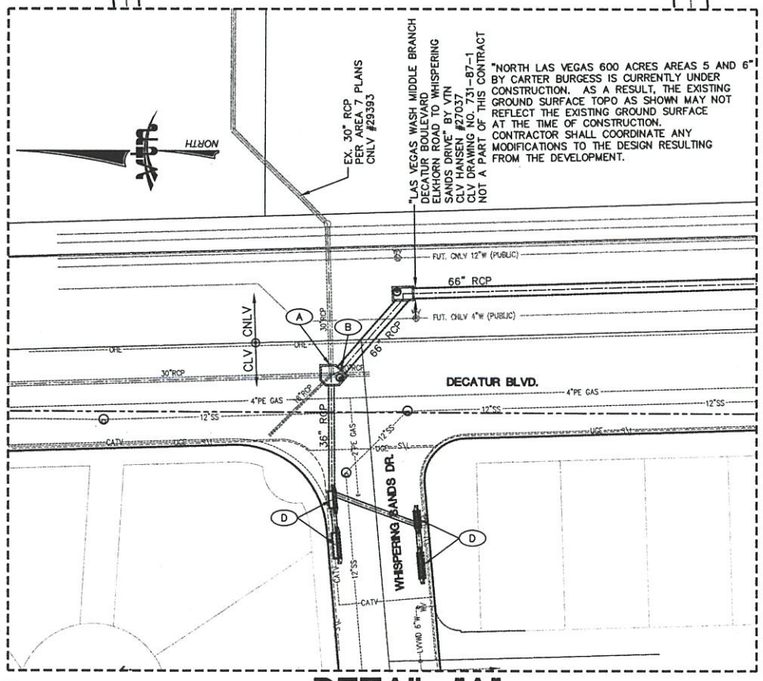
PROFESSIONAL ENGINEER - STATE OF NEVADA
JOHN P. MENG
CIVIL
EXP. 12/31/08
No. 17540
12/11/07

SHEET
D-01
29 OF 32 SHEETS
DRAWING NO.
29293

Drawing Name: G:\21594\34V SITE\VERSION\ARP\MTS\ARCLOT\Improvement Plans\06 1914-07-D-01.dwg Date: 12/11/2007 - 12:21pm

Approved Plans for
Existing Storm Drain Modifications Decatur Boulevard
Las Vegas Middle Branch Storm Drain Improvements
Decatur Boulevard & Elkhorn Road Improvements (CLV No. 16529)





DETAIL "A"
SCALE 1" = 40'

STORM DRAIN CONSTRUCTION ITEMS:

(A) WHISPERING SANDS DR & DECATUR BLVD.
N 26817132.9353, E 767185.3368
INSTALL RCP BRICK & MORTAR PLUG IN EX. 30" RCP(EAST)
SEE DETAIL ON SHEET D1

(B) WHISPERING SANDS DR & DECATUR BLVD.
N 26817127.1554, E 767182.5653
REMOVE EX. RCP END CAP AND SANDBAGS
FROM INSIDE OF EX. JUNCTION STRUCTURE

(C) ELKHORN ROAD & DECATUR BLVD.
N 26812935.9858, E 767347.0917
REMOVE EX. RCB END CAP AND SANDBAGS

(D) WHISPERING SANDS DR & DECATUR BLVD.
N 26817129.6016, E 767079.0853 (15' TYPE "CM2" D.I.)
N 26817131.9575, E 767106.4840 (10' TYPE "CM2" D.I.)
N 26817078.4123, E 767067.3992 (15' TYPE "DM2B" D.I.)
N 26817080.7683, E 767094.7981 (10' TYPE "DM2B" D.I.)
REMOVE TEMPORARY SANDBAGS FROM EXISTING
STORM DRAIN DROP INLETS

(E) FARM ROAD & DECATUR BLVD.
N 26815786.0350, E 767097.1718 (15' TYPE "CM2" D.I.)
N 26815787.9988, E 767127.1074 (15' TYPE "CM2" D.I.)
N 26815789.4717, E 767149.5592 (10' TYPE "CM2" D.I.)
N 26815715.2387, E 767087.3260 (15' TYPE "DM2B" D.I.)
N 26815717.1828, E 767116.9616 (15' TYPE "DM2B" D.I.)
N 26815718.8128, E 767141.8091 (10' TYPE "DM2B" D.I.)
REMOVE TEMPORARY SANDBAGS FROM EXISTING
STORM DRAIN DROP INLETS

(F) SEVERANCE LANE & DECATUR BLVD.
N 26814422.0087, E 767148.8680 (15' TYPE "CM2" D.I.)
N 26814424.0196, E 767178.8005 (15' TYPE "CM2" D.I.)
N 26814371.8385, E 767148.0125 (15' TYPE "CM2" D.I.)
N 26814373.8494, E 767177.9450 (15' TYPE "CM2" D.I.)
REMOVE TEMPORARY SANDBAGS FROM EXISTING
STORM DRAIN DROP INLETS

(G) DECATUR BLVD.
N 26816441.9995, E 767165.2904 (5' TYPE "DM2B" D.I.)
N 26814867.9299, E 767210.7626 (5' TYPE "DM2B" D.I.)
N 26813968.7467, E 767236.6444 (5' TYPE "DM2B" D.I.)
REMOVE TEMPORARY SANDBAGS FROM EXISTING
STORM DRAIN DROP INLETS

NOTE:

CONTRACTOR SHALL REMOVE TRASH AND DEBRIS FROM EX. RCB AND JUNCTION STRUCTURE AS NECESSARY TO PERFORM WORK. THE COST OF TRASH AND DEBRIS REMOVAL SHALL BE CONSIDERED INCIDENTAL TO OTHER BID ITEMS.

GRAPHIC SCALE
160 0 80 160 320
(IN FEET)
1 inch = 160 ft.
(VERIFY SCALE – PLANS MAY HAVE BEEN REDUCED)

CALL SOUTHWEST GAS AT 365-2296
FOR STANDBY WHEN EXCAVATING OVER
OR NEAR HIGH PRESSURE GAS LINES

AVOID OVERHEAD POWER LINE CONTACT IT'S COSTLY
Call before you Overhead
1-702-227-2929
NV ENERGY ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

Call before you Dig
Avoid cutting underground utility lines. It's costly.
Call 811

H#16529

REV	DATE	BY	REVISION

PUBLIC WORKS DEPARTMENT
400 E. STEWART AVE.
LAS VEGAS, NV 89101
702-229-6272

2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89146-5148
PHONE (702) 362-3999
FAX (702) 362-2597
WEB SITE WWW.YTNNV.COM

EXISTING STORM DRAIN MODIFICATIONS
DECATUR BOULEVARD

LAS VEGAS WASH MIDDLE BRANCH
STORM DRAIN IMPROVEMENTS
DECATUR BOULEVARD & ELKHORN ROAD

DRAWN BY: YTN 11/20/2009
DESIGNED BY: YTN 11/20/2009
CHECKED BY: JHS 11/20/2009
PROJECT NO: 6801
SCALE: HORIZ. 1"=160' VERT. NA

PROFESSIONAL ENGINEER STATE OF NEVADA
JEFFREY N. GRIEST
EXP. 06-30-11
CIVIL
No. 17858
12-17-09

SHEET
D4
105 OF 134 SHEETS
DRAWING NO.
731-87-2

I:\6801\dwg\DETAILS\Elkhorn & Decatur Blvd\6801-D4-Amgstandrdgs Dec 01, 2009 - 3:34pm

Technical Drainage Study for
North Las Vegas 600 Acres Areas 8 and 9 (CNLV No. 36235)

Approval Letters

Mayor
Michael L. Montandon

Council Members
William E. Robinson
Stephanie S. Smith
Shari Buck
Robert L. Eliason

CITY OF
NORTH LAS VEGAS

Your Community of Choice

City Manager
Gregory E. Rose

Public Works Department - Dr. Qiong Liu, P.E., P.T.O.E., Director
Development & Flood Control
2266 Civic Center Drive • North Las Vegas, Nevada 89030
Telephone: (702) 633-1200 • Fax: (702) 649-4696 • TDD: (800) 326-6868
www.cityofnorthlasvegas.com

September 16, 2008

David M. Mueller, P.E.

G.C.Wallace Companies
1555 South Rainbow Boulevard
Las Vegas, Nevada 89146

Re: Technical Drainage Study for North Las Vegas 600-Acre - Areas 8 and 9
CNLV No. 36235

Dear Mr. Mueller:

Staff has reviewed the above referenced study, dated July 3, 2008, Addendum #1, dated September 3, 2008, and found it to meet the minimum accepted standards for a technical drainage study. This acceptance is contingent upon the following conditions:

1. The approval of this **Technical Drainage Study** is predicated on the construction of Grand Teton Drive, CCRFCD Facility GTEA 0248, Facility LVDE 0000 and Facility LVMD 2324 prior to any developments within Areas 8 and 9. If any construction downstream of Grand Teton Drive and east of Decatur is anticipated, the City of North Las Vegas will require an interim analysis for the proposed developments.

Please be advised that all land surface area disturbances over 1 acre and/or adjacent to a water way must submit a "Notice of Intent" to discharge to the Nevada Division of Environmental Protection, which certifies that a stormwater pollution prevention plan has been developed and is maintained on site. For more information, including forms and applications, see http://ndep.nv.gov/bwpc/storm01.htm.

Acceptance of this drainage study does not imply approval of the grading plan or the structural calculations associated with the drainage for this site. A detailed review of the grading plan is performed by staff during the improvement plan review process.

Any future changes in the proposed design (or design assumptions) as outlined in the approved drainage study and the attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the City of North Las Vegas (CNLV) Development and 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 CNLV 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.

The City, its officials, or employees assume no liability for information, data, and conclusions presented by the consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review. If you have any questions concerning this matter, please contact me at 633-2771.

Sincerely,

Kent Chang, P.E.
Senior Engineer
Development and Flood Control Division

Improvement Plans

ADD#1 (OLY) CNLV #36235

RESPONSE TO COMMENTS ON THE TECHNICAL DRAINAGE STUDY FOR OFFSITE IMPROVEMENTS FOR NORTH LAS VEGAS 600-ACRE SITE AREAS 8 AND 9

820-60-122X2

September 2008

CNLV No. 36235

Prepared For:

November 2005 Land Investors LLC/DHRI, Inc.
11411 Southern Highlands Parkway, Suite 300
Las Vegas, Nevada 89141
Phone: (702) 616-3800
Fax: (702) 616-3833

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS

Avoid overhead power line contact. It's costly.

Call before you Overhead
1-702-227-2929
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
811
Know what's below. Call before you dig.
811 UNDERGROUND SERVICE ALERT (USA)

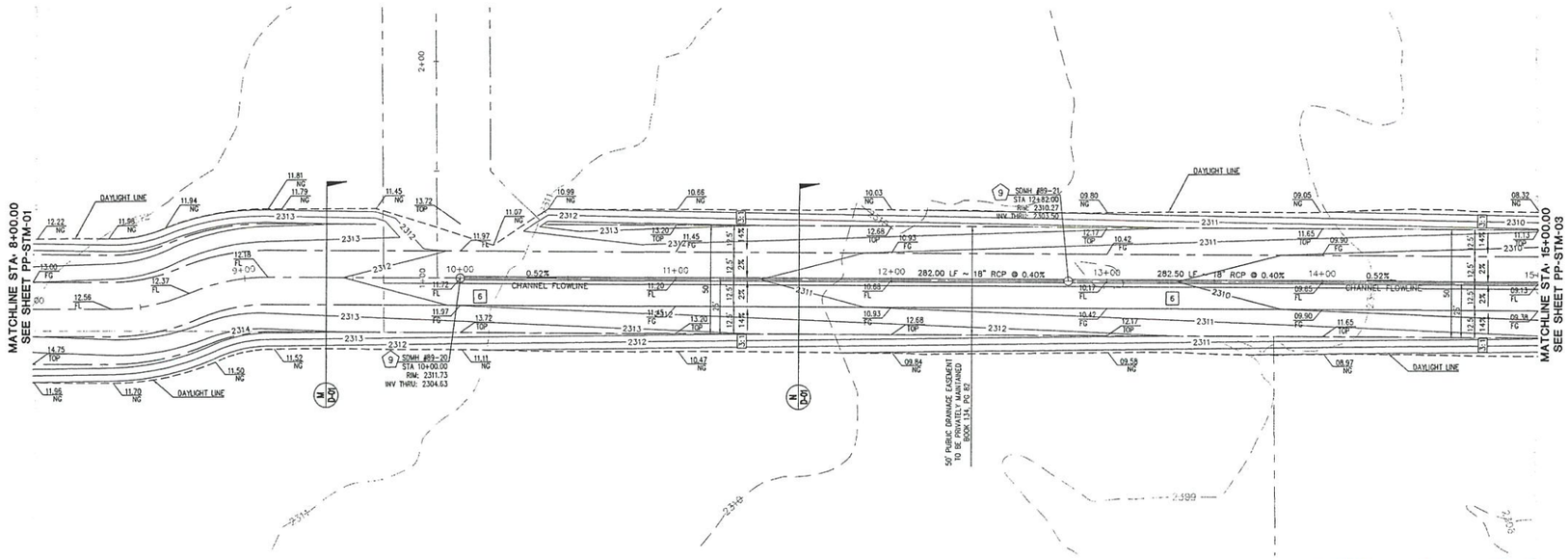
DISCLAIMER:
UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UNDERGROUND OR OVERHEAD UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION. CONTRACTOR TO NOTIFY ENGINEER OF ANY CHANGES OR DISCREPANCIES.

BENCHMARK:
NLV9117NWS, BEING A RIVET & 2" ROUND ALUM. DISK, STAMPED NORTH LAS VEGAS BM NO. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. & ALIANTE PKWY.
2294.88 FT, 699.482 M (NAVD 88, PUBLISHED 11/01/06) 2294.98 FT, 699.511 M (ELEVATION USED FOR THESE PLANS, PRE-REVISION)

LEGAL DESCRIPTION:
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, & 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

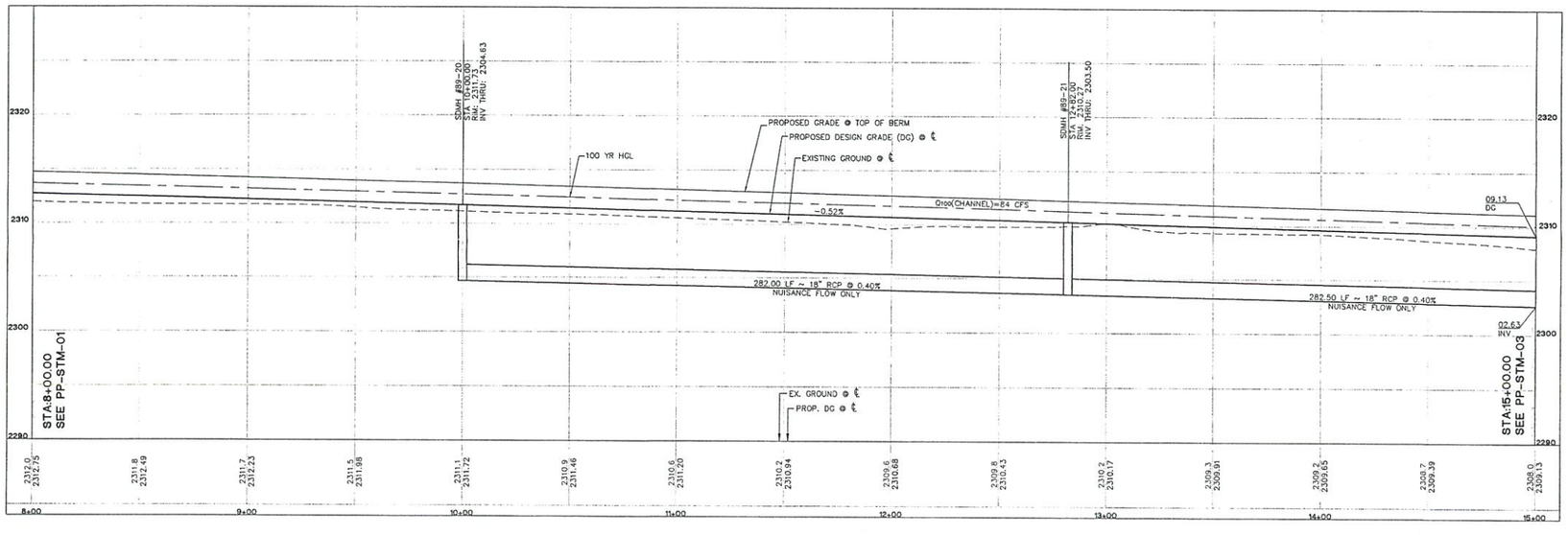
BASIS OF BEARINGS:
SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

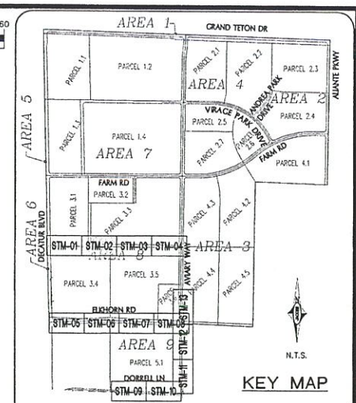
30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.



SEVERANCE CHANNEL / TRAIL 3.7
(PUBLIC)

*Existing storm drain location, size & slope





KEY MAP

PROP. ASPHALT PROP. SIDEWALK PROP. RIP-RAP

GEOTECHNICAL NOTE:
PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC., DATED: APRIL 26, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.
CUT TOTAL: 4,226 CY
FILL TOTAL: 12,952 CY
NET IMPORT: 8,726 CY

STORM CONSTRUCTION NOTES:
- ALL RCP TO BE CLASS III, UNLESS OTHEWISE NOTED.
- NOT ALL NOTES USED ON THIS SHEET -

1. INSTALL 48" TYPE I MANHOLE CCAUSD No. 403. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
2. INSTALL TYPE II MANHOLE PER CCAUSD No. 405. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
3. INSTALL TYPE III MANHOLE PER CCAUSD No. 406. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
4. INSTALL MODIFIED TYPE "C" DROP INLET, DROP INLET TO CONFORM TO CCAUSD No. 412A
5. INSTALL TEMPORARY PLUG & CAP FOR FUTURE PHASE.
6. REMOVE EX. CAP & CONNECT TO EX. RCP PIPE. CONTRACTOR TO VERIFY SIZE, INVERT & LOCATION PRIOR TO CONSTRUCTION.
7. INSTALL NDOT TYPE IV MANHOLE PER R-4.3.2 OF NDOT STANDARDS
8. CONNECT TO EX. RCP PIPE. MATCH EX. SLOPE.
9. INSTALL 48" TYPE 1 MANHOLE PER CCAUSD No. 403 W/ BEEHIVE BUBBLER FRAME & GRATE PER CCAUSD No. 416.

CONSTRUCTION NOTES:
- ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH "CLARK COUNTY AREA UNIFORM STANDARD DRAWINGS (CCAUSD)" LATEST EDITION AND/OR REGULATING ENTITY HAVING JURISDICTION.
- NOT ALL NOTES USED ON THIS SHEET -

1. CONSTRUCT "L" TYPE CURB & GUTTER PER CCAUSD No. 216.
2. CONSTRUCT "A" TYPE CURB PER CCAUSD No. 219.
3. INSTALL A.C. PAVEMENT PER STREET SECTIONS.
4. SAWCUT & MATCH EX. ASPHALT PAVING, CURB & GUTTER.
5. CONSTRUCT BUS TURN-OUT PER CCAUSD No. 234.1.
6. CONSTRUCT MEANDERING SIDEWALK PER CCAUSD No. 234.
7. NOT USED
8. CONSTRUCT CASE II SIDEWALK RAMP W/ TRUNCATED DOMES PER CCAUSD No. 235, CASE II, A & B=8.0' UNLESS NOTED OTHERWISE.

GENERAL GRADING AND DRAINAGE NOTES:
1. PURSUANT TO CITY OF NORTH LAS VEGAS ORDINANCE NUMBER 1172, THE CONTRACTOR IS REQUIRED TO SECURE A GRADING PERMIT PRIOR TO COMMENCING WORK.
2. THE CONTRACTOR SHALL SECURE A PERMIT FOR ANY OFF-SITE CONSTRUCTION.
3. THE CONTRACTORS OPERATIONS SHALL NOT TRESPASS BEYOND THE PROJECT PROPERTY LINES UNLESS A PERMIT OR WRITTEN AUTHORIZATION HAS BEEN OBTAINED FROM THE PROPERTY OWNER(S) INVOLVED. COPIES OF SUCH WRITTEN AUTHORIZATION SHALL BE FURNISHED TO THE CITY OF NORTH LAS VEGAS' REPRESENTATIVE PRIOR TO START OF CONSTRUCTION.
4. THE CITY OF NORTH LAS VEGAS CONSTRUCTION SERVICES SHALL BE NOTIFIED ONE (1) WORKING DAY BEFORE ANY ON-SITE CONSTRUCTION WORK BEGINS.
5. AN APPROVED GRADING AND DRAINAGE PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE APPROVED PLAN WILL REQUIRE SUBMITTAL OF A FORMAL REVISED PLAN FOR REVIEW AND APPROVAL.
6. ALL CONSTRUCTION SURVEY CONTROL SHALL BE DONE BY A LICENSED PROFESSIONAL LAND SURVEYOR IN ACCORDANCE WITH APPLICABLE STATUTES AND CODES. THE CONTRACTOR SHALL PROVIDE COMPETENT RESOURCES TO ASSURE BUILDING PAD AND BUILDING FLOOR ELEVATIONS CONFORM TO THOSE SHOWN ON THE CONSTRUCTION DRAWINGS. FURTHERMORE, THE CONTRACTOR SHALL PROVIDE THE CITY OF NORTH LAS VEGAS BUILDING DEPARTMENT WITH:
   A. CERTIFICATION OF "BUILDING FLOOR ELEVATIONS" IN CRITICAL DRAINAGE AREAS.
   B. CERTIFICATES OF "BUILDING PAD ELEVATIONS" IN NONCRITICAL AREAS.
7. THE CONTRACTOR SHALL CERTIFY TO THE CITY OF NORTH LAS VEGAS CONSTRUCTION SERVICES DIVISION THAT ALL FILLS, FOUNDATIONS AND SUBGRADES MEET THE MINIMUM COMPACTION REQUIREMENTS. CERTIFICATION SHALL BE MADE PRIOR TO POURING CONCRETE.

CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION
MANAGER, JENNIFER E. DOODY, P.E. DATE:

GRADING PLAN CERTIFICATION
JOHN P. MENG PE #: 17540 DATE:
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY (H# 36235) FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

JACOBS
6655 Bermuda Road
Las Vegas, NEVADA 89119
(702) 938-5400 Fax (702) 938-5454

STORM PLAN/PROFILE
SEVERANCE CHANNEL
STA: 8+00 TO STA: 15+00
NORTH LAS VEGAS
600 ACRES
AREA 8 AND 9

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT NO:	SCALE:
MJS	MJS	JPM	241594	1" = 30' 1" = 6'
02-13-08	02-13-08	02-13-08		

PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STATE OF NEVADA JOHN P. MENG CIVIL EXP. 12/31/09 No.17540 07/31/08

SHEET
PP-STM-02
9 OF 51 SHEETS
DRAWING NO.
36397

Drawing Name: L:\241594 - NLV SITE\DESIGN\MPRIMARY\AREA_08-09\06 1594-08-09-PP-STM-01_04.dwg User: mmeigs Aug 28, 2008 - 12:45pm

Avoid overhead power line contact. It's costly.

Call before you Overhead
1-702-227-2929
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

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811
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811 UNDERGROUND SERVICE ALERT (USA)

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BENCHMARK:
NLV9117NWS, BEING A RIVET & 2" ROUND ALUM. DISK, STAMPED NORTH LAS VEGAS BM NO. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. & ALIANTE PKWY.
2294.88 FT, 699.462 M (NAVD 88, PUBLISHED 11/01/06) 2294.98 FT, 699.511 M (ELEVATION USED FOR THESE PLANS, PRE-REVISION)

LEGAL DESCRIPTION:
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, & 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

BASIS OF BEARINGS:
SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

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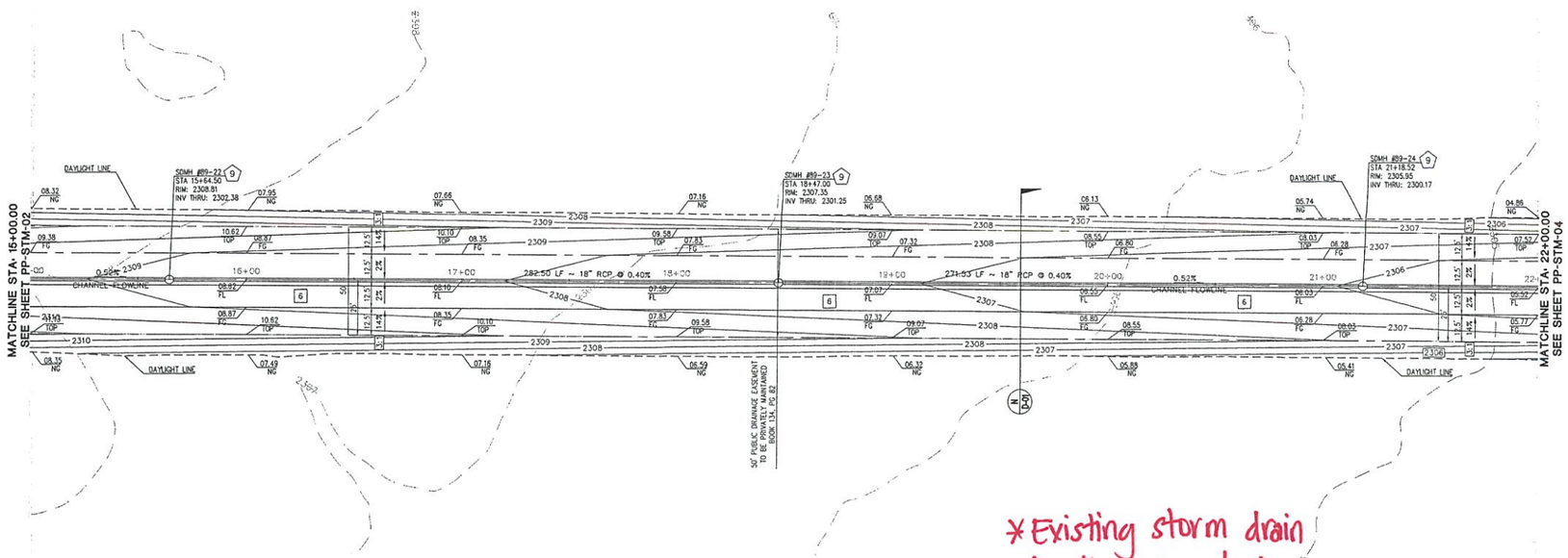
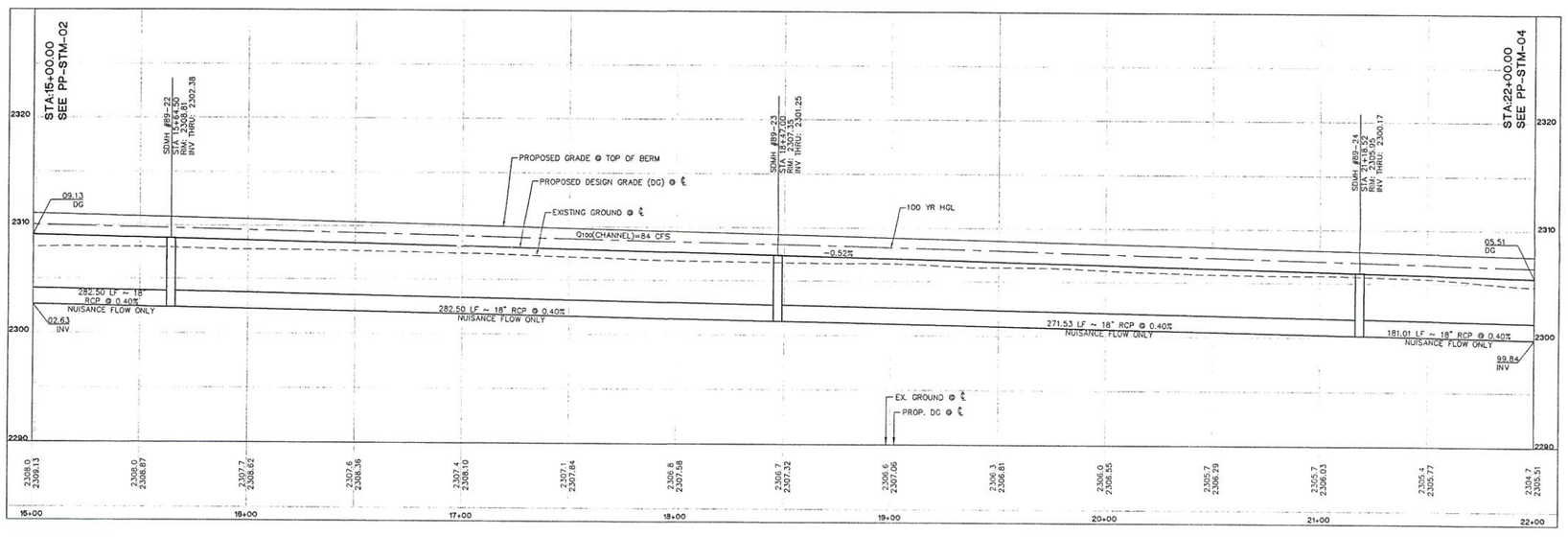
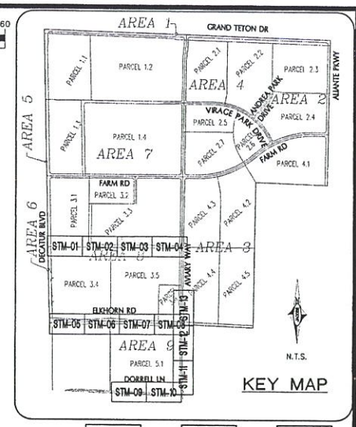


* Existing storm drain location, size & slope

TRAIL 3.7
(PUBLIC)





KEY MAP

PROP. ASPHALT | PROP. SIDEWALK | PROP. RIP-RAP

GEOTECHNICAL NOTE:
PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC., DATED: APRIL 26, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.
CUT TOTAL: 4,216 CY
FILL TOTAL: 12,952 CY
NET IMPORT: 8,726 CY

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5. INSTALL TEMPORARY PLUG & CAP FOR FUTURE PHASE.
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4. SAWCUT & MATCH EX. ASPHALT PAVING, CURB & GUTTER.
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7. NOT USED
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CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION
MANAGER, JENNIFER E. DOODY, P.E. DATE:

GRADING PLAN CERTIFICATION
JOHN P. MENG PE #: 17540 DATE:
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY (#36235) FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

JACOBS
6655 Bermuda Road
Las Vegas, NEVADA 89119
(702) 938-5400 FAX (702) 938-5454

STORM PLAN/PROFILE
TRAIL 3.7
STA: 15+00 TO STA: 22+00
NORTH LAS VEGAS
600 ACRES
AREA 8 AND 9

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT NO:	SCALE:
MJS	MJS	JPM	241594	1" = 30' (H) 1" = 6' (V)
02-13-08	02-13-08	02-13-08		

PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STATE OF NEVADA JOHN P. MENG CIVIL EXP. 12/31/09 No. 17540 8/24/08

SHEET
PP-STM-03
10 OF 51 SHEETS

DRAWING NO.
36397

Drawing Name: L:\241594 NLV SITE\DESIGN\MPRNMS\AREA_08-09\08 1594-08-09-PP-STM-01_04.dwg User: mengjp Aug 28, 2008 - 12:46pm

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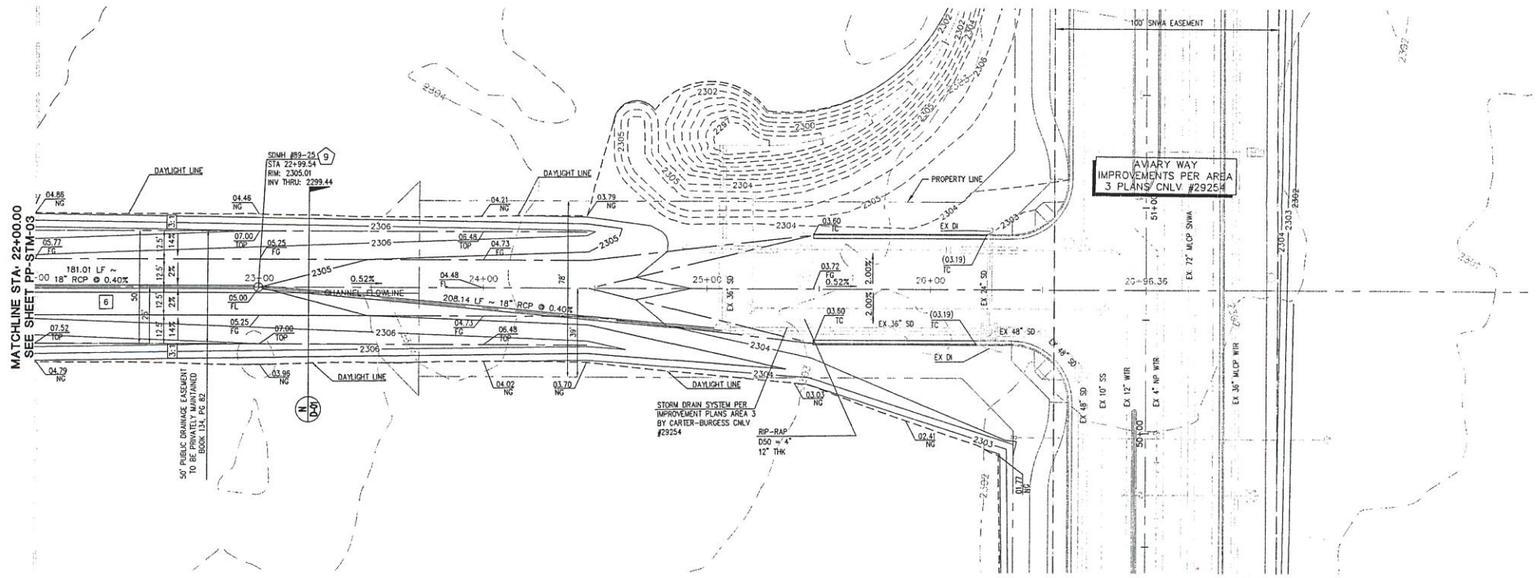

TRAIL 3.7
(PUBLIC)

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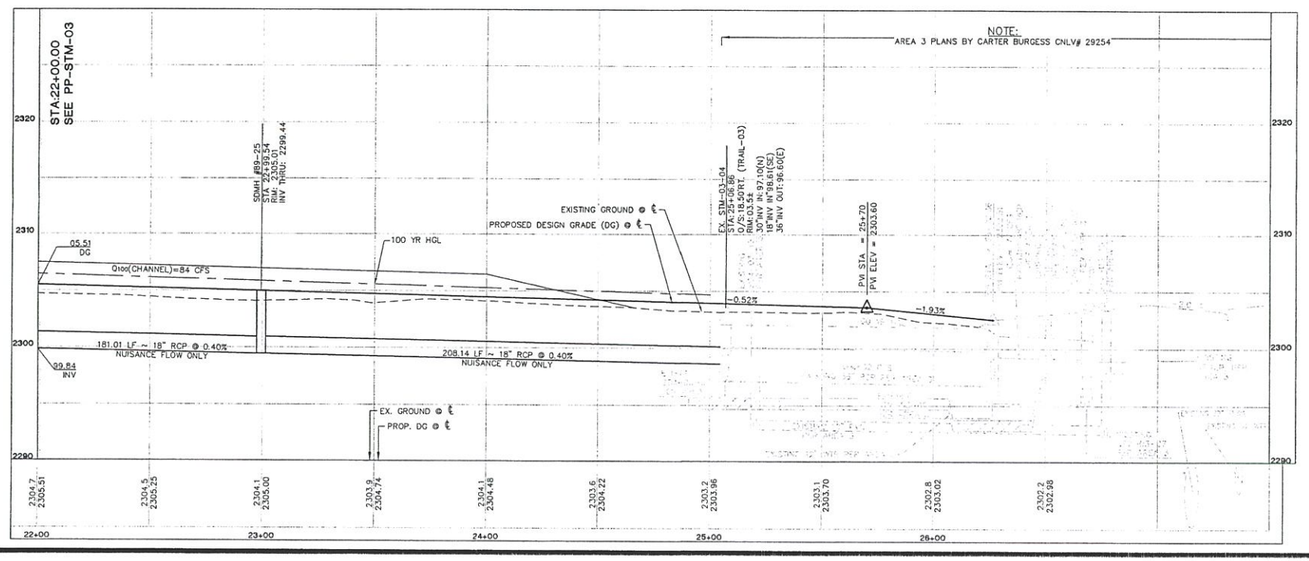

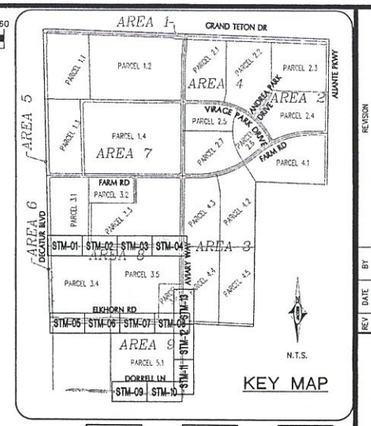

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SNWA NOTE:
LANDSCAPE AND IRRIGATION PLANS (BY OTHERS) SHALL BE SUBMITTED AND APPROVED BY SNWA.

SNWA CONSTRUCTION NOTES:
15. ADJUST EX. FACILITY TO GRADE AND/OR EXTEND TO LOCATION SHOWN.
16. EXTEND/RELO. EX. SNWA/CNLV HARDWARE (IN CONFORMANCE W/ SNWA/UOACS CONSTRUCTION STANDARDS, RESPECTIVELY). EXTEND/RELO EX. TEST STATIONS PER SHEET CP-01 & CP-02.

SNWA NOTES:
1. SNWA FIBER OPTIC CONDUIT FOLLOWS ALONG THE WEST SIDE OF THE SNWA PIPELINE.
2. CAUTION: SNWA TEST LEADS ARE SHALLOW.
3. ALL REPAIRS, REPLACEMENTS, RELOCATIONS AND/OR EXTENSIONS MUST BE DESIGNED AND MONITORED BY A NACE INTERNATIONAL–CERTIFIED CATHODIC PROTECTION SPECIALIST AND WITNESSED AND APPROVED BY SNWA CATHODIC PROTECTION TECHNICIAN PRIOR TO ACCEPTING THE INSTALLATION. CONTRACTOR SHALL PROVIDE ALL MATERIALS FOR ALL REPAIRS, REPLACEMENTS, RELOCATIONS, AND/OR EXTENSIONS. MATERIALS PROVIDED BY CONTRACTOR SHALL BE APPROVED BY SNWA PRIOR TO ACCEPTING THE INSTALLATION.

SNWA SHEET REFERENCE NOTE:
FOR 72" SNWA TRANSMISSION MAIN (CONTRACT NO 140–A AND 170–B), FIBER OPTIC CONDUIT AND ALL OTHER SNWA APPURTENANCES SEE SHEETS PP–UTL–04, PP–UTL–09, PP–UTL–10, PP–UTL–11, PP–UTL–12, WAT–DET–01 & LAT–01 THIS SET .

SNWA CONSTRUCTION NOTE
CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS AND CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS, AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY, DEVELOPMENT PLAN REVIEW, AT (702) 862–3444 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITY.

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY DATE:

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CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION
MANAGER, JENNIFER E. DOODY, P.E. DATE:

GRADING PLAN CERTIFICATION
JOHN P. MENG PE #: 17540 DATE:

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY (H# 36235) FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

JACOBS
6655 Bermuda Road
Las Vegas, NEVADA 89119
(702) 938-5400 Fax (702) 938-5454

STORM PLAN/PROFILE
TRAIL 3.7
STA: 22+00 TO STA: 26+96.36
NORTH LAS VEGAS
600 ACRES
AREA 8 AND 9

DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT NO:	SCALE:
MJS	MJS	JPM	21594	1" = 30' 1" = 6'
02-13-08	02-13-08	02-13-08		

PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STATE OF NEVADA JOHN P. MENG CIVIL EXP. 12/31/09 No.17540 8/19/08

SHEET
PP-STM-04
11 OF 51 SHEETS

DRAWING NO.
36397

Drawing Name: L:\21594 NLV SPECDESIGN\WPRVWTS\AREA_08-09\06 1594-08-09-PP-STM-01.dwg User: mmejb Aug 28, 2008 - 12:47pm

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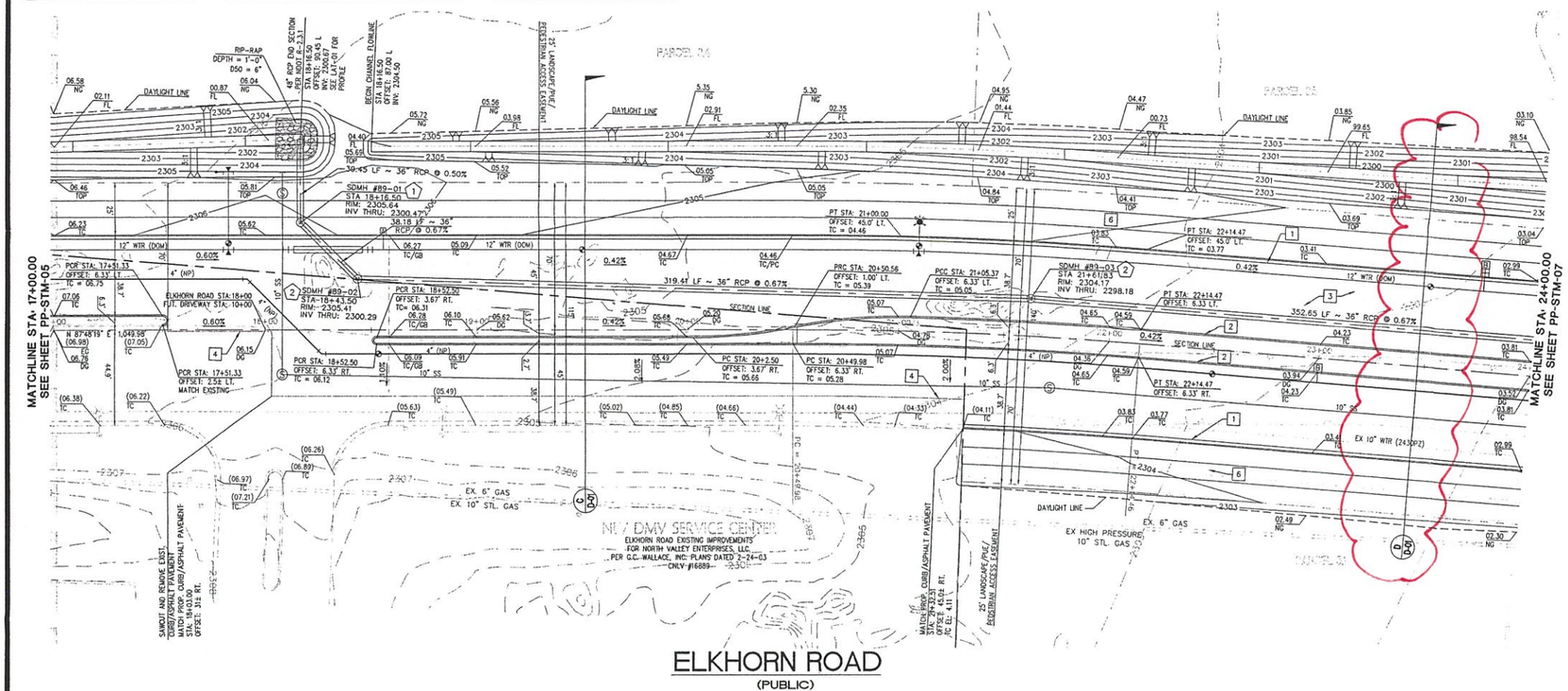

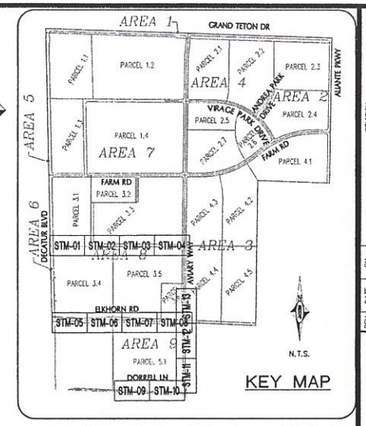

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1. PURSUANT TO CITY OF NORTH LAS VEGAS ORDINANCE NUMBER 1172, THE CONTRACTOR IS REQUIRED TO SECURE A GRADING PERMIT PRIOR TO COMMENCING WORK.
2. THE CONTRACTOR SHALL SECURE A PERMIT FOR ANY OFF-SITE CONSTRUCTION.
3. THE CONTRACTORS OPERATIONS SHALL NOT TRESPASS BEYOND THE PROJECT PROPERTY LINES UNLESS A PERMIT OR WRITTEN AUTHORIZATION HAS BEEN OBTAINED FROM THE PROPERTY OWNER(S) INVOLVED. COPIES OF SUCH WRITTEN AUTHORIZATION SHALL BE FURNISHED TO THE CITY OF NORTH LAS VEGAS' REPRESENTATIVE PRIOR TO START OF CONSTRUCTION.
4. THE CITY OF NORTH LAS VEGAS CONSTRUCTION SERVICES SHALL BE NOTIFIED ONE (1) WORKING DAY BEFORE ANY ON-SITE CONSTRUCTION WORK BEGINS.
5. AN APPROVED GRADING AND DRAINAGE PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE APPROVED PLAN WILL REQUIRE SUBMITTAL OF A FORMAL REVISED PLAN FOR REVIEW AND APPROVAL.
6. ALL CONSTRUCTION SURVEY CONTROL SHALL BE DONE BY A LICENSED PROFESSIONAL LAND SURVEYOR IN ACCORDANCE WITH APPLICABLE STATUTES AND CODES. THE CONTRACTOR SHALL PROVIDE COMPETENT RESOURCES TO ASSURE BUILDING PAD AND BUILDING FLOOR ELEVATIONS CONFORM TO THOSE SHOWN ON THE CONSTRUCTION DRAWINGS. FURTHERMORE, THE CONTRACTOR SHALL PROVIDE THE CITY OF NORTH LAS VEGAS BUILDING DEPARTMENT WITH:
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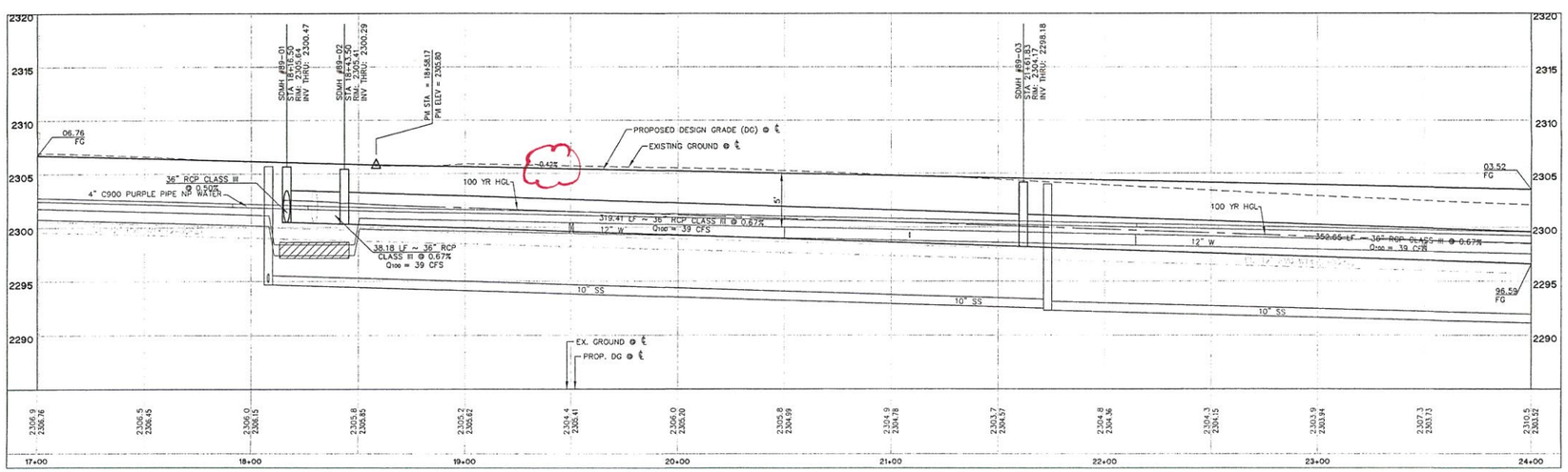

CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION

MANAGER, JENNIFER E. DOODY, P.E. DATE:

GRADING PLAN CERTIFICATION

JOHN P. MENG PE #: 17540 DATE:

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY (H# 36235) FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

JACOBS
6655 Bermuda Road
Las Vegas NEVADA 89119
(702) 938-5400 Fax (702) 938-5454

ROADWAY AND STORM PLAN/PROFILE
ELKHORN ROAD
STA: 17+00 TO STA: 24+00
NORTH LAS VEGAS
600 ACRES
AREA 8 AND 9

DRAWN BY:	DESIGNED BY:	CHECKED BY:	SCALE:
MJS 02-14-08	MJS 02-14-08	JPM 02-14-08	1" = 30' 1" = 6'

PROJECT NO. 21594

PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER — JOHN P. MENG CIVIL EXP. 12/31/09 No. 17540 — STATE OF NEVADA — 9/26/08

SHEET
PP-STM-06
13 OF 51 SHEETS

DRAWING NO.
36397

Drawing Name: L\21594 NLV SITE\DESIGN\MRKMTS\AREA_08-09\06_1594-08-09-PP-STM-05_08.dwg User: mengjp Aug 28, 2008 - 12:45pm

* Previously proposed storm drain location, size & slope

Avoid overhead power line contact, it's costly.
Call before you Overhead
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NEVADA POWER OVERHEAD/U AND SAFETY SERVICES DEPARTMENT

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811 Know what's below. Call before you dig.
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BENCHMARK:
NLV9117NWS, BEING A RIVET & 2" ROUND ALUM. DISK, STAMPED NORTH LAS VEGAS BM NO. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH BCR AT THE INTERSECTION OF GRAND TETON DR. & ALIANTE PKWY. 2294.88 FT, 699.482 M (NAVD 88, PUBLISHED 11/01/06) 2294.98 FT, 699.511 M (ELEVATION USED FOR THESE PLANS, PRE-REVISION)

LEGAL DESCRIPTION:
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, & 28 THROUGH 32, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

BASIS OF BEARINGS:
SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

30 0 15 30 60
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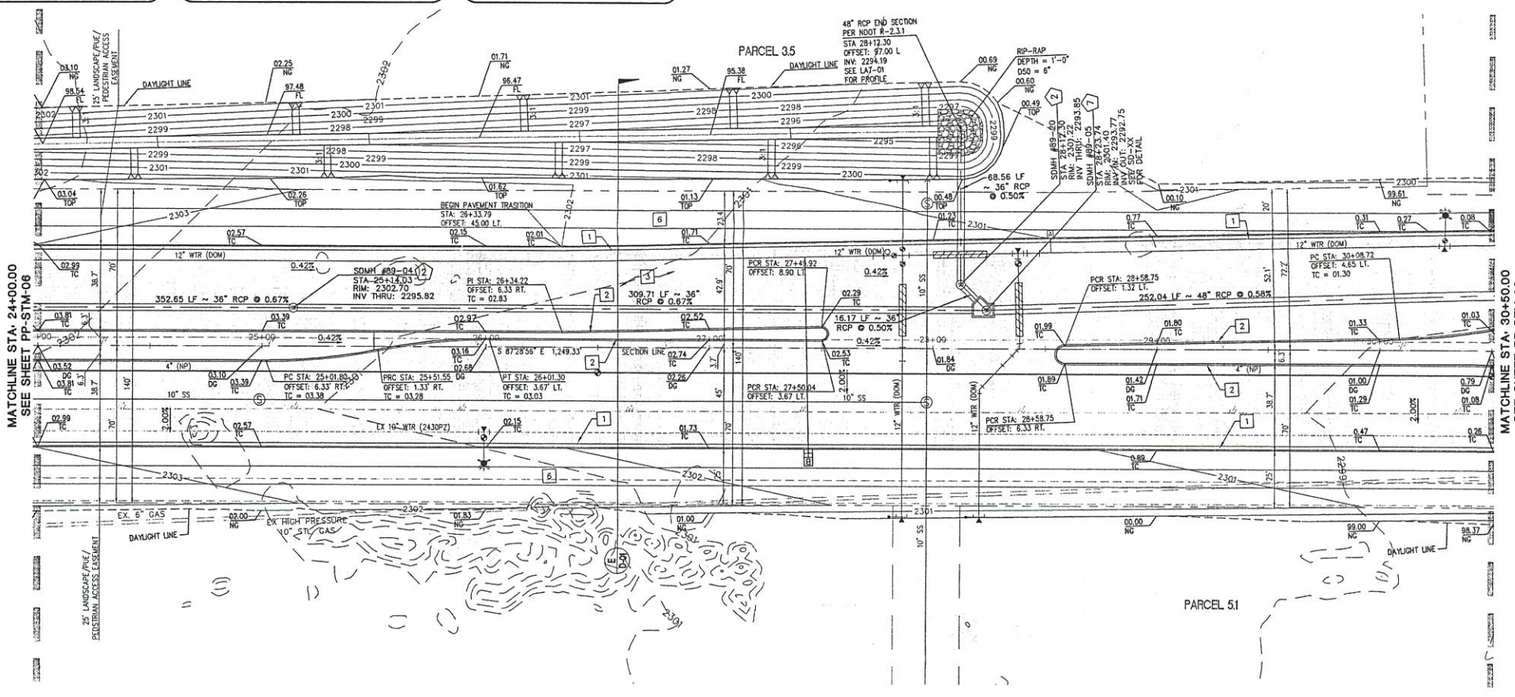

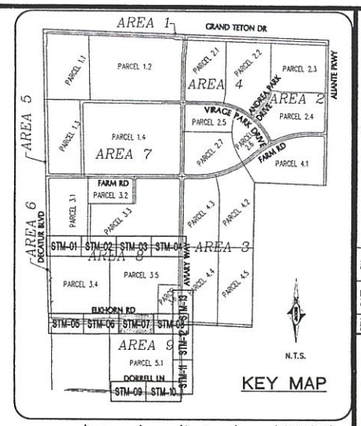

PROP. ASPHALT PROP. SIDEWALK PROP. RIP-RAP

GEOTECHNICAL NOTE:

PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC., DATED: APRIL 26, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 26, 2007.
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8. CONNECT TO EX. RCP PIPE. MATCH EX. SLOPE.
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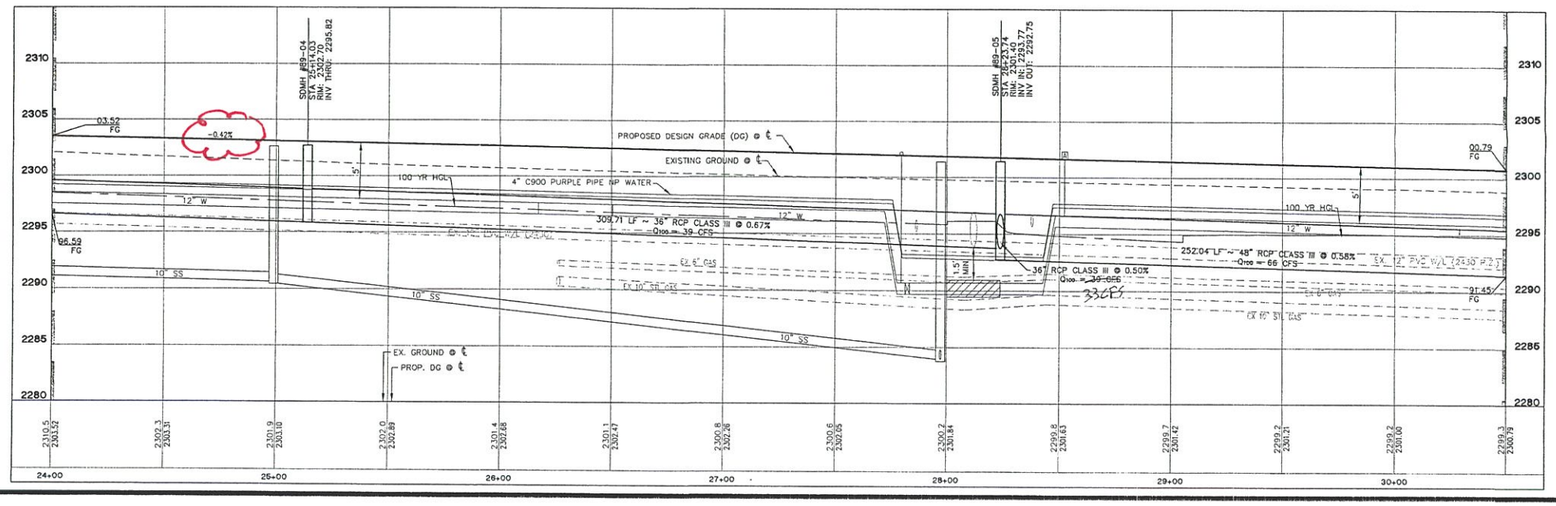
ELKHORN ROAD
(PUBLIC)

*Previously proposed storm drain location, size & slope



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ROADWAY AND STORM PLAN/PROFILE
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DRAWN BY: MJS 02-14-08
DESIGNED BY: MJS 02-14-08
CHECKED BY: JPM 02-14-08
PROJECT NO: 241594
SCALE: 1" = 30' 1" = 6'

PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STATE OF NEVADA JOHN P. MENG CIVIL EXP. 12/31/09 No.17540 8/19/09

SHEET
PP-STM-07
14 OF 51 SHEETS
DRAWING NO.
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Drawing Name: L:\241594 - NLV SITE\DESIGN\MAPPING\MTS\AREA_08-09\08 1594-08-09-PP-STM-05_08.dwg User: mengjp Aug 28, 2008 - 12:49pm

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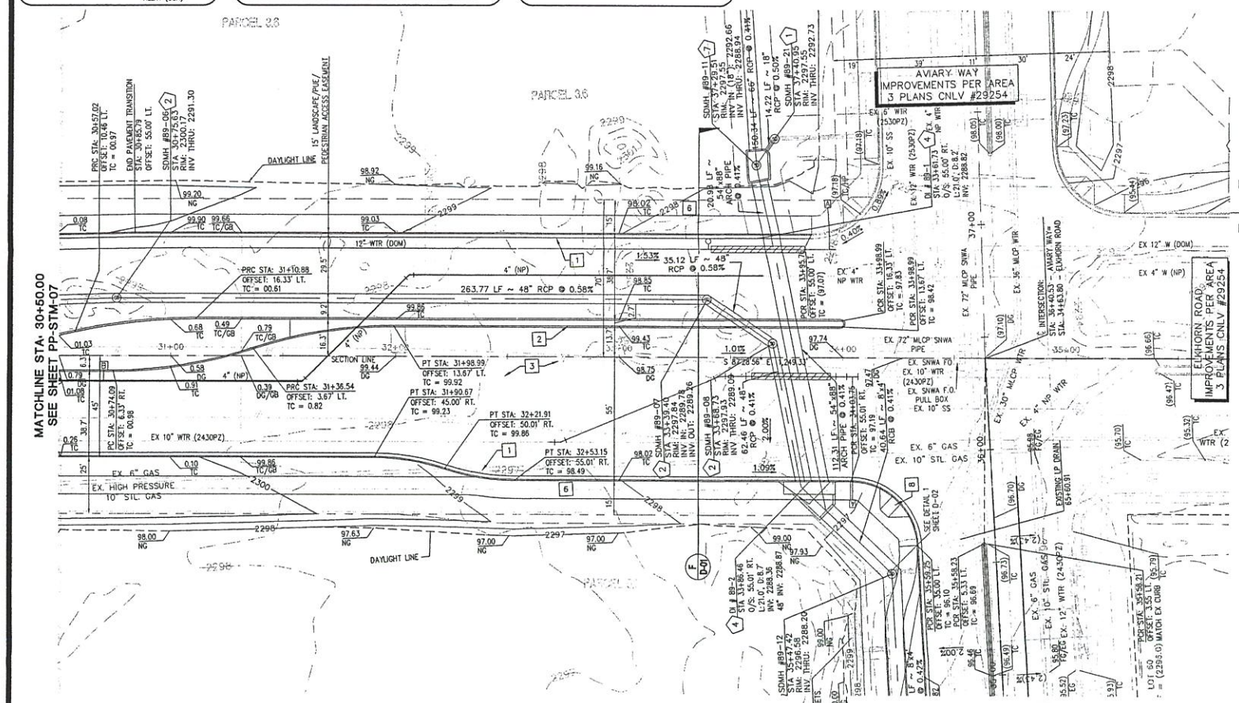

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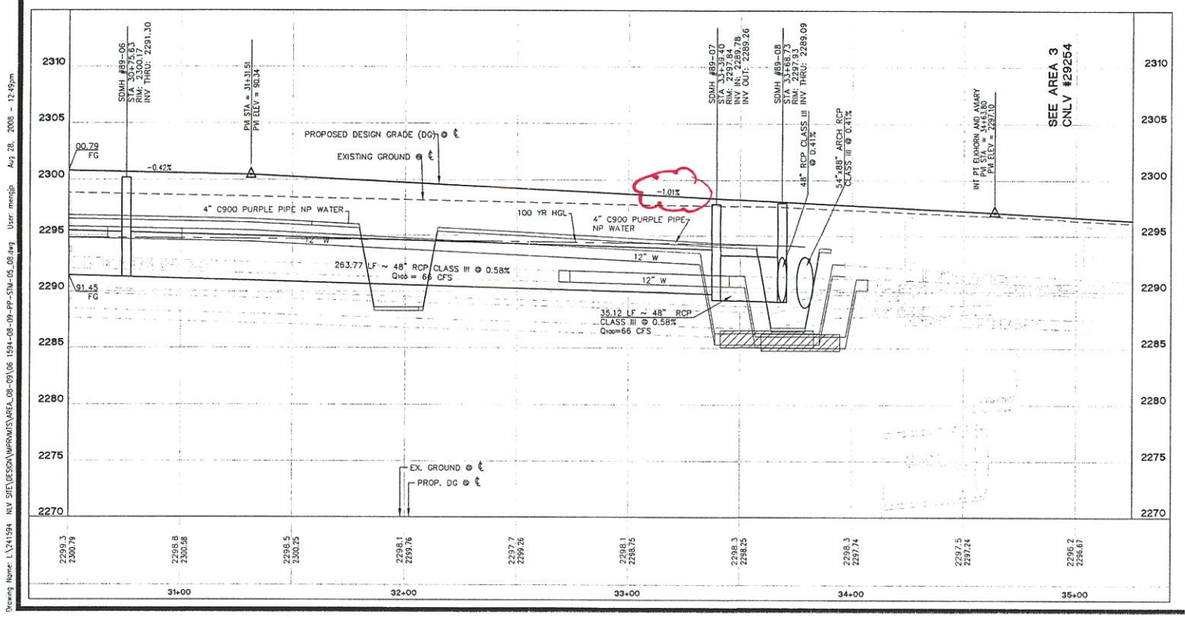

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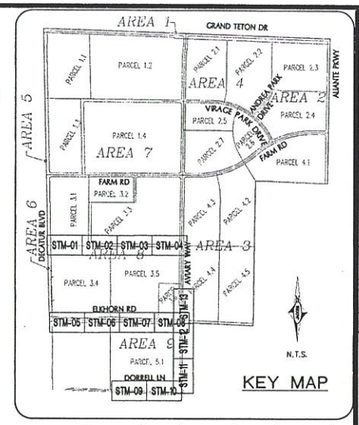

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GAS NOTE:
CALL SOUTHWEST GAS AT 365-2296 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SNWA NOTE:
LANDSCAPE AND IRRIGATION PLANS (BY OTHERS) SHALL BE SUBMITTED AND APPROVED BY SNWA.

SNWA CONSTRUCTION NOTES:
(15) ADJUST EX. FACILITY TO GRADE AND/OR EXTEND TO LOCATION SHOWN.
(16) EXTEND/RELO. EX. SNWA/CNLV HARDWARE (IN CONFORMANCE W/ SNWA/LDACS CONSTRUCTION STANDARDS, RESPECTIVELY). EXTEND/RELO EX. TEST STATIONS PER SHEET CP-01 & CP-02.

SNWA NOTES:
1. SNWA FIBER OPTIC CONDUIT FOLLOWS ALONG THE WEST SIDE OF THE SNWA PIPELINE.
2. CAUTION: SNWA TEST LEADS ARE SHALLOW.
3. ALL REPAIRS, REPLACEMENTS, RELOCATIONS AND/OR EXTENSIONS MUST BE DESIGNED AND MONITORED BY A NACE INTERNATIONAL-CERTIFIED CATHODIC PROTECTION SPECIALIST AND WITNESSED AND APPROVED BY SNWA CATHODIC PROTECTION TECHNICIAN PRIOR TO ACCEPTING THE INSTALLATION. CONTRACTOR SHALL PROVIDE ALL MATERIALS FOR ALL REPAIRS, REPLACEMENTS, RELOCATIONS, AND/OR EXTENSIONS. MATERIALS PROVIDED BY CONTRACTOR SHALL BE APPROVED BY SNWA PRIOR TO ACCEPTING THE INSTALLATION.

SNWA SHEET REFERENCE NOTE:
FOR 72" SNWA TRANSMISSION MAIN (CONTRACT NO 140-A AND 170-B), FIBER OPTIC CONDUIT AND ALL OTHER SNWA APPURTENANCES SEE SHEETS PP-UTL-04, PP-UTL-09, PP-UTL-10, PP-UTL-11, PP-UTL-12, WAT-DET-01 & LAT-01 THIS SET.

SNWA CONSTRUCTION NOTE
CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS AND CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS, AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY, DEVELOPMENT PLAN REVIEW, AT (702) 862-3444 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITY.

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY DATE:

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CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION
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NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

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ROADWAY AND STORM PLAN/PROFILE
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STA: 30+50 TO STA: 34+63.80
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DRAWN BY:	DESIGNED BY:	CHECKED BY:	PROJECT NO:	SCALE:
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	02-14-08	02-14-08		

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PROFESSIONAL ENGINEER STATE OF NEVADA JOHN P. MENG CIVIL EXP. 12/31/09 No.17540 9/30/08

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GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, & 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

BASIS OF BEARINGS:
SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
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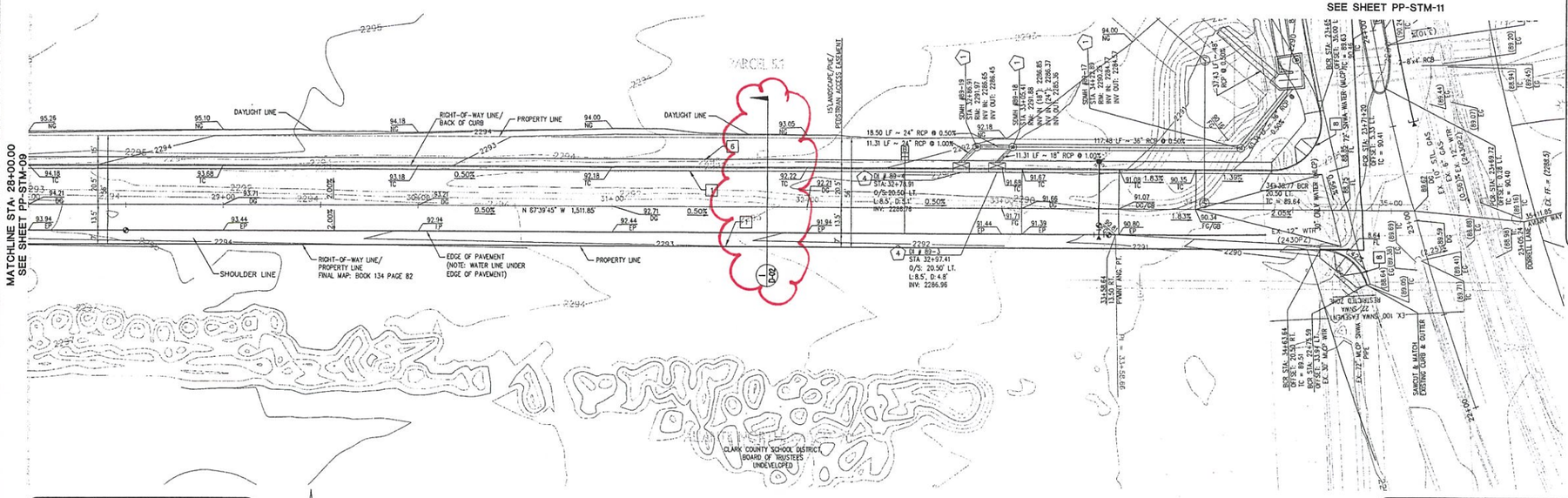

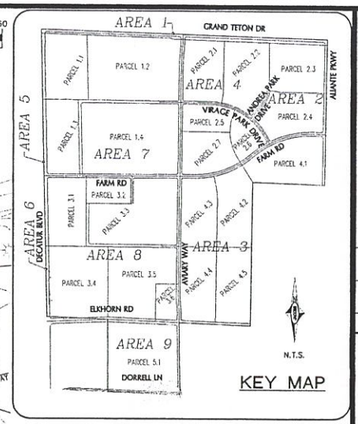

PROP. ASPHALT PROP. SIDEWALK PROP. RIP-RAP

GAS NOTE:
CALL SOUTHWEST GAS AT 365-2296 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

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LANDSCAPE AND IRRIGATION PLANS (BY OTHERS) SHALL BE SUBMITTED AND APPROVED BY SNWA.

SNWA CONSTRUCTION NOTES:
(15) ADJUST EX. FACILITY TO GRADE AND/OR EXTEND TO LOCATION SHOWN.
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* Previously proposed storm drain location, size & slope

SNWA NOTES:
1. SNWA FIBER OPTIC CONDUIT FOLLOWS ALONG THE WEST SIDE OF THE SNWA PIPELINE.
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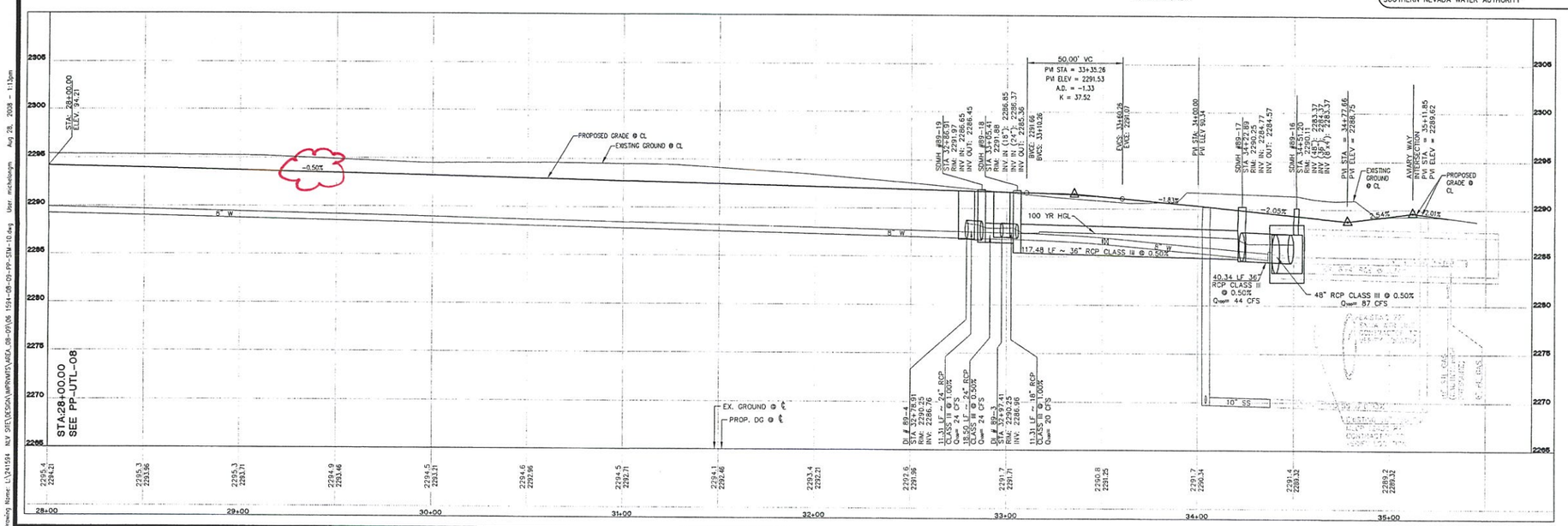

GEOTECHNICAL NOTE:
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2. CONSTRUCT "A" TYPE CURB PER CCAUSD No. 219.
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4. SAWCUT & MATCH EX. ASPHALT PAVING, CURB & GUTTER.
5. CONSTRUCT BUS TURN-OUT PER CCAUSD No. 234.1.
6. CONSTRUCT MEANDERING SIDEWALK PER CCAUSD No. 234.
7. NOT USED
8. CONSTRUCT CASE II SIDEWALK RAMP W/ TRUNCATED DOMES PER CCAUSD No. 235, CASE II A & B=8.0' UNLESS NOTED OTHERWISE.

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2. THE CONTRACTOR SHALL SECURE A PERMIT FOR ANY OFF-SITE CONSTRUCTION.
3. THE CONTRACTORS OPERATIONS SHALL NOT TRESPASS BEYOND THE PROJECT PROPERTY LINES UNLESS A PERMIT OR WRITTEN AUTHORIZATION HAS BEEN OBTAINED FROM THE PROPERTY OWNER(S) INVOLVED. COPIES OF SUCH WRITTEN AUTHORIZATION SHALL BE FURNISHED TO THE CITY OF NORTH LAS VEGAS' REPRESENTATIVE PRIOR TO START OF CONSTRUCTION.
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CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION
MANAGER, JENNIFER E. DOODY, P.E. DATE:

GRADING PLAN CERTIFICATION
JOHN P. MENG PE #: 17540 DATE:
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY (M# 36235) FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

JACOBS
6655 Bermuda Road
Las Vegas, NEVADA 89119
(702) 938-5400 Fax (702) 938-5454

REV	DATE	BY	REVISION

ROADWAY AND STORM PLAN/PROFILE
DORELL LANE
STA: 28+00 TO STA: 35+00
NORTH LAS VEGAS
600 ACRES
AREA 8 AND 9

DRAWN BY: MJS	02-14-08	
DESIGNED BY: MJS	02-14-08	
CHECKED BY: JPM	02-14-08	
PROJECT NO: 241594	SCALE:	1" = 30' 1" = 6'

PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER-STATE OF NEVADA JOHN P. MENG CIVIL No.17540 EXP. 12/31/09 9/30/09

SHEET
PP-STM-10
17 OF 51 SHEETS

DRAWING NO.
36397

Drawing Name: L:\241594 NLV SITE\DESIGN\MPR\MTR\AREA_08-09\08 1594-08-09-PP-STM-10.dwg User: michelsgm Aug 28, 2009 - 1:13pm

Avoid overhead power line contact, it's costly.
Call before you Overhead
1-702-227-2929
NEVADA POWER EMERGENCY and SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
811 Know what's below. Call before you dig.
811 UNDERGROUND SERVICE ALERT (USA)

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JACOBS

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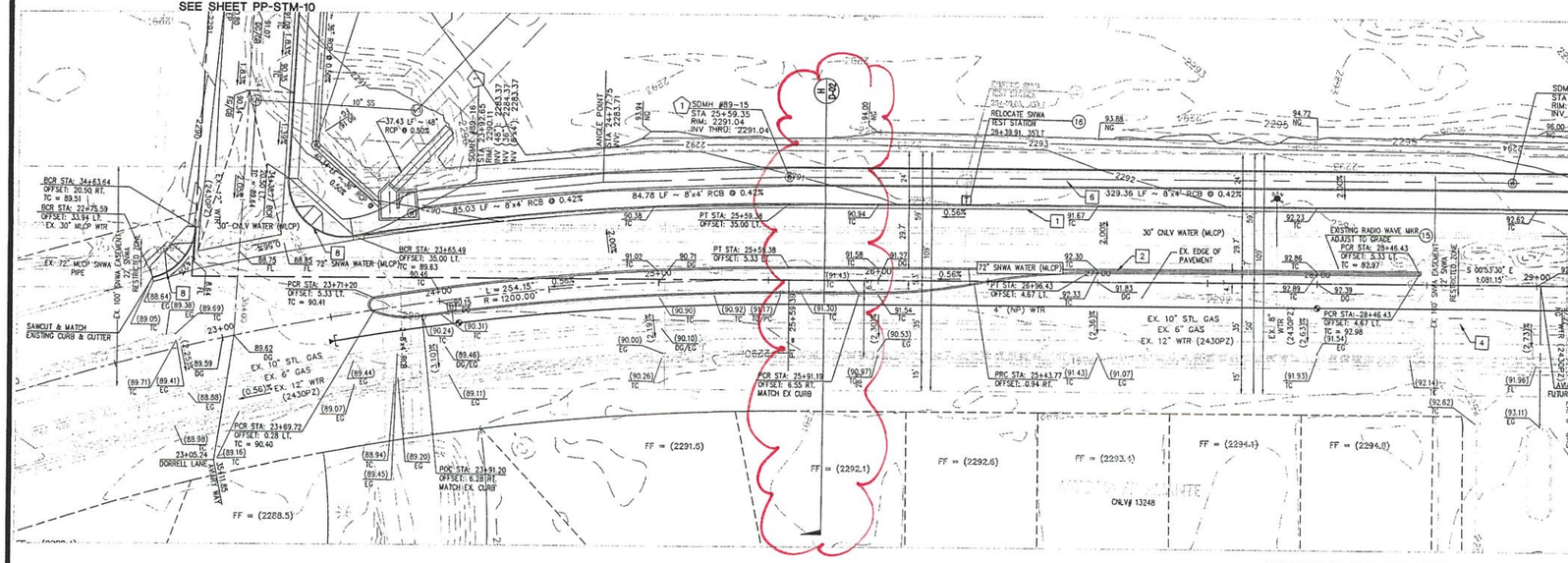

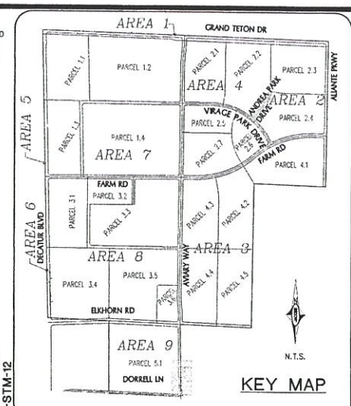

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AVIARY WAY
(PUBLIC)

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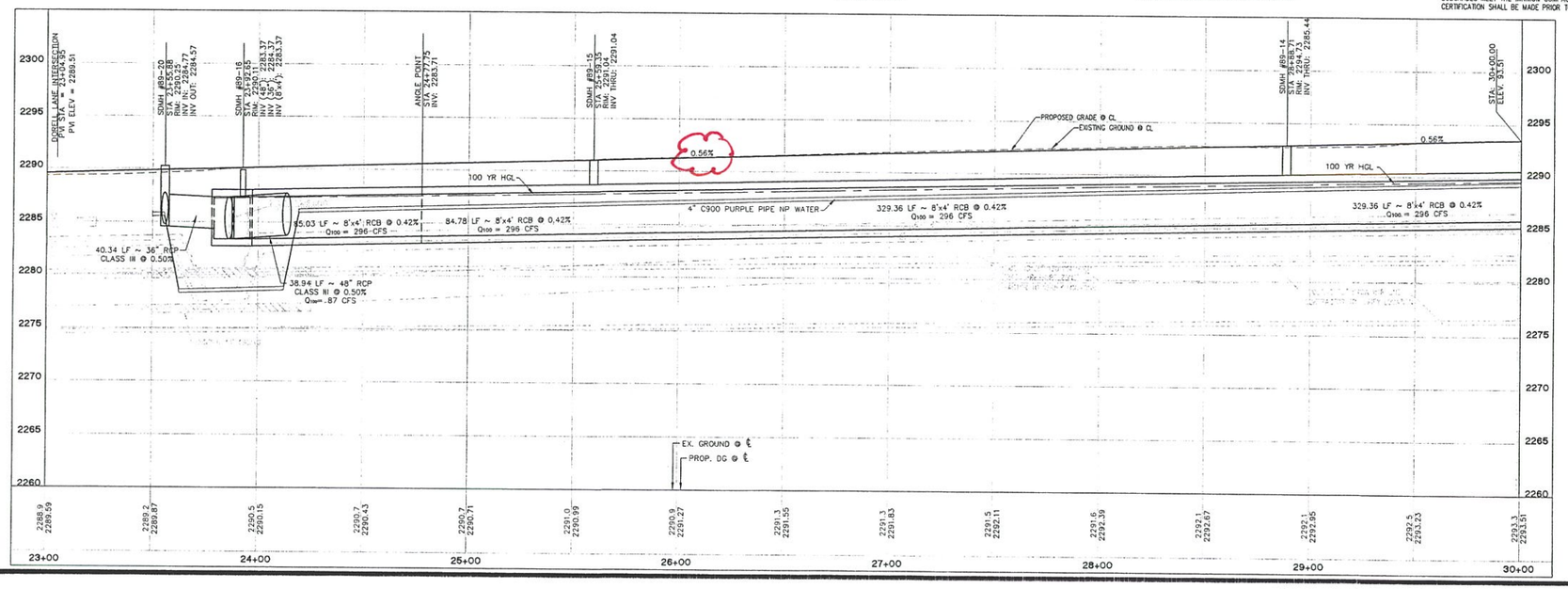

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SOUTHERN NEVADA WATER AUTHORITY DATE:

CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION

MANAGER, JENNIFER E. DOODY, P.E. DATE:

GRADING PLAN CERTIFICATION

JOHN P. MENG PE #: 17540 DATE:

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY (H# 36235) FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REVISION | BY | DATE
NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

JACOBS
6655 Bermuda Road
Las Vegas, NEVADA 89119
(702) 938-5400 Fax (702) 938-5454

ROADWAY AND STORM PLAN/PROFILE
AVIARY WAY
STA: 23+00 TO STA: 30+00
NORTH LAS VEGAS
600 ACRES
AREA 8 AND 9

DRAWN BY: MJS 02-14-08
DESIGNED BY: MJS 02-14-08
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PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STATE OF NEVADA JOHN P. MENG CIVIL EXP. 12/31/09 No. 17540 07/08

SHEET
PP-STM-11
18 OF 51 SHEETS

DRAWING NO.
36397

Drawing Name: L:\241594 - NLV SITE\DESIGN\MAPPING\AREA_08-09\06 1594-08-09-PP-STM-11.dwg User: michelogm Aug 28, 2008 - 1:15pm

Avoid overhead power line contact. It's costly.

Call before you Overhead

1-702-227-2929

NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.

811

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30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.

MATCHLINE STA. 30+00.00
SEE SHEET PP-STM-11

MATCHLINE STA. 34+03.75
SEE SHEET PP-STM-08

MATCHLINE STA. 37+00.00
SEE SHEET PP-STM-13

SDMH #89-13
STA 32+18.06
RIM: 2294.73
INV THRU: 2288.20

SDMH #89-12
STA 35+47.42
RIM: 2296.58
INV THRU: 2288.20

SDMH #89-08
STA 33+68.73
RIM: 2297.93
INV THRU: 2289.06

329.36 LF ~ 8'x4' RCB @ 0.42%

112.31 LF ~ 54"x88" ARCH PIPE @ 0.41%

40.64 LF ~ 8'x4' RCB @ 0.41%

62.46 LF ~ 48" RCP CLASS III @ 0.41%

EX. 10" STL. GAS
EX. 6" GAS
EX. 12" WTR (2430PZ)
4" (NP) WTR
30" CNLV WATER (MLCP)
72" SNWA WATER (MLCP)
EX. 36" MLCP WTR
EX. 72" MLCP SNWA PIPE
EX. 30" MLCP WTR
EX. 12" WTR
EXISTING LP DRAIN
EX. 6" STL. GAS
EX. 8" STL. GAS
EX. 12" STL. GAS

EX. EDGE OF PAVEMENT
RELOCATE AV/AR 34+82.84, 35LT
EXISTING MANHOLE ADJUST TO GRADE
S 00°51'30" E 1,081.15'
SEE DETAIL 1 SHEET D-02

PRC STA: 31+57.31 OFFSET: 0.33 LT. TC = 94.81
PT STA: 31+07.06 OFFSET: 5.33 LT.
PT STA: 31+07.56 OFFSET: 4.67 RT. TC = 94.44
PCR STA: 35+59.25 OFFSET: 35.00 LT. TC = 98.10
PCR STA: 35+58.23 OFFSET: 5.33 LT. TC = 98.69
PCR STA: 35+58.21 OFFSET: 3.55 LT.
PCR STA: 33+95.30 OFFSET: 55.00 LT. TC = (97.07)
PCR STA: 33+01.25 OFFSET: 55.01 RT. TC = 97.19
PCR STA: 33+98.99 OFFSET: 16.33 LT. TC = 97.83
PCR STA: 33+98.99 OFFSET: 13.67 LT. TC = 98.42

FF = (2296.1)
FF = (2296.4)
FF = (2296.7)
FF = (2297.0)
FF = (2297.0)
FF = (2296.9)
FF = (2296.4)

ASTORIA AT ALIANTE
CNLV# 13248

LOT NO FF = (2296.0) MATCH EX CURB

ELKHORN ROAD IMPROVEMENTS PER AREA 3 PLANS CNLV #29254

INTERSECTION: STA: 36+40.53 - AVIARY WAY - STA: 34+63.80 - ELKHORN ROAD

* Previously proposed storm drain location size & slope

AVIARY WAY
(PUBLIC)

SNWA NOTES:
1. SNWA FIBER OPTIC CONDUIT FOLLOWS ALONG THE WEST SIDE OF THE SNWA PIPELINE.
2. CAUTION: SNWA TEST LEADS ARE SHALLOW.
3. ALL REPAIRS, REPLACEMENTS, RELOCATIONS AND/OR EXTENSIONS MUST BE DESIGNED AND MONITORED BY A NACE INTERNATIONAL-CERTIFIED CATHODIC PROTECTION SPECIALIST AND WITNESSED AND APPROVED BY SNWA CATHODIC PROTECTION TECHNICIAN PRIOR TO ACCEPTING THE INSTALLATION. CONTRACTOR SHALL PROVIDE ALL MATERIALS FOR ALL REPAIRS, REPLACEMENTS, RELOCATIONS, AND/OR EXTENSIONS. MATERIALS PROVIDED BY CONTRACTOR SHALL BE APPROVED BY SNWA PRIOR TO ACCEPTING THE INSTALLATION.

SNWA SHEET REFERENCE NOTE:
FOR 72" SNWA TRANSMISSION MAIN (CONTRACT NO 140-A AND 170-B), FIBER OPTIC CONDUIT AND ALL OTHER SNWA APPURTENANCES SEE SHEETS PP-UTL-04, PP-UTL-09, PP-UTL-10, PP-UTL-11, PP-UTL-12, WAT-DET-01 & LAT-01 THIS SET .

GAS NOTE:
CALL SOUTHWEST GAS AT 365-2296 FOR STANDBY WHEN EXCAVATING OVER OR NEAR HIGH PRESSURE GAS LINES

SNWA NOTE:
LANDSCAPE AND IRRIGATION PLANS (BY OTHERS) SHALL BE SUBMITTED AND APPROVED BY SNWA.

SNWA CONSTRUCTION NOTES:
(15) ADJUST EX. FACILITY TO GRADE AND/OR EXTEND TO LOCATION SHOWN.
(16) EXTEND/RELO. EX. SNWA/CNLV HARDWARE (IN CONFORMANCE W/ SNWA/UDACS CONSTRUCTION STANDARDS, RESPECTIVELY). EXTEND/RELO EX. TEST STATIONS PER SHEET CP-01 & CP-02.

SNWA CONSTRUCTION NOTE
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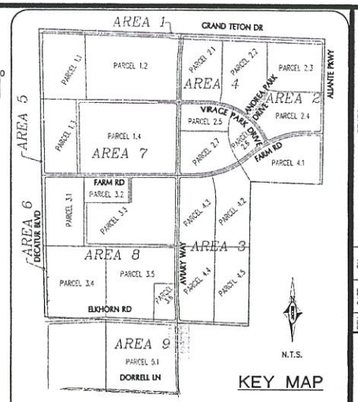
SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY DATE:



KEY MAP

PROP. ASPHALT PROP. SIDEWALK PROP. RIP-RAP

GEOTECHNICAL NOTE:
PROJECT COMPLIES WITH SOILS REPORT PREPARED BY: OWENS GEOTECHNICAL, INC., DATED: APRIL 26, 2006, REVISED: JULY 14, 2006, UPDATE LETTER DATED: JULY 25, 2007.
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FILL TOTAL: 12,952 CY
NET IMPORT: 8,726 CY

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1. INSTALL 48" TYPE I MANHOLE CCAUSD No. 403. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
2. INSTALL TYPE II MANHOLE PER CCAUSD No. 405. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
3. INSTALL TYPE III MANHOLE PER CCAUSD No. 406. MANHOLES TO CONFORM TO CCAUSD No. 401 & 402.
4. INSTALL MODIFIED TYPE "C" DROP INLET, DROP INLET TO CONFORM TO CCAUSD No. 412A
5. INSTALL TEMPORARY PLUG & CAP FOR FUTURE PHASE.
6. REMOVE EX. CAP & CONNECT TO EX. RCP PIPE. CONTRACTOR TO VERIFY SIZE, INVERT & LOCATION PRIOR TO CONSTRUCTION.
7. INSTALL NDOT TYPE IV MANHOLE PER R-4.3.2 OF NDOT STANDARDS
8. CONNECT TO EX. RCP PIPE. MATCH EX. SLOPE.
9. INSTALL 48" TYPE I MANHOLE PER CCAUSD No. 403 W/ BEEHIVE BUBBLER FRAME & GRATE PER CCAUSD No. 416.

CONSTRUCTION NOTES:
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2. CONSTRUCT "A" TYPE CURB PER CCAUSD No. 219.
3. INSTALL A.C. PAVEMENT PER STREET SECTIONS.
4. SAWCUT & MATCH EX. ASPHALT PAVING, CURB & GUTTER.
5. CONSTRUCT BUS TURN-OUT PER CCAUSD No. 234.1.
6. CONSTRUCT MEANDERING SIDEWALK PER CCAUSD No. 234.
7. NOT USED
8. CONSTRUCT CASE II SIDEWALK RAMP W/ TRUNCATED DOMES PER CCAUSD No. 235, CASE II. A & B=8.0' UNLESS NOTED OTHERWISE.

GENERAL GRADING AND DRAINAGE NOTES:
1. PURSUANT TO CITY OF NORTH LAS VEGAS ORDINANCE NUMBER 1172, THE CONTRACTOR IS REQUIRED TO SECURE A GRADING PERMIT PRIOR TO COMMENCING WORK.
2. THE CONTRACTOR SHALL SECURE A PERMIT FOR ANY OFF-SITE CONSTRUCTION.
3. THE CONTRACTORS OPERATIONS SHALL NOT TRESPASS BEYOND THE PROJECT PROPERTY LINES UNLESS A PERMIT OR WRITTEN AUTHORIZATION HAS BEEN OBTAINED FROM THE PROPERTY OWNER(S) INVOLVED. COPIES OF SUCH WRITTEN AUTHORIZATION SHALL BE FURNISHED TO THE CITY OF NORTH LAS VEGAS' REPRESENTATIVE PRIOR TO START OF CONSTRUCTION.
4. THE CITY OF NORTH LAS VEGAS CONSTRUCTION SERVICES SHALL BE NOTIFIED ONE (1) WORKING DAY BEFORE ANY ON-SITE CONSTRUCTION WORK BEGINS.
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   A. CERTIFICATION OF "BUILDING FLOOR ELEVATIONS" IN CRITICAL DRAINAGE AREAS.
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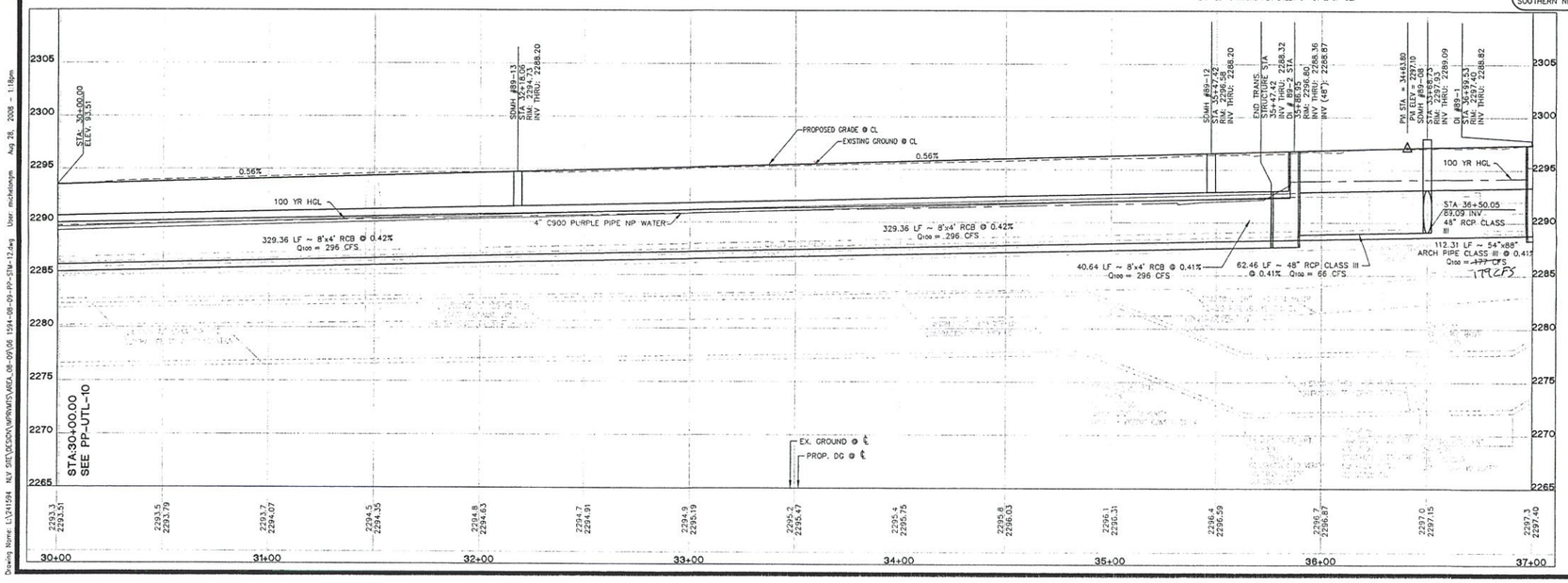
CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION

MANAGER, JENNIFER E. DOODY, P.E. DATE:

GRADING PLAN CERTIFICATION

JOHN P. MENG PE #: 17540 DATE:

I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY (#: 36235) FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.



REVISION | BY | DATE | REV

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

JACOBS
6655 Bermuda Road
Las Vegas, NEVADA 89119
(702) 938-5400 Fax (702) 938-5454

ROADWAY AND STORM PLAN/PROFILE
AVIARY WAY
STA: 30+00 TO STA: 37+00
NORTH LAS VEGAS
600 ACRES
AREA 8 AND 9

DRAWN BY: MJS 02-14-08
DESIGNED BY: MJS 02-14-08
CHECKED BY: JPM 02-14-08
PROJECT NO: 241591
SCALE: 1" = 30' 1" = 6'

PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STATE OF NEVADA JOHN P. MENG CIVIL EXP. 12/31/09 No.17540 8/30/08

SHEET
PP-STM-12
19 OF 51 SHEETS

DRAWING NO.
36397

Drawing Name: LLV241584 NLV SHT:\DESIGN\WORKWAYS\AREA_08-09\08 1514-08-09-PP-STM-12.dwg User: michelsmgm Aug 28, 2008 - 1:18pm

avoid overhead power line contact. It's costly.

Call before you Overhead
1-702-227-2929
NEVADA POWER CONTRACTORS AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.

811 Know what's below. Call before you dig
811 UNDERGROUND SERVICE ALERT (USA)

DISCLAIMER:
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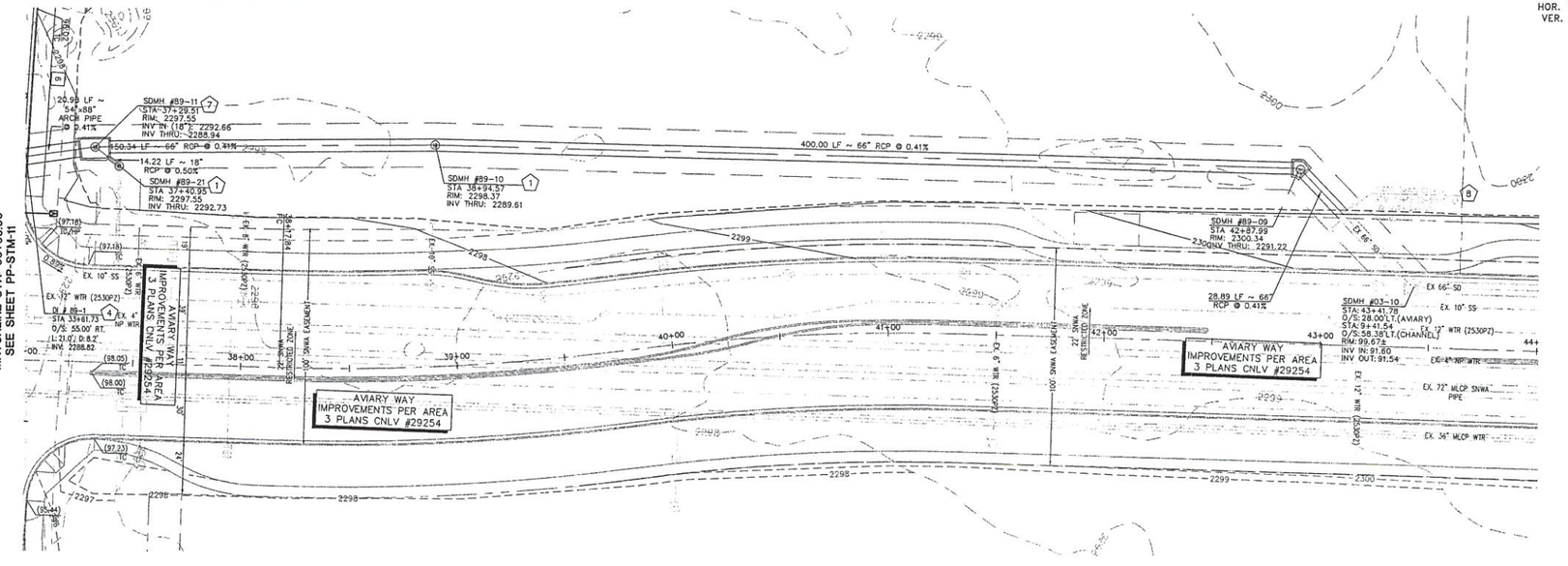
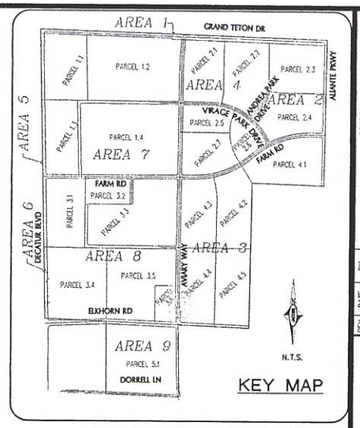
BENCHMARK:
NLV9117NWS, BEING A RIVET & 2" ROUND ALUM. DISK, STAMPED NORTH LAS VEGAS BM NO. NLV9117NWS, SET IN THE TOP OF CURB, LOCATED APPROX. 29 FEET SOUTH OF THE SOUTHEAST SOUTH SCR AT THE INTERSECTION OF GRAND TETON DR. & ALIANTE PKWY. 2294.88 FT, 699.482 M (NAVD 88, PUBLISHED 11/01/06) 2294.98 FT, 699.511 M (ELEVATION USED FOR THESE PLANS, PRE-REVISION)

LEGAL DESCRIPTION:
GOVERNMENT LOTS 5, 7, 10, 12, 14, 18, 19, 21, 24, 25, & 28 THROUGH 37, INCLUSIVE, OF SECTION 18, TOGETHER WITH GOVERNMENT LOT 7 OF SECTION 19, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA.

BASIS OF BEARINGS:
SOUTH 87°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

JACOBS
30 0 15 30 60
(IN FEET)
HOR. 1 INCH = 30 FT.
VER. 1 INCH = 6 FT.





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CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION

MANAGER, JENNIFER E. DOODY, P.E. DATE:

GRADING PLAN CERTIFICATION

JOHN P. MENG PE #: 17540 DATE:

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*Existing storm drain location, size & slope

AVIARY WAY
(PUBLIC)

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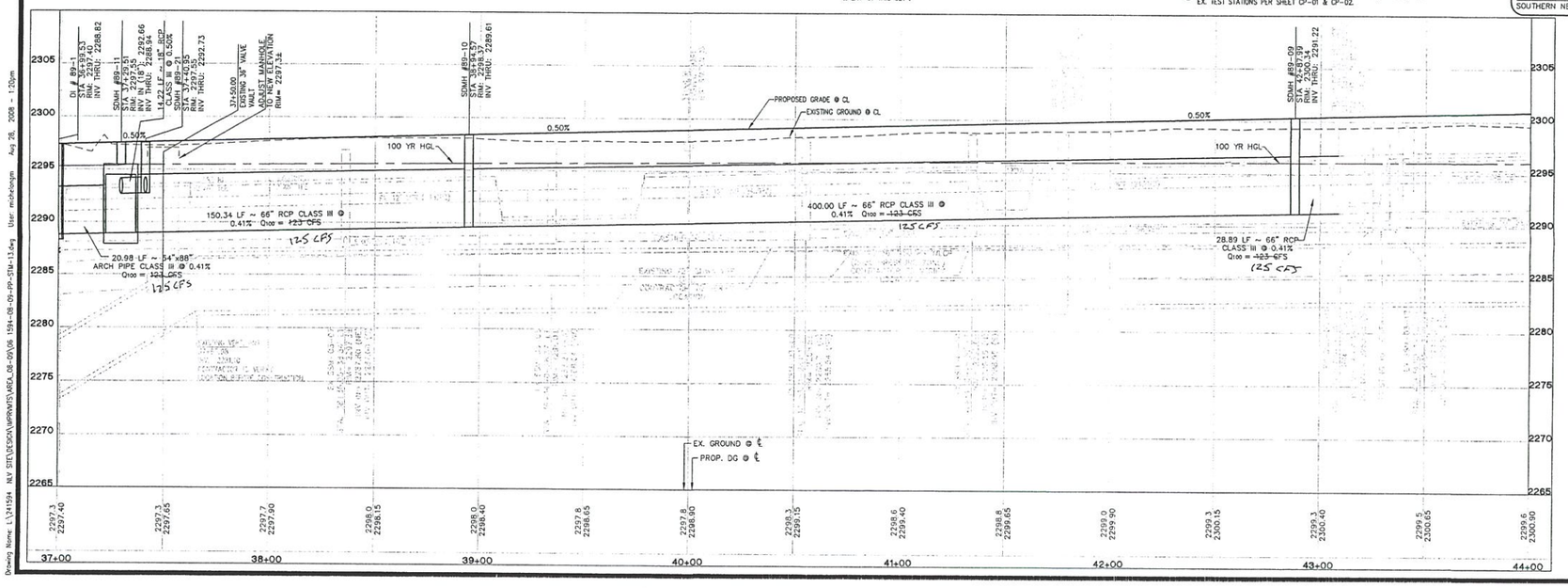

REVISION | DATE | BY

NOVEMBER 2005 LAND INVESTORS, LLC/DRH, INC.

JACOBS
6655 Bermuda Road
Las Vegas, NEVADA 89119
(702) 938-5400 Fax (702) 938-5454

ROADWAY AND STORM PLAN/PROFILE
AVIARY WAY
STA: 9+74.64 TO STA: 37+00
NORTH LAS VEGAS
600 ACRES
AREA 8 AND 9

DRAWN BY: MJS | DESIGNED BY: MJS | CHECKED BY: JPM | PROJECT NO: 241594 | SCALE: 1" = 30' 1" = 6'
02-14-08 | 02-14-08 | 02-14-08

PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STATE OF NEVADA JOHN P. MENG CIVIL EXP. 12/31/09 No. 17540

SHEET
PP-STM-13
20 OF 51 SHEETS

DRAWING NO.
36397

Drawing Name: L:\241594 ALV SITE\DESIGN\WRKNTS\ASCL_08-09\05 1594-08-09-PP-STM-13.dwg User: mchristgen Aug 28, 2008 - 1:20pm

Avoid overhead power line contact. It's costly.
Call before you Overhead
1-702-227-2929
NEVADA POWER ENVIRONMENT AND SAFETY SERVICES DEPARTMENT

AVOID CUTTING UNDERGROUND UTILITY LINES. IT'S COSTLY.
811
Know what's below. Call before you dig.
811 UNDERGROUND SERVICE ALERT (USA)

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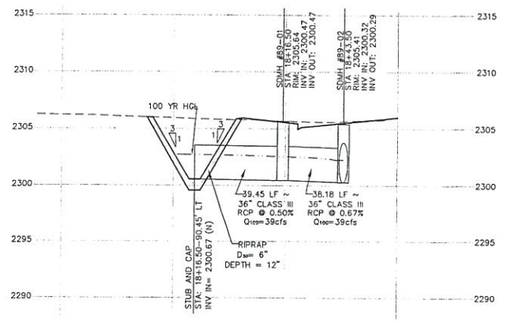
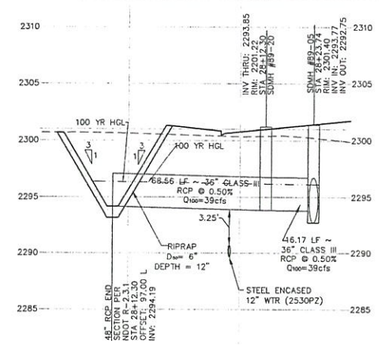
30 0 15 30 60
(IN FEET)
1 INCH = 30 HORZ
1 INCH = 6 VERT

STM



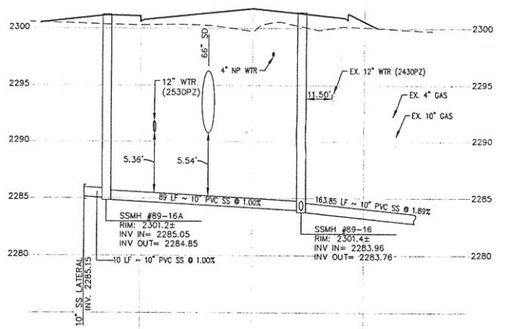
STORM LATERAL #89-01
ELKHORN ROAD
STA: 18+16.50



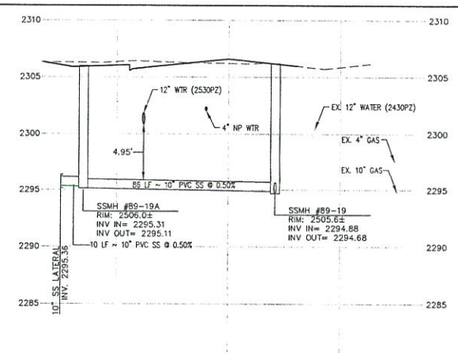
STORM LATERAL #89-02
ELKHORN ROAD
STA: 28+12.30

*Previously proposed storm drain location size & slope

SAN

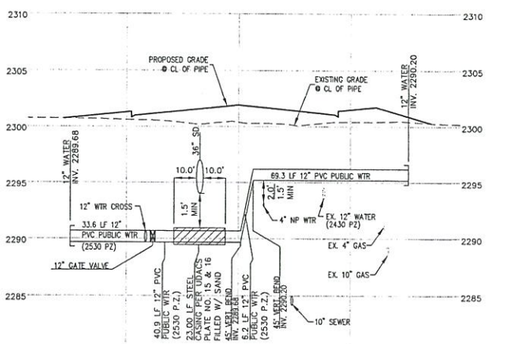


SEWER LATERAL #89-01
ELKHORN ROAD
STA: 27+97.30

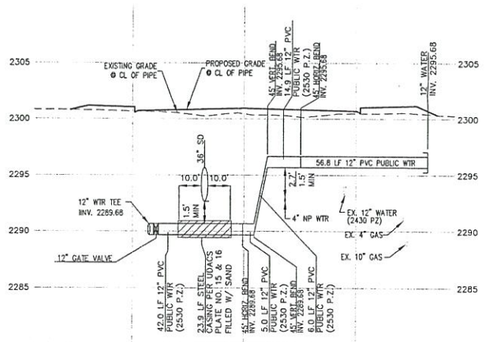


SEWER LATERAL #89-02
ELKHORN ROAD
STA: 18+08.00

WTR



WATER LATERAL #89-01
ELKHORN ROAD
STA: 27+86.30



WATER LATERAL #89-02
ELKHORN ROAD
STA: 28+37.75

STORM DRAIN PIPE NOTES
ALL CONCRETE STORM DRAINAGE PIPE SHALL BE RCP CL. III UNLESS NOTED OTHERWISE

CNLV DEVELOPMENT AND FLOOD CONTROL DIVISION
MANAGER, JENNIFER E. DOODY, P.E. DATE:

GRADING PLAN CERTIFICATION
JOHN P. MENG PE #: 17540 DATE:
I CERTIFY THAT THIS GRADING PLAN IS IN CONFORMANCE WITH APPROVED DRAINAGE STUDY (H# 36235) FOR THIS SITE ON FILE AT CITY OF NORTH LAS VEGAS.

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

JACOBS
6655 Bermuda Road
Las Vegas, NEVADA 89119
(702) 938-5400 Fax (702) 938-5454

WATER, SEWER AND STORM LATERALS

NORTH LAS VEGAS
600 ACRES
AREA 8 AND 9

DRAWN BY: MJS 02-14-08
DESIGNED BY: MJS 02-14-08
CHECKED BY: JPM 02-14-08
PROJECT NO: 21594
SCALE: 1:1"

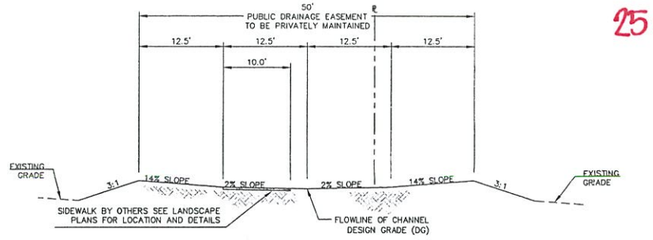
PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER STATE OF NEVADA JOHN P. MENG CIVIL No.17540 EXP. 12/31/09 8/15/08

SHEET
LAT-01
34 OF 51 SHEETS

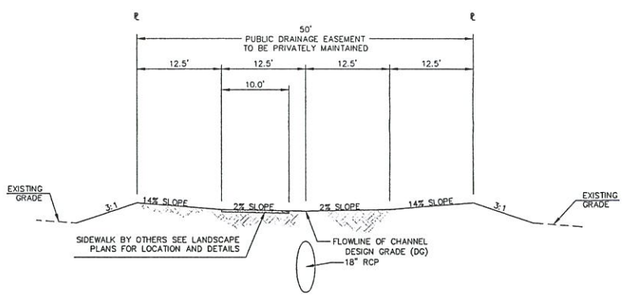
DRAWING NO.
36397

Drawing Name: L\21594 INLV SITE\DESIGN\MPRMTS\LAT\CA_08-05\08 1594-89-STM-LAT-07.dwg User: michelongm Aug 28, 2008 - 1:21pm



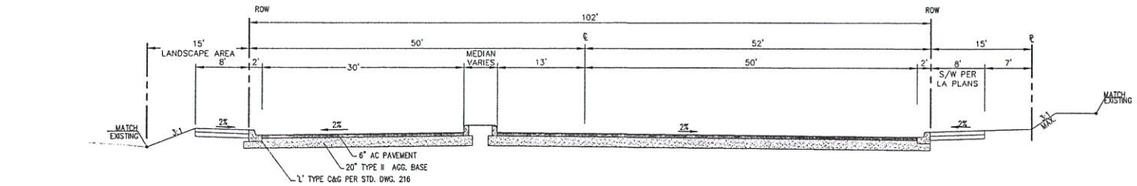
SEVERANCE CHANNEL DETAIL (M) — NTS D-01

CHANNEL COMPACTION - MINIMUM 90% STANDARD PROCTOR

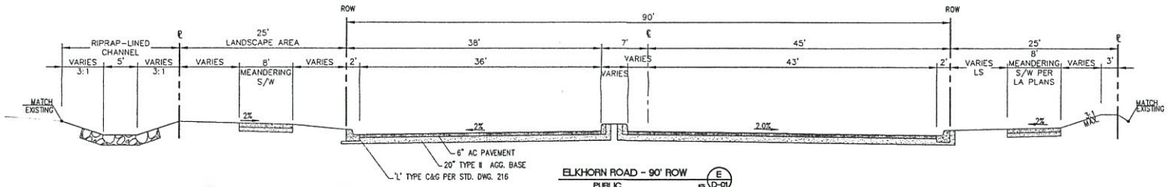


TRAIL 3.7 CHANNEL DETAIL (N) — NTS D-01

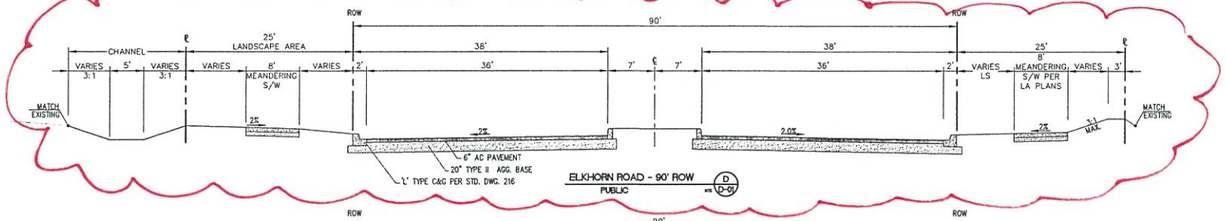
CHANNEL COMPACTION - MINIMUM 90% STANDARD PROCTOR



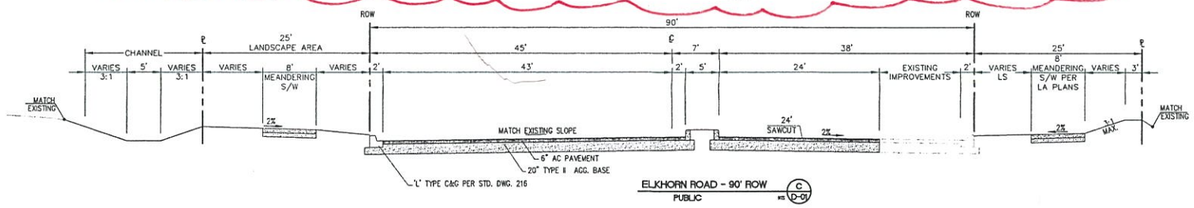
ELKHORN ROAD - 90' ROW (F) — PUBLIC — NTS D-01



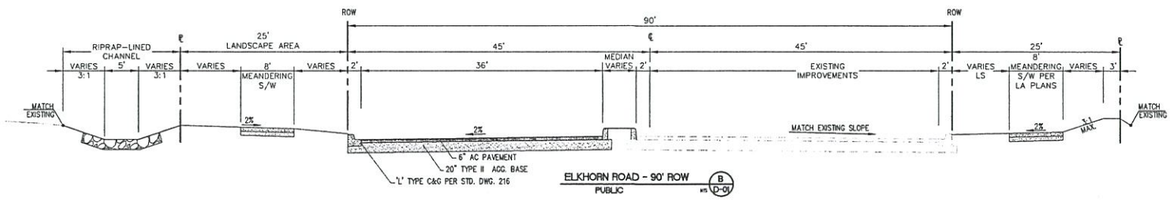
ELKHORN ROAD - 90' ROW (E) — PUBLIC — NTS D-01



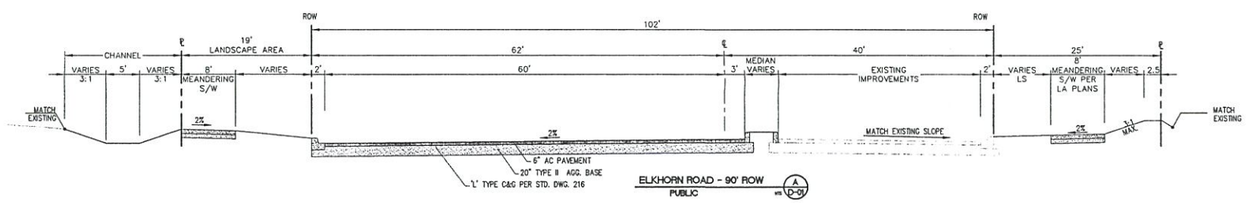
ELKHORN ROAD - 90' ROW (D) — PUBLIC — NTS D-01



ELKHORN ROAD - 90' ROW (C) — PUBLIC — NTS D-01



ELKHORN ROAD - 90' ROW (B) — PUBLIC — NTS D-01



ELKHORN ROAD - 90' ROW (A) — PUBLIC — NTS D-01

Section 25 & 26

NOTE:
THE OFF-SITE PAVEMENT SECTIONS SHOWN ON THE PLANS MUST BE DESIGNED IN ACCORDANCE WITH THE STANDARD SPECIFICATION SECTION 401 USING THE AASHTO MODEL. THE NEW SECTION MUST BE BASED ON THE ACTUAL DAILY TRAFFIC COUNTS PROVIDED BY THE CITY AND R-VALUE TEST RESULTS PERFORMED SUBSEQUENT TO GRADING.

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

JACOBS
6655 Bermuda Road
Las Vegas, NEVADA 89119
(702) 938-5400 FAX (702) 938-5454

CROSS SECTIONS & DETAILS

NORTH LAS VEGAS
600 ACRES
AREA 8 AND 9

DRAWN BY:	DESIGNED BY:	CHECKED BY:	SCALE:
M/S 02-14-08	M/S 02-14-08	JPM 02-14-08	N.T.S.

PROJECT NO: 241594

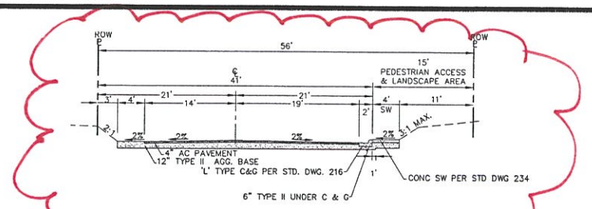
PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER — JOHN P. MENG — CIVIL — EXP. 12/31/09 — No. 17540 — STATE OF NEVADA — 9/26/08

SHEET
D-01
35 OF 51 SHEETS

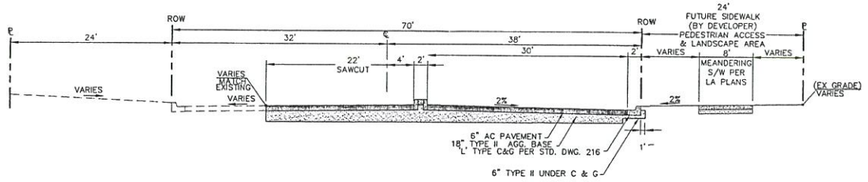
DRAWING NO.
36397

Drawing Name: L:\241594 INV SITE\DESIGN\WORKMS\MISC_08-09\09 1594-89-D-01.dwg User: mickelsonjm Aug 28, 2008 - 1:21pm

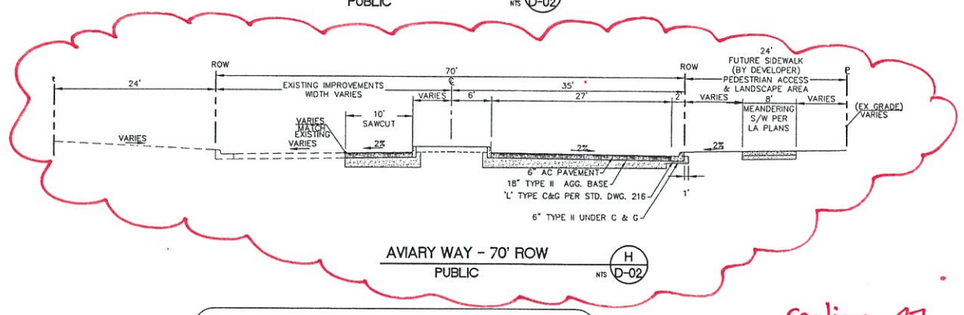


DORRELL LANE - 41' ROW
PUBLIC
NTS (I) D-02

Section 26



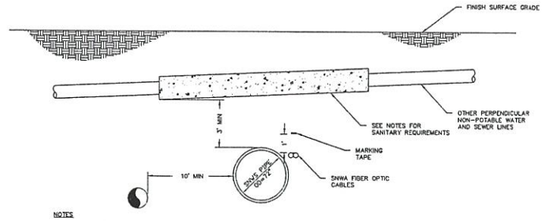
AVIARY WAY - 70' ROW
PUBLIC
NTS (G) D-02



AVIARY WAY - 70' ROW
PUBLIC
NTS (H) D-02

Section 27

NOTE:
THE OFF-SITE PAVEMENT SECTIONS SHOWN ON THE PLANS MUST BE DESIGNED IN ACCORDANCE WITH THE STANDARD SPECIFICATION SECTION 401 USING THE AASHTO MODEL. THE NEW SECTION MUST BE BASED ON THE ACTUAL DAILY TRAFFIC COUNTS PROVIDED BY THE CITY AND R-VALUE TEST RESULTS PERFORMED SUBSEQUENT TO GRADING.

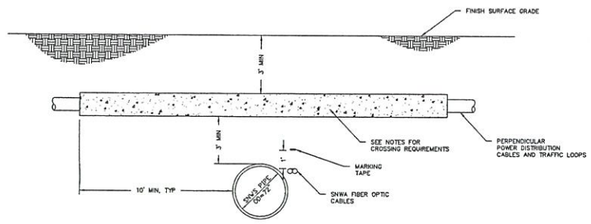


NOTES

1. ALL NON-POTABLE WATER AND SEWER UTILITIES CROSSING SNWS PIPELINES MUST MAINTAIN A MINIMUM OF THREE (3) FEET SEPARATION WHEN INSTALLED OVER SNWS PIPELINES AND A MINIMUM OF TWO (2) FEET SEPARATION WHEN INSTALLED BELOW SNWS PIPELINES. DESIGNS THAT DO NOT MEET THE MINIMUM CLEARANCE SHALL BE COORDINATED AND APPROVED BY SNWA.
2. ALL NON-POTABLE WATER OR SEWER LINE CROSSING AT ANY DISTANCE ABOVE THE SNWS PIPELINE AND LESS THAN TWO (2) FEET BELOW THE WATERMAIN WILL BE CONSTRUCTED USING ONE OF THE FOLLOWING OPTIONS FOR A MINIMUM OF TEN (10) FEET PAST THE OUTSIDE DIAMETER ON EACH SIDE OF THE CROSSING AND AT ANY DISTANCE ABOVE THE WATER MAIN AND LESS THAN TWO (2) FEET BELOW.
   A. THE LINE WILL BE INSTALLED IN A STEEL SLEEVE WITH A MINIMUM THICKNESS OF ONE QUARTER (1/4) INCH.
   B. THE LINE WILL BE CONSTRUCTED OF WATER QUALITY MATERIALS MEETING AWWA STANDARDS.
   C. THE LINE WILL BE TOTALLY ENCASED WITH A MINIMUM OF FOUR (4) INCHES OF CLSM (300 PSI) ENCASEMENT. THIS OPTION WILL NOT BE PERMITTED FOR ASBESTOS CEMENT PIPE.
   D. STORM SEWERS TWENTY-FOUR (24) INCHES IN DIAMETER OR GRATER SHALL BE INSTALLED WITH WATER TIGHT JOINTS USING EITHER JOINT SEALANTS OR GASKETS.
3. ALL PARALLELING NON-POTABLE WATER AND SEWER LINES AND APPURTENANT STRUCTURES MUST BE LOCATED A MINIMUM OF TEN (10) FEET AWAY FROM THE OUTSIDE DIAMETER OF THE SNWS LINE.

DETAIL 1: NON-POTABLE WATERLINE CROSSING

SCALE: NTS

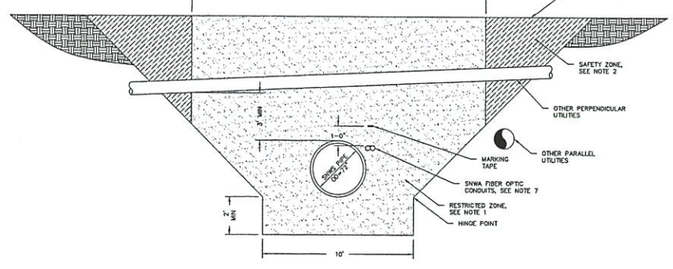


NOTES

1. ALL POWER LINES (INCLUDING STREET LIGHT AND TRAFFIC SIGNAL CONDUIT(S)) SHALL BE ENCASED IN A MINIMUM OF SIX (6) INCHES OF RED CONCRETE (300 PSI MINIMUM) EXTENDING A MINIMUM OF TEN (10) FEET ON EACH SIDE OF THE CROSSING FROM THE OUTSIDE DIAMETER (IN BOTH DIRECTIONS) OF THE WATER TRANSMISSION MAIN.
2. ALL POWER LINES (INCLUDING STREET LIGHT AND TRAFFIC SIGNAL CONDUIT(S)) SHALL MAINTAIN MINIMUM VERTICAL CLEARANCES OF THREE (3) FEET ABOVE AND TWO (2) BELOW SNWS PIPELINE.

DETAIL 2: POWER LINE CROSSING

SCALE: NTS



1. RESTRICTED ZONE: ALL EFFORTS SHALL BE MADE TO AVOID PARALLEL UTILITIES AND APPURTENANT STRUCTURES IN THE RESTRICTED ZONE. UTILITIES MAY CROSS PERPENDICULARLY THROUGH BOTH THE SAFETY AND RESTRICTED ZONES PROVIDED THAT THE VERTICAL CLEARANCES OF 3 FEET AND 2 FEET BELOW THE SNWS FACILITIES ARE MAINTAINED. DESIGNS THAT DO NOT MEET THE MINIMUM CLEARANCE SHALL BE COORDINATED AND APPROVED BY SNWA.
2. SAFETY ZONE: ALL REASONABLE EFFORTS SHALL BE MADE TO LOCATE PARALLEL UTILITIES AND APPURTENANT STRUCTURES OUTSIDE THE SAFETY ZONE. PARALLEL UTILITIES AND APPURTENANT STRUCTURES LOCATED WITHIN THIS ZONE SHALL BE DESIGNED TO MINIMIZE IMPACT ON THE MAINTENANCE ACCESS OF SNWS FACILITIES. THE BOUNDARIES OF THE SAFETY ZONE ARE ESTABLISHED BY A 1:1 SLOPE EXTENDING FROM THE HINGE POINTS TO THE FINISH SURFACE GRADE ON EACH SIDE OF THE SNWS PIPELINE. THE DESIGN OF UTILITIES IN THE SAFETY ZONE SHALL BE COORDINATED AND APPROVED BY SNWA.
3. THE SNWS PIPELINE MAY EMPLOY A CATHODIC PROTECTION SYSTEM THAT WILL MITIGATE ADVERSE IMPACTS FROM CATHODIC PROTECTION SYSTEM ON EXISTING FACILITIES. ALL OTHER UTILITIES IN THE VICINITY OF THE SNWS WILL BE RESPONSIBLE TO COORDINATE WITH SNWS FOR THE PROTECTION OF THEIR NEW FACILITIES FROM STRAY ELECTRICAL CURRENTS.
4. HORIZONTAL AND VERTICAL SEPARATION OF SANITARY SEWERS AND STORM DRAINS FROM POTABLE WATER FACILITIES MUST COMPLY WITH THE "DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEM" FOR SOUTHERN NEVADA.
5. ALL POWER (INCLUDING STREETLIGHT AND TRAFFIC SIGNAL CONDUITS(S)) CROSSING SNWS PIPELINE SHALL BE ENCASED IN RED CONCRETE (3000 PSI MINIMUM) FOR A MINIMUM DISTANCE OF TEN (10) FEET PAST THE OUTSIDE DIAMETER OF THE SNWS PIPELINE IN BOTH DIRECTIONS.
6. SNWS FIBER OPTIC CONDUIT PARALLELS SNWS PIPELINE WITHIN THE SAME TRENCH AS THE PIPELINE.

DETAIL 3: GENERAL WATERLINE CROSSING

SCALE: NTS

NOTES:
1. SNWA FIBER OPTIC CONDUIT RUNS ALONG THE WEST SIDE OF THE SNWA PIPELINE.
2. CAUTION SNWA TEST LEADS ARE SHALLOW
3. SNWA FACILITIES MUST BE POTHOLED TO DETERMINE VERTICAL AND HORIZONTAL LOCATION PRIOR TO CONSTRUCTION.

SNWA CONSTRUCTION NOTE

CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS AND CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS, AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY DEVELOPMENT PLAN REVIEW, 702-862-3444, AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITY.

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY DATE

REV	DATE	BY	REVISION

NOVEMBER 2005 LAND INVESTORS, LLC/DRHI, INC.

JACOBS
6655 Bermuda Road
Las Vegas, NEVADA 89119
(702) 938-5400 Fax (702) 938-5454

CROSS SECTIONS & DETAILS

NORTH LAS VEGAS
600 ACRES
AREA 8 AND 9

DRAWN BY: MJS	02-14-08	CHECKED BY: JPM	02-14-08
DESIGNED BY: MJS	02-14-08	PROJECT NO: 24159A	SCALE: N.T.S.

PRELIMINARY NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER - STATE OF NEVADA
JOHN P. MENG
CIVIL
EXP. 12/31/09
No. 17540
8/15/08

SHEET
D-02
36 OF 51 SHEETS

DRAWING NO.
36397

Drawing Name: L:\24159A INV SITE\DESIGN\IMPROVE\SVREA_08-09\09 1594-89-D-02.dwg User: michaelcpn Aug 28, 2008 - 1:21pm

Technical Drainage Study for
Grand Teton Regional Flood Control Facility (CNLV No. 45326)

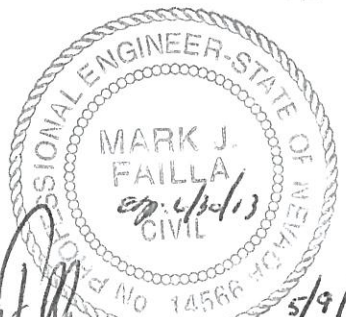
TECHNICAL DRAINAGE STUDY
SUPPLEMENT No.1 to ADDENDUM No. 1
Park Highlands Grand Teton
Regional Flood Control Facility

City of North Las Vegas, Nevada
(Volume 1 of 2)

Job No.: CBH1201.000
Date: May 2013

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:
Crescent Bay Holdings
7144 East Stetson Drive, Suite 410
Scottsdale, AZ 85251
Phone: 404-584-6997



5/9/13

Mark J. Failla, P.E., CFM
NV Professional Engineer No. 14566

Assisted by: Kylie Anderson, P.E.
Kellin Collins, P.E.

HEC-1 Model Excerpt

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1*****************************************
*****************************************
 *                                       *
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *                                       *
 *              JUN   1998               *
 *                                       *
 *            VERSION 4.1                *
 *                                       *
 *                                       *
 *                                       *
 *  RUN DATE   30OCT12  TIME  16:17:22   *
 *                                       *
 *                                       *
 *                                       *
 *****************************************
*****************************************
```


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, INC.
    2     ID    PARK HIGHLANDS GRAND TETON REGIONAL FLOOD CONTROL FACILITY
    3     ID    ULTIMATE CONDITION
    4     ID
    5     ID    RETURN PERIOD ------- 100-YEAR
    6     ID    DISTRIBUTION -------- 6-HOUR SDN3
    7     ID    PROJECT NO. --------- CBH1201.000
    8     ID    FILENAME ------------ ULT100.H1
    9     ID    DATE ---------------- NOVEMBER 2012
   10     ID    MODELED BY ---------- KC/KCR
   11     ID
   12     ID       SIX HOUR DEPTH-AREA REDUCTION FACTORS
   13     ID       DRAINAGE AREA (MI^2)       DARF
   14     ID       0.00-0.49                  0.990
   15     ID       0.50-0.99                  0.975
   16     ID       1.00-1.99                  0.950
   17     ID       2.00-2.99                  0.925
   18     ID       3.00-3.99                  0.915
   19     ID       4.00-4.99                  0.908
   20     ID
   21     IT     5       0       0     300
   22     IO     5       0       0
   23     IN     5       0       0
   24     JR   PREC   0.990   0.975   0.950   0.925   0.915   0.908
          *
   25     KK   U190
   26     BA  .3684
   27     PB   2.77
   28     PC      0   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
   29     PC  0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
   30     PC  0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
   31     PC  0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
   32     PC  0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
   33     PC  0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
   34     PC  0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
   35     PC  0.998   0.999   1.000
   36     LS      0    80.7
   37     UD  0.522
          *
   38     KK   U170
   39     BA  .2521
   40     LS      0    83.0
   41     UD  0.521
          *
   42     KK    CP1
   43     KM   COMBINE U190 AND U120 AT IRON MOUNTAIN AND TORREY PINES
   44     HC      2
          *
```

1 HEC-1 INPUT PAGE 2

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

   45     KK   CP1E
   46     KM   CP1E IS THE FLOW DRAINING EAST IN IRON MOUNTAIN
   47     KM   CP1S IS THE FLOW DRAINING SOUTH IN TORREY PINES
   48     DT   CP1S
   49     DI    297     302     308     323     339     348
   50     DQ    125     127     129     136     143     148
          *
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```
395           UD   0.246
              *

396           KK    CP19
397           KM   COMBINE CP18 AND U630 IN GRAND TETON BETWEEN DECATUR AND SAN MATEO
398           HC      2
              *

399           KK    U620
400           BA   .0472
401           LS      0     88.1
402           UD   0.246
              *

403           KK    CP20
404           KM   COMBINE CP19 AND U620 AT GRAND TETON AND SAN MATEO
405           HC      2
              *

406           KK   RCP20
407           KM   ROUTE TO CP22
408           RD    1230   .0050   0.016       0    TRAP       0      50
              *

409           KK   CP15S
410           KM   RETRIEVE CP15S
411           DR   CP15S
              *

412           KK  RCP15S
413           KM   ROUTE TO CP20
414           RD    2555   .0050   0.016       0    TRAP       0      50
              *

415           KK    U680
416           BA   .1122
417           LS      0     88.0
418           UD   0.303
              *

419           KK    CP21
420           KM   COMBINE CP15S AND U680 IN AVIARY JUST NORTH OF GRAND TETON
421           HC      2
              *
```



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

422           KK    U760
423           BA   .0076
424           LS      0     88.3
425           UD   0.147
              *

426           KK   CPGTA
427           KM   COMBINE CP20 CP21 AND U760 AT GRAND TETON AND AVIARY
428           HC      3
              *

429           KK     2-3
430           KM   PARK OR TRAIL
431           BA  0.0327
432           LS      0     86.0
433           UD   0.157
              *

434           KK  CPGTA2
435           KM   COMBINE CPGTA AND 2-3
436           HC      2
              *

437           KK     2-1
438           KM   NEIGHBORHOOD COMMERCIAL
439           BA  0.0367
440           LS      0     94.0
441           UD   0.187
              *

442           KK     2-2
443           KM   MEDIUM DENSITY
444           BA  0.0742
445           LS      0     91.0
446           UD   0.215
              *

447           KK   2-14A
448           KM   PARK OR TRAIL
449           BA  0.0027
450           LS      0     86.0
451           UD   0.135
              *

452           KK      2A
453           HC       3
              *

454           KK      2B
455           KO       2
456           HC       2
              *
```



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

457           KK     DB1
458           KM   DETENTION BASIN 1
459           KO       2
460           RS       1    ELEV      -1
461           SV       0   0.339   3.015   9.712  18.977  29.349  42.004 102.301 126.116 159.117
462           SE  2297.0  2298.0  2299.0  2300.0  2301.0  2302.0  2303.0  2307.0  2308.5  2310.5
```

```
463          SQ        0      72     110     138     161     199     215     231     252    1975
464          SE   2297.0  2300.0  2301.0  2302.0  2303.0  2305.0  2306.0  2307.0  2308.5  2310.5
465          KO        1
             *
466          KK      2-6
467          KM    ELEMENTARY SCHOOL
468          BA   0.0180
469          LS        0     94.0
470          UD    0.158
             *

471          KK       2C
472          HC        2
             *

473          KK      2-7
474          KM    PARK OR TRAIL
475          BA   0.0156
476          LS        0     86.0
477          UD    0.137
             *

478          KK       2D
479          HC        2
             *

480          KK      2-4
481          KM    HIGH DENSITY
482          BA   0.0334
483          LS        0     94.0
484          UD    0.137
             *

485          KK     REM1
486          DT    FRSD1
487          DI        0       57
488          DQ        0       29
             *

489          KK    2-14B
490          KM    PARK OR TRAIL
491          BA   0.0025
492          LS        0     86.0
493          UD    0.100
             *
```



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

494          KK      2-5
495          KM    MEDIUM DENSITY
496          BA   0.0891
497          LS        0     91.0
498          UD    0.215
             *

499          KK     REM2
500          DT    FRSD2
501          DI        0      117
502          DQ        0       53
             *

503          KK      2-9
504          KM    PARK OR TRAIL
505          BA   0.0156
506          LS        0     86.0
507          UD    0.146
             *

508          KK     REM3
509          DT    FRSD3
510          DI        0       20
511          DQ        0        7
             *

512          KK     2-10
513          KM    MEDIUM DENSITY
514          BA   0.0627
515          LS        0     91.0
516          UD    0.192
             *

517          KK    NORTH
518          DT    SOUTH
519          DI        0       87
520          DQ        0       58
             *

521          KK     REM4
522          DT    FRSD4
523          DI        0       29
524          DQ        0       29
             *

525          KK       2E
526          KM    SURFACE FLOW IN FARM ROAD
527          HC        5
             *
```



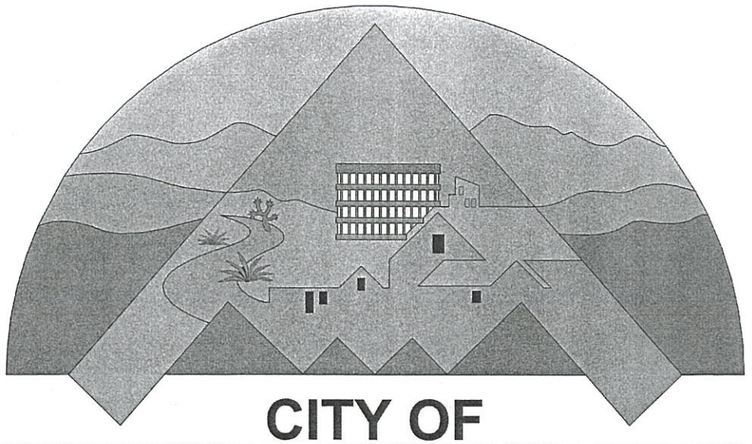
```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

528          KK  RFRSD1
529          DR   FRSD1
             *

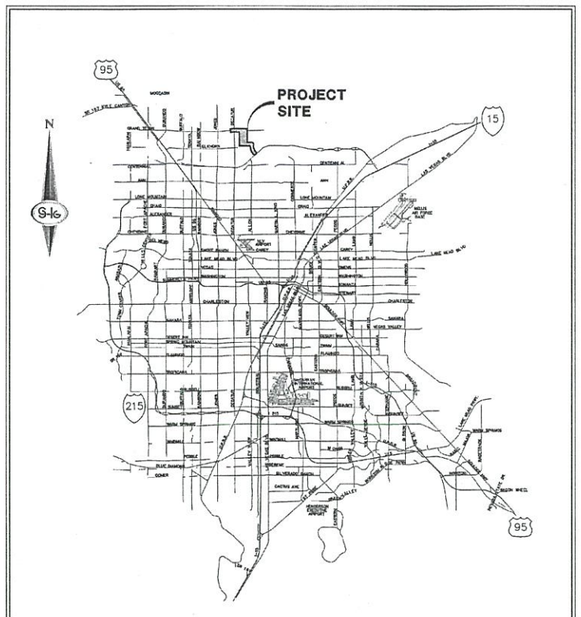
530          KK  RFRSD2
531          DR   FRSD2
             *
```

Improvement Plans

GRAND TETON REGIONAL FLOOD CONTROL FACILITY



CITY OF NORTH LAS VEGAS



VICINITY MAP
NOT TO SCALE

SHEET INDEX

SHT NO.	SHEET	DESCRIPTION
1	G-01	COVER SHEET
2	G-02	ABBREVIATIONS, LEGEND, LOCATION MAP, AND GENERAL NOTES
3	G-03	DETENTION BASIN PERFORMANCE CURVES
4	SD-01	STORM DRAIN PLAN AND PROFILE – "SD-1" 9+10.00 TO "SD-1" 16+00.00
5	SD-02	STORM DRAIN PLAN AND PROFILE – "SD-1" 16+00.00 TO "SD-1" 25+50.00
6	SD-03	STORM DRAIN PLAN AND PROFILE – "SD-1" 25+50.00 TO "SD-1" 35+00.00
7	SD-04	STORM DRAIN PLAN AND PROFILE – "SD-1" 35+00.00 TO "SD-1" 39+78.65
8	SD-05	STORM DRAIN PLAN AND PROFILE – "SD-2" 55+18.00 TO "SD-2" 63+00.00
9	SD-06	STORM DRAIN PLAN AND PROFILE – "SD-2" 63+00.00 TO "SD-2" 69+70.33
10	SD-07	DETENTION BASIN GRADING PLAN – 1
11	SD-08	DETENTION BASIN GRADING PLAN – 2
12	SD-09	STORM DRAIN LATERAL PROFILES – 1
13	SD-10	STORM DRAIN LATERAL PROFILES – 2
14	DT-01	DETAILS
15	DT-02	DETENTION BASIN OUTFALL STRUCTURE DETAILS
16	DT-03	SECTIONS

BENCHMARK

CITY OF LAS VEGAS BENCHMARK SLV90 13NES–NAVD88
ELEVATION – 719.629 METERS, 2332.11 FEET

RIVET AND 2" ROUND ALUMINUM DISK, STAMPED CITY OF LAS VEGAS BENCHMARK SLV90/13NES, LOCATED ON THE EAST CORNER OF A POWER POLE FOOTING AT THE SOUTHWEST CORNER OF THE INTERSECTION OF GRAND TETON DRIVE AND DECATUR BOULEVARD

THIS IS A COMMON BENCHMARK FOR THE CITY OF LAS VEGAS AND THE CITY OF NORTH LAS VEGAS AS SHOWN IN THE CITY OF NORTH LAS VEGAS VERTICAL CONTROL BENCHMARK BOOK. REVISED NOVEMBER 1, 2006

BASIS OF BEARING

SOUTH 67°29'39" EAST, BEING THE SOUTH LINE OF GOVERNMENT LOT 19 OF SECTION 18, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA, AS SHOWN BY MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE, IN FILE 104, PAGE 61 OF PARCEL MAPS.

FLOOD ZONE:

THIS SITE LIES WITHIN ZONE "X" DETERMINED TO BE OUTSIDE OF THE 500 YEAR FLOODPLAIN AS DEPICTED ON FIRM MAP PANEL NUMBER 32003C1715F, REVISED NOVEMBER 16, 2011.

OWNER

CRESCENT BAY HOLDINGS
7144 EAST STETSON DRIVE, SUITE 410
SCOTTSDALE, AZ 85251
(480) 584-6997

DEVELOPER

CRESCENT BAY HOLDINGS
7144 EAST STETSON DRIVE, SUITE 410
SCOTTSDALE, AZ 85251
(480) 584-6997

ENGINEER

SLATER HANIFAN GROUP, INC.
5740 S. ARVILLE STREET #216,
LAS VEGAS, NV 89118
PHONE (702) 284-5300
FAX (702) 284-5399

GEOTECH ENGINEER

PREPARED BY: X
PROJECT NUMBER: X
DATE: X
REVISED DATE: X

***NOTE:**

IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

CITY OF NORTH LAS VEGAS
FLOOD CONTROL

JENNIFER C. DOODY, P.E., CFM — DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

APPROVALS:

DR. DONG LIU, P.E. PTOE — DATE
DIRECTOR, PUBLIC WORKS DEPARTMENT

LORENA CANDELARIO, SR/WA — DATE
MANAGER, REAL PROPERTY SERVICES DIVISION

UTILITIES DEPARTMENT – ENGINEERING SERVICES DIVISION — DATE
Approval of these plans shall not be construed to be a permit for construction, a commitment to supply water and/or sewer service, or an approval of any violation of ONLY water and/or sewer service rules and regulations or design and construction standards.

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.

SOUTHERN NEVADA WATER AUTHORITY — DATE

SOUTHWEST GAS CORPORATION — DATE

COX COMMUNICATIONS OF LAS VEGAS, INC. — DATE

CENTURYLINK — DATE

"THE AFFIXED EMBARQ 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 STATUES AND / OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS."

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or
1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES IT'S EASY!
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1-702-227-2929

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5740 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5300 FAX (702) 284-5399

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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NORTH LAS VEGAS, NV

CRESCENT BAY HOLDINGS

GRAND TETON REGIONAL FLOOD CONTROL FACILITY

COVER SHEET

SECTION 18
TOWNSHIP 19S
RANGE 61E

DATE: 3/7/2013
DRAFTER: JAS
DESIGNER: JSR
CHECKED: JJS
PROJECT NO.
CBH1201-000

PROFESSIONAL ENGINEER – STATE OF NEVADA – JERRY SLATER – Exp. 06/30/2014 – CIVIL – No. 14167

5 of 16

G-01
SHEET 1 OF 16

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J:\CBH1201 000 Park Highlands DK\Engineering\G-01.dwg, 3/8/2013 11:26:26 AM, jerodr

GENERAL NOTES

A. All maps, technical studies, reports, designs, construction drawings, specifications and special technical requirements associated with the project and improvements presented herein has been accomplished, under the supervision of responsible Professional(s) having the appropriate registration to serve in this capacity based on the scope of this specific project, and in accordance with the statutory provisions of the Nevada Revised Statutes (NRS) and the Nevada Administrative Code (NAC) including:
NRS 278, 338, NRS 623, NRS 625, NAC 338, NAC 623 and NAC 625
Certification signifying compliance with statutory and related administrative code requirements is hereby provided by the responsible Professional(s) in the form of a stamp or seal placed on the project documents.
B. The project and all improvements related thereto as illustrated on the project drawings must conform to North Las Vegas Municipal Code including the Titles and Chapters noted below:
Title 2, Chapter 2.36 Administrative Fees
Title 8, Chapter 8.16 Fire Code
Title 10, Chapter 10.16 Traffic Control Devices
Title 10, Chapter 10.52 Temporary Traffic Control Regulations
Title 12, Chapter 12.08 Public Works Project Permit and Performance Regulations
Title 13 Public Services
Title 15 Uniform Regulations for the Control of Drainage
Title 16 Subdivisions
It is expected that these Titles and Chapters, as a minimum, will be applied on a project specific basis and not construed to be all inclusive or exclusive. The project is also expected to conform with revisions in the North Las Vegas Municipal Code as it may be revised from time to time.
C. Project review by representatives of the City of North Las Vegas is intended to complement and assist the responsible Professional(s) in advancing a project that is in compliance with City of North Las Vegas requirements, and is consistent with public benefit, health, safety, and welfare. Review is not an assurance of project feasibility, professional and technical accuracy, or conformance with special conditions imposed by public agencies, including the North Las Vegas Planning Commission.
D. Approval of these improvement plans and specifications is made based on the representations made by the Professional(s) that they have discharged their responsibilities and prepared complete documents which comply with City of North Las Vegas requirements for construction of the improvements depicted herein.
E. If construction has not commenced within, or in the event of an interruption in construction for a period of, one (1) year after the most recent approval date noted hereon, these improvement plans must be resubmitted for evaluation by the City of North Las Vegas for possible design update.

II. STANDARD SPECIFICATIONS AND STANDARD DRAWINGS FOR GENERAL CONSTRUCTION
A. All improvements shown on these construction drawings shall be implemented in accordance with the "Uniform Standard Specifications for Public Works Construction Off-site Improvements, Clark County Area, Nevada," latest edition. Approved revisions to these Standards are posted on the Regional Transportation Commission of Southern Nevada website.
B. Exceptions to these Standards are noted below:
1. All provisions directly related to those procedures used to solicit competitive bids and to award and execute contracts for public agency projects.
2. The City of North Las Vegas Trench Backfill Policy dated August 15, 1996, shall be implemented for this project. Copies of the Trench Backfill Policy can be obtained from the Department of Public Works, Construction Services Division, 50 East Brooks Avenue, North Las Vegas, Nevada 89030, 633-1320.
3. The City of North Las Vegas Policy Regarding Grading and Construction On Or In Close Proximity To Geologic Faults and Ground Fissures. Copies of the policy can be obtained from the Department of Public Works, Construction Services Division, 50 East Brooks Avenue, North Las Vegas, Nevada 89030, 633-1320.
4. Where allowed, curb and gutter having a design grade of 0.5 percent or less shall be constructed by forming. Form grades and elevations shall be verified prior to placement of concrete and water flow tested as soon after placement as curing allows.
5. "No parking" zones at curb returns, fire hydrant zones and school zones shall be painted red to the limits noted on the plans, or if not shown on the plans, to the limits established by the City of North Las Vegas Traffic Engineer.
C. Modifications and clarifications to these standards are noted below:
1. The contractor shall make a project site visit with plans-in-hand prior to construction to confirm project constructability, and shall immediately notify the Professional of any constructability problems.
2. Information noted on the plans concerning the existence and location of existing wet underground utilities and other underground structures were obtained by a search of available records. The City of North Las Vegas, Professional, and Owner make no assurances concerning the accuracy of such information. The Contractor shall exercise caution and use best available construction techniques to determine the actual location of and protection for all underground utilities whether or not they are shown on the plans. At a minimum, the contractor shall:
Call Before You Dig 1-800-227-2000
Call Before You Overhead 1-702-227-2929
3. The contractor is responsible for securing all project permits and complying with all terms and conditions imposed by the permitting agencies. Agencies other than the North Las Vegas Public Works Department that may have jurisdiction or regulatory authority concerning the project include:
City of North Las Vegas Building Department
Clark County Health District – Division of Air Quality Management
Nevada Department of Transportation
Nevada Department of Environmental Protection
US Army Corps of Engineers
Nevada Division of Water Resources
4. The contractor shall provide at least seventy-two (72) hours notice to each of the following agencies confirming the scheduled start of construction:
City of North Las Vegas Utilities Division (702)633-1290
Cox Communication (702)385-3644
Nv Energy (800)227-2600
CenturyLink Telephone Company (800)227-2600
Southwest Gas Corporation (800)227-2600
5. The contractor shall exercise caution and use construction techniques to protect and preserve existing permanent survey monuments. All survey monuments disturbed shall be replaced and/or rehabilitated in accordance with Standards by a Professional Land Surveyor retained by the contractor.
6. The contractor shall exercise caution and use construction techniques to protect and preserve existing public and private features located in close proximity to or abutting improvements shown on these plans. Restoration of damaged features shall be accomplished by the contractor at the contractor's expense to the satisfaction of the City of North Las Vegas' representative.
7. The location of all sewcut lines for the project may be determined by the City of North Las Vegas if the location is not clearly shown on the plans or if existing conditions require adjustment to the location shown on the plans.
8. The contractor shall cooperate and coordinate with the City of North Las Vegas' representative in providing ingress and egress to abutting properties, and shall protect such properties from project related storm water and nuisance runoff by providing temporary positive drainage control.
9. Plantmix bituminous shall be finished to a height of between 3/8 inches and 5/8 inches above the lip of curb gutters and valley gutters.
10. Fog seal shall be applied to plantmix bituminous surfaces after all corrections and adjustments have been made.
11. Type V cement shall be used for all off-site improvements and the mix shall be designed for soluble sulfates in the subgrade of 1.5 percent or greater based on subgrade material sampling and testing. All mix designs shall be project specific and approved by the City of North Las Vegas representative prior to placements.
12. All manholes, valve boxes, junction structures, vaults and cleanouts that are located within the roadway limits shall be constructed to, and plated at subgrade level until such time as the aggregate base and plantmix bituminous surface has been completed. Thereafter, these items shall be adjusted to finish grade.
13. Utility boxes and vaults located in the sidewalk area are to be constructed to the finish design grade. The elevation shall be consistent with that required for the standard concrete City of North Las Vegas sidewalk even if the concrete sidewalk construction is deferred to a future date.
14. The contractor shall provide reasonable accommodations for City of North Las Vegas personnel to obtain GPS/GIS data on all underground utilities and infrastructure.
15. All off-site improvement subgrade must be certified by the Geotechnical Engineer of Record.

GRADING/DRAINAGE NOTES

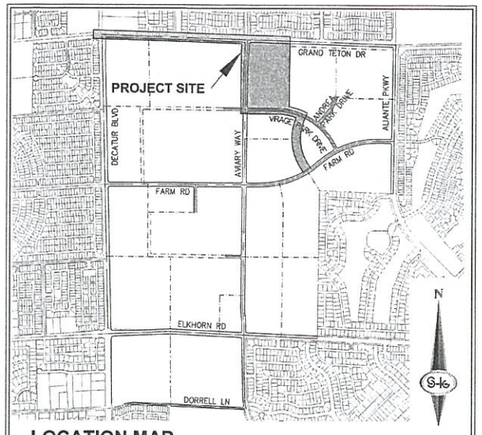
A. General Grading and Drainage Notes
1. Pursuant to City of North Las Vegas Ordinance Number 1172, the contractor is required to secure a grading permit prior to commencing work.
2. The contractor shall secure a permit for any off-site construction.
3. The contractor's operations shall not trespass beyond the project property lines unless a permit or written authorization has been obtained from the property owner(s) involved. Copies of such written authorization shall be furnished to the City of North Las Vegas' representative prior to start of construction.
4. The City of North Las Vegas Construction Services shall be notified one (1) working day before any on-site construction work begins.
5. An approved grading and drainage plan shall be on the job site at all times. Deviations from the approved plan will require submittal of a formal revised plan for review and approval.
6. All construction survey control shall be done by a licensed Professional Land Surveyor in accordance with applicable statutes and codes. The contractor shall provide competent resources to assure building pad and building floor elevations conform to those shown on the construction drawings. Furthermore, the contractor shall provide the City of North Las Vegas Building Department with:
a. Certification of "Building Floor Elevations" in critical drainage areas.
b. Certificates of "Building Pad Elevations" in noncritical areas.
7. The contractor shall certify to the City of North Las Vegas Construction Services Division that all fills, foundations and subgrades meet the minimum compaction requirements. Certification shall be made prior to pouring concrete.

CNLV WATER DISTRICT NOTES

III. STANDARD SPECIFICATION AND STANDARD DRAWINGS FOR WATER LINE CONSTRUCTION
A. All water improvements shown on these construction drawings shall conform to the standards described below, and in order of precedence shown.
1. City of North Las Vegas Municipal Water Service District Service Rules and Regulations, latest edition.
2. Uniform Design and Construction Standards for Water Distribution Systems, Clark County Nevada' latest edition.
3. Uniform Standard Specification for Public Works Construction Off-site Improvements, Clark County Area, Nevada, latest edition.
B. Exceptions to these Standards are noted below:
1. No water main may be shut down to make connections without prior approval of the City of North Las Vegas representative.
2. Materials used for water distribution facilities shall be included on the "City of North Las Vegas Approved Materials List," latest revision, or specifically identified and approved on these plans.
3. All water meters two (2) inches and smaller shall be installed by the City of North Las Vegas. Note that all locations must be clearly identified and marked at the site. The service lines, laterals, meter boxes and sidewalks or collars must all be installed and set at grade or the meter will not be set.
4. The City of North Las Vegas' Trench Backfill Policy, dated August 15, 1996, shall be adhered to for this project.
C. Modification and clarification to these Standards are as noted below:
1. Water Metering Requirements for New Development:
a. Separate domestic and fire services (where applicable) are required for each dwelling unit, public, quasi-public, commercial, and/or industrial occupancy located on a single parcel or lot.
b. In the event that a building within an industrial or commercial subdivision is divided, separate domestic services are required for each unit.
c. Each parcel or lot of a commercial or residential subdivision will have a minimum of one (1) metered domestic service. When a fire service is required, each parcel or lot will have a minimum of one (1) fire service. The City, at its option, may allow a communal fire service provided the property owners first establish a property management association which accepts responsibility for the payment of water bills and the maintenance and operation of the fire lines and the backflow prevention assembly.
2. Fire and domestic water services as approved on this plan, are intended specifically for the lot and use shown, and are not intended to serve additional parcels or structures which may be created in the future. In the event that the parcels and/or lots shown on this plan are further divided to create additional parcels or lots, the owner is required to provide separate fire and domestic water services to each.
3. Connection to public fire hydrants shall not be made for domestic and/or private fire service.
4. All service laterals two (2) inches and smaller shall be copper tubing with approved service saddles. Corporation stops and angle meter stops shall be the same size as the service lateral. Angle meter stops and meter shall be centered in meter the box.
5. UDACS Plates No. 1A and 1C– Revise note to read "couplings are not allowed between the corporation stop and the angle meter".
6. All meters to be installed in the City of North Las Vegas water system, including DCDAs must be compatible with the SENSUS AMR protocol (a.k.a. Invensys) and must be installed with the encoded register. Meters that are fully compatible are: Sensus/Invensys ECR/MP models (5/8"and larger) Neptune Autoread models (3" and larger).
7. Any parcel receiving water from the public distribution system from multiple connections is required to utilize the same meter manufacturer. For master metered multi-family residential, the meters shall be of the same manufacturer, model, and size.
8. All meter boxes shall be equipped with traffic bearing covers and installed to finish design grade and elevation. If such is not shown on the plans, the elevation will be established by the City of North Las Vegas representative.
9. Any block wall or other fence shall be designed and constructed around the outside of the easement(s), to allow the City direct access to vault(s) and inlet piping from the adjacent right-of-way.
10. No utility boxes shall be located in driveway approaches, unless approved by the Utilities Division.
11. A single pipe material shall be used throughout the project unless otherwise approved by the City of North Las Vegas representative.
12. The on-site water lines and appurtenances are private facilities not to be operated or maintained by the City of North Las Vegas, unless otherwise specified on Civil Improvements Plans.
13. All valves will be located outside of driveways, valley gutters, and curb gutters.
14. A minimum of two (2) valves shall be located at every mainline tee, or three (3) valves at every mainline cross.
15. All new fire hydrants shall have a 5–1/4 inch valve opening.
16. Two sources of water supply are required for any development with any combination of more than three (3) fire hydrants (public or private) or fire services.
17. Minimum separations between fire systems and domestic water mains shall be six (6)–feet horizontally from exterior pipe walls and eighteen (18)–inches vertically. Minimum separation from sewer lines shall be ten (10)–feet horizontally.
18. Pipe detector ribbon and locator balls shall be required above all water mains, service laterals that are six (6) inches and larger, and any service lateral not installed perpendicular to the main line.
19. All water mains shall be filled, pressure tested to 200 PSI, disinfected, flushed, refilled and an acceptable water sample obtained, prior to connection by the City. Contact the City of North Las Vegas Utility Division twenty-four (24) hours in advance to schedule sampling.
20. All backflow prevention assemblies shall be tested and certified by the City of North Las Vegas prior to placing the water system in service. No water shall be taken from a service requiring backflow prevention until the reduced pressure principle assembly has been successfully tested by the CNLV. Contact the City of North Las Vegas twenty-four (24) hours in advance to schedule testing.
21. Limits of asphalt patches to be determined in the field by a City of North Las Vegas inspector. Patches will be a minimum of twelve (12)–feet machine replaced.
22. Schedule Utility inspections online at . Utility inspections must be scheduled online by 2:00 p.m. for inspections to occur the following normal working day (Monday through Friday). For after hours utility inspections, including weekends, contact Utility Customer Service at (702) 633–1277 to set up an account.
23. Record drawings shall be prepared, signed and submitted to the City of North Las Vegas representative prior to final acceptance of any water distribution facilities to be owned, operated or maintained by the City of North Las Vegas.
D. Shutdown requirements and information:
1. Contact the Utilities Department seven (7) working days prior to any anticipated shutdown for coordination purposes. The contractor shall not open/close any valves within the City utilities department contact number is 633–1285.
2. For commercial properties, provide written notification and verbal coordination between the Utilities Department and the commercial property owner(s) a minimum of seven (7) working days prior to anticipated shutdown. The commercial owner(s) shall have the ability to provide input in scheduling shutdowns.
3. For residential properties, provide written notification to residential properties a minimum of 48 hours prior to anticipated shutdown.
4. Working days are deemed to be Monday through Thursday for shutdown purposes.
5. Shutdowns are anticipated to be night work. Final decisions shall be at the discretion of the Utilities Department.

CNLV SEWER NOTES

IV. STANDARD SPECIFICATIONS AND STANDARD DRAWINGS FOR SEWER LINE CONSTRUCTION
A. All sewer lines (wastewater collection systems) shown on these construction drawings shall conform to the standards described below, and in accordance with the precedent shown:
1. Design and Construction Standards for Wastewater Collection Systems, Southern Nevada, latest edition.
2. Uniform Standard Specifications for Public Works construction Off-Site Improvements, Clark County Area, Nevada, latest edition.
B. Exceptions to these Standards are noted below:
1. Materials used for wastewater collection systems shall be included in the City of North Las Vegas approved Materials List, latest edition, or specifically identified and approved on these plans.
2. The City of North Las Vegas Trench Backfill Policy, dated August 15, 1996 shall be adhered to for this project.
3. The contractor shall inscribe "S", 3–inches in height, into the curb at the point where the sewer lateral enters each subdivision lot or private land parcel.
C. Modifications and clarification to these Standards are noted below:
1. All sanitary sewer manhole bases for new pipe must be precast per Design and Construction Standards for Wastewater Collection Systems plates SD–1A & 1B.
2. Limits of asphalt patches to be determined in the field by a City of North Las Vegas inspector. Patches will be a minimum of twelve (12)–feet, machine replaced.
3. The on–site sewer lines and appurtenances are private facilities not to be operated or maintained by the City of North Las Vegas, unless otherwise specified on Civil Improvement Plans.
4. Sewer services as approved on this plan, are intended specifically for the lot and use shown, and are not intended to serve additional parcels or structures which may be created in the future. In the event that the parcels and/or lots shown on this plan are further divided to create additional parcels or lots, the owner is required to provide separate sewer services to each.
5. Schedule Utility inspections online at . Utility inspections must be scheduled online by 2:00 p.m. for inspections to occur the following normal working day (Monday through Friday). For after hours utility inspections, including weekends, contact Utility Customer Service at (702) 633–1277 to set up an account.
6. Record drawings shall be prepared, signed and submitted to the City of North Las Vegas prior to acceptance of any wastewater collection systems to be owned, operated, or maintained by the City of North Las Vegas.
7. Pipe detector ribbon and locator balls shall also be required above all sewer mains.



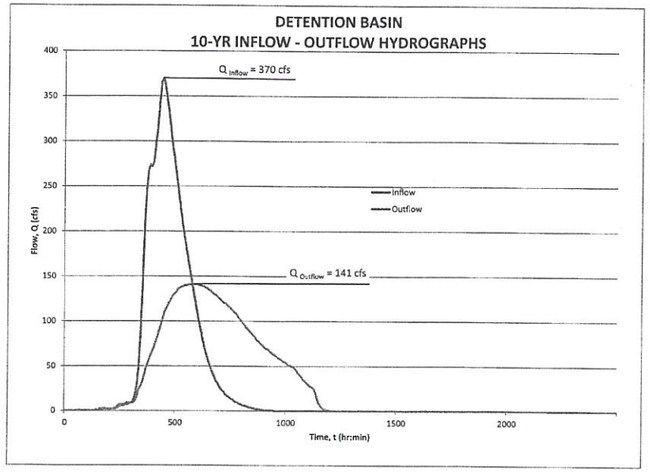
LOCATION MAP
NOT TO SCALE

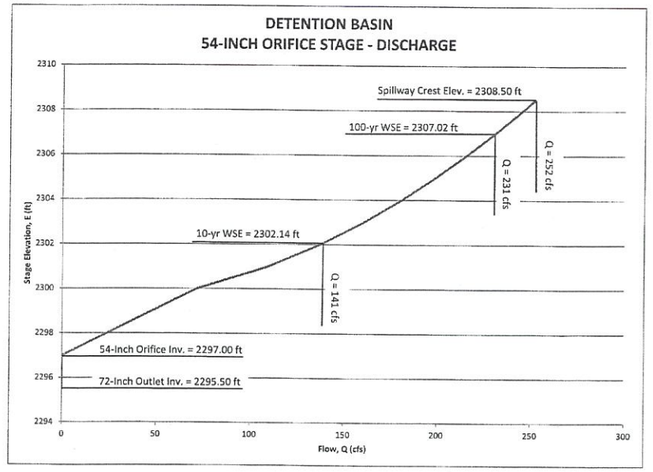
CNLV TRAFFIC NOTES

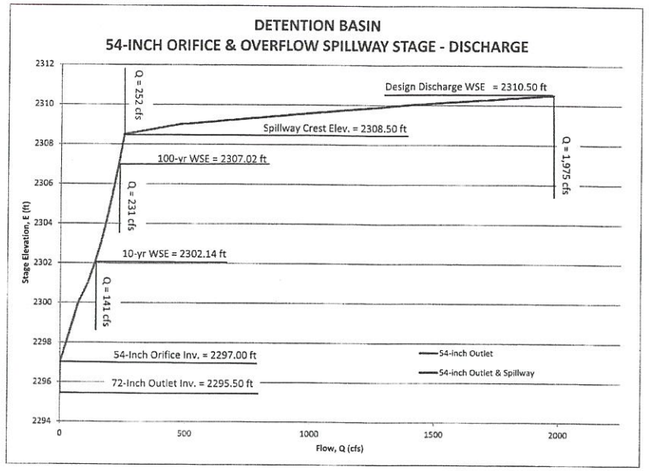
1. All barricading, construction signing, traffic delineation and markings shall be in accordance with the latest edition of the manual on uniform traffic control devices and/or work zone traffic control handbook. It shall be the contractor's responsibility to see that all traffic control devices are properly installed and maintained throughout the duration of the project. Contact the City of North Las Vegas' City Traffic Engineer for specific traffic control requirements.
2. If the project improvements necessitate temporary removal and/or relocation of traffic control signs, markings or any other traffic control devices, they shall be maintained throughout the entire duration of the project and shall be restored to the satisfaction of City of North Las Vegas' Construction Services Manager.
3. Permanent pavement marking shall be required for all rights-of-way 80 feet wide or greater which include half street improvements unless otherwise noted. New pavement markings designs shall incorporate into any existing bordering markings. Painted markings shall not be used for temporary conditions. All temporary markings shall be a removable grade tape. All other markings shall be per Clark County Uniform Standard Drawing 244 thru 248 and meet the satisfaction of the City Traffic Engineer.
4. All permanent traffic control devices required by City Traffic Engineer shall be properly installed in accordance with the latest edition of the MUTCD and/or the RTC standards prior to allowing any public traffic onto the streets, regardless of the status of their completion.
5. Fiber optic conduit schedule 40 PVC is required on all rights-of-way 80 feet and greater, size shall be 4 inches, unless otherwise specified. Pull boxes and covers shall be made of reinforced polymer concrete materials and pull box covers shall be stamped with CNLV FIBER. Pull boxes shall be of Type P 30 with straight bottom entry and exits. Spacing of pull boxes shall be 400 feet, maximum 500 feet apart, if construction limits are less than 450 feet, and one pull box shall be installed. All fiber conduits at limit of construction shall be stubbed and capped 5 feet past property line and/or connected to existing fiber conduit. All conduits shall be cleaned, blown out, mandrel(ed) and shall have a 200 lb. Pull line and a number 8 AWG THW brace wire. Pull line and wire shall be secured at both ends and capped.
6. All intersections with 80 feet/80 feet rights-of-way and greater shall be in accordance with Clark County Uniform Standard Drawing, 404.1206. Location of future signal pole foundation shall be Type I and located center of radius as in accordance with Clark County Uniform Standard Drawing 404.1300 unless otherwise noted.
7. All development plans shall have a master street lighting and traffic control (signing and striping) plan sheet contained in the set which includes all units and/or phases of the project.
8. All temporary regulatory signage shall be ground mounted in accordance with Clark County Uniform Standard Drawing 249 and meet the most recent MUTCD requirements.
9. "No Parking" zones at curb returns, fire hydrant zones and school zones shall be painted red to the limits noted on the plans.
10. Private Street name signs shall have a white background with black lettering.

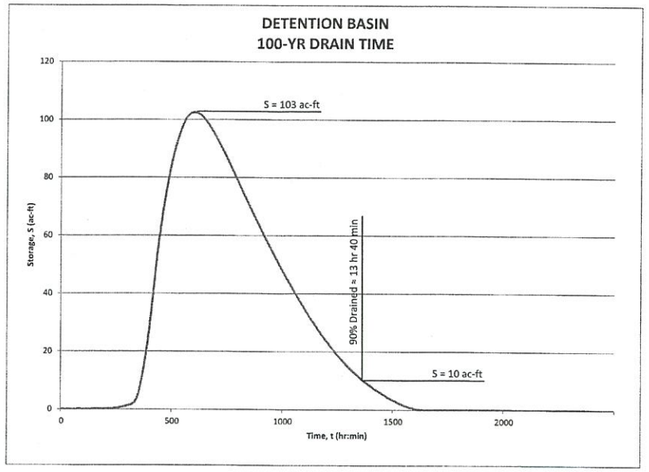
BONDABLE ITEM QUANTITIES LIST

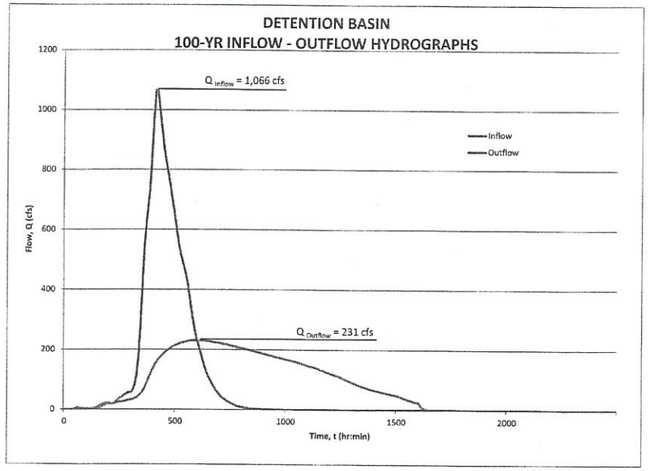
ITEM NO.	ITEM DESCRIPTION	UNIT	TOTALS

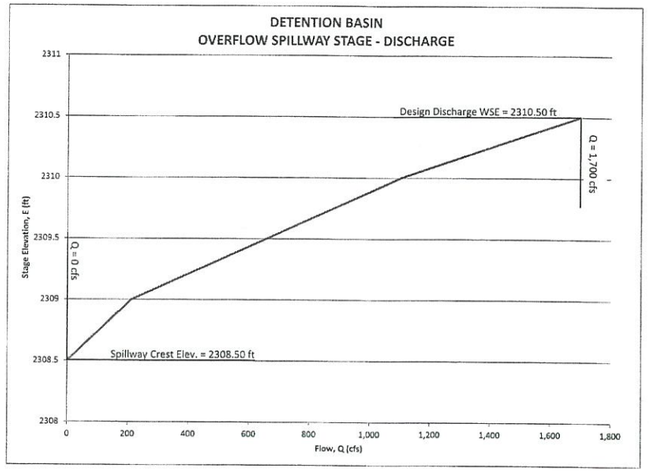


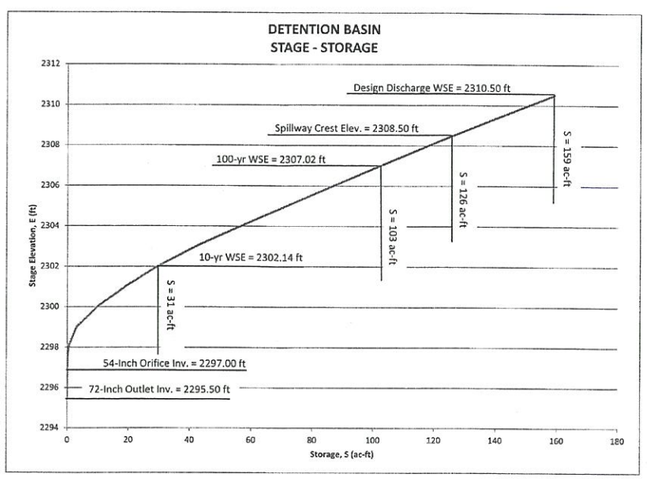


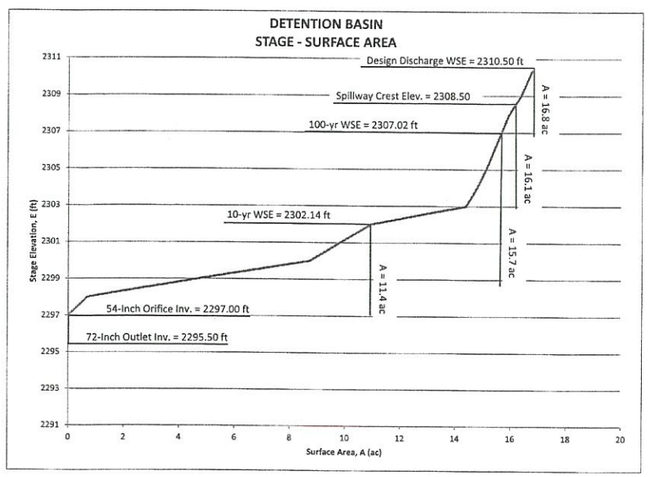












Summary of Detention Basin Characteristics	
Basin Attribute	Design Parameter
100-Year Storm Event	
Contributing Area	3.19 mi^2
Peak Inflow	1,066 cfs (SDN3)
Orifice Dimension/Invert	54" / 2297.00
Outfall Conduit/Invert	72" RCP @ 0.003 ft/ft / 2295.50
Peak Water Surface Elevation	2307.02 ft
Peak Outflow	231 cfs
Peak Storage Volume	103 ac-ft
Sediment Storage Provided/Required	23 ac-ft / 1 ac-ft
Drain Time	13 Hr, 40 Min
10-Year Storm Event	
Peak Inflow	370 cfs
Peak Outflow	141 cfs
Peak Water Surface Elevation	2302.14 ft
Peak Storage Volume	31 ac-ft
Overflow Spillway	
Crest Length/Elevation	200 LF / 2308.5
Design Discharge Capacity/Elevation	1,700 cfs / 2310.5
Peak Storage Volume/Elevation	159 ac-ft / 2310.5

*Previously proposed detention basin parameters/design

SLATER HANIFAN GROUP
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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NORTH LAS VEGAS, NV

CRESCENT BAY HOLDINGS

GRAND TETON REGIONAL FLOOD CONTROL FACILITY
DETENTION BASIN PERFORMANCE CURVES

SECTION 19
TOWNSHIP 19S
RANGE 61E

DATE: 3/7/2013
DRAFTER: JAS
DESIGNER: JSR
CHECKED: JJS

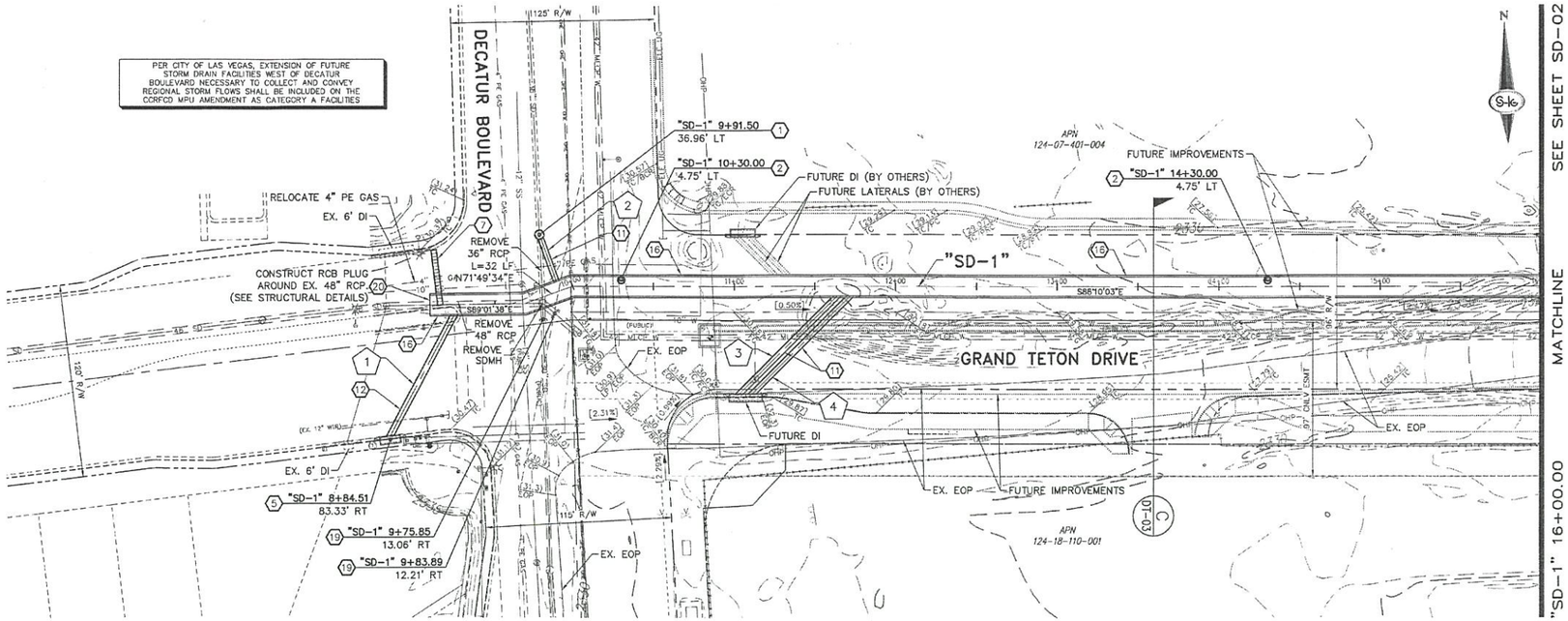
PROJECT NO.
CBH1201-000

PROFESSIONAL ENGINEER STATE OF NEVADA
JERRY J. SLATER
No. 14167
CIVIL
5/7/13

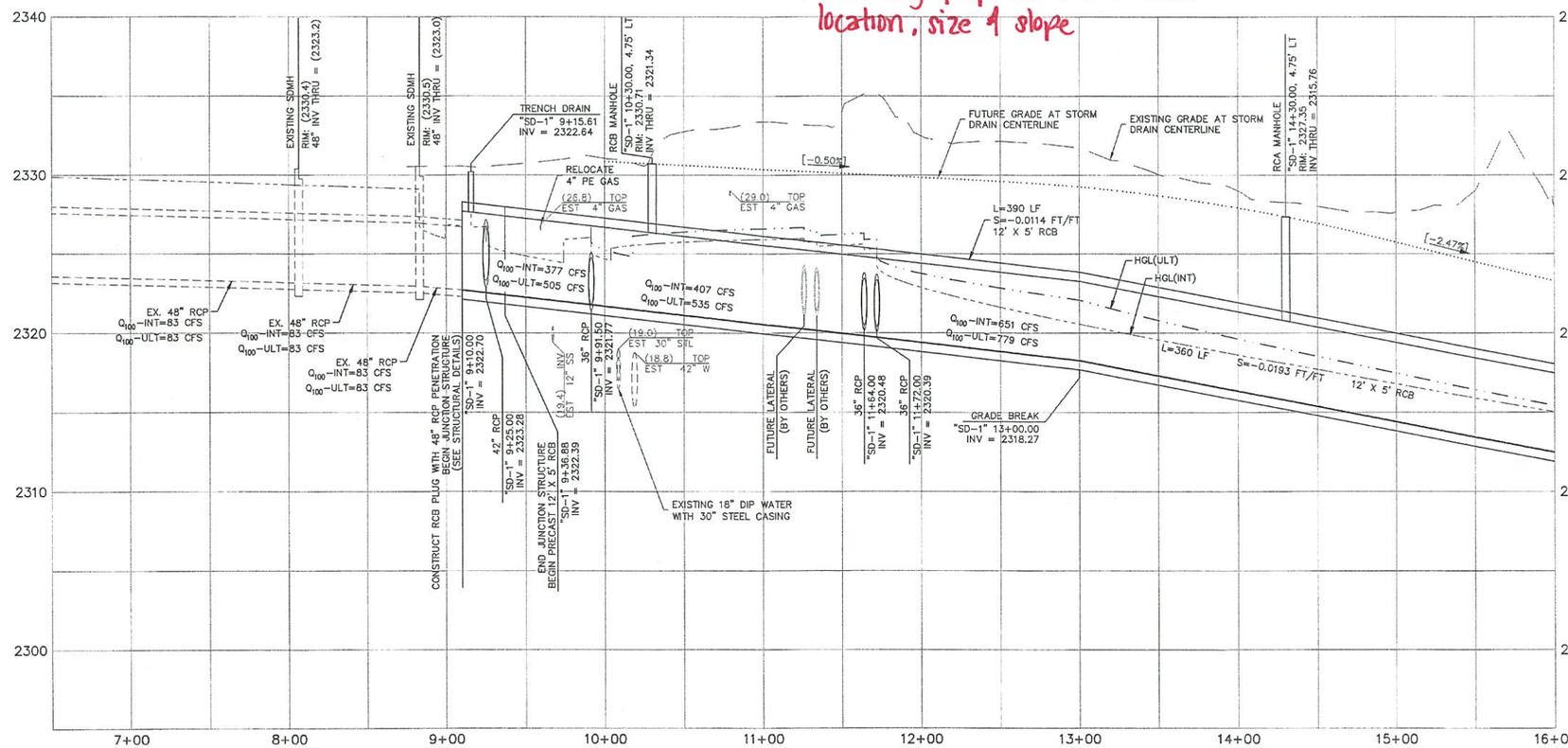
G-03
SHEET 3 OF 16

J:\CBH1201-000 Park Highlands 6th Village\mxd\g-03.dwg 5/6/2013 11:27 AM Jarrod Fields

J:\CBH1201-000 Park Highlands 6th Village\mxd\g-03.mxd 5/6/2013 11:26:03 AM jfields



* Previously proposed storm drain location, size & slope



STORM DRAIN NOTES

1. CONSTRUCT 60" TYPE III MANHOLE (USDCCA STD. DWG. NO. 406.1)
2. CONSTRUCT RCB MANHOLE (SEE STRUCTURAL DETAILS)
3. CONSTRUCT RCA MANHOLE (SEE STRUCTURAL DETAILS)
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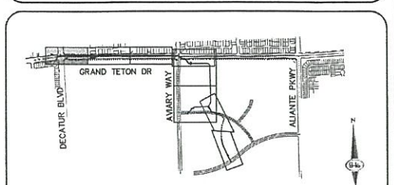
LATERAL RUN PROFILE INDEX	
LATERAL RUN NO	SEE SHEET
1 THRU 8	SD-09
9 THRU 14	SD-10

FLOOD ZONE:

THIS SITE LIES WITHIN ZONE "X" DETERMINED TO BE OUTSIDE OF THE 500 YEAR FLOODPLAIN AS DEPICTED ON FIRM MAP PANEL NUMBER 32003C1765F, REVISED NOVEMBER 16, 2011.

"I CERTIFY THAT THIS PLAN CONFORMS TO THE APPROVED TECHNICAL DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF NORTH LAS VEGAS CNLV #45326."

JERRY SLATER, P.E. 14167 DATE



KEY MAP

SCALE 40 0 40 80 FEET

FAST Call before you UnderGround. 1-702-432-6300
Call before you Dig Call 811 1-800-227-2600
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP'D DATE	APP.

NORTH LAS VEGAS, NV

CRESCENT BAY HOLDINGS

SECTION 18 TOWNSHIP 19S RANGE 61E

GRAND TETON REGIONAL FLOOD CONTROL FACILITY
STORM DRAIN PLAN AND PROFILE
"SD-1" 9+10.00 TO "SD-1" 16+00.00

DATE: 3/7/2013
DRAFTER: JAS
DESIGNER: JSR
CHECKED: JJS
PROJECT NO. CBH1201-000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - Exp. 06/30/2014 - CIVIL - No. 14167 - 3-8-13

SD-01
SHEET 4 OF 16

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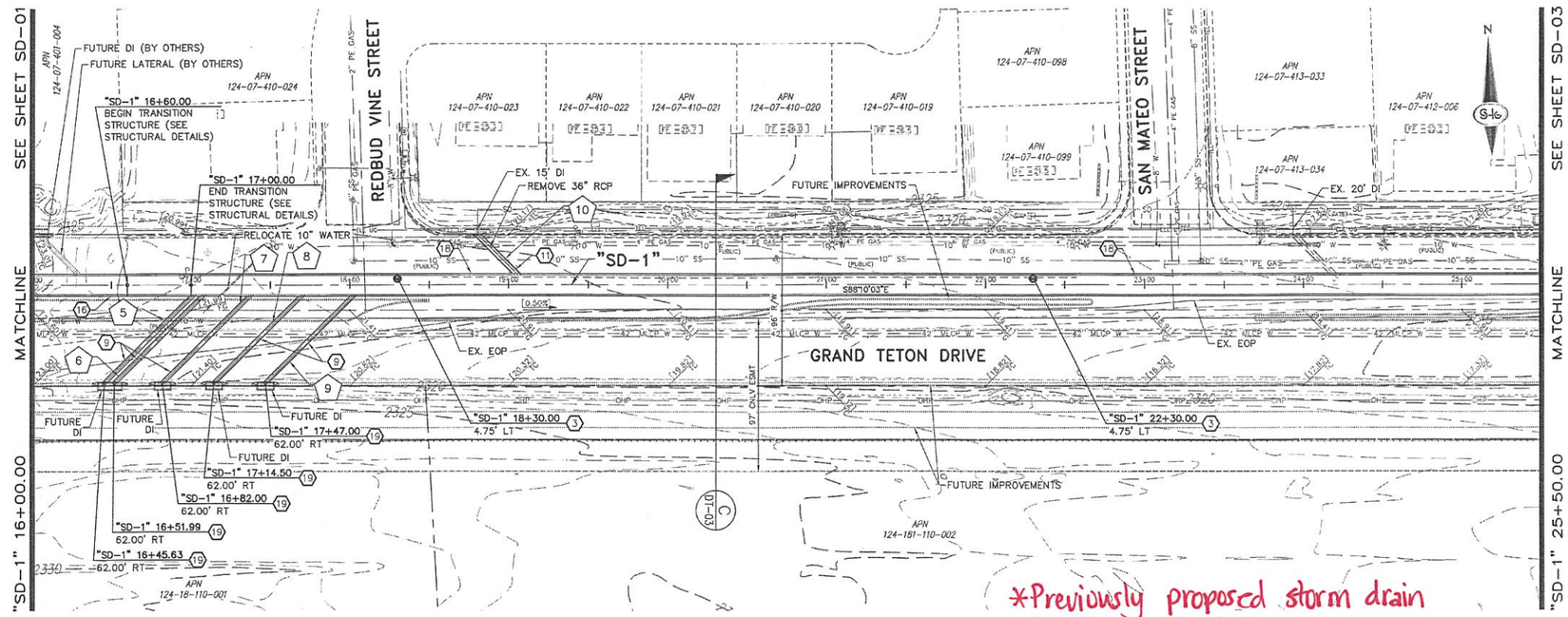
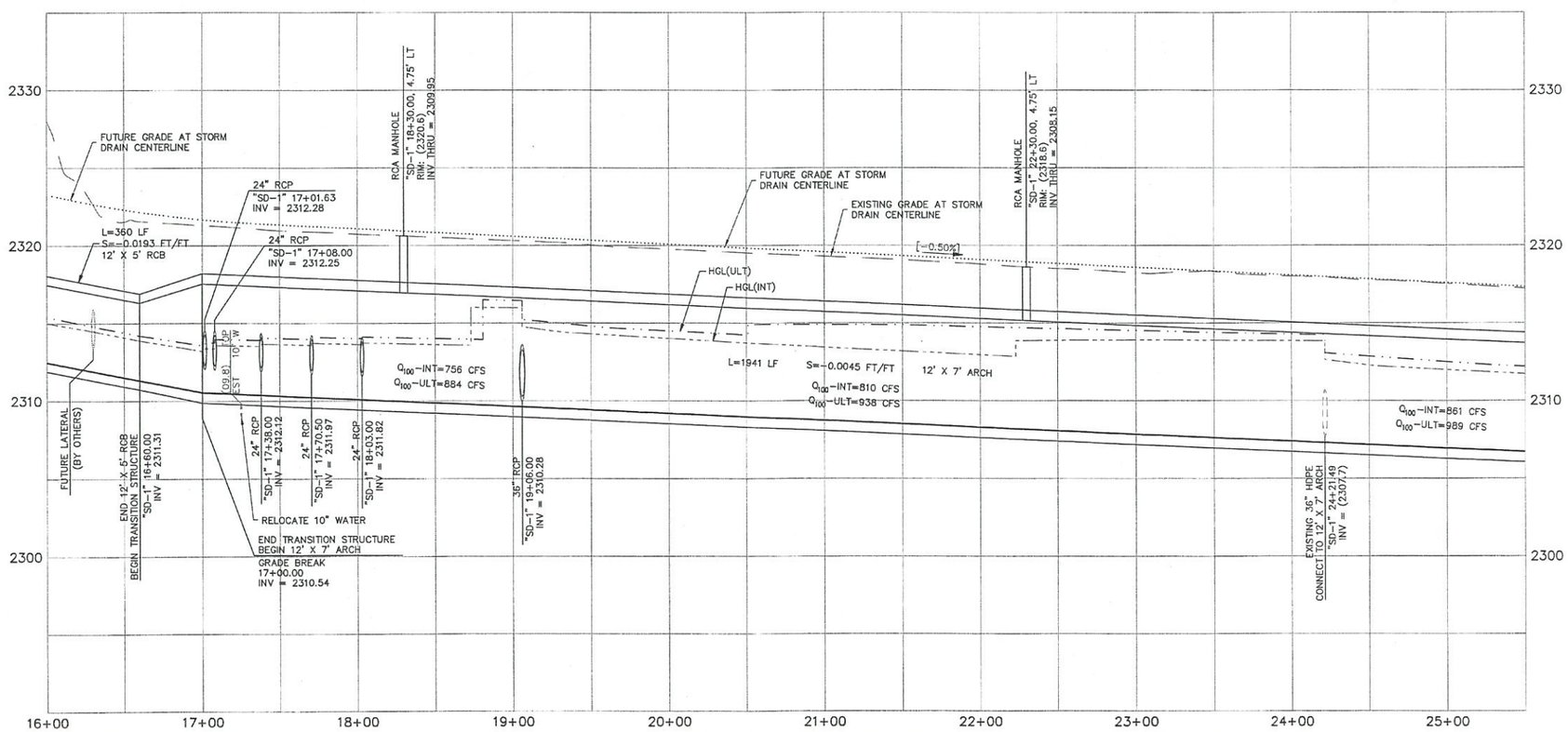


*Previously proposed storm drain location, size & slope



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9 THRU 14	SD-10

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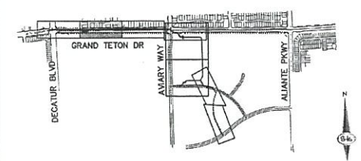
JERRY SLATER, P.E. 14167 DATE



KEY MAP

SCALE 40 0 40 80 FEET

Call before you Dig — Avoid cutting underground utility lines. It's safety. Call 811 or 1-800-227-2600

CALL BEFORE YOU DO OVERHEAD — 1-702-227-2929

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'D

NORTH LAS VEGAS, NV

CRESCENT BAY HOLDINGS

GRAND TETON REGIONAL FLOOD CONTROL FACILITY
STORM DRAIN PLAN AND PROFILE
"SD-1" 16+00.00 TO "SD-1" 25+50.00

SECTION 18
TOWNSHIP 19S
RANGE 61E

DATE: 3/7/2013
DRAFTER: JAS
DESIGNER: JSR
CHECKED: JJS
PROJECT NO.
CBH1201-000

PROFESSIONAL ENGINEER STATE OF NEVADA JERRY SLATER Exp. 06/30/2014 CIVIL No. 14167

SD-02
SHEET 5 OF 16

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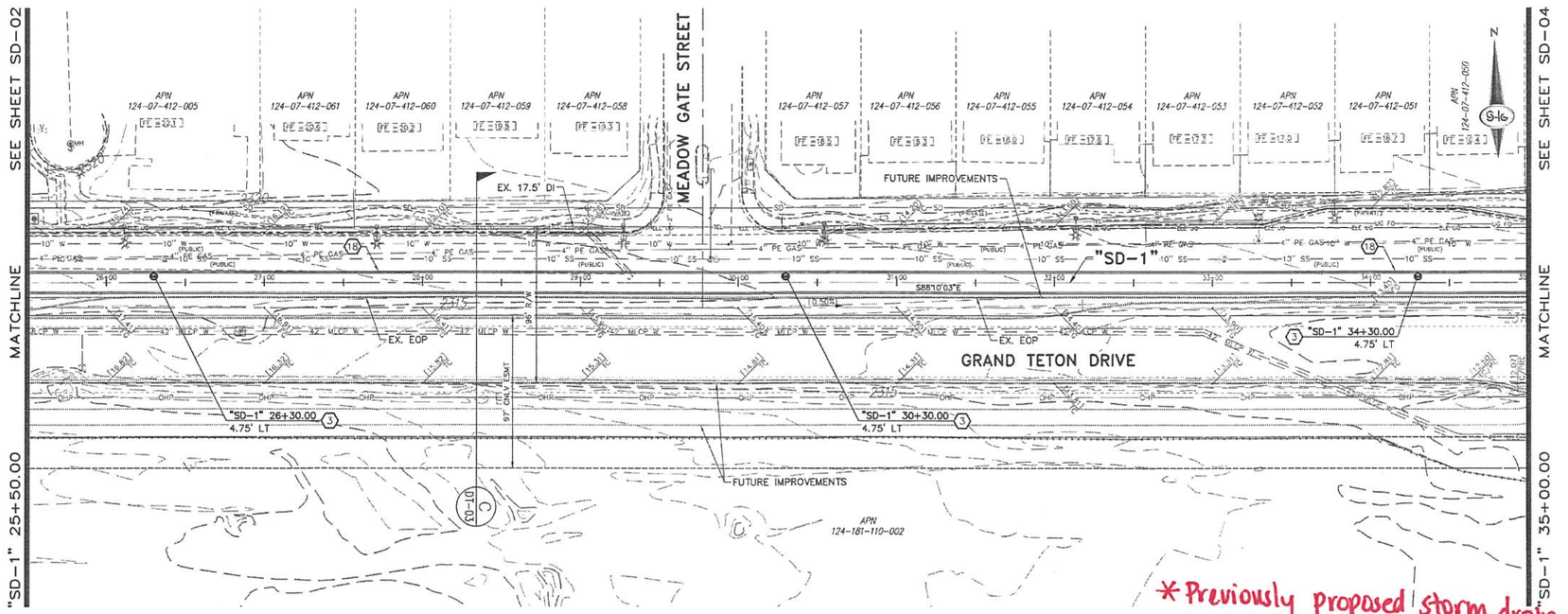

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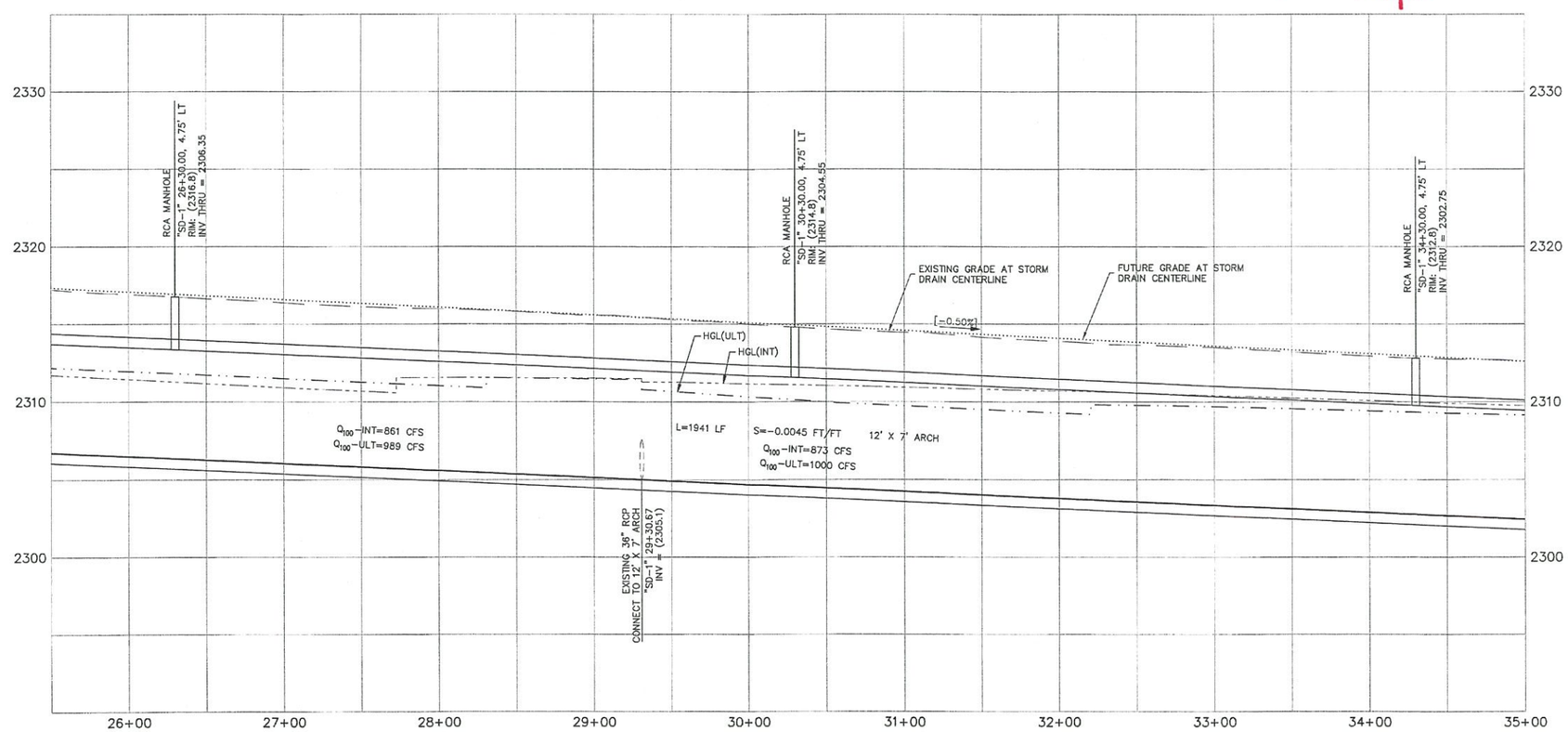

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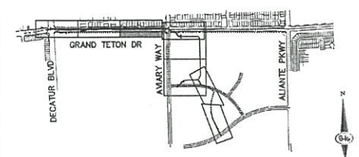

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CRESCENT BAY HOLDINGS

SECTION 18
TOWNSHIP 19S
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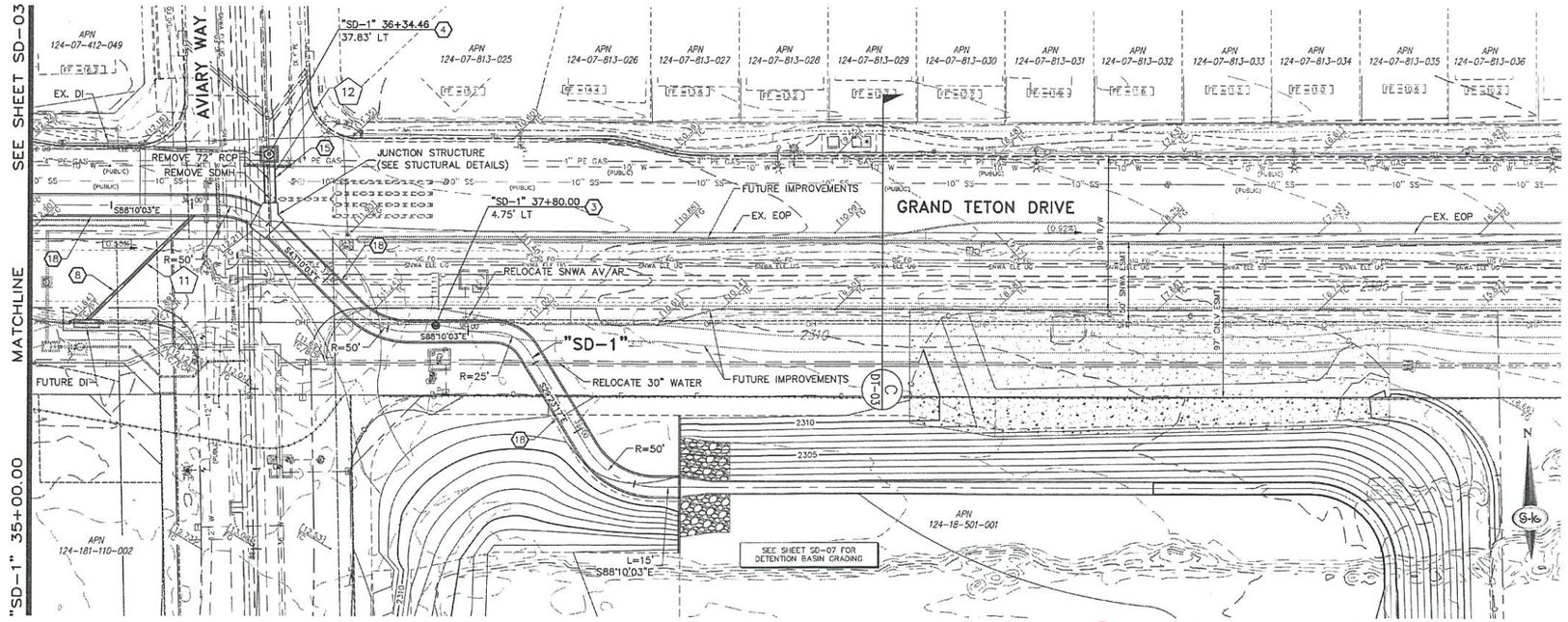
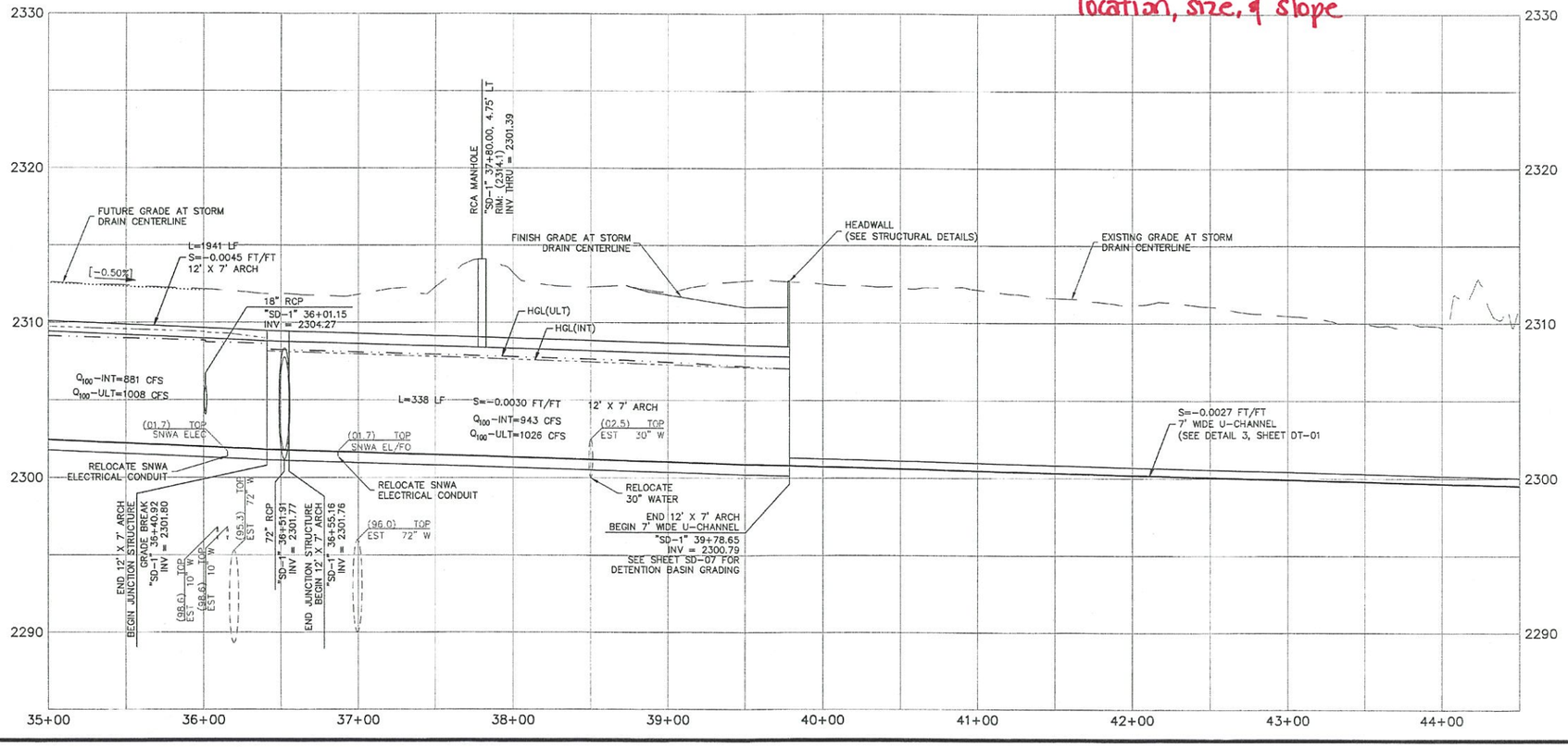
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY SLATER Exp. 06/30/2014 CIVIL No. 14167 SD13

SD-03
SHEET 6 OF 16

J:\cbh\1201-000 park highlands db\dwg\Improve\Lon-03.dwg 3/6/2013 11:31 AM Jerrod Ratliffe





*Previously proposed storm drain location, size, & slope

STORM DRAIN NOTES

1. CONSTRUCT 60" TYPE III MANHOLE (USDCCA STD. DWG. NO. 406.1)
2. CONSTRUCT RCB MANHOLE (SEE STRUCTURAL DETAILS)
3. CONSTRUCT RCA MANHOLE (SEE STRUCTURAL DETAILS)
4. CONSTRUCT SPECIAL MANHOLE (SEE STRUCTURAL DETAILS)
5. CONSTRUCT 12.5-FOOT TYPE "DM" DROP INLET (USDCCA STD. DWG. NO. 412.1)
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7. CONSTRUCT TRENCH DRAIN (L=34') (17 NEENAH R-4999-LX TYPE C HEAVY DUTY BOLT DOWN GRATES) (SEE STRUCTURAL DETAILS)
8. INSTALL 18" RCP (USDCCA STD. DWG. NO. 503.2)
9. INSTALL 24" RCP (USDCCA STD. DWG. NO. 503.2)
10. NOT USED
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12. INSTALL 42" RCP (USDCCA STD. DWG. NO. 503.2)
13. INSTALL 48" RCP (USDCCA STD. DWG. NO. 503.2)
14. INSTALL 66" RCP (USDCCA STD. DWG. NO. 503.2)
15. INSTALL 72" RCP (USDCCA STD. DWG. NO. 503.2)
16. CONSTRUCT 12' X 5' PRECAST RCB
17. CONSTRUCT 6' X 5' PRECAST RCB
18. CONSTRUCT 12' X 7' RCA (SEE STRUCTURAL DETAILS)
19. CONSTRUCT BRICK AND MORTAR PLUG (SEE DETAIL 7, SHEET DT-01)
20. CONSTRUCT RCB PLUG (NDOT STD. PLAN B-20.1.7)

STORM DRAIN NOTES:

1. ALL PIPE LENGTHS MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE OR GRADE BREAK OR TO INSIDE EDGE OF DI, RCB, OR STRUCTURE.
2. ALL DROP INLETS SHALL INCLUDE STORM WATER MANAGEMENT STAMP AND DETAIL PER USDCCA STD. DWG. NO. 421.
3. ALL STORM DRAIN SHALL BE CLASS III UNLESS OTHERWISE NOTED.
4. SEE STRUCTURAL DETAILS FOR EXISTING AND PROPOSED LATERAL CONNECTIONS TO RCB AND RCA.

LATERAL RUN PROFILE INDEX

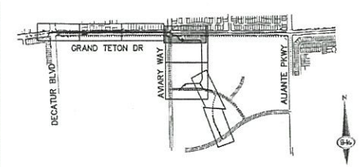
LATERAL RUN NO	SEE SHEET
1 THRU 8	SD-09
9 THRU 14	SD-10

FLOOD ZONE:

THIS SITE LIES WITHIN ZONE "X" DETERMINED TO BE OUTSIDE OF THE 500 YEAR FLOODPLAIN AS DEPICTED ON FIRM MAP PANEL NUMBER 32003C1765F, REVISED NOVEMBER 16, 2011.

"I CERTIFY THAT THIS PLAN CONFORMS TO THE APPROVED TECHNICAL DRAINAGE STUDY FOR THIS SITE ON FILE AT THE CITY OF NORTH LAS VEGAS CNLV #45326."

JERRY SLATER, P.E. 14167 DATE



KEY MAP

SCALE 40 0 40 80 FEET

Call Before you Dig Under Ground. 1-702-432-6300 REGULAR AND NATIONAL SYSTEM OF TRANSPORTATION

Call before you Dig Call 811 1-800-227-2600

CALL BEFORE YOU DIG OVERHEAD 1-702-227-2929

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

NO.	DESCRIPTION	DATE	BY	APP. DES.	APP.

NORTH LAS VEGAS, NV

CRESCENT BAY HOLDINGS

GRAND TETON REGIONAL FLOOD CONTROL FACILITY
STORM DRAIN PLAN AND PROFILE
"SD-1" 35+00.00 TO "SD-1" 39+78.65

SECTION 19
TOWNSHIP 19S
RANGE 61E

DATE: 3/7/2013
DRAFTER: JAS
DESIGNER: JSR
CHECKED: JJS
PROJECT NO.
CBH1201-000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY SLATER - No. 14167 - 6/30/2014 - CIVIL

SD-04
SHEET 7 OF 16

J:\cbh1201-000 north hollands dr\civil\cmtrcv\xsd-04.dwg 3/6/2013 11:33 AM Jarrod Ratcliffe
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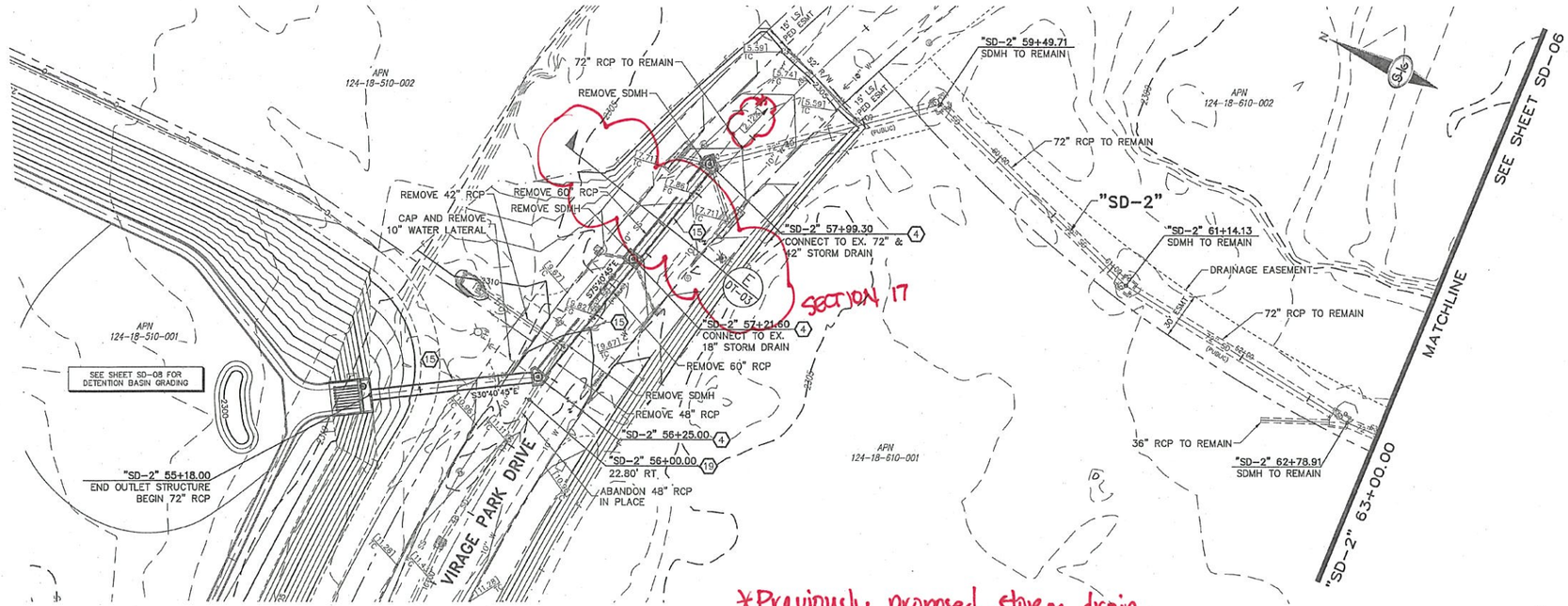

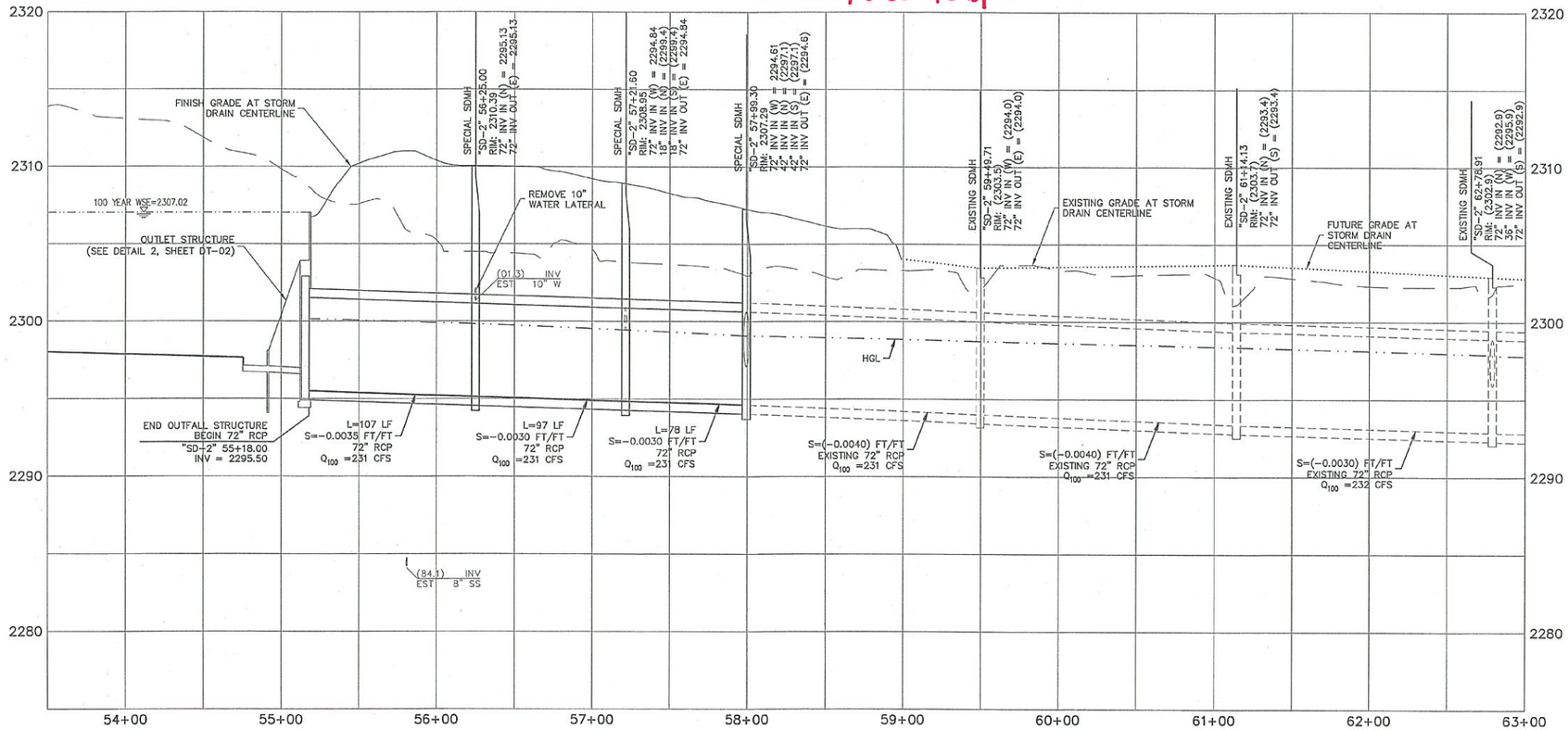

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10. INSTALL 30" RCP (USDCCA STD. DWG. NO. 503.2)
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12. INSTALL 42" RCP (USDCCA STD. DWG. NO. 503.2)
13. INSTALL 48" RCP (USDCCA STD. DWG. NO. 503.2)
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19. CONSTRUCT BRICK AND MORTAR PLUG (SEE DETAIL 7, SHEET DT-01)
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LATERAL RUN PROFILE INDEX

LATERAL RUN NO	SEE SHEET
1 THRU 8	SD-09
9 THRU 14	SD-10

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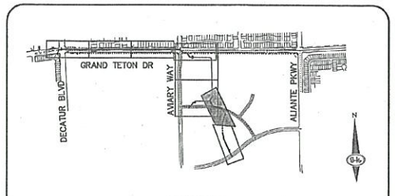
JERRY SLATER, P.E. 14167 DATE



KEY MAP

SCALE 40 0 40 80 FEET

Call before you Dig — Under Ground. 1-702-432-5300 (NEVADA 811 SYSTEM OF TRANSPORTATION)

Call before you Dig — Call 811 OR 1-800-227-2600

CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

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CONSULTING ENGINEERS & PLANNERS
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NORTH LAS VEGAS, NV

CRESCENT BAY HOLDINGS

GRAND TETON REGIONAL FLOOD CONTROL FACILITY
STORM DRAIN PLAN AND PROFILE
"SD-2" 55+18.00 TO "SD-2" 63+00.00

SECTION 16
TOWNSHIP 19S
RANGE 61E

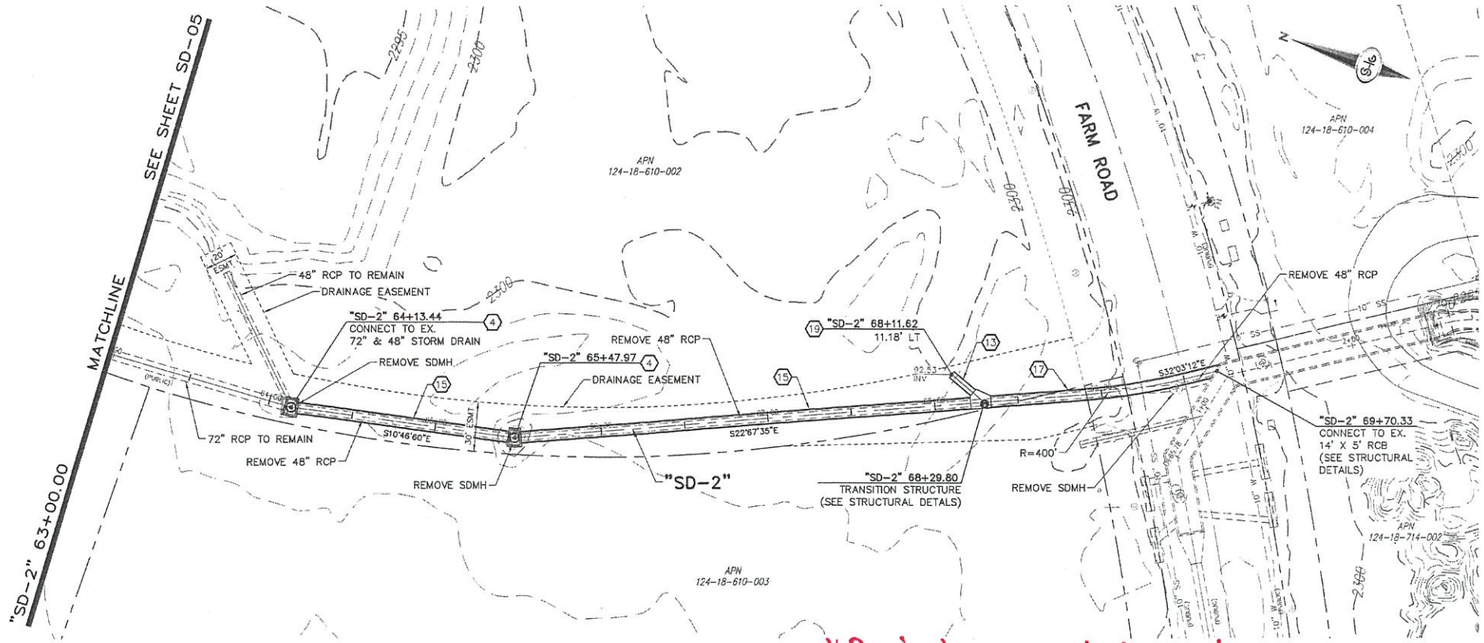
DATE: 3/7/2013
DRAFTER: JAS
DESIGNER: JSR
CHECKED: JJS
PROJECT NO.
CBH1201-000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - No. 14167 - CIVIL - EXP. 06/30/2014 - 3-7-13

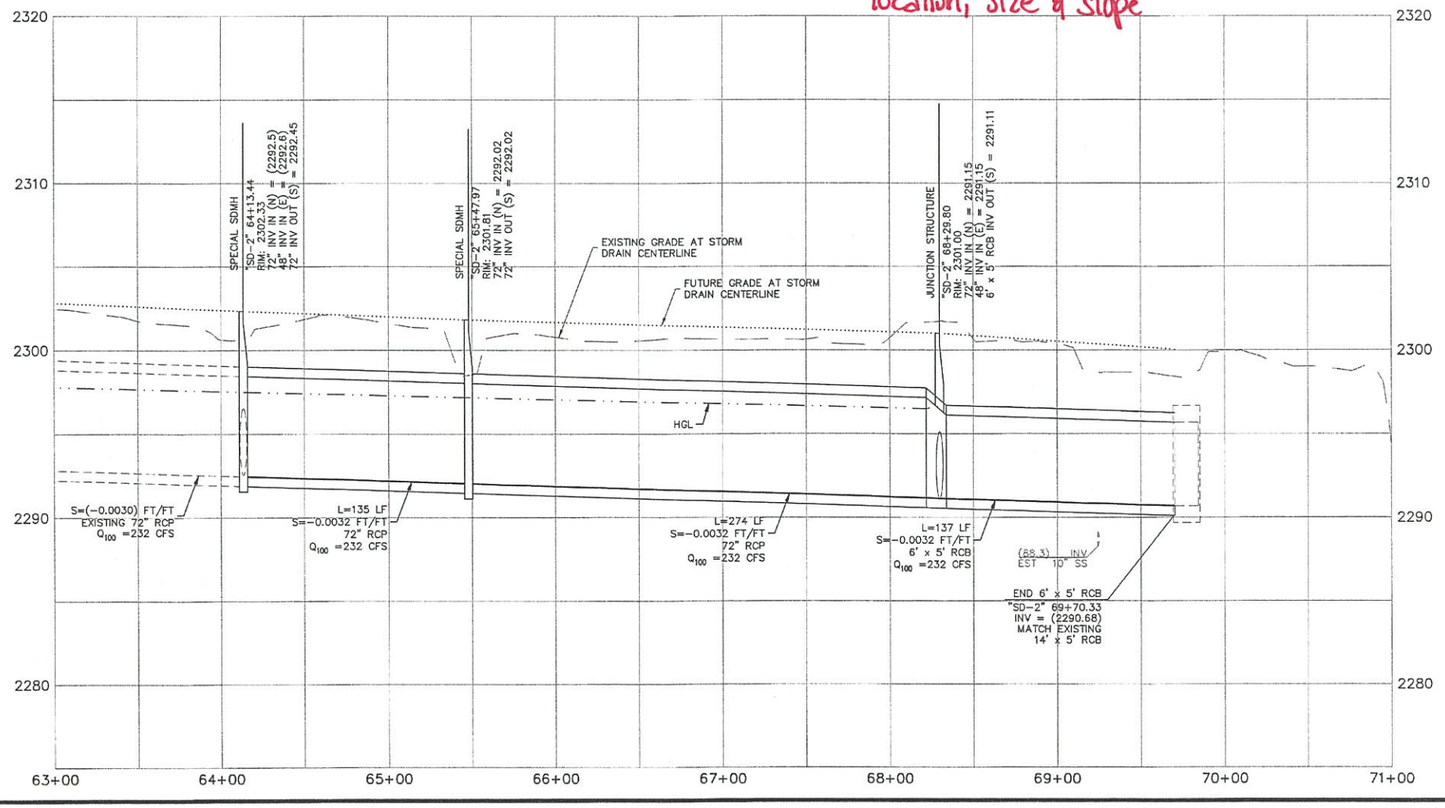
SD-05
SHEET 8 OF 16

J:\cbh1201-000 park highlands d$\sdwg\xrecrx\sd-05.dwg 3/7/2013 10:09 AM Jerrod Ratcliffe

JOB2841025-500 Park Highlands DSD\dgn\sd-05.dgn 3/7/2013 10:08:57 PM Justin



* Previously proposed storm drain location, size & slope



STORM DRAIN NOTES

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STORM DRAIN NOTES:

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LATERAL RUN PROFILE INDEX

LATERAL RUN NO	SEE SHEET
1 THRU 8	SD-09
9 THRU 14	SD-10

FLOOD ZONE:

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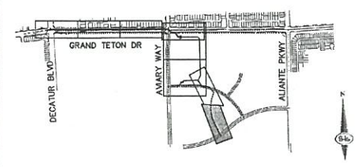
JERRY SLATER, P.E. 14167 DATE



KEY MAP

40 0 40 80
SCALE FEET

Call before you Dig
Call 811
or 1-800-227-2600

CALL BEFORE YOU DIG OVERHEAD
1-702-227-2929

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
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PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NORTH LAS VEGAS, NV

CRESCENT BAY HOLDINGS

SECTION 18
TOWNSHIP 19S
RANGE 61E

GRAND TETON REGIONAL FLOOD CONTROL FACILITY
STORM DRAIN PLAN AND PROFILE
"SD-2" 63+00.00 TO "SD-2" 69+70.33

DATE: 3/7/2013
DRAFTER: JAS
DESIGNER: JSR
CHECKED: JJS

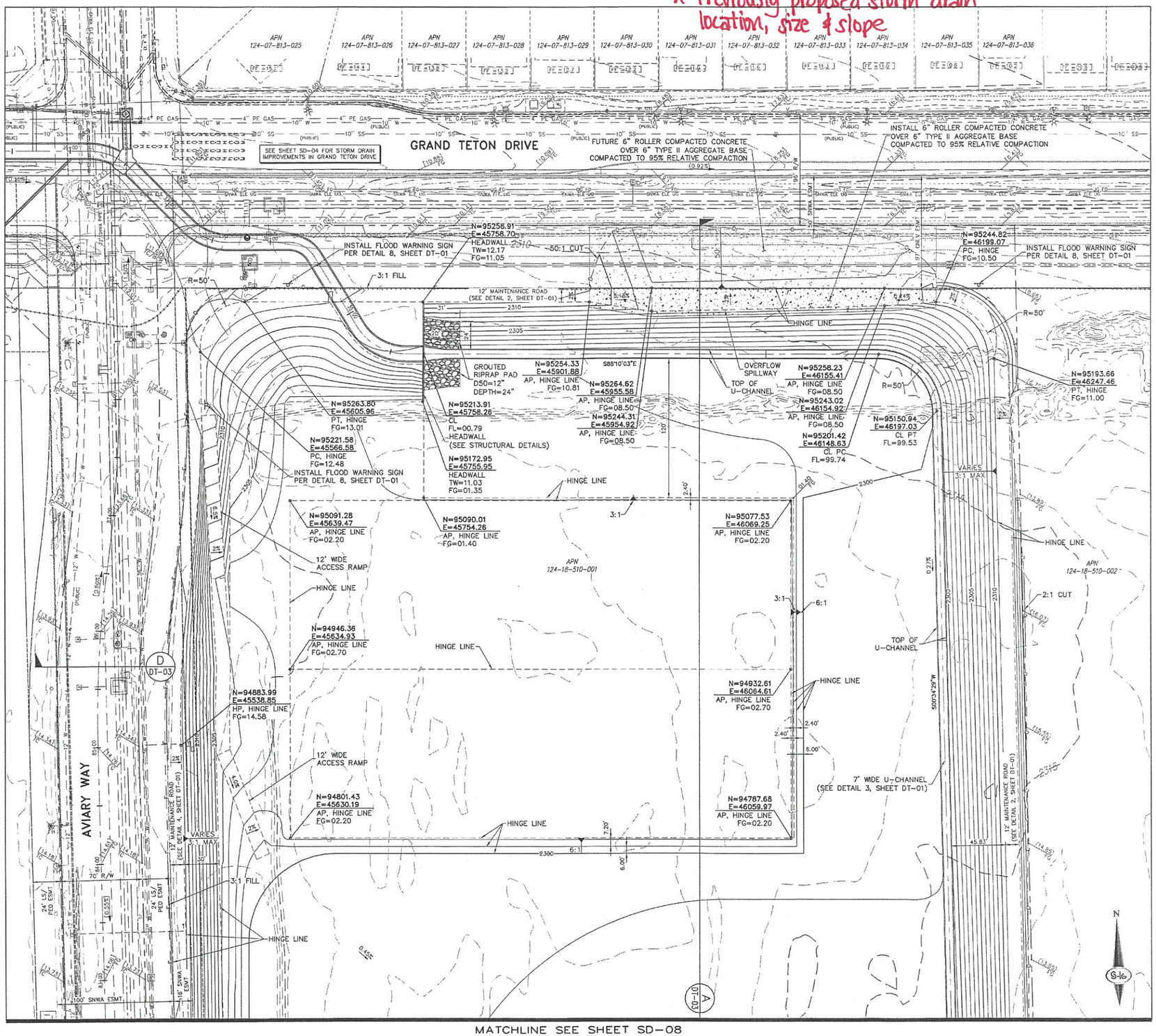
PROJECT NO.
CBH1201-000

PROFESSIONAL ENGINEER — STATE OF NEVADA — JERRY SLATER — Exp. 06/30/2014 — CIVIL — No. 14167

SD-06
SHEET 9 OF 16

J:\cbh1201-000 park highlands ctd\dwg\storm\sd-06.dwg 3/8/2013 11:36 AM Jerrod Rateliff's

* Previously proposed storm drain location, size & slope



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LATERAL RUN PROFILE INDEX	
LATERAL RUN NO	SEE SHEET
1 THRU 8	SD-09
9 THRU 14	SD-10

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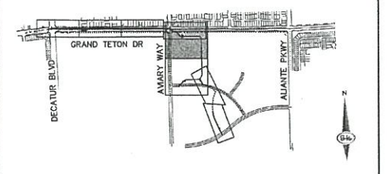
JERRY SLATER, P.E. 14167 DATE



KEY MAP

SCALE 40 0 40 80 FEET

FAST Call before you UnderGround. 1-702-432-5300

Call before you Dig Avoid cutting underground utility lines. It's easy. Call 811 1-800-227-2600

CALL BEFORE YOU DO OVERHEAD 1-702-227-2929

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
8740 S. ARVILLE STREET #216, LAS VEGAS, NV 89116
PHONE (702) 284-5300 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NORTH LAS VEGAS, NV

CRESCENT BAY HOLDINGS

GRAND TETON REGIONAL FLOOD CONTROL FACILITY
DETENTION BASIN GRADING PLAN - 1

SECTION 13
TOWNSHIP 19S
RANGE 61E

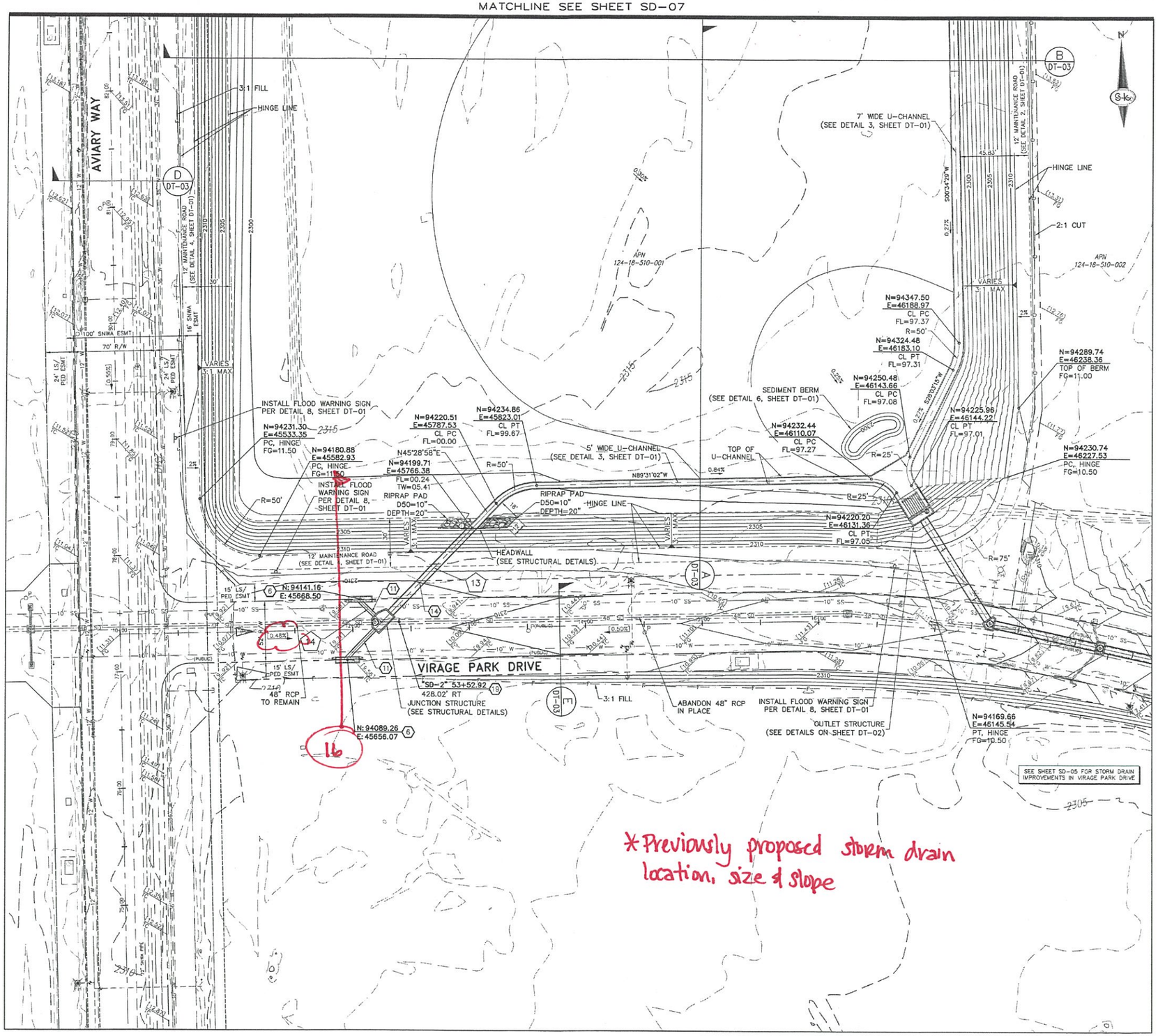
DATE: 3/7/2013
DRAFTER: JAS
DESIGNER: JSR
CHECKED: JJS
PROJECT NO.
CBH1201-000

PROFESSIONAL ENGINEER - STATE OF NEVADA - JERRY J. SLATER - Exp. 06/30/2014 - CIVIL - No. 14167 - 5-6-13

SD-07
SHEET 10 OF 16

J:\CBH1201-000 Park Highlands 08\Dwg\Hanifan\SD-07.dwg, 5/6/2013 11:37:36 AM, Jerrod Radcliffe

MATCHLINE SEE SHEET SD-07



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LATERAL RUN PROFILE INDEX

LATERAL RUN NO	SEE SHEET
1 THRU 8	SD-09
9 THRU 14	SD-10

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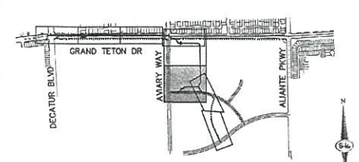

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SCALE FEET

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NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NORTH LAS VEGAS, NV

CRESCENT BAY HOLDINGS

GRAND TETON REGIONAL FLOOD CONTROL FACILITY
DETENTION BASIN GRADING PLAN - 2

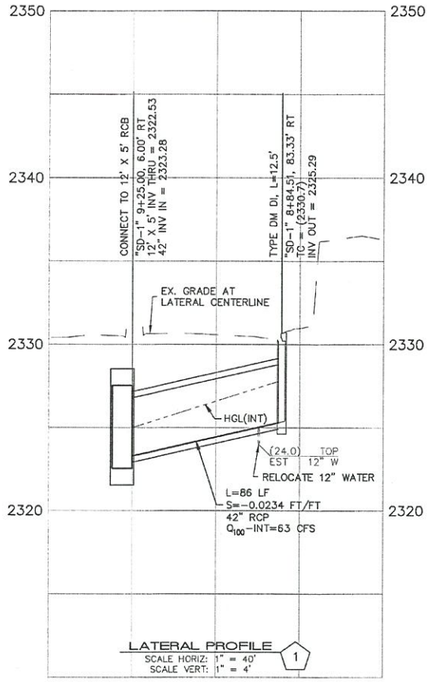
SECTION 13
TOWNSHIP 19S
RANGE 61E

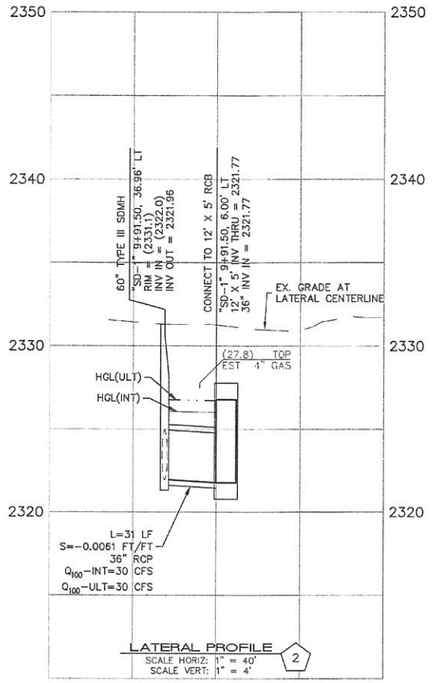
DATE: 3/7/2013
DRAFTER: JAS
DESIGNER: JSR
CHECKED: JJS
PROJECT NO. CBH1201-000

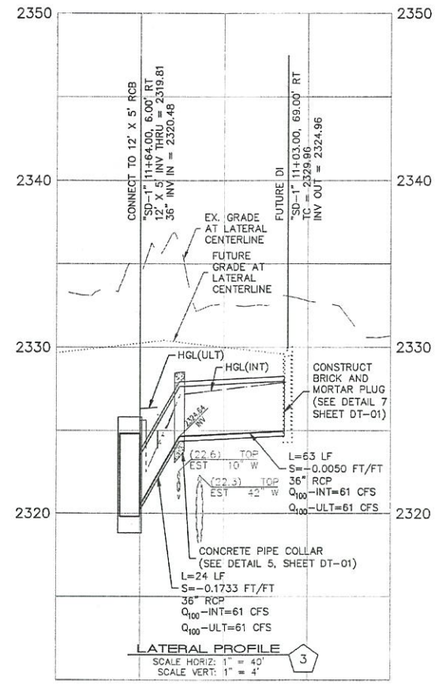
PROFESSIONAL ENGINEER STATE OF NEVADA JERRY J. SLATER No. 14167 EXP. 12/31/2014 CIVIL 5/8/13

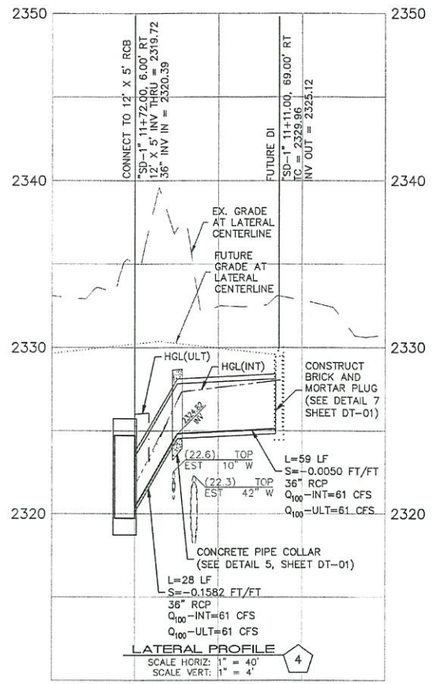
SD-08
SHEET 11 OF 16

J:\CBH1201-000 Park Highlands 08\Dwg\preliminary\SD-08.dwg, 5/8/2013 11:39 AM, Jerrod Radcliffe

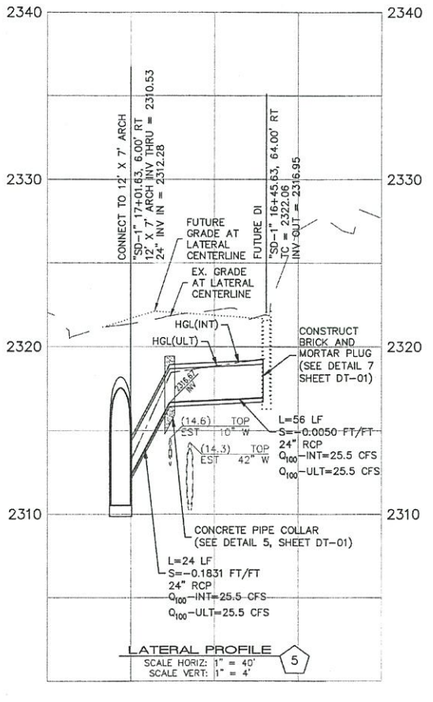


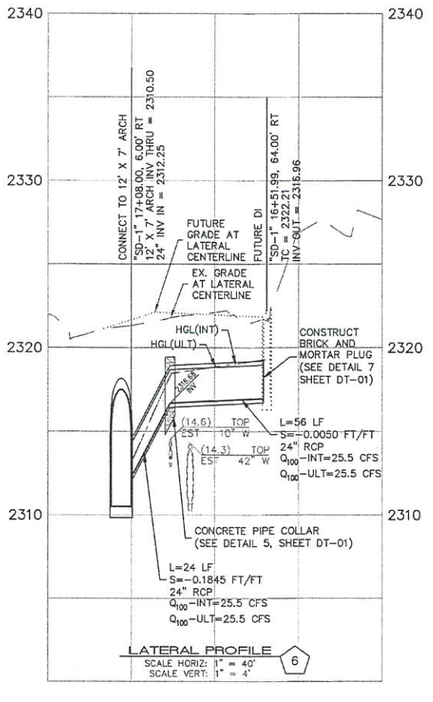


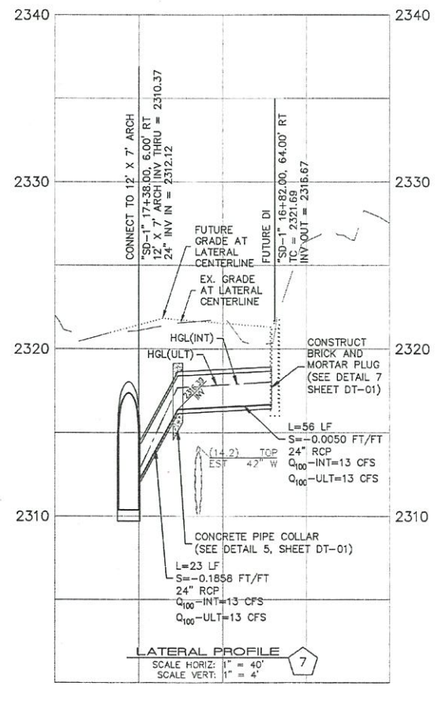


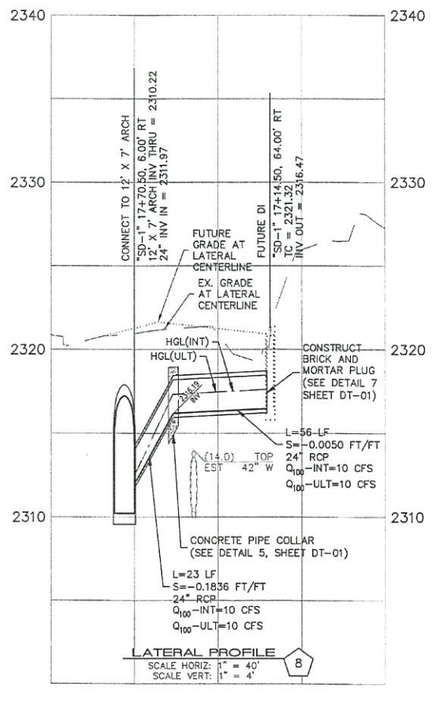


*Previously proposed storm drain location, size & slope









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'D	APP'D DATE

NORTH LAS VEGAS, NV

CRESCENT BAY HOLDINGS

GRAND TETON REGIONAL FLOOD CONTROL FACILITY

STORM DRAIN LATERAL PROFILES - 1

SECTION 18
TOWNSHIP 19S
RANGE 61E

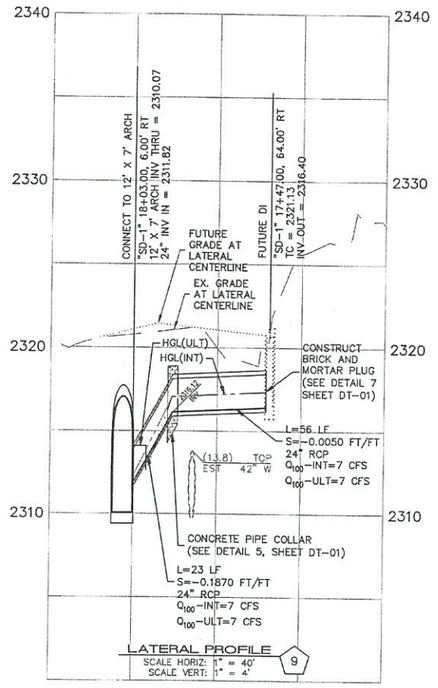
DATE: 3/7/2013
DRAFTER: JAS
DESIGNER: JSR
CHECKED: JJS
PROJECT NO.
CBH1201-000

PROFESSIONAL ENGINEER — STATE OF NEVADA — JERRY J. SLATER — Exp. 06/30/2014 — CIVIL — No. 14167

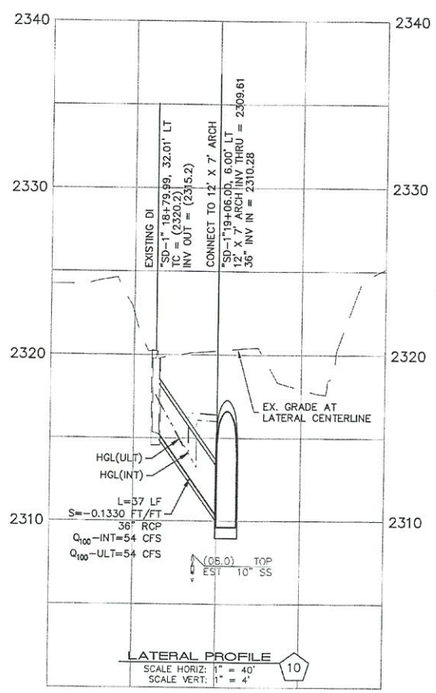
SD-09
SHEET 12 OF 16

J:\cbh1201-000 pave_hydrlands db\dwg\Virginia\Lts-09.dwg 3/8/2013 11:39 AM Jerrod Rotolfe

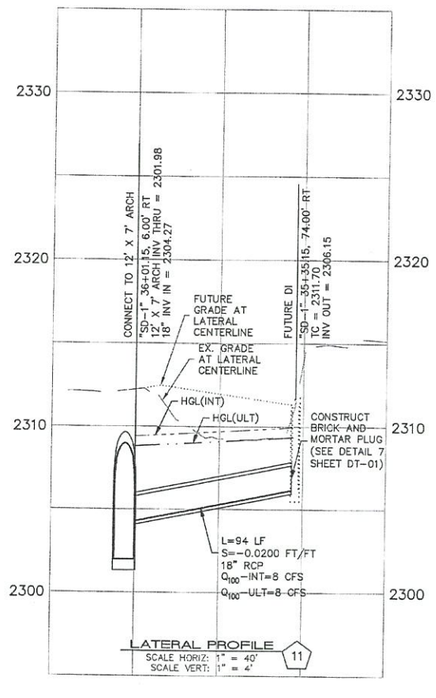
ACBH1201-000 Park Highlands (Withdrawn)\2140.dwg 3/8/2013 11:39:26 AM jrotolfe



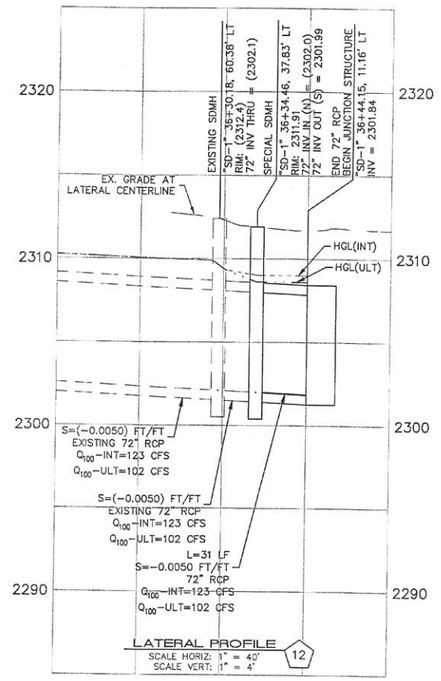
LATERAL PROFILE
SCALE HORIZ: 1" = 40'
SCALE VERT: 1" = 4'
9



LATERAL PROFILE
SCALE HORIZ: 1" = 40'
SCALE VERT: 1" = 4'
10

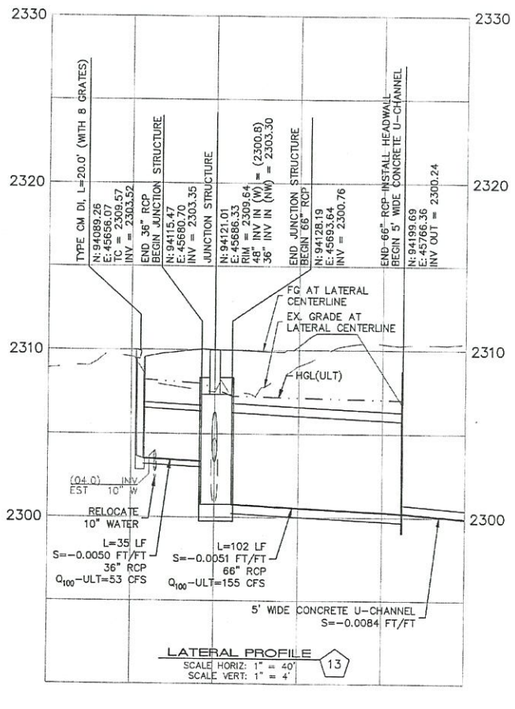


LATERAL PROFILE
SCALE HORIZ: 1" = 40'
SCALE VERT: 1" = 4'
11

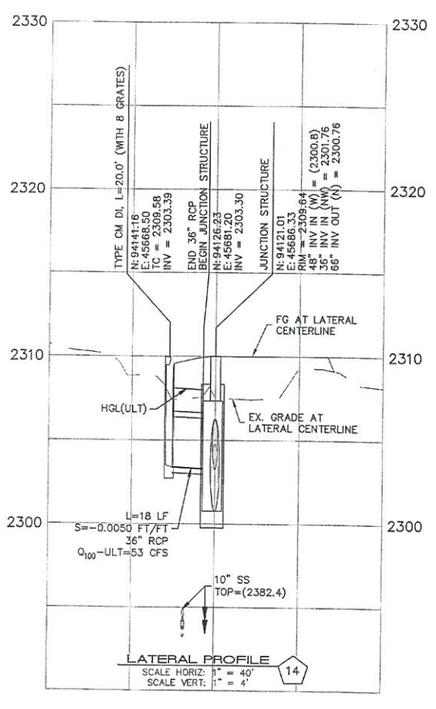


LATERAL PROFILE
SCALE HORIZ: 1" = 40'
SCALE VERT: 1" = 4'
12

* Previously proposed storm drain location, size & slope



LATERAL PROFILE
SCALE HORIZ: 1" = 40'
SCALE VERT: 1" = 4'
13



LATERAL PROFILE
SCALE HORIZ: 1" = 40'
SCALE VERT: 1" = 4'
14

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.
				APP. DATE

NORTH LAS VEGAS, NV

CRESCENT BAY HOLDINGS

GRAND TETON REGIONAL FLOOD CONTROL FACILITY

STORM DRAIN LATERAL PROFILES - 2

SECTION 18
TOWNSHIP 19S
RANGE 61E

DATE: 3/7/2013
DRAFTER: JAS
DESIGNER: JSR
CHECKED: JJS
PROJECT NO.
CBH1201-000

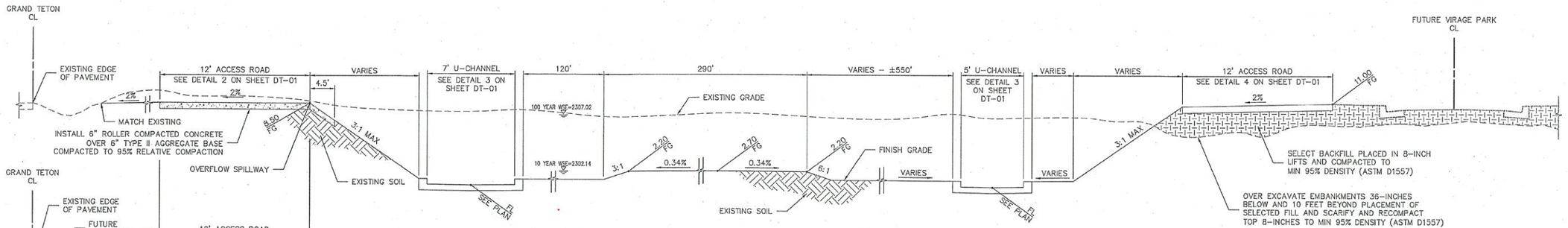
PROFESSIONAL ENGINEER - STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2014
CIVIL
No. 14167

SD-12

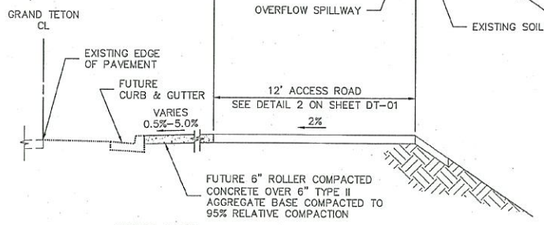
SD-10
SHEET 13 OF 16

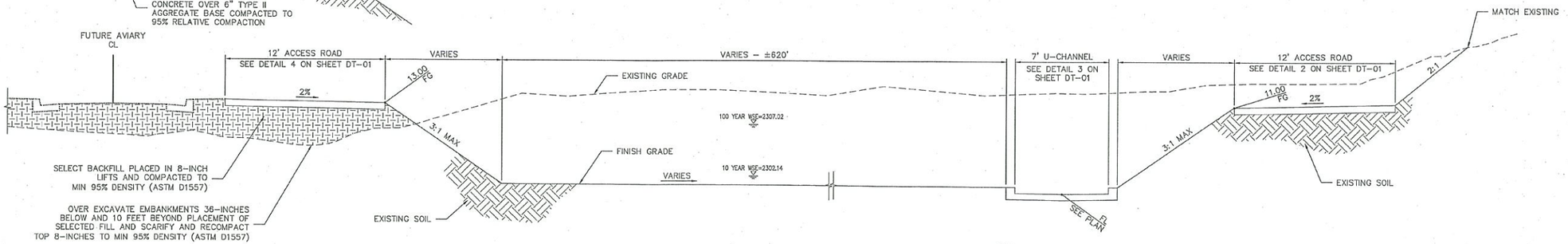
J:\CBH1201-000 Rock Trail\Work 2013\Dwg\Improved\SD-10.dwg, 5/8/2013 11:40:07 AM, Jerrod Ratcliffe

J:\CBH1201-000 Rock Trail\Work 2013\Dwg\Improved\SD-10.dwg, 5/8/2013 11:40:07 AM, jsmith



DETENTION BASIN SECTION — A
NOT TO SCALE





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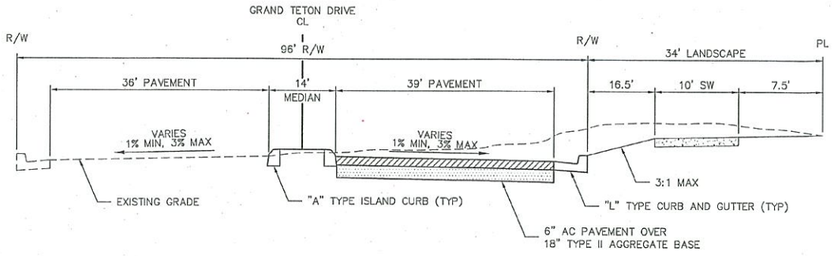
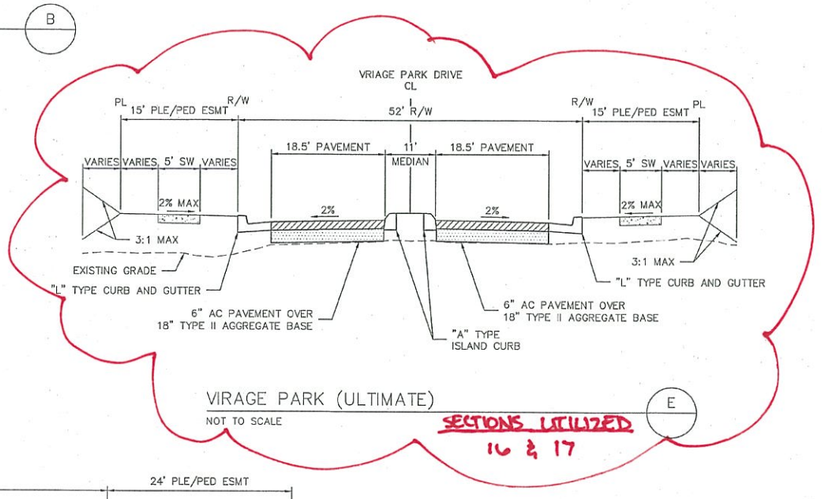
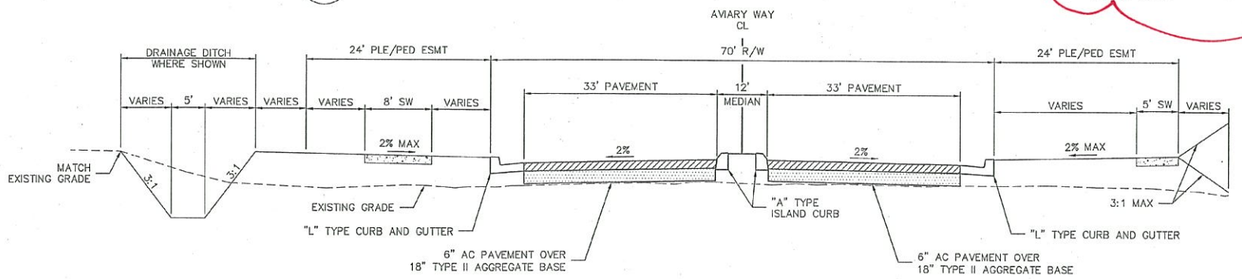


GRAND TETON (ULTIMATE) — C
NOT TO SCALE



VIRAGE PARK (ULTIMATE) — E
NOT TO SCALE

SECTIONS UTILIZED 16 & 17



AVIARY (ULTIMATE) — D
NOT TO SCALE

SLATER HANIFAN GROUP
CONSULTING ENGINEERS & PLANNERS
5345 S. ARVILLE STREET #216, LAS VEGAS, NV 89118
PHONE (702) 284-5599 FAX (702) 284-5399

NO.	DESCRIPTION	DATE	BY	APP. DATE	APP.

NORTH LAS VEGAS, NV

CRESCENT BAY HOLDINGS

GRAND TETON REGIONAL FLOOD CONTROL FACILITY

SECTIONS

SECTION 19
TOWNSHIP 19S
RANGE 61E

DATE: 3/7/2013
DRAFTER: JAS
DESIGNER: JSR
CHECKED: JJS

PROJECT NO.
CBH1201-000

PROFESSIONAL ENGINEER – STATE OF NEVADA
JERRY J. SLATER
Exp. 06/30/2014
CIVIL
No. 14167
3-1-13

DT-03
SHEET 16 OF 16

J:\CBH1201-000 park highlands d\Civil\Micro\Plt-03.dwg, 3/12/2013 8:30 AM, Jerod Ratcliffe

Technical Drainage Study for Nelson Ranch (CNLV No. 14854)

Approval Letters

Mayor
Michael L. Montandon

Council Members
William E. Robinson
Stephanie S. Smith
Shari Buck
Robert L. Eliason

CITY OF
NORTH LAS VEGAS

City Manager
Gregory E. Rose

Assistant City Manager
Dan Tarwater

Your Community of Choice
Public Works Department - Development & Flood Control
2266 Civic Center Drive • North Las Vegas, Nevada 89030
Telephone: (702) 633-1200 • Fax: (702) 649-4696
www.cityofnorthlasvegas.com

July 22, 2004

Dean W. Rasmuson, PE
Orion Engineering and Surveying, Inc.
7391 Prairie Falcon Road, Suite 150
Las Vegas, NV 89128

Re: Addendum No. 2 to the Technical Drainage Study for Nelson Ranch
CNLV No. 14854; Orion No. 041-0314

Dear Mr. Rasmuson:

Staff has reviewed the above referenced study, dated July 22, 2004, and found it to meet the minimum accepted standards for a technical drainage study. This acceptance is contingent upon the following condition:

1. Concurrence must be obtained by the Clark County Regional Flood Control District due to the proposed improvements proximity to Regional Flood Control Facilities.

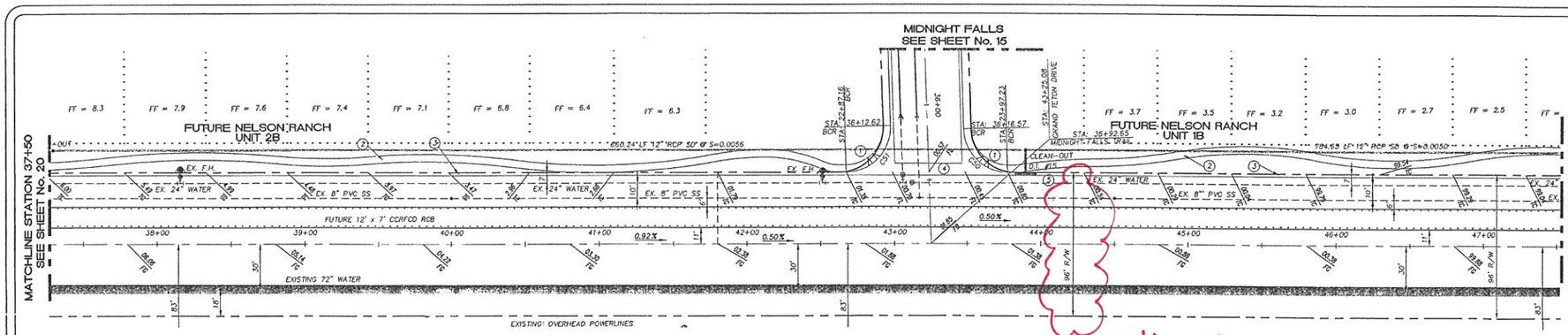
Acceptance of this drainage study does not imply approval of the grading plan or the structural calculations associated with the drainage for this site. A detailed review of the grading plan is performed by staff during the improvement plan review process.

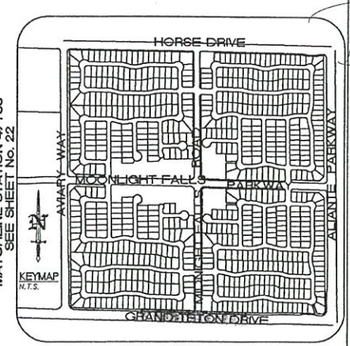
The City assumes no responsibility for the information, data, and conclusions presented in this report. If you have any questions concerning this matter, please contact me at 633-2088.

Sincerely,

Jennifer E. Doody, PE
Senior Engineering
Development and Flood Control Division

Improvement Plans





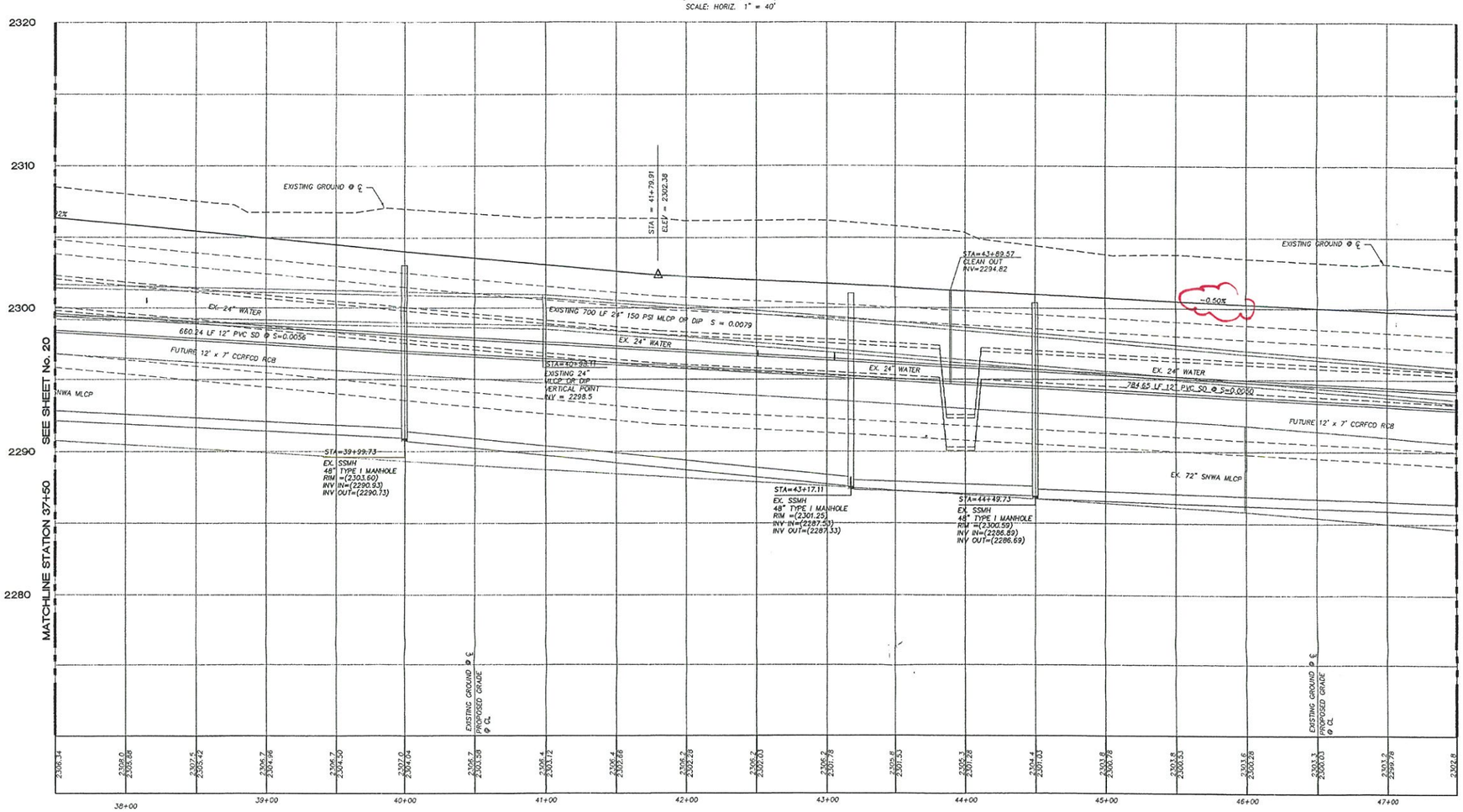


DESIGNED BY: MJF	DRAWN BY: KWNA	DATE: 03/16/04
CHECKED BY: ASP	JOB NUMBER: 041-0314	

NO.	REVISION	BY	DATE

GRAND TETON DRIVE (PUBLIC STREET)

SCALE: HORIZ. 1" = 40'



GRAND TETON DRIVE (PUBLIC STREET)

SCALE: HORIZ. 1" = 40'
SCALE: VERT. 1" = 4'

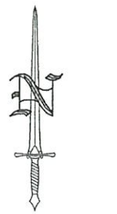
CONSTRUCTION NOTES:

1. INSTALL SIDEWALK RAMP PER C.C.A. STD. DWG. NO. 235(CASE 1)
2. INSTALL 5' MEANDERING CONCRETE SIDEWALK PER STD. DWG. NO 234
3. INSTALL "L" TYPE CURB & GUTTER PER USD NO. 216.
4. INSTALL 8' CROSS GUTTER PER C.C.A. STD. DWG. NO. 228.
5. INSTALL DROP INLET #15 PER DETAIL "A" SHEET 4

NOTE:

FOR STREET SECTION SEE DETAIL "G" SHEET 4

CURVE TABLE		
CURVE	LENGTH	RADIUS
C50	46.05	30.00
C51	48.20	30.00



GRAPHIC SCALE
40 0 20 40
(IN FEET)
1 inch = 40 ft.

LEGEND

- 70.94 FL — = FLOWLINE ELEVATION
- 71.5 FG — = FINISHED GRADE ELEVATION
- 70.94 TC — = TOP OF CURB ELEVATION
- 2.00% — = RATE & DIRECTION OF SLOPE
- = GRADEBREAK
- (73.50) = EXISTING GRADES
- 35 = LOT NUMBER
- = CENTERLINE
- = RIGHT OF WAY
- = PROPERTY LINE
- = TRANSITION
- = EXISTING MLCP
- = SCARP (2:1 MAX.)

BASIS OF BEARINGS

THE EAST LINE OF THE NORTHWEST QUARTER (NW1/4) OF THE SOUTHWEST QUARTER (SW1/4) OF SECTION 7, T.19S., R.61E., M.D.M., CITY NORTH LAS VEGAS, CLARK COUNTY, NEVADA AS DEPICTED UPON PARCEL MAP FILE 95 PAGE 03 OF PARCEL MAPS, OFFICIAL RECORDS, CLARK COUNTY, NEVADA. SAID LINE BEARS NORTH 00°00'27" WEST.

BENCHMARK

BEING CITY NORTH LAS VEGAS BENCHMARK NO. 1LV90 12NEE6, A BLM BRASS CAP LOCATED AT THE INTERSECTION OF HORSE AND DECATUR STREETS.
PUBLISHED ELEVATION = 713.5808 METERS NAVD88 DATUM
CONVERTED ELEVATION = 2341.14 FEET NAVD88 DATUM

DISCLAIMER NOTE

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

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

Avoid overhead power line contact. Call before you Overhead 1-702-593-6111 (NEVADA POWER EMERGENCY AND SAFETY SERVICES DEPARTMENT)

PROGRESS PRINT

PLAN AND PROFILE STA= 37+00 TO 47+00
GRAND TETON DRIVE

WESTWIND - INFRASTRUCTURE
SIGNATURE HOMES

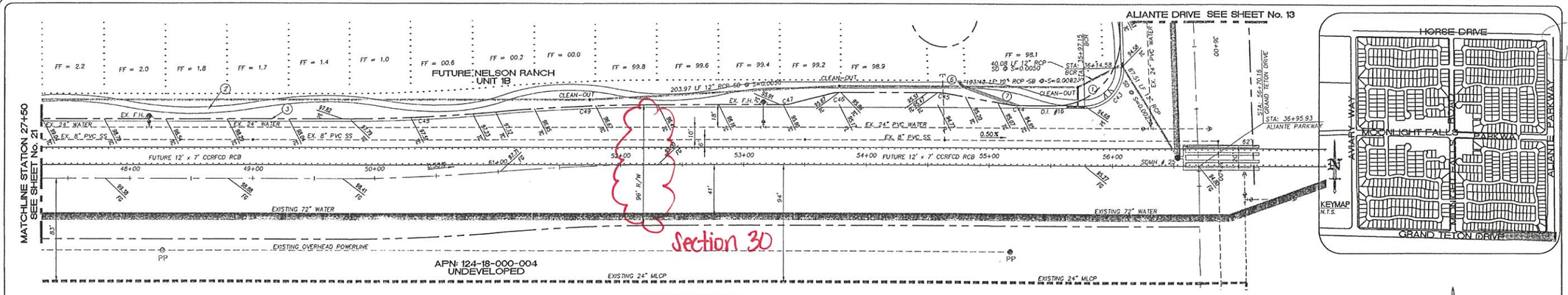
CITY OF NORTH LAS VEGAS NEVADA

ORION ENGINEERING AND SURVEYING, INC.
3068 E. SUNSET ROAD, SUITE 9
LAS VEGAS, NEVADA 89120
(702) 739-5921 FAX (702) 739-5929

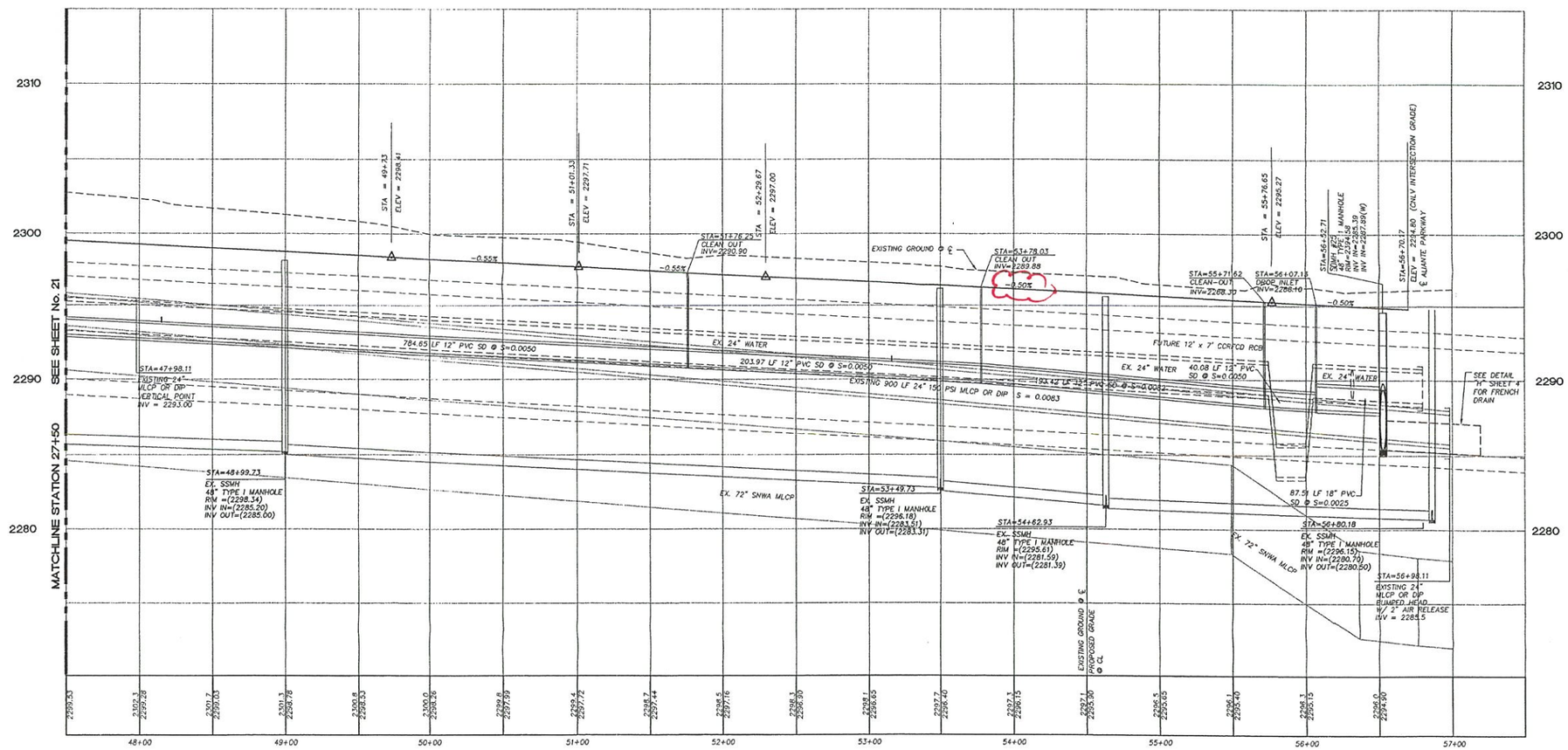
Orion

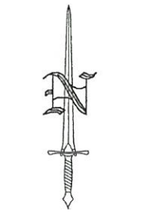
SHEET 21
of : 25

M:\Projects\041031-4\DWGS\INFRASTRUCTURE\041-4-PP-GRNDTETON.dwg, 03/16/2004 05:32:03 PM, sysA



GRAND TETON DRIVE
(PUBLIC STREET)
SCALE: HORIZ. 1" = 40'





LEGEND

- 70.84 / FL = FLOWLINE ELEVATION
- 71.5 / FG = FINISHED GRADE ELEVATION
- 70.84 / TC = TOP OF CURB ELEVATION
- 2.00% = RATE & DIRECTION OF SLOPE
- = GRADEBREAK
- (73.50) = EXISTING GRADES
- 35 = LOT NUMBER
- = CENTERLINE
- = RIGHT OF WAY
- = PROPERTY LINE
- = TRANSITION
- = EXISTING MLCP
- =SCARP (2:1 MAX.)

CURVE TABLE		
CURVE	LENGTH	RADIUS
C43	48.22	30.00
C44	4.13	25.00
C45	4.13	25.00
C46	6.12	25.00
C47	6.12	25.00
C48	124.38	1452.00
C49	132.60	1548.00

CONSTRUCTION NOTES:

1. INSTALL SIDEWALK RAMP PER C.C.A. STD. DWG. NO. 235(CASE I)
2. INSTALL 5' MEANDERING CONCRETE SIDEWALK PER STD. DWG. NO 234
3. INSTALL "L" TYPE CURB & GUTTER PER USD NO. 216.
4. INSTALL DROP INLET #16 PER DETAIL "B" SHEET 4
5. INSTALL FRENCH DRAIN PER DETAIL "H" SHEET 4
6. INSTALL SIDEWALK UNDERDRAIN PER DETAIL "D" SHEET 4
7. INSTALL FLUME PER DETAIL "F" SHEET 4

GRAND TETON DRIVE
(PUBLIC STREET)
SCALE: HORIZ. 1" = 40'
SCALE: VERT. 1" = 4'

BASIS OF BEARINGS

THE EAST LINE OF THE NORTHWEST QUARTER (NW1/4) OF THE SOUTHWEST QUARTER (SW1/4) OF SECTION 7, T.19S., R.61E, M.D.M., CITY NORTH LAS VEGAS, CLARK COUNTY, NEVADA AS DEPICTED UPON PARCEL MAP FILE 93 PAGE 03 OF PARCEL MAPS, OFFICIAL RECORDS, CLARK COUNTY, NEVADA. SAID LINE BEARS NORTH 00°00'27" WEST.

NOTE:

FOR STREET SECTION SEE DETAIL "G" SHEET 4

BENCHMARK

BEING CITY NORTH LAS VEGAS BENCHMARK NO. 1LV90 12NE66, A BLM BRASS CAP LOCATED AT THE INTERSECTION OF HORSE AND DECATUR STREETS.
PUBLISHED ELEVATION = 713.5808 METERS NAVD88 DATUM
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Avoid overhead power line contact. Call before you Overhead 1-702-593-6111 NEVADA POWER OVERHEAD AND SWITCH SERVICES DEPARTMENT

PROGRESS PRINT

PROFESSIONAL ENGINEER STATE OF NEVADA
DEAN M. RASMUSON
CIVIL
NO. 9193
EXP. 12-31-05

DESIGNED BY:MJF	DRAWN BY:KWNA	DATE:03/16/04
CHECKED BY:ASP	JOB NUMBER: 041-0314	
NO.	REVISION	BY DATE

PLAN AND PROFILE STA= 47+00 TO 56+19.56
GRAND TETON DRIVE
WESTWIND - INFRASTRUCTURE
SIGNATURE
CITY OF NORTH LAS VEGAS NEVADA

ORION ENGINEERING AND SURVEYING, INC.
3068 E. SUNSET ROAD, SUITE 9
LAS VEGAS, NEVADA 89120
(702) 739-5921 FAX (702) 739-5929

SHEET 22 of : 25

N:\Projects\041103\14WGD\INFRASTRUCTURE\0314-PP-GTNDTETON.dwg, 03/16/2004 10:32:19 PM, ayelk

Update to Conceptual Drainage Study for North Las Vegas 1905 Acre Site (Aliante) (CNLV No. 12601)

Approval Letters

Mayor
Michael L. Montandon

Council Members
William E. Robinson
Stephanie S. Smith
Shari Buck
Robert L. Eliason

CITY OF
NORTH LAS VEGAS

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Gregory E. Rose

Assistant City Manager
Dan Turnwater

Public Works Department - Development & Flood Control
2266 Civic Center Drive • North Las Vegas, Nevada 89030
Telephone: (702) 633-1200 • Fax: (702) 649-4696
www.cityofnorthlasvegas.com

November 10, 2003

Jeffery J. McBride, PE
GC Wallace, Inc.
1555 South Rainbow Blvd.
Las Vegas, NV 89146

Re: Update to the Conceptual Drainage Study for North Las Vegas 1905 Acres
CNLV No. 12601; GCW No. 590.211.200

Dear Mr. Lozano:

Staff has reviewed the above referenced study, dated September 17, 2003, and found it to meet the minimum accepted standards for a technical drainage study. This acceptance is contingent upon the following conditions:

1. Concurrence must be obtained by the Clark County Regional Flood Control District due to the FEMA Special Flood Hazard Area that traverses the site and the proposed improvements proximity to Regional Flood Control Facilities. Please submit the study and a copy of this conditional approval letter to the Clark County Regional Flood Control District at your earliest convenience.

2. Concurrence must be obtained by the Clark County Public Works due to the proposed improvements proximity to the Clark County Beltway. Please submit the study and a copy of this conditional approval letter to the Clark County Public Works at your earliest convenience.

Acceptance of this drainage study does not imply approval of the grading plan or the structural calculations associated with the drainage for this site. A detailed review of the grading plan is performed by staff during the improvement plan review process.

The City assumes no responsibility for the information, data, and conclusions presented in this report. If you have any questions concerning this matter, please contact me at 633-2088.

Sincerely,

Jennifer E. Doody, PE
Senior Engineer
Development and Flood Control Division

C L A R K C O U N T Y
REGIONAL FLOOD CONTROL DISTRICT



Jeff
590.21.200

Fraser, II, P.E.
ral Manager/Chief Engineer

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ce L. Woodbury
Clark County

December 19, 2003

Mr. Stephen E. Casmus, P.E.
City of North Las Vegas Public Works
2266 Civic Center Drive
North Las Vegas, NV 89030

DISTRICT CONCURRENCE: NORTH LAS VEGAS 1905 ACRES UPDATE (CNLV NO. 12601) (RFCD NO. 03-5509)

Dear Mr. Casmus:

Clark County Regional Flood Control District (District) reviewed Conceptual Drainage Study dated September 17, 2003, 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 North Las Vegas Public Works dated November 10, 2003.

District concurs with acceptance of this Conceptual Drainage Study by City of North 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.* As noted in study, site resides in a Special Flood Hazard Area (SFHA) designated as "Zone A" per the effective Flood Insurance Rate Map (FIRM). Therefore, consultant should be advised that this acceptance does not serve to amend the FIRM or remove the SFHA.

Please be aware that as additional information becomes available and/or restudies of Flood Insurance Studies are performed, information submitted by G. C. 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: Jeffery J. McBride, P.E., G. C. Wallace, Inc.

File: 19-61-17.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

Department of Development Services
Civil Engineering Division

500 S Grand Central Pky 1st Fl • PO Box 551799 • Las Vegas NV 89155-1799
(702) 455-4600 • Fax (702) 388-2550

Phil Rosenquist, Director • Carla J. Pearson, Assistant Director

5th floor

Rick
Jeff
Calvin

December 5, 2003

G. C. Wallace, Inc.
1555 South Rainbow Boulevard
Las Vegas, Nevada 89146

CONCURRENCE FOR THE UPDATE TO THE CONCEPTUAL DRAINAGE STUDY FOR NORTH LAS VEGAS 1905 ACRES (ALIANTE) - SEC. 17-21, T. 19 S., R. 61 E. - HTE 03- 48960

The above-referenced site is located within the City of North Las Vegas. The drainage study was submitted to the County for concurrence because the property is crossed by the Northern Segment of the Las Vegas Beltway The County has reviewed the submittal. In addition, the County has received the acceptance letter dated November 10, 2003 from the City of North Las Vegas. The County concurs with the acceptance of this drainage study by the City of North Las Vegas, subject to the following conditions:

1. Grading within the Northern Beltway right-of-way requires an encroachment permit from Clark County Department of Development Services, Civil Engineering Division;

2. No nuisance water is allowed within the Northern Beltway right-of-way at any time. Nuisance flows from the site must be conveyed within a storm drain system to be maintained by the City of North Las Vegas;

Please note that the County's review of this development is limited to drainage issues significant to Clark County unincorporated areas.

No liability is assumed by the County for information, data, and conclusions of the consulting engineer.

DEVELOPMENT SERVICES DEPARTMENT
Civil Engineering Division

BY _____
Todd L. Myers, P.E.
Senior Engineer

TM: pts
cc: Jennifer E. Doody, P.E., Senior Engineer
City of North Las Vegas Department of Public Works
Mike Hand, P.E.
Clark County Department of Public Works

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Drainage Exhibits

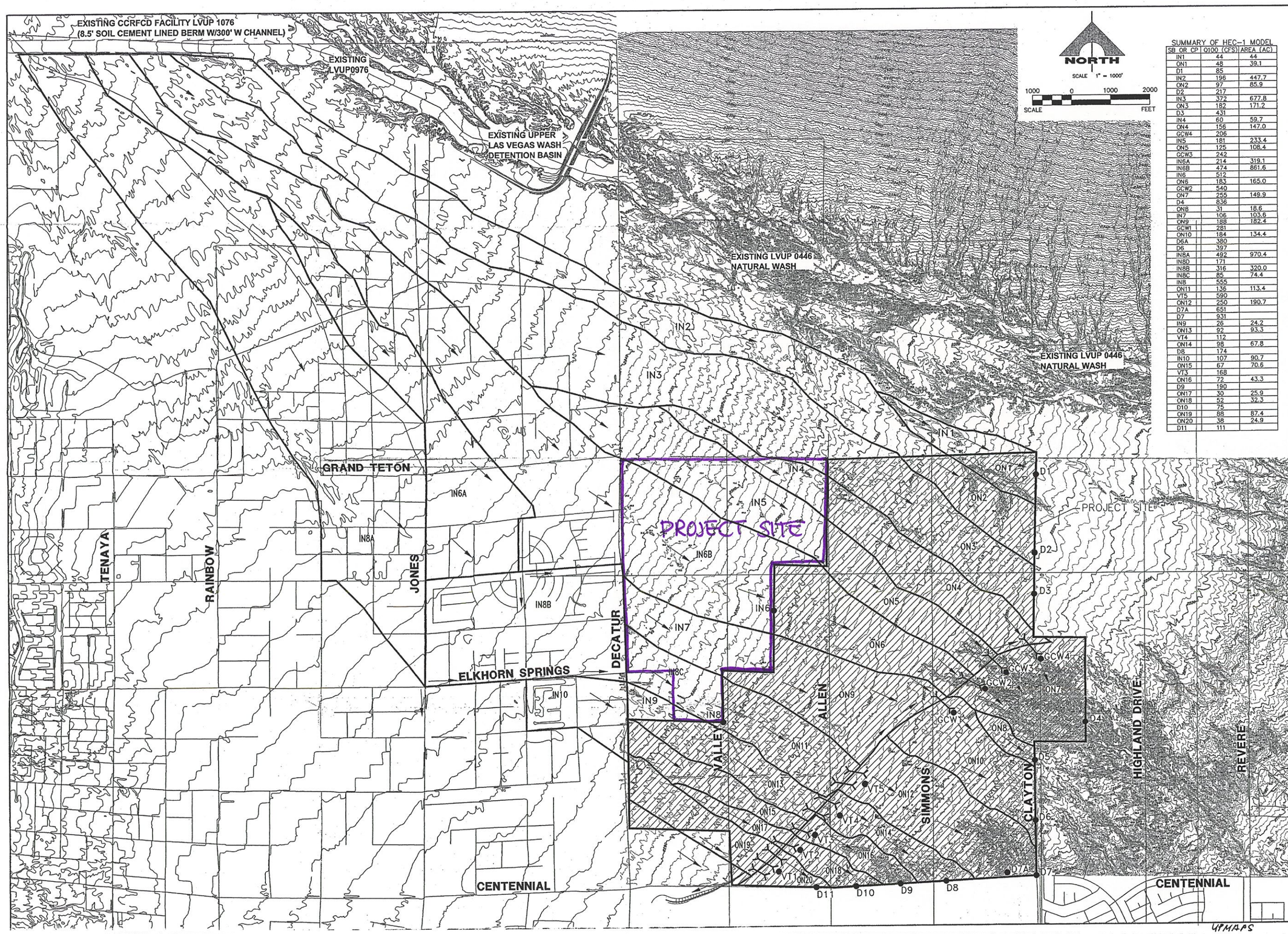
UPDATE TO THE CONCEPTUAL DRAINAGE STUDY FOR NORTH LAS VEGAS 1905 ACRES (ALIANTE)

590.211.200

September 2003

Prepared for:

North Valley Enterprises, L.L.C.
901 N. Green Valley Parkway, Ste. 200
Henderson, NV 89074
Phone: (702) 458-8855
Fax: (702) 435-6605



SUMMARY OF HEC-1 MODEL

SB OR CP	Q100 (CFS)	AREA (AC)
IN1	44	44
ON1	48	39.1
D1	85	
IN2	196	447.7
ON2	97	85.9
D2	217	
IN3	372	677.8
ON3	182	171.2
D3	431	
IN4	60	59.7
ON4	156	147.0
GCW4	206	
IN5	181	233.4
ON5	125	108.4
GCW3	242	
IN6A	214	319.1
IN6B	474	861.6
IN6	512	
ON6	183	165.0
GCW2	540	
ON7	255	149.9
D4	836	
ON8	31	18.6
IN7	106	103.6
ON9	188	182.4
GCW1	281	
ON10	184	134.4
D6A	380	
D6	397	
IN8A	492	970.4
IN8D	171	
IN8B	316	320.0
IN8C	85	74.4
IN8	555	
ON11	136	113.4
VT5	590	
ON12	250	190.7
D7A	651	
D7	931	
IN9	26	24.2
ON13	92	93.3
VT4	112	
ON14	98	67.8
D8	174	
IN10	107	90.7
ON15	67	70.6
VT3	168	
ON16	72	43.3
D9	190	
ON17	30	25.9
ON18	52	32.3
D10	75	
ON19	88	87.4
ON20	38	24.9
D11	111	

REV	DATE	DESCRIPTION	DATE	AGEN. APP.	DATE	GCW. APP.	DATE:

DESIGN:
DRAWN:
CHECK:
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 04-14-03
PLOT TIME: 15:55:03

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299
F:\590-211\MASTER STUDIES\HYDRO\fig\EXISTINGR.dwg

NORTH LAS VEGAS 7500 PHASE I
AMERICA NEVADA CORPORATION / DEL WEBB CORPORATION
EXISTING CONDITIONS

UPMAPS 03-48960

SHEET
FIG. 5
SHT OF SHTS

UPMAPS

PROJECT SITE

GRAND TETON DRIVE

ELKHORN DRIVE

DORRELL LN.

DECATUR BOULEVARD

ROME BOULEVARD

DEER SPRINGS WAY

VALLEY DRIVE

AVIARY WAY

ALIANTE PARKWAY

NORTHERN SEGMENT — LAS VEGAS BELTWAY

CENTENNIAL PARKWAY

CLAYTON STREET

ELKHORN DRIVE

AKA PT1

AKA PT2

AKA PT4

4.31 → 62cfs

2.28cfs

SUMMARY OF HEC-1 MODEL

SB OR CP	AREA (AC)	Q100 (CFS)	SB OR CP	AREA (AC)	Q100 (CFS)
IN4	59.7	60	3-10B	17.8	31
IN5	233.4	181	D3A	---	62
IN5A	---	236	5-1	20.4	34
4-1	5.0	12	5-2	3.1	6
4-2	5.4	13	5-3	13.7	33
4D	---	243	5-4	4.5	12
IN6A	319.1	202	D5	---	75
D_IN8D	---	162	6-1	4.4	12
D_IN6	---	40	6-2	31.2	78
IN8B	861.6	474	D6	---	157
IN6	---	512	IN10A	36.6	36
4-8A	15.2	18	IN9	24.2	25
4-7A	25.4	50	IN8A	970.4	492
4E	---	525	D_JONE	---	337
4-8B	8.1	9	D_IN8A	---	155
4-7B	9.4	22	IN6A	319.1	202
4F	---	532	D_IN6A	---	40
4-9	2.6	7	D_IN8	---	162
4G	---	657	IN8B	320.0	268
4-18A	11.7	33	COM	---	486
4-19A	7.3	10	IN8C	74.4	85
4-3	13.0	33	IN8	---	549
4B	---	73	7-1	3.6	9
4-3A	1.5	4	7A	---	550
4C	---	76	7-2	37.3	75
4-6	7.1	20	7-3	5.4	9
4-11	8.1	11	7B	---	559
4-20	15.5	41	7-4	2.7	5
4-5	8.2	21	7-8	29.9	78
4C1	---	156	7-12	50.9	105
4H1	---	676	7-13	4.7	8
4-11B	9.0	11	7F	---	587
4-12	5.0	14	7-35	15.5	24
4H	---	680	7-10	1.2	3
4-19B	6.6	9	7-14B	7.5	20
4M	---	51	7E	---	591
4-23	11.6	14	IN7	103.6	105
4N	---	62	7-15A	7.3	5
4-22	36.8	85	7-15B	3.8	5
4N1	---	147	15	---	10
4I	---	700	7-16A	27.2	71
4-26	39.4	60	16N	---	81
4O	---	713	16	---	136
4-14	13.4	36	7-17B	2.1	6
4-15	6.0	18	7-17	7.7	20
4-16	5.5	13	17S	---	23
4J	---	64	7-16B	10.0	25
4-17	2.8	9	7G	---	171
4K	---	71	7-18	2.8	9
4-13	10.8	29	7-19	1.8	4
4-27	2.2	7	7-14A	45.5	96
4PW	---	105	7-N	---	275
4P	---	731	7J	---	662
IN3	677.8	372	7-20	14.6	38
IN2	447.7	196	7-21	7.5	19
2A	---	531	GCW1N	---	53
DIV2A	---	166	7-22	43.1	77
D2A	---	365	GCW1	---	725
2-1	8.5	17	7-24	20.6	52
2B	---	370	7-25	6.4	16
3-2	16.9	43	7KN	---	752
3B	---	376	7-27	4.4	12
3-3	29.3	69	7-28	30.2	75
3-4	14.2	22	7KW	---	87
3C	---	394	7K	---	797
3-5	42.3	93	7-29	43.9	87
3-6	8.1	14	7-30	5.6	9
4-28	28.5	66	7ON	---	856
3O	---	427	7-5	10.0	26
3-9	13.7	21	7-6	9.9	21
3E	---	432	7-31	13.8	35
3-8A	8.1	21	7-32	1.9	3
4-31B	3.8	7	7L	---	84
3-8B	5.7	16	7-33	9.0	24
3F	---	43	7-34	2.1	6
4-31A	8.7	15	7M	---	106
4-29	15.7	43	7-36	16.3	34
GCW4-3	---	449	7N	---	129
DB3	---	426	7-37	31.7	72
4-30	9.5	25	7-38	6.2	16
4O	---	425	7P	---	200
4-36	35.2	91	7-39	13.5	29
4R	---	1121	7-40	5.1	6
4-33	40.3	93	7QW	---	230
4S	---	1138	7Q	---	1063
4-37	2.1	6	7-41	33.8	91
4-34	4.2	11	7-42	7.8	22
GCW4	---	1147	7-43	38.1	92
DBGCW	---	1096	D7W	---	1136
4-38	14.1	43	D7	---	1236
4-35A	10.9	31	8-1	33.9	89
4-39A	18.6	37	8-2	4.9	14
4-42	32.8	77	8-3	10.7	28
4-43	3.0	9	8-4	5.3	15
COMB	---	85	D8	---	142
4UA	---	186	9-1	10.0	19
4-39B	6.7	14	9-2	27.7	75
4-35B	16.5	44	9-3	4.0	9
4UB	---	1131	D9	---	99
DB4UB	---	771	11-1	27.2	63
4-40	13.4	36	11-2	25.7	56
4-41	9.0	24	VT1	---	116
4V	---	772	11-3	7.2	16
4-44	17.5	47	11-4	42.0	100
4-45	10.5	27	11-5	4.8	12
D4	---	773	D11	---	226
IN1	44.0	43	12-3B	16.7	43
1A	---	180	12-5	23.3	56
1-1	6.7	14	12B	---	94
1B	---	183	IN10B	54.1	68
D1	---	66	12-2	13.4	33
D1B	---	117	12-3A	21.2	52
2-2A	5.9	16	12-4	7.8	18
2-2B	20.5	46	12C	---	213
2CN	---	59	12-7	25.0	51
2-4	16.5	9	12-6	24.3	51
2-3	22.5	54	12-8	16.0	29
2-5	15.1	40	12-9	6.3	18
2CS	---	94	12-10	2.6	21
2C	---	154	12D	---	360
D2	---	179	12-10	2.6	5
4-32	1.1	4	D12	---	351
4-32B	4.3	12			
3-10	6.40	18			

N

GRAPHIC SCALE

600 0 300 600

(IN FEET)

1 inch = 600 ft.

LEGEND

- 7-43 DRAINAGE SUBBASIN
- D7W △ CONCENTRATION POINT
- SUBBASIN BOUNDARY
- WATERSHED BOUNDARY
- FLOW DIRECTION
- XXX PARCEL NUMBER

DESIGN:
DRAWN:
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ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 09-17-03
PLOT TIME: 12:04:34

NO.	REV. DATE	DESCRIPTION	DATE AGEN. APP.	DATE DCCW. APP.	DATE

G. C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
(702) 804-8000 • FAX: (702) 804-8008
F:\590-211-200\update\Varg1\Figure6.dwg jmcbride

UPDATE TO THE CONCEPTUAL DRAINAGE STUDY FOR
NORTH LAS VEGAS 1905 ACRES (ALIANTE)

INTERIM DRAINAGE MAP

DRAWING
FIG. 6
1 OF 1 SHTS

PROJECT SITE

GRAND TETON DRIVE

ELKHORN DRIVE

DORRELL LN.

DECATUR BOULEVARD

AVERY WAY

ALIANTE PARKWAY

VALLEY DRIVE

DEER SPRINGS WAY

ROME BOULEVARD

CENTENNIAL PARKWAY

NORTHERN SEGMENT LAS VEGAS BELTWAY

CLAYTON STREET

ELKHORN DRIVE

PROPOSED ALIGNMENT OF FUTURE FREEWAY REGIONAL

ACTIVE ADULT

GOLF COURSE

PUBLIC / SEMI-PUBLIC

RESIDENTIAL SFD

GENERAL COMMERCIAL WITH GAMING OVERLAY

NEIGHBORHOOD COMMERCIAL

MULTI-FAMILY

GENERAL COMMERCIAL

OPEN SPACE

FIRE STATION

OFFICE

ARROYO PARK

PARK

LIBRARY

MIDDLE SCHOOL

ELEMENTARY SCHOOL

DEER SPRINGS RESERVOIR

TOWNHOUSE

SINGLE FAMILY SFD

ULT4

ULT5

ULT6

ULT7

ULT8

ULT9

SUMMARY OF HEC-1 MODEL

SB OR CP	AREA (AC)	Q100 (CFS)	Q10 (CFS)	SB OR CP	AREA (AC)	Q100 (CFS)	Q10 (CFS)
ULT4	37.2	46	15	7-3	5.4	9	3
ULT5	129.3	138	46	7B	----	173	61
ULT5A	----	184	61	7-4	2.7	5	2
4-1	5.0	12	6	7-8	39.9	78	35
4-2	5.4	13	6	7-12	50.9	105	49
4D	----	200	68	7-13	4.7	8	3
ULT6	264.1	260	86	7F	----	341	136
4-8A	15.2	18	4	7-35	15.5	24	9
4-7A	25.4	50	22	7-10	1.2	3	1
4E	----	289	95	7-14B	7.5	20	10
4-8B	8.1	9	2	7-14A	7.3	17	10
4-7B	9.4	22	10	ULT7	105.7	107	35
4F	----	288	98	7-15A	7.3	----	----
4-9	2.6	7	3	7-15B	3.8	5	1
4G	----	474	161	15	----	10	2
4-18A	11.7	33	17	7-16A	27.2	71	35
4-19A	7.3	10	3	16N	----	81	36
4-3	13.0	33	16	16	----	137	49
4B	----	73	33	7-17B	2.1	6	3
4-3A	1.5	4	2	7-17	7.7	20	10
4C	----	76	35	17S	----	23	11
4-6	7.1	20	10	7-16B	10.0	25	12
4-11	8.1	11	3	7G	----	172	68
4-20	5.4	41	21	7-18	2.8	9	4
4-5	8.2	21	11	7-19	1.8	4	2
4C1	----	156	74	7-14A	45.5	96	47
4H1	----	564	201	7JN	----	275	119
4-11B	9.0	11	3	7J	----	618	260
4-12	5.0	14	7	7-20	14.6	38	19
4H	----	568	204	7-21	7.5	19	9
4-19B	6.6	9	3	GCW1N	----	53	27
4-18B	15.6	41	21	7-22	43.1	77	33
4M	----	51	23	GCW1	----	737	317
4-23	11.6	14	4	7-24	20.6	52	27
4N	----	62	26	7-25	6.4	16	8
4-22	36.8	85	43	7KN	----	68	35
4N1	----	147	70	7-27	4.4	12	6
4I	----	647	258	7-28	30.2	75	38
4-26	39.4	60	21	7KW	----	87	44
4O	----	691	275	7K	----	155	79
4-14	13.4	36	18	7-29	43.9	87	42
4-15	6.0	18	9	7-30	5.4	9	3
4-16	5.5	13	6	7ON	----	247	120
4V	----	64	31	7-5	10.0	26	13
4-17	2.8	9	5	7-6	9.9	21	10
4K	----	71	35	7-31	13.8	35	17
4-13	10.8	29	15	7-32	1.9	3	1
4-27	2.2	7	3	7L	----	84	40
4PW	----	105	52	7-33	9.0	24	13
4P	----	757	308	7-34	2.1	6	3
2-1	8.5	17	9	7M	----	106	51
3-2	16.9	43	21	7-36	16.3	34	14
3B	----	55	27	7N	----	132	61
3-3	29.3	69	34	7-37	31.7	72	34
3-4	14.2	22	8	7-38	6.2	16	8
3C	----	143	67	7P	----	88	42
3-5	42.3	93	48	7-39	13.5	29	13
3-6	8.1	14	5	7-40	2.7	6	2
4-28	28.5	66	34	7QW	----	118	54
3D	----	306	146	7Q	----	242	115
3-9	13.7	21	7	7-41	33.8	91	47
3E	----	322	151	7-42	7.8	22	9
3-8A	8.1	21	10	7-43	38.1	92	45
4-31B	3.8	7	2	D7W	----	376	173
3-8B	5.7	16	8	D7	----	622	292
3F	----	43	21	8-1	33.9	89	44
4-31A	8.7	15	5	8-2	4.9	14	7
4-29	15.7	43	22	8-3	10.7	28	14
GCW4-3	----	384	176	8-4	5.3	15	7
DB3	----	341	175	D8	----	142	71
4-30	9.5	25	13	9-1	10.0	19	7
4Q	----	355	185	9-2	27.7	75	38
4-36	35.2	91	46	9-3	4.0	9	4
4R	----	432	229	D9	----	99	46
4-33	40.3	93	47	11-1	27.2	63	32
4S	----	515	272	11-2	25.7	55	23
4-37	2.1	6	3	11-3	7.2	16	7
4-34	4.2	11	5	VTI	----	134	62
GCW4	----	528	279	11-4	42.0	100	48
4-38	14.1	43	22	11-5	4.8	12	6
4-35A	10.9	31	15	D11	----	113	54
4-39A	18.6	37	15	12-3B	16.7	43	21
4-42	32.8	77	38	12-5	23.3	56	27
4-43	3.0	9	4	12B	----	94	46
COMB	----	85	42	12-2	13.4	33	16
4UA	----	186	90	12-3A	21.2	52	25
4-39B	6.7	14	6	12-4	7.8	16	8
4-35B	16.5	44	22	12C	----	213	91
4UB	----	245	118	12-7	25.0	51	23
DB4UB	----	247	119	12-6	24.3	51	23
4-40	13.4	36	18	12-8	16.0	29	11
4-41	9.0	24	12	12-9	6.3	18	9
4V	----	306	148	12-10	8.2	21	11
4-44	17.5	47	23	12D	----	330	158
4-45	10.5	27	11	12-11	2.6	5	2
D4	----	373	180	D12	----	330	158
1-1	6.7	14	7				
2-2A	5.9	16	8				
2-2B	20.5	46	24				
2CN	----	59	29				
2-4	16.5	9	1				
2-3	22.5	54	27				
2-5	15.1	40	20				
2CS	----	101	48				
D2	----	154	73				
4-32	1.1	4	2				
4-32B	4.3	12	6				
3-10	6.4	18	9				
3-10B	17.8	31	13				
D3A	----	62	28				
5-1	20.4	34	11				
5-2	3.1	7	3				
5-3	13.7	33	15				
5-4	4.5	12	6				
D5	----	76	30				
6-1	4.4	14	7				
6-2	31.2	78	40				
D6	----	160	73				
ULT9	24.1	29	10				
ULT8	72.8	83	27				
ULT8A	----	112	37				
7-1	3.6	9	4				
7A	----	116	38				
7-2	37.3	75	34				

AKA PT3

N

GRAPHIC SCALE

(IN FEET)

1 inch = 600 ft.

LEGEND

- 7-43 DRAINAGE SUBBASIN
- D7W △ CONCENTRATION POINT
- SUBBASIN BOUNDARY
- FLOW DIRECTION
- XXX PARCEL NUMBER

DESIGN:
DRAWN:
CHECK:
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 07-17-03
PLOT TIME: 15:09:38

DATE | DESCRIPTION | REV. DATE

DATE | AGEN. | APP. | DATE | ENGR. | APP. | DATE

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UPDATE TO THE CONCEPTUAL DRAINAGE STUDY FOR
NORTH LAS VEGAS 1905 ACRES (ALIANTE)

ULTIMATE DRAINAGE MAP

DRAWING
FIG. 7
1 OF 1 SHTS

APPENDIX G

Electronic Files