

TECHNICAL DRAINAGE STUDY
ADDENDUM #2
Skye Canyon
(Phase 2 Infrastructure)
City of Las Vegas, Nevada

Job No.: OLY1501.001
Date: November 2015

Prepared By:
Slater Hanifan Group, Inc.
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Prepared For:
Ninety-Five Management, LLC
11411 Southern Highlands Parkway, Suite 300
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Phone: 702-220-6565 • Fax: 702-220-6566



Stanley Okey Amadi, P.E.
NV Professional Engineer No. 21724

Assisted by: Erick Mata, EI

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Skye Canyon – Phase 2 Infrastructure – Addendum No.2 Date: November 2015
Location of Development: a) Descriptive (Cross Streets): North/South: Hualapai Way
East/West: Grand Teton Drive
b) Section: 12 Township: 19 South Range: 59 East
c) APN: Portion of 126-12-000-001

Name of Owner/Developer: Section 12, LLC / Ninety-Five Management, LLC
Telephone No.: 702-220-6565 Fax No.: 702-220-6566 E-mail Address: mbolduc@olympiacompanies.com
Address: 11411 Southern Highlands Parkway, Suite 300; Las Vegas, NV 89141

Contact Person – Name: Stanley Okey Amadi, P.E. Telephone No.: 702-284-5300
*E-mail Address: samadi@shg-inc.com Fax No.: 702-284-5399
Firm: Slater Hanifan Group
Address: 5740 S. Arville Street, Suite 216; Las Vegas, NV 89118

Type of Land Development/Land Disturbance Process:

☐ Rezoning	☐ Subdivision Map	☐ Clearing and grading Only
☐ Parcel Map	☐ Planned Unit Development	☒ Other (Please specify below)
☐ Large Parcel Map	☐ Building Permit	☐ Roadway & Storm Drain Infrastructure

1. Total Owned Land Area: At Site: 665 Acres Being Developed/Disturbed: 202 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.): Roadway & Storm Drain Infrastructure

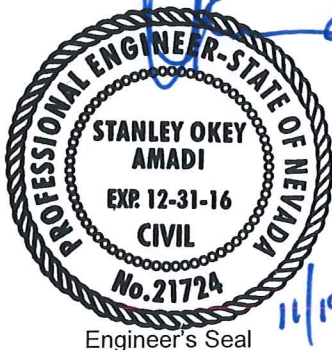
5. Approximate upstream land area which drains to the subject site: 48 acre +/-

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

Master Drainage Study for Kyle Canyon (SHG, DS4420); Master Drainage Study for Kyle Canyon (GCW, DS4091)

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Racel Street thru CCRFCD CNKC 0050,
And Minor flows to the CCRFCD Moccasin-Hualapai Branch alignment, Hualapai Way (MOHU 0118)

8. Briefly describe your proposed schedule for the subject project: ASAP Upon Substantial Completion of Detention Basin 1 Facilities
Phase 2 – Roadway Infrastructure per this TDS; Future Phase 2 Residential Subdivisions to follow by separate TDS.



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: SHG Job No. OLY1501.001

STANDARD FORM 1

Updated 05/01/2008

OLY1501.001

November 19, 2015

Mr. Albert Sung, P.E.
Flood Control Project Engineer
City of Las Vegas Department of Public Works
333 N. Rancho Drive
Las Vegas, Nevada 89106

Subject: Addendum No. 2 to the Technical Drainage Study for Skye Canyon – Phase 2 Infrastructure (CLV # DS4739)

Dear Mr. Sung:

This letter is submitted in response to the comments in your review memorandum dated November 03, 2015, regarding the above referenced project. Please note that the proposed drainage plan has been further modified since the previous submittal in an effort to thoroughly address the comments in the subject memorandum. In addition, a review meeting was held at the City of Las Vegas (CLV) on November 10, 2015 between Slater Hanifan Group (Stanley Okey Amadi & Steve Jones) and Peter Jackson (CLV Flood Control Division). As agreed to in the subject meeting, revisions to the drainage plan have been made with this submittal. Some drop inlets have been added and/or relocated to be more efficient and transition lines for the street intersections have been provided on the plans to better define the intersection drainage patterns. Note that all the drop inlets designed to capture storm flows (except nuisance inlets) have been relocated to stay outside of the transition areas. All other design assumptions and drainage patterns addressed in the previous submittal remain valid.

A copy of the City of Las Vegas (CLV) Department of Public Works comment letter has been provided in Appendix A, and the comments have been individually addressed as follows:

1. **Comment:** *The impacts to existing downstream neighborhoods of the long term discharge from the detention basin(s) without the associated regional outfall facilities is a major concern of both the City and the Clark County Regional Flood Control District. Flood Control understands that these impacts are being addressed with Skye Canyon Detention Basin #1. The proposed impact solution shall be reviewed and addressed as a part of the Skye Canyon Detention Basin #1 improvements until the Skye Canyon MPU facilities are completed.*

Response: Acknowledged.

2. **Comment:** *The provided Storm Drain Plans now include some key grading elevations and also show cross fall street slopes at intersections and/or reduced cross section slopes. This information is in conflict with the proposed drop inlets. Provide detailed grading information for the roads and revise the roadway information and/or modify the storm drain system to account for the road grading.*

Response: Acknowledged. Additional grading details including intersection transitions have been provided on the revised plans. Note that all the designed drop inlets at street intersections have been relocated to stay outside of the transition areas except the additional 5-ft Type CM2 inlet proposed at the southeast corner of the intersection of Shaumber Road and Eagle Canyon Avenue per Comment #29. Nuisance drop inlets have also been provided at the localized low points of the street intersections to ensure positive drainage of flows within the curb and gutter.

3. **Comment:** *Revise the storm drain lateral connections near Station 68+17 to less than 90-degrees per the Manual requirements for the higher lateral inflow or provide a transition structure.*

Response: Noted. The drop inlet lateral connections near Station 68+17 along Eagle Canyon Avenue have been revised to a 45 degree angle.

4. **Comment:** *Adjust the Manning N-value for the roadway sections to 0.016 per Section 906 of the Manual. Based upon the reduced cross section slopes and/or cross fall street sections, review and revise the corresponding street capacities and inlet calculations.*

Response: Noted. All the street sections have been revised to utilize a Manning N-value of 0.016 for the entire cross-section. Note that the designed drop inlets have been relocated outside of the street transition areas. Therefore, street calculations utilizing reduced cross section slopes and/or cross fall street sections will not be necessary since the flows are intercepted upstream of the transition areas.

5. **Comment:** *The plans show preliminary mass grading with collection facilities within the parcels to intercept the flows prior to entering the infrastructure roadway improvements. The inlet collection system needs to incorporate stormwater quality (SWQ) features and Best Management Practices (BMP's) at these interim collection points. Additionally, the mass grading plan shows sheet flow from Basin ON2-1B discharging directly onto Hualapai Way without any interim collection. Revise to incorporate appropriate SWQ and BMP measures. How will these collection facilities be maintained without graded access to the structures?*

Response: Acknowledged. The required BMPs will be specifically addressed in the Storm Water Pollution Prevention Plan (SWPPP) to be provided for the site. However, as agreed to in the aforementioned review meeting, maintenance accesses to the bottom and inverts of the interim collection facilities have been addressed. The grading of all the drainage ditches have been revised to a minimum of 10-ft wide bottom width and access to the ditches and inverts of the storm drain stubs from the improved streets can be achieved through the traversable portions of the mass grading improvements. No particular access roads have been designated on the plans to avoid limitation of the maintenance activities by the owner through specific routes.

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

Response: Acknowledged. A copy of the drainage study and pertinent addendums will be submitted to CCRFCD upon receipt of a conditional approval letter from the City of Las Vegas flood control.

7. **Comment:** *Note that the **Skye Canyon Master Drainage Study** has not been approved in the current stage. The subject Skye Canyon Infrastructure Phase 2 drainage study will not be approved prior to the final approval of the master drainage study.*

Response: Acknowledged.

8. **Comment:** *The **Skye Canyon Phase 2 Development** is based on the sole protection of a planned **Skye Canyon Detention Basin #1** from major storm flood events. The subject drainage study will not be approved prior to the final approval of the Detention Basin #1 drainage study.*

Response: Acknowledged.

9. **Comment:** *No Building Permits for onsite developments will be issued prior to the construction and substantial completion of the **Skye Canyon Detention Basin #1**. The notice of Substantial Completion from the City of Las Vegas, Department of Public Works is required for the release of Building Permits.*

Response: Acknowledged.

10. **Comment:** *All drainage facilities proposed in this **Phase 2 Infrastructure Study** are considered interim facilities and must be maintained by the Master Developer until the facilities are dedicated to and formally accepted by the City of Las Vegas.*

Response: Acknowledged.

11. **Comment:** *Since the streets network and the associated storm drain facilities will eventually be accepted by the City, the engineer must coordinate with City of Las Vegas Streets & Sanitation Department for their review and approval prior to the final approval of the subject drainage study.*

Response: Noted. The plans have been submitted to Mr. Mathew Meyer of the City of Las Vegas Streets and Sanitation Department for review and approval. Continued coordination with CLV Street and Sanitation Department will be maintained until final approval of the drainage study.

12. **Comment:** *The provided WSPG Model shows that the storm drain in Eagle Canyon Avenue exceeds the maximum allowed velocity (25 fps) per the CCRFCD Hydrologic & Hydraulic Design Manual. The engineer must provide a detail showing additional sacrificial concrete (1-inch minimum) on the plans. A Special Construction Note has been added to the plan & profile sheets that call out the special construction requirement and the required special inspection for the additional sacrificial concrete.*

Response: Noted. A typical shop drawing detail for RCP constructed with sacrificial concrete was included in Appendix B of the last submittal. An additional detail has been provided on the detail sheet. Please refer to Detail 2 on Sheet SD-26.

13. **Comment:** *Provide a WSPG Model for Lateral #9, located near Station 50+25 to verify lateral velocity. If above 25 fps, provide additional 1" sacrificial concrete and notes similar to Comment #12 above.*

Response: Please note that the stub for Lateral #9 has been removed and relocated to the back of the drop inlet at the low point in Eagle Canyon Avenue. A revised WSPGW model that includes the drop inlet lateral and the stub has been provided with this submittal which indicates that the velocities are less than 25 fps. Note that the drop inlet and lateral stub have been relocated slightly west to Station 49+24.12 in order to remain outside of the transition area of the street intersection.

14. **Comment:** *Provide maintenance access road (12-foot wide with a minimum of 6" Type II) to manholes and discharge structures located outside of the improved roadways. Extend the access roads to the manholes located outside of the current access road limits.*

Response: Acknowledged. The maintenance access roads have been extended to the manholes located outside of the improved roadways.

15. **Comment:** *Structural plans for the storm drain improvements must be submitted for review. Provide a soil report, structural calculations and specifications, wet stamped structural sets and a grading plan to the City of Las Vegas Building Department for processing (call Building Department to confirm their submittal requirements). The engineer must provide a copy of Building Department approval of the structures to City Flood Control Section prior to the final acceptance of the technical drainage study.*

Response: Noted. Structural Calculations and specifications with the soils report and grading plans will be submitted to the CLV building department for approval prior to final approval of the technical drainage study.

16. **Comment:** *The project proposes to build temporary drainage berms/swales over the Phase 2 site. Prior to final plan approval the developer must complete a **Maintenance and Liability Agreement** for the interim drainage improvements and post a minimum maintenance bond of \$50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for constructing the facility and an exhibit that adequately shows the location and limits of the drainage facility to City Flood Control for approval. Once the drainage study is conditionally approved, the engineer/developer should contact the City's Land Development Section (702-229-6371) to begin the agreement process.*

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

Response: The developer is aware and agrees to the conditions required for the Maintenance and Liability Agreement and maintenance bond for the interim drainage improvements within the subject Phase 2 portion of the project.

17. **Comment:** *Technical drainage studies are required for each of the future PODs. The technical drainage studies for the PODs may not be submitted until the conditional approval of the pertinent infrastructure drainage study is obtained. Final approval for the*

infrastructure study must be obtained prior to conditional approval of the impacted POD drainage studies.

Response: Acknowledged.

18. **Comment:** *No Building Permits for the homes within the individual PODs will be issued prior to the construction and substantial completion of the **Skye Canyon Detention Basin #1**. Additionally, Building permits for the homes within the individual PODs will not be issued until construction of the streets and flood control infrastructure around the POD is substantially complete or interim protection is provided per the approved technical drainage study.*

Response: Acknowledged.

19. **Comment:** *Provide a note on all grading plans: Property Owner is responsible to maintain the best management practices such as but not limited to the removal of accumulated sediment and debris and care of the vegetation.*

Response: Noted. Please refer to the revised grading plans for the subject note provided.

20. **Comment:** *Provide numbering system for the manholes and inlets.*

Response: It is acknowledged that a numbering system is required for all manholes and drop inlets. However, it is the developer's intent to split the improvement plans submittal under multiple packages for bonding and bidding purposes. Therefore, the numbering of manholes and drop inlets have been deferred to the improvement plan submittal to avoid renumbering them later.

21. **Comment:** *Show the size of the proposed riprap areas and include a detail on the plans. Include the Type 2 and geofabric in the detail section. It is noted that the minimum size of a riprap pad is d50=8". Revise all pertinent plans and callouts accordingly.*

Response: Acknowledged. Please refer to the revised plans for the sizes of the riprap pads provided. A detail section of the riprap pads indicating the Type 2 and geofabric has also been provided on the detail sheet. Please refer to Detail 3 on Sheet SD-26.

22. **Comment:** *Revise the pipe penetration detail to include a concrete collar with dowelled rebar connections.*

Response: The pipe penetration detail has been revised to include a reinforced concrete collar. The dowelled rebar for connection will be structurally designed and include as a part of the structural submittal. Please refer to the revised Detail 4 provided on Sheet SD-25.

The following comments pertain to Grand Teton Blvd. Storm Drain Plan & Profile: SD-01 to SD-06

23. **Comment:** *It appears that drop inlets may be installed along Grand Teton west of Shaumber based upon the curb location shown. Provide pothole data for the RCB to verify the constructability of the inlets and include inlets west of Station 21+00 and west of Station 28+00. Consider using the CM inlet (Std. dwg # 422) in this space critical area.*

Response: Noted. As agreed to in the aforementioned review meeting, 5.0' Type CM inlets have been specified at the lateral locations west of Shaumber Road to show the developer's intent. Pothole data will be not be necessary for the approval of the drainage study but will be required prior to construction. Please note that the street calculations along Grand Teton Drive have not been revised since the calculations previously provided conservatively assumed no interception of flows by the new inlets added upstream of Shaumber Road.

24. **Comment:** *The provided Storm Drain Plans now include some key grading elevations and also show cross fall street slopes at the Grand Teton & Shaumber intersection. This information is in conflict with the proposed drop inlets. Review and revise the roadway information and/or modify the storm drain system to account for the road grading.*

Response: Acknowledged. Please refer to the response to Comment No. 2 above. All designed drop inlets other than those intended for interception of nuisance water have been relocated to stay outside the street transition areas.

25. **Comment:** *Review and revise the drop inlet locations to include drop inlets at both end of the curb return at the northwest corner of Grand Teton and Shaumber.*

Response: Revised as noted. Nuisance drop inlets have been provided at both ends of the curb return at the northwest corner of Shaumber road and Grand Teton Drive.

26. **Comment:** *Provide a wider valley gutter section to accommodate the storm drain manhole within the valley gutter near Station 21+50.*

Response: Acknowledged. A wider valley gutter has been provided as noted. Please refer to the revised plans.

The following comments pertain to Shaumber Road Storm Drain Plan & Profile: SD-07 to SD-09

27. **Comment:** *The provided Storm Drain Plans now include some key grading elevations and also show cross fall street slopes at the Shaumber and Grand Teton intersection. This information is in conflict with the proposed drop inlets. Review and revise the roadway information and/or modify the storm drain system to account for the road grading.*

Response: Acknowledged. Please refer to the response to Comment Nos. 2 & 24 above.

28. **Comment:** *Review and revise the drop inlet locations to include drop inlets at both end of the curb return at the northwest corner of Shaumber and Grand Teton.*

Response: Acknowledged. Please see the response to Comment No. 25 above.

29. **Comment:** *The Shaumber and Eagle Canyon intersection has cross fall drainage on Eagle Canyon. Provide an additional drop inlet on Shaumber west of the intersection to collect the flow in Shaumber.*

Response: An additional 5-ft Type CM2 drop inlet has been provided as noted. Note that the proposed inlet is designed to capture some of the flows conveyed along the eastern half of Shaumber Road south of Eagle Canyon Avenue. The half street capacity

calculation at Section SHA on Shaumber Road for the drop inlet design utilized a cross fall slope of 1.50%, since the inlet is located within an area with cross fall slope that transitions from 2.0% to 1.30%. An additional half street calculation for the western half of Shaumber Road is also provided at Section SHA with a cross fall slope of 0.50% to verify that the flows within the western half of the street will not overtop the crown at the intersection with Eagle Canyon Avenue. Please refer to Appendix B for the street and drop inlet calculations and to the revised plans in Appendix E for the location of the drop inlet.

30. **Comment:** *Provide Type 2 access to the manhole near Station 25+57.*

Response: Noted. The Type 2 access has been revised to extend over the manhole near Station 25+57.

The following comments pertain to Egan Crest Drive Storm Drain Plan & Profile: SD-10 to SD-13

31. **Comment:** *The provided Storm Drain Plans now include some key grading elevations and also show cross fall street slopes at the Egan Crest and Eagle Canyon intersection. This information is in conflict with the proposed drop inlets. Review and revise the roadway information and/or modify the storm drain system to account for the road grading.*

Response: Acknowledged. Please refer to the response to Comment No. 2 above. Note that the drop inlet at the southwest corner of Egan Crest Drive and Eagle Canyon Avenue has been provided to intercept nuisance water from the localized low point in the transition area. However, the inlet at the southeast corner of the intersection is outside of the transition area and has been designed to intercept a portion of the flows within the eastern half of Egan Crest Drive. The combined bypass flows (from the DI and those from the western half of Egan Crest Drive) are assumed to continue east along Eagle Canyon Avenue and have been accounted for in the design of the downstream inlets on Eagle Canyon Avenue. However, two additional inlets are provided on Egan Crest Drive north of Eagle Canyon Avenue to intercept nuisance flows and any flows that may bypass the intersection to the north.

32. **Comment:** *With the revised roadway profile, provide inlets at the terminus of the road improvements.*

Response: Noted. Two drop inlets have been provided at the terminus of the roadway improvements along Egan Crest Drive.

The following comments pertain to Eagle Canyon Avenue Storm Drain Plan & Profile: SD-14 to SD-19

33. **Comment:** *The provided Storm Drain Plans now include some key grading elevations and also show cross fall street slopes at the Eagle Canyon and Egan Crest intersection. This information is in conflict with the proposed drop inlets. Review and revise the roadway information and/or modify the storm drain system to account for the road grading.*

Response: Acknowledged. Please refer to the response to Comment No. 2 above.

34. **Comment:** *Provide details for the transition structure modifications to accommodate the 66"-RCP connection and the removal of the existing facilities to allow construction of the proposed improvements.*

Response: Noted. Please refer to Detail 1 on Sheet SD-27 for a civil detail of the transition structure modifications.

35. **Comment:** *Replace the Type "A" inlet shown on Lateral # 1 & 5 with a CM-2 inlet. The City does not allow Type "A" inlets due to maintenance issues.*

Response: Noted. The two type "A" inlets have been replaced with two 7.5' Type CM2 inlets.

We believe the above responses and revisions provided on the plans have adequately addressed your concerns in the referenced review memorandum. The revised improvement plans adopting the revisions addressed in this letter have been included in Appendix G for review. If you have any questions or require additional information, please do not hesitate to contact us at 702-284-5300.

Respectfully Submitted,

SLATER HANIFAN GROUP



Stanley Okey Amadi, P.E.
Project Manager - Flood Control Division

cc: Mark Failla, P.E., CFM – SHG
Steve Jones, P.E. - SHG
Jerry Slater, P.E. – SHG
Jerrod Ratcliffe, - SHG

APPENDIX

Appendix A – CLV Drainage Comment Letter

Appendix B – Revised Normal Depth, Drop Inlet & Headwater Calculations

- Street Flow
- Drop Inlets
- Interim Ditches
- Inlet Control Nomographs

Appendix C – Revised Storm Drain Hydraulic Calculations

- Interim Condition
 - Eagle Canyon Main & Laterals
 - Eagle Canyon West & Laterals
 - Egan Crest South & Laterals
 - Egan Crest North & Laterals
 - Shaumber Main & Laterals
- Ultimate Condition
 - Eagle Canyon Main
 - Eagle Canyon West
 - Egan Crest South
 - Egan Crest North
 - Shaumber Main

Appendix D – Revised Exhibits

- Exhibit E – Interim Condition Drainage Map
- Exhibit F – Storm Drain Schematic Map

Appendix E – CD of Electronic Files and Revised Improvement Plans

APPENDIX A

CLV Drainage Comment Letter

CITY OF LAS VEGAS		DATE:
INTER-OFFICE MEMORANDUM		November 3, 2015
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. <i>for</i> Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for:	
	Skye Canyon – Phase 2 Infrastructure	
Cross Streets:	NWC of Grand Teton Blvd. & Hualapai Way	COPIES TO: Slater Hanifan Group, Inc.
File Number:	F:\Depot\DSMemos\DS4739B.doc	Section 12, LLC / Ninety Five Mgmt.
Parcel Number:	Portion of 126-12-000-001	Bart Anderson, P.E., DevCo
Zoning Action:	TMP-58560	CCRFCFCD
FEMA Flood Zone	YES	NO X
Proposed Storm Drain	YES X	NO

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal & Supplemental	6/18/2015, 8/4/2015	8/26/2015	See Comments Below	\$400.00	402578: \$400
2 nd Submittal	10/19/2015	11/02/2015	See Comments Below	\$400.00	419048: \$400
TOTAL FEES (LDDRS):				\$800.00	----

REMARKS: Supplemental impacts to studies from National Monument.

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

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

The City of Las Vegas will not allow further residential building permits for development outside of the limits of Phase I at this time based upon the current MPU impacts from the National Monument. This is a temporary hold of further residential building permits outside of Phase I until the National Monument Grant issues are resolved and/or alternative regional facilities are proposed and constructed to mitigate the development. Flood Control will continue to review the Infrastructure for Phase 2 and the Detention Basins; however Flood Control cannot issue final drainage study approvals until given clearance to do so. The City will work with the Developer and CCRFCFCD to help identify and alleviate these impacts.

1. The impacts to existing downstream neighborhoods of the long term discharge from the detention basin(s) without the associated regional outfall facilities is a major concern of both the City and the Clark County Regional Flood Control District. Flood Control understands that these impacts are being addressed with Skye Canyon Detention Basin #1. The proposed impact solution shall be reviewed and addressed as a part of the Skye Canyon Detention Basin #1 improvements until the Skye Canyon MPU facilities are completed.
2. The provided Storm Drain Plans now include some key grading elevations and also show cross fall street slopes at intersections and/or reduced cross section slopes. This information is in conflict with the proposed drop inlets. Provide detailed grading information for the roads and revise the roadway information and/or modify the storm drain system to account for the road grading.

3. Revise the storm drain lateral connections near Station 68+17 to less than 90-degrees per the Manual requirements for the higher lateral inflow or provide a transition structure.
4. Adjust the Manning N-value for the roadway sections to 0.016 per Section 906 of the Manual. Based upon the reduced cross section slopes and/or cross fall street sections, review and revise the corresponding street capacities and inlet calculations.
5. The plans show preliminary mass grading with collection facilities within the parcels to intercept the flows prior to entering the infrastructure roadway improvements. The inlet collection system needs to incorporate stormwater quality (SWQ) features and Best Management Practices (BMP's) at these interim collection points. Additionally, the mass grading plan shows sheet flow from Basin ON2-IB discharging directly onto Hualapai Way without any interim collection. Revise to incorporate appropriate SWQ and BMP measures. How will these collection facilities be maintained without graded access to the structures?
6. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.
7. Note that the ***Skye Canyon Master Drainage Study*** has not been approved in the current stage. The subject *Skye Canyon Infrastructure Phase 2* drainage study will not be approved prior to the final approval of the master drainage study.
8. The ***Skye Canyon Phase 2 Development*** is based on the sole protection of a planned ***Skye Canyon Detention Basin #1*** from major storm flood events. The subject drainage study will not be approved prior to the final approval of the Detention Basin #1 drainage study.
9. No Building Permits for onsite developments will be issued prior to the construction and substantial completion of the ***Skye Canyon Detention Basin #1***. The notice of Substantial Completion from the City of Las Vegas, Department of Public Works is required for the release of Building Permits.
10. All drainage facilities proposed in this ***Phase 2 Infrastructure Study*** are considered interim facilities and must be maintained by the Master Developer until the facilities are dedicated to and formally accepted by the *City of Las Vegas*.
11. Since the streets network and the associated storm drain facilities will eventually be accepted by the City, the engineer must coordinate with *City of Las Vegas Streets & Sanitation Department* for their review and approval prior to the final approval of the subject drainage study.
12. The provided WSPG Model shows that the storm drain in *Eagle Canyon Avenue* exceeds the maximum allowed velocity (25 fps) per the *CCRFCD Hydrologic & Hydraulic Design Manual*. The engineer must provide a detail showing additional sacrificial concrete (1-inch minimum) on the plans. A *Special Construction Note* has been added to the plan & profile sheets that call out the special construction requirement and the required special inspection for the additional sacrificial concrete.
13. Provide a WSPG Model for Lateral #9, located near Station 50+25 to verify lateral velocity. If above 25 fps, provide additional 1" sacrificial concrete and notes similar to Comment #12 above.
14. Provide maintenance access road (12-foot wide with a minimum of 6" Type II) to manholes and discharge structures located outside of the improved roadways. Extend the access roads to the manholes located outside of the current access road limits.
15. Structural plans for the storm drain improvements must be submitted for review. Provide a soil report, structural calculations and specifications, wet stamped structural sets and a grading plan to the *City of Las Vegas Building Department* for processing (call *Building Department* to confirm their submittal requirements). The engineer must provide a copy of *Building Department* approval of the structures to *City Flood Control Section* prior to the final acceptance of the technical drainage study.

16. The project proposes to build temporary drainage berms/swales over the *Phase 2* site. Prior to final plan approval the developer must complete a **Maintenance and Liability Agreement** for the interim drainage improvements and post a minimum maintenance bond of \$50,000 or 50-percent of the construction cost for the improvements, whichever is greater. The engineer must submit an estimate of the quantities for construction the facility and an exhibit that adequately shows the location and limits of the drainage facility to *City Flood Control* for approval. Once the drainage study is conditionally approved, the engineer/developer should contact the *City's Land Development Section* (702-229-6371) to begin the agreement process.

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

17. Technical drainage studies are required for each of the future PODs. The technical drainage studies for the PODs may not be submitted until the conditional approval of the pertinent infrastructure drainage study is obtained. Final approval for the infrastructure study must be obtained prior to conditional approval of the impacted POD drainage studies.
18. No Building Permits for the homes within the individual PODs will be issued prior to the construction and substantial completion of the **Skye Canyon Detention Basin #1**. Additionally, Building permits for the homes within the individual PODs will not be issued until construction of the streets and flood control infrastructure around the POD is substantially complete or interim protection is provided per the approved technical drainage study.
19. Provide a note on all grading plans: *Property Owner is responsible to maintain the best management practices such as but not limited to the removal of accumulated sediment and debris and care of the vegetation.*
20. Provide numbering system for the manholes and inlets.
21. Show the size of the proposed riprap areas and include a detail on the plans. Include the Type 2 and geofabric in the detail section. It is noted that the minimum size of a riprap pad is $d_{60}=8"$. Revise all pertinent plans and callouts accordingly.
22. Revise the pipe penetration detail to include a concrete collar with dowelled rebar connections.

The following comments pertain to Grand Teton Blvd. Storm Drain Plan & Profile: SD-01 to SD-06

23. It appears that drop inlets may be installed along *Grand Teton* west of *Shaumber* based upon the curb location shown. Provide pothole data for the RCB to verify the constructability of the inlets and include inlets west of Station 21+00 and west of Station 28+00. Consider using the CM inlet (Std. dwg # 422) in this space critical area.
24. The provided Storm Drain Plans now include some key grading elevations and also show cross fall street slopes at the *Grand Teton & Shaumber* intersection. This information is in conflict with the proposed drop inlets. Review and revise the roadway information and/or modify the storm drain system to account for the road grading.
25. Review and revise the drop inlet locations to include drop inlets at both end of the curb return at the northwest corner of *Grand Teton* and *Shaumber*.
26. Provide a wider valley gutter section to accommodate the storm drain manhole within the valley gutter near Station 21+50.

The following comments pertain to Shaumber Road Storm Drain Plan & Profile: SD-07 to SD-09

27. The provided Storm Drain Plans now include some key grading elevations and also show cross fall street slopes at the *Shaumber* and *Grand Teton* intersection. This information is in conflict with the proposed drop inlets. Review and revise the roadway information and/or modify the storm drain system to account for the road grading.
28. Review and revise the drop inlet locations to include drop inlets at both end of the curb return at the northwest corner of *Shaumber* and *Grand Teton*.
29. The *Shaumber* and *Eagle Canyon* intersection has cross fall drainage on *Eagle Canyon*. Provide an additional drop inlet on *Shaumber* west of the intersection to collect the flow in *Shaumber*.
30. Provide Type 2 access to the manhole near Station 25+57.

The following comments pertain to Egan Crest Drive Storm Drain Plan & Profile: SD-10 to SD-13

31. The provided Storm Drain Plans now include some key grading elevations and also show cross fall street slopes at the *Egan Crest* and *Eagle Canyon* intersection. This information is in conflict with the proposed drop inlets. Review and revise the roadway information and/or modify the storm drain system to account for the road grading.
32. With the revised roadway profile, provide inlets at the terminus of the road improvements.

The following comments pertain to Eagle Canyon Avenue Storm Drain Plan & Profile: SD-14 to SD-19

33. The provided Storm Drain Plans now include some key grading elevations and also show cross fall street slopes at the *Eagle Canyon* and *Egan Crest* intersection. This information is in conflict with the proposed drop inlets. Review and revise the roadway information and/or modify the storm drain system to account for the road grading.
34. Provide details for the transition structure modifications to accommodate the 66"-RCP connection and the removal of the existing facilities to allow construction of the proposed improvements.
35. Replace the Type "A" inlet shown on Lateral # 1 & 5 with a CM-2 inlet. The City does not allow Type "A" inlets due to maintenance issues.

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/R59E/12
AREA F-12

APPENDIX B

Revised Normal Depth, Drop inlet and Headwater Calculations

Street Flow

Section - ECA1

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - ECA1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	4.90 %
Discharge	30.00 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	0.43 ft
Elevation Range	0.00 to 0.56
Flow Area	4.5 ft ²
Wetted Perimeter	30.10 ft
Top Width	29.14 ft
Actual Depth	0.43 ft
Critical Elevation	0.59 ft
Critical Slope	0.47 %
Velocity	6.64 ft/s
Velocity Head	0.69 ft
Specific Energy	1.12 ft
Froude Number	2.97
Flow Type	Supercritical

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+41.00	0.016
0+41.00	0+43.00	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+21.50	0.56
0+41.00	0.17
0+41.00	0.13
0+42.50	0.00

Section - ECA1
Worksheet for Irregular Channel

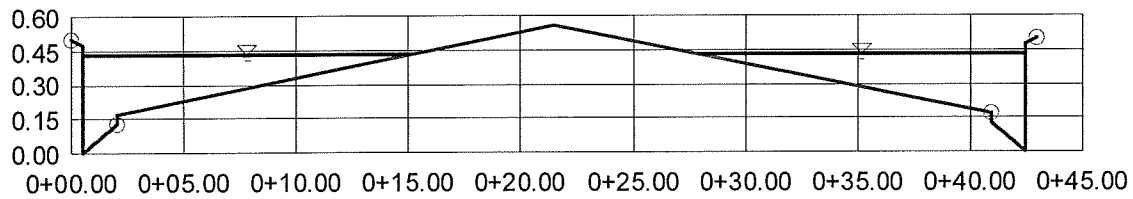
Natural Channel Points	
Station (ft)	Elevation (ft)
0+42.50	0.48
0+43.00	0.50

Notes: Q=30 cfs being ON3-I(A) Plus Half of EAGL1

Section - ECA1 **Cross Section for Irregular Channel**

Project Description	
Worksheet	Section - ECA1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.014
Channel Slope	4.90 %
Water Surface Elevation	0.43 ft
Elevation Range	0.00 to 0.56
Discharge	30.00 cfs



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NTS

Section - ECA2

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - ECA2
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	4.90 %
Discharge	43.00 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	0.50 ft
Elevation Range	0.00 to 0.56
Flow Area	6.6 ft²
Wetted Perimeter	37.57 ft
Top Width	36.52 ft
Actual Depth	0.50 ft
Critical Elevation	0.66 ft
Critical Slope	0.57 %
Velocity	6.47 ft/s
Velocity Head	0.65 ft
Specific Energy	1.15 ft
Froude Number	2.68
Flow Type	Supercritical

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+43.00	0.016

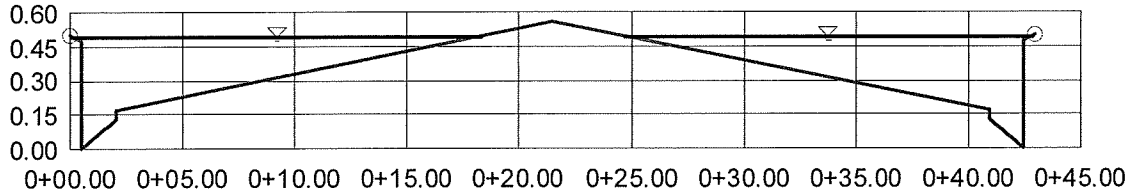
Natural Channel Points	
Station (ft)	Elevation (ft)
0+00.00	0.50
0+00.50	0.48
0+00.50	0.00
0+02.00	0.13
0+02.00	0.17
0+21.50	0.56
0+41.00	0.17
0+41.00	0.13
0+42.50	0.00
0+42.50	0.48
0+43.00	0.50

Section - ECA2
Worksheet for Irregular Channel

Notes: Q=43 cfs being ON3-I(A) + ON3-I(C) + EAGL1

Section - ECA2 **Cross Section for Irregular Channel**

Project Description	
Worksheet	Section - ECA2
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth
Section Data	
Mannings Coefficient	0.016
Channel Slope	4.90 %
Water Surface Elevation	0.50 ft
Elevation Range	0.00 to 0.56
Discharge	43.00 cfs



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Section - ECA2b

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - ECA2b
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	2.00 %
Discharge	13.00 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	0.40 ft
Elevation Range	0.00 to 1.18
Flow Area	3.7 ft ²
Wetted Perimeter	27.19 ft
Top Width	26.29 ft
Actual Depth	0.40 ft
Critical Elevation	0.46 ft
Critical Slope	0.70 %
Velocity	3.49 ft/s
Velocity Head	0.19 ft
Specific Energy	0.59 ft
Froude Number	1.63
Flow Type	Supercritical

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+65.00	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+26.00	0.65
0+26.01	0.73
0+26.25	1.04
0+26.42	1.06
0+32.50	1.18
0+38.58	1.06

Section - ECA2b
Worksheet for Irregular Channel

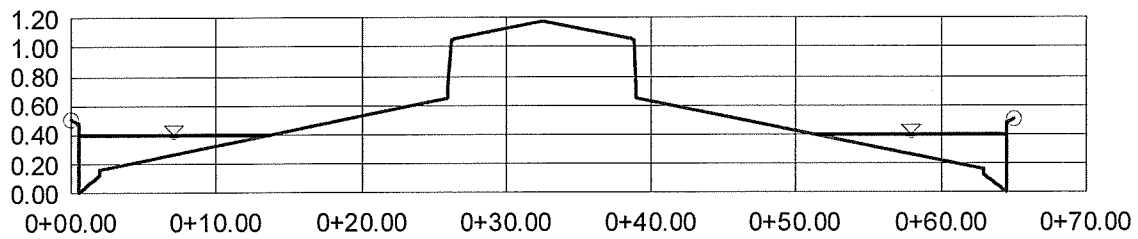
Natural Channel Points	
Station (ft)	Elevation (ft)
0+38.74	1.04
0+38.99	0.73
0+39.00	0.65
0+63.00	0.17
0+63.00	0.13
0+64.50	0.00
0+64.50	0.48
0+65.00	0.50

Notes: Q = ECA2 Bypass

Section - ECA2b
Cross Section for Irregular Channel

Project Description	
Worksheet	Section - ECA2b
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	2.00 %
Water Surface Elevation	0.40 ft
Elevation Range	0.00 to 1.18
Discharge	13.00 cfs



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Section - ECA3a

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - ECA3a
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	4.94 %
Discharge	5.00 cfs

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

Results	
Mannings Coefficient	0.016
Water Surface Elevation	0.28 ft
Elevation Range	0.00 to 0.56
Flow Area	1.3 ft ²
Wetted Perimeter	14.65 ft
Top Width	14.00 ft
Actual Depth	0.28 ft
Critical Elevation	0.35 ft
Critical Slope	0.80 %
Velocity	4.00 ft/s
Velocity Head	0.25 ft
Specific Energy	0.53 ft
Froude Number	2.36
Flow Type	Supercritical

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+43.00	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+21.50	0.56
0+41.00	0.17
0+41.00	0.13
0+42.50	0.00
0+42.50	0.48
0+43.00	0.50

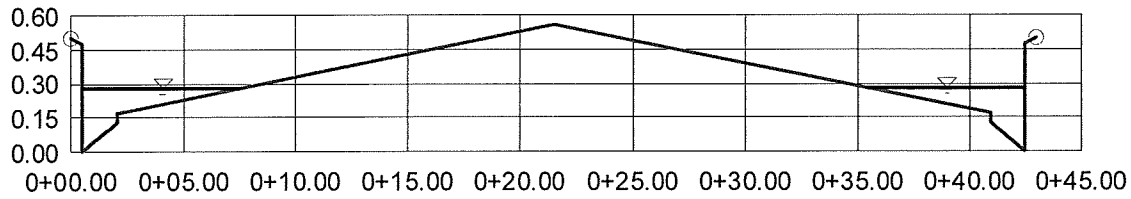
Section - ECA3a
Worksheet for Irregular Channel

Notes: $Q = \text{EAGL2/4 (2 CFS)} + \text{EGAN1b BYPASS (3 CFS)} = 5 \text{ CFS}$

Section - ECA3a **Cross Section for Irregular Channel**

Project Description	
Worksheet	Section - ECA3a
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	4.94 %
Water Surface Elevation	0.28 ft
Elevation Range	0.00 to 0.56
Discharge	5.00 cfs



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Section - ECA3b

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - ECA3b
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	4.94 %
Discharge	42.00 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	0.49 ft
Elevation Range	0.00 to 0.56
Flow Area	6.5 ft ²
Wetted Perimeter	36.94 ft
Top Width	35.88 ft
Actual Depth	0.49 ft
Critical Elevation	0.66 ft
Critical Slope	0.58 %
Velocity	6.47 ft/s
Velocity Head	0.65 ft
Specific Energy	1.14 ft
Froude Number	2.68
Flow Type	Supercritical

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+43.00	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+21.50	0.56
0+41.00	0.17
0+41.00	0.13
0+42.50	0.00
0+42.50	0.48
0+43.00	0.50

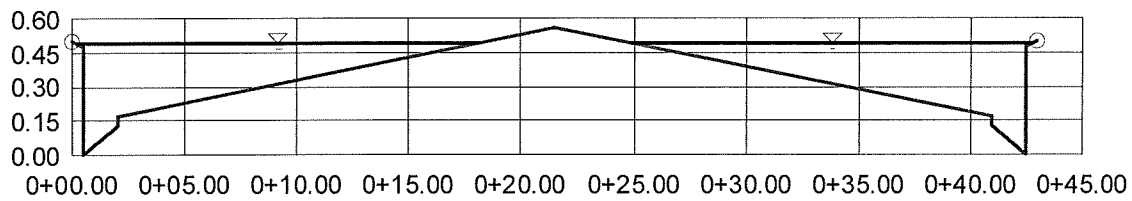
Section - ECA3b
Worksheet for Irregular Channel

Notes: $Q = \text{ON2-1A (20 CFS)} + \text{ON4-1B (19 CFS)} + \text{EC3a BYPASS (1 CFS)} + \text{EAGL2/4 (2 CFS)} = 42 \text{ CFS}$

Section - ECA3a **Cross Section for Irregular Channel**

Project Description	
Worksheet	Section - ECA3b
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	4.94 %
Water Surface Elevation	0.49 ft
Elevation Range	0.00 to 0.56
Discharge	42.00 cfs



V:10.0
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NTS

Section - ECA4

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - ECA4
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	0.50 %
Discharge	51.00 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	0.71 ft
Elevation Range	0.00 to 0.56
Flow Area	15.6 ft ²
Wetted Perimeter	44.48 ft
Top Width	43.00 ft
Actual Depth	0.71 ft
Critical Elevation	0.70 ft
Critical Slope	0.55 %
Velocity	3.27 ft/s
Velocity Head	0.17 ft
Specific Energy	0.88 ft
Froude Number	0.96
Flow Type	Subcritical

Calculation Messages:
 Water elevation exceeds lowest end station by 0.20999024 ft.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+43.00	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+21.50	0.56
0+41.00	0.17
0+41.00	0.13
0+42.50	0.00
0+42.50	0.48
0+43.00	0.50

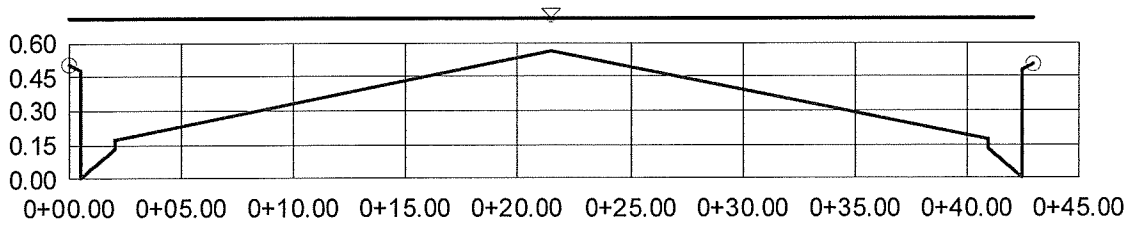
Section - ECA4
Worksheet for Irregular Channel

Notes: $Q = \text{ON4-IC (19 CFS)} + \text{EAGL2/2 (4 CFS)} + \text{ECA3b BYPASS (28 CFS)} = 51 \text{ CFS}$

Section - ECA4 **Cross Section for Irregular Channel**

Project Description	
Worksheet	Section - ECA4
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	0.50 %
Water Surface Elevation	0.71 ft
Elevation Range	0.00 to 0.56
Discharge	51.00 cfs



V:10.0
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NTS

Section - EGN1a

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - EGN1a
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	2.46 %
Discharge	4.00 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	0.29 ft
Elevation Range	0.00 to 1.18
Flow Area	1.4 ft ²
Wetted Perimeter	15.58 ft
Top Width	14.91 ft
Actual Depth	0.29 ft
Critical Elevation	0.33 ft
Critical Slope	0.82 %
Velocity	2.90 ft/s
Velocity Head	0.13 ft
Specific Energy	0.42 ft
Froude Number	1.68
Flow Type	Supercritical

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+65.00	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+26.00	0.65
0+26.01	0.73
0+26.25	1.04
0+26.42	1.06
0+32.50	1.18
0+38.58	1.06

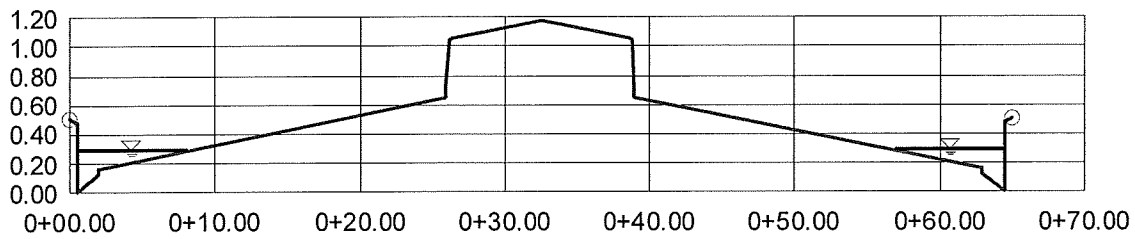
Section - EGN1a
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+38.74	1.04
0+38.99	0.73
0+39.00	0.65
0+63.00	0.17
0+63.00	0.13
0+64.50	0.00
0+64.50	0.48
0+65.00	0.50

Section - EGN1a
Cross Section for Irregular Channel

Project Description	
Worksheet	Section - EGN1a
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	2.46 %
Water Surface Elevation	0.29 ft
Elevation Range	0.00 to 1.18
Discharge	4.00 cfs



V:10.0
H:1
NTS

Section - EGN1a (10-Year)

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - EGN1a (10-Year)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	2.46 %
Discharge	2.00 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	0.24 ft
Elevation Range	0.00 to 1.18
Flow Area	0.8 ft ²
Wetted Perimeter	10.72 ft
Top Width	10.15 ft
Actual Depth	0.24 ft
Critical Elevation	0.28 ft
Critical Slope	0.89 %
Velocity	2.55 ft/s
Velocity Head	0.10 ft
Specific Energy	0.34 ft
Froude Number	1.62
Flow Type	Supercritical

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+65.00	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+26.00	0.65
0+26.01	0.73
0+26.25	1.04
0+26.42	1.06
0+32.50	1.18
0+38.58	1.06

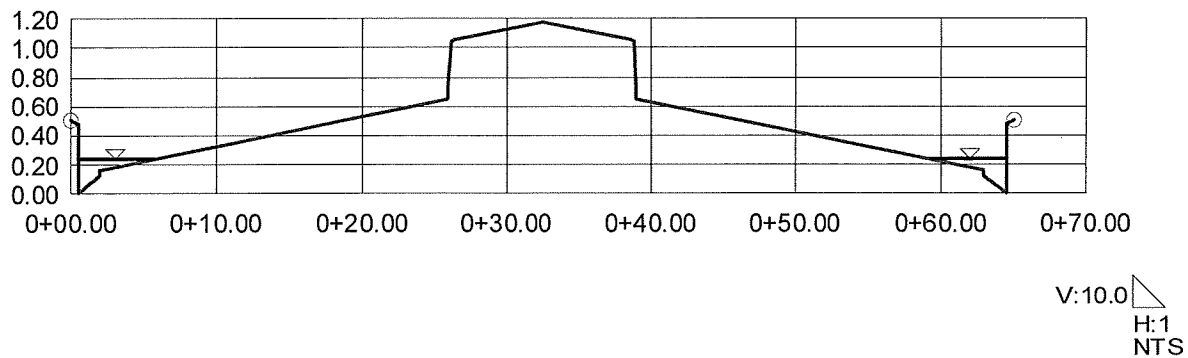
Section - EGN1a (10-Year)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+38.74	1.04
0+38.99	0.73
0+39.00	0.65
0+63.00	0.17
0+63.00	0.13
0+64.50	0.00
0+64.50	0.48
0+65.00	0.50

Section - EGN1a (10-Year) **Cross Section for Irregular Channel**

Project Description	
Worksheet	Section - EGN1a (10-Year)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	2.46 %
Water Surface Elevation	0.24 ft
Elevation Range	0.00 to 1.18
Discharge	2.00 cfs



Section - EGN1b

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - EGN1b
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	0.50 %
Discharge	2.50 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	0.38 ft
Elevation Range	0.00 to 1.18
Flow Area	1.5 ft ²
Wetted Perimeter	12.21 ft
Top Width	11.79 ft
Actual Depth	0.38 ft
Critical Elevation	0.35 ft
Critical Slope	0.80 %
Velocity	1.64 ft/s
Velocity Head	0.04 ft
Specific Energy	0.42 ft
Froude Number	0.80
Flow Type	Subcritical

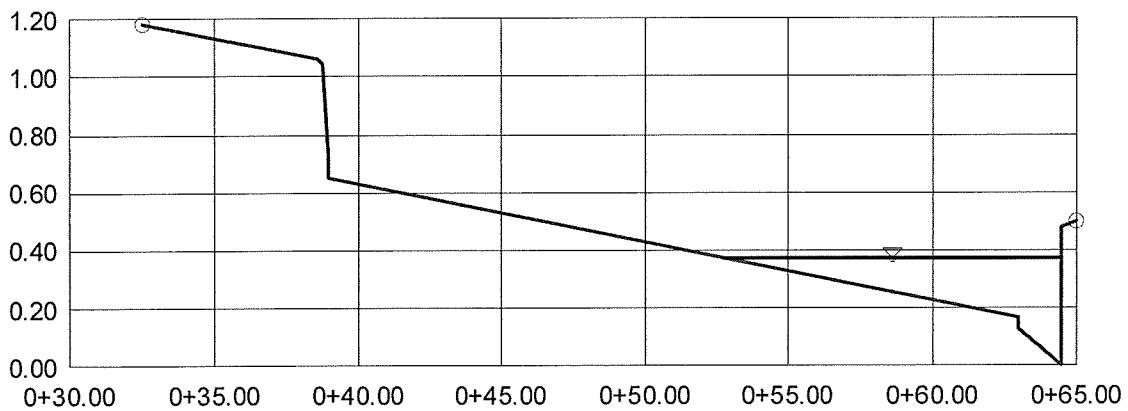
Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+32.50	0+65.00	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+32.50	1.18
0+38.58	1.06
0+38.74	1.04
0+38.99	0.73
0+39.00	0.65
0+63.00	0.17
0+63.00	0.13
0+64.50	0.00
0+64.50	0.48
0+65.00	0.50

Section - EGN1b **Cross Section for Irregular Channel**

Project Description	
Worksheet	Section - EGN1b
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	0.50 %
Water Surface Elevation	0.38 ft
Elevation Range	0.00 to 1.18
Discharge	2.50 cfs



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Section - EGN1b (10-Year)

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - EGN1b (10-Year)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	0.50 %
Discharge	1.00 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	0.30 ft
Elevation Range	0.00 to 1.18
Flow Area	0.7 ft ²
Wetted Perimeter	8.18 ft
Top Width	7.84 ft
Actual Depth	0.30 ft
Critical Elevation	0.28 ft
Critical Slope	0.89 %
Velocity	1.33 ft/s
Velocity Head	0.03 ft
Specific Energy	0.32 ft
Froude Number	0.76
Flow Type	Subcritical

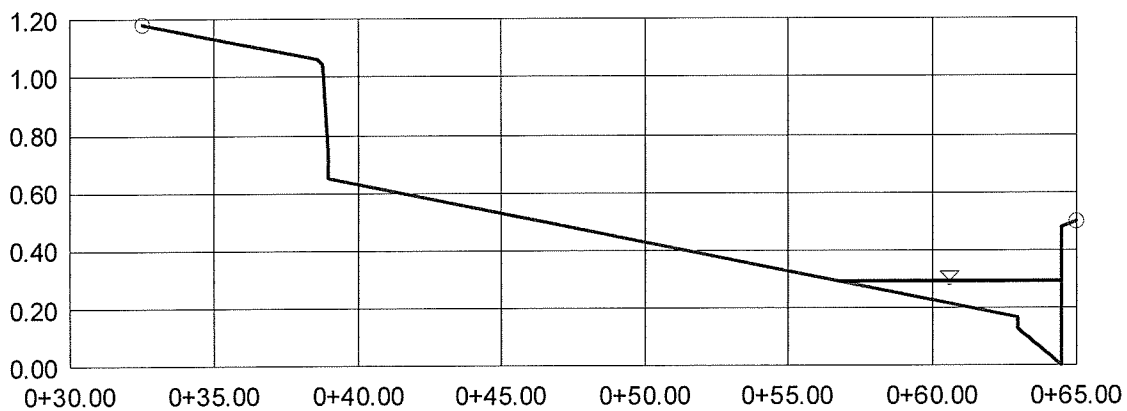
Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+32.50	0+65.00	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+32.50	1.18
0+38.58	1.06
0+38.74	1.04
0+38.99	0.73
0+39.00	0.65
0+63.00	0.17
0+63.00	0.13
0+64.50	0.00
0+64.50	0.48
0+65.00	0.50

Section - EGN1b (10-Year) **Cross Section for Irregular Channel**

Project Description	
Worksheet	Section - EGN1b (10-Year)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	0.50 %
Water Surface Elevation	0.30 ft
Elevation Range	0.00 to 1.18
Discharge	1.00 cfs



V:10.0
H:1
NTS

Section - EGN2

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - EGN2
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	0.50 %
Discharge	3.00 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	0.32 ft
Elevation Range	0.00 to 1.18
Flow Area	1.8 ft²
Wetted Perimeter	18.36 ft
Top Width	17.64 ft
Actual Depth	0.32 ft
Critical Elevation	0.31 ft
Critical Slope	0.62 %
Velocity	1.64 ft/s
Velocity Head	0.04 ft
Specific Energy	0.36 ft
Froude Number	0.90
Flow Type	Subcritical

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+26.00	0.016
0+26.00	0+39.00	0.013
0+39.00	0+63.00	0.016
0+63.00	0+65.00	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+26.00	0.65
0+26.01	0.73

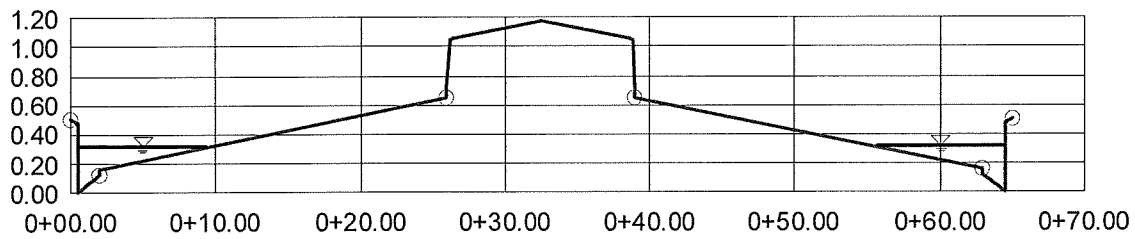
Section - EGN2
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+26.25	1.04
0+26.42	1.06
0+32.50	1.18
0+38.58	1.06
0+38.74	1.04
0+38.99	0.73
0+39.00	0.65
0+63.00	0.17
0+63.00	0.13
0+64.50	0.00
0+64.50	0.48
0+65.00	0.50

Section - EGN2
Cross Section for Irregular Channel

Project Description	
Worksheet	Section - EGN2
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.014
Channel Slope	0.50 %
Water Surface Elevation	0.32 ft
Elevation Range	0.00 to 1.18
Discharge	3.00 cfs



V:10.0
H:1
NTS

Section - EGN2 (10-Year)

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - EGN2 (10-Year)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	0.50 %
Discharge	2.00 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	0.28 ft
Elevation Range	0.00 to 1.18
Flow Area	1.3 ft²
Wetted Perimeter	15.00 ft
Top Width	14.34 ft
Actual Depth	0.28 ft
Critical Elevation	0.28 ft
Critical Slope	0.62 %
Velocity	1.54 ft/s
Velocity Head	0.04 ft
Specific Energy	0.32 ft
Froude Number	0.90
Flow Type	Subcritical

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+26.00	0.016
0+26.00	0+39.00	0.013
0+39.00	0+63.00	0.016
0+63.00	0+65.00	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+26.00	0.65
0+26.01	0.73

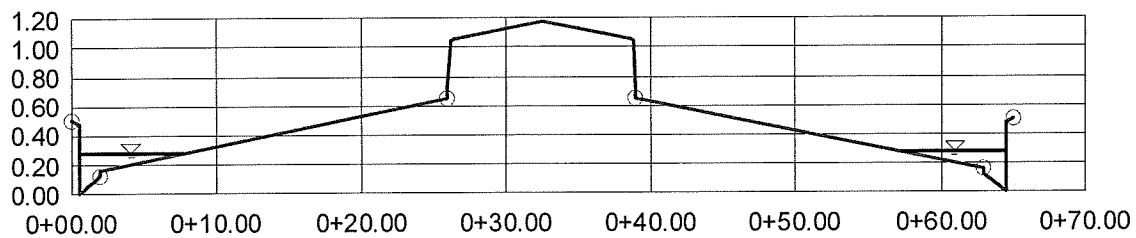
Section - EGN2 (10-Year)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+26.25	1.04
0+26.42	1.06
0+32.50	1.18
0+38.58	1.06
0+38.74	1.04
0+38.99	0.73
0+39.00	0.65
0+63.00	0.17
0+63.00	0.13
0+64.50	0.00
0+64.50	0.48
0+65.00	0.50

Section - EGN2 (10-Year)
Cross Section for Irregular Channel

Project Description	
Worksheet	Section - EGN2 (10-Year)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.013
Channel Slope	0.50 %
Water Surface Elevation	0.28 ft
Elevation Range	0.00 to 1.18
Discharge	2.00 cfs



V:10.0
H:1
NTS

Section - SHA

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - SHA
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	2.75 %
Discharge	2.50 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	0.29 ft
Elevation Range	0.00 to 0.53
Flow Area	0.8 ft ²
Wetted Perimeter	10.03 ft
Top Width	9.69 ft
Actual Depth	0.29 ft
Critical Elevation	0.34 ft
Critical Slope	0.82 %
Velocity	2.96 ft/s
Velocity Head	0.14 ft
Specific Energy	0.43 ft
Froude Number	1.77
Flow Type	Supercritical

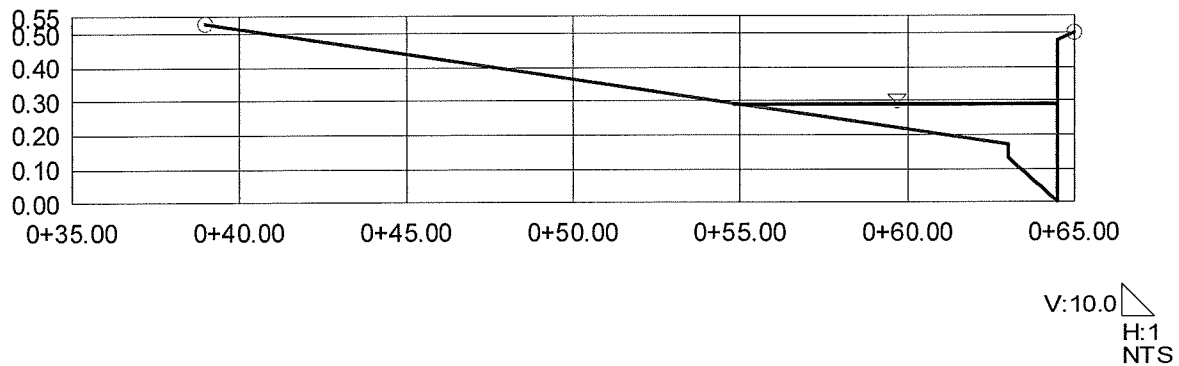
Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+39.00	0+65.00	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+39.00	0.53
0+63.00	0.17
0+63.00	0.13
0+64.50	0.00
0+64.50	0.48
0+65.00	0.50

Section - SHA **Cross Section for Irregular Channel**

Project Description	
Worksheet	Section - SHA
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	2.75 %
Water Surface Elevation	0.29 ft
Elevation Range	0.00 to 0.53
Discharge	2.50 cfs



Section - SHA (West Half Street)

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - SHA (West Half Street)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	2.75 %
Discharge	2.50 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	0.26 ft
Elevation Range	0.00 to 0.50
Flow Area	1.1 ft ²
Wetted Perimeter	19.89 ft
Top Width	19.59 ft
Actual Depth	0.26 ft
Critical Elevation	0.29 ft
Critical Slope	0.93 %
Velocity	2.25 ft/s
Velocity Head	0.08 ft
Specific Energy	0.34 ft
Froude Number	1.67
Flow Type	Supercritical

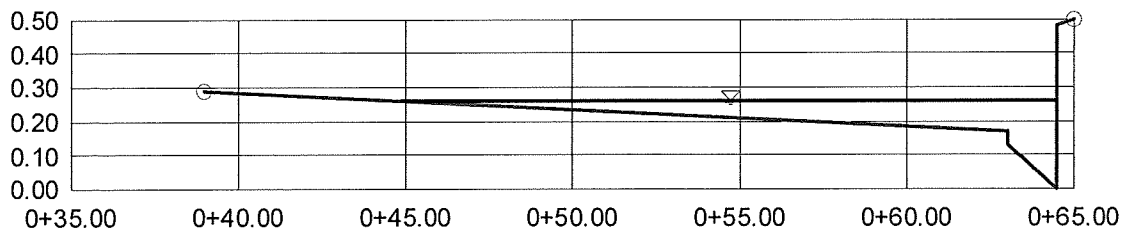
Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+39.00	0+65.00	0.016

Natural Channel Points	
Station (ft)	Elevation (ft)
0+39.00	0.29
0+63.00	0.17
0+63.00	0.13
0+64.50	0.00
0+64.50	0.48
0+65.00	0.50

Section - SHA (West Half Street) **Cross Section for Irregular Channel**

Project Description	
Worksheet	Section - SHA (West Half Street)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	2.75 %
Water Surface Elevation	0.26 ft
Elevation Range	0.00 to 0.50
Discharge	2.50 cfs



V:10.0
H:1
NTS

Section - SHA1

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - SHA1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	2.75 %
Discharge	5.00 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	0.30 ft
Elevation Range	0.00 to 1.18
Flow Area	1.6 ft ²
Wetted Perimeter	16.86 ft
Top Width	16.16 ft
Actual Depth	0.30 ft
Critical Elevation	0.35 ft
Critical Slope	0.79 %
Velocity	3.17 ft/s
Velocity Head	0.16 ft
Specific Energy	0.46 ft
Froude Number	1.79
Flow Type	Supercritical

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+65.00	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+26.00	0.65
0+26.01	0.73
0+26.25	1.04
0+26.42	1.06
0+32.50	1.18
0+38.58	1.06

Section - SHA1
Worksheet for Irregular Channel

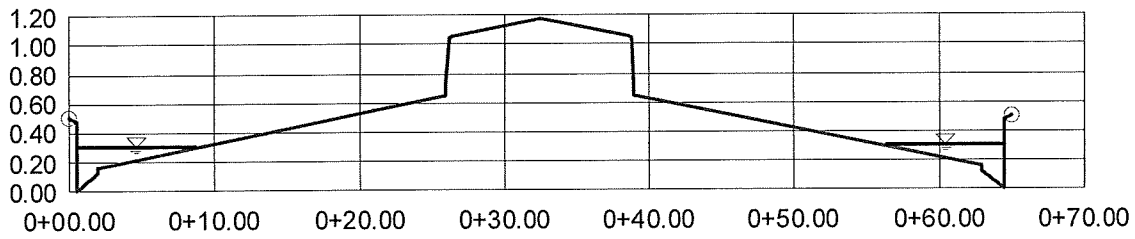
Natural Channel Points	
Station (ft)	Elevation (ft)
0+38.74	1.04
0+38.99	0.73
0+39.00	0.65
0+63.00	0.17
0+63.00	0.13
0+64.50	0.00
0+64.50	0.48
0+65.00	0.50

Section - SHA1

Cross Section for Irregular Channel

Project Description	
Worksheet	Section - SHA1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.016
Channel Slope	2.75 %
Water Surface Elevation	0.30 ft
Elevation Range	0.00 to 1.18
Discharge	5.00 cfs



V:10.0
H:1
NTS

Section - SHA1 (10-Year)

Worksheet for Irregular Channel

Project Description	
Worksheet	Section - SHA1 (10-Year)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Channel Slope	2.75 %
Discharge	3.00 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	0.26 ft
Elevation Range	0.00 to 1.18
Flow Area	1.0 ft ²
Wetted Perimeter	12.74 ft
Top Width	12.13 ft
Actual Depth	0.26 ft
Critical Elevation	0.31 ft
Critical Slope	0.77 %
Velocity	2.98 ft/s
Velocity Head	0.14 ft
Specific Energy	0.40 ft
Froude Number	1.83
Flow Type	Supercritical

Calculation Messages:
Flow is divided.

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+00.00	0+02.00	0.013
0+02.00	0+26.00	0.016
0+26.00	0+39.00	0.013
0+39.00	0+63.00	0.016
0+63.00	0+65.00	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+26.00	0.65
0+26.01	0.73

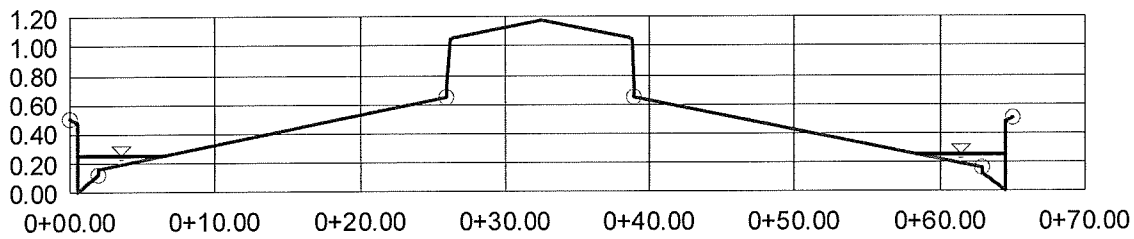
Section - SHA1 (10-Year)
Worksheet for Irregular Channel

Natural Channel Points	
Station (ft)	Elevation (ft)
0+26.25	1.04
0+26.42	1.06
0+32.50	1.18
0+38.58	1.06
0+38.74	1.04
0+38.99	0.73
0+39.00	0.65
0+63.00	0.17
0+63.00	0.13
0+64.50	0.00
0+64.50	0.48
0+65.00	0.50

Section - SHA1 (10-Year) Cross Section for Irregular Channel

Project Description	
Worksheet	Section - SHA1 (10-Year)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.015
Channel Slope	2.75 %
Water Surface Elevation	0.26 ft
Elevation Range	0.00 to 1.18
Discharge	3.00 cfs



V:10.0
H:1
NTS

Drop Inlets

Project:		Skye Canyon Infrastructure - Phase 2	
Title:		Type CM2 Drop Inlet (Continuous Grade)	
Subtitle:		5-ft Drop Inlet at Section SHA	
By:		ETM	
Date:		11/19/2015	
Input:		Variable:	Input:
Street Flow (cfs)		Q	2.5
Longitudinal Slope (ft/ft)		S _o	0.0275
Manning's Coefficient		n	0.016
Street Flow Velocity (fps)		V	2.96
Street Flow Depth (ft)		D	0.29
Street Cross Slope (ft/ft)		S _x	0.02
Grate Width (ft)		W	1.5
Grate Depression (in)		D _g	2.0
Length of Grate (ft)		L _g	2.5
Length of Curb Opening (ft)		L _c	5.0
Clogging Factor - Grate (%)		CF _g	50%
Clogging Factor - Curb (%)		CF _c	50%
Effective Grate Length (ft)		L _{ge}	1.3
Effective Curb Opening Length (ft)		L _{ce}	2.50
Output (Grate):		Equation:	Output (Grate):
¹ R _f - Frontal Flow Factor		1-0.09*(V-V _x) if V>V _x ; else Frontal Flow Factor=1	1.00
² V _o - Splash Over Velocity (fps)		V _x =p+q*L _g -r*L _{ge} ² +sy*L _{ge} ³ ; where p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate)	4.61
¹ E - Grate Flow Ratio		Frontal Flow/Side Flow	0.52
² Q _w - Frontal Flow (cfs)		Q _w = Q[1-(1-(W/T)) ^{2.67}]	1.31
¹ Q _s - Side Flow (cfs)		Q _s = Q-Q _w	1.2
T - Side Flow Spread (ft)		(D-D _g)/S _x	6.17
¹ R _s - Side Flow Factor		1/(1+(0.15*V ^{1.8})/(S _x *L _{ge} ^{2.3}))	0.03
¹ Q _{gi} - Intercepted Flow (cfs)		(R _f *E+R _s *(1-E))*Q	1.3
Output (Curb):		Equation:	Output (Curb):
¹ S _e - Equivalent Cross Slope (ft/ft)		S _x +S _g *E	0.078
Q _{sx} - Remaining Flow After Grate Interception (cfs)		Q-Q _{gi}	1.151
S _g - Gutter Cross Slope (ft/ft)		D _g /W	0.111
¹ L _i - Effective Interception Length (ft)		0.60*Q _{sx} ^{0.42} *S _o ^{0.30} *(1/n*S _e) ^{0.6}	11.94
¹ Q _{ci} - Intercepted Flow (cfs)		(1-(1-L _{ce} /L _i) ^{1.8})*Q _{sx}	0.4
		or Q _{sx} if L _i is less than L _{ce}	
Output (Combination):			Output (Combination):
Total Intercepted Flow (cfs)		Intercepted (Grate) + Intercepted (Curb)	2

¹ Formula referenced from the CCRFCD Manual

² Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

¹ Formula referenced from the CCRFCD Manual

² Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

Project:	Skye Canyon Infrastructure - Phase 2	
Title:	Type CM2 Drop Inlet (SUMP)	
Subtitle:	5-ft Drop Inlet at Section SHA1	
By:	ETM	
Date:	11/19/2015	

Input:	Variable:	Input:
Depth at Inlet (ft)	D	0.64
Grate Width (ft)	W	1.50
Length of Grate (ft)	L _g	2.50
Length of Curb Opening (ft)	L _c	5.00
Height of Curb Opening (ft)	H	0.500
Weir Coef. - Curb Opening	W _c	2.3
Weir Coef. - Grate	W _g	3.0
Orifice Coef.	O _c	0.67
Grate Coef.	G _c	0.60
Clogging Factor - Grate (%)	CF _g	50
Clogging Factor - Curb (%)	CF _c	50

Output (Grate):	Equation:	Output (Grate):
Effective Weir Length (ft)	2*W+L _g	5.50
Adjusted Effective Weir Length (ft)	2*(1-CF _g /100)*W+(1-CF _g /100)*L _g	2.75
Grate Open Area (sf)	W*L _g	3.75
Adjusted Grate Open Area (sf)	Grate Open Area * G _c *(1-CF _g /100)	1.13
Controlling Flow Type (weir/orifice)	If D<1.792*(Adj. Grate Open Area/Adj. Eff. Length) use weir, else orifice	weir
Intercepted Flow (cfs)	weir: W _g *(Adj. Eff. Weir Length)*D ^{1.5}	4.2
	orifice: O _c *(Adj. Grate Open Area)*(64.4*D) ^{0.5}	

Output (Curb):	Equation:	Output (Curb):
Effective Weir Length (ft)	L+1.8*W	7.70
Adjusted Effective Weir Length (ft)	L+1.8(1-CF _c /100)*W	6.41
Curb Open Area (sf)	L*H	2.50
Adjusted Curb Open Area (sf)	Curb Open Area * (1-CF _c /100)	1.25
Controlling Flow Type (weir/orifice)	If D<H, weir, else orifice	orifice
Intercepted Flow (cfs)	weir: W _c *(Adj. Eff. Weir Length)*D ^{1.5}	5.36
	orifice: O _c *(Adj. Curb Open Area)*(64.4*(D-H/2)) ^{0.5}	

Output (Combination):		Output (Combination):
Total Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	9.6

Project:	Skye Canyon Infrastructure - Phase 2	
Title:	Type CM2 Drop Inlet (Continuous Grade)	
Subtitle:	20-ft Drop Inlet at Section ECA2	
By:	ETM	
Date:	11/19/2015	
Input:	Variable:	Input:
Street Flow (cfs)	Q	21.5
Longitudinal Slope (ft/ft)	S _o	0.0490
Manning's Coefficient	n	0.016
Street Flow Velocity (fps)	V	6.47
Street Flow Depth (ft)	D	0.50
Street Cross Slope (ft/ft)	S _x	0.02
Gate Width (ft)	W	1.5
Gate Depression (in)	D _g	2.0
Length of Gate (ft)	L _g	17.5
Length of Curb Opening (ft)	L _c	20.0
Clogging Factor - Gate (%)	CF _g	50%
Clogging Factor - Curb (%)	CF _c	50%
Effective Gate Length (ft)	L _{ge}	8.8
Effective Curb Opening Length (ft)	L _{ce}	10.00
Output (Grate):	Equation:	Output (Grate):
¹ R _f - Frontal Flow Factor	1-0.09*(V-V _x) if V>V _x ; else Frontal Flow Factor=1	1.00
² V _o - Splash Over Velocity (fps)	V _x =p+q*L _g -r*L _{ge} ² +sy*L _{ge} ³ ; where p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate)	42.93
¹ E - Grate Flow Ratio	Frontal Flow/Side Flow	0.22
² Q _w - Frontal Flow (cfs)	Q _w = Q[1-(1-(W/T)) ^{2.67}]	4.79
¹ Q _s - Side Flow (cfs)	Q _s = Q-Q _w	16.7
T - Side Flow Spread (ft)	(D-D _g)/S _x	16.67
¹ R _s - Side Flow Factor	1/(1+(0.15*V ^{1.8})/(S _x *L _{ge} ^{2.3}))	0.40
¹ Q _{gi} - Intercepted Flow (cfs)	(R _f *E+R _s *(1-E))*Q	11.5
Output (Curb):	Equation:	Output (Curb):
¹ S _e - Equivalent Cross Slope (ft/ft)	S _x +S _g *E	0.045
Q _{sx} - Remaining Flow After Grate Interception (cfs)	Q-Q _{gi}	9.954
S _g - Gutter Cross Slope (ft/ft)	D _g /W	0.111
¹ L _i - Effective Interception Length (ft)	0.60*Q _{sx} ^{0.42} *S _o ^{0.30} *(1/n*S _e) ^{0.6}	49.15
¹ Q _{ci} - Intercepted Flow (cfs)	(1-(1-L _{ce} /L _i) ^{1.8})*Q _{sx}	3.3
	or Q _{sx} if L _i is less than L _{ce}	
Output (Combination):		Output (Combination):
Total Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	15
Total Collected by Two Inlets =		30 cfs

¹ Formula referenced from the CCRFCD Manual

² Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

Project:		Skye Canyon Infrastructure - Phase 2	
Title:		Type CM2 Drop Inlet (Continuous Grade)	
Subtitle:		20-ft Drop Inlet at Section ECA2b	
By:		ETM	
Date:		11/19/2015	
Input:		Variable:	Input:
Street Flow (cfs)		Q	6.5
Longitudinal Slope (ft/ft)		S _o	0.0200
Manning's Coefficient		n	0.016
Street Flow Velocity (fps)		V	3.49
Street Flow Depth (ft)		D	0.40
Street Cross Slope (ft/ft)		S _x	0.02
Grate Width (ft)		W	1.5
Grate Depression (in)		D _g	2.0
Length of Grate (ft)		L _g	17.5
Length of Curb Opening (ft)		L _c	20.0
Clogging Factor - Grate (%)		CF _g	50%
Clogging Factor - Curb (%)		CF _c	50%
Effective Grate Length (ft)		L _{ge}	8.8
Effective Curb Opening Length (ft)		L _{ce}	10.00
Output (Grate):		Equation:	Output (Grate):
¹ R _f - Frontal Flow Factor		1-0.09*(V-V _x) if V>V _x ; else Frontal Flow Factor=1	1.00
² V _o - Splash Over Velocity (fps)		V _x =p+q*L _g -r*L _{ge} ² +sy*L _{ge} ³ ; where p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate)	42.93
¹ E - Grate Flow Ratio		Frontal Flow/Side Flow	0.31
² Q _w - Frontal Flow (cfs)		Q _w = Q[1-(1-(W/T)) ^{2.67}]	2.00
¹ Q _s - Side Flow (cfs)		Q _s = Q-Q _w	4.5
T - Side Flow Spread (ft)		(D-D _g)/S _x	11.67
¹ R _s - Side Flow Factor		1/(1+(0.15*V ^{1.8})/(S _x *L _{ge} ^{2.3}))	0.67
¹ Q _{gi} - Intercepted Flow (cfs)		(R _f *E+R _s *(1-E))*Q	5.0
Output (Curb):		Equation:	Output (Curb):
¹ S _e - Equivalent Cross Slope (ft/ft)		S _x +S _g *E	0.054
Q _{sx} - Remaining Flow After Grate Interception (cfs)		Q-Q _{gi}	1.470
S _g - Gutter Cross Slope (ft/ft)		D _g /W	0.111
¹ L _t - Effective Interception Length (ft)		0.60*Q _{sx} ^{0.42} *S _o ^{0.30} *(1/n*S _e) ^{0.6}	15.00
¹ Q _{ci} - Intercepted Flow (cfs)		(1-(1-L _{ce} /L _t) ^{1.8})*Q _{sx}	1.3
		or Q _{sx} if L _t is less than L _{ce}	
Output (Combination):			Output (Combination):
Total Intercepted Flow (cfs)		Intercepted (Grate) + Intercepted (Curb)	6.3

¹ Formula referenced from the CCRFCD Manual

² Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

Project:		Skye Canyon Infrastructure - Phase 2	
Title:		Type CM2 Drop Inlet (Continuous Grade)	
Subtitle:		5-ft Drop Inlet at Section ECA3a	
By:		ETM	
Date:		11/19/2015	
Input:		Variable:	Input:
Street Flow (cfs)		Q	2.5
Longitudinal Slope (ft/ft)		S _o	0.0494
Manning's Coefficient		n	0.016
Street Flow Velocity (fps)		V	4.00
Street Flow Depth (ft)		D	0.28
Street Cross Slope (ft/ft)		S _x	0.02
Grate Width (ft)		W	1.5
Grate Depression (in)		D _g	2.0
Length of Grate (ft)		L _g	2.5
Length of Curb Opening (ft)		L _c	5.0
Clogging Factor - Grate (%)		CF _g	50%
Clogging Factor - Curb (%)		CF _c	50%
Effective Grate Length (ft)		L _{ge}	1.3
Effective Curb Opening Length (ft)		L _{ce}	2.50
Output (Grate):		Equation:	Output (Grate):
¹ R _f - Frontal Flow Factor		1-0.09*(V-V _x) if V>V _x ; else Frontal Flow Factor=1	1.00
² V _o - Splash Over Velocity (fps)		V _x =p+q*L _g -r*L _{ge} ² +sy*L _{ge} ³ ; where p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate)	4.61
¹ E - Grate Flow Ratio		Frontal Flow/Side Flow	0.56
² Q _w - Frontal Flow (cfs)		Q _w = Q[1-(1-(W/T)) ^{2.67}]	1.40
¹ Q _s - Side Flow (cfs)		Q _s = Q-Q _w	1.1
T - Side Flow Spread (ft)		(D-D _g)/S _x	5.67
¹ R _s - Side Flow Factor		1/(1+(0.15*V ^{1.8})/(S _x *L _{ge} ^{2.3}))	0.02
¹ Q _{gi} - Intercepted Flow (cfs)		(R _f *E+R _s *(1-E))*Q	1.4
Output (Curb):		Equation:	Output (Curb):
¹ S _e - Equivalent Cross Slope (ft/ft)		S _x +S _g *E	0.082
Q _{sx} - Remaining Flow After Grate Interception (cfs)		Q-Q _{gi}	1.080
S _g - Gutter Cross Slope (ft/ft)		D _g /W	0.111
¹ L _i - Effective Interception Length (ft)		0.60*Q _{sx} ^{0.42} *S _o ^{0.30} *(1/n*S _e) ^{0.6}	13.45
¹ Q _{ci} - Intercepted Flow (cfs)		(1-(1-L _{ce} /L _i) ^{1.8})*Q _{sx}	0.3
		or Q _{sx} if L _i is less than L _{ce}	
Output (Combination):			Output (Combination):
Total Intercepted Flow (cfs)		Intercepted (Grate) + Intercepted (Curb)	2

¹ Formula referenced from the CCRFCD Manual

² Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

¹ Formula referenced from the CCRFCD Manual

² Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

Project:	Skye Canyon Infrastructure - Phase 2	
Title:	Type CM2 Drop Inlet (Continuous Grade)	
Subtitle:	5-ft Drop Inlet at Section EGN1a	
By:	ETM	
Date:	11/19/2015	
Input:	Variable:	Input:
Street Flow (cfs)	Q	2
Longitudinal Slope (ft/ft)	S _o	0.0246
Manning's Coefficient	n	0.016
Street Flow Velocity (fps)	V	2.90
Street Flow Depth (ft)	D	0.29
Street Cross Slope (ft/ft)	S _x	0.02
Grate Width (ft)	W	1.5
Grate Depression (in)	D _g	2.0
Length of Grate (ft)	L _g	2.5
Length of Curb Opening (ft)	L _c	5.0
Clogging Factor - Grate (%)	CF _g	50%
Clogging Factor - Curb (%)	CF _c	50%
Effective Grate Length (ft)	L _{ge}	1.3
Effective Curb Opening Length (ft)	L _{ce}	2.50
Output (Grate):	Equation:	Output (Grate):
¹ R _f - Frontal Flow Factor	1-0.09*(V-V _x) if V>V _x ; else Frontal Flow Factor=1	1.00
² V _o - Splash Over Velocity (fps)	V _x =p+q*L _g -r*L _{ge} ² +sy*L _{ge} ³ ; where p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate)	4.61
¹ E - Grate Flow Ratio	Frontal Flow/Side Flow	0.52
² Q _w - Frontal Flow (cfs)	Q _w = Q[1-(1-(W/T)) ^{2.67}]	1.10
¹ Q _s - Side Flow (cfs)	Q _s = Q-Q _w	1.0
T - Side Flow Spread (ft)	(D-D _g)/S _x	6.17
¹ R _s - Side Flow Factor	1/(1+(0.15*V ^{1.8})/(S _x *L _{ge} ^{2.3}))	0.03
¹ Q _{gi} - Intercepted Flow (cfs)	(R _f *E+R _s *(1-E))*Q	1.1
Output (Curb):	Equation:	Output (Curb):
¹ S _e - Equivalent Cross Slope (ft/ft)	S _x +S _g *E	0.078
Q _{sx} - Remaining Flow After Grate Interception (cfs)	Q-Q _{gi}	0.966
S _g - Gutter Cross Slope (ft/ft)	D _g /W	0.111
¹ L _i - Effective Interception Length (ft)	0.60*Q _{sx} ^{0.42} *S _o ^{0.30} *(1/n*S _e) ^{0.6}	10.72
¹ Q _{ci} - Intercepted Flow (cfs)	(1-(1-L _{ce} /L _i) ^{1.85})*Q _{sx} or Q _{sx} if L _i is less than L _{ce}	0.4
Output (Combination):		Output (Combination):
Total Intercepted Flow (cfs)	Intercepted (Grate) + Intercepted (Curb)	1.5
Total Collected by Two Inlets =		3 cfs
¹ Formula referenced from the CCRFCD Manual		
² Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)		

Project:		Skye Canyon Infrastructure - Phase 2	
Title:		Type CM2 Drop Inlet (Continuous Grade)	
Subtitle:		7.5-ft Drop Inlet at Section EGN2	
By:		ETM	
Date:		11/19/2015	
Input:		Variable:	Input:
Street Flow (cfs)		Q	1.5
Longitudinal Slope (ft/ft)		S _o	0.0050
Manning's Coefficient		n	0.014
Street Flow Velocity (fps)		V	1.64
Street Flow Depth (ft)		D	0.32
Street Cross Slope (ft/ft)		S _x	0.02
Grate Width (ft)		W	1.5
Grate Depression (in)		D _g	2.0
Length of Grate (ft)		L _g	5.0
Length of Curb Opening (ft)		L _c	7.5
Clogging Factor - Grate (%)		CF _g	50%
Clogging Factor - Curb (%)		CF _c	50%
Effective Grate Length (ft)		L _{ge}	2.5
Effective Curb Opening Length (ft)		L _{ce}	3.75
Output (Grate):		Equation:	Output (Grate):
¹ R _f - Frontal Flow Factor		1-0.09*(V-V _x) if V>V _x ; else Frontal Flow Factor=1	1.00
² V _o - Splash Over Velocity (fps)		V _x =p+q*L _g -r*L _{ge} ² +sy*L _{ge} ³ ; where p=0.30,q=4.85,r=1.31,sy=0.15 (for Vane Grate)	6.58
¹ E - Grate Flow Ratio		Frontal Flow/Side Flow	0.44
² Q _w - Frontal Flow (cfs)		Q _w = Q[1-(1-(W/T)) ^{2.67}]	0.66
¹ Q _s - Side Flow (cfs)		Q _s = Q-Q _w	0.8
T - Side Flow Spread (ft)		(D-D _g)/S _x	7.67
¹ R _s - Side Flow Factor		1/(1+(0.15*V ^{1.8})/(S _x *L _{ge} ^{2.3}))	0.31
¹ Q _{gi} - Intercepted Flow (cfs)		(R _f *E+R _s *(1-E))*Q	0.9
Output (Curb):		Equation:	Output (Curb):
¹ S _e - Equivalent Cross Slope (ft/ft)		S _x +S _g *E	0.069
Q _{sx} - Remaining Flow After Grate Interception (cfs)		Q-Q _{gi}	0.578
S _g - Gutter Cross Slope (ft/ft)		D _g /W	0.111
¹ L _i - Effective Interception Length (ft)		0.60*Q _{sx} ^{0.42} *S _o ^{0.30} *(1/n*S _e) ^{0.6}	6.27
¹ Q _{ci} - Intercepted Flow (cfs)		(1-(1-L _{ce} /L _i) ^{1.8})*Q _{sx}	0.5
		or Q _{sx} if L _i is less than L _{ce}	
Output (Combination):			Output (Combination):
Total Intercepted Flow (cfs)		Intercepted (Grate) + Intercepted (Curb)	1.4
		Total Collected by Two Inlets =	3 cfs

¹ Formula referenced from the CCRFCD Manual

² Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

¹ Formula referenced from the CCRFCD Manual

² Formula referenced from FHWA Urban Drainage Design Manual (HEC-22)

Interim Ditches

Ditch 11

Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Ditch 11
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.025
Channel Slope	0.65 %
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	35.00 cfs

Results	
Depth	0.79 ft
Flow Area	9.7 ft ²
Wetted Perimeter	14.98 ft
Top Width	14.72 ft
Critical Depth	0.68 ft
Critical Slope	1.12 %
Velocity	3.60 ft/s
Velocity Head	0.20 ft
Specific Energy	0.99 ft
Froude Number	0.78
Flow Type	Subcritical

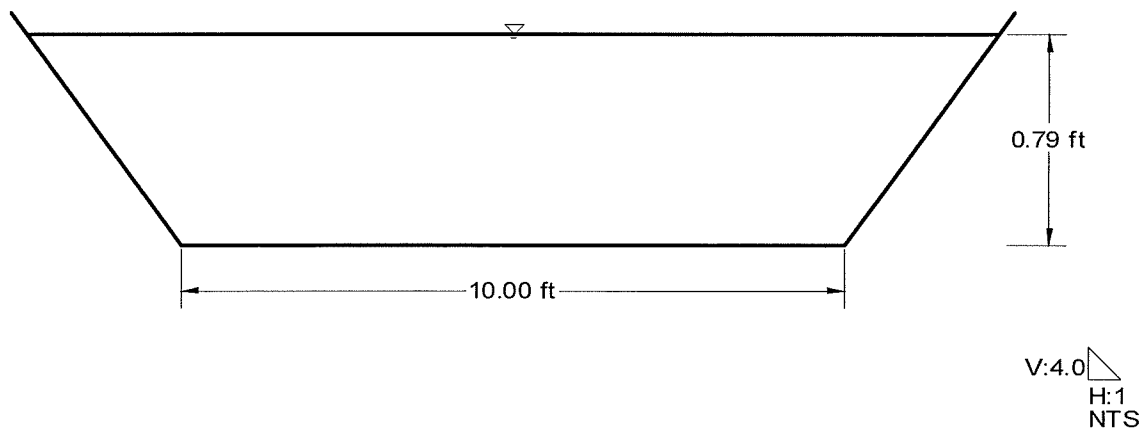
Notes: Q = OFF1-I

Ditch 11

Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Ditch 11
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.025
Channel Slope	0.65 %
Depth	0.79 ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	35.00 cfs



Ditch 1I-1

Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Ditch 1I-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.025
Channel Slope	3.70 %
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	11.00 cfs

Results	
Depth	0.24 ft
Flow Area	2.6 ft ²
Wetted Perimeter	11.53 ft
Top Width	11.45 ft
Critical Depth	0.32 ft
Critical Slope	1.38 %
Velocity	4.23 ft/s
Velocity Head	0.28 ft
Specific Energy	0.52 ft
Froude Number	1.57
Flow Type	Supercritical

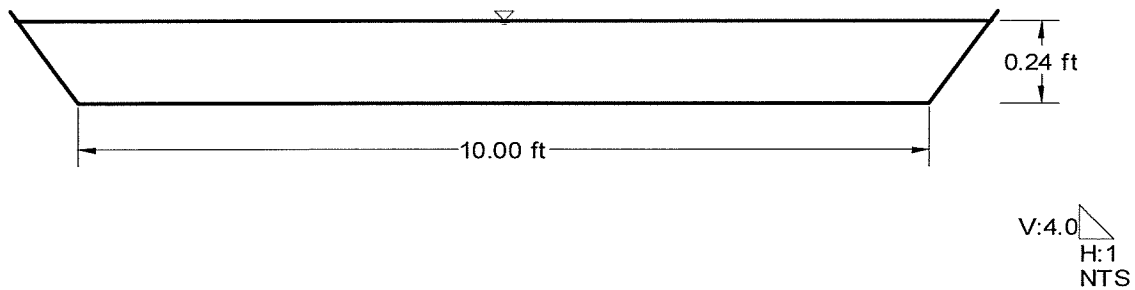
Notes: Q = Assumed approx. 1/3 of OFF1-I

Ditch 1I-1

Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Ditch 1I-1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.025
Channel Slope	3.70 %
Depth	0.24 ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	11.00 cfs



Ditch 2I

Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Ditch 2I
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.025
Channel Slope	0.90 %
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	19.00 cfs

Results	
Depth	0.51 ft
Flow Area	5.8 ft ²
Wetted Perimeter	13.19 ft
Top Width	13.03 ft
Critical Depth	0.46 ft
Critical Slope	1.25 %
Velocity	3.27 ft/s
Velocity Head	0.17 ft
Specific Energy	0.67 ft
Froude Number	0.86
Flow Type	Subcritical

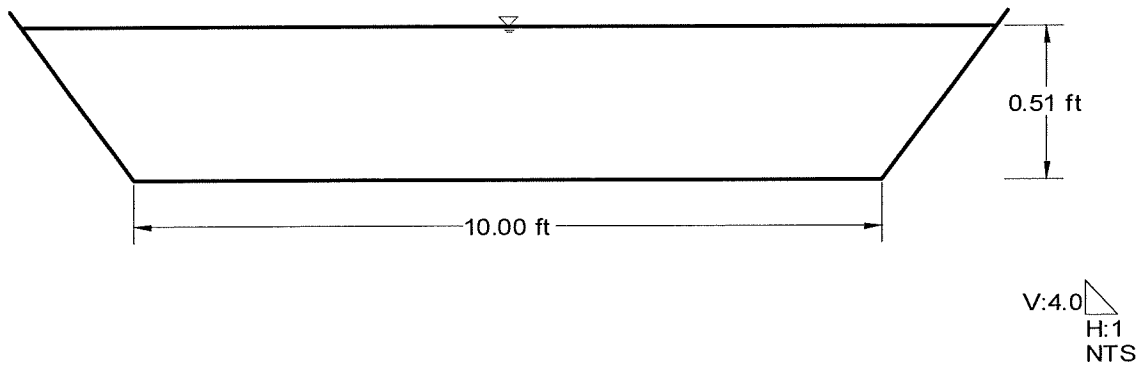
Notes: Q = OFF2-I

Ditch 2I

Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Ditch 2I
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.025
Channel Slope	0.90 %
Depth	0.51 ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	19.00 cfs



Ditch 3I

Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Ditch 3I
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.025
Channel Slope	1.90 %
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	32.00 cfs

Results	
Depth	0.55 ft
Flow Area	6.4 ft ²
Wetted Perimeter	13.48 ft
Top Width	13.30 ft
Critical Depth	0.64 ft
Critical Slope	1.13 %
Velocity	4.99 ft/s
Velocity Head	0.39 ft
Specific Energy	0.94 ft
Froude Number	1.27
Flow Type	Supercritical

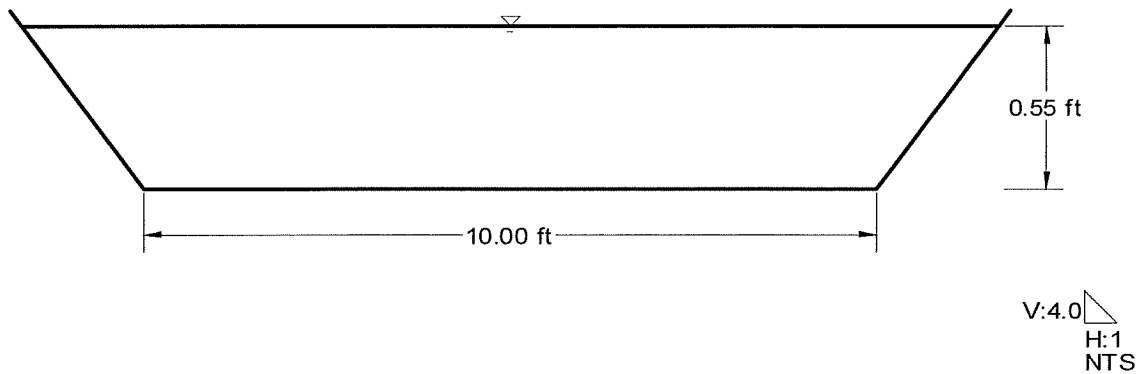
Notes: Q = OFF3-I

Ditch 3I

Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Ditch 3I
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.025
Channel Slope	1.90 %
Depth	0.55 ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	32.00 cfs



Ditch 6I

Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Ditch 6I
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.025
Channel Slope	0.80 %
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	59.00 cfs

Results	
Depth	1.00 ft
Flow Area	12.9 ft ²
Wetted Perimeter	16.30 ft
Top Width	15.98 ft
Critical Depth	0.93 ft
Critical Slope	1.02 %
Velocity	4.56 ft/s
Velocity Head	0.32 ft
Specific Energy	1.32 ft
Froude Number	0.89
Flow Type	Subcritical

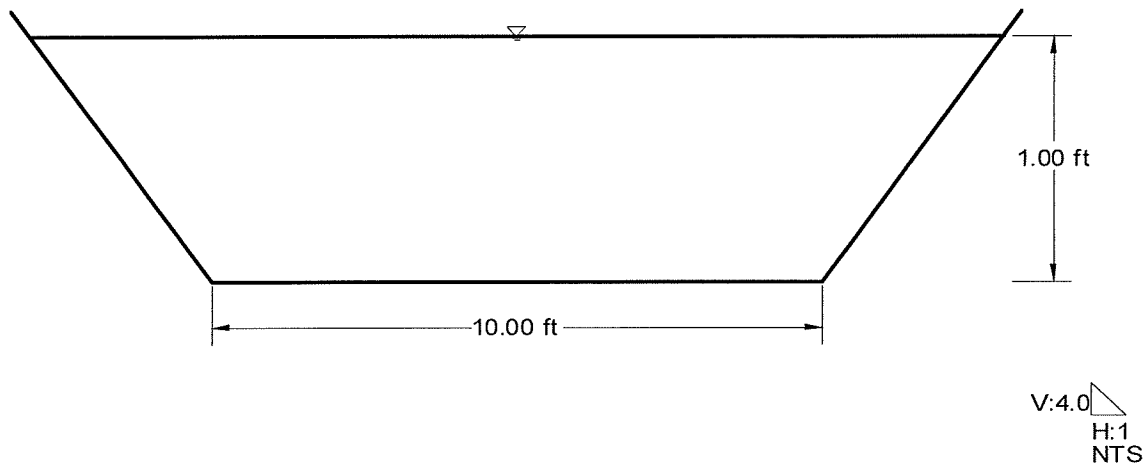
Notes: Q = ON3-I(B) Prorate

Ditch 6I

Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Ditch 6I
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.025
Channel Slope	0.80 %
Depth	1.00 ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	59.00 cfs



Ditch 71
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Ditch 71
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.025
Channel Slope	1.50 %
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	26.50 ft
Discharge	85.00 cfs

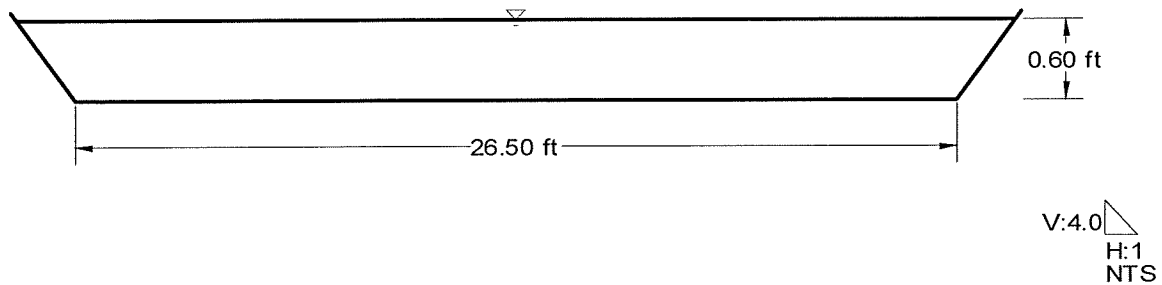
Results	
Depth	0.60 ft
Flow Area	17.1 ft ²
Wetted Perimeter	30.32 ft
Top Width	30.12 ft
Critical Depth	0.67 ft
Critical Slope	1.08 %
Velocity	4.97 ft/s
Velocity Head	0.38 ft
Specific Energy	0.99 ft
Froude Number	1.16
Flow Type	Supercritical

Notes: Q = ON1-I(A) Prorate

Ditch 71
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Ditch 71
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.025
Channel Slope	1.50 %
Depth	0.60 ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	26.50 ft
Discharge	85.00 cfs



Ditch 8I

Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Ditch 8I
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.025
Channel Slope	0.90 %
Left Side Slope	4.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	15.00 ft
Discharge	85.00 cfs

Results	
Depth	0.96 ft
Flow Area	17.5 ft ²
Wetted Perimeter	21.96 ft
Top Width	21.69 ft
Critical Depth	0.93 ft
Critical Slope	1.00 %
Velocity	4.85 ft/s
Velocity Head	0.37 ft
Specific Energy	1.32 ft
Froude Number	0.95
Flow Type	Subcritical

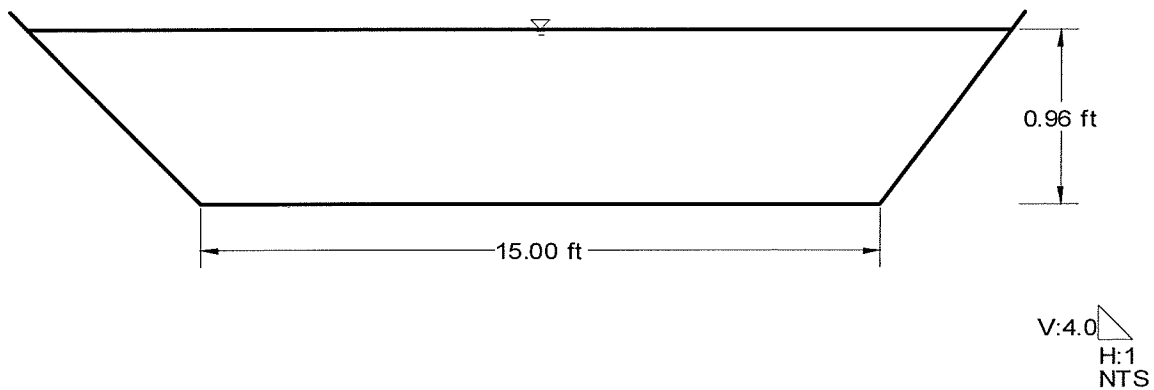
Notes: Q = ON1-I(B) Prorate

Ditch 8I

Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Ditch 8I
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.025
Channel Slope	0.90 %
Depth	0.96 ft
Left Side Slope	4.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	15.00 ft
Discharge	85.00 cfs



Ditch 9I

Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Ditch 9I
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.025
Channel Slope	0.50 %
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	60.00 cfs

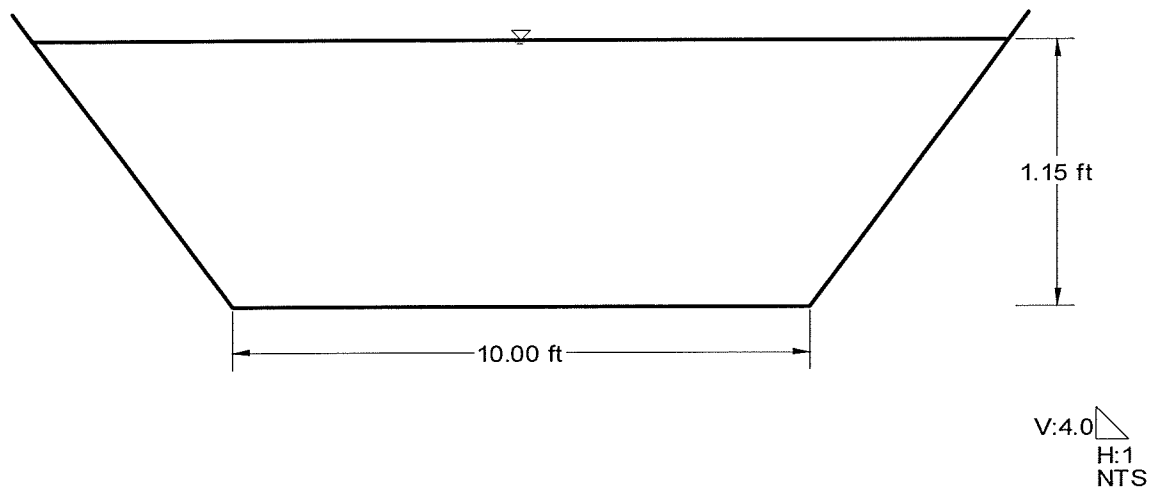
Results	
Depth	1.15 ft
Flow Area	15.4 ft ²
Wetted Perimeter	17.25 ft
Top Width	16.87 ft
Critical Depth	0.94 ft
Critical Slope	1.02 %
Velocity	3.90 ft/s
Velocity Head	0.24 ft
Specific Energy	1.38 ft
Froude Number	0.72
Flow Type	Subcritical

Notes: Q = ON2-I(A) Prorate

Ditch 9I
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Ditch 9I
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.025
Channel Slope	0.50 %
Depth	1.15 ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	60.00 cfs



Ditch 101

Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Ditch 101
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.025
Channel Slope	0.50 %
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	35.00 cfs

Results	
Depth	0.85 ft
Flow Area	10.6 ft ²
Wetted Perimeter	15.36 ft
Top Width	15.09 ft
Critical Depth	0.68 ft
Critical Slope	1.12 %
Velocity	3.29 ft/s
Velocity Head	0.17 ft
Specific Energy	1.02 ft
Froude Number	0.69
Flow Type	Subcritical

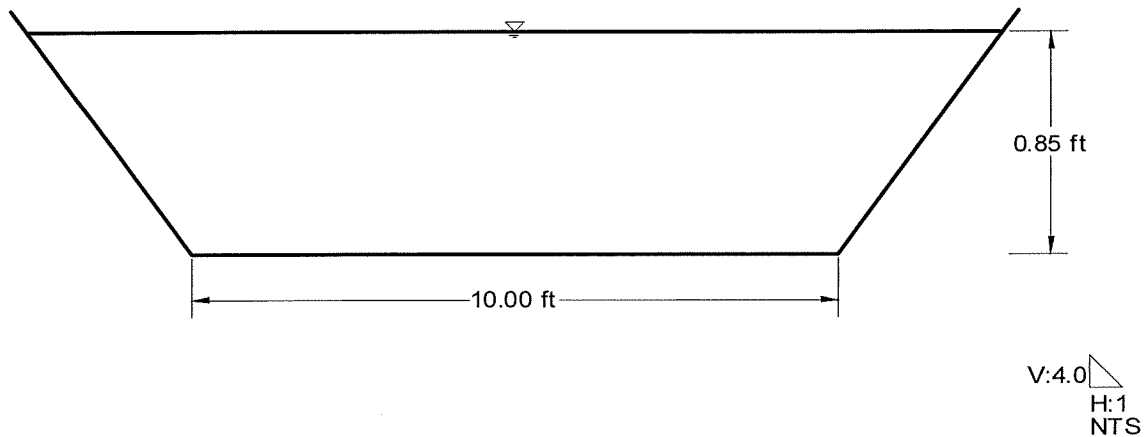
Notes: Q = ON4-I(B) Prorate

Ditch 101

Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Ditch 101
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.025
Channel Slope	0.50 %
Depth	0.85 ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	10.00 ft
Discharge	35.00 cfs



Ditch 111

Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Ditch 111
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.025
Channel Slope	1.90 %
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	12.00 ft
Discharge	27.50 cfs

Results	
Depth	0.46 ft
Flow Area	6.1 ft ²
Wetted Perimeter	14.88 ft
Top Width	14.73 ft
Critical Depth	0.52 ft
Critical Slope	1.19 %
Velocity	4.52 ft/s
Velocity Head	0.32 ft
Specific Energy	0.77 ft
Froude Number	1.24
Flow Type	Supercritical

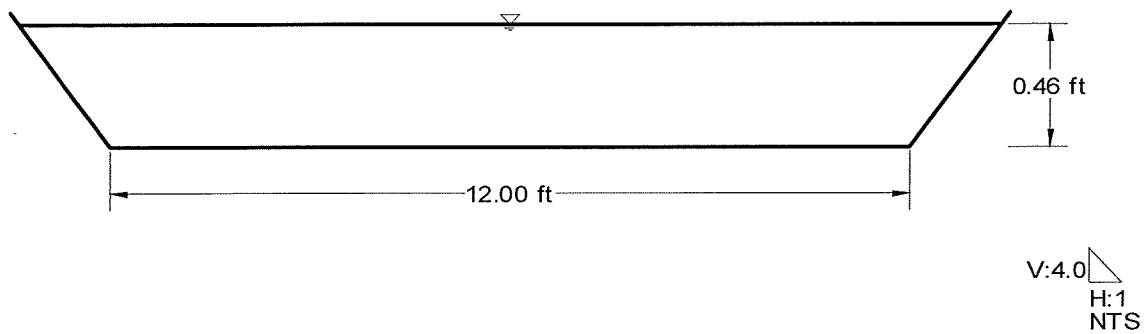
Notes: Q = 30 cfs being Approx. half of ON2-I(C) Prorate

Ditch 111

Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Ditch 111
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.025
Channel Slope	1.90 %
Depth	0.46 ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	12.00 ft
Discharge	27.50 cfs



Ditch 12I

Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Ditch 12I
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Mannings Coefficient	0.025
Channel Slope	0.50 %
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	12.00 ft
Discharge	27.50 cfs

Results	
Depth	0.67 ft
Flow Area	9.4 ft ²
Wetted Perimeter	16.25 ft
Top Width	16.03 ft
Critical Depth	0.52 ft
Critical Slope	1.19 %
Velocity	2.92 ft/s
Velocity Head	0.13 ft
Specific Energy	0.80 ft
Froude Number	0.67
Flow Type	Subcritical

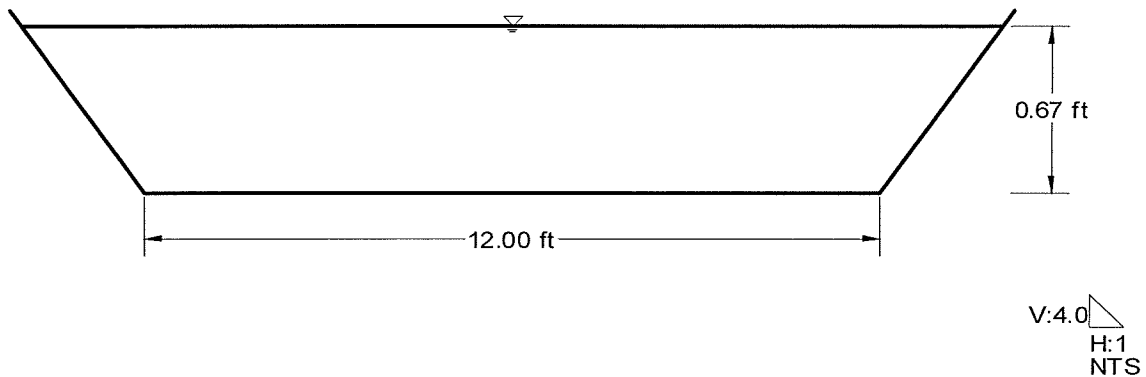
Notes: Q = 27.5 cfs being Approx. half of ON2-I(C)

Ditch 121

Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Ditch 121
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data	
Mannings Coefficient	0.025
Channel Slope	0.50 %
Depth	0.67 ft
Left Side Slope	3.00 H : V
Right Side Slope	3.00 H : V
Bottom Width	12.00 ft
Discharge	27.50 cfs

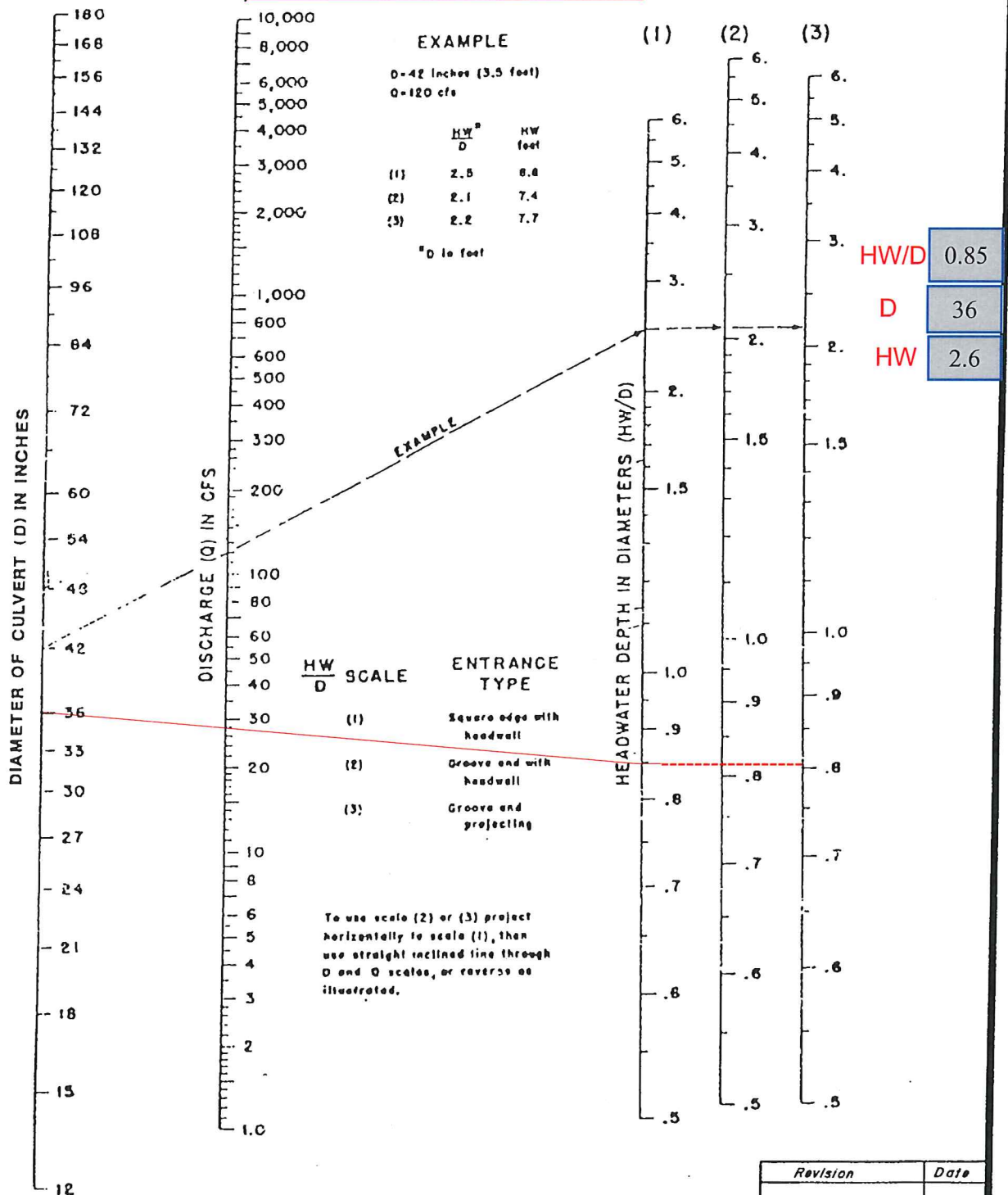


Inlet Control Nomographs

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP

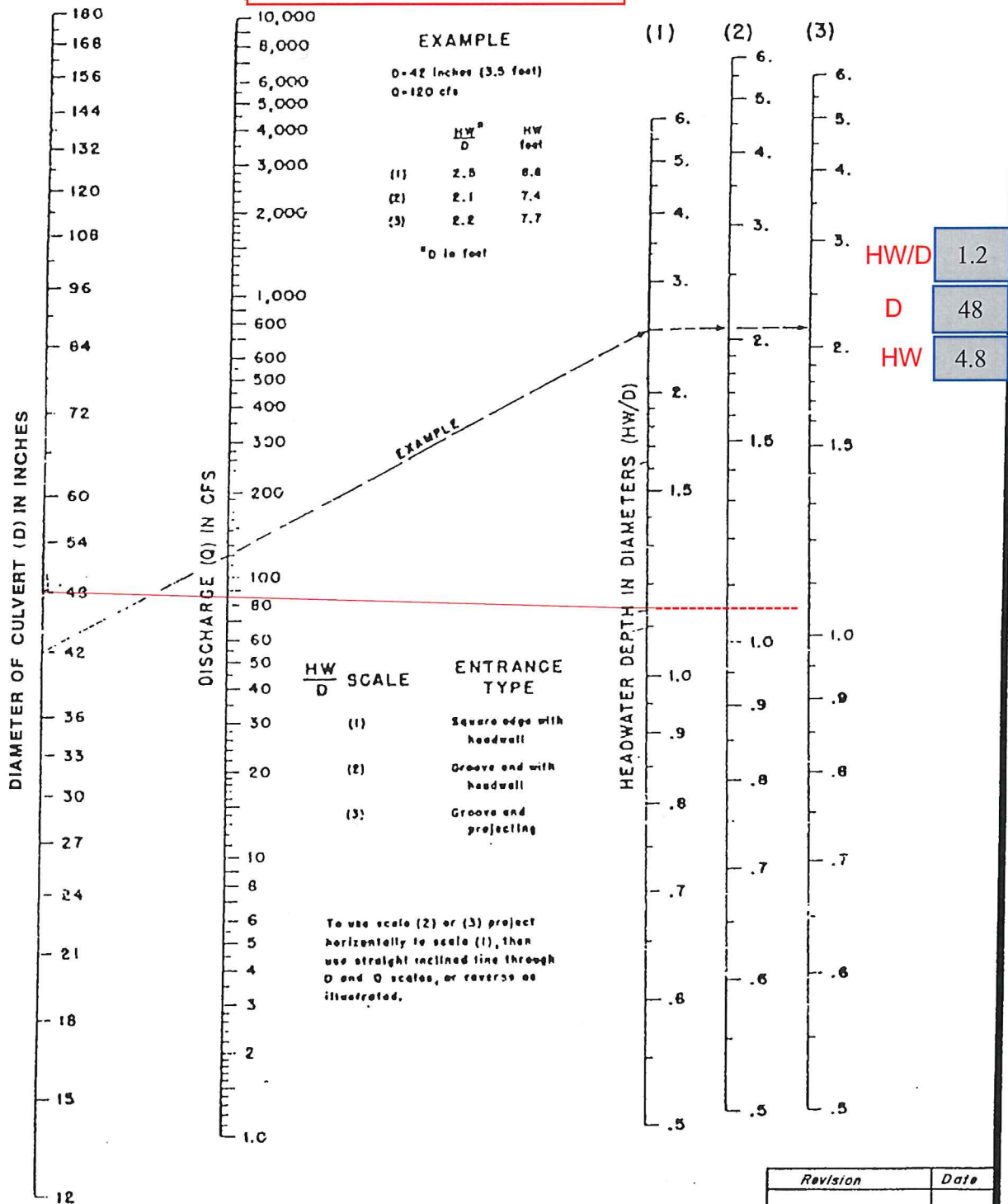
EAGLE CANYON L9: Q=27.5 CFS



HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

NOMOGRAPH - INLET CONTROL RCP

EAGLE CANYON L5: Q=85 CFS



Revision	Date

WRC
ENGINEERING

REFERENCE:

USDOT, FHWA, HDS, No. 5, 1985

FIGURE 1005

APPENDIX C

Revised Storm Drain Hydraulic Calculations

Interim Condition

Eagle Canyon Main & Laterals

0.0

85.0

I-ECA

DATE: 11/19/2015
TIME: 10: 0

I-ECA

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

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

F 0 5 1 5 P

PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGLE CANYON - TRUNK STORM DRAIN
F 0 5 1 5 P

‡

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1	IS A	SYSTEM OUTLET	STATION	INVERT	SECT	W S ELEV
			U/S DATA	613.00	2823.35	72	2829.26

ELEMENT NO	2	IS A	REACH	STATION	INVERT	SECT	RADIUS	ANGLE	ANG PT	MAN H
			U/S DATA	900.00	2830.32	72	0.00	0.00	0.00	1

ELEMENT NO	3	IS A	JUNCTION	STATION	INVERT	SECT	LAT-1	LAT-2	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
			U/S DATA	900.00	2830.32	72	48	0	0.013	72.5	0.0	2832.52	0.00	45.00
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING														
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING														

ELEMENT NO	4	IS A	REACH	STATION	INVERT	SECT	RADIUS	ANGLE	ANG PT	MAN H
			U/S DATA	950.00	2831.58	72	0.013	0.00	0.00	1

ELEMENT NO	5	IS A	WALL ENTRANCE	STATION	INVERT	SECT	RADIUS	ANGLE	ANG PT	MAN H
			U/S DATA	950.00	2831.58	72	0.013	0.00	0.00	1

ELEMENT NO	6	IS A	TRANSITION	STATION	INVERT	SECT	RADIUS	ANGLE	ANG PT	MAN H
			U/S DATA	1000.00	2833.61	66	0.013	0.00	0.00	1

ELEMENT NO	7	IS A	WALL EXIT	STATION	INVERT	SECT	RADIUS	ANGLE	ANG PT	MAN H
			U/S DATA	1000.00	2833.61	66	0.013	0.00	0.00	1

ELEMENT NO	8	IS A	REACH	STATION	INVERT	SECT	RADIUS	ANGLE	ANG PT	MAN H
			U/S DATA	1093.00	2837.13	66	0.013	0.00	0.00	1

ELEMENT NO	9	IS A	JUNCTION	STATION	INVERT	SECT	LAT-1	LAT-2	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
			U/S DATA	1093.00	2838.13	54	42	42	0.013	53.0	42.5	2839.13	45.00	45.00

ELEMENT NO	10	IS A	REACH	STATION	INVERT	SECT	RADIUS	ANGLE	ANG PT	MAN H
			U/S DATA	1389.50	2839.63	54	0.013	0.00	0.00	1

ELEMENT NO 11 IS A TRANSITION

Page 1

I-ECA

PAGE NO 3

F

N
F 0 5 1 5 P 0.013U/S DATA STATION INVERT SECT
1394.50 2840.13 48

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 12 IS A REACH U/S DATA STATION INVERT SECT * * * * *
1632.00 2854.48 48 0.013

ELEMENT NO 13 IS A REACH U/S DATA STATION INVERT SECT * * * * *
1762.00 2862.62 48 0.013

ELEMENT NO 14 IS A REACH U/S DATA STATION INVERT SECT * * * * *
1883.00 2868.57 48 0.013

ELEMENT NO 15 IS A REACH U/S DATA STATION INVERT SECT * * * * *
1992.00 2873.94 48 0.013

ELEMENT NO 16 IS A JUNCTION U/S DATA STATION INVERT SECT LAT-1 LAT-2 * * * * *
1992.00 2873.94 48 18 24 0.013 Q3 7.0 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 17 IS A REACH U/S DATA STATION INVERT SECT * * * * *
2072.00 2877.87 48 0.013

ELEMENT NO 18 IS A REACH U/S DATA STATION INVERT SECT * * * * *
2167.00 2882.51 48 0.013

ELEMENT NO 19 IS A REACH U/S DATA STATION INVERT SECT * * * * *
2262.00 2885.16 48 0.013

ELEMENT NO 20 IS A REACH U/S DATA STATION INVERT SECT * * * * *
2422.00 2888.80 48 0.013

ELEMENT NO 21 IS A JUNCTION U/S DATA STATION INVERT SECT LAT-1 LAT-2 * * * * *
2422.00 2888.80 48 30 18 0.013 Q3 42.0 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
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

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 22 IS A REACH U/S DATA STATION INVERT SECT * * * * *
2820.00 2903.13 48 0.013

ELEMENT NO 23 IS A JUNCTION U/S DATA STATION INVERT SECT LAT-1 LAT-2 * * * * *
2820.00 2903.13 48 42 0 0.013 Q3 90.0 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 24 IS A REACH U/S DATA STATION INVERT SECT * * * * *
3004.00 2908.81 48 0.013

ELEMENT NO 25 IS A JUNCTION U/S DATA STATION INVERT SECT LAT-1 LAT-2 * * * * *
3004.00 2908.81 48 36 18 0.013 Q3 30.0 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

ELEMENT NO 26 IS A REACH U/S DATA STATION INVERT SECT * * * * *
3024.00 2910.72 48 0.013

ELEMENT NO 27 IS A JUNCTION U/S DATA STATION INVERT SECT LAT-1 LAT-2 * * * * *
3024.00 2910.72 48 48 0 0.013 Q3 6.5 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
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

I-ECA

ELEMENT NO 28 IS A REACH U/S DATA STATION INVERT SECT * * * * *
3060.00 2912.43 48 N 0.013 RADIUS ANGLE ANG PT MAN H
0.00 0.00 0.00 1

ELEMENT NO 29 IS A SYSTEM HEADWORKS U/S DATA STATION INVERT SECT * * * * *
3060.00 2912.43 48 W S ELEV
0.00
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC *
LICENSEE: SLATER HANIFAN GROUP F0515P PAGE 1

WATER SURFACE PROFILE LISTING
SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON - TRUNK STORM DRAIN

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 AVBPR PIER
---------	-------------	---------------	-----------	---	-----	----------	----------------	------------	----------------	---------	-------------	----	---------------

L/ELEM	SO						SF AVE	HF		NORM DEPTH		ZR	
--------	----	--	--	--	--	--	--------	----	--	------------	--	----	--

613.00	2823.35	3.741	2827.091	460.0	24.82	9.564	2836.655	0.00	5.565	6.00	0.00	0.00	0 0.00
--------	---------	-------	----------	-------	-------	-------	----------	------	-------	------	------	------	--------

106.95	0.02498						.022863	2.45		3.654		0.00	
--------	---------	--	--	--	--	--	---------	------	--	-------	--	------	--

719.95	2826.02	3.787	2829.809	460.0	24.46	9.289	2839.098	0.00	5.565	6.00	0.00	0.00	0 0.00
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180.05	0.02498						.021183	3.81		3.654		0.00	
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900.00	2830.52	3.947	2834.467	460.0	23.32	8.445	2842.912	0.00	5.565	6.00	0.00	0.00	0 0.00
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JUNCT STR	0.00000						.021986	0.00				0.00	
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900.00	2830.52	3.315	2833.835	387.5	24.18	9.081	2842.916	0.00	5.275	6.00	0.00	0.00	0 0.00
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50.00	0.02120						.024370	1.22		3.448		0.00	
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950.00	2831.58	3.288	2834.868	387.5	24.43	9.266	2844.134	0.00	5.275	6.00	0.00	0.00	0 0.00
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TRANS STR	0.08060						.018989	0.95				0.00	
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1000.00	2835.61	4.513	2840.123	387.5	18.57	5.357	2845.480	0.00	5.158	5.50	0.00	0.00	0 0.00
---------	---------	-------	----------	-------	-------	-------	----------	------	-------	------	------	------	--------

WALL EXIT												0.00	
-----------	--	--	--	--	--	--	--	--	--	--	--	------	--

1000.00	2835.61	4.512	2840.122	387.5	18.58	5.359	2845.481	0.00	5.158	5.50	0.00	0.00	0 0.00
---------	---------	-------	----------	-------	-------	-------	----------	------	-------	------	------	------	--------

15.12	0.01634						.013184	0.20		4.089		0.00	
-------	---------	--	--	--	--	--	---------	------	--	-------	--	------	--

1015.12	2835.86	4.554	2840.411	387.5	18.42	5.268	2845.679	0.00	5.158	5.50	0.00	0.00	0 0.00
---------	---------	-------	----------	-------	-------	-------	----------	------	-------	------	------	------	--------

56.77	0.01634						.012558	0.71		4.089		0.00	
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1071.89	2836.78	4.818	2841.603	387.5	17.56	4.789	2846.392	0.00	5.158	5.50	0.00	0.00	0 0.00
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21.11	0.01634						.011775	0.25		4.089		0.00	
-------	---------	--	--	--	--	--	---------	------	--	-------	--	------	--

1093.00	2837.13	5.158	2842.288	387.5	16.74	4.353	2846.641	0.00	5.158	5.50	0.00	0.00	0 0.00
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JUNCT STR	0.00000						.016778	0.00				0.00	
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1093.00	2838.13	5.411	2843.541	292.0	18.36	5.234	2848.775	0.00	4.374	4.50	0.00	0.00	0 0.00
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296.50	0.00506						.022049	6.54		4.500		0.00	
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LICENSEE: SLATER HANIFAN GROUP F0515P PAGE 2

WATER SURFACE PROFILE LISTING
SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON - TRUNK STORM DRAIN

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 AVBPR PIER
---------	-------------	---------------	-----------	---	-----	----------	----------------	------------	----------------	---------	-------------	----	---------------

L/ELEM	SO						SF AVE	HF		NORM DEPTH		ZR	
--------	----	--	--	--	--	--	--------	----	--	------------	--	----	--

1389.50	2839.63	10.710	2850.340	292.0	18.36	5.234	2855.574	0.00	4.374	4.50	0.00	0.00	0 0.00
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TRANS STR	0.10000											0.00	
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1394.50	2840.13	2.810	2842.940	292.0	30.96	14.882	2857.822	0.00	3.965	4.00	0.00	0.00	0 0.00
---------	---------	-------	----------	-------	-------	--------	----------	------	-------	------	------	------	--------

Page 3

3004.00 2908.81 9.065 2917.875 91.5 7.28 0.823 2918.698 0.00 2.900 I-ECA
20.00 0.09550 .004058 0.08 1.232
3024.00 2910.72 7.278 2917.998 91.5 7.28 0.823 2918.821 0.00 2.900
JUNCT STR 0.00000 .003780 0.00
3024.00 2910.72 7.503 2918.223 85.0 6.76 0.710 2918.933 0.00 2.795
36.00 0.04750 .003502 0.13 1.423
LICENSEE: SLATER HANIFAN GROUP F0515P
SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON - TRUNK STORM DRAIN

WATER SURFACE PROFILE LISTING

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.ELEV	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		

3060.00 2912.43 5.955 2918.385 85.0 6.76 0.710 2919.095 0.00 2.795 4.00 0.00 0.00 0 0.00#
SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON - TRUNK STORM DRAIN

613.00	I	W	CH	E										R
649.52														
686.04														R
722.57	I	W	CH	E										
759.09														
795.61														
832.13														
868.66														
905.18														JX
941.70	I	W	CH	E										R
978.22	I	W	CH	E										TX
1014.75	I	W	CH	E										WX
1051.27	I	W	CH	E										R
1087.79	I	W	CH	E										R
1124.31	I	W	CH	E										R
1160.84	I	W	CH	E										JX
1197.36	I	W	CH	E										R
1233.88														
1270.40														
1306.93														
1343.45														
1379.97														TX
1416.49														R
1453.01	I	X												
1489.54	I	WX												
1526.06														
1562.58														
1599.10														
1635.63														
1672.15														
1708.67														
1745.19	I	WX												
1781.72	I	WX												
1818.24	I	WX												
1854.76														
1891.28														
1927.81	I	WX												
1964.33	I	WX												
2000.85	I	WX												
2037.37	I	WX												
2073.90	I	WX												
2110.42	I	WX												
2146.94	I	WX												
2183.46	I	WX												
2219.99	I	WX												
2256.51	I	WX												
2293.03	I	WX												
2329.55	I	WX												
2366.07	I	WX												
2402.60	I	WX												
2439.12	I	WX												

	I	X	I-ECA	W	E		R
2475.64	.	.	.	.	.	.	.
2512.16	.	.	.	.	.	.	.
2548.69	.	.	.	.	.	.	.
2585.21	.	.	.	.	.	.	.
2621.73	.	.	.	.	.	.	.
2658.25	.	.	.	.	.	.	.
2694.78	.	.	.	.	.	.	.
2731.30	.	.	.	.	.	.	.
2767.82	.	.	.	.	.	.	.
2804.34	.	.	.	.	.	.	.
2840.87	.	.	.	.	.	.	.
2877.39	.	.	.	.	.	.	.
2913.91	.	.	.	.	.	.	.
2950.43	.	.	.	.	.	.	.
2986.96	.	.	.	.	.	.	.
3023.48	.	.	.	.	.	.	.
3060.00	.	.	.	.	.	.	.
2823.35	.	.	2832.92	.	.	2842.50	.
2852.07	.	.	2861.65	.	.	2871.22	.
2880.80	.	.	2890.37	.	.	2899.95	.
2909.52	.	.	2919.09	.	.		.

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?

P3B-L

0	T1	SKYE CANYON INFRASTRUCTURE - PHASE 2	
	T2	BY OLYMPIA COMPANIES	
	T3	EAGLE CANYON - LATERAL P38-L	
	SO	1000.002911.31 18	
	R	1021.002912.36 18	.013
	SH	1021.002912.36 18	
	CD	18	4
	CD	24	4
	CD	30	4
	CD	36	4
	CD	42	4
	CD	48	4
	CD	54	4
	CD	60	4
	CD	66	4
	CD	72	4
	CD	78	4
			1.5
			2.5
			3.5
			4.5
			5.5
			6.5
			6.5

2917.88

I

0.0

6.5

P3B-L

*
DATE: 11/18/2015
TIME: 19:18

P3B-L

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING
PAGE 1

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

F 0 5 1 5 P
PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGLE CANYON - LATERAL P3B-L
F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET U/S DATA	STATION	INVERT SECT	W S ELEV
		1000.00	2911.31	2917.88
ELEMENT NO	2 IS A REACH U/S DATA	STATION	INVERT SECT	RADIUS
		1021.00	2912.36	0.00
ELEMENT NO	3 IS A SYSTEM HEADWORKS U/S DATA	STATION	INVERT SECT	ANGLE
		1021.00	2912.36	0.00

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

F0515P
WATER SURFACE PROFILE LISTING
SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON - LATERAL P3B-L
PAGE 1

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													
1000.00	2911.31	6.570	2917.880	6.5	3.68	0.210	2918.090	0.00	0.986	1.50	0.00	0.00	0	0.00
21.00	0.05000					.003829	0.08							0.00
1021.00	2912.36	5.611	2917.971	6.5	3.68	0.210	2918.181	0.00	0.986	1.50	0.00	0.00	0	0.00

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

P4-L1

0	T1	SKYE CANYON INFRASTRUCTURE - PHASE 2			
	T2	BY OLYMPIA COMPANIES			
	T3	EAGLE CANYON LATERAL P4-L1			
	S0	1000.002890.30 30	2900.59		
	R	1022.002894.54 30		45.	1
	JX	1022.002894.58 30 30		90.00	
	R	1072.002894.89 30	2894.58		1
	SH	1072.002894.89 30			
	CD	18 4			
	CD	24 4			
	CD	30 4			
	CD	36 4			
	CD	42 4			
	CD	48 4			
	CD	54 4			
	CD	60 4			
	CD	66 4			
	CD	72 4			
	CD	78 4			

0 0 1

40.0

P4-L1

1022.00	2894.54	6.506	2901.046	42.0	8.56	1.137	2902.183	0.00	2.171	P4-L1	2.50	0.00	0.00	0	0.00
JUNCT STR	0.00000					.009997	0.00					0.00			
1022.00	2894.58	6.678	2901.258	40.0	8.15	1.031	2902.289	0.00	2.129		2.50	0.00	0.00	0	0.00
50.00	0.00620					.009510	0.48			2.500		0.00			
1072.00	2894.89	6.895	2901.785	40.0	8.15	1.031	2902.816	0.00	2.129		2.50	0.00	0.00	0	0.00#

SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON LATERAL P4-L1

1000.00	I														
1001.97															
1002.94															
1004.11															
1005.88															
1007.35															
1008.82															
1010.29															
1011.72															
1013.22															
1014.66															
1016.16															
1017.63															
1019.10															
1020.57															
1022.04															
1023.51	I														
1024.98	I														
1026.45															
1027.92															
1029.39															
1030.86															
1032.33															
1033.80															
1035.27															
1036.73															
1038.20															
1039.67															
1041.14															
1042.61															
1044.08															
1045.55															
1047.02															
1048.49															
1049.96															
1051.43															
1052.90															
1054.37															
1055.84															
1057.31															
1058.78															
1060.24															
1061.71															
1063.18															
1064.65															
1066.12															
1067.59															
1069.06															
1070.53															
1072.00															
2890.30															
2891.55															
2892.80															
2894.06															
2895.31															
2896.56															
2897.81															
2899.06															
2900.31															
2901.57															
2902.82															

NOTES
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 EXACTLY²

P4-L2

0	T1	SKYE CANYON INFRASTRUCTURE - PHASE 2		
	T2	BY OLYMPIA COMPANIES		
	T3	EAGLE CANYON LATERAL P4-L2		
	S0	1000.002891.30 30	2900.59	
	R	1051.002896.37 30		
	SH	1051.002896.37 30		45. 1
	CD	18 4		
	CD	24 4		1.5
	CD	30 4		2.
	CD	36 4		2.5
	CD	42 4		3.
	CD	48 4		3.5
	CD	54 4		4.
	CD	60 4		4.5
	CD	66 4		5.
	CD	72 4		5.5
	CD	78 4		6.
				6.5

0 0

2.0

P4-L2

DATE: 11/18/2015
TIME: 19:19

PAGE 1

F051SP
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

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

PAGE NO 3

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGLE CANYON LATERAL P4-L2

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET	U/S DATA	STATION	INVERT SECT	W S ELEV
			1000.00	2891.30	2900.59
ELEMENT NO	2 IS A REACH	U/S DATA	STATION	INVERT SECT	RADIUS
			1051.00	2896.37	0.00
ELEMENT NO	3 IS A SYSTEM HEADWORKS	U/S DATA	STATION	INVERT SECT	ANG PT
			1051.00	2896.37	45.00

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

PAGE 1

F051SP
WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON LATERAL P4-L2

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							
1000.00	2891.30	9.290	2900.590	2.0	0.41	0.003	2900.593	0.00	0.461	2.50	0.00	0.00	0	0.00
51.00	0.09941					.000024	0.00					0.210		0.00
1051.00	2896.37	4.222	2900.592	2.0	0.41	0.003	2900.595	0.00	0.461	2.50	0.00	0.00	0	0.00

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

P5-L1

0
T1 SKYE CANYON INFRASTRUCTURE - PHASE 2
T2 BY OLYMPIA COMPANIES
T3 EAGLE CANYON LATERAL P5-L1
SO 1000.002876.44 18
R 1020.002876.64 18 .013
SH 1020.002876.64 18
CD 18 4 1.5
CD 24 4 2.
CD 30 4 2.5
CD 36 4 3.
CD 42 4 3.5
CD 48 4 4.
CD 54 4 4.5
CD 60 4 5.
CD 66 4 5.5
CD 72 4 6.
CD 78 4 6.5

2881.07

1

0 0 †

7.0

P5-L1

DATE: 11/18/2015
TIME: 19:20

F0515P

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

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

PAGE NO 3

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

HEADING LINE NO 2 IS -

HEADING LINE NO 3 IS -

EAGLE CANYON LATERAL P5-L1

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET	U/S DATA	STATION	INVERT SECT	W S ELEV
			1000.00	2876.44	2881.07

ELEMENT NO	2 IS A REACH	U/S DATA	STATION	INVERT SECT	RADIUS	ANGLE	ANG PT	MAN H
			1020.00	2876.84	0.00	0.00	0.00	1

ELEMENT NO	3 IS A SYSTEM HEADWORKS	U/S DATA	STATION	INVERT SECT	W S ELEV
			1020.00	2876.64	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

*** WARNING NO. 2 *** WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

LICENSEE: SLATER HANIFAN GROUP

F0515P

WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

EAGLE CANYON LATERAL P5-L1

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 AVBPR PIER
1000.00	2876.44	4.630	2881.070	7.0	3.96	0.244	2881.314	0.00	1.024	1.50	0.00	0.00	0
20.00	0.01000					.004441	0.09					0.00	
1020.00	2876.64	4.531	2881.171	7.0	3.96	0.244	2881.415	0.00	1.024	1.50	0.00	0.00	0

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

P5-L2

0	T1	SKYE CANYON INFRASTRUCTURE - PHASE 2			
	T2	BY OLYMPIA COMPANIES			
	T3	EAGLE CANYON LATERAL P5-L2			
	SO	1000.002875.94 24	2881.07		
	R	1021.002877.32 24		1	
	JX	1021.002877.36 24			2.0
	R	1069.002881.33 24	2877.36		
	SH	1069.002881.33 24		1	
	CD	18 4			1.5
	CD	24 4			2.5
	CD	30 4			2.5
	CD	36 4			3.5
	CD	42 4			3.5
	CD	48 4			4.5
	CD	54 4			4.5
	CD	60 4			5.5
	CD	66 4			5.5
	CD	72 4			6.5
	CD	78 4			6.5

0 0 †

16.0

P5-L2

*
DATE: 11/18/2015
TIME: 19:20

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING
F0515P

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

F 0 5 1 5 P

PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGLE CANYON LATERAL P5-L2
F 0 5 1 5 P

†

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET U/S DATA	STATION	INVERT	SECT	24	W S ELEV	2881.07
ELEMENT NO	2 IS A REACH U/S DATA	STATION	INVERT	SECT	24		
ELEMENT NO	3 IS A JUNCTION U/S DATA	STATION	INVERT	SECT	24		
ELEMENT NO	4 IS A REACH U/S DATA	STATION	INVERT	SECT	24		
ELEMENT NO	5 IS A SYSTEM HEADWORKS U/S DATA	STATION	INVERT	SECT	24		

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
F0515P

BY OLYMPIA COMPANIES

EAGLE CANYON LATERAL P5-L2

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													
1000.00	2875.94	5.130	2881.070	18.0	5.73	0.510	2881.580	0.00	1.528	2.00	0.00	0.00	0	0.00
21.00	0.06571					.006331	0.13							
1021.00	2877.32	3.908	2881.228	18.0	5.73	0.510	2881.738	0.00	1.528	2.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.005666	0.00							
1021.00	2877.36	4.082	2881.442	16.0	5.09	0.403	2881.845	0.00	1.442	2.00	0.00	0.00	0	0.00

[illegible]

P6-L1

0	T1	SKYE CANYON INFRASTRUCTURE - PHASE 2			
	T2	BY OLYMPIA COMPANIES			
	T3	EAGLE CANYON LATERAL P6-L1			
	SO	1000.002839.13 42	2843.54		
	R	1030.002839.28 42			1
	JX	1030.002839.30 36			
	R	1065.002839.48 36	2839.30	90.00	1
	SH	1065.002839.48 36			
	CD	18 4			1.5
	CD	24 4			2.5
	CD	30 4			2.5
	CD	36 4			3.5
	CD	42 4			3.5
	CD	48 4			4.5
	CD	54 4			4.5
	CD	60 4			5.5
	CD	66 4			5.5
	CD	72 4			6.5
	CD	78 4			6.5

0
Q

27.5

P6-L1

DATE: 11/18/2015
TIME: 19:21

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING F0515P PAGE 1

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

PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGLE CANYON LATERAL P6-L1

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET	U/S DATA	STATION	INVERT	SECT	W S ELEV	RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO	1	IS A SYSTEM OUTLET	1000.00	2839.13	42	2843.54	0.00	0.00	0.00	1
ELEMENT NO	2	IS A REACH	1030.00	2839.28	42		0.00	0.00	0.00	1
ELEMENT NO	3	IS A JUNCTION	1030.00	2839.30	36		0.0	INVERT-3 2839.30	PHI 3 90.00	0.00
ELEMENT NO	4	IS A REACH	1065.00	2839.48	36		0.00	0.00	0.00	1
ELEMENT NO	5	IS A SYSTEM HEADWORKS	1065.00	2839.48	36		0.00	0.00	0.00	1

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC %
LICENSEE: SLATER HANIFAN GROUP F0515P PAGE 1

WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES

EAGLE CANYON LATERAL P6-L1

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 AVBPR PIER
L/ELEM	SO					SF AVE	HF		NORM DEPTH	ZR			
1000.00	2839.13	4.410	2843.540	53.0	5.51	0.471	2844.011	0.00	2.278	3.50	0.00	0.00	0 0.00
30.00	0.00500					.002775	0.08			2.250		0.00	

Page 1

1030.00	2839.28	4.367	2843.647	53.0	5.51	0.471	2844.118	0.00	2.278	P6-L1	3.50	0.00	0.00	0	0.00
JUNCT STR	0.00000					.002237	0.00					0.00			
1030.00	2839.30	5.035	2844.335	27.5	3.89	0.235	2844.570	0.00	1.696		3.00	0.00	0.00	0	0.00
35.00	0.00514					.001700	0.06			1.630		0.00			
1065.00	2839.48	4.926	2844.406	27.5	3.89	0.235	2844.641	0.00	1.696		3.00	0.00	0.00	0	0.00#

SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON LATERAL P6-L1

1000.00	.I					.C									
1001.33															
1002.65															
1003.98															
1005.31															
1006.63															
1007.96															
1009.29															
1010.61															
1011.94															
1013.27															
1014.59															
1015.92															
1017.24															
1018.57															
1019.90															
1021.22															
1022.55															
1023.88															
1025.20															
1026.53															
1027.86															
1029.18															
1030.51															
1031.84	I														
1033.16	I														
1034.49															
1035.82															
1037.14															
1038.47															
1039.80															
1041.12															
1042.45															
1043.78															
1045.10															
1046.43															
1047.76															
1049.08															
1050.41															
1051.73															
1053.06															
1054.39															
1055.71															
1057.04															
1058.37															
1059.69															
1061.02															
1062.35															
1063.67															
1065.00	I														
2839.13		2839.68	2840.23	2840.78	2841.33	2841.89	2842.44	2842.99	2843.54	2844.09	2844.64				

JX
R

R

NOTES
1. GLOSSARY
I = INVERT ELEVATION
C = CRITICAL DEPTH
W = WATER SURFACE ELEVATION

P6-L1

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

P6-L2

0	T1	SKYE CANYON INFRASTRUCTURE - PHASE 2			
	T2	BY OLYMPIA COMPANIES			
	T3	EAGLE CANYON LATERAL P6-L2			
	SO	1000.002839.13 42	2843.54		
	R	1028.002839.49 42		.013	1
	JX	1028.002840.99 24 24		.013	25.5
	R	1058.002841.44 24	2840.99	.013	1
	SH	1058.002841.44 24			
	CD	18 4		1.5	
	CD	24 4		2.5	
	CD	30 4		2.5	
	CD	36 4		3.	
	CD	42 4		3.5	
	CD	48 4		4.	
	CD	54 4		4.5	
	CD	60 4		5.	
	CD	66 4		5.5	
	CD	72 4		6.	
	CD	78 4		6.5	

0 Q

17.0

P6-L2

DATE: 11/18/2015
TIME: 19:21

P6-L2

F0515P																			
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING																			
CARD	SECT	CHN	NO OF	AVE PIER	HEIGHT 1	BASE	ZL	ZR	INV	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CODE	NO	TYPE	PIERS	WIDTH	DIAMETER	WIDTH			DROP										
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														
CD	36	4			3.00														
CD	42	4			3.50														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														
CD	66	4			5.50														
CD	72	4			6.00														
CD	78	4			6.50														
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PAGE NO 3																			

PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGLE CANYON LATERAL P6-L2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

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

F0515P
WATER SURFACE PROFILE LISTING
SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON LATERAL P6-L2

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EV.	SUPER ELEV	CRITICAL DEPTH	HGT/DIA	BASE/ID NO.	ZL	NO AVBPR PIER
L/ELEM	SO	SF AVE HF											
1000.00	2839.13	4.410	2843.540	42.5	4.42	0.303	2843.843	0.00	2.031	3.50	0.00	0.00	0
28.00	0.01286					.001784	0.05		1.480			0.00	
1028.00	2839.49	4.115	2843.605	42.5	4.42	0.303	2843.908	0.00	2.031	3.50	0.00	0.00	0
JUNCT STR	0.00000					.003716	0.00					0.00	
1028.00	2840.99	2.463	2843.453	17.0	5.41	0.455	2843.908	0.00	1.486	2.00	0.00	0.00	0

Page 1

Eagle Canyon West & Laterals

I-ECAW

0	T1	SKYE CANYON INFRASTRUCTURE - PHASE 2			
	T2	BY OLYMPIA COMPANIES			
	T3	EAGLE CANYON - TRUNK STORM DRAIN (WEST PORTION)			
	SO	1000.002909.81 36		2917.88	
	R	1118.002913.45 36	.013		
	JX	1118.002913.45 36 18	.013	15.0	
	R	1138.002915.42 36	.013		
	SH	1138.002915.42 36			
	CD	18 4			1.5
	CD	24 4			2.5
	CD	30 4			3.5
	CD	36 4			4.5
	CD	42 4			5.5
	CD	48 4			6.5
	CD	54 4			
	CD	60 4			
	CD	66 4			
	CD	72 4			
	CD	78 4			

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DATE: 11/18/2015
TIME: 18:16

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING
F0515P
PAGE 1

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

PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGLE CANYON - TRUNK STORM DRAIN (WEST PORTION)
F 0 5 1 5 P

‡

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET	U/S DATA	STATION	INVERT	SECT	W S ELEV	RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO 1	IS A SYSTEM OUTLET	U/S DATA	1000.00	2909.81	36	2917.88	0.00	0.00	60.00	1
ELEMENT NO 2	IS A REACH	U/S DATA	1118.00	2913.45	36		0.00	0.00	60.00	1
ELEMENT NO 3	IS A JUNCTION	U/S DATA	1118.00	2913.45	36		0.00	0.00	60.00	1
ELEMENT NO 4	IS A REACH	U/S DATA	1138.00	2915.42	36		0.00	0.00	60.00	0
ELEMENT NO 5	IS A SYSTEM HEADWORKS	U/S DATA	1138.00	2915.42	36		0.00	0.00	60.00	0

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC ‡
LICENSEE: SLATER HANIFAN GROUP
F0515P
PAGE 1

WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

EAGLE CANYON - TRUNK STORM DRAIN (WEST PORTION)

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 AVBPR PIER
1000.00	2909.81	8.070	2917.880	30.0	4.24	0.280	2918.160	0.00	1.775	3.00	0.00	0.00	0 0.00

Page 1

Line	Account	118.00	0.03085	4.738	2918.188	30.0	4.24	.002023	0.24	0.00	1.775	3.00	0.00	0.00	I-ECAW 1.034
1118.00	2913.45														
JUNCT STR	0.00000							.001264	0.00					0.00	
1118.00	2913.45			4.948	2918.398	15.0	2.12	0.070	2918.468	0.00	1.235	3.00	0.00	0.00	
19.88	0.09850							.000502	0.01					0.00	
1137.88	2915.41			3.000	2918.408	15.0	2.12	0.070	2918.478	0.00	1.235	3.00	0.00	0.00	
0.12	0.09850							.000488	0.00					0.00	
1138.00	2915.42			2.987	2918.407	15.0	2.12	0.070	2918.477	0.00	1.235	3.00	0.00	0.00	

SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON - TRUNK STORM DRAIN (WEST PORTION)

[illegible]
$$\begin{array}{ccccccc} & & & & & & R \\ JX & & & & & & \\ R & & & & & & \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ E & X & & & & & XE \\ W & & & & & & \end{array}$$
 $\frac{d}{dx}$ $\frac{d}{dx}$

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*

P3-L1

0	T1	SKYE CANYON INFRASTRUCTURE - PHASE 2	
	T2	BY OLYMPIA COMPANIES	
	T3	EAGLE CANYON WEST LATERAL P3-L1	
	SO	1000.002914.95 18	2918.40
	R	1021.002917.05 18	
	SH	1021.002917.05 18	.013
	CD	18 4	1.5
	CD	24 4	2.
	CD	30 4	2.5
	CD	36 4	3.
	CD	42 4	3.5
	CD	48 4	4.
	CD	54 4	4.5
	CD	60 4	5.
	CD	66 4	5.5
	CD	72 4	6.
	CD	78 4	6.5

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P3-L1

DATE: 11/18/2015
TIME: 19:15

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING
PAGE 1

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

F 0 5 1 5 P
PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGLE CANYON WEST LATERAL P3-L1
F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET	U/S DATA	STATION	INVERT SECT	W S ELEV
			1000.00	2914.95	2918.40
ELEMENT NO 2	IS A REACH	U/S DATA	STATION	INVERT SECT	RADIUS
			1021.00	2917.05	0.00
ELEMENT NO 3	IS A SYSTEM HEADWORKS	U/S DATA	STATION	INVERT SECT	ANGLE
			1021.00	2917.05	0.00

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

PAGE 1

WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON WEST LATERAL P3-L1

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. AVBPR PIER
1000.00	2914.95	3.450	2918.400	15.0	8.49	1.119	2919.519	0.00	1.406	1.50	0.00	0.00	0
21.00	0.10000					.020391	0.43						
1021.00	2917.05	1.834	2918.884	15.0	8.49	1.119	2920.003	0.00	1.406	1.50	0.00	0.00	0

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

Egan Crest South & Laterals

I-E CRS

0	T1 SKYE CANYON INFRASTRUCTURE - PHASE 2
T1	T2 BY OLYMPIA COMPANIES
T2	T3 EGAN CREST SOUTH - TRUNK STORM DRAIN
T3	SO 1000.002903.63 42
R	R 1025.002905.35 42 .013
R	R 1075.002905.60 42 .013
JX	JX 1075.002905.60 42 18 .013
R	R 1171.002906.08 42 .013
R	R 1306.002906.76 42 .013
R	R 1406.002907.76 42 .013
R	R 1503.502910.00 42 .013
TS	TS 1508.502910.50 36 .013
R	R 1600.002912.86 36 18 18.013
JX	JX 1689.002915.09 36 .013
R	R 1759.002916.14 36 .013
R	R 1793.002922.43 36 .013
JX	JX 1793.002922.63 48 .013
R	R 1801.002922.91 48 .013
SH	SH 1801.002922.91 48
CD	CD 18 4 1.5
CD	CD 24 4 2.5
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CD	CD 36 4 3.5
CD	CD 42 4 3.5
CD	CD 48 4 4.5
CD	CD 54 4 4.5
CD	CD 60 4 5.5
CD	CD 66 4 5.5
CD	CD 72 4 6.5
CD	CD 78 4 6.5

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I-ECRS

DATE: 11/18/2015
TIME: 16:35

F0515P

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

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

PAGE NO 3

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EGAN CREST SOUTH - TRUNK STORM DRAIN

F 0 5 1 5 P

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET	U/S DATA	STATION	INVERT	SECT	W S ELEV	RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO 1	IS A SYSTEM OUTLET	U/S DATA	1000.00	2903.63	42	2914.64	0.00	0.00	45.00	1
ELEMENT NO 2	IS A REACH	U/S DATA	1025.00	2903.35	42		0.00	0.00	0.00	1
ELEMENT NO 3	IS A REACH	U/S DATA	1075.00	2903.60	42		0.00	0.00	0.00	1
ELEMENT NO 4	IS A JUNCTION	U/S DATA	1075.00	2903.60	42		0.00	0.00	0.00	1
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
ELEMENT NO 5	IS A REACH	U/S DATA	1171.00	2906.08	42		0.00	0.00	5.00	1
ELEMENT NO 6	IS A REACH	U/S DATA	1306.00	2906.76	42		0.00	0.00	5.00	1
ELEMENT NO 7	IS A REACH	U/S DATA	1406.00	2907.76	42		0.00	0.00	5.00	1
ELEMENT NO 8	IS A REACH	U/S DATA	1503.50	2910.00	42		0.00	0.00	5.00	1
ELEMENT NO 9	IS A TRANSITION	U/S DATA	1508.50	2910.50	36		0.00	0.00	5.00	1

Page 1

I-ECRS

ELEMENT NO 10 IS A REACH U/S DATA STATION * INVERT SECT * *
1600.00 2912.86 36 N 0.013

ELEMENT NO 11 IS A JUNCTION U/S DATA STATION * INVERT SECT LAT-1 LAT-2 N Q3 * Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
1600.00 2912.86 36 18 0.013 1.5 2914.36 2914.36 45.00 45.00
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 REACH U/S DATA STATION * INVERT SECT * *
1689.00 2915.09 36 N 0.013

ELEMENT NO 13 IS A REACH U/S DATA STATION * INVERT SECT * *
1759.00 2916.14 36 N 0.013

ELEMENT NO 14 IS A REACH U/S DATA STATION * INVERT SECT * *
1793.00 2922.43 36 N 0.013

ELEMENT NO 15 IS A JUNCTION U/S DATA STATION * INVERT SECT LAT-1 LAT-2 N Q3 * Q4 INVERT-3 INVERT-4 PHI 3 PHI 4
1793.00 2922.63 48 0 0.013 0.0 0.00 0.00 0.00

ELEMENT NO 16 IS A REACH U/S DATA STATION * INVERT SECT * *
1801.00 2922.91 48 N 0.013

ELEMENT NO 17 IS A SYSTEM HEADWORKS U/S DATA STATION * INVERT SECT * *
1801.00 2922.91 48 N 0.00

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

PAGE 1

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

EGAN CREST SOUTH - TRUNK STORM DRAIN

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

L/ELEM SO ***** SF AVE HF ***** NORM DEPTH ***** ZR *****

1000.00 2903.63 11.010 2914.640 90.0 9.35 1.359 2915.999 0.00 2.944 3.50 0.00 0.00 0 0.00

25.00 0.06880 .008002 0.20 1.410 0.00

1025.00 2905.35 9.760 2915.110 90.0 9.35 1.359 2916.469 0.00 2.944 3.50 0.00 0.00 0 0.00

50.00 0.00500 .008002 0.40 3.500 0.00

1075.00 2905.60 9.978 2915.578 90.0 9.35 1.359 2916.937 0.00 2.944 3.50 0.00 0.00 0 0.00

JUNCT STR 0.00000 .007826 0.00

1075.00 2905.60 10.097 2915.697 88.0 9.15 1.299 2916.996 0.00 2.916 3.50 0.00 0.00 0 0.00

96.00 0.00500 .007650 0.73 3.500 0.00

1171.00 2906.08 10.438 2916.518 88.0 9.15 1.299 2917.817 0.00 2.916 3.50 0.00 0.00 0 0.00

135.00 0.00504 .007650 1.03 3.500 0.00

1306.00 2906.76 10.877 2917.637 88.0 9.15 1.299 2918.936 0.00 2.916 3.50 0.00 0.00 0 0.00

100.00 0.01000 .007650 0.77 2.535 0.00

1406.00 2907.76 10.729 2918.489 88.0 9.15 1.299 2919.788 0.00 2.916 3.50 0.00 0.00 0 0.00

Page 2

I-ECRS													
97.50	0.02297												
1503.50	2910.00	9.321	2919.321	88.0	9.15	.007650	0.75					1.907	0.00
TRANS STR 0.10000													
1508.50	2910.50	7.998	2918.498	88.0	12.45	.012528	0.06						0.00
91.50	0.02579					.017407	1.59					2.070	0.00
1600.00	2912.86	7.351	2920.211	88.0	12.45	2.406	2922.617	0.00					0.00
JUNCT STR 0.00000													
1600.00	2912.86	7.665	2920.525	85.0	12.02	.016824	0.00						0.00
89.00	0.02506					.016241	1.45					2.040	0.00
SKYE CANYON INFRASTRUCTURE - PHASE 2 LICENSEE: SLATER HANIFAN GROUP WATER SURFACE PROFILE LISTING BY OLYMPIA COMPANIES EGAN CREST SOUTH - TRUNK STORM DRAIN													
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 AVBPR PIER
L/ELEM	SO					SF AVE	HF		NORM DEPTH				

1689.00	2915.09	7.030	2922.120	85.0	12.02	2.245	2924.365	0.00	2.812	3.00	0.00	0.00	0 0.00
70.00	0.01500					.016241	1.14		2.583			0.00	
1759.00	2916.14	7.673	2923.813	85.0	12.02	2.245	2926.058	0.00	2.812	3.00	0.00	0.00	0 0.00
16.12	0.18500					.016241	0.26		1.120			0.00	
1775.12	2919.12	4.953	2924.075	85.0	12.02	2.245	2926.320	0.00	2.812	3.00	0.00	0.00	0 0.00
HYDRAULIC JUMP													
1775.12	2919.12	1.734	2920.856	85.0	20.08	6.258	2927.114	0.00	2.812	3.00	0.00	0.00	0 0.00
0.69	0.18500					.039903	0.03		1.120			0.00	
1775.81	2919.25	1.747	2920.998	85.0	19.89	6.144	2927.142	0.00	2.812	3.00	0.00	0.00	0 0.00
3.30	0.18500					.037152	0.12		1.120			0.00	
1779.11	2919.86	1.818	2921.679	85.0	18.96	5.585	2927.264	0.00	2.812	3.00	0.00	0.00	0 0.00
2.85	0.18500					.032896	0.09		1.120			0.00	
1781.96	2920.39	1.893	2922.280	85.0	18.08	5.077	2927.357	0.00	2.812	3.00	0.00	0.00	0 0.00
2.44	0.18500					.029175	0.07		1.120			0.00	
1784.40	2920.84	1.973	2922.813	85.0	17.24	4.616	2927.429	0.00	2.812	3.00	0.00	0.00	0 0.00
2.11	0.18500					.025927	0.05		1.120			0.00	
1786.51	2921.23	2.058	2923.287	85.0	16.44	4.196	2927.483	0.00	2.812	3.00	0.00	0.00	0 0.00
1.79	0.18500					.023100	0.04		1.120			0.00	
1788.30	2921.56	2.150	2923.710	85.0	15.67	3.815	2927.525	0.00	2.812	3.00	0.00	0.00	0 0.00
1.50	0.18500					.020651	0.03		1.120			0.00	
1789.80	2921.84	2.250	2924.088	85.0	14.94	3.468	2927.556	0.00	2.812	3.00	0.00	0.00	0 0.00
1.23	0.18500					.018548	0.02		1.120			0.00	
SKYE CANYON INFRASTRUCTURE - PHASE 2 LICENSEE: SLATER HANIFAN GROUP WATER SURFACE PROFILE LISTING													

I-ECRS

BY OLYMPIA COMPANIES EGAN CREST SOUTH - TRUNK STORM DRAIN														
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		

1791.03	2922.07	2.360	2924.426	85.0	14.25	3.152	2927.578	0.00	2.812	3.00	0.00	0.00	0	0.00
0.97	0.18500					.016768	0.02		1.120			0.00		
1792.00	2922.25	2.483	2924.729	85.0	13.58	2.866	2927.595	0.00	2.812	3.00	0.00	0.00	0	0.00
0.70	0.18500					.015325	0.01		1.120			0.00		
1792.70	2922.37	2.626	2925.000	85.0	12.95	2.605	2927.605	0.00	2.812	3.00	0.00	0.00	0	0.00
0.30	0.18500					.014364	0.00		1.120			0.00		
1793.00	2922.43	2.812	2925.242	85.0	12.35	2.367	2927.609	0.00	2.812	3.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.008769	0.00					0.00		
1793.00	2922.63	4.269	2926.899	85.0	6.76	0.710	2927.609	0.00	2.795	4.00	0.00	0.00	0	0.00
8.00	0.03500					.003502	0.03		1.545			0.00		
1801.00	2922.91	4.017	2926.927	85.0	6.76	0.710	2927.637	0.00	2.795	4.00	0.00	0.00	0	0.00

SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EGAN CREST SOUTH - TRUNK STORM DRAIN

1000.00	I													
1014.56														
1029.13	I													R
1043.69														R
1058.25														
1072.82														
1087.38	I													JX
1101.95	I													R
1116.51														
1131.07														
1145.64														
1160.20														
1174.76	I													R
1189.33														
1203.89														
1218.45														
1233.03														
1247.58														
1262.13														
1276.71														
1291.27														
1305.84														
1320.40														
1334.96	I													R
1349.53														
1364.09														
1378.65														
1393.22														
1407.78	I													R
1422.35														
1436.91														
1451.47														
1466.04														
1480.60														
1495.16														
1509.73														
1524.29	I													TX
1538.85	I													R
1553.42														

P7B-L

0	T1 SKYE CANYON INFRASTRUCTURE - PHASE 2		
	T2 BY OLYMPIA COMPANIES		
	T3 EGAN CREST - LATERAL P7B-L		
	SO 1000.002907.60 18	2915.70	
	R 1062.002908.84 18		1
	SH 1062.002908.84 18		
	CD 18 4		
	CD 24 4		
	CD 30 4		
	CD 36 4		
	CD 42 4		
	CD 48 4		
	CD 54 4		
	CD 60 4		
	CD 66 4		
	CD 72 4		
	CD 78 4		

0 Q t

2.0

P7B-L

DATE: 11/18/2015
TIME: 19:17

P7B-L

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

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

PAGE NO 3

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EGAN CREST - LATERAL P7B-L

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET	U/S DATA	STATION	INVERT	SECT	W S ELEV
			1000.00	2907.60	18	2915.70
ELEMENT NO	2 IS A REACH	U/S DATA	STATION	INVERT	SECT	RADIUS
			1062.00	2908.84	18	0.00
ELEMENT NO	3 IS A SYSTEM HEADWORKS	U/S DATA	STATION	INVERT	SECT	ANGLE
			1062.00	2908.84	18	0.00

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

PAGE 1

F0515P

WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EGAN CREST - LATERAL P7B-L

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							
1000.00	2907.60	8.100	2915.700	2.0	1.13	0.020	2915.720	0.00	0.533	1.50	0.00	0.00	0	0.00
62.00	0.02000					.000363	0.02							
1062.00	2908.84	6.883	2915.723	2.0	1.13	0.020	2915.743	0.00	0.533	1.50	0.00	0.00	0	0.00

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

P7-L1

0 T1 SKYE CANYON INFRASTRUCTURE - PHASE 2
T2 BY OLYMPIA COMPANIES
T3 EGAN CREST - LATERAL P7-L1
SO 1000.002914.36 18
R 1072.002915.81 18 .013
SH 1072.002915.81 18
CD 18 4 1.5
CD 24 4 2.5
CD 30 4 2.5
CD 36 4 3.
CD 42 4 3.5
CD 48 4 4.
CD 54 4 4.5
CD 60 4 5.
CD 66 4 5.5
CD 72 4 6.
CD 78 4 6.5
,

2920.53

1

0

1.5

P7-L1

P7-L1

DATE: 11/18/2015
TIME: 19:17

F0515P										PAGE 1										
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING										PAGE 1										
CARD	SECT	CHN	NO OF	AVE	HEIGHT	1	BASE	ZL	ZR	INV	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CODE	NO	TYPE	PIERS	WIDTH	DIAMETER	WIDTH				DROP										
00	18	4			1.50															
00	24	4			2.00															
00	30	4			2.50															
00	36	4			3.00															
00	42	4			3.50															
00	48	4			4.00															
00	54	4			4.50															
00	60	4			5.00															
00	66	4			5.50															
00	72	4			6.00															
00	78	4			6.50															

PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EGAN CREST - LATERAL P7-L1

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1	IS A SYSTEM OUTLET	U/S DATA	STATION	INVERT	SECT					W S ELEV
				1000.00	2914.36	18					2920.53
ELEMENT NO	2	IS A REACH	U/S DATA	STATION	INVERT	SECT					
				1072.00	2915.81	18					
ELEMENT NO	3	IS A SYSTEM HEADWORKS	U/S DATA	STATION	INVERT	SECT					
				1072.00	2915.81	18					

PAGE NO 2

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKOS, W.S.ELEV = INV + DC

LICENSEE: SLATER HANIFAN GROUP

WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

EGAN CREST - LATERAL P7-L1

STATION	INVERT	DEPTH	W.S.	Q	VEL	VEL	ENERGY	SUPER	CRITICAL	HGT/	BASE/	ZL	NO	AVBPR
L/ELEM	ELEV	OF FLOW	ELEV		HEAD	GRD.EL.	HF	ELEV	DEPTH	DIA	ID NO.		PIER	
1000.00	2914.36	6.170	2920.530	1.5	0.85	0.011	2920.541	0.00	0.460	1.50	0.00	0.00	0	0.00
72.00	0.02014					.000204	0.01							
1072.00	2915.81	4.735	2920.545	1.5	0.85	0.011	2920.556	0.00	0.460	1.50	0.00	0.00	0	0.00

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

P7-L2

0 T1 SKYE CANYON INFRASTRUCTURE - PHASE 2
T2 BY OLYMPIA COMPANIES
T3 EGAN CREST - LATERAL P7-L2
S0 1000.002914.36 18
R 1013.002915.68 18 .013
SH 1013.002915.68 18
CD 18 4 1.5
CD 24 4 2.5
CD 30 4 2.5
CD 36 4 3.5
CD 42 4 3.5
CD 48 4 4.5
CD 54 4 4.5
CD 60 4 5.5
CD 66 4 5.5
CD 72 4 6.5
CD 78 4 6.5

2920.53

1

P7-L2

0 1.5

DATE: 11/18/2015
TIME: 19:18

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

CARD CODE	CHN NO	SECT NO	NO OF PIERS	AVE WIDTH	HEIGHT 1	BASE	ZL	ZR	INV	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD 18	4																		
CD 24	4																		
CD 30	4																		
CD 36	4																		
CD 42	4																		
CD 48	4																		
CD 54	4																		
CD 60	4																		
CD 66	4																		
CD 72	4																		
CD 78	4																		

PAGE NO 3

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EGAN CREST - LATERAL P7-L2

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET	U/S DATA	STATION	INVERT	SECT	W S ELEV
						2920.53
ELEMENT NO 2	IS A REACH	U/S DATA	STATION	INVERT	SECT	
ELEMENT NO 3	IS A SYSTEM HEADWORKS	U/S DATA	STATION	INVERT	SECT	

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

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

EGAN CREST - LATERAL P7-L2

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/ELEV	SO													
1000.00	2914.36	6.170	2920.530	1.5	0.85	0.011	2920.541	0.00	0.460	1.50	0.00	0.00	0	0.00
13.00	0.10154						0.00							
1013.00	2915.68	4.853	2920.533	1.5	0.85	0.011	2920.544	0.00	0.460	1.50	0.00	0.00	0	0.00

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

Egan Crest North & Laterals

I-ECRN

0 T1 SKYE CANYON INFRASTRUCTURE - PHASE 2
T2 BY OLYMPIA COMPANIES
T3 EAGAN CREST (NORTH) - TRUNK STORM DRAIN
S0 1000.002905.30 36 .013
R 1139.002906.60 36 18 1.5
JX 1139.002906.60 36 18 1.5
R 1148.002908.14 36 .013
JX 1148.002908.14 36 36 1.5
R 1205.002909.64 36 .013
SH 1205.002909.64 36 1.5
CD 18 4
CD 24 4
CD 30 4
CD 36 4
CD 42 4
CD 48 4
CD 54 4
CD 60 4
CD 66 4
CD 72 4
CD 78 4 ,

2908.30
2908.10
2908.14
90. 1
90.00
45.
90.00

DATE: 11/19/2015
TIME: 9:56

F051SP

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

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

PAGE NO 3

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGAN CREST (NORTH) - TRUNK STORM DRAIN
F 0 5 1 5 P

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET U/S DATA	STATION	INVERT	SECT	W S ELEV
ELEMENT NO	2 IS A REACH U/S DATA	STATION	INVERT	SECT	2908.50
ELEMENT NO	3 IS A JUNCTION U/S DATA	STATION	INVERT	SECT	
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING					
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING					
ELEMENT NO	4 IS A REACH U/S DATA	STATION	INVERT	SECT	
ELEMENT NO	5 IS A JUNCTION U/S DATA	STATION	INVERT	SECT	
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING					
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING					
ELEMENT NO	6 IS A REACH U/S DATA	STATION	INVERT	SECT	
ELEMENT NO	7 IS A SYSTEM HEADWORKS U/S DATA	STATION	INVERT	SECT	
NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING					
*** WARNING NO. 2 *** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC					
LICENSEE: SLATER HANIFAN GROUP					

PAGE 1

F051SP

WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

Page 1

I-ECRN

EAGAN CREST (NORTH) - TRUNK STORM DRAIN

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR		
1000.00	2905.30	2.050	2907.350	62.0	12.05	2.254	2909.604	0.00	2.537	3.00	0.00	0.00	0	0.00
28.22	0.00935					.013895	0.39					2.360	0.00	
1028.22	2905.56	1.971	2907.535	62.0	12.59	2.461	2909.996	0.00	2.537	3.00	0.00	0.00	0	0.00
26.73	0.00935					.015567	0.42					2.360	0.00	
1054.95	2905.81	1.891	2907.705	62.0	13.21	2.708	2910.413	0.00	2.537	3.00	0.00	0.00	0	0.00
23.88	0.00935					.017552	0.42					2.360	0.00	
1078.83	2906.04	1.816	2907.853	62.0	13.85	2.978	2910.831	0.00	2.537	3.00	0.00	0.00	0	0.00
21.66	0.00935					.019823	0.43					2.360	0.00	
1100.49	2906.24	1.745	2907.985	62.0	14.52	3.275	2911.260	0.00	2.537	3.00	0.00	0.00	0	0.00
19.95	0.00935					.022419	0.45					2.360	0.00	
1120.44	2906.43	1.678	2908.104	62.0	15.23	3.603	2911.707	0.00	2.537	3.00	0.00	0.00	0	0.00
18.56	0.00935					.025393	0.47					2.360	0.00	
1139.00	2906.60	1.616	2908.216	62.0	15.98	3.965	2912.181	0.00	2.537	3.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.028459	0.00					0.00	0	
1139.00	2906.60	1.543	2908.143	60.5	16.52	4.238	2912.381	0.00	2.511	3.00	0.00	0.00	0	0.00
0.88	0.17111					.029235	0.03					0.953	0.00	
1139.88	2906.75	1.564	2908.315	60.5	16.22	4.087	2912.402	0.00	2.511	3.00	0.00	0.00	0	0.00
2.16	0.17111					.026849	0.06					0.953	0.00	
1142.04	2907.12	1.625	2908.745	60.5	15.47	3.716	2912.461	0.00	2.511	3.00	0.00	0.00	0	0.00
1.85	0.17111					.023690	0.04					0.953	0.00	
1143.89	2907.44	1.689	2909.127	60.5	14.75	3.378	2912.505	0.00	2.511	3.00	0.00	0.00	0	0.00
1.60	0.17111					.020927	0.03					0.953	0.00	
LICENSEE: SLATER HANIFAN GROUP						F0515P							PAGE	2

WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

EAGAN CREST (NORTH) - TRUNK STORM DRAIN

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		
1145.49	2907.71	1.757	2909.467	60.5	14.06	3.071	2912.538	0.00	2.511	3.00	0.00	0.00	0	0.00
1.36	0.17111					.018507	0.03					0.953	0.00	
1146.85	2907.94	1.828	2909.771	60.5	13.41	2.792	2912.563	0.00	2.511	3.00	0.00	0.00	0	0.00
1.15	0.17111					.016389	0.02					0.953	0.00	
1148.00	2908.14	1.904	2910.044	60.5	12.79	2.538	2912.582	0.00	2.511	3.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.016476	0.00					0.00	0	
1148.00	2908.14	1.793	2909.933	59.0	13.39	2.783	2912.716	0.00	2.484	3.00	0.00	0.00	0	0.00

I-ECRN									
7.27	0.02632								
1155.27	2908.33	1.818	2910.149	59.0	13.17	.017181	0.12		1.580
16.22	0.02632								
1171.49	2908.76	1.893	2910.651	59.0	12.55	.015856	0.26		1.580
11.63	0.02632								
1183.12	2909.06	1.973	2911.037	59.0	11.97	.014063	0.16		1.580
8.48	0.02632								
1191.60	2909.29	2.058	2911.345	59.0	11.41	.012497	0.11		1.580
6.05	0.02632								
1197.65	2909.45	2.150	2911.597	59.0	10.88	.011134	0.07		1.580
4.10	0.02632								
1201.75	2909.55	2.250	2911.804	59.0	10.37	.009954	0.04		1.580
2.47	0.02632								
1204.22	2909.62	2.359	2911.978	59.0	9.89	.008939	0.02		1.580
0.78	0.02632								
LICENSEE: SLATER HANIFAN GROUP									
SKYE CANYON INFRASTRUCTURE - PHASE 2									
BY OLYMPIA COMPANIES									
EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
WATER SURFACE PROFILE LISTING									
F0515P									
0.01									
0.008078									
1.580									
PAGE 3									

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 AVBPR PIER
1205.00	2909.64	2.484	2912.124	59.0	9.43	1.380	2913.504	0.00	2.484	3.00	0.00	0.00	0 0.00
SKYE CANYON INFRASTRUCTURE - PHASE 2													
BY OLYMPIA COMPANIES													
EAGAN CREST (NORTH) - TRUNK STORM DRAIN													

L/ELEM	SO	W	C	H	E	NORM DEPTH	ZR
1000.00	I						
1004.18	.						
1008.37	.						
1012.55	.						
1016.73	.						
1020.92	.						
1025.10	.						
1029.29	.						
1033.47	.						
1037.65	.						
1041.84	.						
1046.02	.						
1050.20	.						
1054.39	.						
1058.57	.						
1062.76	.						
1066.94	.						
1071.11	.						
1075.29	.						
1079.48	.						
1083.67	.						
1087.86	.						
1092.04	.						
1096.21	.						
1100.41	.						
1104.59	.						

I-ECRN											
1108.78	.	.	.	.	.	.	.	.	.	.	.
1112.96	.	.	.	.	.	.	.	.	.	.	.
1117.14	.	.	.	.	.	.	.	.	.	.	.
1121.33	.	.	.	.	.	.	.	.	.	.	.
1125.51	.	.	.	.	.	.	.	.	.	.	.
1129.69	.	.	.	.	.	.	.	.	.	.	.
1133.88	.	.	.	.	.	.	.	.	.	.	.
1138.06	.	.	.	.	.	.	.	.	.	.	.
1142.24	.	.	.	.	.	.	.	.	.	.	.
1146.43	.	.	.	.	.	.	.	.	.	.	.
1150.61	.	.	.	.	.	.	.	.	.	.	.
1154.80	.	.	.	.	.	.	.	.	.	.	.
1158.98	.	.	.	.	.	.	.	.	.	.	.
1163.16	.	.	.	.	.	.	.	.	.	.	.
1167.35	.	.	.	.	.	.	.	.	.	.	.
1171.53	.	.	.	.	.	.	.	.	.	.	.
1175.71	.	.	.	.	.	.	.	.	.	.	.
1179.90	.	.	.	.	.	.	.	.	.	.	.
1184.08	.	.	.	.	.	.	.	.	.	.	.
1188.27	.	.	.	.	.	.	.	.	.	.	.
1192.45	.	.	.	.	.	.	.	.	.	.	.
1196.63	.	.	.	.	.	.	.	.	.	.	.
1200.82	.	.	.	.	.	.	.	.	.	.	.
1205.00	.	.	.	.	.	.	.	.	.	.	.
2905.30	.	.	.	.	.	.	.	.	.	.	.
2906.12	.	.	.	.	.	.	.	.	.	.	.
2906.94	.	.	.	.	.	.	.	.	.	.	.
2907.76	.	.	.	.	.	.	.	.	.	.	.
2908.58	.	.	.	.	.	.	.	.	.	.	.
2909.40	.	.	.	.	.	.	.	.	.	.	.
2910.22	.	.	.	.	.	.	.	.	.	.	.
2911.04	.	.	.	.	.	.	.	.	.	.	.
2911.86	.	.	.	.	.	.	.	.	.	.	.
2912.68	.	.	.	.	.	.	.	.	.	.	.
2913.50	.	.	.	.	.	.	.	.	.	.	.

NOTES

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

P9-L

0 T1 SKYE CANYON INFRASTRUCTURE - PHASE 2
T2 BY OLYMPIA COMPANIES
T3 EAGLE CANYON NORTH LATERAL P9-L
SO 1000.002908.10 18
R 1052.002908.36 18 .013
SH 1052.002908.36 18
CD 18 4 1.5
CD 24 4 2.
CD 30 4 2.5
CD 36 4 3.
CD 42 4 3.5
CD 48 4 4.
CD 54 4 4.5
CD 60 4 5.
CD 66 4 5.5
CD 72 4 6.
CD 78 4 6.5 ,

2908.16

1

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1.5

P9-L

8
DATE: 11/18/2015
TIME: 19:47

F051SP
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

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

PAGE NO 3

F 0 5 1 5 P
WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGLE CANYON NORTH LATERAL P9-L

F 0 5 1 5 P
WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET U/S DATA	INVERT STATION	SECT 18	W S ELEV 2908.16
ELEMENT NO 2 IS A REACH U/S DATA	STATION 1052.00	INVERT 2908.36	SECT 18	RADIUS 0.00
ELEMENT NO 3 IS A SYSTEM HEADWORKS U/S DATA	STATION 1052.00	INVERT 2908.36	SECT 18	ANGLE 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				

F051SP
WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON NORTH LATERAL P9-L

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	HF	CRITICAL DEPTH	SUPER ELEV	INVERT ELEV	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO															
1000.00	2908.10	0.460	2908.560	1.5	3.26	0.165	2908.725	0.00	0.460			1.50	0.00	0.00	0	0.00
51.99	0.00500					.004884	0.25									
1051.99	2908.36	0.460	2908.820	1.5	3.26	0.165	2908.985	0.00	0.460			1.50	0.00	0.00	0	0.00
0.01	0.00500					.004884	0.00									
1052.00	2908.36	0.460	2908.820	1.5	3.26	0.165	2908.985	0.00	0.460			1.50	0.00	0.00	0	0.00

SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON NORTH LATERAL P9-L

1000.00
1001.06

Page 1

[illegible]NOTES
1. GLOSSARY

1. GLOSSARY
- | | |
|---|---------------------------|
| A | = SURFACE ELEVATION |
| B | = SURFACE DEPTH |
| C | = CRITICAL DEPTH |
| D | = WATER SURFACE ELEVATION |
| H | = HEIGHT OF CHANNEL |
| E | = ENERGY GRADE LINE |
| F | = ENERGY LOSS |
| G | = SURVES CROSSING OVER |
| X | = SURVEY CROSSING |
| Y | = WALL ENTRANCE OR EXIT |
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

Shaumber Main & Laterals

I-SHA

54.

I-SHA

DATE: 11/18/2015
TIME: 11: 6

F0515P																		
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING																		
CARD	SECT	CHN	NO OF	AVE	HEIGHT 1	ZL	ZR	INV	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CODE	NO	TYPE	PIERS	WIDTH	DIAMETER	WIDTH		DROP										
00	18	4			1.50													
00	24	4			2.00													
00	30	4			2.50													
00	36	4			3.00													
00	42	4			3.50													
00	48	4			4.00													
00	54	4			4.50													
00	60	4			5.00													
00	66	4			5.50													
00	72	4			6.00													
00	78	4			6.50													
F 0 5 1 5 P																		
PAGE NO 3																		
9																		

PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2 ADDENDUM

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

SHAUMBER - TRUNK STORM DRAIN
F 0 5 1 5 P

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET	U/S DATA	STATION	INVERT	SECT	W S ELEV	RADIUS	ANGLE	ANG PT	MAN H
ELEMENT NO 1	IS A SYSTEM OUTLET	U/S DATA	1000.00	2991.19	36	2994.19	0.00	0.00	0.00	1
ELEMENT NO 2	IS A REACH	U/S DATA	1268.00	2992.98	36		0.00	0.00	0.00	1
ELEMENT NO 3	IS A JUNCTION	U/S DATA	1268.00	2992.98	36		0.00	0.00	0.00	1
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
ELEMENT NO 4	IS A REACH	U/S DATA	1389.00	2996.48	36		0.00	0.00	0.00	1
ELEMENT NO 5	IS A JUNCTION	U/S DATA	1389.00	2996.48	36		0.00	0.00	0.00	1
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
ELEMENT NO 6	IS A REACH	U/S DATA	1575.00	3000.30	36		0.00	0.00	0.00	1
ELEMENT NO 7	IS A JUNCTION	U/S DATA	1575.00	3000.30	36		0.00	0.00	0.00	1
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
ELEMENT NO 8	IS A REACH	U/S DATA	1922.00	3006.06	36		0.00	0.00	0.00	1

Page 1

ELEMENT NO	9	IS A REACH U/S DATA		*	STATTON	* INVERT	SECT	N	RADIUS	ANGLE	ANG PT	H MAN
					1984.00	3007.81	36	0.013	0.00	0.00	O#	3
								F 0 5 1 5 P	PAGE NO			

ELEMENT NO 10 IS A SYSTEM HEADWORKS

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 $\frac{1}{2}$
 LICENSEE: SLATER HANIFAN GROUP
 F0515P
 1204.00 3007.81 30
 0.00

LICENSEE: SLATER MANIPAN GROUP
FOJ13P
WATER SURFACE PROFILE LISTING
SKYE CANYON INFRASTRUCTURE - PHASE 2 APPENDUM
PAGE 1

SHAUMBER - TRUNK STORM DRAIN

[illegible]

LICENSEE: SLATER HANIFAN GROUP
12.7.28 0.02623 F0515P
.016238 0.22
WATER SURFACE PROFILE LISTING
SKYE CANYON INFRASTRUCTURE - PHASE 2 ADDENDUM

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL NO	AVBPR PIER
Page 2												

L/ELEM	SO	SF AVE										HF	NORM DEPTH										I-SHA											
1934.28	3006.41	1.694	3008.101	54.0	13.12	2.671	3010.772	0.00	2.387	3.00	0.00	0.00	0	0.00	1949.19	3006.83	1.762	3008.589	54.0	12.51	2.428	3011.017	0.00	2.387	3.00	0.00	0.00	0	0.00					
14.91	0.02823					.016501	0.25								1.467																			
1949.19	3006.83	1.762	3008.589	54.0	12.51	2.428	3011.017	0.00	2.387	3.00	0.00	0.00	0	0.00	1949.19	3006.83	1.762	3008.589	54.0	12.51	2.428	3011.017	0.00	2.387	3.00	0.00	0.00	0	0.00					
10.91	0.02823					.014596	0.16								1.467																			
1960.10	3007.14	1.834	3008.969	54.0	11.92	2.207	3011.176	0.00	2.387	3.00	0.00	0.00	0	0.00	1960.10	3007.14	1.834	3008.969	54.0	11.92	2.207	3011.176	0.00	2.387	3.00	0.00	0.00	0	0.00					
8.15	0.02823					.012928	0.11								1.467																			
1968.25	3007.36	1.910	3009.275	54.0	11.37	2.007	3011.282	0.00	2.387	3.00	0.00	0.00	0	0.00	1968.25	3007.36	1.910	3009.275	54.0	11.37	2.007	3011.282	0.00	2.387	3.00	0.00	0.00	0	0.00					
6.05	0.02823					.011470	0.07								1.467																			
1974.30	3007.54	1.991	3009.527	54.0	10.84	1.824	3011.351	0.00	2.387	3.00	0.00	0.00	0	0.00	1974.30	3007.54	1.991	3009.527	54.0	10.84	1.824	3011.351	0.00	2.387	3.00	0.00	0.00	0	0.00					
4.38	0.02823					.010200	0.04								1.467																			
1978.68	3007.66	2.078	3009.738	54.0	10.33	1.659	3011.397	0.00	2.387	3.00	0.00	0.00	0	0.00	1978.68	3007.66	2.078	3009.738	54.0	10.33	1.659	3011.397	0.00	2.387	3.00	0.00	0.00	0	0.00					
3.02	0.02823					.009094	0.03								1.467																			
1981.70	3007.74	2.171	3009.916	54.0	9.85	1.508	3011.424	0.00	2.387	3.00	0.00	0.00	0	0.00	1981.70	3007.74	2.171	3009.916	54.0	9.85	1.508	3011.424	0.00	2.387	3.00	0.00	0.00	0	0.00					
1.74	0.02823					.008136	0.01								1.467																			
1983.44	3007.79	2.273	3010.067	54.0	9.39	1.370	3011.437	0.00	2.387	3.00	0.00	0.00	0	0.00	1983.44	3007.79	2.273	3010.067	54.0	9.39	1.370	3011.437	0.00	2.387	3.00	0.00	0.00	0	0.00					
0.56	0.02823					.007314	0.00								1.467																			
1984.00	3007.81	2.387	3010.197	54.0	8.95	1.245	3011.442	0.00	2.387	3.00	0.00	0.00	0	0.00	1984.00	3007.81	2.387	3010.197	54.0	8.95	1.245	3011.442	0.00	2.387	3.00	0.00	0.00	0	0.00					
SKYE CANYON INFRASTRUCTURE - PHASE 2 ADDENDUM																																		
BY OLYMPIA COMPANIES																																		
SHAUMBER - TRUNK STORM DRAIN																																		
1000.00	.I	.	X	.	E	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.					
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1321.31	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.					
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1502.04	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.					
1522.12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.					
1542.20	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.					
1562.29	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.					
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Page 3																																		

P1-L

0 T1 SKYE CANYON INFRASTRUCTURE - PHASE 2
T2 BY OLYMPIA COMPANIES
T3 SHAUMBER - LATERAL P1
SO 1000.003001.80 18
R 1060.003002.40 18 .013
SH 1060.003002.40 18
CD 18 4 1.5
CD 24 4 2.5
CD 30 4 2.5
CD 36 4 3.5
CD 42 4 3.5
CD 48 4 4.5
CD 54 4 4.5
CD 60 4 5.5
CD 66 4 5.5
CD 72 4 6.5
CD 78 4 6.5

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P1-L

DATE: 11/18/2015
TIME: 11: 8

PI-L

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

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

PAGE NO 3

F 0 5 1 5 P

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

SHAUMBER - LATERAL P1

PAGE NO 2

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET	* STATION	* INVERT SECT	* W S ELEV
	U/S DATA	1000.00	3001.80	3004.99
ELEMENT NO	2 IS A REACH	* STATION	* INVERT SECT	* RADIUS
	U/S DATA	1060.00	3002.40	0.00
ELEMENT NO	3 IS A SYSTEM HEADWORKS	* STATION	* INVERT SECT	* ANG PT
	U/S DATA	1060.00	3002.40	90.00

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

PAGE 1

F0515P
WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
SHAUMBER - LATERAL P1

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. AVBPR PIER
L/ELEM	SO					SF AVE	HF						
1000.00	3001.80	3.190	3004.990	2.0	1.13	0.020	3005.010	0.00	0.533	1.50	0.00	0.00	0
60.00	0.01000					.000363	0.02					0.00	
1060.00	3002.40	2.619	3005.019	2.0	1.13	0.020	3005.039	0.00	0.533	1.50	0.00	0.00	0

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

P2A-L

0	T1	SKYE CANYON INFRASTRUCTURE - PHASE 2			
	T2	BY OLYMPIA COMPANIES			
	T3	SHAUMBER - LATERAL P2A-L			
	SO	1000.002997.98 18	3003.51		
	R	1019.002998.17 18		90.	1
	SH	1019.002998.17 18			
	CD	18 4			
	CD	24 4			
	CD	30 4			
	CD	36 4			
	CD	42 4			
	CD	48 4			
	CD	54 4			
	CD	60 4			
	CD	66 4			
	CD	72 4			
	CD	78 4			

P2A-L

0 0

1.5

♀ DATE: 11/18/2015
TIME: 11: 9

PAGE 1

PAGE NO 3 +

WATER SURFACE PROFILE - TITLE CARD LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 3 IS -

PAGE NO 2

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

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** WARNING NO 22 ** - NO PLOT GENERATED BAD DATA OR NOT ENOUGH POINTS 3 OR LESS 8

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Page 1

0 0 ±

1.5

P2B-L

DATE: 11/18/2015
TIME: 11:10

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING
PAGE 1

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

F 0 5 1 5 P
PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

SHAUMBER - LATERAL P2B-L

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET U/S DATA	STATION	INVERT SECT	W S ELEV
		1000.00	2997.98	3003.51
ELEMENT NO	2 IS A REACH U/S DATA	STATION	INVERT SECT	RADIUS
		1042.00	2998.40	0.00
ELEMENT NO	3 IS A SYSTEM HEADWORKS U/S DATA	STATION	INVERT SECT	ANG PT
		1042.00	2998.40	90.00

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

F0515P
WATER SURFACE PROFILE LISTING
SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
SHAUMBER - LATERAL P2B-L

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
1000.00	2997.98	5.530	3003.510	1.5	0.85	0.011	3003.521	0.00	0.460	1.50	0.00	0.00	0	0.00
42.00	0.01000					.000204	0.01							0.00
1042.00	2998.40	5.122	3003.522	1.5	0.85	0.011	3003.533	0.00	0.460	1.50	0.00	0.00	0	0.00

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

Ultimate Condition

Eagle Canyon Main

U-ECA.WSP

[illegible]

†
DATE: 11/19/2015
TIME: 10: 3

U-ECA.OUT

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

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

†
PAGE NO 3

F 0 5 1 5 P
WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGLE CANYON - TRUNK STORM DRAIN
F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

†
PAGE NO 2

ELEMENT NO	1 IS A SYSTEM OUTLET	U/S DATA	STATION	INVERT SECT	W S ELEV
			613.00	2823.35	2829.26

ELEMENT NO	2 IS A REACH	U/S DATA	STATION	INVERT SECT	RADIUS	ANGLE	ANG PT	MAN H
			900.00	2830.52	0.00	0.00	0.00	1

ELEMENT NO	3 IS A JUNCTION	U/S DATA	STATION	INVERT SECT	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
			900.00	2830.52	72.5	0.0	2832.52	0.00	45.00	0.00

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

ELEMENT NO	4 IS A REACH	U/S DATA	STATION	INVERT SECT	RADIUS	ANGLE	ANG PT	MAN H
			950.00	2831.58	0.013	0.00	0.00	1

ELEMENT NO	5 IS A WALL ENTRANCE	U/S DATA	STATION	INVERT SECT	FP
			950.00	2831.58	0.013

ELEMENT NO	6 IS A TRANSITION	U/S DATA	STATION	INVERT SECT	N
			1000.00	2835.61	0.013

ELEMENT NO	7 IS A WALL EXIT	U/S DATA	STATION	INVERT SECT	N
			1000.00	2835.61	0.013

ELEMENT NO	8 IS A REACH	U/S DATA	STATION	INVERT SECT	N
			1093.00	2837.13	0.013

ELEMENT NO	9 IS A JUNCTION	U/S DATA	STATION	INVERT SECT	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
			1093.00	2838.13	47.0	36.5	2839.13	2839.13	45.00	45.00

ELEMENT NO	10 IS A REACH	U/S DATA	STATION	INVERT SECT	N
			1389.50	2839.63	0.013

ELEMENT NO	11 IS A TRANSITION	U/S DATA	STATION	INVERT SECT	N
			1394.50	2840.13	0.013

†
PAGE NO 3

F 0 5 1 5 P
WATER SURFACE PROFILE - ELEMENT CARD LISTING

U-ECA.OUT

ELEMENT NO 12 IS A REACH U/S DATA	STATION 1632.00	* INVERT 2854.48	* SECT 48	N 0.013			RADIUS 0.00	ANGLE 0.00	ANG PT 5.00	MAN H 1
ELEMENT NO 13 IS A REACH U/S DATA	STATION 1762.00	* INVERT 2862.62	* SECT 48	N 0.013			RADIUS 0.00	ANGLE 0.00	ANG PT 5.00	MAN H 1
ELEMENT NO 14 IS A REACH U/S DATA	STATION 1883.00	* INVERT 2868.57	* SECT 48	N 0.013			RADIUS 0.00	ANGLE 0.00	ANG PT 5.00	MAN H 1
ELEMENT NO 15 IS A REACH U/S DATA	STATION 1992.00	* INVERT 2873.94	* SECT 48	N 0.013			RADIUS 0.00	ANGLE 0.00	ANG PT 5.00	MAN H 1
ELEMENT NO 16 IS A JUNCTION U/S DATA	STATION 1992.00	* INVERT 2873.94	* SECT 48	N 0.013	* LAT-1 LAT-2 18 24	* Q3 7.0	* INVERT-3 INVERT-4 23.0 2876.44 2875.94	* PHI 3 75.00	* PHI 4 75.00	
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
ELEMENT NO 17 IS A REACH U/S DATA	STATION 2072.00	* INVERT 2877.87	* SECT 48	N 0.013			RADIUS 0.00	ANGLE 0.00	ANG PT 5.00	MAN H 1
ELEMENT NO 18 IS A REACH U/S DATA	STATION 2167.00	* INVERT 2882.51	* SECT 48	N 0.013			RADIUS 0.00	ANGLE 0.00	ANG PT 5.00	MAN H 1
ELEMENT NO 19 IS A REACH U/S DATA	STATION 2262.00	* INVERT 2885.16	* SECT 48	N 0.013			RADIUS 0.00	ANGLE 0.00	ANG PT 5.00	MAN H 1
ELEMENT NO 20 IS A REACH U/S DATA	STATION 2422.00	* INVERT 2888.80	* SECT 48	N 0.013			RADIUS 0.00	ANGLE 0.00	ANG PT 0.00	MAN H 1
ELEMENT NO 21 IS A JUNCTION U/S DATA	STATION 2422.00	* INVERT 2888.80	* SECT 48	N 0.013	* LAT-1 LAT-2 30 18	* Q3 42.0	* INVERT-3 INVERT-4 2.0 2890.30 2891.30	* PHI 3 45.00	* PHI 4 45.00	
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 4										

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 22 IS A REACH U/S DATA	STATION 2820.00	* INVERT 2903.13	* SECT 48	N 0.013			RADIUS 0.00	ANGLE 0.00	ANG PT 0.00	MAN H 1
ELEMENT NO 23 IS A JUNCTION U/S DATA	STATION 2820.00	* INVERT 2903.13	* SECT 48	N 0.013	* LAT-1 LAT-2 42 0	* Q3 86.0	* INVERT-3 INVERT-4 0.0 2903.63 0.00	* PHI 3 45.00	* PHI 4 0.00	
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
ELEMENT NO 24 IS A REACH U/S DATA	STATION 3004.00	* INVERT 2908.81	* SECT 48	N 0.013			RADIUS 0.00	ANGLE 0.00	ANG PT 60.00	MAN H 1
ELEMENT NO 25 IS A JUNCTION U/S DATA	STATION 3004.00	* INVERT 2908.81	* SECT 48	N 0.013	* LAT-1 LAT-2 36 18	* Q3 30.0	* INVERT-3 INVERT-4 4.5 2909.81 2911.31	* PHI 3 60.00	* PHI 4 45.00	
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
ELEMENT NO 26 IS A REACH U/S DATA	STATION 3024.00	* INVERT 2910.72	* SECT 48	N 0.013			RADIUS 0.00	ANGLE 0.00	ANG PT 0.00	MAN H 1
ELEMENT NO 27 IS A JUNCTION U/S DATA	STATION 3024.00	* INVERT 2910.72	* SECT 48	N 0.013	* LAT-1 LAT-2 48 0	* Q3 4.5	* INVERT-3 INVERT-4 0.0 2912.12 0.00	* PHI 3 90.00	* PHI 4 0.00	
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING										
ELEMENT NO 28 IS A REACH U/S DATA	STATION 3060.00	* INVERT 2912.43	* SECT 48	N 0.013			RADIUS 0.00	ANGLE 0.00	ANG PT 0.00	MAN H 1
ELEMENT NO 29 IS A SYSTEM HEADWORKS U/S DATA	STATION 3060.00	* INVERT 2912.43	* SECT 48	N 0.013			RADIUS 0.00	ANGLE 0.00	ANG PT 0.00	MAN H 1

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

U-ECA. OUT

SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON - TRUNK STORM DRAIN

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 AVBPR PIER
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR	
613.00	2823.35	3.698	2827.048	432.0	23.63	8.667	2835.715	0.00	5.469	6.00	0.00	0.00	0 0.00
103.44	0.02498					.020346	2.10		3.507			0.00	
716.44	2825.93	3.811	2829.745	432.0	22.80	8.074	2837.819	0.00	5.469	6.00	0.00	0.00	0 0.00
86.34	0.02498					.018347	1.58		3.507			0.00	
802.78	2828.09	3.972	2832.063	432.0	21.74	7.341	2839.404	0.00	5.469	6.00	0.00	0.00	0 0.00
56.99	0.02498					.016310	0.93		3.507			0.00	
859.77	2829.51	4.145	2833.660	432.0	20.73	6.673	2840.333	0.00	5.469	6.00	0.00	0.00	0 0.00
40.23	0.02498					.014540	0.58		3.507			0.00	
900.00	2830.52	4.332	2834.852	432.0	19.77	6.067	2840.919	0.00	5.469	6.00	0.00	0.00	0 0.00
JUNCT STR	0.00000					.018842	0.00					0.00	
900.00	2830.52	3.170	2833.690	359.5	23.72	8.738	2842.428	0.00	5.125	6.00	0.00	0.00	0 0.00
50.00	0.02120					.024294	1.21		3.291			0.00	
950.00	2831.58	3.144	2834.724	359.5	23.97	8.918	2843.642	0.00	5.125	6.00	0.00	0.00	0 0.00
TRANS STR	0.08060					.018585	0.93					0.00	
1000.00	2835.61	4.303	2839.913	359.5	18.03	5.046	2844.959	0.00	5.062	5.50	0.00	0.00	0 0.00
WALL EXIT												0.00	
1000.00	2835.61	4.302	2839.912	359.5	18.03	5.048	2844.960	0.00	5.062	5.50	0.00	0.00	0 0.00
49.35	0.01634					.012035	0.59		3.850			0.00	
1049.35	2836.42	4.496	2840.913	359.5	17.29	4.642	2845.555	0.00	5.062	5.50	0.00	0.00	0 0.00
32.03	0.01634					.011036	0.35		3.850			0.00	
1081.38	2836.94	4.748	2841.688	359.5	16.49	4.220	2845.908	0.00	5.062	5.50	0.00	0.00	0 0.00
11.62	0.01634					.010253	0.12		3.850			0.00	
LICENSEE: SLATER HANIFAN GROUP						F0515P							PAGE 2

SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON - TRUNK STORM DRAIN

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 AVBPR PIER
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR	
1093.00	2837.13	5.062	2842.192	359.5	15.72	3.836	2846.028	0.00	5.062	5.50	0.00	0.00	0 0.00
JUNCT STR	0.00000					.014823	0.00					0.00	
1093.00	2838.13	5.023	2843.153	276.0	17.35	4.676	2847.829	0.00	4.344	4.50	0.00	0.00	0 0.00
242.01	0.00506					.019699	4.77		4.500			0.00	
1335.01	2839.35	8.757	2848.111	276.0	17.35	4.676	2852.787	0.00	4.344	4.50	0.00	0.00	0 0.00
HYDRAULIC JUMP												0.00	
1335.01	2839.35	2.667	2842.021	276.0	28.11	12.271	2854.292	0.00	4.344	4.50	0.00	0.00	0 0.00
3.41	0.00506					.045661	0.16		4.500			0.00	
1338.42	2839.37	2.654	2842.026	276.0	28.28	12.415	2854.441	0.00	4.344	4.50	0.00	0.00	0 0.00
25.90	0.00506					.049015	1.27		4.500			0.00	
1364.32	2839.50	2.551	2842.054	276.0	29.66	13.656	2855.710	0.00	4.344	4.50	0.00	0.00	0 0.00
25.18	0.00506					.055486	1.40		4.500			0.00	

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1389.50	2839.63	2.455	2842.085	276.0	31.10	15.021	2857.106	0.00	4.344	4.50	0.00	0.00	0	0.00
TRANS STR	0.10000					.058745	0.29				0.00			
1394.50	2840.13	2.692	2842.822	276.0	30.69	14.623	2857.445	0.00	3.956	4.00	0.00	0.00	0	0.00
237.50	0.06042					.055425	13.16		2.661		0.00			
1632.00	2854.48	2.807	2857.287	276.0	29.29	13.322	2870.609	0.00	3.956	4.00	0.00	0.00	0	0.00
74.63	0.06262					.049858	3.72		2.627		0.00			
1706.63	2859.15	2.918	2862.071	276.0	28.10	12.259	2874.330	0.00	3.956	4.00	0.00	0.00	0	0.00
55.37	0.06262					.044985	2.49		2.627		0.00			
1762.00	2862.62	3.056	2865.676	276.0	26.79	11.143	2876.819	0.00	3.956	4.00	0.00	0.00	0	0.00
37.87	0.04917					.041877	1.59		2.875		0.00			
LICENSEE: SLATER HANIFAN GROUP						F0515P							PAGE 3	

SKYE CANYON INFRASTRUCTURE - PHASE 2
 BY OLYMPIA COMPANIES
 EAGLE CANYON - TRUNK STORM DRAIN

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EV.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
I/ELEM	SO					SF AVE	HF		NORM DEPTH					
1799.87	2864.48	3.101	2867.583	276.0	26.40	10.819	2878.402	0.00	3.956	4.00	0.00	0.00	0	0.00
83.13	0.04917					.039250	3.26		2.875		0.00			
1883.00	2868.57	3.260	2871.830	276.0	25.17	9.836	2881.666	0.00	3.956	4.00	0.00	0.00	0	0.00
44.31	0.04927					.035988	1.59		2.873		0.00			
1927.31	2870.75	3.405	2874.158	276.0	24.21	9.100	2883.258	0.00	3.956	4.00	0.00	0.00	0	0.00
39.00	0.04927					.033514	1.31		2.873		0.00			
1966.31	2872.67	3.618	2876.292	276.0	23.08	8.273	2884.565	0.00	3.956	4.00	0.00	0.00	0	0.00
25.69	0.04927					.033120	0.85		2.873		0.00			
1992.00	2873.94	3.956	2877.896	276.0	22.01	7.520	2885.416	0.00	3.956	4.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.031606	0.00				0.00			
1992.00	2873.94	6.943	2880.883	246.0	19.58	5.951	2886.834	0.00	3.931	4.00	0.00	0.00	0	0.00
80.00	0.04913					.029329	2.35		2.640		0.00			
2072.00	2877.87	5.755	2883.625	246.0	19.58	5.951	2889.576	0.00	3.931	4.00	0.00	0.00	0	0.00
95.00	0.04884					.029329	2.79		2.644		0.00			
2167.00	2882.51	4.297	2886.807	246.0	19.58	5.951	2892.758	0.00	3.931	4.00	0.00	0.00	0	0.00
95.00	0.02789					.029329	2.79		3.377		0.00			
2262.00	2885.16	4.829	2889.989	246.0	19.58	5.951	2895.940	0.00	3.931	4.00	0.00	0.00	0	0.00
160.00	0.02275					.029329	4.69		4.000		0.00			
2422.00	2888.80	6.179	2894.979	246.0	19.58	5.951	2900.930	0.00	3.931	4.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.024552	0.00				0.00			
2422.00	2888.80	9.423	2898.223	202.0	16.08	4.013	2902.236	0.00	3.852	4.00	0.00	0.00	0	0.00
243.21	0.03601					.019776	4.81		2.563		0.00			
LICENSEE: SLATER HANIFAN GROUP						F0515P							PAGE 4	

SKYE CANYON INFRASTRUCTURE - PHASE 2
 BY OLYMPIA COMPANIES
 EAGLE CANYON - TRUNK STORM DRAIN

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EV.	SUPER ELEV	CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
I/ELEM	SO					SF AVE	HF		NORM DEPTH					
2665.21	2897.56	5.600	2903.157	202.0	16.08	4.013	2907.170	0.00	3.852	4.00	0.00	0.00	0	0.00

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HYDRAULIC JUMP

2665.21	2897.56	2.811	2900.368	202.0	21.41	7.116	2907.484	0.00	3.852	4.00	0.00	0.00	0.00
45.87	0.03601					.026782	1.23		2.563				
2711.08	2899.21	2.906	2902.114	202.0	20.65	6.620	2908.734	0.00	3.852	4.00	0.00	0.00	0.00
39.78	0.03601					.024321	0.97		2.563				
2750.86	2900.64	3.043	2903.684	202.0	19.69	6.019	2909.703	0.00	3.852	4.00	0.00	0.00	0.00
28.05	0.03601					.021880	0.61		2.563				
2778.91	2901.65	3.194	2904.845	202.0	18.77	5.472	2910.317	0.00	3.852	4.00	0.00	0.00	0.00
20.18	0.03601					.019833	0.40		2.563				
2799.09	2902.38	3.365	2905.742	202.0	17.90	4.974	2910.716	0.00	3.852	4.00	0.00	0.00	0.00
13.96	0.03601					.018225	0.25		2.563				
2813.05	2902.88	3.569	2906.449	202.0	17.07	4.522	2910.971	0.00	3.852	4.00	0.00	0.00	0.00
6.95	0.03601					.017408	0.12		2.563				
2820.00	2903.13	3.852	2906.982	202.0	16.27	4.110	2911.092	0.00	3.852	4.00	0.00	0.00	0.00
JUNCT STR	0.00000					.011898	0.00						
2820.00	2903.13	8.009	2911.139	116.0	9.23	1.323	2912.462	0.00	3.249	4.00	0.00	0.00	0.00
178.03	0.03087					.006477	1.15		1.904				
2998.03	2908.63	4.000	2912.626	116.0	9.23	1.323	2913.949	0.00	3.249	4.00	0.00	0.00	0.00
5.97	0.03087					.006041	0.04		1.904				
3004.00	2908.81	3.800	2912.610	116.0	9.41	1.374	2913.984	0.00	3.249	4.00	0.00	0.00	0.00

PAGE 5

JUNCT STR 0.00000

LICENSEE: SLATER HANIFAN GROUP

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

EAGLE CANYON - TRUNK STORM DRAIN

WATER SURFACE PROFILE LISTING

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LICENSEE: SLATER HANIFAN GROUP
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 SKYE CANYON INFRASTRUCTURE - PHASE 2
 BY OLYMPIA COMPANIES
 EAGLE CANYON - TRUNK STORM DRAIN
 WATER SURFACE PROFILE LISTING
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SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES
EAGLE CANYON - TRUNK STORM DRAIN

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NOTES

1. GLOSSARY

2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY²

Eagle Canyon West

0	T1 SKYE CANYON INFRASTRUCTURE - PHASE 2			
	T2 BY OLYMPIA COMPANIES			
	T3 EAGLE CANYON - TRUNK STORM DRAIN (WEST PORTION)			
	S0 1000.002909.81 36		2913.84	
	R 1118.002913.45 36	.013		60. 1
	JX 1118.002913.45 36 18	.013	15.0	
	R 1138.002915.42 36	.013		45.00
	SH 1138.002915.42 36			
	CD 18 4		1.5	
	CD 24 4		2.5	
	CD 30 4		2.5	
	CD 36 4		3.5	
	CD 42 4		3.5	
	CD 48 4		4.5	
	CD 54 4		4.5	
	CD 60 4		5.5	
	CD 66 4		5.5	
	CD 72 4		6.5	
	CD 78 4		6.5	

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DATE: 11/19/2015
TIME: 10: 6

F051SP
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING
PAGE 1

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

PAGE NO 3

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WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGLE CANYON - TRUNK STORM DRAIN (WEST PORTION)

F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1 IS A SYSTEM OUTLET U/S DATA	INVERT STATION	INVERT SECT	W S ELEV
		1000.00	2909.81	2913.84

†

PAGE NO 2

ELEMENT NO	2 IS A REACH U/S DATA	INVERT STATION	INVERT SECT	RADIUS	ANGLE	ANG PT	MAN H
		1118.00	2913.45	0.00	0.00	60.00	1

ELEMENT NO	3 IS A JUNCTION U/S DATA	INVERT STATION	INVERT SECT	RADIUS	ANGLE	ANG PT	MAN H
		1118.00	2913.45	0.00	0.00	60.00	1

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

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

ELEMENT NO	4 IS A REACH U/S DATA	INVERT STATION	INVERT SECT	RADIUS	ANGLE	ANG PT	MAN H
		1138.00	2915.42	0.00	0.00	0.00	0

ELEMENT NO	5 IS A SYSTEM HEADWORKS U/S DATA	INVERT STATION	INVERT SECT	W S ELEV
		1138.00	2915.42	0.00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HOWKDS, W.S.ELEV = INV + DC †

LICENSEE: SLATER HANIFAN GROUP

F051SP

WATER SURFACE PROFILE LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

EAGLE CANYON - TRUNK STORM DRAIN (WEST PORTION)

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 AVBPR PIER
1000.00	2909.81	4.030	2913.840	30.0	4.24	0.280	2914.120	0.00	1.775	3.00	0.00	0.00	0.00
37.81	0.03085					.002007	0.08						
1037.81	2910.98	3.000	2913.976	30.0	4.24	0.280	2914.256	0.00	1.775	3.00	0.00	0.00	0.00
8.63	0.03085					.001880	0.02						
1046.44	2911.24	2.721	2913.964	30.0	4.45	0.308	2914.272	0.00	1.775	3.00	0.00	0.00	0.00
0.43	0.03085					.001773	0.00						
1046.87	2911.26	2.707	2913.963	30.0	4.47	0.310	2914.273	0.00	1.775	3.00	0.00	0.00	0.00

HYDRAULIC JUMP															U-ECAW. OUT					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	AVBPR												
L/ELEM	SO	*****															NORM DEPTH					*****				
*****															*****					*****						
1108.98	2913.17	1.411	2914.583	30.0	9.18	1.308	2915.891	0.00	1.775	3.00	0.00	0.00	0	0.00												
3.06	0.03085	*****															1.034					*****				
1112.04	2913.27	1.464	2914.730	30.0	8.75	1.189	2915.919	0.00	1.775	3.00	0.00	0.00	0	0.00												
2.31	0.03085	*****															1.034					*****				
1114.35	2913.34	1.520	2914.857	30.0	8.34	1.081	2915.938	0.00	1.775	3.00	0.00	0.00	0	0.00												
1.66	0.03085	*****															1.034					*****				
1116.01	2913.39	1.579	2914.968	30.0	7.95	0.982	2915.950	0.00	1.775	3.00	0.00	0.00	0	0.00												
1.16	0.03085	*****															1.034					*****				
1117.17	2913.42	1.640	2915.064	30.0	7.58	0.893	2915.957	0.00	1.775	3.00	0.00	0.00	0	0.00												
0.64	0.03085	*****															1.034					*****				
1117.81	2913.44	1.705	2915.149	30.0	7.23	0.812	2915.961	0.00	1.775	3.00	0.00	0.00	0	0.00												
0.19	0.03085	*****															1.034					*****				
1118.00	2913.45	1.775	2915.225	30.0	6.89	0.737	2915.962	0.00	1.775	3.00	0.00	0.00	0	0.00												
JUNCT STR	0.00000	*****																								
1118.00	2913.45	0.672	2914.122	15.0	12.68	2.496	2916.618	0.00	1.235	3.00	0.00	0.00	0	0.00												
2.25	0.09850	*****															0.541					*****				
1120.25	2913.67	0.686	2914.358	15.0	12.31	2.351	2916.709	0.00	1.235	3.00	0.00	0.00	0	0.00												
3.05	0.09850	*****															0.541					*****				
1123.30	2913.97	0.709	2914.681	15.0	11.74	2.139	2916.820	0.00	1.235	3.00	0.00	0.00	0	0.00												
2.53	0.09850	*****															0.541					*****				
1125.83	2914.22	0.734	2914.955	15.0	11.19	1.943	2916.898	0.00	1.235	3.00	0.00	0.00	0	0.00												
2.13	0.09850	*****															0.541					*****				
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U-ECAW, OUT

EAGLE CANYON - TRUNK STORM DRAIN (WEST PORTION)

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		
1127.96	2914.43	0.759	2915.190	15.0	10.67	1.767	2916.957	0.00	1.235	3.00	0.00	0.00	0	0.00
1.81	0.09850					.024045	0.04					0.541		
1129.77	2914.61	0.785	2915.394	15.0	10.17	1.606	2917.000	0.00	1.235	3.00	0.00	0.00	0	0.00
1.54	0.09850					.021031	0.03					0.541		
1131.31	2914.76	0.812	2915.573	15.0	9.70	1.460	2917.033	0.00	1.235	3.00	0.00	0.00	0	0.00
1.30	0.09850					.018398	0.02					0.541		
1132.61	2914.89	0.840	2915.729	15.0	9.25	1.328	2917.057	0.00	1.235	3.00	0.00	0.00	0	0.00
1.10	0.09850					.016105	0.02					0.541		
1133.71	2915.00	0.870	2915.868	15.0	8.81	1.206	2917.074	0.00	1.235	3.00	0.00	0.00	0	0.00
0.95	0.09850					.014100	0.01					0.541		
1134.66	2915.09	0.900	2915.991	15.0	8.40	1.097	2917.088	0.00	1.235	3.00	0.00	0.00	0	0.00
0.79	0.09850					.012339	0.01					0.541		
1135.45	2915.17	0.931	2916.100	15.0	8.01	0.997	2917.097	0.00	1.235	3.00	0.00	0.00	0	0.00
0.66	0.09850					.010804	0.01					0.541		
1136.11	2915.23	0.964	2916.198	15.0	7.64	0.907	2917.105	0.00	1.235	3.00	0.00	0.00	0	0.00
0.55	0.09850					.009465	0.01					0.541		
1136.66	2915.29	0.998	2916.286	15.0	7.29	0.824	2917.110	0.00	1.235	3.00	0.00	0.00	0	0.00
0.43	0.09850					.008293	0.00					0.541		
1137.09	2915.33	1.034	2916.364	15.0	6.95	0.750	2917.114	0.00	1.235	3.00	0.00	0.00	0	0.00
0.35	0.09850					.007268	0.00					0.541		
1137.44	2915.36	1.070	2916.435	15.0	6.62	0.681	2917.116	0.00	1.235	3.00	0.00	0.00	0	0.00
0.25	0.09850					.006371	0.00					0.541		

LICENSEE: SLATER HANIFAN GROUP

WATER SURFACE PROFILE LISTING
SKYE CANYON INFRASTRUCTURE - PHASE 2
BY OLYMPIA COMPANIES

EAGLE CANYON - TRUNK STORM DRAIN (WEST PORTION)

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		
1137.69	2915.39	1.109	2916.498	15.0	6.32	0.619	2917.117	0.00	1.235	3.00	0.00	0.00	0	0.00
0.17	0.09850					.005588	0.00					0.541		
1137.86	2915.41	1.149	2916.556	15.0	6.02	0.563	2917.119	0.00	1.235	3.00	0.00	0.00	0	0.00
0.11	0.09850					.004902	0.00					0.541		
1137.97	2915.42	1.190	2916.607	15.0	5.74	0.512	2917.119	0.00	1.235	3.00	0.00	0.00	0	0.00
0.03	0.09850					.004296	0.00					0.541		
1138.00	2915.42	1.235	2916.655	15.0	5.47	0.464	2917.119	0.00	1.235	3.00	0.00	0.00	0	0.00

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES
EAGLE CANYON - TRUNK STORM DRAIN (WEST PORTION)

1000.00
1001.89
1003.78
1005.67
1007.56

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NOTES

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

Egan Crest South

U-ECRS.WSQ

Q 81.0

U-ECRS.OUT

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE NO 3

F0515P

WATER SURFACE PROFILE -- TITLE CARD LISTING

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

EGAN CREST SOUTH - TRUNK STORM DRAIN
F 0 5 1 5 P

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1	IS A SYSTEM OUTLET	*	*
		U/S DATA	STATION	INVERT
			1000.00	2903.63
				42
				SECT

W S ELEV
2911.14

ELEMENT NO	2 IS A REACH	*	* * *
	U/S DATA	STATION	INVERT SECT
		1025.00	2905.35 42

N
0.013

ELEMENT NO	3 IS A REACH	STATION	INVERT	SECT
	U/S DATA	1075.00	2905.60	42

0.013 N

ELEMENT NO	4 IS A JUNCTION				
	U/S DATA				
		STATION	INVERT	SECT	
		1075.00	2905.60	42	

Q3 2.0

VERT-4 PHI 3
0.00 90.00

ELEMENT NO	5	IS A REACH	STATION	INVERT	SECT
		U/S DATA	1171.00	2906.08	42

0.013 N

ELEMENT NO	6	IS A REACH	*	*	*
		U/S DATA			
		STATION	INVERT	SECT	
		1306.00	2906.76	42	

0.013 N

ELEMENT NO	7	IS A REACH	*	*	*
		U/S DATA	STATION	INVERT	SECT
			1406.00	2907.76	42

0.013 N

ELEMENT NO	8	IS A REACH	*	*	*
		U/S DATA			
		STATION	INVERT	SECT	
		1503.50	2910.00	42	

0.013 N

ELEMENT NO	9	IS A TRANSITION	*	*	*
		U/S DATA	STATION	INVERT	SECT
			1508.50	2910.50	36

0.013 N

ELEMENT NO	10	IS A REACH	STATION	INVERT	SECT
		U/S DATA	1600.00	2912.86	36

0013

ELEMENT NO	11 IS A JUNCTION		*	*	*
	U/S DATA	STATION	INVERT	SECTION	
		1600.00	2912.86	36	

Q3

RT-4 PHI 3
4.36 45.00

OT GREATER TI
F 0 5 1 5 P

PAGE NO 3

U-ECKS.OUT

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	12	IS A REACH	U/S DATA	STATION	*	INVERT	SECT	*	N		RADIUS	ANGLE	ANG PT	MAN H
				1689.00		2915.09	36		0.013		0.00	0.00	5.00	1
ELEMENT NO	13	IS A REACH	U/S DATA	STATION	*	INVERT	SECT	*	N		RADIUS	ANGLE	ANG PT	MAN H
				1759.00		2916.14	36		0.013		0.00	0.00	75.00	0
ELEMENT NO	14	IS A REACH	U/S DATA	STATION	*	INVERT	SECT	*	N		RADIUS	ANGLE	ANG PT	MAN H
				1793.00		2922.43	36		0.013		0.00	0.00	0.00	0
ELEMENT NO	15	IS A JUNCTION	U/S DATA	STATION	*	INVERT	SECT	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4	
				1793.00		2922.63	48	0.0	0.0	0.00	0.00	0.00	0.00	
ELEMENT NO	16	IS A REACH	U/S DATA	STATION	*	INVERT	SECT	*	N		RADIUS	ANGLE	ANG PT	MAN H
				1801.00		2922.91	48		0.013		0.00	0.00	0.00	0
ELEMENT NO	17	IS A SYSTEM HEADWORKS	U/S DATA	STATION	*	INVERT	SECT	*		W S ELEV				
				1801.00		2922.91	48			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 HDKDS, W.S.ELEV = INV + DC ‡
 LICENSEE: SLATER HANIFAN GROUP

WATER SURFACE PROFILE LISTING
 F0515P

SKYE CANYON INFRASTRUCTURE - PHASE 2
 BY OLYMPIA COMPANIES
 EGAN CREST SOUTH - TRUNK STORM DRAIN

STATION	INVERT	DEPTH	W.S.	Q	VEL	VEL	ENERGY	SUPER	CRITICAL	HGT/	BASE/	ZL	NO	AVBPR
L/ELEM	ELEV	OF FLOW	ELEV			HEAD	GRD.EV.	ELEV	DEPTH	DIA	ID NO.		PIER	
1000.00	2903.63	7.510	2911.140	86.0	8.94	1.241	2912.381	0.00	2.887	3.50	0.00	0.00	0	0.00
25.00	0.06880					.007307	0.18					1.374		
1025.00	2905.35	6.219	2911.569	86.0	8.94	1.241	2912.810	0.00	2.887	3.50	0.00	0.00	0	0.00
50.00	0.00500					.007307	0.37					3.500		
1075.00	2905.60	6.396	2911.996	86.0	8.94	1.241	2913.237	0.00	2.887	3.50	0.00	0.00	0	0.00
JUNCT STR	0.00000					.007139	0.00					0.00		
1075.00	2905.60	6.510	2912.110	84.0	8.73	1.184	2913.294	0.00	2.857	3.50	0.00	0.00	0	0.00
96.00	0.00500					.006971	0.67					3.500		
1171.00	2906.08	6.778	2912.858	84.0	8.73	1.184	2914.042	0.00	2.857	3.50	0.00	0.00	0	0.00
135.00	0.00504					.006971	0.94					3.500		
1306.00	2906.76	7.118	2913.878	84.0	8.73	1.184	2915.062	0.00	2.857	3.50	0.00	0.00	0	0.00
100.00	0.01000					.006971	0.70					2.444		
1406.00	2907.76	6.894	2914.654	84.0	8.73	1.184	2915.838	0.00	2.857	3.50	0.00	0.00	0	0.00
97.50	0.02297					.006971	0.68					1.853		
1503.50	2910.00	5.412	2915.412	84.0	8.73	1.184	2916.596	0.00	2.857	3.50	0.00	0.00	0	0.00
TRANS STR	0.10000					.011416	0.06					0.00		
1508.50	2910.50	4.162	2914.662	84.0	11.88	2.193	2916.855	0.00	2.805	3.00	0.00	0.00	0	0.00
21.67	0.02579					.015861	0.34					2.000		
1530.17	2911.06	3.978	2915.037	84.0	11.88	2.193	2917.230	0.00	2.805	3.00	0.00	0.00	0	0.00
HYDRAULIC JUMP												0.00		
1530.17	2911.06	1.985	2913.044	84.0	16.93	4.450	2917.494	0.00	2.805	3.00	0.00	0.00	0	0.00
69.83	0.02579					.026635	1.86					2.000		
LICENSEE: SLATER HANIFAN GROUP												0.00		

WATER SURFACE PROFILE LISTING
 F0515P
 SKYE CANYON INFRASTRUCTURE - PHASE 2
 BY OLYMPIA COMPANIES
 EGAN CREST SOUTH - TRUNK STORM DRAIN

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	U-ECRS.OUT CRITICAL DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO													
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
1600.00	2912.86	1.971	2914.831	84.0	17.06	4.521	2919.352	0.00	2.805	3.00	0.00	0.00	0	0.00
JUNCT STR	0.00000					.028776	0.00							0.00
1600.00	2912.86	1.838	2914.698	81.0	17.84	4.943	2919.641	0.00	2.780	3.00	0.00	0.00	0	0.00
46.64	0.02506					.032234	1.50		1.970					0.00
1646.64	2914.03	1.780	2915.809	81.0	18.54	5.335	2921.144	0.00	2.780	3.00	0.00	0.00	0	0.00
42.36	0.02506					.036029	1.53		1.970					0.00
1689.00	2915.09	1.711	2916.801	81.0	19.44	5.870	2922.671	0.00	2.780	3.00	0.00	0.00	0	0.00
16.99	0.01500					.040364	0.69		2.434					0.00
1705.99	2915.34	1.656	2917.001	81.0	20.24	6.361	2923.362	0.00	2.780	3.00	0.00	0.00	0	0.00
18.91	0.01500					.045308	0.86		2.434					0.00
1724.90	2915.63	1.593	2917.222	81.0	21.23	7.000	2924.222	0.00	2.780	3.00	0.00	0.00	0	0.00
17.62	0.01500					.051374	0.91		2.434					0.00
1742.52	2915.89	1.534	2917.427	81.0	22.26	7.698	2925.125	0.00	2.780	3.00	0.00	0.00	0	0.00
16.48	0.01500					.058319	0.96		2.434					0.00
1759.00	2916.14	1.478	2917.618	81.0	23.35	8.466	2926.084	0.00	2.780	3.00	0.00	0.00	0	0.00
1.33	0.18500					.061113	0.08		1.090					0.00
1760.33	2916.39	1.490	2917.877	81.0	23.10	8.283	2926.160	0.00	2.780	3.00	0.00	0.00	0	0.00
5.42	0.18500					.056616	0.31		1.090					0.00
1765.75	2917.39	1.547	2918.937	81.0	22.02	7.531	2926.468	0.00	2.780	3.00	0.00	0.00	0	0.00
4.63	0.18500					.049893	0.23		1.090					0.00
1770.38	2918.24	1.607	2919.852	81.0	21.00	6.845	2926.697	0.00	2.780	3.00	0.00	0.00	0	0.00
3.97	0.18500					.044008	0.17		1.090					0.00

LICENSEE: SLATER HANIFAN GROUP F051SP
 SKYE CANYON INFRASTRUCTURE - PHASE 2
 BY OLYMPIA COMPANIES
 EGAN CREST SOUTH - TRUNK STORM DRAIN

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													
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
1774.35	2918.98	1.670	2920.649	81.0	20.02	6.223	2926.872	0.00	2.780	3.00	0.00	0.00	0	0.00
3.41	0.18500					.038861	0.13		1.090					0.00
1777.76	2919.61	1.737	2921.347	81.0	19.09	5.659	2927.006	0.00	2.780	3.00	0.00	0.00	0	0.00
2.95	0.18500					.034356	0.10		1.090					0.00
1780.71	2920.16	1.807	2921.963	81.0	18.20	5.142	2927.105	0.00	2.780	3.00	0.00	0.00	0	0.00
2.54	0.18500					.030408	0.08		1.090					0.00
1783.25	2920.63	1.881	2922.508	81.0	17.35	4.675	2927.183	0.00	2.780	3.00	0.00	0.00	0	0.00
2.19	0.18500					.026964	0.06		1.090					0.00
1785.44	2921.03	1.961	2922.992	81.0	16.54	4.250	2927.242	0.00	2.780	3.00	0.00	0.00	0	0.00
1.88	0.18500					.023957	0.05		1.090					0.00
1787.32	2921.38	2.045	2923.423	81.0	15.77	3.864	2927.287	0.00	2.780	3.00	0.00	0.00	0	0.00
1.59	0.18500					.021335	0.03		1.090					0.00
1788.91	2921.67	2.136	2923.809	81.0	15.04	3.513	2927.322	0.00	2.780	3.00	0.00	0.00	0	0.00
1.32	0.18500					.019065	0.03		1.090					0.00

U-ECRS.OUT									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH
1790.23	2921.92	2.235	2924.153	81.0	14.34	3.194	2927.347	0.00	2.780
1.09	0.18500					.017109	0.02		1.090
1791.32	2922.12	2.343	2924.462	81.0	13.67	2.903	2927.365	0.00	2.780
0.84	0.18500					.015450	0.01		1.090
1792.16	2922.28	2.464	2924.739	81.0	13.04	2.639	2927.378	0.00	2.780
0.59	0.18500					.014090	0.01		1.090
1792.75	2922.39	2.603	2924.988	81.0	12.43	2.400	2927.388	0.00	2.780
0.25	0.18500					.013129	0.00		1.090

LICENSEE: SLATER HANIFAN GROUP
 SKYE CANYON INFRASTRUCTURE - PHASE 2
 BY OLYMPIA COMPANIES
 EGAN CREST SOUTH - TRUNK STORM DRAIN

WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH
1793.00	2922.43	2.780	2925.210	81.0	11.85	2.180	2927.390	0.00	2.780
JUNCT STR	0.00000					.007975	0.00		0.00
1793.00	2922.63	4.116	2926.746	81.0	6.45	0.645	2927.391	0.00	2.727
3.64	0.03500					.003158	0.01		1.505
1796.64	2922.76	4.000	2926.757	81.0	6.45	0.645	2927.402	0.00	2.727
4.36	0.03500					.002954	0.01		1.505
1801.00	2922.91	3.842	2926.752	81.0	6.53	0.662	2927.414	0.00	2.727

SKYE CANYON INFRASTRUCTURE - PHASE 2
 BY OLYMPIA COMPANIES
 EGAN CREST SOUTH - TRUNK STORM DRAIN

NORM DEPTH									
L/ELEV	SO	CH	W	E	W	E	W	E	W
1000.00									
1010.97									
1021.95									
1032.92									
1043.89									
1054.86									
1065.84									
1076.81									
1087.78									
1098.75									
1109.73									
1120.70									
1131.67									
1142.64									
1153.62									
1164.59									
1175.56									
1186.53									
1197.51									
1208.48									
1219.45									
1230.42									
1241.40									
1252.37									
1263.34									
1274.32									
1285.29									
1296.26									
1307.23									
1318.21									
1329.18									
1340.15									
1351.12									
1362.10									
1373.07									
1384.04									
1395.01									
1405.99									
1416.96									
1427.93									

U-ECRS. OUT

1. GLOSSARY

1. 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 JUNCTION

2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY?

Egan Crest North

0 T1 SKYE CANYON INFRASTRUCTURE - PHASE 2
T2 BY OLYMPIA COMPANIES
T3 EAGAN CREST (NORTH) - TRUNK STORM DRAIN
SO 1000.002905.30 36
R 1139.002906.60 36 .013
JX 1139.002906.60 36 18 .013 1.5
R 1148.002908.14 36 .013
JX 1148.002908.14 36 36 .013 1.5
R 1205.002909.64 36 .013
SH 1205.002909.64 36
CD 18 4 1.5
CD 24 4 2.5
CD 30 4 2.5
CD 36 4 3.5
CD 42 4 3.5
CD 48 4 4.5
CD 54 4 4.5
CD 60 4 5.5
CD 66 4 5.5
CD 72 4 6.5
CD 78 4 6.5
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DATE: 11/19/2015
TIME: 10: 2

F051SP																			
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING																			
CARD	SECT	CHN	NO OF	AVE	HEIGHT 1	ZL	ZR	INV	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	PAGE	1
CODE	NO	TYPE	PIERS	WIDTH	DIAMETER	WIDTH		DROP										Y(10)	
00	18	4			1.50														
00	24	4			2.00														
00	30	4			2.50														
00	36	4			3.00														
00	42	4			3.50														
00	48	4			4.00														
00	54	4			4.50														
00	60	4			5.00														
00	66	4			5.50														
00	72	4			6.00														
00	78	4			6.50														

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PAGE NO 3

PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

EAGAN CREST (NORTH) - TRUNK STORM DRAIN

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1	IS A	SYSTEM OUTLET	*	STATION	INVERT	SECT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Page 1

U-ECRN. OUT

EAGAN CREST (NORTH) - TRUNK STORM DRAIN

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
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR	
1000.00	2905.30	1.962	2907.262	58.0	11.84	2.177	2909.439	0.00	2.465	3.00	0.00	0.00	0 0.00
30.18	0.00935					.013784	0.42		2.222			0.00	
1030.18	2905.58	1.885	2907.467	58.0	12.40	2.388	2909.855	0.00	2.465	3.00	0.00	0.00	0 0.00
26.59	0.00935					.015515	0.41		2.222			0.00	
1056.77	2905.83	1.810	2907.641	58.0	13.01	2.627	2910.268	0.00	2.465	3.00	0.00	0.00	0 0.00
23.57	0.00935					.017525	0.41		2.222			0.00	
1080.34	2906.05	1.740	2907.791	58.0	13.64	2.889	2910.680	0.00	2.465	3.00	0.00	0.00	0 0.00
21.20	0.00935					.019824	0.42		2.222			0.00	
1101.54	2906.25	1.673	2907.923	58.0	14.31	3.178	2911.101	0.00	2.465	3.00	0.00	0.00	0 0.00
19.46	0.00935					.022450	0.44		2.222			0.00	
1121.00	2906.43	1.610	2908.042	58.0	15.01	3.497	2911.539	0.00	2.465	3.00	0.00	0.00	0 0.00
18.00	0.00935					.025456	0.46		2.222			0.00	
1139.00	2906.60	1.550	2908.150	58.0	15.74	3.847	2911.997	0.00	2.465	3.00	0.00	0.00	0 0.00
JUNCT STR	0.00000					.028656	0.00					0.00	
1139.00	2906.60	1.477	2908.077	56.5	16.31	4.129	2912.206	0.00	2.437	3.00	0.00	0.00	0 0.00
1.17	0.17111					.029290	0.03		0.920			0.00	
1140.17	2906.80	1.505	2908.306	56.5	15.91	3.931	2912.237	0.00	2.437	3.00	0.00	0.00	0 0.00
2.07	0.17111					.026645	0.06		0.920			0.00	
1142.24	2907.16	1.563	2908.718	56.5	15.17	3.572	2912.290	0.00	2.437	3.00	0.00	0.00	0 0.00
1.79	0.17111					.023489	0.04		0.920			0.00	
1144.03	2907.46	1.624	2909.085	56.5	14.46	3.249	2912.334	0.00	2.437	3.00	0.00	0.00	0 0.00
1.54	0.17111					.020726	0.03		0.920			0.00	

LICENSEE: SLATER HANIFAN GROUP

SKYE CANYON INFRASTRUCTURE - PHASE 2

BY OLYMPIA COMPANIES

EAGAN CREST (NORTH) - TRUNK STORM DRAIN

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
L/ELEM	SO					SF AVE	HF		NORM DEPTH			ZR	
1145.57	2907.72	1.688	2909.412	56.5	13.79	2.953	2912.365	0.00	2.437	3.00	0.00	0.00	0 0.00
1.32	0.17111					.018304	0.02		0.920			0.00	
1146.89	2907.95	1.755	2909.705	56.5	13.15	2.685	2912.390	0.00	2.437	3.00	0.00	0.00	0 0.00
1.11	0.17111					.016185	0.02		0.920			0.00	
1148.00	2908.14	1.827	2909.967	56.5	12.54	2.440	2912.407	0.00	2.437	3.00	0.00	0.00	0 0.00
JUNCT STR	0.00000					.016343	0.00					0.00	
1148.00	2908.14	1.716	2909.856	55.0	13.16	2.688	2912.544	0.00	2.407	3.00	0.00	0.00	0 0.00

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STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
15.56	0.02632								
1163.56	2908.55	1.774	2910.323	55.0	12.63	.016614	0.26	1.514	0.00
13.36	0.02632								
1176.92	2908.90	1.846	2910.747	55.0	12.05	.014837	0.20	1.514	0.00
9.71	0.02632								
1186.63	2909.16	1.923	2911.079	55.0	11.49	.013143	0.13	1.514	0.00
7.11	0.02632								
1193.74	2909.34	2.005	2911.349	55.0	10.95	.011666	0.08	1.514	0.00
5.10	0.02632								
1198.84	2909.48	2.093	2911.571	55.0	10.44	.010378	0.05	1.514	0.00
3.46	0.02632								
1202.30	2909.57	2.188	2911.757	55.0	9.96	.009259	0.03	1.514	0.00
2.05	0.02632								
1204.35	2909.62	2.291	2911.914	55.0	9.49	.008290	0.02	1.514	0.00
0.65	0.02632								
LICENSEE: SLATER HANIFAN GROUP									
SKYE CANYON INFRASTRUCTURE - PHASE 2									
BY OLYMPIA COMPANIES									
EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
BY OLYMPIA COMPANIES									
EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
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EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
BY OLYMPIA COMPANIES									
EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
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WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
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WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
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WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
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EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
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EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
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EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
BY OLYMPIA COMPANIES									
EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
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WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
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EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
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WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
BY OLYMPIA COMPANIES									
EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
BY OLYMPIA COMPANIES									
EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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F0515P									
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STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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F0515P									
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STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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F0515P									
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STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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BY OLYMPIA COMPANIES									
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F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
BY OLYMPIA COMPANIES									
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F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
BY OLYMPIA COMPANIES									
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F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
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EAGAN CREST (NORTH) - TRUNK STORM DRAIN									
F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
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F0515P									
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STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
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1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
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1205.00	2909.64	2.407	2912.047	55.0	9.05	1.271	2913.318	0.00	2.407
SKYE CANYON INFRASTRUCTURE - PHASE 2									
BY OLYMPIA COMPANIES									
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F0515P									
WATER SURFACE PROFILE LISTING									
STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD. EL.	SUPER ELEV	CRITICAL DEPTH
1205.00	2909.64	2.407	2912.047						

NOTES

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

Shaumber Main

	T1	SKYE CANYON INFRASTRUCTURE - PHASE 2 ADDENDUM T2 BY OLYMPIA COMPANIES	T3 SHAUMBER - TRUNK STORM DRAIN						
0									
	S0	1000.002991.19	36				2994.19		1
	R	1268.002992.98	36	.013					
	JX	1268.002992.98	36	30	.013	4.0	2993.48	90.00	1
	R	1389.002996.48	36	.013					
	JX	1389.002996.48	36	18	18.013	2.5	0.52997.982997.98	90.00	90.00
	R	1575.003000.30	36	.013					1
	JX	1575.003000.30	36	18	.013	2.0	3001.80	45.00	90.00
	R	1922.003006.06	36	.013					
	R	1984.003007.81	36	.013					
	SH	1984.003007.81	36						
	CD	18	4			1.5			
	CD	24	4			2.5			
	CD	30	4			3.			
	CD	36	4			3.5			
	CD	42	4			4.			
	CD	48	4			4.5			
	CD	54	4			5.			
	CD	60	4			5.5			
	CD	66	4			6.			
	CD	72	4			6.5			
	CD	78	4						

DATE: 11/19/2015
TIME: 10: 2

F051SP WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING																						PAGE 1
CARD	SECT	CHN	NO OF	AVE	PIER	HEIGHT	1	BASE	ZL	ZR	INV	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)	
CODE	NO	TYPE	PIERS	WIDTH	WIDTH	DIAMETER	WIDTH	DROP														
00	18	4				1.50																
00	24	4				2.00																
00	30	4				2.50																
00	36	4				3.00																
00	42	4				3.50																
00	48	4				4.00																
00	54	4				4.50																
00	60	4				5.00																
00	66	4				5.50																
00	72	4				6.00																
00	78	4				6.50																

F 0 5 1 5 P

PAGE NO 3

PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

SKYE CANYON INFRASTRUCTURE - PHASE 2 ADDENDUM

HEADING LINE NO 2 IS -

BY OLYMPIA COMPANIES

HEADING LINE NO 3 IS -

SHAUMBER - TRUNK STORM DRAIN
F 0 5 1 5 P

PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO	1	IS A	SYSTEM	OUTLET	U/S DATA	STATION	INVERT	SECT	W S ELEV	RADIUS	ANGLE	ANG PT	MAN H
						1000.00	2991.19	36	2994.19	0.00	0.00	0.00	1
ELEMENT NO	2	IS A	REACH	U/S DATA	STATION	INVERT	SECT	36					
					1268.00	2992.98	36	0.013					
ELEMENT NO	3	IS A	JUNCTION	U/S DATA	STATION	INVERT	SECT	36					
					1268.00	2992.98	36	0.013					
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING													
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING													
ELEMENT NO	4	IS A	REACH	U/S DATA	STATION	INVERT	SECT	36					
					1389.00	2996.48	36	0.013					
ELEMENT NO	5	IS A	JUNCTION	U/S DATA	STATION	INVERT	SECT	36					
					1389.00	2996.48	36	0.013					
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING													
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING													
ELEMENT NO	6	IS A	REACH	U/S DATA	STATION	INVERT	SECT	36					
					1573.00	3000.50	36	0.013					
ELEMENT NO	7	IS A	JUNCTION	U/S DATA	STATION	INVERT	SECT	36					
					1573.00	3000.50	36	0.013					
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING													
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING													
ELEMENT NO	8	IS A	REACH	U/S DATA	STATION	INVERT	SECT	36					
					1922.00	3006.06	36	0.013					

Page 1

U-SHA.OUT

ELEMENT NO 9 IS A REACH U/S DATA STATION INVERT SECT * * * * *
 1984.00 3007.81 36 F 0 5 1 5 P N 0.013
 RADIUS ANGLE ANG PT MAN H
 0.00 0.00 0.00 0.00 0.00
 PAGE NO 3

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 10 IS A SYSTEM HEADWORKS U/S DATA STATION INVERT SECT * * * * *
 1984.00 3007.81 36 W S ELEV 0.00
 NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
 ** WARNING NO. 2 ** - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS. W.S.ELEV = INV + DC +
 LICENSEE: SLATER HANIFAN GROUP F0515P WATER SURFACE PROFILE LISTING
 SKYE CANYON INFRASTRUCTURE - PHASE 2 ADDENDUM
 BY OLYMPIA COMPANIES
 SHAUMBER - TRUNK STORM DRAIN

PAGE 1

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 AVBPR PIER
L/ELEM	SO					SF AVE	HF		NORM DEPTH				
1000.00	2991.19	3.000	2994.190	75.0	10.61	1.748	2995.938	0.00	2.719	3.00	0.00	0.00	0 0.00
268.00	0.00668					.012644	3.39		3.000				
1268.00	2992.98	4.686	2997.666	75.0	10.61	1.748	2999.414	0.00	2.719	3.00	0.00	0.00	0 0.00
JUNCT STR	0.00000					.011988	0.00						
1268.00	2992.98	5.049	2998.029	71.0	10.04	1.566	2999.595	0.00	2.671	3.00	0.00	0.00	0 0.00
94.38	0.02893					.011331	1.07		1.720				
1362.38	2995.71	3.451	2999.161	71.0	10.04	1.566	3000.727	0.00	2.671	3.00	0.00	0.00	0 0.00
HYDRAULIC JUMP													
1362.38	2995.71	1.980	2997.690	71.0	14.34	3.193	3000.883	0.00	2.671	3.00	0.00	0.00	0 0.00
11.01	0.02893					.018417	0.20		1.720				
1373.39	2996.03	2.022	2998.050	71.0	14.01	3.046	3001.096	0.00	2.671	3.00	0.00	0.00	0 0.00
15.61	0.02893					.016910	0.26		1.720				
1389.00	2996.48	2.111	2998.591	71.0	13.36	2.770	3001.361	0.00	2.671	3.00	0.00	0.00	0 0.00
JUNCT STR	0.00000					.017849	0.00						
1389.00	2996.48	1.894	2998.374	68.0	14.46	3.246	3001.620	0.00	2.630	3.00	0.00	0.00	0 0.00
97.80	0.02054					.018978	1.86		1.870				
1486.80	2998.49	1.948	3000.437	68.0	13.99	3.040	3003.477	0.00	2.630	3.00	0.00	0.00	0 0.00
57.43	0.02054					.017189	0.99		1.870				
1544.23	2999.67	2.032	3001.700	68.0	13.34	2.764	3004.464	0.00	2.630	3.00	0.00	0.00	0 0.00
30.77	0.02054					.015305	0.47		1.870				
1575.00	3000.30	2.122	3002.422	68.0	12.72	2.512	3004.934	0.00	2.630	3.00	0.00	0.00	0 0.00
JUNCT STR	0.00000					.015527	0.00						

PAGE 2

WATER SURFACE PROFILE LISTING
 SKYE CANYON INFRASTRUCTURE - PHASE 2 ADDENDUM
 BY OLYMPIA COMPANIES
 SHAUMBER - TRUNK STORM DRAIN

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 AVBPR PIER
 Page 2

U-SHA. OUT

L/ELEM	SO	INVERT	DEPTH	W.S.	Q	VEL	VEL	HEAD	ENERGY	SUPER	CRITICAL	NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO	AVBPR
		ELEV	OF FLOW	ELEV					GRD. EL.	ELEV	DEPTH					PIER	
1575.00	3000.30	1.970	3002.270	66.0	13.41	2.793	3005.063	0.00	2.601	1.970	0.00	0.00	0.00	0.00	0.00	0	0.00
42.38	0.01660																
1617.38	3001.00	1.970	3002.974	66.0	13.41	2.793	3005.767	0.00	2.601	1.970	0.00	0.00	0.00	0.00	0.00	0	0.00
164.65	0.01660																
1782.03	3003.74	1.955	3005.692	66.0	13.53	2.843	3008.535	0.00	2.601	1.970	0.00	0.00	0.00	0.00	0.00	0	0.00
139.97	0.01660																
1922.00	3006.06	1.876	3007.936	66.0	14.19	3.127	3011.063	0.00	2.601	1.970	0.00	0.00	0.00	0.00	0.00	0	0.00
1.26	0.02823																
1923.26	3006.10	1.880	3007.976	66.0	14.16	3.112	3011.088	0.00	2.601	1.655	0.00	0.00	0.00	0.00	0.00	0	0.00
19.86	0.02823																
1943.12	3006.66	1.959	3008.615	66.0	13.50	2.829	3011.444	0.00	2.601	1.655	0.00	0.00	0.00	0.00	0.00	0	0.00
14.11	0.02823																
1957.23	3007.05	2.043	3009.097	66.0	12.87	2.572	3011.669	0.00	2.601	1.655	0.00	0.00	0.00	0.00	0.00	0	0.00
10.18	0.02823																
1967.41	3007.34	2.134	3009.476	66.0	12.27	2.338	3011.814	0.00	2.601	1.655	0.00	0.00	0.00	0.00	0.00	0	0.00
7.38	0.02823																
1974.79	3007.55	2.232	3009.782	66.0	11.70	2.126	3011.908	0.00	2.601	1.655	0.00	0.00	0.00	0.00	0.00	0	0.00
5.06	0.02823																
1979.85	3007.69	2.340	3010.033	66.0	11.15	1.932	3011.965	0.00	2.601	1.655	0.00	0.00	0.00	0.00	0.00	0	0.00
3.10	0.02823																
1982.95	3007.78	2.460	3010.240	66.0	10.64	1.757	3011.997	0.00	2.601	1.655	0.00	0.00	0.00	0.00	0.00	0	0.00
1.05	0.02823																

LICENSEE: SLATER HANIFAN GROUP
 SKYE CANYON INFRASTRUCTURE - PHASE 2 ADDENDUM
 BY OLYMPIA COMPANIES
 SHAUMBER - TRUNK STORM DRAIN

L/ELEM	SO	INVERT	DEPTH	W.S.	Q	VEL	VEL	HEAD	ENERGY	SUPER	CRITICAL	NORM DEPTH	HGT/ DIA	BASE/ ID NO.	ZL	NO	AVBPR
		ELEV	OF FLOW	ELEV					GRD. EL.	ELEV	DEPTH					PIER	
1984.00	3007.81	2.601	3010.411	66.0	10.14	1.596	3012.007	0.00	2.601	3.00	0.00	0.00	0.00	0.00	0	0.00	0.00

SKYE CANYON INFRASTRUCTURE - PHASE 2 ADDENDUM
 BY OLYMPIA COMPANIES
 SHAUMBER - TRUNK STORM DRAIN

1000.00	.I																
1020.08	.																
1040.16	.																
1060.24	.																
1080.33	.																
1100.41	.																
1120.49	.																
1140.57	.																
1160.65	.																

APPENDIX D

Revised Exhibits

APPENDIX E

CD of Electronic Files & Revised Improvement Plans