OUR REF: 16-254-210602-01A RP

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Network simulation/analysis Report

For

1:1 year, 1:30 year, 1:100year & 1:100+40%

Rainfall Events

For

Fitzroy Park Development

2nd June 2021

Rev.A 05th November 2021

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CONTENTS

16-254-210602-01A

Revision A:

S1 & S2 drainage network simulation for the 1:30yr and 1:100yr + 40% storm events provided in Appendix B.

Revised attenuation calculations to include full site area is provided in Appendix C

INTRODUCTION

This report has been produced to support documentation already submitted in relation to the proposed development at Fitzroy Park. Refer to Coyle Kennedy report 16-254-190227-01RP rev C

This report, in conjunction with calculations and relevant drawings included in the appendices demonstrates that the surface water network is more than adequate to deal the expected runoff from the various storm events - 1:1 year, 1:30 year, 1:100 year & 1:100 + 40% year rainfall events.

SURFACE WATER NETWORK ANALYSIS

For surface water drainage, the surface water networks have been divided up as follows;

- (i) Storm water network reference S1 & S2, taking the runoff from the paved carparking & road areas & discharging to the combined sewer running beneath Fitzroy Park via attenuation and a hydrocarbon interceptor.
- (ii) Storm water network reference S3, taking runoff from proposed blue/green roofs, paved areas & footpaths discharging through the attenuation/infiltration trench via percolation within the existing made ground to the Heath.

Refer to Figure 1 and Figure 2 on the following pages for diagrammatic locations of Storm Water Networks S1, S2 & S3.

Camden Co. Council have requested our client to demonstrate,

- the hydraulic performance of the proposed drainage network

We have used Autodesk Storm & Sanitary Analysis to run simulations for the 1:1yr, 1:30yr, 1:100yr & 1:100yr + 40% rainfall events for the surface water drainage networks. We have used rainfall data from the Met Office in our simulation model.

For the purposes of analysis for the green roofs Plot 1 to Plot 5 we have taken a figure of 0.05l/s runoff for the largest roof which is Plot 5. This figure is the equivalent of 2.0l/s per hectare and this value is applied to all the green roofs to take account of attenuation at source. Refer to Figure 2 for location of green roofs.

The resulting calculations show there is no surcharging of the surface water networks at any point during the simulation. We have included sections through the network at various times during the analysis for the 1:30yr and 1:100yr + 40% storm events. These sections and the calculations for all the rainfall events are included in Appendix A for S3 drainage network & Appendix B for S1 & S2 drainage networks.

Revised attenuation calculations to include the full site area are provided in Appendix C,

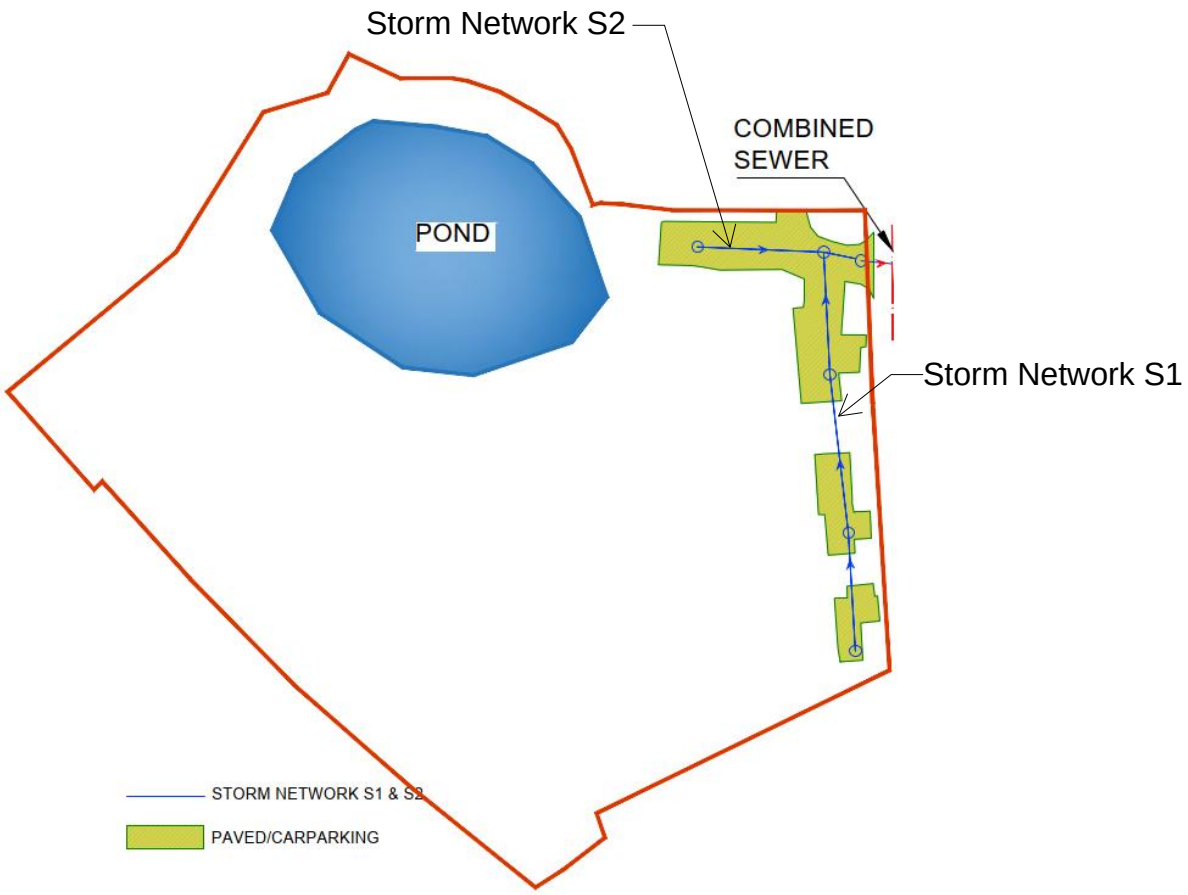

Figure 1.

Storm Network S1 & S2 with contributing paved carparking & road areas discharging to the combined sewer running beneath Fitzroy Park.

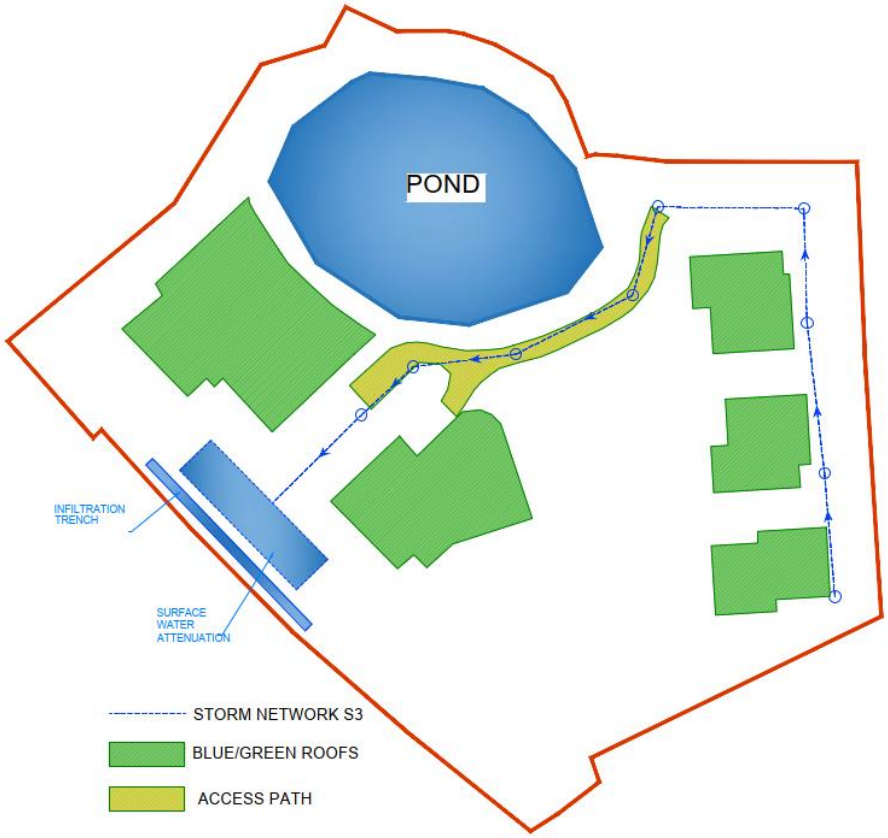

Figure 2.

Plan indicating Storm network S3 with contributing areas, Blue/Green Roofs, Access Path, Attenuation and Infiltration trench location.

Appendix A

Surface Water Analysis

Calculations and Sections

Autodesk® Storm and Sanitary Analysis 2016 - Version 13.4.121 (Build 0)

****
Project Description
****
File Name ..... 16-254-Fitzroy ParkS3 100+40.SPF
Description ..... 16-254 Fitzroy Park Development
1:100YR + 40%
STORM NETWORK S3

****
Analysis Options
****
Flow Units ..... LPS
Subbasin Hydrograph Method. Modified Rational
Time of Concentration..... Kirpich
Return Period..... 100 years
Storm Duration..... 360 min
Link Routing Method ..... Hydrodynamic
Storage Node Exfiltration.. Constant rate, wetted area
Starting Date JUN-01-2021 00:00:00
Ending Date JUN-02-2021 00:01:00
Report Time Step 00:00:10

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.008	86.100
Continuity Error (%)	1.000	

Flow Routing Continuity	Volume hectare-m	Volume Mliters
External Inflow	0.000	0.000
External Outflow	0.002	0.021
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Path-5

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Path-6

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot 5-Paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot.4-Paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.00	-	0.90
Composite Area & Weighted Runoff Coeff.	0.00		0.90

Subbasin Plot1

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.06
Composite Area & Weighted Runoff Coeff.	0.01		0.06

Subbasin Plot2

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.06
Composite Area & Weighted Runoff Coeff.	0.01		0.06

Subbasin Plot3

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.06
Composite Area & Weighted Runoff Coeff.	0.01		0.06

Subbasin Plot4

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.02	-	0.06
Composite Area & Weighted Runoff Coeff.	0.02		0.06

Subbasin Plot5

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.02	-	0.06
Composite Area & Weighted Runoff Coeff.	0.02		0.06

****
Kirpich Time of Concentration Computations Report

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

        Tc = (0.01947 * (L^0.77) * (S^-0.385))

        Where:

        Tc = Time of Concentration (min)
        L  = Flow length (m)
        S = Slope (m/m)

------------------
Subbasin Path-5
------------------

        Flow length (m):                    5.00
        Slope (%):                          0.50
        Computed TOC (minutes):             0.52

------------------
Subbasin Path-6
------------------

        Flow length (m):                   10.00
        Slope (%):                          0.50
        Computed TOC (minutes):             0.88

------------------------
Subbasin Plot 5-Paved
------------------------

        Flow length (m):                   10.00
        Slope (%):                          0.50
        Computed TOC (minutes):             0.88

------------------------
Subbasin Plot.4-Paved
------------------------

        Flow length (m):                   20.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.50

-----------------
Subbasin Plot1
-----------------

        Flow length (m):                   15.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.20

-----------------
Subbasin Plot2
-----------------

        Flow length (m):                   15.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.20

-----------------
Subbasin Plot3
-----------------

        Flow length (m):                   15.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.20
```

Subbasin Plot4

Flow length (m):	15.00
Slope (%):	0.50
Computed TOC (minutes):	1.20

Subbasin Plot5

Flow length (m):	15.00
Slope (%):	0.50
Computed TOC (minutes):	1.20

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip mm	Rainfall Intensity mm/hr	Total Runoff mm	Peak Runoff LPS	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
Path-5	86.10	14.35	77.49	0.18	0.900	0	00:05:00
Path-6	86.10	14.35	77.49	0.18	0.900	0	00:05:00
Plot 5-Paved	86.10	14.35	77.49	0.33	0.900	0	00:05:00
Plot.4-Paved	86.10	14.35	77.49	0.10	0.900	0	00:05:00
Plot1	86.10	14.35	5.17	0.03	0.060	0	00:05:00
Plot2	86.10	14.35	5.17	0.03	0.060	0	00:05:00
Plot3	86.10	14.35	5.17	0.03	0.060	0	00:05:00
Plot4	86.10	14.35	5.17	0.04	0.060	0	00:05:00
Plot5	86.10	14.35	5.17	0.05	0.060	0	00:05:00

****
Node Depth Summary
****

Node ID	Average Depth Attained m	Maximum Depth Attained m	Maximum HGL Attained m	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume ha-mm	Total Time Flooded minutes	Retention Time hh:mm:ss
S10	0.00	0.01	81.07	0	03:30	0	0	0:00:00
S11	0.00	0.01	80.31	0	03:34	0	0	0:00:00
S12	0.00	0.01	79.23	0	03:00	0	0	0:00:00
S13	0.00	0.01	78.43	0	03:00	0	0	0:00:00
S14	0.00	0.02	77.67	0	01:26	0	0	0:00:00
S15	0.02	0.08	77.58	0	06:00	0	0	0:00:00
S16(Outfall)	0.03	0.11	77.57	0	06:00	0	0	0:00:00
S6	0.00	0.00	82.80	0	00:56	0	0	0:00:00
S7	0.00	0.01	82.58	0	01:04	0	0	0:00:00
S8	0.00	0.01	82.42	0	02:55	0	0	0:00:00
S9	0.00	0.01	82.29	0	02:50	0	0	0:00:00
Outfall(Swale)	0.00	0.00	77.45	0	00:00	0	0	0:00:00
Stor-S3	0.01	0.03	77.58	0	06:01	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow LPS	Peak Inflow LPS	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow LPS	Time of Peak Flooding Occurrence days	Time of Peak Flooding Occurrence hh:mm
S10	JUNCTION	0.00	0.08	0	02:38	0.00		
S11	JUNCTION	0.18	0.27	0	02:12	0.00		
S12	JUNCTION	0.00	0.27	0	03:22	0.00		
S13	JUNCTION	0.18	0.45	0	01:16	0.00		
S14	JUNCTION	0.00	0.45	0	01:08	0.00		
S15	JUNCTION	0.53	0.98	0	01:26	0.00		
S16(Outfall)	JUNCTION	0.00	0.91	0	06:01	0.00		
S6	JUNCTION	0.03	0.03	0	00:05	0.00		
S7	JUNCTION	0.03	0.06	0	00:56	0.00		
S8	JUNCTION	0.03	0.08	0	01:04	0.00		
S9	JUNCTION	0.00	0.08	0	05:13	0.00		
Outfall(Swale)	OUTFALL	0.00	0.91	0	06:00	0.00		
Stor-S3	STORAGE	0.00	0.17	0	00:23	0.00		

Storage Node Summary

Storage Node ID	Maximum Ponded Volume 1000 m³	Maximum Ponded Volume (%)	Time of Max Ponded Volume days hh:mm	Average Ponded Volume 1000 m³	Average Ponded Volume (%)	Maximum Storage Node Outflow LPS	Maximum Exfiltration Rate cmm	Time of Max. Exfiltration Rate hh:mm:ss	Total Exfiltrated Volume 1000 m³
Stor-S3	0.002	4	0 06:01	0.001	1	0.70	0.00	0:00:00	0.000

Outfall Loading Summary

Outfall Node ID	Flow Frequency (%)	Average Flow LPS	Peak Inflow LPS
Outfall(Swale)	39.81	0.60	0.91
System	39.81	0.60	0.91

Link Flow Summary

Link ID	Element Type	Time of Peak	Maximum Flow	Length	Peak Flow Velocity	Design Flow	Ratio of Peak to Design Flow	Ratio of Total Reported Flow

	Type	Peak Flow	Velocity	Factor	during	Flow	Maximum	Maximum	Time	Condition
		Occurrence	Attained		Analysis	Capacity	/Design	Flow	Surcharged	
		days hh:mm	m/sec		LPS	LPS	Flow	Depth	minutes	
S3.000	CONDUIT	0 00:56	0.13	1.00	0.03	17.15	0.00	0.04	0	Calculated
S3.001	CONDUIT	0 01:04	0.15	1.00	0.06	13.28	0.00	0.05	0	Calculated
S3.002	CONDUIT	0 05:13	0.26	1.00	0.08	13.42	0.01	0.05	0	Calculated
S3.003	CONDUIT	0 02:38	0.45	1.00	0.08	36.85	0.00	0.03	0	Calculated
S3.004	CONDUIT	0 02:12	0.36	1.00	0.08	36.60	0.00	0.05	0	Calculated
S3.005	CONDUIT	0 03:22	0.60	1.00	0.27	36.73	0.01	0.06	0	Calculated
S3.006	CONDUIT	0 01:16	0.52	1.00	0.27	35.61	0.01	0.07	0	Calculated
S3.007	CONDUIT	0 01:08	0.64	1.00	0.45	41.88	0.01	0.10	0	Calculated
S3.008	CONDUIT	0 01:26	0.21	1.00	0.45	13.53	0.03	0.31	0	Calculated
S3.009	CONDUIT	0 06:01	0.37	1.00	0.91	10.98	0.08	0.63	0	Calculated
Storage Link	CONDUIT	0 06:07	0.29	1.00	0.70	13.20	0.05	0.33	0	Calculated
Outfall Orifice	ORIFICE	0 06:00			0.91			1.00		

```
  ********************************
  Highest Flow Instability Indexes
  ********************************
  All links are stable.




  Analysis began on:  Wed Jun  2 10:17:11 2021
  Analysis ended on:  Wed Jun  2 10:17:15 2021
  Total elapsed time: 00:00:04
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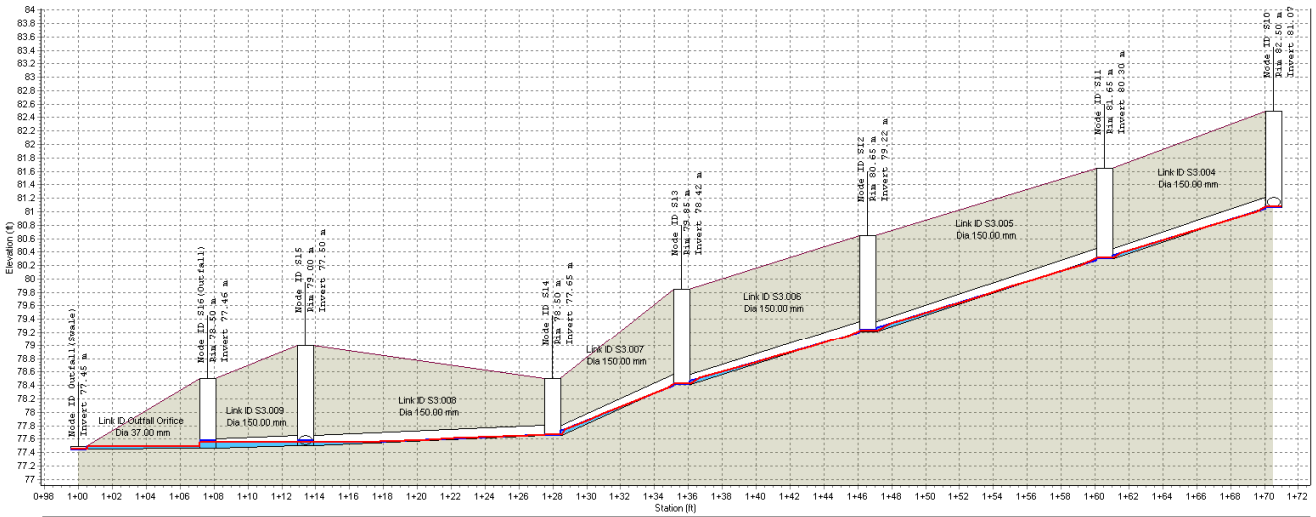
Profile Plot
S3.004 - Outfall

06/01/2021 01:00:00



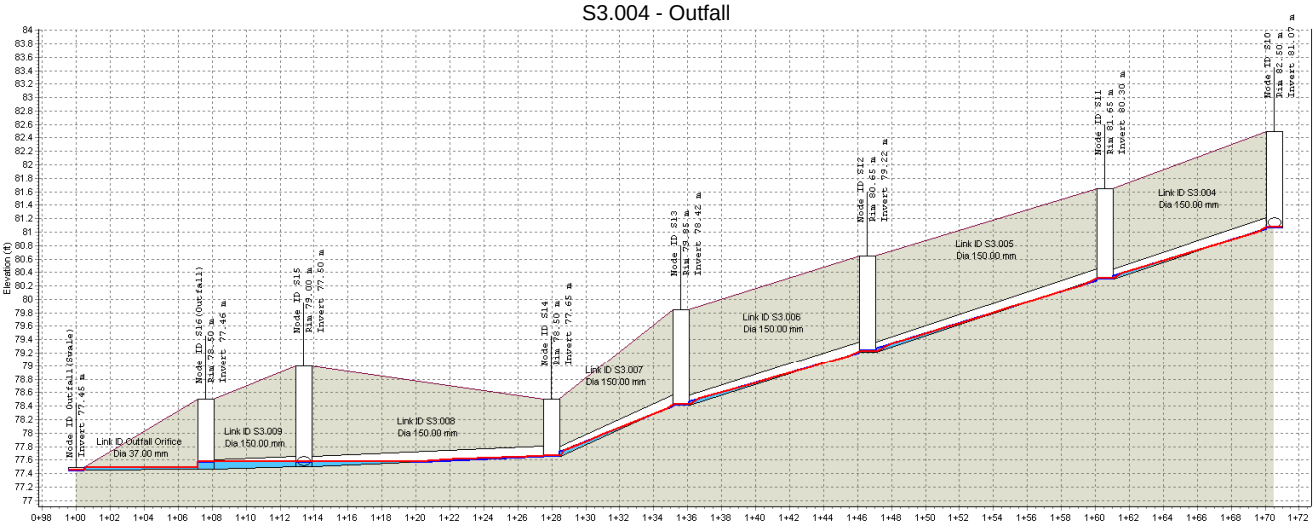
Node ID:	Outfall(Swale)	S16(Outfall)	S15	S14	S13	S12	S11	S10
Rim (m):		78.50	79.00	78.50	79.85	80.65	81.65	82.50
Invert (m):	77.45	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Min Pipe Cover (m):		0.00	1.35	0.70	1.28	1.28	1.20	1.28
Max HGL (m):	77.45	77.57	77.58	77.67	78.43	79.23	80.31	81.07

Link ID:	Outfall Orifice	S3.009	S3.008	S3.007	S3.006	S3.005	S3.004
Length (m):		5.78	14.55	7.61	10.99	14.01	9.95
Dia (mm):	37.00	150.00	150.00	150.00	150.00	150.00	150.00
Slope (m/m):		0.0069	0.0105	0.1007	0.0728	0.0774	0.0769
Up Invert (m):	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Dn Invert (m):	77.45	77.46	77.50	77.65	78.42	79.22	80.30
Max Q (lps):	0.91	0.91	0.45	0.45	0.27	0.27	0.08
Max Vel (m/s):	0.00	0.37	0.21	0.64	0.52	0.60	0.36
Max Depth (m):	0.00	0.09	0.05	0.01	0.01	0.01	0.01

1:100yr +40% 6hr Storm Analysis - Elapsed Time 01:00:00

Profile Plot
S3.004 - Outfall

06/01/2021 06:00:00



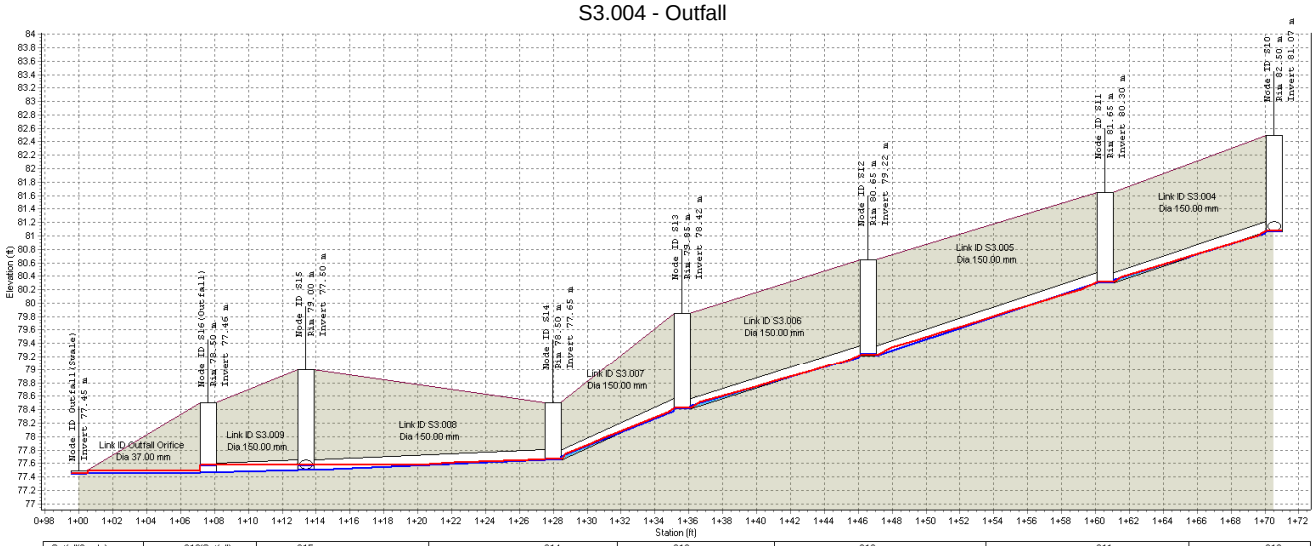
Node ID:	Outfall(Swale)	S16(Outfall)	S15	S14	S13	S12	S11	S10
Rim (m):		78.50	79.00	78.50	79.85	80.65	81.65	82.50
Invert (m):	77.45	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Min Pipe Cover (m):		0.00	1.35	0.70	1.28	1.28	1.20	1.28
Max HGL (m):	77.45	77.57	77.58	77.67	78.43	79.23	80.31	81.07

Link ID:	Outfall Orifice	S3.009	S3.008	S3.007	S3.006	S3.005	S3.004
Length (m):		5.78	14.55	7.61	10.99	14.01	9.95
Dia (mm):	37.00	150.00	150.00	150.00	150.00	150.00	150.00
Slope (m/m):		0.0069	0.0105	0.1007	0.0728	0.0774	0.0769
Up Invert (m):	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Dn Invert (m):	77.45	77.46	77.50	77.65	78.42	79.22	80.30
Max Q (lps):	0.91	0.91	0.45	0.45	0.27	0.27	0.08
Max Vel (m/s):	0.00	0.37	0.21	0.64	0.52	0.60	0.36
Max Depth (m):	0.00	0.09	0.05	0.01	0.01	0.01	0.01

1:100yr +40% 6hr Storm Analysis - Elapsed Time 06:00:00

Profile Plot
S3.004 - Outfall

06/01/2021 12:00:00



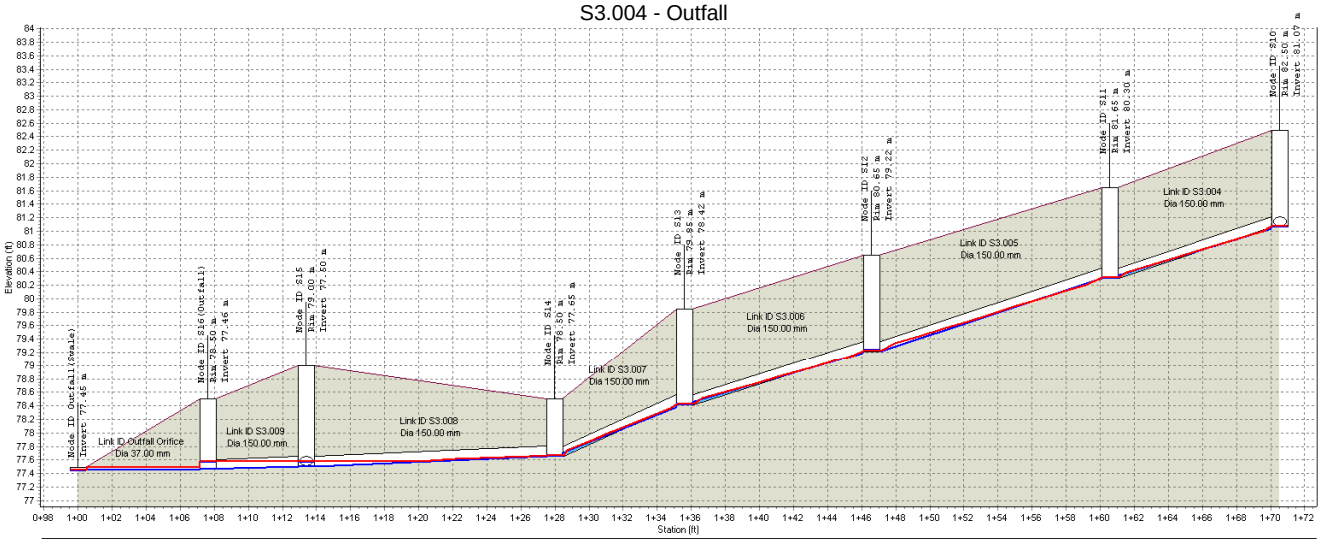
Node ID:	Outfall(Swale)	S16(Outfall)	S15	S14	S13	S12	S11	S10
Rim (ft):		78.50	79.00	78.50	79.85	80.65	81.65	82.50
Invert (ft):	77.45	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Min Pipe Cover (ft):		0.00	1.35	0.70	1.28	1.28	1.20	1.28
Max HGL (ft):	77.45	77.57	77.58	77.67	78.43	79.23	80.31	81.07

Link ID:	Outfall Orifice	S3.009	S3.008	S3.007	S3.006	S3.005	S3.004
Length (ft):		5.78	14.55	7.61	10.99	14.01	9.95
Dia (mm):	37.00	150.00	150.00	150.00	150.00	150.00	150.00
Slope (ft/ft):		0.0069	0.0105	0.1007	0.0728	0.0774	0.0769
Up Invert (ft):	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Dn Invert (ft):	77.45	77.46	77.50	77.65	78.42	79.22	80.30
Max Q (lps):	0.91	0.91	0.45	0.45	0.27	0.27	0.08
Max Vel (ft/s):	0.00	0.37	0.21	0.64	0.52	0.60	0.36
Max Depth (ft):	0.00	0.09	0.05	0.01	0.01	0.01	0.01

1:100yr +40% 6hr Storm Analysis - Elapsed Time 12:00:00

Profile Plot
S3.004 - Outfall

06/02/2021 00:00:00



Node ID:	Outfall(Swale)	S16(Outfall)	S15	S14	S13	S12	S11	S10
Rim (ft):		78.50	79.00	78.50	79.85	80.65	81.65	82.50
Invert (ft):	77.45	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Min Pipe Cover (ft):		0.00	1.35	0.70	1.28	1.28	1.20	1.28
Max HGL (ft):	77.45	77.57	77.58	77.67	78.43	79.23	80.31	81.07

Link ID:	Outfall Orifice	S3.009	S3.008	S3.007	S3.006	S3.005	S3.004
Length (ft):		5.78	14.55	7.61	10.99	14.01	9.95
Dia (mm):	37.00	150.00	150.00	150.00	150.00	150.00	150.00
Slope (ft/ft):		0.0069	0.0105	0.1007	0.0728	0.0774	0.0769
Up Invert (ft):	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Dn Invert (ft):	77.45	77.46	77.50	77.65	78.42	79.22	80.30
Max Q (lps):	0.91	0.91	0.45	0.45	0.27	0.27	0.08
Max Vel (ft/s):	0.00	0.37	0.21	0.64	0.52	0.60	0.36
Max Depth (ft):	0.00	0.09	0.05	0.01	0.01	0.01	0.01

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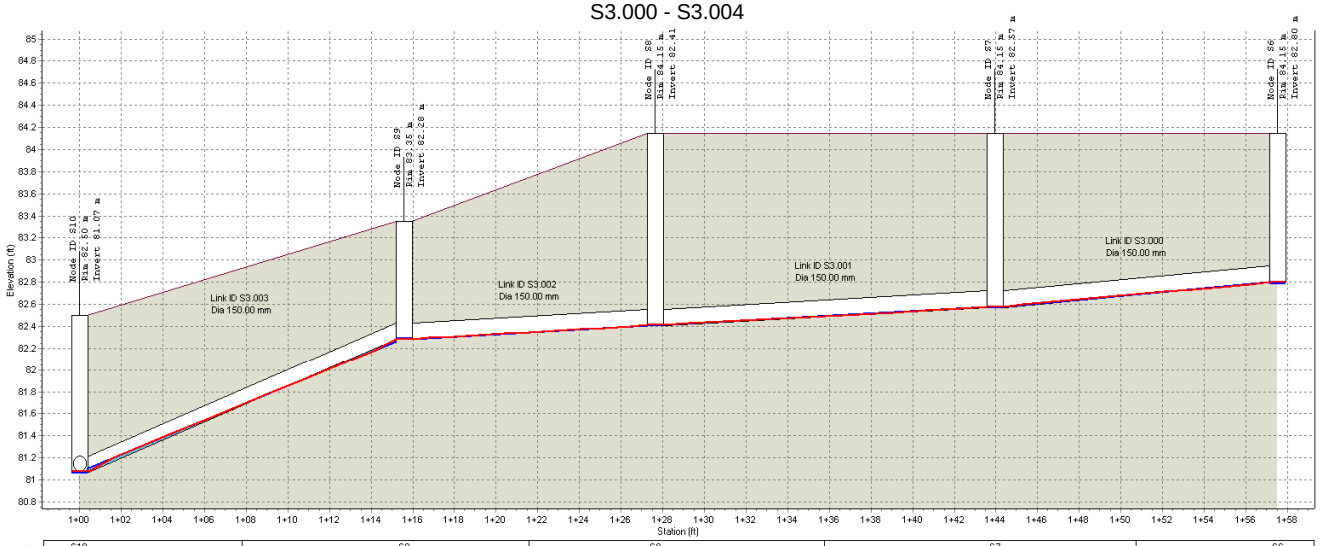
Profile Plot
S3.000 - S3.004

06/01/2021 01:00:00



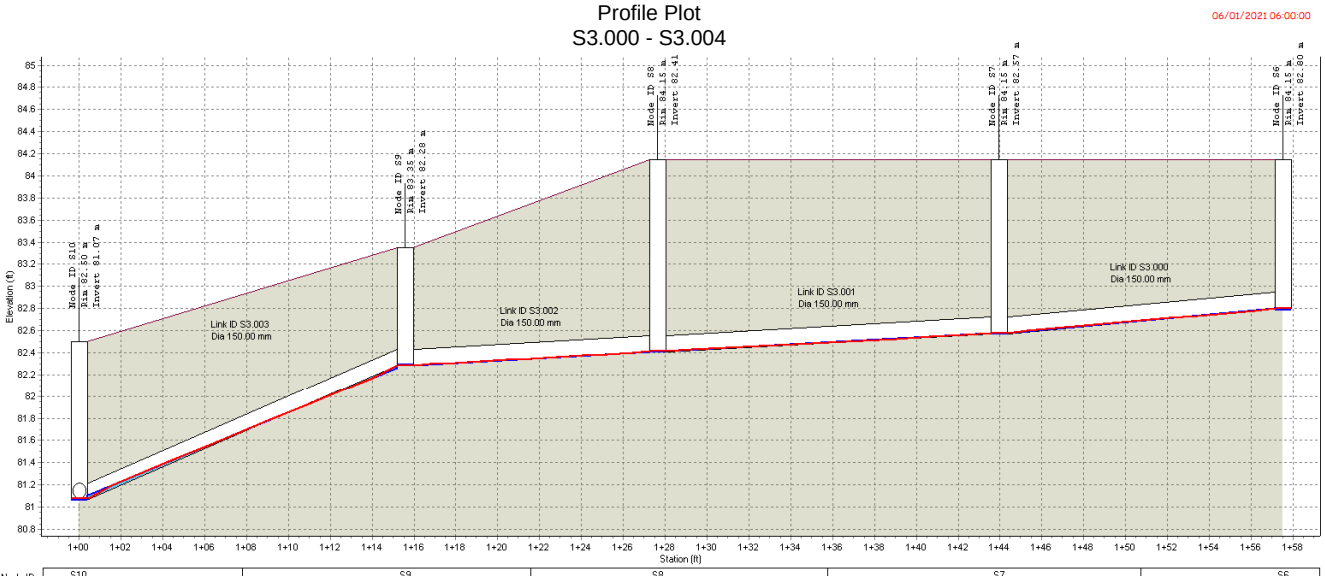
Node ID:	S10	S9	S8	S7	S6
Rim (m):	82.50	83.35	84.15	84.15	84.15
Invert (m):	81.07	82.28	82.41	82.57	82.80
Min Pipe Cover (m):	1.28	0.92	1.59	1.43	1.20
Max HGL (m):	81.07	82.29	82.42	82.58	82.80

Link ID:	S3.003	S3.002	S3.001	S3.000
Length (m):	15.55	12.09	16.30	13.57
Dia (mm):	150.00	150.00	150.00	150.00
Slope (m/m):	0.0779	0.0103	0.0101	0.0169
Up Invert (m):	82.28	82.41	82.57	82.80
Dn Invert (m):	81.07	82.28	82.41	82.57
Max Q (lps):	0.08	0.08	0.06	0.03
Max Vel (m/s):	0.45	0.26	0.15	0.13
Max Depth (m):	0.01	0.01	0.01	0.01

1:100yr +40% 6hr Storm Analysis - Elapsed Time 01:00:00

Profile Plot
S3.000 - S3.004

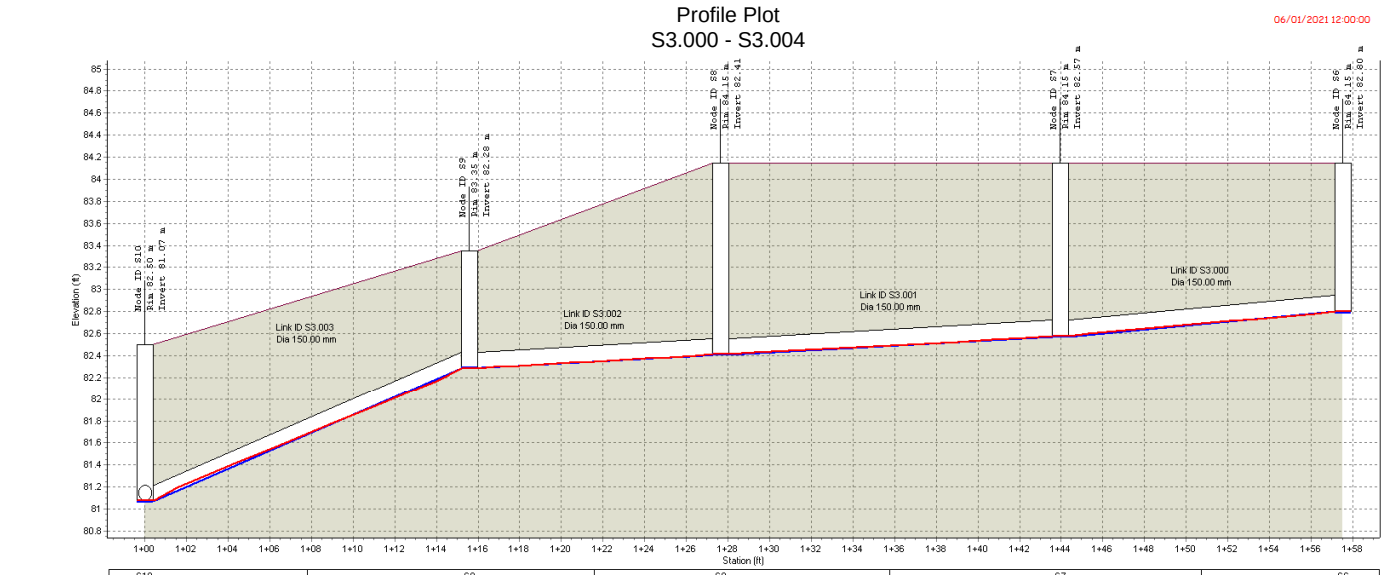
06/01/2021 06:00:00



Node ID:	S10	S9	S8	S7	S6
Rim (m):	82.50	83.35	84.15	84.15	84.15
Invert (m):	81.07	82.28	82.41	82.57	82.80
Min Pipe Cover (m):	1.28	0.92	1.59	1.43	1.20
Max HGL (m):	81.07	82.29	82.42	82.58	82.80

Link ID:	S3.003	S3.002	S3.001	S3.000
Length (m):	15.55	12.09	16.30	13.57
Dia (mm):	150.00	150.00	150.00	150.00
Slope (m/m):	0.0779	0.0103	0.0101	0.0169
Up Invert (m):	82.28	82.41	82.57	82.80
Dn Invert (m):	81.07	82.28	82.41	82.57
Max Q (lps):	0.08	0.08	0.06	0.03
Max Vel (m/s):	0.45	0.26	0.15	0.13
Max Depth (m):	0.01	0.01	0.01	0.01

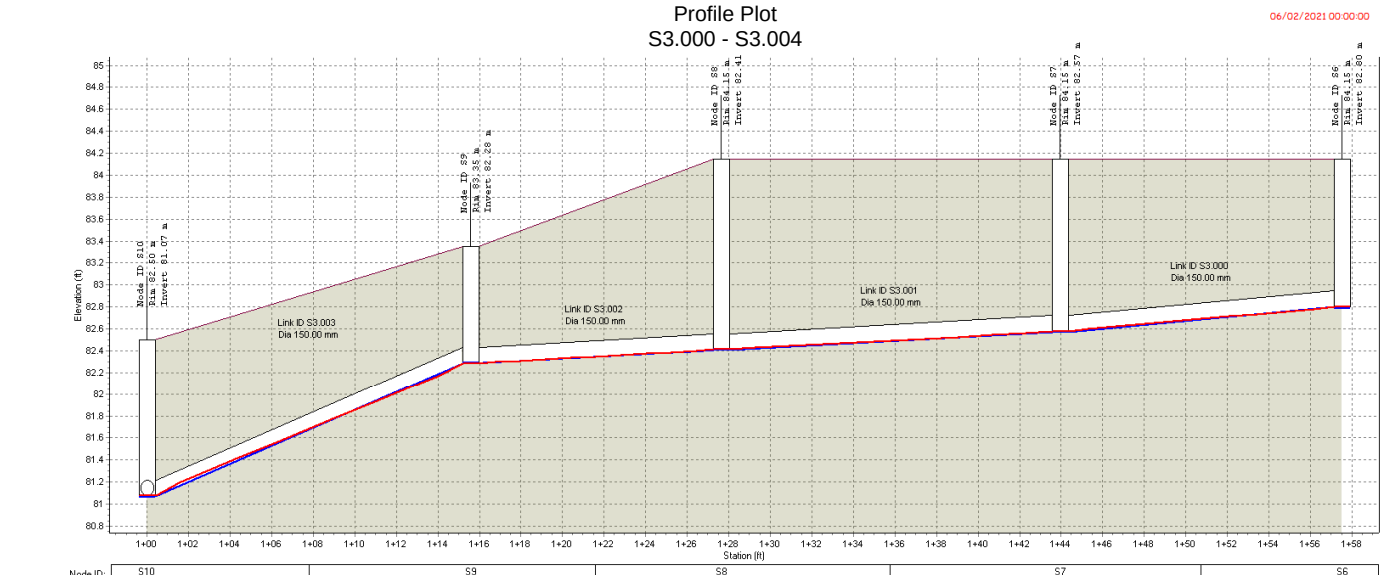
1:100yr +40% 6hr Storm Analysis - Elapsed Time 06:00:00



Node ID:	S10	S9	S8	S7	S6
Rim (m):	82.50	83.35	84.15	84.15	84.15
Invert (m):	81.07	82.28	82.41	82.57	82.80
Min Pipe Cover (m):	1.28	0.92	1.59	1.43	1.20
Max HGL (m):	81.07	82.29	82.42	82.58	82.80

Link ID:	S3.003	S3.002	S3.001	S3.000
Length (m):	15.55	12.09	16.30	13.57
Dia (mm):	150.00	150.00	150.00	150.00
Slope (m/m):	0.0779	0.0103	0.0101	0.0169
Up Invert (m):	82.28	82.41	82.57	82.80
Dn Invert (m):	81.07	82.28	82.41	82.57
Max Q (lps):	0.08	0.08	0.06	0.03
Max Vel (m/s):	0.45	0.26	0.15	0.13
Max Depth (m):	0.01	0.01	0.01	0.01

1:100yr +40% 6hr Storm Analysis - Elapsed Time 12:00:00



Node ID:	S10	S9	S8	S7	S6
Rim (m):	82.50	83.35	84.15	84.15	84.15
Invert (m):	81.07	82.28	82.41	82.57	82.80
Min Pipe Cover (m):	1.28	0.92	1.59	1.43	1.20
Max HGL (m):	81.07	82.29	82.42	82.58	82.80

Link ID:	S3.003	S3.002	S3.001	S3.000
Length (m):	15.55	12.09	16.30	13.57
Dia (mm):	150.00	150.00	150.00	150.00
Slope (m/m):	0.0779	0.0103	0.0101	0.0169
Up Invert (m):	82.28	82.41	82.57	82.80
Dn Invert (m):	81.07	82.28	82.41	82.57
Max Q (lps):	0.08	0.08	0.06	0.03
Max Vel (m/s):	0.45	0.26	0.15	0.13
Max Depth (m):	0.01	0.01	0.01	0.01

1:100yr +40% 6hr Storm Analysis - Elapsed Time 24:00:00

Autodesk® Storm and Sanitary Analysis 2016 - Version 13.4.121 (Build 0)

****
Project Description
****

File Name 16-254-Fitzroy ParkS3 100.SPF
Description ..... 16-254 Fitzroy Park Development
1:100YR
STORM NETWORK S3

****
Analysis Options
****

Flow Units ..... LPS
Subbasin Hydrograph Method. Modified Rational
Time of Concentration..... Kirpich
Return Period..... 100 years
Storm Duration..... 360 min
Link Routing Method ..... Hydrodynamic
Storage Node Exfiltration.. Constant rate, wetted area
Starting Date JUN-01-2021 00:00:00
Ending Date JUN-02-2021 00:01:00
Report Time Step 00:00:10

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.006	61.500
Continuity Error (%)	1.000	

Flow Routing Continuity	Volume hectare-m	Volume Mliters
External Inflow	0.000	0.000
External Outflow	0.002	0.016
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Path-5

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Path-6

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot 5-Paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot.4-Paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.00	-	0.90
Composite Area & Weighted Runoff Coeff.	0.00		0.90

Subbasin Plot1

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.09
Composite Area & Weighted Runoff Coeff.	0.01		0.09

Subbasin Plot2

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.09
Composite Area & Weighted Runoff Coeff.	0.01		0.09

Subbasin Plot3

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.09
Composite Area & Weighted Runoff Coeff.	0.01		0.09

Subbasin Plot4

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.02	-	0.09
Composite Area & Weighted Runoff Coeff.	0.02		0.09

Subbasin Plot5

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.02	-	0.09
Composite Area & Weighted Runoff Coeff.	0.02		0.09

****
Kirpich Time of Concentration Computations Report

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

        Tc = (0.01947 * (L^0.77) * (S^-0.385))

        Where:

        Tc = Time of Concentration (min)
        L  = Flow length (m)
        S = Slope (m/m)

------------------
Subbasin Path-5
------------------

        Flow length (m):                    5.00
        Slope (%):                          0.50
        Computed TOC (minutes):             0.52

------------------
Subbasin Path-6
------------------

        Flow length (m):                   10.00
        Slope (%):                          0.50
        Computed TOC (minutes):             0.88

------------------------
Subbasin Plot 5-Paved
------------------------

        Flow length (m):                   10.00
        Slope (%):                          0.50
        Computed TOC (minutes):             0.88

------------------------
Subbasin Plot.4-Paved
------------------------

        Flow length (m):                   20.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.50

-----------------
Subbasin Plot1
-----------------

        Flow length (m):                   15.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.20

-----------------
Subbasin Plot2
-----------------

        Flow length (m):                   15.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.20

-----------------
Subbasin Plot3
-----------------

        Flow length (m):                   15.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.20
```

Subbasin Plot4

Flow length (m):	15.00
Slope (%):	0.50
Computed TOC (minutes):	1.20

Subbasin Plot5

Flow length (m):	15.00
Slope (%):	0.50
Computed TOC (minutes):	1.20

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip mm	Rainfall Intensity mm/hr	Total Runoff mm	Peak Runoff LPS	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
Path-5	61.50	10.25	55.35	0.13	0.900	0	00:05:00
Path-6	61.50	10.25	55.35	0.13	0.900	0	00:05:00
Plot 5-Paved	61.50	10.25	55.35	0.24	0.900	0	00:05:00
Plot.4-Paved	61.50	10.25	55.35	0.07	0.900	0	00:05:00
Plot1	61.50	10.25	5.53	0.03	0.090	0	00:05:00
Plot2	61.50	10.25	5.53	0.03	0.090	0	00:05:00
Plot3	61.50	10.25	5.53	0.03	0.090	0	00:05:00
Plot4	61.50	10.25	5.53	0.05	0.090	0	00:05:00
Plot5	61.50	10.25	5.53	0.05	0.090	0	00:05:00

****
Node Depth Summary
****

Node ID	Average Depth Attained m	Maximum Depth Attained m	Maximum HGL Attained m	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume ha-mm	Total Time Flooded minutes	Retention Time hh:mm:ss
S10	0.00	0.01	81.07	0	03:07	0	0	0:00:00
S11	0.00	0.01	80.31	0	01:34	0	0	0:00:00
S12	0.00	0.01	79.23	0	01:13	0	0	0:00:00
S13	0.00	0.01	78.43	0	01:20	0	0	0:00:00
S14	0.00	0.02	77.67	0	01:30	0	0	0:00:00
S15	0.01	0.05	77.55	0	06:00	0	0	0:00:00
S16(Outfall)	0.02	0.09	77.55	0	05:59	0	0	0:00:00
S6	0.00	0.00	82.80	0	00:56	0	0	0:00:00
S7	0.00	0.01	82.58	0	01:21	0	0	0:00:00
S8	0.00	0.01	82.42	0	02:15	0	0	0:00:00
S9	0.00	0.01	82.29	0	04:49	0	0	0:00:00
Outfall(Swale)	0.00	0.00	77.45	0	00:00	0	0	0:00:00
Stor-S3	0.00	0.00	77.55	0	00:00	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow LPS	Peak Inflow LPS	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow LPS	Time of Peak Flooding Occurrence days	Time of Peak Flooding Occurrence hh:mm
S10	JUNCTION	0.00	0.09	0	02:49	0.00		
S11	JUNCTION	0.13	0.22	0	01:25	0.00		
S12	JUNCTION	0.00	0.22	0	01:42	0.00		
S13	JUNCTION	0.13	0.35	0	01:09	0.00		
S14	JUNCTION	0.00	0.35	0	01:08	0.00		
S15	JUNCTION	0.41	0.76	0	01:11	0.00		
S16(Outfall)	JUNCTION	0.00	0.76	0	05:48	0.00		
S6	JUNCTION	0.03	0.03	0	00:05	0.00		
S7	JUNCTION	0.03	0.06	0	00:56	0.00		
S8	JUNCTION	0.03	0.09	0	01:20	0.00		
S9	JUNCTION	0.00	0.09	0	01:28	0.00		
Outfall(Swale)	OUTFALL	0.00	0.76	0	05:59	0.00		
Stor-S3	STORAGE	0.00	0.00	0	00:00	0.00		

Storage Node Summary

Storage Node ID	Maximum Ponded Volume 1000 m³	Maximum Ponded Volume (%)	Time of Max Ponded Volume days hh:mm	Average Ponded Volume 1000 m³	Average Ponded Volume (%)	Maximum Storage Node Outflow LPS	Maximum Exfiltration Rate cmm	Time of Max. Exfiltration Rate hh:mm:ss	Total Exfiltrated Volume 1000 m³
Stor-S3	0.000	0	0 00:00	0.000	0	0.00	0.00	0:00:00	0.000

Outfall Loading Summary

Outfall Node ID	Flow Frequency (%)	Average Flow LPS	Peak Inflow LPS
Outfall(Swale)	26.74	0.71	0.76
System	26.74	0.71	0.76

Link Flow Summary

Link ID	Element Type	Time of Peak	Maximum Flow	Length	Peak Flow Velocity	Design Flow	Ratio of Maximum to Design	Ratio of Total Reported

	Type	Peak Flow	Velocity	Factor	during	Flow	Maximum	Maximum	Time	Condition
		Occurrence	Attained		Analysis	Capacity	/Design	Flow	Surcharged	
		days hh:mm	m/sec		LPS	LPS	Flow	Depth	minutes	
S3.000	CONDUIT	0 00:56	0.13	1.00	0.03	17.15	0.00	0.04	0	Calculated
S3.001	CONDUIT	0 01:20	0.15	1.00	0.06	13.28	0.00	0.05	0	Calculated
S3.002	CONDUIT	0 01:28	0.27	1.00	0.09	13.42	0.01	0.05	0	Calculated
S3.003	CONDUIT	0 02:49	0.45	1.00	0.09	36.85	0.00	0.04	0	Calculated
S3.004	CONDUIT	0 01:25	0.37	1.00	0.09	36.60	0.00	0.05	0	Calculated
S3.005	CONDUIT	0 01:42	0.56	1.00	0.22	36.73	0.01	0.06	0	Calculated
S3.006	CONDUIT	0 01:09	0.50	1.00	0.22	35.61	0.01	0.06	0	Calculated
S3.007	CONDUIT	0 01:08	0.59	1.00	0.35	41.88	0.01	0.09	0	Calculated
S3.008	CONDUIT	0 01:11	0.20	1.00	0.35	13.53	0.03	0.21	0	Calculated
S3.009	CONDUIT	0 05:48	0.35	1.00	0.76	10.98	0.07	0.44	0	Calculated
Storage Link	CONDUIT	0 00:00	0.00	1.00	0.00	13.20	0.00	0.16	0	Calculated
Outfall Orifice	ORIFICE	0 05:59			0.76			1.00		

****
Highest Flow Instability Indexes
****
All links are stable.

Analysis began on: Wed Jun 2 11:44:11 2021
Analysis ended on: Wed Jun 2 11:44:14 2021
Total elapsed time: 00:00:03

Autodesk® Storm and Sanitary Analysis 2016 - Version 13.4.121 (Build 0)

****
Project Description
****

File Name ..... 16-254-Fitzroy ParkS3 100+40.SPF
Description ..... 16-254 Fitzroy Park Development
1:30YR
STORM NETWORK S3

****
Analysis Options
****

Flow Units ..... LPS
Subbasin Hydrograph Method. Modified Rational
Time of Concentration..... Kirpich
Return Period..... 30 years
Storm Duration..... 360 min
Link Routing Method ..... Hydrodynamic
Storage Node Exfiltration.. Constant rate, wetted area
Starting Date JUN-01-2021 00:00:00
Ending Date JUN-02-2021 00:01:00
Report Time Step 00:00:10

********** Runoff Quantity Continuity **********	Volume hectare-m	Depth mm
Total Precipitation	0.004	44.580
Continuity Error (%)	1.000	

********** Flow Routing Continuity **********	Volume hectare-m	Volume Mliters
External Inflow	0.000	0.000
External Outflow	0.001	0.013
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Path-5

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Path-6

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot 5-Paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot.4-Paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.00	-	0.90
Composite Area & Weighted Runoff Coeff.	0.00		0.90

Subbasin Plot1

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.13
Composite Area & Weighted Runoff Coeff.	0.01		0.13

Subbasin Plot2

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.13
Composite Area & Weighted Runoff Coeff.	0.01		0.13

Subbasin Plot3

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.13
Composite Area & Weighted Runoff Coeff.	0.01		0.13

Subbasin Plot4

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.02	-	0.13
Composite Area & Weighted Runoff Coeff.	0.02		0.13

Subbasin Plot5

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.02	-	0.13
Composite Area & Weighted Runoff Coeff.	0.02		0.13

****
Kirpich Time of Concentration Computations Report

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

        Tc = (0.01947 * (L^0.77) * (S^-0.385))

        Where:

        Tc = Time of Concentration (min)
        L  = Flow length (m)
        S = Slope (m/m)

------------------
Subbasin Path-5
------------------

        Flow length (m):                    5.00
        Slope (%):                          0.50
        Computed TOC (minutes):             0.52

------------------
Subbasin Path-6
------------------

        Flow length (m):                   10.00
        Slope (%):                          0.50
        Computed TOC (minutes):             0.88

------------------------
Subbasin Plot 5-Paved
------------------------

        Flow length (m):                   10.00
        Slope (%):                          0.50
        Computed TOC (minutes):             0.88

------------------------
Subbasin Plot.4-Paved
------------------------

        Flow length (m):                   20.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.50

-----------------
Subbasin Plot1
-----------------

        Flow length (m):                   15.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.20

-----------------
Subbasin Plot2
-----------------

        Flow length (m):                   15.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.20

-----------------
Subbasin Plot3
-----------------

        Flow length (m):                   15.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.20
```

Subbasin Plot4

Flow length (m):	15.00
Slope (%):	0.50
Computed TOC (minutes):	1.20

Subbasin Plot5

Flow length (m):	15.00
Slope (%):	0.50
Computed TOC (minutes):	1.20

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip mm	Rainfall Intensity mm/hr	Total Runoff mm	Peak Runoff LPS	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
Path-5	44.58	7.43	40.12	0.10	0.900	0	00:05:00
Path-6	44.58	7.43	40.12	0.10	0.900	0	00:05:00
Plot 5-Paved	44.58	7.43	40.12	0.17	0.900	0	00:05:00
Plot.4-Paved	44.58	7.43	40.12	0.05	0.900	0	00:05:00
Plot1	44.58	7.43	5.80	0.03	0.130	0	00:05:00
Plot2	44.58	7.43	5.80	0.03	0.130	0	00:05:00
Plot3	44.58	7.43	5.80	0.03	0.130	0	00:05:00
Plot4	44.58	7.43	5.80	0.05	0.130	0	00:05:00
Plot5	44.58	7.43	5.80	0.05	0.130	0	00:05:00

****
Node Depth Summary
****

Node ID	Average Depth Attained m	Maximum Depth Attained m	Maximum HGL Attained m	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume ha-mm	Total Time Flooded minutes	Retention Time hh:mm:ss
S10	0.00	0.01	81.07	0	02:09	0	0	0:00:00
S11	0.00	0.01	80.31	0	05:00	0	0	0:00:00
S12	0.00	0.01	79.23	0	01:58	0	0	0:00:00
S13	0.00	0.01	78.43	0	04:17	0	0	0:00:00
S14	0.00	0.01	77.67	0	01:33	0	0	0:00:00
S15	0.01	0.02	77.52	0	05:58	0	0	0:00:00
S16(Outfall)	0.02	0.06	77.52	0	04:14	0	0	0:00:00
S6	0.00	0.00	82.80	0	01:09	0	0	0:00:00
S7	0.00	0.01	82.58	0	01:21	0	0	0:00:00
S8	0.00	0.01	82.42	0	01:48	0	0	0:00:00
S9	0.00	0.01	82.29	0	01:23	0	0	0:00:00
Outfall(Swale)	0.00	0.00	77.45	0	00:00	0	0	0:00:00
Stor-S3	0.00	0.00	77.55	0	00:00	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow LPS	Peak Inflow LPS	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow LPS	Time of Peak Flooding Occurrence days	Time of Peak Flooding Occurrence hh:mm
S10	JUNCTION	0.00	0.09	0	01:38	0.00		
S11	JUNCTION	0.10	0.19	0	01:21	0.00		
S12	JUNCTION	0.00	0.19	0	02:41	0.00		
S13	JUNCTION	0.10	0.28	0	01:13	0.00		
S14	JUNCTION	0.00	0.28	0	01:06	0.00		
S15	JUNCTION	0.33	0.61	0	01:26	0.00		
S16(Outfall)	JUNCTION	0.00	0.61	0	03:52	0.00		
S6	JUNCTION	0.03	0.03	0	00:05	0.00		
S7	JUNCTION	0.03	0.06	0	01:09	0.00		
S8	JUNCTION	0.03	0.09	0	01:19	0.00		
S9	JUNCTION	0.00	0.09	0	01:36	0.00		
Outfall(Swale)	OUTFALL	0.00	0.61	0	04:13	0.00		
Stor-S3	STORAGE	0.00	0.00	0	00:00	0.00		

Storage Node Summary

Storage Node ID	Maximum Ponded Volume 1000 m³	Maximum Ponded Volume (%)	Time of Max Ponded Volume days hh:mm	Average Ponded Volume 1000 m³	Average Ponded Volume (%)	Maximum Storage Node Outflow LPS	Maximum Exfiltration Rate cmm	Time of Max. Exfiltration Rate hh:mm:ss	Total Exfiltrated Volume 1000 m³
Stor-S3	0.000	0	0 00:00	0.000	0	0.00	0.00	0:00:00	0.000

Outfall Loading Summary

Outfall Node ID	Flow Frequency (%)	Average Flow LPS	Peak Inflow LPS
Outfall(Swale)	26.69	0.57	0.61
System	26.69	0.57	0.61

Link Flow Summary

Link ID	Element Type	Time of Peak	Maximum Flow	Length	Peak Flow Velocity	Design Flow	Ratio of Peak to Design Flow	Ratio of Total Reported

	Type	Peak Flow	Time	Velocity	Factor	during	Flow	Maximum	Time	Condition
		Occurrence		Attained		Analysis	Capacity	/Design		
		days	hh:mm	m/sec		LPS	LPS	Flow	Surcharged	
								Depth	minutes	
S3.000	CONDUIT	0	01:09	0.14	1.00	0.03	17.15	0.00	0.04	0 Calculated
S3.001	CONDUIT	0	01:19	0.16	1.00	0.06	13.28	0.00	0.06	0 Calculated
S3.002	CONDUIT	0	01:36	0.27	1.00	0.09	13.42	0.01	0.05	0 Calculated
S3.003	CONDUIT	0	01:38	0.46	1.00	0.09	36.85	0.00	0.04	0 Calculated
S3.004	CONDUIT	0	01:21	0.38	1.00	0.09	36.60	0.00	0.04	0 Calculated
S3.005	CONDUIT	0	02:41	0.54	1.00	0.19	36.73	0.01	0.05	0 Calculated
S3.006	CONDUIT	0	01:13	0.49	1.00	0.19	35.61	0.01	0.06	0 Calculated
S3.007	CONDUIT	0	01:06	0.56	1.00	0.28	41.88	0.01	0.08	0 Calculated
S3.008	CONDUIT	0	01:26	0.21	1.00	0.28	13.53	0.02	0.13	0 Calculated
S3.009	CONDUIT	0	03:52	0.34	1.00	0.61	10.98	0.06	0.29	0 Calculated
Storage Link	CONDUIT	0	00:00	0.00	1.00	0.00	13.20	0.00	0.08	0 Calculated
Outfall Orifice	ORIFICE	0	04:13			0.61			1.00	

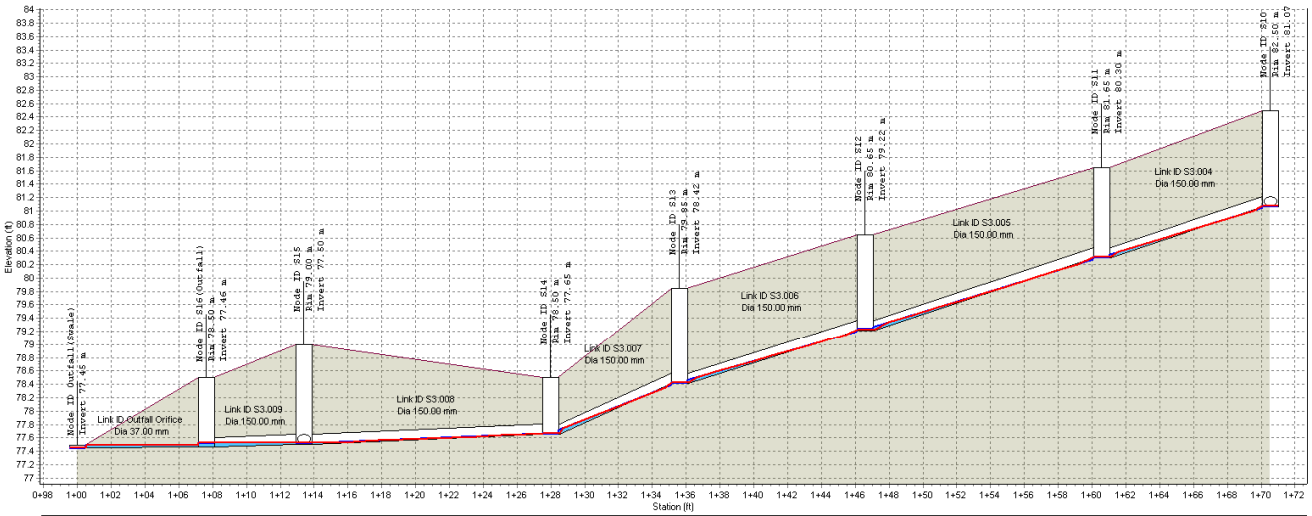
```
  ********************************
  Highest Flow Instability Indexes
  ********************************
  All links are stable.




  Analysis began on:  Wed Jun  2 10:49:05 2021
  Analysis ended on:  Wed Jun  2 10:49:08 2021
  Total elapsed time: 00:00:03
```

Profile Plot
S3.004 - Outfall

06/01/2021 01:00:00



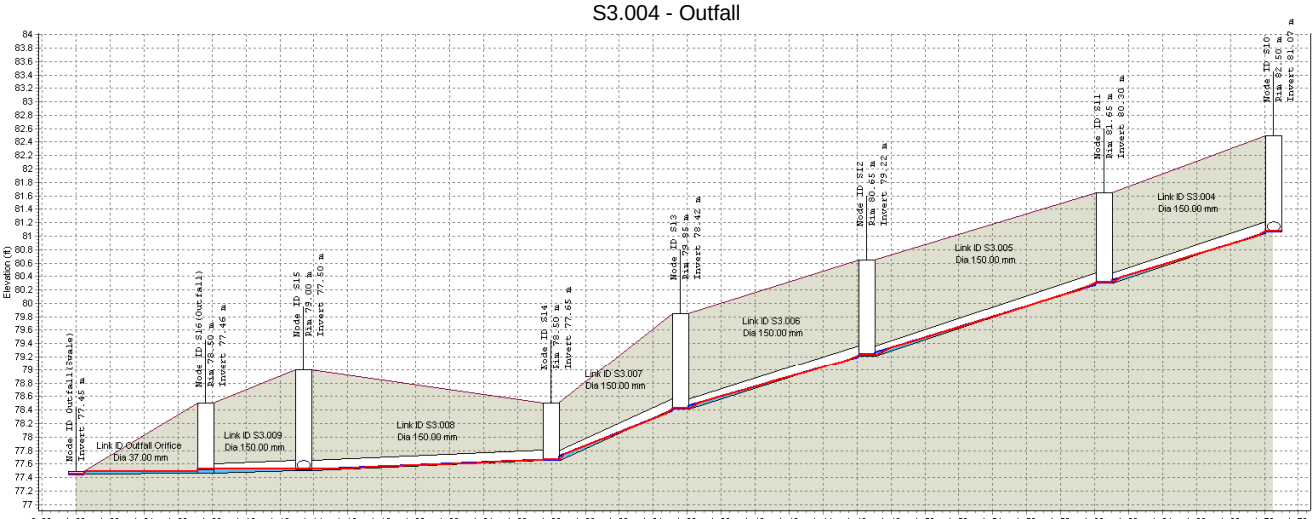
Node ID:	Outfall(Swale)	S16(Outfall)	S15	S14	S13	S12	S11	S10
Rim (m):		78.50	79.00	78.50	79.85	80.65	81.65	82.50
Invert (m):	77.45	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Min Pipe Cover (m):		0.00	1.35	0.70	1.28	1.28	1.20	1.28
Max HGL (m):	77.45	77.52	77.52	77.67	78.43	79.23	80.31	81.07

Link ID:	Outfall Orifice	S3.009	S3.008	S3.007	S3.006	S3.005	S3.004
Length (m):		5.78	14.55	7.61	10.99	14.01	9.95
Dia (mm):	37.00	150.00	150.00	150.00	150.00	150.00	150.00
Slope (m/m):		0.0069	0.0105	0.1007	0.0728	0.0774	0.0769
Up Invert (m):	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Dn Invert (m):	77.45	77.46	77.50	77.65	78.42	79.22	80.30
Max Q (lps):	0.61	0.61	0.28	0.28	0.19	0.19	0.09
Max Vel (m/s):	0.00	0.34	0.21	0.56	0.49	0.54	0.38
Max Depth (m):	0.00	0.04	0.02	0.01	0.01	0.01	0.01

1:30yr 6hr Storm Analysis - Elapsed Time 01:00:00

Profile Plot
S3.004 - Outfall

06/01/2021 06:00:00



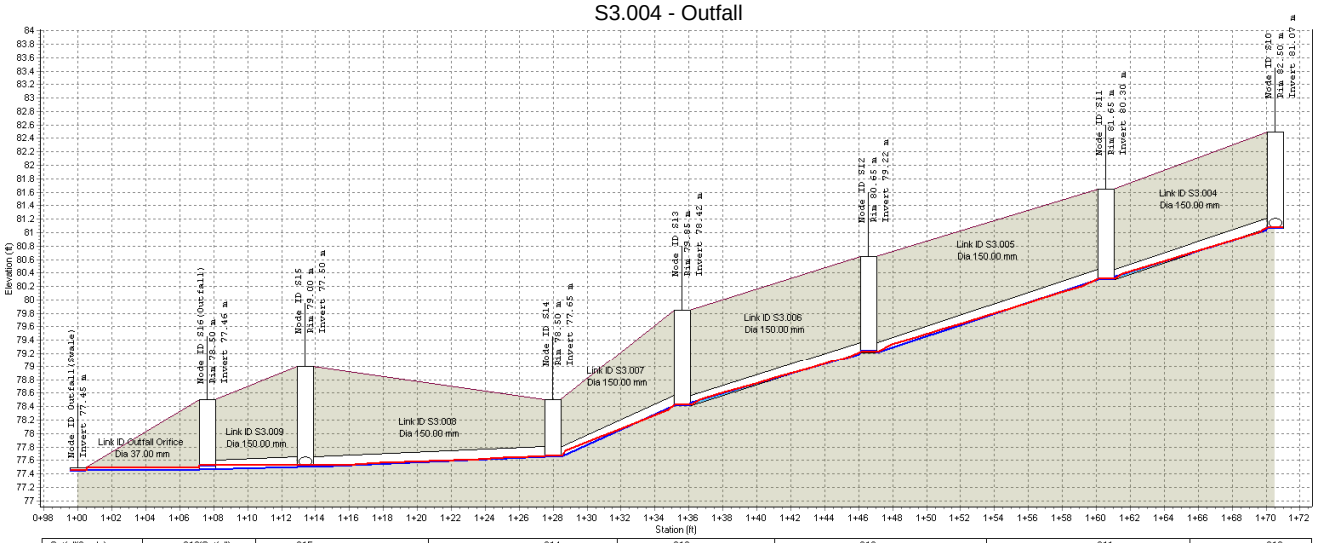
Node ID:	Outfall(Swale)	S16(Outfall)	S15	S14	S13	S12	S11	S10
Rim (m):		78.50	79.00	78.50	79.85	80.65	81.65	82.50
Invert (m):	77.45	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Min Pipe Cover (m):		0.00	1.35	0.70	1.28	1.28	1.20	1.28
Max HGL (m):	77.45	77.52	77.52	77.67	78.43	79.23	80.31	81.07

Link ID:	Outfall Orifice	S3.009	S3.008	S3.007	S3.006	S3.005	S3.004
Length (m):		5.78	14.55	7.61	10.99	14.01	9.95
Dia (mm):	37.00	150.00	150.00	150.00	150.00	150.00	150.00
Slope (m/m):		0.0069	0.0105	0.1007	0.0728	0.0774	0.0769
Up Invert (m):	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Dn Invert (m):	77.45	77.46	77.50	77.65	78.42	79.22	80.30
Max Q (lps):	0.61	0.61	0.28	0.28	0.19	0.19	0.09
Max Vel (m/s):	0.00	0.34	0.21	0.56	0.49	0.54	0.38
Max Depth (m):	0.00	0.04	0.02	0.01	0.01	0.01	0.01

1:30yr 6hr Storm Analysis - Elapsed Time 06:00:00

Profile Plot
S3.004 - Outfall

06/01/2021 12:00:00



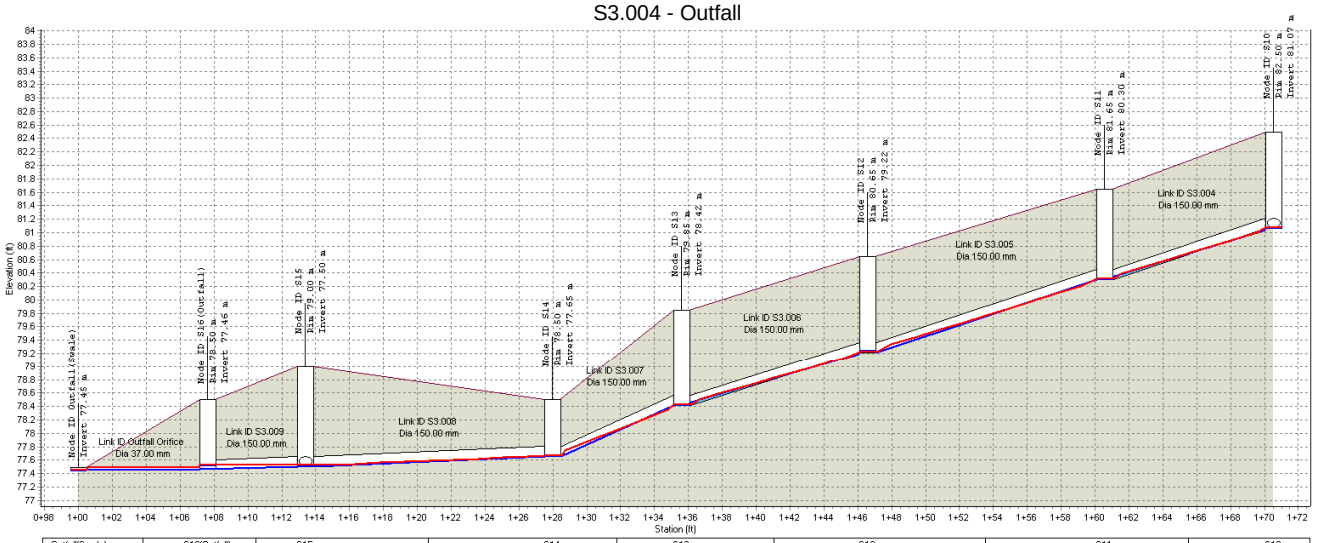
Node ID:	Outfall(Swale)	S16(Outfall)	S15	S14	S13	S12	S11	S10
Rim (m):		78.50	79.00	78.50	79.85	80.65	81.65	82.50
Invert (m):	77.45	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Min Pipe Cover (m):		0.00	1.35	0.70	1.28	1.28	1.20	1.28
Max HGL (m):	77.45	77.52	77.52	77.67	78.43	79.23	80.31	81.07

Link ID:	Outfall Orifice	S3.009	S3.008	S3.007	S3.006	S3.005	S3.004
Length (m):		5.78	14.55	7.61	10.99	14.01	9.95
Dia (mm):	37.00	150.00	150.00	150.00	150.00	150.00	150.00
Slope (m/m):		0.0069	0.0105	0.1007	0.0728	0.0774	0.0769
Up Invert (m):	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Dn Invert (m):	77.45	77.46	77.50	77.65	78.42	79.22	80.30
Max Q (lps):	0.61	0.61	0.28	0.28	0.19	0.19	0.09
Max Vel (m/s):	0.00	0.34	0.21	0.56	0.49	0.54	0.38
Max Depth (m):	0.00	0.04	0.02	0.01	0.01	0.01	0.01

1:30yr 6hr Storm Analysis - Elapsed Time 12:00:00

Profile Plot
S3.004 - Outfall

06/02/2021 00:00:00



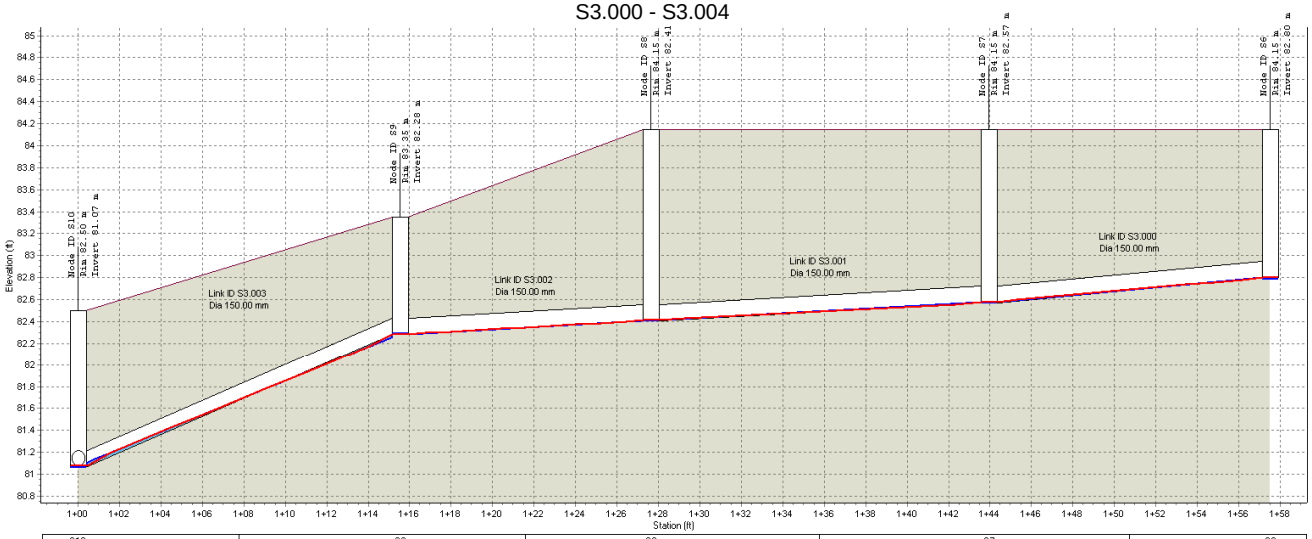
Node ID:	Outfall(Swale)	S16(Outfall)	S15	S14	S13	S12	S11	S10
Rim (m):		78.50	79.00	78.50	79.85	80.65	81.65	82.50
Invert (m):	77.45	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Min Pipe Cover (m):		0.00	1.35	0.70	1.28	1.28	1.20	1.28
Max HGL (m):	77.45	77.52	77.52	77.67	78.43	79.23	80.31	81.07

Link ID:	Outfall Orifice	S3.009	S3.008	S3.007	S3.006	S3.005	S3.004
Length (m):		5.78	14.55	7.61	10.99	14.01	9.95
Dia (mm):	37.00	150.00	150.00	150.00	150.00	150.00	150.00
Slope (m/m):		0.0069	0.0105	0.1007	0.0728	0.0774	0.0769
Up Invert (m):	77.46	77.50	77.65	78.42	79.22	80.30	81.07
Dn Invert (m):	77.45	77.46	77.50	77.65	78.42	79.22	80.30
Max Q (lps):	0.61	0.61	0.28	0.28	0.19	0.19	0.09
Max Vel (m/s):	0.00	0.34	0.21	0.56	0.49	0.54	0.38
Max Depth (m):	0.00	0.04	0.02	0.01	0.01	0.01	0.01

1:30yr 6hr Storm Analysis - Elapsed Time 24:00:00

Profile Plot
S3.000 - S3.004

06/01/2021 01:00:00



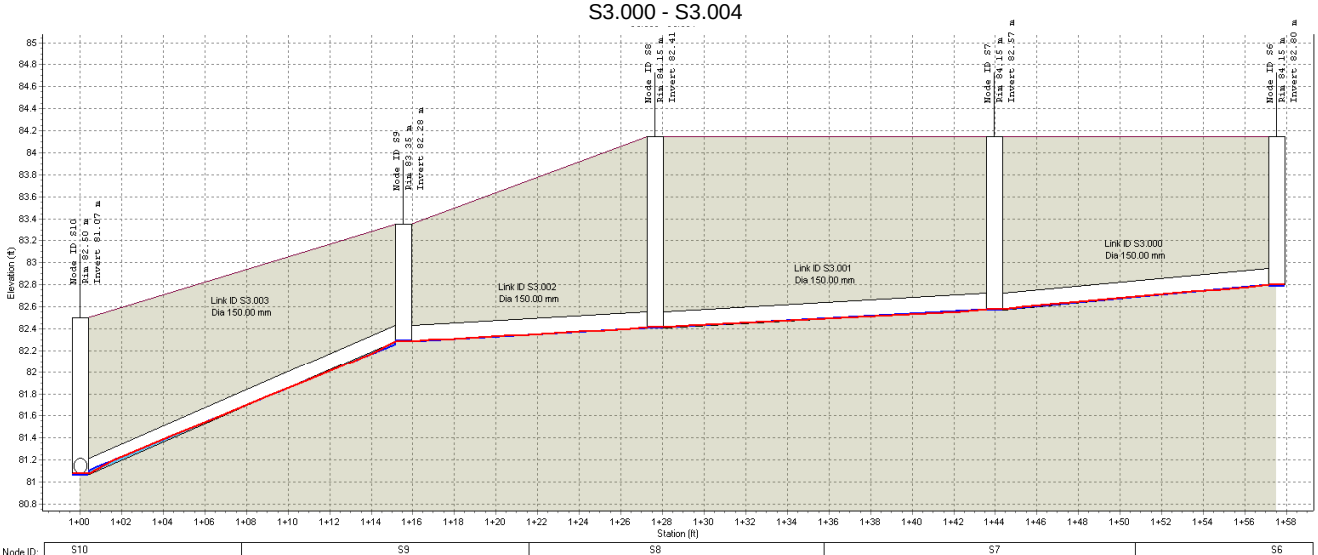
Node ID:	S10	S9	S8	S7	S6
Rim (m):	82.50	83.35	84.15	84.15	84.15
Invert (m):	81.07	82.28	82.41	82.57	82.80
Min Pipe Cover (m):	1.28	0.92	1.59	1.43	1.20
Max HGL (m):	81.07	82.29	82.42	82.58	82.80

Link ID:	S3.003	S3.002	S3.001	S3.000
Length (m):	15.55	12.09	16.30	13.57
Dia (mm):	150.00	150.00	150.00	150.00
Slope (m/m):	0.0779	0.0103	0.0101	0.0169
Up Invert (m):	82.28	82.41	82.57	82.80
Dn Invert (m):	81.07	82.28	82.41	82.57
Max Q (lps):	0.09	0.09	0.06	0.03
Max Vel (m/s):	0.46	0.27	0.16	0.14
Max Depth (m):	0.01	0.01	0.01	0.01

1:30yr 6hr Storm Analysis - Elapsed Time 01:00:00

Profile Plot
S3.000 - S3.004

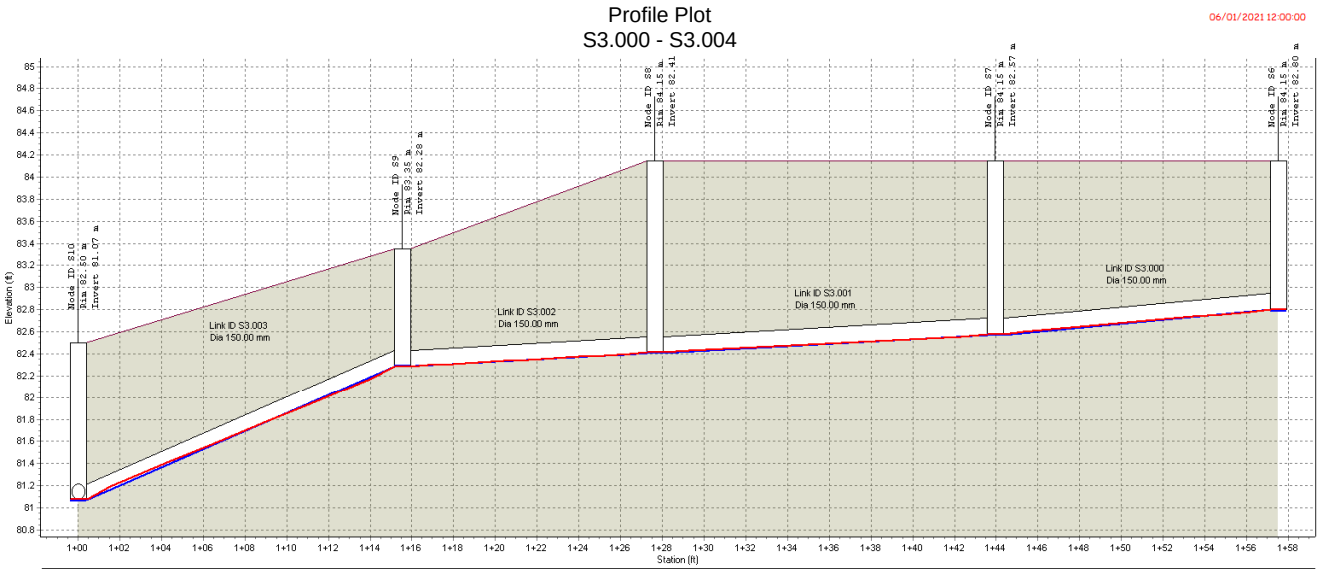
06/01/2021 06:00:00



Node ID:	S10	S9	S8	S7	S6
Rim (m):	82.50	83.35	84.15	84.15	84.15
Invert (m):	81.07	82.28	82.41	82.57	82.80
Min Pipe Cover (m):	1.28	0.92	1.59	1.43	1.20
Max HGL (m):	81.07	82.29	82.42	82.58	82.80

Link ID:	S3.003	S3.002	S3.001	S3.000
Length (m):	15.55	12.09	16.30	13.57
Dia (mm):	150.00	150.00	150.00	150.00
Slope (m/m):	0.0779	0.0103	0.0101	0.0169
Up Invert (m):	82.28	82.41	82.57	82.80
Dn Invert (m):	81.07	82.28	82.41	82.57
Max Q (lps):	0.09	0.09	0.06	0.03
Max Vel (m/s):	0.46	0.27	0.16	0.14
Max Depth (m):	0.01	0.01	0.01	0.01

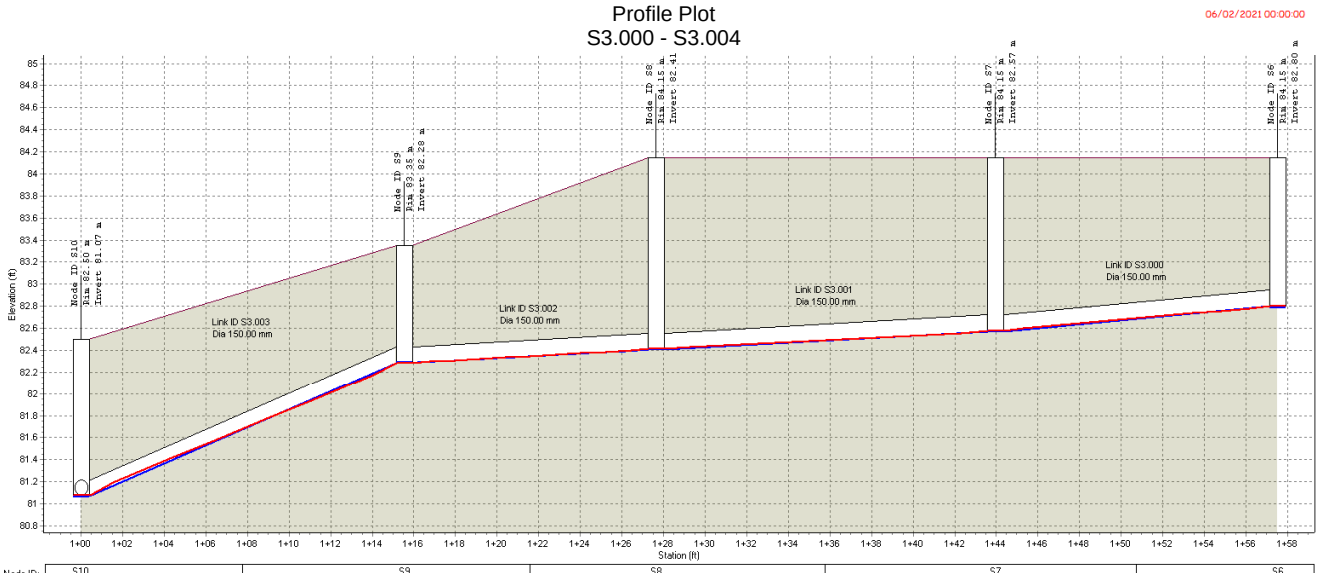
1:30yr 6hr Storm Analysis - Elapsed Time 06:00:00



Node ID:	S10	S9	S8	S7	S6
Rim (m):	82.50	83.35	84.15	84.15	84.15
Invert (m):	81.07	82.28	82.41	82.57	82.80
Min Pipe Cover (m):	1.28	0.92	1.59	1.43	1.20
Max HGL (m):	81.07	82.29	82.42	82.58	82.80

Link ID:	S3.003	S3.002	S3.001	S3.000
Length (m):	15.55	12.09	16.30	13.57
Dia (mm):	150.00	150.00	150.00	150.00
Slope (m/m):	0.0779	0.0103	0.0101	0.0169
Up Invert (m):	82.28	82.41	82.57	82.80
Dn Invert (m):	81.07	82.28	82.41	82.57
Max Q (lps):	0.09	0.09	0.06	0.03
Max Vel (m/s):	0.46	0.27	0.16	0.14
Max Depth (m):	0.01	0.01	0.01	0.01

1:30yr 6hr Storm Analysis - Elapsed Time 12:00:00



Node ID:	S10	S9	S8	S7	S6
Rim (m):	82.50	83.35	84.15	84.15	84.15
Invert (m):	81.07	82.28	82.41	82.57	82.80
Min Pipe Cover (m):	1.28	0.92	1.59	1.43	1.20
Max HGL (m):	81.07	82.29	82.42	82.58	82.80

Link ID:	S3.003	S3.002	S3.001	S3.000
Length (m):	15.55	12.09	16.30	13.57
Dia (mm):	150.00	150.00	150.00	150.00
Slope (m/m):	0.0779	0.0103	0.0101	0.0169
Up Invert (m):	82.28	82.41	82.57	82.80
Dn Invert (m):	81.07	82.28	82.41	82.57
Max Q (lps):	0.09	0.09	0.06	0.03
Max Vel (m/s):	0.46	0.27	0.16	0.14
Max Depth (m):	0.01	0.01	0.01	0.01

1:30yr 6hr Storm Analysis - Elapsed Time 24:00:00

Autodesk® Storm and Sanitary Analysis 2016 - Version 13.4.121 (Build 0)

****
Project Description
****
File Name ..... 16-254-Fitzroy ParkS3 100+40.SPF
Description ..... 16-254 Fitzroy Park Development
1:1YR
STORM NETWORK S3

****
Analysis Options
****
Flow Units ..... LPS
Subbasin Hydrograph Method. Modified Rational
Time of Concentration..... Kirpich
Return Period..... 1 year
Storm Duration..... 360 min
Link Routing Method ..... Hydrodynamic
Storage Node Exfiltration.. Constant rate, wetted area
Starting Date JUN-01-2021 00:00:00
Ending Date JUN-02-2021 00:01:00
Report Time Step 00:00:10

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.002	19.500
Continuity Error (%)	1.000	

Flow Routing Continuity	Volume hectare-m	Volume Mliters
External Inflow	0.000	0.000
External Outflow	0.001	0.008
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Path-5

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Path-6

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot 5-Paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot.4-Paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.00	-	0.90
Composite Area & Weighted Runoff Coeff.	0.00		0.90

Subbasin Plot1

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.30
Composite Area & Weighted Runoff Coeff.	0.01		0.30

Subbasin Plot2

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.30
Composite Area & Weighted Runoff Coeff.	0.01		0.30

Subbasin Plot3

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.30
Composite Area & Weighted Runoff Coeff.	0.01		0.30

Subbasin Plot4

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.02	-	0.30
Composite Area & Weighted Runoff Coeff.	0.02		0.30

Subbasin Plot5

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.02	-	0.30
Composite Area & Weighted Runoff Coeff.	0.02		0.30

****
Kirpich Time of Concentration Computations Report

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

        Tc = (0.01947 * (L^0.77) * (S^-0.385))

        Where:

        Tc = Time of Concentration (min)
        L  = Flow length (m)
        S = Slope (m/m)

------------------
Subbasin Path-5
------------------

        Flow length (m):                    5.00
        Slope (%):                          0.50
        Computed TOC (minutes):             0.52

------------------
Subbasin Path-6
------------------

        Flow length (m):                   10.00
        Slope (%):                          0.50
        Computed TOC (minutes):             0.88

------------------------
Subbasin Plot 5-Paved
------------------------

        Flow length (m):                   10.00
        Slope (%):                          0.50
        Computed TOC (minutes):             0.88

------------------------
Subbasin Plot.4-Paved
------------------------

        Flow length (m):                   20.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.50

-----------------
Subbasin Plot1
-----------------

        Flow length (m):                   15.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.20

-----------------
Subbasin Plot2
-----------------

        Flow length (m):                   15.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.20

-----------------
Subbasin Plot3
-----------------

        Flow length (m):                   15.00
        Slope (%):                          0.50
        Computed TOC (minutes):             1.20
```

Subbasin Plot4

Flow length (m):	15.00
Slope (%):	0.50
Computed TOC (minutes):	1.20

Subbasin Plot5

Flow length (m):	15.00
Slope (%):	0.50
Computed TOC (minutes):	1.20

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip mm	Rainfall Intensity mm/hr	Total Runoff mm	Peak Runoff LPS	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
Path-5	19.50	3.25	17.55	0.04	0.900	0	00:05:00
Path-6	19.50	3.25	17.55	0.04	0.900	0	00:05:00
Plot 5-Paved	19.50	3.25	17.55	0.08	0.900	0	00:05:00
Plot.4-Paved	19.50	3.25	17.55	0.02	0.900	0	00:05:00
Plot1	19.50	3.25	5.85	0.03	0.300	0	00:05:00
Plot2	19.50	3.25	5.85	0.03	0.300	0	00:05:00
Plot3	19.50	3.25	5.85	0.03	0.300	0	00:05:00
Plot4	19.50	3.25	5.85	0.05	0.300	0	00:05:00
Plot5	19.50	3.25	5.85	0.05	0.300	0	00:05:00

****
Node Depth Summary
****

Node ID	Average Depth Attained m	Maximum Depth Attained m	Maximum HGL Attained m	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume ha-mm	Total Time Flooded minutes	Retention Time hh:mm:ss
S10	0.00	0.01	81.07	0	03:12	0	0	0:00:00
S11	0.00	0.01	80.31	0	04:38	0	0	0:00:00
S12	0.00	0.01	79.23	0	03:39	0	0	0:00:00
S13	0.00	0.01	78.43	0	04:35	0	0	0:00:00
S14	0.00	0.01	77.66	0	05:00	0	0	0:00:00
S15	0.01	0.02	77.52	0	02:17	0	0	0:00:00
S16(Outfall)	0.01	0.04	77.50	0	05:00	0	0	0:00:00
S6	0.00	0.00	82.80	0	00:54	0	0	0:00:00
S7	0.00	0.01	82.58	0	01:07	0	0	0:00:00
S8	0.00	0.01	82.42	0	05:39	0	0	0:00:00
S9	0.00	0.01	82.29	0	05:01	0	0	0:00:00
Outfall(Swale)	0.00	0.00	77.45	0	00:00	0	0	0:00:00
Stor-S3	0.00	0.00	77.55	0	00:00	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow LPS	Peak Inflow LPS	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow LPS	Time of Peak Flooding Occurrence days	Time of Peak Flooding Occurrence hh:mm
S10	JUNCTION	0.00	0.09	0	05:39	0.00		
S11	JUNCTION	0.04	0.13	0	01:07	0.00		
S12	JUNCTION	0.00	0.13	0	03:12	0.00		
S13	JUNCTION	0.04	0.18	0	01:09	0.00		
S14	JUNCTION	0.00	0.18	0	01:09	0.00		
S15	JUNCTION	0.20	0.38	0	01:12	0.00		
S16(Outfall)	JUNCTION	0.00	0.38	0	01:12	0.00		
S6	JUNCTION	0.03	0.03	0	00:05	0.00		
S7	JUNCTION	0.03	0.06	0	00:54	0.00		
S8	JUNCTION	0.03	0.09	0	01:06	0.00		
S9	JUNCTION	0.00	0.09	0	02:19	0.00		
Outfall(Swale)	OUTFALL	0.00	0.38	0	01:21	0.00		
Stor-S3	STORAGE	0.00	0.00	0	00:00	0.00		

Storage Node Summary

Storage Node ID	Maximum Ponded Volume 1000 m³	Maximum Ponded Volume (%)	Time of Max Ponded Volume days hh:mm	Average Ponded Volume 1000 m³	Average Ponded Volume (%)	Maximum Storage Node Outflow LPS	Maximum Exfiltration Rate cmm	Time of Max. Exfiltration Rate hh:mm:ss	Total Exfiltrated Volume 1000 m³
Stor-S3	0.000	0	0 00:00	0.000	0	0.00	0.00	0:00:00	0.000

Outfall Loading Summary

Outfall Node ID	Flow Frequency (%)	Average Flow LPS	Peak Inflow LPS
Outfall(Swale)	26.61	0.35	0.38
System	26.61	0.35	0.38

Link Flow Summary

Link ID	Element Type	Time of Peak	Maximum Flow	Length	Peak Flow	Design Flow	Ratio of Peak to Design	Ratio of Total Reported

	Type	Peak Flow	Velocity	Factor	during	Flow	Maximum	Maximum	Time	Condition
		Occurrence	Attained		Analysis	Capacity	/Design	Flow	Surcharged	
		days hh:mm	m/sec		LPS	LPS	Flow	Depth	minutes	
S3.000	CONDUIT	0 00:54	0.14	1.00	0.03	17.15	0.00	0.04	0	Calculated
S3.001	CONDUIT	0 01:06	0.16	1.00	0.06	13.28	0.00	0.06	0	Calculated
S3.002	CONDUIT	0 02:19	0.27	1.00	0.09	13.42	0.01	0.05	0	Calculated
S3.003	CONDUIT	0 05:39	0.46	1.00	0.09	36.85	0.00	0.04	0	Calculated
S3.004	CONDUIT	0 01:07	0.40	1.00	0.09	36.60	0.00	0.04	0	Calculated
S3.005	CONDUIT	0 03:12	0.48	1.00	0.13	36.73	0.00	0.04	0	Calculated
S3.006	CONDUIT	0 01:09	0.46	1.00	0.13	35.61	0.00	0.05	0	Calculated
S3.007	CONDUIT	0 01:09	0.46	1.00	0.18	41.88	0.00	0.06	0	Calculated
S3.008	CONDUIT	0 01:12	0.20	1.00	0.18	13.53	0.01	0.10	0	Calculated
S3.009	CONDUIT	0 01:12	0.30	1.00	0.38	10.98	0.03	0.18	0	Calculated
Storage Link	CONDUIT	0 00:00	0.00	1.00	0.00	13.20	0.00	0.06	0	Calculated
Outfall Orifice	ORIFICE	0 01:21			0.38			0.96		

****
Highest Flow Instability Indexes
****
All links are stable.

Analysis began on: Wed Jun 2 11:31:05 2021
Analysis ended on: Wed Jun 2 11:31:08 2021
Total elapsed time: 00:00:03

Appendix B

Surface Water Analysis

Calculations and Sections

for S1 & S2 network

Autodesk® Storm and Sanitary Analysis 2016 - Version 13.4.121 (Build 0)

****
Project Description
****
File Name ..... 16-254-Fitzroy Park S1 S2 100yr+40.SPF
Description ..... 16-254 Fitzroy Park Development
100yr Return + 40%
Storm Network S1 & S2

****
Analysis Options
****
Flow Units ..... LPS
Subbasin Hydrograph Method. Modified Rational
Time of Concentration..... Kirpich
Return Period..... 100 years
Storm Duration..... 360 min
Link Routing Method ..... Hydrodynamic
Storage Node Exfiltration.. Constant rate, wetted area
Starting Date NOV-04-2021 00:00:00
Ending Date NOV-05-2021 00:00:00
Report Time Step 00:00:10

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.012	86.100
Continuity Error (%)	1.000	

Flow Routing Continuity	Volume hectare-m	Volume Mliters
External Inflow	0.000	0.000
External Outflow	0.011	0.110
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Entrance

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.06	-	0.90
Composite Area & Weighted Runoff Coeff.	0.06		0.90

Subbasin Plot1-paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot2-paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.02	-	0.90
Composite Area & Weighted Runoff Coeff.	0.02		0.90

Subbasin Plot3-paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.02	-	0.90
Composite Area & Weighted Runoff Coeff.	0.02		0.90

****
Kirpich Time of Concentration Computations Report
****

Tc = (0.01947 * (L^0.77) * (S^-0.385))

Where:

Tc = Time of Concentration (min)
L = Flow length (m)
S = Slope (m/m)

Subbasin Entrance

Flow length (m): 10.00
Slope (%): 0.50
Computed TOC (minutes): 0.88

Subbasin Plot1-paved

Flow length (m): 5.00
Slope (%): 0.50
Computed TOC (minutes): 0.52

Subbasin Plot2-paved

Flow length (m): 5.00
Slope (%): 0.50
Computed TOC (minutes): 0.52

Subbasin Plot3-paved

Flow length (m): 5.00
Slope (%): 0.50
Computed TOC (minutes): 0.52

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip mm	Rainfall Intensity mm/hr	Total Runoff mm	Peak Runoff LPS	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
Entrance	86.10	14.35	77.49	2.13	0.900	0	00:05:00
Plot1-paved	86.10	14.35	77.49	1.25	0.900	0	00:05:00
Plot2-paved	86.10	14.35	77.49	0.89	0.900	0	00:05:00
Plot3-paved	86.10	14.35	77.49	0.82	0.900	0	00:05:00

****
Node Depth Summary
****

Node ID	Average Depth Attained m	Maximum Depth Attained m	Maximum HGL Attained m	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume ha-mm	Total Flooded Time minutes	Retention Time hh:mm:ss
S Outfall	0.02	0.08	81.23	0	00:45	0	0	0:00:00
S1	0.01	0.02	82.82	0	00:16	0	0	0:00:00
S2	0.01	0.04	82.59	0	00:21	0	0	0:00:00
S3	0.01	0.05	82.46	0	00:29	0	0	0:00:00
S4	0.00	0.00	81.65	0	00:00	0	0	0:00:00
S5	0.01	0.04	81.56	0	00:57	0	0	0:00:00
Outfall(Combined)	0.00	0.00	81.14	0	00:00	0	0	0:00:00
Stor-S1	0.00	0.00	81.60	0	00:00	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow LPS	Peak Inflow LPS	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow LPS	Time of Peak Flooding Occurrence days	Time of Peak Flooding Occurrence hh:mm
S Outfall	JUNCTION	0.00	5.09	0	00:22	0.00		
S1	JUNCTION	0.82	0.82	0	00:05	0.00		
S2	JUNCTION	0.89	1.71	0	00:16	0.00		
S3	JUNCTION	1.25	2.95	0	00:21	0.00		
S4	JUNCTION	0.00	0.00	0	00:00	0.00		
S5	JUNCTION	2.13	5.09	0	00:25	0.00		
Outfall(Combined)	OUTFALL	0.00	5.09	0	00:53	0.00		
Stor-S1	STORAGE	0.00	0.00	0	00:00	0.00		

****
Storage Node Summary
****

Storage Node ID	Maximum Ponded Volume 1000 m³	Maximum Ponded Volume (%)	Time of Max Ponded Volume days hh:mm	Average Ponded Volume 1000 m³	Average Ponded Volume (%)	Maximum Storage Node Outflow LPS	Maximum Exfiltration Rate cmm	Time of Max. Exfiltration Rate hh:mm:ss	Total Exfiltrated Volume 1000 m³
Stor-S1	0.000	0	0 00:00	0.000	0	0.00	0.00	0:00:00	0.000

****
Outfall Loading Summary
****

Outfall Node ID	Flow Frequency (%)	Average Flow LPS	Peak Inflow LPS
Outfall(Combined)	26.28	4.84	5.09
System	26.28	4.84	5.09

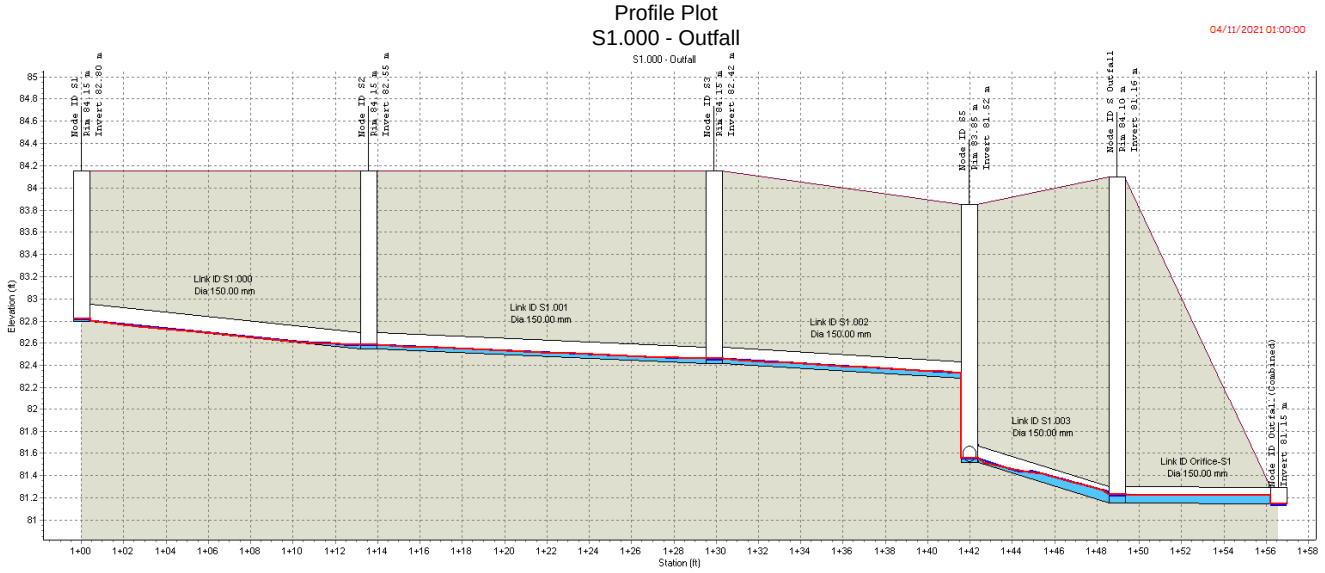
****
Link Flow Summary
****

Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity Attained m/sec	Length Factor	Peak Flow during Analysis LPS	Design Flow Capacity LPS	Ratio of Maximum /Design Flow	Ratio of Maximum Flow Depth	Total Time Surcharged minutes	Reported Condition
S1.000	CONDUIT	0 00:16	0.33	1.00	0.82	17.99	0.05	0.20	0	Calculated
S1.001	CONDUIT	0 00:21	0.40	1.00	1.71	11.92	0.14	0.29	0	Calculated
S1.002	CONDUIT	0 00:25	0.60	1.00	2.95	13.74	0.21	0.32	0	Calculated
S1.003	CONDUIT	0 00:22	0.99	1.00	5.09	29.97	0.17	0.40	0	Calculated
S2.000	CONDUIT	0 00:00	0.00	1.00	0.00	13.20	0.00	0.14	0	Calculated
Storage Link	CONDUIT	0 00:00	0.00	1.00	0.00	17.46	0.00	0.14	0	Calculated
Orifice-S1	ORIFICE	0 00:53			5.09			0.53		

****
Highest Flow Instability Indexes
****
All links are stable.

Analysis began on: Fri Nov 5 15:04:06 2021
Analysis ended on: Fri Nov 5 15:04:07 2021
Total elapsed time: 00:00:01

Profile Plot
S1.000 - Outfall

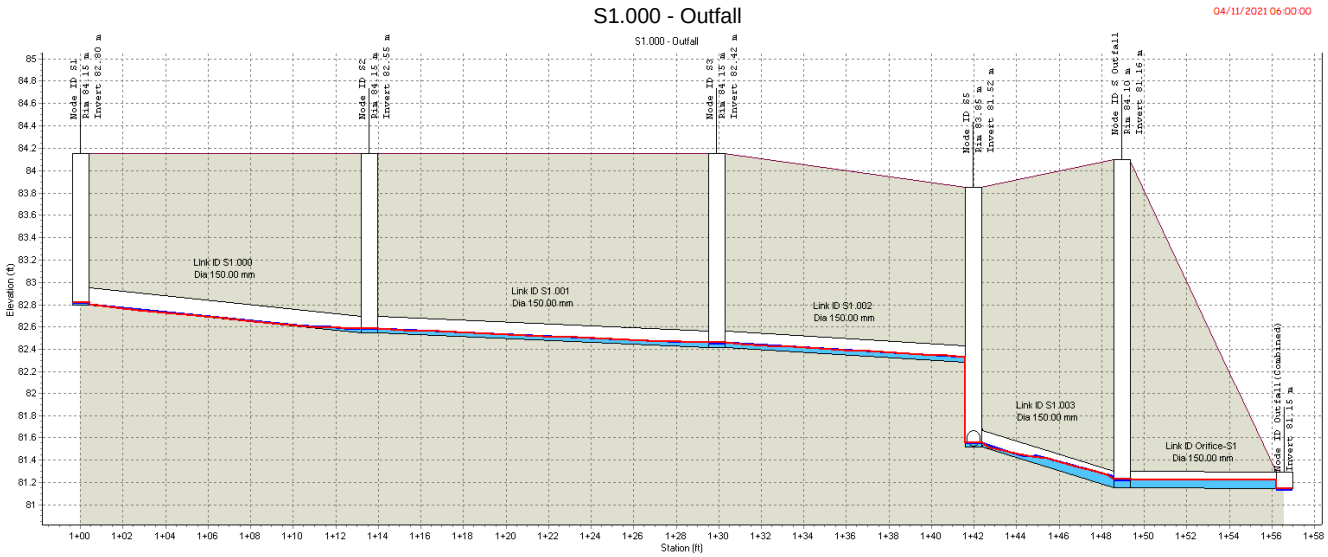


Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.82	82.59	82.46	81.56	81.23	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.82	1.71	2.95	5.09	5.09
Max Vel (m/s):	0.33	0.40	0.60	0.99	0.00
Max Depth (m):	0.03	0.04	0.05	0.06	0.00

1:100yr +40% 6hr Storm Analysis - Elapsed Time 01:00:00

Profile Plot
S1.000 - Outfall



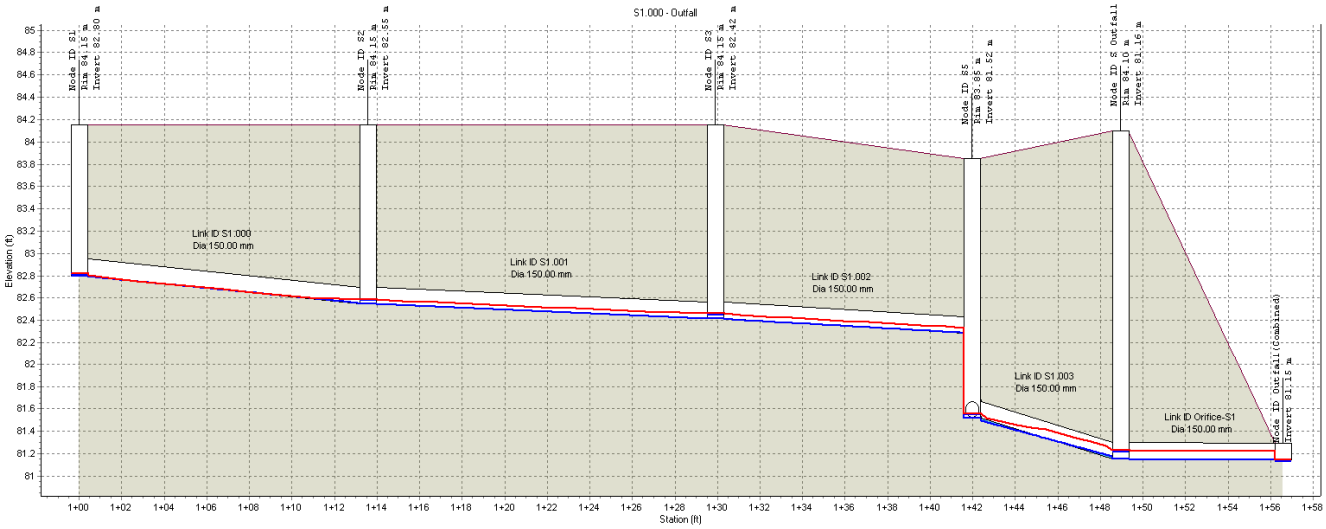
Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.82	82.59	82.46	81.56	81.23	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.82	1.71	2.95	5.09	5.09
Max Vel (m/s):	0.33	0.40	0.60	0.99	0.00
Max Depth (m):	0.03	0.04	0.05	0.06	0.00

1:100yr +40% 6hr Storm Analysis - Elapsed Time 06:00:00

Profile Plot
S1.000 - Outfall

04/11/2021 12:00:00



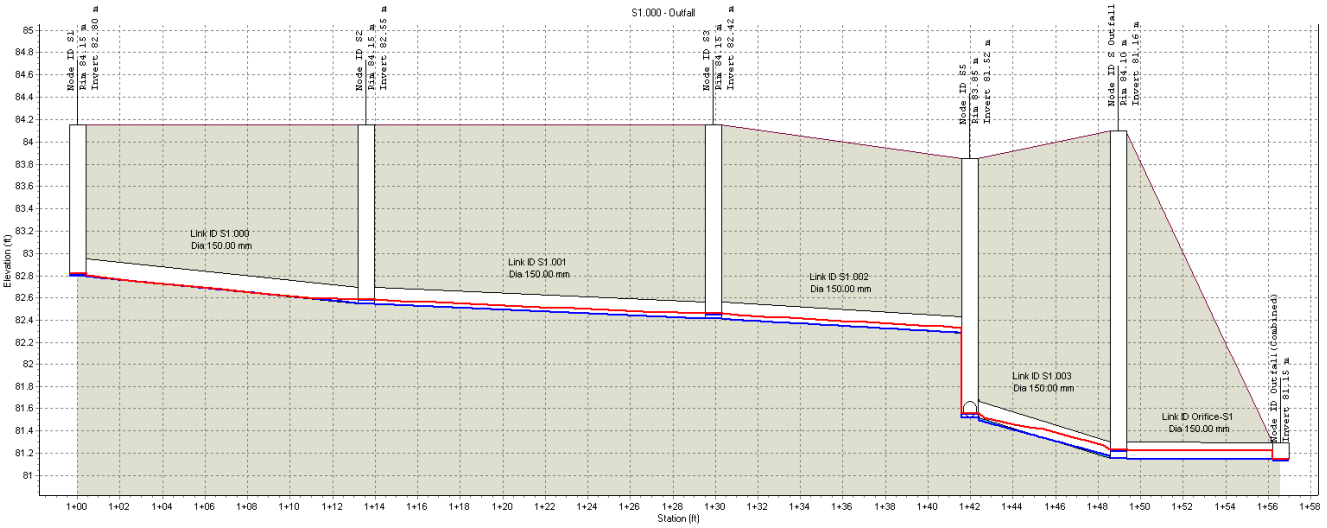
Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.82	82.59	82.46	81.56	81.23	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.82	1.71	2.95	5.09	5.09
Max Vel (m/s):	0.33	0.40	0.60	0.99	0.00
Max Depth (m):	0.03	0.04	0.05	0.06	0.00

1:100yr +40% 6hr Storm Analysis - Elapsed Time 12:00:00

Profile Plot
S1.000 - Outfall

05/11/2021 00:00:00



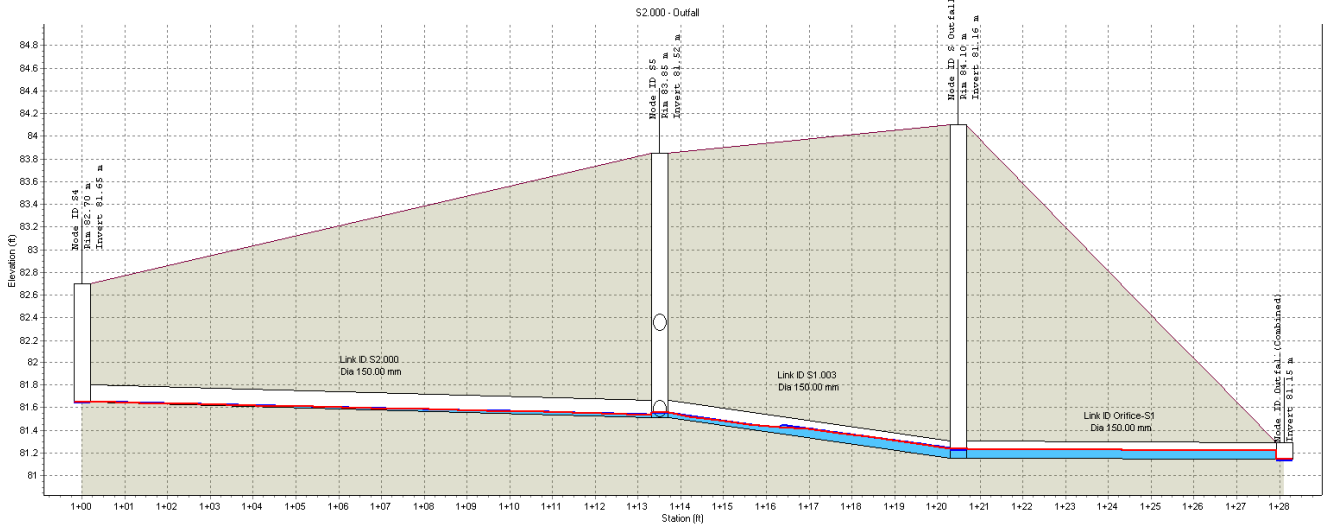
Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.82	82.59	82.46	81.56	81.23	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.82	1.71	2.95	5.09	5.09
Max Vel (m/s):	0.33	0.40	0.60	0.99	0.00
Max Depth (m):	0.03	0.04	0.05	0.06	0.00

1:100yr +40% 6hr Storm Analysis - Elapsed Time 24:00:00

Profile Plot
S2.000 - Outfall

04/11/2021 01:00:00



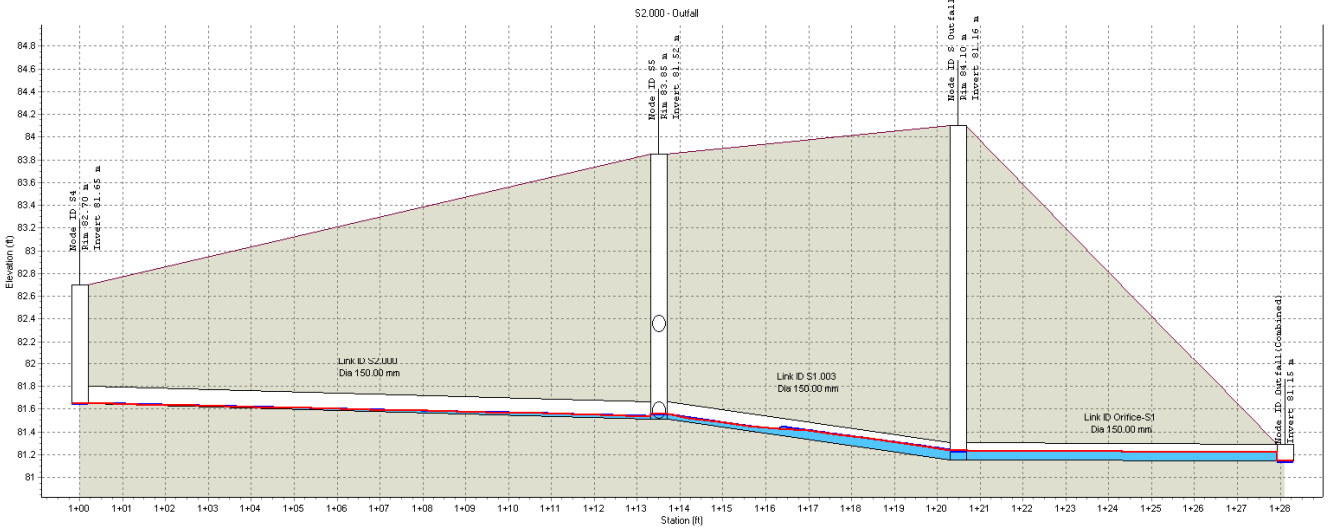
Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
Min Pipe Cover (m):	0.90	1.42	0.00	
Max HGL (m):	81.65	81.56	81.23	81.14

Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
Slope (m/m):	0.0100	0.0515	
Up Invert (m):	81.65	81.52	81.16
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	5.09	5.09
Max Vel (m/s):	0.00	0.99	0.00
Max Depth (m):	0.02	0.06	0.00

1:100yr +40% 6hr Storm Analysis - Elapsed Time 01:00:00

Profile Plot
S2.000 - Outfall

04/11/2021 06:00:00



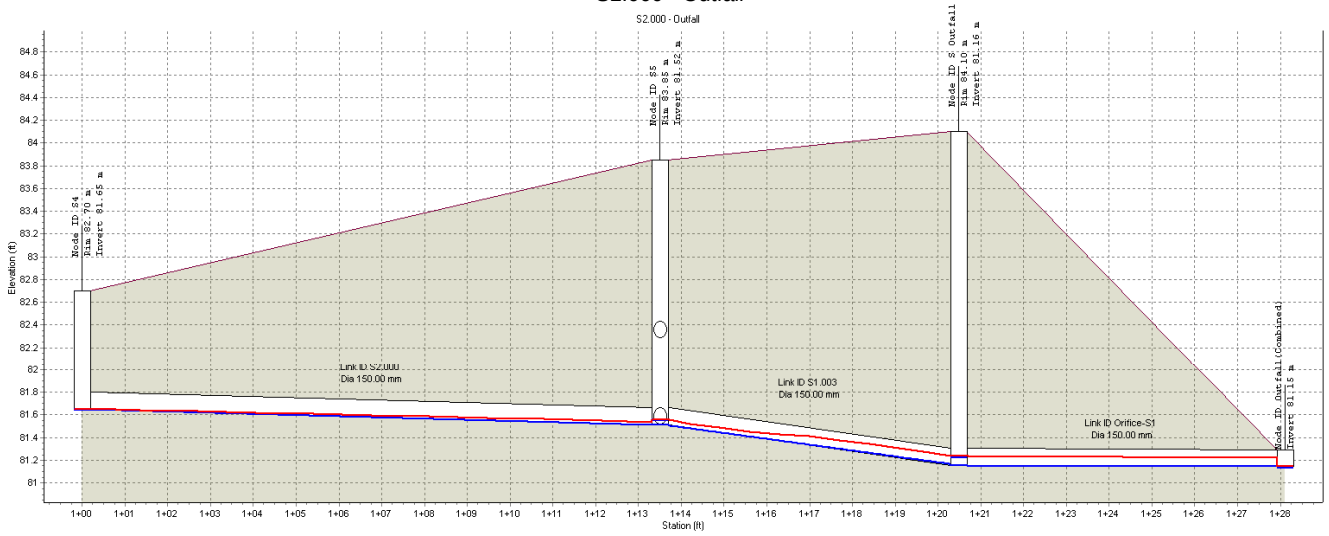
Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
Min Pipe Cover (m):	0.90	1.42	0.00	
Max HGL (m):	81.65	81.56	81.23	81.14

Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
Slope (m/m):	0.0100	0.0515	
Up Invert (m):	81.65	81.52	81.16
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	5.09	5.09
Max Vel (m/s):	0.00	0.99	0.00
Max Depth (m):	0.02	0.06	0.00

1:100yr +40% 6hr Storm Analysis - Elapsed Time 06:00:00

Profile Plot
S2.000 - Outfall

04/11/2021 12:00:00



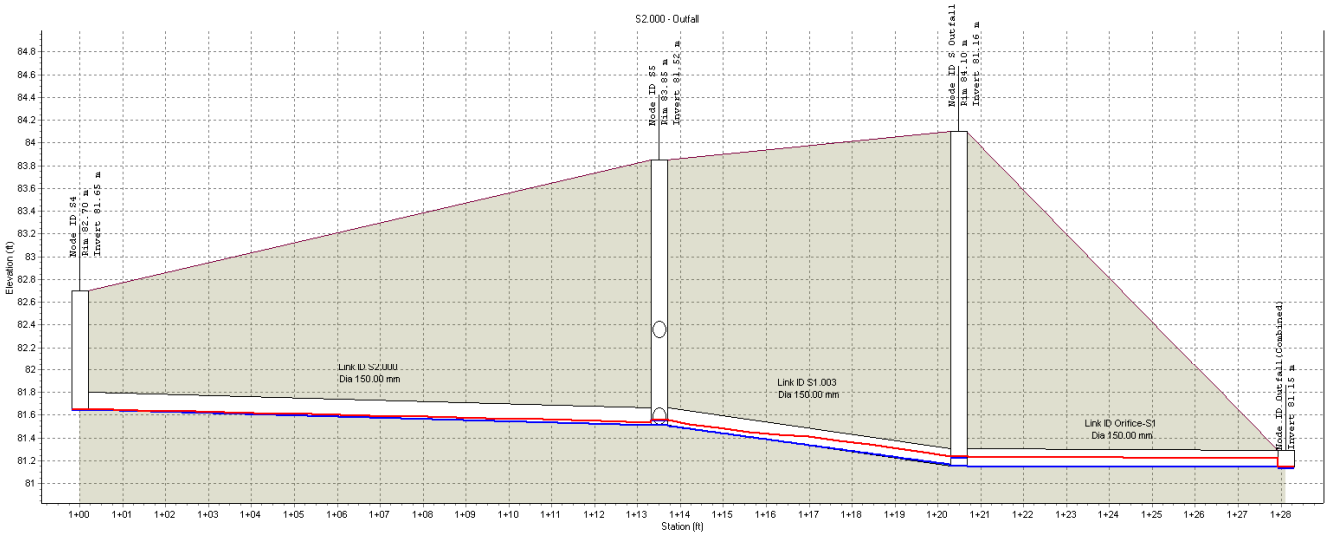
Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
Min Pipe Cover (m):	0.90	1.42	0.00	
Max HGL (m):	81.65	81.56	81.23	81.14

Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
Slope (m/m):	0.0100	0.0515	
Up Invert (m):	81.65	81.52	81.16
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	5.09	5.09
Max Vel (m/s):	0.00	0.99	0.00
Max Depth (m):	0.02	0.06	0.00

1:100yr +40% 6hr Storm Analysis - Elapsed Time 12:00:00

Profile Plot
S2.000 - Outfall

05/11/2021 00:00:00



Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
Min Pipe Cover (m):	0.90	1.42	0.00	
Max HGL (m):	81.65	81.56	81.23	81.14

Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
Slope (m/m):	0.0100	0.0515	
Up Invert (m):	81.65	81.52	81.16
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	5.09	5.09
Max Vel (m/s):	0.00	0.99	0.00
Max Depth (m):	0.02	0.06	0.00

1:100yr +40% 6hr Storm Analysis - Elapsed Time 24:00:00

Autodesk® Storm and Sanitary Analysis 2016 - Version 13.4.121 (Build 0)

****
Project Description
****

File Name ..... 16-254-Fitzroy Park S1 S2 100yr.SPF
Description ..... 16-254 Fitzroy Park Development
100yr Return
Storm Network S1 & S2

****
Analysis Options
****

Flow Units ..... LPS
Subbasin Hydrograph Method. Modified Rational
Time of Concentration..... Kirpich
Return Period..... 100 years
Storm Duration..... 360 min
Link Routing Method ..... Hydrodynamic
Storage Node Exfiltration.. Constant rate, wetted area
Starting Date NOV-04-2021 00:00:00
Ending Date NOV-05-2021 00:00:00
Report Time Step 00:00:10

********** Runoff Quantity Continuity **********	Volume hectare-m	Depth mm
Total Precipitation	0.009	61.500
Continuity Error (%)	1.000	

********** Flow Routing Continuity **********	Volume hectare-m	Volume Mliters
External Inflow	0.000	0.000
External Outflow	0.008	0.078
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Entrance

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot1-paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot2-paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.00	-	0.90
Composite Area & Weighted Runoff Coeff.	0.00		0.90

Subbasin Plot3-paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.02	-	0.90

Composite Area & Weighted Runoff Coeff. 0.02 0.90

****
Kirpich Time of Concentration Computations Report
****

Tc = (0.01947 * (L^0.77) * (S^-0.385))

Where:

Tc = Time of Concentration (min)
L = Flow length (m)
S = Slope (m/m)

Subbasin Entrance

Flow length (m): 10.00
Slope (%): 0.50
Computed TOC (minutes): 0.88

Subbasin Plot1-paved

Flow length (m): 5.00
Slope (%): 0.50
Computed TOC (minutes): 0.52

Subbasin Plot2-paved

Flow length (m): 5.00
Slope (%): 0.50
Computed TOC (minutes): 0.52

Subbasin Plot3-paved

Flow length (m): 5.00
Slope (%): 1.50
Computed TOC (minutes): 0.34

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip mm	Rainfall Intensity mm/hr	Total Runoff mm	Peak Runoff LPS	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
Entrance	61.50	10.25	55.35	1.52	0.900	0	00:05:00
Plot1-paved	61.50	10.25	55.35	0.89	0.900	0	00:05:00
Plot2-paved	61.50	10.25	55.35	0.64	0.900	0	00:05:00
Plot3-paved	61.50	10.25	55.35	0.58	0.900	0	00:05:00

****
Node Depth Summary
****

Node ID	Average Depth Attained m	Maximum Depth Attained m	Maximum HGL Attained m	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume ha-mm	Total Flooded Time minutes	Retention Time hh:mm:ss
S Outfall	0.02	0.06	81.22	0	01:47	0	0	0:00:00
S1	0.00	0.02	82.82	0	00:16	0	0	0:00:00
S2	0.01	0.03	82.58	0	01:53	0	0	0:00:00
S3	0.01	0.04	82.46	0	00:24	0	0	0:00:00
S4	0.00	0.00	81.65	0	00:00	0	0	0:00:00
S5	0.01	0.04	81.55	0	02:44	0	0	0:00:00
Outfall(Combined)	0.00	0.00	81.14	0	00:00	0	0	0:00:00
Stor-S1	0.00	0.00	81.60	0	00:00	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow LPS	Peak Inflow LPS	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow LPS	Time of Peak Flooding Occurrence days	Time of Peak Flooding Occurrence hh:mm
S Outfall	JUNCTION	0.00	3.63	0	00:25	0.00		
S1	JUNCTION	0.58	0.58	0	00:05	0.00		
S2	JUNCTION	0.64	1.22	0	00:16	0.00		
S3	JUNCTION	0.89	2.11	0	01:45	0.00		
S4	JUNCTION	0.00	0.00	0	00:00	0.00		
S5	JUNCTION	1.52	3.63	0	00:24	0.00		
Outfall(Combined)	OUTFALL	0.00	3.63	0	00:49	0.00		
Stor-S1	STORAGE	0.00	0.00	0	00:00	0.00		

****
Storage Node Summary
****

Storage Node ID	Maximum Ponded Volume 1000 m³	Maximum Ponded Volume (%)	Time of Max Ponded Volume days	Time of Max Ponded Volume hh:mm	Average Ponded Volume 1000 m³	Average Ponded Volume (%)	Maximum Storage Node Outflow LPS	Maximum Exfiltration Rate cmm	Time of Max. Exfiltration Rate hh:mm:ss	Total Exfiltrated Volume 1000 m³
Stor-S1	0.000	0	0	00:00	0.000	0	0.00	0.00	0:00:00	0.000

****
Outfall Loading Summary
****

Outfall Node ID	Flow Frequency (%)	Average Flow LPS	Peak Inflow LPS
Outfall(Combined)	26.24	3.46	3.63
System	26.24	3.46	3.63

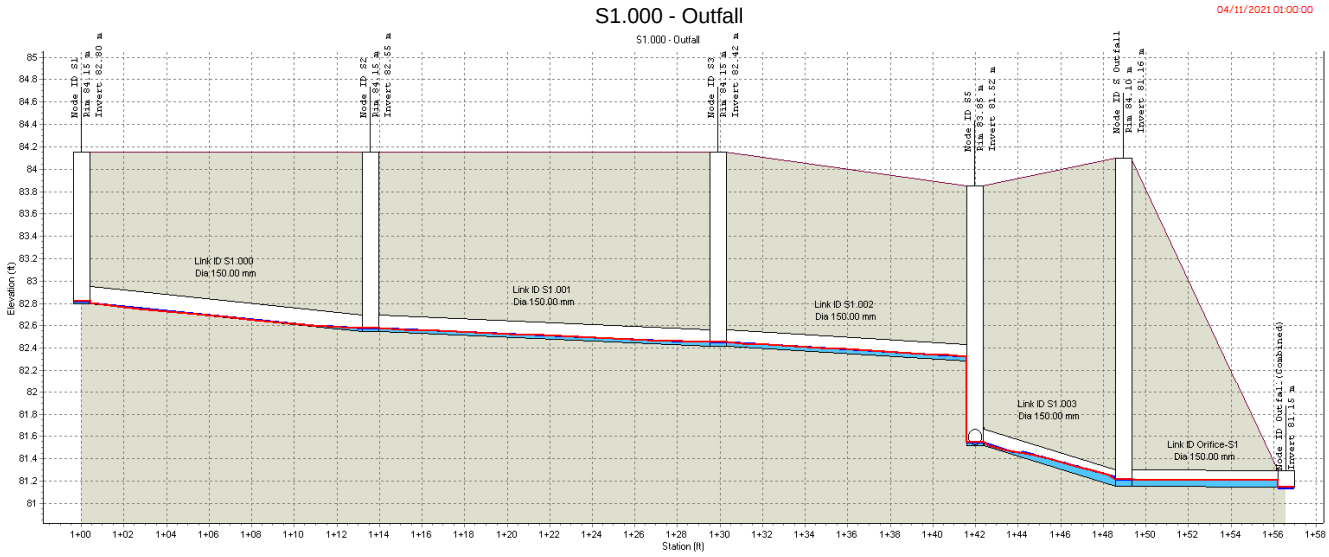
****
Link Flow Summary
****

Link ID	Element Type	Time of Peak Flow Occurrence days	Time of Peak Flow Occurrence hh:mm	Maximum Velocity Attained m/sec	Length Factor	Peak Flow during Analysis LPS	Design Flow Capacity LPS	Ratio of Maximum /Design Flow	Ratio of Maximum Flow Depth	Total Time Surcharged minutes	Reported Condition
S1.000	CONDUIT	0	00:16	0.30	1.00	0.58	17.99	0.03	0.17	0	Calculated
S1.001	CONDUIT	0	01:45	0.37	1.00	1.22	11.92	0.10	0.25	0	Calculated
S1.002	CONDUIT	0	00:24	0.55	1.00	2.11	13.74	0.15	0.27	0	Calculated
S1.003	CONDUIT	0	00:25	0.93	1.00	3.63	29.97	0.12	0.33	0	Calculated
S2.000	CONDUIT	0	00:00	0.00	1.00	0.00	13.20	0.00	0.12	0	Calculated
Storage Link	CONDUIT	0	00:00	0.00	1.00	0.00	17.46	0.00	0.12	0	Calculated
Orifice-S1	ORIFICE	0	00:49			3.63			0.42		

****
Highest Flow Instability Indexes
****
All links are stable.

Analysis began on: Fri Nov 5 15:30:59 2021
Analysis ended on: Fri Nov 5 15:31:00 2021
Total elapsed time: 00:00:01

Profile Plot
S1.000 - Outfall

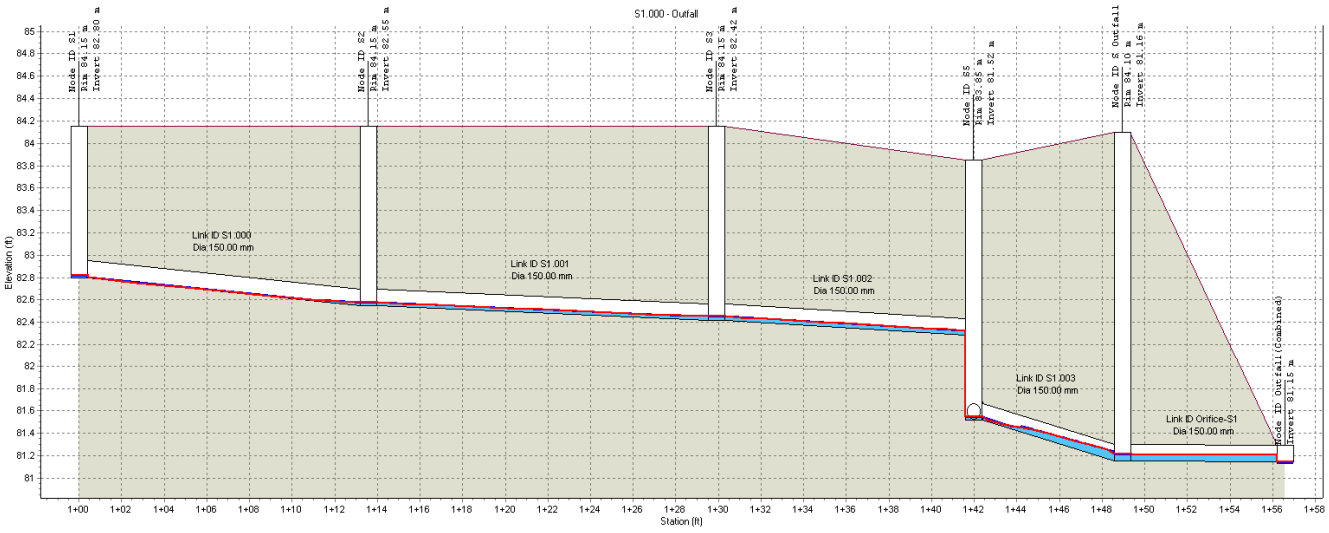


Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.82	82.58	82.46	81.55	81.22	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.58	1.22	2.11	3.63	3.63
Max Vel (m/s):	0.30	0.37	0.55	0.93	0.00
Max Depth (m):	0.03	0.04	0.04	0.05	0.00

1:100yr 6hr Storm Analysis - Elapsed Time 01:00:00

Profile Plot
S1.000 - Outfall



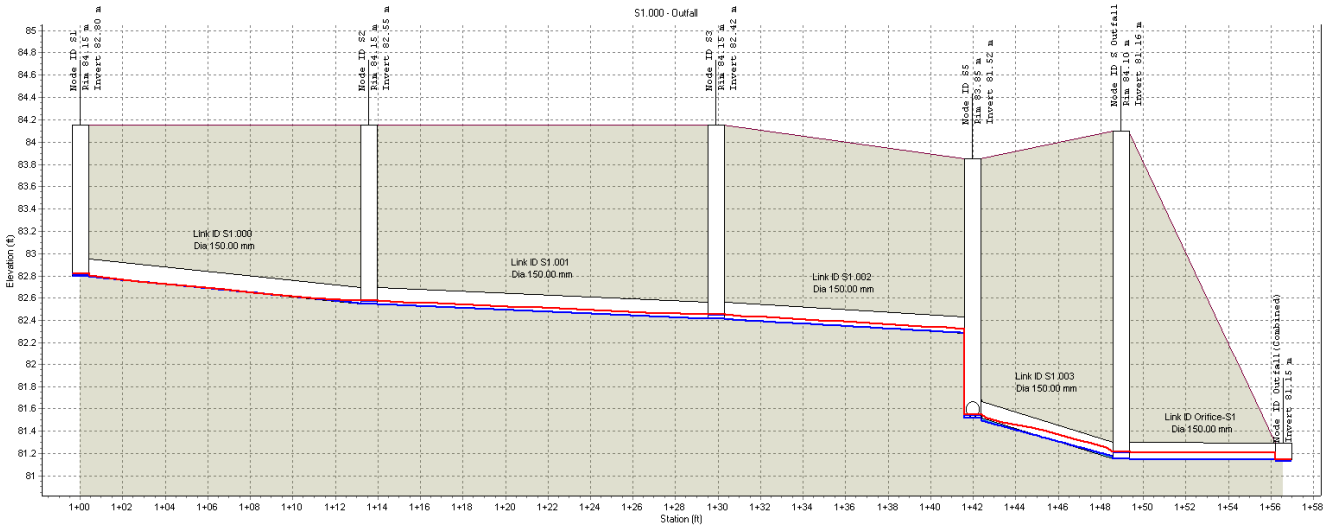
Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.82	82.58	82.46	81.55	81.22	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.58	1.22	2.11	3.63	3.63
Max Vel (m/s):	0.30	0.37	0.55	0.93	0.00
Max Depth (m):	0.03	0.04	0.04	0.05	0.00

1:100yr 6hr Storm Analysis - Elapsed Time 06:00:00

Profile Plot
S1.000 - Outfall

04/11/2021 12:00:00



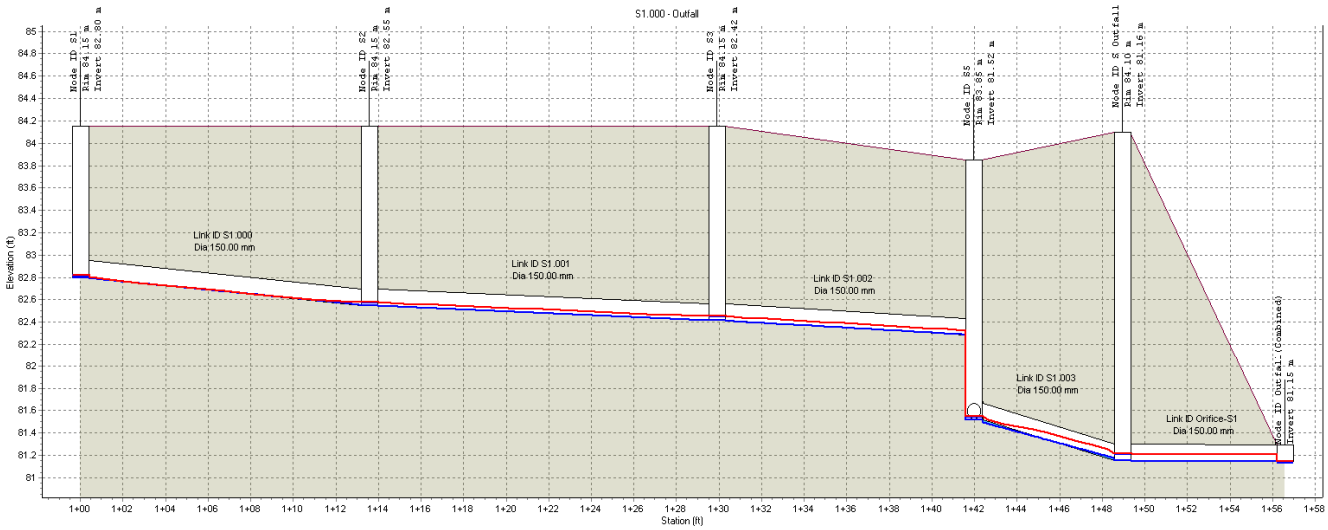
Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.82	82.58	82.46	81.55	81.22	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.58	1.22	2.11	3.63	3.63
Max Vel (m/s):	0.30	0.37	0.55	0.93	0.00
Max Depth (m):	0.03	0.04	0.04	0.05	0.00

1:100yr 6hr Storm Analysis - Elapsed Time 12:00:00

Profile Plot
S1.000 - Outfall

05/11/2021 00:00:00



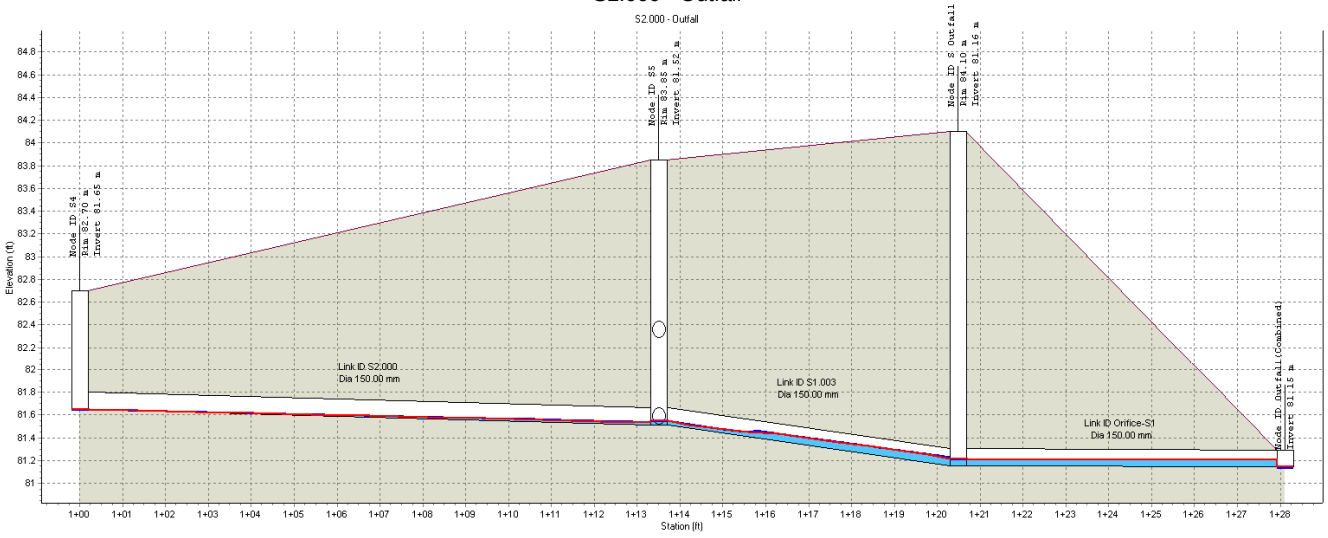
Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.82	82.58	82.46	81.55	81.22	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.58	1.22	2.11	3.63	3.63
Max Vel (m/s):	0.30	0.37	0.55	0.93	0.00
Max Depth (m):	0.03	0.04	0.04	0.05	0.00

1:100yr 6hr Storm Analysis - Elapsed Time 24:00:00

Profile Plot
S2.000 - Outfall

04/11/2021 01:00:00



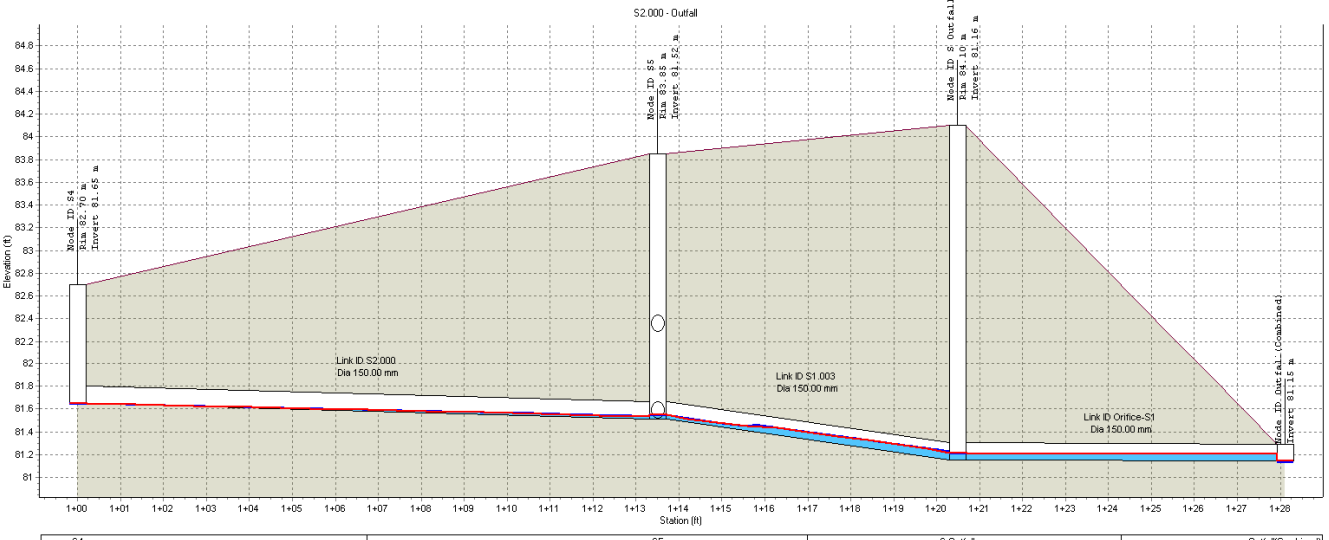
Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
Min Pipe Cover (m):	0.90	1.42	0.00	
Max HGL (m):	81.65	81.55	81.22	81.14

Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
Slope (m/m):	0.0100	0.0515	
Up Invert (m):	81.65	81.52	81.16
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	3.63	3.63
Max Vel (m/s):	0.00	0.93	0.00
Max Depth (m):	0.02	0.05	0.00

1:100yr 6hr Storm Analysis - Elapsed Time 01:00:00

Profile Plot
S2.000 - Outfall

04/11/2021 06:00:00



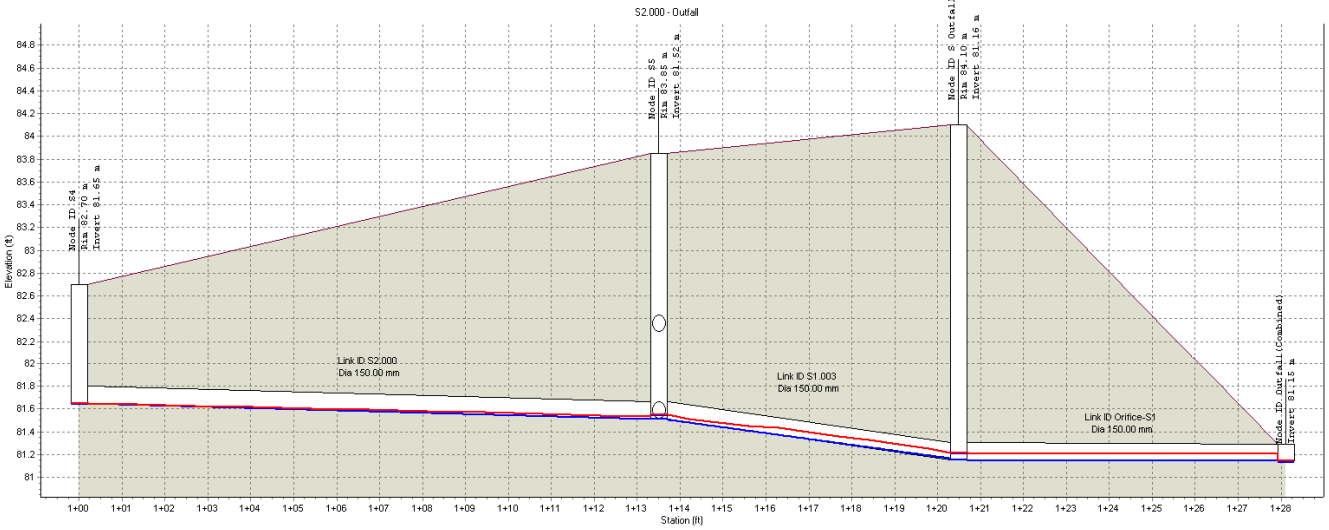
Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
Min Pipe Cover (m):	0.90	1.42	0.00	
Max HGL (m):	81.65	81.55	81.22	81.14

Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
Slope (m/m):	0.0100	0.0515	
Up Invert (m):	81.65	81.52	81.16
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	3.63	3.63
Max Vel (m/s):	0.00	0.93	0.00
Max Depth (m):	0.02	0.05	0.00

1:100yr 6hr Storm Analysis - Elapsed Time 06:00:00

Profile Plot
S2.000 - Outfall

04/11/2021 12:00:00



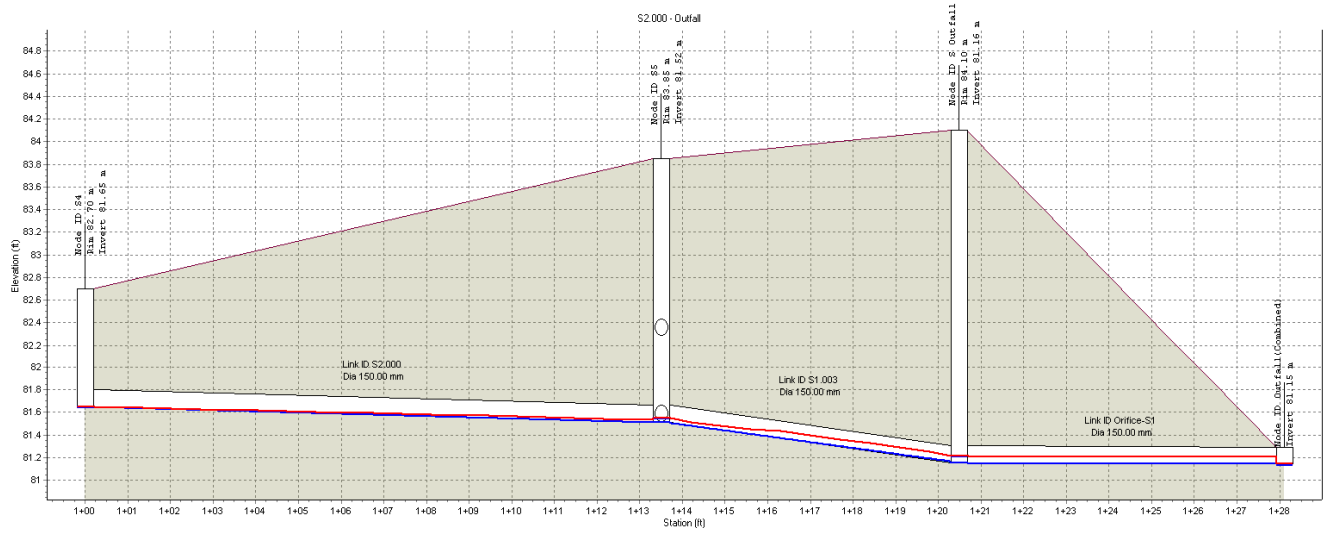
Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
Min Pipe Cover (m):	0.90	1.42	0.00	
Max HGL (m):	81.65	81.55	81.22	81.14

Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
Slope (m/m):	0.0100	0.0515	
Up Invert (m):	81.65	81.52	81.16
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	3.63	3.63
Max Vel (m/s):	0.00	0.93	0.00
Max Depth (m):	0.02	0.05	0.00

1:100yr 6hr Storm Analysis - Elapsed Time 12:00:00

Profile Plot
S2.000 - Outfall

05/11/2021 00:00:00



Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
Min Pipe Cover (m):	0.90	1.42	0.00	
Max HGL (m):	81.65	81.55	81.22	81.14

Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
Slope (m/m):	0.0100	0.0515	
Up Invert (m):	81.65	81.52	81.16
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	3.63	3.63
Max Vel (m/s):	0.00	0.93	0.00
Max Depth (m):	0.02	0.05	0.00

1:100yr 6hr Storm Analysis - Elapsed Time 24:00:00

Autodesk® Storm and Sanitary Analysis 2016 - Version 13.4.121 (Build 0)

****
Project Description
****
File Name ..... 16-254-Fitzroy Park S1 S2 30yr.SPF
Description ..... 16-254 Fitzroy Park Development
30yr Return
Storm Network S1 & S2

****
Analysis Options
****
Flow Units ..... LPS
Subbasin Hydrograph Method. Modified Rational
Time of Concentration..... Kirpich
Return Period..... 30 years
Storm Duration..... 360 min
Link Routing Method ..... Hydrodynamic
Storage Node Exfiltration.. Constant rate, wetted area
Starting Date NOV-04-2021 00:00:00
Ending Date NOV-05-2021 00:00:00
Report Time Step 00:00:10

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.006	44.580
Continuity Error (%)	1.000	

Flow Routing Continuity	Volume hectare-m	Volume Mliters
External Inflow	0.000	0.000
External Outflow	0.006	0.057
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Entrance

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot1-paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot2-paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.03	-	0.90
Composite Area & Weighted Runoff Coeff.	0.03		0.90

Subbasin Plot3-paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.00	-	0.90
Composite Area & Weighted Runoff Coeff.	0.00		0.90

****
Kirpich Time of Concentration Computations Report
****

Tc = (0.01947 * (L^0.77) * (S^-0.385))

Where:

Tc = Time of Concentration (min)
L = Flow length (m)
S = Slope (m/s)

Subbasin Entrance

Flow length (m): 10.00
Slope (%): 0.50
Computed TOC (minutes): 0.88

Subbasin Plot1-paved

Flow length (m): 5.00
Slope (%): 0.50
Computed TOC (minutes): 0.52

Subbasin Plot2-paved

Flow length (m): 5.00
Slope (%): 0.50
Computed TOC (minutes): 0.52

Subbasin Plot3-paved

Flow length (m): 5.00
Slope (%): 1.50
Computed TOC (minutes): 0.34

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip mm	Rainfall Intensity mm/hr	Total Runoff mm	Peak Runoff LPS	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
Entrance	44.58	7.43	40.12	1.11	0.900	0	00:05:00
Plot1-paved	44.58	7.43	40.12	0.64	0.900	0	00:05:00
Plot2-paved	44.58	7.43	40.12	0.46	0.900	0	00:05:00
Plot3-paved	44.58	7.43	40.12	0.42	0.900	0	00:05:00

****
Node Depth Summary
****

Node ID	Average Depth Attained m	Maximum Depth Attained m	Maximum HGL Attained m	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume ha-mm	Total Flooded Time minutes	Retention Time hh:mm:ss
S Outfall	0.01	0.05	81.21	0	00:45	0	0	0:00:00
S1	0.00	0.02	82.82	0	00:19	0	0	0:00:00
S2	0.01	0.03	82.58	0	00:25	0	0	0:00:00
S3	0.01	0.03	82.45	0	00:36	0	0	0:00:00
S4	0.00	0.00	81.65	0	00:00	0	0	0:00:00
S5	0.01	0.03	81.55	0	00:54	0	0	0:00:00
Outfall(Combined)	0.00	0.00	81.14	0	00:00	0	0	0:00:00
Stor-S1	0.00	0.00	81.60	0	00:00	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow LPS	Peak Inflow LPS	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow LPS	Time of Peak Flooding Occurrence days	Time of Peak Flooding Occurrence hh:mm
S Outfall	JUNCTION	0.00	2.63	0	00:26	0.00		
S1	JUNCTION	0.42	0.42	0	00:05	0.00		
S2	JUNCTION	0.46	0.88	0	00:19	0.00		
S3	JUNCTION	0.64	1.53	0	00:25	0.00		
S4	JUNCTION	0.00	0.00	0	00:00	0.00		
S5	JUNCTION	1.11	2.63	0	00:37	0.00		
Outfall(Combined)	OUTFALL	0.00	2.63	0	00:45	0.00		
Stor-S1	STORAGE	0.00	0.00	0	00:00	0.00		

****
Storage Node Summary
****

Storage Node ID	Maximum Ponded Volume 1000 m³	Maximum Ponded Volume (%)	Time of Max Ponded Volume days hh:mm	Average Ponded Volume 1000 m³	Average Ponded Volume (%)	Maximum Storage Node Outflow LPS	Maximum Exfiltration Rate cmm	Time of Max. Exfiltration Rate hh:mm:ss	Total Exfiltrated Volume 1000 m³
Stor-S1	0.000	0	0 00:00	0.000	0	0.00	0.00	0:00:00	0.000

****
Outfall Loading Summary
****

Outfall Node ID	Flow Frequency (%)	Average Flow LPS	Peak Inflow LPS
Outfall(Combined)	26.20	2.51	2.63
System	26.20	2.51	2.63

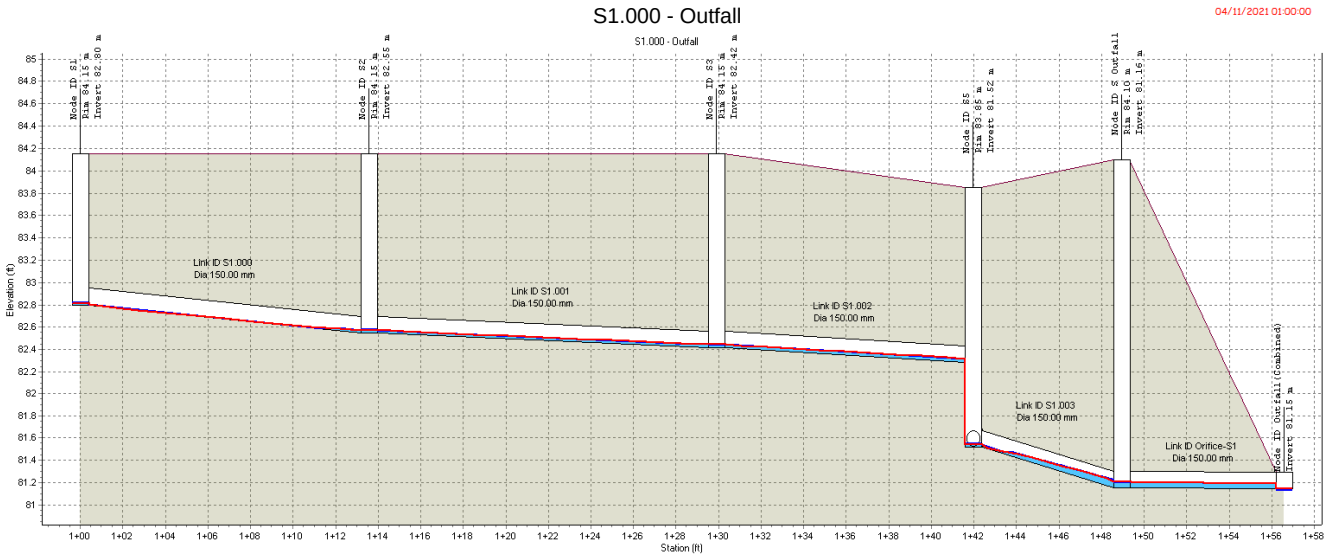
****
Link Flow Summary
****

Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity Attained m/sec	Length Factor	Peak Flow during Analysis LPS	Design Flow Capacity LPS	Ratio of Maximum /Design Flow	Ratio of Maximum Flow Depth	Total Time Surcharged minutes	Reported Condition
S1.000	CONDUIT	0 00:19	0.28	1.00	0.42	17.99	0.02	0.15	0	Calculated
S1.001	CONDUIT	0 00:25	0.33	1.00	0.88	11.92	0.07	0.21	0	Calculated
S1.002	CONDUIT	0 00:37	0.50	1.00	1.53	13.74	0.11	0.23	0	Calculated
S1.003	CONDUIT	0 00:26	0.88	1.00	2.63	29.97	0.09	0.27	0	Calculated
S2.000	CONDUIT	0 00:00	0.00	1.00	0.00	13.20	0.00	0.10	0	Calculated
Storage Link	CONDUIT	0 00:00	0.00	1.00	0.00	17.46	0.00	0.10	0	Calculated
Orifice-S1	ORIFICE	0 00:45			2.63			0.34		

****
Highest Flow Instability Indexes
****
All links are stable.

Analysis began on: Fri Nov 5 15:55:49 2021
Analysis ended on: Fri Nov 5 15:55:50 2021
Total elapsed time: 00:00:01

Profile Plot
S1.000 - Outfall

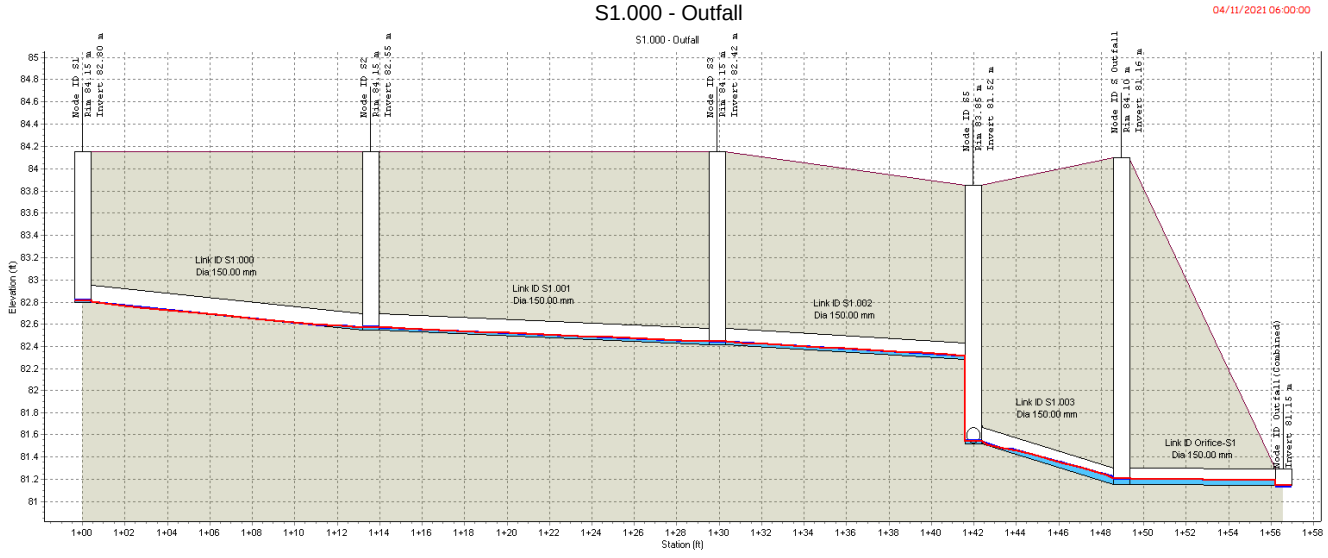


Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.82	82.58	82.45	81.55	81.21	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.42	0.88	1.53	2.63	2.63
Max Vel (m/s):	0.28	0.33	0.50	0.88	0.00
Max Depth (m):	0.02	0.03	0.03	0.04	0.00

1:30yr 6hr Storm Analysis - Elapsed Time 01:00:00

Profile Plot
S1.000 - Outfall

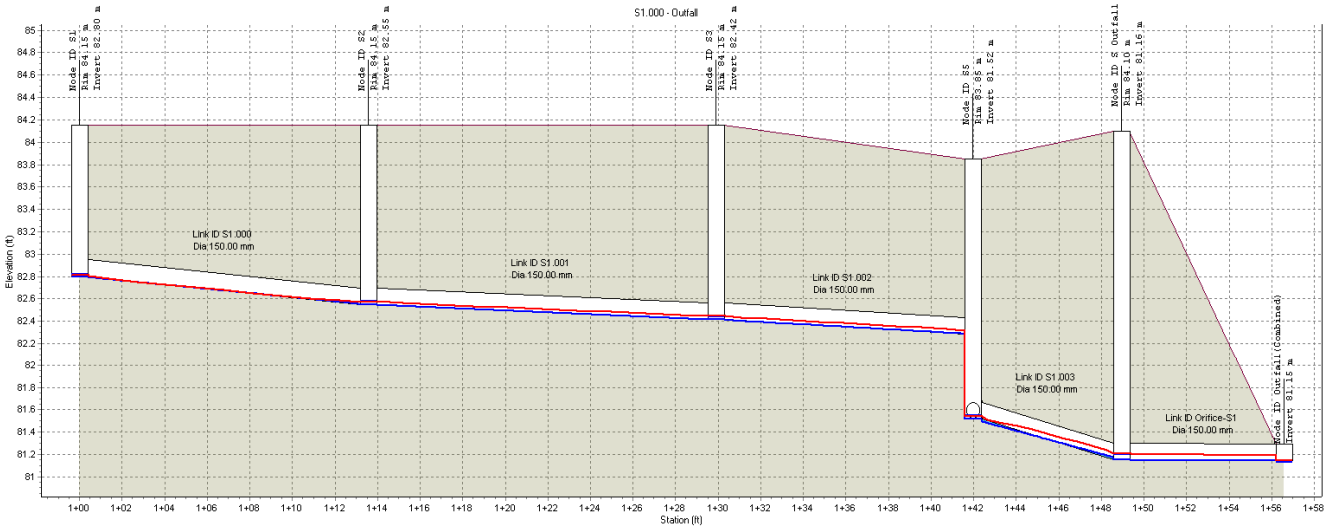


Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.82	82.58	82.45	81.55	81.21	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.42	0.88	1.53	2.63	2.63
Max Vel (m/s):	0.28	0.33	0.50	0.88	0.00
Max Depth (m):	0.02	0.03	0.03	0.04	0.00

1:30yr 6hr Storm Analysis - Elapsed Time 06:00:00

Profile Plot
S1.000 - Outfall

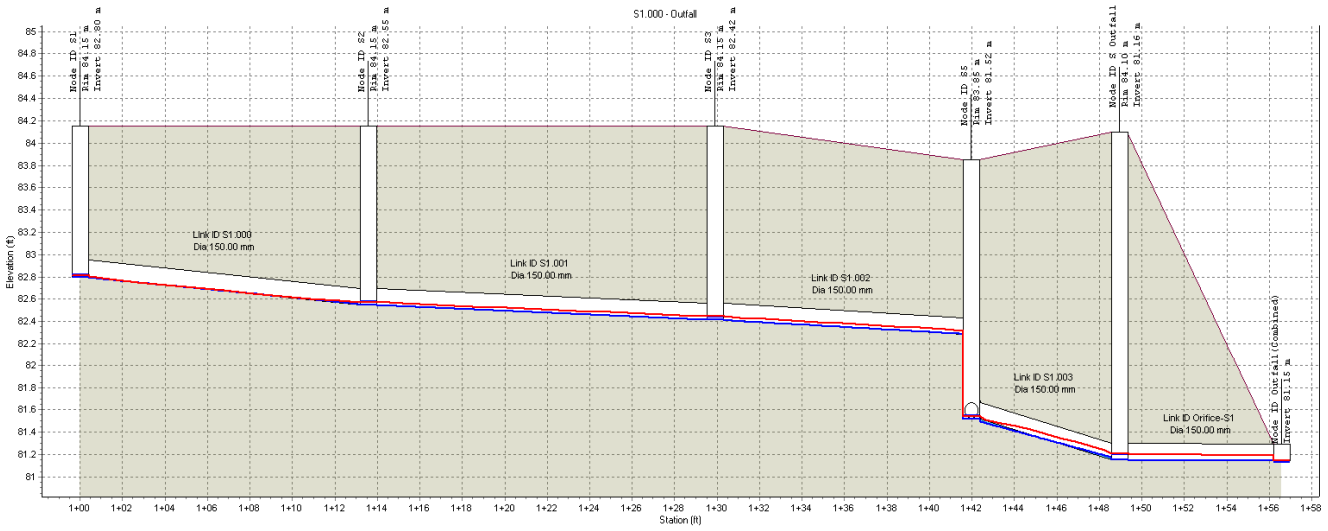


Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.82	82.58	82.45	81.55	81.21	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.42	0.88	1.53	2.63	2.63
Max Vel (m/s):	0.28	0.33	0.50	0.88	0.00
Max Depth (m):	0.02	0.03	0.03	0.04	0.00

1:30yr 6hr Storm Analysis - Elapsed Time 12:00:00

Profile Plot
S1.000 - Outfall



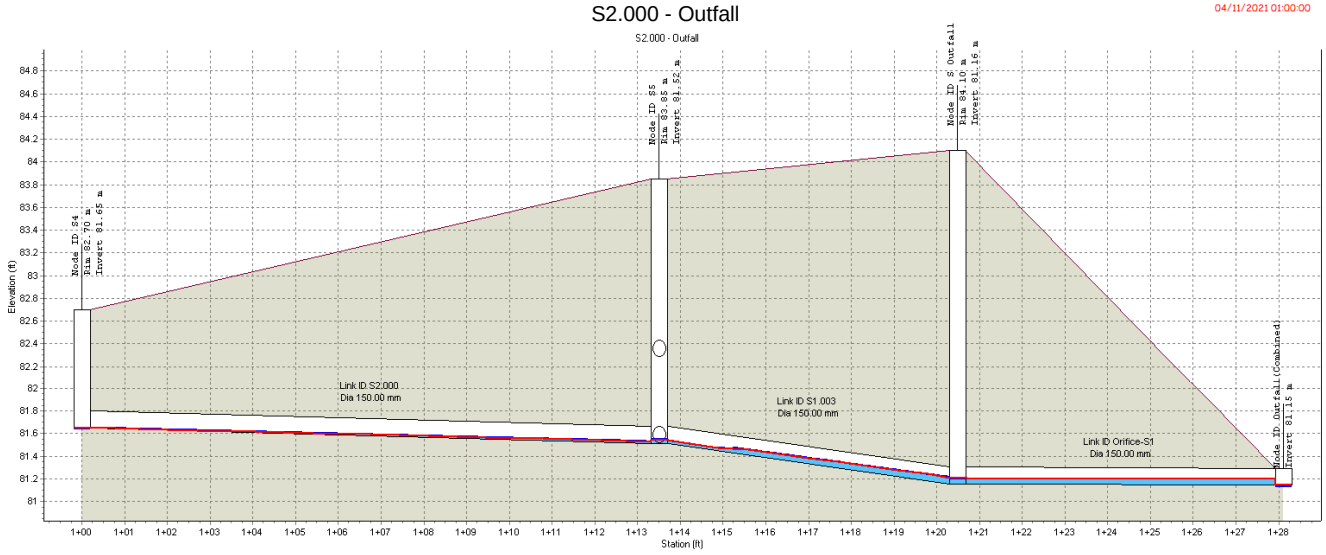
Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.82	82.58	82.45	81.55	81.21	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.42	0.88	1.53	2.63	2.63
Max Vel (m/s):	0.28	0.33	0.50	0.88	0.00
Max Depth (m):	0.02	0.03	0.03	0.04	0.00

1:30yr 6hr Storm Analysis - Elapsed Time 24:00:00

Profile Plot
S2.000 - Outfall

04/11/2021 01:00:00



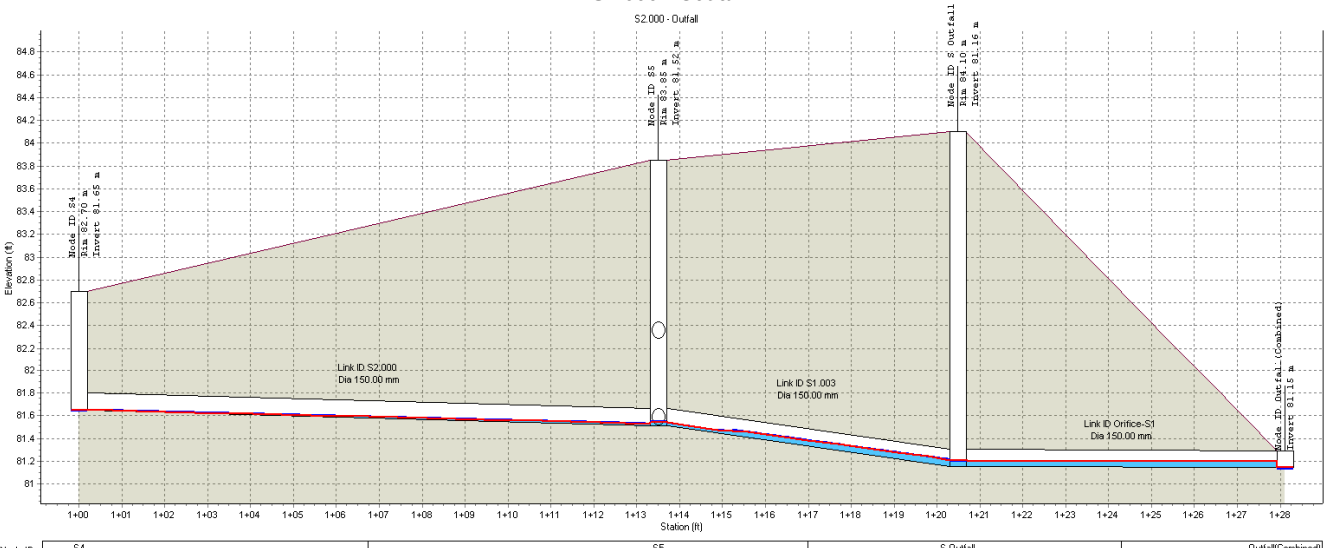
Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
Min Pipe Cover (m):	0.90	1.42	0.00	
Max HGL (m):	81.65	81.55	81.21	81.14

Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
Slope (m/m):	0.0100	0.0515	
Up Invert (m):	81.65	81.52	81.16
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	2.63	2.63
Max Vel (m/s):	0.00	0.88	0.00
Max Depth (m):	0.02	0.04	0.00

1:30yr 6hr Storm Analysis - Elapsed Time 01:00:00

Profile Plot
S2.000 - Outfall

04/11/2021 06:00:00



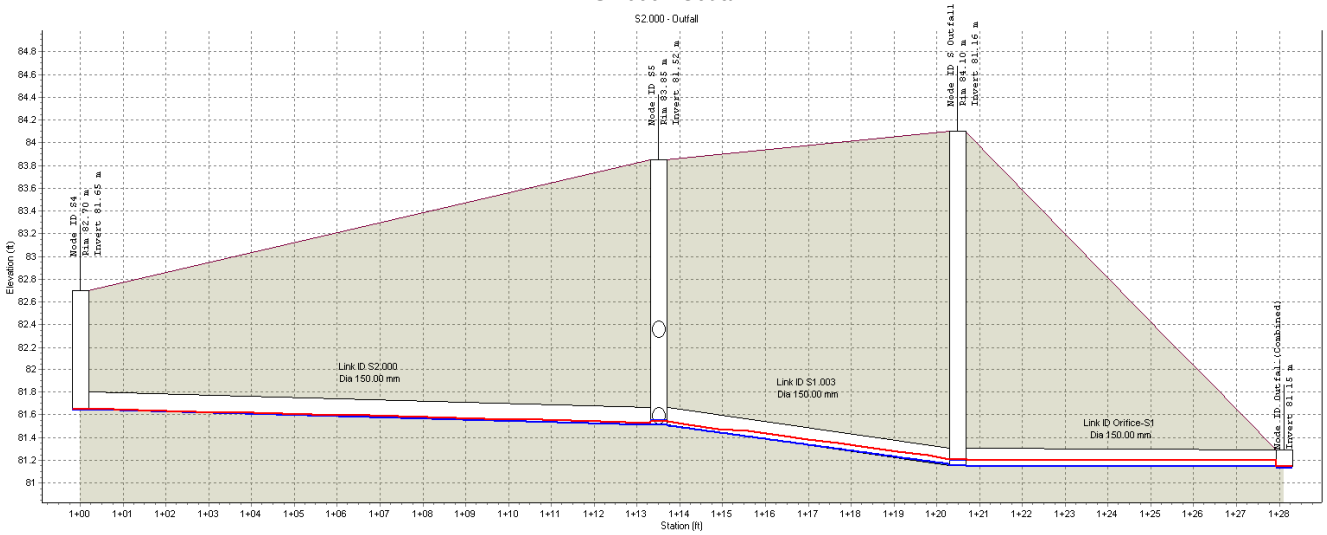
Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
Min Pipe Cover (m):	0.90	1.42	0.00	
Max HGL (m):	81.65	81.55	81.21	81.14

Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
Slope (m/m):	0.0100	0.0515	
Up Invert (m):	81.65	81.52	81.16
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	2.63	2.63
Max Vel (m/s):	0.00	0.88	0.00
Max Depth (m):	0.02	0.04	0.00

1:30yr 6hr Storm Analysis - Elapsed Time 06:00:00

Profile Plot
S2.000 - Outfall

04/11/2021 12:00:00



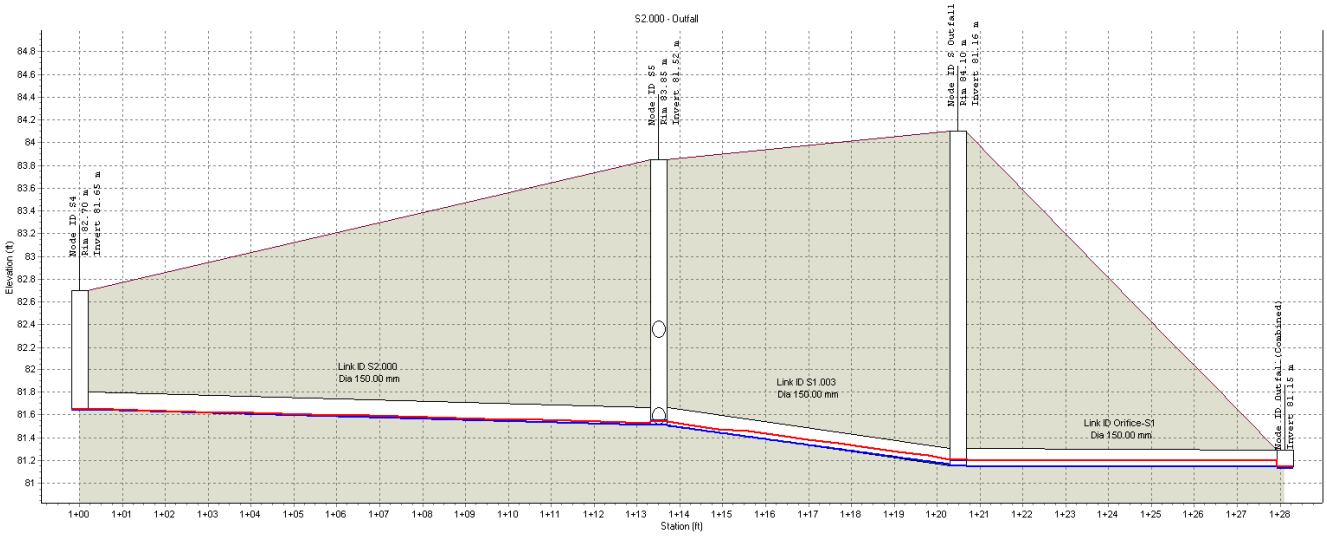
Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
Min Pipe Cover (m):	0.90	1.42	0.00	
Max HGL (m):	81.65	81.55	81.21	81.14

Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
Slope (m/m):	0.0100	0.0515	
Up Invert (m):	81.65	81.52	81.16
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	2.63	2.63
Max Vel (m/s):	0.00	0.88	0.00
Max Depth (m):	0.02	0.04	0.00

1:30yr 6hr Storm Analysis - Elapsed Time 12:00:00

Profile Plot
S2.000 - Outfall

05/11/2021 00:00:00



Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
Min Pipe Cover (m):	0.90	1.42	0.00	
Max HGL (m):	81.65	81.55	81.21	81.14

Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
Slope (m/m):	0.0100	0.0515	
Up Invert (m):	81.65	81.52	81.16
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	2.63	2.63
Max Vel (m/s):	0.00	0.88	0.00
Max Depth (m):	0.02	0.04	0.00

1:30yr 6hr Storm Analysis - Elapsed Time 24:00:00

Autodesk® Storm and Sanitary Analysis 2016 - Version 13.4.121 (Build 0)

****
Project Description
****

File Name ..... 16-254-Fitzroy Park S1 S2 1yr.SPF
Description ..... 16-254 Fitzroy Park Development
1yr Return
Storm Network S1 & S2

****
Analysis Options
****

Flow Units ..... LPS
Subbasin Hydrograph Method. Modified Rational
Time of Concentration..... Kirpich
Return Period..... 1 year
Storm Duration..... 360 min
Link Routing Method ..... Hydrodynamic
Storage Node Exfiltration.. Constant rate, wetted area
Starting Date NOV-04-2021 00:00:00
Ending Date NOV-05-2021 00:00:00
Report Time Step 00:00:10

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.003	19.500
Continuity Error (%)	1.000	

Flow Routing Continuity	Volume hectare-m	Volume Mliters
External Inflow	0.000	0.000
External Outflow	0.002	0.025
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin Entrance

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot1-paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.01	-	0.90
Composite Area & Weighted Runoff Coeff.	0.01		0.90

Subbasin Plot2-paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.00	-	0.90
Composite Area & Weighted Runoff Coeff.	0.00		0.90

Subbasin Plot3-paved

Soil/Surface Description	Area (ha)	Soil Group	Runoff Coeff.
-	0.02	-	0.90
Composite Area & Weighted Runoff Coeff.	0.02		0.90

****
Kirpich Time of Concentration Computations Report
****

Tc = (0.01947 * (L^0.77) * (S^-0.385))

Where:

Tc = Time of Concentration (min)
L = Flow length (m)
S = Slope (m/m)

Subbasin Entrance

Flow length (m): 10.00
Slope (%): 0.50
Computed TOC (minutes): 0.88

Subbasin Plot1-paved

Flow length (m): 5.00
Slope (%): 0.50
Computed TOC (minutes): 0.52

Subbasin Plot2-paved

Flow length (m): 5.00
Slope (%): 0.50
Computed TOC (minutes): 0.52

Subbasin Plot3-paved

Flow length (m): 5.00
Slope (%): 1.50
Computed TOC (minutes): 0.34

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip mm	Rainfall Intensity mm/hr	Total Runoff mm	Peak Runoff LPS	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
Entrance	19.50	3.25	17.55	0.48	0.900	0	00:05:00
Plot1-paved	19.50	3.25	17.55	0.28	0.900	0	00:05:00
Plot2-paved	19.50	3.25	17.55	0.20	0.900	0	00:05:00
Plot3-paved	19.50	3.25	17.55	0.19	0.900	0	00:05:00

****
Node Depth Summary
****

Node ID	Average Depth Attained m	Maximum Depth Attained m	Maximum HGL Attained m	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume ha-mm	Total Flooded Time minutes	Retention Time hh:mm:ss
S Outfall	0.01	0.03	81.18	0	00:59	0	0	0:00:00
S1	0.00	0.01	82.81	0	00:25	0	0	0:00:00
S2	0.00	0.02	82.57	0	00:33	0	0	0:00:00
S3	0.01	0.02	82.44	0	00:38	0	0	0:00:00
S4	0.00	0.00	81.65	0	00:00	0	0	0:00:00
S5	0.01	0.02	81.54	0	00:37	0	0	0:00:00
Outfall(Combined)	0.00	0.00	81.14	0	00:00	0	0	0:00:00
Stor-S1	0.00	0.00	81.60	0	00:00	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow LPS	Peak Inflow LPS	Time of Peak Inflow Occurrence days	Time of Peak Inflow Occurrence hh:mm	Maximum Flooding Overflow LPS	Time of Peak Flooding Occurrence days	Time of Peak Flooding Occurrence hh:mm
S Outfall	JUNCTION	0.00	1.15	0	00:36	0.00		
S1	JUNCTION	0.19	0.19	0	00:05	0.00		
S2	JUNCTION	0.20	0.39	0	00:25	0.00		
S3	JUNCTION	0.28	0.67	0	00:33	0.00		
S4	JUNCTION	0.00	0.00	0	00:00	0.00		
S5	JUNCTION	0.48	1.15	0	00:38	0.00		
Outfall(Combined)	OUTFALL	0.00	1.15	0	00:52	0.00		
Stor-S1	STORAGE	0.00	0.00	0	00:00	0.00		

****
Storage Node Summary
****

Storage Node ID	Maximum Ponded Volume 1000 m³	Maximum Ponded Volume (%)	Time of Max Ponded Volume days hh:mm	Average Ponded Volume 1000 m³	Average Ponded Volume (%)	Maximum Storage Node Outflow LPS	Maximum Exfiltration Rate cmm	Time of Max. Exfiltration Rate hh:mm:ss	Total Exfiltrated Volume 1000 m³
Stor-S1	0.000	0	0 00:00	0.000	0	0.00	0.00	0:00:00	0.000

****
Outfall Loading Summary
****

Outfall Node ID	Flow Frequency (%)	Average Flow LPS	Peak Inflow LPS
Outfall(Combined)	26.07	1.10	1.15
System	26.07	1.10	1.15

****
Link Flow Summary
****

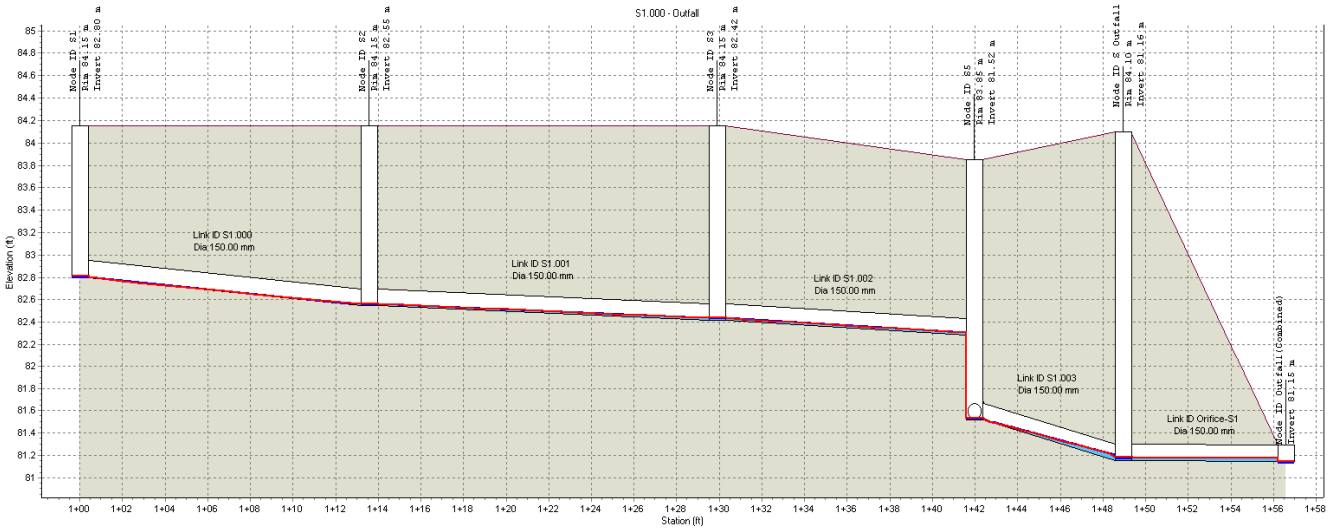
Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity Attained m/sec	Length Factor	Peak Flow during Analysis LPS	Design Flow Capacity LPS	Ratio of Maximum /Design Flow	Ratio of Maximum Flow Depth	Total Time Surcharged minutes	Reported Condition
S1.000	CONDUIT	0 00:25	0.23	1.00	0.19	17.99	0.01	0.10	0	Calculated
S1.001	CONDUIT	0 00:33	0.26	1.00	0.39	11.92	0.03	0.14	0	Calculated
S1.002	CONDUIT	0 00:38	0.40	1.00	0.67	13.74	0.05	0.15	0	Calculated
S1.003	CONDUIT	0 00:36	0.76	1.00	1.15	29.97	0.04	0.17	0	Calculated
S2.000	CONDUIT	0 00:00	0.00	1.00	0.00	13.20	0.00	0.07	0	Calculated
Storage Link	CONDUIT	0 00:00	0.00	1.00	0.00	17.46	0.00	0.07	0	Calculated
Orifice-S1	ORIFICE	0 00:52			1.15			0.20		

****
Highest Flow Instability Indexes
****
All links are stable.

Analysis began on: Fri Nov 5 16:08:32 2021
Analysis ended on: Fri Nov 5 16:08:33 2021
Total elapsed time: 00:00:01

Profile Plot
S1.000 - Outfall

04/11/2021 01:00:00



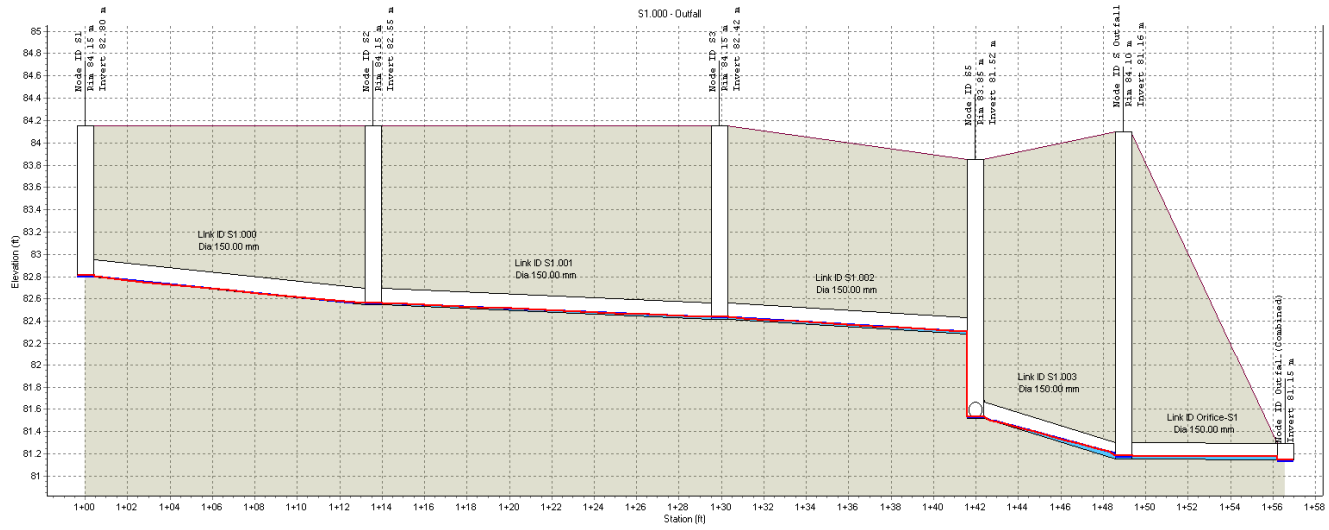
Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.81	82.57	82.44	81.54	81.18	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.19	0.39	0.67	1.15	1.15
Max Vel (m/s):	0.23	0.26	0.40	0.76	0.00
Max Depth (m):	0.01	0.02	0.02	0.02	0.00

1:1yr 6hr Storm Analysis - Elapsed Time 01:00:00

Profile Plot
S1.000 - Outfall

04/11/2021 06:00:00

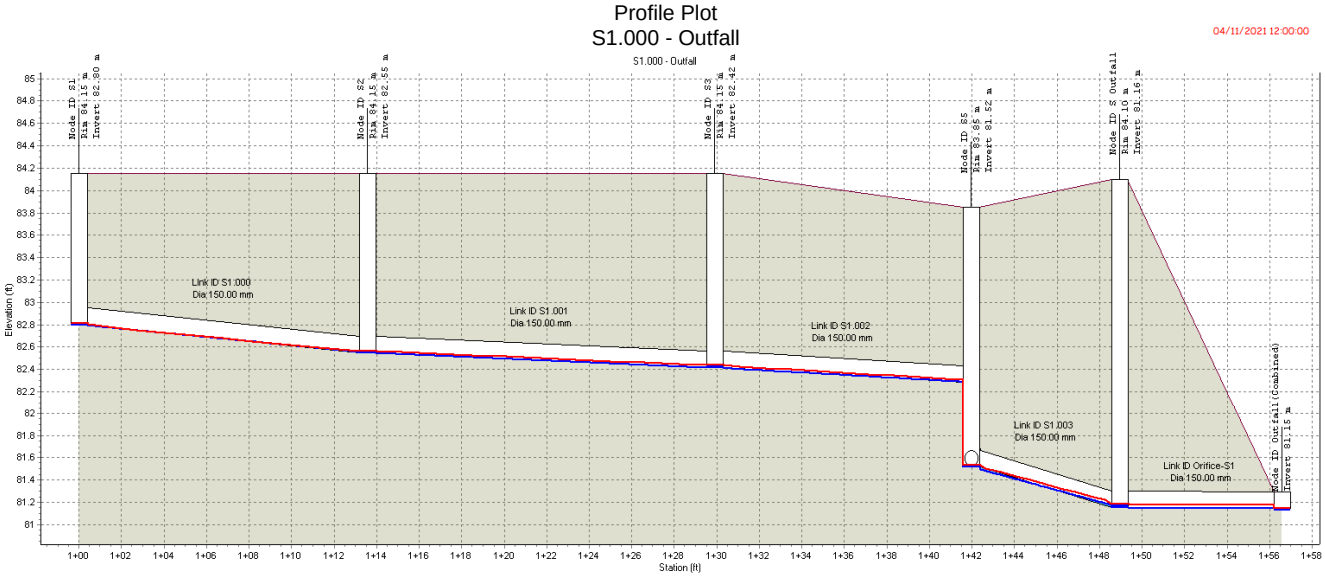


Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.81	82.57	82.44	81.54	81.18	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.19	0.39	0.67	1.15	1.15
Max Vel (m/s):	0.23	0.26	0.40	0.76	0.00
Max Depth (m):	0.01	0.02	0.02	0.02	0.00

1:1yr 6hr Storm Analysis - Elapsed Time 06:00:00

Profile Plot
S1.000 - Outfall

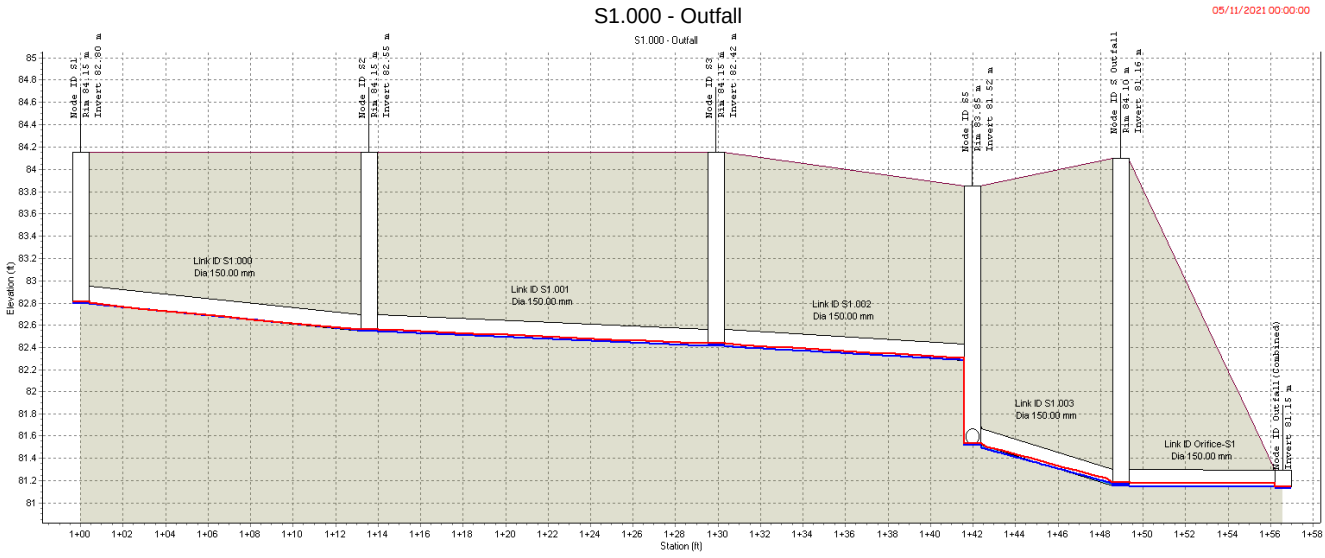


Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.81	82.57	82.44	81.54	81.18	81.14

Link ID:	S1.000	S1.001	S1.002	S1.003	Orifice-S1
Length (m):	13.57	16.30	12.09	6.99	
Dia (mm):	150.00	150.00	150.00	150.00	150.00
Slope (m/m):	0.0186	0.0082	0.0108	0.0515	
Up Invert (m):	82.80	82.55	82.42	81.52	81.16
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.19	0.39	0.67	1.15	1.15
Max Vel (m/s):	0.23	0.26	0.40	0.76	0.00
Max Depth (m):	0.01	0.02	0.02	0.02	0.00

1:1yr 6hr Storm Analysis - Elapsed Time 12:00:00

Profile Plot
S1.000 - Outfall



Node ID:	S1	S2	S3	S5	S Outfall	Outfall(Combined)
Rim (m):	84.15	84.15	84.15	83.85	84.10	
Invert (m):	82.80	82.55	82.42	81.52	81.16	81.15
Min Pipe Cover (m):	1.20	1.45	1.59	1.42	0.00	
Max HGL (m):	82.81	82.57	82.44	81.54	81.18	81.14

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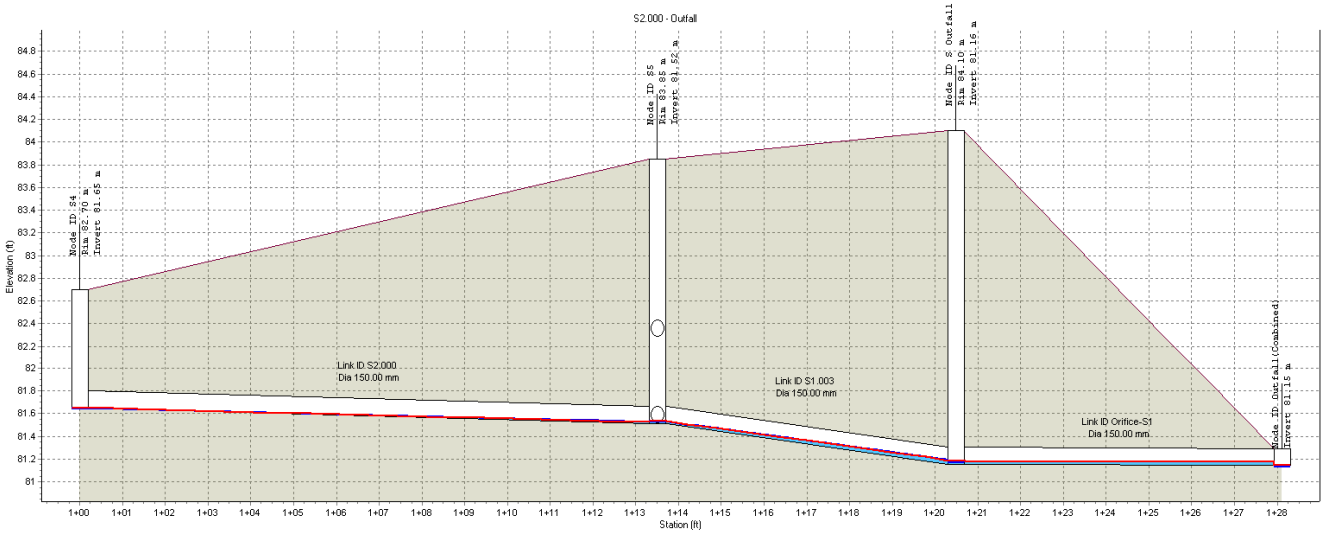
Dn Invert (m):	82.55	82.42	82.28	81.16	81.15
Max Q (lps):	0.19	0.39	0.67	1.15	1.15
Max Vel (m/s):	0.23	0.26	0.40	0.76	0.00
Max Depth (m):	0.01	0.02	0.02	0.02	0.00

1:1yr 6hr Storm Analysis - Elapsed Time 24:00:00

Profile Plot
S2.000 - Outfall

04/11/2021 01:00:00



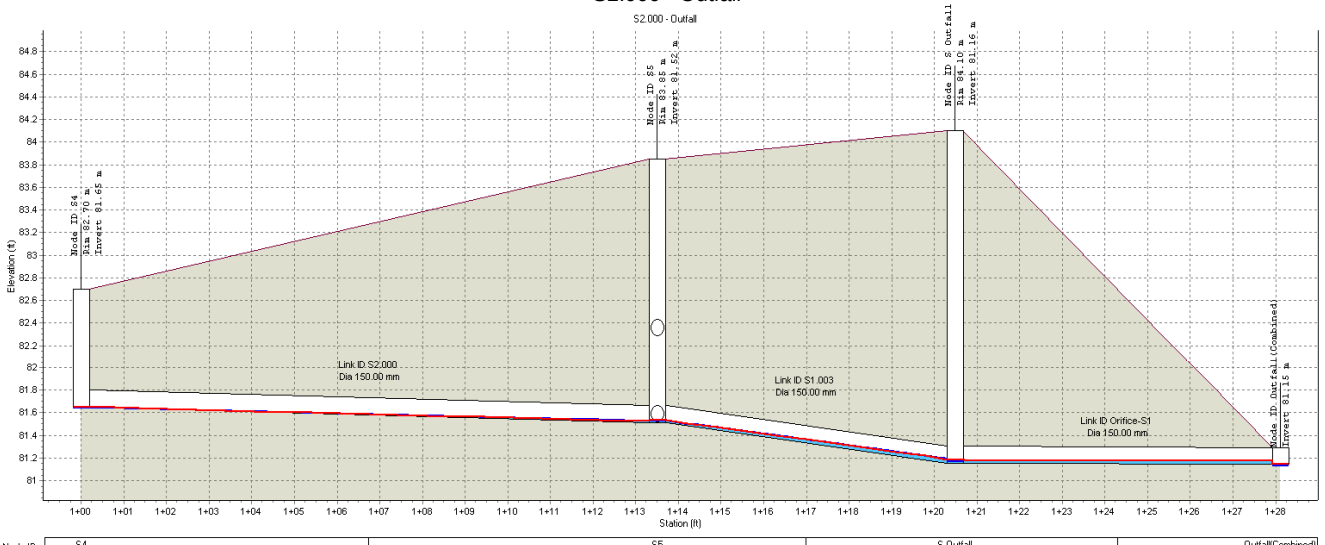
Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
Min Pipe Cover (m):	0.90	1.42	0.00	
Max HGL (m):	81.65	81.54	81.18	81.14

Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
Slope (m/m):	0.0100	0.0515	
Up Invert (m):	81.65	81.52	81.16
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	1.15	1.15
Max Vel (m/s):	0.00	0.76	0.00
Max Depth (m):	0.01	0.02	0.00

1:1yr 6hr Storm Analysis - Elapsed Time 01:00:00

Profile Plot
S2.000 - Outfall

04/11/2021 06:00:00



Node ID:	S4	S5	S Outfall	Outfall(Combined)
Rim (m):	82.70	83.85	84.10	
Invert (m):	81.65	81.52	81.16	81.15
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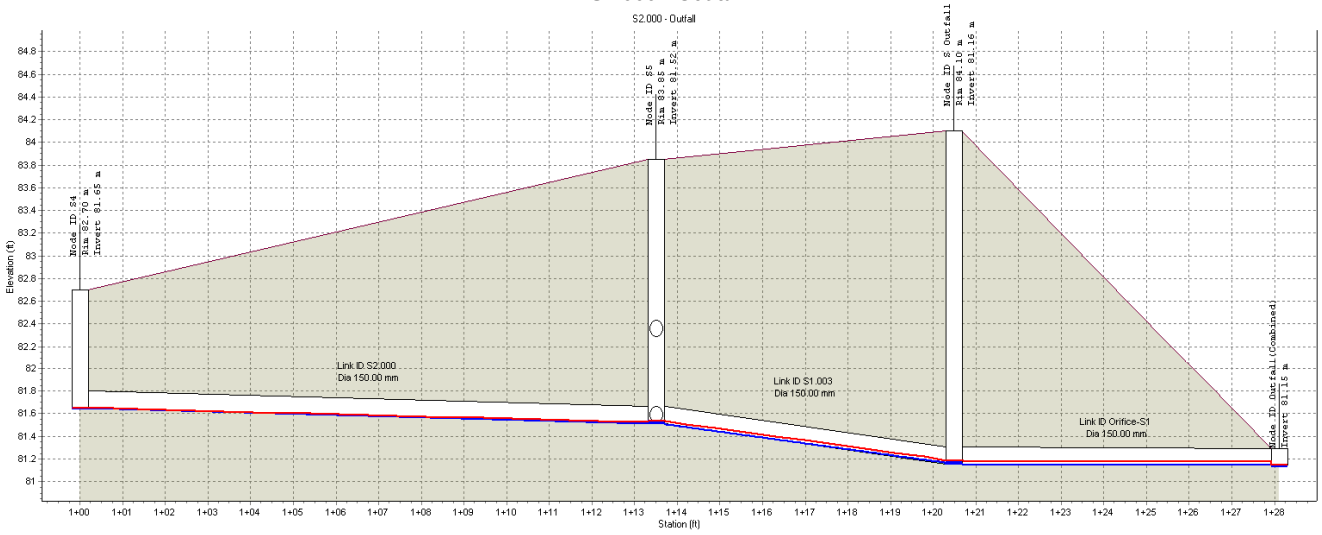
Dn Invert (m):	81.52	81.16	81.15
Max Q (lps):	0.00	1.15	1.15
Max Vel (m/s):	0.00	0.76	0.00
Max Depth (m):	0.01	0.02	0.00

1:1yr 6hr Storm Analysis - Elapsed Time 06:00:00

Profile Plot
S2.000 - Outfall

04/11/2021 12:00:00



Node ID:	S4	S5	S Outfall	Outfall(Combined)
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Link ID:	S2.000	S1.003	Orifice-S1
Length (m):	13.50	6.99	
Dia (mm):	150.00	150.00	150.00
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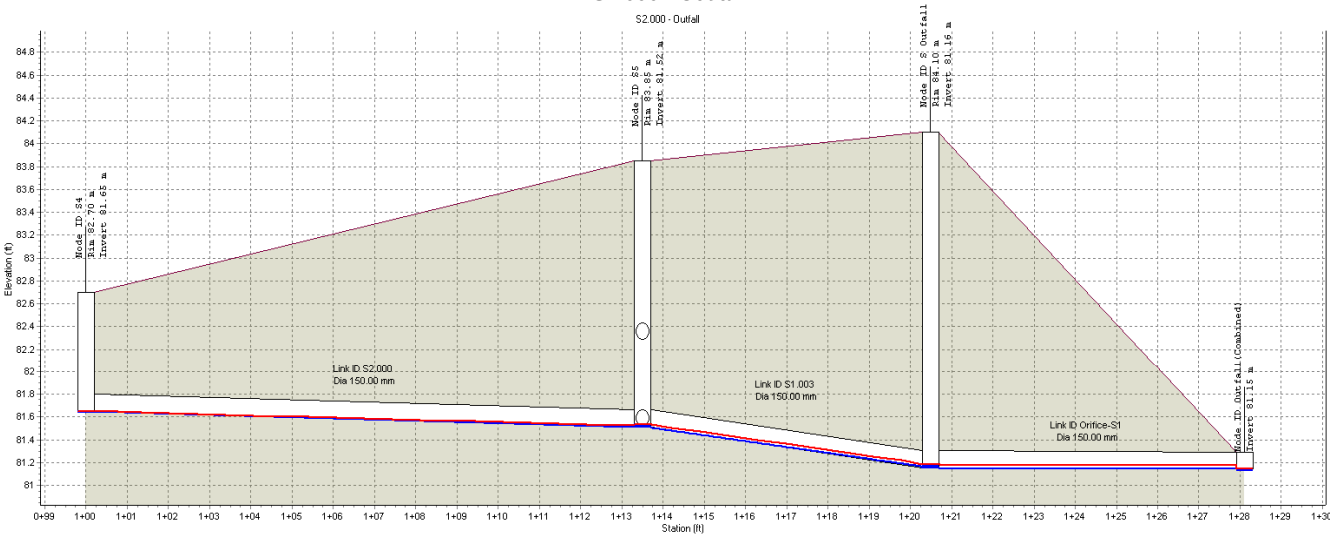
Max Q (lps):	0.00	1.15	1.15
Max Vel (m/s):	0.00	0.76	0.00
Max Depth (m):	0.01	0.02	0.00

1:1yr 6hr Storm Analysis - Elapsed Time 12:00:00

Profile Plot
S2.000 - Outfall

05/11/2021 00:00:00



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Link ID:	S2.000	S1.003	Orifice-S1
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Max Q (lps):	0.00	1.15	1.15
Max Vel (m/s):	0.00	0.76	0.00
Max Depth (m):	0.01	0.02	0.00

1:1yr 6hr Storm Analysis - Elapsed Time 24:00:00

Appendix C

Attenuation Calculations

HR Wallingford
Working with water

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	Alan Clancy
Site name:	Fitzroy Park Development
Site location:	Fitzroy Park N6 6JA

Parking area

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the drainage scheme.

Site coordinates

Latitude:	51.56695° N
Longitude:	0.15783° W
Reference:	6530830
Date:	2021-11-05T16:10:02

Methodology	IH124

Site characteristics

Total site area (ha)	0.5041
Significant public open space (ha)	0.08
Area positively drained (ha)	0.0475
Pervious area contribution (%)	30
Impermeable area (ha)	0.026
Percentage of drained area that is impermeable (%)	55
Impervious area drained via infiltration (ha)	0
Return period for infiltration system design (year)	10
Impervious area drained to rainwater harvesting systems (ha)	0
Return period for rainwater harvesting system design (year)	10
Compliance factor for rainwater harvesting system design (%)	66
Net site area for storage volume design (ha)	0.05
Net impermeable area for storage volume design (ha)	0.03

* Where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50 % of the 'area positively drained', the 'net site area' and the estimates of Qbar and other flow rates will have been reduced accordingly.

Design criteria

Volume control approach	controlled discharge

	Default	Edited
Climate change allowance factor	1.4	1.4
Urban creep allowance factor	1.1	1.1
Interception rainfall depth (mm)	5	5
Minimum flow rate (l/s)	5	5

Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type

	Default	Edited
Qbar total site area (l/s)	0.57	--
SOIL type	4	4
HOST class	N/A	N/A
SPR	0.47	0.47

Hydrology

	Default	Edited
SAAR (mm)	659	659
M5-60 Rainfall Depth (mm)	20	20
'r' Ratio M5-60/M5-2 day	0.4	0.4
Rainfall 100 yrs 6 hrs	63	
Rainfall 100 yrs 12 hrs	98.56	
FEH/FSR conversion factor	1.28	1.28
Hydrological region	6	
Growth curve factor: 1 year	0.85	0.85
Growth curve factor: 10 year	1.62	1.62
Growth curve factor: 30 year	2.3	2.3
Growth curve factor: 100 year	3.19	3.19

Site discharge rates

	Default	Edited
Qbar total site area (l/s)	0.57	0.57
Qbar net site area (l/s)	0.21	0.21
1 in 1 year (l/s)	5	5
1 in 30 years (l/s)	5	5
1 in 100 years (l/s)	5	5

Estimated storage volumes

	Default	Edited
Interception storage (m^3)	1	1
Attenuation storage (m^3)	2	2
Long term storage (m^3)	0	0
Treatment storage (m^3)	3	3
Total storage *(excluding treatment)* (m^3)	3	3