



## **Final Drainage Report Amendment**

***Compark Village South, Filing No. 1  
Parker, Colorado***

P.N. CLCPKC3

Prepared for:  
470 Compark, LLC  
1001 Bannock Street, Suite 240  
Denver, CO 80204

Prepared by:  
Manhard Consulting  
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Contact: Rick Moore, P.E.  
303-708-0500

Initially Submitted September 30, 2019  
Revised March 2, 2020

March 2, 2020

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This final drainage report amendment for the Compark Village South project was prepared by me or under my direct supervision in accordance with the provisions of the *Town of Parker Storm Drainage and Environmental Criteria Manual*. I understand that the Town of Parker and its designated town authority do not and will not assume liability for drainage facilities designed by others.

Prepared by:

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Amie S. Drucker, P.E.  
Registered Professional Engineer  
State of Colorado No. 49038

Reviewed by:

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Ricky J Moore, P.E.  
Registered Professional Engineer  
State of Colorado No. 30877

March 2, 2020

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Compark Village South Filing No. 2 Proposed Drainage Area Map  
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UD Detention – CVS Filing No. 2 + Belford Ave + 15 ac Commercial +11 ac CVS Filing No. 3  
 UD Detention – Grand View Estates (H180)  
 UD Detention – CVS Filing No. 2 + Belford Ave + 15 ac Commercial +Grand View Estates (H180) +11 ac CVS Filing No. 3

**APPENDIX D**

StormCAD profiles

**APPENDIX E**

Pipe Outlet Rip Rap Sizing Calculations

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## I. GENERAL LOCATION AND DESCRIPTION

### A. Scope

This is an amendment to the “Final Drainage Report, Compark Village South, Filing No. 1”, prepared by Manhard Consulting, dated November 20, 2015, last revised October 21, 2016. The original scope of this project included realignment of the Green Acres Tributary and construction of an on-line regional detention pond. Since preparation of the previous design, it has been determined by a consultant for Mile High Flood Control District that the on-line regional detention basin is not required for this area. The realignment and improvements to the Green Acres Tributary will now be designed and permitted by RESPEC, the MHFD’s consultant.

This amendment is to design an off-line detention basin to control the runoff and provide water quality treatment for the proposed stormwater runoff from Compark Village South Filing No. 1 Belford Avenue improvements and the Compark Village South Filing No. 2 residential subdivision, as well as, a portion of the Compark Village South Filing No. 3 project. Drainage criteria utilized for the design are in accordance with the *Town of Parker Storm Drainage and Environmental Criteria Manual and Urban Drainage and Flood Control District*.

## II. DRAINAGE BASINS AND SUB-BASINS

### A. Basin Description

The basins and sub-basins utilized to size the proposed detention basin were taken from the “Final Drainage Report, Compark Village South Filing No. 1”, prepared by Manhard Consulting, dated November 20 2015, last revised October 21, 2016. The areas include Belford Avenue from a high point at station 35+15 to the next high point at station 77+41, the 47 acres that comprise the CVS F2 project 11.5 acres of future multi-family development in CVS F3, the 15 acres of future commercial land between the Green Acres Tributary and Belford Avenue and 20 acres of off-site Grand View Estates property that currently drains through this property (H180).

In the original design, there were three direct discharges to the Green Acres Tributary and one discharge to the regional detention pond. The direct discharge into the proposed arch culvert crossing of Belford Avenue will

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remain unchanged with this amendment. The other direct discharges into the Green Acres Tributary will remain, but baffle walls will be added to the structures upstream of the GAT to direct the 2 year storm runoff to a drainage pipe that will convey the runoff to the proposed off-line detention basin for water quality treatment. The elevations of the tops of the baffle walls were set at the 2 yr design storm HGL taken from the StormCAD model. The model includes rating tables in the diversion manholes to reflect the proposed diversion of the 2 yr storm flows from the pipes to the GAT. Flows greater than the 2 year storm will overtop the baffle walls and directly discharge to the Green Acres Tributary. The previous discharge to the regional detention pond will be upsized from a 42" RCP to a 60" RCP to convey the runoff from the original design plus the flows from a 2 year storm from the upstream drainage basins that previously discharged directly to the GAT. The drainage system has been revised to route the runoff from STMH 11-12 across the future commercial tract, along Green Acres Tributary and into the proposed off-line detention basin. Although runoff from portions of Belford Avenue and CVS F2 will be directly discharged to the GAT, storage and water quality treatment for these areas will be provided in the proposed detention basin. That is, compensatory storage and treatment will be provided in the proposed detention basin.

Sizing of the proposed Forebay A includes 40 acres of Grandview Estates in addition to the 93.5 acres utilized to size the detention basin. This property drains into the CVS system and was included in the calculations for the 2 year runoff being directed to the detention basin. Flows greater than the 2 year design storm will pass over the baffle wall in the diversion manhole and will discharge directly to the Green Acres Tributary, therefore, this area was not included in the sizing of the proposed detention basin.

### III. DRAINAGE DESIGN CRITERIA

#### A. Regulations

The regulations, guidelines, and drainage design criteria to be used are those contained within the *Town of Parker Storm Drainage Design and Environmental Criteria* and the *Urban Storm Drainage Criteria Manual*. The general drainage concept is to construct a full spectrum extended detention basin to provide detention and water quality treatment for the proposed stormwater runoff from a portion of Belford Avenue, the entire Compark

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Village South Filing No. 2 subdivision, a portion of the Compark Village South Filing No. 3 tract and the portion of the commercial tract between the Green Acres Tributary and Belford Avenue.

**B. Hydrologic Criteria**

The stormwater system associated with Belford Avenue (major collector) was design for a 5 yr minor storm and the 100 yr major storm. Detailed design information for the system can be found in “Final Drainage Report, Compark Village South, Filing No. 1”, prepared by Manhard Consulting, dated November 20, 2015, last revised October 21, 2016. The UDFCD UD Detention worksheet was utilized to design the proposed extended detention basin, the proposed outlet structure, emergency overflow weir, as well as, to calculate the direct runoff from the Grand View Estates property that currently drains across this property.

The UD Detention workbook was completed for the portions of Belford Avenue, all of Compark Village South Filing No. 2, an 11.5 acre portion of Compark Village South Filing No. 3 and 15 acres of commercial area north of Belford Avenue to calculate the allowable release rates for the proposed development without the Grand View Estates area. Then the workbook was utilized to calculate the runoff from the Grand View Estates drainage basin. The 100-year runoff from Grand View Estates will be “passed through” the detention basin, i.e. the allowable 90% of the 100-year discharge from the CVS F2 basin, 42.7 cfs, was increased to include the runoff of 26.8 cfs as calculated by the UD Worksheet for the 20 acre drainage basin.

Drainage Areas to Proposed Detention Basin (See Appendix A):

- 15 ac Commercial (South of Green Acres Trib) @ 90% Impervious (assumed)
- 47 ac CVS Filing No. 2 Residential @ 48% Impervious (calculated)
- 11.5 ac CVS Filing No. 3 Multi-Family @ 75% Impervious (assumed)
- 20 ac Grandview Estates (H180) @ 15% Impervious

Total DA=93.5 ac @ 51% Impervious

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Use UD Detention to Calculate Allowable Release of Developed Areas (No Grandview Estates)

Total DA=73.5 ac @ 61% Impervious

From Spreadsheet 100 yr Predeveloped = 65.3 cfs

90% Predeveloped = 58.8 cfs

Direct Discharge to GAT -26 cfs (Calculated using UD Detention)  
32.8 cfs

Allowable 100 yr Release from Detention Basin:

32.8 cfs (Developed runoff) + 26.8 cfs (H180 runoff) = **59.6 cfs**

#### C. Variance from Criteria

No variance is required.

#### IV. CONCLUSION

This final drainage report amendment complies with all major standards of the Town of Parker and the Urban Drainage Flood Control District. This overall plan for the site's drainage design is effective and economical for controlling damage due to excess storm runoff and minimizing erosive discharges.

**Appendix A**

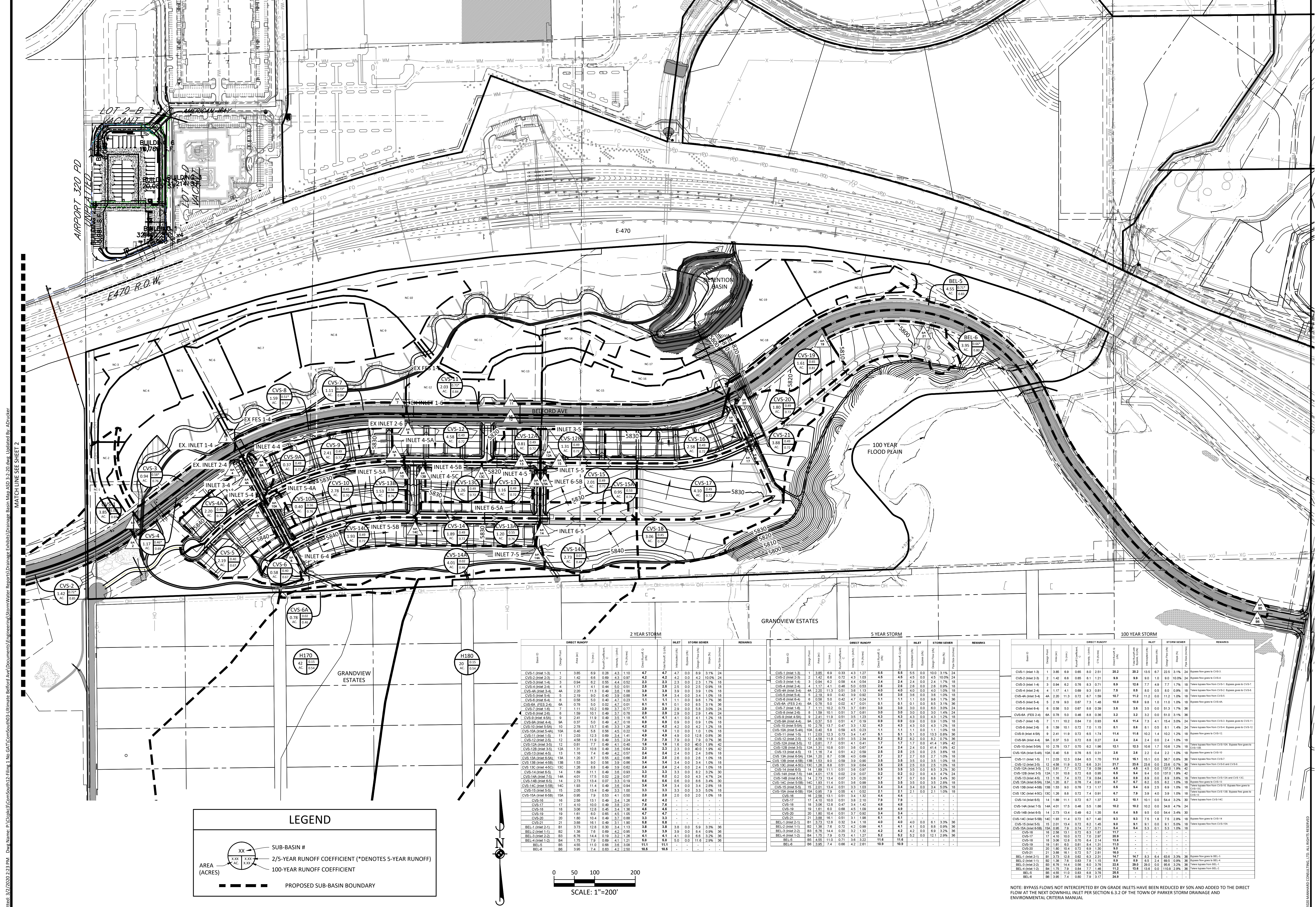




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## **Appendix B**



MATCH LINE SEE SHEET 2

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**LEGEND**

- XX SUB-BASIN #
- XX 2/5-YEAR RUNOFF COEFFICIENT (\*DENOTES 5-YEAR RUNOFF)
- XX 100-YEAR RUNOFF COEFFICIENT
- PROPOSED SUB-BASIN BOUNDARY

Basin ID	Change Point	Area (Ac)	DIRECT RUNOFF				INLET	STORM SEWER	REMARKS				
			Flow (cfs)	Depth (ft)	Velocity (ft/s)	Time (min)							
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.28	4.3	1.10	4.7	4.7	0.0	8.9	3.1%	24	
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.09	4.3	0.97	4.2	4.2	4.2	0.0	4.2	10.0%	24
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.55	4.4	0.52	3.3	2.3	2.3	0.0	2.3	1.7%	18
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.44	5.0	0.51	2.6	2.6	2.6	0.0	2.6	0.9%	18
CVS-5 (Inlet 3-4)	5	2.19	11.3	0.49	3.6	1.08	3.9	3.9	3.9	0.0	3.9	1.0%	18
CVS-6 (Inlet 4-4)	6	0.58	5.0	0.40	4.7	0.23	1.1	1.1	1.1	0.0	1.1	1.7%	36
CVS-7 (Inlet 5-4)	7	1.11	10.1	0.59	3.7	0.77	2.9	2.9	2.9	0.0	2.9	3.0%	24
CVS-8 (Inlet 1-5)	8	0.58	5.0	0.40	4.7	0.23	1.1	1.1	1.1	0.0	1.1	1.7%	36
CVS-9 (Inlet 2-5)	9	2.41	11.9	0.51	3.5	1.19	4.1	4.1	4.1	0.0	4.1	1.2%	18
CVS-10 (Inlet 3-5)	10	0.97	5.0	0.49	4.7	0.18	0.9	0.9	0.9	0.0	0.9	1.0%	18
CVS-11 (Inlet 4-5)	11	2.09	12.1	0.69	3.4	1.41	4.8	4.8	4.8	0.0	4.8	0.8%	36
CVS-12 (Inlet 5-5)	12	4.58	11.9	0.49	3.5	2.24	7.9	7.9	7.9	0.0	7.9	0.7%	36
CVS-13 (Inlet 1-6)	13	0.81	7.7	0.49	4.1	0.42	1.6	1.6	1.6	0.0	1.6	1.0%	42
CVS-14 (Inlet 2-6)	14	1.91	10.8	0.49	3.6	0.64	2.9	2.9	2.9	0.0	2.9	1.9%	42
CVS-15 (Inlet 3-6)	15	1.16	7.4	0.49	4.2	0.57	2.4	2.4	2.4	0.0	2.4	3.6%	18
CVS-16 (Inlet 4-6)	16	1.29	8.7	0.51	4.5	0.66	2.6	2.6	2.6	0.0	2.6	1.0%	18
CVS-17 (Inlet 5-6)	17	1.53	9.0	0.56	3.9	0.86	3.4	3.4	3.4	0.0	3.4	1.0%	18
CVS-18 (Inlet 1-7)	18	1.26	8.8	0.49	3.9	0.62	2.4	2.4	2.4	0.0	2.4	1.0%	18
CVS-19 (Inlet 2-7)	19	1.99	11.1	0.49	3.6	0.93	3.3	3.3	3.3	0.0	3.3	3.2%	30
CVS-20 (Inlet 3-7)	20	4.01	17.5	0.51	3.2	1.07	9.2	9.2	9.2	0.0	9.2	0.7%	36
CVS-21 (Inlet 4-7)	21	4.01	17.5	0.51	3.2	1.07	9.2	9.2	9.2	0.0	9.2	0.7%	36

Basin ID	Change Point	Area (Ac)	DIRECT RUNOFF				INLET	STORM SEWER	REMARKS				
			Flow (cfs)	Depth (ft)	Velocity (ft/s)	Time (min)							
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.33	4.3	1.27	5.5	5.5	5.5	0.0	10.0	3.1%	24
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.09	4.3	1.09	4.6	4.6	4.6	0.0	4.6	10.0%	24
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.59	4.4	0.56	2.4	2.4	2.4	0.0	2.4	1.7%	18
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.46	5.0	0.53	2.6	2.6	2.6	0.0	2.6	0.9%	18
CVS-5 (Inlet 3-4)	5	2.19	11.3	0.51	3.6	1.19	4.0	4.0	4.0	0.0	4.0	1.0%	18
CVS-6 (Inlet 4-4)	6	0.58	5.0	0.42	4.7	0.24	1.1	1.1	1.1	0.0	1.1	1.7%	36
CVS-7 (Inlet 5-4)	7	1.11	10.1	0.52	3.7	0.81	3.0	3.0	3.0	0.0	3.0	3.1%	36
CVS-8 (Inlet 1-5)	8	0.58	5.0	0.40	4.7	0.23	1.1	1.1	1.1	0.0	1.1	1.7%	36
CVS-9 (Inlet 2-5)	9	2.41	11.9	0.51	3.5	1.19	4.3	4.3	4.3	0.0	4.3	1.2%	18
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CVS-11 (Inlet 4-5)	11	2.09	12.1	0.69	3.4	1.41	4.8	4.8	4.8	0.0	4.8	0.8%	36
CVS-12 (Inlet 5-5)	12	4.58	11.9	0.49	3.5	2.24	8.2	8.2	8.2	0.0	8.2	0.7%	36
CVS-13 (Inlet 1-6)	13	0.81	7.7	0.49	4.1	0.42	1.7	1.7	1.7	0.0	1.7	1.0%	42
CVS-14 (Inlet 2-6)	14	1.91	10.8	0.49	3.6	0.64	2.9	2.9	2.9	0.0	2.9	1.9%	42
CVS-15 (Inlet 3-6)	15	1.16	7.4	0.49	4.2	0.57	2.4	2.4	2.4	0.0	2.4	3.6%	18
CVS-16 (Inlet 4-6)	16	1.29	8.7	0.51	4.5	0.66	2.6	2.6	2.6	0.0	2.6	1.0%	18
CVS-17 (Inlet 5-6)	17	1.53	9.0	0.56	3.9	0.86	3.4	3.4	3.4	0.0	3.4	1.0%	18
CVS-18 (Inlet 1-7)	18	1.26	8.8	0.49	3.9	0.62	2.4	2.4	2.4	0.0	2.4	1.0%	18
CVS-19 (Inlet 2-7)	19	1.99	11.1	0.49	3.6	0.93	3.3	3.3	3.3	0.0	3.3	3.2%	30
CVS-20 (Inlet 3-7)	20	4.01	17.5	0.51	3.2	1.07	9.2	9.2	9.2	0.0	9.2	0.7%	36
CVS-21 (Inlet 4-7)	21	4.01	17.5	0.51	3.2	1.07	9.2	9.2	9.2	0.0	9.2	0.7%	36

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CVS-2 (Inlet 2-3)	2	1.42	6.6	0.08	8.1	1.21	8.9	8.9	8.9	0.0	8.9	10.0%	24
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.78	8.3	0.71	6.9	12.6	7.7	4.9	7.7	1.7%	18
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.60	9.3	0.61	7.8	6.5	8.0	0.0	8.0	0.9%	18
CVS-5 (Inlet 3-4)	5	2.19	11.3	0.72	6.7	1.96	10.7	11.2	11.2	0.0	11.2	1.0%	18
CVS-6 (Inlet 4-4)	6	0.58	5.0	0.67	7.3	1.48	10.8	10.8	10.8	0.0	11.0	1.0%	18
CVS-7 (Inlet 5-4)	7	1.11	10.1	0.67	8.8	0.39	3.5	3.5	3.5	0.0	5.1	1.7%	36
CVS-8 (Inlet 1-5)	8	0.58	5.0	0.48	8.6	0.36	3.2	3.2	3.2	0.0	5.1	3.1%	36
CVS-9 (Inlet 2-5)	9	2.41	11.9	0.68	8.0	0.36	3.2	3.2	3.2	0.0	5.1	3.1%	36
CVS-10 (Inlet 3-5)	10	0.97	5.0	0.49	4.7	0.18	0.9	0.9	0.9	0.0	1.0	1.0%	18
CVS-11 (Inlet 4-5)	11	2.09	12.1	0.72	7.0	1.15	8.1	8.1	8.1	0.0	11.4	2.4%	24
CVS-12 (Inlet 5-5)	12	4.58	11.9	0.51	3.5	2.34	8.2	8.2	8.2	0.0	11.4	1.9%	42
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CVS-18 (Inlet 1-7)	18	1.26	8.8	0.51	3.6	0.66	2.6	2.6	2.6	0.0	2.6	1.0%	18
CVS-19 (Inlet 2-7)	19	1.91	10.8	0.51	3.6	0.66	2.9	2.9	2.9	0.0	2.9	1.9%	42
CVS-20 (Inlet 3-7)	20	4.01	17.5	0.51	3.2	1.07	9.2	9.2	9.2	0.0	9.2	0.7%	36
CVS-21 (Inlet 4-7)	21	4.01	17.5	0.51	3.2	1.07	9.2	9.2	9.2	0.0	9.2	0.7%	36



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DATE: 6-30-16

REVISIONS:

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PROJ. ASSOC.: ASD

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DATE: 6-30-16

SHEET

1 OF 3

CLPC3

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Civil Engineering | Surveying & Geospatial Services | GIS | Water Resource Management | Construction Management

COMPARK SOUTH

TOWN OF PARKER, CO

PROPOSED DRAINAGE AREA MAP

NOTE: BYPASS FLOWS NOT INTERCEPTED BY ON GRADE INLETS HAVE BEEN REDUCED BY 50% AND ADDED TO THE DIRECT FLOW AT THE NEXT DOWNHILL INLET PER SECTION 6.3.2 OF THE TOWN OF PARKER SEWER DRAINAGE AND ENVIRONMENTAL CRITERIA MANUAL





Compark Villge South Filing No. 2  
Proposed Sub-Basins to Detention Basin  
9-27-19

	Design Pt	DA (ac)	% Imp	DA x % Imp
CVS-4A (Inlet 3-4)	4A	2.2	0.55	1.21
CVS-5 (Inlet 5-4)	5	2.19	0.45	0.9855
CVS-6 (Inlet 6-4)	6	0.58	0.45	0.261
CVS-6A (FES 2-4)	6A	0.78	0.02	0.0156
CVS-9 (Inlet 4-5A)	9	2.41	0.55	1.3255
CVS-9A (Inlet 4-4)	9A	0.37	0.55	0.2035
CVS-10 (Inlet 5-5A)	10	2.78	0.51	1.4178
CVS-10A (Inlet 5-4A)	10A	0.4	0.63	0.252
CVS-12 (Inlet 2-5)	12	4.58	0.55	2.519
CVS-12A (Inlet 3-5)	12	0.81	0.55	0.4455
CVS-12B (Inlet 3-5)	12A	1.31	0.55	0.7205
CVS-13 (Inlet 4-5)	13	1.16	0.55	0.638
CVS 13A (Inlet 6-5A)	13A	1.2	0.62	0.744
CVS 13B (Inlet 4-5B)	13B	1.53	0.63	0.9639
CVS 13C (Inlet 4-5C)	13C	1.26	0.55	0.693
CVS-14 (Inlet 6-5)	14	1.89	0.55	1.0395
CVS-14A (Inlet 7-5)	14A	4.01	0.02	0.0802
CVS-14B (Inlet 6-5)	14	2.73	0.08	0.2184
CVS-14C (Inlet 5-5B)	14C	1.93	0.55	1.0615
CVS-15 (Inlet 5-5)	15	2.05	0.55	1.1275
CVS-15A (Inlet 6-5B)	15A	0.95	0.59	0.5605
CVS-16	16	2.58	0.55	1.419
CVS-17	17	4.1	0.55	2.255
CVS-18	18	3.06	0.5	1.53
		46.86		21.6864

Overall % Imp = 21.69/46.86= 46.27913

Compark Village South  
 Belford Ave Proposed Sub-Basins to Det Basin  
 9-28-19

	Design Pt	DA	% Imp	DA x % Imp	
CVS-1 (Inlet 1-3)	1	3.85	0.32	1.232	
CVS-2 (Inlet 2-3)	2	1.42	0.77	1.0934	
CVS-3 (Inlet 1-4)	3	0.94	0.62	0.5828	
CVS-4 (Inlet 2-4)	4	1.17	0.49	0.5733	
CVS-7 (Inlet 1-6)	7	1.11	0.78	0.8658	
CVS-8 (Inlet 2-6)	8	1.59	0.55	0.8745	
CVS-11 (Inlet 1-5)	11	<u>2.03</u>	0.78	<u>1.5834</u>	
		12.11		6.8052	
			Total % Imp=		0.561949

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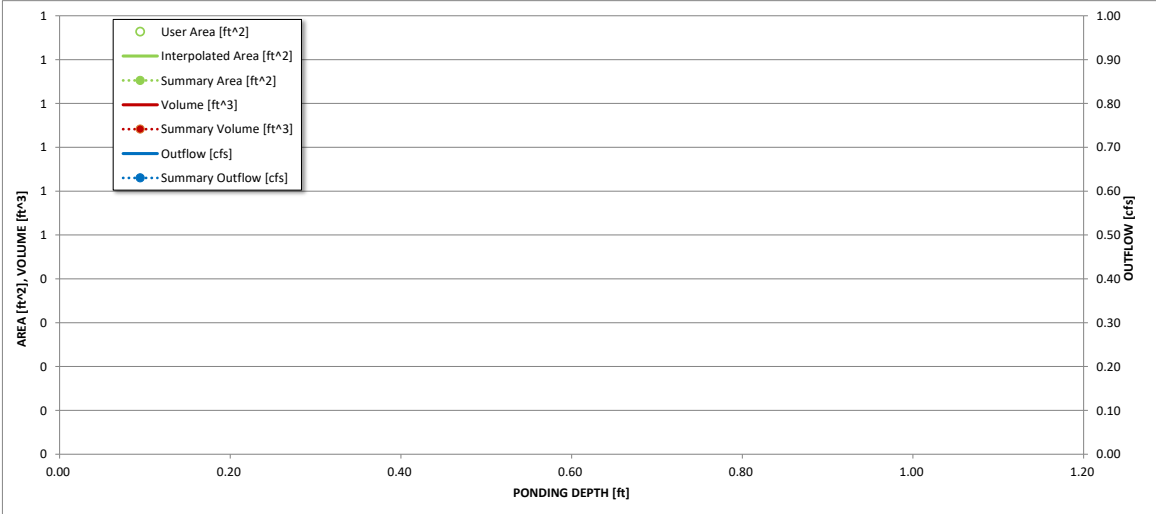
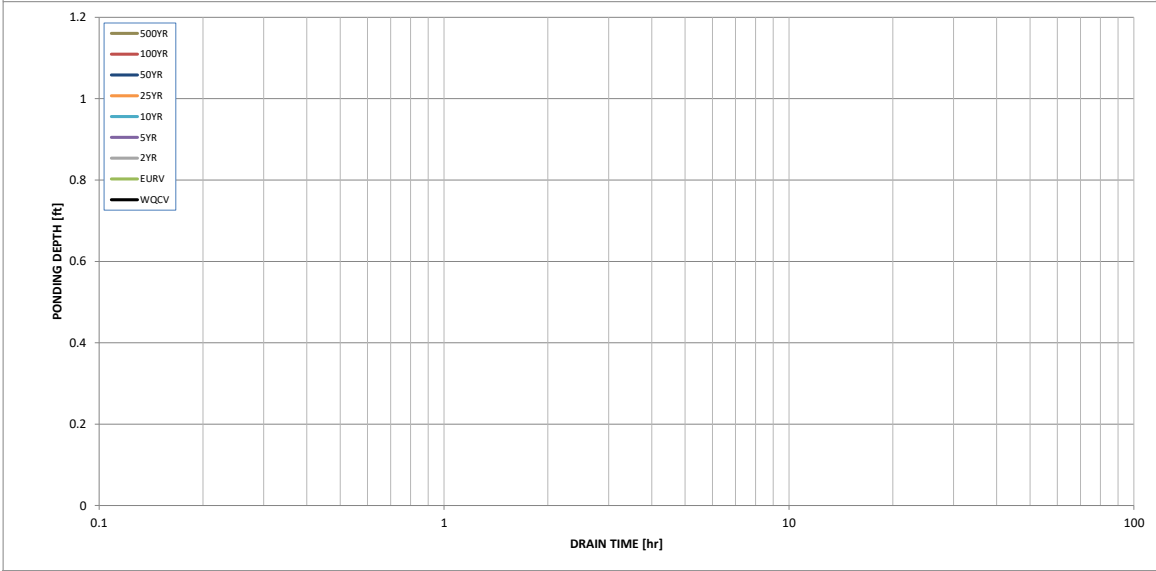
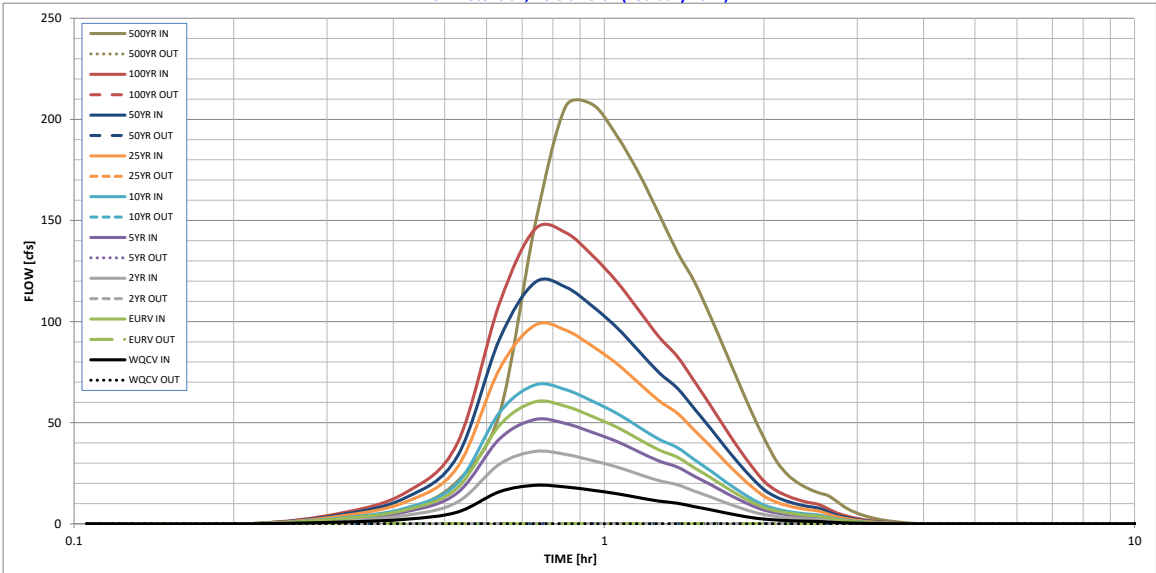
**Appendix C**





# Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)



**S-A-V-D Chart Axis Override**

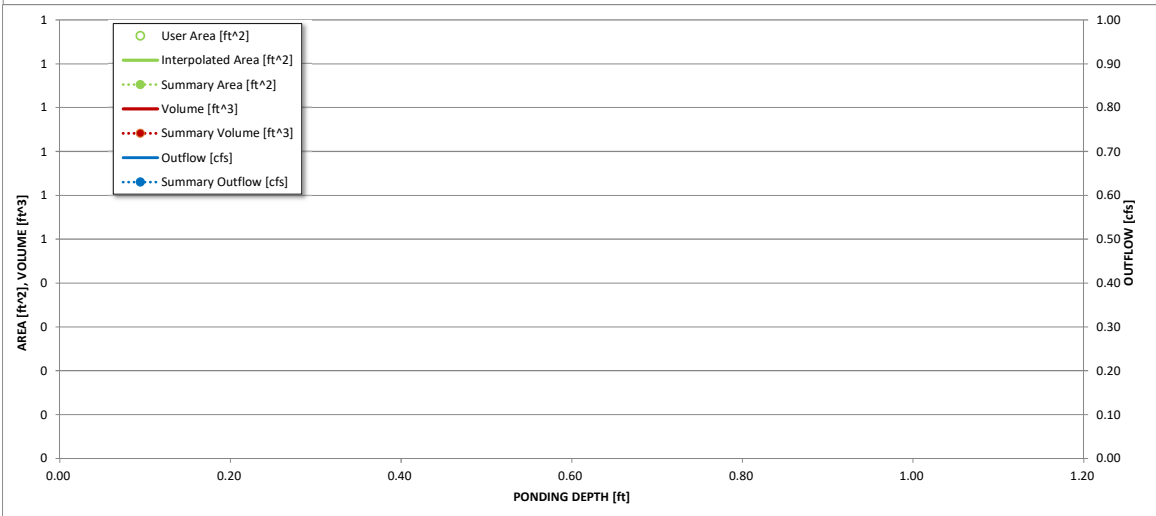
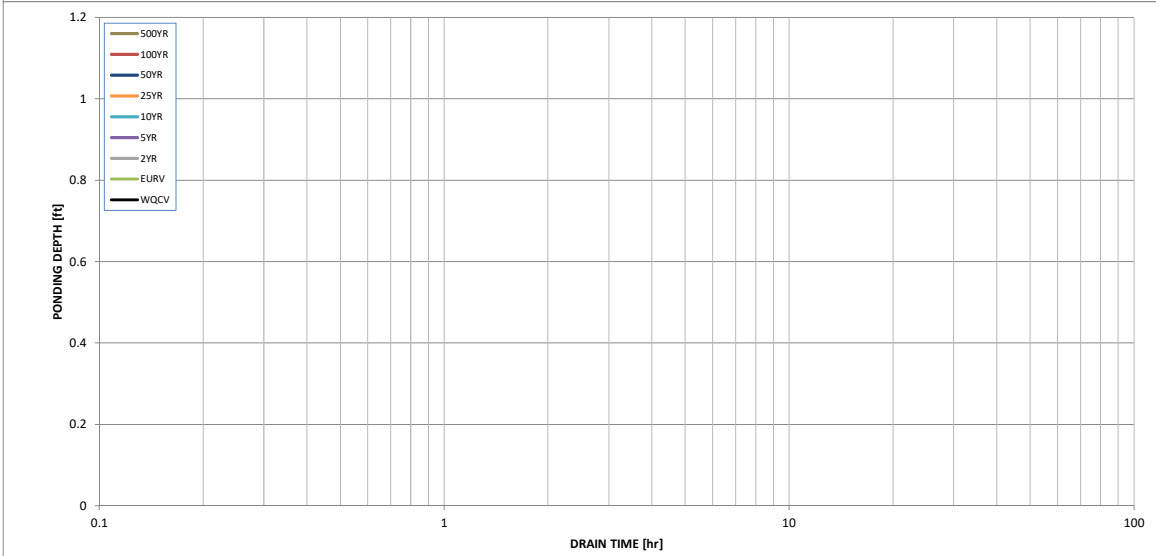
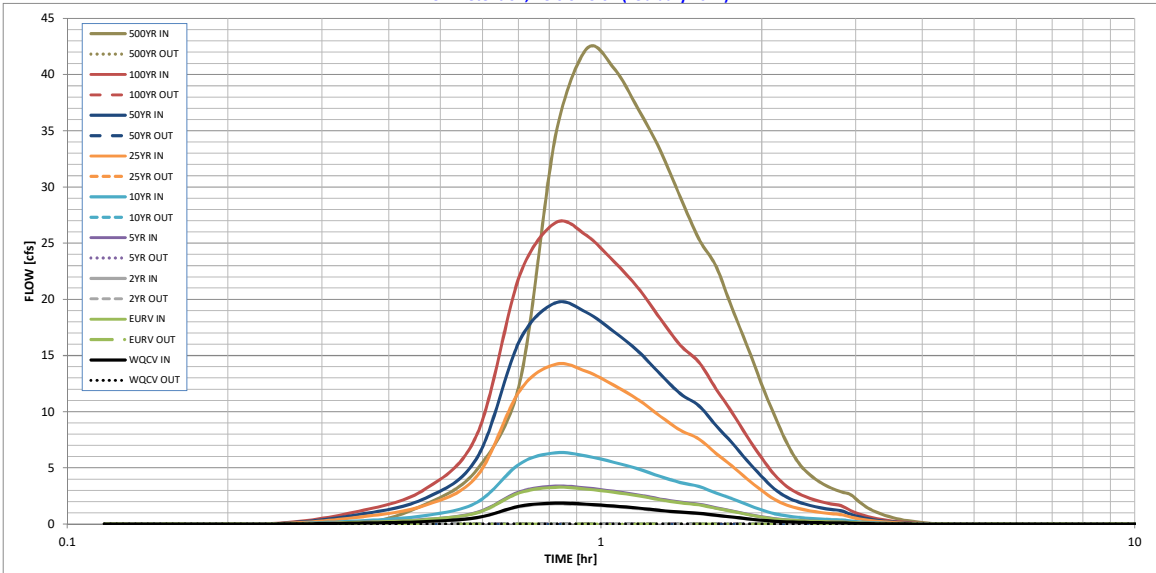
	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			





# Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)



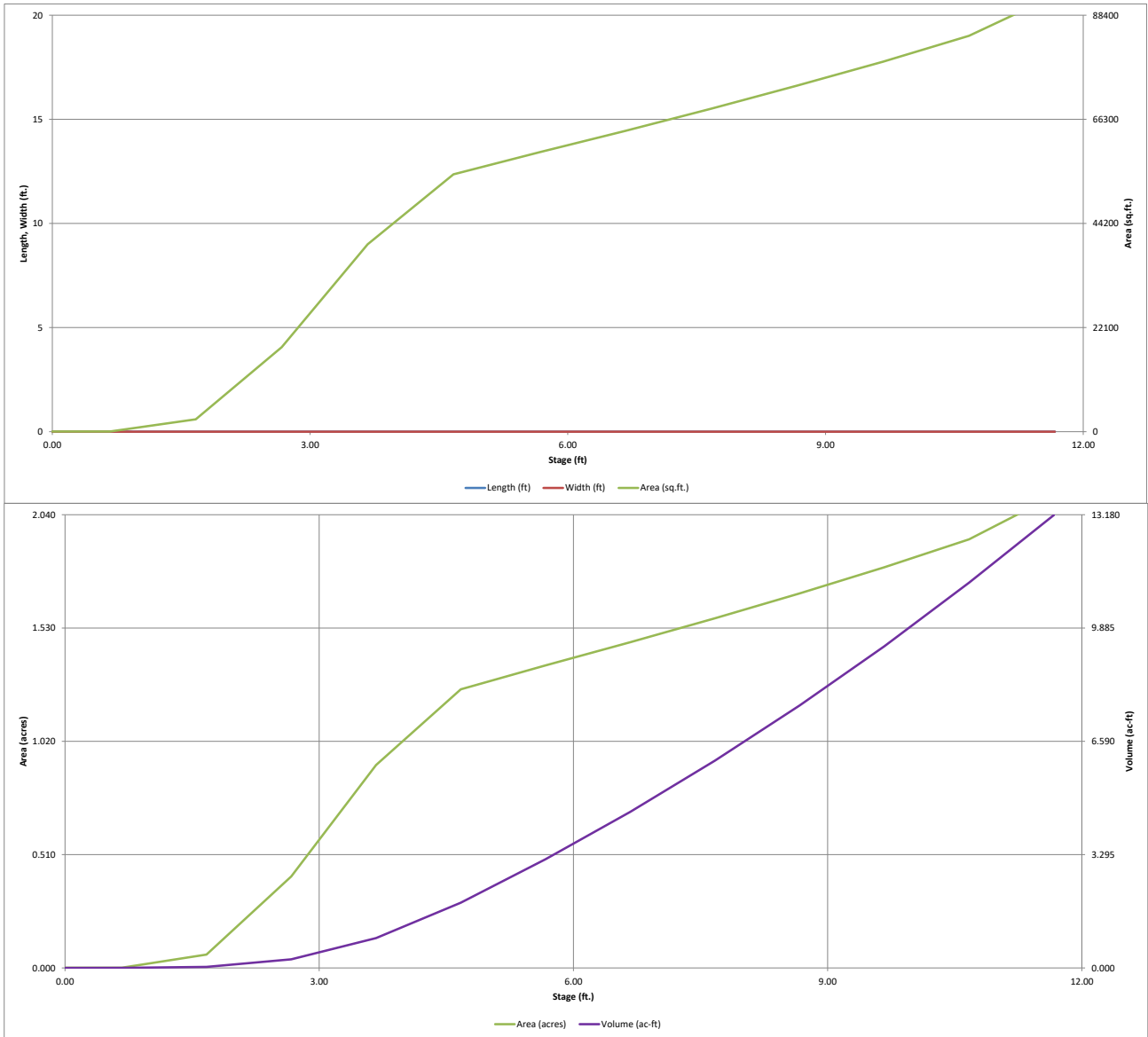
**S-A-V-D Chart Axis Override**

	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			



# DETENTION BASIN STAGE-STORAGE TABLE BUILDER

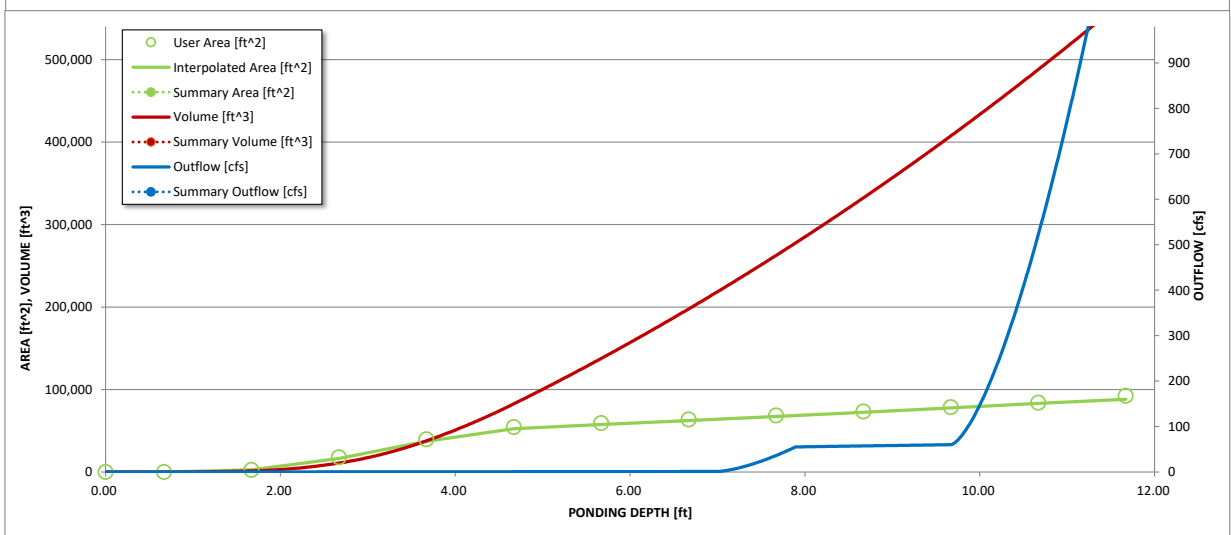
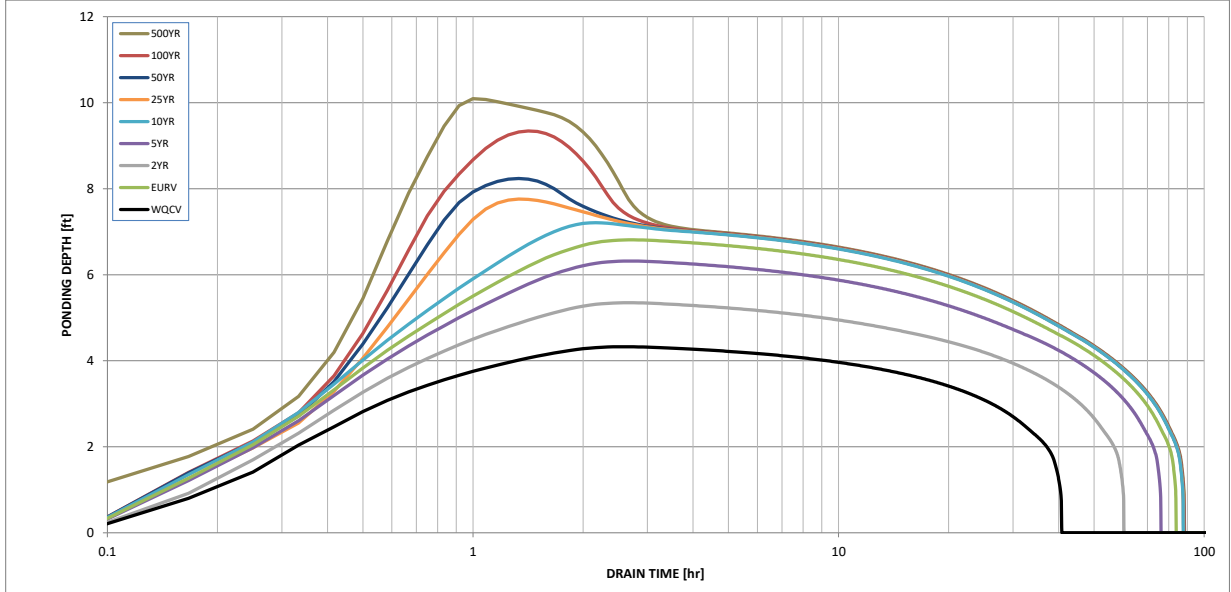
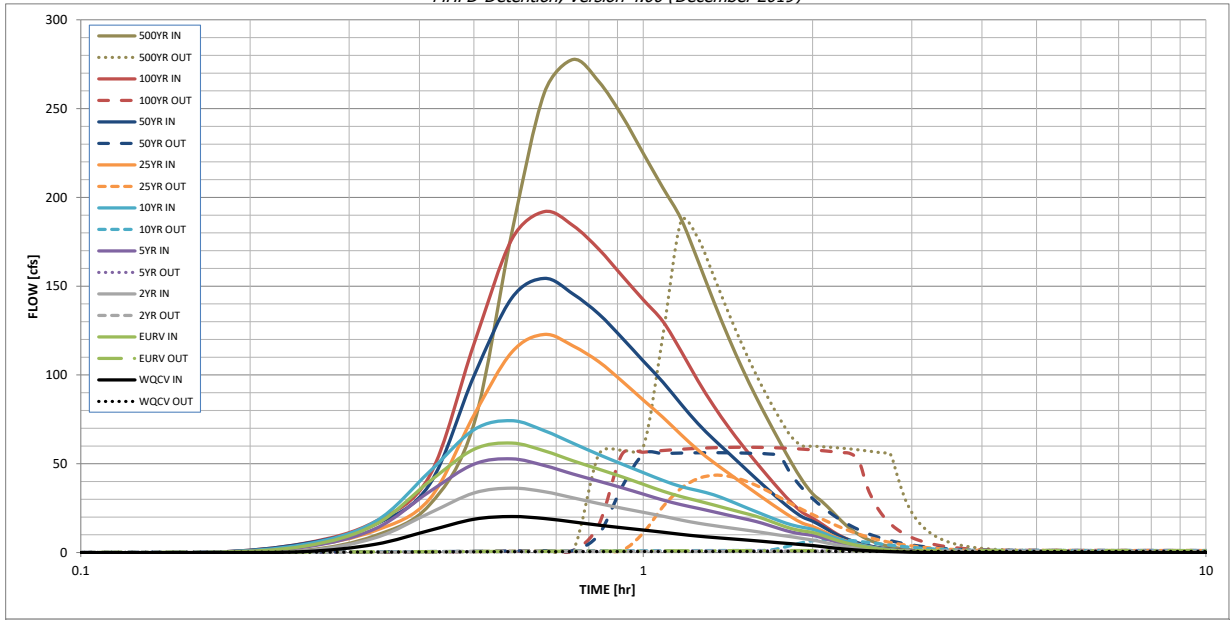
*MHFD-Detention, Version 4.00 (December 2019)*





# DETENTION BASIN OUTLET STRUCTURE DESIGN

*MHFD-Detention, Version 4.00 (December 2019)*



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			



**PROJECT: Compark South**  
**CODE: CLCPKC3**  
**DESIGN BY: Michael McGuire**  
**DATE: 2/27/2020**  
**REV. :**

**DETENTION POND FOREBAY A VOLUME**

**Detention Pond Forebay**

FOREBAY OUTLET ELEVATION = 5790.10

WQCV (in)	V (ACRE-FT)	V (FT^3)	Forebay at 3% (FT^3)	Forebay Area at 2.5' <sub>DEPTH</sub>
0.182	1.581	68,889.51	2,066.69	826.67

**WQCV Designed from Urban Drainage Criteria Manual Volume 3 (Pgs 3-5 through 3-9)**

$$WQCV = a(0.91i^3 - 1.19i^2 + 0.78i)$$

$$a = 1.0 \text{ 40-hr drain time}$$

$$V = (WQCV/12)A$$

<http://www.udfcd.org/downloads/pdf/critmanual/Volume%203%20PDFs/Chapter%203%20Calculating%20the%20WQCV%20and%20Volume%20Reduction.pdf>

**Forbay Sizing Designed from Urban Drainage Criteria Manual Volume 3 (Pg EDB-12 table EDB-4)**

<http://www.udfcd.org/downloads/pdf/critmanual/Volume%203%20PDFs/Chapter%204%20Treatment%20BMPs.pdf>

**Ground Coverage**

Weighted I (%):	41.00%
Total Acentage:	104.00

**PROJECT: Compark South**  
**CODE: CLCPKC3**  
**DESIGN BY: Michael McGuire**  
**DATE: 2/27/2020**  
**REV. :**

**DETENTION POND FOREBAY B VOLUME**

**Detention Pond Forebay**

FOREBAY OUTLET ELEVATION =5789.72

WQCV (in)	V (ACRE-FT)	V (FT^3)	Forebay at 2% (FT^3)	Forebay Area at 2.0' <sub>DEPTH</sub>
0.217	0.843	36,710.93	734.22	293.69

**WQCV Designed from Urban Drainage Criteria Manual Volume 3 (Pgs 3-5 through 3-9)**

$$WQCV = a(0.91i^3 - 1.19i^2 + 0.78i)$$

$$a = 1.0 \text{ 40-hr drain time}$$

$$V = (WQCV/12)A$$

<http://www.udfcd.org/downloads/pdf/critmanual/Volume%203%20PDFs/Chapter%203%20Calculating%20the%20WQCV%20and%20Volume%20Reduction.pdf>

**Forbay Sizing Designed from Urban Drainage Criteria Manual Volume 3 (Pg EDB-12 table EDB-4)**

<http://www.udfcd.org/downloads/pdf/critmanual/Volume%203%20PDFs/Chapter%204%20Treatment%20BMPs.pdf>

**Ground Coverage**

Weighted I (%):	54.00%
Total Acentage:	46.50

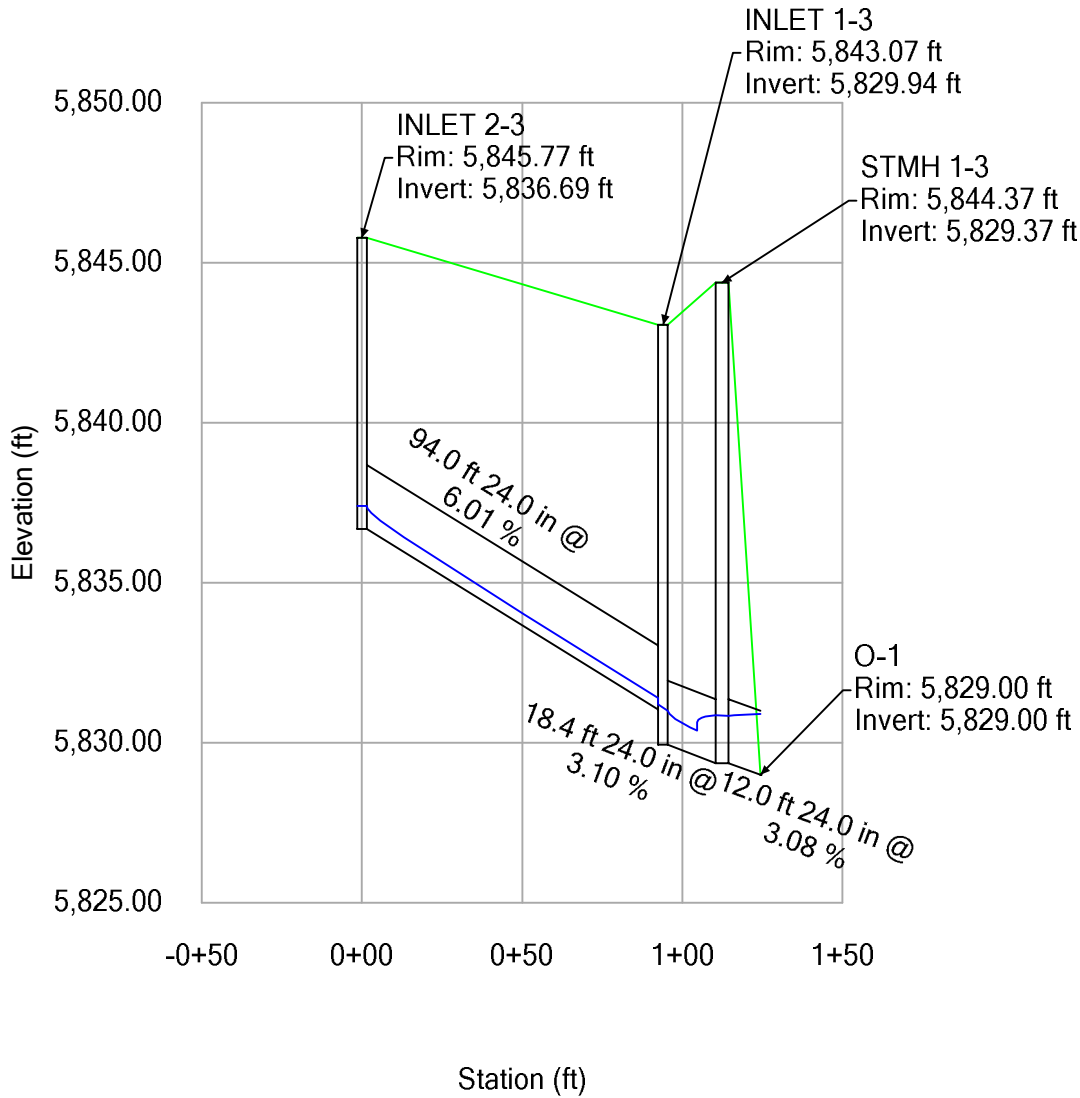
March 2, 2020

---

## Appendix D

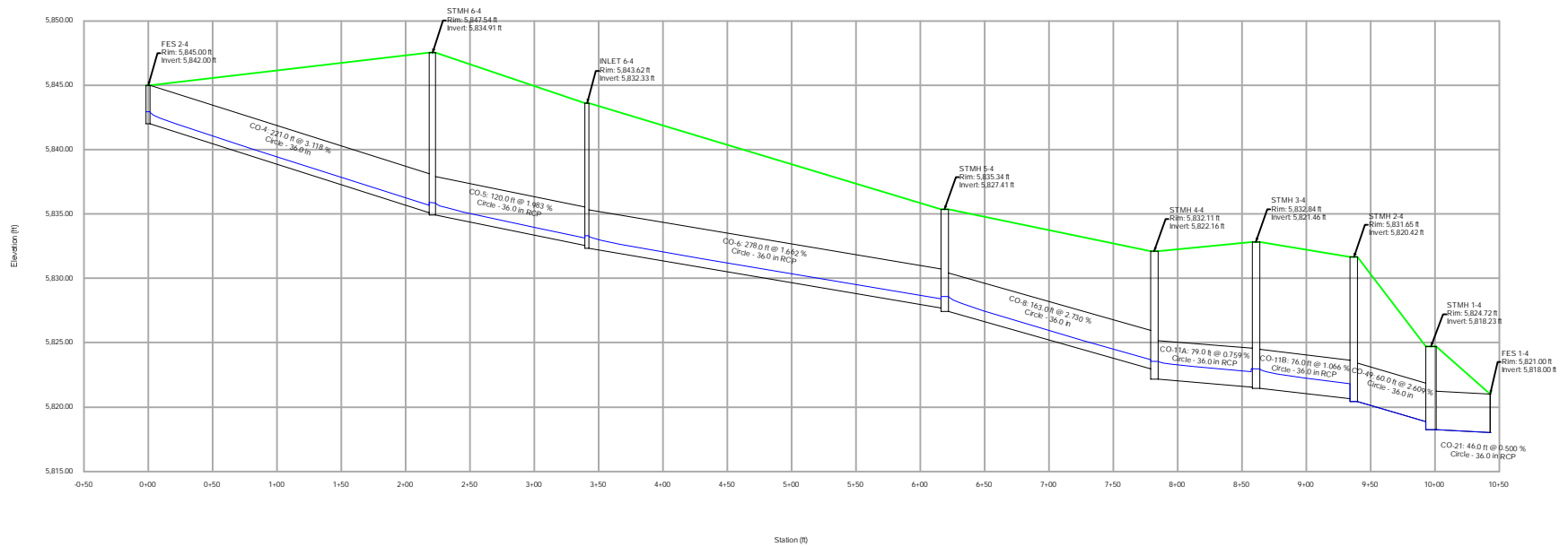
# Profile Report

## Engineering Profile - Profile - Storm Line 03 (Compark Village South StormCAD [2 year].stsw)



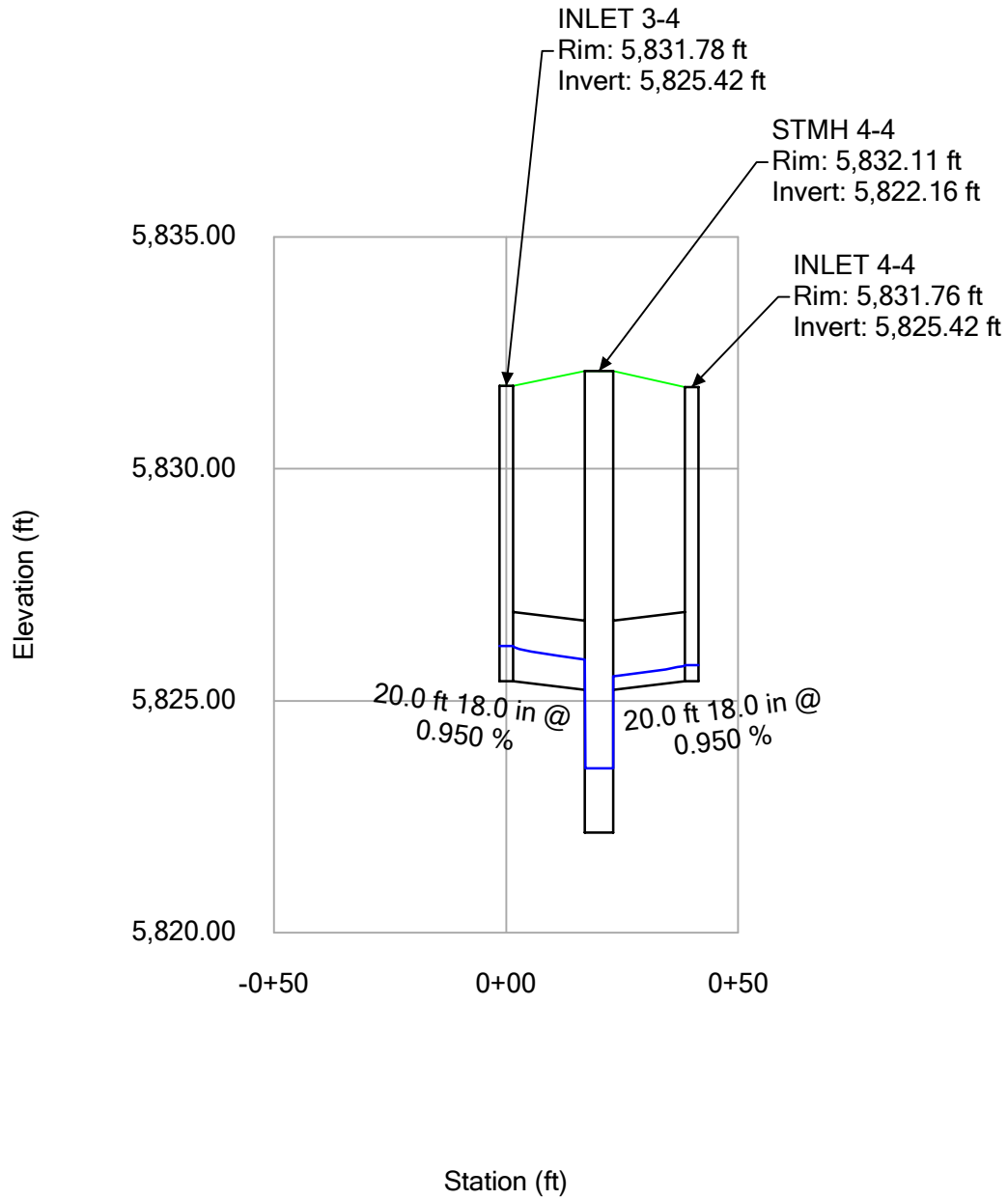
# Profile Report

## Engineering Profile - Profile - Storm Line 04 (Compark Village South StormCAD [2 year].stsw)



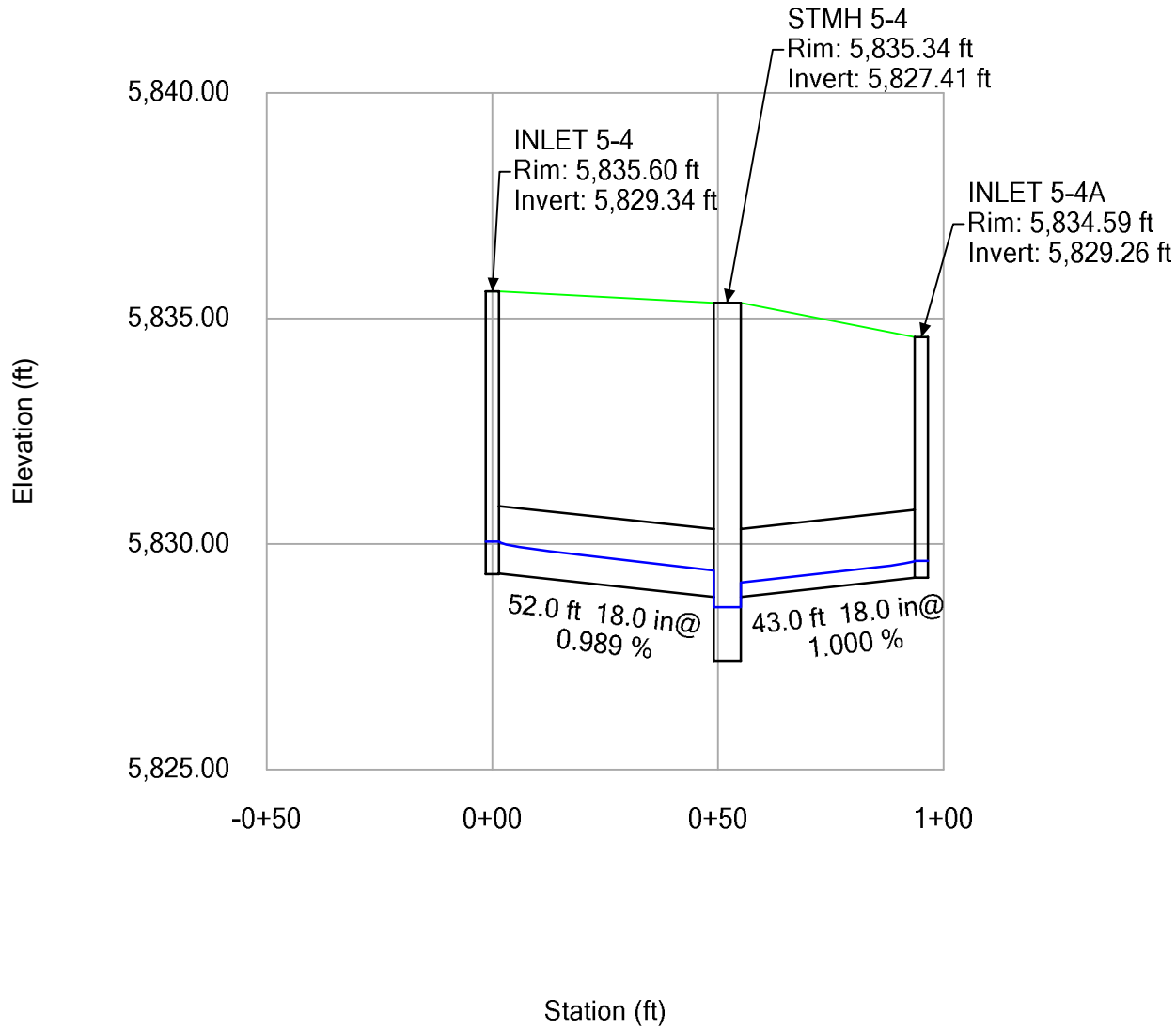
# Profile Report

## Engineering Profile - Profile - Storm Line 04A (Compark Village South StormCAD [2 year].stsw)



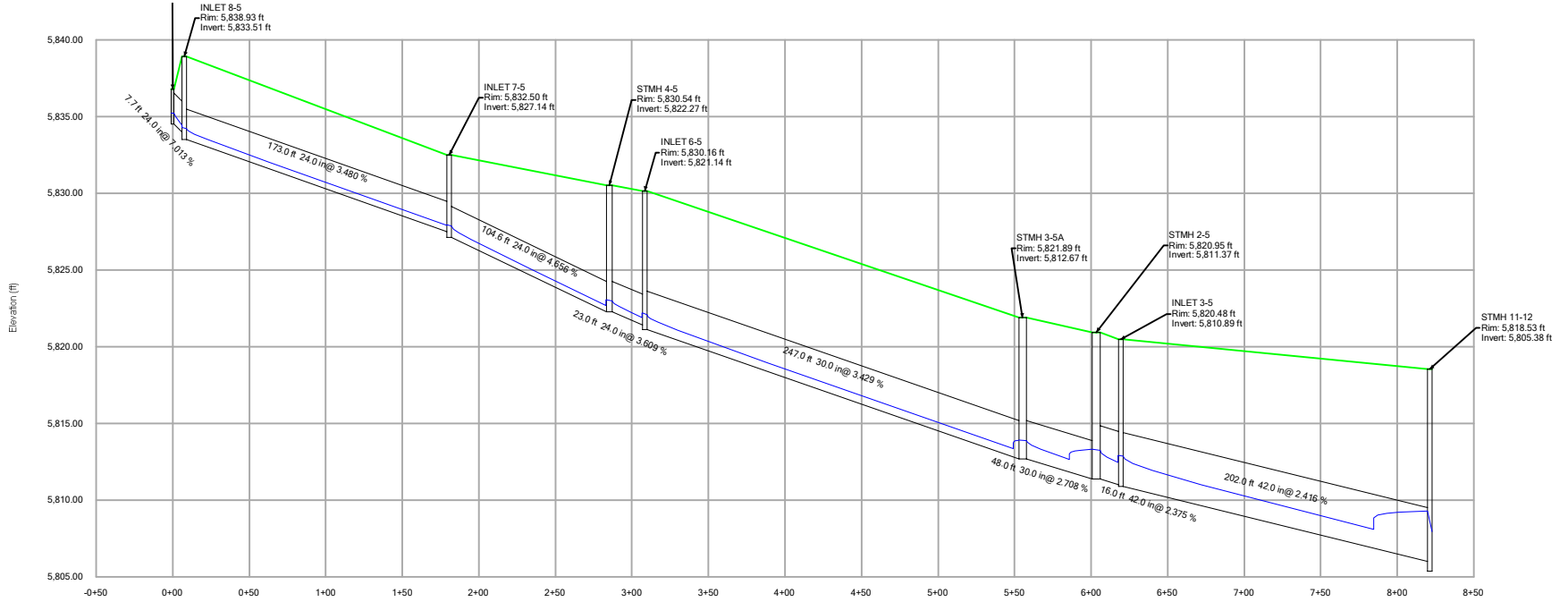
# Profile Report

## Engineering Profile - Profile - Storm Line 04B (Compark Village South StormCAD [2 year].stsw)



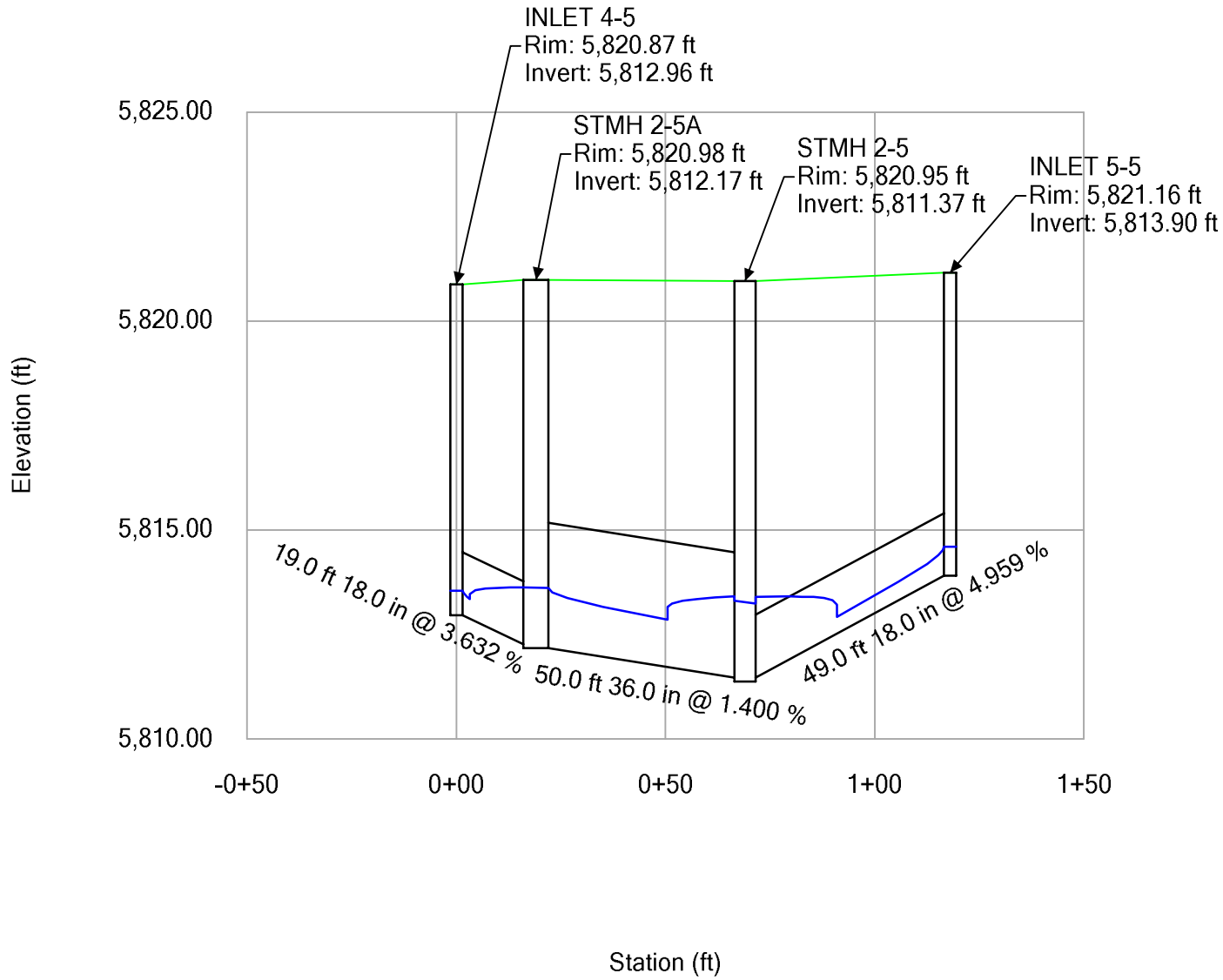
# Profile Report

## Engineering Profile - Profile - Storm Line 05 (Compark Village South StormCAD [2 year].stsw)



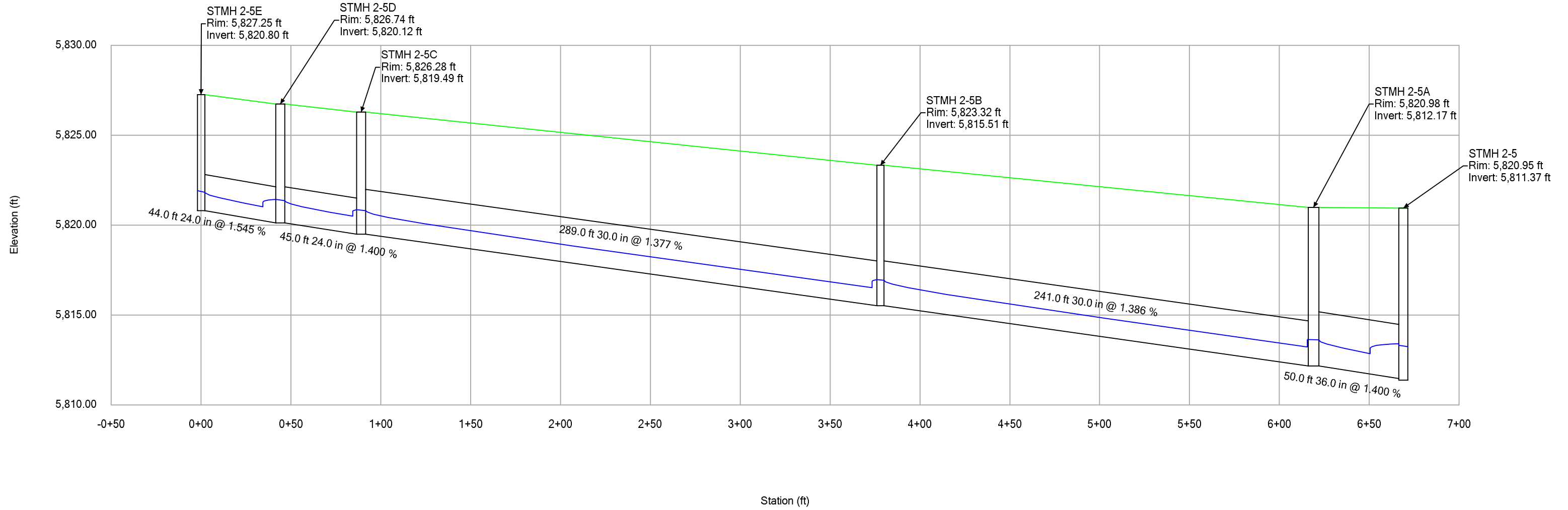
# Profile Report

## Engineering Profile - Profile - Storm Line 05B (Compark Village South StormCAD [2 year].stsw)



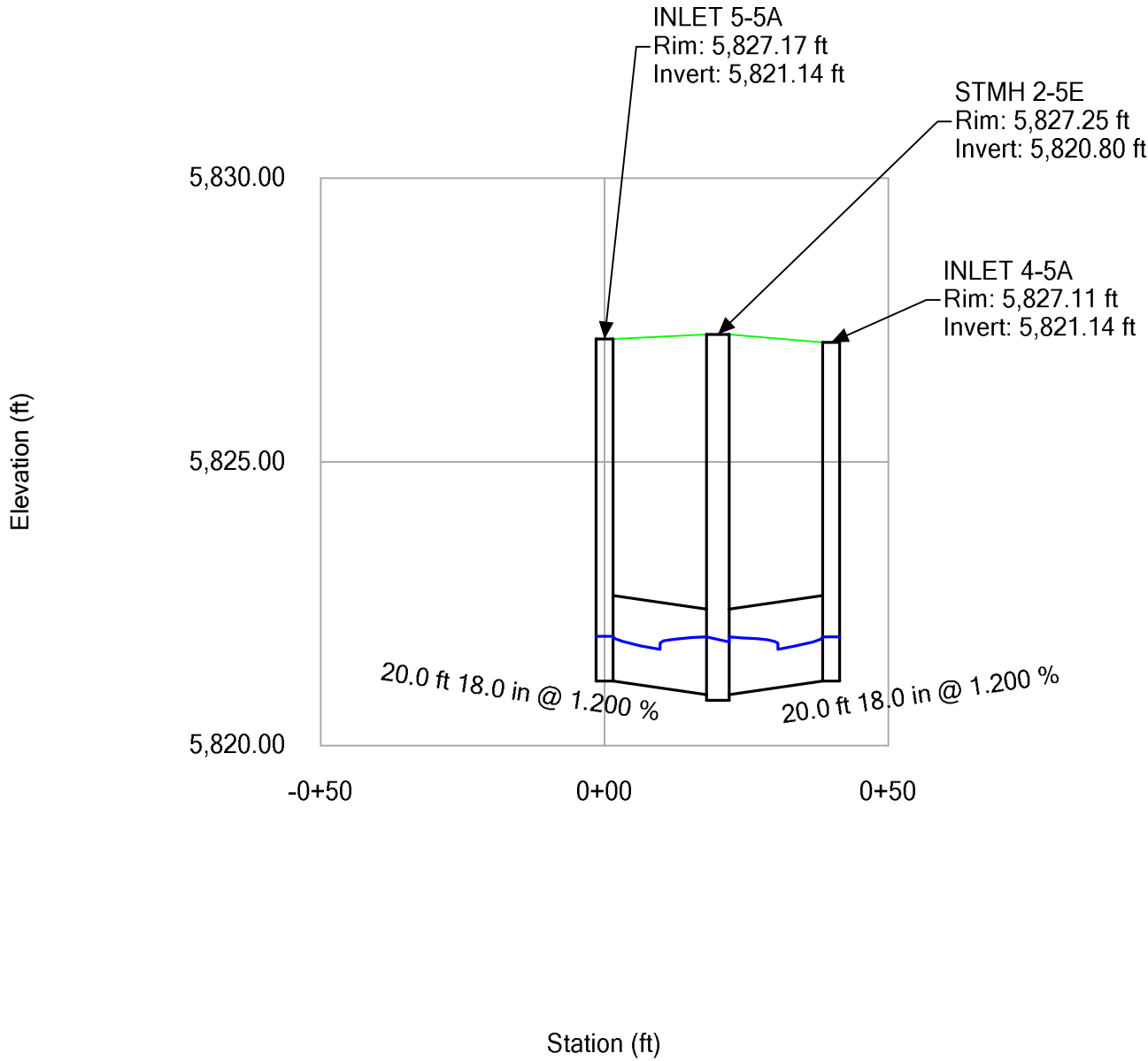
# Profile Report

## Engineering Profile - Profile - Storm Line 05C (Compark Village South StormCAD [2 year].stsw)



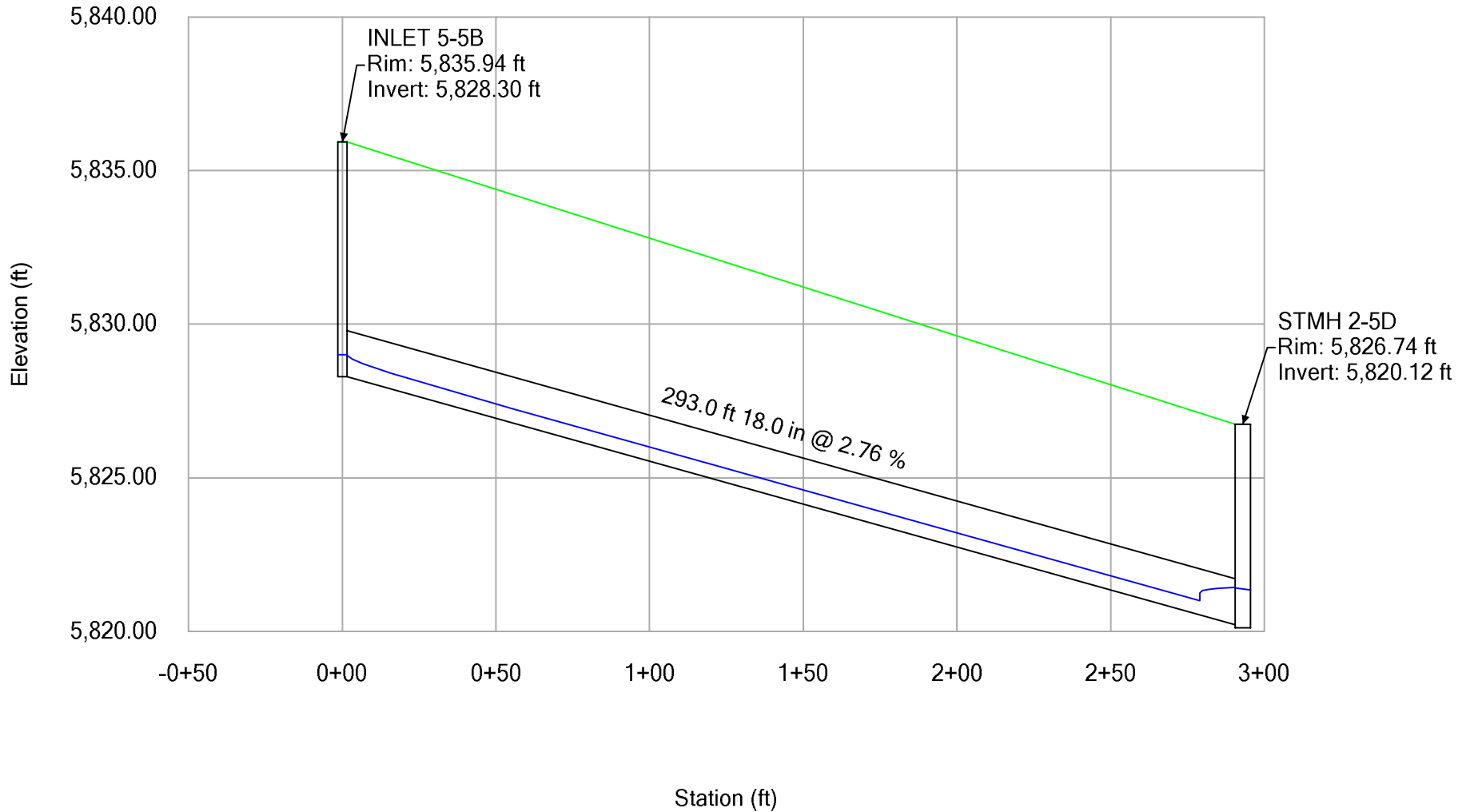
# Profile Report

## Engineering Profile - Profile - Storm Line 05D (Compark Village South StormCAD [2 year].stsw)



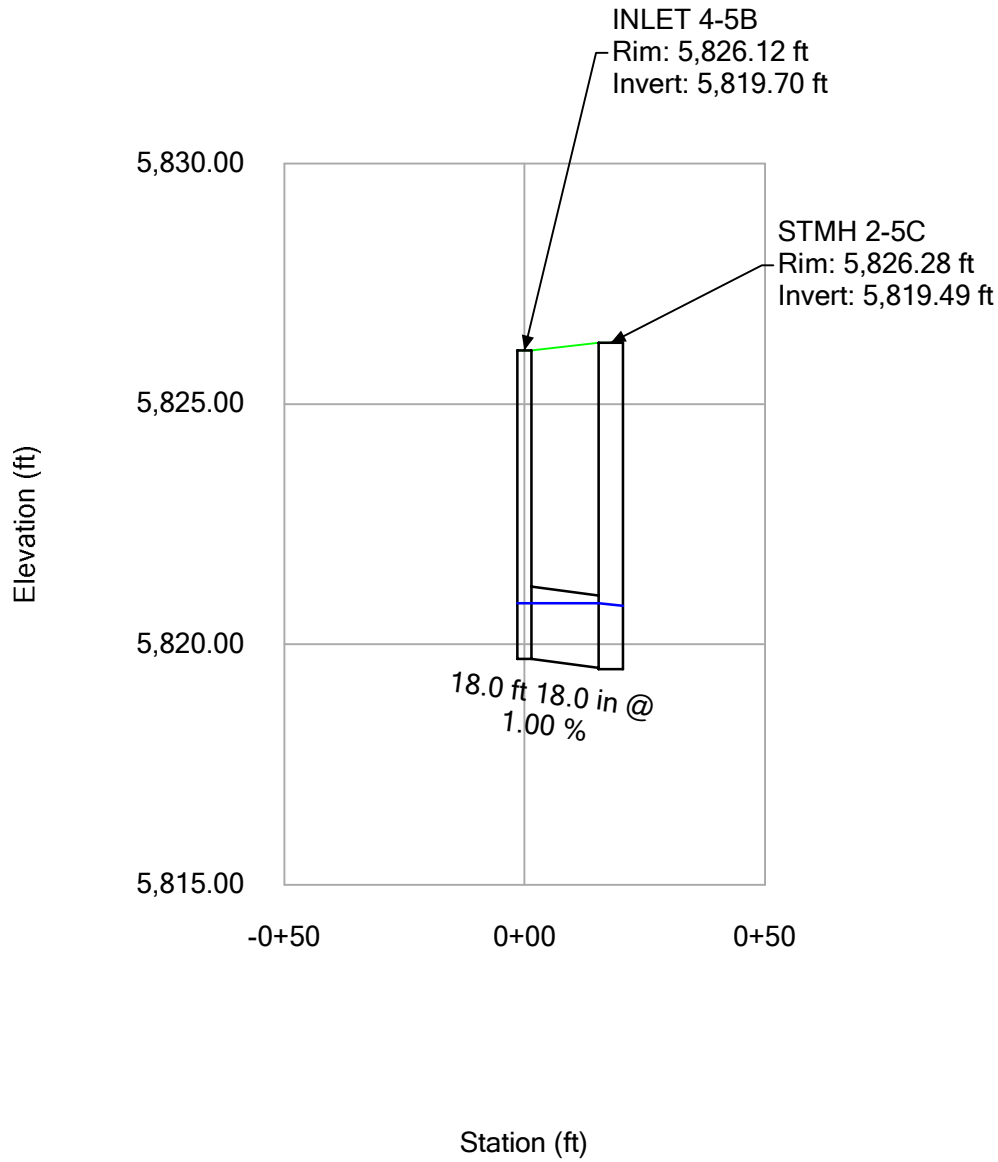
# Profile Report

## Engineering Profile - Profile - Storm Line 05E (Compark Village South StormCAD [2 year].stsw)



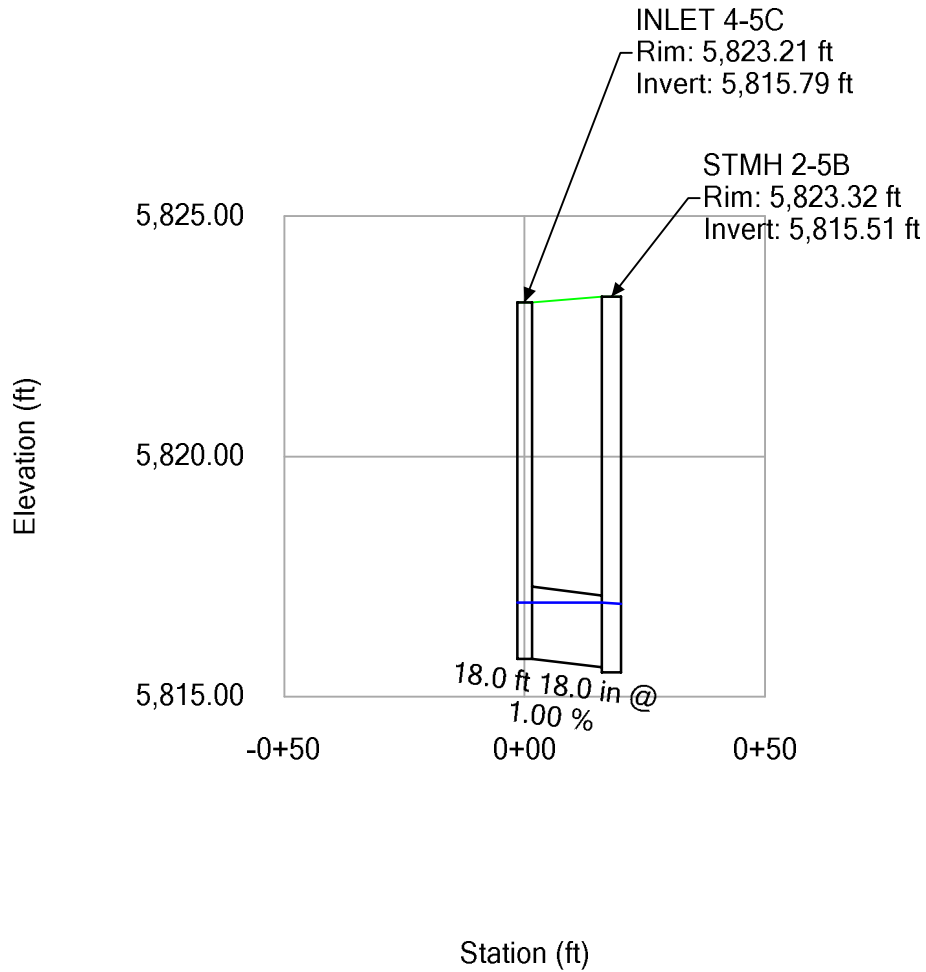
# Profile Report

## Engineering Profile - Profile - Storm Line 05F (Compark Village South StormCAD [2 year].stsw)



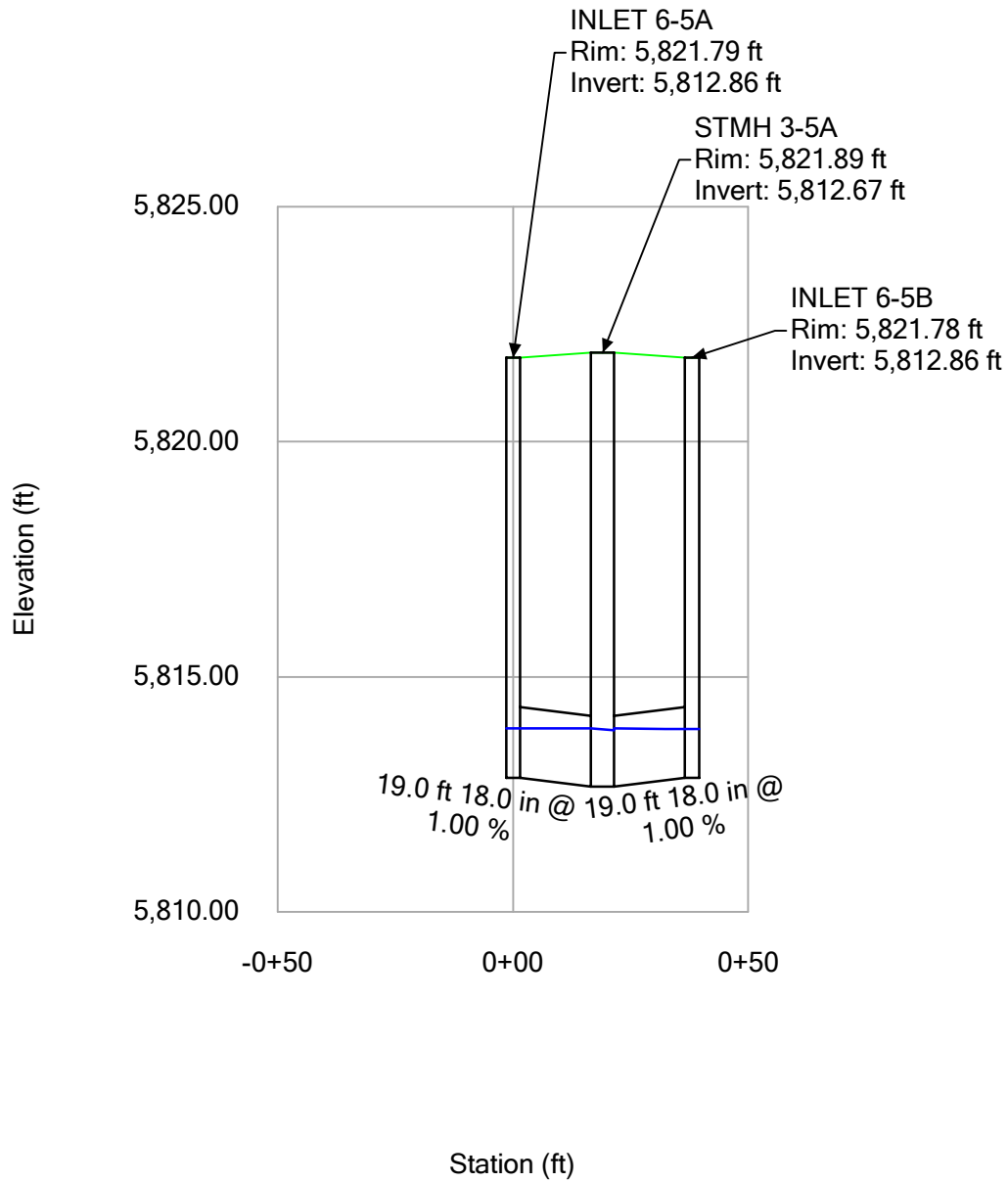
# Profile Report

## Engineering Profile - Profile - Storm Line 05G (Compark Village South StormCAD [2 year].stsw)

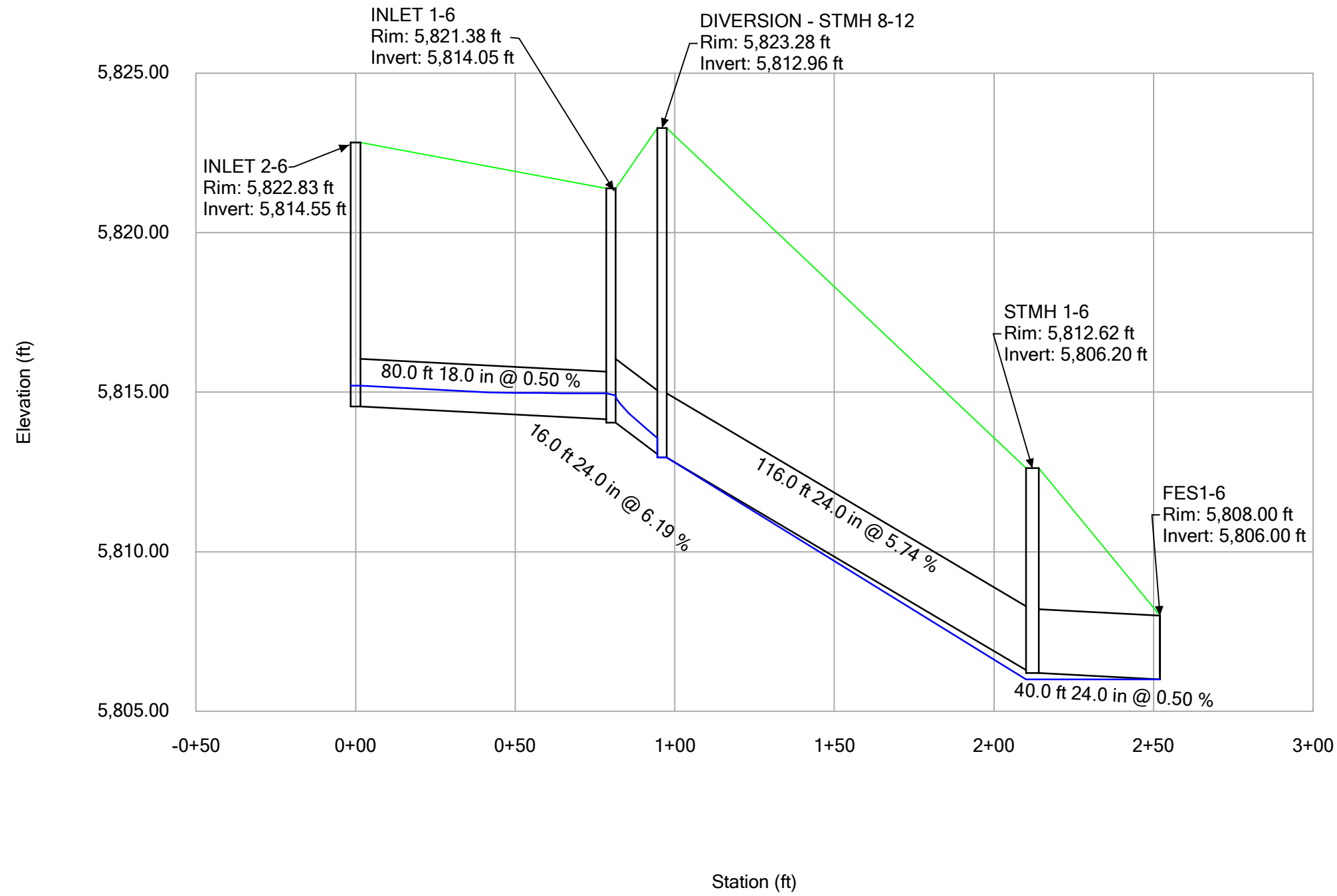


# Profile Report

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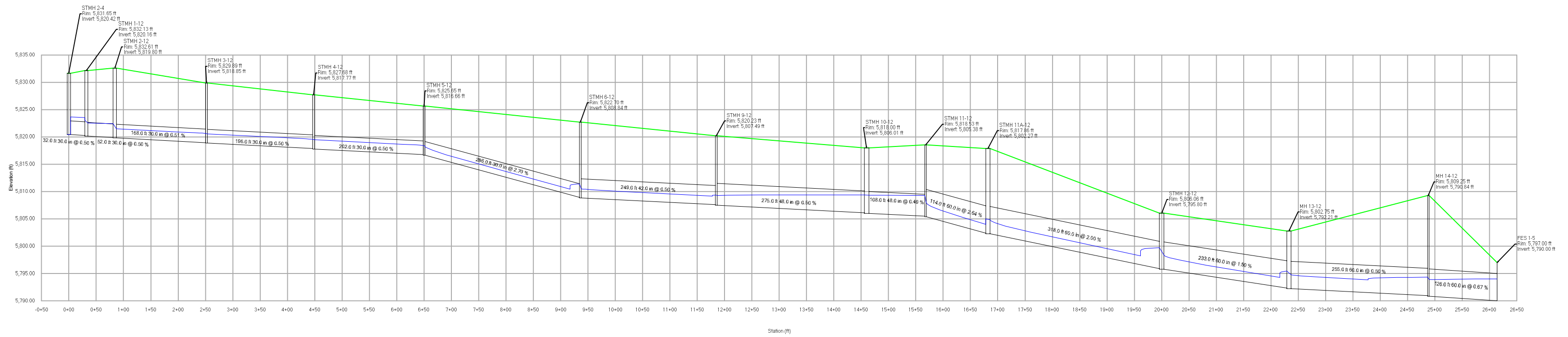


**Profile Report**  
**Engineering Profile - Profile - Storm Line 06 (Compark Village South StormCAD [2 year].stsw)**



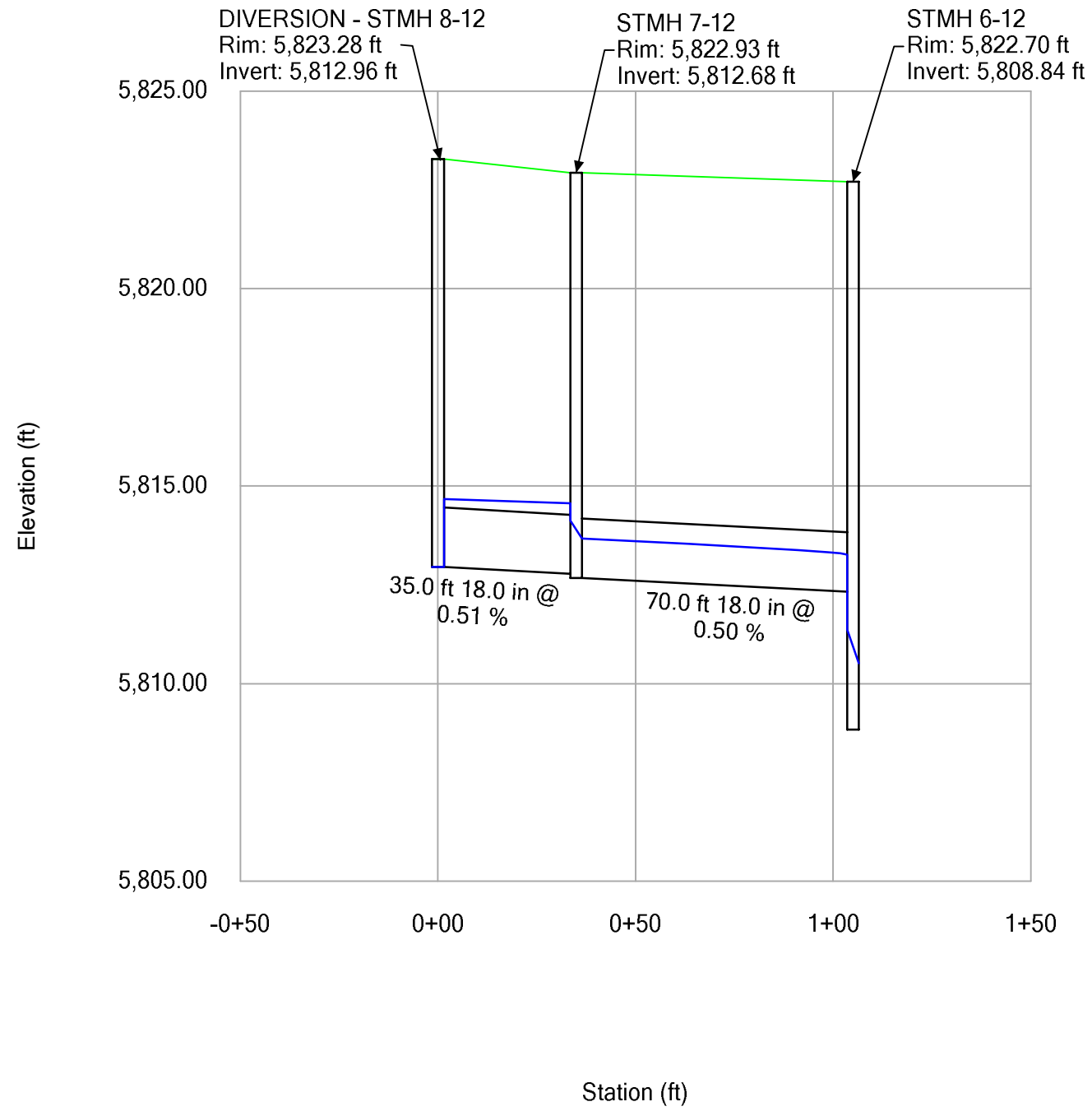
# Profile Report

## Engineering Profile - Profile - Storm Line 12 (Compark Village South StormCAD [2 year].stsw)



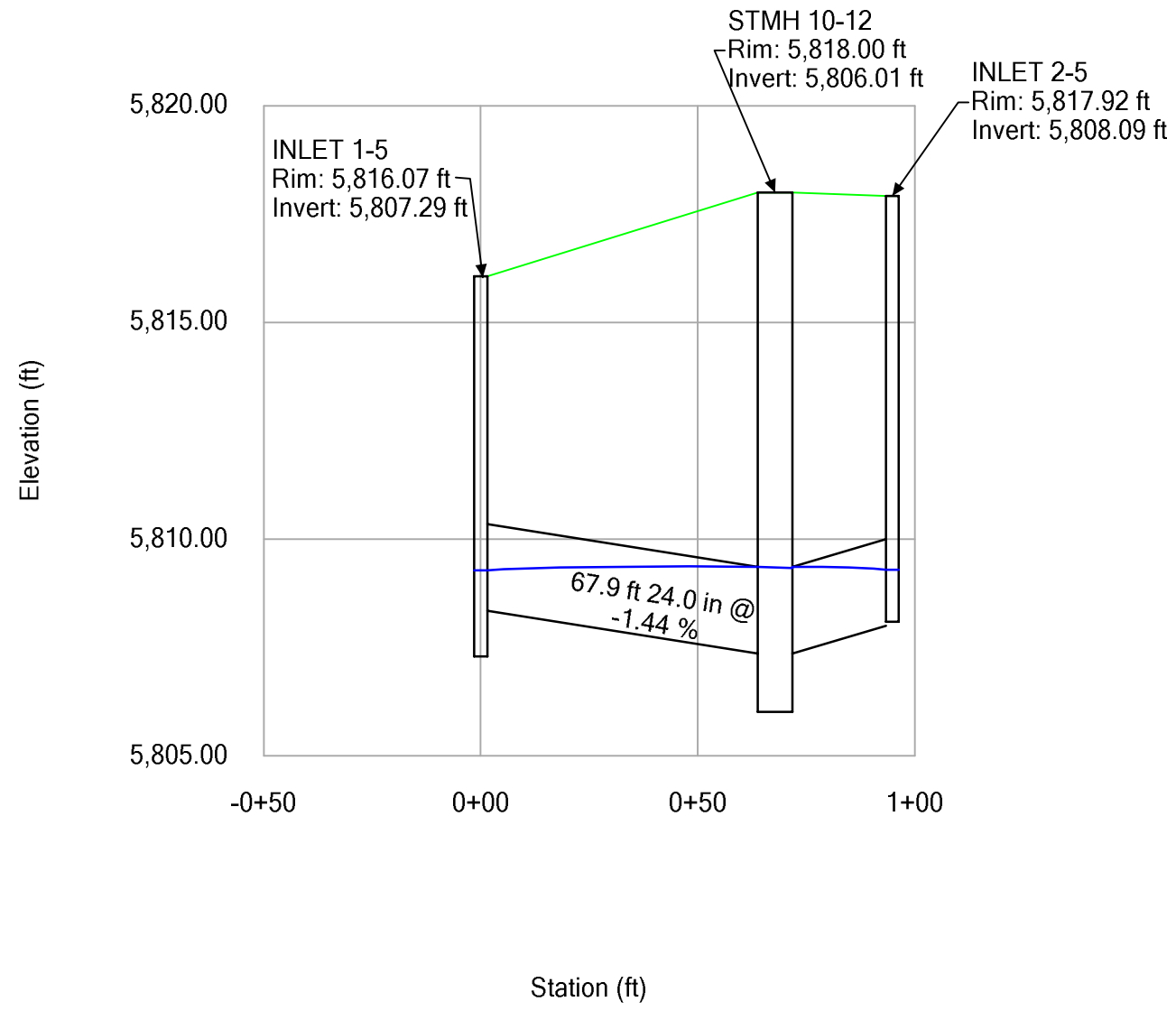
# Profile Report

## Engineering Profile - Profile - Storm Line 12A (Compark Village South StormCAD [2 year].stsw)



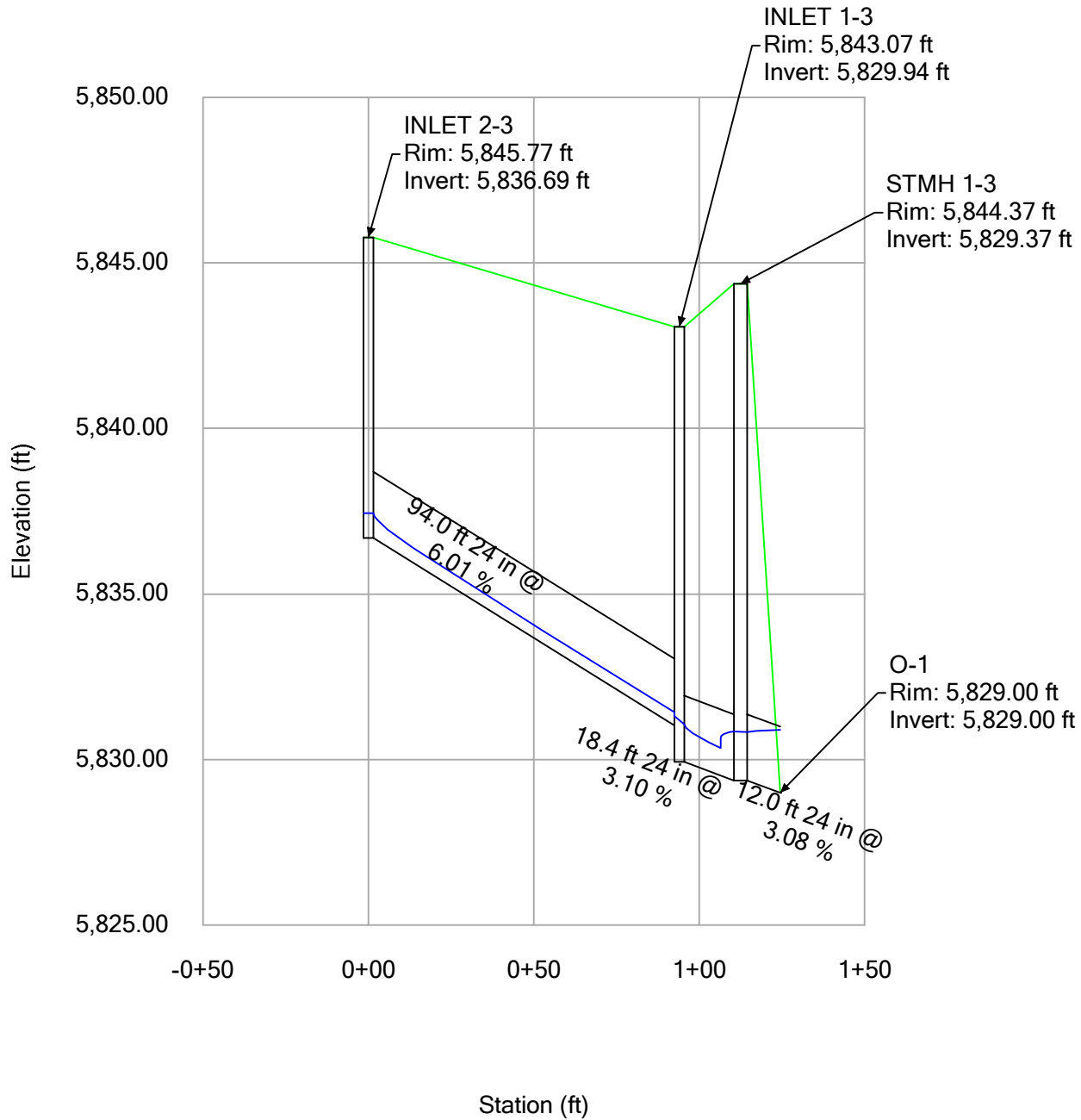
**Profile Report**

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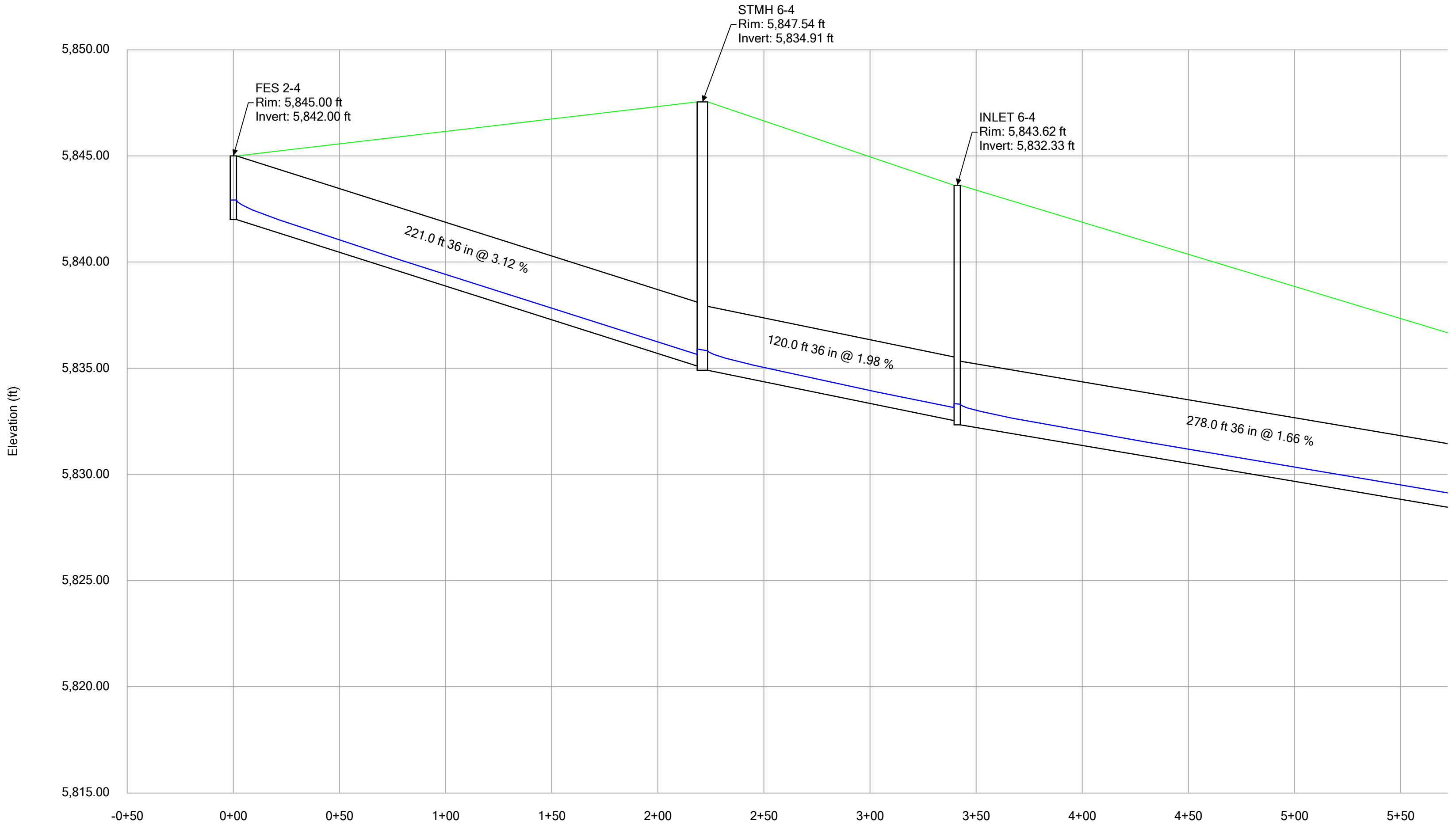


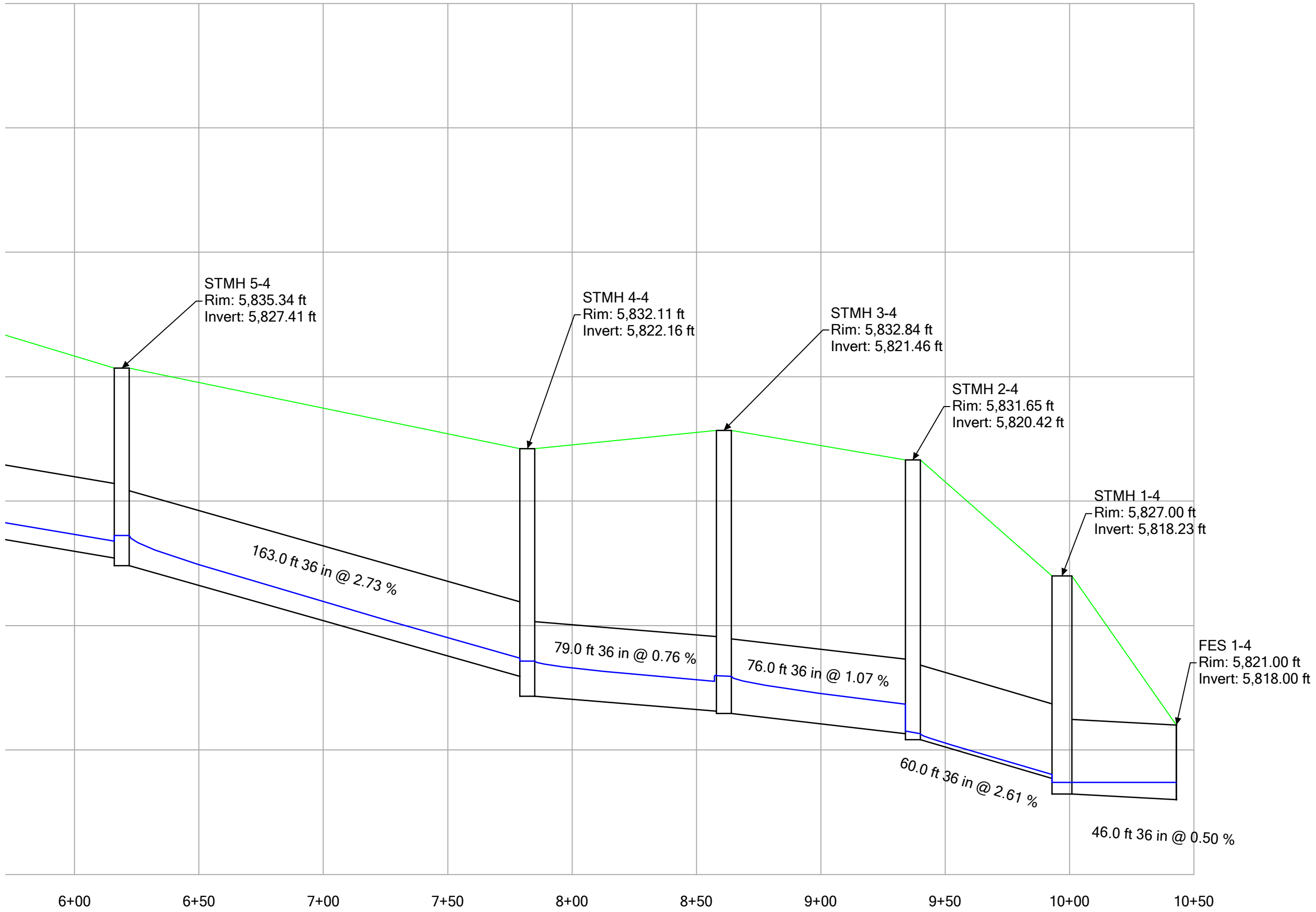
# Profile Report

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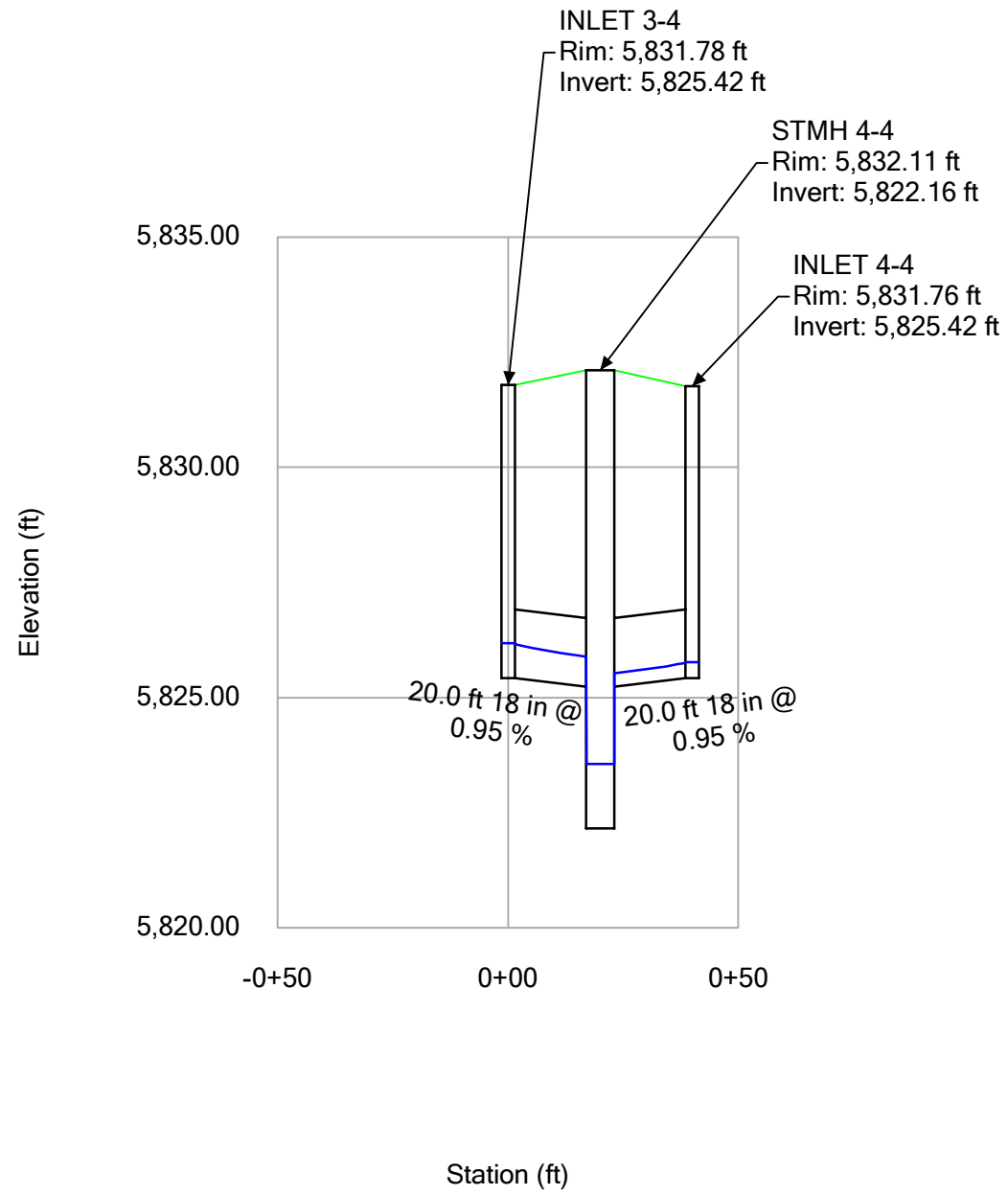


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**Engineering Profile - Profile - Storm Line 04 (Compark Village South StormCAD [5 year].stsw)**

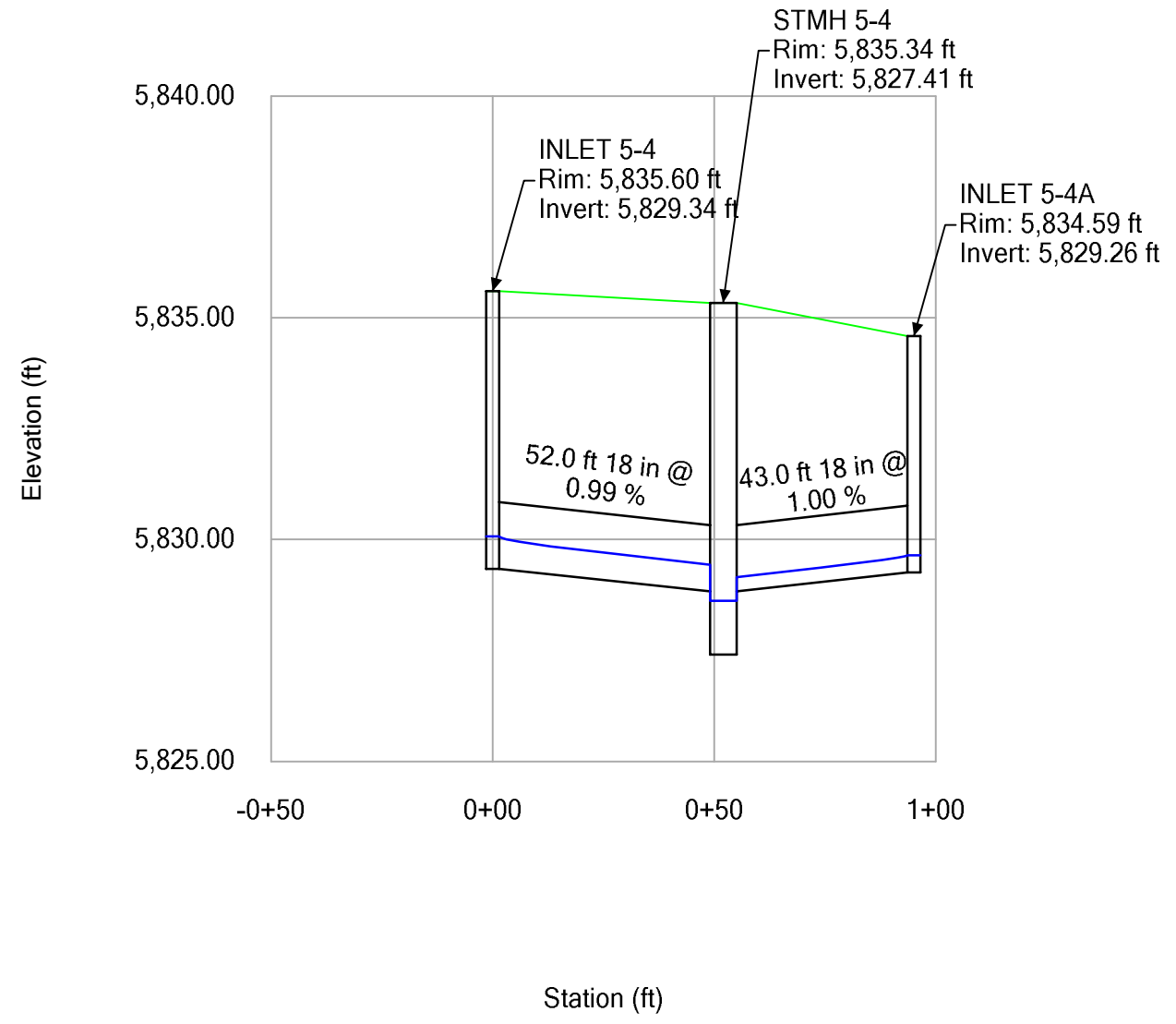




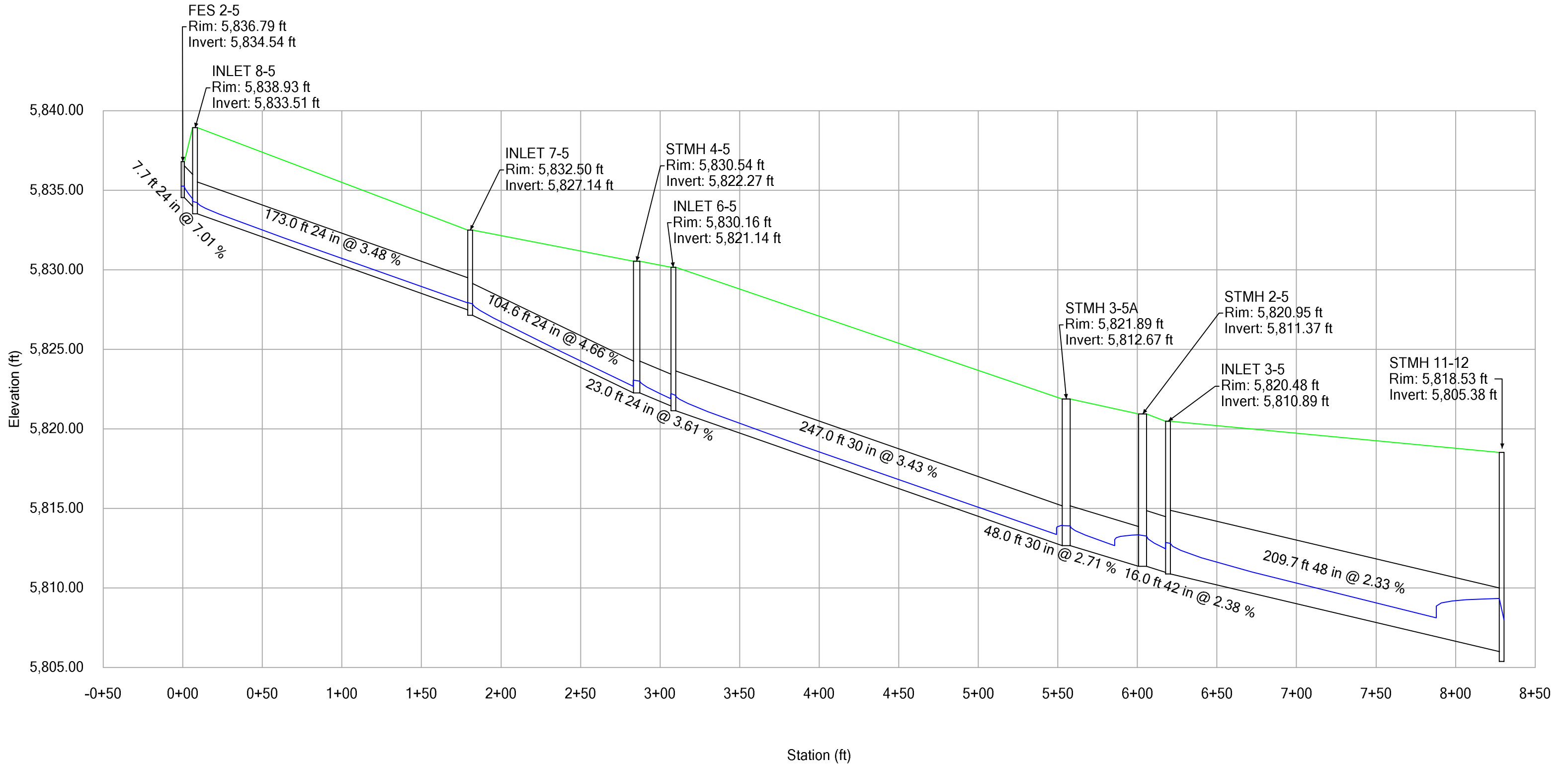
**Profile Report**  
**Engineering Profile - Profile - Storm Line 04A (Compark Village South StormCAD [5 year].stsw)**



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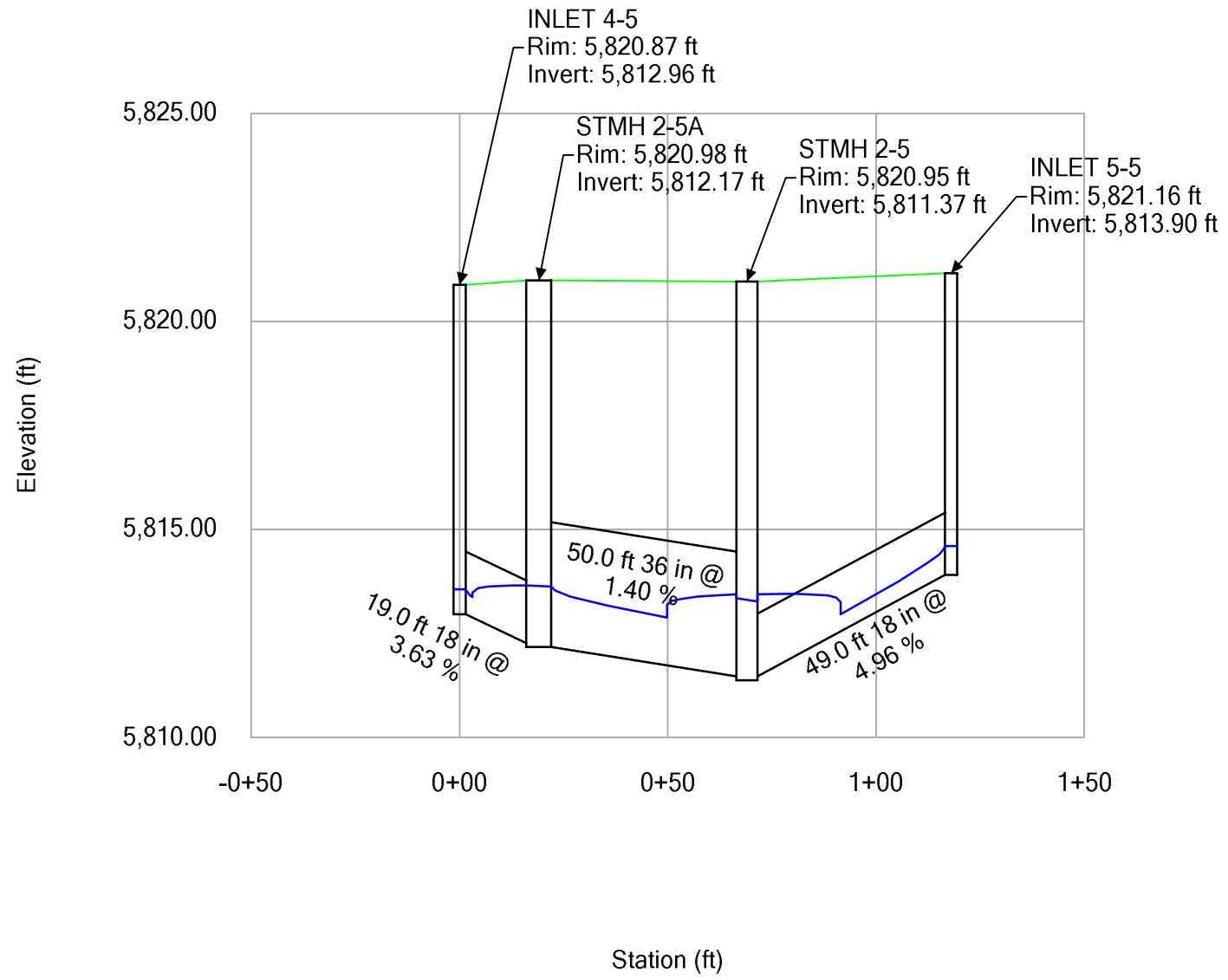


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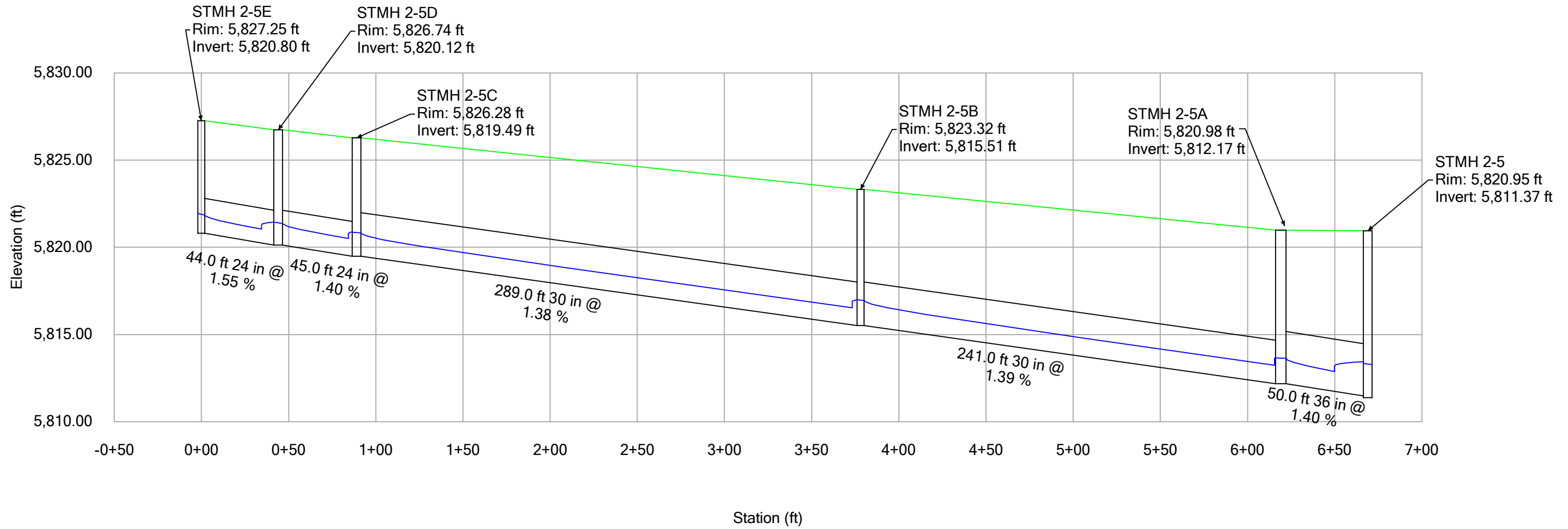
# Profile Report

## Engineering Profile - Profile - Storm Line 05B (Compark Village South StormCAD [5 year].stsw)



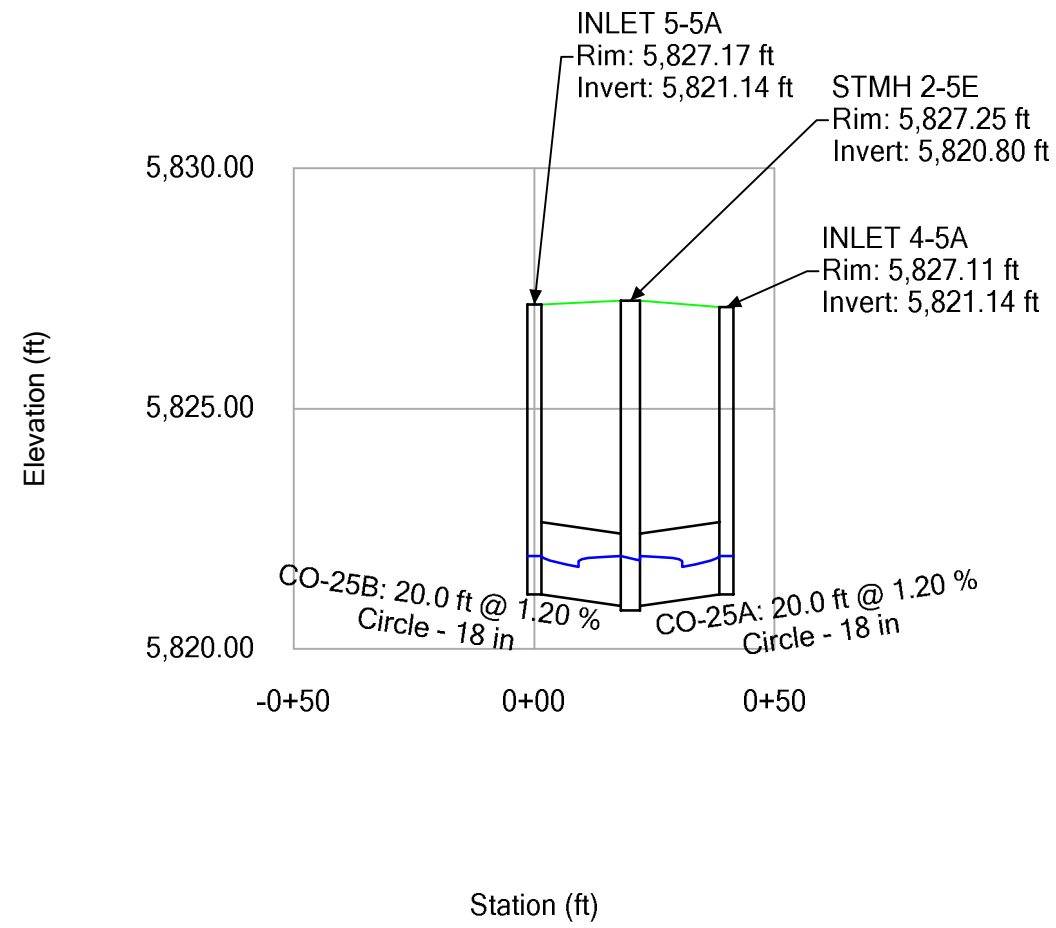
# Profile Report

## Engineering Profile - Profile - Storm Line 05C (Compark Village South StormCAD [5 year].stsw)



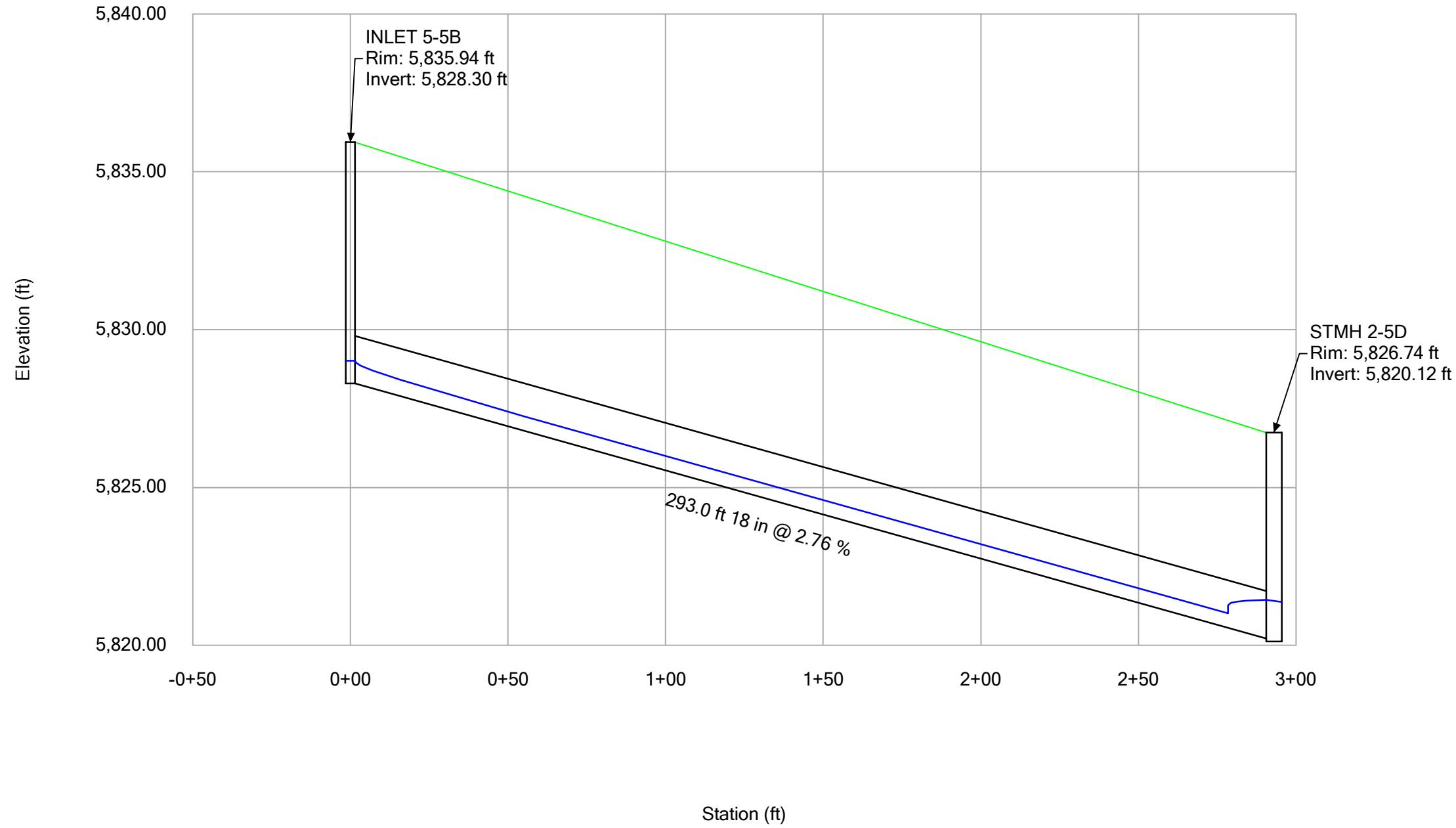
# Profile Report

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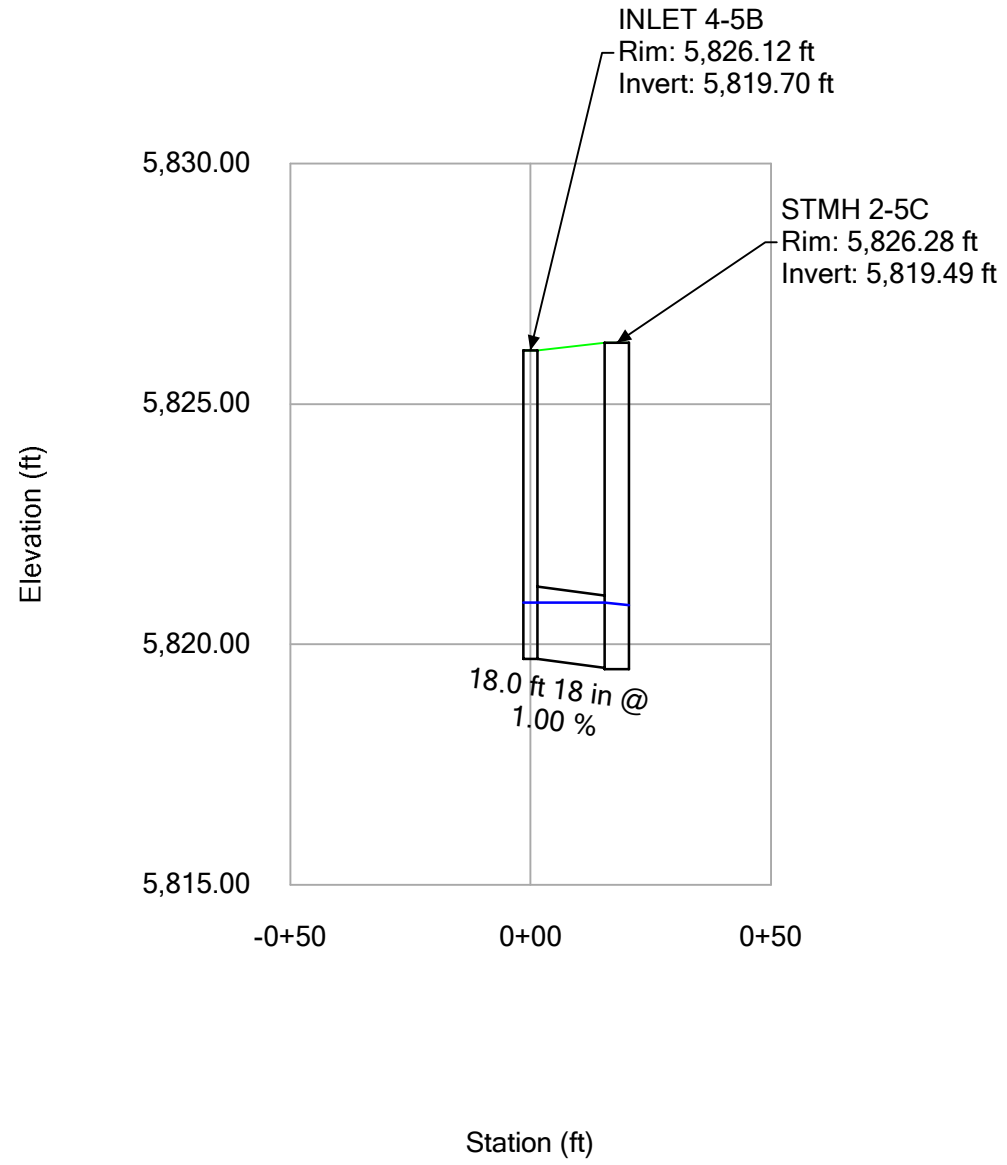
# Profile Report

## Engineering Profile - Profile - Storm Line 05E (Compark Village South StormCAD [5 year].stsw)



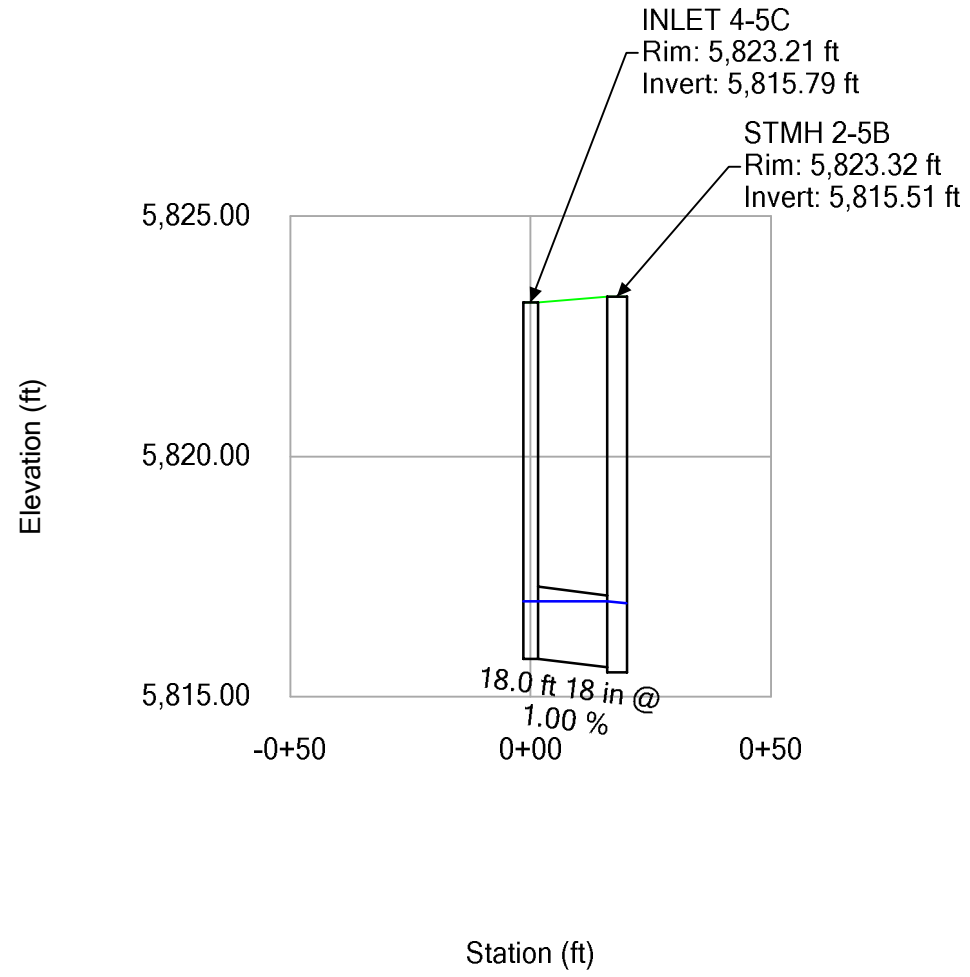
# Profile Report

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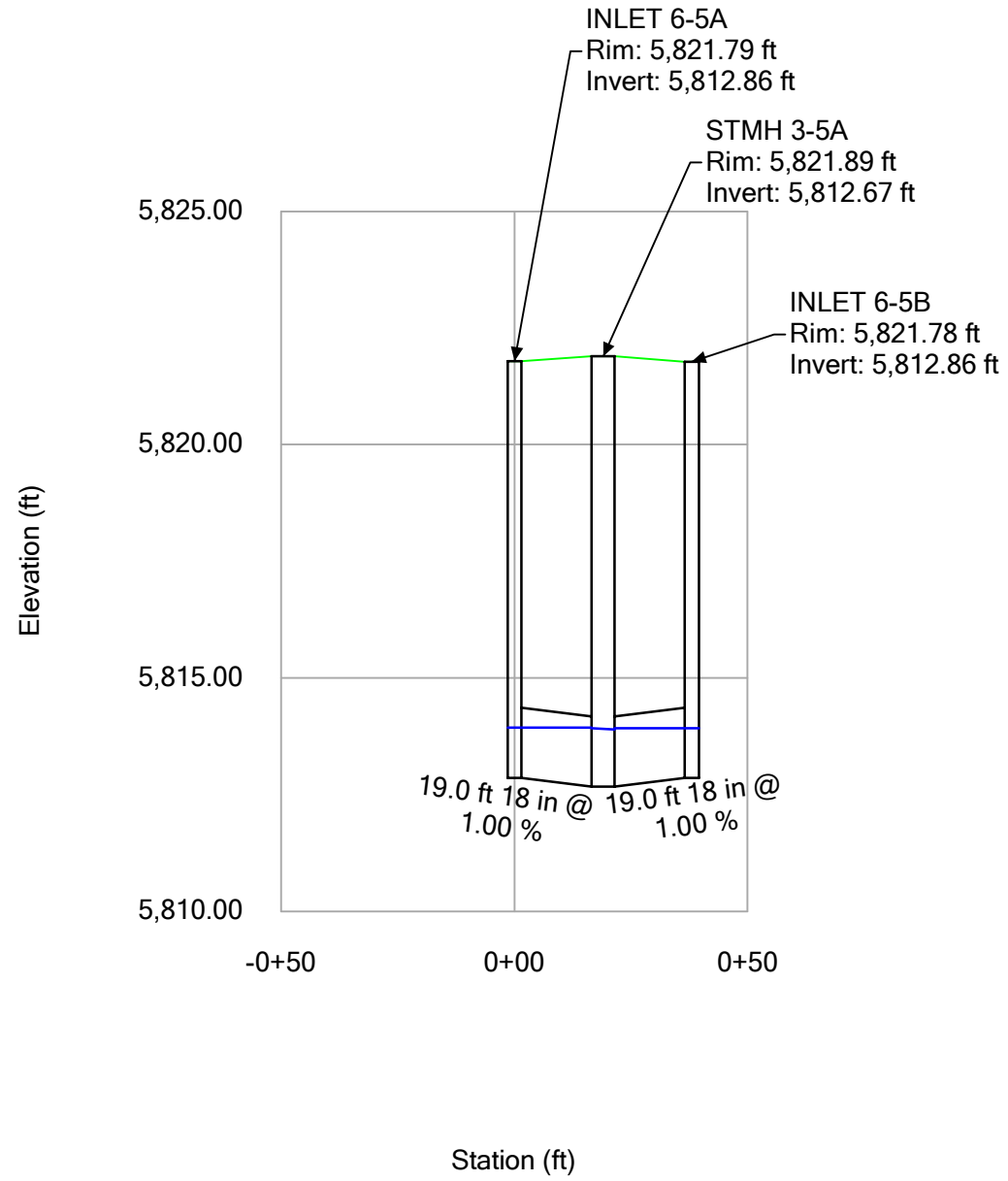
# Profile Report

## Engineering Profile - Profile - Storm Line 05G (Compark Village South StormCAD [5 year].stsw)

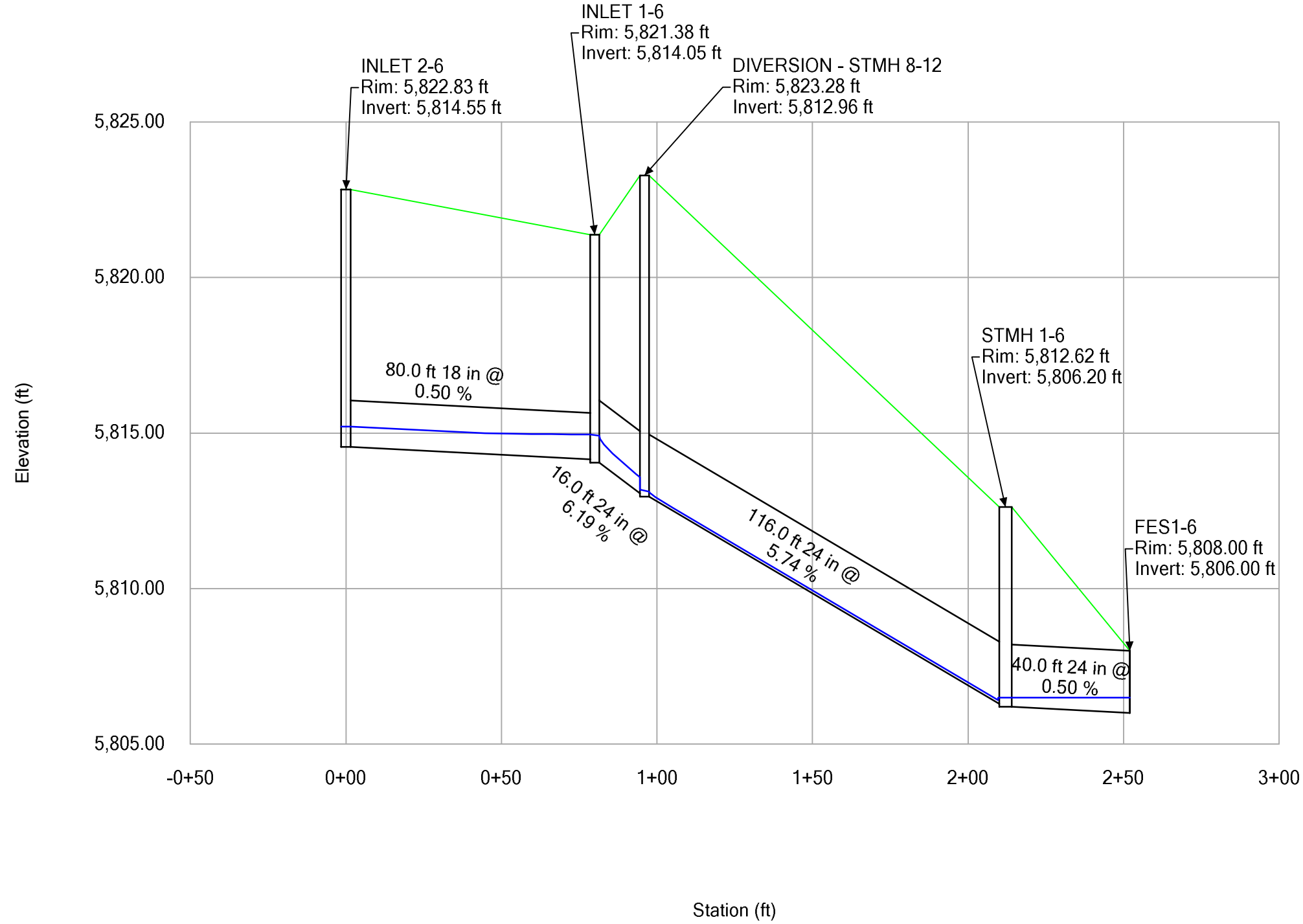


# Profile Report

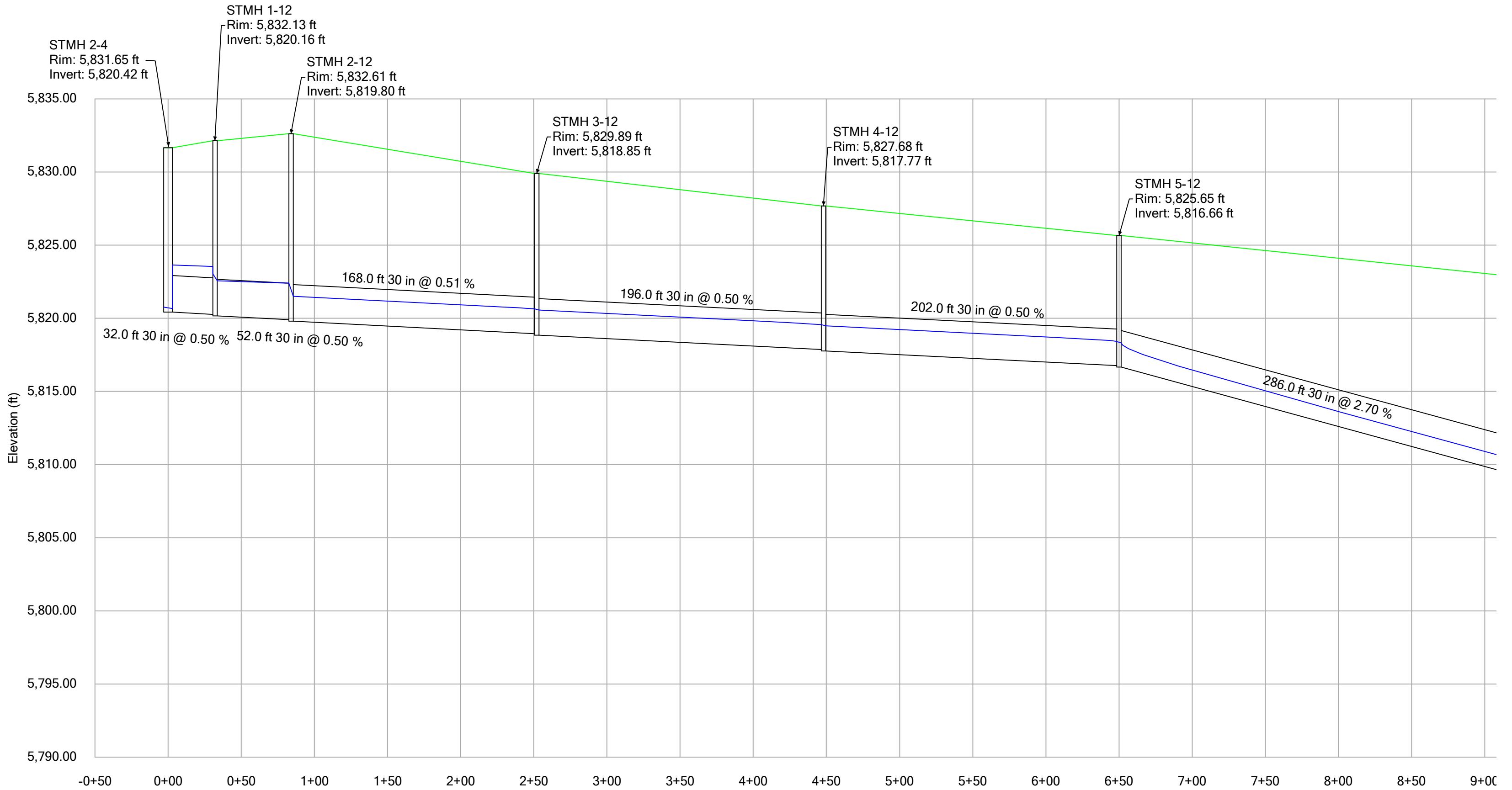
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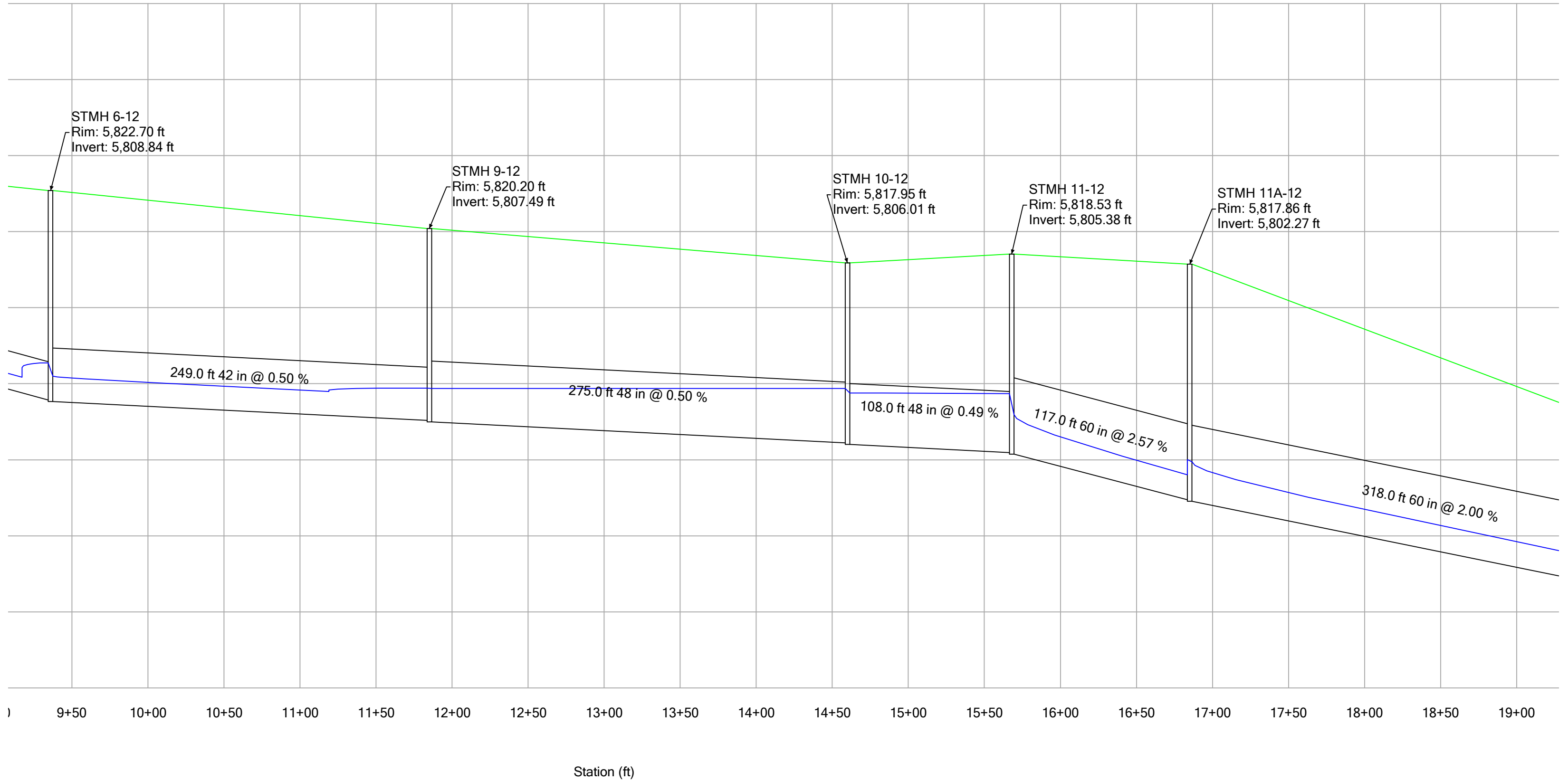


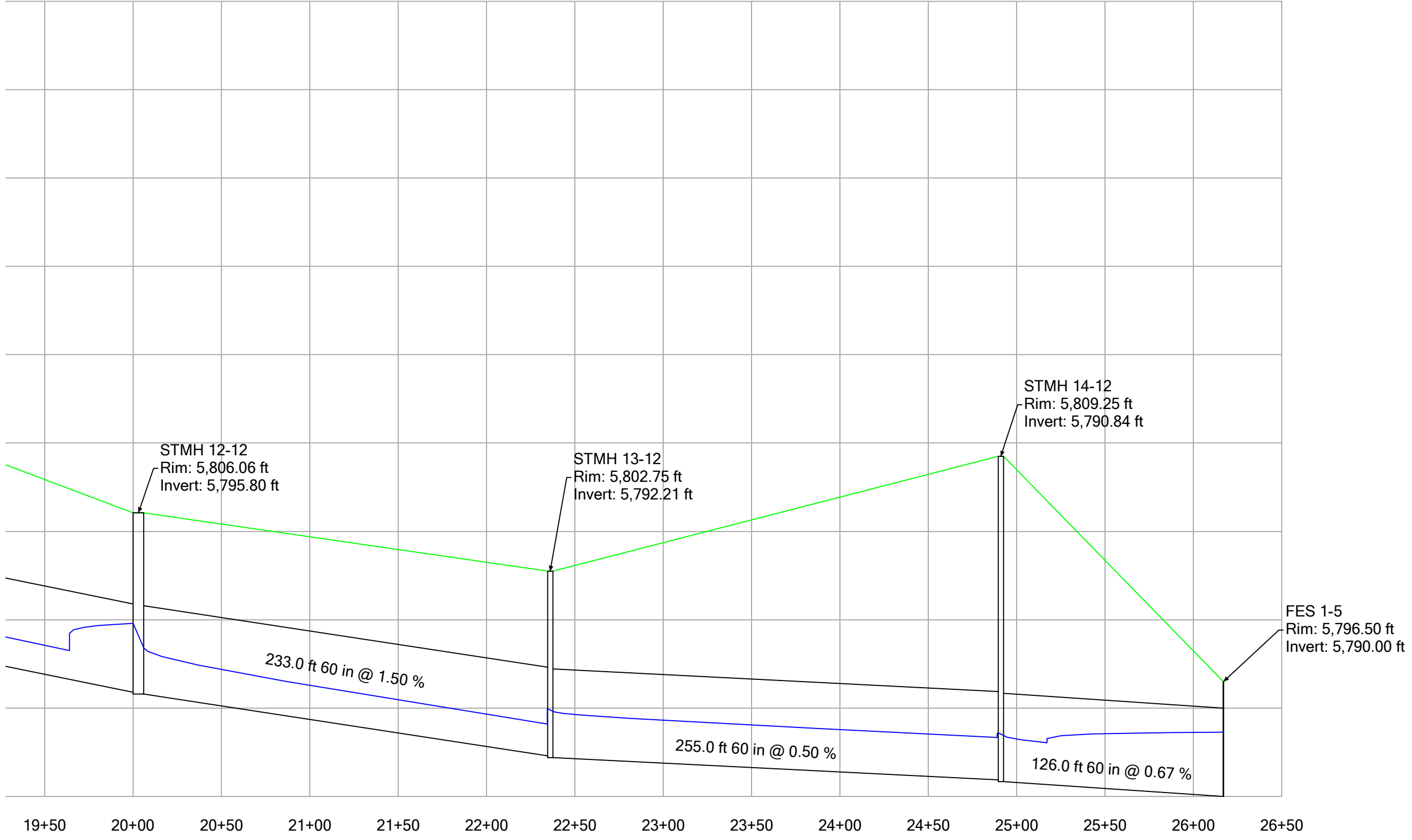
**Profile Report**  
**Engineering Profile - Profile - Storm Line 06 (Compark Village South StormCAD [5 year].stsw)**



**Profile Report**  
**Engineering Profile - Profile - Storm Line 12 (Compark Village South StormCAD [5 year].stsw)**

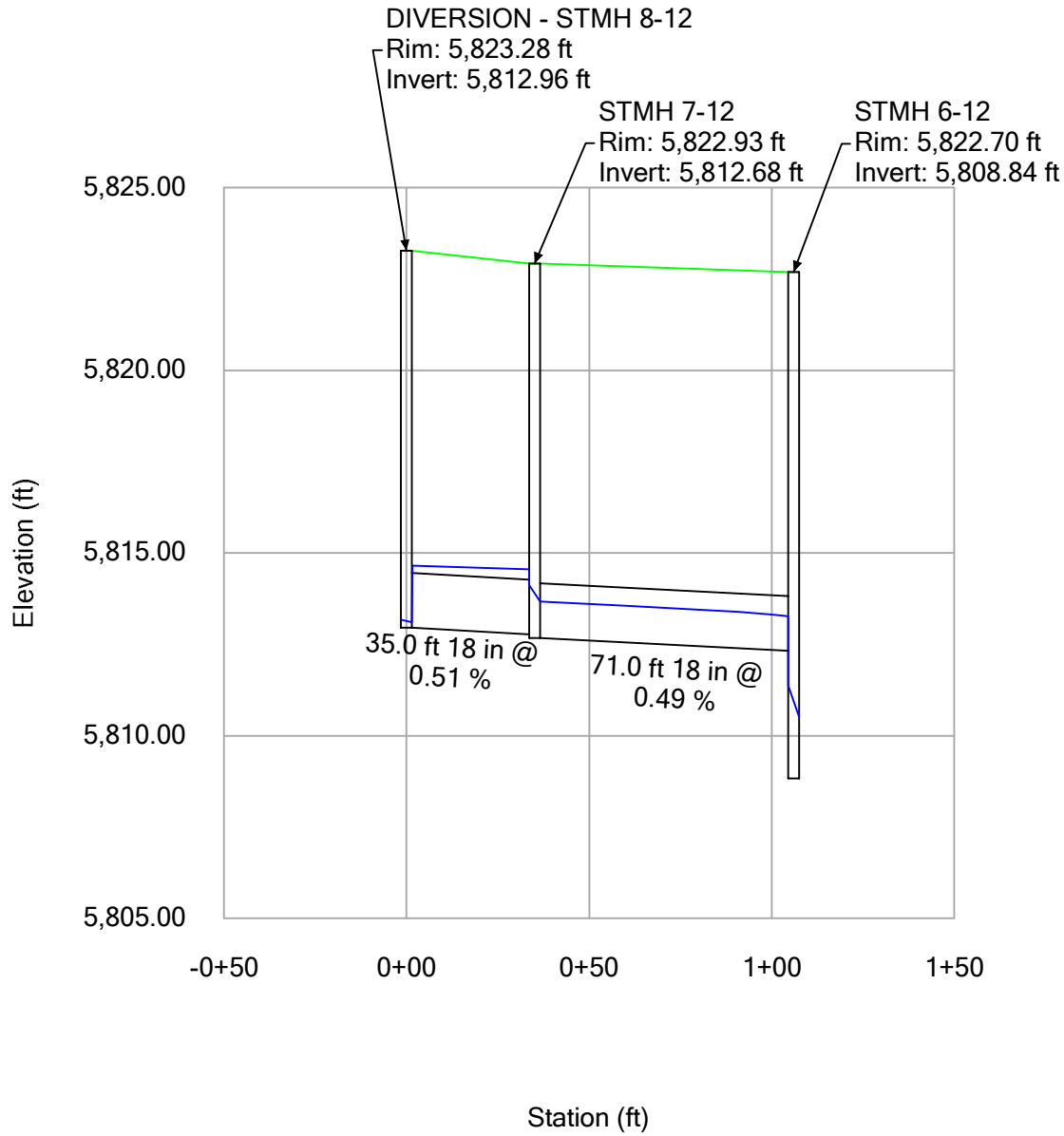






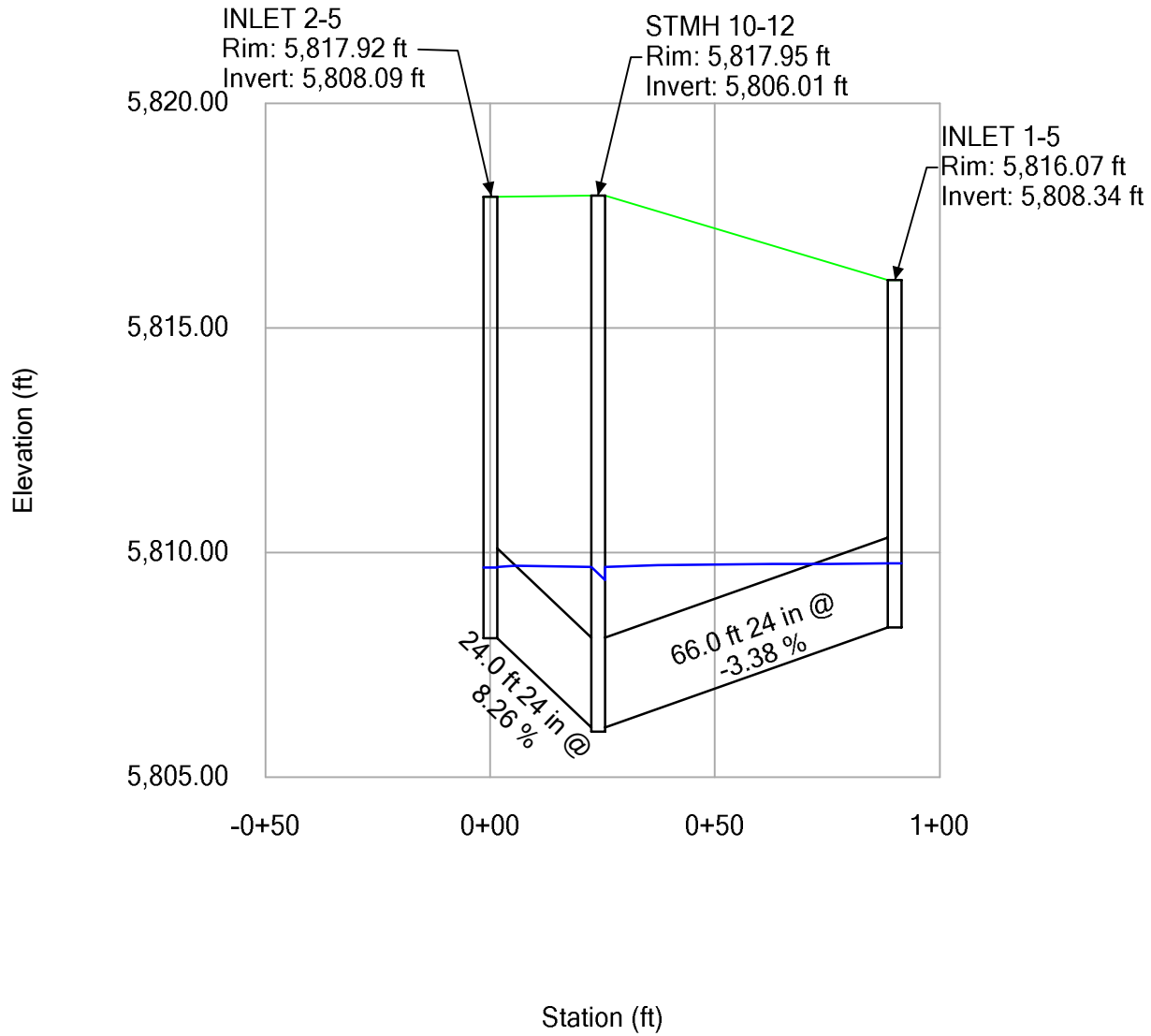
# Profile Report

## Engineering Profile - Profile - Storm Line 12A (Compark Village South StormCAD [5 year].stsw)

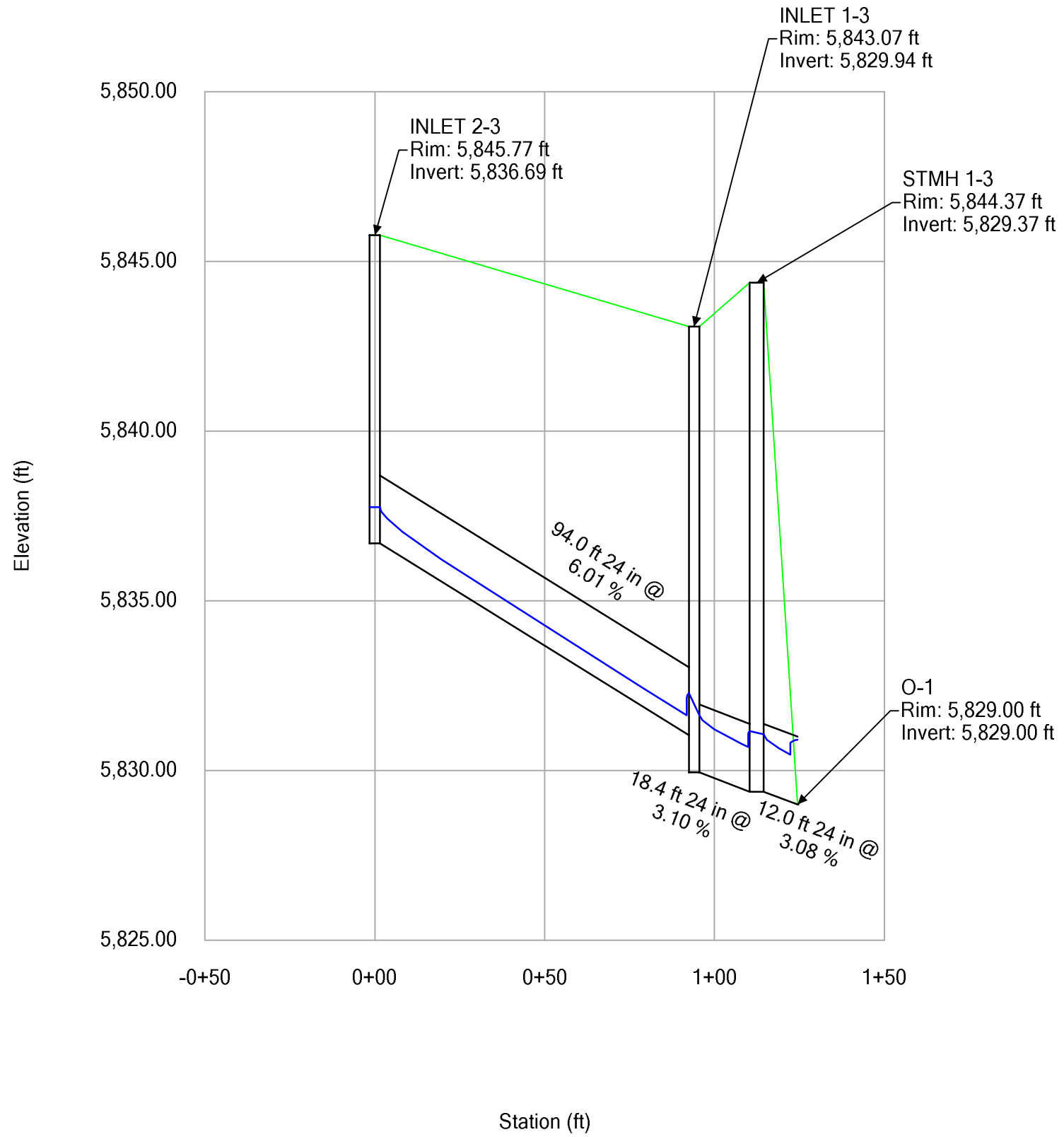


# Profile Report

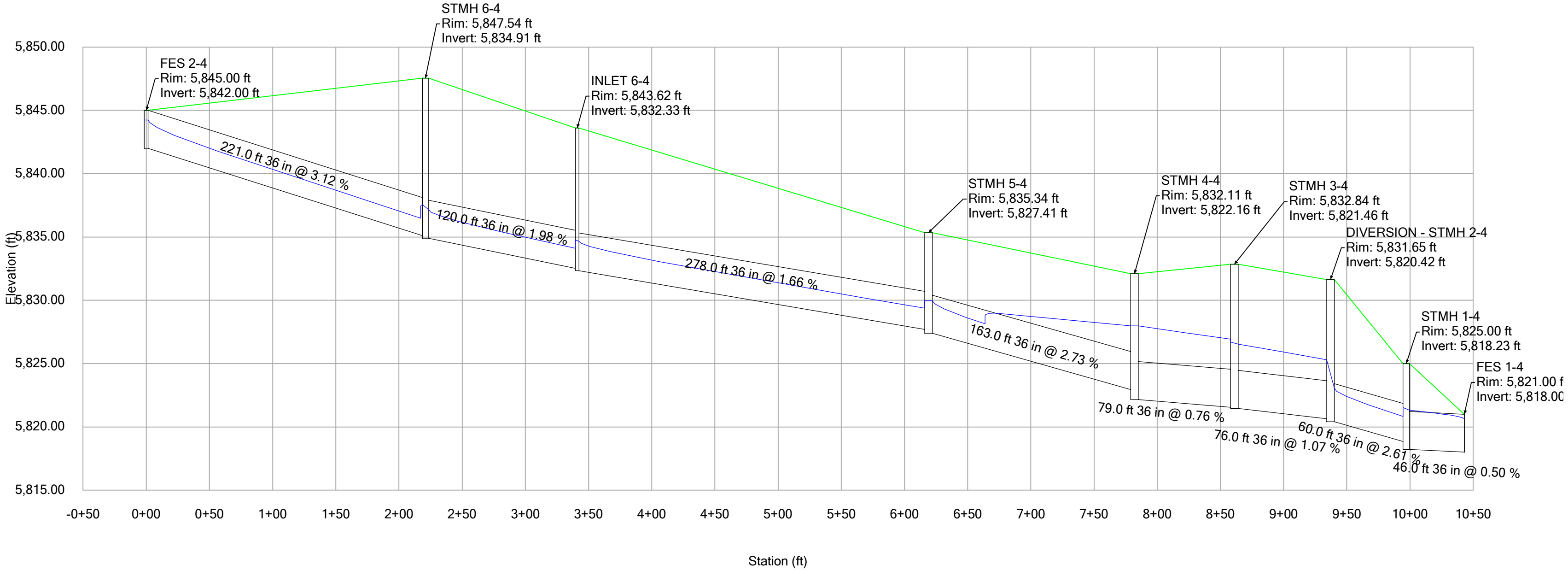
## Engineering Profile - Profile - Storm Line 12B (Compark Village South StormCAD [5 year].stsw)



**Profile Report**  
**Engineering Profile - Profile - Storm Line 03 (Compark Village South StormCAD [100 year].stsw)**

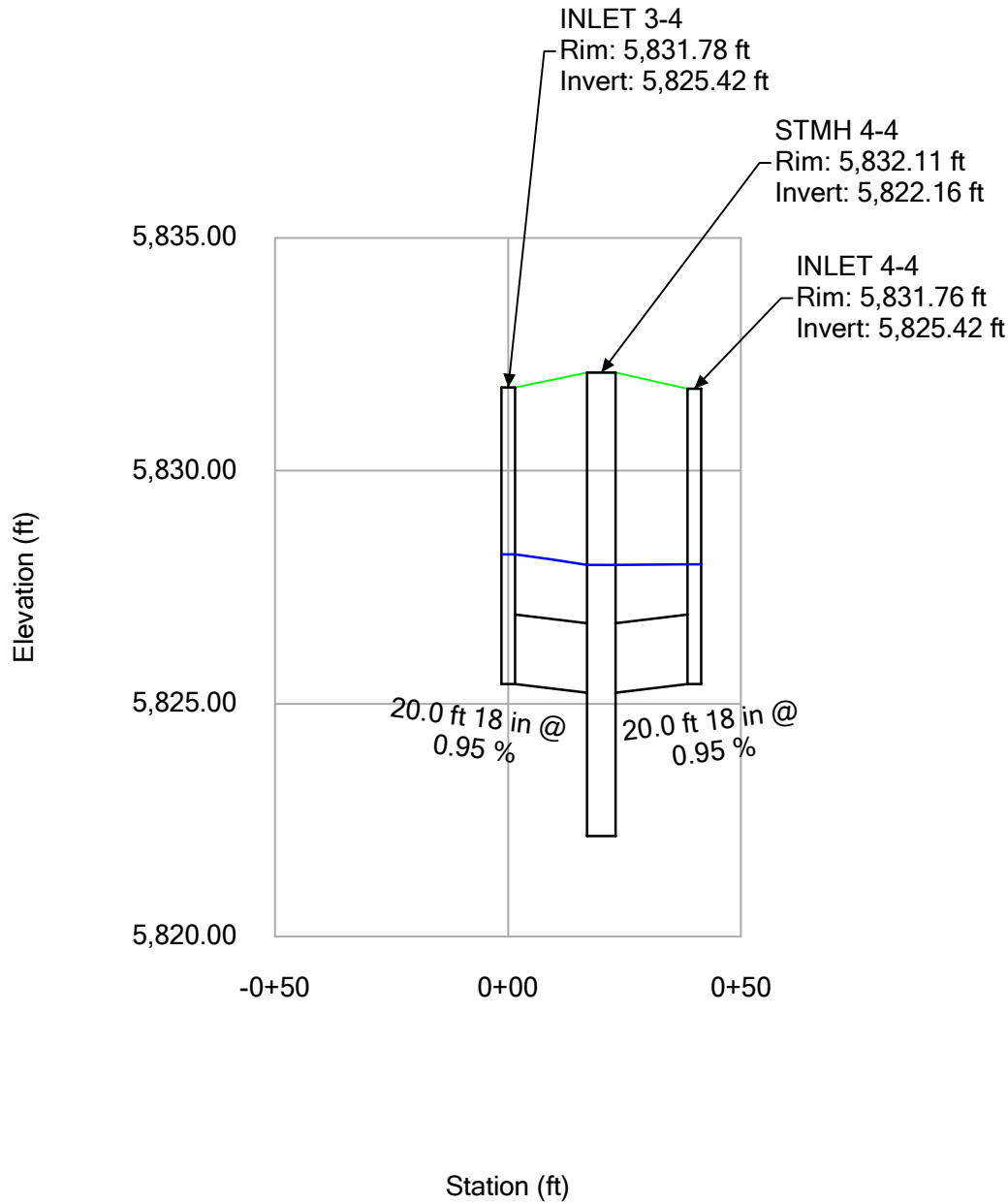


**Profile Report**  
**Engineering Profile - Profile - Storm Line 04 (Compark Village South StormCAD [100 year].stsw)**



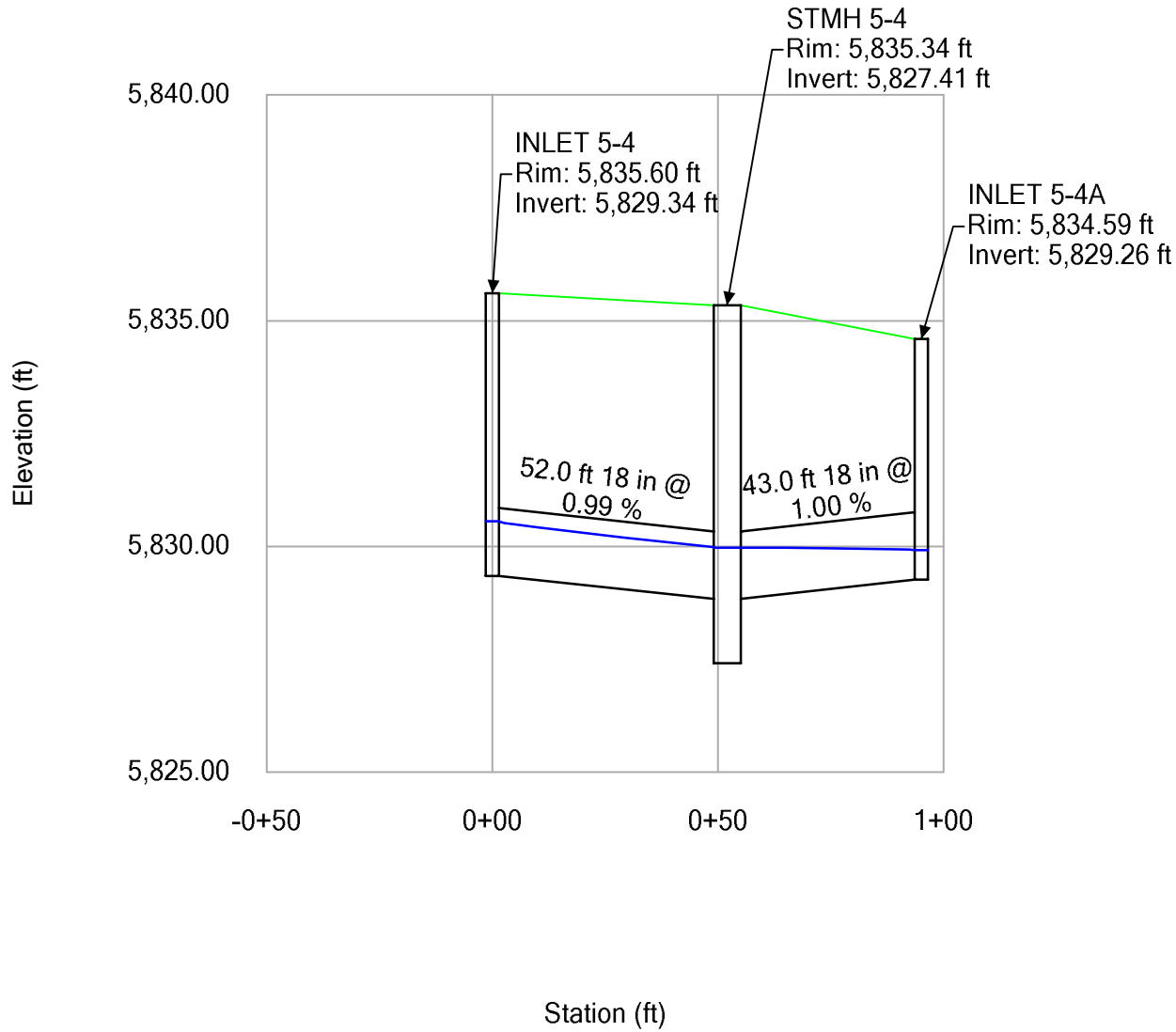
# Profile Report

## Engineering Profile - Profile - Storm Line 04A (Compark Village South StormCAD [100 year].stsw)

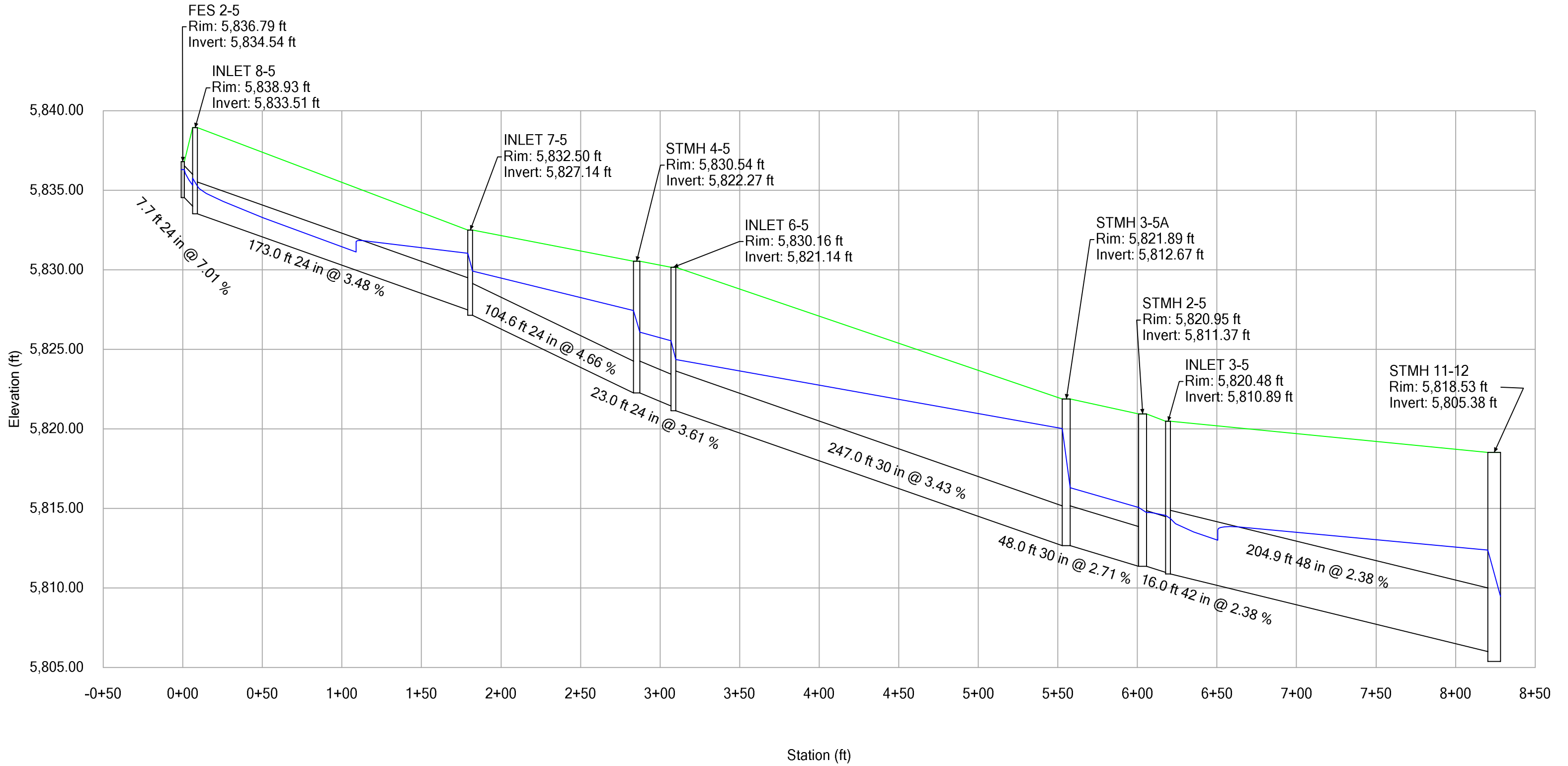


# Profile Report

## Engineering Profile - Profile - Storm Line 04B (Compark Village South StormCAD [100 year].stsw)

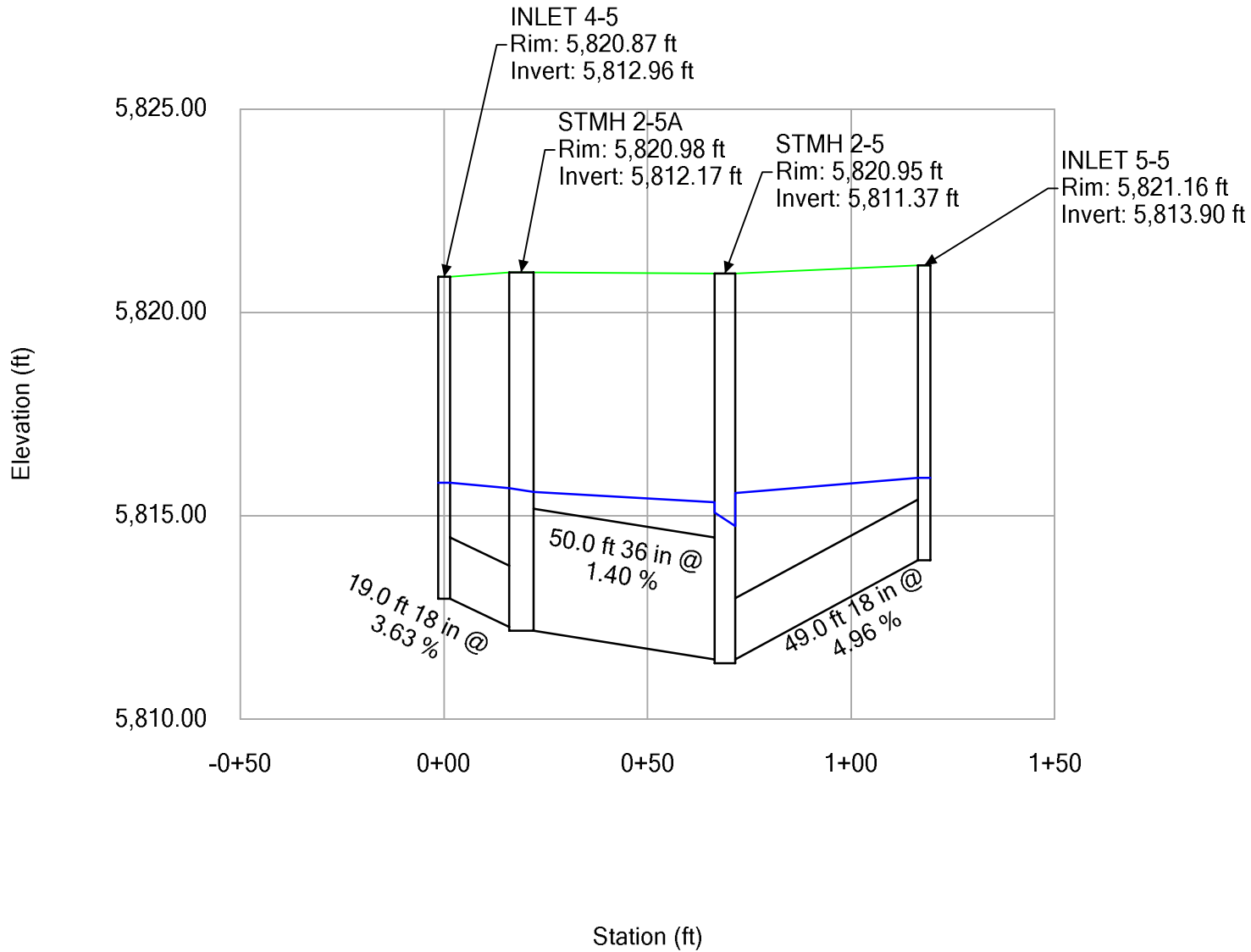


**Profile Report**  
**Engineering Profile - Profile - Storm Line 05 (Compark Village South StormCAD [100 year].stsw)**



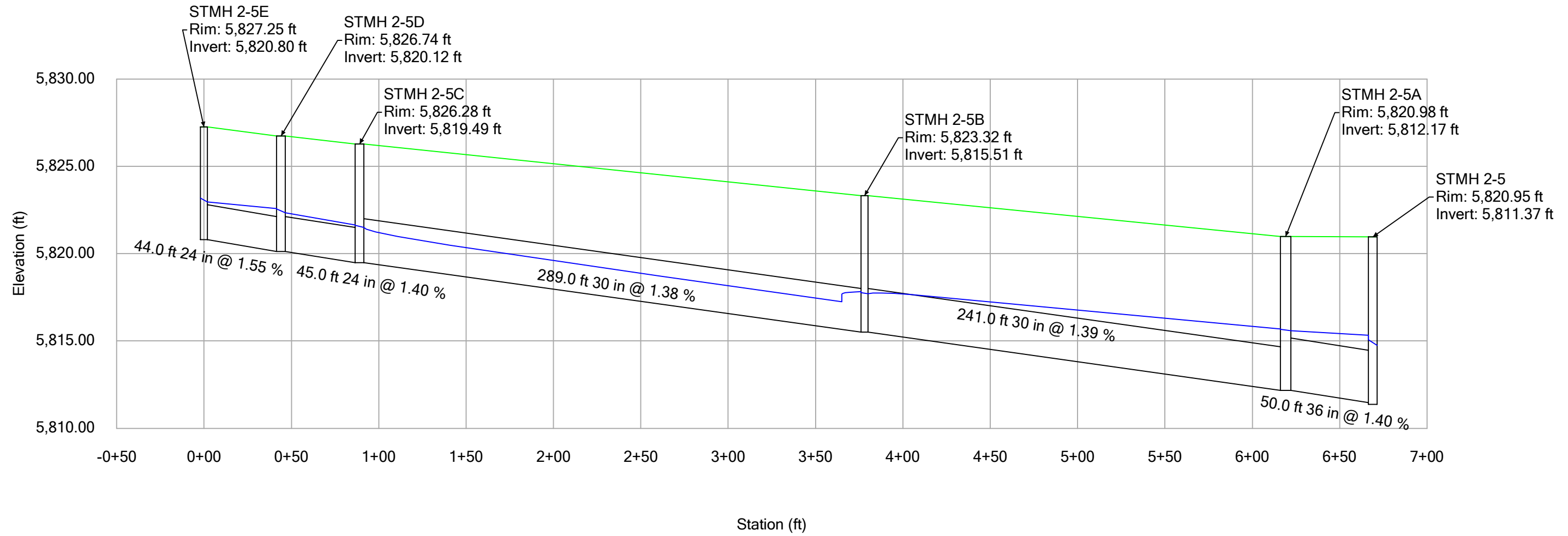
# Profile Report

## Engineering Profile - Profile - Storm Line 05B (Compark Village South StormCAD [100 year].stsw)



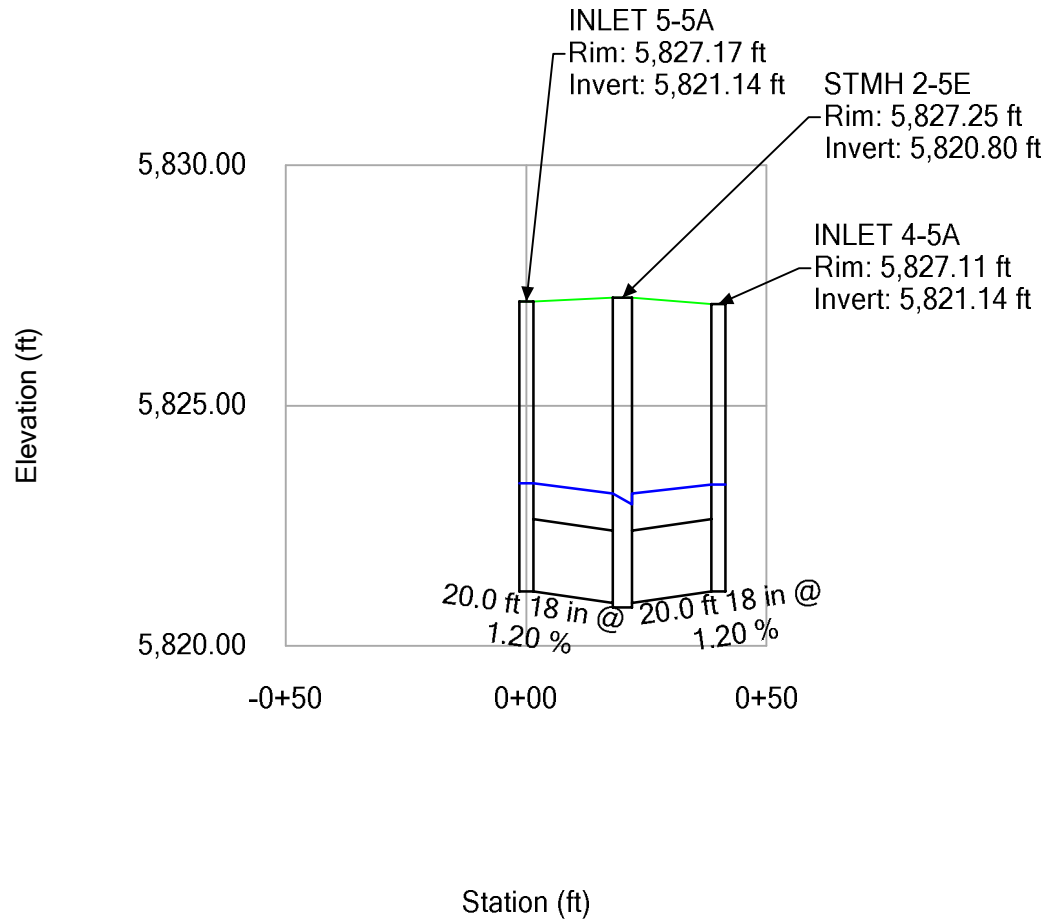
# Profile Report

## Engineering Profile - Profile - Storm Line 05C (Compark Village South StormCAD [100 year].stsw)

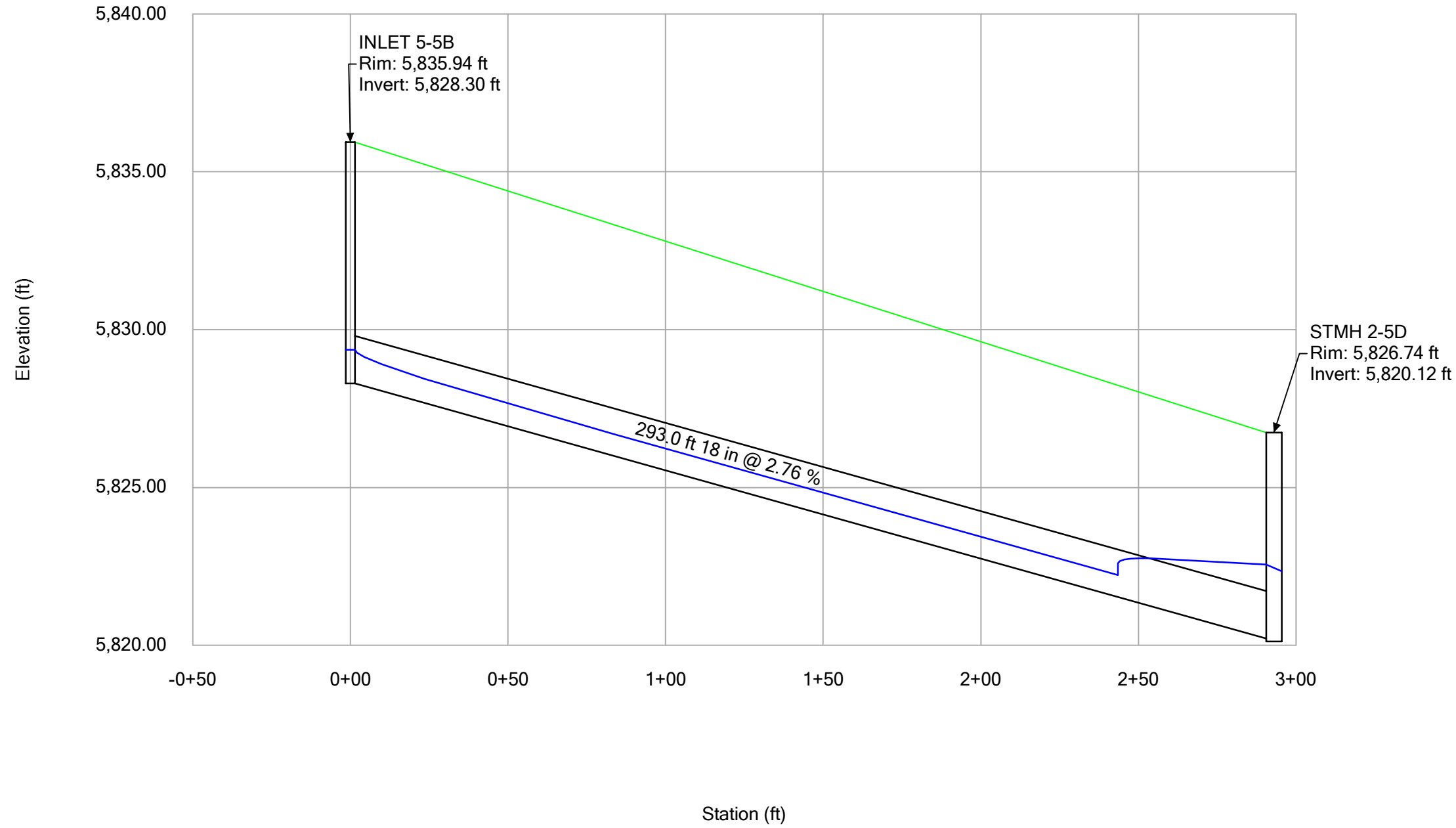


# Profile Report

## Engineering Profile - Profile - Storm Line 05D (Compark Village South StormCAD [100 year].stsw)

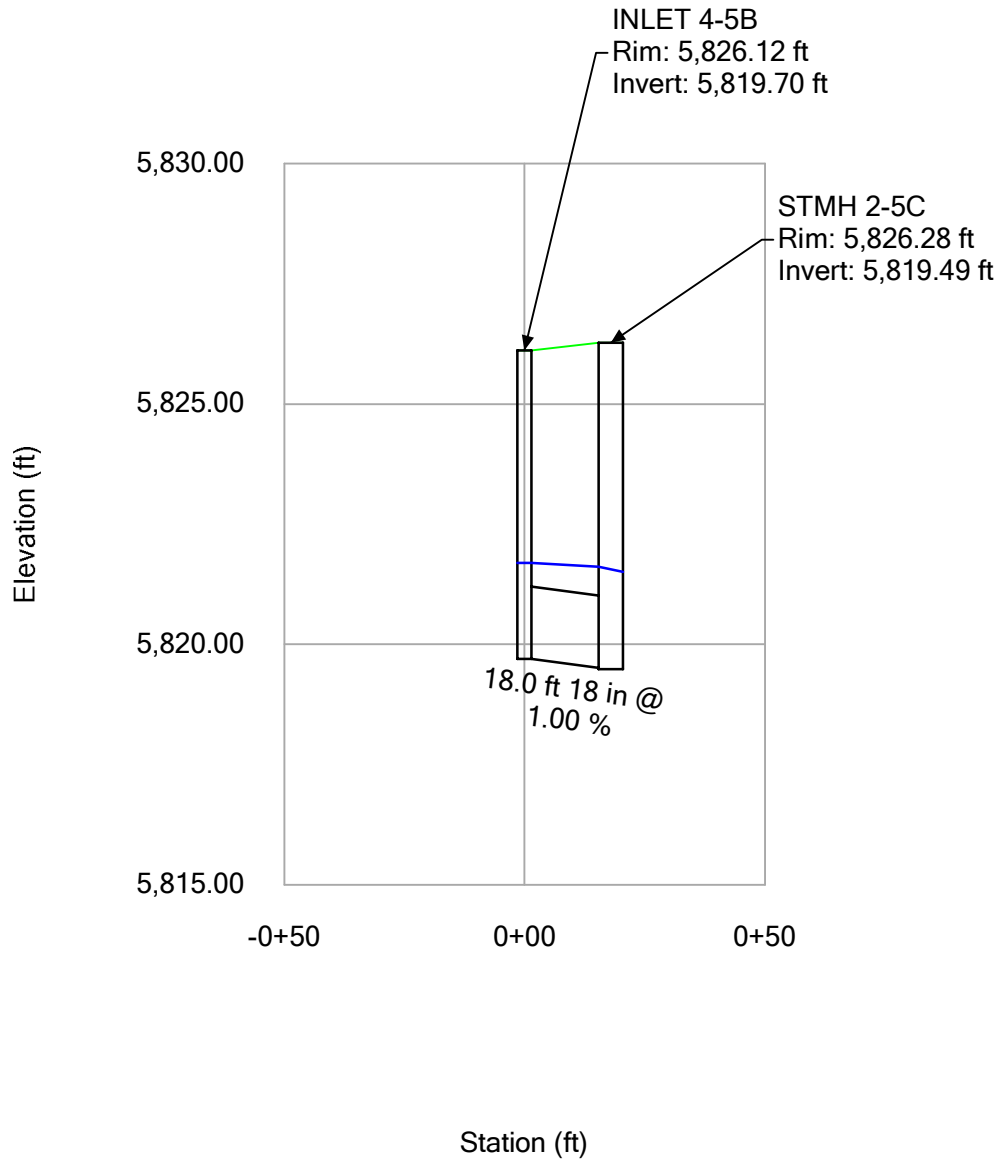


**Profile Report**  
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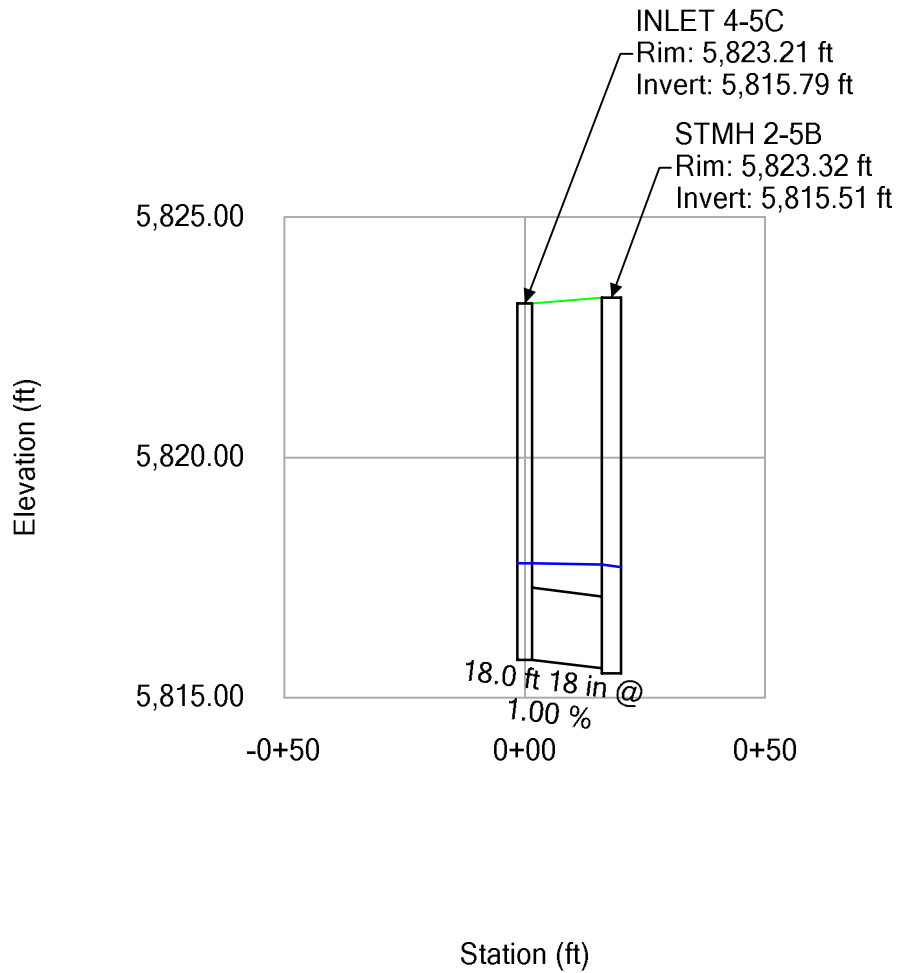
# Profile Report

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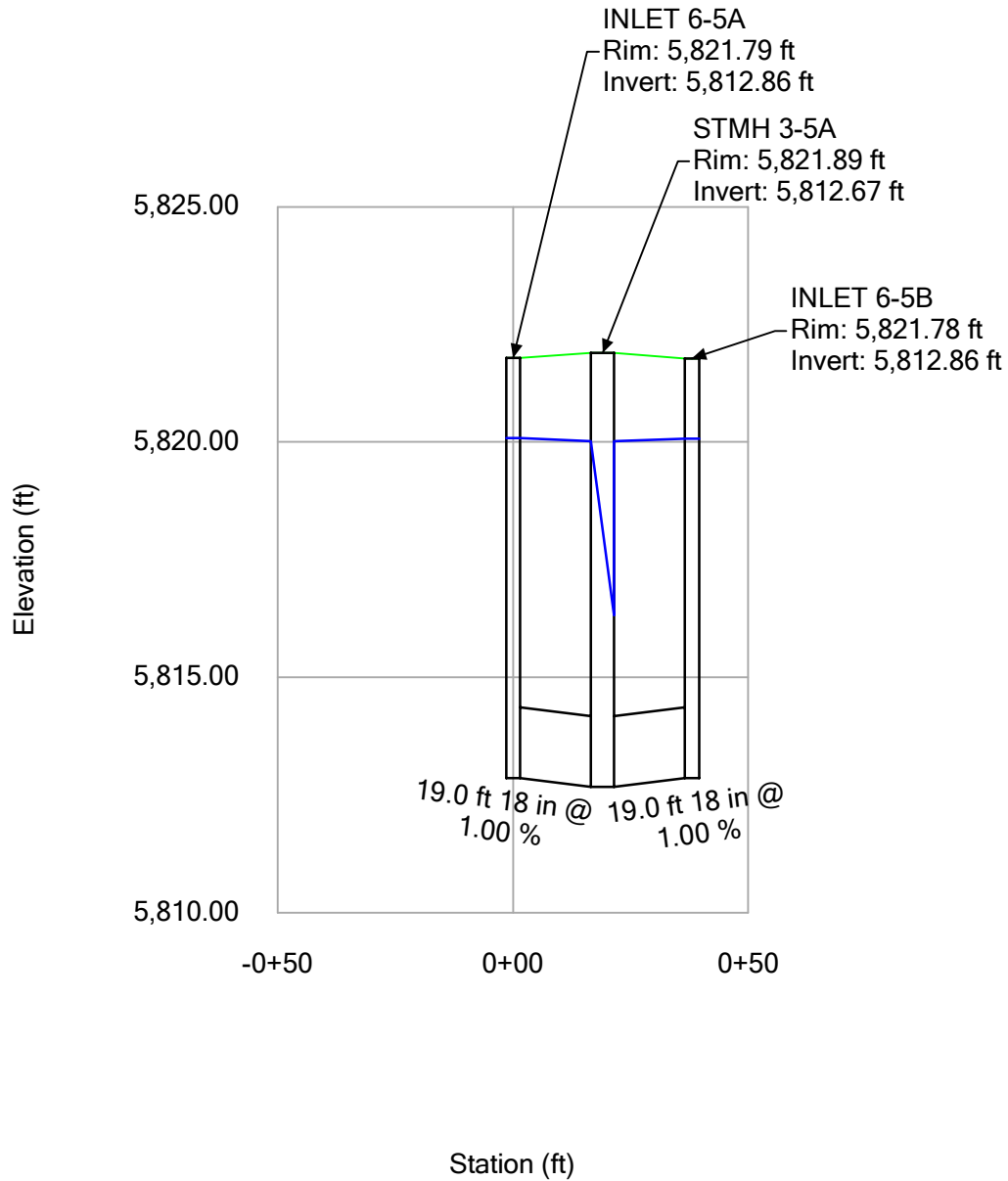
# Profile Report

## Engineering Profile - Profile - Storm Line 05G (Compark Village South StormCAD [100 year].stsw)

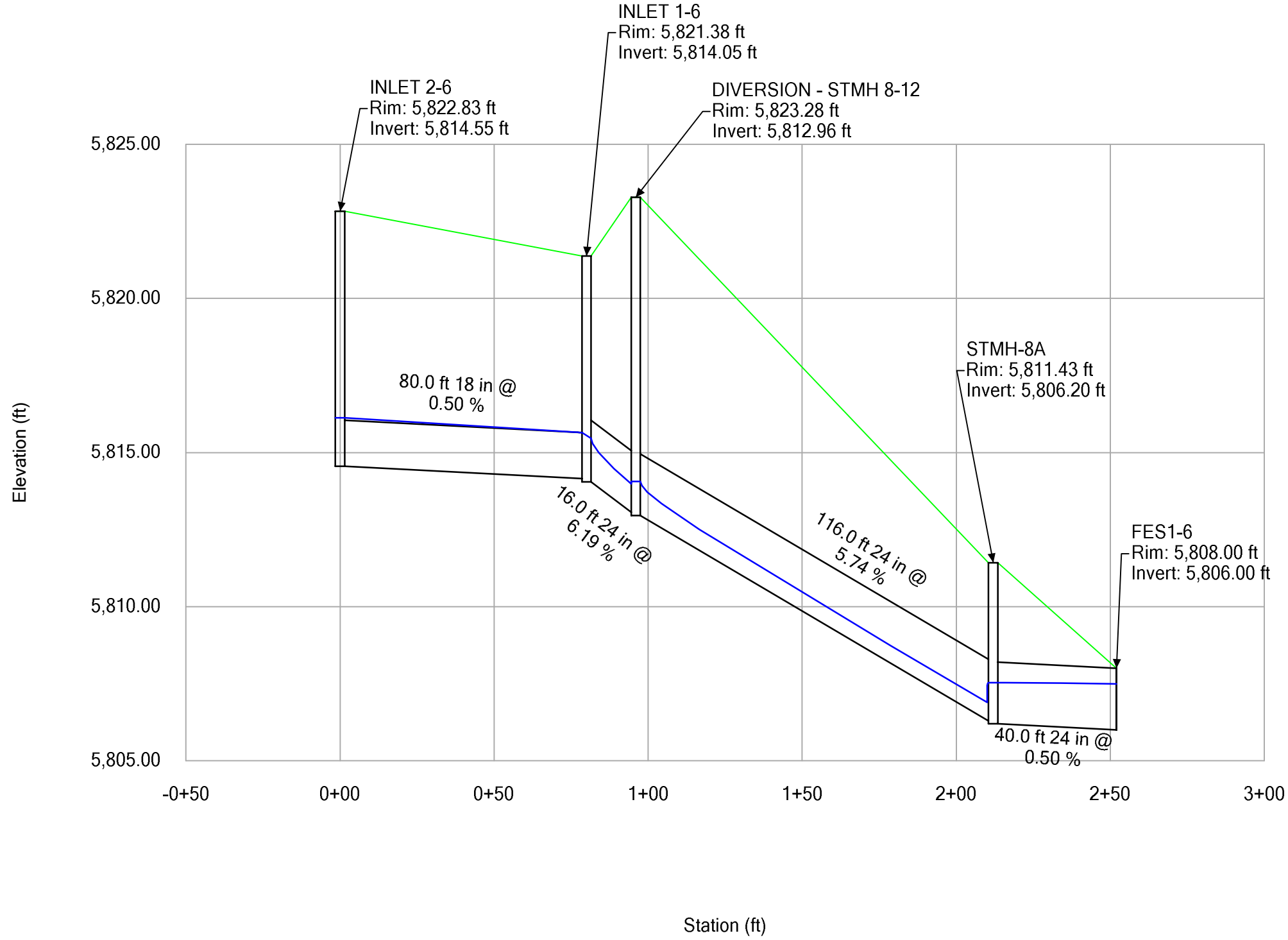


# Profile Report

## Engineering Profile - Profile - Storm Line 05H (Compark Village South StormCAD [100 year].stsw)

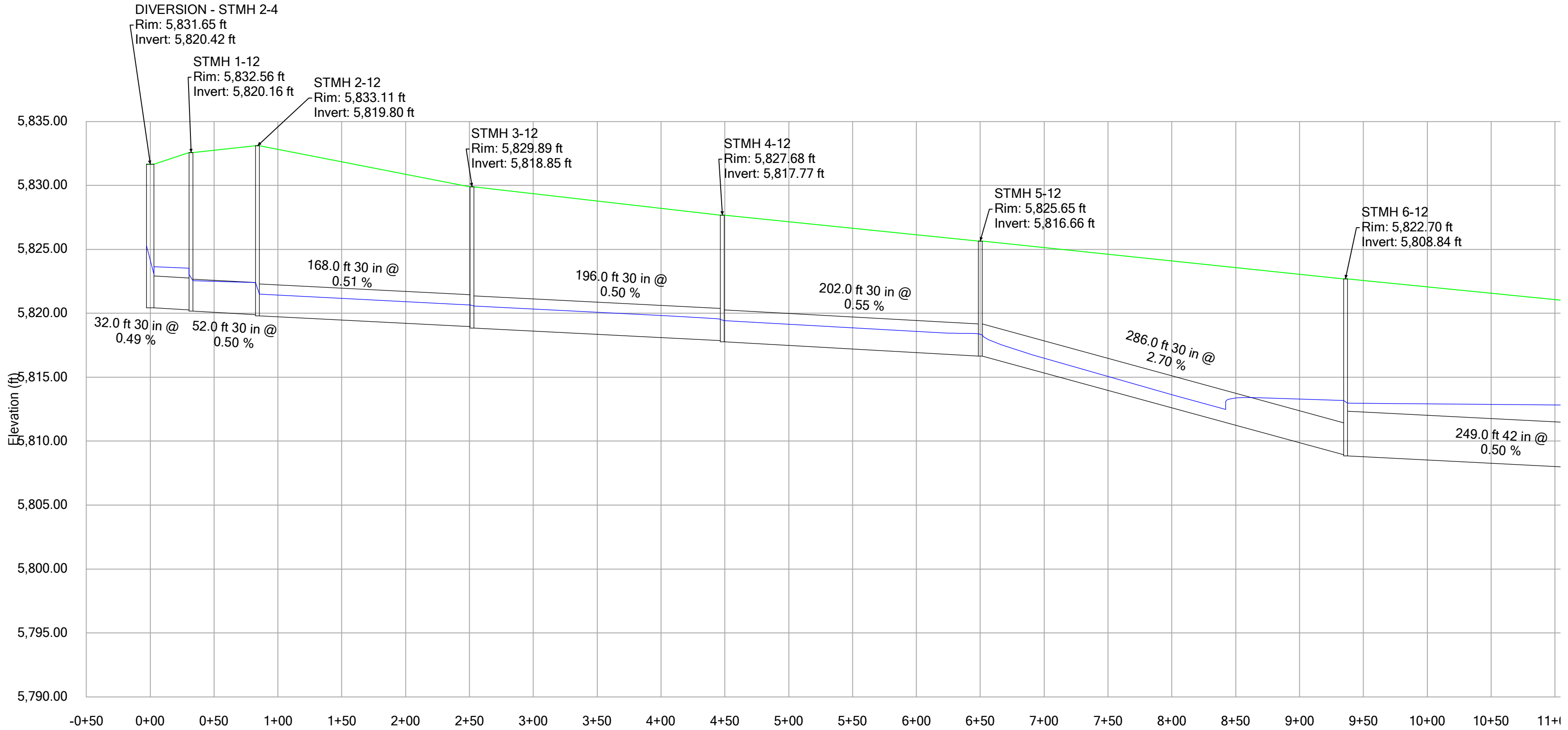


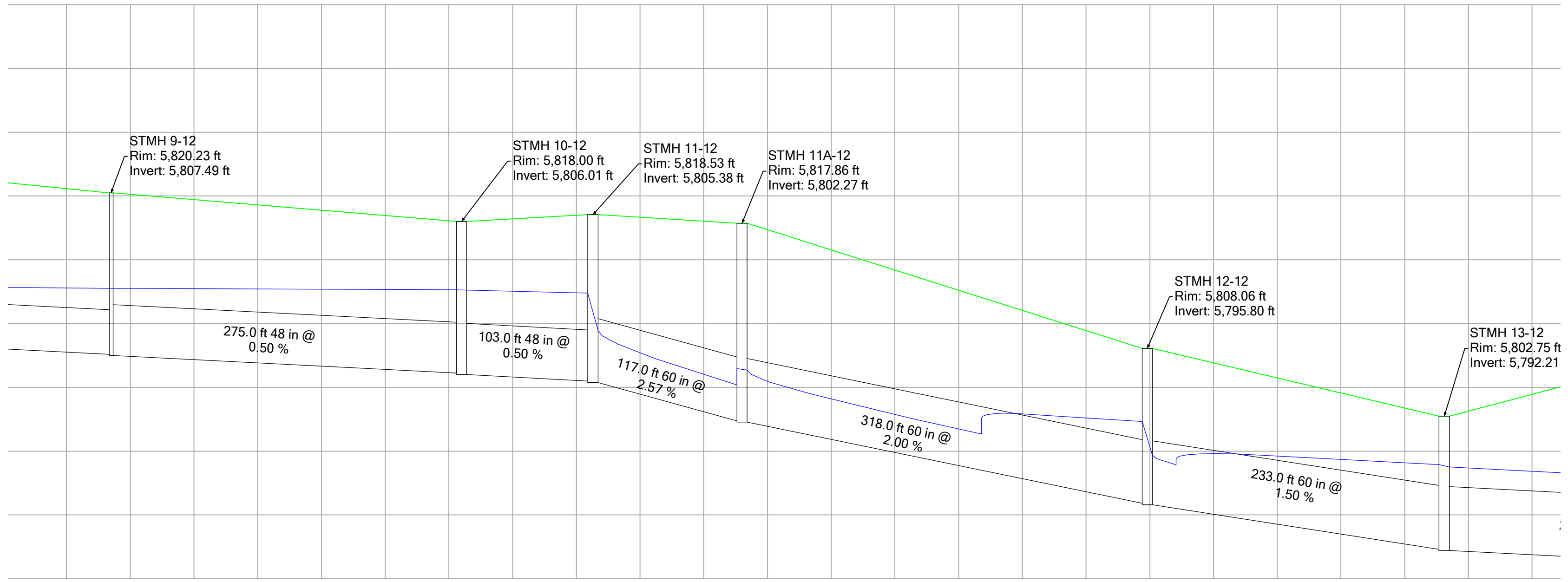
**Profile Report**  
**Engineering Profile - Profile - Storm Line 06 (Compark Village South StormCAD [100 year].stsw)**



# Profile Report

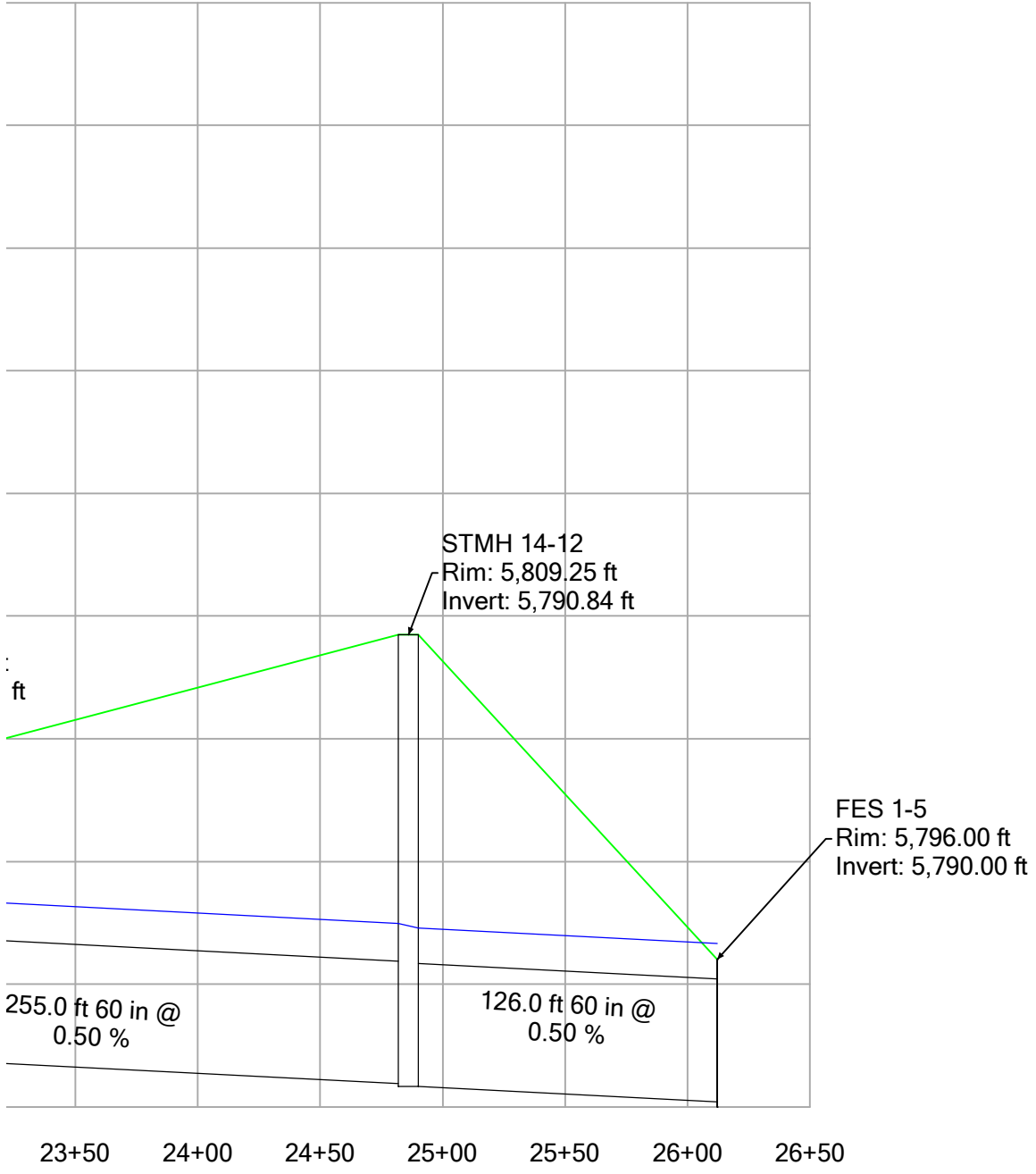
## Engineering Profile - Profile - Storm Line 12 (Compark Village South StormCAD [100 year].stsw)





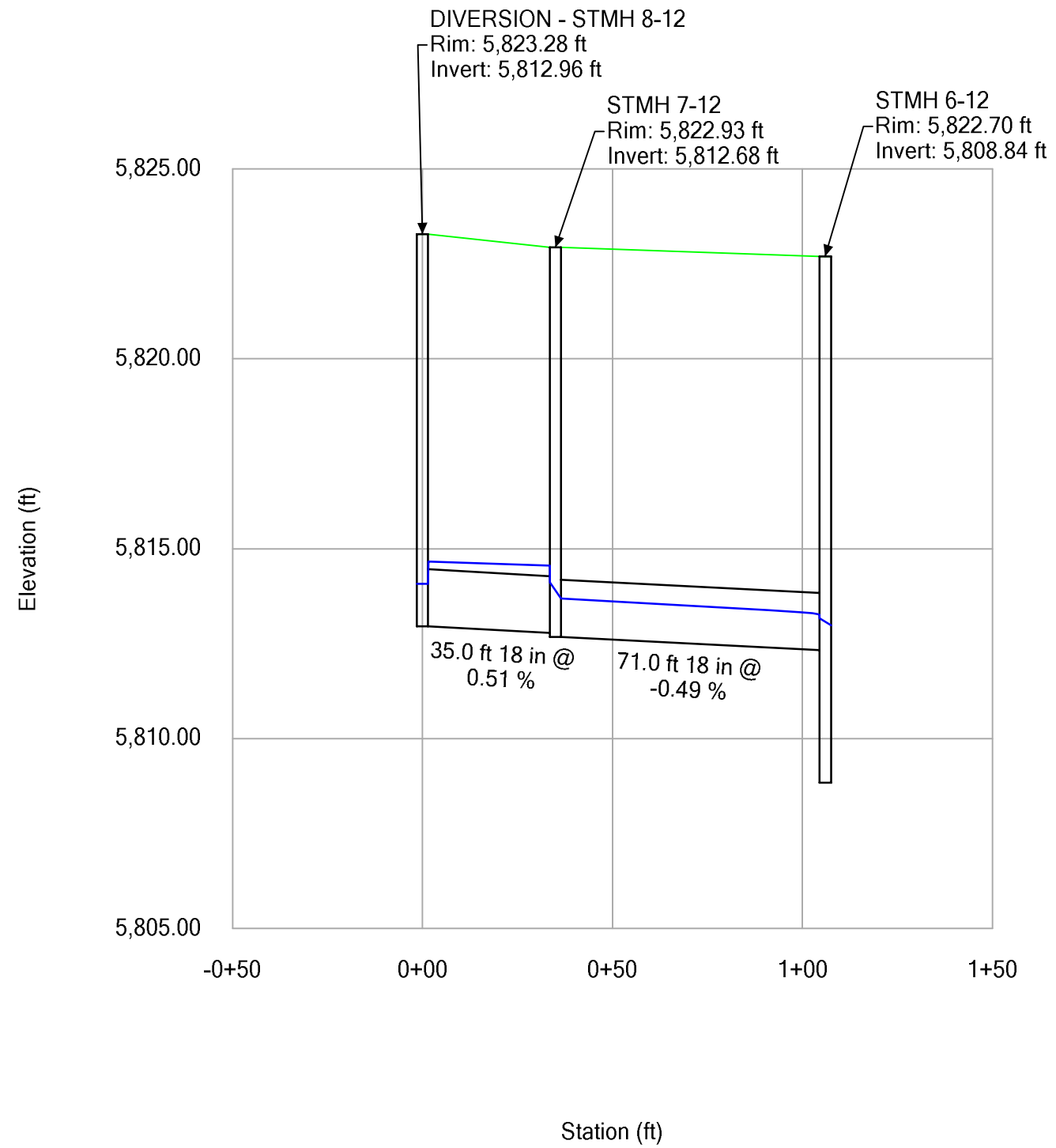
00 11+50 12+00 12+50 13+00 13+50 14+00 14+50 15+00 15+50 16+00 16+50 17+00 17+50 18+00 18+50 19+00 19+50 20+00 20+50 21+00 21+50 22+00 22+50 23+00

Station (ft)



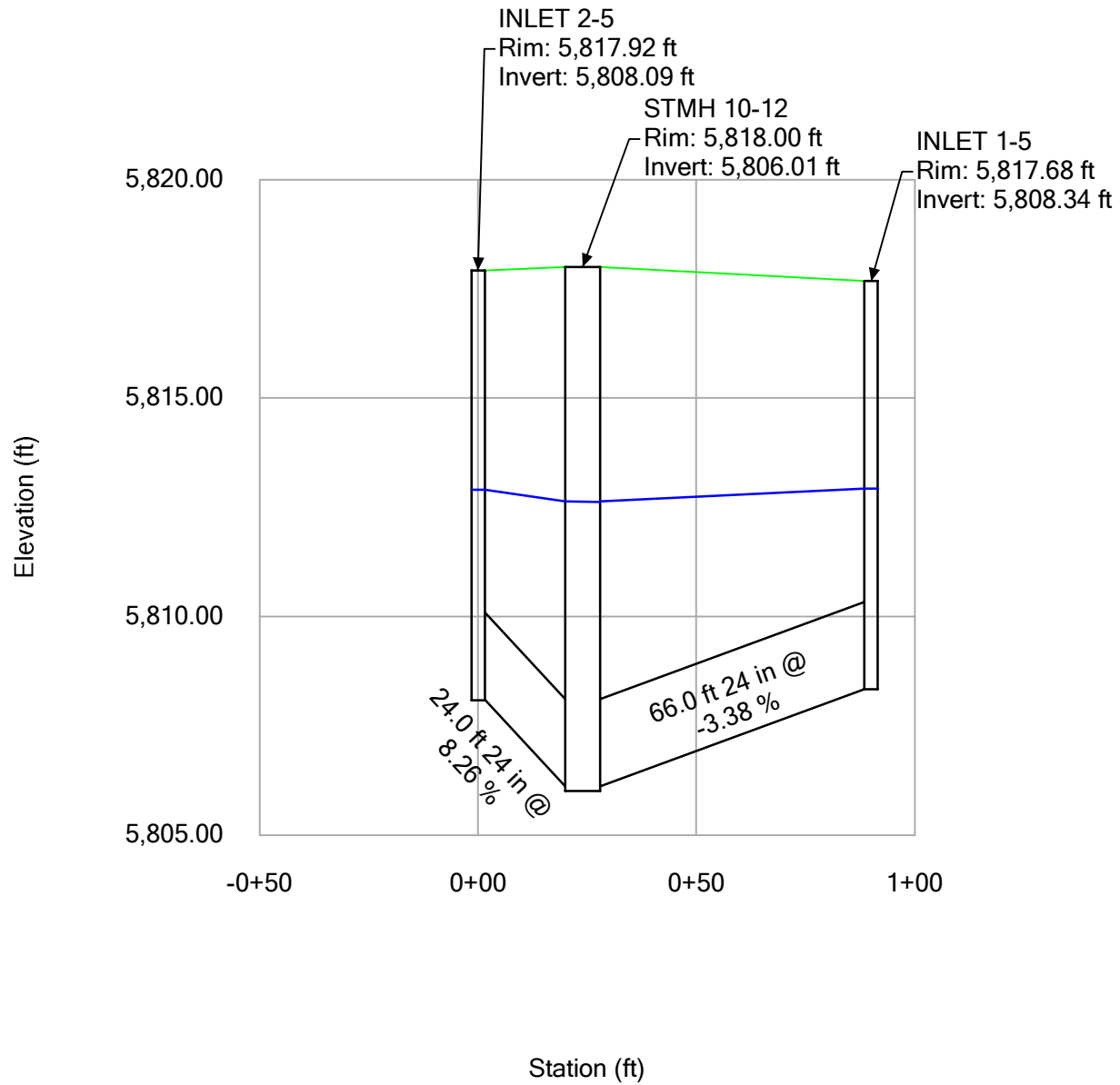
# Profile Report

## Engineering Profile - Profile - Storm Line 12A (Compark Village South StormCAD [100 year].stsw)



# Profile Report

## Engineering Profile - Profile - Storm Line 12B (Compark Village South StormCAD [100 year].stsw)



March 2, 2020

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## Appendix E

Job Name: Compass Village South - Filing 1  
Proj. No.: CLCPKC3  
Crew: MM  
Sheet(s): 1 / 1 Date: 3/3/20



7600 E. Orchard Rd. Ste. 150-N  
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See UDFCD Figure 9-38 Riprap Sizing Graph

Outfall 1 - FES 1-4

$Q_{100} = 69.03 \text{ cfs}$     $D = 3.0'$     $Y_T = 1.7' \rightarrow$  Based on Respec 60%  
GAT Design flow depths

$$\frac{Q_{100}}{D^{1.5}} = \frac{69.03}{3.0^{1.5}} = 13.3 \quad \frac{Y_T}{D} = \frac{1.7}{3.0} = 0.57$$

Figure 9-38  $\rightarrow$  Type L Required

Town of Parker - Type M minimum

Outfall 2 - FES 1-6

$Q_{100} = 9.60 \text{ cfs}$     $D = 2.0'$     $Y_T = 1.5' \rightarrow$  Based on Respec 60% GAT Design  
Flow Depths

$$\frac{Q_{100}}{D^{1.5}} = \frac{9.60}{2.0^{1.5}} = 3.4 \quad \frac{Y_T}{D} = \frac{1.5}{2.0} = 0.75$$

Figure 9-38  $\rightarrow$  Type L Required

Town of Parker - Type M minimum

Outfall 3 - FES 1-10

$Q_{100} = 59.3 \text{ cfs}$     $D = 3.0'$     $Y_T = 1.0'$

$$\frac{Q_{100}}{D^{1.5}} = \frac{59.3}{3.0^{1.5}} = 11.4 \quad \frac{Y_T}{D} = \frac{1.0}{3.0} = 0.33$$

Figure 9-38  $\rightarrow$  Type M required

$$H_a = \frac{(H + Y_n)}{2}$$

Equation 9-19

Where the maximum value of  $H_a$  shall not exceed  $H$ , and:

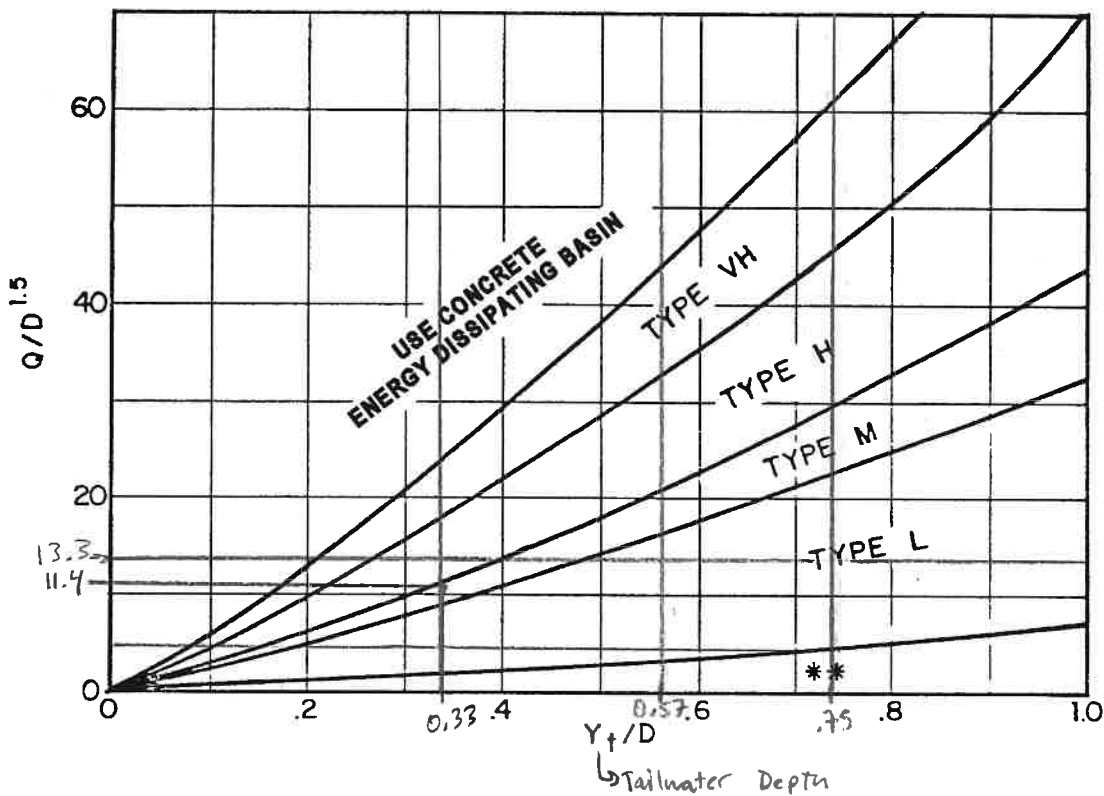
$D_a$  = parameter to use in place of  $D$  in Figure 9-38 when flow is supercritical (ft)

$D_c$  = diameter of circular culvert (ft)

$H_a$  = parameter to use in place of  $H$  in Figure 9-39 when flow is supercritical (ft)

$H$  = height of rectangular culvert (ft)

$Y_n$  = normal depth of supercritical flow in the culvert (ft)



Use  $D_a$  instead of  $D$  whenever flow is supercritical in the barrel.  
 \*\* Use Type L for a distance of  $3D$  downstream.

Figure 9-38. Riprap erosion protection at circular conduit outlet (valid for  $Q/D^{2.5} \leq 6.0$ )