

***Final Drainage Report***

***Compark Village South Filing No. 2  
Parker, Colorado***

***Code: CLCPKC3***

***Prepared For:***

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**ENGINEERS CERTIFICATION**

This Final Drainage Report for Compark Village South Filing No. 2 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.

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## I. **Introduction**

### A. Location

Compark Village South Filing 2 is located within the south half of section 6, township 6 south, range 66 west of the 6th principal meridian, Town of Parker, Douglas County, Colorado. The site is bound by existing residential neighborhoods to the South, future Belford Ave to the North, and future developed parcels to the East and West.

The Compark Village South Filing 2 developed area is approximately 32.9 acres. Upon final build out, the site will contain 120 residential duplex lots and 72 residential single family home lots.

### B. Description of Property

The topography for the site generally slopes from South to North. The highest elevation on the site is located at the southwest quadrant of the site and the lowest elevation is located directly north of Belford Avenue.

Existing vegetation on the site is comprised of native grasses, shrubs and weedy species indigenous to the area.

### C. Existing Soils

Existing soils for the site were researched on the NRCS web soil survey, see Appendix A. Three principal soil groups exist onsite:

- Newlin Gravelly Sandy Loam (NeE 8 to 30% slopes) This rolling to steep sloping soil is located on uplands and terrace side slopes. Runoff is medium and erosion hazard is slight to moderate. This soil is classified as a Type B Hydrologic Soil Group.
- Fondis Clay Loam (FoD 3 to 9% slopes) This sloping soil is located on uplands. Runoff is high and the erosion hazard is moderate. The soil is classified as a Type C Hydrologic Soil Group.
- Fondis Clay Loam (FoB 1 to 3% slopes) This gently sloping soil is located on tablelands and uplands. Runoff is medium and erosion hazard is slight to moderate. The soil is classified as a Type C Hydrologic Soil Group.

## II. Drainage Basins and Sub-Basins

### A. Existing Basin Description

The proposed site is tributary to Green Acres Tributary which runs through the property adjacent to the North of the site. The Green Acres Tributary confluences w/ Happy Canyon Creek upstream of Jordan Road and ultimately joins Cherry Creek, further downstream of Jordan Road. There is an existing 10' x 12' box culvert located to the north of the site that conveys flows from an existing depressed area to the north of the site through and under E-470.

The site is located within Zone X as shown on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) numbers 08035C0062F and 08035C0066F, dated September 30, 2005 for Happy Canyon Creek. The FIRM maps can be found in Appendix A. A portion of the Green Acres Tributary is located in the Zone A 100-year Floodplain, also shown on the FIRM maps in Appendix A.

### B. Proposed Basin Development

The proposed site will be divided into several drainage sub-basins. These sub-basins have been determined based on land use, area, roadway slopes, storm sewer locations and inlet capacities. The developed site will generally follow the existing drainage patterns and runoff will be conveyed via storm sewer, overland flow, and channel flow through a proposed channel to a proposed regional detention and water quality pond located directly north of the site. This regional detention pond will release restricted flows into an existing box culvert under E-470 and into the Green Acres Tributary in compliance with the Master Drainage Report for Compark Village South and Town of Parker requirements. The Preliminary Drainage Exhibit located in Appendix D shows the location and size of each proposed drainage sub-basin.

### C. Sub Basin Descriptions

#### BEL-1

Drainage basin BEL-1 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. Storm water will flow east toward Design Point B1 where it will be collected by Inlet 2-1. This is an on grade 10' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed to the West Water Quality Pond just southeast of Belford Avenue via storm sewer. This pond discharges directly to Green Acres Tributary. In the 100 year storm event, excess runoff will bypass Inlet 2-1 and flow into sub basin BEL-3 where it will be intercepted by Inlet 2-2 at Design Point B3.

#### BEL-2

Drainage basin BEL-2 is composed of landscaped area, sidewalk, and the south half of a portion of Belford Avenue. Storm water will flow east toward Design Point B2 where it will be collected by Inlet 1-1. This is an on grade 10' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed to the West Water Quality Pond just southeast of Belford Avenue via storm sewer. This pond discharges directly to Green Acres Tributary. In the 100 year storm event, excess runoff will bypass Inlet 1-1 and flow into sub basin BEL-4 where it will be intercepted by Inlet 1-2 at Design Point B4.

#### BEL-3

Drainage basin BEL-3 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. Storm water will flow toward a low point in the middle of the basin at Design Point B3 where it will be collected by Inlet 2-2. This is a 15' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event for basin BEL-3 as well as the bypass runoff from basin BEL-1. From there, storm water will be conveyed to the East Water Quality Pond just east of Belford Avenue via storm sewer. This pond discharges directly to Green Acres Tributary.

#### BEL-4

Drainage basin BEL-4 is composed of landscaped area, sidewalk, and the south half of a portion of Belford Avenue. Storm water will flow toward a low point in the middle of the basin at Design Point B4 where it will be collected by Inlet 1-2. This is a 10' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event for basin BEL-4 as well as the bypass runoff from basin BEL-2. From there, storm water will be conveyed to the East Water Quality Pond just east of Belford Avenue via storm sewer. This pond discharges directly to Green Acres Tributary.

#### BEL-5

Drainage basin BEL-5 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. It also includes half of the bridge over Happy Canyon Creek. Storm water will generally flow southeast toward Design Point B5 at South Chambers Road. A storm sewer network has not yet been designed to accommodate this basin. This will be completed in another phase.

#### BEL-6

Drainage basin BEL-6 is composed of landscaped area, sidewalk, and the south half of a portion of Belford Avenue. It also includes half of the bridge over Happy Canyon Creek. Storm water will generally flow southeast toward Design Point B6 at South

Chambers Road. A storm sewer network has not yet been designed to accommodate this basin. This will be completed in another phase.

#### CVS-1

Drainage basin CVS-1 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. Storm water will flow northeast toward Design Point 1 where it will be intercepted by Inlet 1-3. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. A water quality structure will be installed just before the outfall into Green Acres Tributary as part of the Compark Village South Filing No. 1 project. In the 100 year storm event, excess runoff will bypass Inlet 1-3 and flow into sub basin CVS-3 where it will be intercepted by Inlet 1-4 at Design Point 3.

#### CVS-2

Drainage basin CVS-2 is composed of landscaped area, sidewalk, and the south half of a portion of Belford Avenue. Storm water will flow northeast toward Design Point 2 where it will be intercepted by Inlet 2-3. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 2-3 and flow into sub basin CVS-4 where it will be intercepted by Inlet 2-4 at Design Point 4.

#### CVS-3

Drainage basin CVS-3 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. Storm water will flow northeast toward Design Point 3 where it will be collected by Inlet 1-4. This is an on grade 10' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. A water quality structure will be installed just before the outfall into Green Acres Tributary as part of the Compark Village South Filing No. 1 project. In the 100 year storm event, excess runoff will bypass Inlet 2-3 and flow into sub basin CVS-7 where it will be intercepted by Inlet 1-6 at Design Point 7.

#### CVS-4

Drainage basin CVS-4 is composed of landscaped area, sidewalk, and the south half of a portion of Belford Avenue. Storm water will flow northeast toward Design Point 4 where it will be collected by Inlet 2-4. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 2-4 and flow into sub basin CVS-8 where it will be intercepted by Inlet 2-6 at Design Point 8.

#### CVS-4A

Drainage basin CVS-4 is composed of landscaped area, sidewalk, residential homes, and residential local streets. Storm water will flow northeast toward Design Point 4A where it will be collected by Inlet 3-4. This is a 10' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event for basin CVS-4A as well as the bypass runoff from basin CVS-5. From there, it will be conveyed directly to Green Acres Tributary via storm sewer.

#### CVS-5

Drainage basin CVS-5 is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow northeast toward Design Point 5 where it will be collected by Inlet 5-4. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 2 year storm event. From there, it will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 5-4 and flow into sub basin CVS-4A where it will be intercepted by Inlet 3-4 at Design Point 4A.

#### CVS-6

Drainage basin CVS-6 is composed of landscaped area, a berm, sidewalk, and residential local streets. Storm water will flow north toward Design Point 6 where it will be collected by Inlet 6-4. This is an on grade 10' Type R inlet with the capacity to handle the runoff from a 100 year storm event. From there, it will be conveyed directly to Green Acres Tributary via storm sewer.

#### CVS-7

Drainage basin CVS-7 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. Storm water will flow east toward Design Point 7 where it will be collected by Inlet 1-6. This is an on grade 10' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. A water quality structure will be installed just before the outfall into Green Acres Tributary as part of the Compark Village South Filing No. 1 project. In the 100 year storm event, excess runoff will bypass Inlet 5-4 and flow into sub basin CVS-11 where it will be intercepted by Inlet 1-5 at Design Point 11.

#### CVS-8

Drainage basin CVS-8 is composed of landscaped area, sidewalk, and the south half of a portion of Belford Avenue. Storm water will flow east toward Design Point 8 where it will be intercepted by Inlet 2-6. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 5 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm

event, excess runoff will bypass Inlet 2-6 and flow into sub basin CVS-12 where it will be intercepted by Inlet 2-5 at Design Point 12.

#### CVS-9

Drainage basin CVS-9 is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow northeast toward Design Point 9 where it will be collected by Inlet 4-5A. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 2 year storm event. From there, it will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 4-5A and flow into sub basin CVS-12 where it will be intercepted by Inlet 2-5 at Design Point 12.

#### CVS-9A

Drainage basin CVS-9A is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will generally flow northwest toward Design Point 9A where it will be collected by Inlet 4-4. This is a 5' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event. From there, it will be conveyed directly to Green Acres Tributary via storm sewer.

#### CVS-10

Drainage basin CVS-10 is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow northeast toward Design Point 10 where it will be collected by Inlet 5-5A. This is an on grade 15' Type R inlet with the capacity to handle the runoff from a 2 year storm event. From there, storm water will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 5-5A and flow into sub basin CVS-13B where it will be intercepted by Inlet 4-5B at Design Point 13B.

#### CVS-10A

Drainage basin CVS-10A is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will generally flow northwest toward Design Point 10A where it will be collected by Inlet 5-4A. This is a 5' Type R inlet on grade with the capacity to handle the runoff from a 2 year storm event. From there, it will be conveyed directly to Green Acres Tributary via storm sewer. In the 100 year storm event, excess runoff will bypass Inlet 5-4A and flow into sub basin CVS-10 where it will be intercepted by Inlet 5-5A at Design Point 10.

#### CVS-11

Drainage basin CVS-11 is composed of landscaped area, sidewalk, and the north half of a portion of Belford Avenue. Storm water will flow toward a low point in the middle of the basin at Design Point 11 where it will be collected by Inlet 1-5. This is a 10'

Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event for basin CVS-11 as well as the bypass runoff from basin CVS-7. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

#### CVS-12

Drainage basin CVS-12 is composed of landscaped area, sidewalk, residential homes, residential local streets, and the south half of a portion of Belford Avenue. Storm water will flow toward a low point in the middle of the north side of the basin at Design Point 12 where it will be collected by Inlet 2-5. This is a 15' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event for basin CVS-12 as well as the bypass runoff from basins CVS-8 and CVS-9. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

#### CVS-12A

Drainage basin CVS-12A is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow south and east toward Design Point 12A where it will be collected by Inlet 3-5. This is a 15' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

#### CVS-12B

Drainage basin CVS-12B is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will generally flow south and west toward Design Point 12A where it will be collected by Inlet 3-5. This is a 15' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

#### CVS-13

Drainage basin CVS-13 is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow northeast toward Design Point 13 where it will be collected by Inlet 4-5. This is a 10' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event as well as the bypass runoff from basin CVS-13C. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

#### CVS-13A

Drainage basin CVS-13A is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow east and north toward Design Point 13A where it will be collected by Inlet 6-5A. This is a 10' Type R inlet on grade with the capacity to handle the runoff from a 2 year storm event. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary. In the 100 year storm event, excess runoff will bypass Inlet 6-5A and flow into sub basin CVS-13 where it will be intercepted by Inlet 4-5 at Design Point 13.

#### CVS-13B

Drainage basin CVS-13B is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow east and north toward Design Point 13B where it will be collected by Inlet 4-5B. This is a 10' Type R inlet on grade with the capacity to handle the runoff from a 2 year storm event. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary. In the 100 year storm event, excess runoff will bypass Inlet 4-5B and flow into sub basin CVS-13C where it will be intercepted by Inlet 4-5C at Design Point 13C.

#### CVS-13C

Drainage basin CVS-13C is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow north and east toward Design Point 13C where it will be collected by Inlet 4-5C. This is a 5' Type R inlet on grade with the capacity to handle the runoff from a 2 year storm event. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary. In the 100 year storm event, excess runoff will bypass Inlet 4-5C and flow into sub basin CVS-13 where it will be intercepted by Inlet 4-5 Design Point 13.

#### CVS-14

Drainage basin CVS-14 is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow north and east toward Design Point 14 where it will be collected by Inlet 6-5. This is a 15' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event including runoff from basin CVS-14B and bypass runoff from basin CVS-14C. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

#### CVS-14A

Drainage basin CVS-14A is composed of landscaped area and berms. Runoff will flow toward a swale along the north side of the basin. The swale will send the storm water east toward Design Point 14A where it will be collected by Inlet 7-5. This is a

CDOT Type C inlet with the capacity to handle the runoff from a 100 year storm event. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

#### CVS-14B

Drainage basin CVS-14 is composed of landscaped area, future sidewalk, some future residential homes and future residential local streets. Storm water will north and east flow toward Design Point 14 where it will be collected by Inlet 6-5. This is a 15' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event including runoff from basin CVS-14. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

#### CVS-14C

Drainage basin CVS-14C is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow north and east toward Design Point 14C where it will be collected by Inlet 5-5B. This is a 10' Type R inlet on grade with the capacity to handle the runoff from a 2 year storm event. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary. In the 100 year storm event, excess runoff will bypass Inlet 5-5B and flow into sub basin CVS-14 where it will be intercepted by Inlet 6-5 at Design Point 14.

#### CVS-15

Drainage basin CVS-15 is to be developed in a later phase and will be composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow north and west toward Design Point 15 where it will be collected by Inlet 5-5. This is a 10' Type R inlet in sump with the capacity to handle the runoff from a 100 year storm event as well as bypass runoff from Basin CVS-15A. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary.

#### CVS-15A

Drainage basin CVS-15A is to be developed in a later phase and will be composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow west and north toward Design Point 15A where it will be collected by Inlet 6-5B. This is a 10' Type R inlet on grade with the capacity to handle the runoff from a 2 year storm event. From there, storm water will be conveyed to the regional detention pond at E-470 via storm sewer. This pond discharges directly to Green Acres Tributary. In the 100 year storm event, excess runoff will bypass Inlet 6-5B and

flow into sub basin CVS-15 where it will be intercepted by Inlet 5-5 at Design Point 15.

#### CVS-16

Drainage basin CVS-16 is composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow northeast toward Design Point 16. A storm sewer network has not yet been designed to accommodate this basin. This will be completed in a later phase of the project. In the interim condition, runoff will be collected by a temporary swale directly east of the basin. This swale is sized with the capacity to handle the runoff from the 100 year storm event. It is designed to convey water directly to the regional detention pond at E-470.

#### CVS-17

Drainage basin CVS-17 is to be developed in a later phase and will be composed of landscaped area, sidewalk, residential homes and residential local streets. Storm water will flow northeast toward Design Point 17. A storm sewer network has not yet been designed to accommodate this basin. This will be completed as part of a later phase.

#### CVS-18

Drainage basin CVS-18 is to be developed in a later phase and will be composed of landscaped area, sidewalk, and residential local streets. Storm water will flow northeast toward Design Point 18. A storm sewer network has not yet been designed to accommodate this basin. This will be completed as part of a later phase.

#### CVS-19

Drainage basin CVS-19 is to be developed in a later phase and will be composed of landscaped area, sidewalk, residential homes, residential local streets, and the south half of a portion of Belford Avenue. Storm water will flow northeast toward Design Point 19. A storm sewer network has not yet been designed to accommodate this basin. This will be completed as part of a later phase.

#### CVS-20

Drainage basin CVS-20 is to be developed in a later phase and will be composed of landscaped area, sidewalk, residential homes, and residential local streets. Storm water will flow southwest and then northwest toward Design Point 20. A storm sewer network has not yet been designed to accommodate this basin. This will be completed as part of a later phase.

#### CVS-21

Drainage basin CVS-21 is to be developed in a later phase and will be composed of landscaped area, sidewalk, residential homes, and residential local streets. Storm water will flow north east toward Design Point 21. A storm sewer network has not yet been designed to accommodate this basin. This will be completed as part of a later phase.

### III. Drainage Design Criteria

#### A. Hydrology Criteria

The Town of Parker *Storm Drainage and Environmental Criteria Manual* and the Urban Drainage and Flood Control District (UDFCD) *Urban Storm Drainage Criteria Manual* were used for the storm drainage system design.

The following criteria was utilized in developing the proposed drainage system:

- The proposed drainage system is designed to match, as best as possible, the historic drainage patterns occurring at the site.
- The proposed drainage system attempts to limit the diversion of storm runoff from one basin to another (basin transfer).
- Runoff generated from drainage sub-basins is conveyed via the proposed storm sewer system, overland flow or via the Green Acres Tributary into the proposed regional detention and water quality pond.

Design Rainfall: UDFCD rainfall data is used to determine peak runoff values. The 2-year and 100-year frequency storms are used as the minor and major design storms respectively.

Runoff Calculation: Peak storm runoff is determined using the rational formula,

$$Q = CIA \text{ (CFS)}$$

C = Runoff coefficient based on surface impermeability

I = Rainfall intensity in inches per hour

A = Drainage basin area in acres

UDFCD Imperviousness Values (Table 6-3) and Runoff Coefficients (Table 6-5) were used to develop basin runoff coefficients. These tables can be found in Appendix B. The runoff coefficients are weighted for each applicable sub-basin to more accurately reflect the runoff characteristics of the site.

Time of Concentration is determined using the criteria in Sections 3.4.1 and 3.4.2 of the UDFCD Criteria Manual. These calculations are included in Appendix B.

Rainfall intensities are determined using the Town of Parker's *Storm Drainage and Environmental Criteria Manual* Point Rainfall data and Intensity-Duration curves.

The recurrence intervals used for this study were based on a residential land use. The minor drainage system is designed for a 2-year recurrence interval and the major drainage system is designed for a 100-year recurrence interval.

#### B. Hydraulic Criteria

The following criteria were utilized in determining allowable street flow.

##### Minor Storm (2-yr)

- Local Street – No curb overtopping and flow may spread to crown of street.

##### Minor Storm (5-yr)

- Collector Street – No curb overtopping. Flow Spread must leave at least a 10 foot width free of water. (5-feet on each side of crown for roads without median. 10-feet on each side of median for roads with a median.)

##### Major Storm (100-yr)

- Local and Collector Streets – The depth of water at the gutter flowline shall not exceed 12 inches. A minimum of 18-inches must be provided from the water surface elevation to the lowest floor elevation or window well opening elevation for structures that are adjacent to the roadway (this includes residential dwellings, public, commercial and industrial buildings).

For the major and minor storm events, allowable capacity was determined using Street and Inlet Hydraulics version 3.14 by UDFCD.

### IV. **Drainage Facility Design**

#### A. General Concept

Stormwater runoff from the proposed subdivision will generally follow existing drainage patterns from southwest to northeast on the site. Overland flow and a proposed storm sewer system will route the runoff to the Green Acres Tributary or directly to the

proposed regional detention and water quality pond located on the Green Acres Tributary at E-470. This pond will release restricted flows directly into the Green Acres Tributary through the existing 10' x 12' box culvert under E-470.

B. Specific Details

As mentioned previously in this report, the site will be divided into several drainage sub-basins. The onsite runoff will be routed through the site via the proposed roadways and gutters where it will be intercepted by a number of on-grade inlets and inlets located in roadway sumps. This runoff will be routed, via storm sewer, to either the Green Acres Tributary which leads to the proposed regional detention pond or directly to the proposed regional detention pond. Existing water quality structures from the Compark Village South, Filing 1 project will ensure that any water directly entering the Green Acres Tributary is treated.

In addition to the onsite sub-basins, the runoff from some offsite areas will be routed through the proposed site. These offsite areas are two basins (H170 & H180) directly south of the site that include part of the Grand View Estates development. In each basin, flows are intercepted via proposed flared end sections and carried through the site via proposed storm sewer into either the Green Acres Tributary or directly into the proposed regional detention pond at E-470.

The proposed regional detention pond for this development was designed based on a study of major basins that all discharge to the Green Acres Tributary. As has been stated, smaller sub basins were created for this report to more accurately design the storm sewer network that serves the KB Homes residential development. To verify coordination between these two sets of data, a table has been provided below.

<b>Basin ID</b>	<b>Impervious % used in GAT Hydrology Study</b>	<b>Composite Impervious % of Corresponding Sub Basins</b>
H161	50%	41%
H171	50%	44%
H181	50%	38%

The corresponding composite impervious percentages from the sub basin analysis are all below the percentages used to design the regional detention pond. Therefore, the pond has been sufficiently designed to exceed the storage requirements for the KB Homes residential site.

More details for the proposed detention and water quality pond are included in the Conceptual Drainage Report for Compark South prepared by Manhard Consulting, Ltd.<sup>[5]</sup> and approved by the Town of Parker.

## V. Environmental Protection Criteria

### A. Erosion and Sediment Control Measures

During construction, silt fence, inlet protection, and vehicle tracking pads will be used to prevent sediment from entering the storm sewer system or sediment leaving the site. Temporary sediment basins will also be used during construction to trap sediment from stormwater before it leaves the site. All erosion and sediment control measures will be maintained, inspected, and repaired by the Contractor throughout the construction project in compliance with Town of Parker requirements. The proposed Construction Best Management Practices (CBMPs) for this development will follow the requirements for the Town of Parker and UDFCD.

### B. Water Quality

Water quality control for this development will be constructed as part of the Compark Village South Filing 1 project. This will consist of CDS manhole structures from Contech Engineered Solutions LLC at the end of each storm line that discharges to Green Acres Tributary.

## VI. Conclusion

### A. Compliance with Standards

The drainage system for Compark Village South Filing No. 2 was designed to meet the Town of Parker's *Storm Drainage and Environmental Criteria Manual* and the Urban Drainage and Flood Control District's *Urban Storm Drainage Criteria Manual*. The existing Flood Insurance Rate Map (FIRM) in Appendix A shows no portion of the developed site area to be within a flood hazard area. Therefore, no map revisions through FEMA are required as part of this development.

### B. Drainage Concept

The drainage system was designed to allow storm water to be safely conveyed through and away from the site without negatively impacting downstream properties. The drainage concepts proposed for this site are in accordance with the Conceptual Drainage Report for Compark South prepared by Manhard Consulting, Ltd. and approved by the Town of Parker.

All storm sewer facilities are intended to be included within the Town of Parker's public improvements maintenance program. The Compark South Drainage Channel Tract will be owned and maintained by the Belford South Metropolitan District. The Town of Parker will retain oversight maintenance rights as needed during emergency conditions.

C. Erosion and Sediment Control Concept

The Construction Best Management Practices (CBMPs) proposed for this site follow the requirements of the Town of Parker and the recommendations by UDFCD. Attention to proper installation and maintenance are essential for the sediment and erosion control practices to function properly.

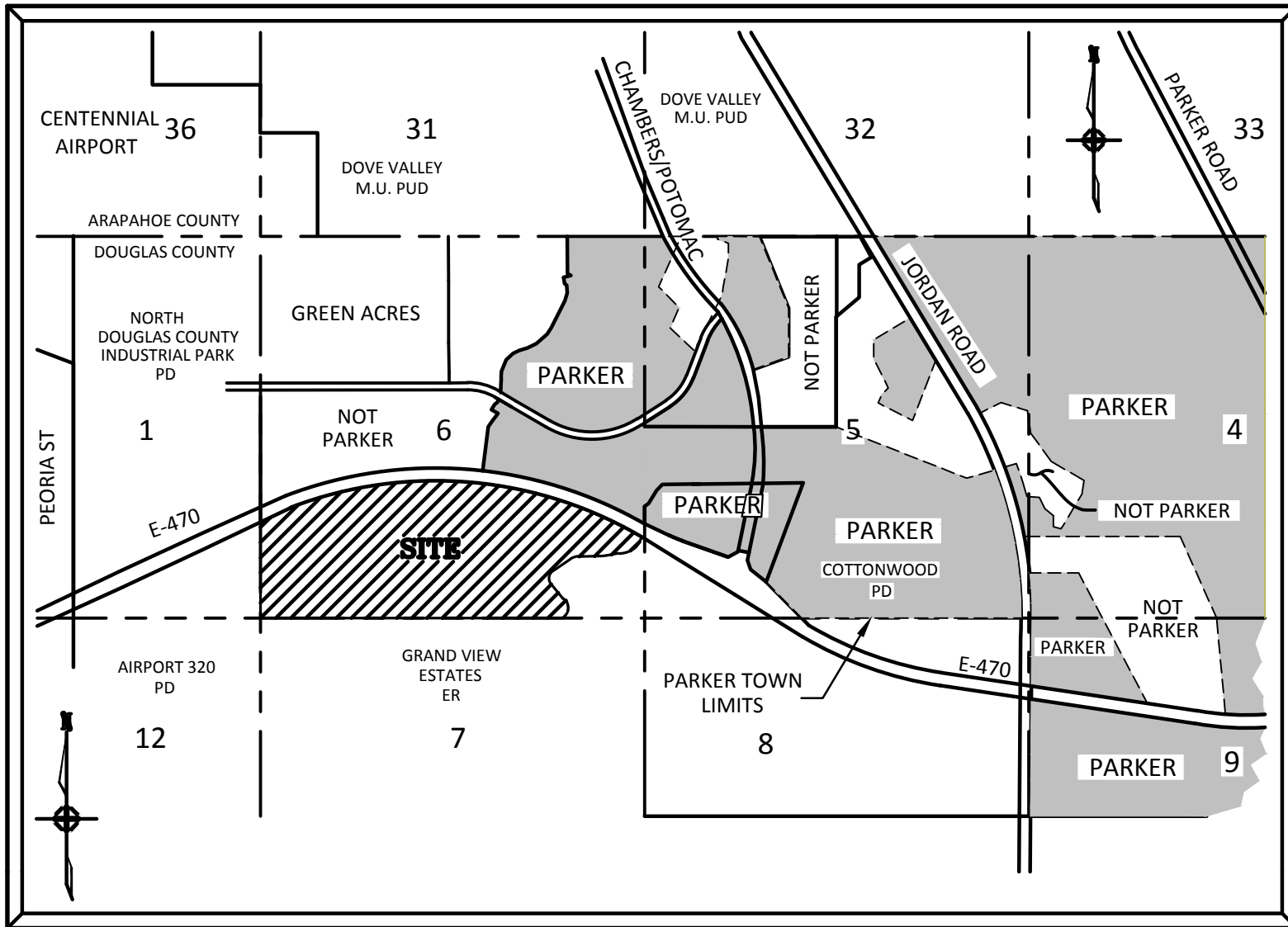
## VII. References

1. Town of Parker's *Storm Drainage and Environmental Criteria Manual*, February 2014.
2. Urban Drainage and Flood Control District's *Urban Storm Drainage Criteria Manual* Vol. 1–2, dated April, 2008.
3. Urban Drainage and Flood Control District's *Urban Storm Drainage Criteria Manual* Vol. 3, dated November, 2010.
4. StormCAD, V8i (SELECT series 2), Bentley Systems, Inc., c. 2011 Bentley Systems, Inc.
5. Conceptual Drainage Report for Compark South, prepared by Manhard Consulting, Ltd., dated November 20, 2015.
6. Happy Canyon Creek Major Drainageway Plan, prepared by Muller Engineering Company, Inc., dated March 2014
7. Final Drainage Report for Compark Village South, Filing No. 1, prepared by Manhard Consulting Ltd., dated December 20, 2016

## **APPENDIX A**

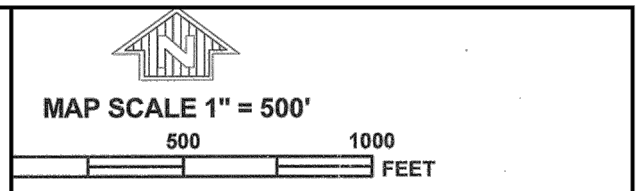
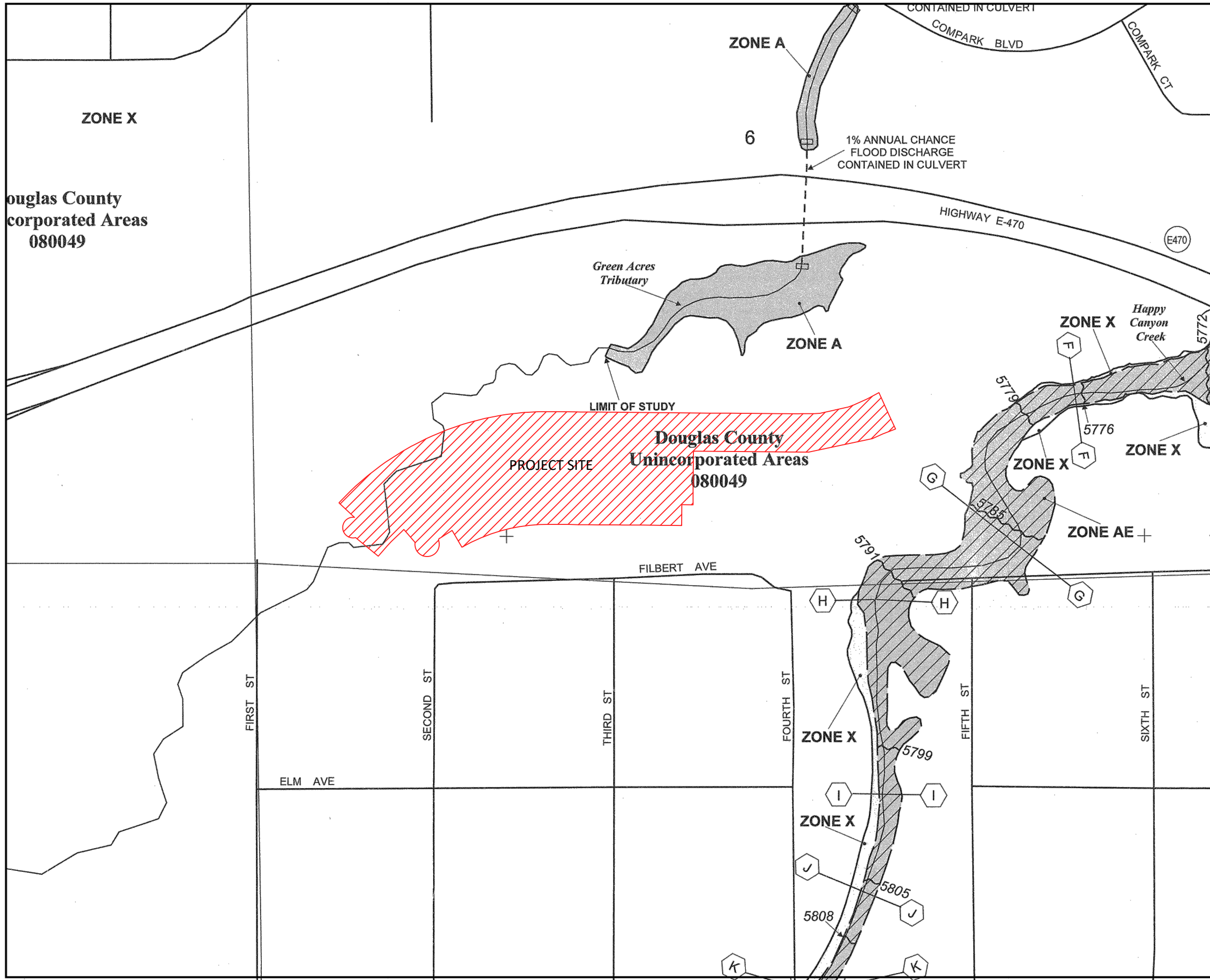
### Maps

- Vicinity Map
- FEMA Flood Information Rate Map
- Soils Map



# VICINITY MAP

N.T.S.



PANEL 0062F

**FIRM**  
FLOOD INSURANCE RATE MAP  
DOUGLAS COUNTY,  
COLORADO  
AND INCORPORATED AREAS

PANEL 62 OF 495  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
DOUGLAS COUNTY	080049	0062	F
LONE TREE, CITY OF	080319	0062	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER  
08035C0062F

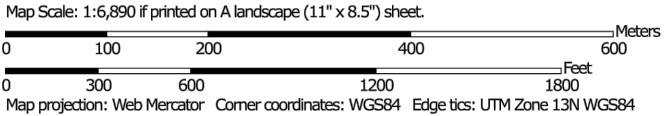
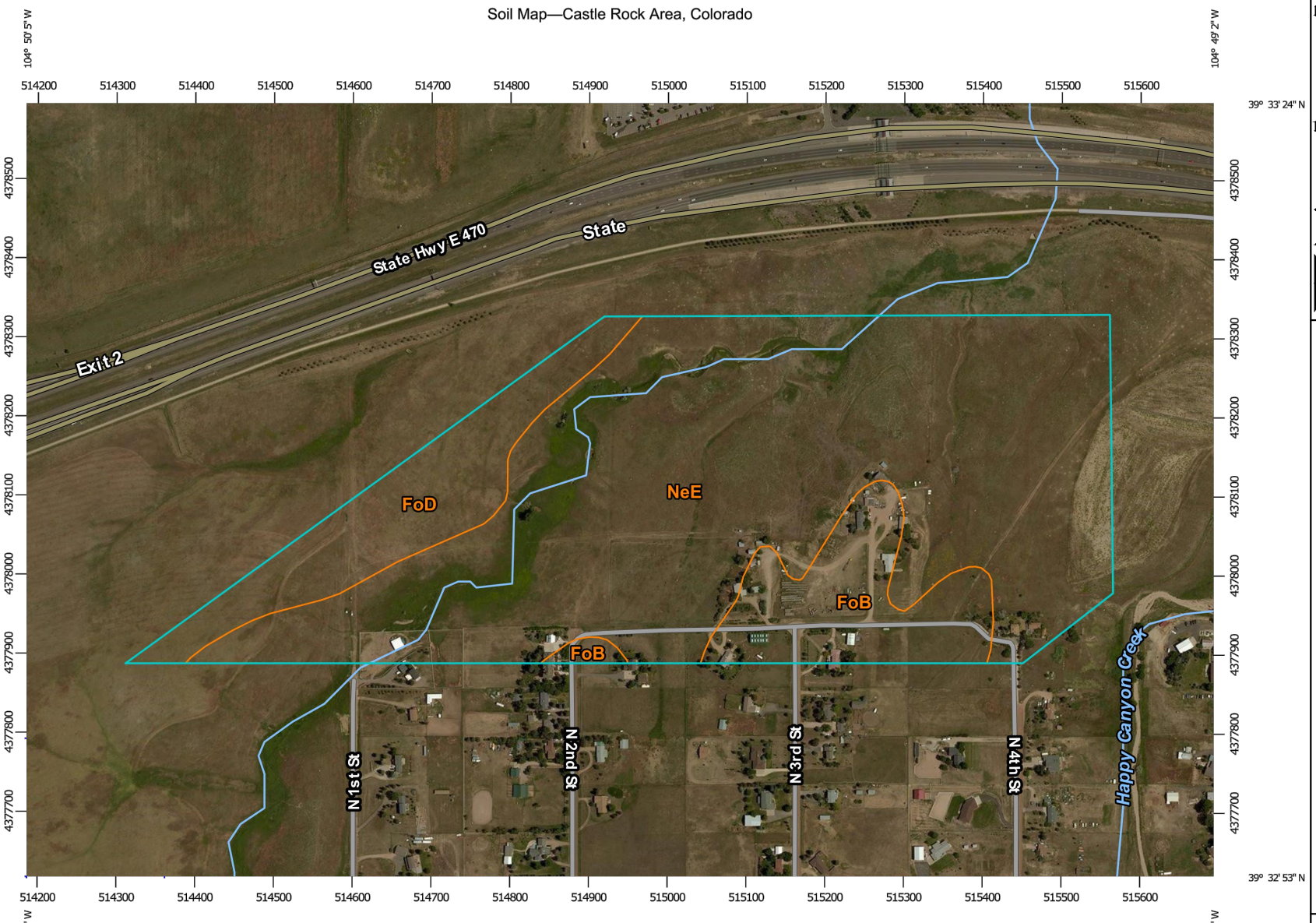
EFFECTIVE DATE:  
SEPTEMBER 30, 2005

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

11:25 D:\a\Name: P:\Clc\pkc3\ComSouth05-Residential\_Preliminary\_Plot\Documents\Engineering\StormWater\_Reports\Preliminary\_Report\Soil\_Map\_Exhibit.dwg Updated By: rkatz

### Soil Map—Castle Rock Area, Colorado



Web Soil Survey  
National Cooperative Soil Survey





































1/14/2016  
Page 1 of 3



COMPARK VILLAGE SOUTH FILING NO. 1  
TOWN OF PARKER, CO  
SOIL MAP EXHIBIT

RJM
RAK
1/14/16
1:6,890
SHEET
<b>1</b>
CLCPKC3

### MAP LEGEND

- Area of Interest (AOI)**
-  Area of Interest (AOI)
- Soils**
-  Soil Map Unit Polygons
-  Soil Map Unit Lines
-  Soil Map Unit Points
- Special Point Features**
-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot
-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features
- Water Features**
-  Streams and Canals
- Transportation**
-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads
- Background**
-  Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Castle Rock Area, Colorado  
 Survey Area Data: Version 8, Sep 23, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 10, 2014—Aug 21, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



COMPARK VILLAGE SOUTH FILING NO. 1  
 TOWN OF PARKER, CO  
 SOIL MAP EXHIBIT

RJM  
 RAK  
 1/14/16  
 1:6, 890  
 SHEET  
**2**  
 CLCPKC3

Soil Map—Castle Rock Area, Colorado

## Map Unit Legend

Castle Rock Area, Colorado (CO622)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
FoB	Fondis clay loam, 1 to 3 percent slopes	12.3	12.1%
FoD	Fondis clay loam, 3 to 9 percent slopes	13.2	12.9%
NeE	Newlin gravelly sandy loam, 8 to 30 percent slopes	76.6	75.0%
<b>Totals for Area of Interest</b>		<b>102.1</b>	<b>100.0%</b>

## **APPENDIX B**

### Hydrologic Analysis

- UDFCD Table 6-3
- UDFCD Table 6-4
- UDFCD Table 6-5
- UDFCD Figures 6-1, 6-2 & 6-3
- Impervious Percentage Calculations
- Time of Concentration Calculations
- 2-Year Storm Runoff Calculations
- 5-Year Storm Runoff Calculations
- 100-Year Storm Runoff Calculations

**Table 6-3. Recommended percentage imperviousness values**

Land Use or Surface Characteristics	Percentage Imperviousness (%)
<b>Business:</b>	
Downtown Areas	95
Suburban Areas	75
<b>Residential:</b>	
Single-family	
2.5 acres or larger	12
0.75 – 2.5 acres	20
0.25 – 0.75 acres	30
0.25 acres or less	45
Apartments	75
<b>Industrial:</b>	
Light areas	80
Heavy areas	90
<b>Parks, cemeteries</b>	10
<b>Playgrounds</b>	25
<b>Schools</b>	55
<b>Railroad yard areas</b>	50
<b>Undeveloped Areas:</b>	
Historic flow analysis	2
Greenbelts, agricultural	2
Off-site flow analysis (when land use not defined)	45
<b>Streets:</b>	
Paved	100
Gravel (packed)	40
Drive and walks	90
Roofs	90
Lawns, sandy soil	2
Lawns, clayey soil	2

**Table 6-4. Runoff coefficient equations based on NRCS soil group and storm return period**

NRCS Soil Group	Storm Return Period					
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
A	$C_A = 0.89i$	$C_A = 0.93i$	$C_A = 0.94i$	$C_A = 0.944i$	$C_A = 0.95i$	$C_A = 0.81i + 0.154$
B	$C_B = 0.89i$	$C_B = 0.93i$	$C_B = 0.81i + 0.125$	$C_B = 0.70i + 0.23$	$C_B = 0.59i + 0.364$	$C_B = 0.49i + 0.454$
C/D	$C_{C/D} = 0.89i$	$C_{C/D} = 0.87i + 0.052$	$C_{C/D} = 0.74i + 0.2$	$C_{C/D} = 0.64i + 0.31$	$C_{C/D} = 0.54i + 0.418$	$C_{C/D} = 0.45i + 0.508$

Where:

$i$  = % imperviousness (expressed as a decimal)

$C_A$  = Runoff coefficient for Natural Resources Conservation Service (NRCS) HSG A soils

$C_B$  = Runoff coefficient for NRCS HSG B soils

$C_{C/D}$  = Runoff coefficient for NRCS HSG C and D soils.

The values for various catchment imperviousness and storm return periods are presented graphically in Figures 6-1 through 6-3, and are tabulated in Table 6-5. These coefficients were developed for the Denver region to work in conjunction with the time of concentration recommendations in Section 2.4. Use of these coefficients and this procedure outside of the semi-arid climate found in the Denver region may not be valid. The UD-Rational Excel workbook performs all the needed calculations to find the runoff coefficient given the soil type and imperviousness and the reader may want to take advantage of this macro-enabled Excel workbook that is available for download from the UDFCD's website [www.udfcd.org](http://www.udfcd.org).

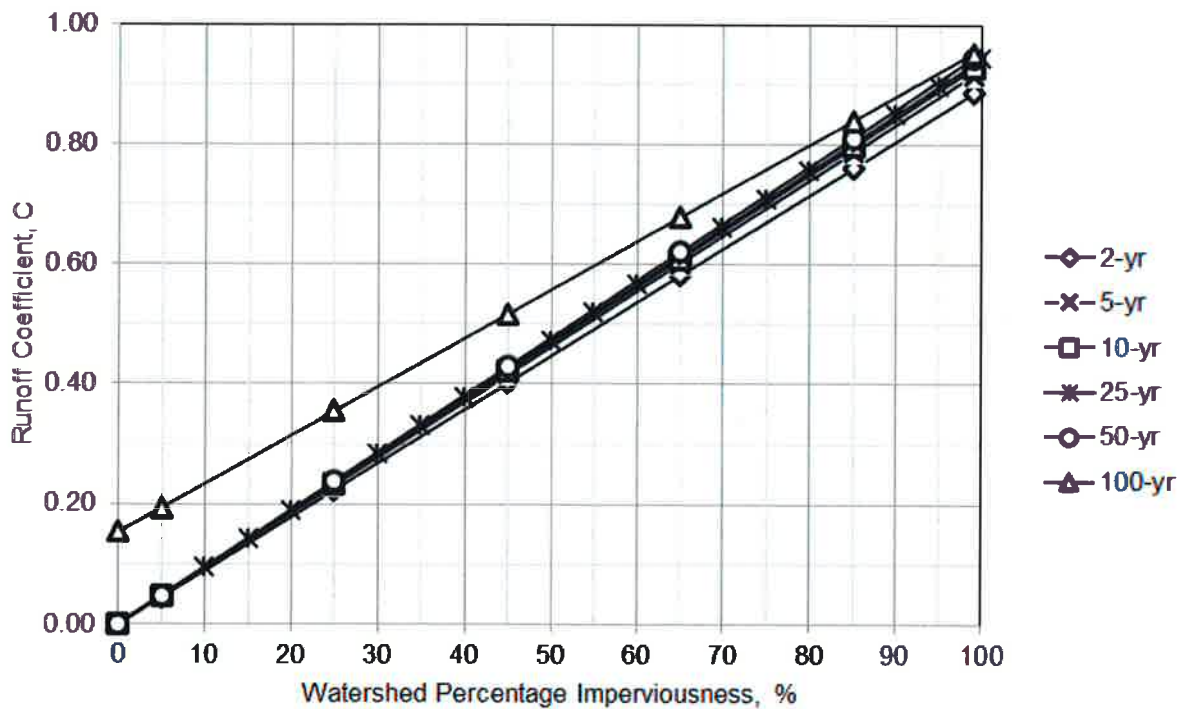
See Examples 7.1 and 7.2 that illustrate the Rational Method.

Table 6-5. Runoff coefficients, *c*

Total or Effective % Imperviousness	NRCS Hydrologic Soil Group A					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
2%	0.02	0.02	0.02	0.02	0.02	0.17
5%	0.04	0.05	0.05	0.05	0.05	0.19
10%	0.09	0.09	0.09	0.09	0.1	0.23
15%	0.13	0.14	0.14	0.14	0.14	0.28
20%	0.18	0.19	0.19	0.19	0.19	0.32
25%	0.22	0.23	0.24	0.24	0.24	0.36
30%	0.27	0.28	0.28	0.28	0.29	0.4
35%	0.31	0.33	0.33	0.33	0.33	0.44
40%	0.36	0.37	0.38	0.38	0.38	0.48
45%	0.4	0.42	0.42	0.42	0.43	0.52
50%	0.45	0.47	0.47	0.47	0.48	0.56
55%	0.49	0.51	0.52	0.52	0.52	0.6
60%	0.53	0.56	0.56	0.57	0.57	0.64
65%	0.58	0.6	0.61	0.61	0.62	0.68
70%	0.62	0.65	0.66	0.66	0.67	0.72
75%	0.67	0.7	0.71	0.71	0.71	0.76
80%	0.71	0.74	0.75	0.76	0.76	0.8
85%	0.76	0.79	0.8	0.8	0.81	0.84
90%	0.8	0.84	0.85	0.85	0.86	0.88
95%	0.85	0.88	0.89	0.9	0.9	0.92
100%	0.89	0.93	0.94	0.94	0.95	0.96
Total or Effective % Imperviousness	NRCS Hydrologic Soil Group B					
2%	0.02	0.02	0.14	0.24	0.38	0.46
5%	0.04	0.05	0.17	0.27	0.39	0.48
10%	0.09	0.09	0.21	0.3	0.42	0.5
15%	0.13	0.14	0.25	0.34	0.45	0.53
20%	0.18	0.19	0.29	0.37	0.48	0.55
25%	0.22	0.23	0.33	0.41	0.51	0.58
30%	0.27	0.28	0.37	0.44	0.54	0.6
35%	0.31	0.33	0.41	0.48	0.57	0.63
40%	0.36	0.37	0.45	0.51	0.6	0.65
45%	0.4	0.42	0.49	0.55	0.63	0.67
50%	0.45	0.47	0.53	0.58	0.66	0.7
55%	0.49	0.51	0.57	0.62	0.69	0.72
60%	0.53	0.56	0.61	0.65	0.72	0.75
65%	0.58	0.6	0.65	0.69	0.75	0.77
70%	0.62	0.65	0.69	0.72	0.78	0.8
75%	0.67	0.7	0.73	0.76	0.81	0.82
80%	0.71	0.74	0.77	0.79	0.84	0.85
85%	0.76	0.79	0.81	0.83	0.87	0.87
90%	0.8	0.84	0.85	0.86	0.89	0.9
95%	0.85	0.88	0.89	0.9	0.92	0.92
100%	0.89	0.93	0.94	0.94	0.95	0.94

**Table 6-5. Runoff coefficients, *c* (continued)**

Total or Effective % Imperviousness	NRCS Hydrologic Soil Groups C and D					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
2%	0.02	0.07	0.22	0.32	0.43	0.52
5%	0.04	0.1	0.24	0.34	0.45	0.53
10%	0.09	0.14	0.27	0.37	0.47	0.55
15%	0.13	0.18	0.31	0.41	0.5	0.58
20%	0.18	0.23	0.35	0.44	0.53	0.6
25%	0.22	0.27	0.39	0.47	0.55	0.62
30%	0.27	0.31	0.42	0.5	0.58	0.64
35%	0.31	0.36	0.46	0.53	0.61	0.67
40%	0.36	0.4	0.5	0.57	0.63	0.69
45%	0.4	0.44	0.53	0.6	0.66	0.71
50%	0.45	0.49	0.57	0.63	0.69	0.73
55%	0.49	0.53	0.61	0.66	0.72	0.76
60%	0.53	0.57	0.64	0.69	0.74	0.78
65%	0.58	0.62	0.68	0.73	0.77	0.8
70%	0.62	0.66	0.72	0.76	0.8	0.82
75%	0.67	0.7	0.76	0.79	0.82	0.85
80%	0.71	0.75	0.79	0.82	0.85	0.87
85%	0.76	0.79	0.83	0.85	0.88	0.89
90%	0.8	0.83	0.87	0.89	0.9	0.91
95%	0.85	0.88	0.9	0.92	0.93	0.94
100%	0.89	0.92	0.94	0.95	0.96	0.96



**Figure 6-1. Runoff coefficient vs. watershed imperviousness NRCS HSG A**

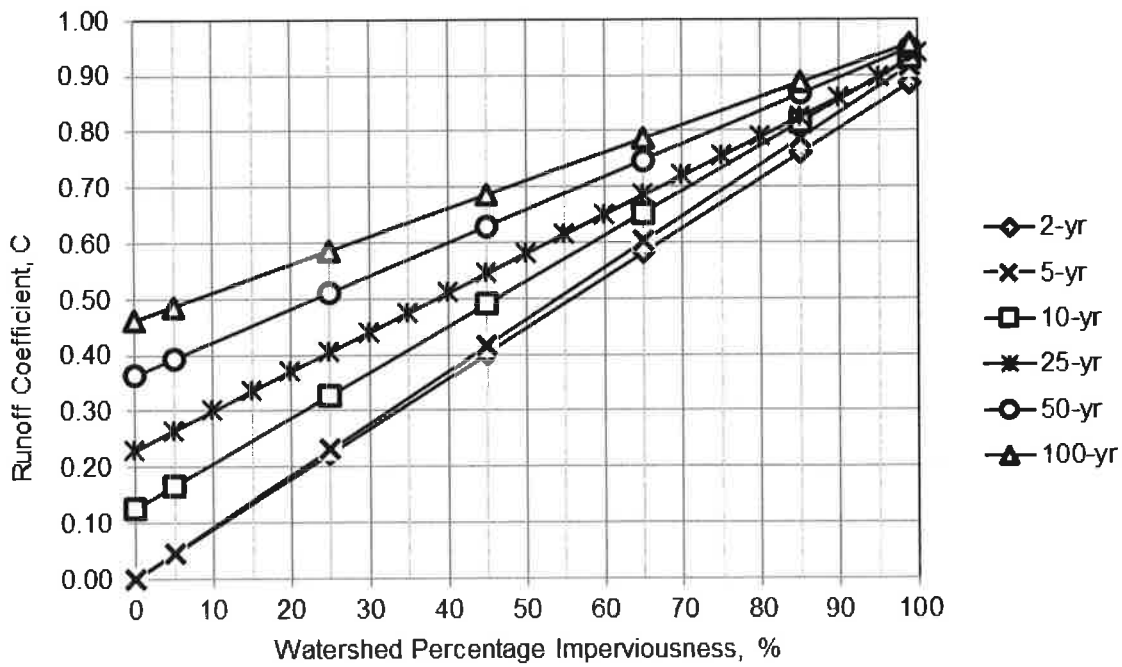


Figure 6-2. Runoff coefficient vs. watershed imperviousness NRCS HSG B

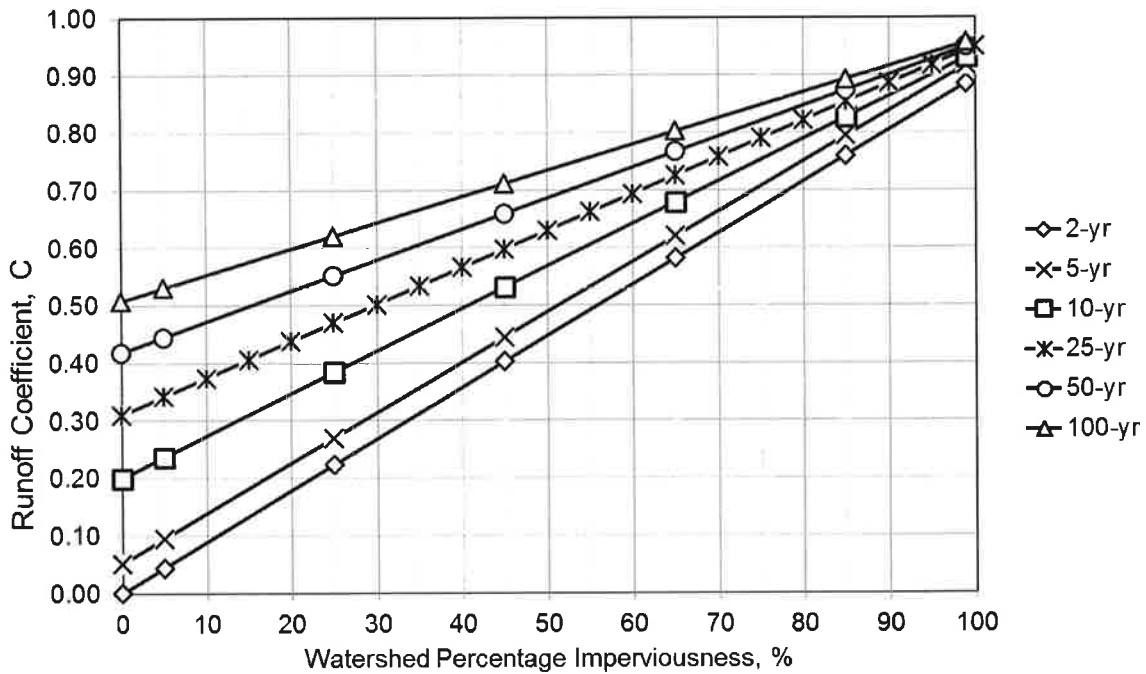


Figure 6-3. Runoff coefficient vs. watershed imperviousness NRCS HSG C and D

## Compark South

### TOWN OF PARKER, COLORADO PROPOSED IMPERVIOUSNESS CALCULATIONS 6/9/2016

#### CVS-1

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	1.18	1.18
Landscape	2%	2.67	0.05

Total Area: 3.85

**Percentage Imperviousness: 32.0%**  
**C<sub>2</sub> (Table 6-4, Type C Soil): 0.28**  
**C<sub>5</sub> (Table 6-4, Type C Soil): 0.33**  
**C<sub>100</sub> (Table 6-4, Type C Soil): 0.65**

#### CVS-2

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	1.09	1.09
Landscape	2%	0.33	0.01

Total Area: 1.42

**Percentage Imperviousness: 77.0%**  
**C<sub>2</sub> (Table 6-4, Type C Soil): 0.69**  
**C<sub>5</sub> (Table 6-4, Type C Soil): 0.72**  
**C<sub>100</sub> (Table 6-4, Type C Soil): 0.85**

#### CVS-3

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.57	0.57
Landscape	2%	0.37	0.01

Total Area: 0.94

**Percentage Imperviousness: 62.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.55**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.58**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.76**

#### CVS-4

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.56	0.56
Landscape	2%	0.61	0.01

Total Area: 1.17

**Percentage Imperviousness: 49.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.44**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.46**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.69**

\*Note: Impervious percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Criteria Manual.

CVS-4A

**Percentage Imperviousness\*:** **55.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil):** **0.49**  
**C<sub>5</sub> (Table 6-4, Type B Soil):** **0.51**  
**C<sub>100</sub> (Table 6-4, Type B Soil):** **0.72**

CVS-5

**Percentage Imperviousness\*:** **45.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil):** **0.40**  
**C<sub>5</sub> (Table 6-4, Type B Soil):** **0.42**  
**C<sub>100</sub> (Table 6-4, Type B Soil):** **0.67**

CVS-6

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.28	0.28
Landscape	2%	0.37	0.01

Total Area: 0.65

**Percentage Imperviousness:** **45.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil):** **0.40**  
**C<sub>5</sub> (Table 6-4, Type B Soil):** **0.42**  
**C<sub>100</sub> (Table 6-4, Type B Soil):** **0.67**

CVS-6A

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.00	0.00
Landscape	2%	0.78	0.02

Total Area: 0.78

**Percentage Imperviousness:** **2.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil):** **0.02**  
**C<sub>5</sub> (Table 6-4, Type B Soil):** **0.02**  
**C<sub>100</sub> (Table 6-4, Type B Soil):** **0.46**

CVS-7

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.86	0.86
Landscape	2%	0.25	0.01

Total Area: 1.11

**Percentage Imperviousness:** **78.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil):** **0.69**  
**C<sub>5</sub> (Table 6-4, Type B Soil):** **0.73**  
**C<sub>100</sub> (Table 6-4, Type B Soil):** **0.84**

\*Note: Impervious percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Criteria Manual.

CVS-8

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.86	0.86
Landscape	2%	0.73	0.01

Total Area: 1.59

**Percentage Imperviousness: 55.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.49**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.51**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.72**

CVS-9

**Percentage Imperviousness\*: 55.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.49**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.51**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.72**

CVS-9A

**Percentage Imperviousness\*: 55.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.49**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.51**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.72**

CVS-10

**Percentage Imperviousness\*: 51.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.45**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.47**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.70**

CVS-10A

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.25	0.25
Landscape	2%	0.15	0.00

Total Area: 0.40

**Percentage Imperviousness: 63.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.56**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.59**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.76**

CVS-11

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	2.08	2.08
Landscape	2%	1.39	0.03

Total Area: 3.47

**Percentage Imperviousness: 78.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.69**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.73**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.84**

\*Note: Impervious percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Criteria Manual.

CVS-12

<b>Percentage Imperviousness*:</b>	<b>55.0%</b>
C <sub>2</sub> (Table 6-4, Type B Soil):	0.49
C <sub>5</sub> (Table 6-4, Type B Soil):	0.51
C <sub>100</sub> (Table 6-4, Type B Soil):	0.72

CVS-12A

<b>Percentage Imperviousness*:</b>	<b>55.0%</b>
C <sub>2</sub> (Table 6-4, Type B Soil):	0.49
C <sub>5</sub> (Table 6-4, Type B Soil):	0.51
C <sub>100</sub> (Table 6-4, Type B Soil):	0.72

CVS-12B

<b>Percentage Imperviousness*:</b>	<b>55.0%</b>
C <sub>2</sub> (Table 6-4, Type B Soil):	0.49
C <sub>5</sub> (Table 6-4, Type B Soil):	0.51
C <sub>100</sub> (Table 6-4, Type B Soil):	0.72

CVS-13

<b>Percentage Imperviousness*:</b>	<b>55.0%</b>
C <sub>2</sub> (Table 6-4, Type B Soil):	0.49
C <sub>5</sub> (Table 6-4, Type B Soil):	0.51
C <sub>100</sub> (Table 6-4, Type B Soil):	0.72

CVS-13A

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.76	0.76
Landscape	2%	0.48	0.01

Total Area: 1.24

<b>Percentage Imperviousness:</b>	<b>62.0%</b>
C <sub>2</sub> (Table 6-4, Type B Soil):	0.55
C <sub>5</sub> (Table 6-4, Type B Soil):	0.58
C <sub>100</sub> (Table 6-4, Type B Soil):	0.76

CVS-13B

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.79	0.79
Landscape	2%	0.48	0.01

Total Area: 1.27

<b>Percentage Imperviousness:</b>	<b>63.0%</b>
C <sub>2</sub> (Table 6-4, Type B Soil):	0.56
C <sub>5</sub> (Table 6-4, Type B Soil):	0.59
C <sub>100</sub> (Table 6-4, Type B Soil):	0.76

\*Note: Impervious percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Criteria Manual.

CVS-13C

**Percentage Imperviousness\*:** **55.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil):** **0.49**  
**C<sub>5</sub> (Table 6-4, Type B Soil):** **0.51**  
**C<sub>100</sub> (Table 6-4, Type B Soil):** **0.72**

CVS-14

**Percentage Imperviousness:** **55.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil):** **0.49**  
**C<sub>5</sub> (Table 6-4, Type B Soil):** **0.51**  
**C<sub>100</sub> (Table 6-4, Type B Soil):** **0.72**

CVS-14A

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.00	0.00
Landscape	2%	4.12	0.08
Total Area:		4.12	

**Percentage Imperviousness:** **2.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil):** **0.02**  
**C<sub>5</sub> (Table 6-4, Type B Soil):** **0.02**  
**C<sub>100</sub> (Table 6-4, Type B Soil):** **0.46**

CVS-14B

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.18	0.18
Landscape	2%	2.55	0.05
Total Area:		2.73	

**Percentage Imperviousness:** **8.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil):** **0.07**  
**C<sub>5</sub> (Table 6-4, Type B Soil):** **0.07**  
**C<sub>100</sub> (Table 6-4, Type B Soil):** **0.49**

CVS-14C

**Percentage Imperviousness:** **55.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil):** **0.49**  
**C<sub>5</sub> (Table 6-4, Type B Soil):** **0.51**  
**C<sub>100</sub> (Table 6-4, Type B Soil):** **0.72**

CVS-15

**Percentage Imperviousness\*:** **55.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil):** **0.49**  
**C<sub>5</sub> (Table 6-4, Type B Soil):** **0.51**  
**C<sub>100</sub> (Table 6-4, Type B Soil):** **0.72**

\*Note: Impervious percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Criteria Manual.

CVS-15A

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.55	0.55
Landscape	2%	0.40	0.01
Total Area:		0.95	

<b>Percentage Imperviousness:</b>	<b>59.0%</b>
C <sub>2</sub> (Table 6-4, Type B Soil):	0.53
C <sub>5</sub> (Table 6-4, Type B Soil):	0.55
C <sub>100</sub> (Table 6-4, Type B Soil):	0.74

CVS-16

<b>Percentage Imperviousness*:</b>	<b>55.0%</b>
C <sub>2</sub> (Table 6-4, Type B Soil):	0.49
C <sub>5</sub> (Table 6-4, Type B Soil):	0.51
C <sub>100</sub> (Table 6-4, Type B Soil):	0.72

CVS-17

<b>Percentage Imperviousness*:</b>	<b>55.0%</b>
C <sub>2</sub> (Table 6-4, Type B Soil):	0.49
C <sub>5</sub> (Table 6-4, Type B Soil):	0.51
C <sub>100</sub> (Table 6-4, Type B Soil):	0.72

CVS-18

<b>Percentage Imperviousness*:</b>	<b>50.0%</b>
C <sub>2</sub> (Table 6-4, Type B Soil):	0.45
C <sub>5</sub> (Table 6-4, Type B Soil):	0.47
C <sub>100</sub> (Table 6-4, Type B Soil):	0.70

CVS-19

<b>Percentage Imperviousness*:</b>	<b>73.0%</b>
C <sub>2</sub> (Table 6-4, Type B Soil):	0.65
C <sub>5</sub> (Table 6-4, Type B Soil):	0.68
C <sub>100</sub> (Table 6-4, Type B Soil):	0.81

CVS-20

<b>Percentage Imperviousness*:</b>	<b>55.0%</b>
C <sub>2</sub> (Table 6-4, Type B Soil):	0.49
C <sub>5</sub> (Table 6-4, Type B Soil):	0.51
C <sub>100</sub> (Table 6-4, Type B Soil):	0.72

CVS-21

<b>Percentage Imperviousness*:</b>	<b>55.0%</b>
C <sub>2</sub> (Table 6-4, Type B Soil):	0.49
C <sub>5</sub> (Table 6-4, Type B Soil):	0.51
C <sub>100</sub> (Table 6-4, Type B Soil):	0.72

\*Note: Impervious percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Criteria Manual.

BEL-1

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	1.23	1.23
Landscape	2%	2.50	0.05

Total Area: 3.73

**Percentage Imperviousness: 34.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.30**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.32**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.62**

BEL-2

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	0.68	0.68
Landscape	2%	0.70	0.01

Total Area: 1.38

**Percentage Imperviousness: 77.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.69**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.72**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.83**

BEL-3

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	1.34	1.34
Landscape	2%	5.42	0.11

Total Area: 6.76

**Percentage Imperviousness: 21.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.19**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.20**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.56**

BEL-4

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	1.36	1.36
Landscape	2%	0.39	0.01

Total Area: 1.75

**Percentage Imperviousness: 78.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.69**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.73**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.84**

\*Note: Impervious percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Criteria Manual.

BEL-5

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	3.43	3.43
Landscape	2%	1.12	0.02

Total Area: 4.55

**Percentage Imperviousness: 76.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.68**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.71**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.83**

BEL-6

Land Use	Imperviousness (UDFCD Table 6-3)	Total Area (Acres)	Impervious Area (Acres)
Pavement/Hardscape	100%	2.77	2.77
Landscape	2%	1.18	0.02

Total Area: 3.95

**Percentage Imperviousness: 71.0%**  
**C<sub>2</sub> (Table 6-4, Type B Soil): 0.63**  
**C<sub>5</sub> (Table 6-4, Type B Soil): 0.66**  
**C<sub>100</sub> (Table 6-4, Type B Soil): 0.80**

\*Note: Impervious percentages were determined using Figures 3-3, 3-4, 3-5 from Volume 3 of the Urban Storm Drainage Criteria Manual.

**PROPOSED DRAINAGE BASINS  
STANDARD FORM SF-2  
TIME OF CONCENTRATION**

PROJECT: Compark Village South, Filing 1

NOTES:  
 $T_1 = [0.395 \times (1.1 - C_c) \times L^{0.5}] / (S^{0.33})$   
 $T_1 = L / (60 \times V)$  (Velocity from UDFCD Fig. RO-1)  
 $T_c \text{ Check} = 10 + L/180$  (Urbanized Basins Only)

JOB NO: CLCPKC3

CALCULATED BY: RAK DATE: November 16, 2016  
 REVISED BY: DATE:

SUB-BASIN DATA			INITIAL/OVERLAND TIME (T <sub>1</sub> )			TRAVEL TIME (T <sub>2</sub> ) - (GRASS SWALE)				TRAVEL TIME (T <sub>3</sub> ) - (PAVEMENT/CURB & GUTTER)				T <sub>c</sub> CHECK (urbanized basins)		FINAL T <sub>c</sub> (min)	REMARKS
AREA DESIGNATION	RUNOFF COEFFICIENT, C <sub>100</sub>	AREA, A (acres)	FLOW LENGTH, (ft)	SLOPE (%)	INITIAL TIME T <sub>1</sub> (min)	FLOW LENGTH, (ft)	SLOPE (%)	VELOCITY (ft/s)	TRAVEL TIME T <sub>2</sub> (min)	FLOW LENGTH, (ft)	SLOPE (%)	VELOCITY (ft/s)	TRAVEL TIME T <sub>3</sub> (min)	TOTAL LENGTH (ft)	MAXIMUM T <sub>c</sub> = (T <sub>1</sub> + T <sub>3</sub> )		
CVS-1 (Inlet 1-3)	0.65	3.85	0	0.0%	0.0	0	0.0%	0.0	0.0	1172	2.0%	2.8	6.9	1172	16.5	6.9	
CVS-2 (Inlet 2-3)	0.85	1.42	0	0.0%	0.0	0	0.0%	0.0	0.0	1125	2.0%	2.8	6.6	1125	16.3	6.6	
CVS-3 (Inlet 1-4)	0.76	0.94	0	0.0%	0.0	0	0.0%	0.0	0.0	1055	2.0%	2.8	6.2	1055	15.9	6.2	
CVS-4 (Inlet 2-4)	0.69	1.17	0	0.0%	0.0	0	0.0%	0.0	0.0	600	1.5%	2.4	4.1	600	13.3	4.1	
CVS-4A (Inlet 3-4)	0.72	1.76	100	2.0%	5.4	180	2.0%	1.0	3.0	416	1.5%	2.4	2.8	696	13.9	11.3	
CVS-5 (Inlet 5-4)	0.67	2.63	100	4.0%	4.9	130	5.5%	1.6	1.3	380	1.3%	2.3	2.8	610	13.4	9.0	
CVS-6 (Inlet 6-4)	0.67	0.58	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	Minimum
CVS-6A (FES 2-4)	0.46	0.78	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	Minimum
CVS-7 (Inlet 1-6)	0.84	1.11	0	0.0%	0.0	0	0.0%	0.0	0.0	904	0.6%	1.5	10.2	904	15.0	10.2	
CVS-8 (Inlet 2-6)	0.72	1.59	0	0.0%	0.0	0	0.0%	0.0	0.0	897	0.6%	1.5	10.1	897	15.0	10.1	
CVS-9 (Inlet 4-5A)	0.72	2.41	100	2.0%	5.4	180	2.0%	1.0	3.0	440	1.1%	2.1	3.5	720	14.0	11.9	
CVS-9A (Inlet 3-4)	0.72	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	Minimum
CVS-10 (Inlet 5-5A)	0.70	2.78	100	2.0%	5.7	180	2.0%	1.0	3.0	594	1.0%	2.0	5.0	874	14.9	13.7	
CVS-10A (Inlet 5-4A)	0.76	0.40	100	2.0%	4.8	55	2.0%	1.0	0.9	5	1.0%	2.0	0.0	160	10.9	5.8	
CVS-11 (Inlet 1-5)	0.84	2.03	0	0.0%	0.0	0	0.0%	0.0	0.0	1046	0.5%	1.4	12.3	1046	15.8	12.3	
CVS-12 (Inlet 2-5)	0.72	4.58	100	1.5%	5.9	48	1.5%	0.9	0.9	599	1.0%	2.0	5.0	747	14.2	11.9	
CVS-12A (Inlet 3-5)	0.72	0.81	100	2.0%	5.4	120	2.0%	1.0	2.0	30	1.0%	2.0	0.3	250	11.4	7.7	
CVS-12B (Inlet 3-5)	0.72	1.31	100	2.0%	5.4	190	2.0%	1.0	3.2	350	1.8%	2.7	2.2	640	13.6	10.8	
CVS-13 (Inlet 4-5)	0.72	1.16	100	4.7%	4.1	81	2.0%	1.0	1.4	230	1.0%	2.0	1.9	411	12.3	7.4	
CVS 13A (Inlet 6-5A)	0.76	1.20	55	2.0%	3.6	0	0.0%	0.0	0.0	817	1.8%	2.7	5.1	872	14.8	8.7	
CVS 13B (Inlet 4-5B)	0.76	1.53	55	2.0%	3.6	0	0.0%	0.0	0.0	877	1.8%	2.7	5.4	932	15.2	9.0	
CVS 13C (Inlet 4-5C)	0.72	1.26	100	2.0%	5.4	81	2.0%	1.0	1.4	250	1.0%	2.0	2.1	431	12.4	8.8	
CVS-14 (Inlet 6-5)	0.72	1.89	100	2.0%	5.4	40	2.0%	1.0	0.7	608	1.0%	2.0	5.1	748	14.2	11.1	
CVS-14A (Inlet 7-5)	0.46	4.01	100	5.0%	6.8	1258	2.0%	1.0	21.2	0	0.0%	0.0	0.0	1358	17.5	17.5	
CVS-14B (Inlet 6-5)	0.49	2.73	100	5.0%	6.4	512	3.0%	1.2	7.0	5	1.0%	2.0	0.0	617	13.4	13.4	
CVS-14C (Inlet 5-5B)	0.72	1.93	100	2.0%	5.4	40	2.0%	1.0	0.7	634	1.0%	2.0	5.3	774	14.3	11.4	
CVS-15 (Inlet 5-5)	0.72	2.01	100	2.0%	5.4	170	2.0%	1.0	2.9	619	1.0%	2.0	5.2	889	14.9	13.4	
CVS-15A (Inlet 6-5B)	0.74	0.95	55	2.0%	3.8	0	0.0%	0.0	0.0	698	2.0%	2.8	4.1	753	14.2	7.9	
CVS-16	0.72	2.58	100	1.6%	5.8	44	1.6%	0.9	0.8	772	1.0%	2.0	6.4	916	15.1	13.1	
CVS-17	0.72	4.10	100	5.3%	3.9	129	5.3%	1.6	1.3	564	1.0%	2.0	4.7	793	14.4	10.0	
CVS-18	0.70	3.06	100	15.5%	2.9	115	3.0%	1.2	1.6	990	1.0%	2.0	8.3	1205	16.7	12.8	
CVS-19	0.81	1.61	100	3.5%	3.4	200	3.5%	1.3	2.5	0	0.0%	0.0	0.0	300	11.7	6.0	
CVS-20	0.72	1.80	100	2.0%	5.4	17	2.0%	1.0	0.3	570	1.0%	2.0	4.8	687	13.8	10.4	
CVS-21	0.72	3.88	100	0.0%	21.0	164	3.3%	1.3	2.1	833	1.1%	2.1	6.6	1097	16.1	16.1	
BEL-1 (Inlet 2-1)	0.62	3.73	100	1.5%	7.6	466	1.5%	0.9	9.1	462	0.8%	1.8	4.4	508	12.8	12.8	
BEL-2 (Inlet 1-1)	0.83	1.38	0	0.0%	0.0	0	0.0%	0.0	0.0	1123	1.5%	2.4	7.6	1123	16.2	7.6	
BEL-3 (Inlet 2-2)	0.56	6.76	100	1.5%	8.6	232	1.5%	0.9	4.5	462	0.8%	1.8	4.3	794	14.4	14.4	
BEL-4 (Inlet 1-2)	0.84	1.75	0	0.0%	0.0	0	0.0%	0.0	0.0	825	0.8%	1.7	7.9	825	14.6	7.9	
BEL-5	0.83	4.55	100	3.1%	3.4	0	0.0%	0.0	0.0	1602	3.1%	3.5	7.6	1702	19.5	11.0	
BEL-6	0.80	3.95	100	9.8%	2.5	0	0.0%	0.0	0.0	1009	3.0%	3.5	4.9	1109	16.2	7.4	

**PROPOSED DRAINAGE BASINS  
STANDARD FORM SF-3  
STORM DRAINAGE SYSTEM DESIGN  
(RATIONAL METHOD PROCEDURE)**

PROJECT: COMPARK VILLAGE SOUTH, FILINGS 1 & 2

CLCPKC3

CALCULATED BY:  
REVISED BY:

RAK

DATE: November 18, 2016  
DATE:

Manning's n-value =0.013

2-YEAR

Basin ID	Design Point	DIRECT RUNOFF						Direct Runoff, Q (cfs)	Total Runoff, Q (cfs)	STORM SEWER					REMARKS
		Area (ac)	Tc (min.)	Runoff Coefficient, C	Intensity, I (in/hr)	C*A (Acres)	Intercepted (cfs)			Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)		
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.28	4.3	1.10	4.7	4.7	4.7	0.0	8.9	3.1%	24		
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.69	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	2.3	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	2.5	2.5	2.5	0.0	2.5	0.9%	18		
CVS-4A (Inlet 3-4)	4A	1.76	11.3	0.49	3.6	0.86	3.1	3.1	3.1	0.0	2.9	1.0%	18		
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.40	3.9	1.05	4.1	4.1	4.1	0.0	4.1	1.0%	18		
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.40	4.7	0.23	1.1	1.1	1.1	0.0	9.6	1.7%	36		
CVS-6A (FES 2-4)	6A	0.78	5.0	0.02	4.7	0.01	0.1	0.1	0.1	0.0	8.5	3.1%	36		
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.69	3.7	0.77	2.9	2.9	2.9	0.0	5.8	3.0%	24		
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.49	3.7	0.78	2.9	2.9	2.9	0.0	2.9	1.4%	24		
CVS-9 (Inlet 4-5A)	9	2.41	11.9	0.49	3.5	1.18	4.1	4.1	4.1	0.0	4.1	1.2%	18		
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.49	4.7	0.18	0.9	0.9	0.9	0.0	0.9	1.0%	18		
CVS-10 (Inlet 5-5A)	10	2.78	13.7	0.45	3.3	1.26	4.2	4.2	4.2	0.0	4.2	1.2%	18		
CVS-10A (Inlet 5-4A)	10A	0.40	5.8	0.56	4.5	0.22	1.0	1.0	1.0	0.0	1.0	1.0%	18		
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.69	3.4	1.41	4.9	4.9	4.9	0.0	12.8	0.8%	36		
CVS-12 (Inlet 2-5)	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-12A (Inlet 3-5)	12	0.81	7.7	0.49	4.1	0.40	1.6	1.6	1.6	0.0	40.0	1.9%	42		
CVS-12B (Inlet 3-5)	12A	1.31	10.8	0.49	3.6	0.64	2.3	2.3	2.3	0.0	40.0	1.9%	42		
CVS-13 (Inlet 4-5)	13	1.16	7.4	0.49	4.2	0.57	2.4	2.4	2.4	0.0	2.4	3.6%	18		
CVS 13A (Inlet 6-5A)	13A	1.20	8.7	0.55	4.0	0.66	2.6	2.6	2.6	0.0	2.6	1.0%	18		
CVS 13B (Inlet 4-5B)	13B	1.53	9.0	0.56	3.9	0.86	3.4	3.4	3.4	0.0	3.4	1.0%	18		
CVS 13C (Inlet 4-5C)	13C	1.26	8.8	0.49	3.9	0.62	2.4	2.4	2.4	0.0	2.4	1.0%	18		
CVS-14 (Inlet 6-5)	14	1.89	11.1	0.49	3.6	0.93	3.3	3.3	3.3	0.0	8.2	3.2%	30		
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.02	2.9	0.07	0.2	0.2	0.2	0.0	4.3	4.7%	24		
CVS-14B (Inlet 6-5)	14	2.73	13.4	0.07	3.3	0.19	0.6	0.6	0.6	0.0	8.6	3.4%	30		
CVS-14C (Inlet 5-5B)	14C	1.93	11.4	0.49	3.6	0.94	3.4	3.4	3.4	0.0	3.4	2.8%	18		
CVS-15 (Inlet 5-5)	15	2.05	13.4	0.49	3.3	1.00	3.3	3.3	3.3	0.0	3.3	5.0%	18		
CVS-15A (Inlet 6-5B)	15A	0.95	7.9	0.53	4.1	0.50	2.0	2.0	2.0	0.0	2.0	1.0%	18		
CVS-16	16	2.58	13.1	0.49	3.4	1.26	4.2	4.2	-	-	-	-	-		
CVS-17	17	4.10	10.0	0.49	3.8	2.01	7.6	7.6	-	-	-	-	-		
CVS-18	18	3.06	12.8	0.45	3.4	1.36	4.6	4.6	-	-	-	-	-		
CVS-19	19	1.61	6.0	0.65	4.5	1.05	4.7	4.7	-	-	-	-	-		
CVS-20	20	1.80	10.4	0.49	3.7	0.88	3.3	3.3	-	-	-	-	-		
CVS-21	21	3.88	16.1	0.49	3.1	1.90	5.8	5.8	-	-	-	-	-		
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.30	3.4	1.13	3.8	3.8	3.8	0.0	5.9	3.3%	36		
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.69	4.2	0.95	3.9	3.9	3.9	0.0	8.4	0.9%	36		
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.19	3.2	1.26	4.1	4.1	4.1	0.0	6.6	3.2%	36		
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.69	4.1	1.21	5.0	5.0	5.0	0.0	11.6	2.9%	36		
BEL-5	B5	4.55	11.0	0.68	3.6	3.08	11.1	11.1	-	-	-	-	-		
BEL-6	B6	3.95	7.4	0.63	4.2	2.50	10.5	10.5	-	-	-	-	-		

**PROPOSED DRAINAGE BASINS  
STANDARD FORM SF-3  
STORM DRAINAGE SYSTEM DESIGN  
(RATIONAL METHOD PROCEDURE)**

PROJECT: COMPARK VILLAGE SOUTH, FILINGS 1 & 2 CLCPKC3  
 CALCULATED BY: RAK DATE: November 18, 2016 Manning's n-value = 0.013  
 REVISED BY: DATE: 5-YEAR

Basin ID	Design Point	DIRECT RUNOFF							INLET		STORM SEWER			REMARKS
		Area (ac)	Tc (min.)	Runoff Coefficient, C	Intensity, i (in/hr)	C*A (Acres)	Direct Runoff, Q (cfs)	Total Runoff, Q (cfs)	Intercepted (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
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	0.72	4.3	1.03	4.5	4.5	4.5	0.0	4.5	10.0%	24	
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.58	4.4	0.54	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-4A (Inlet 3-4)	4A	1.76	11.3	0.51	3.6	0.90	3.2	3.2	3.2	0.0	3.1	1.0%	18	
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.42	3.9	1.10	4.3	4.3	4.3	0.0	4.3	1.0%	18	
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.42	4.7	0.24	1.1	1.1	1.1	0.0	9.6	1.7%	36	
CVS-6A (FES 2-4)	6A	0.78	5.0	0.02	4.7	0.01	0.1	0.1	0.1	0.0	8.5	3.1%	36	
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.73	3.7	0.81	3.0	3.0	3.0	0.0	6.0	3.0%	24	
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.51	3.7	0.81	3.0	3.0	3.0	0.0	3.0	1.4%	24	
CVS-9 (Inlet 4-5A)	9	2.41	11.9	0.51	3.5	1.23	4.3	4.3	4.3	0.0	4.3	1.2%	18	
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.51	4.7	0.19	0.9	0.9	0.9	0.0	0.9	1.0%	18	
CVS-10 (Inlet 5-5A)	10	2.78	13.7	0.47	3.3	1.32	4.3	4.3	4.3	0.0	4.3	1.2%	18	
CVS-10A (Inlet 5-4A)	10A	0.40	5.8	0.59	4.5	0.23	1.1	1.1	1.1	0.0	1.1	1.0%	18	
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.73	3.4	1.47	5.1	5.1	5.1	0.0	13.3	0.8%	36	
CVS-12 (Inlet 2-5)	12	4.58	11.9	0.51	3.5	2.34	8.2	8.2	8.2	0.0	8.2	0.7%	36	
CVS-12A (Inlet 3-5)	12	0.81	7.7	0.51	4.1	0.41	1.7	1.7	1.7	0.0	41.4	1.9%	42	
CVS-12B (Inlet 3-5)	12A	1.31	10.8	0.51	3.6	0.67	2.4	2.4	2.4	0.0	41.4	1.9%	42	
CVS-13 (Inlet 4-5)	13	1.16	7.4	0.51	4.2	0.59	2.5	2.5	2.5	0.0	2.5	3.6%	18	
CVS 13A (Inlet 6-5A)	13A	1.20	8.7	0.58	4.0	0.69	2.7	2.7	2.7	0.0	2.7	1.0%	18	
CVS 13B (Inlet 4-5B)	13B	1.53	9.0	0.59	3.9	0.90	3.5	3.5	3.5	0.0	3.5	1.0%	18	
CVS 13C (Inlet 4-5C)	13C	1.26	8.8	0.51	3.9	0.64	2.5	2.5	2.5	0.0	2.5	1.0%	18	
CVS-14 (Inlet 6-5)	14	1.89	11.1	0.51	3.6	0.97	3.5	3.5	3.5	0.0	8.5	3.2%	30	
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.02	2.9	0.07	0.2	0.2	0.2	0.0	4.3	4.7%	24	
CVS-14B (Inlet 6-5)	14	2.73	13.4	0.07	3.3	0.20	0.7	0.7	0.7	0.0	8.8	3.4%	30	
CVS-14C (Inlet 5-5B)	14C	1.93	11.4	0.51	3.6	0.99	3.5	3.5	3.5	0.0	3.5	2.8%	18	
CVS-15 (Inlet 5-5)	15	2.01	13.4	0.51	3.3	1.03	3.4	3.4	3.4	0.0	3.4	5.0%	18	
CVS-15A (Inlet 6-5B)	15A	0.95	7.9	0.55	4.1	0.52	2.1	2.1	2.1	0.0	2.1	1.0%	18	
CVS-16	16	2.58	13.1	0.51	3.4	1.32	4.4	4.4	-	-	-	-	-	
CVS-17	17	4.10	10.0	0.51	3.8	2.10	7.9	7.9	-	-	-	-	-	
CVS-18	18	3.06	12.8	0.47	3.4	1.42	4.8	4.8	-	-	-	-	-	
CVS-19	19	1.61	6.0	0.68	4.5	1.09	4.9	4.9	-	-	-	-	-	
CVS-20	20	1.80	10.4	0.51	3.7	0.92	3.4	3.4	-	-	-	-	-	
CVS-21	21	3.88	16.1	0.51	3.1	1.98	6.1	6.1	-	-	-	-	-	
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.32	3.4	1.18	4.0	4.0	4.0	0.0	6.1	3.3%	36	
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.72	4.2	0.99	4.1	4.1	4.1	0.0	8.8	0.9%	36	
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.20	3.2	1.32	4.2	4.2	4.2	0.0	6.9	3.2%	36	
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.73	4.1	1.27	5.2	5.2	5.2	0.0	12.1	2.9%	36	
BEL-5	B5	4.55	11.0	0.71	3.6	3.22	11.6	11.6	-	-	-	-	-	
BEL-6	B6	3.95	7.4	0.66	4.2	2.61	10.9	10.9	-	-	-	-	-	

**PROPOSED DRAINAGE BASINS  
STANDARD FORM SF-3  
STORM DRAINAGE SYSTEM DESIGN  
(RATIONAL METHOD PROCEDURE)**

PROJECT: COMPARK VILLAGE SOUTH, FILINGS 1 & 2 CLCPKC3  
 CALCULATED BY: RAK DATE: November 18, 2016 Manning's n-value = 0.013  
 REVISED BY: DATE: \_\_\_\_\_ 100-YEAR \_\_\_\_\_

Basin ID	Design Point	DIRECT RUNOFF							INLET		STORM SEWER			REMARKS
		Area (ac)	Tc (min.)	Runoff Coefficient, C	Intensity, I (in/hr)	C*A (Acres)	Direct Runoff, Q (cfs)	Total Runoff with Bypass, Q (cfs)	Intercepted (cfs)	Bypass (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.65	8.0	2.51	20.2	20.2	13.5	6.7	22.5	3.1%	24	Bypass flow goes to CVS-3.
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.85	8.1	1.21	9.9	9.9	9.0	1.0	9.0	10.0%	24	Bypass flow goes to CVS-4.
CVS-3 (Inlet 1-4)	3	0.94	6.2	0.76	8.3	0.71	5.9	12.6	7.7	4.9	7.7	1.7%	18	Takes bypass flow from CVS-1. Bypass goes to CVS-7.
CVS-4 (Inlet 2-4)	4	1.17	4.1	0.69	9.3	0.81	7.5	8.5	8.0	0.5	8.0	0.9%	18	Takes bypass flow from CVS-2. Bypass goes to CVS-8.
CVS-4A (Inlet 3-4)	4A	1.76	11.3	0.72	6.7	1.27	8.5	9.5	9.5	0.0	9.6	1.0%	18	Takes bypass flow from CVS-5.
CVS-5 (Inlet 5-4)	5	2.63	9.0	0.67	7.3	1.77	13.0	13.0	11.0	2.0	11.0	1.0%	18	Bypass flow goes to CVS-4A.
CVS-6 (Inlet 6-4)	6	0.58	5.0	0.67	8.8	0.39	3.5	3.5	3.5	0.0	51.3	1.7%	36	
CVS-6A (FES 2-4)	6A	0.78	5.0	0.46	8.8	0.36	3.2	3.2	3.2	0.0	51.0	3.1%	36	
CVS-7 (Inlet 1-6)	7	1.11	10.2	0.84	7.0	0.93	6.5	11.4	7.3	4.1	15.4	3.0%	24	Takes bypass flow from CVS-3. Bypass goes to CVS-11.
CVS-8 (Inlet 2-6)	8	1.59	10.1	0.72	7.0	1.15	8.1	8.6	8.1	0.5	8.1	1.4%	24	Takes bypass flow from CVS-4. Bypass goes to CVS-12.
CVS-9 (Inlet 4-5A)	9	2.41	11.9	0.72	6.5	1.74	11.4	11.6	10.2	1.4	10.2	1.2%	18	Bypass flow goes to CVS-12.
CVS-9A (Inlet 4-4)	9A	0.37	5.0	0.72	8.8	0.27	2.4	2.4	2.4	0.0	2.4	1.0%	18	
CVS-10 (Inlet 5-5A)	10	2.78	13.7	0.70	6.2	1.96	12.1	12.3	10.6	1.7	10.6	1.2%	18	Takes bypass flow from CVS-10A. Bypass flow goes to CVS-13B.
CVS-10A (Inlet 5-4A)	10A	0.40	5.8	0.76	8.5	0.31	2.6	2.6	2.2	0.4	2.2	1.0%	18	Bypass flow goes to CVS-10
CVS-11 (Inlet 1-5)	11	2.03	12.3	0.84	6.5	1.70	11.0	15.1	15.1	0.0	38.7	0.8%	36	Takes bypass flow from CVS-7.
CVS-12 (Inlet 2-5)	12	4.58	11.9	0.72	6.6	3.31	21.7	23.6	23.6	0.0	23.6	0.7%	36	Takes bypass flow from CVS-8 and CVS-9.
CVS-12A (Inlet 3-5)	12	0.81	7.7	0.72	7.8	0.59	4.5	4.5	4.5	0.0	137.0	1.9%	42	
CVS-12B (Inlet 3-5)	12A	1.31	10.8	0.72	6.8	0.95	6.5	9.4	9.4	0.0	137.0	1.9%	42	
CVS-13 (Inlet 4-5)	13	1.16	7.4	0.72	7.9	0.84	6.6	8.9	8.9	0.0	8.9	3.6%	18	Takes bypass flow from CVS-13A and CVS 13C.
CVS 13A (Inlet 6-5A)	13A	1.20	8.7	0.76	7.4	0.91	6.7	6.7	6.2	0.5	6.2	1.0%	18	Bypass flow goes to CVS-13
CVS 13B (Inlet 4-5B)	13B	1.53	9.0	0.76	7.3	1.17	8.5	9.4	6.9	2.5	6.9	1.0%	18	Takes bypass flow from CVS-10. Bypass flow goes to CVS-13C.
CVS 13C (Inlet 4-5C)	13C	1.26	8.8	0.72	7.4	0.91	6.7	7.9	3.9	4.0	3.9	1.0%	18	Takes bypass flow from CVS 13B. Bypass flow goes to CVS-13
CVS-14 (Inlet 6-5)	14	1.89	11.1	0.72	6.7	1.37	9.2	10.1	10.1	0.0	54.4	3.2%	30	Takes bypass from CVS-14C
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.46	5.5	1.86	10.2	10.2	10.2	0.0	34.8	4.7%	24	
CVS-14B (Inlet 6-5)	14	2.73	13.4	0.49	6.2	1.35	8.4	9.5	9.5	0.0	54.4	3.4%	30	
CVS-14C (Inlet 5-5B)	14C	1.93	11.4	0.72	6.7	1.40	9.3	9.3	7.5	1.8	7.5	2.8%	18	Bypass flow goes to CVS-14
CVS-15 (Inlet 5-5)	15	2.01	13.4	0.72	6.2	1.45	9.0	9.1	9.1	0.0	9.1	5.0%	18	Takes bypass flow from CVS-15A
CVS-15A (Inlet 6-5B)	15A	0.95	7.9	0.74	7.7	0.71	5.4	5.4	5.3	0.1	5.3	1.0%	18	
CVS-16	16	2.58	13.1	0.72	6.3	1.87	11.7	-	-	-	-	-	-	
CVS-17	17	4.10	10.0	0.72	7.0	2.97	20.9	-	-	-	-	-	-	
CVS-18	18	3.06	12.8	0.70	6.4	2.14	13.6	-	-	-	-	-	-	
CVS-19	19	1.61	6.0	0.81	8.4	1.31	11.0	-	-	-	-	-	-	
CVS-20	20	1.80	10.4	0.72	6.9	1.30	9.0	-	-	-	-	-	-	
CVS-21	21	3.88	16.1	0.72	5.7	2.81	16.0	-	-	-	-	-	-	
BEL-1 (Inlet 2-1)	B1	3.73	12.8	0.62	6.3	2.31	14.7	14.7	8.3	6.4	63.6	3.3%	36	Bypass flow goes to BEL-3.
BEL-2 (Inlet 1-1)	B2	1.38	7.6	0.83	7.8	1.15	8.9	8.9	6.5	2.4	69.5	0.9%	36	Bypass flow goes to BEL-4.
BEL-3 (Inlet 2-2)	B3	6.76	14.4	0.56	6.0	3.76	22.6	29.0	29.0	0.0	95.6	3.2%	36	Takes bypass from BEL-1.
BEL-4 (Inlet 1-2)	B4	1.75	7.9	0.84	7.7	1.46	11.2	13.6	13.6	0.0	110.8	2.9%	36	Takes bypass from BEL-2.
BEL-5	B5	4.55	11.0	0.83	6.8	3.76	25.5	-	-	-	-	-	-	
BEL-6	B6	3.95	7.4	0.80	7.9	3.17	24.9	-	-	-	-	-	-	

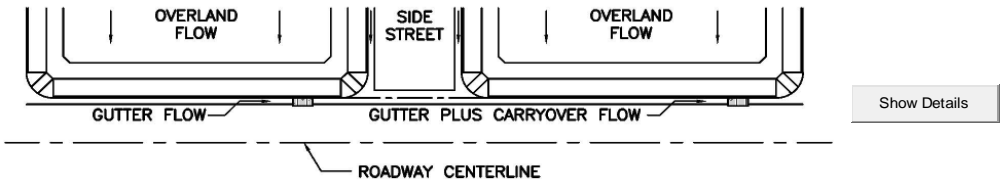
## **APPENDIX C**

### Hydraulic Analysis

- Inlet Capacity Calculations
- StormCAD Storm Sewer Design
  - 2-Year Storm Table and Profiles
  - 5-Year Storm Table and Profiles
  - 100-Year Storm Table and Profiles
- Swale Calculations
- Water Quality Structure Cut Sheets & Calculations

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 1-1

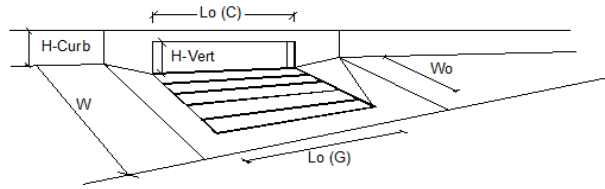


<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td align="center" style="padding: 2px;">4.1</td> <td align="center" style="padding: 2px;">8.9</td> </tr> </table> cfs	Minor Storm	Major Storm	4.1	8.9	<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---												
Minor Storm	Major Storm																		
4.1	8.9																		
* If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.																			
<b>Geographic Information:</b> (Enter data in the blue cells):																			
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Subcatchment Area = <input type="text"/> Acres Percent Imperviousness = <input type="text"/> % NRCS Soil Type = <input type="text"/> A, B, C, or D																	
		Slope (ft/ft)    Length (ft) Overland Flow = <input type="text"/> <input type="text"/> Channel Flow = <input type="text"/> <input type="text"/>																	
<b>Rainfall Information:</b> Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c)^{C_3}$		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="padding: 2px;">Design Storm Return Period, <math>T_r</math> =</td> <td style="padding: 2px;">years</td> </tr> <tr> <td style="padding: 2px;">Return Period One-Hour Precipitation, <math>P_1</math> =</td> <td style="padding: 2px;">inches</td> </tr> <tr> <td style="padding: 2px;"><math>C_1</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"><math>C_2</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"><math>C_3</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), <math>C_5</math> =</td> <td style="padding: 2px;"></td> </tr> </table>	Minor Storm	Major Storm	Design Storm Return Period, $T_r$ =	years	Return Period One-Hour Precipitation, $P_1$ =	inches	$C_1$ =		$C_2$ =		$C_3$ =		User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =		User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ =		
Minor Storm	Major Storm																		
Design Storm Return Period, $T_r$ =	years																		
Return Period One-Hour Precipitation, $P_1$ =	inches																		
$C_1$ =																			
$C_2$ =																			
$C_3$ =																			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =																			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ =																			
		Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ = <input type="text"/> 0.0 <input type="text"/> 0.0    cfs																	
		Total Design Peak Flow, Q = <input type="text"/> 4.1 <input type="text"/> 8.9    cfs																	



**INLET ON A CONTINUOUS GRADE**

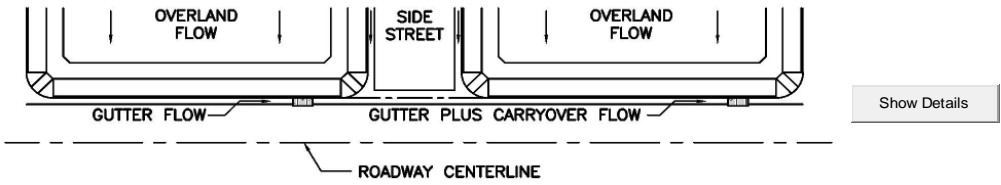
Project: COMPARK SOUTH  
 Inlet ID: INLET 1-1



Design Information (Input)	MINOR		MAJOR		
	MINOR	MAJOR	MINOR	MAJOR	
Type of Inlet	Type = CDOT Type R Curb Opening				
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{LOCAL} = 3.0$	$3.0$			inches
Total Number of Units in the Inlet (Grate or Curb Opening)	$No = 2$	$2$			
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_G = 5.00$	$5.00$			ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	$W_G = N/A$	$N/A$			ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G = N/A$	$N/A$			
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C = 0.10$	$0.10$			
<b>Street Hydraulics: OK - <math>Q &lt;</math> maximum allowable from sheet 'Q-Allow'</b>					
Total Inlet Interception Capacity	$Q = 3.98$	$6.47$			cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b = 0.1$	$2.4$			cfs
Capture Percentage = $Q_g/Q_o =$	$C\% = 97$	$73$			%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
Inlet ID: INLET 1-2



<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		Minor Storm	Major Storm	
		*Q <sub>known</sub> =	5.2	11.2
				cfs
* If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.				
<b>Geographic Information:</b> (Enter data in the blue cells):				
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban		Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median		
		Subcatchment Area =		Acres
		Percent Imperviousness =		%
		NRCS Soil Type =		A, B, C, or D
		Slope (ft/ft)	Length (ft)	
		Overland Flow =		
		Channel Flow =		
<b>Rainfall Information:</b> Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c)^{C_3}$		Minor Storm	Major Storm	
Design Storm Return Period, T <sub>r</sub> =				years
Return Period One-Hour Precipitation, P <sub>1</sub> =				inches
C <sub>1</sub> =				
C <sub>2</sub> =				
C <sub>3</sub> =				
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =				
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C <sub>5</sub> =				
Bypass (Carry-Over) Flow from upstream Subcatchments, Q <sub>b</sub> =		0.0	2.4	cfs
Total Design Peak Flow, Q =		5.2	13.6	cfs

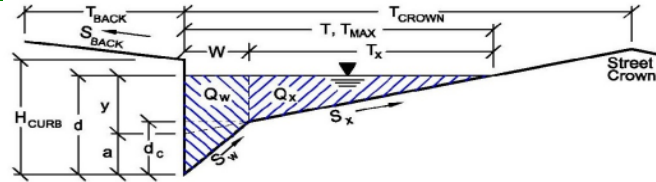
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FILL IN THIS SECTION  
OR...  
FILL IN THE  
SECTIONS BELOW.  
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## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:  
Inlet ID:

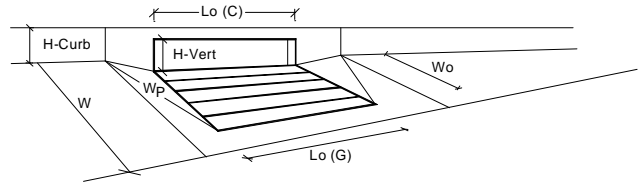
**COMPARK SOUTH**  
**INLET 1-2**



<b>Gutter Geometry (Enter data in the blue cells)</b>					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = $ <input style="width: 50px;" type="text" value="17.5"/> ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/>				
Height of Curb at Gutter Flow Line	$H_{CURB} = $ <input style="width: 50px;" type="text" value="6.00"/> inches				
Distance from Curb Face to Street Crown	$T_{CROWN} = $ <input style="width: 50px;" type="text" value="37.0"/> ft				
Gutter Width	$W = $ <input style="width: 50px;" type="text" value="2.00"/> ft				
Street Transverse Slope	$S_x = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft				
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = $ <input style="width: 50px;" type="text" value="0.083"/> ft/ft				
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = $ <input style="width: 50px;" type="text" value="0.000"/> ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = $ <input style="width: 50px;" type="text" value="0.013"/>				
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><math>T_{MAX} = </math> <input style="width: 50px;" type="text" value="20.0"/></td> <td style="text-align: center;"><math>T_{MAX} = </math> <input style="width: 50px;" type="text" value="37.0"/></td> </tr> </tbody> </table> ft	Minor Storm	Major Storm	$T_{MAX} = $ <input style="width: 50px;" type="text" value="20.0"/>	$T_{MAX} = $ <input style="width: 50px;" type="text" value="37.0"/>
Minor Storm	Major Storm				
$T_{MAX} = $ <input style="width: 50px;" type="text" value="20.0"/>	$T_{MAX} = $ <input style="width: 50px;" type="text" value="37.0"/>				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><math>d_{MAX} = </math> <input style="width: 50px;" type="text" value="6.0"/></td> <td style="text-align: center;"><math>d_{MAX} = </math> <input style="width: 50px;" type="text" value="12.0"/></td> </tr> </tbody> </table> inches	Minor Storm	Major Storm	$d_{MAX} = $ <input style="width: 50px;" type="text" value="6.0"/>	$d_{MAX} = $ <input style="width: 50px;" type="text" value="12.0"/>
Minor Storm	Major Storm				
$d_{MAX} = $ <input style="width: 50px;" type="text" value="6.0"/>	$d_{MAX} = $ <input style="width: 50px;" type="text" value="12.0"/>				
Allow Flow Depth at Street Crown (leave blank for no)	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </tbody> </table> check = yes	Minor Storm	Major Storm	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Minor Storm	Major Storm				
<input type="checkbox"/>	<input checked="" type="checkbox"/>				
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>					
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>					
<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><math>Q_{allow} = </math> <input style="width: 50px;" type="text" value="SUMP"/></td> <td style="text-align: center;"><math>Q_{allow} = </math> <input style="width: 50px;" type="text" value="SUMP"/></td> </tr> </tbody> </table> cfs		Minor Storm	Major Storm	$Q_{allow} = $ <input style="width: 50px;" type="text" value="SUMP"/>	$Q_{allow} = $ <input style="width: 50px;" type="text" value="SUMP"/>
Minor Storm	Major Storm				
$Q_{allow} = $ <input style="width: 50px;" type="text" value="SUMP"/>	$Q_{allow} = $ <input style="width: 50px;" type="text" value="SUMP"/>				
<b>Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'</b> <b>Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'</b>					

**INLET IN A SUMP OR SAG LOCATION**

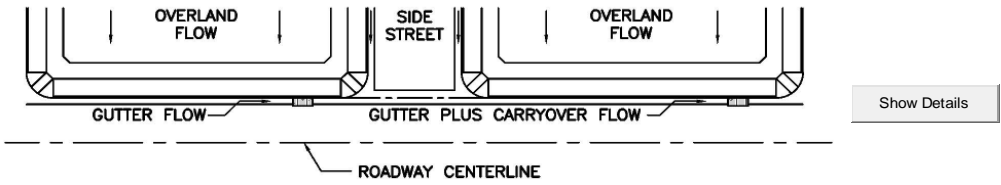
Project = **COMPARK SOUTH**  
 Inlet ID = **INLET 1-2**



Design Information (Input)	MINOR		MAJOR	
	Type of Inlet	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a <sub>local</sub> =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	10.4	inches
<b>Grate Information</b>				<input type="checkbox"/> Override Depths
Length of a Unit Grate	L <sub>o</sub> (G) =	N/A	N/A	feet
Width of a Unit Grate	W <sub>o</sub> =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A <sub>ratio</sub> =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C <sub>r</sub> (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C <sub>w</sub> (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C <sub>o</sub> (G) =	N/A	N/A	
<b>Curb Opening Information</b>				
Length of a Unit Curb Opening	L <sub>o</sub> (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H <sub>vert</sub> =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H <sub>throat</sub> =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W <sub>p</sub> =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C <sub>r</sub> (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C <sub>w</sub> (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C <sub>o</sub> (C) =	0.67	0.67	
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>				
<b>Inlet Capacity IS GOOD for Minor and Major Storms (&gt;Q PEAK)</b>	Q <sub>a</sub> =	10.5	23.8	cfs
	Q <sub>PEAK REQUIRED</sub> =	5.2	13.6	cfs

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
Inlet ID: INLET 1-3

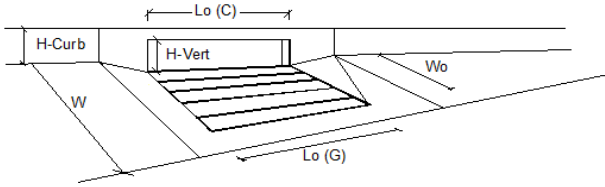


<p><b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):</p> <p><b>*Q<sub>known</sub></b> = <table border="1" style="display: inline-table;"><tr><td style="width: 50px;">Minor Storm</td><td style="width: 50px;">Major Storm</td></tr><tr><td style="text-align: center;">5.5</td><td style="text-align: center;">20.2</td></tr></table> cfs</p> <p><b>* If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.</b></p>		Minor Storm	Major Storm	5.5	20.2	<p>&lt;--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. &lt;---</p>				
Minor Storm	Major Storm									
5.5	20.2									
<p><b>Geographic Information:</b> (Enter data in the blue cells):</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Site Type:</p> <p><input type="radio"/> Site is Urban</p> <p><input type="radio"/> Site is Non-Urban</p> </div> <div style="width: 30%;"> <p>Flows Developed For:</p> <p><input type="radio"/> Street Inlets</p> <p><input type="radio"/> Area Inlets in a Median</p> </div> <div style="width: 30%;"> <p>Subcatchment Area = <input type="text"/> Acres</p> <p>Percent Imperviousness = <input type="text"/> %</p> <p>NRCS Soil Type = <input type="text"/> A, B, C, or D</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p>Slope (ft/ft)    Length (ft)</p> <p>Overland Flow = <input type="text"/>    <input type="text"/></p> <p>Channel Flow = <input type="text"/>    <input type="text"/></p> </div> </div>										
<p><b>Rainfall Information:</b> Intensity I (inch/hr) = <math>C_1 * P_1 / (C_2 + T_c)^{C_3}</math></p> <p>Design Storm Return Period, T<sub>r</sub> = <input type="text"/> years</p> <p>Return Period One-Hour Precipitation, P<sub>1</sub> = <input type="text"/> inches</p> <p>C<sub>1</sub> = <input type="text"/></p> <p>C<sub>2</sub> = <input type="text"/></p> <p>C<sub>3</sub> = <input type="text"/></p> <p>User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = <input type="text"/></p> <p>User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C<sub>5</sub> = <input type="text"/></p> <p>Bypass (Carry-Over) Flow from upstream Subcatchments, Q<sub>b</sub> = <table border="1" style="display: inline-table;"><tr><td style="width: 50px;">Minor Storm</td><td style="width: 50px;">Major Storm</td></tr><tr><td style="text-align: center;">0.0</td><td style="text-align: center;">0.0</td></tr></table> cfs</p> <p style="text-align: right;">Total Design Peak Flow, Q = <table border="1" style="display: inline-table;"><tr><td style="width: 50px;">Minor Storm</td><td style="width: 50px;">Major Storm</td></tr><tr><td style="text-align: center;">5.5</td><td style="text-align: center;">20.2</td></tr></table> cfs</p>		Minor Storm	Major Storm	0.0	0.0	Minor Storm	Major Storm	5.5	20.2	
Minor Storm	Major Storm									
0.0	0.0									
Minor Storm	Major Storm									
5.5	20.2									



**INLET ON A CONTINUOUS GRADE**

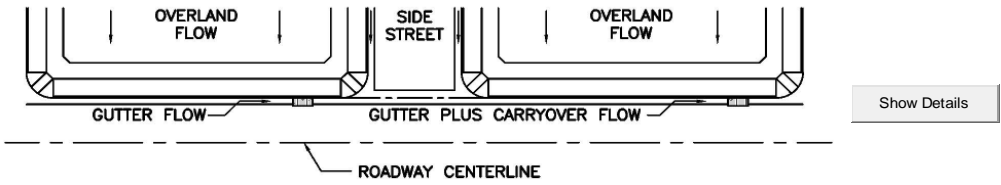
Project: COMPARK SOUTH  
 Inlet ID: INLET 1-3



Design Information (Input)	MINOR		MAJOR	
	Type of Inlet	Type = CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{LOCAL} =$	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	$N_o =$	3	3	
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_o =$	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	$W_o =$	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G =$	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C =$	0.10	0.10	
<b>Street Hydraulics: OK - <math>Q &lt;</math> maximum allowable from sheet 'Q-Allow'</b>				
Total Inlet Interception Capacity	$Q =$	5.50	13.47	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b =$	0.0	6.7	cfs
Capture Percentage = $Q_i/Q_o =$	$C\% =$	100	67	%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 1-4



<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		Minor Storm	Major Storm	
		*Q <sub>known</sub> =	2.4	5.9
				cfs
* If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.				
<b>Geographic Information:</b> (Enter data in the blue cells):				
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban		Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median		
		Subcatchment Area =		Acres
		Percent Imperviousness =		%
		NRCS Soil Type =		A, B, C, or D
		Slope (ft/ft)	Length (ft)	
		Overland Flow =		
		Channel Flow =		
<b>Rainfall Information:</b> Intensity I (inch/hr) = C <sub>1</sub> * P <sub>1</sub> / (C <sub>2</sub> + I <sub>c</sub> ) <sup>C<sub>3</sub></sup>		Minor Storm	Major Storm	
Design Storm Return Period, T <sub>r</sub> =				years
Return Period One-Hour Precipitation, P <sub>1</sub> =				inches
C <sub>1</sub> =				
C <sub>2</sub> =				
C <sub>3</sub> =				
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =				
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C <sub>5</sub> =				
Bypass (Carry-Over) Flow from upstream Subcatchments, Q <sub>b</sub> =		0.0	6.7	cfs
Total Design Peak Flow, Q =		2.4	12.6	cfs

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 FILL IN THIS SECTION  
 OR...  
 FILL IN THE  
 SECTIONS BELOW.  
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## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

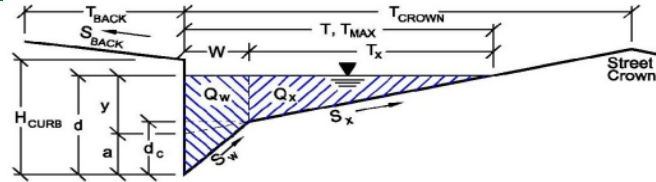
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

COMPARK SOUTH

Inlet ID:

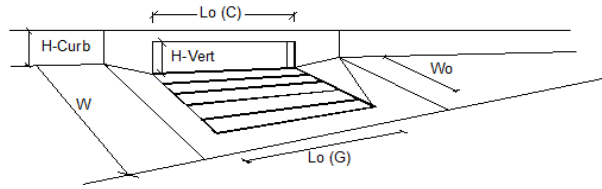
INLET 1-4



<b>Gutter Geometry (Enter data in the blue cells)</b>					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} =$ <input style="width: 50px;" type="text" value="17.5"/> ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} =$ <input style="width: 50px;" type="text" value="0.020"/> ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} =$ <input style="width: 50px;" type="text" value="0.020"/>				
Height of Curb at Gutter Flow Line	$H_{CURB} =$ <input style="width: 50px;" type="text" value="6.00"/> inches				
Distance from Curb Face to Street Crown	$T_{CROWN} =$ <input style="width: 50px;" type="text" value="37.0"/> ft				
Gutter Width	$W =$ <input style="width: 50px;" type="text" value="2.00"/> ft				
Street Transverse Slope	$S_x =$ <input style="width: 50px;" type="text" value="0.020"/> ft/ft				
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w =$ <input style="width: 50px;" type="text" value="0.083"/> ft/ft				
Street Longitudinal Slope - Enter 0 for sump condition	$S_o =$ <input style="width: 50px;" type="text" value="0.019"/> ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} =$ <input style="width: 50px;" type="text" value="0.013"/>				
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><math>T_{MAX} =</math> <input style="width: 50px;" type="text" value="20.0"/></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="37.0"/></td> </tr> </tbody> </table> ft	Minor Storm	Major Storm	$T_{MAX} =$ <input style="width: 50px;" type="text" value="20.0"/>	<input style="width: 50px;" type="text" value="37.0"/>
Minor Storm	Major Storm				
$T_{MAX} =$ <input style="width: 50px;" type="text" value="20.0"/>	<input style="width: 50px;" type="text" value="37.0"/>				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><math>d_{MAX} =</math> <input style="width: 50px;" type="text" value="6.0"/></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="12.0"/></td> </tr> </tbody> </table> inches	Minor Storm	Major Storm	$d_{MAX} =$ <input style="width: 50px;" type="text" value="6.0"/>	<input style="width: 50px;" type="text" value="12.0"/>
Minor Storm	Major Storm				
$d_{MAX} =$ <input style="width: 50px;" type="text" value="6.0"/>	<input style="width: 50px;" type="text" value="12.0"/>				
Allow Flow Depth at Street Crown (leave blank for no)	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tbody> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>check = yes</td> </tr> </tbody> </table>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	check = yes	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	check = yes			
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>					
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>					
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'	$Q_{allow} =$ <table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><input style="width: 50px;" type="text" value="23.4"/></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="207.0"/></td> </tr> </tbody> </table> cfs	Minor Storm	Major Storm	<input style="width: 50px;" type="text" value="23.4"/>	<input style="width: 50px;" type="text" value="207.0"/>
Minor Storm	Major Storm				
<input style="width: 50px;" type="text" value="23.4"/>	<input style="width: 50px;" type="text" value="207.0"/>				
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'					

**INLET ON A CONTINUOUS GRADE**

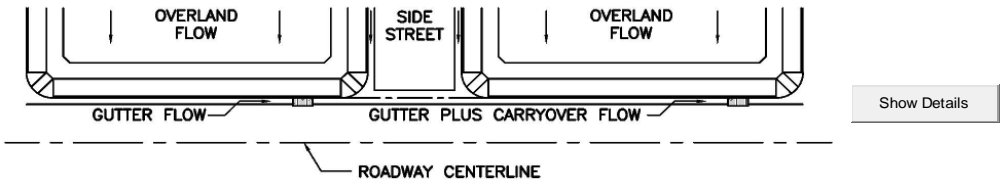
Project: COMPARK SOUTH  
 Inlet ID: INLET 1-4



Design Information (Input)	MINOR		MAJOR		
	Type = CDOT Type R Curb Opening				
Type of Inlet	CDOT Type R Curb Opening				
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{LOCAL} =$	3.0	3.0		inches
Total Number of Units in the Inlet (Grate or Curb Opening)	$N_o =$	2	2		
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_o =$	5.00	5.00		ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	$W_o =$	N/A	N/A		ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G =$	N/A	N/A		
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C =$	0.10	0.10		
<b>Street Hydraulics: OK - <math>Q &lt;</math> maximum allowable from sheet 'Q-Allow'</b>					
Total Inlet Interception Capacity	$Q =$	2.40	7.70		cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b =$	0.0	4.9		cfs
Capture Percentage = $Q_i/Q_o =$	$C\% =$	100	61		%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 1-5



<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		Minor Storm	Major Storm
* <b>If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.</b>		5.1	11.0
<b>Geographic Information:</b> (Enter data in the blue cells):			
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Subcatchment Area = <input type="text"/> Acres Percent Imperviousness = <input type="text"/> % NRCS Soil Type = <input type="text"/> A, B, C, or D	
		Slope (ft/ft)	Length (ft)
		Overland Flow = <input type="text"/>	<input type="text"/>
		Channel Flow = <input type="text"/>	<input type="text"/>
<b>Rainfall Information:</b> Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + I_c)^{C_3}$		Minor Storm	Major Storm
Design Storm Return Period, $T_r$ = <input type="text"/> years			
Return Period One-Hour Precipitation, $P_1$ = <input type="text"/> inches			
$C_1$ = <input type="text"/>			
$C_2$ = <input type="text"/>			
$C_3$ = <input type="text"/>			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), $C$ = <input type="text"/>			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = <input type="text"/>			
Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ = <input type="text"/>		0.0	4.1
Total Design Peak Flow, $Q$ = <input type="text"/>		5.1	15.1

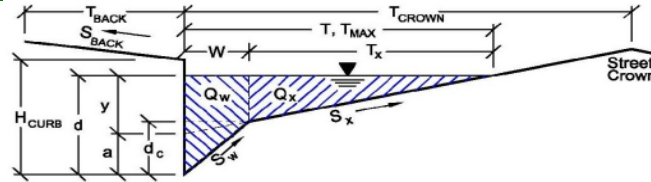
<---  
 FILL IN THIS SECTION  
 OR...  
 FILL IN THE  
 SECTIONS BELOW.  
 <---

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:  
Inlet ID:

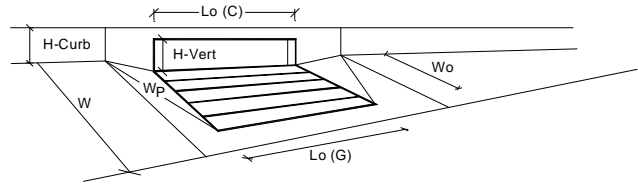
**COMPARK SOUTH**  
**INLET 1-5**



<b>Gutter Geometry (Enter data in the blue cells)</b>																	
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = $ <input style="width: 50px;" type="text" value="17.5"/> ft																
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft																
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/>																
Height of Curb at Gutter Flow Line	$H_{CURB} = $ <input style="width: 50px;" type="text" value="6.00"/> inches																
Distance from Curb Face to Street Crown	$T_{CROWN} = $ <input style="width: 50px;" type="text" value="37.0"/> ft																
Gutter Width	$W = $ <input style="width: 50px;" type="text" value="2.00"/> ft																
Street Transverse Slope	$S_x = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft																
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = $ <input style="width: 50px;" type="text" value="0.083"/> ft/ft																
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = $ <input style="width: 50px;" type="text" value="0.000"/> ft/ft																
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = $ <input style="width: 50px;" type="text" value="0.013"/>																
Max. Allowable Spread for Minor & Major Storm	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 25%; text-align: center;">Minor Storm</th> <th style="width: 25%; text-align: center;">Major Storm</th> <th></th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} = </math></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="20.0"/></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="37.0"/></td> <td>ft</td> </tr> <tr> <td><math>d_{MAX} = </math></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="6.0"/></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="12.0"/></td> <td>inches</td> </tr> <tr> <td></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>check = yes</td> </tr> </tbody> </table>		Minor Storm	Major Storm		$T_{MAX} = $	<input style="width: 50px;" type="text" value="20.0"/>	<input style="width: 50px;" type="text" value="37.0"/>	ft	$d_{MAX} = $	<input style="width: 50px;" type="text" value="6.0"/>	<input style="width: 50px;" type="text" value="12.0"/>	inches		<input type="checkbox"/>	<input checked="" type="checkbox"/>	check = yes
	Minor Storm	Major Storm															
$T_{MAX} = $	<input style="width: 50px;" type="text" value="20.0"/>	<input style="width: 50px;" type="text" value="37.0"/>	ft														
$d_{MAX} = $	<input style="width: 50px;" type="text" value="6.0"/>	<input style="width: 50px;" type="text" value="12.0"/>	inches														
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<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>																	
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Minor storm max. allowable capacity <b>GOOD</b> - greater than flow given on sheet 'Q-Peak'																	
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$Q_{allow} = $	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 25%; text-align: center;">Minor Storm</th> <th style="width: 25%; text-align: center;">Major Storm</th> <th></th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="SUMP"/></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="SUMP"/></td> <td>cfs</td> </tr> </tbody> </table>		Minor Storm	Major Storm			<input style="width: 50px;" type="text" value="SUMP"/>	<input style="width: 50px;" type="text" value="SUMP"/>	cfs								
	Minor Storm	Major Storm															
	<input style="width: 50px;" type="text" value="SUMP"/>	<input style="width: 50px;" type="text" value="SUMP"/>	cfs														

**INLET IN A SUMP OR SAG LOCATION**

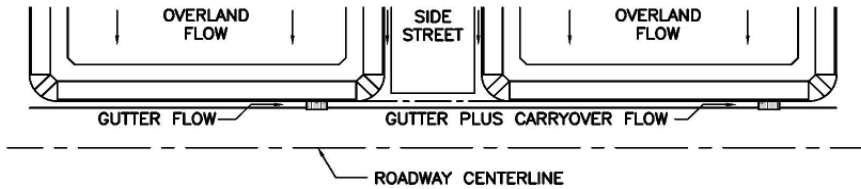
Project = **COMPARK SOUTH**  
 Inlet ID = **INLET 1-5**



Design Information (Input)	MINOR		MAJOR	
	Type of Inlet	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{local} = 3.00$	$3.00$	inches	
Number of Unit Inlets (Grate or Curb Opening)	$N_o = 2$	$2$		
Water Depth at Flowline (outside of local depression)	Ponding Depth = $6.0$		$10.4$ inches <input type="checkbox"/> Override Depths	
<b>Grate Information</b>	MINOR		MAJOR	
Length of a Unit Grate	$L_o (G) = N/A$	$N/A$	feet	
Width of a Unit Grate	$W_o = N/A$	$N/A$	feet	
Area Opening Ratio for a Grate (typical values 0.15-0.90)	$A_{ratio} = N/A$	$N/A$		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	$C_r (G) = N/A$	$N/A$		
Grate Weir Coefficient (typical value 2.15 - 3.60)	$C_w (G) = N/A$	$N/A$		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	$C_o (G) = N/A$	$N/A$		
<b>Curb Opening Information</b>	MINOR		MAJOR	
Length of a Unit Curb Opening	$L_o (C) = 5.00$	$5.00$	feet	
Height of Vertical Curb Opening in Inches	$H_{vert} = 6.00$	$6.00$	inches	
Height of Curb Orifice Throat in Inches	$H_{throat} = 6.00$	$6.00$	inches	
Angle of Throat (see USDCM Figure ST-5)	$\theta = 63.40$	$63.40$	degrees	
Side Width for Depression Pan (typically the gutter width of 2 feet)	$W_p = 2.00$	$2.00$	feet	
Clogging Factor for a Single Curb Opening (typical value 0.10)	$C_r (C) = 0.10$	$0.10$		
Curb Opening Weir Coefficient (typical value 2.3-3.7)	$C_w (C) = 3.60$	$3.60$		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	$C_o (C) = 0.67$	$0.67$		
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>	MINOR		MAJOR	
	$Q_a = 10.5$	$23.8$	cfs	
<b>Inlet Capacity IS GOOD for Minor and Major Storms (&gt;Q PEAK)</b>	$Q_{PEAK REQUIRED} = 5.1$		$15.1$ cfs	

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 1-6



Show Details

<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="text-align: center; padding: 2px;">3.0</td> <td style="text-align: center; padding: 2px;">6.5</td> </tr> </table> cfs	Minor Storm	Major Storm	3.0	6.5	<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---																
Minor Storm	Major Storm																						
3.0	6.5																						
* If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.																							
<b>Geographic Information:</b> (Enter data in the blue cells):																							
Site Type: <div style="display: flex; gap: 10px;"> <input type="radio"/> Site is Urban  <input type="radio"/> Site is Non-Urban                 </div>	Flows Developed For: <div style="display: flex; gap: 10px;"> <input type="radio"/> Street Inlets  <input type="radio"/> Area Inlets in a Median                 </div>	Subcatchment Area = <input type="text"/> Acres Percent Imperviousness = <input type="text"/> % NRCS Soil Type = <input type="text"/> A, B, C, or D																					
		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Slope (ft/ft)</td> <td style="padding: 2px;">Length (ft)</td> </tr> <tr> <td style="padding: 2px;">Overland Flow =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Channel Flow =</td> <td style="padding: 2px;"></td> </tr> </table>	Slope (ft/ft)	Length (ft)	Overland Flow =		Channel Flow =																
Slope (ft/ft)	Length (ft)																						
Overland Flow =																							
Channel Flow =																							
<b>Rainfall Information:</b> Intensity $I$ (inch/hr) = $C_1 * P_1 / (C_2 + T_c) ^{C_3}$																							
		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="padding: 2px;">Design Storm Return Period, <math>T_r</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Return Period One-Hour Precipitation, <math>P_1</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"><math>C_1</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"><math>C_2</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"><math>C_3</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), <math>C</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), <math>C_5</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Bypass (Carry-Over) Flow from upstream Subcatchments, <math>Q_b</math> =</td> <td style="padding: 2px;">0.0      4.9</td> </tr> <tr> <td style="padding: 2px;">Total Design Peak Flow, <math>Q</math> =</td> <td style="padding: 2px;">3.0      11.4</td> </tr> </table>	Minor Storm	Major Storm	Design Storm Return Period, $T_r$ =		Return Period One-Hour Precipitation, $P_1$ =		$C_1$ =		$C_2$ =		$C_3$ =		User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), $C$ =		User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ =		Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ =	0.0      4.9	Total Design Peak Flow, $Q$ =	3.0      11.4	
Minor Storm	Major Storm																						
Design Storm Return Period, $T_r$ =																							
Return Period One-Hour Precipitation, $P_1$ =																							
$C_1$ =																							
$C_2$ =																							
$C_3$ =																							
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), $C$ =																							
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ =																							
Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ =	0.0      4.9																						
Total Design Peak Flow, $Q$ =	3.0      11.4																						

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

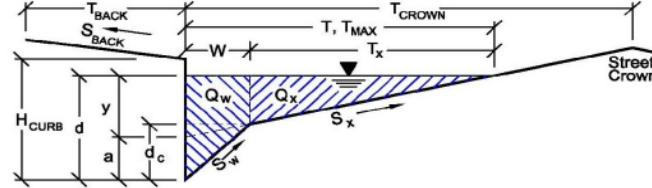
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

**COMPARK SOUTH**

Inlet ID:

**INLET 1-6**



**Gutter Geometry (Enter data in the blue cells)**

Maximum Allowable Width for Spread Behind Curb  
 Side Slope Behind Curb (leave blank for no conveyance credit behind curb)  
 Manning's Roughness Behind Curb (typically between 0.012 and 0.020)  
 Height of Curb at Gutter Flow Line  
 Distance from Curb Face to Street Crown  
 Gutter Width  
 Street Transverse Slope  
 Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)  
 Street Longitudinal Slope - Enter 0 for sump condition  
 Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} = 17.5$  ft  
 $S_{BACK} = 0.020$  ft/ft  
 $n_{BACK} = 0.020$   
 $H_{CURB} = 6.00$  inches  
 $T_{CROWN} = 37.0$  ft  
 $W = 2.00$  ft  
 $S_x = 0.020$  ft/ft  
 $S_w = 0.083$  ft/ft  
 $S_D = 0.010$  ft/ft  
 $n_{STREET} = 0.013$

Max. Allowable Spread for Minor & Major Storm  
 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm  
 Allow Flow Depth at Street Crown (leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX}$	20.0	37.0	ft
$d_{MAX}$	6.0	12.0	inches
Allow Flow Depth at Street Crown	<input type="checkbox"/>	<input checked="" type="checkbox"/>	check = yes

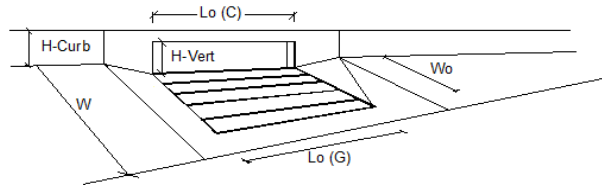
**MINOR STORM Allowable Capacity is based on Depth Criterion**  
**MAJOR STORM Allowable Capacity is based on Depth Criterion**

	Minor Storm	Major Storm	
$Q_{allow}$	16.8	171.1	cfs

**Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**  
**Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

**INLET ON A CONTINUOUS GRADE**

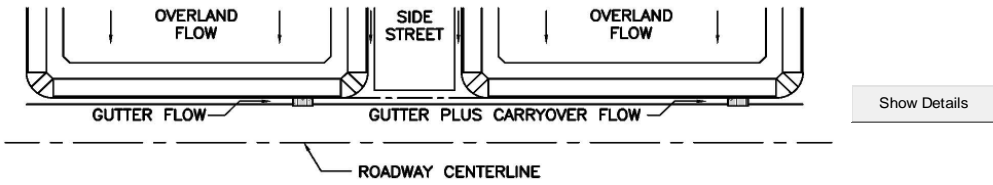
Project: COMPARK SOUTH  
 Inlet ID: INLET 1-6



Design Information (Input)	MINOR		MAJOR		
	MINOR	MAJOR	MINOR	MAJOR	
Type of Inlet	Type = CDOT Type R Curb Opening				
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{LOCAL} = 3.0$	$3.0$			inches
Total Number of Units in the Inlet (Grate or Curb Opening)	$N_o = 2$	$2$			
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_o = 5.00$	$5.00$			ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	$W_o = N/A$	$N/A$			ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G = N/A$	$N/A$			
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C = 0.10$	$0.10$			
<b>Street Hydraulics: OK - <math>Q &lt; Q_{allow}</math> maximum allowable from sheet 'Q-Allow'</b>					
Total Inlet Interception Capacity	$Q = 3.00$	$7.28$			cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b = 0.0$	$4.1$			cfs
Capture Percentage = $Q_i/Q_o =$	$C\% = 100$	$64$			%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 2-1



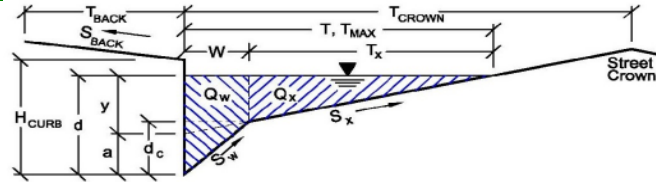
<p><b>Design Flow:</b> ONLY if already determined through other methods:                  (local peak flow for 1/2 of street OR grass-lined channel):</p>		<table border="1" style="display: inline-table;"> <tr> <td style="width: 50px;">Minor Storm</td> <td style="width: 50px;">Major Storm</td> </tr> <tr> <td style="text-align: center;">4.0</td> <td style="text-align: center;">14.7</td> </tr> <tr> <td colspan="2" style="text-align: right;">cfs</td> </tr> </table>	Minor Storm	Major Storm	4.0	14.7	cfs		<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---		
Minor Storm	Major Storm										
4.0	14.7										
cfs											
<p><b>Geographic Information:</b> (Enter data in the blue cells):</p>											
<p>Site Type:</p> <p><input type="radio"/> Site is Urban</p> <p><input type="radio"/> Site is Non-Urban</p>	<p>Flows Developed For:</p> <p><input type="radio"/> Street Inlets</p> <p><input type="radio"/> Area Inlets in a Median</p>	<p>Subcatchment Area = <input type="text"/> Acres</p> <p>Percent Imperviousness = <input type="text"/> %</p> <p>NRCS Soil Type = <input type="text"/> A, B, C, or D</p>									
		<table border="1" style="display: inline-table;"> <tr> <td style="width: 50px;">Slope (ft/ft)</td> <td style="width: 50px;">Length (ft)</td> </tr> <tr> <td style="text-align: center;">Overland Flow = <input type="text"/></td> <td style="text-align: center;">Channel Flow = <input type="text"/></td> </tr> </table>	Slope (ft/ft)	Length (ft)	Overland Flow = <input type="text"/>	Channel Flow = <input type="text"/>					
Slope (ft/ft)	Length (ft)										
Overland Flow = <input type="text"/>	Channel Flow = <input type="text"/>										
<p><b>Rainfall Information:</b> Intensity I (inch/hr) = <math>C_1 * P_1 / (C_2 + T_c)^{C_3}</math></p>		<table border="1" style="display: inline-table;"> <tr> <td style="width: 50px;">Minor Storm</td> <td style="width: 50px;">Major Storm</td> </tr> <tr> <td style="text-align: center;">0.0</td> <td style="text-align: center;">0.0</td> </tr> <tr> <td colspan="2" style="text-align: right;">cfs</td> </tr> </table>	Minor Storm	Major Storm	0.0	0.0	cfs				
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4.0	14.7										
cfs											

**ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)**

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **COMPARK SOUTH**

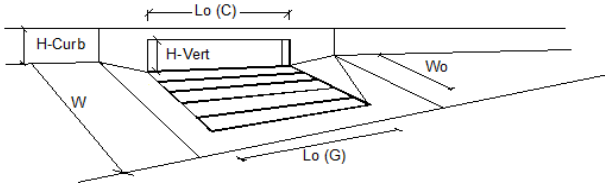
Inlet ID: **INLET 2-1**



Gutter Geometry (Enter data in the blue cells)							
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 17.5$ ft						
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft						
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.020$						
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches						
Distance from Curb Face to Street Crown	$T_{CROWN} = 37.0$ ft						
Gutter Width	$W = 2.00$ ft						
Street Transverse Slope	$S_x = 0.020$ ft/ft						
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = 0.083$ ft/ft						
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = 0.019$ ft/ft						
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.013$						
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th></th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} = 20.0</math></td> <td><math>T_{MAX} = 37.0</math></td> <td>ft</td> </tr> </tbody> </table>	Minor Storm	Major Storm		$T_{MAX} = 20.0$	$T_{MAX} = 37.0$	ft
Minor Storm	Major Storm						
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Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th></th> </tr> </thead> <tbody> <tr> <td><math>d_{MAX} = 6.0</math></td> <td><math>d_{MAX} = 12.0</math></td> <td>inches</td> </tr> </tbody> </table>	Minor Storm	Major Storm		$d_{MAX} = 6.0$	$d_{MAX} = 12.0$	inches
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$d_{MAX} = 6.0$	$d_{MAX} = 12.0$	inches					
Allow Flow Depth at Street Crown (leave blank for no)	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th>check = yes</th> </tr> </thead> <tbody> <tr> <td align="center"><input type="checkbox"/></td> <td align="center"><input checked="" type="checkbox"/></td> <td></td> </tr> </tbody> </table>	Minor Storm	Major Storm	check = yes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Minor Storm	Major Storm	check = yes					
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>							
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>							
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'							
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'							
$Q_{allow} =$	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th>cfs</th> </tr> </thead> <tbody> <tr> <td><math>23.4</math></td> <td><math>207.0</math></td> <td></td> </tr> </tbody> </table>	Minor Storm	Major Storm	cfs	$23.4$	$207.0$	
Minor Storm	Major Storm	cfs					
$23.4$	$207.0$						

**INLET ON A CONTINUOUS GRADE**

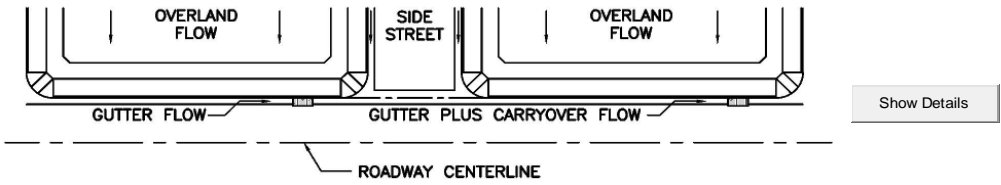
Project: COMPARK SOUTH  
 Inlet ID: INLET 2-1



Design Information (Input)	MINOR		MAJOR	
	Type of Inlet	Type = CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{LOCAL} =$	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	$N_o =$	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_o =$	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	$W_o =$	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G =$	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C =$	0.10	0.10	
<b>Street Hydraulics: OK - Q &lt; maximum allowable from sheet 'Q-Allow'</b>				
Total Inlet Interception Capacity	$Q =$	3.90	8.29	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b =$	0.1	6.4	cfs
Capture Percentage = $Q_i/Q_o =$	$C\% =$	98	56	%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 2-2



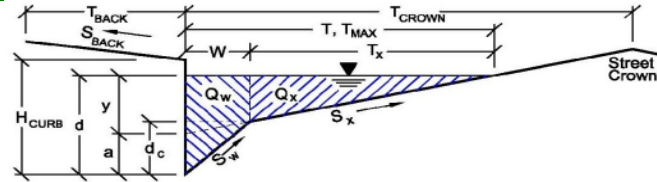
<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		Minor Storm    Major Storm *Q <sub>known</sub> = <input type="text" value="4.2"/> <input type="text" value="22.6"/> cfs	<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---
<b>Geographic Information:</b> (Enter data in the blue cells):		Subcatchment Area = <input type="text"/> Acres Percent Imperviousness = <input type="text"/> % NRCS Soil Type = <input type="text"/> A, B, C, or D	
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Slope (ft/ft)    Length (ft) Overland Flow = <input type="text"/> <input type="text"/> Channel Flow = <input type="text"/> <input type="text"/>	
<b>Rainfall Information:</b> Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + I_c)^{C_3}$		Minor Storm    Major Storm	
		Design Storm Return Period, T <sub>r</sub> = <input type="text"/> years	
		Return Period One-Hour Precipitation, P <sub>1</sub> = <input type="text"/> inches	
		C <sub>1</sub> = <input type="text"/>	
		C <sub>2</sub> = <input type="text"/>	
		C <sub>3</sub> = <input type="text"/>	
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = <input type="text"/>		User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C <sub>5</sub> = <input type="text"/>	
		Bypass (Carry-Over) Flow from upstream Subcatchments, Q <sub>b</sub> = <input type="text" value="0.1"/> <input type="text" value="6.4"/> cfs	
		Total Design Peak Flow, Q = <input type="text" value="4.3"/> <input type="text" value="29.0"/> cfs	

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: COMPARK SOUTH

Inlet ID: INLET 2-2



### Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb

$T_{BACK} = 17.5$  ft

Side Slope Behind Curb (leave blank for no conveyance credit behind curb)

$S_{BACK} = 0.020$  ft/ft

Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

$n_{BACK} = 0.020$

Height of Curb at Gutter Flow Line

$H_{CURB} = 6.00$  inches

Distance from Curb Face to Street Crown

$T_{CROWN} = 37.0$  ft

Gutter Width

$W = 2.00$  ft

Street Transverse Slope

$S_x = 0.020$  ft/ft

Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)

$S_w = 0.083$  ft/ft

Street Longitudinal Slope - Enter 0 for sump condition

$S_o = 0.000$  ft/ft

Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$n_{STREET} = 0.013$

Max. Allowable Spread for Minor & Major Storm

	Minor Storm	Major Storm	
$T_{MAX} =$	20.0	37.0	ft

Max. Allowable Depth at Gutter Flowline for Minor & Major Storm

	Minor Storm	Major Storm	
$d_{MAX} =$	6.0	12.0	inches

Allow Flow Depth at Street Crown (leave blank for no)

check = yes

**MINOR STORM Allowable Capacity is based on Depth Criterion**

**MAJOR STORM Allowable Capacity is based on Depth Criterion**

$Q_{allow} =$ 

Minor Storm	Major Storm
SUMP	SUMP

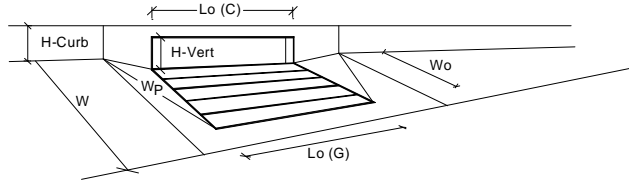
 cfs

**Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

**Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

**INLET IN A SUMP OR SAG LOCATION**

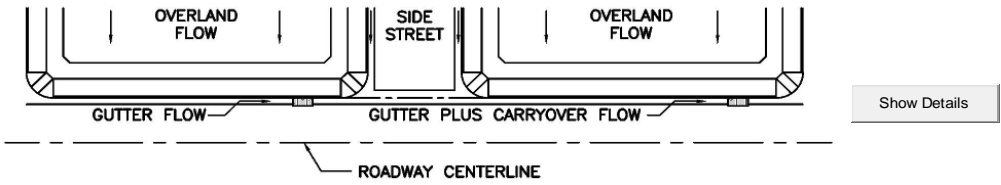
Project = **COMPARK SOUTH**  
 Inlet ID = **INLET 2-2**



<b>Design Information (Input)</b>		MINOR		MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening			
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{local}$ =	3.00	3.00	inches	
Number of Unit Inlets (Grate or Curb Opening)	$N_o$ =	3	3		
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	10.4	inches	<input type="checkbox"/> Override Depths
<b>Grate Information</b>		MINOR		MAJOR	
Length of a Unit Grate	$L_o (G)$ =	N/A	N/A	feet	
Width of a Unit Grate	$W_o$ =	N/A	N/A	feet	
Area Opening Ratio for a Grate (typical values 0.15-0.90)	$A_{ratio}$ =	N/A	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	$C_r (G)$ =	N/A	N/A		
Grate Weir Coefficient (typical value 2.15 - 3.60)	$C_w (G)$ =	N/A	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	$C_o (G)$ =	N/A	N/A		
<b>Curb Opening Information</b>		MINOR		MAJOR	
Length of a Unit Curb Opening	$L_o (C)$ =	5.00	5.00	feet	
Height of Vertical Curb Opening in Inches	$H_{vert}$ =	6.00	6.00	inches	
Height of Curb Orifice Throat in Inches	$H_{throat}$ =	6.00	6.00	inches	
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees	
Side Width for Depression Pan (typically the gutter width of 2 feet)	$W_p$ =	2.00	2.00	feet	
Clogging Factor for a Single Curb Opening (typical value 0.10)	$C_r (C)$ =	0.10	0.10		
Curb Opening Weir Coefficient (typical value 2.3-3.7)	$C_w (C)$ =	3.60	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	$C_o (C)$ =	0.67	0.67		
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>		MINOR		MAJOR	
	$Q_a$ =	13.5	36.4	cfs	
<b>Inlet Capacity IS GOOD for Minor and Major Storms (&gt;Q PEAK)</b>	$Q_{PEAK REQUIRED}$ =	4.3	29.0	cfs	

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
Inlet ID: INLET 2-3



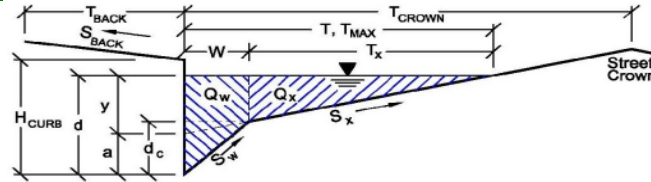
<p><b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):</p> <p><b>*Q<sub>known</sub></b> = <input type="text" value="4.5"/> <input type="text" value="9.9"/> cfs</p> <p><b>* If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.</b></p>		<p>&lt;--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. &lt;---</p>
<p><b>Geographic Information:</b> (Enter data in the blue cells):</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Site Type:</p> <p><input type="radio"/> Site is Urban</p> <p><input type="radio"/> Site is Non-Urban</p> </div> <div style="width: 30%;"> <p>Flows Developed For:</p> <p><input type="radio"/> Street Inlets</p> <p><input type="radio"/> Area Inlets in a Median</p> </div> <div style="width: 30%;"> <p>Subcatchment Area = <input type="text"/> Acres</p> <p>Percent Imperviousness = <input type="text"/> %</p> <p>NRCS Soil Type = <input type="text"/> A, B, C, or D</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p>Slope (ft/ft)    Length (ft)</p> <p>Overland Flow = <input type="text"/> <input type="text"/></p> <p>Channel Flow = <input type="text"/> <input type="text"/></p> </div> </div>		
<p><b>Rainfall Information:</b> Intensity I (inch/hr) = <math>C_1 * P_1 / (C_2 + T_c)^{C_3}</math></p> <p>Design Storm Return Period, T<sub>r</sub> = <input type="text"/> years</p> <p>Return Period One-Hour Precipitation, P<sub>1</sub> = <input type="text"/> inches</p> <p>C<sub>1</sub> = <input type="text"/></p> <p>C<sub>2</sub> = <input type="text"/></p> <p>C<sub>3</sub> = <input type="text"/></p> <p>User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = <input type="text"/></p> <p>User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C<sub>5</sub> = <input type="text"/></p> <p>Bypass (Carry-Over) Flow from upstream Subcatchments, Q<sub>b</sub> = <input type="text" value="0.0"/> <input type="text" value="0.0"/> cfs</p> <p style="text-align: right;"><b>Total Design Peak Flow, Q</b> = <input type="text" value="4.5"/> <input type="text" value="9.9"/> cfs</p>		

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:  
Inlet ID:

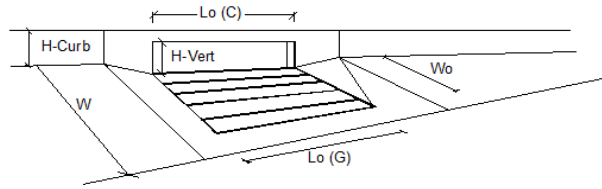
**COMPARK SOUTH**  
**INLET 2-3**



Gutter Geometry (Enter data in the blue cells)					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 17.5$ ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.013$				
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches				
Distance from Curb Face to Street Crown	$T_{CROWN} = 37.0$ ft				
Gutter Width	$W = 2.00$ ft				
Street Transverse Slope	$S_x = 0.020$ ft/ft				
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = 0.083$ ft/ft				
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = 0.015$ ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.013$				
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} = 20.0</math></td> <td><math>T_{MAX} = 37.0</math></td> </tr> </tbody> </table> ft	Minor Storm	Major Storm	$T_{MAX} = 20.0$	$T_{MAX} = 37.0$
Minor Storm	Major Storm				
$T_{MAX} = 20.0$	$T_{MAX} = 37.0$				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>d_{MAX} = 6.0</math></td> <td><math>d_{MAX} = 12.0</math></td> </tr> </tbody> </table> inches	Minor Storm	Major Storm	$d_{MAX} = 6.0$	$d_{MAX} = 12.0$
Minor Storm	Major Storm				
$d_{MAX} = 6.0$	$d_{MAX} = 12.0$				
Allow Flow Depth at Street Crown (leave blank for no)	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </tbody> </table> check = yes	Minor Storm	Major Storm	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Minor Storm	Major Storm				
<input type="checkbox"/>	<input checked="" type="checkbox"/>				
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>					
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>					
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'					
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'					
$Q_{allow} =$	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>20.8</math></td> <td><math>225.6</math></td> </tr> </tbody> </table> cfs	Minor Storm	Major Storm	$20.8$	$225.6$
Minor Storm	Major Storm				
$20.8$	$225.6$				

**INLET ON A CONTINUOUS GRADE**

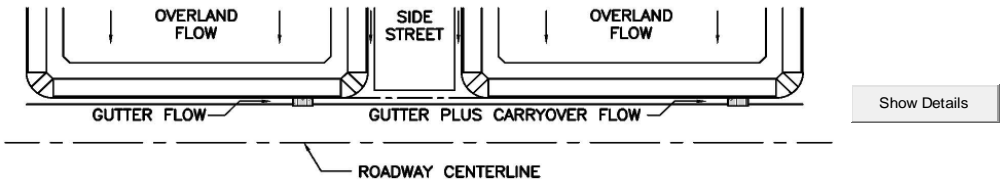
Project: COMPARK SOUTH  
 Inlet ID: INLET 2-3



Design Information (Input)	MINOR		MAJOR		
	MINOR	MAJOR	MINOR	MAJOR	
Type of Inlet	Type = CDOT Type R Curb Opening				
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{LOCAL} = 3.0$	$3.0$			inches
Total Number of Units in the Inlet (Grate or Curb Opening)	$No = 3$	$3$			
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_G = 5.00$	$5.00$			ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	$W_G = N/A$	$N/A$			ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G = N/A$	$N/A$			
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C = 0.10$	$0.10$			
<b>Street Hydraulics: OK - <math>Q &lt; Q_{allow}</math> from sheet 'Q-Allow'</b>					
Total Inlet Interception Capacity	$Q = 4.50$	$8.95$			cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b = 0.0$	$1.0$			cfs
Capture Percentage = $Q_c/Q_o =$	$C\% = 100$	$90$			%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
Inlet ID: INLET 2-4

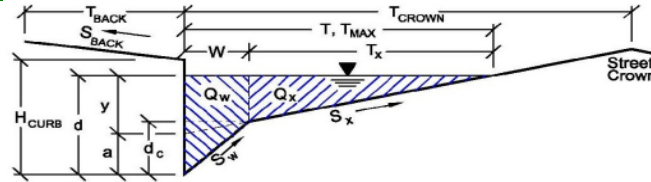


<p><b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):</p> <p><b>*Q<sub>known</sub></b> = <input type="text" value="2.6"/> <input type="text" value="7.5"/> cfs</p> <p><b>* If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.</b></p>		<p>&lt;--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. &lt;---</p>
<p><b>Geographic Information:</b> (Enter data in the blue cells):</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Site Type:</p> <p><input type="radio"/> Site is Urban</p> <p><input type="radio"/> Site is Non-Urban</p> </div> <div style="width: 30%;"> <p>Flows Developed For:</p> <p><input type="radio"/> Street Inlets</p> <p><input type="radio"/> Area Inlets in a Median</p> </div> <div style="width: 30%;"> <p>Subcatchment Area = <input type="text"/> Acres</p> <p>Percent Imperviousness = <input type="text"/> %</p> <p>NRCS Soil Type = <input type="text"/> A, B, C, or D</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p>Slope (ft/ft)    Length (ft)</p> <p>Overland Flow = <input type="text"/> <input type="text"/></p> <p>Channel Flow = <input type="text"/> <input type="text"/></p> </div> </div>		
<p><b>Rainfall Information:</b> Intensity I (inch/hr) = <math>C_1 * P_1 / (C_2 + I_c)^{C_3}</math></p> <p>Design Storm Return Period, T<sub>r</sub> = <input type="text"/> years</p> <p>Return Period One-Hour Precipitation, P<sub>1</sub> = <input type="text"/> inches</p> <p>C<sub>1</sub> = <input type="text"/></p> <p>C<sub>2</sub> = <input type="text"/></p> <p>C<sub>3</sub> = <input type="text"/></p> <p>User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = <input type="text"/></p> <p>User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C<sub>5</sub> = <input type="text"/></p> <p>Bypass (Carry-Over) Flow from upstream Subcatchments, Q<sub>b</sub> = <input type="text" value="0.0"/> <input type="text" value="1.0"/> cfs</p> <p style="text-align: right;"><b>Total Design Peak Flow, Q</b> = <input type="text" value="2.6"/> <input type="text" value="8.5"/> cfs</p>		

**ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)**

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

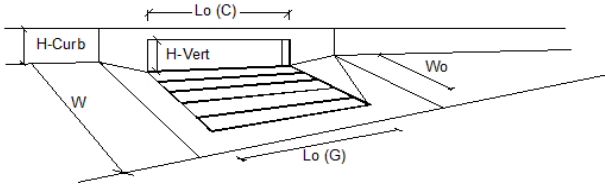
Project: **COMPARK SOUTH**  
 Inlet ID: **INLET 2-4**



Gutter Geometry (Enter data in the blue cells)					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 5.0$ ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.013$				
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches				
Distance from Curb Face to Street Crown	$T_{CROWN} = 37.0$ ft				
Gutter Width	$W = 2.00$ ft				
Street Transverse Slope	$S_x = 0.020$ ft/ft				
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = 0.083$ ft/ft				
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = 0.015$ ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.013$				
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} = 20.0</math></td> <td><math>T_{MAX} = 37.0</math></td> </tr> </tbody> </table>	Minor Storm	Major Storm	$T_{MAX} = 20.0$	$T_{MAX} = 37.0$
Minor Storm	Major Storm				
$T_{MAX} = 20.0$	$T_{MAX} = 37.0$				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>d_{MAX} = 6.0</math></td> <td><math>d_{MAX} = 12.0</math></td> </tr> </tbody> </table>	Minor Storm	Major Storm	$d_{MAX} = 6.0$	$d_{MAX} = 12.0$
Minor Storm	Major Storm				
$d_{MAX} = 6.0$	$d_{MAX} = 12.0$				
Allow Flow Depth at Street Crown (leave blank for no)	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td align="center"><input type="checkbox"/></td> <td align="center"><input checked="" type="checkbox"/></td> </tr> </tbody> </table> check = yes	Minor Storm	Major Storm	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Minor Storm	Major Storm				
<input type="checkbox"/>	<input checked="" type="checkbox"/>				
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>					
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>					
Minor storm max. allowable capacity <b>GOOD</b> - greater than flow given on sheet 'Q-Peak'					
Major storm max. allowable capacity <b>GOOD</b> - greater than flow given on sheet 'Q-Peak'					
$Q_{allow} =$	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>20.8</math></td> <td><math>204.4</math></td> </tr> </tbody> </table> cfs	Minor Storm	Major Storm	$20.8$	$204.4$
Minor Storm	Major Storm				
$20.8$	$204.4$				

**INLET ON A CONTINUOUS GRADE**

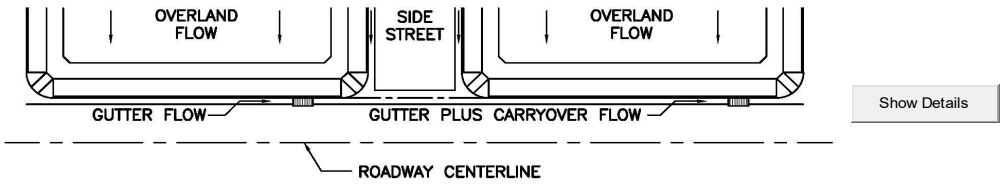
Project: COMPARK SOUTH  
 Inlet ID: INLET 2-4



Design Information (Input)	MINOR		MAJOR		
Type of Inlet	Type = CDOT Type R Curb Opening				
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{LOCAL} =$	3.0	3.0		inches
Total Number of Units in the Inlet (Grate or Curb Opening)	$N_o =$	3	3		
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_o =$	5.00	5.00		ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	$W_o =$	N/A	N/A		ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G =$	N/A	N/A		
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C =$	0.10	0.10		
<b>Street Hydraulics: OK - Q &lt; maximum allowable from sheet 'Q-Allow'</b>					
Total Inlet Interception Capacity	$Q =$	2.60	8.05		cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b =$	0.0	0.5		cfs
Capture Percentage = $Q_i/Q_o =$	$C\% =$	100	95		%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
Inlet ID: INLET 2-5



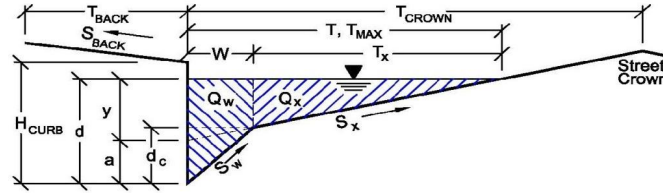
<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="text-align: center; padding: 2px;">7.9</td> <td style="text-align: center; padding: 2px;">21.7</td> </tr> </table> cfs	Minor Storm	Major Storm	7.9	21.7	<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---																	
Minor Storm	Major Storm																							
7.9	21.7																							
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Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Subcatchment Area = <input style="width: 50px;" type="text"/> Acres Percent Imperviousness = <input style="width: 50px;" type="text"/> % NRCS Soil Type = <input style="width: 50px;" type="text"/> A, B, C, or D																						
		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Slope (ft/ft)</td> <td style="padding: 2px;">Length (ft)</td> </tr> <tr> <td style="padding: 2px;">Overland Flow = <input style="width: 50px;" type="text"/></td> <td style="padding: 2px;">Channel Flow = <input style="width: 50px;" type="text"/></td> </tr> </table>	Slope (ft/ft)	Length (ft)	Overland Flow = <input style="width: 50px;" type="text"/>	Channel Flow = <input style="width: 50px;" type="text"/>																		
Slope (ft/ft)	Length (ft)																							
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<b>Rainfall Information:</b> Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c)^{C_3}$		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="padding: 2px;">Design Storm Return Period, <math>T_r</math> = <input style="width: 50px;" type="text"/></td> <td style="padding: 2px;">years</td> </tr> <tr> <td style="padding: 2px;">Return Period One-Hour Precipitation, <math>P_1</math> = <input style="width: 50px;" type="text"/></td> <td style="padding: 2px;">inches</td> </tr> <tr> <td style="padding: 2px;"><math>C_1</math> = <input style="width: 50px;" type="text"/></td> <td></td> </tr> <tr> <td style="padding: 2px;"><math>C_2</math> = <input style="width: 50px;" type="text"/></td> <td></td> </tr> <tr> <td style="padding: 2px;"><math>C_3</math> = <input style="width: 50px;" type="text"/></td> <td></td> </tr> <tr> <td style="padding: 2px;">User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = <input style="width: 50px;" type="text"/></td> <td></td> </tr> <tr> <td style="padding: 2px;">User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), <math>C_5</math> = <input style="width: 50px;" type="text"/></td> <td></td> </tr> <tr> <td style="padding: 2px;">Bypass (Carry-Over) Flow from upstream Subcatchments, <math>Q_b</math> = <input style="width: 50px; text-align: center; border: 1px solid black;" type="text"/></td> <td style="padding: 2px;">0.0</td> </tr> <tr> <td style="padding: 2px;">Total Design Peak Flow, Q = <input style="width: 50px; text-align: center; border: 1px solid black;" type="text"/></td> <td style="padding: 2px;">7.9</td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">23.6</td> </tr> </table> cfs	Minor Storm	Major Storm	Design Storm Return Period, $T_r$ = <input style="width: 50px;" type="text"/>	years	Return Period One-Hour Precipitation, $P_1$ = <input style="width: 50px;" type="text"/>	inches	$C_1$ = <input style="width: 50px;" type="text"/>		$C_2$ = <input style="width: 50px;" type="text"/>		$C_3$ = <input style="width: 50px;" type="text"/>		User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = <input style="width: 50px;" type="text"/>		User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = <input style="width: 50px;" type="text"/>		Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ = <input style="width: 50px; text-align: center; border: 1px solid black;" type="text"/>	0.0	Total Design Peak Flow, Q = <input style="width: 50px; text-align: center; border: 1px solid black;" type="text"/>	7.9		23.6
Minor Storm	Major Storm																							
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	23.6																							

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **COMPARK SOUTH**

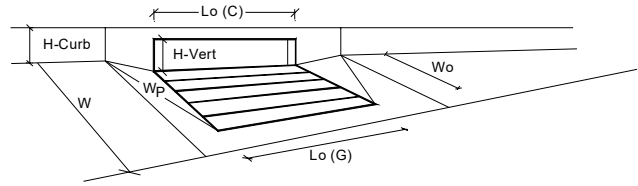
Inlet ID: **INLET 2-5**



<b>Gutter Geometry (Enter data in the blue cells)</b>																	
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = $ <input style="width: 50px;" type="text" value="0.0"/> ft																
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft																
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = $ <input style="width: 50px;" type="text" value="0.013"/>																
Height of Curb at Gutter Flow Line	$H_{CURB} = $ <input style="width: 50px;" type="text" value="6.00"/> inches																
Distance from Curb Face to Street Crown	$T_{CROWN} = $ <input style="width: 50px;" type="text" value="37.0"/> ft																
Gutter Width	$W = $ <input style="width: 50px;" type="text" value="2.00"/> ft																
Street Transverse Slope	$S_x = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft																
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = $ <input style="width: 50px;" type="text" value="0.083"/> ft/ft																
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = $ <input style="width: 50px;" type="text" value="0.000"/> ft/ft																
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = $ <input style="width: 50px;" type="text" value="0.016"/>																
Max. Allowable Spread for Minor & Major Storm	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 25%; text-align: center;">Minor Storm</th> <th style="width: 25%; text-align: center;">Major Storm</th> <th style="width: 10%;"></th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} = </math></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="20.0"/></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="37.0"/></td> <td style="text-align: right;">ft</td> </tr> <tr> <td><math>d_{MAX} = </math></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="6.0"/></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="10.2"/></td> <td style="text-align: right;">inches</td> </tr> <tr> <td>Allow Flow Depth at Street Crown (leave blank for no)</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: right;">check = yes</td> </tr> </tbody> </table>		Minor Storm	Major Storm		$T_{MAX} = $	<input style="width: 50px;" type="text" value="20.0"/>	<input style="width: 50px;" type="text" value="37.0"/>	ft	$d_{MAX} = $	<input style="width: 50px;" type="text" value="6.0"/>	<input style="width: 50px;" type="text" value="10.2"/>	inches	Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	check = yes
	Minor Storm	Major Storm															
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<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>																	
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	Minor Storm	Major Storm															
	<input style="width: 50px;" type="text" value="SUMP"/>	<input style="width: 50px;" type="text" value="SUMP"/>	cfs														

**INLET IN A SUMP OR SAG LOCATION**

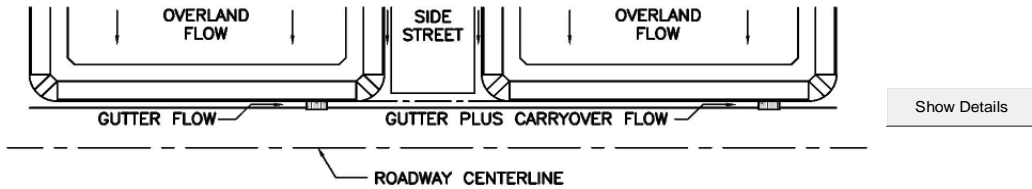
Project = **COMPARK SOUTH**  
 Inlet ID = **INLET 2-5**



Design Information (Input)	MINOR		MAJOR	
	Type of Inlet	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{local}$ = 3.00	3.00	inches	
Number of Unit Inlets (Grate or Curb Opening)	$N_o$ = 2	2		
Water Depth at Flowline (outside of local depression)	Ponding Depth = 5.6	12.0	inches	
<b>Grate Information</b>	MINOR		MAJOR	
Length of a Unit Grate	$L_o (G)$ = N/A	N/A	feet	
Width of a Unit Grate	$W_o$ = N/A	N/A	feet	
Area Opening Ratio for a Grate (typical values 0.15-0.90)	$A_{ratio}$ = N/A	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	$C_r (G)$ = N/A	N/A		
Grate Weir Coefficient (typical value 2.15 - 3.60)	$C_w (G)$ = N/A	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	$C_o (G)$ = N/A	N/A		
<b>Curb Opening Information</b>	MINOR		MAJOR	
Length of a Unit Curb Opening	$L_o (C)$ = 5.00	5.00	feet	
Height of Vertical Curb Opening in Inches	$H_{vert}$ = 6.00	6.00	inches	
Height of Curb Orifice Throat in Inches	$H_{throat}$ = 6.00	6.00	inches	
Angle of Throat (see USDCM Figure ST-5)	Theta = 63.40	63.40	degrees	
Side Width for Depression Pan (typically the gutter width of 2 feet)	$W_p$ = 2.00	2.00	feet	
Clogging Factor for a Single Curb Opening (typical value 0.10)	$C_r (C)$ = 0.10	0.10		
Curb Opening Weir Coefficient (typical value 2.3-3.7)	$C_w (C)$ = 3.60	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	$C_o (C)$ = 0.67	0.67		
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>	MINOR		MAJOR	
	$Q_a$ = 8.7	25.5	cfs	
<b>Inlet Capacity IS GOOD for Minor and Major Storms (&gt;Q PEAK)</b>	$Q_{PEAK REQUIRED}$ = 7.9	23.6	cfs	

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 2-6



<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="text-align: center; padding: 2px;">3.0</td> <td style="text-align: center; padding: 2px;">8.1</td> </tr> <tr> <td colspan="2" style="text-align: right; padding: 2px;">cfs</td> </tr> </table>	Minor Storm	Major Storm	3.0	8.1	cfs		<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---																									
Minor Storm	Major Storm																																	
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Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Subcatchment Area = <input style="width: 50px;" type="text"/> Acres Percent Imperviousness = <input style="width: 50px;" type="text"/> % NRCS Soil Type = <input style="width: 50px;" type="text"/> A, B, C, or D																																
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cfs																																		

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

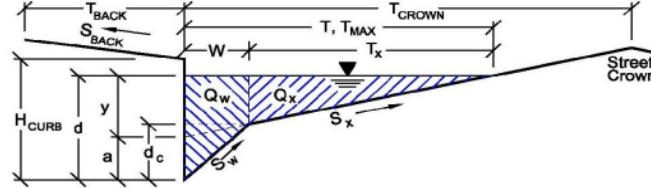
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

COMPARK SOUTH

Inlet ID:

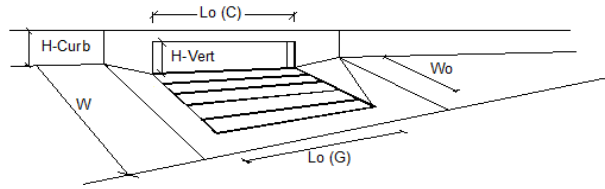
INLET 2-6



<b>Gutter Geometry (Enter data in the blue cells)</b>					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 5.0$ ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.013$				
Height of Curb at Gutter Flow Line	$H_{CURB} = 6.00$ inches				
Distance from Curb Face to Street Crown	$T_{CROWN} = 37.0$ ft				
Gutter Width	$W = 2.00$ ft				
Street Transverse Slope	$S_x = 0.020$ ft/ft				
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = 0.083$ ft/ft				
Street Longitudinal Slope - Enter 0 for sump condition	$S_D = 0.005$ ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.013$				
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> <tr> <td style="text-align: center; padding: 2px;"><math>T_{MAX} = 20.0</math></td> <td style="text-align: center; padding: 2px;"><math>37.0</math></td> </tr> </table> ft	Minor Storm	Major Storm	$T_{MAX} = 20.0$	$37.0$
Minor Storm	Major Storm				
$T_{MAX} = 20.0$	$37.0$				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> <tr> <td style="text-align: center; padding: 2px;"><math>d_{MAX} = 6.0</math></td> <td style="text-align: center; padding: 2px;"><math>12.0</math></td> </tr> </table> inches	Minor Storm	Major Storm	$d_{MAX} = 6.0$	$12.0$
Minor Storm	Major Storm				
$d_{MAX} = 6.0$	$12.0$				
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input checked="" type="checkbox"/> check = yes				
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>					
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>					
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'					
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'					
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> </tr> <tr> <td style="text-align: center; padding: 2px;"><math>Q_{allow} = 12.0</math></td> <td style="text-align: center; padding: 2px;"><math>118.0</math></td> </tr> </table> cfs	Minor Storm	Major Storm	$Q_{allow} = 12.0$	$118.0$
Minor Storm	Major Storm				
$Q_{allow} = 12.0$	$118.0$				

**INLET ON A CONTINUOUS GRADE**

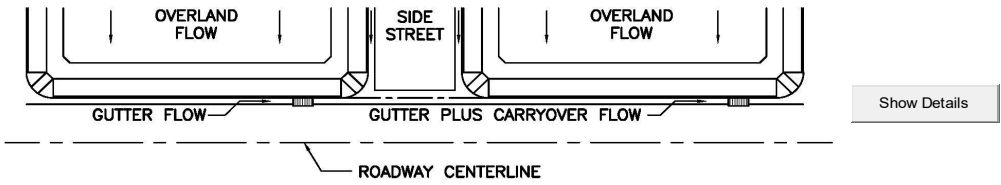
Project: COMPARK SOUTH  
 Inlet ID: INLET 2-6



Design Information (Input)	MINOR		MAJOR		
	MINOR	MAJOR	MINOR	MAJOR	
Type of Inlet	Type = CDOT Type R Curb Opening				
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{LOCAL} = 3.0$	$3.0$			inches
Total Number of Units in the Inlet (Grate or Curb Opening)	$No = 3$	$3$			
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_G = 5.00$	$5.00$			ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	$W_G = N/A$	$N/A$			ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G = N/A$	$N/A$			
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C = 0.10$	$0.10$			
<b>Street Hydraulics: OK - <math>Q &lt; Q_{allow}</math> from sheet 'Q-Allow'</b>					
Total Inlet Interception Capacity	$Q = 3.00$	$8.06$			cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b = 0.0$	$0.5$			cfs
Capture Percentage = $Q_c/Q_o =$	$C\% = 100$	$94$			%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 3-4



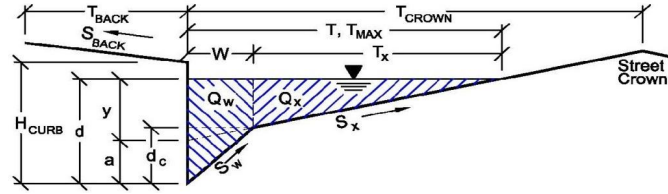
<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		Minor Storm    Major Storm * $Q_{known}$ = <input type="text" value="3.9"/> <input type="text" value="10.7"/> cfs	<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---
<b>Geographic Information:</b> (Enter data in the blue cells):		Subcatchment Area = <input type="text"/> Acres Percent Imperviousness = <input type="text"/> % NRCS Soil Type = <input type="text"/> A, B, C, or D	
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Slope (ft/ft)    Length (ft) Overland Flow = <input type="text"/> <input type="text"/> Channel Flow = <input type="text"/> <input type="text"/>	
<b>Rainfall Information:</b> Intensity $I$ (inch/hr) = $C_1 * P_1 / (C_2 + T_c)^{C_3}$		Minor Storm    Major Storm	
		Design Storm Return Period, $T_r$ = <input type="text"/> years	
		Return Period One-Hour Precipitation, $P_1$ = <input type="text"/> inches	
		$C_1$ = <input type="text"/>	
		$C_2$ = <input type="text"/>	
		$C_3$ = <input type="text"/>	
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), $C$ = <input type="text"/>		$C$ = <input type="text"/>	
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = <input type="text"/>		$C_5$ = <input type="text"/>	
		Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ = <input type="text" value="0.0"/> <input type="text" value="0.5"/> cfs	
		Total Design Peak Flow, $Q$ = <input type="text" value="3.9"/> <input type="text" value="11.2"/> cfs	

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **COMPARK SOUTH**

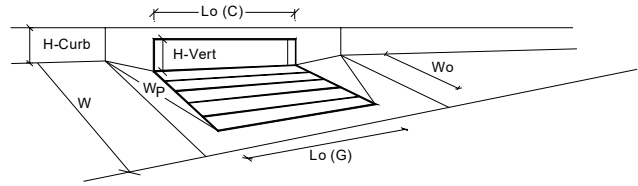
Inlet ID: **INLET 3-4**



Gutter Geometry (Enter data in the blue cells)							
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 0.0$ ft						
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft						
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.020$						
Height of Curb at Gutter Flow Line	$H_{CURB} = 4.00$ inches						
Distance from Curb Face to Street Crown	$T_{CROWN} = 17.0$ ft						
Gutter Width	$W = 2.00$ ft						
Street Transverse Slope	$S_x = 0.020$ ft/ft						
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = 0.083$ ft/ft						
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = 0.000$ ft/ft						
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$						
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> <th style="padding: 2px;">ft</th> </tr> <tr> <td style="text-align: center; padding: 2px;"><math>T_{MAX} = 17.0</math></td> <td style="text-align: center; padding: 2px;"><math>T_{MAX} = 17.0</math></td> <td style="padding: 2px;"></td> </tr> </table>	Minor Storm	Major Storm	ft	$T_{MAX} = 17.0$	$T_{MAX} = 17.0$	
Minor Storm	Major Storm	ft					
$T_{MAX} = 17.0$	$T_{MAX} = 17.0$						
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> <th style="padding: 2px;">inches</th> </tr> <tr> <td style="text-align: center; padding: 2px;"><math>d_{MAX} = 4.0</math></td> <td style="text-align: center; padding: 2px;"><math>d_{MAX} = 12.0</math></td> <td style="padding: 2px;"></td> </tr> </table>	Minor Storm	Major Storm	inches	$d_{MAX} = 4.0$	$d_{MAX} = 12.0$	
Minor Storm	Major Storm	inches					
$d_{MAX} = 4.0$	$d_{MAX} = 12.0$						
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input checked="" type="checkbox"/> check = yes						
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>							
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>							
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'							
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$Q_{allow} =$	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> <th style="padding: 2px;">cfs</th> </tr> <tr> <td style="text-align: center; padding: 2px;">SUMP</td> <td style="text-align: center; padding: 2px;">SUMP</td> <td style="padding: 2px;"></td> </tr> </table>	Minor Storm	Major Storm	cfs	SUMP	SUMP	
Minor Storm	Major Storm	cfs					
SUMP	SUMP						

**INLET IN A SUMP OR SAG LOCATION**

Project = **COMPARK SOUTH**  
 Inlet ID = **INLET 3-4**

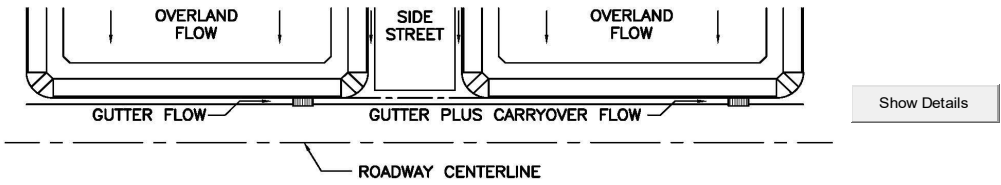


Design Information (Input)		MINOR		MAJOR	
		CDOT Type R Curb Opening			
Type of Inlet	Inlet Type =	5.00	5.00	inches	
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{local}$ =	3	3		
Number of Unit Inlets (Grate or Curb Opening)	No =	4.0	12.0	inches	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	<input checked="" type="checkbox"/> Override Depths			
<b>Grate Information</b>		MINOR		MAJOR	
Length of a Unit Grate	$L_o (G)$ =	N/A	N/A	feet	
Width of a Unit Grate	$W_o$ =	N/A	N/A	feet	
Area Opening Ratio for a Grate (typical values 0.15-0.90)	$A_{ratio}$ =	N/A	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	$C_r (G)$ =	N/A	N/A		
Grate Weir Coefficient (typical value 2.15 - 3.60)	$C_w (G)$ =	N/A	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	$C_o (G)$ =	N/A	N/A		
<b>Curb Opening Information</b>		MINOR		MAJOR	
Length of a Unit Curb Opening	$L_o (C)$ =	5.00	5.00	feet	
Height of Vertical Curb Opening in Inches	$H_{vert}$ =	6.00	6.00	inches	
Height of Curb Orifice Throat in Inches	$H_{throat}$ =	6.00	6.00	inches	
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees	
Side Width for Depression Pan (typically the gutter width of 2 feet)	$W_p$ =	2.00	2.00	feet	
Clogging Factor for a Single Curb Opening (typical value 0.10)	$C_r (C)$ =	0.10	0.10		
Curb Opening Weir Coefficient (typical value 2.3-3.7)	$C_w (C)$ =	3.60	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	$C_o (C)$ =	0.67	0.67		
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>		MINOR		MAJOR	
	$Q_a$ =	3.9	42.1	cfs	
	$Q_{PEAK REQUIRED}$ =	3.9	11.2	cfs	

**Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)**

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
Inlet ID: INLET 3-5

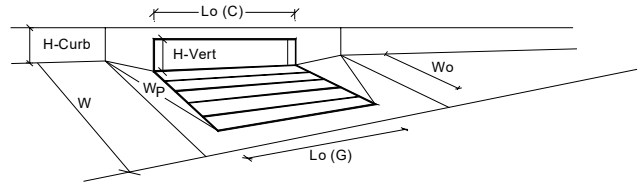


<p><b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):</p> <p style="text-align: right;"><b>*Q<sub>known</sub></b> = <input type="text" value="3.9"/> <input type="text" value="11.0"/> cfs</p> <p><b>* If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.</b></p>		<p>&lt;--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. &lt;---</p>
<p><b>Geographic Information:</b> (Enter data in the blue cells):</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Site Type:</p> <p><input type="radio"/> Site is Urban</p> <p><input type="radio"/> Site is Non-Urban</p> </div> <div style="width: 30%;"> <p>Flows Developed For:</p> <p><input type="radio"/> Street Inlets</p> <p><input type="radio"/> Area Inlets in a Median</p> </div> <div style="width: 30%;"> <p>Subcatchment Area = <input type="text"/> Acres</p> <p>Percent Imperviousness = <input type="text"/> %</p> <p>NRCS Soil Type = <input type="text"/> A, B, C, or D</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p>Slope (ft/ft)    Length (ft)</p> <p>Overland Flow = <input type="text"/> <input type="text"/></p> <p>Channel Flow = <input type="text"/> <input type="text"/></p> </div> </div>		
<p><b>Rainfall Information:</b> Intensity I (inch/hr) = <math>C_1 * P_1 / (C_2 + T_c)^{C_3}</math></p> <p>Design Storm Return Period, T<sub>r</sub> = <input type="text"/> years</p> <p>Return Period One-Hour Precipitation, P<sub>1</sub> = <input type="text"/> inches</p> <p>C<sub>1</sub> = <input type="text"/></p> <p>C<sub>2</sub> = <input type="text"/></p> <p>C<sub>3</sub> = <input type="text"/></p> <p>User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = <input type="text"/></p> <p>User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C<sub>5</sub> = <input type="text"/></p> <p>Bypass (Carry-Over) Flow from upstream Subcatchments, Q<sub>b</sub> = <input type="text" value="0.0"/> <input type="text" value="0.0"/> cfs</p> <p style="text-align: right;"><b>Total Design Peak Flow, Q</b> = <input type="text" value="3.9"/> <input type="text" value="11.0"/> cfs</p>		



**INLET IN A SUMP OR SAG LOCATION**

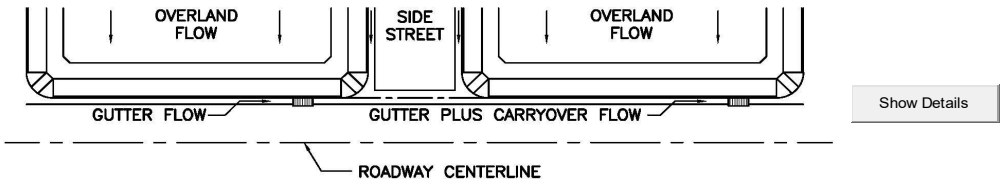
Project = **COMPARK SOUTH**  
 Inlet ID = **INLET 3-5**



Design Information (Input)	MINOR		MAJOR	
	Type of Inlet	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{local}$ =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)	$N_o$ =	3	3	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.0	12.0	inches
<b>Grate Information</b>	<input checked="" type="checkbox"/> Override Depths			
Length of a Unit Grate	$L_o (G)$ =	N/A	N/A	feet
Width of a Unit Grate	$W_o$ =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	$A_{ratio}$ =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	$C_r (G)$ =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	$C_w (G)$ =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	$C_o (G)$ =	N/A	N/A	
<b>Curb Opening Information</b>				
Length of a Unit Curb Opening	$L_o (C)$ =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	$H_{vert}$ =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	$H_{throat}$ =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	$W_p$ =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	$C_r (C)$ =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	$C_w (C)$ =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	$C_o (C)$ =	0.67	0.67	
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>				
<b>Inlet Capacity IS GOOD for Minor and Major Storms (&gt;Q PEAK)</b>	$Q_a$ =	3.9	42.1	cfs
	$Q_{PEAK REQUIRED}$ =	3.9	11.0	cfs

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
Inlet ID: INLET 4-4



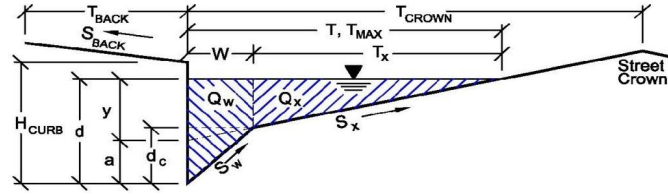
<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		Minor Storm    Major Storm * $Q_{known}$ = <input type="text" value="0.9"/> <input type="text" value="2.4"/> cfs	<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---
<b>Geographic Information:</b> (Enter data in the blue cells):		Subcatchment Area = <input type="text"/> Acres Percent Imperviousness = <input type="text"/> % NRCS Soil Type = <input type="text"/> A, B, C, or D	
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Slope (ft/ft)    Length (ft) Overland Flow = <input type="text"/> <input type="text"/> Channel Flow = <input type="text"/> <input type="text"/>	
<b>Rainfall Information:</b> Intensity $I$ (inch/hr) = $C_1 * P_1 / (C_2 + T_c)^{C_3}$		Minor Storm    Major Storm	
		Design Storm Return Period, $T_r$ = <input type="text"/> years	
		Return Period One-Hour Precipitation, $P_1$ = <input type="text"/> inches	
		$C_1$ = <input type="text"/>	
		$C_2$ = <input type="text"/>	
		$C_3$ = <input type="text"/>	
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), $C$ = <input type="text"/>		$C_4$ = <input type="text"/>	
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = <input type="text"/>		$C_5$ = <input type="text"/>	
Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ =		<input type="text" value="0.0"/> <input type="text" value="0.0"/> cfs	
Total Design Peak Flow, $Q$ =		<input type="text" value="0.9"/> <input type="text" value="2.4"/> cfs	

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **COMPARK SOUTH**

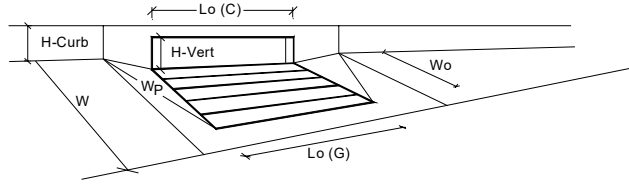
Inlet ID: **INLET 4-4**



<b>Gutter Geometry (Enter data in the blue cells)</b>					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 0.0$ ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.020$				
Height of Curb at Gutter Flow Line	$H_{CURB} = 4.00$ inches				
Distance from Curb Face to Street Crown	$T_{CROWN} = 17.0$ ft				
Gutter Width	$W = 2.00$ ft				
Street Transverse Slope	$S_x = 0.020$ ft/ft				
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = 0.083$ ft/ft				
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = 0.000$ ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$				
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Minor Storm</th> <th style="width: 50%;">Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} = 17.0</math></td> <td><math>T_{MAX} = 17.0</math></td> </tr> </tbody> </table> ft	Minor Storm	Major Storm	$T_{MAX} = 17.0$	$T_{MAX} = 17.0$
Minor Storm	Major Storm				
$T_{MAX} = 17.0$	$T_{MAX} = 17.0$				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Minor Storm</th> <th style="width: 50%;">Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>d_{MAX} = 4.0</math></td> <td><math>d_{MAX} = 12.0</math></td> </tr> </tbody> </table> inches	Minor Storm	Major Storm	$d_{MAX} = 4.0$	$d_{MAX} = 12.0$
Minor Storm	Major Storm				
$d_{MAX} = 4.0$	$d_{MAX} = 12.0$				
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input checked="" type="checkbox"/> check = yes				
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>					
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>					
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'					
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'					
$Q_{allow} =$	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Minor Storm</th> <th style="width: 50%;">Major Storm</th> </tr> </thead> <tbody> <tr> <td>SUMP</td> <td>SUMP</td> </tr> </tbody> </table> cfs	Minor Storm	Major Storm	SUMP	SUMP
Minor Storm	Major Storm				
SUMP	SUMP				

**INLET IN A SUMP OR SAG LOCATION**

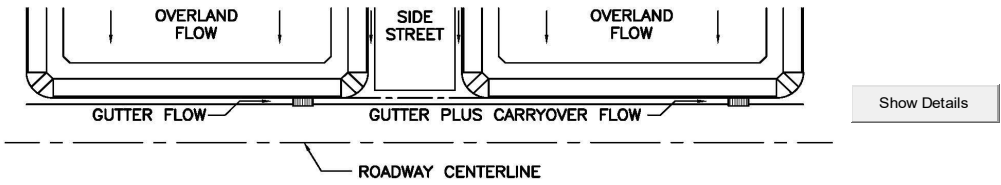
Project = **COMPARK SOUTH**  
 Inlet ID = **INLET 4-4**



Design Information (Input)	MINOR		MAJOR	
	Type of Inlet	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{local}$ =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)	$N_o$ =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.0	12.0	inches
<b>Grate Information</b>	<input checked="" type="checkbox"/> Override Depths			
Length of a Unit Grate	$L_o (G)$ =	N/A	N/A	feet
Width of a Unit Grate	$W_o$ =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	$A_{ratio}$ =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	$C_r (G)$ =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	$C_w (G)$ =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	$C_o (G)$ =	N/A	N/A	
<b>Curb Opening Information</b>				
Length of a Unit Curb Opening	$L_o (C)$ =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	$H_{vert}$ =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	$H_{throat}$ =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	$W_p$ =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	$C_r (C)$ =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	$C_w (C)$ =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	$C_o (C)$ =	0.67	0.67	
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>				
<b>Inlet Capacity IS GOOD for Minor and Major Storms (&gt;Q PEAK)</b>	$Q_a$ =	1.9	13.2	cfs
	$Q_{PEAK REQUIRED}$ =	0.9	2.4	cfs

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 4-5

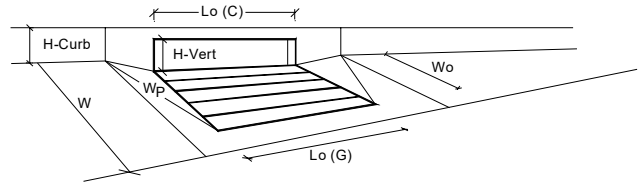


<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		Minor Storm    Major Storm *Q <sub>known</sub> = <input type="text" value="2.4"/> <input type="text" value="6.6"/> cfs	<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---
<b>Geographic Information:</b> (Enter data in the blue cells):		Subcatchment Area = <input type="text"/> Acres Percent Imperviousness = <input type="text"/> % NRCS Soil Type = <input type="text"/> A, B, C, or D	
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Slope (ft/ft)    Length (ft) Overland Flow = <input type="text"/> <input type="text"/> Channel Flow = <input type="text"/> <input type="text"/>	
<b>Rainfall Information:</b> Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c)^{C_3}$		Minor Storm    Major Storm	
		Design Storm Return Period, T <sub>r</sub> = <input type="text"/> years	
		Return Period One-Hour Precipitation, P <sub>1</sub> = <input type="text"/> inches	
		C <sub>1</sub> = <input type="text"/>	
		C <sub>2</sub> = <input type="text"/>	
		C <sub>3</sub> = <input type="text"/>	
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = <input type="text"/>		User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C <sub>5</sub> = <input type="text"/>	
		Bypass (Carry-Over) Flow from upstream Subcatchments, Q <sub>b</sub> = <input type="text" value="0.0"/> <input type="text" value="2.3"/> cfs	
		Total Design Peak Flow, Q = <input type="text" value="2.4"/> <input type="text" value="8.9"/> cfs	



**INLET IN A SUMP OR SAG LOCATION**

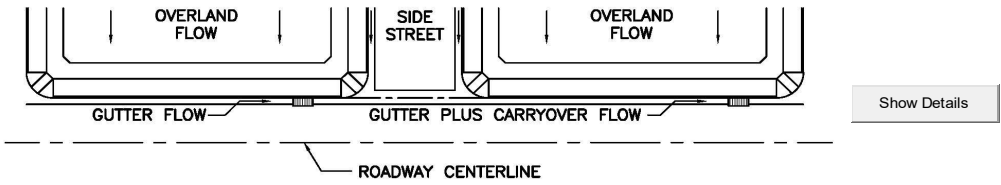
Project = **COMPARK SOUTH**  
 Inlet ID = **INLET 4-5**



Design Information (Input)	MINOR		MAJOR		
	Type of Inlet	CDOT Type R Curb Opening			
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{local}$ =	5.00	5.00	inches	
Number of Unit Inlets (Grate or Curb Opening)	$N_o$ =	2	2		
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.0	12.0	inches	
<b>Grate Information</b>		MINOR		MAJOR	
Length of a Unit Grate	$L_o (G)$ =	N/A	N/A	feet	
Width of a Unit Grate	$W_o$ =	N/A	N/A	feet	
Area Opening Ratio for a Grate (typical values 0.15-0.90)	$A_{ratio}$ =	N/A	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	$C_r (G)$ =	N/A	N/A		
Grate Weir Coefficient (typical value 2.15 - 3.60)	$C_w (G)$ =	N/A	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	$C_o (G)$ =	N/A	N/A		
<b>Curb Opening Information</b>		MINOR		MAJOR	
Length of a Unit Curb Opening	$L_o (C)$ =	5.00	5.00	feet	
Height of Vertical Curb Opening in Inches	$H_{vert}$ =	6.00	6.00	inches	
Height of Curb Orifice Throat in Inches	$H_{throat}$ =	6.00	6.00	inches	
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees	
Side Width for Depression Pan (typically the gutter width of 2 feet)	$W_p$ =	2.00	2.00	feet	
Clogging Factor for a Single Curb Opening (typical value 0.10)	$C_r (C)$ =	0.10	0.10		
Curb Opening Weir Coefficient (typical value 2.3-3.7)	$C_w (C)$ =	3.60	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	$C_o (C)$ =	0.67	0.67		
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>		MINOR		MAJOR	
	$Q_a$ =	3.1	27.5	cfs	
<b>Inlet Capacity IS GOOD for Minor and Major Storms (&gt;Q PEAK)</b>	$Q_{PEAK REQUIRED}$ =	2.4	8.9	cfs	

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 4-5A

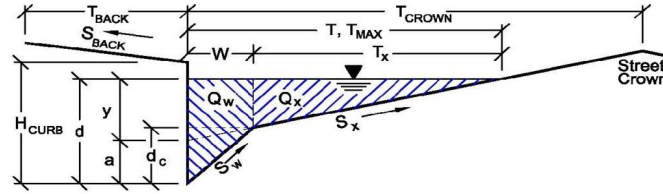


<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		*Q <sub>known</sub> = <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 50px; text-align: center;">Minor Storm</td> <td style="width: 50px; text-align: center;">Major Storm</td> </tr> <tr> <td style="text-align: center;">4.1</td> <td style="text-align: center;">11.4</td> </tr> </table> cfs	Minor Storm	Major Storm	4.1	11.4	<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---					
Minor Storm	Major Storm											
4.1	11.4											
<b>Geographic Information:</b> (Enter data in the blue cells): You cannot enter values for Q and use the Q calculator at the same time		Subcatchment Area = <input style="width: 50px;" type="text"/> Acres Percent Imperviousness = <input style="width: 50px;" type="text"/> % NRCS Soil Type = <input style="width: 50px;" type="text"/> A, B, C, or D										
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input checked="" type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">Slope (ft/ft)</td> <td style="text-align: center;">Length (ft)</td> </tr> <tr> <td>Overland Flow =</td> <td style="width: 50px;"><input style="width: 90%;" type="text"/></td> <td><input style="width: 90%;" type="text"/></td> </tr> <tr> <td>Gutter Flow =</td> <td><input style="width: 90%;" type="text"/></td> <td><input style="width: 90%;" type="text"/></td> </tr> </table>		Slope (ft/ft)	Length (ft)	Overland Flow =	<input style="width: 90%;" type="text"/>	<input style="width: 90%;" type="text"/>	Gutter Flow =	<input style="width: 90%;" type="text"/>	<input style="width: 90%;" type="text"/>	
	Slope (ft/ft)	Length (ft)										
Overland Flow =	<input style="width: 90%;" type="text"/>	<input style="width: 90%;" type="text"/>										
Gutter Flow =	<input style="width: 90%;" type="text"/>	<input style="width: 90%;" type="text"/>										
<b>Rainfall Information:</b> Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c)^{C_3}$		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 50px; text-align: center;">Minor Storm</td> <td style="width: 50px; text-align: center;">Major Storm</td> </tr> </table>	Minor Storm	Major Storm								
Minor Storm	Major Storm											
Design Storm Return Period, T <sub>r</sub> = <input style="width: 50px;" type="text"/> years Return Period One-Hour Precipitation, P <sub>1</sub> = <input style="width: 50px;" type="text"/> inches C <sub>1</sub> = <input style="width: 50px;" type="text"/> C <sub>2</sub> = <input style="width: 50px;" type="text"/> C <sub>3</sub> = <input style="width: 50px;" type="text"/> User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = <input style="width: 50px;" type="text"/> User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C <sub>5</sub> = <input style="width: 50px;" type="text"/>												
Bypass (Carry-Over) Flow from upstream Subcatchments, Q <sub>b</sub> = <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 50px; text-align: center;">0.0</td> <td style="width: 50px; text-align: center;">0.2</td> </tr> </table> cfs		0.0	0.2									
0.0	0.2											
Total Design Peak Flow, Q = <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 50px; text-align: center;">4.1</td> <td style="width: 50px; text-align: center;">11.6</td> </tr> </table> cfs		4.1	11.6									
4.1	11.6											

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

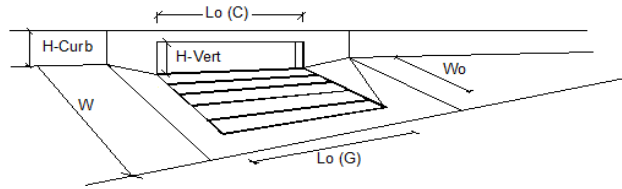
Project: **COMPARK SOUTH**  
 Inlet ID: **INLET 4-5A**



<b>Gutter Geometry (Enter data in the blue cells)</b>							
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 0.0$ ft						
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft						
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.020$						
Height of Curb at Gutter Flow Line	$H_{CURB} = 4.00$ inches						
Distance from Curb Face to Street Crown	$T_{CROWN} = 17.0$ ft						
Gutter Width	$W = 2.00$ ft						
Street Transverse Slope	$S_x = 0.020$ ft/ft						
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = 0.083$ ft/ft						
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = 0.010$ ft/ft						
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$						
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Minor Storm</th> <th style="width: 50%;">Major Storm</th> <th></th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} = 17.0</math></td> <td><math>17.0</math></td> <td>ft</td> </tr> </tbody> </table>	Minor Storm	Major Storm		$T_{MAX} = 17.0$	$17.0$	ft
Minor Storm	Major Storm						
$T_{MAX} = 17.0$	$17.0$	ft					
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Minor Storm</th> <th style="width: 50%;">Major Storm</th> <th></th> </tr> </thead> <tbody> <tr> <td><math>d_{MAX} = 4.3</math></td> <td><math>12.0</math></td> <td>inches</td> </tr> </tbody> </table>	Minor Storm	Major Storm		$d_{MAX} = 4.3$	$12.0$	inches
Minor Storm	Major Storm						
$d_{MAX} = 4.3$	$12.0$	inches					
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input checked="" type="checkbox"/> check = yes						
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>							
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>							
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Minor Storm</th> <th style="width: 50%;">Major Storm</th> <th></th> </tr> </thead> <tbody> <tr> <td><math>Q_{allow} = 4.4</math></td> <td><math>91.2</math></td> <td>cfs</td> </tr> </tbody> </table>	Minor Storm	Major Storm		$Q_{allow} = 4.4$	$91.2$	cfs
Minor Storm		Major Storm					
$Q_{allow} = 4.4$	$91.2$	cfs					
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'							

**INLET ON A CONTINUOUS GRADE**

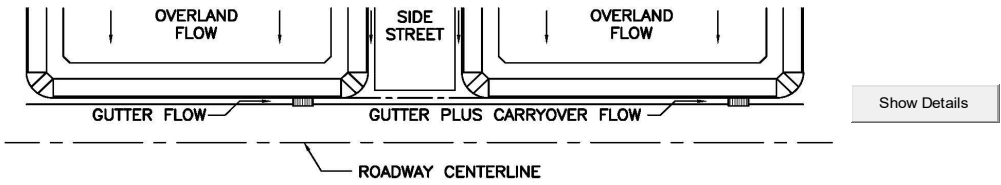
Project: COMPARK SOUTH  
 Inlet ID: INLET 4-5A



Design Information (Input)	MINOR		MAJOR		
	MINOR	MAJOR	MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening				
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	3.0	3.0			inches
Total Number of Units in the Inlet (Grate or Curb Opening)	3	3			
Length of a Single Unit Inlet (Grate or Curb Opening)	5.00	5.00			ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	N/A	N/A			ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	N/A	N/A			
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	0.10	0.10			
<b>Street Hydraulics: OK - Q &lt; maximum allowable from sheet 'Q-Allow'</b>					
Total Inlet Interception Capacity	4.10	10.24			cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	0.0	1.4			cfs
Capture Percentage = $Q_a/Q_o$ =	100	88			%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 4-5B

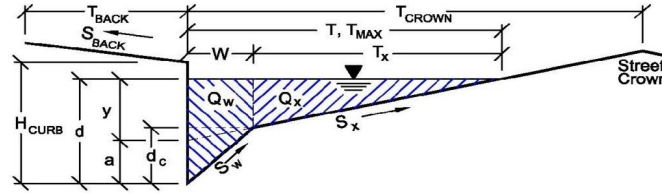


<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		Minor Storm    Major Storm *Q <sub>known</sub> = <input type="text" value="3.4"/> <input type="text" value="8.5"/> cfs	<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---
<b>Geographic Information:</b> (Enter data in the blue cells):		Subcatchment Area = <input type="text"/> Acres Percent Imperviousness = <input type="text"/> % NRCS Soil Type = <input type="text"/> A, B, C, or D	
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Slope (ft/ft)    Length (ft) Overland Flow = <input type="text"/> <input type="text"/> Channel Flow = <input type="text"/> <input type="text"/>	
<b>Rainfall Information:</b> Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c)^{C_3}$		Minor Storm    Major Storm	
Design Storm Return Period, T <sub>r</sub> = <input type="text"/> years Return Period One-Hour Precipitation, P <sub>1</sub> = <input type="text"/> inches C <sub>1</sub> = <input type="text"/> C <sub>2</sub> = <input type="text"/> C <sub>3</sub> = <input type="text"/> User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = <input type="text"/> User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C <sub>5</sub> = <input type="text"/>		Bypass (Carry-Over) Flow from upstream Subcatchments, Q <sub>b</sub> = <input type="text" value="0.0"/> <input type="text" value="0.9"/> cfs	
Total Design Peak Flow, Q = <input type="text" value="3.4"/> <input type="text" value="9.4"/> cfs			

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

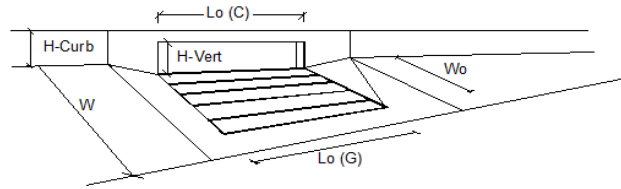
Project: **COMPARK SOUTH**  
 Inlet ID: **INLET 4-5B**



<b>Gutter Geometry (Enter data in the blue cells)</b>																	
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = $ <input style="width: 50px;" type="text" value="0.0"/> ft																
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft																
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/>																
Height of Curb at Gutter Flow Line	$H_{CURB} = $ <input style="width: 50px;" type="text" value="4.00"/> inches																
Distance from Curb Face to Street Crown	$T_{CROWN} = $ <input style="width: 50px;" type="text" value="17.0"/> ft																
Gutter Width	$W = $ <input style="width: 50px;" type="text" value="2.00"/> ft																
Street Transverse Slope	$S_x = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft																
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = $ <input style="width: 50px;" type="text" value="0.083"/> ft/ft																
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = $ <input style="width: 50px;" type="text" value="0.010"/> ft/ft																
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = $ <input style="width: 50px;" type="text" value="0.016"/>																
Max. Allowable Spread for Minor & Major Storm	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 25%; text-align: center;">Minor Storm</th> <th style="width: 25%; text-align: center;">Major Storm</th> <th style="width: 10%;"></th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} = </math></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="17.0"/></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="17.0"/></td> <td style="text-align: right;">ft</td> </tr> <tr> <td><math>d_{MAX} = </math></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="4.0"/></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="12.0"/></td> <td style="text-align: right;">inches</td> </tr> <tr> <td></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: right;">check = yes</td> </tr> </tbody> </table>		Minor Storm	Major Storm		$T_{MAX} = $	<input style="width: 50px;" type="text" value="17.0"/>	<input style="width: 50px;" type="text" value="17.0"/>	ft	$d_{MAX} = $	<input style="width: 50px;" type="text" value="4.0"/>	<input style="width: 50px;" type="text" value="12.0"/>	inches		<input type="checkbox"/>	<input checked="" type="checkbox"/>	check = yes
	Minor Storm	Major Storm															
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Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input checked="" type="checkbox"/> check = yes																
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<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>																	
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	Minor Storm	Major Storm															
	<input style="width: 50px;" type="text" value="3.4"/>	<input style="width: 50px;" type="text" value="91.2"/>	cfs														

**INLET ON A CONTINUOUS GRADE**

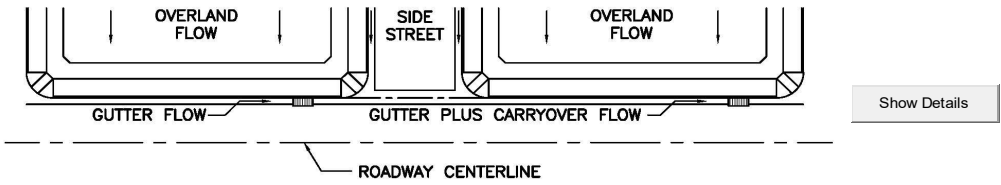
Project: COMPARK SOUTH  
 Inlet ID: INLET 4-5B



Design Information (Input)	MINOR		MAJOR	
	Type of Inlet	Type = CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{LOCAL} = 3.0$	$3.0$	inches	
Total Number of Units in the Inlet (Grate or Curb Opening)	$N_o = 2$	$2$		
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_o = 5.00$	$5.00$	ft	
Width of a Unit Grate (cannot be greater than W from Q-Allow)	$W_o = N/A$	$N/A$	ft	
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G = N/A$	$N/A$		
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C = 0.10$	$0.10$		
<b>Street Hydraulics: OK - Q &lt; maximum allowable from sheet 'Q-Allow'</b>				
Total Inlet Interception Capacity	$Q = 3.40$	$6.90$	cfs	
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b = 0.0$	$2.4$	cfs	
Capture Percentage = $Q_a/Q_o =$	$C\% = 100$	$74$	%	

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 4-5C

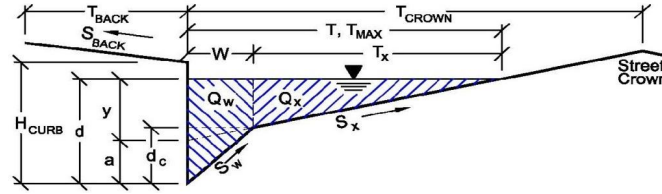


<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td align="center" style="padding: 2px;">2.4</td> <td align="center" style="padding: 2px;">6.7</td> </tr> </table> cfs	Minor Storm	Major Storm	2.4	6.7	<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---																	
Minor Storm	Major Storm																							
2.4	6.7																							
* If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.																								
<b>Geographic Information:</b> (Enter data in the blue cells):																								
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Subcatchment Area = <input type="text"/> Acres Percent Imperviousness = <input type="text"/> % NRCS Soil Type = <input type="text"/> A, B, C, or D																						
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		Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ = <input type="text"/> 0.0 <input type="text"/> 1.2 cfs																						
		Total Design Peak Flow, Q = <input type="text"/> 2.4 <input type="text"/> 7.9 cfs																						

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

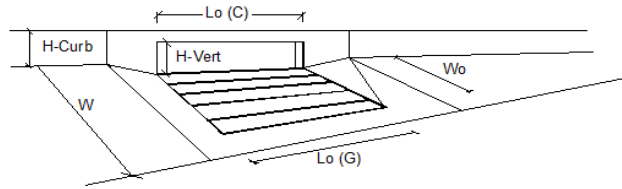
Project: **COMPARK SOUTH**  
 Inlet ID: **INLET 4-5C**



<b>Gutter Geometry (Enter data in the blue cells)</b>													
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 0.0$ ft												
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft												
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.020$												
Height of Curb at Gutter Flow Line	$H_{CURB} = 4.00$ inches												
Distance from Curb Face to Street Crown	$T_{CROWN} = 17.0$ ft												
Gutter Width	$W = 2.00$ ft												
Street Transverse Slope	$S_x = 0.020$ ft/ft												
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = 0.083$ ft/ft												
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = 0.010$ ft/ft												
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$												
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="width: 50px;"></th> <th style="width: 50px; text-align: center;">Minor Storm</th> <th style="width: 50px; text-align: center;">Major Storm</th> <th style="width: 50px;"></th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} =</math></td> <td style="text-align: center;">17.0</td> <td style="text-align: center;">17.0</td> <td>ft</td> </tr> <tr> <td><math>d_{MAX} =</math></td> <td style="text-align: center;">4.0</td> <td style="text-align: center;">12.0</td> <td>inches</td> </tr> </tbody> </table>		Minor Storm	Major Storm		$T_{MAX} =$	17.0	17.0	ft	$d_{MAX} =$	4.0	12.0	inches
	Minor Storm	Major Storm											
$T_{MAX} =$	17.0	17.0	ft										
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Max. Allowable Depth at Gutter Flowline for Minor & Major Storm													
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input checked="" type="checkbox"/> check = yes												
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>													
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$Q_{allow} =$	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="width: 50px;"></th> <th style="width: 50px; text-align: center;">Minor Storm</th> <th style="width: 50px; text-align: center;">Major Storm</th> <th style="width: 50px;"></th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">3.4</td> <td style="text-align: center;">91.2</td> <td>cfs</td> </tr> </tbody> </table>		Minor Storm	Major Storm			3.4	91.2	cfs				
	Minor Storm	Major Storm											
	3.4	91.2	cfs										

**INLET ON A CONTINUOUS GRADE**

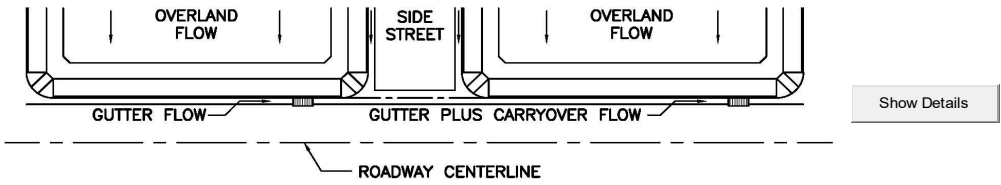
Project: COMPARK SOUTH  
 Inlet ID: INLET 4-5C



Design Information (Input)	MINOR		MAJOR		
	MINOR	MAJOR	MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening				
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	5.0	5.0	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	2	2	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)	5.00	5.00	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	N/A	N/A	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	N/A	N/A	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	0.10	0.10	0.10	0.10	
<b>Street Hydraulics: OK - Q &lt; maximum allowable from sheet 'Q-Allow'</b>					
Total Inlet Interception Capacity	2.40	6.85	2.40	6.85	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	0.0	1.1	0.0	1.1	cfs
Capture Percentage = $Q_a/Q_o$ =	100	87	100	87	%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 5-4



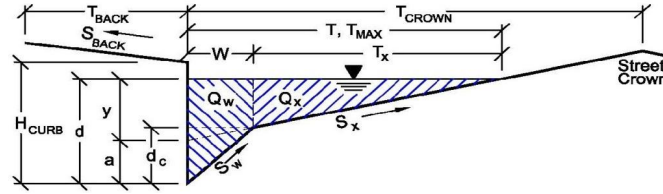
<p><b>Design Flow:</b> ONLY if already determined through other methods:                  (local peak flow for 1/2 of street OR grass-lined channel):</p>		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="text-align: center;">3.4</td> <td style="text-align: center;">10.8</td> </tr> <tr> <td colspan="2" style="text-align: right; padding-right: 5px;">cfs</td> </tr> </table>	Minor Storm	Major Storm	3.4	10.8	cfs		<p style="color: red; font-size: small;">&lt;--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. &lt;---</p>																														
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<p>Site Type:</p> <p><input type="radio"/> Site is Urban</p> <p><input type="radio"/> Site is Non-Urban</p>	<p>Flows Developed For:</p> <p><input type="radio"/> Street Inlets</p> <p><input type="radio"/> Area Inlets in a Median</p>	<p>Subcatchment Area = <input type="text"/> Acres</p> <p>Percent Imperviousness = <input type="text"/> %</p> <p>NRCS Soil Type = <input type="text"/> A, B, C, or D</p>																																					
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Design Storm Return Period, $T_r$ =	Minor Storm	Major Storm	years																																				
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## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **COMPARK SOUTH**

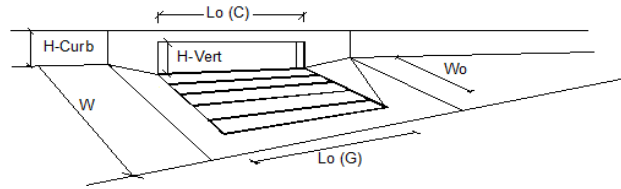
Inlet ID: **INLET 5-4**



<b>Gutter Geometry (Enter data in the blue cells)</b>							
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = $ <input style="width: 50px;" type="text" value="0.0"/> ft						
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft						
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/>						
Height of Curb at Gutter Flow Line	$H_{CURB} = $ <input style="width: 50px;" type="text" value="4.00"/> inches						
Distance from Curb Face to Street Crown	$T_{CROWN} = $ <input style="width: 50px;" type="text" value="17.0"/> ft						
Gutter Width	$W = $ <input style="width: 50px;" type="text" value="2.00"/> ft						
Street Transverse Slope	$S_x = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft						
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = $ <input style="width: 50px;" type="text" value="0.083"/> ft/ft						
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = $ <input style="width: 50px;" type="text" value="0.010"/> ft/ft						
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = $ <input style="width: 50px;" type="text" value="0.016"/>						
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px 5px;">Minor Storm</th> <th style="padding: 2px 5px;">Major Storm</th> <th style="padding: 2px 5px;">ft</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><input style="width: 50px;" type="text" value="17.0"/></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="17.0"/></td> <td></td> </tr> </tbody> </table>	Minor Storm	Major Storm	ft	<input style="width: 50px;" type="text" value="17.0"/>	<input style="width: 50px;" type="text" value="17.0"/>	
Minor Storm	Major Storm	ft					
<input style="width: 50px;" type="text" value="17.0"/>	<input style="width: 50px;" type="text" value="17.0"/>						
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px 5px;">Minor Storm</th> <th style="padding: 2px 5px;">Major Storm</th> <th style="padding: 2px 5px;">inches</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><input style="width: 50px;" type="text" value="4.0"/></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="12.0"/></td> <td></td> </tr> </tbody> </table>	Minor Storm	Major Storm	inches	<input style="width: 50px;" type="text" value="4.0"/>	<input style="width: 50px;" type="text" value="12.0"/>	
Minor Storm	Major Storm	inches					
<input style="width: 50px;" type="text" value="4.0"/>	<input style="width: 50px;" type="text" value="12.0"/>						
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input checked="" type="checkbox"/> check = yes						
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>							
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>							
<b>Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'</b>							
<b>Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'</b>							
$Q_{allow} = $	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px 5px;">Minor Storm</th> <th style="padding: 2px 5px;">Major Storm</th> <th style="padding: 2px 5px;">cfs</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><input style="width: 50px;" type="text" value="3.4"/></td> <td style="text-align: center;"><input style="width: 50px;" type="text" value="91.4"/></td> <td></td> </tr> </tbody> </table>	Minor Storm	Major Storm	cfs	<input style="width: 50px;" type="text" value="3.4"/>	<input style="width: 50px;" type="text" value="91.4"/>	
Minor Storm	Major Storm	cfs					
<input style="width: 50px;" type="text" value="3.4"/>	<input style="width: 50px;" type="text" value="91.4"/>						

**INLET ON A CONTINUOUS GRADE**

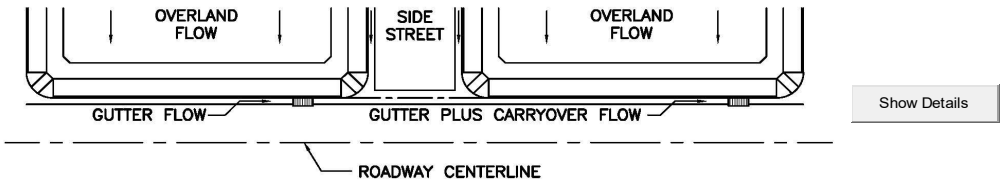
Project: COMPARK SOUTH  
 Inlet ID: INLET 5-4



Design Information (Input)	MINOR		MAJOR	
	Type of Inlet	Type = CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{LOCAL} = 3.0$	$3.0$	inches	
Total Number of Units in the Inlet (Grate or Curb Opening)	$N_o = 3$	$3$		
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_o = 5.00$	$5.00$	ft	
Width of a Unit Grate (cannot be greater than W from Q-Allow)	$W_o = N/A$	$N/A$	ft	
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G = N/A$	$N/A$		
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C = 0.10$	$0.10$		
<b>Street Hydraulics: OK - Q &lt; maximum allowable from sheet 'Q-Allow'</b>				
Total Inlet Interception Capacity	$Q = 3.40$	$9.77$	cfs	
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b = 0.0$	$1.0$	cfs	
Capture Percentage = $Q_d/Q_o =$	$C\% = 100$	$90$	%	

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 5-4A

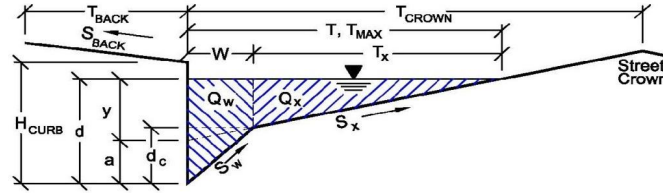


<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="text-align: center; padding: 2px;">1.0</td> <td style="text-align: center; padding: 2px;">2.6</td> </tr> </table> cfs	Minor Storm	Major Storm	1.0	2.6	<--- FILL IN THIS SECTION OR...												
Minor Storm	Major Storm																		
1.0	2.6																		
* If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.																			
<b>Geographic Information:</b> (Enter data in the blue cells):																			
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Subcatchment Area = <input style="width: 50px;" type="text"/> Acres Percent Imperviousness = <input style="width: 50px;" type="text"/> % NRCS Soil Type = <input style="width: 50px;" type="text"/> A, B, C, or D	Slope (ft/ft)    Length (ft) Overland Flow = <input style="width: 50px;" type="text"/> / <input style="width: 50px;" type="text"/> Channel Flow = <input style="width: 50px;" type="text"/> / <input style="width: 50px;" type="text"/>																
<b>Rainfall Information:</b> Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c)^{C_3}$																			
		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="padding: 2px;">Design Storm Return Period, <math>T_r</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Return Period One-Hour Precipitation, <math>P_1</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"><math>C_1</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"><math>C_2</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"><math>C_3</math> =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), <math>C_5</math> =</td> <td style="padding: 2px;"></td> </tr> </table>	Minor Storm	Major Storm	Design Storm Return Period, $T_r$ =		Return Period One-Hour Precipitation, $P_1$ =		$C_1$ =		$C_2$ =		$C_3$ =		User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =		User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ =		<--- FILL IN THE SECTIONS BELOW. <---
Minor Storm	Major Storm																		
Design Storm Return Period, $T_r$ =																			
Return Period One-Hour Precipitation, $P_1$ =																			
$C_1$ =																			
$C_2$ =																			
$C_3$ =																			
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =																			
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ =																			
		Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ = <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px;">0.0</td><td style="padding: 2px;">0.0</td></tr></table> cfs	0.0	0.0															
0.0	0.0																		
		Total Design Peak Flow, Q = <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px;">1.0</td><td style="padding: 2px;">2.6</td></tr></table> cfs	1.0	2.6															
1.0	2.6																		

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

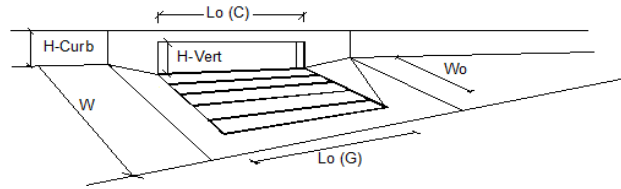
Project: **COMPARK SOUTH**  
 Inlet ID: **INLET 5-4A**



<b>Gutter Geometry (Enter data in the blue cells)</b>																	
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = $ <input style="width: 50px;" type="text" value="0.0"/> ft																
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft																
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/>																
Height of Curb at Gutter Flow Line	$H_{CURB} = $ <input style="width: 50px;" type="text" value="4.00"/> inches																
Distance from Curb Face to Street Crown	$T_{CROWN} = $ <input style="width: 50px;" type="text" value="17.0"/> ft																
Gutter Width	$W = $ <input style="width: 50px;" type="text" value="2.00"/> ft																
Street Transverse Slope	$S_x = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft																
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = $ <input style="width: 50px;" type="text" value="0.083"/> ft/ft																
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = $ <input style="width: 50px;" type="text" value="0.010"/> ft/ft																
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = $ <input style="width: 50px;" type="text" value="0.016"/>																
Max. Allowable Spread for Minor & Major Storm	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 25%; text-align: center;">Minor Storm</th> <th style="width: 25%; text-align: center;">Major Storm</th> <th style="width: 10%;"></th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} = </math></td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="17.0"/></td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="17.0"/></td> <td style="text-align: right;">ft</td> </tr> <tr> <td><math>d_{MAX} = </math></td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="4.0"/></td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="12.0"/></td> <td style="text-align: right;">inches</td> </tr> <tr> <td>Allow Flow Depth at Street Crown (leave blank for no)</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: right;">check = yes</td> </tr> </tbody> </table>		Minor Storm	Major Storm		$T_{MAX} = $	<input style="width: 40px;" type="text" value="17.0"/>	<input style="width: 40px;" type="text" value="17.0"/>	ft	$d_{MAX} = $	<input style="width: 40px;" type="text" value="4.0"/>	<input style="width: 40px;" type="text" value="12.0"/>	inches	Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	check = yes
	Minor Storm	Major Storm															
$T_{MAX} = $	<input style="width: 40px;" type="text" value="17.0"/>	<input style="width: 40px;" type="text" value="17.0"/>	ft														
$d_{MAX} = $	<input style="width: 40px;" type="text" value="4.0"/>	<input style="width: 40px;" type="text" value="12.0"/>	inches														
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	check = yes														
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>	$Q_{allow} = $ <table style="display: inline-table; border-collapse: collapse;"><tr><th style="width: 50%;"></th><th style="width: 25%; text-align: center;">Minor Storm</th><th style="width: 25%; text-align: center;">Major Storm</th></tr><tr><td></td><td style="text-align: center;"><input style="width: 40px;" type="text" value="3.4"/></td><td style="text-align: center;"><input style="width: 40px;" type="text" value="91.2"/></td></tr></table> cfs		Minor Storm	Major Storm		<input style="width: 40px;" type="text" value="3.4"/>	<input style="width: 40px;" type="text" value="91.2"/>										
	Minor Storm	Major Storm															
	<input style="width: 40px;" type="text" value="3.4"/>	<input style="width: 40px;" type="text" value="91.2"/>															
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>																	
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'																	
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'																	

**INLET ON A CONTINUOUS GRADE**

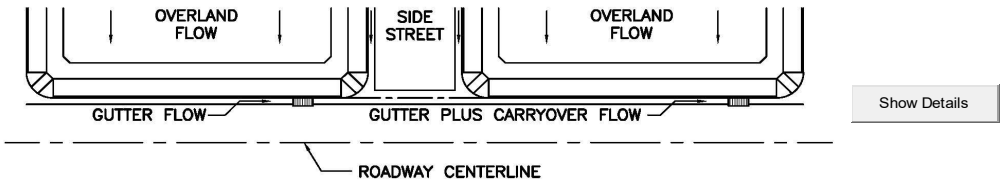
Project: COMPARK SOUTH  
 Inlet ID: INLET 5-4A



Design Information (Input)	MINOR		MAJOR		
	MINOR	MAJOR	MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening				
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	5.0	5.0			inches
Total Number of Units in the Inlet (Grate or Curb Opening)	1	1			
Length of a Single Unit Inlet (Grate or Curb Opening)	5.00	5.00			ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	N/A	N/A			ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	N/A	N/A			
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	0.10	0.10			
<b>Street Hydraulics: OK - Q &lt; maximum allowable from sheet 'Q-Allow'</b>					
Total Inlet Interception Capacity	1.00	2.22			cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	0.0	0.4			cfs
Capture Percentage = $Q_a/Q_o$ =	100	85			%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 5-5



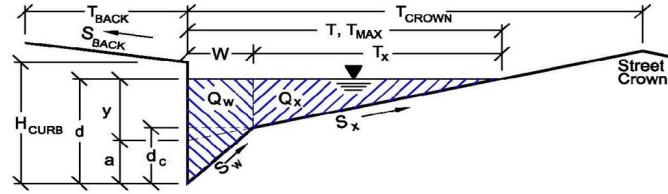
<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		Minor Storm	Major Storm	
		*Q <sub>known</sub> =	3.3	9.0
				cfs
* If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.				
<b>Geographic Information:</b> (Enter data in the blue cells):				
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban		Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median		
Subcatchment Area =		Acres		
Percent Imperviousness =		%		
NRCS Soil Type =		A, B, C, or D		
Overland Flow =		Slope (ft/ft)	Length (ft)	
Channel Flow =				
<b>Rainfall Information:</b> Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c)^{C_3}$				
Design Storm Return Period, T <sub>r</sub> =		Minor Storm	Major Storm	years
Return Period One-Hour Precipitation, P <sub>1</sub> =				inches
C <sub>1</sub> =				
C <sub>2</sub> =				
C <sub>3</sub> =				
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C =				
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C <sub>5</sub> =				
Bypass (Carry-Over) Flow from upstream Subcatchments, Q <sub>b</sub> =		0.0	6.4	cfs
Total Design Peak Flow, Q =		3.3	15.4	cfs

<---  
 FILL IN THIS SECTION  
 OR...  
 FILL IN THE  
 SECTIONS BELOW.  
 <---

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

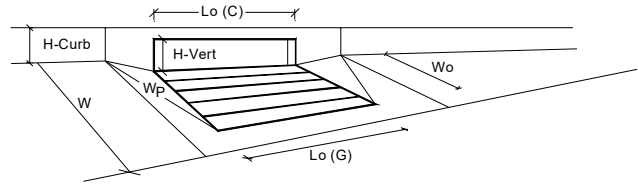
Project: **COMPARK SOUTH**  
 Inlet ID: **INLET 5-5**



<b>Gutter Geometry (Enter data in the blue cells)</b>	
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 0.0$ ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.020$
Height of Curb at Gutter Flow Line	$H_{CURB} = 4.00$ inches
Distance from Curb Face to Street Crown	$T_{CROWN} = 17.0$ ft
Gutter Width	$W = 2.00$ ft
Street Transverse Slope	$S_x = 0.020$ ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = 0.083$ ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = 0.000$ ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$
Max. Allowable Spread for Minor & Major Storm	$T_{MAX} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 17.0 & 17.0 \end{matrix}$ ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	$d_{MAX} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 4.0 & 12.0 \end{matrix}$ inches
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input checked="" type="checkbox"/> check = yes
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>	
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>	
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'	
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'	
$Q_{allow} =$	$\begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ \text{SUMP} & \text{SUMP} \end{matrix}$ cfs

**INLET IN A SUMP OR SAG LOCATION**

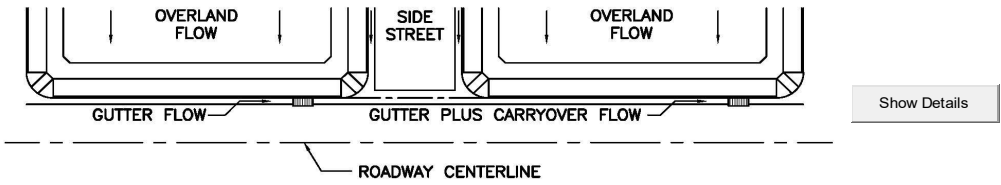
Project = **COMPARK SOUTH**  
 Inlet ID = **INLET 5-5**



Design Information (Input)	MINOR		MAJOR	
	Type of Inlet	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{local}$ =	5.00	5.00	inches
Number of Unit Inlets (Grate or Curb Opening)	$N_o$ =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.1	12.0	inches
<b>Grate Information</b>	<input checked="" type="checkbox"/> Override Depths			
Length of a Unit Grate	$L_o (G)$ =	N/A	N/A	feet
Width of a Unit Grate	$W_o$ =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	$A_{ratio}$ =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	$C_r (G)$ =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	$C_w (G)$ =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	$C_o (G)$ =	N/A	N/A	
<b>Curb Opening Information</b>				
Length of a Unit Curb Opening	$L_o (C)$ =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	$H_{vert}$ =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	$H_{throat}$ =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	$W_p$ =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	$C_r (C)$ =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	$C_w (C)$ =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	$C_o (C)$ =	0.67	0.67	
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>				
<b>Inlet Capacity IS GOOD for Minor and Major Storms (&gt;Q PEAK)</b>	$Q_a$ =	3.4	27.5	cfs
	$Q_{PEAK REQUIRED}$ =	3.3	15.4	cfs

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
Inlet ID: INLET 5-5A

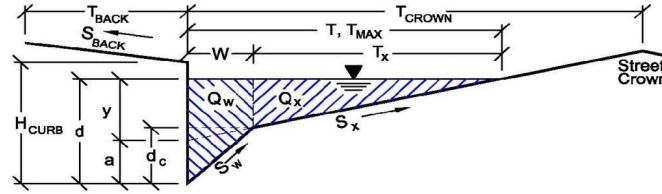


<p><b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):</p> <p><b>*Q<sub>known</sub></b> = <table border="1" style="display: inline-table;"><tr><td>Minor Storm</td><td>Major Storm</td></tr><tr><td style="text-align: center;">4.2</td><td style="text-align: center;">12.1</td></tr></table> cfs</p> <p><b>* If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.</b></p>		Minor Storm	Major Storm	4.2	12.1	<p>&lt;--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. &lt;---</p>				
Minor Storm	Major Storm									
4.2	12.1									
<p><b>Geographic Information:</b> (Enter data in the blue cells):</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Site Type:</p> <p><input type="radio"/> Site is Urban</p> <p><input type="radio"/> Site is Non-Urban</p> </div> <div style="width: 30%;"> <p>Flows Developed For:</p> <p><input type="radio"/> Street Inlets</p> <p><input type="radio"/> Area Inlets in a Median</p> </div> <div style="width: 30%;"> <p>Subcatchment Area = <input type="text"/> Acres</p> <p>Percent Imperviousness = <input type="text"/> %</p> <p>NRCS Soil Type = <input type="text"/> A, B, C, or D</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p>Slope (ft/ft)    Length (ft)</p> <p>Overland Flow = <input type="text"/>    <input type="text"/></p> <p>Channel Flow = <input type="text"/>    <input type="text"/></p> </div> </div>										
<p><b>Rainfall Information:</b> Intensity I (inch/hr) = <math>C_1 * P_1 / (C_2 + T_c)^{C_3}</math></p> <p>Design Storm Return Period, T<sub>r</sub> = <input type="text"/> years</p> <p>Return Period One-Hour Precipitation, P<sub>1</sub> = <input type="text"/> inches</p> <p>C<sub>1</sub> = <input type="text"/></p> <p>C<sub>2</sub> = <input type="text"/></p> <p>C<sub>3</sub> = <input type="text"/></p> <p>User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = <input type="text"/></p> <p>User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), C<sub>5</sub> = <input type="text"/></p> <p>Bypass (Carry-Over) Flow from upstream Subcatchments, Q<sub>b</sub> = <table border="1" style="display: inline-table;"><tr><td>Minor Storm</td><td>Major Storm</td></tr><tr><td style="text-align: center;">0.0</td><td style="text-align: center;">0.2</td></tr></table> cfs</p> <p style="text-align: right;"><b>Total Design Peak Flow, Q =</b> <table border="1" style="display: inline-table;"><tr><td>Minor Storm</td><td>Major Storm</td></tr><tr><td style="text-align: center;">4.2</td><td style="text-align: center;">12.3</td></tr></table> cfs</p>		Minor Storm	Major Storm	0.0	0.2	Minor Storm	Major Storm	4.2	12.3	
Minor Storm	Major Storm									
0.0	0.2									
Minor Storm	Major Storm									
4.2	12.3									

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

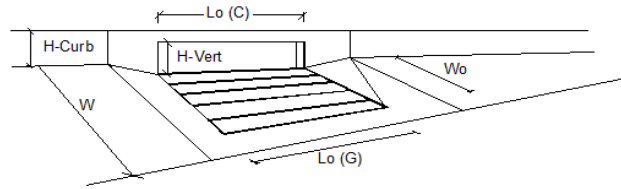
Project: **COMPARK SOUTH**  
 Inlet ID: **INLET 5-5A**



Gutter Geometry (Enter data in the blue cells)							
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = $ <input style="width: 50px;" type="text" value="0.0"/> ft						
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft						
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/>						
Height of Curb at Gutter Flow Line	$H_{CURB} = $ <input style="width: 50px;" type="text" value="4.00"/> inches						
Distance from Curb Face to Street Crown	$T_{CROWN} = $ <input style="width: 50px;" type="text" value="17.0"/> ft						
Gutter Width	$W = $ <input style="width: 50px;" type="text" value="2.00"/> ft						
Street Transverse Slope	$S_x = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft						
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = $ <input style="width: 50px;" type="text" value="0.083"/> ft/ft						
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = $ <input style="width: 50px;" type="text" value="0.010"/> ft/ft						
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = $ <input style="width: 50px;" type="text" value="0.016"/>						
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> <th style="padding: 2px;">ft</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><input style="width: 40px;" type="text" value="17.0"/></td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="17.0"/></td> <td></td> </tr> </tbody> </table>	Minor Storm	Major Storm	ft	<input style="width: 40px;" type="text" value="17.0"/>	<input style="width: 40px;" type="text" value="17.0"/>	
Minor Storm	Major Storm	ft					
<input style="width: 40px;" type="text" value="17.0"/>	<input style="width: 40px;" type="text" value="17.0"/>						
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> <th style="padding: 2px;">inches</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><input style="width: 40px;" type="text" value="4.3"/></td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="12.0"/></td> <td></td> </tr> </tbody> </table>	Minor Storm	Major Storm	inches	<input style="width: 40px;" type="text" value="4.3"/>	<input style="width: 40px;" type="text" value="12.0"/>	
Minor Storm	Major Storm	inches					
<input style="width: 40px;" type="text" value="4.3"/>	<input style="width: 40px;" type="text" value="12.0"/>						
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input checked="" type="checkbox"/> check = yes						
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>							
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>							
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'							
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'							
$Q_{allow} = $	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Minor Storm</th> <th style="padding: 2px;">Major Storm</th> <th style="padding: 2px;">cfs</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><input style="width: 40px;" type="text" value="4.4"/></td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="91.2"/></td> <td></td> </tr> </tbody> </table>	Minor Storm	Major Storm	cfs	<input style="width: 40px;" type="text" value="4.4"/>	<input style="width: 40px;" type="text" value="91.2"/>	
Minor Storm	Major Storm	cfs					
<input style="width: 40px;" type="text" value="4.4"/>	<input style="width: 40px;" type="text" value="91.2"/>						

**INLET ON A CONTINUOUS GRADE**

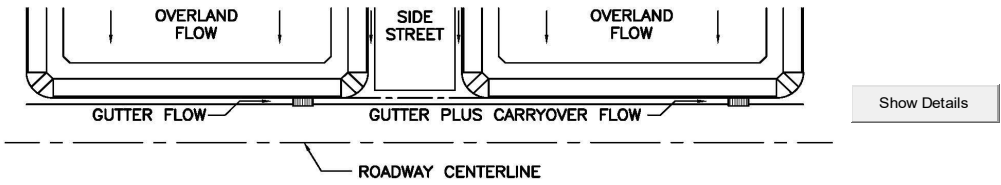
Project: COMPARK SOUTH  
 Inlet ID: INLET 5-5A



Design Information (Input)	MINOR		MAJOR	
	Type of Inlet	Type = CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a <sub>LOCAL</sub> = 3.0	3.0	inches	
Total Number of Units in the Inlet (Grate or Curb Opening)	No = 3	3		
Length of a Single Unit Inlet (Grate or Curb Opening)	L <sub>o</sub> = 5.00	5.00	ft	
Width of a Unit Grate (cannot be greater than W from Q-Allow)	W <sub>o</sub> = N/A	N/A	ft	
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C <sub>r-G</sub> = N/A	N/A		
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C <sub>r-C</sub> = 0.10	0.10		
<b>Street Hydraulics: OK - Q &lt; maximum allowable from sheet 'Q-Allow'</b>				
Total Inlet Interception Capacity	Q = 4.20	10.62	cfs	
Total Inlet Carry-Over Flow (flow bypassing inlet)	Q <sub>b</sub> = 0.0	1.7	cfs	
Capture Percentage = Q <sub>a</sub> /Q <sub>o</sub> =	C% = 100	86	%	

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 5-5B

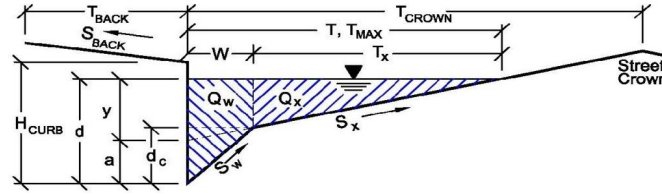


<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		Minor Storm    Major Storm * $Q_{known}$ = <input type="text" value="3.4"/> <input type="text" value="9.3"/> cfs	<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---
<b>Geographic Information:</b> (Enter data in the blue cells):		Subcatchment Area = <input type="text"/> Acres Percent Imperviousness = <input type="text"/> % NRCS Soil Type = <input type="text"/> A, B, C, or D	
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Slope (ft/ft)    Length (ft) Overland Flow = <input type="text"/> <input type="text"/> Channel Flow = <input type="text"/> <input type="text"/>	
<b>Rainfall Information:</b> Intensity $I$ (inch/hr) = $C_1 * P_1 / (C_2 + T_c)^{C_3}$		Minor Storm    Major Storm	
		Design Storm Return Period, $T_r$ = <input type="text"/> years	
		Return Period One-Hour Precipitation, $P_1$ = <input type="text"/> inches	
		$C_1$ = <input type="text"/>	
		$C_2$ = <input type="text"/>	
		$C_3$ = <input type="text"/>	
User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), $C$ = <input type="text"/>		$C$ = <input type="text"/>	
User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = <input type="text"/>		$C_5$ = <input type="text"/>	
Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ = <input type="text"/>		$Q_b$ = <input type="text" value="0.0"/> <input type="text" value="0.0"/> cfs	
Total Design Peak Flow, $Q$ = <input type="text" value="3.4"/> <input type="text" value="9.3"/> cfs			

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

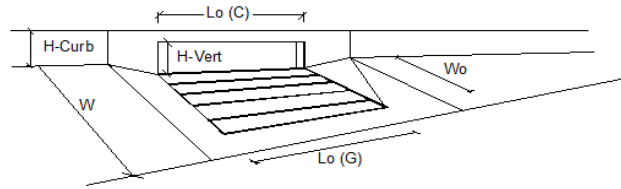
Project: **COMPARK SOUTH**  
 Inlet ID: **INLET 5-5B**



<b>Gutter Geometry (Enter data in the blue cells)</b>									
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = $ <input style="width: 50px;" type="text" value="0.0"/> ft								
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft								
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = $ <input style="width: 50px;" type="text" value="0.020"/>								
Height of Curb at Gutter Flow Line	$H_{CURB} = $ <input style="width: 50px;" type="text" value="4.01"/> inches								
Distance from Curb Face to Street Crown	$T_{CROWN} = $ <input style="width: 50px;" type="text" value="17.0"/> ft								
Gutter Width	$W = $ <input style="width: 50px;" type="text" value="2.00"/> ft								
Street Transverse Slope	$S_x = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft								
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = $ <input style="width: 50px;" type="text" value="0.083"/> ft/ft								
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = $ <input style="width: 50px;" type="text" value="0.010"/> ft/ft								
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = $ <input style="width: 50px;" type="text" value="0.016"/>								
Max. Allowable Spread for Minor & Major Storm	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;"><math>T_{MAX} = </math></td> <td style="text-align: center; border: none;">Minor Storm</td> <td style="text-align: center; border: none;">Major Storm</td> <td style="border: none;"></td> </tr> <tr> <td style="border: 1px solid black; width: 50px; text-align: center;">17.0</td> <td style="border: 1px solid black; width: 50px; text-align: center;">17.0</td> <td style="border: 1px solid black; width: 50px; text-align: center;">17.0</td> <td style="border: none;">ft</td> </tr> </table>	$T_{MAX} = $	Minor Storm	Major Storm		17.0	17.0	17.0	ft
$T_{MAX} = $	Minor Storm	Major Storm							
17.0	17.0	17.0	ft						
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;"><math>d_{MAX} = </math></td> <td style="text-align: center; border: none;">Minor Storm</td> <td style="text-align: center; border: none;">Major Storm</td> <td style="border: none;"></td> </tr> <tr> <td style="border: 1px solid black; width: 50px; text-align: center;">4.0</td> <td style="border: 1px solid black; width: 50px; text-align: center;">4.0</td> <td style="border: 1px solid black; width: 50px; text-align: center;">12.0</td> <td style="border: none;">inches</td> </tr> </table>	$d_{MAX} = $	Minor Storm	Major Storm		4.0	4.0	12.0	inches
$d_{MAX} = $	Minor Storm	Major Storm							
4.0	4.0	12.0	inches						
Allow Flow Depth at Street Crown (leave blank for no)	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;"><input type="checkbox"/></td> <td style="text-align: center; border: none;"><input checked="" type="checkbox"/></td> <td style="border: none;">check = yes</td> </tr> </table>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	check = yes					
<input type="checkbox"/>	<input checked="" type="checkbox"/>	check = yes							
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>									
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>									
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'									
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'									
$Q_{allow} = $	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;">Minor Storm</td> <td style="text-align: center; border: none;">Major Storm</td> <td style="border: none;"></td> </tr> <tr> <td style="border: 1px solid black; width: 50px; text-align: center;">3.4</td> <td style="border: 1px solid black; width: 50px; text-align: center;">91.2</td> <td style="border: none;">cfs</td> </tr> </table>	Minor Storm	Major Storm		3.4	91.2	cfs		
Minor Storm	Major Storm								
3.4	91.2	cfs							

**INLET ON A CONTINUOUS GRADE**

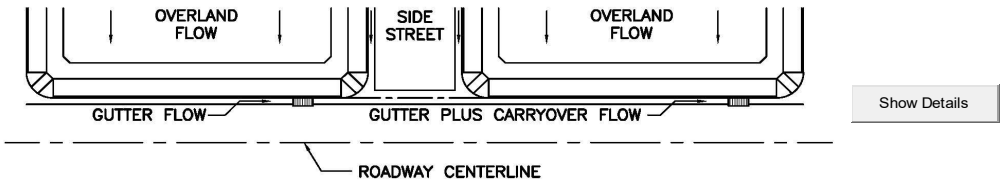
Project: COMPARK SOUTH  
 Inlet ID: INLET 5-5B



Design Information (Input)	MINOR		MAJOR	
	Type of Inlet	Type = CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{LOCAL} = 5.0$	$5.0$	inches	
Total Number of Units in the Inlet (Grate or Curb Opening)	$N_o = 2$	$2$		
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_o = 5.00$	$5.00$	ft	
Width of a Unit Grate (cannot be greater than W from Q-Allow)	$W_o = N/A$	$N/A$	ft	
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G = N/A$	$N/A$		
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C = 0.10$	$0.10$		
<b>Street Hydraulics: OK - Q &lt; maximum allowable from sheet 'Q-Allow'</b>				
Total Inlet Interception Capacity	$Q = 3.40$	$7.54$	cfs	
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b = 0.0$	$1.8$	cfs	
Capture Percentage = $Q_d/Q_o =$	$C\% = 100$	$81$	%	

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 6-4

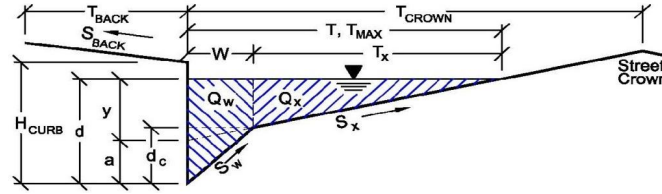


<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="text-align: center; padding: 2px;">1.1</td> <td style="text-align: center; padding: 2px;">3.5</td> </tr> </table> cfs	Minor Storm	Major Storm	1.1	3.5	<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---						
Minor Storm	Major Storm												
1.1	3.5												
* If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.													
<b>Geographic Information:</b> (Enter data in the blue cells):													
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Subcatchment Area = <input style="width: 50px;" type="text"/> Acres Percent Imperviousness = <input style="width: 50px;" type="text"/> % NRCS Soil Type = <input style="width: 50px;" type="text"/> A, B, C, or D											
		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Slope (ft/ft)</td> <td style="padding: 2px;">Length (ft)</td> </tr> <tr> <td style="padding: 2px;">Overland Flow = <input style="width: 50px;" type="text"/></td> <td style="padding: 2px;">Channel Flow = <input style="width: 50px;" type="text"/></td> </tr> </table>	Slope (ft/ft)	Length (ft)	Overland Flow = <input style="width: 50px;" type="text"/>	Channel Flow = <input style="width: 50px;" type="text"/>							
Slope (ft/ft)	Length (ft)												
Overland Flow = <input style="width: 50px;" type="text"/>	Channel Flow = <input style="width: 50px;" type="text"/>												
<b>Rainfall Information:</b> Intensity I (inch/hr) = $C_1 * P_1 / (C_2 + T_c)^{C_3}$													
	Design Storm Return Period, $T_r$ = <input style="width: 50px;" type="text"/> years Return Period One-Hour Precipitation, $P_1$ = <input style="width: 50px;" type="text"/> inches	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="padding: 2px;"><math>C_1</math> = <input style="width: 50px;" type="text"/></td> <td style="padding: 2px;"><math>C_1</math> = <input style="width: 50px;" type="text"/></td> </tr> <tr> <td style="padding: 2px;"><math>C_2</math> = <input style="width: 50px;" type="text"/></td> <td style="padding: 2px;"><math>C_2</math> = <input style="width: 50px;" type="text"/></td> </tr> <tr> <td style="padding: 2px;"><math>C_3</math> = <input style="width: 50px;" type="text"/></td> <td style="padding: 2px;"><math>C_3</math> = <input style="width: 50px;" type="text"/></td> </tr> <tr> <td style="padding: 2px;">User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = <input style="width: 50px;" type="text"/></td> <td style="padding: 2px;">User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), <math>C_5</math> = <input style="width: 50px;" type="text"/></td> </tr> </table>	Minor Storm	Major Storm	$C_1$ = <input style="width: 50px;" type="text"/>	$C_1$ = <input style="width: 50px;" type="text"/>	$C_2$ = <input style="width: 50px;" type="text"/>	$C_2$ = <input style="width: 50px;" type="text"/>	$C_3$ = <input style="width: 50px;" type="text"/>	$C_3$ = <input style="width: 50px;" type="text"/>	User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = <input style="width: 50px;" type="text"/>	User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = <input style="width: 50px;" type="text"/>	
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		Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ = <input style="width: 50px; text-align: center; border: 1px solid black;" type="text"/> 0.0 <input style="width: 50px; text-align: center; border: 1px solid black;" type="text"/> 0.0 cfs											
		Total Design Peak Flow, Q = <input style="width: 50px; text-align: center; border: 1px solid green;" type="text"/> 1.1 <input style="width: 50px; text-align: center; border: 1px solid green;" type="text"/> 3.5 cfs											

**ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)**

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

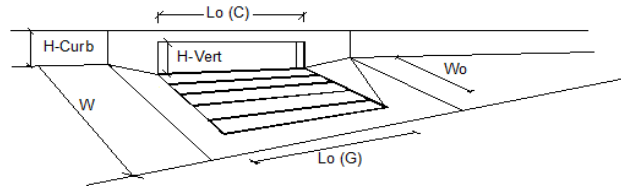
Project: COMPARK SOUTH  
 Inlet ID: INLET 6-4



Gutter Geometry (Enter data in the blue cells)	
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 0.0$ ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.020$
Height of Curb at Gutter Flow Line	$H_{CURB} = 4.00$ inches
Distance from Curb Face to Street Crown	$T_{CROWN} = 17.0$ ft
Gutter Width	$W = 2.00$ ft
Street Transverse Slope	$S_x = 0.020$ ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = 0.083$ ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = 0.006$ ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$
Max. Allowable Spread for Minor & Major Storm	$T_{MAX} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 17.0 & 17.0 \end{matrix}$ ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	$d_{MAX} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 4.0 & 12.0 \end{matrix}$ inches
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input checked="" type="checkbox"/> check = yes
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>	
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>	
<b>Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'</b>	
<b>Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'</b>	
	$Q_{allow} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 2.6 & 70.6 \end{matrix}$ cfs

## INLET ON A CONTINUOUS GRADE

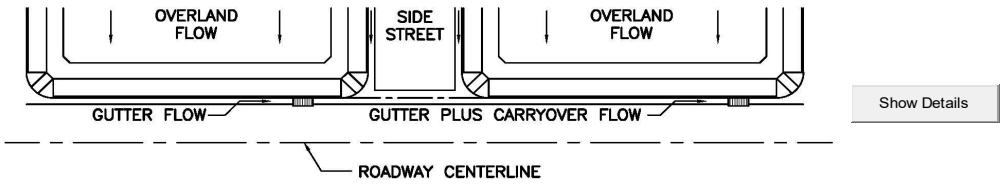
Project: COMPARK SOUTH  
 Inlet ID: INLET 6-4



Design Information (Input)	MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	0.10	0.10	
<b>Street Hydraulics: OK - Q &lt; maximum allowable from sheet 'Q-Allow'</b>			
Total Inlet Interception Capacity	1.10	3.50	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	0.0	0.0	cfs
Capture Percentage = $Q_i/Q_o$ =	100	100	%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 6-5



<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="text-align: center; padding: 2px;">3.9</td> <td style="text-align: center; padding: 2px;">17.6</td> </tr> <tr> <td colspan="2" style="text-align: right; padding: 2px;">cfs</td> </tr> </table>	Minor Storm	Major Storm	3.9	17.6	cfs		<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---																													
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Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Subcatchment Area = <input style="width: 50px;" type="text"/> Acres Percent Imperviousness = <input style="width: 50px;" type="text"/> % NRCS Soil Type = <input style="width: 50px;" type="text"/> A, B, C, or D																																				
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Design Storm Return Period, $T_r$ =	Minor Storm	Major Storm	years																																			
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## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

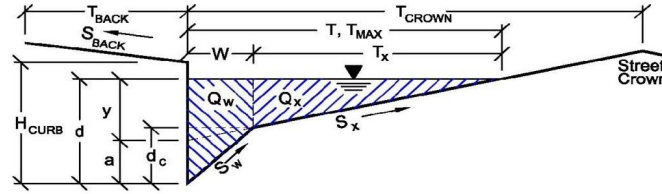
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

**COMPARK SOUTH**

Inlet ID:

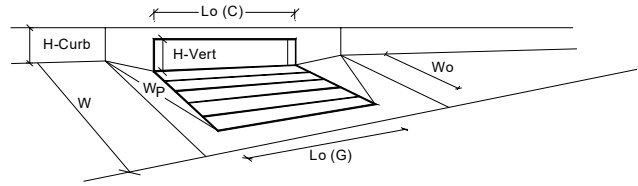
**INLET 6-5**



<b>Gutter Geometry (Enter data in the blue cells)</b>							
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 0.0$ ft						
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft						
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.020$						
Height of Curb at Gutter Flow Line	$H_{CURB} = 4.00$ inches						
Distance from Curb Face to Street Crown	$T_{CROWN} = 17.0$ ft						
Gutter Width	$W = 2.00$ ft						
Street Transverse Slope	$S_x = 0.020$ ft/ft						
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = 0.083$ ft/ft						
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = 0.000$ ft/ft						
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.013$						
Max. Allowable Spread for Minor & Major Storm	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;">Minor Storm</td> <td style="text-align: center; border: none;">Major Storm</td> <td style="border: none;"></td> </tr> <tr> <td style="border: 1px solid black; text-align: center;"><math>T_{MAX} = 17.0</math></td> <td style="border: 1px solid black; text-align: center;"><math>T_{MAX} = 17.0</math></td> <td style="border: none;">ft</td> </tr> </table>	Minor Storm	Major Storm		$T_{MAX} = 17.0$	$T_{MAX} = 17.0$	ft
Minor Storm	Major Storm						
$T_{MAX} = 17.0$	$T_{MAX} = 17.0$	ft					
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;">Minor Storm</td> <td style="text-align: center; border: none;">Major Storm</td> <td style="border: none;"></td> </tr> <tr> <td style="border: 1px solid black; text-align: center;"><math>d_{MAX} = 4.0</math></td> <td style="border: 1px solid black; text-align: center;"><math>d_{MAX} = 12.0</math></td> <td style="border: none;">inches</td> </tr> </table>	Minor Storm	Major Storm		$d_{MAX} = 4.0$	$d_{MAX} = 12.0$	inches
Minor Storm	Major Storm						
$d_{MAX} = 4.0$	$d_{MAX} = 12.0$	inches					
Allow Flow Depth at Street Crown (leave blank for no)	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;"><input type="checkbox"/></td> <td style="text-align: center; border: none;"><input checked="" type="checkbox"/></td> <td style="border: none;">check = yes</td> </tr> </table>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	check = yes			
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<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>							
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>							
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'							
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$Q_{allow} =$	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;">Minor Storm</td> <td style="text-align: center; border: none;">Major Storm</td> <td style="border: none;"></td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">SUMP</td> <td style="border: 1px solid black; text-align: center;">SUMP</td> <td style="border: none;">cfs</td> </tr> </table>	Minor Storm	Major Storm		SUMP	SUMP	cfs
Minor Storm	Major Storm						
SUMP	SUMP	cfs					

**INLET IN A SUMP OR SAG LOCATION**

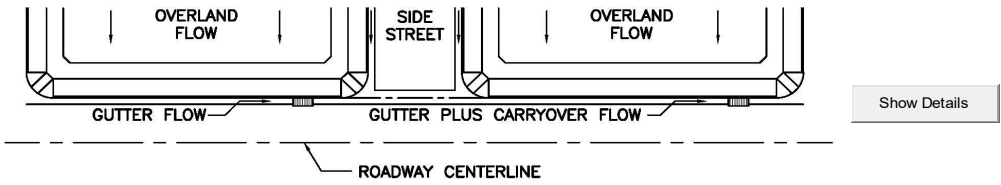
Project = **COMPARK SOUTH**  
 Inlet ID = **INLET 6-5**



<b>Design Information (Input)</b>		MINOR		MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening			
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	$a_{local}$ =	5.00	5.00	inches	
Number of Unit Inlets (Grate or Curb Opening)	$N_o$ =	3	3		
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.0	12.0	inches	<input checked="" type="checkbox"/> Override Depths
<b>Grate Information</b>		MINOR		MAJOR	
Length of a Unit Grate	$L_o (G)$ =	N/A	N/A	feet	
Width of a Unit Grate	$W_o$ =	N/A	N/A	feet	
Area Opening Ratio for a Grate (typical values 0.15-0.90)	$A_{ratio}$ =	N/A	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	$C_r (G)$ =	N/A	N/A		
Grate Weir Coefficient (typical value 2.15 - 3.60)	$C_w (G)$ =	N/A	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	$C_o (G)$ =	N/A	N/A		
<b>Curb Opening Information</b>		MINOR		MAJOR	
Length of a Unit Curb Opening	$L_o (C)$ =	5.00	5.00	feet	
Height of Vertical Curb Opening in Inches	$H_{vert}$ =	6.00	6.00	inches	
Height of Curb Orifice Throat in Inches	$H_{throat}$ =	6.00	6.00	inches	
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees	
Side Width for Depression Pan (typically the gutter width of 2 feet)	$W_p$ =	2.00	2.00	feet	
Clogging Factor for a Single Curb Opening (typical value 0.10)	$C_r (C)$ =	0.10	0.10		
Curb Opening Weir Coefficient (typical value 2.3-3.7)	$C_w (C)$ =	3.60	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	$C_o (C)$ =	0.67	0.67		
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>		MINOR		MAJOR	
	$Q_a$ =	3.9	42.1	cfs	
<b>Inlet Capacity IS GOOD for Minor and Major Storms (&gt;Q PEAK)</b>	$Q_{PEAK REQUIRED}$ =	3.9	18.5	cfs	

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 6-5A

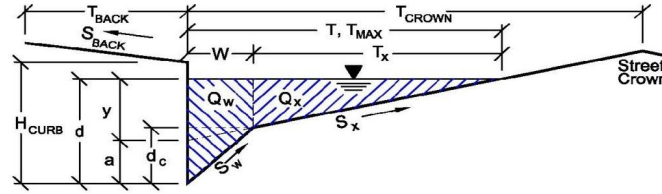


<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="text-align: center; padding: 2px;">2.6</td> <td style="text-align: center; padding: 2px;">6.7</td> </tr> </table> cfs	Minor Storm	Major Storm	2.6	6.7	<--- FILL IN THIS SECTION OR... FILL IN THE SECTIONS BELOW. <---																																
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## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

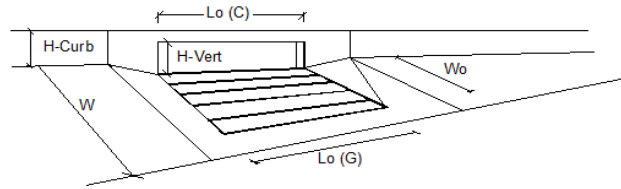
Project: **COMPARK SOUTH**  
 Inlet ID: **INLET 6-5A**



<b>Gutter Geometry (Enter data in the blue cells)</b>	
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 0.0$ ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.020$
Height of Curb at Gutter Flow Line	$H_{CURB} = 4.00$ inches
Distance from Curb Face to Street Crown	$T_{CROWN} = 17.0$ ft
Gutter Width	$W = 2.00$ ft
Street Transverse Slope	$S_x = 0.020$ ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = 0.083$ ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	$S_o = 0.038$ ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$
Max. Allowable Spread for Minor & Major Storm	$T_{MAX} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 17.0 & 17.0 \end{matrix}$ ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	$d_{MAX} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 4.0 & 12.0 \end{matrix}$ inches
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input checked="" type="checkbox"/> check = yes
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>	
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>	
Minor storm max. allowable capacity <b>GOOD</b> - greater than flow given on sheet 'Q-Peak'	$Q_{allow} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 6.6 & 88.7 \end{matrix}$ cfs
Major storm max. allowable capacity <b>GOOD</b> - greater than flow given on sheet 'Q-Peak'	

**INLET ON A CONTINUOUS GRADE**

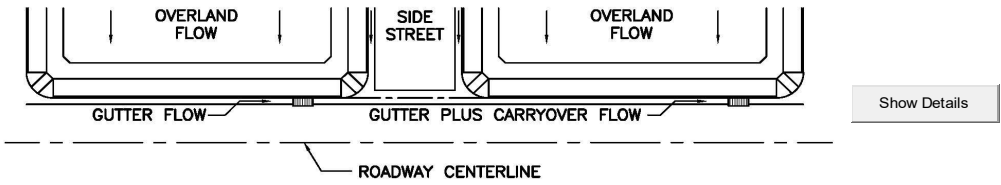
Project: COMPARK SOUTH  
 Inlet ID: INLET 6-5A



Design Information (Input)	MINOR		MAJOR		
	MINOR	MAJOR	MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening				
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	5.0	5.0	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	2	2	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)	5.00	5.00	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	N/A	N/A	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	N/A	N/A	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	0.10	0.10	0.10	0.10	
<b>Street Hydraulics: OK - Q &lt; maximum allowable from sheet 'Q-Allow'</b>					
Total Inlet Interception Capacity	2.60	6.24	2.60	6.24	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	0.0	0.5	0.0	0.5	cfs
Capture Percentage = $Q_a/Q_o$ =	100	93	100	93	%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

Project: COMPARK SOUTH  
 Inlet ID: INLET 6-5B

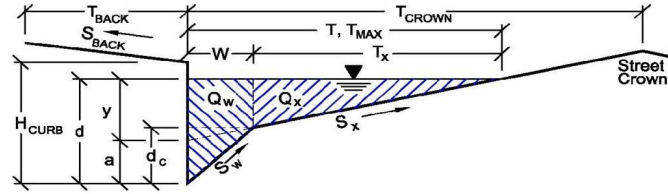


<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="text-align: center; padding: 2px;">2.0</td> <td style="text-align: center; padding: 2px;">5.4</td> </tr> </table> cfs	Minor Storm	Major Storm	2.0	5.4	<--- FILL IN THIS SECTION OR...												
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<b>Geographic Information:</b> (Enter data in the blue cells):																			
Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Subcatchment Area = <input type="text"/> Acres Percent Imperviousness = <input type="text"/> % NRCS Soil Type = <input type="text"/> A, B, C, or D	FILL IN THE SECTIONS BELOW. <---																
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## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

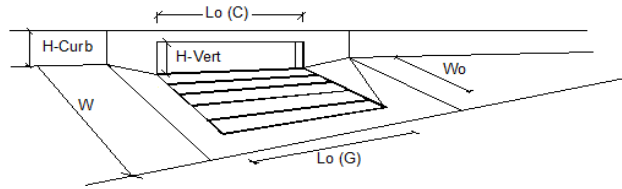
Project: **COMPARK SOUTH**  
 Inlet ID: **INLET 6-5B**



<b>Gutter Geometry (Enter data in the blue cells)</b>													
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 0.0$ ft												
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = 0.020$ ft/ft												
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = 0.020$												
Height of Curb at Gutter Flow Line	$H_{CURB} = 4.00$ inches												
Distance from Curb Face to Street Crown	$T_{CROWN} = 17.0$ ft												
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Street Longitudinal Slope - Enter 0 for sump condition	$S_o = 0.038$ ft/ft												
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$												
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="width: 50px;"></th> <th style="width: 50px; text-align: center;">Minor Storm</th> <th style="width: 50px; text-align: center;">Major Storm</th> <th style="width: 50px;"></th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} =</math></td> <td style="text-align: center;">17.0</td> <td style="text-align: center;">17.0</td> <td style="text-align: right;">ft</td> </tr> <tr> <td><math>d_{MAX} =</math></td> <td style="text-align: center;">4.0</td> <td style="text-align: center;">12.0</td> <td style="text-align: right;">inches</td> </tr> </tbody> </table>		Minor Storm	Major Storm		$T_{MAX} =$	17.0	17.0	ft	$d_{MAX} =$	4.0	12.0	inches
	Minor Storm	Major Storm											
$T_{MAX} =$	17.0	17.0	ft										
$d_{MAX} =$	4.0	12.0	inches										
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm													
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input checked="" type="checkbox"/> check = yes												
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>													
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**INLET ON A CONTINUOUS GRADE**

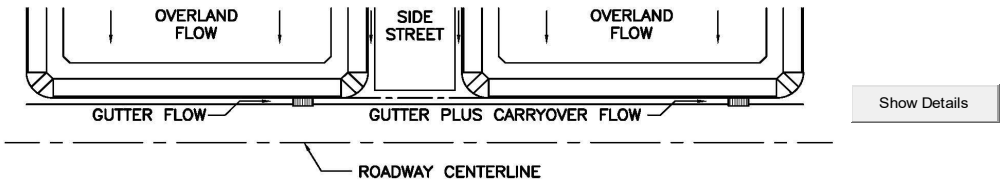
Project: COMPARK SOUTH  
 Inlet ID: INLET 6-5B



Design Information (Input)	MINOR		MAJOR		
	MINOR	MAJOR	MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening				
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	5.0	5.0	5.0	5.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	2	2	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)	5.00	5.00	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W from Q-Allow)	N/A	N/A	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	N/A	N/A	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	0.10	0.10	0.10	0.10	
<b>Street Hydraulics: OK - Q &lt; maximum allowable from sheet 'Q-Allow'</b>					
Total Inlet Interception Capacity	2.00	5.30	2.00	5.30	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	0.0	0.1	0.0	0.1	cfs
Capture Percentage = $Q_a/Q_o$ =	100	98	100	98	%

**DESIGN PEAK FLOW FOR ONE-HALF OF STREET  
OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD**

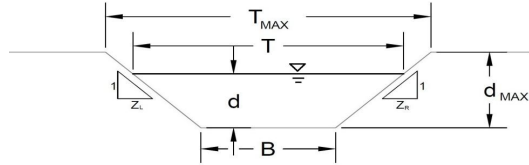
Project: COMPARK SOUTH  
 Inlet ID: INLET 7-5



<b>Design Flow:</b> ONLY if already determined through other methods: (local peak flow for 1/2 of street OR grass-lined channel):		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Minor Storm</td> <td style="padding: 2px;">Major Storm</td> </tr> <tr> <td style="text-align: center; padding: 2px;">0.2</td> <td style="text-align: center; padding: 2px;">10.2</td> </tr> </table> cfs	Minor Storm	Major Storm	0.2	10.2	<--- FILL IN THIS SECTION OR...												
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Site Type: <input type="radio"/> Site is Urban <input type="radio"/> Site is Non-Urban	Flows Developed For: <input type="radio"/> Street Inlets <input type="radio"/> Area Inlets in a Median	Subcatchment Area = <input style="width: 50px;" type="text"/> Acres Percent Imperviousness = <input style="width: 50px;" type="text"/> % NRCS Soil Type = <input style="width: 50px;" type="text"/> A, B, C, or D	FILL IN THE SECTIONS BELOW. <---																
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0.0	0.0																		
		Total Design Peak Flow, Q = <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px;">0.2</td><td style="padding: 2px;">10.2</td></tr></table> cfs	0.2	10.2															
0.2	10.2																		

## AREA INLET IN A TRAPEZOIDAL GRASS-LINED CHANNEL

COMPARK SOUTH  
INLET 7-5



Grass Type	Limiting Manning's n
A	0.06
B	0.04
C	0.033
D	0.03
E	0.024

### Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)  
Manning's n (Leave cell D16 blank to manually enter an n value)  
Channel Invert Slope  
Bottom Width  
Left Side Slope  
Right Side Slope

A, B, C, D or E  
n = 0.030  
S<sub>0</sub> = 0.0100 ft/ft  
B = 2.00 ft  
Z<sub>1</sub> = 5.00 ft/ft  
Z<sub>2</sub> = 5.00 ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V <sub>MAX</sub> )	Max Froude No. (F <sub>MAX</sub> )
Sandy	5.0 fps	0.50
Non-Sandy	7.0 fps	0.80

Choose One:  
 Sandy  
 Non-Sandy

Max. Allowable Top Width of Channel for Minor & Major Storm  
Max. Allowable Water Depth in Channel for Minor & Major Storm

	Minor Storm	Major Storm	
T <sub>MAX</sub> =	12.00	12.00	feet
d <sub>MAX</sub> =	1.00	1.00	feet

### Allowable Channel Capacity Based On Channel Geometry

MINOR STORM Allowable Capacity is based on Depth Criterion  
MAJOR STORM Allowable Capacity is based on Depth Criterion

	Minor Storm	Major Storm	
Q <sub>allow</sub> =	24.01	24.01	cfs
d <sub>allow</sub> =	1.00	1.00	ft

### Water Depth in Channel Based On Design Peak Flow

Design Peak Flow  
Water Depth

Q <sub>p</sub> =	0.20	10.20	cfs
d =	0.09	0.68	feet

Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'  
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

## AREA INLET IN A TRAPEZOIDAL GRASS-LINED CHANNEL

COMPARK SOUTH  
INLET 7-5

### Inlet Design Information (Input)

Type of Inlet

Inlet Type = CDOT Type C

Angle of Inclined Gate (must be  $\leq 30$  degrees)

$\theta =$  0.00 degrees

Width of Gate

$W =$  3.00 feet

Length of Gate

$L =$  3.00 feet

Open Area Ratio

$A_{RATIO} =$  0.70

Height of Inclined Gate

$H_B =$  0.00 feet

Clogging Factor

$C_f =$  0.50

Grate Discharge Coefficient

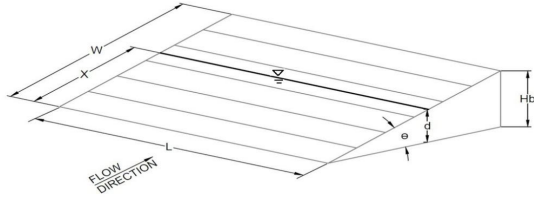
$C_d =$  0.96

Orifice Coefficient

$C_o =$  0.64

Weir Coefficient

$C_w =$  2.05



Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)

	MINOR	MAJOR
$d =$	<span style="border: 1px solid black; padding: 2px;">0.09</span>	<span style="border: 1px solid black; padding: 2px;">0.68</span>

**Total Inlet Interception Capacity (assumes clogged condition)**

	MINOR	MAJOR	
$Q_a =$	<span style="border: 1px solid black; padding: 2px;">0.51</span>	<span style="border: 1px solid black; padding: 2px;">10.44</span>	cfs

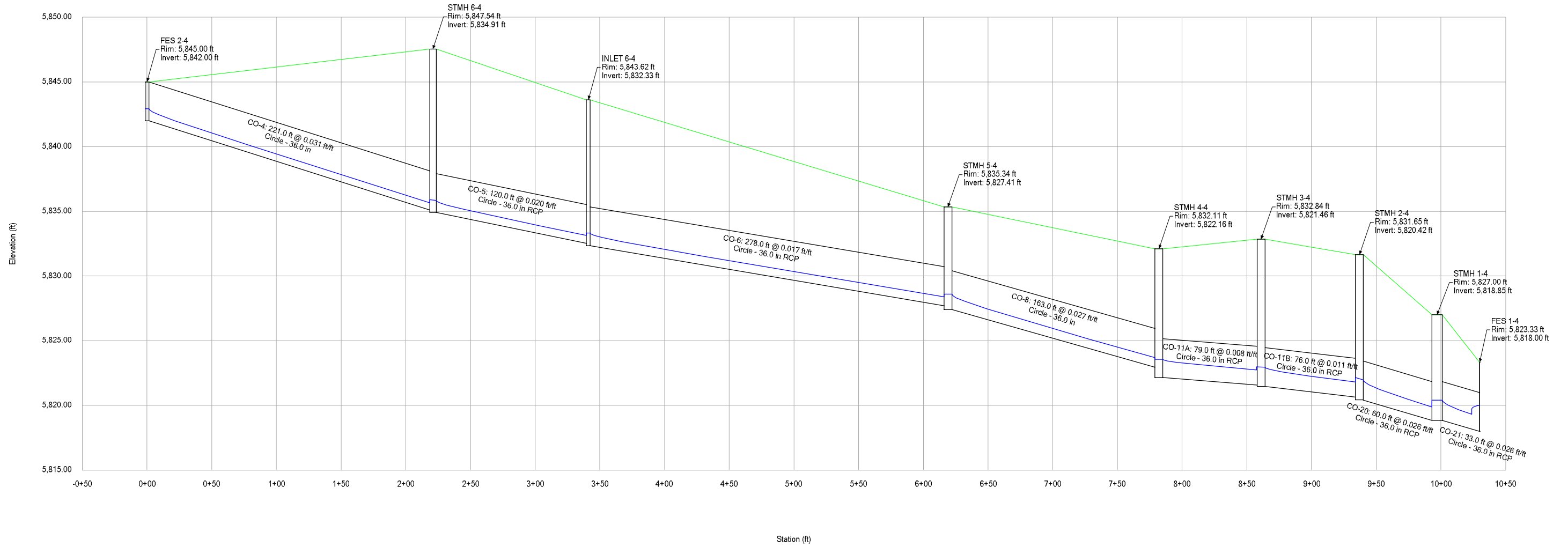
Inlet Capacity IS GOOD for Minor and Major Storms ( $> Q_{PEAK}$ )

Bypassed Flow,  $Q_b =$  0.00 0.00 cfs

Capture Percentage =  $Q_a/Q_o = C\%$  100 100 %

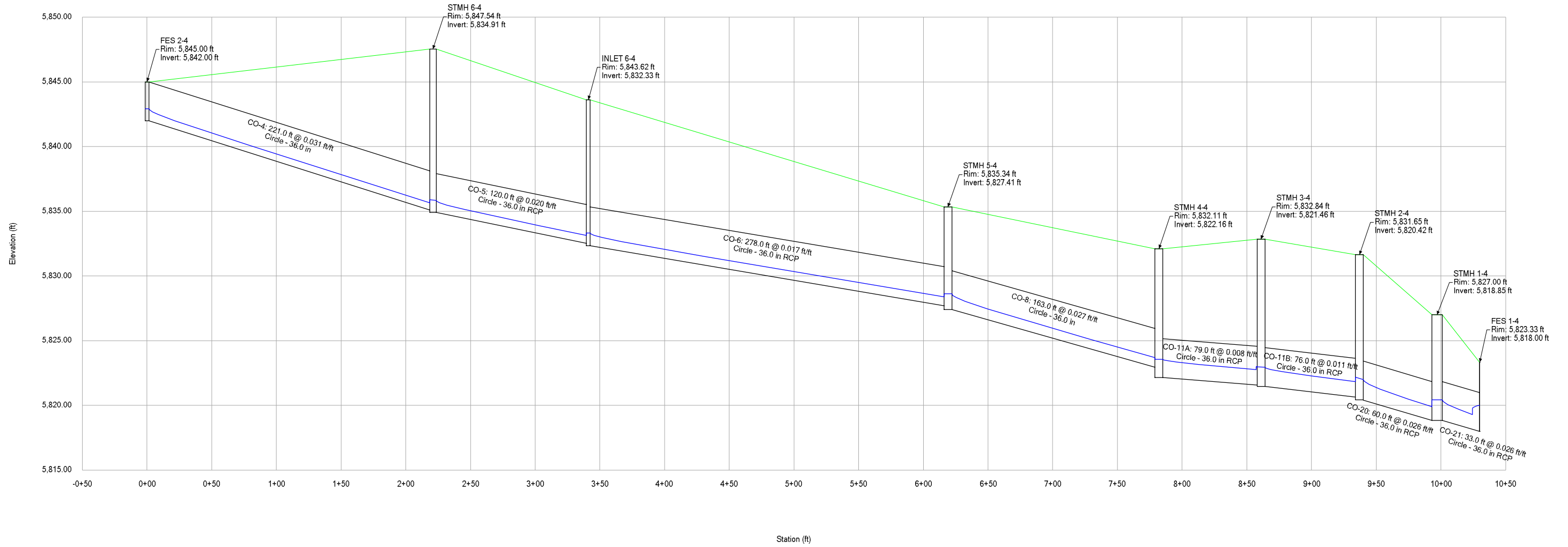
# Profile Report

## Engineering Profile - Profile - Storm Line 4 (Compark Village South StormCAD [2 year].stsw)



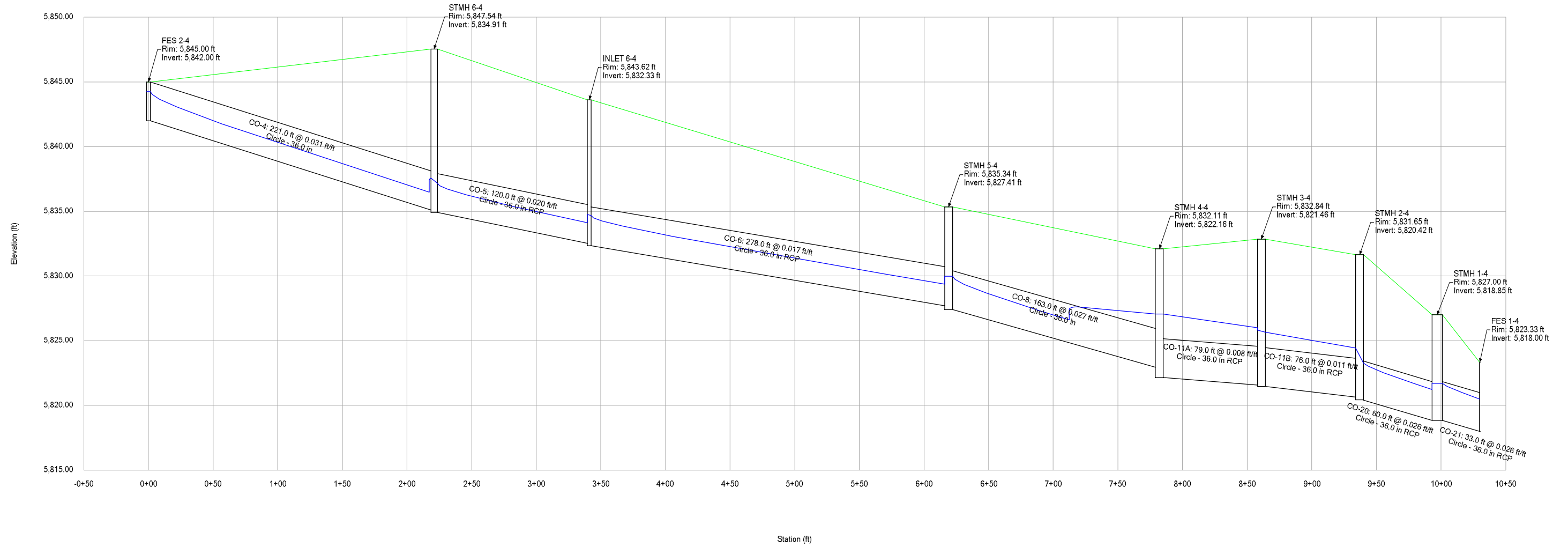
# Profile Report

## Engineering Profile - Profile - Storm Line 4 (Compark Village South StormCAD [5 year].stsw)

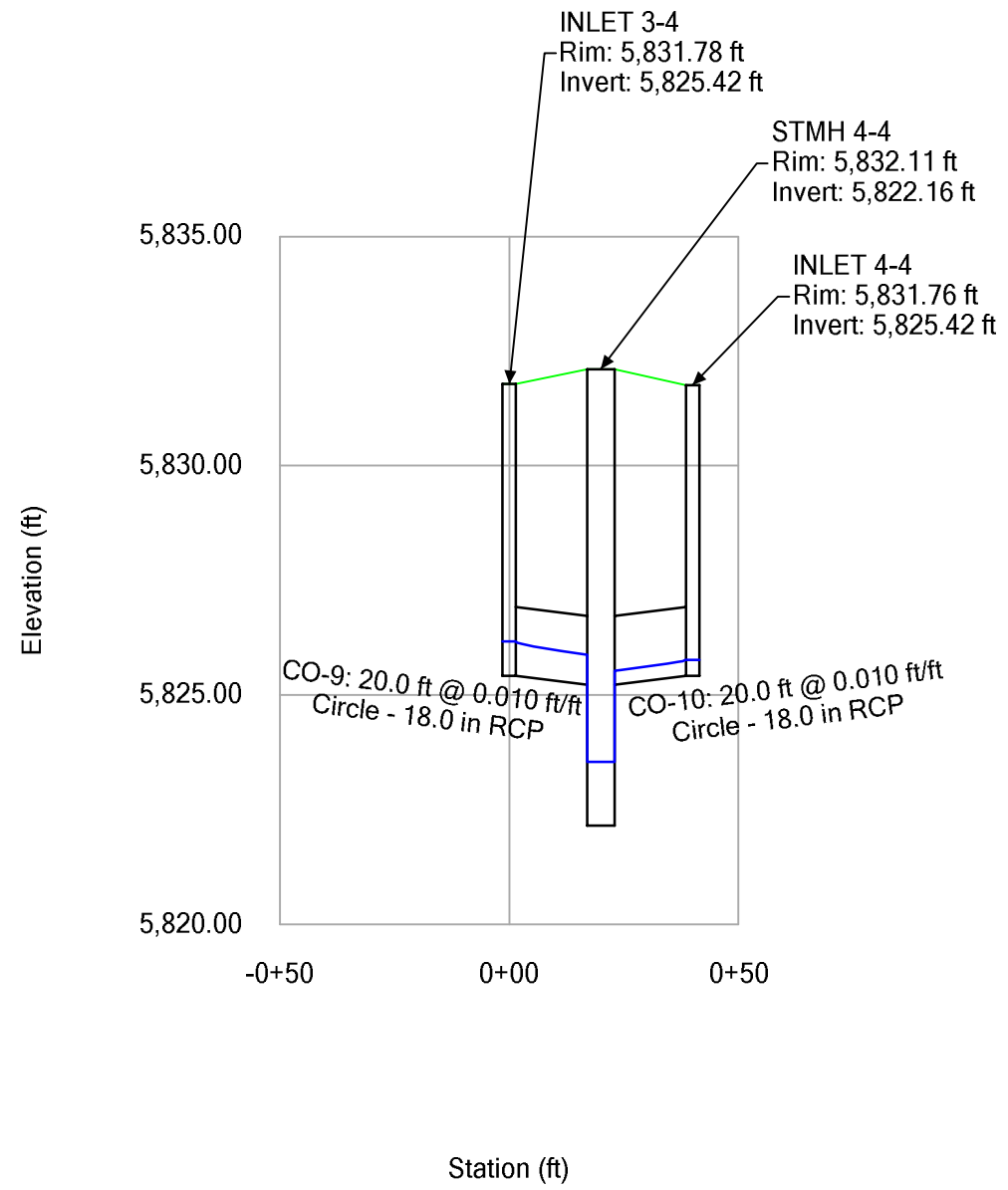


# Profile Report

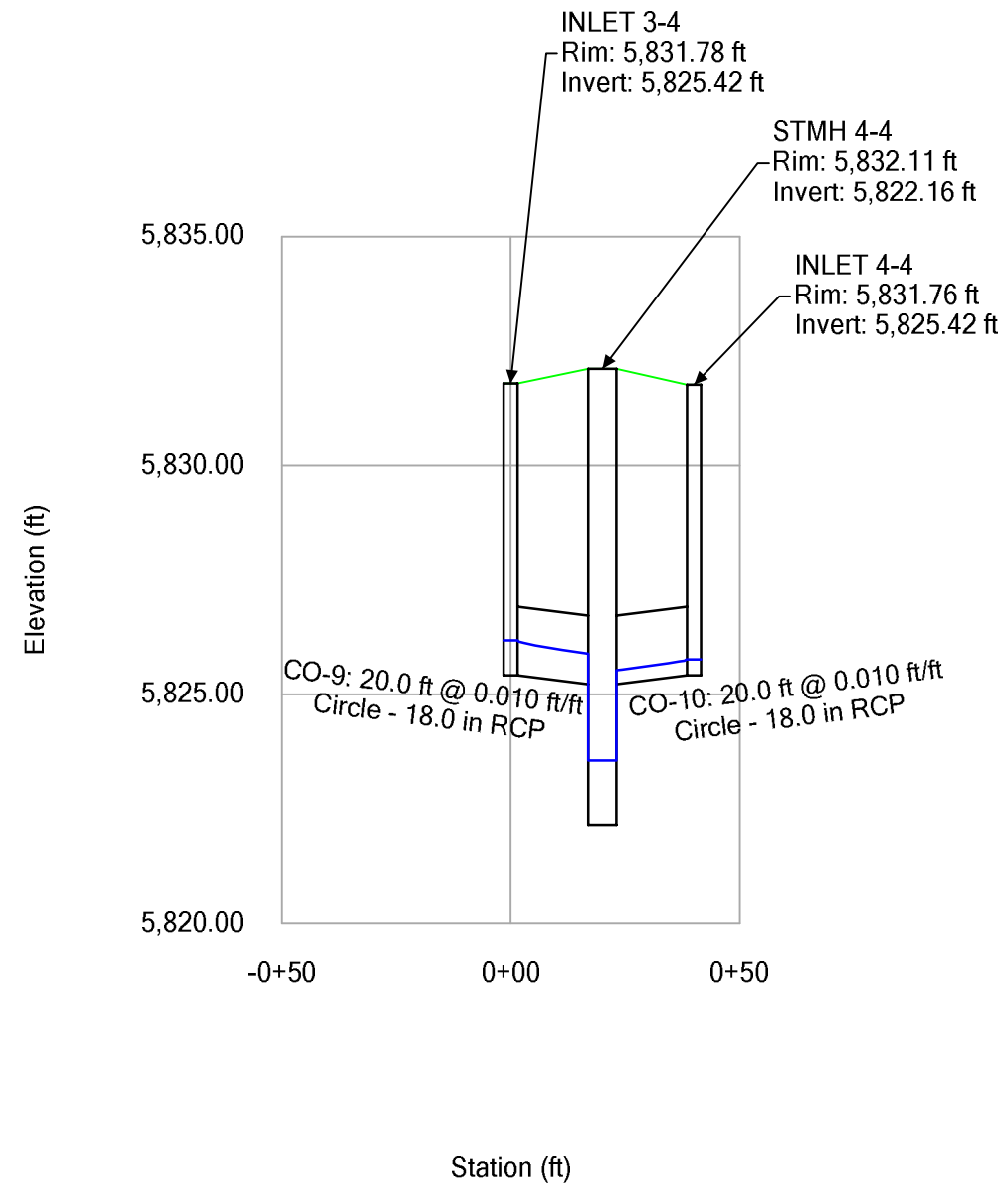
## Engineering Profile - Profile - Storm Line 4 (Compark Village South StormCAD [100 year].stsw)



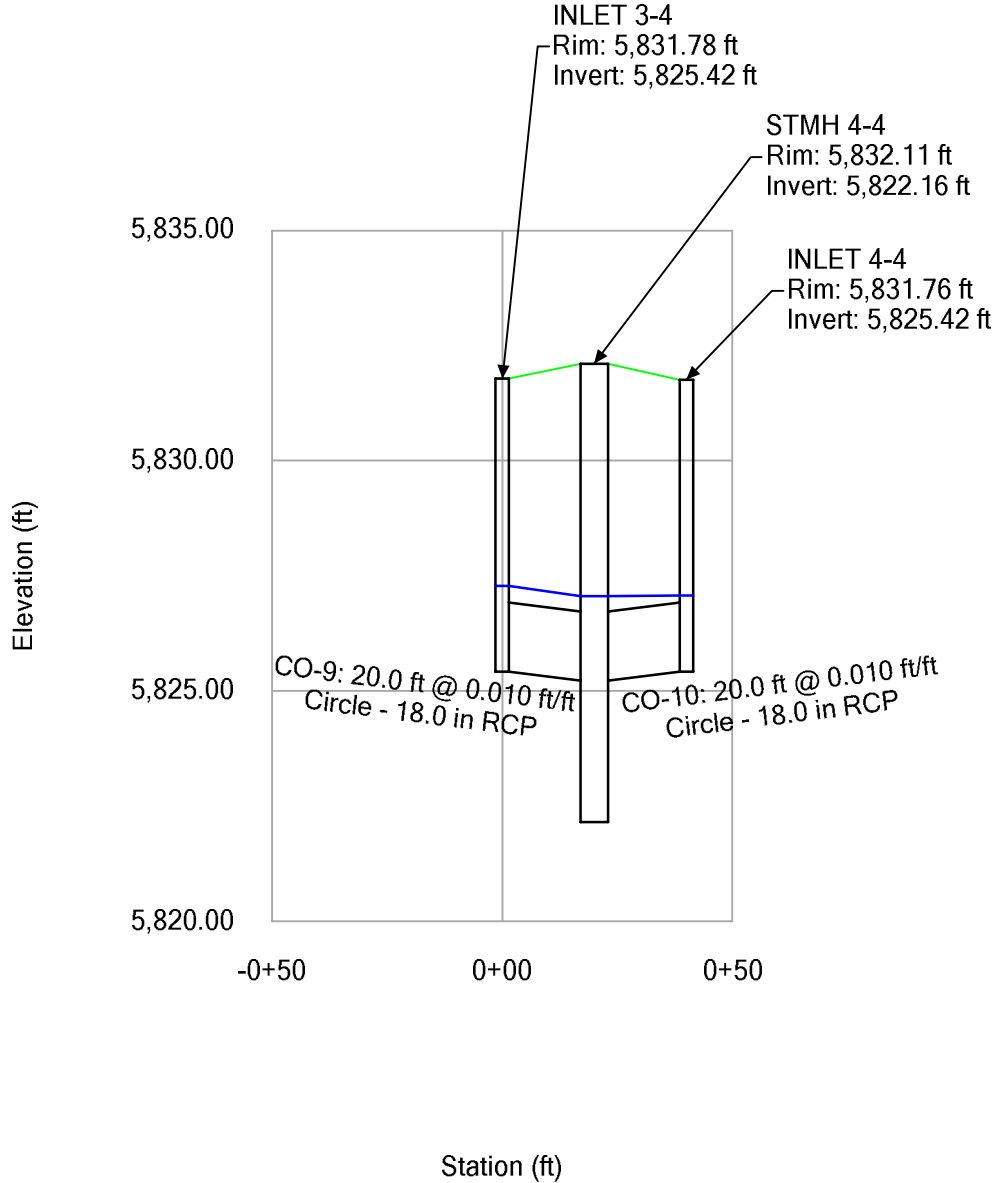
**Profile Report**  
**Engineering Profile - Profile - Storm Line 4A (Compark Village South StormCAD [2 year].stsw)**



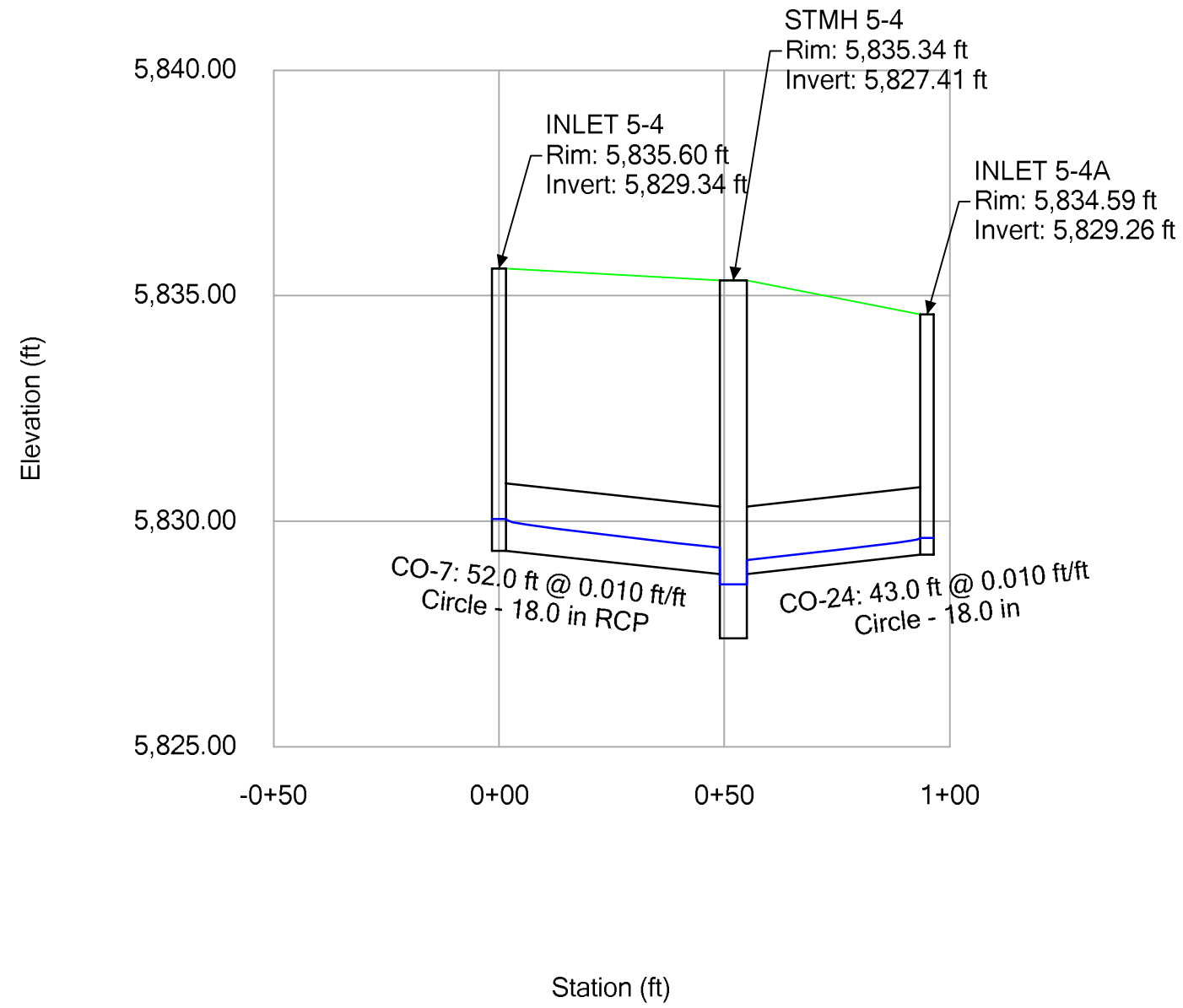
**Profile Report**  
**Engineering Profile - Profile - Storm Line 4A (Compark Village South StormCAD [5 year].stsw)**



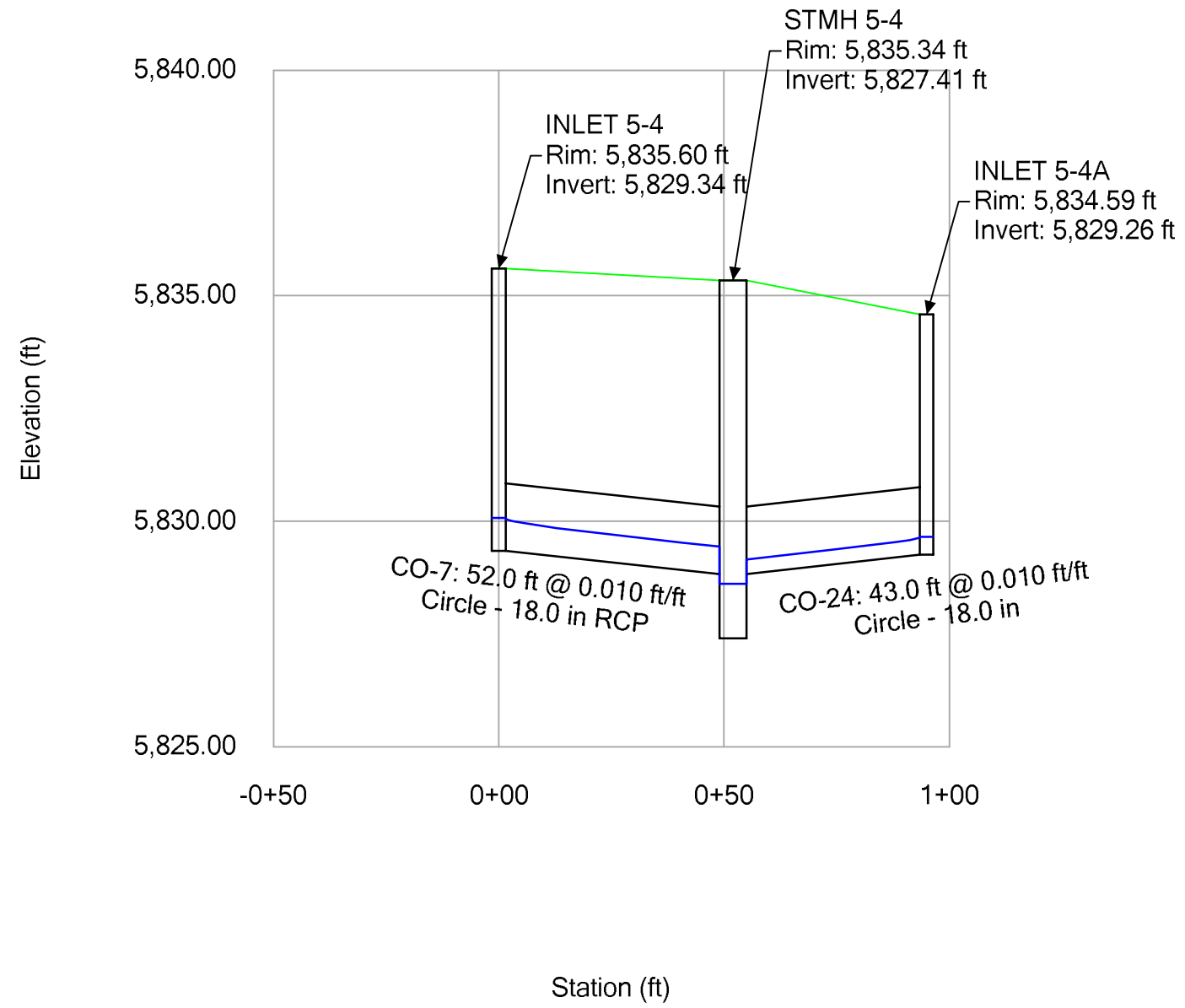
**Profile Report**  
**Engineering Profile - Profile - Storm Line 4A (Compark Village South StormCAD [100 year].stsw)**



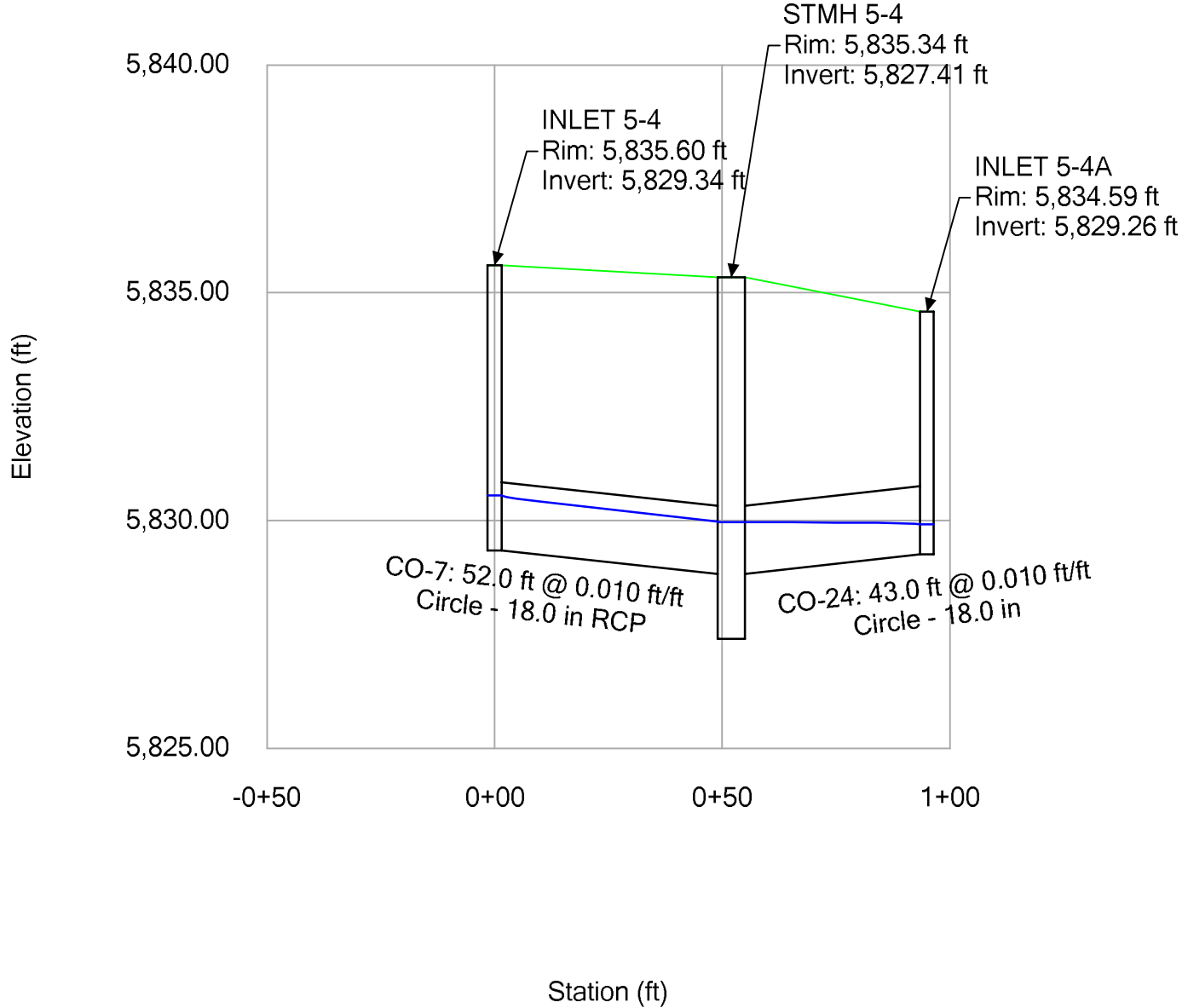
**Profile Report**  
**Engineering Profile - Profile - Storm Line 4B (Compark Village South StormCAD [2 year].stsw)**



**Profile Report**  
**Engineering Profile - Profile - Storm Line 4B (Compark Village South StormCAD [5 year].stsw)**

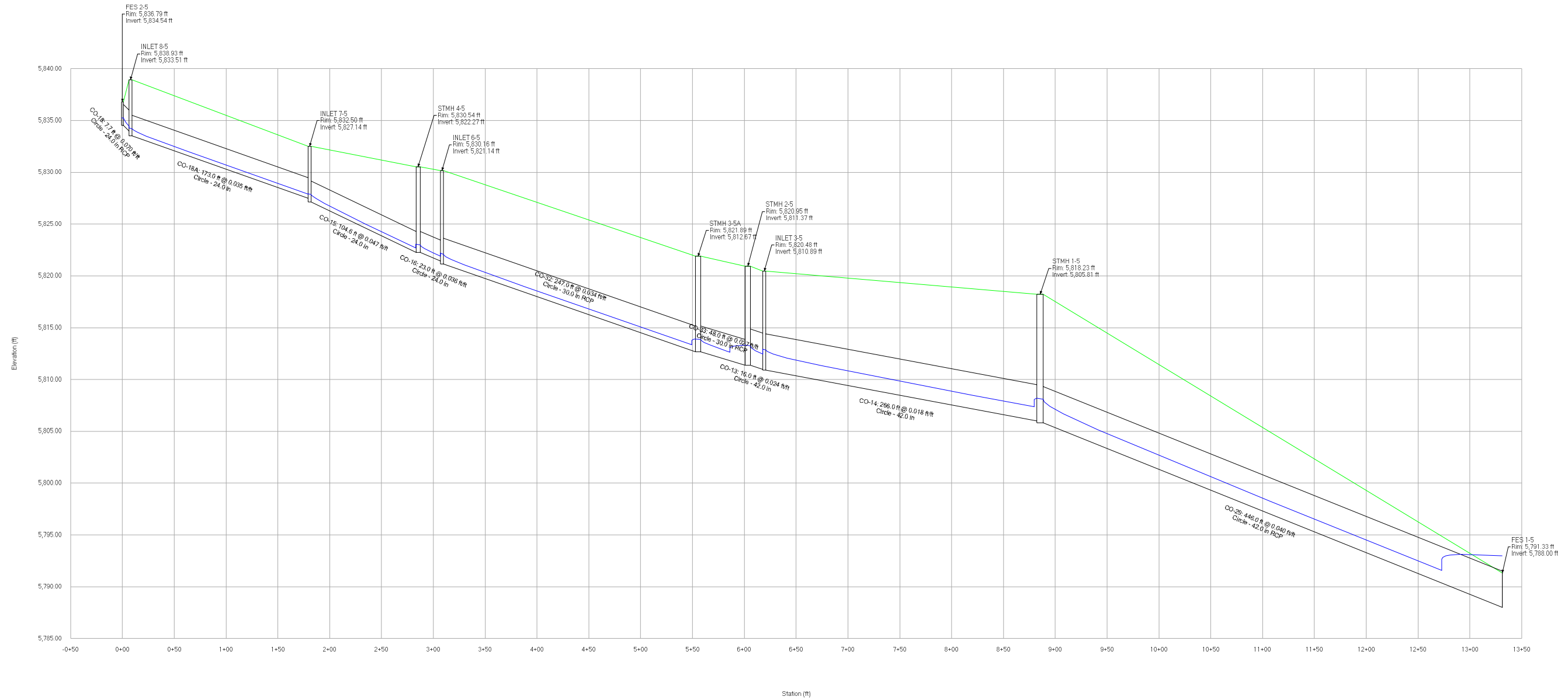


**Profile Report**  
**Engineering Profile - Profile - Storm Line 4B (Compark Village South StormCAD [100 year].stsw)**



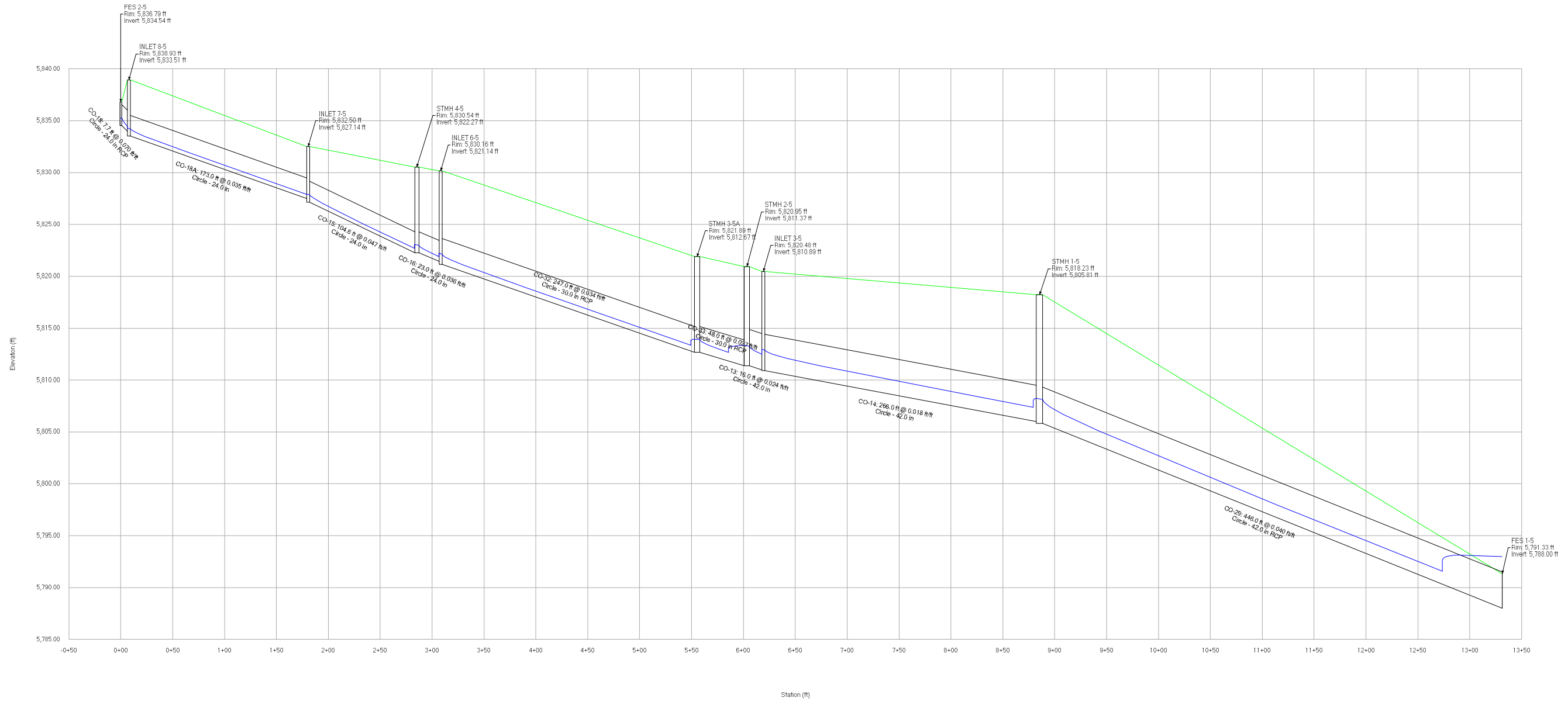
# Profile Report

## Engineering Profile - Profile - Storm Line 5 (Compark Village South StormCAD [2 year].stsw)



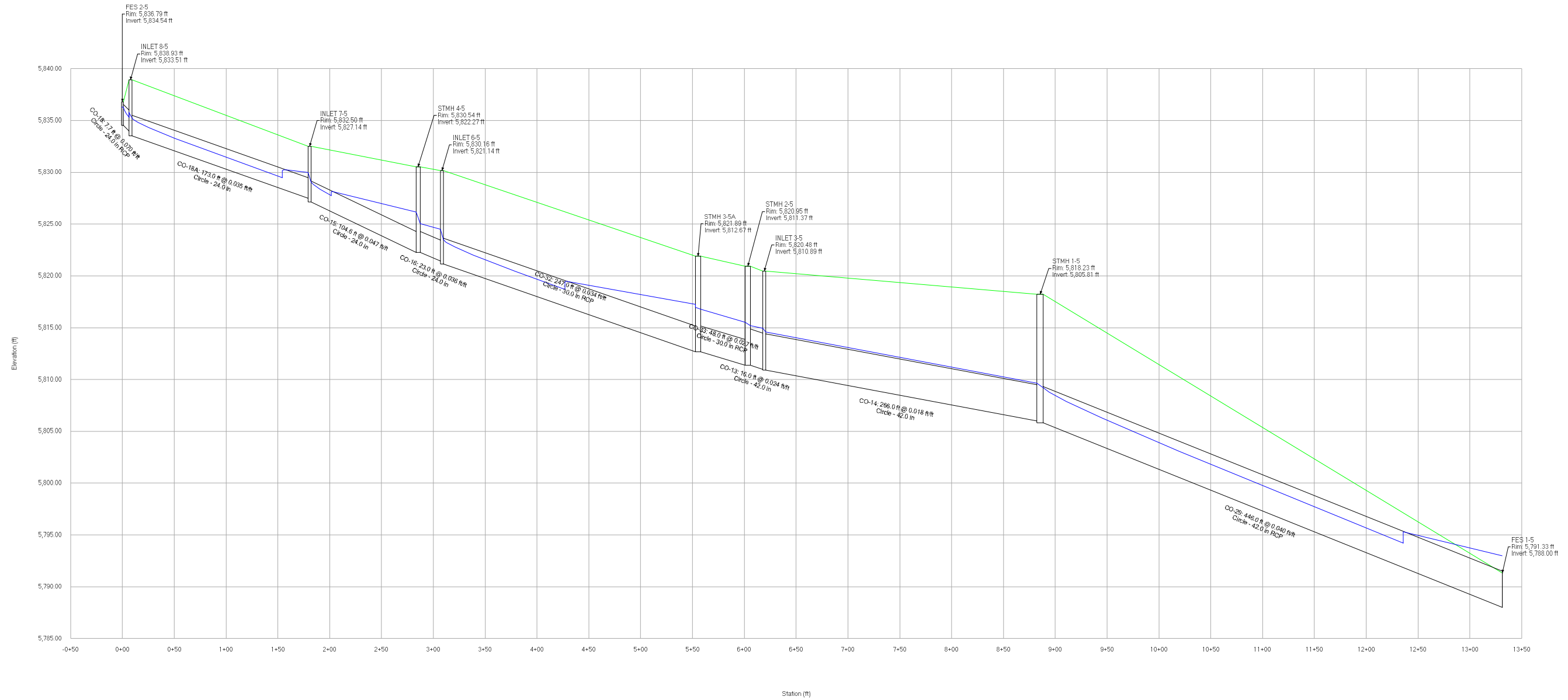
# Profile Report

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

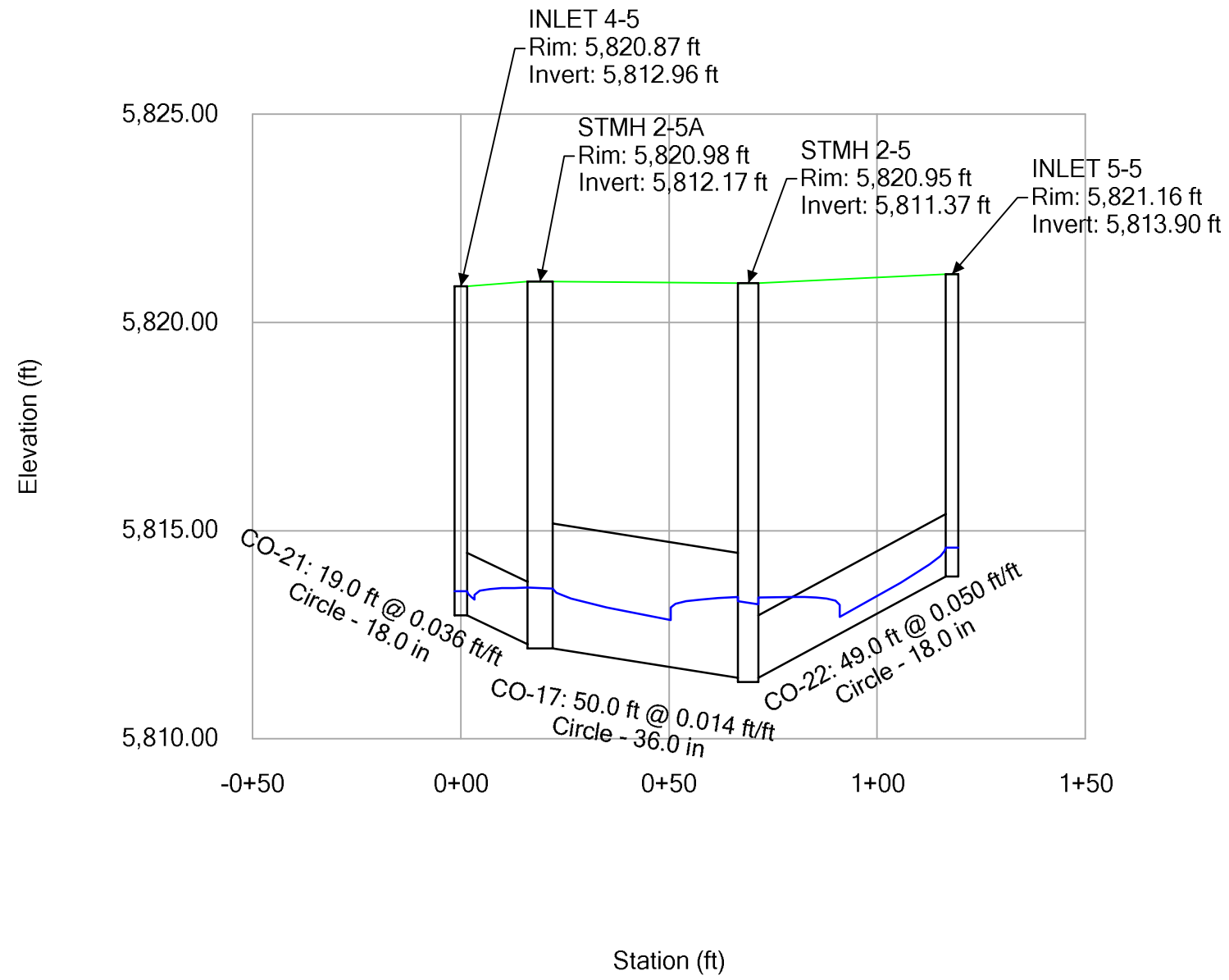


# Profile Report

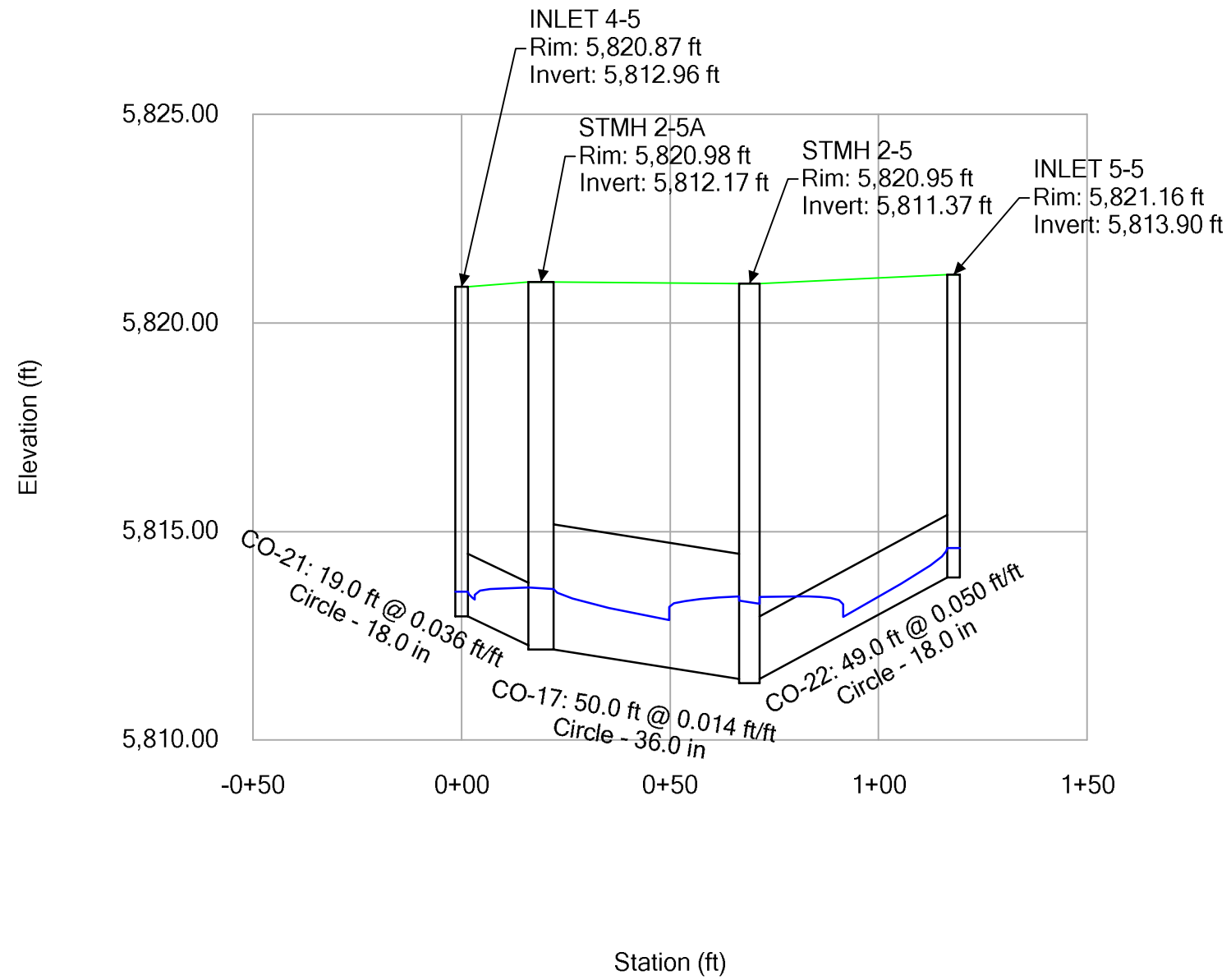
## Engineering Profile - Profile - Storm Line 5 (Compark Village South StormCAD [100 year].stsw)



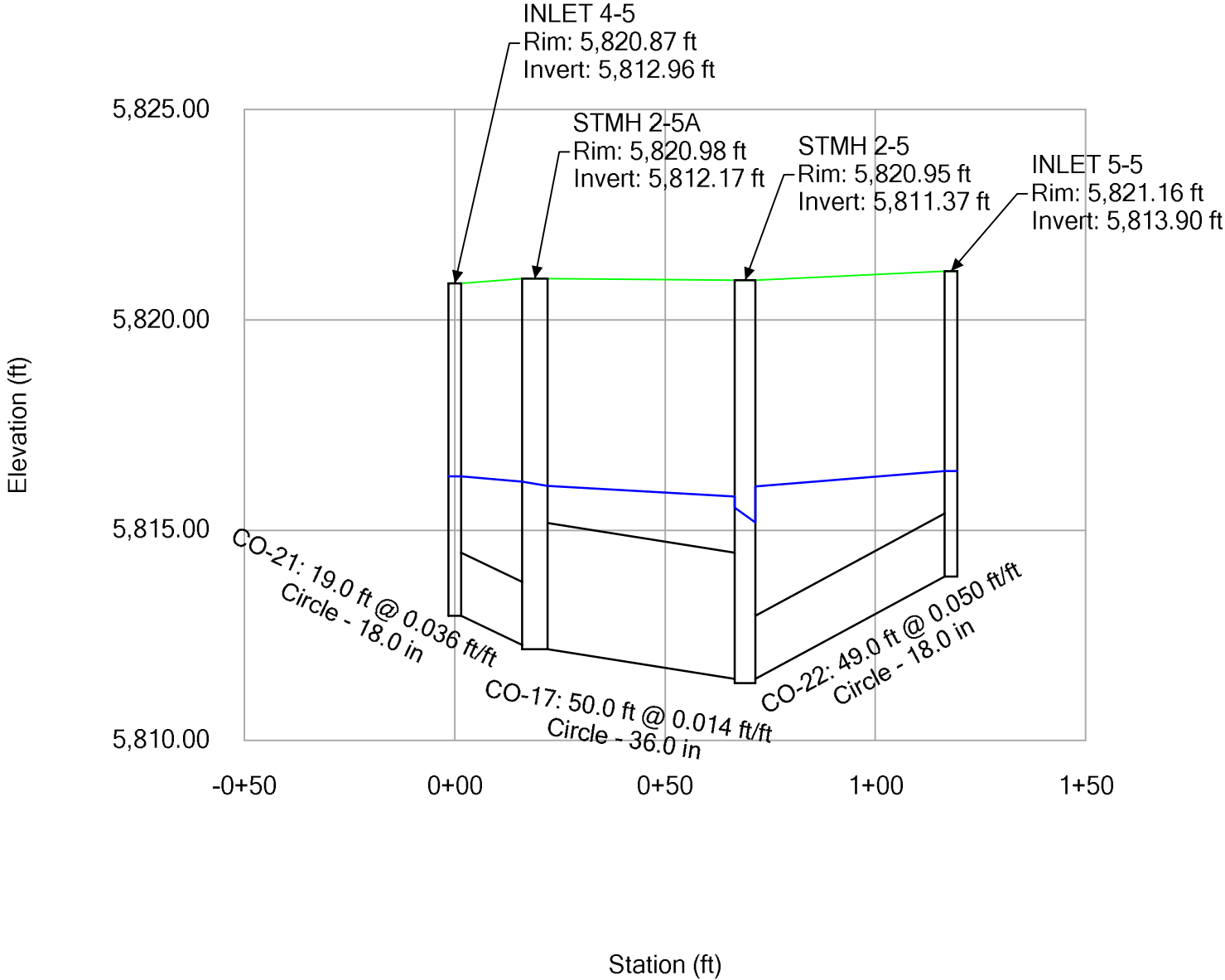
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5B (Compark Village South StormCAD [2 year].stsw)**



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

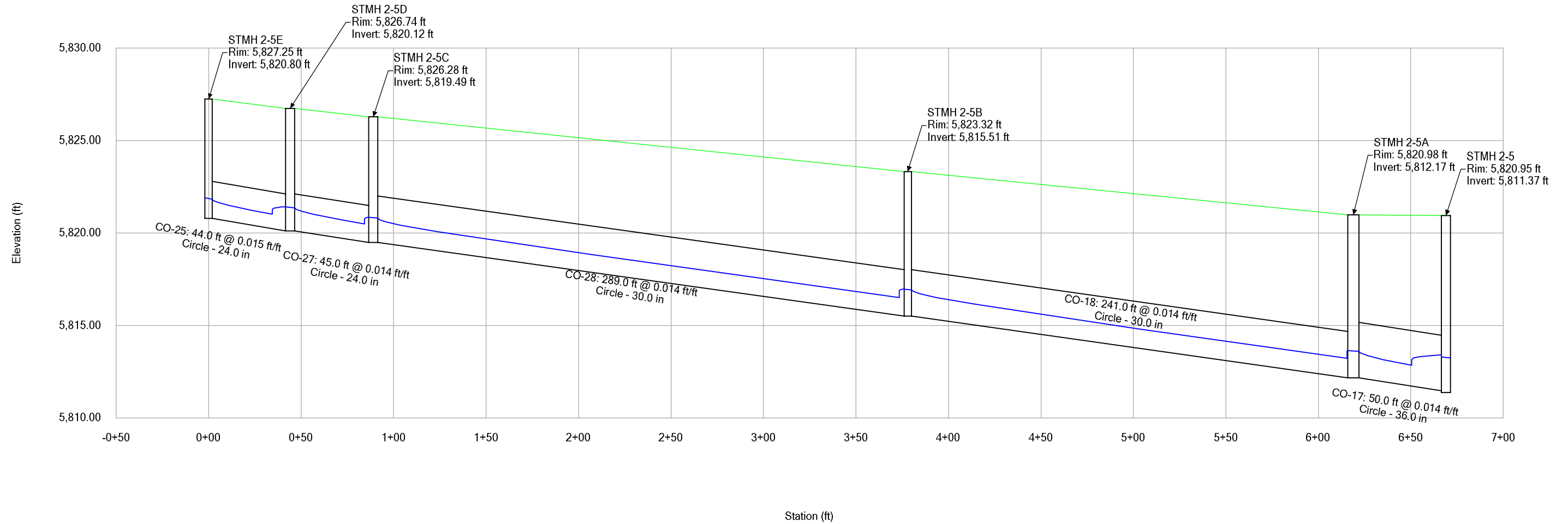


**Profile Report**  
**Engineering Profile - Profile - Storm Line 5B (Compark Village South StormCAD [100 year].stsw)**



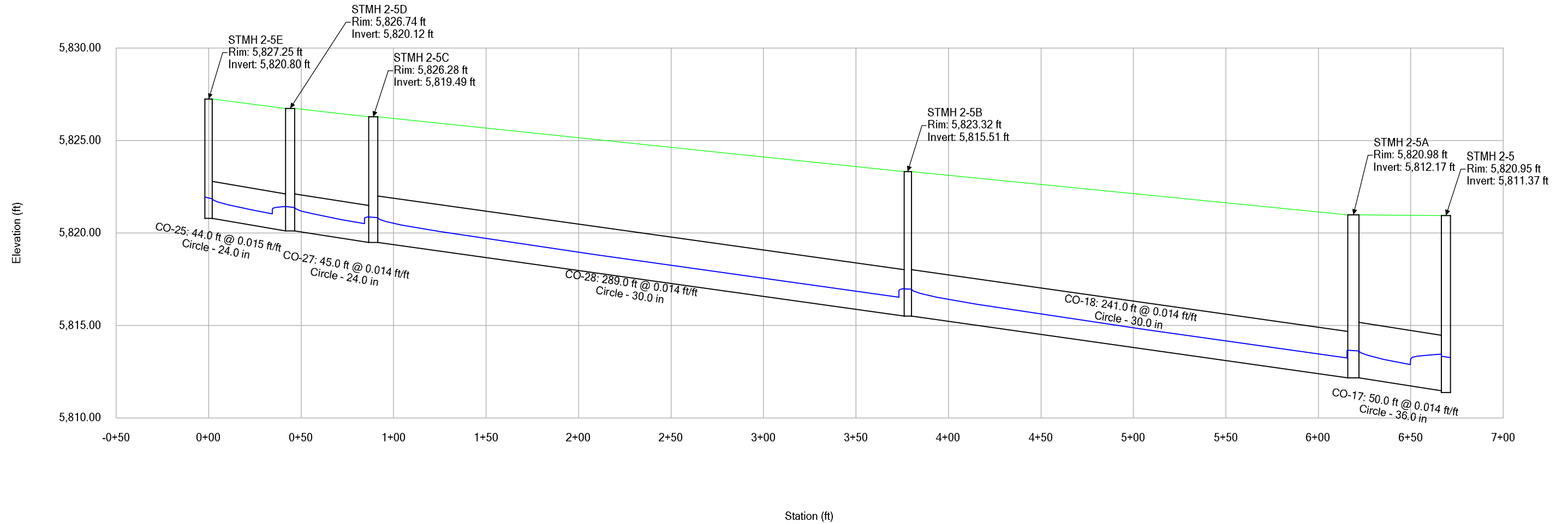
## Profile Report

### Engineering Profile - Profile - Storm Line 5C (Compark Village South StormCAD [2 year].stsw)



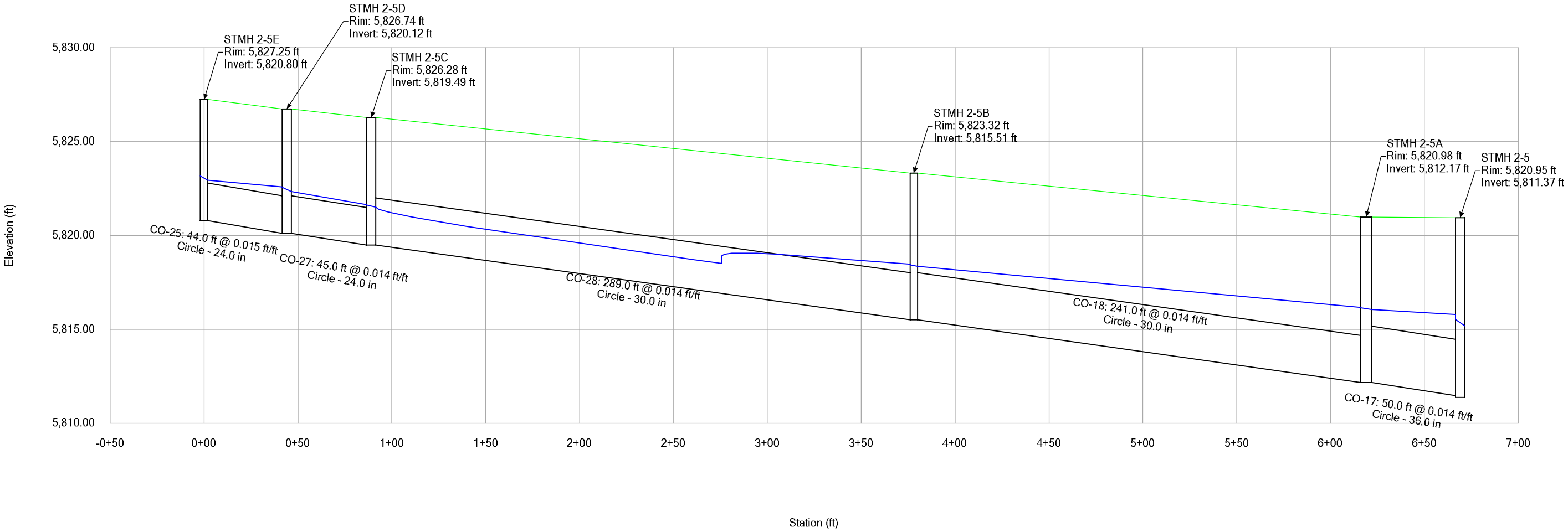
## Profile Report

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

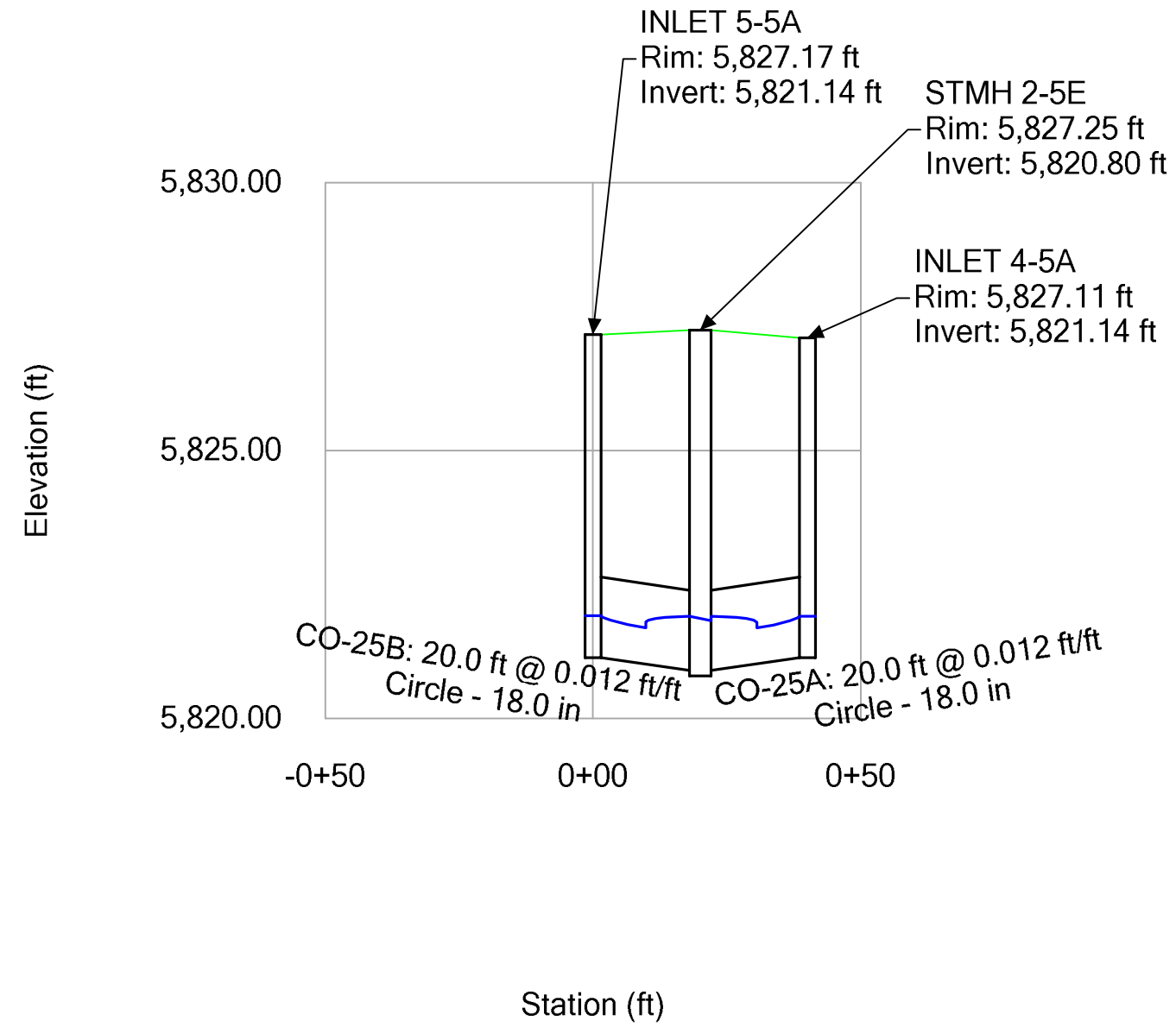


# Profile Report

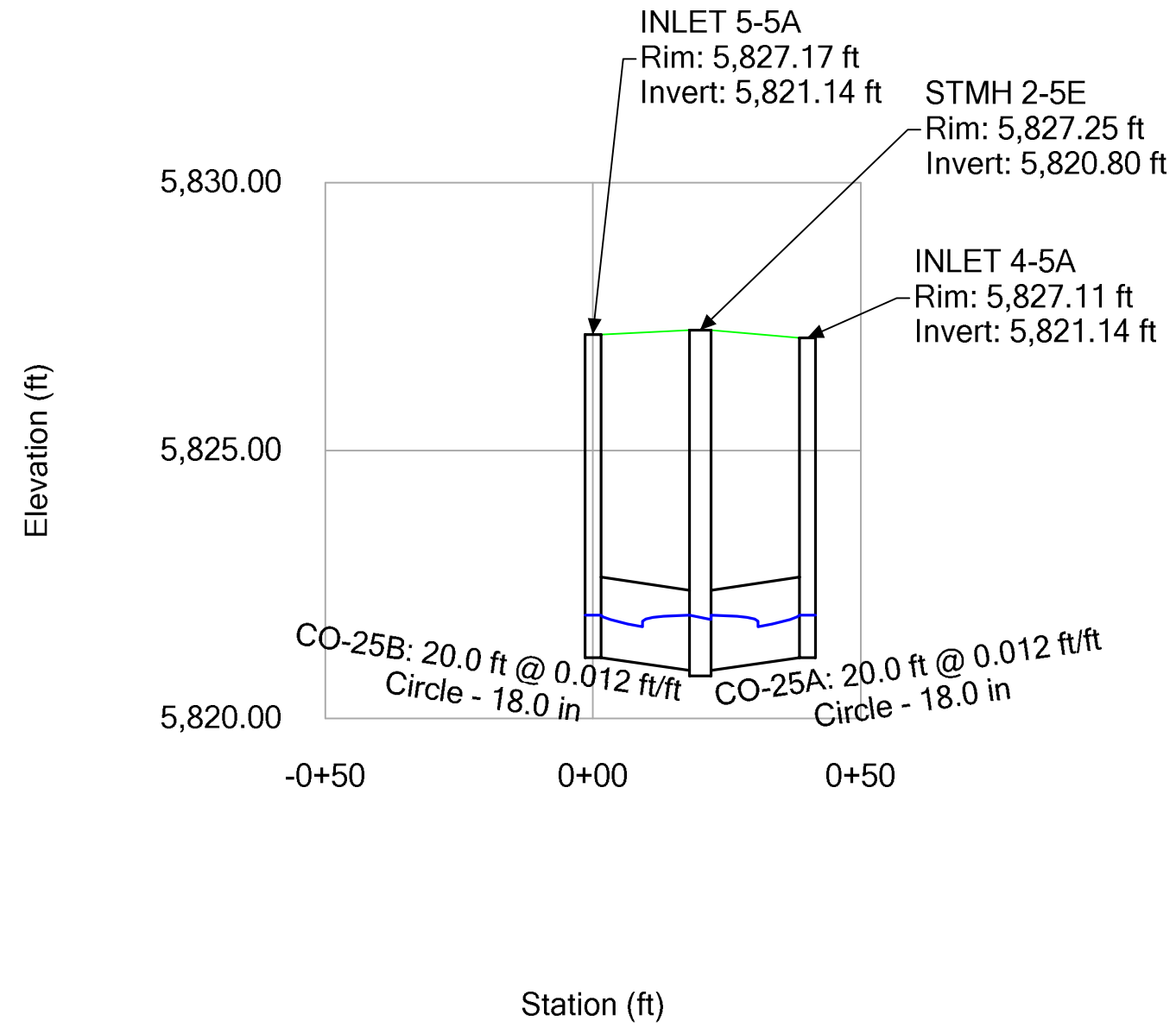
## Engineering Profile - Profile - Storm Line 5C (Compark Village South StormCAD [100 year].stsw)



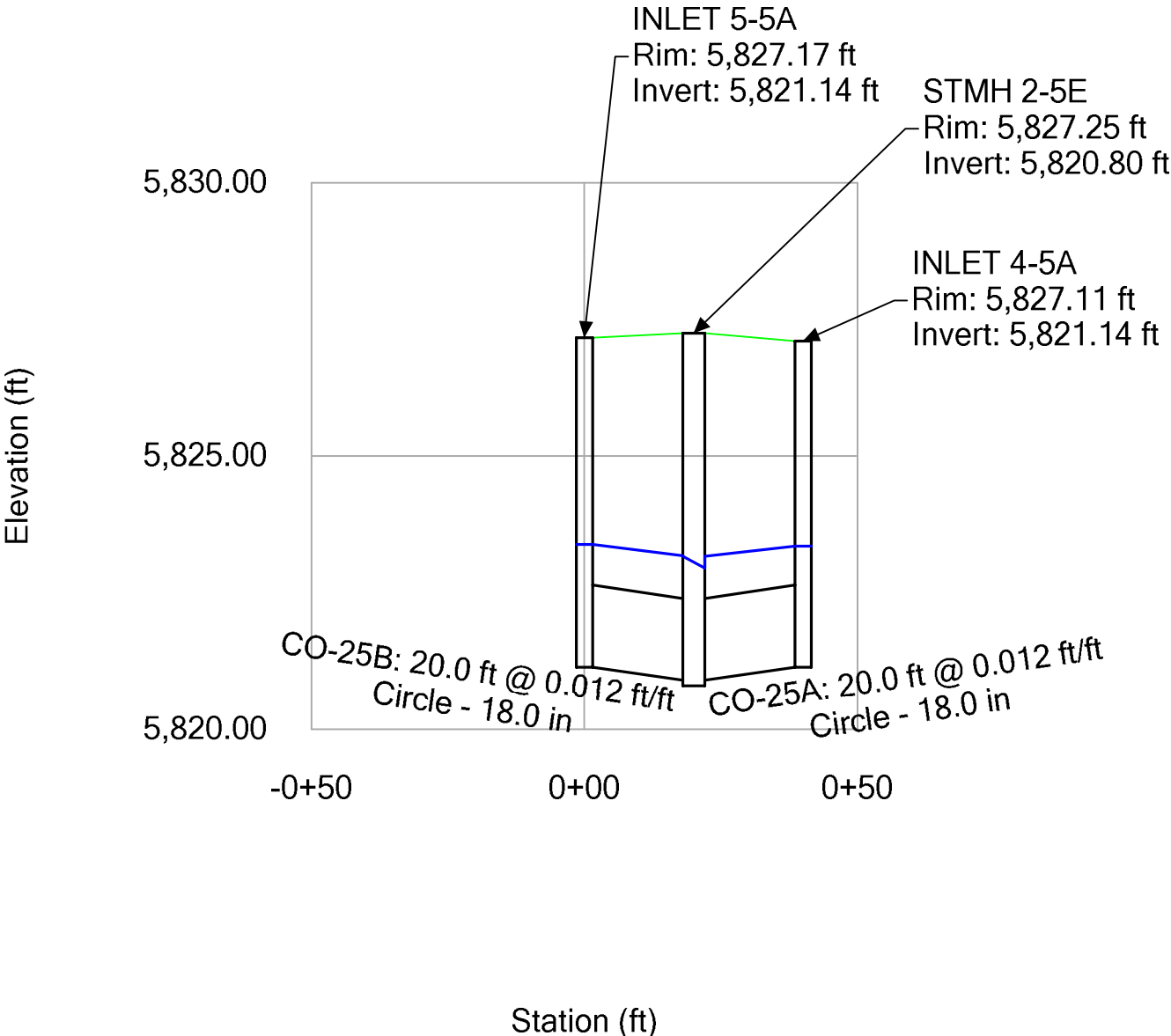
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5D (Compark Village South StormCAD [2 year].stsw)**



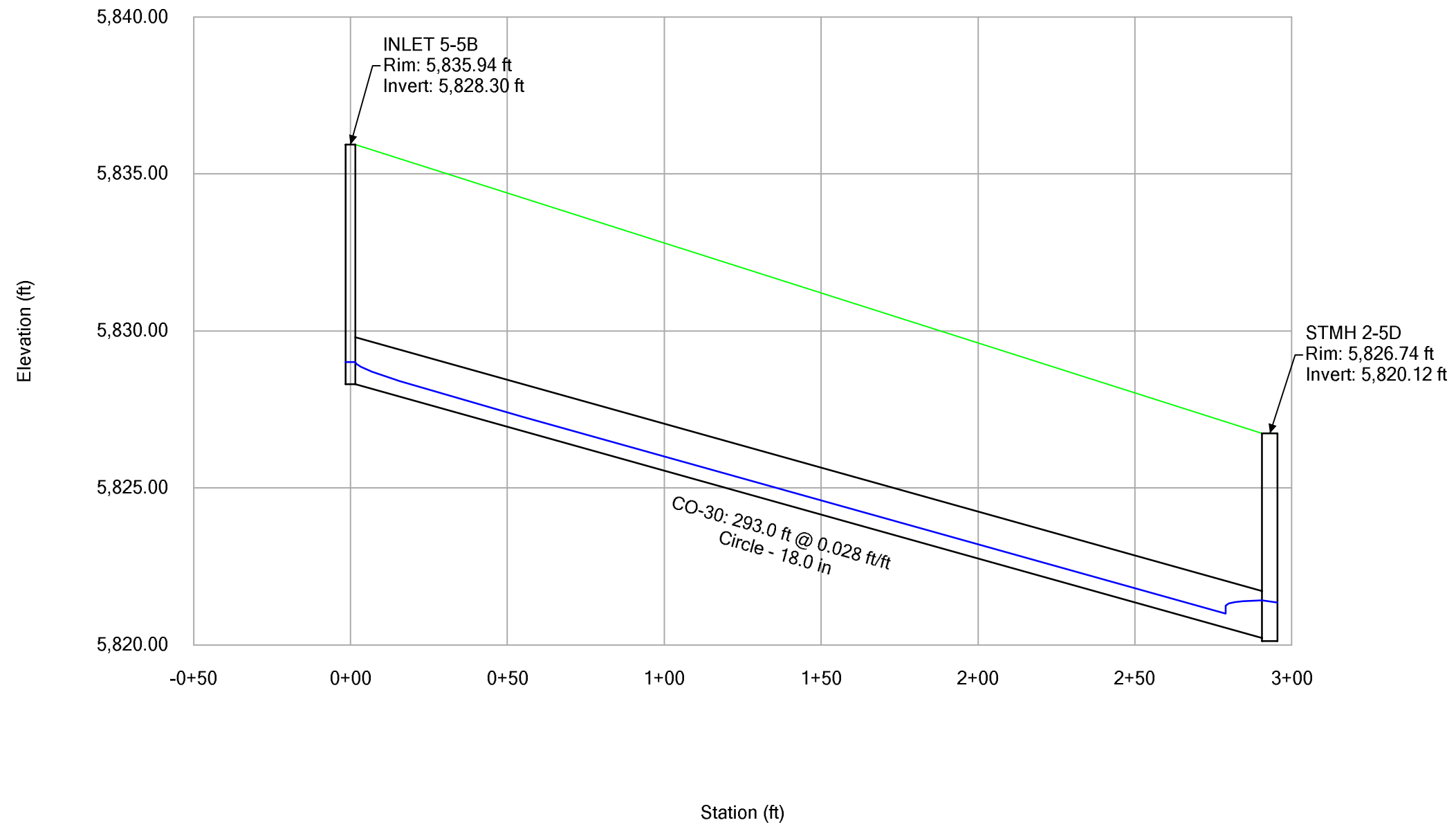
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5D (Compark Village South StormCAD [5 year].stsw)**



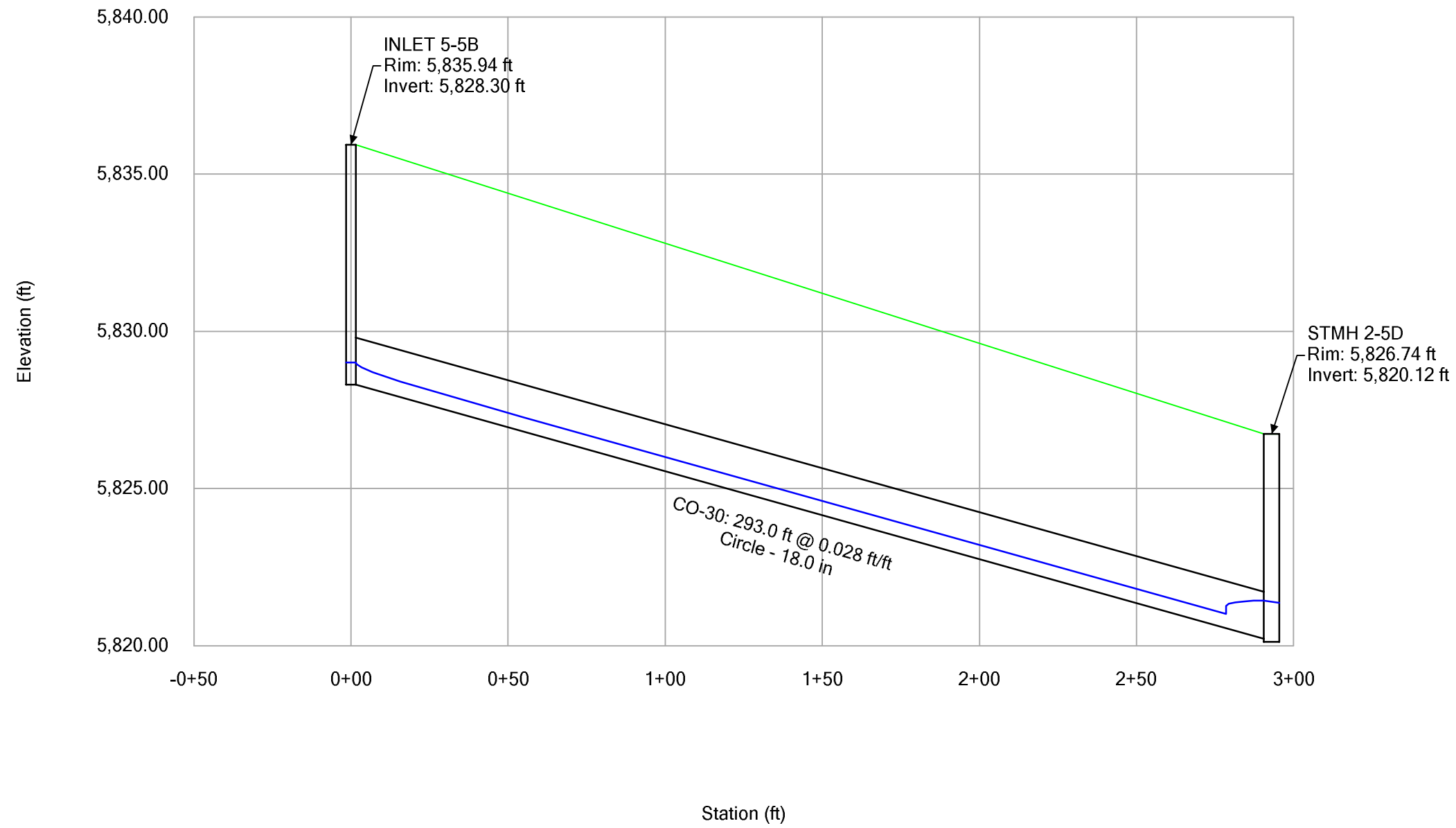
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5D (Compark Village South StormCAD [100 year].stsw)**



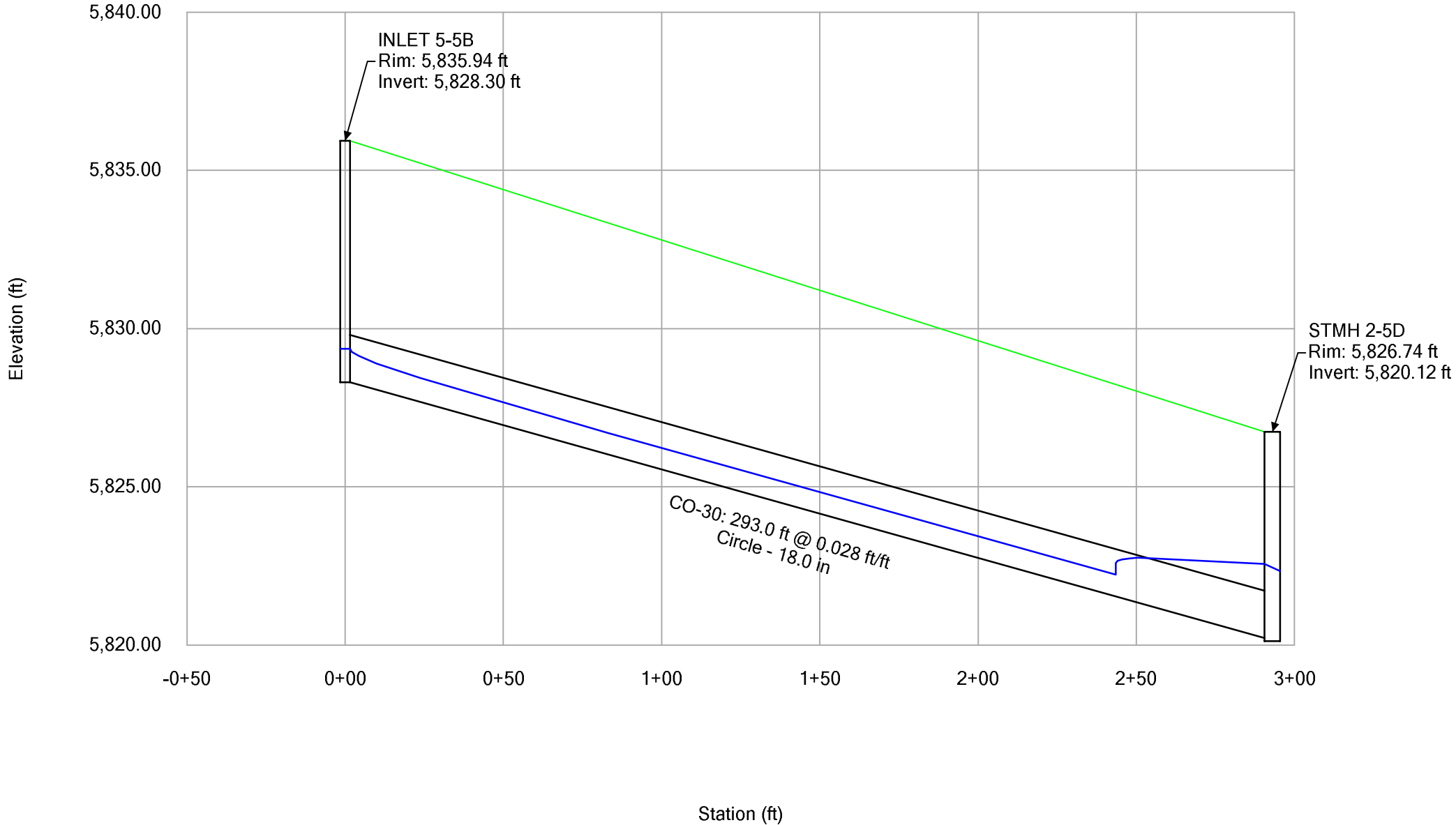
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5E (Compark Village South StormCAD [2 year].stsw)**



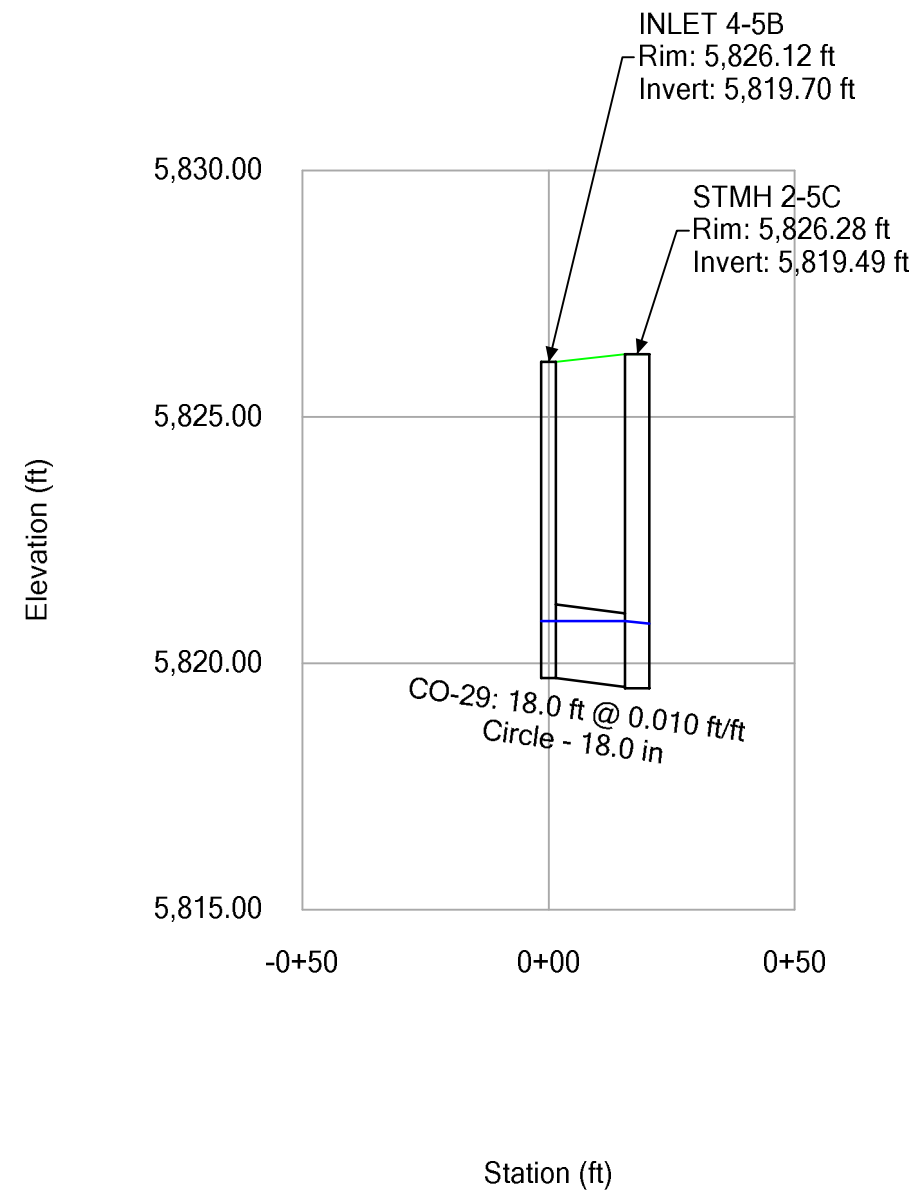
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5E (Compark Village South StormCAD [5 year].stsw)**



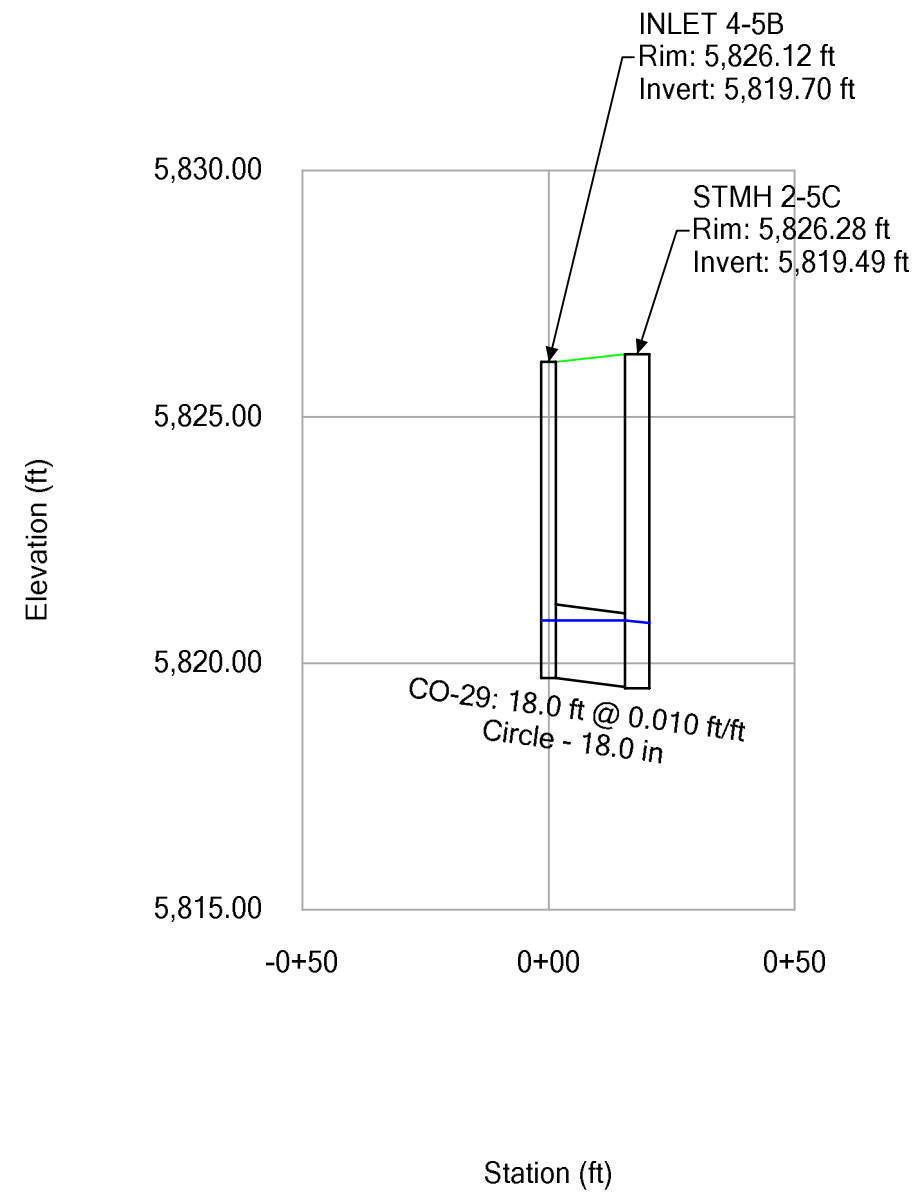
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5E (Compark Village South StormCAD [100 year].stsw)**



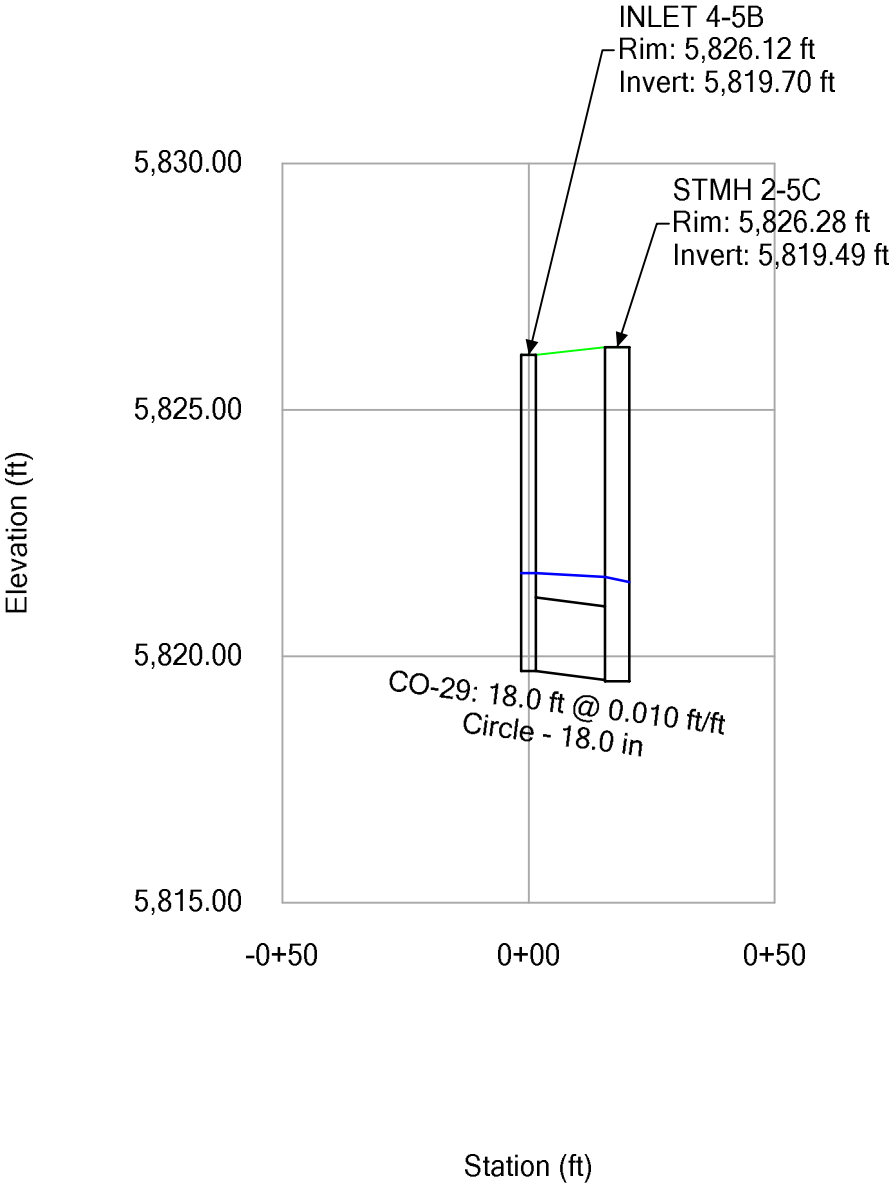
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5F (Compark Village South StormCAD [2 year].stsw)**



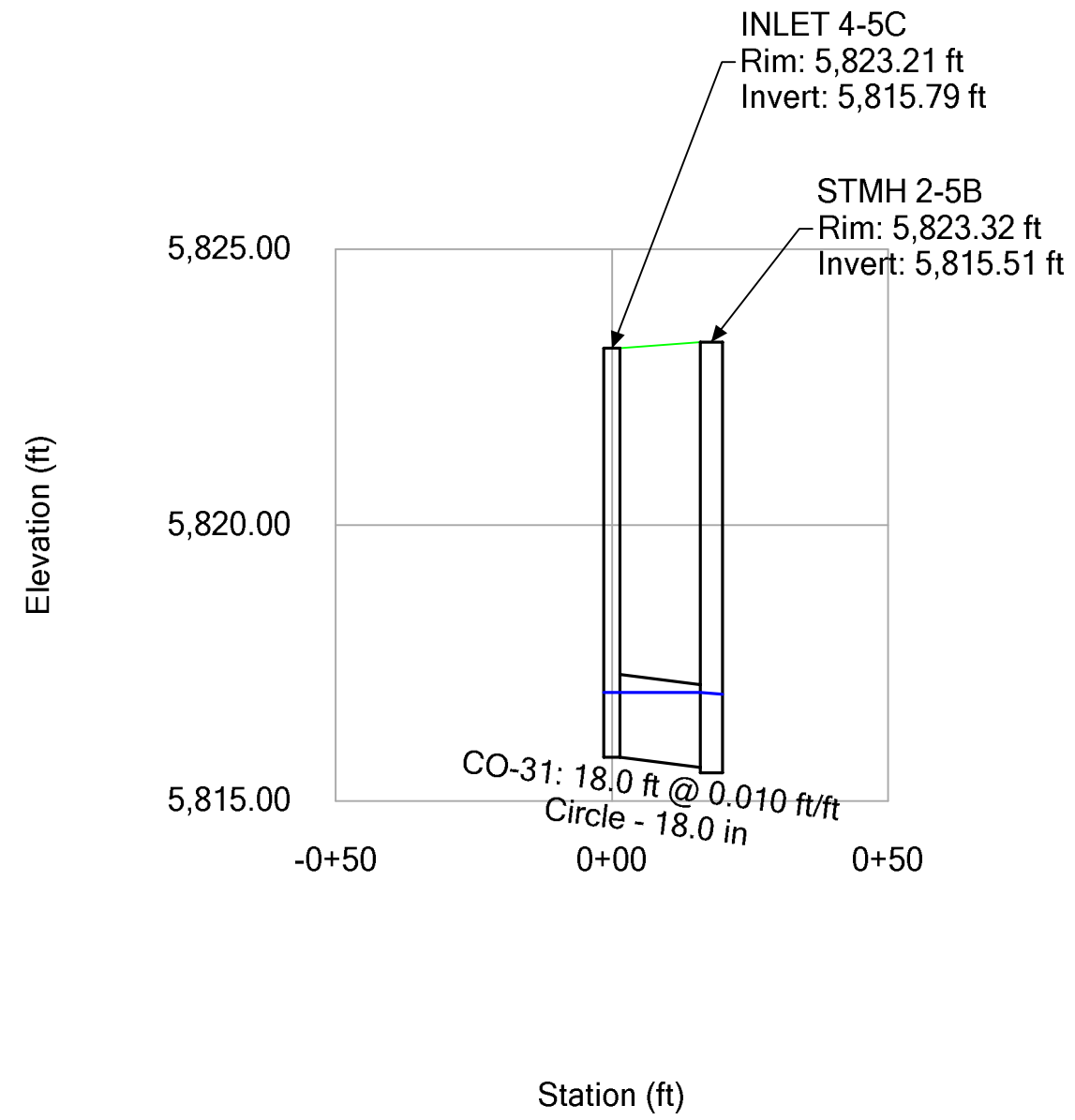
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5F (Compark Village South StormCAD [5 year].stsw)**



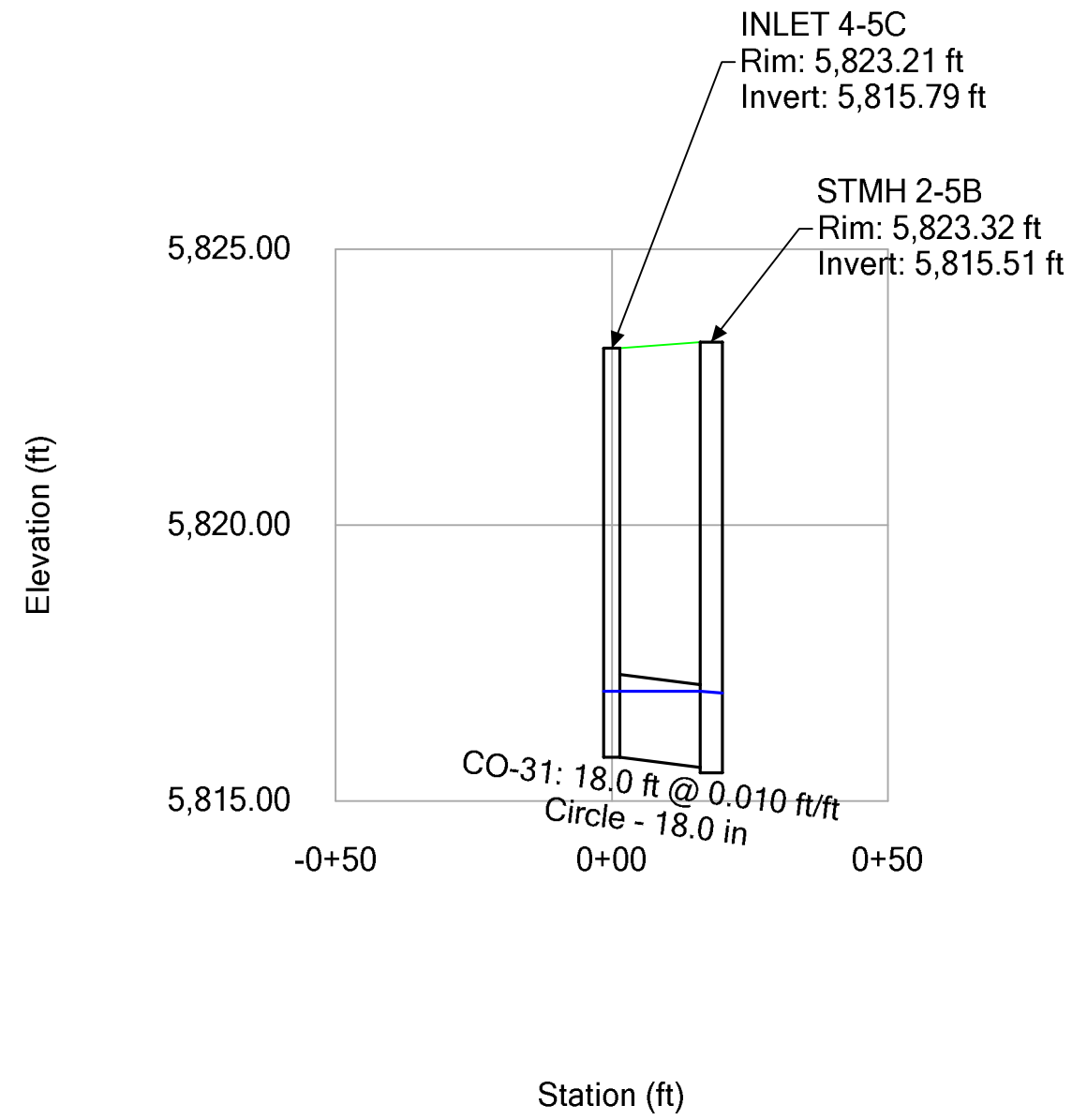
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5F (Compark Village South StormCAD [100 year].stsw)**



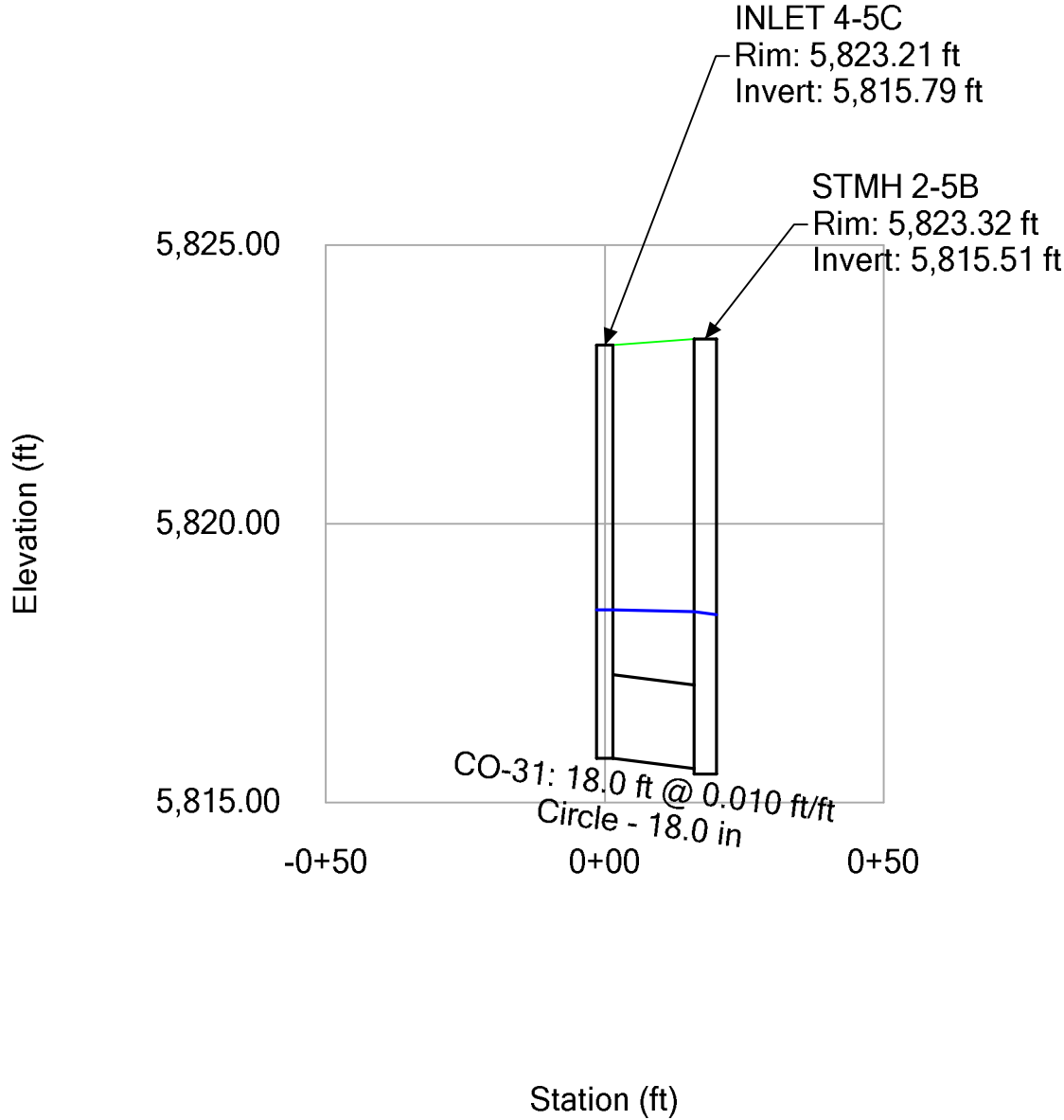
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5G (Compark Village South StormCAD [2 year].stsw)**



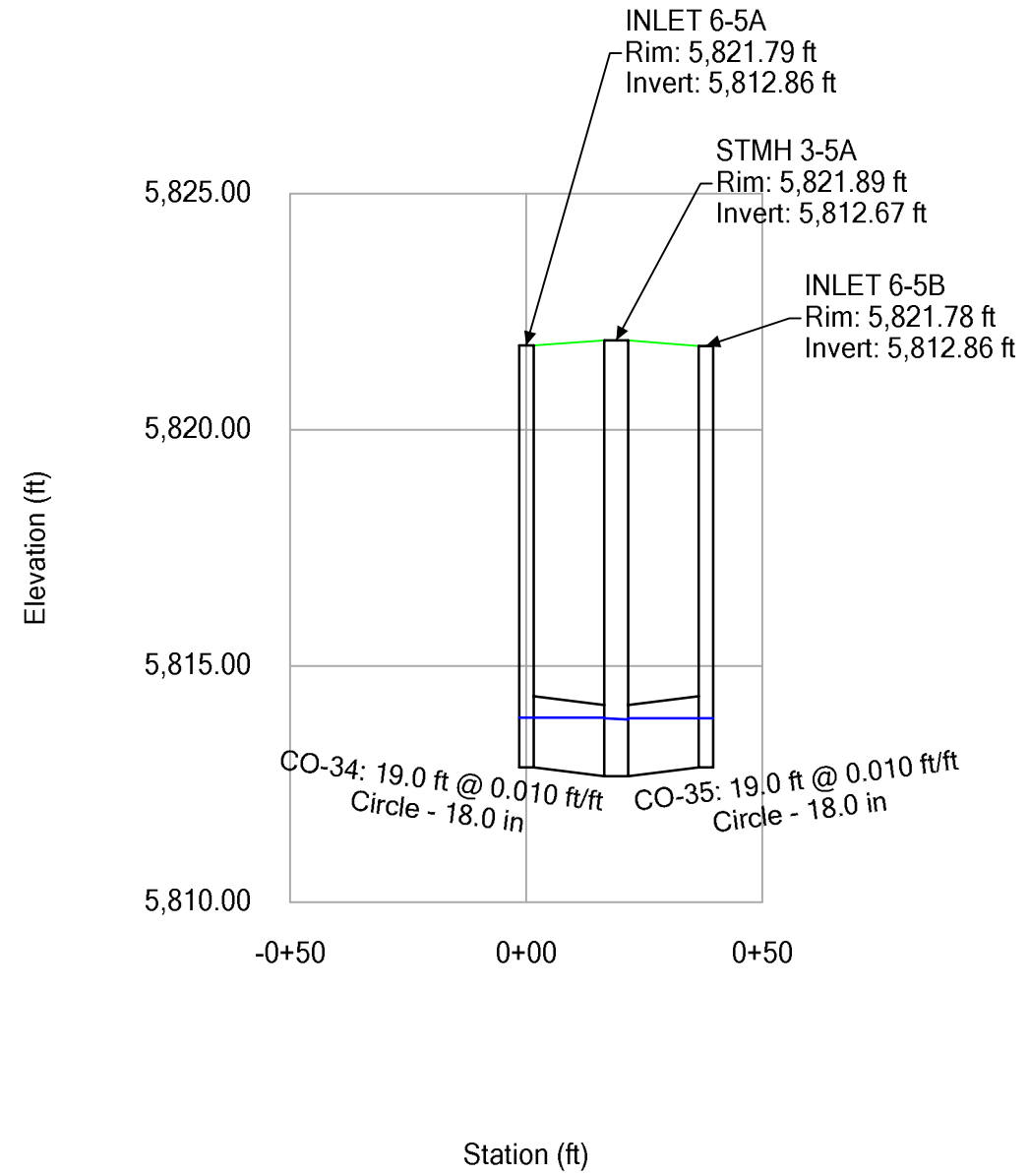
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5G (Compark Village South StormCAD [5 year].stsw)**



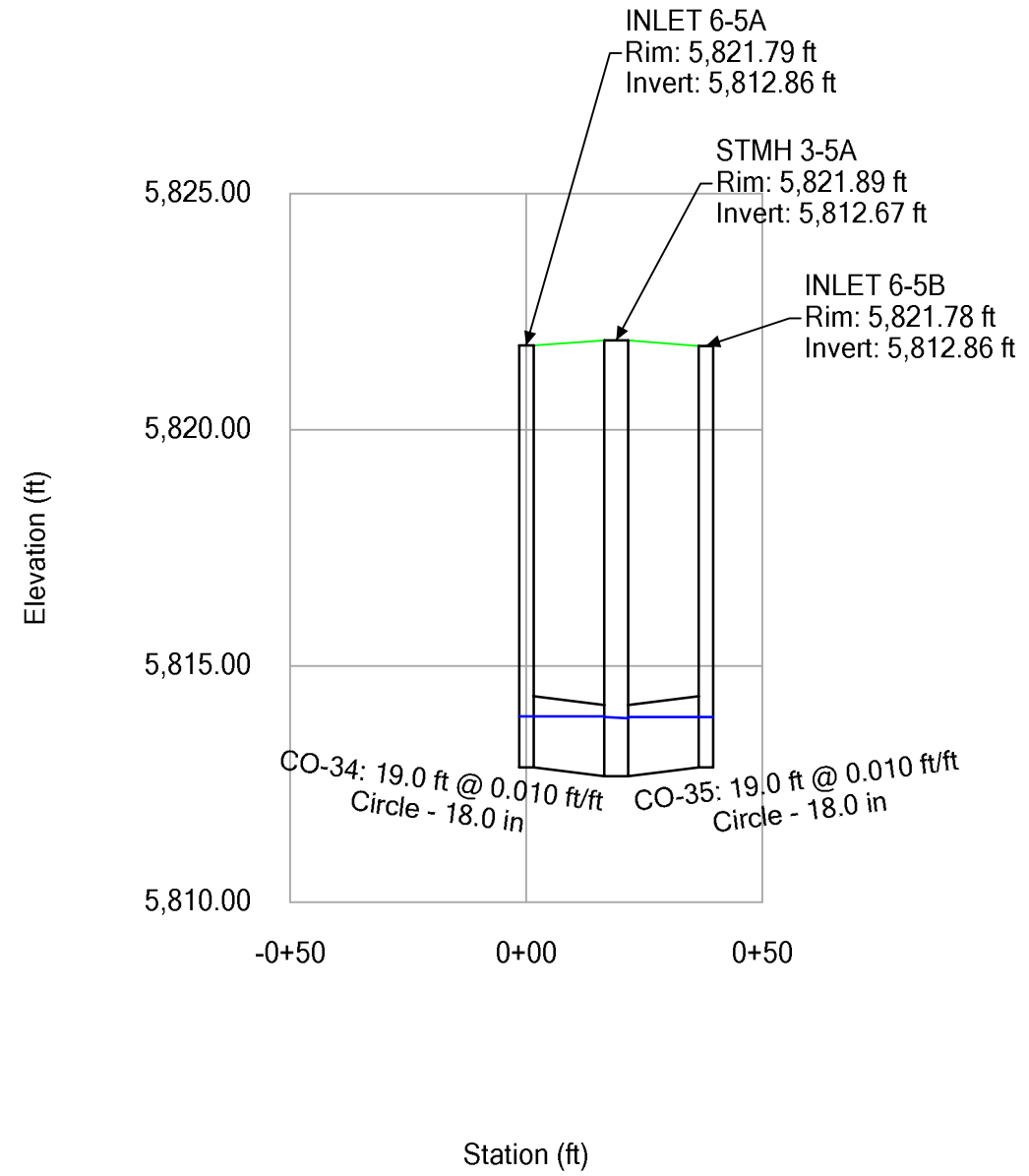
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5G (Compark Village South StormCAD [100 year].stsw)**



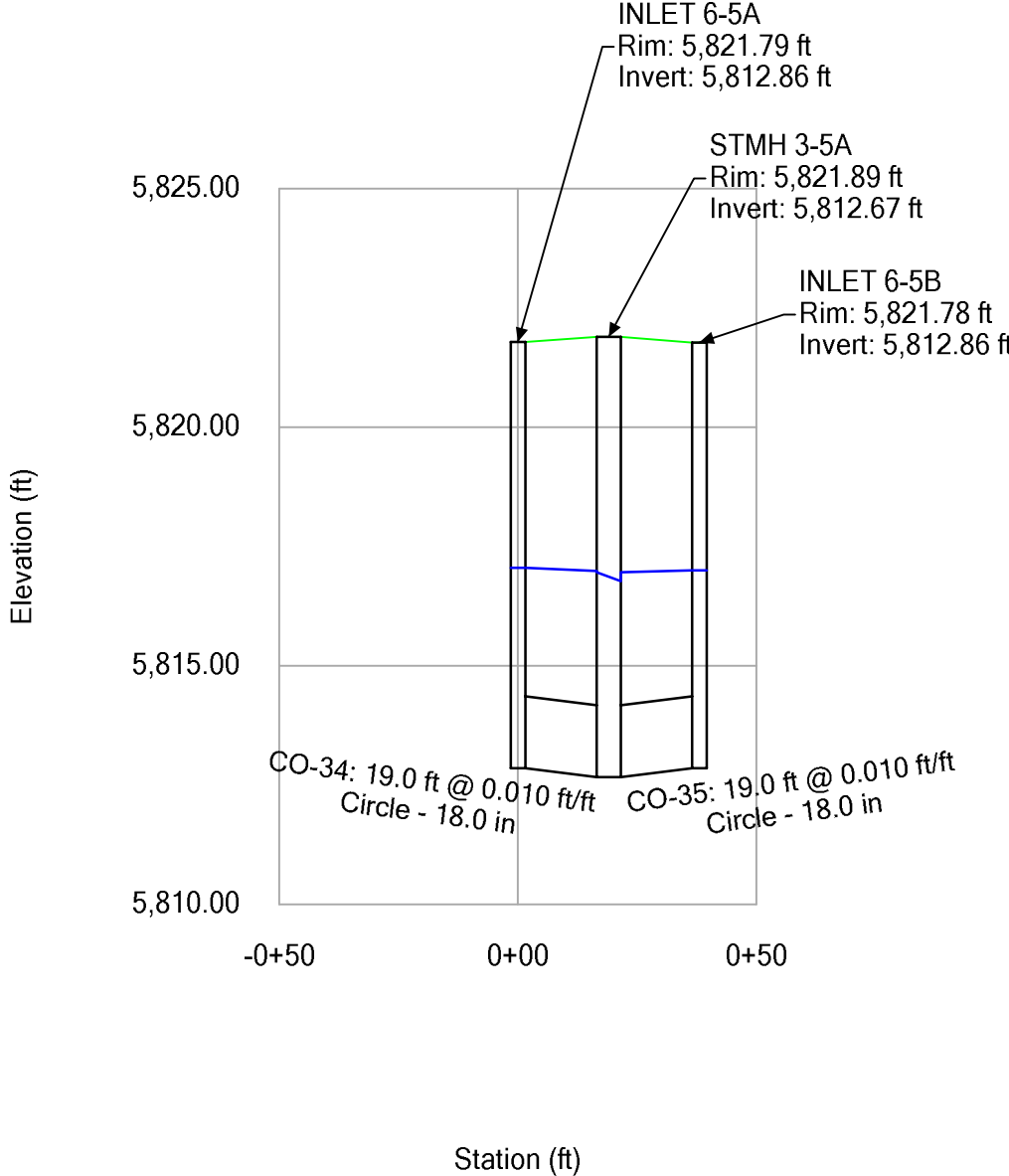
**Profile Report**  
**Engineering Profile - Profile - Storm Line 5H (Compark Village South StormCAD [2 year].stsw)**



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



**Profile Report**  
**Engineering Profile - Profile - Storm Line 5H (Compark Village South StormCAD [100 year].stsw)**



**FlexTable: Conduit Table**

Label	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Manning's n	Flow (cfs)
CO-5	STMH 6-4	5,834.91	INLET 6-4	5,832.53	120.0	0.020	36.0	0.013	8.50
CO-6	INLET 6-4	5,832.33	STMH 5-4	5,827.71	278.0	0.017	36.0	0.013	9.60
CO-18	FES 2-5	5,834.54	INLET 8-5	5,834.00	7.7	0.070	24.0	0.013	4.10
CO-7	INLET 5-4	5,829.34	STMH 5-4	5,828.83	52.0	0.010	18.0	0.013	3.40
CO-9	INLET 3-4	5,825.42	STMH 4-4	5,825.23	20.0	0.010	18.0	0.013	3.90
CO-12	INLET 1-4	5,823.04	STMH 2-4	5,821.92	65.0	0.017	18.0	0.013	2.30
CO-10	INLET 4-4	5,825.42	STMH 4-4	5,825.23	20.0	0.010	18.0	0.013	0.90
CO-16	INLET 2-6	5,813.03	INLET 1-6	5,811.92	80.0	0.014	24.0	0.013	2.90
CO-27	INLET 2-5	5,808.09	INLET 1-5	5,807.49	90.0	0.007	36.0	0.013	7.90
CO-28	INLET 1-5	5,807.29	STMH 1-5	5,806.51	103.0	0.008	36.0	0.013	12.80
CO-29	STMH 1-5	5,805.81	FES 1-5	5,788.00	446.0	0.040	42.0	0.013	53.81
CO-1	INLET 2-3	5,840.56	INLET 1-3	5,831.04	94.0	0.101	24.0	0.013	4.20
CO-4	FES 2-4	5,842.00	STMH 6-4	5,835.11	221.0	0.031	36.0	0.013	8.50
CO-8	STMH 5-4	5,827.41	STMH 4-4	5,822.96	163.0	0.027	36.0	0.013	14.00
CO-21	INLET 4-5	5,812.96	STMH 2-5A	5,812.27	19.0	0.036	18.0	0.013	2.40
CO-22	INLET 5-5	5,813.90	STMH 2-5	5,811.47	49.0	0.050	18.0	0.013	3.30
CO-11A	STMH 4-4	5,822.16	STMH 3-4	5,821.56	79.0	0.008	36.0	0.013	18.80
CO-11B	STMH 3-4	5,821.46	STMH 2-4	5,820.65	76.0	0.011	36.0	0.013	21.30
CO-11C	INLET 2-4	5,822.07	STMH 3-4	5,821.56	56.0	0.009	18.0	0.013	2.50
CO-17	INLET 1-6	5,811.72	STMH 1-6	5,807.77	133.0	0.030	24.0	0.013	5.80
CO-17A	STMH 1-6	5,807.67	FES1-6	5,806.00	70.0	0.024	24.0	0.013	5.80
CO-18A	INLET 8-5	5,833.51	INLET 7-5	5,827.49	173.0	0.035	24.0	0.013	4.10
CO-25A	INLET 4-5A	5,821.14	STMH 2-5E	5,820.90	20.0	0.012	18.0	0.013	4.10
CO-25B	INLET 5-5A	5,821.14	STMH 2-5E	5,820.90	20.0	0.012	18.0	0.013	4.20
CO-13	STMH 2-5	5,811.37	INLET 3-5	5,810.99	16.0	0.024	42.0	0.013	36.10
CO-14	INLET 3-5	5,810.89	STMH 1-5	5,806.01	266.0	0.018	42.0	0.013	40.00
CO-15	INLET 7-5	5,827.14	STMH 4-5	5,822.27	104.6	0.047	24.0	0.013	4.30
CO-16	STMH 4-5	5,822.27	INLET 6-5	5,821.44	23.0	0.036	24.0	0.013	4.30
CO-17	STMH 2-5A	5,812.17	STMH 2-5	5,811.47	50.0	0.014	36.0	0.013	20.00
CO-18	STMH 2-5B	5,815.51	STMH 2-5A	5,812.17	241.0	0.014	30.0	0.013	17.60
CO-20	STMH 2-4	5,820.42	STMH 1-4	5,818.85	60.0	0.026	36.0	0.013	23.60
CO-21	STMH 1-4	5,818.85	FES 1-4	5,818.00	33.0	0.026	36.0	0.013	23.60
CO-22	INLET 1-3	5,829.94	STMH 1-3	5,829.37	18.4	0.031	24.0	0.013	8.90
CO-23	STMH 1-3	5,829.37	O-1	5,829.00	12.0	0.031	24.0	0.013	8.90
CO-24	INLET 5-4A	5,829.26	STMH 5-4	5,828.83	43.0	0.010	18.0	0.013	1.00
CO-25	STMH 2-5E	5,820.80	STMH 2-5D	5,820.12	44.0	0.015	24.0	0.013	8.30
CO-27	STMH 2-5D	5,820.12	STMH 2-5C	5,819.49	45.0	0.014	24.0	0.013	11.80
CO-28	STMH 2-5C	5,819.49	STMH 2-5B	5,815.51	289.0	0.014	30.0	0.013	15.20
CO-29	INLET 4-5B	5,819.70	STMH 2-5C	5,819.52	18.0	0.010	18.0	0.013	3.40
CO-30	INLET 5-5B	5,828.30	STMH 2-5D	5,820.22	293.0	0.028	18.0	0.013	3.50
CO-31	INLET 4-5C	5,815.79	STMH 2-5B	5,815.61	18.0	0.010	18.0	0.013	2.40
CO-32	INLET 6-5	5,821.14	STMH 3-5A	5,812.67	247.0	0.034	30.0	0.013	8.20
CO-33	STMH 3-5A	5,812.67	STMH 2-5	5,811.37	48.0	0.027	30.0	0.013	12.80
CO-34	INLET 6-5A	5,812.86	STMH 3-5A	5,812.67	19.0	0.010	18.0	0.013	2.60
CO-35	INLET 6-5B	5,812.86	STMH 3-5A	5,812.67	19.0	0.010	18.0	0.013	2.00

**FlexTable: Conduit Table**

Label	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Manning's n	Flow (cfs)
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CO-6	INLET 6-4	5,832.33	STMH 5-4	5,827.71	278.0	0.017	36.0	0.013	9.60
CO-18	FES 2-5	5,834.54	INLET 8-5	5,834.00	7.7	0.070	24.0	0.013	4.10
CO-7	INLET 5-4	5,829.34	STMH 5-4	5,828.83	52.0	0.010	18.0	0.013	3.60
CO-9	INLET 3-4	5,825.42	STMH 4-4	5,825.23	20.0	0.010	18.0	0.013	4.00
CO-12	INLET 1-4	5,823.04	STMH 2-4	5,821.92	65.0	0.017	18.0	0.013	2.40
CO-10	INLET 4-4	5,825.42	STMH 4-4	5,825.23	20.0	0.010	18.0	0.013	0.90
CO-16	INLET 2-6	5,813.03	INLET 1-6	5,811.92	80.0	0.014	24.0	0.013	3.00
CO-27	INLET 2-5	5,808.09	INLET 1-5	5,807.49	90.0	0.007	36.0	0.013	8.20
CO-28	INLET 1-5	5,807.29	STMH 1-5	5,806.51	103.0	0.008	36.0	0.013	13.30
CO-29	STMH 1-5	5,805.81	FES 1-5	5,788.00	446.0	0.040	42.0	0.013	55.71
CO-1	INLET 2-3	5,840.56	INLET 1-3	5,831.04	94.0	0.101	24.0	0.013	4.50
CO-4	FES 2-4	5,842.00	STMH 6-4	5,835.11	221.0	0.031	36.0	0.013	8.50
CO-8	STMH 5-4	5,827.41	STMH 4-4	5,822.96	163.0	0.027	36.0	0.013	14.30
CO-21	INLET 4-5	5,812.96	STMH 2-5A	5,812.27	19.0	0.036	18.0	0.013	2.50
CO-22	INLET 5-5	5,813.90	STMH 2-5	5,811.47	49.0	0.050	18.0	0.013	3.40
CO-11A	STMH 4-4	5,822.16	STMH 3-4	5,821.56	79.0	0.008	36.0	0.013	19.20
CO-11B	STMH 3-4	5,821.46	STMH 2-4	5,820.65	76.0	0.011	36.0	0.013	21.80
CO-11C	INLET 2-4	5,822.07	STMH 3-4	5,821.56	56.0	0.009	18.0	0.013	2.60
CO-17	INLET 1-6	5,811.72	STMH 1-6	5,807.77	133.0	0.030	24.0	0.013	6.00
CO-17A	STMH 1-6	5,807.67	FES1-6	5,806.00	70.0	0.024	24.0	0.013	6.00
CO-18A	INLET 8-5	5,833.51	INLET 7-5	5,827.49	173.0	0.035	24.0	0.013	4.10
CO-25A	INLET 4-5A	5,821.14	STMH 2-5E	5,820.90	20.0	0.012	18.0	0.013	4.30
CO-25B	INLET 5-5A	5,821.14	STMH 2-5E	5,820.90	20.0	0.012	18.0	0.013	4.30
CO-13	STMH 2-5	5,811.37	INLET 3-5	5,810.99	16.0	0.024	42.0	0.013	37.30
CO-14	INLET 3-5	5,810.89	STMH 1-5	5,806.01	266.0	0.018	42.0	0.013	41.40
CO-15	INLET 7-5	5,827.14	STMH 4-5	5,822.27	104.6	0.047	24.0	0.013	4.30
CO-16	STMH 4-5	5,822.27	INLET 6-5	5,821.44	23.0	0.036	24.0	0.013	4.30
CO-17	STMH 2-5A	5,812.17	STMH 2-5	5,811.47	50.0	0.014	36.0	0.013	20.60
CO-18	STMH 2-5B	5,815.51	STMH 2-5A	5,812.17	241.0	0.014	30.0	0.013	18.10
CO-20	STMH 2-4	5,820.42	STMH 1-4	5,818.85	60.0	0.026	36.0	0.013	24.20
CO-21	STMH 1-4	5,818.85	FES 1-4	5,818.00	33.0	0.026	36.0	0.013	24.20
CO-22	INLET 1-3	5,829.94	STMH 1-3	5,829.37	18.4	0.031	24.0	0.013	10.00
CO-23	STMH 1-3	5,829.37	O-1	5,829.00	12.0	0.031	24.0	0.013	10.00
CO-24	INLET 5-4A	5,829.26	STMH 5-4	5,828.83	43.0	0.010	18.0	0.013	1.10
CO-25	STMH 2-5E	5,820.80	STMH 2-5D	5,820.12	44.0	0.015	24.0	0.013	8.60
CO-27	STMH 2-5D	5,820.12	STMH 2-5C	5,819.49	45.0	0.014	24.0	0.013	12.10
CO-28	STMH 2-5C	5,819.49	STMH 2-5B	5,815.51	289.0	0.014	30.0	0.013	15.60
CO-29	INLET 4-5B	5,819.70	STMH 2-5C	5,819.52	18.0	0.010	18.0	0.013	3.50
CO-30	INLET 5-5B	5,828.30	STMH 2-5D	5,820.22	293.0	0.028	18.0	0.013	3.50
CO-31	INLET 4-5C	5,815.79	STMH 2-5B	5,815.61	18.0	0.010	18.0	0.013	2.50
CO-32	INLET 6-5	5,821.14	STMH 3-5A	5,812.67	247.0	0.034	30.0	0.013	8.50
CO-33	STMH 3-5A	5,812.67	STMH 2-5	5,811.37	48.0	0.027	30.0	0.013	13.30
CO-34	INLET 6-5A	5,812.86	STMH 3-5A	5,812.67	19.0	0.010	18.0	0.013	2.70
CO-35	INLET 6-5B	5,812.86	STMH 3-5A	5,812.67	19.0	0.010	18.0	0.013	2.10

**FlexTable: Conduit Table**

Label	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Manning's n	Flow (cfs)
CO-5	STMH 6-4	5,834.91	INLET 6-4	5,832.53	120.0	0.020	36.0	0.013	47.81
CO-6	INLET 6-4	5,832.33	STMH 5-4	5,827.71	278.0	0.017	36.0	0.013	51.31
CO-18	FES 2-5	5,834.54	INLET 8-5	5,834.00	7.7	0.070	24.0	0.013	24.64
CO-7	INLET 5-4	5,829.34	STMH 5-4	5,828.83	52.0	0.010	18.0	0.013	9.80
CO-9	INLET 3-4	5,825.42	STMH 4-4	5,825.23	20.0	0.010	18.0	0.013	11.20
CO-12	INLET 1-4	5,823.04	STMH 2-4	5,821.92	65.0	0.017	18.0	0.013	7.70
CO-10	INLET 4-4	5,825.42	STMH 4-4	5,825.23	20.0	0.010	18.0	0.013	2.40
CO-16	INLET 2-6	5,813.03	INLET 1-6	5,811.92	80.0	0.014	24.0	0.013	8.10
CO-27	INLET 2-5	5,808.09	INLET 1-5	5,807.49	90.0	0.007	36.0	0.013	23.50
CO-28	INLET 1-5	5,807.29	STMH 1-5	5,806.51	103.0	0.008	36.0	0.013	38.60
CO-29	STMH 1-5	5,805.81	FES 1-5	5,788.00	446.0	0.040	42.0	0.013	156.03
CO-1	INLET 2-3	5,840.56	INLET 1-3	5,831.04	94.0	0.101	24.0	0.013	9.00
CO-4	FES 2-4	5,842.00	STMH 6-4	5,835.11	221.0	0.031	36.0	0.013	47.81
CO-8	STMH 5-4	5,827.41	STMH 4-4	5,822.96	163.0	0.027	36.0	0.013	63.33
CO-21	INLET 4-5	5,812.96	STMH 2-5A	5,812.27	19.0	0.036	18.0	0.013	8.90
CO-22	INLET 5-5	5,813.90	STMH 2-5	5,811.47	49.0	0.050	18.0	0.013	9.10
CO-11A	STMH 4-4	5,822.16	STMH 3-4	5,821.56	79.0	0.008	36.0	0.013	76.93
CO-11B	STMH 3-4	5,821.46	STMH 2-4	5,820.65	76.0	0.011	36.0	0.013	84.93
CO-11C	INLET 2-4	5,822.07	STMH 3-4	5,821.56	56.0	0.009	18.0	0.013	8.00
CO-17	INLET 1-6	5,811.72	STMH 1-6	5,807.77	133.0	0.030	24.0	0.013	15.40
CO-17A	STMH 1-6	5,807.67	FES1-6	5,806.00	70.0	0.024	24.0	0.013	15.40
CO-18A	INLET 8-5	5,833.51	INLET 7-5	5,827.49	173.0	0.035	24.0	0.013	24.64
CO-25A	INLET 4-5A	5,821.14	STMH 2-5E	5,820.90	20.0	0.012	18.0	0.013	10.20
CO-25B	INLET 5-5A	5,821.14	STMH 2-5E	5,820.90	20.0	0.012	18.0	0.013	10.62
CO-13	STMH 2-5	5,811.37	INLET 3-5	5,810.99	16.0	0.024	42.0	0.013	123.06
CO-14	INLET 3-5	5,810.89	STMH 1-5	5,806.01	266.0	0.018	42.0	0.013	136.96
CO-15	INLET 7-5	5,827.14	STMH 4-5	5,822.27	104.6	0.047	24.0	0.013	34.84
CO-16	STMH 4-5	5,822.27	INLET 6-5	5,821.44	23.0	0.036	24.0	0.013	34.84
CO-17	STMH 2-5A	5,812.17	STMH 2-5	5,811.47	50.0	0.014	36.0	0.013	48.02
CO-18	STMH 2-5B	5,815.51	STMH 2-5A	5,812.17	241.0	0.014	30.0	0.013	39.12
CO-20	STMH 2-4	5,820.42	STMH 1-4	5,818.85	60.0	0.026	36.0	0.013	92.63
CO-21	STMH 1-4	5,818.85	FES 1-4	5,818.00	33.0	0.026	36.0	0.013	92.63
CO-22	INLET 1-3	5,829.94	STMH 1-3	5,829.37	18.4	0.031	24.0	0.013	22.50
CO-23	STMH 1-3	5,829.37	O-1	5,829.00	12.0	0.031	24.0	0.013	22.50
CO-24	INLET 5-4A	5,829.26	STMH 5-4	5,828.83	43.0	0.010	18.0	0.013	2.22
CO-25	STMH 2-5E	5,820.80	STMH 2-5D	5,820.12	44.0	0.015	24.0	0.013	20.82
CO-27	STMH 2-5D	5,820.12	STMH 2-5C	5,819.49	45.0	0.014	24.0	0.013	28.32
CO-28	STMH 2-5C	5,819.49	STMH 2-5B	5,815.51	289.0	0.014	30.0	0.013	35.22
CO-29	INLET 4-5B	5,819.70	STMH 2-5C	5,819.52	18.0	0.010	18.0	0.013	6.90
CO-30	INLET 5-5B	5,828.30	STMH 2-5D	5,820.22	293.0	0.028	18.0	0.013	7.50
CO-31	INLET 4-5C	5,815.79	STMH 2-5B	5,815.61	18.0	0.010	18.0	0.013	3.90
CO-32	INLET 6-5	5,821.14	STMH 3-5A	5,812.67	247.0	0.034	30.0	0.013	54.44
CO-33	STMH 3-5A	5,812.67	STMH 2-5	5,811.37	48.0	0.027	30.0	0.013	65.94
CO-34	INLET 6-5A	5,812.86	STMH 3-5A	5,812.67	19.0	0.010	18.0	0.013	6.20
CO-35	INLET 6-5B	5,812.86	STMH 3-5A	5,812.67	19.0	0.010	18.0	0.013	5.30

## Temporary Swale East of Residential Site - Upper

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.035	
Channel Slope	0.01000	ft/ft
Left Side Slope	0.20	ft/ft (H:V)
Right Side Slope	0.20	ft/ft (H:V)
Bottom Width	4.00	ft
Discharge	9.80	ft <sup>3</sup> /s

### Results

Normal Depth	0.79	ft
Flow Area	3.29	ft <sup>2</sup>
Wetted Perimeter	5.62	ft
Hydraulic Radius	0.59	ft
Top Width	4.32	ft
Critical Depth	0.57	ft
Critical Slope	0.02837	ft/ft
Velocity	2.98	ft/s
Velocity Head	0.14	ft
Specific Energy	0.93	ft
Froude Number	0.60	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.79	ft
Critical Depth	0.57	ft
Channel Slope	0.01000	ft/ft

---

## Temp Swale East of Street E - Top

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### GVF Output Data

Critical Slope 0.02837 ft/ft

## Temporary Swale East of Residential Site - Lower

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.050	
Channel Slope	0.10000	ft/ft
Left Side Slope	0.20	ft/ft (H:V)
Right Side Slope	0.20	ft/ft (H:V)
Bottom Width	4.00	ft
Discharge	9.80	ft <sup>3</sup> /s

### Results

Normal Depth	0.48	ft
Flow Area	1.95	ft <sup>2</sup>
Wetted Perimeter	4.97	ft
Hydraulic Radius	0.39	ft
Top Width	4.19	ft
Critical Depth	0.57	ft
Critical Slope	0.05791	ft/ft
Velocity	5.03	ft/s
Velocity Head	0.39	ft
Specific Energy	0.87	ft
Froude Number	1.30	
Flow Type	Supercritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.48	ft
Critical Depth	0.57	ft
Channel Slope	0.10000	ft/ft

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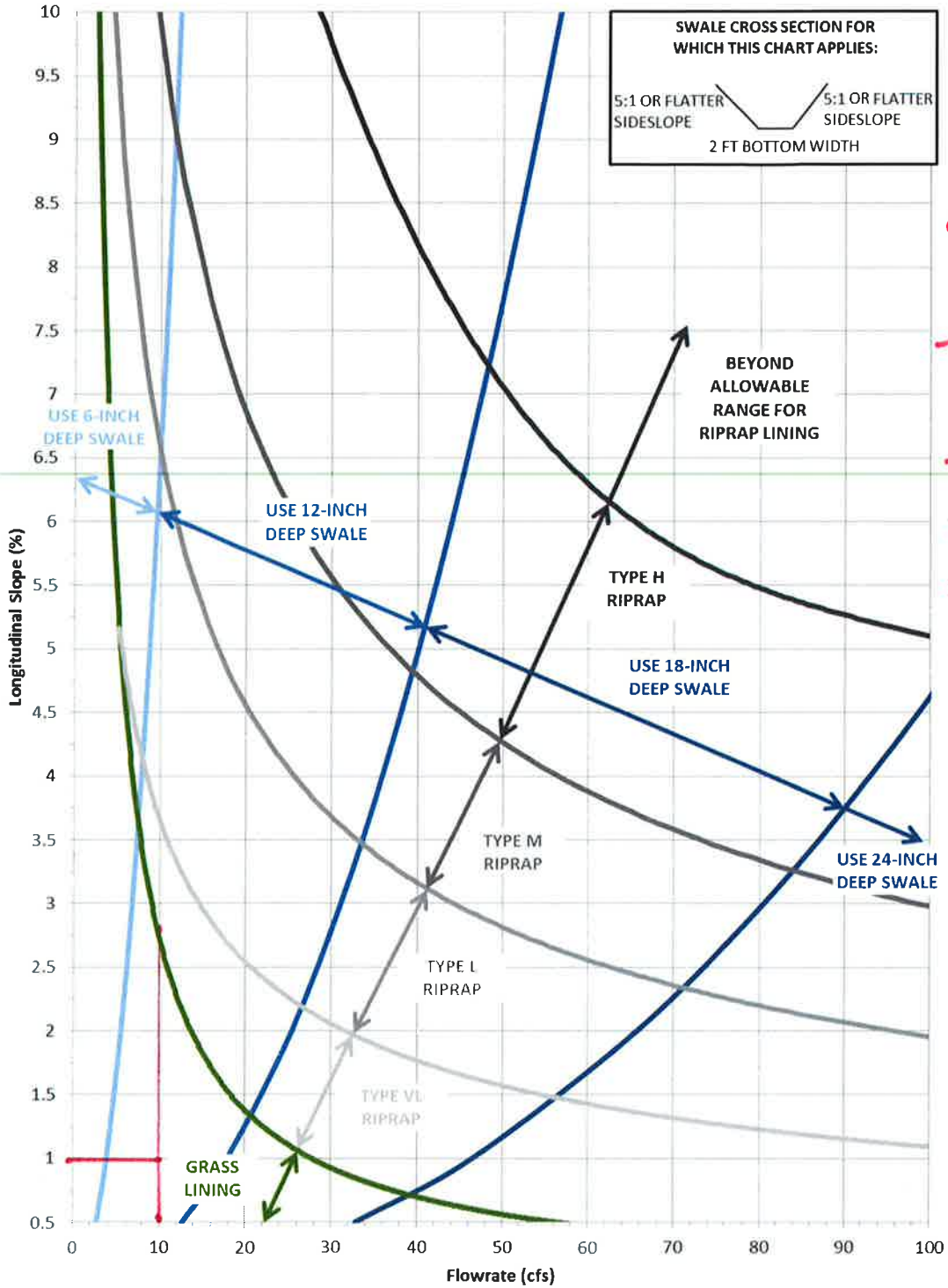
## Temp Swale East of Street E - Bottom

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### GVF Output Data

Critical Slope 0.05791 ft/ft

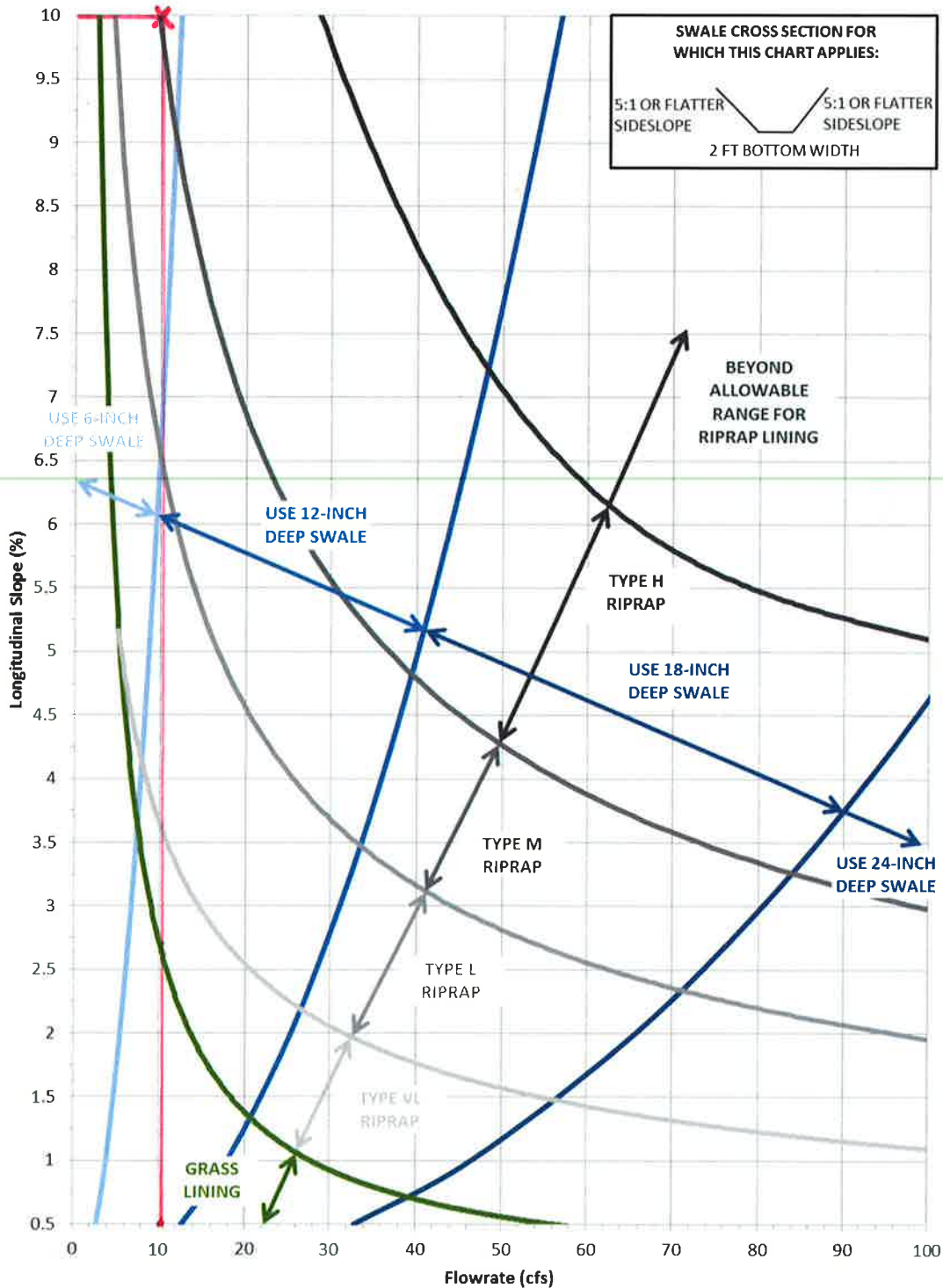
# TEMPORARY SWALE (EAST OF RESIDENTIAL SITE)



Upper  
 $Q = 9.8 \text{ cfs}$   
 $s = 1\%$   
 -1' Deep to Match Lower  
 -Grass lined  
 -2' Bottom  
 -5:1 Sides

**Figure 8-22. Swale stability chart; 2- to 4-foot bottom width and side slopes between 5:1 and 10:1**  
 (Note: Riprap classifications refer to gradation for riprap used in soil riprap or void-filled riprap. See Figure 8-34 for gradations.) (Source: Muller Engineering Company)

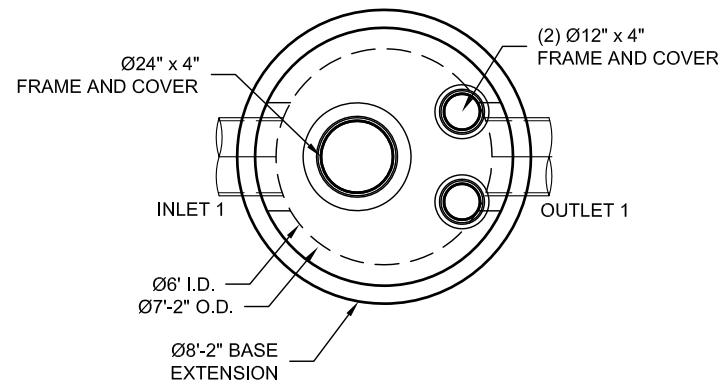
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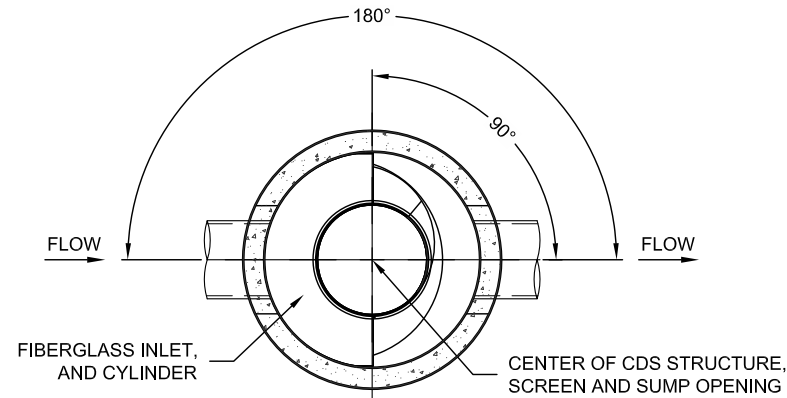
Lower  
 $Q = 9.8 \text{ cfs}$   
 $S = 10\%$   
 1' Deep  
 Type M Riprap  
 2' Bottom  
 5:1 Sides

**Figure 8-22. Swale stability chart; 2- to 4-foot bottom width and side slopes between 5:1 and 10:1**  
 (Note: Riprap classifications refer to gradation for riprap used in soil riprap or void-filled riprap. See Figure 8-34 for gradations.) (Source: Muller Engineering Company)

**FOR REFERENCE ONLY. TO BE CONSTRUCTED AS PART OF FILING 1.**

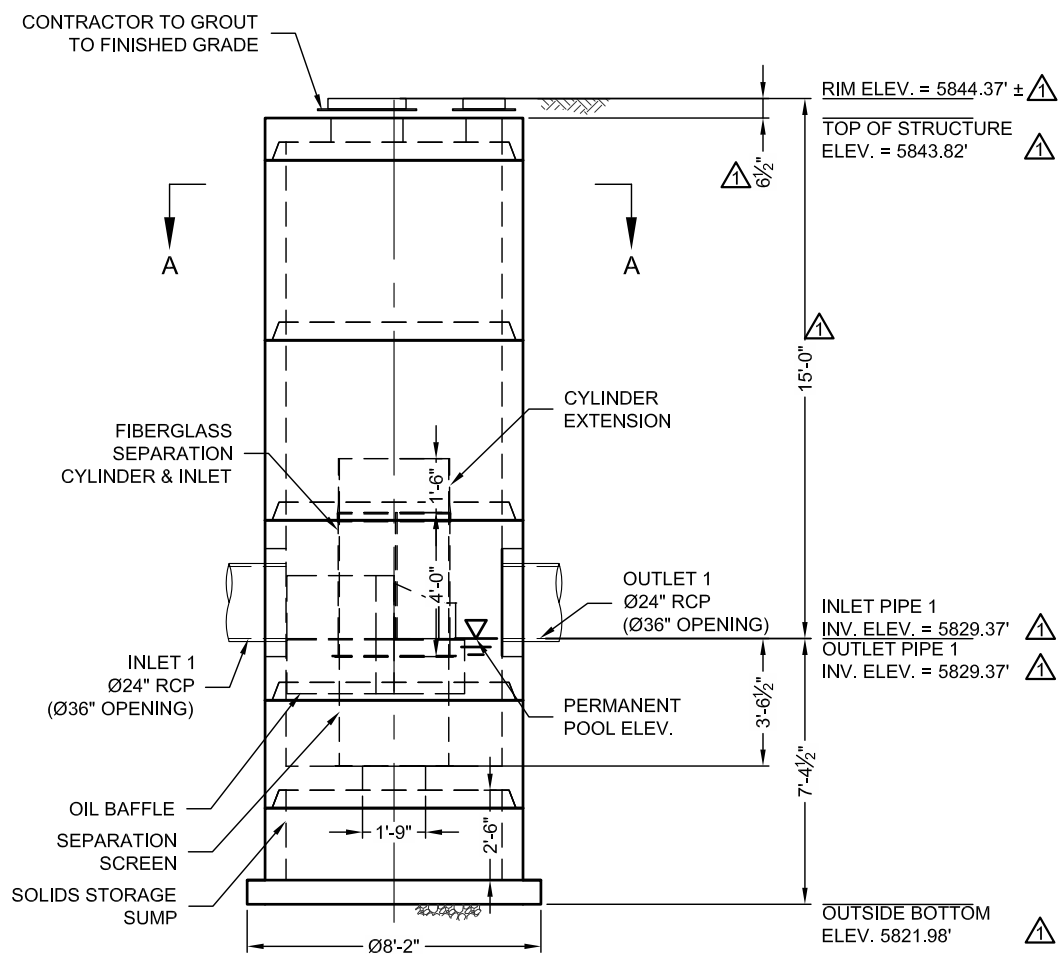


**PLAN VIEW**



**SECTION A-A**

● INTERNAL COMPONENTS TO BE INSTALLED BY CONTECH ON SITE



**ELEVATION VIEW**

**MATERIAL LIST (PROVIDED BY CONTECH)**

COUNT	DESCRIPTION	INSTALLED BY
1	FIBERGLASS INLET AND CYLINDER	CONTECH
1	2400 micron, 3' O.D. x 3.04' SEP. SCREEN	CONTECH
1	CYLINDER EXTENSION	CONTRACTOR
1	SEALANT FOR JOINTS (BY PRECASTER)	CONTRACTOR
1	Ø24" x 4" FRAME & COVER, E.J#41600389, OR EQUIV.	CONTRACTOR
2	Ø12" x 4" FRAME & COVER, E.J#41610201, OR EQUIV.	CONTRACTOR

**SITE DESIGN DATA**

WATER QUALITY FLOW RATE	0 CFS
PEAK FLOW RATE	29.2 CFS
RETURN PERIOD OF PEAK FLOW	100 YRS

**GENERAL NOTES**

- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
- FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. [www.ContechES.com](http://www.ContechES.com)
- CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
- STRUCTURE SHALL MEET AASHTO HS-20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
- IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
- CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

**INSTALLATION NOTES**

- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
- CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
- CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
- CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

▲ **STRUCTURE WEIGHT**  
 APPROXIMATE HEAVIEST PICK = 10000 LBS.  
 STRUCTURE IS DELIVERED IN 6 PIECES

MAX FOOTPRINT = Ø8'-2"

CONTECH  
**CONTRACT**  
 DRAWING

LPICO  
 LAYOUT 1A  
 3030-6-FGIS  
 1026 / FI72886

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MARK	DATE	REVISION DESCRIPTION	BY
1	7/28/16	IN/OUTLET & RIM ELEVATIONS	KJW

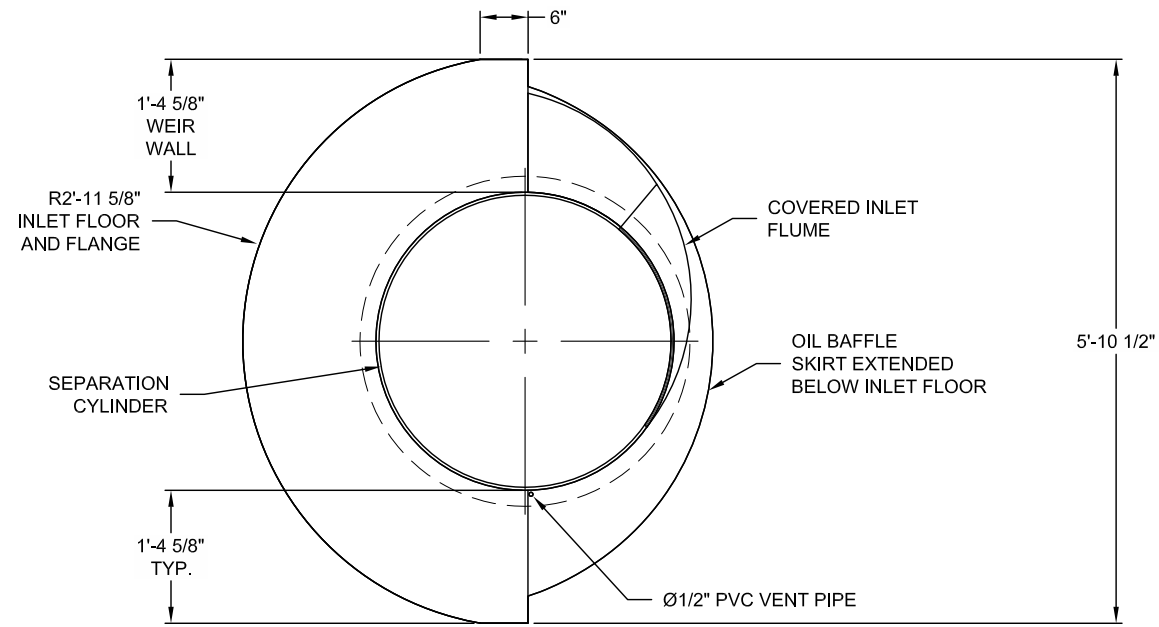
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**COMPARK SOUTH**  
**PARKER, CO**  
 for SYSTEM: STMH 1-3

**CONTECH**  
 ENGINEERED SOLUTIONS LLC  
[www.ContechES.com](http://www.ContechES.com)  
 2201 W. Royal Lane, Suite 200, Irving, TX 75083  
 972-508-2000 972-508-2088 FAX

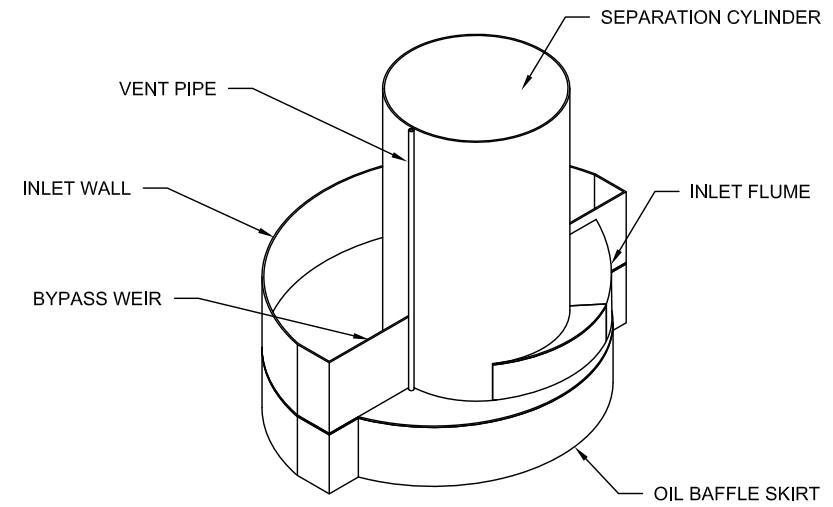
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DESIGNED:	JHR	DRAWN:	KJW
CHECKED:	XXX	APPROVED:	----
PROJECT No.:	542946	SEQUENCE No.:	10
SHEET:	1	OF	1

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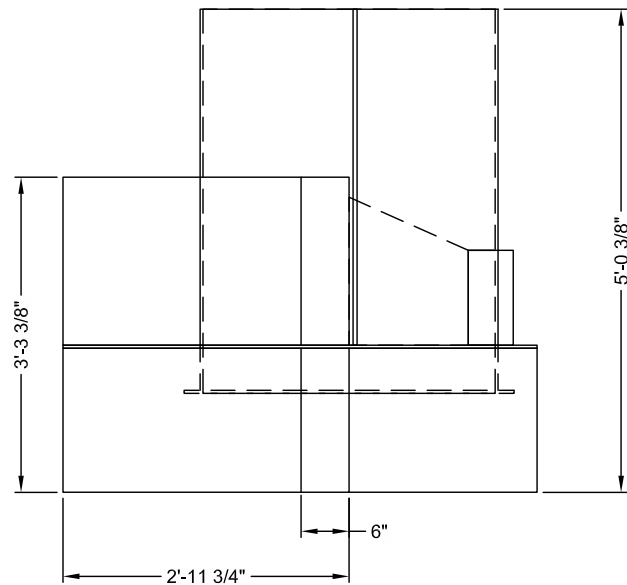
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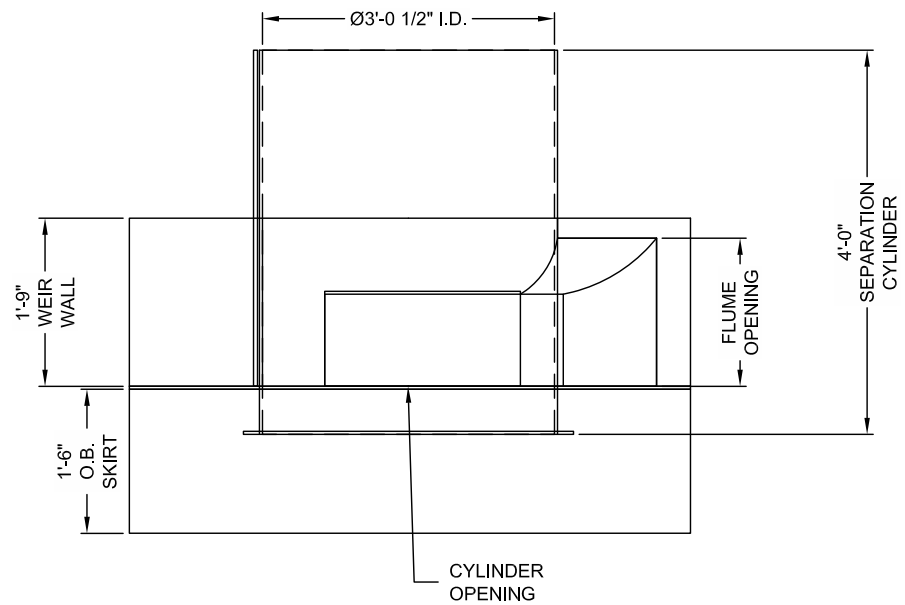
**PLAN VIEW**



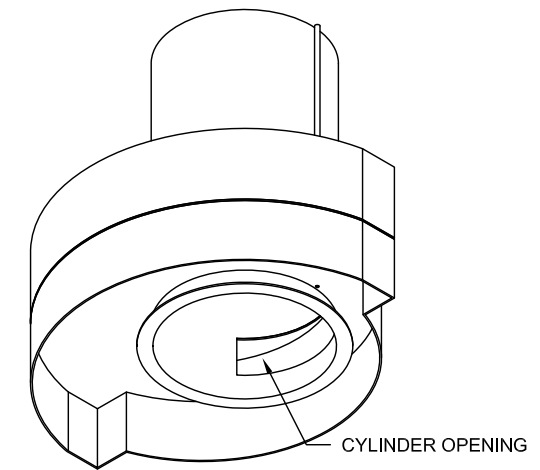
**ASSEMBLY TOP VIEW**  
N.T.S.



**ELEVATION VIEW**



**SIDE VIEW**



**ASSEMBLY BOTTOM VIEW**  
N.T.S.

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DRAWING

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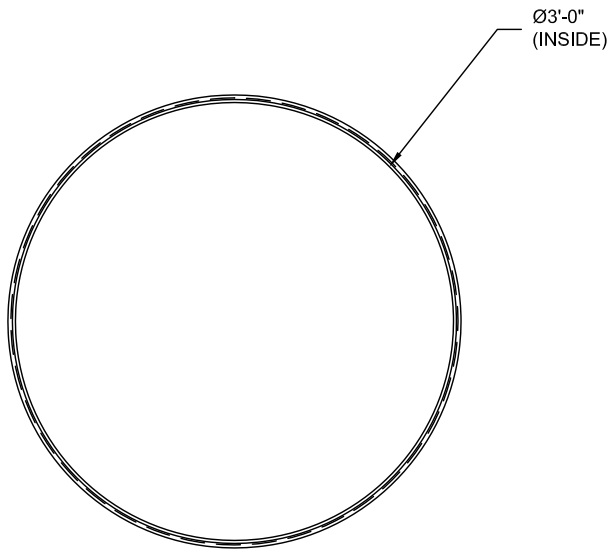
NO.	DATE	MARK	REVISION DESCRIPTION	BY

**CDS3030-6-C - 542946-10**  
**COMPARK SOUTH**  
**PARKER, CO**  
 for SYSTEM: STMH 1-3

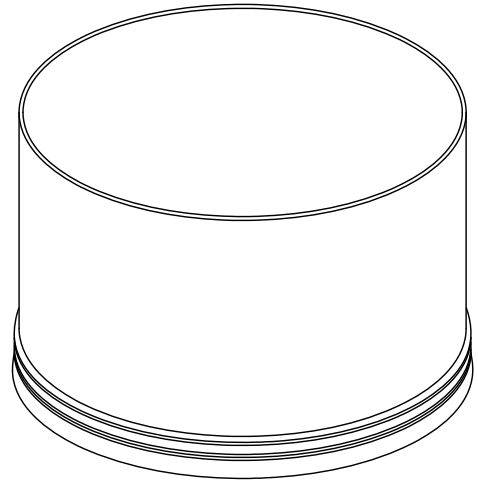
**CONTECH**  
**ENGINEERED SOLUTIONS LLC**  
 www.contechES.com  
 2201 W. Royal Lane, Suite 200, Irving, TX 75083  
 972-580-2000 972-580-2089 FAX

DATE: 07/15/16	SCALE: 1/2" = 1'-0"
DESIGNED: JHR	DRAWN: KJW
CHECKED: XXX	APPROVED: ----
PROJECT No.: 542946	SEQUENCE No.: 10
SHEET: 1 OF 1	

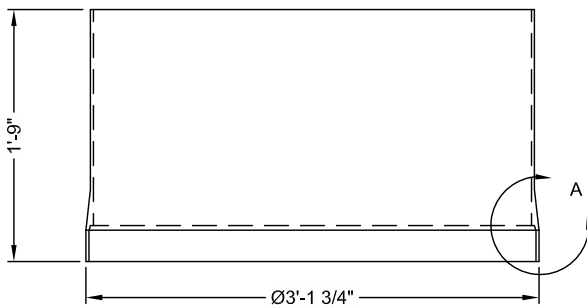
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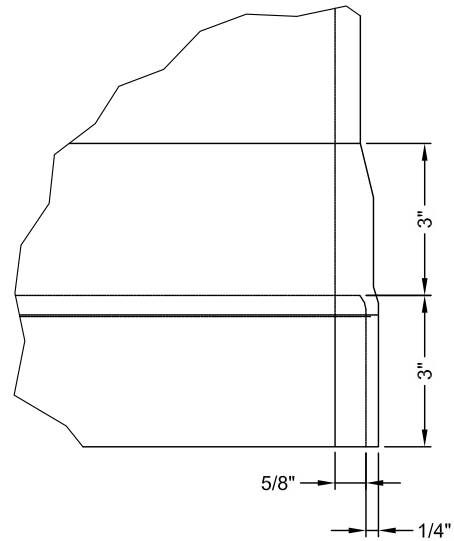
**PLAN VIEW**



**ISOMETRIC VIEW**



**ELEVATION VIEW**



**DETAIL A**  
SCALE 3/16



THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,768,848; 6,641,720; 6,511,985; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CONTECH  
FABRICATION  
DRAWING

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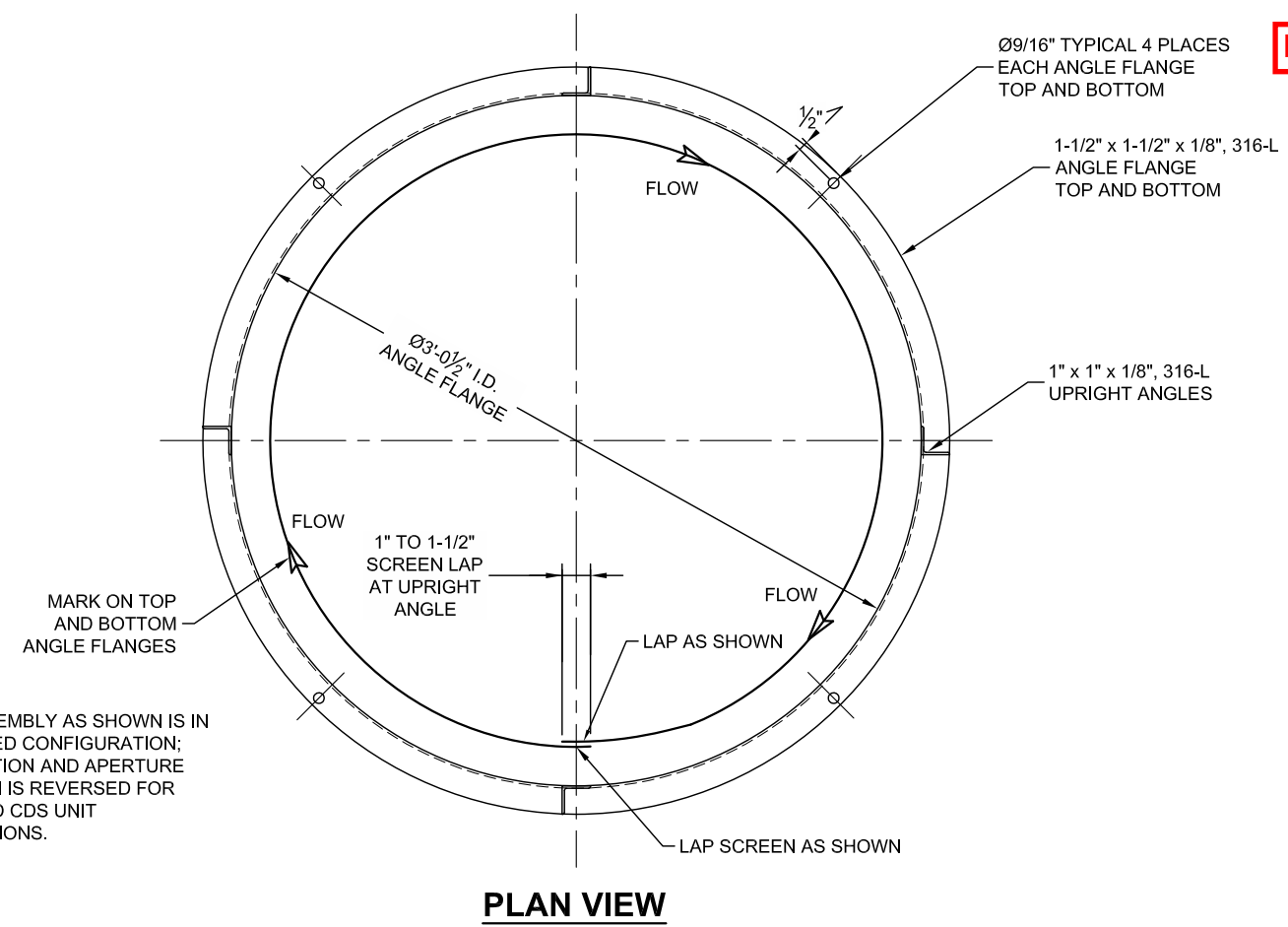
2201 W. Royal Lane, Suite 260, Irving, TX 75063  
972-590-2000 972-590-2039 FAX

CDS3030-6-C - 542946-10, CYLINDER EXTENSION DETAILS  
COMPARK SOUTH  
PARKER, CO  
for SYSTEM: WQ UNIT #1

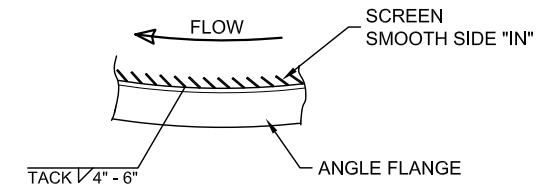
DATE:07/15/16 SCALE: 3/4" = 1'-0" PROJECT No.: 542946 SEQ. No.: 10 DRAWN: KJW CHECKED: XXX

I:\MERLIN\PROJECT\ACTIVE\542946\542946-10-CDS\DRAWINGS\PRE-542946-10-CDS3030-6-C CONFAB.DWG 7/15/2016 10:19 AM

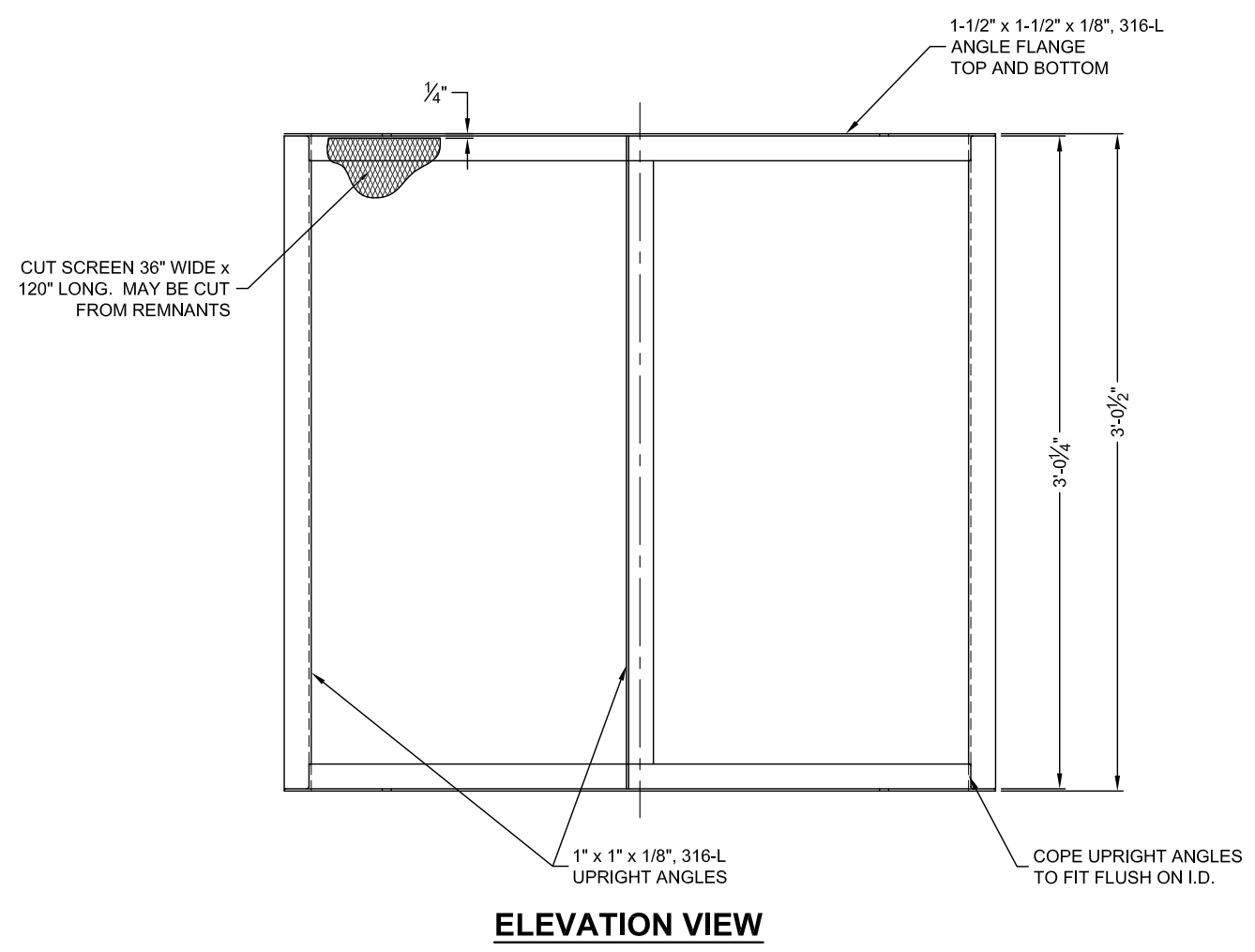
**FOR REFERENCE ONLY. TO BE CONSTRUCTED AS PART OF FILING 1.**



NOTE:  
SCREEN ASSEMBLY AS SHOWN IS IN  
RIGHT-HANDED CONFIGURATION;  
FLOW DIRECTION AND APERTURE  
ORIENTATION IS REVERSED FOR  
LEFT-HANDED CDS UNIT  
CONFIGURATIONS.



**SCREEN DETAIL  
TOP VIEW**



**GENERAL NOTES:**

- ALL MATERIAL IS 316-L STAINLESS
- SCREEN SHALL BE STAINLESS STEEL EXPANDED METAL CONFORMING TO ASTM 1267-01.
- SCREEN APERTURE SIZE SHALL BE EITHER 4700 MICRON OR 2400 MICRON PER PROJECT ORDER.
- TOP AND BOTTOM FLANGES MUST BE ROUND, FLAT, PARALLEL AND PLUM.
- UPRIGHT ANGLES MUST BE PLUM AND SQUARE
- STRAIGHTEN TOP AND BOTTOM FLANGES PRIOR TO ASSEMBLY OF FRAME.
- FLATTEN ENDS OF SCREEN TO TOP AND BOTTOM ANGLE FLANGES PRIOR TO WELDING.
- SCREEN IS TACK WELDED TO FRAME @ 4" CENTERS WITH SMOOTH SIDE ON INSIDE.
- WIPE ANGLE FLANGES CLEAN AND PAINT:
  - CLOCKWISE END "GREEN" (RIGHT HAND FLOW).
  - COUNTER-CLOCKWISE END "RED" (LEFT HANDED FLOW).
- FLANGE PAINTED GREEN ON TOP FOR RIGHT-HANDED CONFIGURATION.
- FLANGE PAINTED RED ON TOP FOR LEFT-HANDED CONFIGURATION.
- FABRICATOR TO SUPPLY THE FOLLOWING STAINLESS STEEL HARDWARE.
  - FOR EACH 3/8" ANCHOR REQUIRED:
    - (1) 3/8" X 2-3/4" ANCHOR
    - (1) 3/8" NUT
    - (1) 3/8" LOCKWASHER
    - (1) 3/8" FLAT WASHER
  - FOR EACH 1/2" BOLT REQUIRED:
    - (1) 1/2" X 1-1/2" BOLT
    - (1) 1/2" NUT
    - (1) 1/2" LOCKWASHER
    - (2) 1/2" FLAT WASHERS

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MARK	DATE	REVISION DESCRIPTION	BY

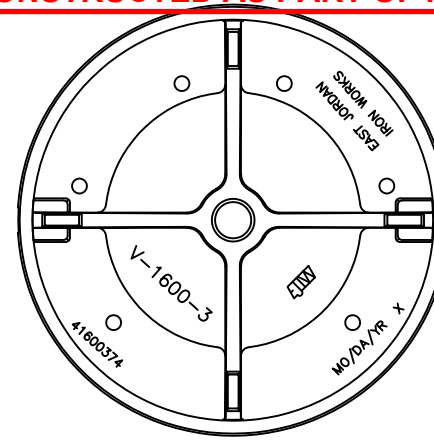
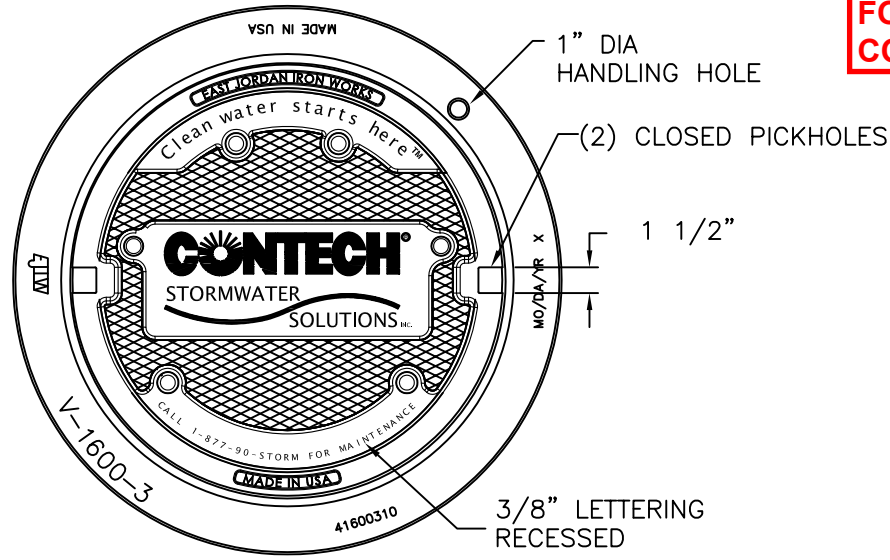
**CDS3030  
SCREEN ASSEMBLY DETAILS**

**CONTECH**  
ENGINEERED SOLUTIONS LLC  
www.conteches.com  
200 Enterprise Drive, Scarborough, ME 04074  
877-507-8676 207-885-8830 207-885-8825 FAX

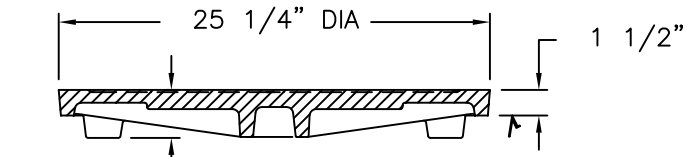
**CDS**  
THIS PRODUCT HAS BEEN PROTECTED BY ONE OR MORE OF THE RELATED FOREIGN PATENTS, OR OTHER PATENT PENDING.

DATE:	07/21/14	
DESIGNED:	N/A	DRAWN: NDG
CHECKED:	N/A	APPROVED: XXX
PROJECT NUMBER:		
SHEET:	OF N/A	

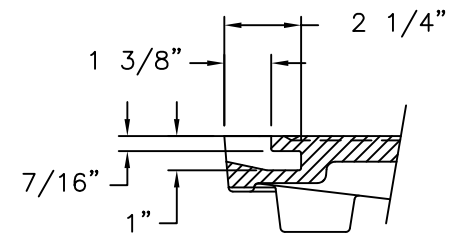
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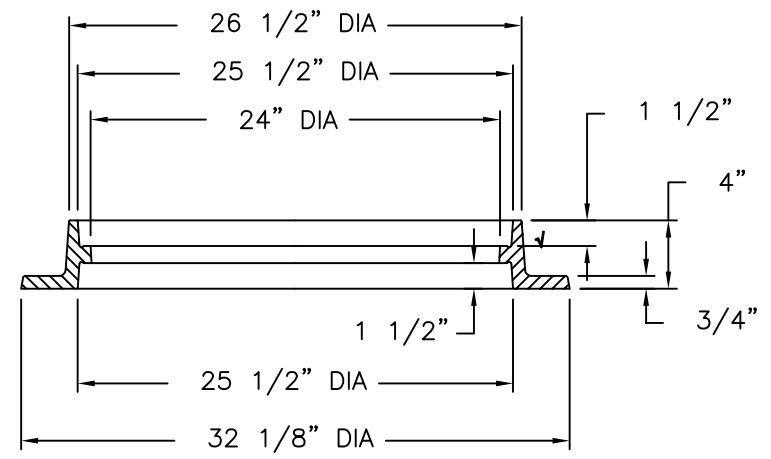
**COVER BACK**



**COVER SECTION**



**PICKHOLE DETAIL**



**RING SECTION**

**EJIW EAST JORDAN**  
IRON WORKS EST. 1883

800-626-4653  
www.ejiw.com  
MADE IN USA

PRODUCT NUMBER

**41600389**

CATALOG NUMBER

**V1600-3**

**REVERSIBLE RING &  
COVER ASSEMBLY**

LOAD RATING

**HEAVY DUTY HS-20**

COATING

**UNDIPPED**

ESTIMATED WEIGHT

COVER: 135 LBS  
RING: 120 LBS  
UNIT: 255 LBS

MATERIAL SPECIFICATION

RING - GRAY IRON  
ASTM A48 CL35B  
COVER - GRAY IRON  
ASTM A48 CL35B

OPEN AREA

N/A

√ DESIGNATES MACHINE SURFACE

DRAWN  
DEW

DATE  
05/02/08

LAST REVISED

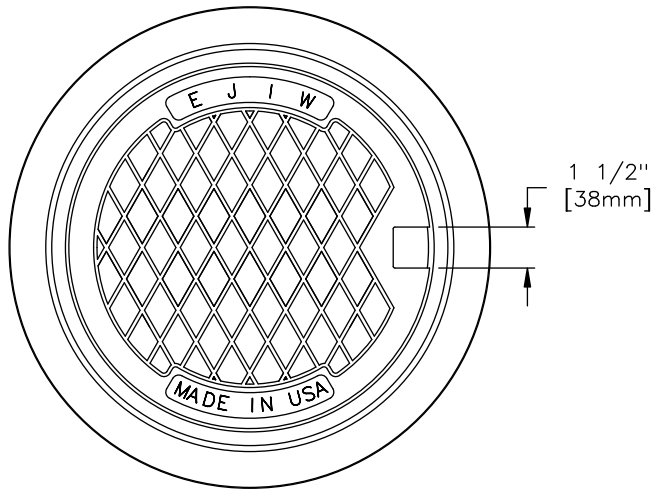
DATE

REFERENCE INFORMATION

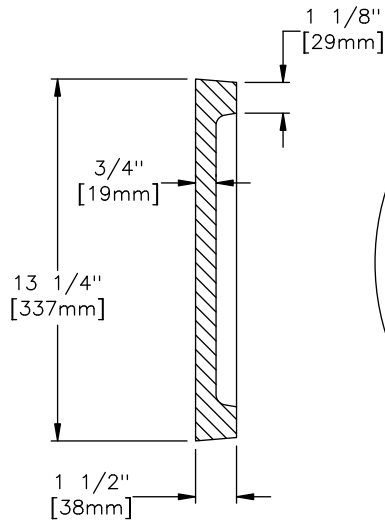
41600310  
41600374

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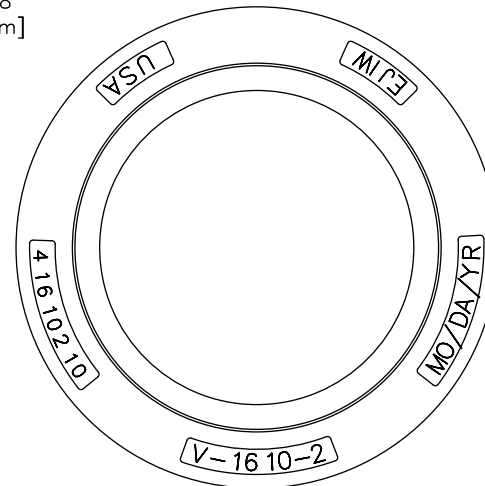
**FOR REFERENCE ONLY. TO BE CONSTRUCTED AS PART OF FILING 1.**



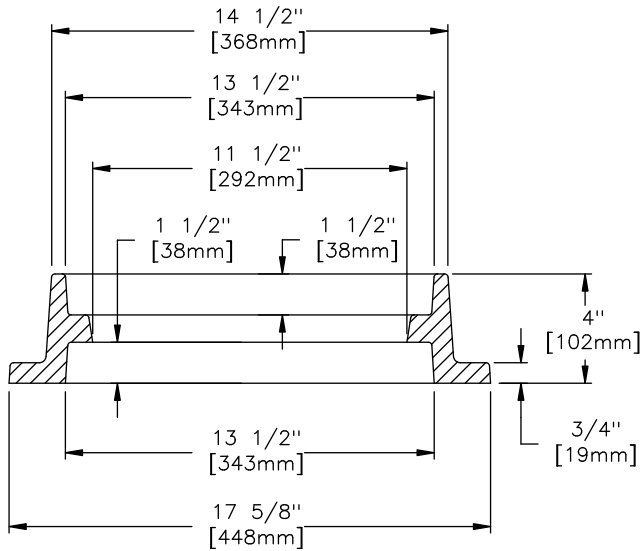
**RING BOTTOM FLANGE**



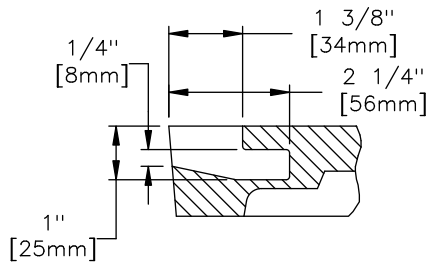
**COVER SECTION**



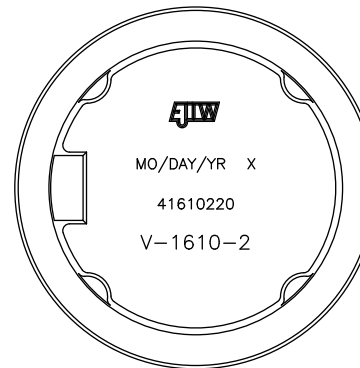
**RING TOP FLANGE**



**RING SECTION**



**PICKHOLE DETAIL**



**COVER BACK**

NOTE:  
RING IS REVERSIBLE AND CAN BE  
INSTALLED AS A TOP FLANGE UNIT

**EAST JORDAN  
IRON WORKS, INC.**

P.O. BOX 439  
EAST JORDAN, MI. 49727  
1-800-874-4100  
FAX 231-536-4458

DRAWN DAL	DATE 06/12/03
APPROVED	DATE

**ASSEMBLY**

PRODUCT NO.

**41610201**

CATALOG NO.

**V-1610-2**

REF. SALES DRAWING  
41610210  
41610220

EST. WT.

COVER: 36 LBS 16kg  
RING: 45 LBS 20kg  
TOTAL: 81 LBS 37kg

OPEN AREA

N/A

MAT'L SPEC.

COVER - GRAY IRON  
ASTM A48 CL35B  
RING - GRAY IRON  
ASTM A48 CL35B

LOAD RATING

**HEAVY DUTY**



**INLINE  
HYDRAULIC CALCULATIONS**  
COMPARK SOUTH  
PARKER, CO  
542946-10



**DESIGN PARAMETERS**

CDS Model No. =	CDS3030
Design Treatment Flow =	3.0 cfs
Peak Design Flow =	29.20 cfs
Peak Design Return Interval =	100 year
Rim Elevation @ US Structure	5843.08 ft

**DETAILED CALCULATIONS**

**TREATMENT FLOW**

**Tailwater Condition at Outfall, EL<sub>0</sub>**

$$EL_0 = \underline{5,830.16} \text{ ft (invert plus depth of flow at D/S outlet)}$$

**Exit Loss from DownStream Pipe, h<sub>1</sub>**

$$h_1 = k * [ V^2 / (2*g) ]$$

where,

$$k = \underline{1.00}$$

$$V = Q / A_F$$

$$= \underline{7.48} \text{ fps}$$

$$h_1 = \underline{0.87} \text{ ft}$$

$$EGL_1 = EL_0 + n_1$$

$$= \underline{5831.03} \text{ ft}$$

**Head Loss Through Downstream Pipe, h<sub>2</sub>**

Friction Losses, h<sub>2</sub>

$$h_2 = S_{EGL} * L$$

where,

$$L = \underline{12} \text{ ft}$$

$$S_{EGL} = [ (Q * n) / (1.49 * A_F * R^{2/3}) ]^2$$

where,

Pipe Characteristics

$$\text{Dia.} = \underline{24} \text{ in}$$

$$S_{PIPE} = \underline{0.0310} \text{ ft/ft}$$

$$n = \underline{0.013}$$

Flow Characteristics

$$d_F = \underline{0.37} \text{ ft}$$

$$A_F = \underline{0.40} \text{ sf}$$

$$P_W = \underline{1.78} \text{ ft}$$

$$R = \underline{0.23} \text{ ft}$$

## Head Loss Through Downstream Pipe, $h_2$ (cont.'d)

7/26/2016

$$S_{EGL} = \underline{0.03112} \text{ ft / ft}$$

$$h_2 = \underline{0.3734} \text{ ft}$$

$$\begin{aligned} EGL_2' &= EGL_1 + h_2 \\ &= \underline{5831.40} \text{ ft} \end{aligned}$$

### Check Entrance Condition for Critical Depth Control

$$EL_{CDS \text{ Inv.}} = \underline{5830.16} \text{ ft}$$

$$d_c = \underline{0.61} \text{ ft}$$

$$\begin{aligned} EGL_C &= EL_{CDS \text{ Inv.}} + d_c + V_{dc}^2 / (2 * g) \\ &= \underline{5830.98} \text{ ft} \end{aligned}$$

### Identify Controlling EGL

Flow enters pipe at critical depth,  $EGL_C$  controls.

$$EGL_2 = \underline{5830.98} \text{ ft}$$

## Re-entry Loss into DownStream Pipe, $h_3$

$$h_3 = k * [ V^2 / (2 * g) ]$$

where,

$$k = \underline{0.20}$$

$$V = Q / A$$

$$= \underline{3.69} \text{ fps (area based on critical depth)}$$

$$h_3 = \underline{0.04} \text{ ft}$$

$$\begin{aligned} EGL_3' &= EGL_2 + h_3 \\ &= \underline{5831.03} \text{ ft} \end{aligned}$$

## Oil Baffle Loss, $h_4$

$$h_4 = k * [ V^2 / (2 * g) ]$$

where,

$$k = \underline{1.00}$$

$$A_{\text{Baffle}} = \underline{6.49} \text{ sf}$$

$$V = Q / A_{\text{baffle}}$$

$$= \underline{0.46} \text{ fps}$$

$$h_4 = \underline{0.0033} \text{ ft}$$

$$\begin{aligned} EGL_4 &= EGL_3 + h_4 \\ &= \underline{5831.03} \text{ ft} \end{aligned}$$

## Check Standard Weir Elevation

$$HL_{CDS} = \underline{0.67} \text{ ft}$$

$$\begin{aligned} EL_W' &= EGL_4 + HL_{CDS} \\ &= \underline{5831.70} \text{ ft} \end{aligned}$$

$$H_W' = EL_W' - EL_{CDS \text{ INV.}}$$

$$= \underline{1.54} \text{ ft, or } \underline{18.46} \text{ in}$$

$$\text{Std. Weir Height} = \underline{21} \text{ in}$$

Status **OK**

$$\text{Use } H_W = \underline{21} \text{ in, or } \underline{1.75} \text{ ft}$$

$$\begin{aligned} EL_W &= EL_{CDS \text{ INV.}} + H_W \\ &= \underline{5831.91} \text{ ft} \end{aligned}$$

## PEAK CONVEYANCE FLOW

7/26/2016

### Tailwater Condition at Outfall, $EL_0$

$$EL_0 = \underline{5,830.90} \text{ ft (tailwater condition per engineer, 100-yr)}$$

### Exit Loss from DownStream Pipe, $h_1$

$$h_1 = k * [ V^2 / (2*g) ]$$

where,

$$k = \underline{1.00}$$
$$V = Q / A_F$$
$$= \underline{13.89} \text{ fps}$$

$$h_1 = \underline{2.99} \text{ ft}$$

$$EGL_1 = EL_0 + h_1$$
$$= \underline{5833.89} \text{ ft}$$

### Head Loss Through Downstream Pipe, $h_2$

#### Friction Losses, $h_2$

$$h_2 = S_{EGL} * L$$

where,

$$L = \underline{12} \text{ ft}$$

$$S_{EGL} = [ (Q * n) / (1.49 * A_F * R^{2/3}) ]^2$$

where,

#### Pipe Characteristics

$$\text{Dia.} = \underline{24} \text{ in}$$
$$S_{PIPE} = \underline{0.0310} \text{ ft/ft}$$
$$n = \underline{0.013}$$

#### Flow Characteristics

$$d_n = \underline{1.27} \text{ ft}$$
$$A_F = \underline{2.10} \text{ sf}$$
$$P_W = \underline{3.69} \text{ ft}$$
$$R = \underline{0.57} \text{ ft}$$

$$S_{EGL} = \underline{0.0310} \text{ ft / ft}$$

$$h_2 = \underline{0.37} \text{ ft}$$

$$EGL_2' = EGL_1 + h_2$$
$$= \underline{5834.27} \text{ ft}$$

### Check Entrance Condition for Critical Depth Control

$$EL_{CDS \text{ Inv.}} = \underline{5830.16} \text{ ft}$$

$$d_c = \underline{1.91} \text{ ft}$$

$$EGL_C = EL_{CDS \text{ Inv.}} + d_c + V_{dc}^2 / (2*g)$$
$$= \underline{5833.46} \text{ ft}$$

### Identify Controlling EGL

Flow enters pipe at critical depth,  $EGL_C$  controls.

$$EGL_2 = \underline{5833.46} \text{ ft}$$

### Re-entry Loss into DownStream Pipe, $h_3$

7/26/2016

$$h_3 = k * [ V^2 / (2*g) ]$$

where,

$$k = \frac{0.20}{}$$

$$V = Q / A_F$$

$$= \frac{9.46}{} \text{ fps (area based on critical depth)}$$

$$h_3 = \frac{0.28}{} \text{ ft}$$

$$EGL_3 = EGL_2 + h_3$$

$$= \frac{5833.73}{} \text{ ft}$$

### Oil Baffle Loss, $h_4$

$$h_4 = k * [ V^2 / (2*g) ]$$

where,

$$k = \frac{0.00}{} \text{ (Skirted-baffle model)}$$

$$A_{\text{Baffle}} = \frac{6.49}{} \text{ sf}$$

$$V = Q / A_{\text{Baffle}}$$

$$= \frac{4.50}{} \text{ fps}$$

$$h_4 = \frac{0.00}{} \text{ ft}$$

$$EGL_4 = EGL_3 + h_4$$

$$= \frac{5833.73}{} \text{ ft}$$

$$HGL_4 = EGL_4 - [ V_P^2 / (2*g) ]$$

$$= \frac{5832.35}{} \text{ ft}$$

### Head over Diversion Weir, $h_5$

#### Elevation of Weir

$$EL_{\text{Weir}} = \frac{5831.91}{} \text{ ft (established above)}$$

#### Headloss for Free Discharge Condition

$$h_{5a} = [ Q / (C * L) ]^{2/3}$$

where,

$$C = \frac{3.1}{}$$

$$L = \frac{3.00}{} \text{ ft}$$

$$h_{5a} = \frac{2.14}{} \text{ ft}$$

$$EGL_{5a} = EL_{\text{Weir}} + h_{5a}$$

$$= \frac{5834.05}{} \text{ ft}$$

#### Headloss for Submerged Condition

$$d_{\text{Sub}} = \frac{0.44}{} \text{ ft (depth of submergence)}$$

$$h_{5b} = \frac{1.76}{} \text{ ft (separate submerged weir calc.)}$$

$$EGL_{5b} = EGL_4 + h_{5b}$$

$$= \frac{5835.50}{} \text{ ft}$$

#### Identify EGL U/S of Weir

The discharge condition is Submerged, therefore

$$EGL_5 = \frac{5835.50}{} \text{ ft}$$

**Expansion Loss from U/S Pipe,  $h_6$** 

7/26/2016

$$h_6 = k * [ V^2 / (2 * g) ]$$

where,

$$k = \underline{0.30}$$

$$V = Q / A_F$$

$$= \underline{9.30} \text{ fps}$$

$$h_6 = \underline{0.40} \text{ ft}$$

$$EGL_6 = EGL_5 + h_6$$

$$= \underline{5835.90} \text{ ft}$$

**Head Loss Through Upstream Pipe,  $h_7$** Friction Losses,  $h_7$ 

$$h_7 = S_{EGL} * L$$

where,

$$L = \underline{18} \text{ ft}$$

$$S_{EGL} = [ (Q * n) / (1.49 * A_F * R^{2/3}) ]^2$$

where,

Pipe Characteristics

$$\text{Dia.} = \underline{24} \text{ in}$$

$$S_{PIPE} = \underline{0.0310} \text{ ft/ft}$$

$$n = \underline{0.013}$$

Flow Characteristics

$$d_n = \underline{2.00} \text{ ft}$$

$$A_F = \underline{3.14} \text{ sf}$$

$$P_W = \underline{6.28} \text{ ft}$$

$$R = \underline{0.50} \text{ ft}$$

$$S_{EGL} = \underline{0.0166} \text{ ft / ft}$$

$$h_7 = \underline{0.30} \text{ ft}$$

$$EGL_7' = EGL_6 + h_7$$

$$= \underline{5836.20} \text{ ft}$$

Check Entrance Condition for Critical Depth Control

$$EL_{U/S \text{ Inv.}} = \underline{5830.72} \text{ ft}$$

$$d_c = \underline{1.91} \text{ ft}$$

$$EGL_C = EL_{CDS \text{ Inv.}} + d_c + V_{dc}^2 / (2 * g)$$

$$= \underline{5834.01} \text{ ft}$$

Identify Controlling EGL

Friction based EGL controls.

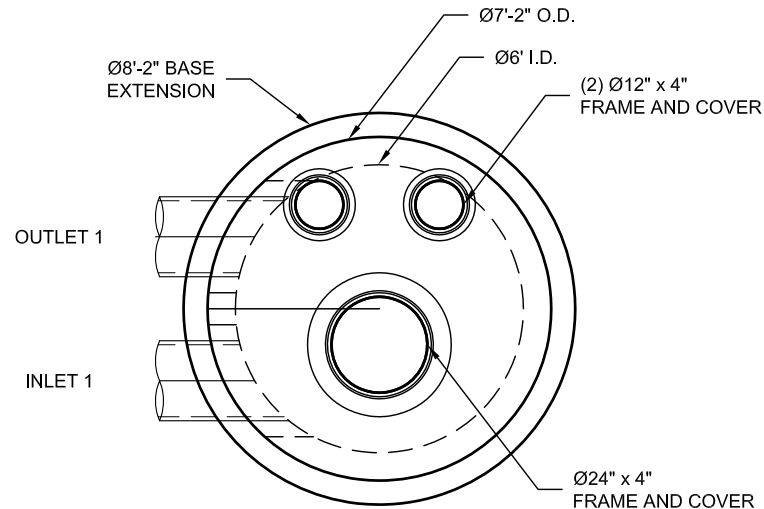
$$EGL_7 = \underline{5836.20} \text{ ft}$$

$$HGL_7 = EGL_7 - [ V^2 / (2 * g) ]$$

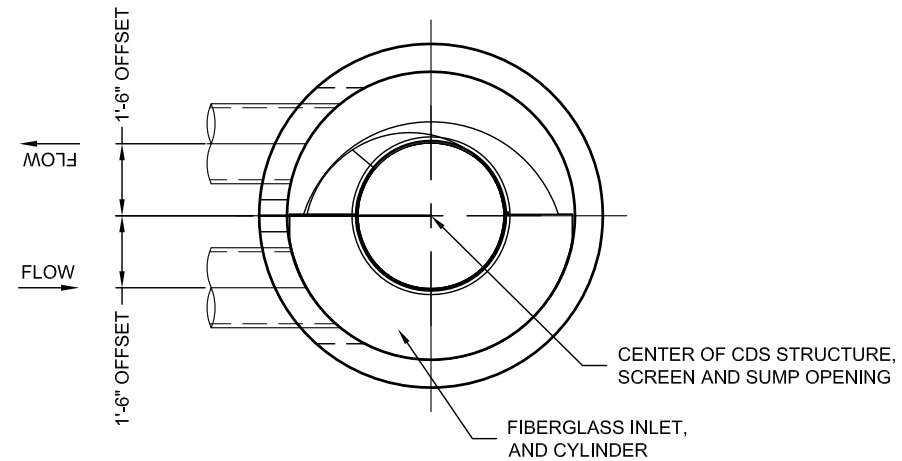
$$= \underline{5834.85} \text{ ft}$$

$$\text{Freeboard} = \underline{8.23} \text{ ft (at first upstream structure)}$$

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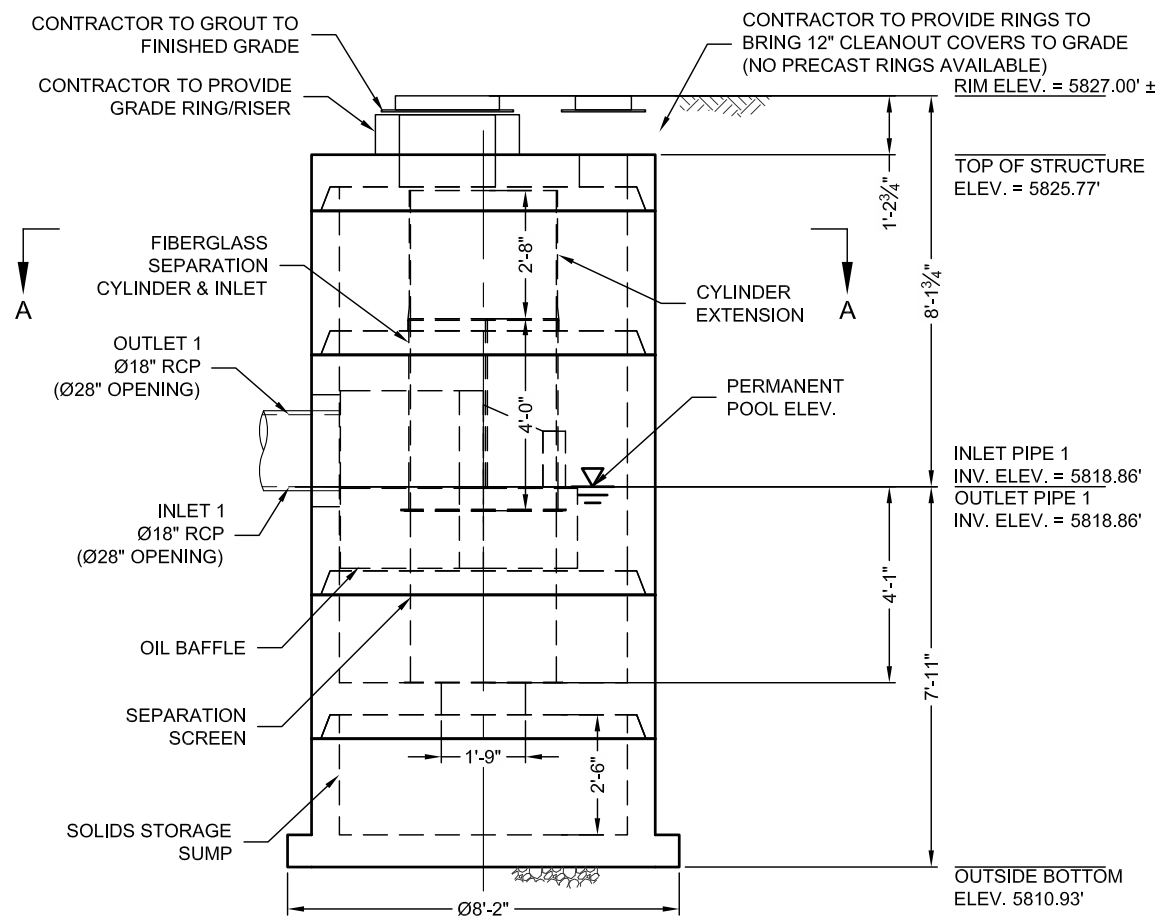


**PLAN VIEW**



**SECTION A-A**

● INTERNAL COMPONENTS TO BE INSTALLED BY CONTECH ON SITE



**ELEVATION VIEW**

**MATERIAL LIST (PROVIDED BY CONTECH)**

COUNT	DESCRIPTION	INSTALLED BY
1	FIBERGLASS INLET AND CYLINDER	CONTECH
1	2400 micron, 3' O.D. x 3.58' SEP. SCREEN	CONTECH
1	CYLINDER EXTENSION	CONTRACTOR
1	SEALANT FOR JOINTS (BY PRECASTER)	CONTRACTOR
1	Ø24" x 4" FRAME & COVER, E.J.#41600389, OR EQUIV.	CONTRACTOR
2	Ø12" x 4" FRAME & COVER, E.J.#41610201, OR EQUIV.	CONTRACTOR

**SITE DESIGN DATA**

WATER QUALITY FLOW RATE	0 CF
PEAK FLOW RATE	88 CF
RETURN PERIOD OF PEAK FLOW	100 YRS

**GENERAL NOTES**

- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
- FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. [www.ContechES.com](http://www.ContechES.com)
- CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
- STRUCTURE SHALL MEET AASHTO HS-20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
- IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
- CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

**INSTALLATION NOTES**

- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
- CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
- CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
- CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

**STRUCTURE WEIGHT**

APPROXIMATE HEAVIEST PICK = 10000 LBS.  
STRUCTURE IS DELIVERED IN 5 PIECES

MAX FOOTPRINT = Ø8'-2"

CONTECH  
**CONTRACT**  
DRAWING

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MARK	DATE	REVISION DESCRIPTION	BY

CDS3035-6-C - 542946-20  
COMPARK SOUTH  
PARKER, CO  
for SYSTEM: STMH 1-4A

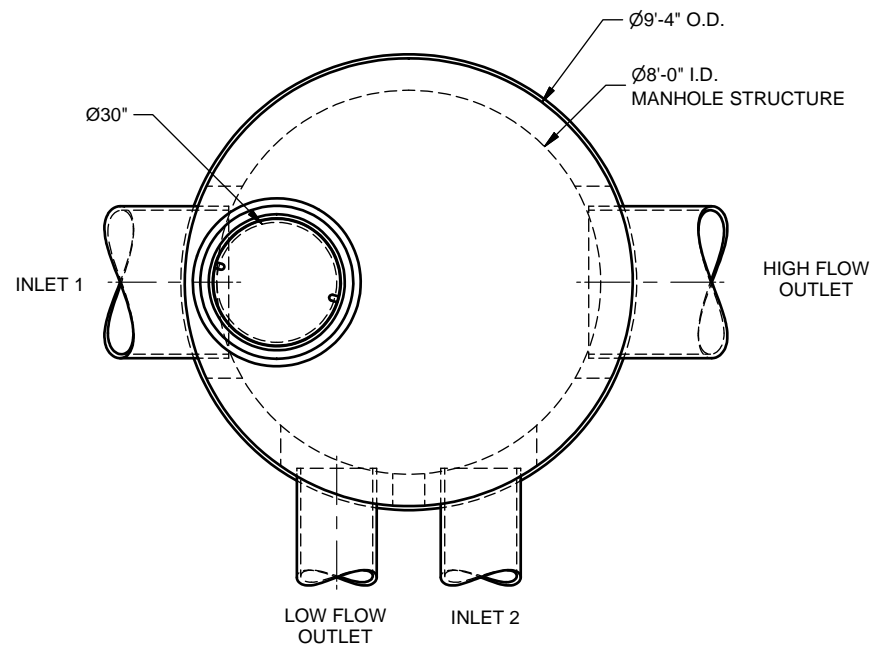
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**CDS**  
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING PATENTS OR OTHER PATENTS PENDING.

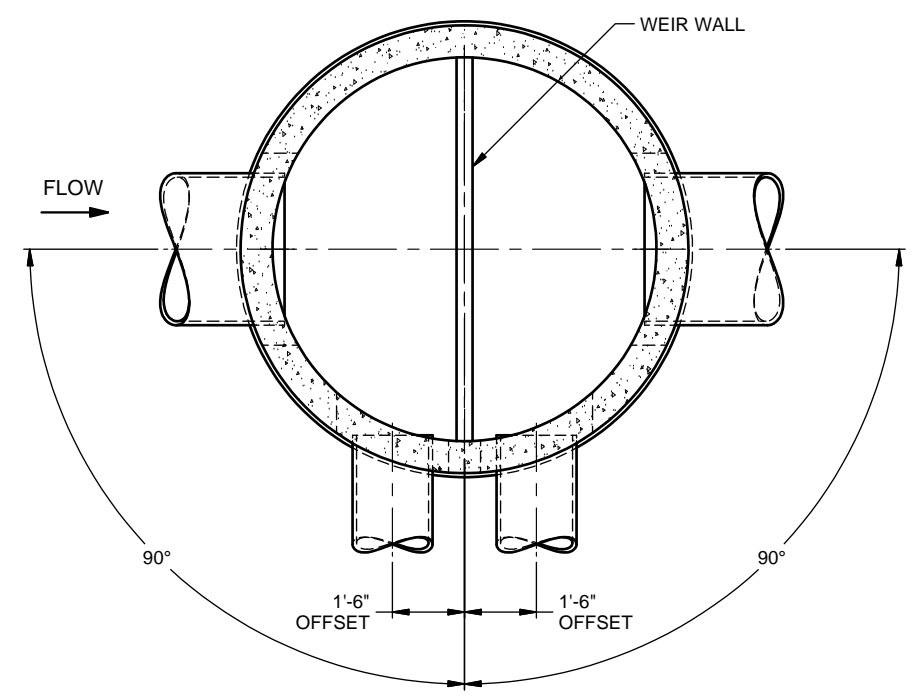
DATE:	07/18/16	SCALE:	1/4" = 1'-0"
DESIGNED:	JHR	DRAWN:	MLC
CHECKED:	XXX	APPROVED:	----
PROJECT No.:	542946	SEQUENCE No.:	20
SHEET:	1	OF	1

LPICO  
LAYOUT 1A  
3035-6-FGIS  
1026 / FI72886

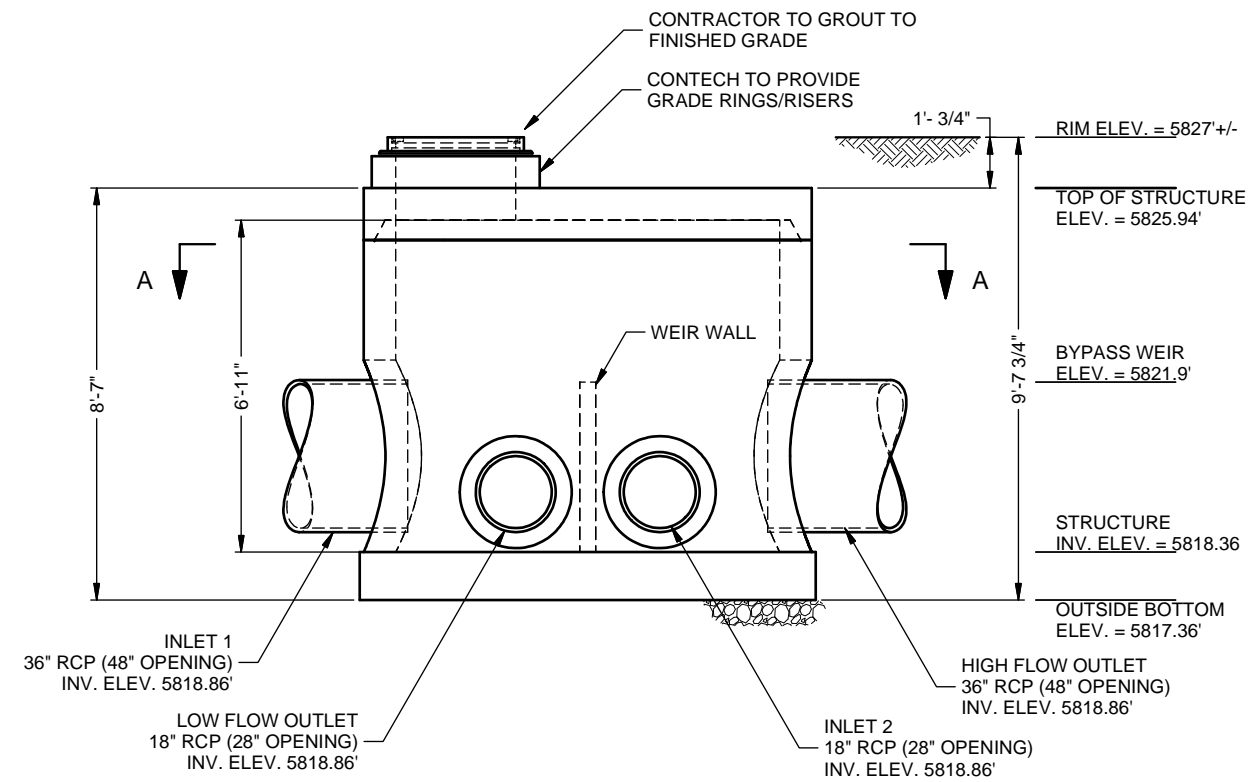
**FOR REFERENCE ONLY. TO BE CONSTRUCTED AS PART OF FILING 1.**



**PLAN VIEW**



**SECTION A-A**



**ELEVATION VIEW**

**MATERIAL LIST - PROVIDED BY CONTECH**

COUNT	DESCRIPTION	INSTALLED BY
1	JOINT SEALANT (BY PRECASTER)	CONTRACTOR
1 PLACE	GRADE RINGS/RISERS	CONTRACTOR
1	Ø30" x 4" EJ #41600484, OR EQUIVALENT	CONTRACTOR

**GENERAL NOTES**

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- BYPASS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

**INSTALLATION NOTES**

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- CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
- CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S).
- CONTRACTOR TO INSTALL GRADE RINGS/RISERS OR BLOCK REQUIRED BETWEEN THE TOP OF THE STRUCTURE AND THE BASE OF THE MANHOLE FRAMES.

STRUCTURE WEIGHT  
APPROXIMATE HEAVIEST PICK = 27000 LBS.  
OF 2 PIECES

MAX FOOTPRINT = 9.5'

**CONTECH  
CONTRACT  
DRAWING**

LPICO  
LAYOUT 1C

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If discrepancies between the supplied information upon which this design was based and the actual conditions are encountered as site work progresses, these discrepancies must be reported to Contech immediately. Contech shall not be held responsible for any liability for information supplied by others.

NO.	DATE	REVISION DESCRIPTION	BY

**DIVERSION BYPASS BPMH96 -  
542946-40  
COMPARK SOUTH  
PARKER, CO**

**CONTECH**  
ENGINEERED SOLUTIONS LLC  
[www.ContechES.com](http://www.ContechES.com)  
9025 Centre Pointe Drive, Suite 400, West Chester, OH 41069  
800-338-1122 513-645-7000 513-645-7846 FAX

DATE: 7/15/16	SCALE: NONE
DESIGNED: JHR	DRAWN: MLC
CHECKED:	APPROVED:
PROJECT NUMBER: 542946	SHEET: 1 OF 1

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**OFFLINE CONCENTRIC CDS  
HYDRAULIC CALCULATIONS**



7/26/2016

**Compark South**

**Parker, CO**

**542946**

STMH 1-4

***DESIGN PARAMETERS***

CDS Model No. = **CDS3035-6**

Design Treatment Flow = **3.8** cfs

Peak Design Flow = **88** cfs

Peak Design Return Interval = **100** year

Rim Elev. @ CDS (diversion) = **5827.00** ft

Required FB @ CDS Unit = **1.00** ft

Rim Elev. @ 1st U/S Structure = **5825.81** ft

Reqd. FB @ 1st U/S Structure = **1.00** ft

***HYDRAULIC RESULTS SUMMARY***

Estimated FB at CDS Unit = **1.31** ft (OK)

Est. FB at 1st U/S structure = **0.52** ft (Flood Potential)

# DETAILED CALCULATIONS

7/26/2016

## TREATMENT FLOW

### Estimated HGL at Outfall

$$EL_{D/S \text{ Inv.}} = \underline{5817.99} \text{ ft} \quad (\text{based on CDS Invert unless provided})$$

$$HGL_{D/S} = \underline{5,818.37} \text{ ft} \quad (\text{unless provided, } D/S_{INV} + d_{n-WQ})$$

### Exit Loss from DownStream Pipe, $h_1$

$$h_1 = k * [ V^2 / (2*g) ]$$

where,

$$k = \underline{0.40}$$

$$V = Q / A_F \\ = \underline{7.31} \text{ fps}$$

$$h_1 = \underline{0.33} \text{ ft}$$

$$EGL_1 = EL_0 + h_1 \\ = \underline{5818.70} \text{ ft}$$

### Head Loss Through Downstream Pipe, $h_2$

#### Friction Losses, $h_2$

$$h_2 = S_{EGL} * L$$

where,

$$L_{D/S} = \underline{33} \text{ ft}$$

$$S_{EGL} = [ (Q * n) / (1.49 * A_F * R^{2/3}) ]^2$$

where,

#### D/S Pipe Characteristics

$$\text{Dia.} = \underline{36} \text{ in}$$

$$S_{PIPE} = \underline{0.0261} \text{ ft/ft}$$

$$n = \underline{0.013}$$

#### Flow Characteristics

$$d_F = \underline{0.38} \text{ ft}$$

$$A_F = \underline{0.52} \text{ sf}$$

$$P_W = \underline{2.18} \text{ ft}$$

$$R = \underline{0.24} \text{ ft}$$

$$S_{EGL} = \underline{0.0275} \text{ ft / ft}$$

$$h_2 = \underline{0.91} \text{ ft}$$

$$EGL_2' = EGL_1 + h_2 \\ = \underline{5819.61} \text{ ft}$$

#### Check Entrance Condition for Critical Depth Control

$$EL_{CDS \text{ Inv.}} = \underline{5818.85} \text{ ft}$$

$$d_c = \underline{0.62} \text{ ft}$$

$$EGL_C = EL_{CDS \text{ Inv.}} + d_c + V_{dc}^2 / (2*g) \\ = \underline{5819.67} \text{ ft}$$

#### Identify Controlling EGL

Flow enters pipe at critical depth, EGLc controls.

$$EGL_2 = \underline{5819.67} \text{ ft}$$

**Re-entry Loss into DownStream Pipe,  $h_3$** 

$$h_3 = k * [ V^2 / (2 * g) ]$$

where,

$$k = \underline{0.40}$$

$$V = Q / A$$

$$= \underline{3.59} \text{ fps (flow area based on critical depth)}$$

$$h_3 = \underline{0.08} \text{ ft}$$

$$EGL_3' = EGL_2 + h_3$$

$$= \underline{5819.75} \text{ ft}$$

Check for CDS outlet control

$$EL_{\text{CDS Inv.}} = \underline{5818.85} \text{ ft}$$

$$\text{CDS I/O Diam.} = \underline{18.00} \text{ in}$$

$$L_{\text{CDS out}} = \underline{5.00} \text{ ft}$$

$$L_{\text{CDS in}} = \underline{5.00} \text{ ft}$$

$$d_{\text{c (CDS out)}} = \underline{0.74} \text{ ft}$$

$$EGL_{\text{C}} = EL_{\text{CDS Inv.}} + d_{\text{c (CDS Out)}} + V_{\text{dc}}^2 / (2 * g)$$

$$= \underline{5819.89} \text{ ft}$$

Identify Controlling EGL

The greater value controls

$$EGL_3 = \underline{5819.89} \text{ ft}$$

**Determine CDS Weir Height**

$$HL_{\text{CDS Op}} = \underline{2.00} \text{ ft}$$

$$V_{\text{CDS out}} = 2.91 \text{ ft} \quad (\text{partial pipe})$$

$$HL_{\text{CDS out}} = 0.012 \text{ ft}$$

$$V_{\text{CDS in}} = 2.15 \text{ ft} \quad (\text{full pipe})$$

$$HL_{\text{CDS in}} = 0.008 \text{ ft}$$

$$HL_{\text{CDS I/O}} = 2.02 \text{ ft}$$

$$EL_{\text{W}}' = EGL_3 + HL_{\text{CDS Op}} + HL_{\text{CDS I/O}}$$

$$= \underline{5821.91} \text{ ft}$$

$$H_{\text{W}}' = EL_{\text{W}}' - EL_{\text{CDS Inv.}}$$

$$= \underline{3.06} \text{ ft, or } \underline{36.7} \text{ in}$$

Adjust for constructability

$$\text{Use } H_{\text{W}} = \underline{36.5} \text{ in, or } \underline{3.04} \text{ ft}$$

$$EL_{\text{W}} = EL_{\text{CDS Inv.}} + H_{\text{W}}$$

$$= \underline{5821.89} \text{ ft}$$

**PEAK CONVEYANCE FLOW**

7/26/2016

**Estimated HGL at Outfall**

HGL<sub>D/S</sub> = 5,820.00 ft (water level at D/S outlet per engineer, 100-yr)

**Exit Loss from D/S Pipe, h<sub>1</sub>**

$h_1 = k * [ V^2 / (2*g) ]$

where,

$k = \frac{0.40}{}$

$V = \frac{Q}{A_F}$   
 $= \frac{17.10}{}$  fps

$h_1 = \frac{1.82}{}$  ft

EGL<sub>1</sub> = EL<sub>0</sub> + h<sub>1</sub>  
 $= \frac{5821.82}{}$  ft

**Head Loss Through D/S Pipe, h<sub>2</sub>**

Friction Losses, h<sub>2</sub>

$h_2 = S_{EGL} * L_{D/S}$

where,

$L_{D/S} = \frac{33}{}$  ft

$S_{EGL} = [ (Q * n) / (1.49 * A_F * R^{2/3}) ]^2$

where,

D/S Pipe Characteristics

Dia. = 36 in

$S_{PIPE} = \frac{0.0261}{}$  ft/ft

$n = \frac{0.013}{}$

Flow Characteristics

$d_n = \frac{2.05}{}$  ft

$A_F = \frac{5.15}{}$  sf

$P_W = \frac{5.84}{}$  ft

$R = \frac{0.88}{}$  ft

$S_{EGL} = \frac{0.0263}{}$  ft / ft

$h_2 = \frac{0.87}{}$  ft

EGL<sub>2</sub>' = EGL<sub>1</sub> + h<sub>2</sub>  
 $= \frac{5822.68}{}$  ft

Check Entrance Condition for Critical Depth Control

EL<sub>CDS Inv.</sub> = 5818.85 ft

$d_c = \frac{2.99}{}$  ft

EGL<sub>C</sub> = EL<sub>CDS Inv.</sub> + d<sub>c</sub> + V<sub>dc</sub><sup>2</sup> / (2\*g)  
 $= \frac{5824.25}{}$  ft

Identify Controlling EGL

Cannot enter at less than minimum energy, EGL<sub>C</sub> controls.

EGL<sub>2</sub> = 5824.25 ft

**Re-entry Loss into D/S Pipe,  $h_3$** 

$$h_3 = k * [ V^2 / (2 * g) ]$$

where,

$$k = \frac{0.40}{}$$

$$V = \frac{Q}{A_F} = \frac{12.45}{\text{fps (area based on critical depth)}}$$

$$h_3 = \frac{0.96}{\text{ft}}$$

$$\begin{aligned} \text{EGL}_3 &= \text{EGL}_2 + h_3 \\ &= \frac{5825.21}{\text{ft}} \end{aligned}$$

$$\begin{aligned} \text{HGL}_3 &= \text{EGL}_3 - [ (V_p/4)^2 / (2 * g) ] \\ &= \frac{5825.06}{\text{ft (velocity assumed 25% of pipe velocity)}} \end{aligned}$$

**Head over Diversion Weir,  $h_4$** 

$$\text{EL}_{\text{weir}} = \frac{5821.89}{\text{ft (established above)}}$$

$$L_{\text{weir}} = \frac{8.00}{\text{ft}}$$

(weir is submerged)

Headloss for Free Discharge Condition

$$h_{4a} = [ Q / (C * L) ]^{2/3}$$

where,

$$C = \frac{3.43}{}$$

$$h_{4a} = \frac{2.18}{\text{ft}}$$

$$\begin{aligned} \text{EGL}_{4a} &= \text{EL}_{\text{weir}} + h_{4a} \\ &= \frac{5824.07}{\text{ft}} \end{aligned}$$

Headloss for Submerged Condition

$$d_{\text{sub}} = \frac{3.17}{\text{ft (depth of submergence)}}$$

$$h_{4b} = \frac{0.48}{\text{ft (separate submerged weir calc.)}}$$

$$\begin{aligned} \text{EGL}_{4b} &= \text{EGL}_3 + h_{4b} \\ &= \frac{5825.69}{\text{ft}} \end{aligned}$$

Identify EGL U/S of Weir

The discharge condition is Submerged, therefore

$$\text{EGL}_4 = \frac{5825.69}{\text{ft}}$$

**Expansion Loss from U/S Pipe,  $h_5$** 

$$h_5 = k * [ V^2 / (2 * g) ]$$

where,

$$k = \frac{0.40}{}$$

$$V = \frac{Q}{A_F} = \frac{12.45}{\text{fps}}$$

$$h_5 = \frac{0.96}{\text{ft}}$$

$$\begin{aligned} \text{EGL}_5 &= \text{EGL}_4 + h_5 \\ &= \frac{5826.65}{\text{ft}} \end{aligned}$$

**Head Loss Through U/S Pipe,  $h_6$** Friction Losses,  $h_6$ 

$$h_6 = S_{EGL} * L$$

where,

$$L_{U/S} = \frac{60}{1} \text{ ft}$$

$$S_{EGL} = \left[ \frac{Q * n}{1.49 * A_F * R^{2/3}} \right]^2$$

where,

U/S Pipe Characteristics

$$\text{Dia.} = \frac{36}{1} \text{ in}$$

$$S_{PIPE} = \frac{0.0261}{1} \text{ ft/ft}$$

$$n = \frac{0.013}{1}$$

Flow Characteristics

$$d_n = \frac{3.00}{1} \text{ ft}$$

$$A_F = \frac{7.07}{1} \text{ sf}$$

$$P_W = \frac{9.42}{1} \text{ ft}$$

$$R = \frac{0.75}{1} \text{ ft}$$

$$S_{EGL} = \frac{0.0173}{1} \text{ ft / ft}$$

$$h_6 = \frac{1.04}{1} \text{ ft}$$

$$EGL_6' = EGL_5 + h_6$$

$$= \frac{5827.69}{1} \text{ ft}$$

Check Entrance Condition for Critical Depth Control

$$EL_{U/S \text{ Inv.}} = \frac{5820.42}{1} \text{ ft (based on inv \& slope unless provided)}$$

$$d_c = \frac{2.99}{1} \text{ ft}$$

$$EGL_C = EL_{CDS \text{ Inv.}} + d_c + V_{dc}^2 / (2 * g)$$

$$= \frac{5825.82}{1} \text{ ft}$$

Identify Controlling EGL

Friction based EGL controls.

$$EGL_6 = \frac{5827.69}{1} \text{ ft}$$

$$HGL_6 = EGL_6 - [ V^2 / (2 * g) ]$$

$$= \frac{5825.29}{1} \text{ ft}$$

Headloss Across Diversion Structure During Peak Flow

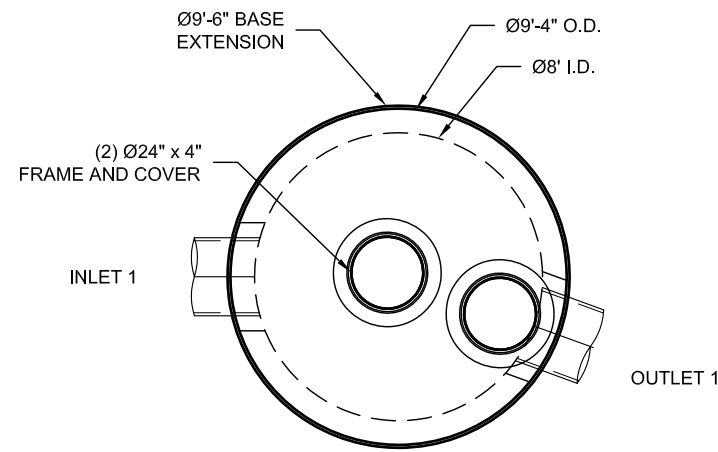
$$HL_{DW} = EGL_5 - EGL_2$$

$$HL_{DW} = \frac{2.40}{1} \text{ ft}$$

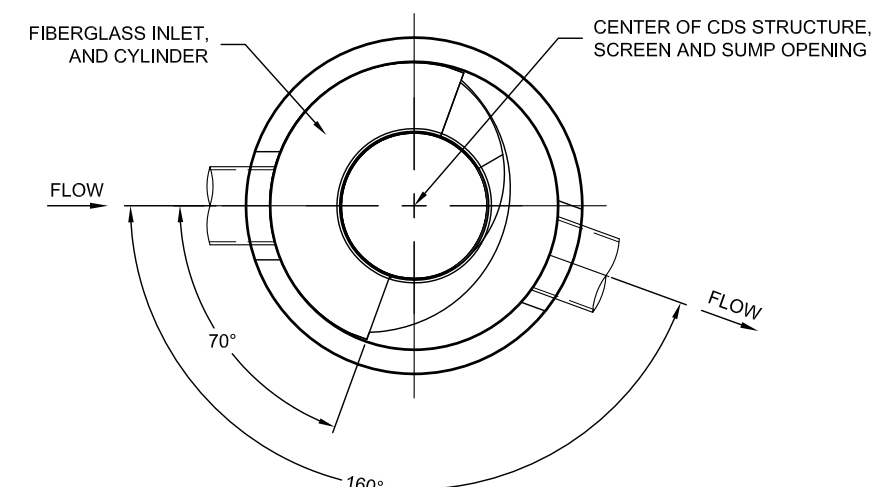
$$\text{Freeboard at CDS Unit} = \frac{1.31}{1} \text{ ft}$$

$$\text{FB at first U/S structure} = \frac{0.52}{1} \text{ ft}$$

**FOR REFERENCE ONLY. TO BE CONSTRUCTED AS PART OF FILING 1.**



**PLAN VIEW**



**SECTION A-A**

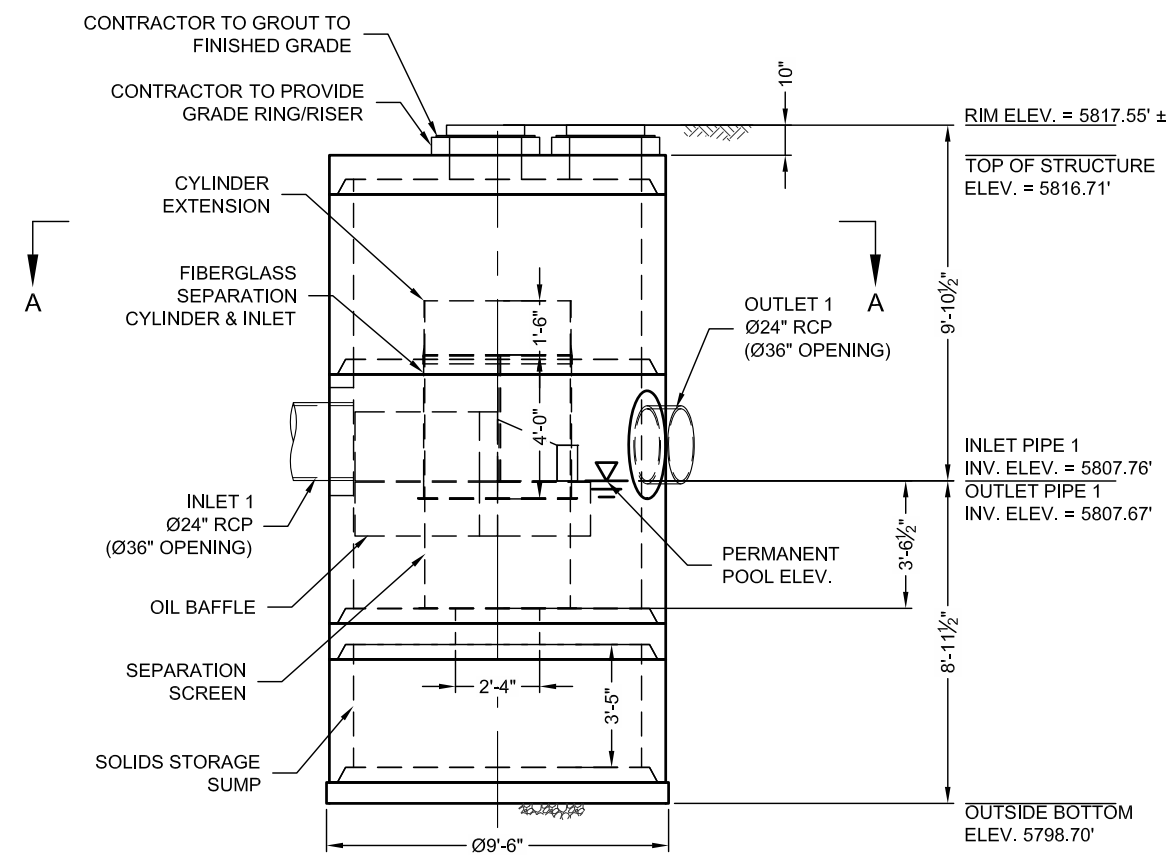
• INTERNAL COMPONENTS TO BE INSTALLED BY CONTECH ON SITE

**MATERIAL LIST (PROVIDED BY CONTECH)**

COUNT	DESCRIPTION	INSTALLED BY
1	FIBERGLASS INLET AND CYLINDER	CONTECH
1	2400 micron, 4' O.D. x 3.04' SEP. SCREEN	CONTECH
1	CYLINDER EXTENSION	CONTRACTOR
1	SEALANT FOR JOINTS (BY PRECASTER)	CONTRACTOR
2	Ø24" x 4" FRAME & COVER, EJ#41600389, OR EQUIV.	CONTRACTOR

**SITE DESIGN DATA**

WATER QUALITY FLOW RATE	0 CF
PEAK FLOW RATE	43.2 CF
RETURN PERIOD OF PEAK FLOW	100 YRS



**ELEVATION VIEW**

**GENERAL NOTES**

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- CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

**INSTALLATION NOTES**

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- CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
- CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

**STRUCTURE WEIGHT**

APPROXIMATE HEAVIEST PICK = 20500 LBS.  
STRUCTURE IS DELIVERED IN 5 PIECES

MAX FOOTPRINT = Ø9'-6"



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MARK	DATE	REVISION DESCRIPTION	BY

**CDS4030-8-C - 542946-30**  
**COMPARK SOUTH**  
**PARKER, CO**  
**for SYSTEM: STMH 1-6**

**CONTECH ENGINEERED SOLUTIONS LLC**  
www.ContechES.com  
11815 NE Glenn Widing Drive, Portland, OR 97220  
800-548-4687 503-240-3393 800-581-1274 FAX

**CDS**  
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE RELATED FOREIGN PATENTS OR OTHER PATENTS TRADEMARKS.

DATE:	07/15/16	SCALE:	3/16" = 1'-0"
DESIGNED:	JHR	DRAWN:	MLC
CHECKED:	XXX	APPROVED:	----
PROJECT No.:	542946	SEQUENCE No.:	30
SHEET:	1	OF	1

LPICO  
LAYOUT 1C  
4030-8-FGIS  
1026 / FI72886

I:\AD\CONTECH\CPL\COM\ROOT\MERLIN\PROJECT\ACTIVE\542946-30\CDS\DRAWINGS\PRE-542946-30\CDS4030-8\_CONFAB.DWG 8/16/2016 3:02 PM

**DESIGN PARAMETERS**

CDS Model No. =	CDS4030
Design Treatment Flow =	4.5 cfs
Peak Design Flow =	43.20 cfs
Peak Design Return Interval =	100 year
Rim Elevation @ US Structure	5821.38 ft

**DETAILED CALCULATIONS**

**TREATMENT FLOW**

**Tailwater Condition at Outfall, EL<sub>0</sub>**

$$EL_0 = 5,791.61 \text{ ft (invert plus depth of flow at D/S outlet)}$$

**Exit Loss from DownStream Pipe, h<sub>1</sub>**

$$h_1 = k * [ V^2 / (2*g) ]$$

where,

$$k = \frac{1.00}{V = Q / A_F} = 17.26 \text{ fps}$$

$$h_1 = 4.63 \text{ ft}$$

$$EGL_1 = EL_0 + n_1 = 5796.23 \text{ ft}$$

**Head Loss Through Downstream Pipe, h<sub>2</sub>**

**Friction Losses, h<sub>2</sub>**

$$h_2 = S_{EGL} * L$$

where,

$$L = 70 \text{ ft}$$

$$S_{EGL} = [ (Q * n) / (1.49 * A_F * R^{2/3}) ]^2$$

where,

**Pipe Characteristics**

$$\begin{aligned} \text{Dia.} &= 24 \text{ in} \\ S_{PIPE} &= 0.2370 \text{ ft/ft} \\ n &= 0.013 \end{aligned}$$

**Flow Characteristics**

$$\begin{aligned} d_F &= 0.28 \text{ ft} \\ A_F &= 0.26 \text{ sf} \\ P_W &= 1.52 \text{ ft} \\ R &= 0.17 \text{ ft} \end{aligned}$$

## Head Loss Through Downstream Pipe, $h_2$ (cont.'d)

7/26/2016

$$S_{EGL} = \underline{0.23814} \text{ ft / ft}$$

$$h_2 = \underline{16.6701} \text{ ft}$$

$$\begin{aligned} EGL_2' &= EGL_1 + h_2 \\ &= \underline{5812.90} \text{ ft} \end{aligned}$$

### Check Entrance Condition for Critical Depth Control

$$EL_{CDS \text{ Inv.}} = \underline{5807.92} \text{ ft}$$

$$d_c = \underline{0.75} \text{ ft}$$

$$\begin{aligned} EGL_C &= EL_{CDS \text{ Inv.}} + d_c + V_{dc}^2 / (2 * g) \\ &= \underline{5808.94} \text{ ft} \end{aligned}$$

### Identify Controlling EGL

Flow enters pipe at critical depth,  $EGL_C$  controls.

$$EGL_2 = \underline{5808.94} \text{ ft}$$

## Re-entry Loss into DownStream Pipe, $h_3$

$$h_3 = k * [ V^2 / (2 * g) ]$$

where,

$$k = \underline{0.20}$$

$$V = Q / A$$

$$= \underline{4.19} \text{ fps (area based on critical depth)}$$

$$h_3 = \underline{0.05} \text{ ft}$$

$$\begin{aligned} EGL_3' &= EGL_2 + h_3 \\ &= \underline{5809.00} \text{ ft} \end{aligned}$$

## Oil Baffle Loss, $h_4$

$$h_4 = k * [ V^2 / (2 * g) ]$$

where,

$$k = \underline{1.00}$$

$$A_{\text{Baffle}} = \underline{8.80} \text{ sf}$$

$$V = Q / A_{\text{baffle}}$$

$$= \underline{0.51} \text{ fps}$$

$$h_4 = \underline{0.0041} \text{ ft}$$

$$\begin{aligned} EGL_4 &= EGL_3 + h_4 \\ &= \underline{5809.00} \text{ ft} \end{aligned}$$

## Check Standard Weir Elevation

$$HL_{CDS} = \underline{0.67} \text{ ft}$$

$$\begin{aligned} EL_W' &= EGL_4 + HL_{CDS} \\ &= \underline{5809.67} \text{ ft} \end{aligned}$$

$$H_W' = EL_W' - EL_{CDS \text{ INV.}}$$

$$= \underline{1.75} \text{ ft, or } \underline{21.01} \text{ in}$$

$$\text{Std. Weir Height} = \underline{23} \text{ in}$$

Status **OK**

$$\text{Use } H_W = \underline{23} \text{ in, or } \underline{1.92} \text{ ft}$$

$$\begin{aligned} EL_W &= EL_{CDS \text{ INV.}} + H_W \\ &= \underline{5809.84} \text{ ft} \end{aligned}$$

**PEAK CONVEYANCE FLOW**

7/26/2016

**Tailwater Condition at Outfall, EL<sub>0</sub>**

EL<sub>0</sub> = 5,810.00 ft (tailwater condition per engineer, 100-yr)

**Exit Loss from DownStream Pipe, h<sub>1</sub>**

$h_1 = k * [ V^2 / (2*g) ]$

where,

$k = \frac{1.00}{}$   
 $V = \frac{Q}{A_F}$   
 $= \frac{13.76}{}$  fps

$h_1 = \frac{2.94}{}$  ft

EGL<sub>1</sub> = EL<sub>0</sub> + h<sub>1</sub>  
 $= \frac{5812.94}{}$  ft

**Head Loss Through Downstream Pipe, h<sub>2</sub>**

Friction Losses, h<sub>2</sub>

$h_2 = S_{EGL} * L$

where,

$L = \frac{70}{}$  ft

$S_{EGL} = [ (Q * n) / (1.49 * A_F * R^{2/3}) ]^2$

where,

Pipe Characteristics

Dia. = 24 in  
 $S_{PIPE} = \frac{0.2370}{}$  ft/ft  
 $n = \frac{0.013}{}$

Flow Characteristics

$d_n = \frac{2.00}{}$  ft  
 $A_F = \frac{3.14}{}$  sf  
 $P_W = \frac{6.28}{}$  ft  
 $R = \frac{0.50}{}$  ft

$S_{EGL} = \frac{0.0363}{}$  ft / ft

$h_2 = \frac{2.54}{}$  ft

EGL<sub>2</sub>' = EGL<sub>1</sub> + h<sub>2</sub>  
 $= \frac{5815.48}{}$  ft

Check Entrance Condition for Critical Depth Control

EL<sub>CDS Inv.</sub> = 5807.92 ft

$d_c = \frac{2.00}{}$  ft

$EGL_C = EL_{CDS\ Inv.} + d_c + V_{dc}^2 / (2*g)$   
 $= \frac{5813.18}{}$  ft

Identify Controlling EGL

Friction based EGL controls.

EGL<sub>2</sub> = 5815.48 ft

### Re-entry Loss into DownStream Pipe, $h_3$

7/26/2016

$$h_3 = k * [ V^2 / (2*g) ]$$

where,

$$k = \frac{0.20}{}$$

$$V = Q / A_F$$

$$= \frac{13.76}{} \text{ fps (area based on flow depth)}$$

$$h_3 = \frac{0.59}{} \text{ ft}$$

$$EGL_3 = EGL_2 + h_3$$

$$= \frac{5816.07}{} \text{ ft}$$

### Oil Baffle Loss, $h_4$

$$h_4 = k * [ V^2 / (2*g) ]$$

where,

$$k = \frac{0.00}{} \text{ (Skirted-baffle model)}$$

$$A_{\text{Baffle}} = \frac{8.80}{} \text{ sf}$$

$$V = Q / A_{\text{Baffle}}$$

$$= \frac{4.91}{} \text{ fps}$$

$$h_4 = \frac{0.00}{} \text{ ft}$$

$$EGL_4 = EGL_3 + h_4$$

$$= \frac{5816.07}{} \text{ ft}$$

$$HGL_4 = EGL_4 - [ V_P^2 / (2*g) ]$$

$$= \frac{5813.13}{} \text{ ft}$$

### Head over Diversion Weir, $h_5$

#### Elevation of Weir

$$EL_{\text{Weir}} = \frac{5809.84}{} \text{ ft (established above)}$$

#### Headloss for Free Discharge Condition

$$h_{5a} = [ Q / (C * L) ]^{2/3}$$

where,

$$C = \frac{3.1}{}$$

$$L = \frac{4.00}{} \text{ ft}$$

$$h_{5a} = \frac{2.30}{} \text{ ft}$$

$$EGL_{5a} = EL_{\text{Weir}} + h_{5a}$$

$$= \frac{5812.14}{} \text{ ft}$$

#### Headloss for Submerged Condition

$$d_{\text{Sub}} = \frac{3.29}{} \text{ ft (depth of submergence)}$$

$$h_{5b} = \frac{0.40}{} \text{ ft (separate submerged weir calc.)}$$

$$EGL_{5b} = EGL_4 + h_{5b}$$

$$= \frac{5816.47}{} \text{ ft}$$

#### Identify EGL U/S of Weir

The discharge condition is Submerged, therefore

$$EGL_5 = \frac{5816.47}{} \text{ ft}$$

**Expansion Loss from U/S Pipe,  $h_6$** 

7/26/2016

$$h_6 = k * [ V^2 / (2 * g) ]$$

where,

$$k = \underline{0.30}$$

$$V = Q / A_F$$

$$= \underline{13.76} \text{ fps}$$

$$h_6 = \underline{0.88} \text{ ft}$$

$$EGL_6 = EGL_5 + h_6$$

$$= \underline{5817.35} \text{ ft}$$

**Head Loss Through Upstream Pipe,  $h_7$** Friction Losses,  $h_7$ 

$$h_7 = S_{EGL} * L$$

where,

$$L = \underline{133} \text{ ft}$$

$$S_{EGL} = [ (Q * n) / (1.49 * A_F * R^{2/3}) ]^2$$

where,

Pipe Characteristics

$$\text{Dia.} = \underline{24} \text{ in}$$

$$S_{PIPE} = \underline{0.0297} \text{ ft/ft}$$

$$n = \underline{0.013}$$

Flow Characteristics

$$d_n = \underline{2.00} \text{ ft}$$

$$A_F = \underline{3.14} \text{ sf}$$

$$P_W = \underline{6.28} \text{ ft}$$

$$R = \underline{0.50} \text{ ft}$$

$$S_{EGL} = \underline{0.0363} \text{ ft / ft}$$

$$h_7 = \underline{4.83} \text{ ft}$$

$$EGL_7' = EGL_6 + h_7$$

$$= \underline{5822.18} \text{ ft}$$

Check Entrance Condition for Critical Depth Control

$$EL_{U/S \text{ Inv.}} = \underline{5811.87} \text{ ft}$$

$$d_c = \underline{2.00} \text{ ft}$$

$$EGL_C = EL_{CDS \text{ Inv.}} + d_c + V_{dc}^2 / (2 * g)$$

$$= \underline{5817.13} \text{ ft}$$

Identify Controlling EGL

Friction based EGL controls.

$$EGL_7 = \underline{5822.18} \text{ ft}$$

$$HGL_7 = EGL_7 - [ V^2 / (2 * g) ]$$

$$= \underline{5819.24} \text{ ft}$$

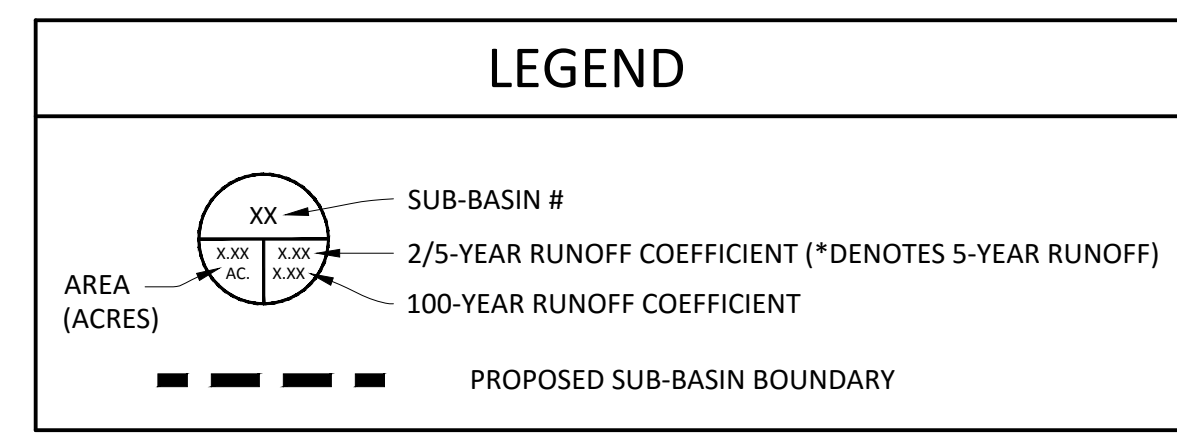
$$\text{Freeboard} = \underline{2.14} \text{ ft (at first upstream structure)}$$

**APPENDIX D**

Drainage Basin Map



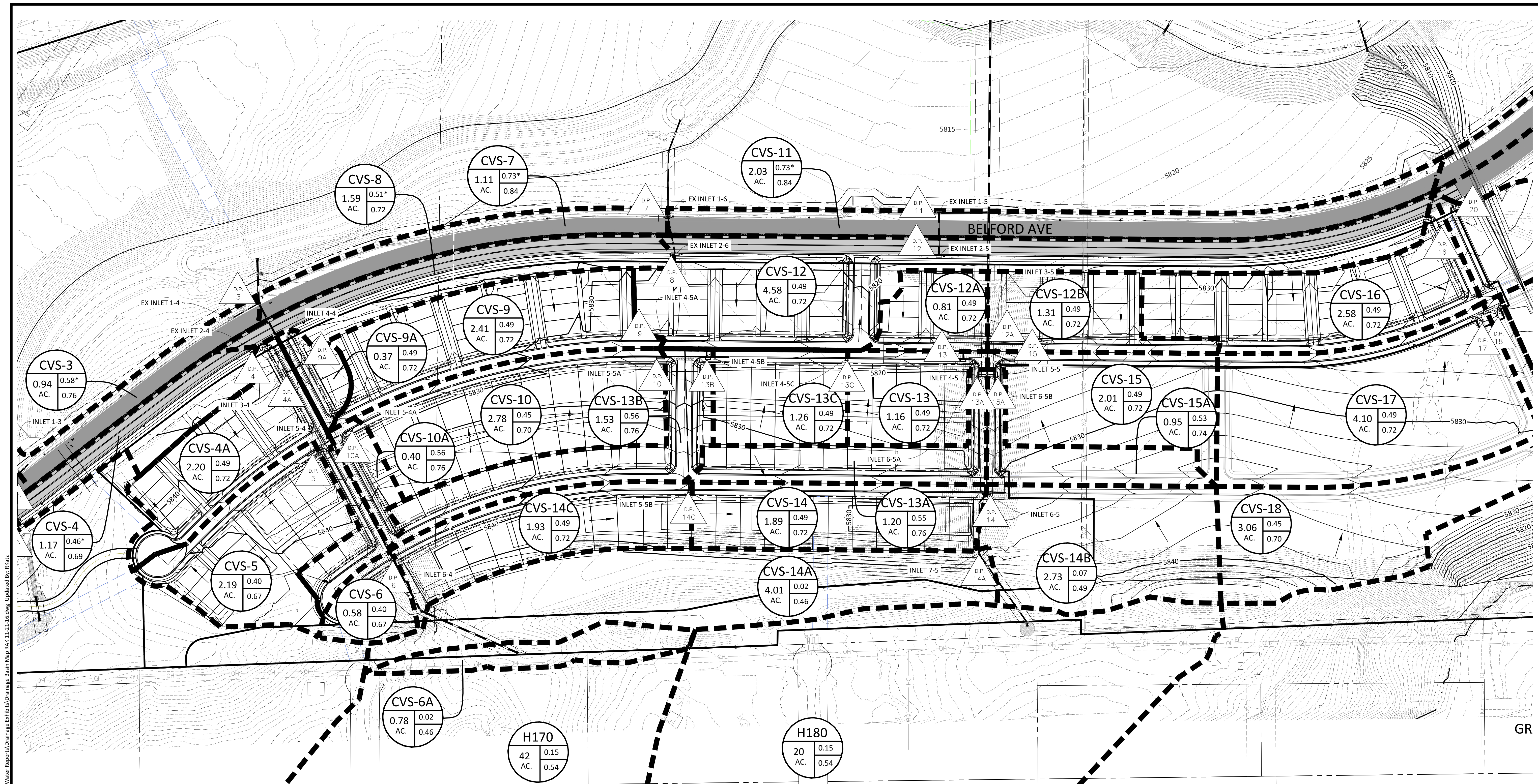
Project: 1/1/2017 8:13:44 Day Name: P:\C\43\3\ConsSouth05-Residential\StormWater\Reports\Drainage\Bain Map RAK 11.2.16.dwg Updated By: RAK



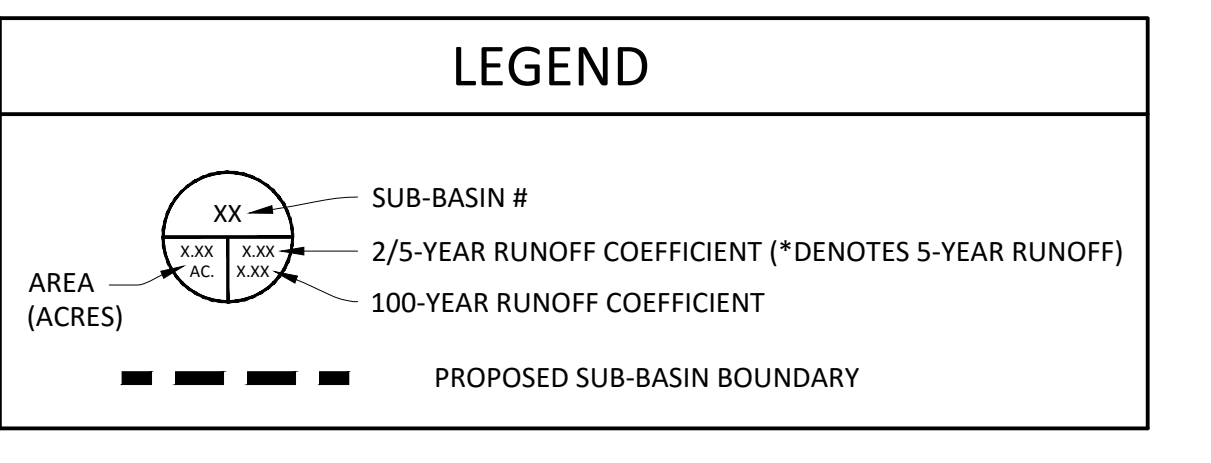
Basin ID	Design Point	DIRECT RUNOFF				INLET	STORM SEWER		REMARKS				
		Area (Ac)	To (ft)	To (ft)	To (ft)		Inlet (ft)	Flow (MGD)					
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.28	4.3	1.10	4.7	4.7	4.7	0.0	8.9	3.1%	24
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.69	4.3	0.97	4.2	4.2	4.2	0.0	4.2	10.0%	24
CVS-3 (Inlet 1-4)	3	0.84	6.2	0.36	4.4	0.52	2.3	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-4A (Inlet 3-4)	4A	2.20	11.3	0.46	3.6	1.08	3.9	3.9	3.9	0.0	3.9	1.0%	18
CVS-5 (Inlet 5-4)	5	2.19	9.0	0.40	3.9	0.88	3.4	3.4	3.4	0.0	3.4	1.0%	18
CVS-6 (Inlet 6-4)	6	0.98	5.0	0.40	4.7	0.23	1.1	1.1	1.1	0.0	1.1	1.7%	36
CVS-6A (FEES 2-4)	6A	0.78	5.0	0.02	4.7	0.01	0.1	0.1	0.1	0.0	0.1	0.5%	36
CVS-7 (Inlet 1-5)	7	1.11	10.2	0.69	3.7	0.77	2.9	2.9	2.9	0.0	2.9	3.0%	24
CVS-8 (Inlet 2-5)	8	1.59	10.1	0.63	3.7	0.78	2.8	2.8	2.8	0.0	2.8	1.1%	24
CVS-9 (Inlet 4-5A)	9	2.41	11.9	0.40	3.5	1.18	4.1	4.1	4.1	0.0	4.1	1.2%	18
CVS-9A (Inlet 4-4)	9A	0.97	5.0	0.40	4.7	0.18	0.9	0.9	0.9	0.0	0.9	1.0%	18
CVS-10 (Inlet 5-5A)	10	2.78	13.7	0.46	3.3	1.26	4.2	4.2	4.2	0.0	4.2	1.2%	18
CVS-10A (Inlet 5-4A)	10A	0.40	5.8	0.96	4.5	0.22	1.0	1.0	1.0	0.0	1.0	1.0%	18
CVS-11 (Inlet 1-5)	11	2.03	15.3	0.69	3.4	1.41	4.8	4.8	4.8	0.0	4.8	0.9%	36
CVS-12 (Inlet 2-5)	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 3-5)	13	0.81	7.7	0.49	4.1	0.40	1.8	1.8	1.8	0.0	1.8	4.0%	42
CVS-13A (Inlet 3-4)	13A	1.31	10.9	0.49	3.6	0.64	2.3	2.3	2.3	0.0	2.3	1.9%	42
CVS-13 (Inlet 4-5)	13	1.16	7.4	0.40	4.2	0.07	2.4	2.4	2.4	0.0	2.4	3.0%	18
CVS-13A (Inlet 5-5A)	13A	1.30	8.7	0.39	4.0	0.69	2.6	2.6	2.6	0.0	2.6	1.0%	18
CVS-13B (Inlet 4-5B)	13B	1.53	9.0	0.59	3.9	0.86	3.4	3.4	3.4	0.0	3.4	1.0%	18
CVS-13C (Inlet 4-5C)	13C	1.28	8.8	0.49	3.9	0.02	2.4	2.4	2.4	0.0	2.4	1.0%	18
CVS-14 (Inlet 6-5)	14	1.89	11.1	0.49	3.6	0.93	3.3	3.3	3.3	0.0	3.3	3.2%	30
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.02	3.9	0.07	0.2	0.2	0.2	0.0	0.2	4.7%	24
CVS-14B (Inlet 6-5)	14B	2.73	13.4	0.97	3.3	1.19	4.6	4.6	4.6	0.0	4.6	3.4%	30
CVS-14C (Inlet 5-5)	14C	1.93	11.4	0.49	3.6	0.84	3.4	3.4	3.4	0.0	3.4	2.0%	18
CVS-15 (Inlet 8-5)	15	2.95	13.4	0.49	3.3	1.00	3.3	3.3	3.3	0.0	3.3	3.0%	18
CVS-15A (Inlet 6-5B)	15A	0.95	7.9	0.53	4.1	0.50	2.0	2.0	2.0	0.0	2.0	1.0%	18
CVS-16	16	2.98	13.1	0.49	3.4	1.26	4.2	4.2	4.2	0.0	4.2	-	-
CVS-17	17	4.10	19.0	0.63	3.8	1.10	7.6	7.6	7.6	0.0	7.6	-	-
CVS-18	18	3.08	12.8	0.63	3.4	1.36	4.6	4.6	4.6	0.0	4.6	-	-
CVS-19	19	1.81	8.0	0.69	4.5	1.00	4.9	4.9	4.9	0.0	4.9	-	-
CVS-20	20	1.80	10.4	0.46	3.7	0.80	3.3	3.3	3.3	0.0	3.3	-	-
CVS-21	21	3.98	19.1	0.49	3.1	1.80	6.8	6.8	6.8	0.0	6.8	-	-
BEL-1 (Inlet 1-1)	81	3.73	12.8	0.30	3.4	1.13	4.8	4.8	4.8	0.0	4.8	5.9%	36
BEL-2 (Inlet 1-1)	82	1.38	7.8	0.69	4.2	0.96	3.9	3.9	3.9	0.0	3.9	8.4%	36
BEL-3 (Inlet 2-2)	83	6.78	14.4	0.13	3.2	1.28	4.1	4.1	4.1	0.0	4.1	8.9%	36
BEL-4 (Inlet 1-2)	84	1.75	7.9	0.69	4.1	1.21	6.0	6.0	6.0	0.0	6.0	2.9%	36
BEL-5	85	4.95	11.0	0.61	3.8	1.00	11.1	11.1	11.1	0.0	11.1	-	-
BEL-6	86	3.99	7.4	0.82	4.2	2.92	10.6	10.6	10.6	0.0	10.6	-	-

Basin ID	Design Point	DIRECT RUNOFF				INLET	STORM SEWER		REMARKS				
		Area (Ac)	To (ft)	To (ft)	To (ft)		Inlet (ft)	Flow (MGD)					
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.33	4.3	1.27	6.5	6.5	6.5	0.0	10.0	3.1%	24
CVS-2 (Inlet 2-3)	2	1.42	6.6	0.72	4.3	1.03	4.5	4.5	4.5	0.0	4.5	10.0%	24
CVS-3 (Inlet 1-4)	3	0.84	6.2	0.36	4.4	0.54	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-4A (Inlet 3-4)	4A	2.20	11.3	0.59	3.6	1.15	4.0	4.0	4.0	0.0	4.0	1.0%	18
CVS-5 (Inlet 5-4)	5	2.19	9.0	0.42	3.9	0.92	3.6	3.6	3.6	0.0	3.6	1.0%	18
CVS-6 (Inlet 6-4)	6	0.98	5.0	0.40	4.7	0.21	1.1	1.1	1.1	0.0	1.1	1.7%	36
CVS-6A (FEES 2-4)	6A	0.78	5.0	0.02	4.7	0.01	0.1	0.1	0.1	0.0	0.1	0.5%	36
CVS-7 (Inlet 1-5)	7	1.11	10.2	0.73	3.7	0.81	3.0	3.0	3.0	0.0	3.0	3.0%	24
CVS-8 (Inlet 2-5)	8	1.59	10.1	0.63	3.7	0.82	3.0	3.0	3.0	0.0	3.0	1.4%	24
CVS-9 (Inlet 4-5A)	9	2.41	11.9	0.51	3.5	1.23	4.3	4.3	4.3	0.0	4.3	1.2%	18
CVS-9A (Inlet 4-4)	9A	0.97	5.0	0.51	4.7	0.19	0.9	0.9	0.9	0.0	0.9	1.0%	18
CVS-10 (Inlet 5-5A)	10	2.78	13.7	0.47	3.3	1.32	4.3	4.3	4.3	0.0	4.3	1.2%	18
CVS-10A (Inlet 5-4A)	10A	0.40	5.8	0.98	4.5	0.23	1.1	1.1	1.1	0.0	1.1	1.0%	18
CVS-11 (Inlet 1-5)	11	2.03	15.3	0.73	3.4	1.47	5.1	5.1	5.1	0.0	5.1	0.9%	36
CVS-12 (Inlet 2-5)	12	4.58	11.9	0.51	3.5	2.34	8.2	8.2	8.2	0.0	8.2	0.7%	36
CVS-13 (Inlet 3-5)	13	0.81	7.7	0.41	4.1	0.41	1.7	1.7	1.7	0.0	1.7	4.0%	42
CVS-13A (Inlet 3-4)	13A	1.31	10.8	0.51	3.6	0.67	2.4	2.4	2.4	0.0	2.4	1.9%	42
CVS-13 (Inlet 4-5)	13	1.16	7.4	0.41	4.2	0.50	2.6	2.6	2.6	0.0	2.6	3.0%	18
CVS-13A (Inlet 5-5A)	13A	1.30	8.7	0.58	4.0	0.69	2.7	2.7	2.7	0.0	2.7	1.0%	18
CVS-13B (Inlet 4-5B)	13B	1.53	9.0	0.59	3.9	0.80	3.5	3.5	3.5	0.0	3.5	1.0%	18
CVS-13C (Inlet 4-5C)	13C	1.28	8.8	0.51	3.9	0.04	2.5	2.5	2.5	0.0	2.5	1.0%	18
CVS-14 (Inlet 6-5)	14	1.89	11.1	0.51	3.6	0.97	3.5	3.5	3.5	0.0	3.5	3.2%	30
CVS-14A (Inlet 7-5)	14A	4.01	17.5	0.02	3.9	0.07	0.2	0.2	0.2	0.0	0.2	4.7%	24
CVS-14B (Inlet 6-5)	14B	2.73	13.4	0.97	3.3	1.19	4.6	4.6	4.6	0.0	4.6	3.4%	30
CVS-14C (Inlet 5-5)	14C	1.93	11.4	0.49	3.6	1.00	3.4	3.4	3.4	0.0	3.4	2.0%	18
CVS-15 (Inlet 8-5)	15	2.95	13.4	0.49	3.3	1.00	3.3	3.3	3.3	0.0	3.3	3.0%	18
CVS-15A (Inlet 6-5B)	15A	0.95	7.9	0.53	4.1	0.52	2.1	2.1	2.1	0.0	2.1	1.0%	18
CVS-16	16	2.98	13.1	0.51	3.4	1.32	4.4	4.4	4.4	0.0	4.4	-	-
CVS-17	17	4.10	19.0	0.63	3.8	1.10	7.9	7.9	7.9	0.0	7.9	-	-
CVS-18	18	3.08	12.8	0.63	3.4	1.42	4.8	4.8	4.8	0.0	4.8	-	-
CVS-19	19	1.81	8.0	0.68	4.5	1.09	4.9	4.9	4.9	0.0	4.9	-	-
CVS-20	20	1.80	10.4	0.46	3.7	0.80	3.4	3.4	3.4	0.0	3.4	-	-
CVS-21	21	3.98	19.1	0.51	3.1	1.86	6.1	6.1	6.1	0.0	6.1	-	-
BEL-1 (Inlet 1-1)	81	3.73	12.8	0.32	3.4	1.18	4.0	4.0	4.0	0.0	4.0	6.1%	36
BEL-2 (Inlet 1-1)	82	1.38	7.8	0.72	4.2	0.99	4.1	4.1	4.1	0.0	4.1	8.8%	36
BEL-3 (Inlet 2-2)	83	6.78	14.4	0.32	3.2	1.32	4.2	4.2	4.2	0.0	4.2	9.3%	36
BEL-4 (Inlet 1-2)	84	1.75	7.9	0.73	4.1	1.27	6.2	6.2	6.2	0.0	6.2	3.2%	36
BEL-5	85	4.95	11.0	0.71	3.8	1.32	11.6	11.6	11.6	0.0	11.6	-	-
BEL-6	86	3.99	7.4	0.88	4.2	2.01	10.9	10.9	10.9	0.0	10.9	-	-

Basin ID	Design Point	DIRECT RUNOFF				INLET	STORM SEWER		REMARKS						
		Area (Ac)	To (ft)	To (ft)	To (ft)		Inlet (ft)	Flow (MGD)							
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.68	8.0	2.51	20.2	20.2	20.2	0.0	13.5	8.7	22.5	3.1%	



2 YEAR STORM												5 YEAR STORM												100 YEAR STORM											
Basin ID	Design Area (Ac)	Direct Runoff (CFS)	Impervious (%)	Area (Ac)	Runoff Coefficient	Area (Ac)	Runoff Coefficient	Area (Ac)	Runoff Coefficient	Area (Ac)	Runoff Coefficient	Basin ID	Design Area (Ac)	Direct Runoff (CFS)	Impervious (%)	Area (Ac)	Runoff Coefficient	Area (Ac)	Runoff Coefficient	Area (Ac)	Runoff Coefficient	Basin ID	Design Area (Ac)	Direct Runoff (CFS)	Impervious (%)	Area (Ac)	Runoff Coefficient	Area (Ac)	Runoff Coefficient						
CVS-1 (Inlet 1-3)	1	3.85	6.9	0.28	4.3	1.10	4.7	4.7	4.7	0.0	8.9	3.1%	24	1.85	6.9	0.33	4.3	1.27	6.5	5.5	5.0	60.0	3.1%	24	1.85	6.9	0.65	8.0	20.2	20.2	6.7	22.5	3.1%		



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 STORM DRAINAGE AND ENVIRONMENTAL CRITERIA MANUAL.

Project: 1/2/2017 8:25 AM Day Name: P:\Civic\3\CompSouth05-Residential Preliminary Plat\Documents\Engineering\StormWater Reports\Drainage Exhibit\Drainage Basin Map BAK 11.21.16.dwg Updated By: BKZ  
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**COMPARK SOUTH**  
**TOWN OF PARKER, CO**  
**PROPOSED DRAINAGE AREA MAP - FILING NO. 2**

PROJ. MGR.: RLB  
 PROJ. ASSOC.: ASD  
 DRAWN BY: RAK  
 DATE: 6-30-16

COLORADO REGISTERED  
**NEW J. MOHR**  
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 PROFESSIONAL ENGINEER

SHEET  
**3 OF 3**  
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