PHASE II DRAINAGE REPORT

for

The Brickyard

401 PRAIRIE HAWK DRIVE
CASTLE ROCK, CO 80109
SDP24-0022

LOT 1 OF CITADEL STATION FILING NO. 2
LOT 1, BLOCK 10, CITADEL STATION FILING NO. 6
LOT 1, BLOCK 7, CITADEL STATION FILING NO. 6
AND TRACT OF LAND, COUNTY OF DOUGLAS, STATE OF COLORADO

Prepared: 08/15/2025

for:

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by:

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HKS Project No. 200726
Mark A. West, PE, CFM

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CERTIFICATION

I affirm that this report and plan for the Phase II drainage design of The Brickyard was prepared by me (or under my direct supervision) in accordance with the provisions of the Town of Castle Rock Drainage Design and Technical Criteria for the owners thereof. I understand that the Town of Castle Rock does not and will not assume liability for drainage facilities designed by others.

SIGNATURE: _____

Mark A. West, P.E., C.F.M.
Registered Professional Engineer State of Colorado No. 38561
On Behalf of Harris Kocher Smith

Confluence Companies, LLC hereby certifies that the drainage facilities for The Brickyard shall be constructed according to the design presented in this report. I understand that the Town of Castle Rock does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that the Town of Castle Rock reviews drainage plans pursuant to the Municipal Code; but cannot, on behalf of The Brickyard, guarantee that final drainage design review will absolve Confluence Companies, LLC and/or their successors and/or assigns of future liability for improper design.

Confluence Companies, LLC

_____

Authorized Signature

I. GENERAL LOCATION AND DESCRIPTION

A. SITE LOCATION

The Brickyard development is located north of Plum Creek Parkway and west of I-25 in Castle Rock, Colorado on 4 parcels: Lot 1, Citadel Station Filing No. 2, County of Douglas, State of Colorado; Lot 1 of Block 10 and Lot 1 of Block 7, Citadel Station Filing No. 6, County of Douglas, State of Colorado; A tract of land situated in sections 10 and 11, Township 8 South, Range 67 West of the 6th Principal Meridian, County of Douglas, State of Colorado. The entire property is situated in the Northwest ¼ of Section 11, Township 8 South, Range 66 West of the 6th Principal Meridian, Town of Castle Rock, County of Douglas, State of Colorado. A Vicinity Map is included in Appendix A of this report, for reference.

The property is bounded by Prairie Hawk Drive along the east with East Plum Creek to the east of Prairie Hawk Drive as the ultimate receiving drainageway. To the north is an adjacent existing drainageway known as the Industrial Tributary Channel. On the west side of the property is a planned development project known as Millers Landing (PDP 16-0003) and the *Phase I drainage report for Millers Landing* can be found in **Appendix G.**

This report serves as the drainage report for The Brickyard SDP for the purposes of describing the storm sewer and drainage facility design for developments associated with The Brickyard development area. The Study Area encompasses public improvements (Phase 1A) including Brickyard Circle and Fifer Street within The Brickyard development, and improvements to existing Prairie Hawk Drive from alongside the property to Wolfensberger Road; the Castle Rock Sports Center (hereinafter referred to as recreation center) and Phases 1B, 2, and 3 of The Brickyard development; and Praxis Street interim condition, including two off-site detention ponds. Conformance drainage documents that adhere to the design contained within this report will be provided for the recreation center and the three (3) phases. Praxis Street and associated off-sites areas, to the west and south of The Brickyard property, are also the subject of a separate study.

B. DESCRIPTION OF PROPERTY

Areas of interest follow below and are tallied on the Imperviousness and Runoff Coefficients Calculations worksheet of the Rational calculations included in the appendix.

- The area within The Brickyard property boundary is 31.56 acres, after right-of-way dedication and vacation, including the recreation center area. Note, some subbasins straddle the property boundary.
- The area of Prairie Hawk Drive right-of-way that encompasses proposed improvements adjacent to the property boundary is approximately 3.75 acres. The area of Prairie Hawk Drive right-of-way that encompasses proposed improvements north of the property boundary is approximately 4.47 acres.
- For this study, the area considered as the Site includes the area within The Brickyard development and the adjacent Prairie Hawk Drive right-of-way, totaling approximately 35.31 acres.

- The total area of disturbance (i.e., the limits of improvements and grading) for this Site, is approximately 39.4 acres. The total area of disturbance for the Study Area is approximately 69.3 acres.
- The total area of subbasins included for this study is approximately 138.7 acres. These areas are all tallied on the Imperviousness and Runoff Coefficients Calculations worksheet of the Rational calculations included in the appendix.
- Note, areas encompassing improvements and grading for Praxis Street and other off-site areas are studied separately are included for reference.

The existing site consists of Type B and Type C hydrologic soil groups. The Industrial Tributary major drainageway exists adjacent to the site to the north. There are no known irrigation facilities on, adjacent to, or otherwise impacting the Site. The Site slopes generally to the northeast towards Prairie Hawk Drive.

According to the Natural Resources Conservation Service (NRCS) – Web Soil Survey, the underlying soils are mostly Newlin gravelly sandy loam (NeE) and Fondis clay loam (FoD) which are classified as Hydrologic Groups B and C. Since most of the underlying soil is NeE, Hydrologic Soil Group B was prioritized in the Rational calculations used for the design of the storm network and inlets. Both Hydrologic Groups B and C were incorporated in the design of the detention facility as a conservative approach in sizing. Pages from the NRCS WSS report are included in **Appendix B**. *Table 1* below shows a summary of the soil types and their percentages based on area of the site.

Table 1: NRCS Web Soil Survey

Map Unit Symbol	Map Unit Name	Area of Interest (AOI)	Hydrologic Soil Group	Percent of AOI
		Acres	Percent	Percent
FoD	Fondis Clay loam, 3 to 9 percent slopes	2.6	C	4.6
NeE	Newlin gravelly sandy loam, 8 to 30 percent slopes	53.1	B	95.4

C. PROPOSED LAND USE

The Brickyard Site will be developed as mixed-use, in phases. The proposed improvements will include public and private roads, landscaped areas, and an on-site water quality and detention pond. Developments will potentially include a combination of hotel, condominiums, for-rent apartments, townhomes, retail and commercial buildings, and office buildings. The primary focus of this report is The Brickyard SDP. As noted, conformance documents adhering to the design layout within this report will be provided for the recreation center, and future development Phases 1B, 2, and 3; Praxis Street and associated off-sites areas, to the west and south of The Brickyard property, are the subject of a separate study.

II. DRAINAGE BASINS AND SUB-BASINS

A. MAJOR DRAINAGE BASINS

The Site is located within a portion of the Industrial Watershed which outfalls to East Plum Creek. The Industrial Watershed was studied as part of the Omni, Industrial and Westfield Watershed Master Plan report by CH2MHill in January 2011, referred to as the Master Plan hereafter. The Master Plan provides a comprehensive drainage plan and floodplain analysis for the Omni, Industrial and Westfield Watersheds, including providing recommendations for channel improvements, and improvements to the culvert at Prairie Hawk Drive. The Master Plan is referenced throughout this report, reference material can be found in **Appendix G**.

In 2019, improvements were made to the Industrial Tributary Channel including sheet pile and drop structures generally based on the recommendations in the Omni, Industrial and Westfield Watershed Master Plan. As-built plans for the Industrial Tributary Stabilization Project can be found in **Appendix G**. The trail included in these plans was not constructed.

Proposed major drainage Basin A encompasses 25.28 acres of the Site and will drain to Forebay 1 (west) in the proposed on-site detention pond in the northeast corner of the Site. It consists of the proposed public roadways, the recreation center, and the Phase 2, and Phase 3 improvements.

Proposed major drainage Basin B encompassing 8.90 acres, along with off-site subbasin OS12 (3.50 acres) and release from the off-site south pond, will drain to Forebay 2 (east) in the proposed on-site detention pond. These areas consist of the improvements to Prairie Hawk Drive, the Phase 3 improvements, and existing improvements within subbasin OS12. The impervious value for OS12 was approximated by digitizing the existing improvements from an aerial image, and accounting for approximately a +5% buffer. It is assumed that future development within subbasin OS12 will have on-site detention, to account for any increase in imperviousness at such time, and will release to the Site's proposed storm drain system, within the extension of existing Prairie Hawk Drive, at or below the existing conditions flowrate. Meanwhile, subbasin OS12 is included to the extent of determining its WQCV for the on-site detention pond computations.

B. MINOR DRAINAGE BASINS

The "A" subbasins consist of areas that are on the Site and contribute to the proposed on-site detention pond, entering via Forebay 1 (west). Subbasins A1 through A19 are within the Castle Rock Sports Center site, included on the drainage plan only for reference.

The "B" subbasins include areas along the stretch of Prairie Hawk Drive that is to be improved with this project. They are not labeled as offsite basins because although they are not on the project property, they still drain to the on-site detention and water quality pond, along with some adjacent Site subbasins, entering via Forebay 2 (east).

The Site is impacted by offsite flows from Prairie Hawk Drive coming from the south. The contributing area is accounted for in the Rational calculations.

Minor subbasin A1 (0.69 acre) encompasses the southwest portion of the recreation center building. It drains via roof drains to Storm Line E. It consists of only roof. Runoff from this subbasin will be captured and conveyed via roof drains to proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A2 (0.24 acre) is located south of the recreation center. It drains via curb and gutter to a proposed 5' Type R inlet (on grade) at Design Point 1 into Storm Line E. It consists of asphalt, concrete, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A3 (0.09 acre) is located south of the recreation center. It drains via curb and gutter to a proposed 5' Type R inlet (on grade) at Design Point 2 into Storm Line E. It consists of asphalt, concrete, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A4 (1.14 acres) is located southwest of the recreation center. It drains via surface flow and curb and gutter to a proposed 10' Type R inlet (on grade) at Design Point 3 into Storm Line EE. It consists of asphalt parking, concrete, and some landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A5 (0.56 acre) is located south of the recreation center. It consists of asphalt parking, concrete, and some landscape areas. It drains via surface flow and curb and gutter to a proposed 10' Type R inlet (sump) at Design Point 4 into Storm Line E. Overflows will overtop the curb to subbasin A8, where a proposed swale and landscape drains will convey to the on-site storm sewer system. Runoff from this subbasin (A5) will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A6 (0.19 acre) is located south of the recreation center. It drains via curb and gutter to a proposed 5' Type R inlet (on grade) at Design Point 5 into Storm Line EC. It consists of asphalt, concrete, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A7 (0.85 acre) is located south of the recreation center. It drains via surface flow and curb and gutter to a proposed 10' Type R inlet (on grade) at Design Point 6 into Storm Line EC. It consists of asphalt parking, concrete, and some landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A8 (0.69 acre) is located southeast of the recreation center building, at the southeast corner of the Site. It drains via swales and landscape drains to Storm Line E. It consists of landscape area. Runoff from this subbasin will be captured and conveyed via roof drains to proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A9 (0.59 acre) encompasses the southeast portion of the recreation center building. It drains via roof drains to Storm Line EC. It consists of only roof. Runoff from this

subbasin will be captured and conveyed via roof drains to proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A10 (0.54 acre) is located east of the recreation center. It drains via curb and gutter to a proposed 10' Type R inlet (on grade) into Storm Line EA. It consists of asphalt, concrete, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A11 (0.32 acre) is located east of the recreation center. It drains via curb and gutter to a proposed 10' Type R inlet (on grade) at Design Point 9 into Storm Line EA. It consists of asphalt, concrete, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A14 (0.52 acre) is located southwest of the recreation center. It drains via surface flow and curb and gutter to a proposed triple #16 valley inlet (on grade) into Storm Line F. It consists of asphalt parking, concrete and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A15 (0.64 acre) is located west of the recreation center. It drains via surface flow and curb and gutter to a proposed 10' Type R inlet (on grade) at Design Point 12 into Storm Line F. It consists of asphalt parking, concrete and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A16 (0.36 acre) is located northwest of the recreation center. It drains via surface flow and curb and gutter to a proposed 10' Type R inlet (on grade), at the downstream end of subbasin A17, into Storm Line FA. It consists of asphalt parking, concrete and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A17 (0.35 acre) is located west of the recreation center. It drains via curb and gutter to the proposed 10' Type R inlet (on grade) at Design Point 13 into Storm Line FA. It consists of drives, walks, parking, and grass buffer. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A18 (0.75 acre) encompasses the northwest portion of the recreation center building. It drains via roof drains to Storm Line FA. It consists of only roof. Runoff from this subbasin will be captured and conveyed via roof drains to proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A19 (0.50 acre) encompasses the northeast portion of the recreation center building. It drains via roof drains into Storm Line AA. It consists of only roof. Runoff from this subbasin will be captured and conveyed via roof drains to proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A20 (1.29 acres) is located on the west side of the west segment of proposed Brickyard Circle. It drains via curb and gutter to a proposed triple #16 valley inlet (on-grade) at Design Point 16 to Storm Line AAA. It consists of asphalt, concrete, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B4.

Minor subbasin A21 (0.70 acre) is located on the east side of the west segment of proposed Brickyard Circle. It drains via curb and gutter to a proposed 10' Type R inlet (on-grade) into Storm Line AAA. It consists of drives, walks, and landscaping. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B3.

Minor subbasin A21a (0.32 acre) encompasses a portion of the south end of proposed Fifer Street. It drains via curb and gutter to a proposed 5' Type R inlet (on-grade) at Design Point 18a along Storm Line B. It consists of asphalt, concrete and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B3.

Minor subbasin A22 (2.01 acres) is located northwest of the intersection of the south segment of proposed Brickyard Circle and Fifer Street. It drains via curb and gutter and roof drains into Storm Line BC – to a single #16 valley inlet (on grade) near the downstream end of a private drive, with bypass flows to a proposed 5' Type R inlet (on grade) along the north side of Fifer Street. It consists of drives, concrete, buildings, pool, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin A23.

Minor subbasin A23 (0.92 acre) is located along the east side of Fifer Street. It drains via curb and gutter to a proposed 5' Type R inlet (on-grade) at Design Point 20 into Storm Line B. It consists of drives and landscaping. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B12.

Minor subbasin A24 (0.83 acre) is located at the northwest corner of the Phase 3 improvements. It consists primarily of landscape area, with some walk. A dog park is also anticipated in a portion of this area. It drains via sheet flow to a proposed concrete swale through subbasin A32 to a proposed Type C inlet at the upstream end of Storm Line JA. Runoff from this subbasin will be captured and conveyed via the proposed concrete swale to a proposed rain garden (with Phase 3) in subbasin A32, upstream of the proposed on-site detention pond. Overflows will drain to subbasin A32.

Minor subbasin A25 (0.53 acre) is located along the north-west sides of the north-west segment of proposed Brickyard Circle. It drains via curb and gutter to a proposed 10' Type R inlet (on-grade) into Storm Line A. It consists of asphalt, concrete and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin A28.

Minor subbasin A26 (1.29 acre) is located at the northwest corner of the Phase 2 improvements. It drains via curb and gutter into Storm Line A. It consists of asphalt,

concrete, building, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A27 (0.36 acre) is located along the south-east sides of the north-west segment of proposed Brickyard Circle, bordering the Phase 2 improvements. It drains via curb and gutter to a proposed 5' Type R inlet (on-grade) at Design Point 21 into Storm Line A. It consists of asphalt, concrete and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin A29.

Minor subbasin A28 (0.17 acre) is located along the north side of the north segment of proposed Brickyard Circle, between the Phase 2 and Phase 3 improvements. It drains via curb and gutter to a proposed triple #16 valley inlet (on-grade) inlet into Storm Line AC. It consists of asphalt, concrete and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin A28a.

Minor subbasin A28a (0.15 acre) is located on the north side of the north segment of proposed Brickyard Circle, west of Fifer Street, between the Phase 2 and Phase 3 improvements. It drains via curb and gutter to a proposed 5' Type R inlet (on-grade) into Storm Line A1. It consists of asphalt, concrete, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B11.

Minor subbasin A29 (0.17 acre) is located along the south side of the north segment of proposed Brickyard Circle, between the Phase 2 and Phase 3 improvements. It drains via curb and gutter to a proposed triple #16 valley inlet (on-grade) at Design Point 23 into Storm Line A. It consists of asphalt, concrete and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin A29a.

Minor subbasin A29a (0.15 acre) is located on the south side of the north segment of proposed Brickyard Circle, west of Fifer Street, between the Phase 2 and Phase 3 improvements. It drains via curb and gutter to a proposed 5' Type R inlet (on-grade) at Design Point 24a along Storm Line A. It consists of asphalt, concrete, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B12.

Minor subbasin A30 (1.88 acres) is located at the east end of the Phase 3 improvements. It consists of asphalt, concrete, building, and landscape areas. It drains via roof drains and curb and gutter to a proposed 10' Type R inlet (sump) to Storm Line J. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to the proposed on-site detention pond.

Minor subbasin A31 (1.47 acres) is located at the north end of the Phase 2 improvements. It drains via roof drains and curb and gutter into Storm Line A. It consists of asphalt, concrete, buildings, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin A29a.

Minor subbasin A32 (0.18 acre) is located alongside the north end of the Phase 3 improvements. It consists of landscape area. It drains via sheet flow and concrete swale, combined with flows from subbasin A24, to a proposed Type D inlet at Design Point 26 into Storm Line J. A rain garden is proposed with Phase 3 near the downstream end of this subbasin, upstream of the proposed Type D inlet. Runoff from this subbasin will be captured and conveyed to proposed storm sewers to the proposed on-site detention pond. Overflows that don't reach the pond will drain to subbasin OS1.

Minor subbasin A33 (0.63 acre) is located north of the north segment of proposed Brickyard Circle, in the Phase 3 improvements. It consists of the top deck of a proposed parking structure, concrete, and landscape areas. It drains via area drains to Storm Line BB. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin A34. Storm runoff to drains atop the parking structure will be piped to Storm Line B.

Minor subbasin A34 (0.67 acre) is located north of the north segment of proposed Brickyard Circle, in the Phase 3 improvements. It consists of asphalt, concrete, and landscape areas. It drains via curb and gutter to a 10' Type R inlet (sump) at Design Point 27 along Storm Line B. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin A36.

Minor subbasin A35 (0.84 acre) encompasses a building portion in Phase 3 improvements. It drains via roof drains into Storm Line BA. It consists of roof only. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin A36 (0.35 acre) encompasses the main parking and landscape area of the Phase 3 improvements. It consists of asphalt, concrete, and pervious areas. Runoff from this subbasin drains via curb and gutter to a proposed 5' Type R inlet (sump) at Design Point 28 along Storm Line B. Runoff from this subbasin will be captured and conveyed through the Phase 3 storm network to the public infrastructure that drains to the proposed on-site detention pond. Overflows will overtop the curb to subbasin B14.

Minor subbasin A37 (1.51 acres) encompasses the proposed on-site detention pond located at the northeast corner of the Site. It consists of concrete, and pervious areas. The detained runoff flows through the proposed outlet structure, discharging to existing Industrial Tributary.

Minor subbasin B1 (0.64 acre) is located on the east side of the south portion of Prairie Hawk Drive. It drains via curb and gutter to a proposed 10' Type R inlet (on-grade) into Storm Line D. It consists primarily of existing unpaved road and some vegetation. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B6.

Minor subbasin B2 (0.63 acre) is located on the west side of the south portion of Prairie Hawk Drive. It drains via curb and gutter to a proposed 10' Type R inlet (on-grade) at Design Point 31 into Storm Line D. It consists primarily of existing unpaved road and some vegetation. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B7.

Minor subbasin B3 (0.32 acre) encompasses a portion of the south end of proposed Fifer Street and the north side of the east end of the south segment of proposed Brickyard Circle. It drains via curb and gutter to a proposed 10' Type R inlet (on-grade) at Design Point 32 into Storm Line DG. It consists of asphalt, concrete and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B7.

Minor subbasin B4 (0.42 acre) is located on the south side of the east end of proposed Brickyard Circle. It drains via curb and gutter to a proposed 10' Type R inlet (on-grade) at Design Point 33 into Storm Line DG. It consists of asphalt, concrete and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B7.

Minor subbasin B5 (1.48 acres) encompasses the south portion of the Phase 1B improvements. It drains via roof drains into Storm Line DG. It consists primarily of roof, with some concrete and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin B6 (0.21 acre) is located along the east side of Prairie Hawk Drive where it intersects the south segment of proposed Brickyard Circle. It consists of asphalt, concrete and landscape areas. It drains via curb and gutter to a proposed 5' Type R inlet (sump) into Storm Line DF. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B15.

Minor subbasin B7 (0.40 acre) is located along the west side of Prairie Hawk Drive where it intersects the south segment of proposed Brickyard Circle. It consists of asphalt, concrete and landscape areas. It drains via curb and gutter to a proposed 10' Type R inlet (sump) into Storm Line DF. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B16.

Minor subbasin B8 (0.18 acre) is located east of the Phase 1B improvements, along the east side of Prairie Hawk Drive near its intersection with the north segment of proposed Brickyard Circle. It consists of asphalt, concrete, and landscape areas. It drains via curb and gutter to a proposed 5' Type R inlet (sump) at Design Point 36a into Storm Line DE. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B13.

Minor subbasin B9 (0.29 acre) is located east of the Phase 1B improvements, along the west side of Prairie Hawk Drive near its intersection with the north segment of proposed Brickyard Circle. It consists of asphalt, concrete, and landscape areas. It drains via curb and gutter to a proposed 5' Type R inlet (sump) at Design Point 37 into Storm Line DE. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B14.

Minor subbasin B10 (1.47 acres) encompasses the north portion of the Phase 1B improvements. It drains via roof drains into Storm Line DC. It consists primarily of roof, with some concrete and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin B11 (0.27 acre) is located on the north side of the east end of the north segment of proposed Brickyard Circle, between the Phase 1B and Phase 3 improvements. It drains via curb and gutter to a proposed 5' Type R inlet (on-grade) into Storm Line DC. It consists of asphalt, concrete, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B14.

Minor subbasin B12 (0.33 acre) is located on the south side of the east end of the north segment of proposed Brickyard Circle, between the Phase 1B and Phase 3 improvements. It drains via curb and gutter to a proposed 10' Type R inlet (on-grade) at Design Point 39 into Storm Line DB. It consists of asphalt, concrete, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B9.

Minor subbasin B13 (0.33 acre) is located east of the Phase 3 improvements, along the east side of Prairie Hawk Drive. It drains via curb and gutter to a proposed 10' Type R inlet (on-grade) into Storm Line DA. It consists of asphalt, concrete, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin P1.

Minor subbasin B14 (0.73 acre) is located east of the Phase 3 improvements, along the west side of Prairie Hawk Drive. It drains via curb and gutter to a proposed 15' Type R inlet (on-grade) at Design Point 41 into Storm Line DA. It consists of asphalt, concrete, and landscape areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin P2.

Minor subbasin B15 (0.27 acre) is located east of the Phase 1B improvements in existing Prairie Hawk Drive. It consists of asphalt, concrete, and landscape areas. It drains via curb and gutter to sub-basin B8 to a proposed 5' Type R inlet (sump) at Design Point 36a into storm line DD. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond. Overflows will drain to subbasin B8.

Minor subbasin B16 (0.35 acre) is located east of the Phase 1B improvements in existing Prairie Hawk Drive. It consists of asphalt, concrete, and landscape areas. It drains via curb and gutter to sub-basin B9 to a proposed 5' Type R inlet (sump) at Design Point 37 into storm line DE. This is a very shallow sump, caused by pull-in parking sloping away from the road crown. Consequently, the inlet does not capture 100% of design storm flows. These flows will be contained within the roadway right-of-way and will be captured downstream. Runoff from this subbasin will be captured and conveyed through proposed storm sewers to the proposed on-site detention pond.

Minor subbasin OS1 (0.09 acre) borders the north end of the Phase 3 improvements and the existing Industrial Tributary. It drains via surface flow to the existing Industrial Tributary. It consists of the southern channel bank and the proposed regional trail. Runoff from this subbasin will flow offsite untreated; combined with subbasins OS2 and OS11, the area draining offsite is less than one acre.

Minor subbasin OS2 (0.27 acre) is at the northeast corner of the Site, between the on-site detention pond and Industrial Tributary. It drains via surface flow toward existing Industrial

Tributary. It consists of Site pervious area and the concrete spillway of the pond. Runoff from this subbasin will flow offsite untreated; combined with subbasins OS1 and OS11, the area draining offsite is less than one acre.

Minor subbasins OS4 through OS10, associated with the separate study for proposed Praxis Street, are included herein for reference.

Minor subbasin OS4 (5.35 acres) is located along Praxis Street. It consists of asphalt street, concrete walk, landscape areas, and undeveloped pervious areas. It drains via sheet flow to curb and gutter to a proposed 10' Type R inlet (sump) at Design Point O1 into Storm Line OS-A. Note, flows are anticipated to be less with future build-out condition (by others). This inlet has more than enough capacity. However, to account for clogging, flanking inlets are included based on FHWA HEC-22 criteria – refer to *Praxis Street Off Site Improvements Field Change Order No. 1* for additional information. Runoff from this subbasin will be captured and conveyed through proposed storm sewers and swale to the off-site south detention pond. Overflows will drain to Plum Creek Parkway.

Minor subbasin OS5 (0.88 acre) is located on the east side of proposed Praxis Street, and straddles the property line. It drains via sheet flow to a drainage swale to Design Point O2. It consists of undeveloped pervious land. Runoff from this subbasin will be conveyed through the proposed swale to the off-site south detention pond.

Minor subbasin OS6 (6.44 acres) is located alongside the south edge of the Site, and straddles the property line. It drains via sheet flow to a drainage swale to Design Point O3. It consists of undeveloped pervious land. Runoff from this subbasin will be conveyed through proposed swale to the off-site south detention pond.

Minor subbasin OS7 (2.79 acres) is located on the east side of proposed Praxis Street, and straddles the property line. It drains via sheet flow and swale to Design Point O4, at the upstream end of Storm Line OS-D. It consists of undeveloped pervious land. Runoff from this subbasin will be captured and conveyed through proposed storm sewers and swale to the off-site north detention pond.

Minor subbasin OS8 (0.60 acre) is a portion of proposed Praxis Street. It drains via curb and gutter to a proposed 10' Type R inlet (on grade) at Design Point O5 into Storm Line OS-D. It consists of asphalt, concrete, and pervious areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers and swale to the off-site north detention pond.

Minor subbasin OS9 (0.09 acre) is a portion of proposed Praxis Street It drains via curb and gutter to a proposed 10' Type R inlet (on grade) at Design Point O6 into Storm Line OS-D. It consists of asphalt and concrete areas. Runoff from this subbasin will be captured and conveyed through proposed storm sewers and swale to the off-site north detention pond.

Minor subbasin OS10 (52.20 acres) is located on the west side of proposed Praxis Street. It drains via sheet flow and swale to Design Point O7. It is the remainder of areas tributary to the off-site north detention pond (refer to *Phase I Drainage Report for Millers Landing*), minus overlapping areas from additional/proposed improvements. It consists primarily of

undeveloped pervious land. Runoff from this subbasin will be conveyed to the off-site north detention pond.

Minor subbasin OS11 (0.21 acre) is located at the southeast corner of the Site. It drains via sheet flow offsite to the east. It consists primarily of pervious area.

Minor subbasin OS12 (3.50 acres) is located between the proposed recreation center and existing Prairie Hawk Drive. It consists of existing roofs, drives, and pervious areas. The impervious value was calculated by using an aerial image and digitizing the existing roofs and drives and adding a 5% buffer. A portion of this area drains to an existing culvert that drains to the east under Prairie Hawk Drive. It is assumed that future development of this area will incorporate on-site detention that will release into the Site's proposed storm network in Prairie Hawk Drive, at or below the existing conditions flowrate. A storm pipe stubout is provided for potential future connection. Assumed future development within this subbasin is not part of this Site's development.

Minor subbasin TR (0.43 acre) consists of the concrete regional trail alongside the north edge of the Site. It drains via sheet flow offsite to Industrial Tributary, untreated. This subbasin falls within excluded impervious area for Trails.

III. DRAINAGE DESIGN CRITERIA

A. REGULATIONS

The basis for design and analysis of the drainage system and drainage impacts for the Site were the Town of Castle Rock Storm Drainage Design and Technical Criteria Manual (SDDTCM), updated February 2025, and the *Urban Storm Drainage Criteria Manuals* (Mile High Flood District, formerly known as Urban Drainage and Flood Control District), Volumes 1, 2 and 3.

The total area of the Site to be developed, including offsite and the existing Prairie Hawk Drive roadway improvements, is under 90 acres. The Rational Method is appropriate and is used to calculate peak rates of stormwater runoff rates. The design storms analyzed for this Site are the 5-year and 100-year for the initial and major storms, respectively. Rainfall intensities were determined by the Town of Castle Rock Drainage Criteria.

Results of hydrologic and hydraulic analysis are included within the **Appendix C** and **Appendix D** of this report.

B. DRAINAGE STUDIES, MASTER PLANS, AND SITE CONSTRAINTS

The primary previous drainage study reference for the Site design is the Omni, Industrial and Westfield Watershed Master Plan report by CH2MHill.

There are no existing formal stormwater quality or storage facilities on the site.

The Site is constrained by the existing and proposed Prairie Hawk Drive roadways on the east and west boundaries of the Site.

C. HYDROLOGY

a. BASIN AREA

All inlet basin areas are calculated using existing and proposed topographic data. Inlet areas were delineated using the proposed contoured surface to show where surface flow meets drainage features. The Minor Subbasin Plan and Proposed Major Basin Plan provided in **Appendix F** show the delineated areas and the design points at their outfalls.

b. IMPERVIOUSNESS & COMPOSITE "C" VALUES

Imperviousness and composite "C" values are calculated using a weighted average of each of 4 land cover types that comprises the basin. The imperviousness values are conservatively estimated based on that information. Composite C values in the 100-year case are weighted by a frequency adjustment factor of 1.25 per the Criteria. The rational method spreadsheet in **Appendix C** contains the imperviousness and composite "C" calculations.

c. RAINFALL

Rainfall intensity values for the site rational method calculations are based on the 1-hour time distribution for respective storm events, and the time of concentration for the watershed in question.

d. TIME OF CONCENTRATION

Time of concentration (Tc) calculations are based on flow lengths delineated using topographical data. Many of the Tc values are assumed to be the minimum value of 5 minutes for urban watersheds. For larger basins, the Time of concentration is calculated directly using the methods outlined in the Castle Rock Drainage Criteria Manual. Time of concentration calculations can be found in the Rational Method spreadsheet presented in **Appendix C.**

D. HYDRAULICS

The methods used to calculate the capacity of the proposed storm sewer on the site include the use of the Rational Method to calculate surface flows coming to each drainage structure, discussed in *Section C* above. Each drainage structure is sized to account for the flow coming into it in a half-clogged condition. The flow is routed to each pipe using typical rational flow routing procedures with design points at each confluence. The Rational Method Calculation workbook is presented in **Appendix C** and shows flow routing calculations based on all hydraulic and hydrologic characteristics of the flow coming into the system**.**

Inlet capacity calculations were completed in MHFD-Inlet (v5.02), using flows determined with Rational Method computations, noted in *Section C* above. Each drainage structure has been sized to account for the flow coming into it in a half-clogged condition.

Swale and channel capacities are calculated with Manning's Equation for open channel flow and are executed in Hydraflow Express software for a given cross section.

Results from capacity and analysis computations are included in **Appendix D**.

Per the Omni, Industrial and Westfield Watershed Master Plan report, the existing 48 reinforced concrete pipe crossing of Prairie hawk Drive will be replaced with a 12'x8' concrete box culvert with the Brickyard development. As this concrete box culvert will be utilized as part of the proposed pedestrian trail that runs parallel to Industrial Tributary, an additional 72-inch RCP will be constructed parallel to the concrete box culvert to convey minor storm flows and allow the 12'x8' pedestrian box culvert to remain dry during minor storm events. The method used to calculate the water surface elevations in the Industrial Channel with the proposed design is HEC-RAS, as further described in the Floodplain Modification Study under separate cover.

E. WATER QUALITY ENHANCEMENT

To help to minimize adverse impacts of urbanization, the site design was prepared per Section14.1 of the SDDTCM with implementation of the Four-Step Approach (or Process), summarized below. Benefits of this process include reduced runoff, improved water quality, a decrease of the required storage volume, reduced burdens to downstream facilities, and improved site aesthetics.

The Four Step Approach implementation for the Site is outlined below:

Step 1: Reduce Runoff Volume

The Site acts to reduce runoff by disconnecting impervious areas to the extent possible, eliminating unnecessary impervious areas, and encouraging infiltration into soils that are suitable. This is accomplished by a combination of landscape islands and landscape areas adjacent to buildings and amenity areas throughout the site. Future infill phases within the Site boundary are also encouraged to reduce directly connected impervious area (MDCIA).

Step 2: Provide Water Quality Capture Volume and Flood Control Via Full-Spectrum Detention

The Site is designed with a Full Spectrum Detention facility at the most downstream area of the Site. The purpose of full-spectrum detention is to control the increase in runoff rates from developed areas during frequent storm events that exacerbate stream degradation. Runoff entering the Full Spectrum Detention Pond will slowly release from the forebay of the pond to the outlet structure to encourage sediment to settle to the bottom of the pond, where it can be collected before entering the drainageway.

Step 3: Utilize Stream Channel Stabilization Techniques

A combination of seeding and mulching and riprap around the outfall will be used on site to stabilize the land and prevent erosion. All new and re-development projects are required to construct or participate in the funding of channel stabilization measures. Drainage basin fees paid, at the time of platting, go towards channel stabilization within the drainage basin. The proposed outlet has sufficient stabilization. The project will investigate the need for and use of

bank protection measures such as buried riprap to protect Site infrastructure adjacent to the channel.

Step 4: Undertake Source Controls

A combination of source control Best Management Practices (BMP's) will be utilized including landscape maintenance, dog park maintenance, snow and ice management, and street sweeping / cleaning. Non-structural control measures will also be used such as a spill prevention plans, preventative maintenance, and recycling programs prevent or reduce the generation of illicit discharges.

The *Summary of Water Quality Conformance to MS4 Permit* and *Permanent Water Quality Determination Worksheet* are included in **Appendix E**.

IV. STORMWATER MANAGEMENT FACILITY DESIGN

A. PROPOSED CONVEYANCE FACILITIES

Minor drainage patterns on the site will change significantly, whereas the major drainage pattern is largely unchanged. In existing conditions, the flow travels generally northeast and ultimately outfalls to Industrial Tributary Channel. In the proposed condition, surface flow is graded to roadways and storm sewer that conveys flow toward to northeast. The proposed on-site detention pond to outlets to the Industrial Tributary Channel. The existing culvert at the Prairie Hawk Drive crossing will be replaced with a concrete box culvert.

The Site will include public roads, private drives, surface parking lots, below grade parking structures, pedestrian plazas, and landscape areas whose runoff needs to be managed. Public improvements adjacent to the Site include proposed storm sewer in Prairie Hawk Drive.

Roadways are designed and graded to strategically convey flow in large storm events. Runoff from the Site will be captured in roadways and routed to proposed inlets, conveyed in proposed pipes, detained in the proposed full spectrum extended detention basin (Pond), and released at or below historic rates.

Storm sewer outfalls are located in 3 locations. The first is the outfall for the pipe system managing the Site within the property boundary. The outfall includes a concrete forebay designed according to the criteria outlined in the Castle Rock Drainage Criteria Manual. The second is the outfall for the pipe system managing the Prairie Hawk Drive improvements, which includes another concrete forebay with energy dissipating baffles. The last outfall on the site goes from the proposed on-site detention pond to Industrial Tributary. Type "L" Riprap is used at the outfall to minimize impact to the channel in high flow events.

Per the Omni, Industrial and Westfield Watershed Master Plan report, the existing 48 reinforced concrete pipe crossing of Prairie hawk Drive will be replaced with a 12' x 10' concrete box culvert with the Brickyard development.

B. STORMWATER STORAGE FACILITIES

A full spectrum detention pond will be located on the northeast section of the Site adjacent to Industrial Channel and Prairie Hawk Drive. Calculations and details for the pond can be found in **Appendix E**. The pond includes a water quality capture volume (WQCV), an excess urban runoff volume (EURV), the 100-year detention volume, plus one-half the WQCV. A spillway is included which allows 1' of freeboard.

Design of the proposed pond follows MHFD criteria, using the MHFD-Detention software (v4-06) to calculate runoff volumes, release rates, emergency spillway design, and outlet structure design. Release rates are based on predevelopment runoff conditions for the site, requiring proposed flowrates from the pond to be less than the flowrates experienced in existing conditions. Runoff volumes for the pond are calculated using the Colorado Urban Hydrograph Procedure (CUHP) that is built into the "Basin" tab of the workbook. The outlet structure is designed using the "Outlet Structure" tab in the workbook. Values are adjusted on the spreadsheet to design the outlet structure in a way that satisfies the release rate and volume requirements outlined for the pond. Required volumes, prior to routing through detention, were computed to be 0.969 acre-foot, 2.851 acre-feet, and 4.966 acre-feet for WQCV, EURV, and 100-year + 1/2 WQCV, respectively, in the "Basin" tab of the workbook. *Table 2* below summarizes the release rates and volumes of the proposed pond.

Table 2: Detention Pond Summary Table

	WQCV	EURV	100-yr	100-yr + 1/2 WQCV
Release Rate (cfs)	0.28	1.21	37.1	42.01
Volume (ac-ft)	0.871	2.852	4.651	4.966
Max. Depth (ft)	4.38	7.08	9.00	9.30

The detention pond outfalls to Industrial Channel, near the culvert that crosses Prairie Hawk Drive. The outfall will be outfitted with Type "L" riprap to minimize erosion and transport of sediment downstream. Stability at the outfall will be controlled by the riprap.

Water rights exemption status require a drain time of 40 hours or less for the WQCV, and 72 hours or less for the 2-year storm and above. With the help of the most current version of the MHFD-Detention spreadsheet plotted in **Appendix E**, the calculations show that the detention pond satisfies the required water rights exemption status requirements.

Maintenance will be completed by field maintenance staff using the required 10' maintenance path provided for the detention pond. The path has access to the trickle channel, forebays, emergency spillway, and outlet structure, so that those items can be maintained. A drainage easement is provided around the pond to allow maintenance access.

C. WATER QUALITY ENHANCEMENT CONTROL MEASURES

Forebays are designed with baffles and walls to help dissipate the energy of the flow coming into the pond. An appropriately sized notch will allow for trickle flows within the downstream low-flow channels. They are sized using the MHFD-BMP workbook procedure

for sizing a forebay to handle incoming flows. See **Appendix E** for spreadsheet calculations for sizing and design of forebays.

The emergency spillway is designed to allow flow to pass over the broad-crested weir with 1' of freeboard to the top of the pond. The calculations are executed in Hydraflow Express software, which uses Manning's Equation to show a water surface above the trapezoidal spillway crest. See **Appendix E** for emergency spillway calculations and design.

The outlet structure was designed in the MHFD-Detention workbook. The calculations include considerations related to drain time, release rate, and volume calculations. Calculations for the outlet structure are presented in **Appendix E**. A drainage easement is provided around the pond to allow maintenance.

The rain garden proposed with Phase 3 is intended to treat water quality runoff from subbasins A24 and A32, and will be sized for the combined area. A Type D area inlet just downstream of the rain garden will incorporate a connection for the rain garden's underdrain, and will capture emergency overflows.

D. OPERATIONS AND MAINTENANCE

The property owner is the party responsible for operation and maintenance of the full spectrum detention pond facility. Routine maintenance procedures include removal of debris and sediment, trash rack clearing, mowing, and noxious weed control. Non-routine restorative maintenance activities include repairs and replacement of structures, and other improvements necessary to maintain functionality of the system.

The proposed onsite dog park will also be maintained by the property owner for contamination mitigation. It is essential that routine maintenance of the dog park is performed to minimize any contaminated runoff into the adjacent Industrial Tributary. The essential routine maintenance practices for the dog park are outlined below.

- Regular inspection and collection of inadvertent pet waste that has been left behind.
- Use of pet friendly cleaners or deodorizers as needed on turf, fencing, etc.
- Regularly resupply provided dog waste bags to encourage pet owners to pick up and dispose of their dog's waste.
- Regularly empty dog waste disposal stations and trash receptacles.
- Encourage local groups to sponsor dog park clean up days, and help monitor, and improve sanitation.
- Regularly pick up and dispose of outside dog toys that may be left behind by pet owners.
- Ensure plantings inside the dog park perimeter are non-poisonous to people and pets.
- Maintain sightlines throughout the dog park by keeping interior plantings trimmed and neat.
- Inspect plants within the dog park for damage caused by urine and chewing and consider replacement plants that are not as susceptible.
- Inspect plantings used around the outside perimeter of the dog park, trim and replace as necessary. Ensure there are no "escape routes" tunneled, dug, or otherwise established to ensure dogs stay within the dog park.

- Fill any holes that have been dug.
- Water grass and feed as necessary. Overseed or replace damaged grass. Mow grass as needed.
- Remove snow as necessary.
- Remove weeds. It is not recommended to use toxins to kill weeds and noxious plants as they can be poisonous to dogs.
- Inspect and test all amenities for damage and repair as necessary.
- Inspect tunnels for debris and remove as needed.
- Inspect fencing perimeter inside and outside the park to ensure escape tunnels have not been dug, and that the fence is secure in all areas.
- Ensure fencing is properly anchored and that all fence hardware is intact.
- Check to make sure all fence bolts and screws are flush with the surface and there are no exposed sharp points.
- Inspect all gates and locking mechanisms to maintain functionality.

V. FLOODPLAIN MODIFICATION STUDY

A floodplain modification study has been prepared, under separate cover, to assess the impacts of the proposed Prairie Hawk Drive culvert crossing, trail, and associated trail culvert through prairie Hawk Drive on the Industrial Tributary floodplain.

VI. ADDITIONAL PERMITTING REQUIREMENTS

A State of Colorado Discharge System Permit (CDPS) for construction site stormwater discharge will be required for the project.

VII. CONCLUSIONS

A. IMPACT OF IMPROVEMENTS

In the current condition, the site is mostly pervious, and runoff flows are otherwise untreated and undetained. The proposed development includes a major and minor storm drainage system conveying runoff from the Site to an on-site water quality and detention pond facility. Additionally, the developer will complete the 10'x12' concrete box culvert crossing of Prairie Hawk Drive, consistent with the Omni, Industrial, and Westfield Watershed Master Plan as prepared by CH2MHILL. The project will result in a significant improvement to the area storm drainage system and will not cause an adverse impact to adjacent or downstream properties.

B. COMPLIANCE WITH STANDARDS

The design of the Site drainage including storm sewer, and the water quality and detention facility are in accordance with the SDDTCM and MHFD standards.

C. VARIANCES

The following variances from the SDDTCM and MHFD standards have been requested, as part of the Phase III Drainage Report:

- Allow for retaining walls around more than 50% of the pond perimeter (SDDTCM 13.3.14) – site constraints prohibitive. – TCV24-0051 approved 1/6/2025.
- Pipe crowns not matching when the downstream pipe is larger than the upstream pipe, and drop between inverts through junction structures less than half diameter of outflow pipe when the angle between inflow and outflow pipes exceeds 45 degrees (SDDTCM 9.7.7) – constraints with elevations and slopes of connecting pipes and structures (e.g., manholes D4, D5; inlet DG1). – TCV25-0027 approved 7/10/2025.
- Less than 2' clearance (cover) from the proposed grade to the top of the storm pipe (SDDTCM 9.5.2) – constraints with elevation needed for the storm outfall pipe into Industrial Tributary and grading of the Trail (e.g., pipe O-1). Upgraded pipe to Class IV. – TCV25-0030 approved 7/10/2025.
- Orifice less than 2.5 inches diameter (SDDTCM 13.3.11) – lowest orifice is 2" diameter; else will cause drain times to exceed state statute. – TCV25-0018 approved 5/16/2025.
- Wall footing below EURV WSE (SDDTCM 13.3.14) – constraints with pond footprint – EURV WSE is off of the face of the wall but encroaches over the wall footing. – TCV25-0031 approved 7/10/2025.
- Less than 100% capture for inlet in sump condition (SDDTCM 8.5.1).
    - Inlet DE1 is in a very shallow depression, to prevent minor ponding, created by sloped down parking adjacent to Prairie Hawk Drive. It is not practical to adjust grading to eliminate this depression. The next inlet downstream, in a more defined sump, captures the bypass flow.
    - Inlet B1 is in a shallow depression created by curb at the downstream end of a parking area – bypass flow will be captured by a grate inlet downstream of the proposed rain garden, in a local depression.

  – TCV25-0028 approved 7/10/2025.

VIII. REFERENCES

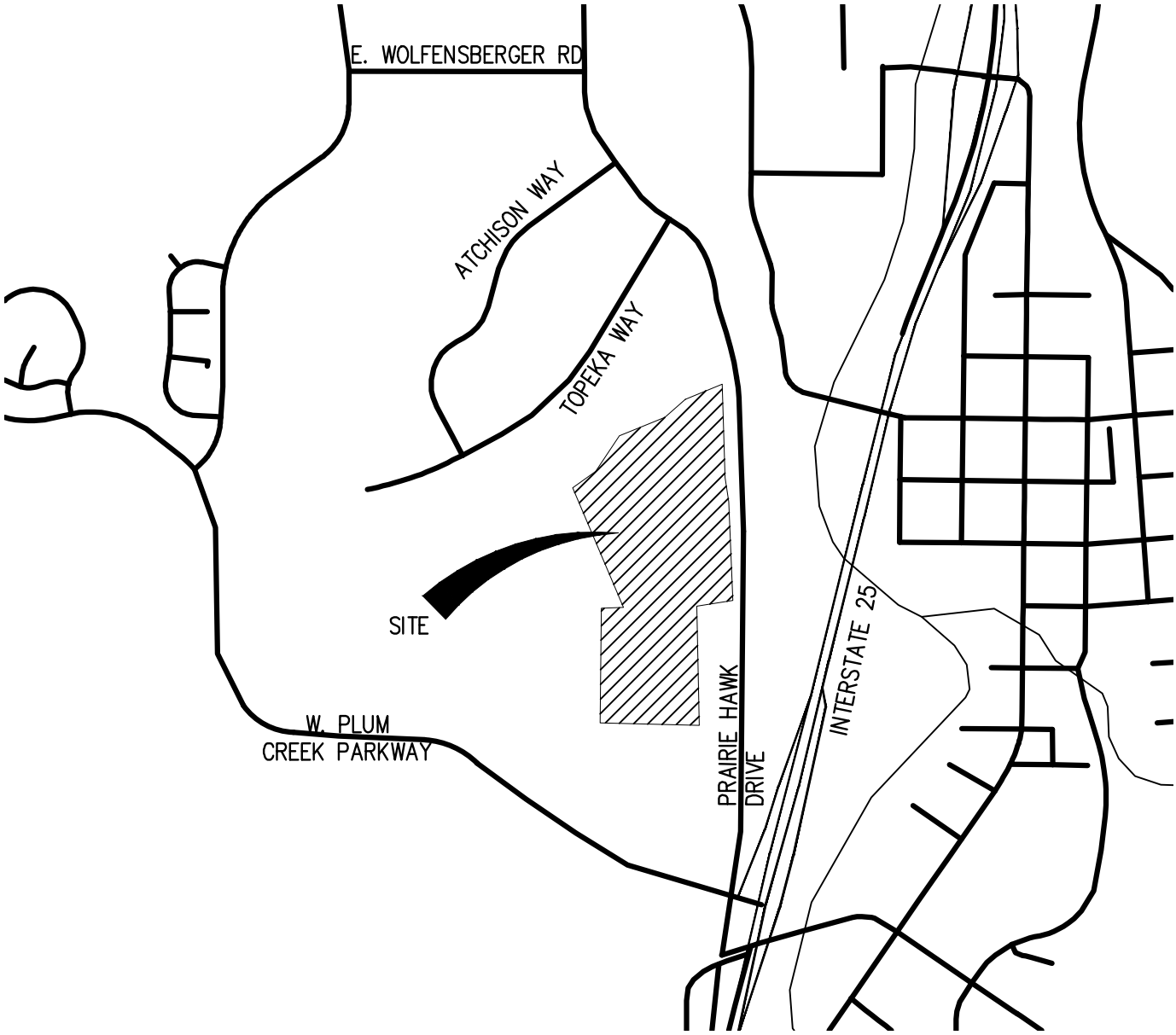
1. *Storm Drainage Design and Technical Criteria Manual* (SDDTCM), Town of Castle Rock, Colorado, updated *February 2025*.

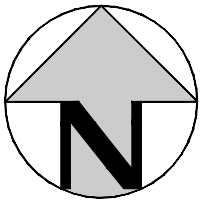
2. *Urban Storm Drainage Criteria Manual* (USDCM), Mile High Flood District (MHFD, formerly known as Urban Drainage and Flood Control District, UDFCD):
    A. *Volume 1, Management, Hydrology and Hydraulics*, *Partially updated March 2024*.
    B. *Volume 2, Structures, Storage and Recreation*, *updated* September 2017.
    C. *Volume 3, Stormwater Quality*, *Partially updated March 2024*.

3. *Omni, Industrial and Westfield Watershed Master Plan report*, CH2MHill, January 2011
4. *Industrial Tributary As-Built Conditions Hydraulic Analysis*, Olsson, December 2020.
5. *Industrial Tributary Stabilization Project Record Drawings*, Olsson, December 17, 2020.
6. *Industrial Tributary Low Flow / Trail Users Safety Memo*, Wilson & Company, January 2025.

IX. APPENDICES

APPENDIX A – VICINITY MAP & FEMA FIRMette





1000 0 1000 2000

SCALE: 1" = 1000'

Plotted: THU 08/25/22 8:26:43A By: Felipe Rocha Filepath: k:\200726\engineering\xref\vicinity map.dwg Layout: layout1

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

CONFLUENCE COMPANIES, L.L.C.

THE BRICKYARD VICINITY MAP

PROJECT #: 200726

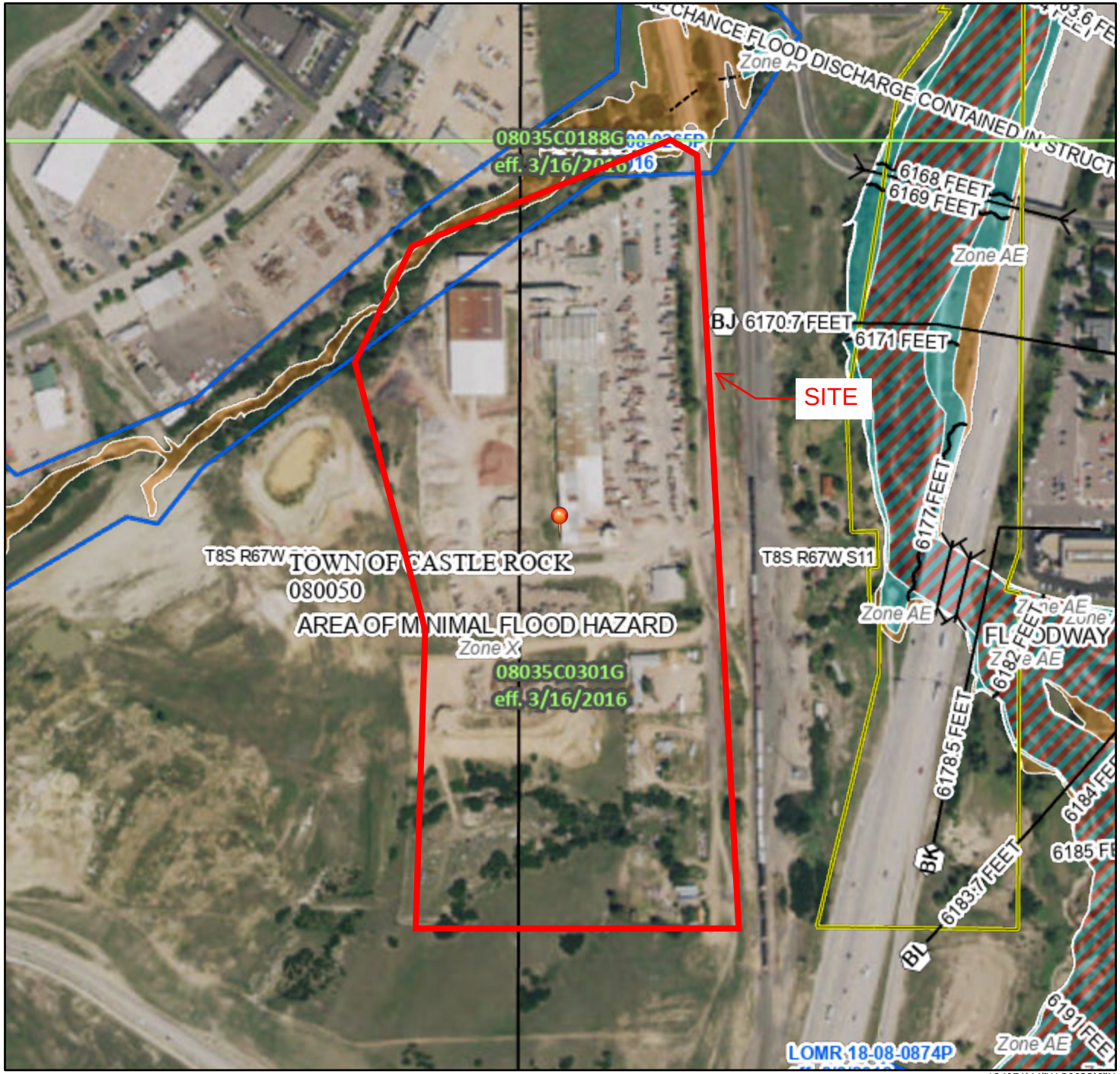
SHEET NUMBER

1

National Flood Hazard Layer FIRMette

FEMA

104°52'22"W 39°22'34"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/23/2023 at 8:55 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX B - NRCS SOILS REPORT

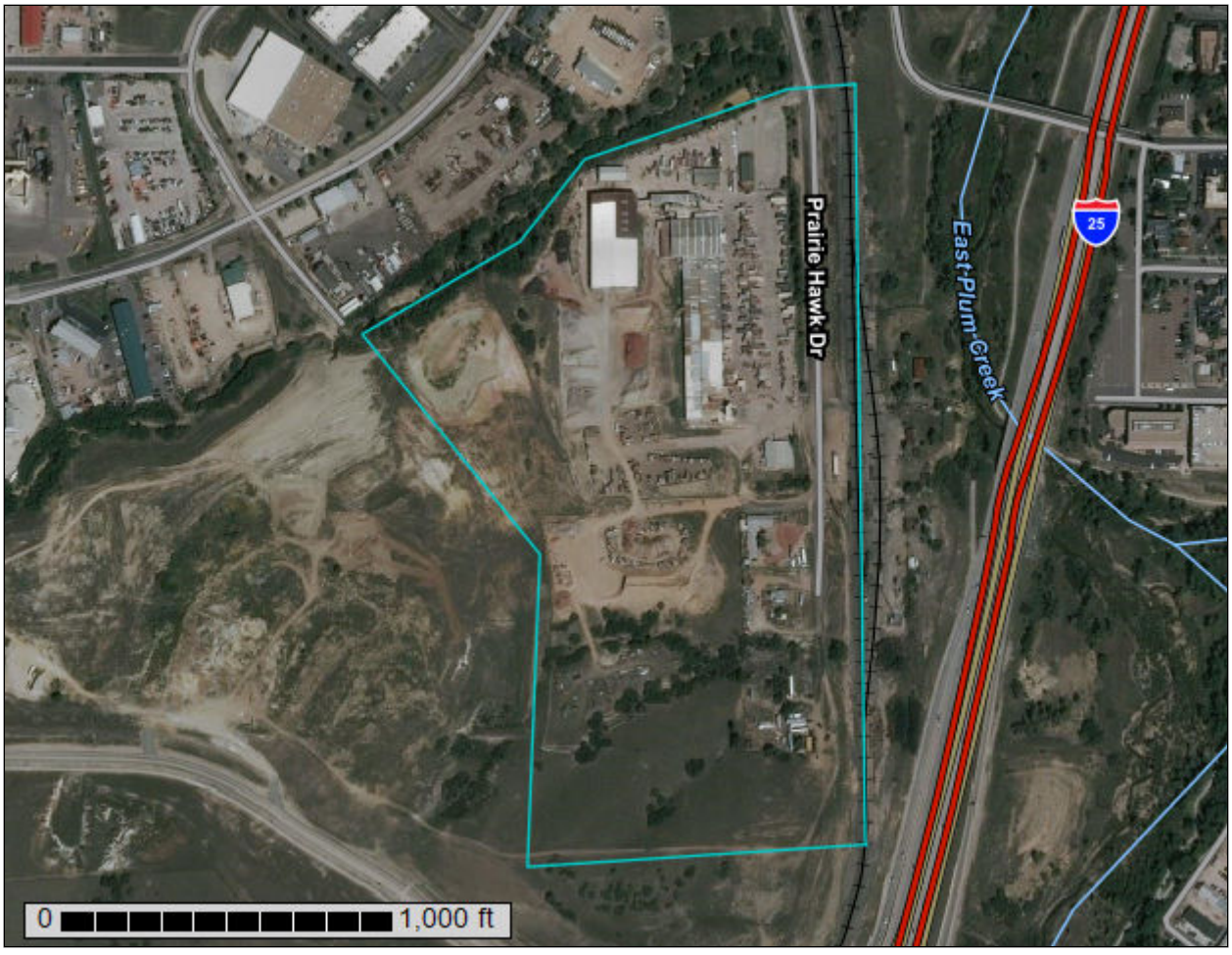
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Castle Rock Area, Colorado



October 21, 2020

Castle Rock Area, Colorado

FoD—Fondis clay loam, 3 to 9 percent slopes

Map Unit Setting

National map unit symbol: jqyp
Elevation: 5,500 to 6,800 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Fondis and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fondis

Setting

Landform: Buttes, ridges, mesas
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits over coarse-silty outwash derived from arkose

Typical profile

H1 - 0 to 7 inches: clay loam
H2 - 7 to 24 inches: clay
H3 - 24 to 60 inches: sandy clay loam

Properties and qualities

Slope: 3 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R049XY208CO - Clayey Foothill DRAFT (1-2018) MLRA 49
Hydric soil rating: No

Minor Components

Kutch

Percent of map unit: 5 percent
Hydric soil rating: No

Englewood
Percent of map unit: 5 percent
Hydric soil rating: No

Denver
Percent of map unit: 4 percent
Hydric soil rating: No

Aquic haplustolls
Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

NeE—Newlin gravelly sandy loam, 8 to 30 percent slopes

Map Unit Setting
National map unit symbol: jqzg
Elevation: 5,500 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition
Newlin and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newlin

Setting
Landform: Terraces, mesas, plateaus
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Unconformable sandy and gravelly and/or mixed source alluvium

Typical profile
H1 - 0 to 8 inches: gravelly sandy loam
H2 - 8 to 17 inches: gravelly sandy clay loam
H3 - 17 to 22 inches: gravelly sandy loam
H4 - 22 to 60 inches: very gravelly sand

Properties and qualities
Slope: 8 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R049XB215CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Bresser

Percent of map unit: 5 percent
Hydric soil rating: No

Satanta

Percent of map unit: 4 percent
Hydric soil rating: No

Stapleton

Percent of map unit: 4 percent
Hydric soil rating: No

Aquic haplustolls

Percent of map unit: 2 percent
Landform: Swales
Hydric soil rating: Yes

Custom Soil Resource Report
Map—Hydrologic Soil Group (ACME Hydrologic Soil Group)



Map Scale: 1:4,210 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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:
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 13, Jun 5, 2020

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

Date(s) aerial images were photographed: Jul 24, 2018—Nov 19, 2018

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.

Table—Hydrologic Soil Group (ACME Hydrologic Soil Group)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
FoD	Fondis clay loam, 3 to 9 percent slopes	C	2.6	4.6%
NeE	Newlin gravelly sandy loam, 8 to 30 percent slopes	B	53.1	95.4%
Totals for Area of Interest			**55.7**	**100.0%**

Rating Options—Hydrologic Soil Group (ACME Hydrologic Soil Group)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX C – HYDROLOGIC CALCULATIONS

IMPERVIOUSNESS AND RUNOFF COEFFICIENTS CALCULATIONS, PROPOSED DEVELOPMENT

CALC'D BY: GRS, VCB
DATE: 08/01/25 REVISED: < >
NRCS Hydrologic Soil Group: B

PROJECT: Brickyard
PROJ. NO: 200726

LAND USE TYPES (per MHFD Table 6-3):

STREETS	ROOFS, DRIVES, PARKING, WALKS	LANDSCAPING (NON-NATIVE PLANTINGS, MULCH, CRUSHER FINES)	UNDISTURBED / DECOMPACTED SOIL; NATIVE GRASSES	GRAVEL (NO TRAFFIC - PEDESTRIAN USE)
% Imp = 100%	% Imp = 90%	% Imp = 20%	% Imp = 5%	% Imp = 40%

ZONING:

GENERAL INDUSTRIAL
% Imp = 85%

		ACRES							RUNOFF COEFFICIENTS PER MHFD USDCM TABLE 6-4		
SUB-BASIN	Areas	STREETS	ROOFS, DRIVES, PARKING, WALKS	LANDSCAPING (NON-NATIVE PLANTINGS, MULCH, CRUSHER FINES)	UNDISTURBED / DECOMPACTED SOIL; NATIVE GRASSES	ZONING	% Imperv.	Imperv. Acres	C_2=	C_5=	C_{100}=
A1	0.69		0.69				90.00%	0.62	0.74	0.77	0.85
A2	0.24	0.08	0.06	0.10			62.79%	0.15	0.49	0.52	0.72
A3	0.09	0.05	0.001	0.03			68.81%	0.06	0.54	0.57	0.75
A4	1.14	1.02	0.05	0.07			94.64%	1.08	0.79	0.81	0.87
A5	0.56	0.52		0.04			93.97%	0.52	0.78	0.80	0.87
A6	0.19	0.07	0.06	0.06			69.63%	0.13	0.55	0.58	0.75
A7	0.85	0.73	0.01	0.10			90.32%	0.76	0.75	0.77	0.85
A8	0.69		0.09	0.60			28.67%	0.20	0.19	0.22	0.56
A9	0.59		0.59				90.00%	0.53	0.74	0.77	0.85
A10	0.54	0.16	0.16	0.21			65.36%	0.35	0.51	0.54	0.73
A11	0.32	0.30		0.02			95.86%	0.30	0.80	0.82	0.88
A14	0.52	0.40	0.02	0.10			83.87%	0.44	0.68	0.71	0.82
A15	0.64	0.53	0.001	0.11			86.75%	0.55	0.71	0.74	0.83
A16	0.36	0.25		0.11			75.44%	0.27	0.60	0.63	0.78
A17	0.35	0.09	0.09	0.17			58.62%	0.21	0.45	0.48	0.70
A18	0.75		0.75				90.00%	0.68	0.74	0.77	0.85
A19	0.50		0.50				90.00%	0.45	0.74	0.77	0.85
A20	1.29	0.43	0.29	0.57			62.57%	0.80	0.49	0.52	0.72
A21	0.70	0.29	0.17	0.24			69.94%	0.49	0.55	0.58	0.75
A21a	0.32	0.19	0.06	0.07			79.74%	0.26	0.64	0.67	0.80
A22	2.01	0.15	1.69	0.17			85.00%	1.71	0.69	0.72	0.83
A23	0.92	0.51	0.21	0.21			79.64%	0.73	0.64	0.67	0.80
A24	0.83		0.04	0.79			23.31%	0.19	0.15	0.18	0.54
A25	0.53	0.21	0.08	0.24			61.98%	0.33	0.48	0.51	0.72
A26	1.29	0.25	0.91	0.13			85.00%	1.10	0.69	0.72	0.83
A27	0.36	0.16	0.06	0.15			66.32%	0.24	0.52	0.55	0.74
A28	0.17	0.10	0.03	0.04			79.95%	0.14	0.65	0.67	0.80
A28a	0.15	0.08	0.03	0.04			75.09%	0.11	0.60	0.63	0.78
A29	0.17	0.10	0.03	0.04			80.66%	0.14	0.65	0.68	0.81
A29a	0.15	0.07	0.03	0.04			75.45%	0.11	0.60	0.63	0.78
A30	1.88	1.27	0.39	0.22			88.65%	1.66	0.73	0.75	0.84
A31	1.47	0.13	1.21	0.12			85.00%	1.25	0.69	0.72	0.83
A32	0.18		0.01				40.00%	0.07	0.29	0.32	0.61
A33	0.63	0.55	0.07	0.00			98.44%	0.62	0.82	0.85	0.89
A34	0.67	0.49	0.03	0.16			81.06%	0.54	0.66	0.68	0.81
A35	0.84		0.84				90.00%	0.76	0.74	0.77	0.85
A36	0.35	0.29	0.02	0.04			89.20%	0.31	0.73	0.76	0.85
A37	1.51		0.28	1.23			32.79%	0.49	0.23	0.26	0.58
B1	0.64	0.51		0.13			83.67%	0.54	0.68	0.71	0.82
B2	0.63	0.50		0.13			83.67%	0.53	0.68	0.71	0.82
B3	0.32	0.18	0.08	0.06			81.76%	0.26	0.66	0.69	0.81
B4	0.42	0.18	0.06	0.17			65.37%	0.27	0.51	0.54	0.73
B5	1.48		1.38	0.10			85.15%	1.26	0.70	0.72	0.83
B6	0.21	0.10	0.02	0.09			63.99%	0.13	0.50	0.53	0.73
B7	0.40	0.20	0.07	0.13			71.99%	0.29	0.57	0.60	0.76
B8	0.18	0.09	0.03	0.07			68.49%	0.12	0.54	0.57	0.75
B9	0.29	0.15	0.07	0.07			78.02%	0.23	0.63	0.66	0.79
B10	1.47		1.35	0.12			84.44%	1.24	0.69	0.72	0.82
B11	0.27	0.13	0.05	0.08			73.34%	0.19	0.58	0.61	0.77
B12	0.33	0.15	0.08	0.10			73.43%	0.25	0.59	0.61	0.77
B13	0.33	0.25	0.06	0.03			92.12%	0.31	0.76	0.79	0.86
B14	0.73	0.27	0.11	0.34			60.57%	0.44	0.47	0.50	0.71
B15	0.27	0.20	0.05	0.02			92.88%	0.25	0.77	0.79	0.86
B16	0.35	0.21	0.08	0.05			86.42%	0.30	0.71	0.73	0.83
OS1	0.09		0.03	0.06			40.64%	0.03	0.29	0.32	0.62
OS2	0.27			0.27			20.00%	0.05	0.13	0.15	0.52
TR	0.43		0.43				90.00%	0.38	0.74	0.77	0.85
OS4	5.35	0.91	0.23		4.22		24.73%	1.32	0.16	0.19	0.54
OS5	0.88				0.88		5.00%	0.04	0.03	0.03	0.45
OS6	6.44				6.44		5.00%	0.32	0.03	0.03	0.45
OS7	2.79					2.79	85.00%	2.37	0.69	0.72	0.83
OS8	0.60	0.37	0.12	0.11			83.60%	0.51	0.68	0.71	0.82
OS9	0.09	0.09					100.00%	0.09	0.84	0.86	0.90
OS10	52.20	0.93	0.29		50.98		7.17%	3.74	0.04	0.05	0.46
OS11	0.21			0.21			20.00%	0.04	0.13	0.15	0.52
OS12	3.50		0.58				15.00%	0.52	0.09	0.11	0.50

TALLY	Areas	STREETS	ROOFS, DRIVES, PARKING, WALKS	LANDSCAPING (NON-NATIVE PLANTINGS, MULCH, CRUSHER FINES)	UNDISTURBED / DECOMPACTED SOIL; NATIVE GRASSES	ZONING	% Imperv.	Imperv. Acres	C_2=	C_5=	C_{100}=
Total tributary to West Forebay (Site sub-basins A1-A36)	23.91	9.47	9.26	5.01			78.92%	18.87	0.64	0.66	0.80
Total Basin A (includes sub-basin A37 containing On-Site Pond)	25.42	9.47	9.53	6.24			80.99%	20.59	0.66	0.68	0.81
Site area to East Forebay (Sub-basins B1-B16)	8.31	3.13	3.49	1.69			79.48%	6.60	0.64	0.67	0.80
Off-site area tributary to off-site south pond (Sub-basins OS4-OS6; WQCV to be routed through East Forebay)	12.67	0.91	0.23		11.53		13.34%	1.69	0.08	0.10	0.49
Off-site area tributary to East Forebay (Sub-basins OS4-OS6, approx 1/3 of OS12; WQCV to be routed through East Forebay)	13.86	0.91	0.42		11.53		13.46%	1.86	0.08	0.10	0.49
Total tributary to East Forebay (off-site tributary areas considered for WQCV only)	34.83	4.94	4.14	1.69	23.07		29.16%	10.16	0.20	0.23	0.56
Total off-site area tributary to On-Site Detention Pond (Sub-basins OS4-OS6 & approx 1/3 OS 12, considered for WQCV only; bypass storm event flows)	13.85	0.91	0.23		11.53		12.20%	1.69	0.07	0.09	0.48
Total Site area to On-site Detention Pond (Sub-basins A1-A37, B1-B16)	33.73	12.60	13.02	7.93			76.80%	25.91	0.62	0.65	0.79
Off-site area tributary to off-site north pond (Sub-basins OS7-OS10) - discharge to Industrial Tributary	55.68	1.39	0.41	0.11	50.98	2.79	12.05%	6.71	0.07	0.09	0.48
Total from Study Area to off-site WQ (OS4-OS10)	68.35	2.30	0.64	0.11	62.51	2.79	12.29%	8.40	0.07	0.09	0.48
Total from Site undetained, not counting Prairie Hawk Drive to north (Sub-basins OS1, OS2, OS11)	0.57		0.03	0.54			23.11%	0.13	0.15	0.17	0.53

ADDITIONAL INFORMATION	Areas	STREETS	ROOFS, DRIVES, PARKING, WALKS	LANDSCAPING (NON-NATIVE PLANTINGS, MULCH, CRUSHER FINES)	UNDISTURBED / DECOMPACTED SOIL; NATIVE GRASSES	ZONING	% Imperv.	Imperv. Acres	C_2=	C_5=	C_{100}=
Sub-basins A1-A19 (CRSC ±)	9.01	4.21	3.06	1.74			81.15%	7.31	0.66	0.69	0.81
Sub-basins B5, B10 (Phase 1 ±)	2.94		2.73	0.22			84.79%	2.50	0.69	0.72	0.82
Sub-basins A22, A26, A31 (Phase 2 ±)	4.76	0.54	3.81	0.42			85.00%	4.05	0.69	0.72	0.83
Sub-basins A24, A30, A32, A33, A34, A35, A36 (Phase 3 ±)	5.38	2.59	1.40	1.21			76.10%	4.10	0.61	0.64	0.78
Total / Composite of above	22.10	7.34	11.00	3.59			81.24%	17.95	0.66	0.69	0.81

MHFD criteria per August 2018 USDCM Vol. 1, check website for updates:

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	500-Year
A	$C_A = 0.84i^{1.302}$	$C_A = 0.86i^{1.276}$	$C_A = 0.87i^{1.232}$	$C_A = 0.88i^{1.124}$	$C_A = 0.85i+0.025$	$C_A = 0.78i+0.110$	$C_A = 0.65i+0.254$
B	$C_B = 0.84i^{1.169}$	$C_B = 0.86i^{1.088}$	$C_B = 0.81i+0.057$	$C_B = 0.63i+0.249$	$C_B = 0.56i+0.328$	$C_B = 0.47i+0.426$	$C_B = 0.37i+0.536$
C/D	$C_{C/D} = 0.83i^{1.122}$	$C_{C/D} = 0.82i+0.035$	$C_{C/D} = 0.74i+0.132$	$C_{C/D} = 0.56i+0.319$	$C_{C/D} = 0.49i+0.393$	$C_{C/D} = 0.41i+0.484$	$C_{C/D} = 0.32i+0.588$

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.

CALCULATED BY: GRS, VCB
CHECKED BY: < >
DATE: 8/1/2025

Standard Form SF-1
Time of Concentration

JOB NO: 200726
PROJECT: Brickyard
REVISED: < >

SUB-BASIN DATA			INITIAL/OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc CHECK (URBANIZED BASINS)				FINAL 5 < Tc (URBAN) 10 < Tc (RURAL)	REMARKS
SUB-BASIN	AREA (AC)	Cs	LENGTH (FT)	SLOPE %	Ti (MIN)	LENGTH (FT)	SLOPE %	K	VELOCITY (FPS)	Tt (MIN)	COMPOS. Tc = Ti + Tt (MIN)	*L t*, TOTAL LENGTH	AVG SLOPE	Tc = $(26-17i)+\frac{L_t}{60(14i+9)\sqrt{S_t}}$	(MIN)	
A1	0.69	0.62	50.0	2.00	5.0	157.1	1.00	20	2.00	1.3	6.3	207.07	1.24	28.7	6.3	
A2	0.24	0.15	31.8	1.43	8.7	143.8	1.96	20	2.80	0.9	9.6	175.62	1.86	27.8	9.6	
A3	0.09	0.06	22.6	2.95	6.3	148.3	1.63	20	2.55	1.0	7.3	170.9	1.80	28.0	7.3	
A4	1.14	1.08	62.0	7.81	0.1	398.5	3.38	20	3.68	1.8	5.0	460.48	3.98	29.8	5.0	
A5	0.56	0.52	73.1	4.07	5.7	401.9	3.58	20	3.78	1.8	7.4	475.07	3.66	29.7	7.4	
A6	0.19	0.13	29.1	3.00	6.7	167.1	4.68	20	4.33	0.6	7.3	196.23	4.43	27.3	7.3	
A7	0.85	0.76	70.1	4.93	3.0	390.8	3.80	20	3.90	1.7	5.0	460.92	3.97	29.5	5.0	
A8	0.69	0.20	70.1	2.55	10.1	199.3	4.45	20	4.22	0.8	10.9	269.36	3.96	27.7	10.9	
A9	0.59	0.53	50.0	2.00	5.9	177.4	1.00	20	2.00	1.5	7.3	227.39	1.22	29.1	7.3	
A10	0.54	0.35	49.4	5.14	5.6	481.7	3.59	20	3.79	2.1	7.7	531.09	3.73	30.5	7.7	
A11	0.32	0.30	13.9	2.20	4.2	495.8	3.61	20	3.80	2.2	6.4	509.68	3.57	30.6	6.4	
A14	0.52	0.44	27.3	14.90	2.6	287.0	3.00	20	3.46	1.4	5.0	314.36	4.03	28.9	5.0	
A15	0.64	0.55	22.9	20.00	1.8	310.3	3.00	20	3.46	1.5	5.0	333.14	4.17	29.1	5.0	
A16	0.36	0.27	54.6	25.00	3.8	180.1	5.62	20	4.74	0.6	5.0	234.67	10.13	27.3	5.0	
A17	0.35	0.21	44.4	3.76	7.0	192.0	5.79	20	4.81	0.7	7.7	236.41	5.41	27.4	7.7	
A18	0.75	0.68	50.0	2.00	4.3	200.7	1.00	20	2.00	1.7	6.0	250.66	1.20	29.5	6.0	
A19	0.50	0.45	50.0	2.00	6.7	158.5	1.00	20	2.00	1.3	8.0	208.53	1.24	28.7	8.0	
A20	1.29	0.80	76.0	6.66	2.5	798.8	4.40	20	4.20	3.2	5.7	874.8	4.60	32.9	5.7	
A21	0.70	0.49	16.6	2.00	3.6	594.5	4.50	20	4.24	2.3	6.0	611.16	4.43	31.0	6.0	
A21a	0.32	0.64													5.0	MIN Tc ASSUMED
A22	2.01	0.69													5.0	MIN Tc ASSUMED
A23	0.92	0.64	44.9	2.13	4.4	294.5	1.57	20	2.51	2.0	6.3	339.37	1.64	30.2	6.3	
A24	0.83	0.15													5.0	MIN Tc ASSUMED
A25	0.53	0.48	49.1	5.54	4.5	493.2	5.00	20	4.47	1.8	6.3	542.27	5.05	29.9	6.3	
A26	1.29	0.69													5.0	MIN Tc ASSUMED
A27	0.36	0.52	29.8	2.87	4.1	376.5	5.00	20	4.47	1.4	5.5	406.27	4.84	29.0	5.5	
A28	0.17	0.65	17.3	3.00	2.4	203.2	3.83	20	3.91	0.9	5.0	220.47	3.76	27.8	5.0	
A28a	0.15	0.60													5.0	MIN Tc ASSUMED
A29	0.17	0.65	16.2	3.00	2.3	202.5	3.83	20	3.91	0.9	5.0	218.62	3.77	27.8	5.0	
A29a	0.15	0.60													5.0	MIN Tc ASSUMED
A30	1.88	0.73													5.0	MIN Tc ASSUMED
A31	1.47	0.69													5.0	MIN Tc ASSUMED
A32	0.18	0.29													5.0	MIN Tc ASSUMED
A33	0.63	0.82	25.2	3.41	1.7	174.1	1.00	20	2.00	1.5	5.0	199.21	1.30	29.0	5.0	
A34	0.67	0.66	26.3	3.27	2.8	173.6	1.00	20	2.00	1.4	5.0	199.94	1.30	29.0	5.0	
A35	0.84	0.74													5.0	MIN Tc ASSUMED
A36	0.35	0.73	32.2	1.63	2.8	174.8	4.00	20	1.79	2.0	5.0	243.6	0.99	30.3	5.0	
A37	1.51	0.23	31.1	2.30	10.6	212.5	0.80	20	2.83	4.0	14.6	744.83	2.00	34.6	14.6	
B1	0.64	0.68	69.6	2.00	5.1	675.2	2.00	20	2.83	4.0	9.1	744.83	2.00	34.6	9.1	
B2	0.63	0.68	66.9	2.00	5.0	676.6	2.00	20	2.83	4.0	9.0	743.5	2.00	34.6	9.0	
B3	0.32	0.66													5.0	MIN Tc ASSUMED
B4	0.42	0.51	39.9	4.22	4.2	330.2	4.28	20	4.14	1.3	5.5	370.01	4.27	28.8	5.5	
B5	1.48	0.70													5.0	MIN Tc ASSUMED
B6	0.21	0.50	17.7	2.59	3.4	146.3	1.32	20	2.30	1.1	5.0	164.01	1.46	28.2	5.0	
B7	0.40	0.57	19.2	3.21	2.9	146.8	1.29	20	2.27	1.1	5.0	165.99	1.51	28.3	5.0	
B8	0.18	0.54	28.0	2.00	4.3	143.0	1.16	20	2.15	1.1	5.4	171	1.30	28.3	5.4	
B9	0.29	0.63	28.8	2.00	3.7	143.0	1.16	20	2.15	1.1	5.0	171.76	1.30	28.3	5.0	
B10	1.47	0.69													5.0	MIN Tc ASSUMED
B11	0.27	0.58													5.0	MIN Tc ASSUMED
B12	0.33	0.59													5.0	MIN Tc ASSUMED
B13	0.33	0.76	17.0	2.76	1.8	337.8	1.09	20	2.09	2.7	5.0	354.8	1.17	31.8	5.0	
B14	0.73	0.47	55.5	5.80	4.8	406.9	1.33	20	2.30	2.9	7.8	462.4	1.86	32.3	7.8	
B15	0.27	0.77	32.0	2.00	2.7	222.0	1.15	20	2.14	1.7	5.0	254	1.26	29.7	5.0	
B16	0.35	0.71	29.0	2.00	3.1	153.5	1.30	20	2.28	1.1	5.0	182.5	1.41	28.3	5.0	
OS1	0.09	0.29													5.0	MIN Tc ASSUMED
OS2	0.27	0.13													5.0	MIN Tc ASSUMED
TR	0.43	0.74													5.0	MIN Tc ASSUMED
OS4	5.35	0.16	29.5	2.61	6.8	850.7	2.15	20	2.93	4.8	11.6	880.2	2.16	36.6	11.6	
OS5	0.88	0.03	51.7	25.01	4.8	461.0	2.95	15	2.58	3.0	7.8	512.7	5.17	30.9	10.0	
OS6	6.44	0.03	149.4	24.79	8.3	676.8	1.89	15	2.06	5.5	13.7	826.2	6.03	35.1	13.7	
OS7	2.79	0.69	51.7	25.01	1.8	552.0	1.57	15	1.88	4.9	6.7	603.7	3.57	34.2	10.0	
OS8	0.60	0.68	29.5	2.61	3.0	588.2	3.15	20	3.55	2.8	5.8	617.7	3.12	31.9	10.0	
OS9	0.09	0.84	28.0	1.39	2.3	188.3	5.01	20	4.48	0.7	5.0	216.3	4.54	27.4	10.0	
OS10	52.20	0.04	500.0	33.00	13.6	2505.0	6.32	15	3.77	11.1	24.6	3005	10.76	44.0	24.6	large, nearly all undeveloped sub-basin
OS11	0.21	0.13	82.9	18.99	6.1	0.0	18.99	20	8.71	0.0	6.1	82.901	18.99	26.0	6.1	
						348.7	5.75	20	4.79	1.2						add'l travel time
OS12	3.50	0.09													5.0	MIN Tc ASSUMED

1-HR Rainfall

Rainfall Values for the Town of Castle Rock per Storm Drainage Design and Technical Criteria Manual (SDDTCM):

Return Interval (YR)	1-hour Rainfall	
WQ	**0.60**	(WQ per MHFD USDCM Vol 3, p 1-9 [29 of 577])
1	**unknown**	
2	**1.06**	
5	**1.43**	
10	**1.66**	
25	**unknown**	
50	**2.26**	
100	**2.60**	
500	**unknown**	

For reference, Site Specific (NOAA Atlas 14 online interactive map):

Return Interval (YR)	1-hour Rainfall	
WQ	0.60	
1	0.684	
2	0.850	
5	1.13	
10	1.38	
25	1.74	(used in MHFD-Detention)
50	2.02	
100	2.32	
500	3.07	(used in MHFD-Detention)

CALCULATED BY: GRS, VCB
DATE: 8/1/2025
CHECKED BY: < >
PROJECT MANAGER: JDO

Standard Form SF-2 (modified)
Storm Drainage System Design
(Rational Method Procedure)
Proposed Development

JOB NO: 200726
PROJECT: Brickyard
DESIGN STORM: 5 YR

SUB-BASIN(s)	DESIGN POINT (DP)	DIRECT RUNOFF								TOTAL RUNOFF					PIPE (for preliminary pipe design and travel time)							REMARKS
		AREA (AC)	RUNOFF COEFF	IMPERVIOUSNESS (%)	SOIL TYPE	T_c (min)	C x A (AC)	I (IN/HR)	Q (CFS)	Σ Area (AC)	T_c (MIN)	Σ(C x A) (AC)	I (IN/HR)	Q (CFS)	DESIGN FLOW (CFS)	SLOPE (%)	PIPE SIZE (IN)	CAPACITY AT 80% (CFS)	LENGTH (FT)	VELOCITY (FPS)	T_t (min)	
A1		0.69	0.77	0.90	B	6.27	0.53	4.55	2.39						2.39	0.50	15	4.14	57.2	3.4	0.28	roof and landscape drain connections
A2		0.24	0.52	0.63	B	9.57	0.12	3.94	0.49													direct to curb inlet
A1 + A2	1									0.93	9.57	0.65	3.94	2.56	2.56	0.50	18	6.74	36.3	3.8	0.16	
A3		0.09	0.57	0.69	B	7.29	0.05	4.34	0.21													direct to curb inlet
DP 1 + A3	2									1.01	9.73	0.70	3.91	2.74	2.74	0.81	18	8.56	103.8	4.8	0.36	
A4		1.14	0.81	0.95	B	5.00	0.92	4.85	4.48													direct to curb inlet
DP 2 + A4	3									2.15	10.08	1.62	3.86	6.26	6.26	2.17	18	14.04	193.5	7.9	0.41	
A5		0.56	0.80	0.94	B	7.43	0.45	4.31	1.93													direct to curb inlet
DP 3 + A5	4									2.71	10.49	2.07	3.80	7.87	7.87	2.51	18	16.64	81.4	9.4	0.14	
A6		0.19	0.58	0.70	B	7.30	0.11	4.34	0.47													direct to curb inlet
A7		0.85	0.77	0.90	B	5.00	0.65	4.85	3.16													direct to curb inlet
DP 5 + A7	6									1.33	7.79	0.99	4.24	4.18	4.18	3.31	18	17.34	69.0	9.8	0.12	
DP 4 + DP 6	7									4.04	10.63	3.06	3.78	11.54	11.54	2.75	24	34.03	75.7	10.8	0.12	
A8		0.69	0.22	0.29	B	10.92	0.15	3.73	0.57						0.57	0.50	18	6.74	25.0	3.8	0.11	to landscape drains to storm
A9		0.59	0.77	0.90	B	7.33	0.45	4.33	1.96						1.96	0.67	15	4.80	81.9	3.9	0.35	roof drain connection
A6 + 1/2 A9	5									0.48	7.68	0.33	4.26	1.42	1.42	1.87	18	13.03	47.4	7.4	0.11	total to DP 5
DP 7 + A8 + A9	8									5.32	10.92	3.66	3.73	13.68	13.68	2.30	24	31.12	396.9	9.9	0.67	
A10		0.54	0.54	0.65	B	7.70	0.29	4.26	1.24													direct to curb inlet
A10 + 1/3 A19										0.71	8.01	0.42	4.20	1.76	1.76	0.99	18	9.48	27.3	5.4	0.08	
A11		0.32	0.82	0.96	B	6.36	0.26	4.53	1.18													direct to curb inlet
A10 + 1/3 A19 + A11	9									1.02	8.09	0.68	4.19	2.85	2.85	3.16	18	16.94	5.7	9.6	0.01	
DP 8 + 2/3 A19 + DP 9	10									6.67	11.59	4.60	3.64	16.75	16.75	1.40	30	44.03	40.7	9.0	0.08	
A14		0.52	0.71	0.84	B	5.00	0.37	4.85	1.81						1.81	2.11	18	13.83	194.3	7.8	0.41	direct to curb inlet
A15		0.64	0.74	0.87	B	5.00	0.47	4.85	2.28													direct to curb inlet
A15 + 1/2 A18										1.01	6.11	0.76	4.59	3.48	3.48	1.22	18	10.53	19.7	6.0	0.06	
A14 + A15 + 1/2 A18	12									1.54	6.17	1.13	4.57	5.17	5.17	2.59	18	15.34	170.5	8.7	0.33	
A16		0.36	0.63	0.75	B	5.00	0.23	4.85	1.11													direct to curb inlet
A17		0.35	0.48	0.59	B	7.69	0.17	4.26	0.72													direct to curb inlet
A16 + A17										0.71	7.69	0.40	4.26	1.70								total direct to curb inlet
A18		0.75	0.77	0.90	B	6.00	0.58	4.61	2.67						2.67	7.00	10	5.26	64.0	9.6	0.11	roof drain connection
A16 + A17 + 1/2 A18	13									1.09	7.69	0.69	4.26	2.93	2.93	2.40	18	14.76	18.8	8.4	0.04	
DP 12 + D P13	14									2.63	7.73	1.82	4.25	7.74	7.74	2.51	18	15.10	18.3	8.5	0.04	
A19		0.50	0.77	0.90	B	8.01	0.38	4.20	1.61						1.61	0.50	15	4.14	132.7	3.4	0.65	roof drain connection
A20		1.29	0.52	0.63	B	5.69	0.66	4.68	3.11													direct to curb inlet
A21		0.70	0.58	0.70	B	5.95	0.41	4.62	1.89						1.89	2.02	18	13.54	27.7	7.7	0.06	direct to curb inlet
A20 + A21	16									1.99	6.01	1.07	4.61	4.94	4.94	1.87	18	13.03	10.7	7.4	0.02	
DP 14 + 1/2 A19 + DP 16	17									4.87	8.66	3.08	4.08	12.59	12.59	2.68	30	60.92	99.6	12.4	0.13	
DP 10 + D P17	18									11.54	11.67	7.68	3.63	27.91	27.91	0.50	36	42.79	68.7	6.1	0.19	
A21a		0.32	0.67	0.80	B	5.00	0.22	4.85	1.06													direct to curb inlet
DP 18 + A21a	18a									11.86	11.85	7.90	3.61	28.50	28.50	0.50	36	42.79	294.8	6.1	0.81	
A22		2.01	0.72	0.85	B	5.00	1.45	4.85	7.02						7.02	2.15	18	13.97	66.6	7.9	0.14	approx half is assumed to be collected in roof drains to connect directly to storm sewer system; stubout to subbasin A22
DP 18a + A22	19									13.87	12.67	9.35	3.51	32.77	32.77	0.50	42	64.54	249.1	6.7	0.62	
A23		0.92	0.67	0.80	B	6.31	0.62	4.54	2.81						2.81	2.20	18	14.13	6.8	8.0	0.01	direct to curb inlet
DP 19 + A23	20									14.79	13.28	9.96	3.43	34.21	34.21	0.50	42	64.54	33.8	6.7	0.08	
A24		0.83	0.18	0.23	B	5.00	0.15	4.85	0.71						0.71	5.20	18	21.73	176.9	12.3	0.24	to swale to A32 to rain garden
A25		0.53	0.51	0.62	B	6.34	0.27	4.54	1.23						1.23	2.00	18	14.86	27.5	8.4	0.05	direct to curb inlet
A26		1.29	0.72	0.85	B	5.00	0.93	4.85	4.50						4.50	1.68	18	12.35	26.8	7.0	0.06	
A27		0.36	0.55	0.66	B	5.49	0.20	4.73	0.94													direct to curb inlet
A25 + A27	21									0.89	6.39	0.47	4.52	2.12	2.12	2.34	18	14.58	53.1	8.2	0.11	total to DP 21
A26 + DP 21	22									2.18	6.50	1.40	4.50	6.29	6.29	1.44	18	11.44	139.4	6.5	0.36	

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Standard Form SF-2 (modified)
Storm Drainage System Design
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Proposed Development

JOB NO: 200726
PROJECT: Brickyard
DESIGN STORM: **5** YR

SUB-BASIN(s)	DESIGN POINT (DP)	DIRECT RUNOFF AREA (AC)	RUNOFF COEFF	IMPERVIOUSNESS (%)	SOIL TYPE	T_c (min)	C x A (AC)	I (IN/HR)	Q (CFS)	TOTAL RUNOFF Σ Area (AC)	T_c (MIN)	Σ(C x A) (AC)	I (IN/HR)	Q (CFS)	PIPE (for preliminary pipe design and travel time) DESIGN FLOW (CFS)	SLOPE (%)	PIPE SIZE (IN)	CAPACITY AT 80% (CFS)	LENGTH (FT)	VELOCITY (FPS)	T_t (min)	REMARKS
A28		0.17	0.67	0.80	B	5.00	0.11	4.85	0.56						0.56	1.75	18	12.61	24.1	7.1	0.06	direct to valley inlet
A29		0.17	0.68	0.81	B	5.00	0.11	4.85	0.55													direct to valley inlet
DP 22 + A28 + A29	23									2.52	6.86	1.63	4.43	7.20	7.20	2.34	18	14.58	87.6	8.2	0.18	
A31		1.47	0.72	0.85	B	5.00	1.06	4.85	5.13						5.13	3.74	18	18.43	19.0	10.4	0.03	
DP 23 + A31	24									3.98	7.03	2.68	4.39	11.78	11.78	3.49	24	38.34	50.6	12.2	0.07	
A28a		0.15	0.63	0.75	B	5.00	0.10	4.85	0.46						0.46	5.74	18	22.83	27.3	12.9	0.04	direct to curb inlet
A29a		0.15	0.63	0.75	B	5.00	0.09	4.85	0.45						0.45	0.90	18	9.04	43.3	5.1	0.14	direct to curb inlet
35% A31 + A29a										0.66	5.00	0.46	4.85	2.24	2.24	3.32	36	110.25	75.7	15.6	0.08	total to curb inlet
DP 24 + A28a + A29a	24a									4.28	7.10	2.87	4.37	12.56	12.56	3.32	36	110.25	75.7	15.6	0.08	
DP 20 + DP 24a	25									19.07	13.37	12.84	3.42	43.94	43.94	0.50	42	64.54	135.2	6.7	0.34	
A30		1.88	0.75	0.89	B	5.00	1.42	4.85	6.87						6.87	6.37	18	24.05	36.9	13.6	0.05	direct to curb inlet
A32		0.18	0.32	0.40	B	5.00	0.06	4.85	0.28													to rain garden
A24 + A32	26									1.02	5.00	0.21	4.85	0.99	0.99	0.52	18	6.87	23.2	3.9	0.10	total to rain garden & overflow inlet
A30 + DP 26	26a									2.89	5.10	1.62	4.83	7.82	7.82	0.50	24	14.51	118.7	4.6	0.43	total to DP 26a
A33		0.63	0.85	0.98	B	5.00	0.53	4.85	2.58						2.58	0.99	18	9.48	34.3	5.4	0.11	to roof drains to DP 27
A34		0.67	0.68	0.81	B	5.00	0.46	4.85	2.23													direct to curb inlet (sump)
DP 25 + 1/2 A33 + A34	27									20.06	13.70	13.56	3.38	45.90	45.90	0.90	42	86.59	243.1	9.0	0.45	total to DP 27
A35		0.84	0.77	0.90	B	5.00	0.65	4.85	3.13						3.13	11.32	18	32.06	48.8	18.1	0.04	to roof drains to DP 28
A36		0.35	0.76	0.89	B	5.00	0.27	4.85	1.29													direct to curb inlet (sump)
DP 26a + DP 27 + A35 + A36	28									24.14	14.16	16.09	3.34	**53.67**	53.67	0.50	48	92.14	23.8	7.3	0.05	**total to west forebay**
A37		1.51	0.26	0.33	B	14.56	0.39	3.29	1.27													sub-basin containing detention pond
B1		0.64	0.71	0.84	B	9.05	0.46	4.02	1.83						1.83	2.74	24	33.97	35.3	10.8	0.05	direct to curb inlet
OS11		0.21	0.15	0.20	B	6.08	0.03	4.59	0.15												1.21	drains offsite to east
off-site south pond out									1.32						1.32	3.00	24	35.56	838.0	11.3	1.23	release from MHFD-Detention - added to system downstream
OS12		3.50	0.11	0.15	B	5.00	0.38	4.85	1.85						1.85	0.50	24	14.51	26.3	4.6	0.10	Offsite future development; evalutated under existing conditions;
35% of OS12		1.22	0.11	0.15	B	5.00	0.13	4.85	0.65													approx 65% drains to ex culvert to east; assumed future developent
65% of OS12		2.27	0.11	0.15	B	5.00	0.25	4.85	1.20													will require on-site detention
OS11 + 65% OS12										2.49	7.29	0.28	4.34	1.21								total to east to ex culvert
B2		0.63	0.71	0.84	B	8.96	0.45	4.03	1.80													direct to curb inlet
35% OS12 + B2										1.85	8.96	0.58	4.03	2.34								total direct to curb inlet
off-site south pond out + B1 + 35% OS12 + B2	31									2.50	24.64	1.04	2.51	3.92	3.92	0.49	24	14.37	34.5	4.6	0.13	total to DP 31, including discharge from off-site south pond
B3		0.32	0.69	0.82	B	5.00	0.22	4.85	1.08													direct to curb inlet
B4		0.42	0.54	0.65	B	5.55	0.23	4.72	1.07						1.07	4.58	18	20.39	39.4	11.5	0.13	direct to curb inlet
B5		1.48	0.72	0.85	B	5.00	1.07	4.85	5.17						5.17	1.00	18	9.53	15.1	5.4	0.05	roof drain connection
B3 + B5	32									1.80	5.05	1.29	4.84	6.24	6.24	0.50	24	14.51	43.3	4.6	0.16	
DP31 + B4	33									2.91	24.77	1.26	2.51	4.48	4.48	0.75	30	32.23	46.6	6.6	0.12	
DP32 + DP 33	34									4.72	24.88	2.55	2.50	7.69	7.69	0.51	30	26.57	76.1	5.4	0.23	total to DP 34, including discharge from off-site south pond
B6		0.21	0.53	0.64	B	5.00	0.11	4.85	0.53						0.53	0.50	18	6.74	49.7	3.8	0.22	direct to curb inlet
B7		0.40	0.60	0.72	B	5.00	0.24	4.85	1.18						1.18	1.00	18	9.53	15.7	5.4	0.05	direct to curb inlet
DP 34 + B6 + B7	35									5.32	25.12	2.90	2.49	8.54	8.54	0.70	30	31.13	381.4	6.3	1.00	total to DP 35, including discharge from off-site south pond
B15		0.27	0.79	0.93	B	5.00	0.21	4.85	1.03													direct to curb inlet in B8
B16		0.35	0.73	0.86	B	5.00	0.25	4.85	1.23						1.23	1.44	18	11.44	18.8	6.5	0.05	direct to curb inlet
DP 35 + B16	36									5.67	26.12	3.16	2.43	8.99	8.99	0.50	36	42.79	96.2	6.1	0.26	total to DP 36, including discharge from off-site south pond
B8		0.18	0.57	0.68	B	5.42	0.10	4.75	0.48													direct to curb inlet
B15 + B8	36a									0.45	6.11	0.31	4.59	1.44	1.44	0.51	18	6.81	35.3	3.9	0.15	total to DP 36
B9		0.29	0.66	0.78	B	5.00	0.19	4.85	0.92													direct to curb inlet
DP 36a + B9	37									0.74	6.26	0.50	4.55	2.29	2.29	0.52	18	6.87	7.8	3.9	0.03	
DP 36 + DP 37	38									6.41	26.39	3.66	2.42	10.17	10.17	0.50	36	42.79	73.6	6.1	0.20	total to DP 38, including discharge from off-site south pond
B10		1.47	0.72	0.84	B	5.00	1.05	4.85	5.09						5.09	3.35	18	17.44	13.2	9.9	0.02	roof drain connection
B11		0.27	0.61	0.73	B	5.00	0.16	4.85	0.79						0.79	0.90	18	9.04	43.3	5.1	0.14	direct to curb inlet

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Standard Form SF-2 (modified)
Storm Drainage System Design
(Rational Method Procedure)
Proposed Development

JOB NO: 200726
PROJECT: Brickyard
DESIGN STORM: **5** YR

SUB-BASIN(s)	DESIGN POINT (DP)	DIRECT RUNOFF								TOTAL RUNOFF					PIPE (for preliminary pipe design and travel time)							REMARKS
		AREA (AC)	RUNOFF COEFF	IMPERVIOUSNESS (%)	SOIL TYPE	T_c (min)	C x A (AC)	I (IN/HR)	Q (CFS)	Σ Area (AC)	T_c (MIN)	Σ(C x A) (AC)	I (IN/HR)	Q (CFS)	DESIGN FLOW (CFS)	SLOPE (%)	PIPE SIZE (IN)	CAPACITY AT 80% (CFS)	LENGTH (FT)	VELOCITY (FPS)	T_t (min)	
B12		0.33	0.61	0.73	B	5.00	0.21	4.85	1.00													direct to curb inlet
B10 + B11 + B12	39									2.07	5.14	1.42	4.81	6.83	6.83	3.24	18	17.15	51.6	9.7	0.09	total to DP 39
DP 38 + DP 39	40									8.47	26.59	5.08	2.41	13.54	13.54	0.50	36	42.79	197.8	6.1	0.54	total to DP 40, including discharge from off-site south pond
1/2 A33 + DP 40	40a									8.79	27.13	5.34	2.38	14.03	14.03	0.90	42	86.59	227.1	9.0	0.42	total to DP 40a
B13		0.33	0.79	0.92	B	5.00	0.26	4.85	1.27						1.27	0.58	18	7.26	65.3	4.1	0.27	direct to curb inlet
B14		0.73	0.50	0.61	B	7.75	0.36	4.25	1.54													direct to curb inlet
B13 + B14	41									1.06	7.75	0.62	4.25	2.65	2.65	0.85	18	8.79	29.3	5.0	0.10	
DP 40a + DP 41	42									9.85	27.55	5.97	2.36	**15.39**	15.39	0.62	48	102.61	8.0	8.2	0.02	**total to east forebay**
DP 28 + DP 42 + A37	43									35.50	27.57	22.45	2.36	**54.23**	54.23	0.50	48	92.14	72.1	7.3	0.16	**total to on-site pond; emergency overflow**
ON-SITE POND OUTFALL	44								7.03						7.03	1.64	30	47.66	109.1	9.7	0.19	flow from MHFD-Detention Routed Hydrograph Results
OS1		0.09	0.32	0.41	B	5.00	0.03	4.85	0.13						0.13	2.00	8	1.55	84.0	4.4	0.32	Site area drains off undetained (to landscape drain to Industrial Tributary)
OS2		0.27	0.15	0.20	B	5.00	0.04	4.85	0.20						0.20	100.00	4	1.73	6.2	19.8	0.01	Site area drains off undetained (connects to outfall from on-site pond)
TR		0.43	0.77	0.90	B	5.00	0.33	4.85	1.59													off-site regional trail along Industrial tributary
OS4	O1	5.35	0.19	0.25	B	11.61	1.01	3.64	3.67						3.67	0.73	24	17.53	409.1	5.6	1.22	direct to off-site curb inlet, to OS6
OS5		0.88	0.03	0.05	B	10.00	0.03	3.87	0.11													to swale to OS6
OS4 + OS5	O2									6.23	12.83	1.04	3.49	3.61								
OS6		6.44	0.03	0.05	B	13.74	0.21	3.38	0.72													to swale to off-site south pond
DP O2 + OS6	O3									12.67	18.31	0.24	2.94	0.71								total to off-site south pond
OS7	O4	2.79	0.72	0.85	B	10.00	2.01	3.87	7.78						7.78	0.50	18	6.74	187.0	3.8	0.82	to swale & landscpe drains, piped to off-site north pond
OS8		0.60	0.71	0.84	B	10.00	0.43	3.87	1.65													direct to off-site curb inlet, piped to off-site north pond
OS7 + OS8	O5									3.40	10.82	2.44	3.75	9.15	9.15	1.00	18	9.53	37.7	5.4	0.12	
OS9		0.09	0.86	1.00	B	10.00	0.07	3.87	0.29													
DP O5 + OS9	O6									3.48	10.93	2.51	3.73	9.39	9.39	1.00	24	20.52	85.3	6.5	0.22	total to south forebay of off-site north pond
OS10		52.20	0.05	0.07	B	24.64	2.55	2.51	6.41													to west forebay of north off-site pond
DP O6 + OS10	O7									55.68	24.64	5.07	2.51	12.73								total to off-site north pond

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Proposed Development

JOB NO: 200726
PROJECT: Brickyard
DESIGN STORM: **100** YR

SUB-BASIN(s)	DESIGN POINT (DP)	DIRECT RUNOFF								TOTAL RUNOFF					PIPE (for preliminary pipe design and travel time)							REMARKS
		AREA (AC)	RUNOFF COEFF	IMPERVIOUSNESS (%)	SOIL TYPE	T_c (min)	C x A (AC)	I (IN/HR)	Q (CFS)	Σ Area (AC)	T_c (MIN)	Σ(C x A) (AC)	I (IN/HR)	Q (CFS)	DESIGN FLOW (CFS)	SLOPE (%)	PIPE SIZE (IN)	CAPACITY, FULL (CFS)	LENGTH (FT)	VELOCITY (FPS)	T_t (min)	
A1		0.69	0.85	0.90	B	6.27	0.58	8.27	4.82						4.82	0.50	15	4.57	57.2	3.7	0.26	roof and landscape drain connections
A2		0.24	0.72	0.63	B	9.57	0.17	7.16	1.24													direct to curb inlet
A1 + A2	1									0.93	9.57	0.76	7.16	5.41	5.41	0.50	18	7.43	36.3	4.2	0.14	
A3		0.09	0.75	0.69	B	7.29	0.06	7.89	0.51													direct to curb inlet
DP 1 + A3	2									1.01	9.71	0.82	7.11	5.84	5.84	0.81	18	9.44	103.8	5.3	0.32	
A4		1.14	0.87	0.95	B	5.00	0.99	8.82	8.76													direct to curb inlet
DP 2 + A4	3									2.15	10.04	1.81	7.02	12.74	12.74	2.17	18	15.47	193.5	8.8	0.37	
A5		0.56	0.87	0.94	B	7.43	0.48	7.84	3.79													direct to curb inlet
DP 3 + A5	4									2.71	10.40	2.30	6.92	15.91	15.91	2.51	18	16.64	81.4	9.4	0.14	
A6		0.19	0.75	0.70	B	7.30	0.14	7.88	1.10													direct to curb inlet
A7		0.85	0.85	0.90	B	5.00	0.72	8.82	6.34													direct to curb inlet
DP 5 + A7	6									1.33	7.75	1.11	7.73	8.57	8.57	3.31	18	19.11	69.0	10.8	0.11	
DP 4 + DP 6	7									4.04	10.55	3.41	6.89	23.47	23.47	2.75	24	37.52	75.7	11.9	0.11	
A8		0.69	0.56	0.29	B	10.92	0.39	6.79	2.63						2.63	0.50	18	7.43	25.0	4.2	0.10	to landscape drains to storm
A9		0.59	0.85	0.90	B	7.33	0.50	7.87	3.94						3.94	0.67	15	5.29	81.9	4.3	0.32	roof drain connection
A6 + 1/2 A9	5									0.48	7.65	0.39	7.76	3.03	3.03	1.87	18	14.36	47.4	8.1	0.10	total to DP 5
DP 7 + A8 + A9	8									5.32	10.92	4.30	6.79	29.16	29.16	2.30	24	34.31	396.9	10.9	0.61	
A10		0.54	0.73	0.65	B	7.70	0.40	7.74	3.06													direct to curb inlet
A10 + 1/3 A19										0.71	8.01	0.54	7.64	4.10	4.10	0.99	18	10.45	27.3	5.9	0.08	
A11		0.32	0.88	0.96	B	6.36	0.28	8.24	2.29													direct to curb inlet
A10 + 1/3 A19 + A11	9									1.02	8.09	0.82	7.61	6.20	6.20	3.16	18	18.67	5.7	10.6	0.01	
DP 8 + 2/3 A19 + DP 9	10									6.67	11.53	5.39	6.64	35.80	35.80	1.40	30	48.53	40.7	9.9	0.07	
A14		0.52	0.82	0.84	B	5.00	0.43	8.82	3.79						3.79	2.11	18	15.25	194.3	8.6	0.38	direct to curb inlet
A15		0.64	0.83	0.87	B	5.00	0.53	8.82	4.68													direct to curb inlet
A15 + 1/2 A18										1.01	6.10	0.85	8.34	7.10	7.10	1.22	18	11.60	19.7	6.6	0.05	
A14 + A15 + 1/2 A18	12									1.54	6.15	1.28	8.32	10.66	10.66	2.59	18	16.91	170.5	9.6	0.30	
A16		0.36	0.78	0.75	B	5.00	0.28	8.82	2.49													direct to curb inlet
A17		0.35	0.70	0.59	B	7.69	0.25	7.75	1.91													direct to curb inlet
A16 + A17										0.71	7.69	0.53	7.75	4.10								total direct to curb inlet
A18		0.75	0.85	0.90	B	6.00	0.64	8.38	5.37						5.37	7.00	10	5.80	64.0	10.6	0.10	roof drain connection
A16 + A17 + 1/2 A18	13									1.09	7.69	0.85	7.75	6.58	6.58	2.40	18	16.27	18.8	9.2	0.03	
DP 12 + D P13	14									2.63	7.72	2.13	7.74	16.48	16.48	2.51	18	16.64	18.3	9.4	0.03	
A19		0.50	0.85	0.90	B	8.01	0.42	7.64	3.24						3.24	0.50	15	4.57	132.7	3.7	0.59	roof drain connection
A20		1.29	0.72	0.63	B	5.69	0.93	8.51	7.88													direct to curb inlet
A21		0.70	0.75	0.70	B	5.95	0.53	8.40	4.45						4.45	2.02	18	14.93	27.7	8.4	0.05	direct to curb inlet
A20 + A21	16									1.99	6.01	1.45	8.38	12.19	12.19	1.87	18	14.36	10.7	8.1	0.02	
DP 14 + 1/2 A19 + DP 16	17									4.87	8.60	3.80	7.45	28.28	28.28	2.68	30	67.15	99.6	13.7	0.12	
DP 10 + D P17	18									11.54	11.60	9.19	6.62	60.86	60.86	0.50	36	47.16	68.7	6.7	0.17	
A21a		0.32	0.80	0.80	B	5.00	0.26	8.82	2.29													direct to curb inlet
DP 18 + A21a	18a									11.86	11.77	9.45	6.58	62.20	62.20	0.50	36	47.16	294.8	6.7	0.74	
A22		2.01	0.83	0.85	B	5.00	1.66	8.82	14.62						14.62	2.15	18	15.40	66.6	8.7	0.13	approx half is assumed to be collected in roof drains to connect directly to storm sewer system; stubout to subbasin A22
DP 18a + A22	19									13.87	12.50	11.11	6.41	71.22	71.22	0.50	42	71.14	249.1	7.4	0.56	
A23		0.92	0.80	0.80	B	6.31	0.74	8.26	6.08													direct to curb inlet
DP 19 + A23	20									14.79	13.07	11.85	6.29	74.49	74.49	0.50	42	71.14	33.8	7.4	0.08	
A24		0.83	0.54	0.23	B	5.00	0.44	8.82	3.92						3.92	5.20	18	23.95	176.9	13.6	0.22	to swale to A32 to rain garden
A25		0.53	0.72	0.62	B	6.34	0.38	8.25	3.13						3.13	2.00	18	14.86	27.5	8.4	0.05	direct to curb inlet
A26		1.29	0.83	0.85	B	5.00	1.06	8.82	9.38						9.38	1.68	18	13.62	26.8	7.7	0.06	
A27		0.36	0.74	0.66	B	5.49	0.27	8.60	2.29													direct to curb inlet
A25 + A27	21									0.89	6.39	0.65	8.22	5.32	5.32	2.34	18	16.07	53.1	9.1	0.10	total to DP 21
A26 + DP 21	22									2.18	6.49	1.71	8.19	14.00	14.00	1.44	18	12.61	139.4	7.1	0.33	

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SUB-BASIN(s)	DESIGN POINT (DP)	DIRECT RUNOFF AREA (AC)	RUNOFF COEFF	IMPERVIOUSNESS (%)	SOIL TYPE	T_c (min)	C x A (AC)	I (IN/HR)	Q (CFS)	TOTAL RUNOFF Σ Area (AC)	T_c (MIN)	Σ(C x A) (AC)	I (IN/HR)	Q (CFS)	PIPE (for preliminary pipe design and travel time) DESIGN FLOW (CFS)	SLOPE (%)	PIPE SIZE (IN)	CAPACITY, FULL (CFS)	LENGTH (FT)	VELOCITY (FPS)	T_t (min)	REMARKS
A28		0.17	0.80	0.80	B	5.00	0.14	8.82	1.20						1.20	1.75	18	13.90	24.1	7.9	0.05	direct to valley inlet
A29		0.17	0.81	0.81	B	5.00	0.14	8.82	1.19													direct to valley inlet
DP 22 + A28 + A29	23									2.52	6.81	1.98	8.06	15.97	15.97	2.34	18	16.07	87.6	9.1	0.16	
A31		1.47	0.83	0.85	B	5.00	1.21	8.82	10.68						10.68	3.74	18	20.31	19.0	11.5	0.03	
DP 23 + A31	24									3.98	6.97	3.19	8.00	25.54	25.54	3.49	24	42.26	50.6	13.5	0.06	
A28a		0.15	0.78	0.75	B	5.00	0.12	8.82	1.04						1.04	5.74	18	25.17	27.3	14.2	0.03	direct to curb inlet
A29a		0.15	0.78	0.75	B	5.00	0.11	8.82	1.01						1.01	0.90	18	9.97	43.3	5.6	0.13	direct to curb inlet
35% A31 + A29a										0.66	5.00	0.54	8.82	4.75	4.75	3.32	36	121.53	75.7	17.2	0.07	total to curb inlet
DP 24 + A28a + A29a	24a									4.28	7.04	3.42	7.98	27.32	27.32	3.32	36	121.53	75.7	17.2	0.07	
DP 20 + DP 24a	25									19.07	13.14	15.27	6.27	95.77	95.77	0.50	42	71.14	135.2	7.4	0.30	
A30		1.88	0.84	0.89	B	5.00	1.58	8.82	13.94						13.94	6.37	18	26.51	36.9	15.0	0.04	direct to curb inlet
A32		0.18	0.61	0.40	B	5.00	0.11	8.82	1.00													to rain garden
A24 + A32	26									1.02	5.00	0.56	8.82	4.92	4.92	0.52	18	7.57	23.2	4.3	0.09	total to rain garden & overflow inlet
A30 + DP 26	26a									2.89	5.09	2.14	8.78	18.78	18.78	0.50	24	16.00	118.7	5.1	0.39	total to DP 26a
A33		0.63	0.89	0.98	B	5.00	0.56	8.82	4.93						4.93	0.99	18	10.45	34.3	5.9	0.10	to roof drains to DP 27
A34		0.67	0.81	0.81	B	5.00	0.54	8.82	4.77													direct to curb inlet (sump)
DP 25 + 1/2 A33 + A34	27									20.06	13.45	16.09	6.21	99.89	99.89	0.90	42	95.45	243.1	9.9	0.41	total to DP 27
A35		0.84	0.85	0.90	B	5.00	0.71	8.82	6.30						6.30	11.32	18	35.34	48.8	20.0	0.04	to roof drains to DP 28
A36		0.35	0.85	0.89	B	5.00	0.30	8.82	2.61													direct to curb inlet (sump)
DP 26a + DP 27 + A35 + A36	28									24.14	13.86	19.24	6.12	**117.83**	117.83	0.50	48	101.57	23.8	8.1	0.05	**total to west forebay**
A37		1.51	0.58	0.33	B	14.56	0.88	5.98	5.24													sub-basin containing detention pond
B1		0.64	0.82	0.84	B	9.05	0.53	7.31	3.86						3.86	2.45	24	35.41	35.3	11.3	0.05	direct to curb inlet
OS11		0.21	0.52	0.20	B	6.08	0.11	8.35	0.92												1.21	drains offsite to east
off-site south pond out									15.29						15.29	3.00	24	39.19	838.0	12.5	1.12	release from MHFD-Detention - added to system downstream
OS12		3.50	0.50	0.15	B	5.00	1.74	8.82	15.31						15.31	0.50	24	16.00	26.3	5.1	0.09	Offsite future development; evalutated under existing conditions;
35% of OS12		1.22	0.50	0.15	B	5.00	0.61	8.82	5.36													approx 65% drains to ex culvert to east; assumed future developent
65% of OS12		2.27	0.50	0.15	B	5.00	1.13	8.82	9.95													will require on-site detention
OS11 + 65% OS12										2.49	7.29	1.24	7.89	9.77								total to east to ex culvert
B2		0.63	0.82	0.84	B	8.96	0.52	7.33	3.78													direct to curb inlet
35% OS12 + B2										1.85	8.96	1.12	7.33	8.24								total direct to curb inlet
off-site south pond out + B1 + 35% OS12 + B2	31									2.50	24.64	1.65	4.57	22.83	22.83	0.49	24	15.84	34.5	5.0	0.11	total to DP 31, including discharge from off-site south pond
B3		0.32	0.81	0.82	B	5.00	0.26	8.82	2.31													direct to curb inlet
B4		0.42	0.73	0.65	B	5.55	0.31	8.57	2.62						2.62	4.58	18	22.48	39.4	12.7	0.05	direct to curb inlet
B5		1.48	0.83	0.85	B	5.00	1.22	8.82	10.77						10.77	1.00	18	10.50	15.1	5.9	0.04	roof drain connection
B3 + B5	32									1.80	5.04	1.48	8.80	13.05	13.05	1.81	24	30.44	40.8	9.7	0.07	
DP31 + B4	33									2.91	24.75	1.96	4.56	24.20	24.20	0.75	30	35.52	46.6	7.2	0.11	
DP32 + DP 33	34									4.72	24.86	3.44	4.55	30.92	30.92	0.51	30	29.29	76.1	6.0	0.21	total to DP 34, including discharge from off-site south pond
B6		0.21	0.73	0.64	B	5.00	0.15	8.82	1.31						1.31	0.50	18	7.43	49.7	4.2	0.20	direct to curb inlet
B7		0.40	0.76	0.72	B	5.00	0.31	8.82	2.73						2.73	1.00	18	10.50	15.7	5.9	0.04	direct to curb inlet
DP 34 + B6 + B7	35									5.32	25.07	3.90	4.52	32.92	32.92	0.70	30	34.32	381.4	7.0	0.91	total to DP 35, including discharge from off-site south pond
B15		0.27	0.86	0.93	B	5.00	0.23	8.82	2.03													direct to curb inlet in B8
B16		0.35	0.83	0.86	B	5.00	0.29	8.82	2.54						2.54	1.44	18	12.61	18.8	7.1	0.04	direct to curb inlet
DP 35 + B16	36									5.67	25.98	4.19	4.43	33.84	33.84	0.50	36	47.16	96.2	6.7	0.24	total to DP 36, including discharge from off-site south pond
B8		0.18	0.75	0.68	B	5.42	0.13	8.63	1.15													direct to curb inlet
B15 + B8	36a									0.45	6.11	0.36	8.34	3.04	3.04	0.51	18	7.50	35.3	4.2	0.14	total to DP 36
B9		0.29	0.79	0.78	B	5.00	0.23	8.82	2.02													direct to curb inlet
DP 36a + B9	37									0.74	6.25	0.59	8.28	4.91	4.91	0.52	18	7.57	7.8	4.3	0.03	
DP 36 + DP 37	38									6.41	26.22	4.78	4.41	36.36	36.36	0.50	36	47.16	73.6	6.7	0.18	total to DP 38, including discharge from off-site south pond
B10		1.47	0.82	0.84	B	5.00	1.21	8.82	10.65						10.65	3.35	18	19.23	13.2	10.9	0.02	roof drain connection
B11		0.27	0.77	0.73	B	5.00	0.20	8.82	1.80						1.80	0.90	18	9.97	43.3	5.6	0.13	direct to curb inlet

CALCULATED BY: GRS, VCB
DATE: 8/1/2025
CHECKED BY: < >
PROJECT MANAGER: JDO

Standard Form SF-2 (modified)
Storm Drainage System Design
(Rational Method Procedure)
Proposed Development

JOB NO: 200726
PROJECT: Brickyard
DESIGN STORM: **100** YR

SUB-BASIN(s)	DESIGN POINT (DP)	DIRECT RUNOFF: AREA (AC)	RUNOFF COEFF	IMPERVIOUSNESS (%)	SOIL TYPE	T_c (min)	C x A (AC)	I (IN/HR)	Q (CFS)	TOTAL RUNOFF: Σ Area (AC)	T_c (MIN)	Σ(C x A) (AC)	I (IN/HR)	Q (CFS)	PIPE (for preliminary pipe design and travel time): DESIGN FLOW (CFS)	SLOPE (%)	PIPE SIZE (IN)	CAPACITY, FULL (CFS)	LENGTH (FT)	VELOCITY (FPS)	T_t (min)	REMARKS
B12		0.33	0.77	0.73	B	5.00	0.26	8.82	2.27													direct to curb inlet
B10 + B11 + B12	39									2.07	5.13	1.67	8.76	14.63	14.63	3.24	18	18.91	51.6	10.7	0.08	total to DP 39
DP 38 + DP 39	40									8.47	26.41	6.45	4.39	43.62	43.62	0.50	36	47.16	197.8	6.7	0.49	total to DP 40, including discharge from off-site south pond
1/2 A33 + DP 40	40a									8.79	26.90	6.73	4.35	44.53	44.53	0.90	42	95.45	227.1	9.9	0.38	total to DP 40a
B13		0.33	0.86	0.92	B	5.00	0.29	8.82	2.52						2.52	0.58	18	8.00	65.3	4.5	0.24	direct to curb inlet
B14		0.73	0.71	0.61	B	7.75	0.52	7.73	3.99													direct to curb inlet
B13 + B14	41									1.06	7.75	0.80	7.73	6.20	6.20	0.85	18	9.68	29.3	5.5	0.09	
DP 40a + DP 41	42									9.85	27.28	7.53	4.31	**47.76**	47.76	0.62	48	113.10	8.0	9.0	0.01	**total to east forebay**
DP 28 + DP 42 + A37	43									35.50	27.30	27.65	4.31	**134.45**	134.45	0.50	48	101.57	72.1	8.1	0.15	**total to on-site pond; emergency overflow**
ON-SITE POND OUTFALL	44								42.20						42.20	1.64	30	52.54	109.1	10.7	0.17	flow from MHFD-Detention Routed Hydrograph Results
OS1		0.09	0.62	0.41	B	5.00	0.05	8.82	0.47						0.47	2.00	8	1.71	84.0	4.9	0.29	Site area drains off undetained (to landscape drain to Industrial Tributary)
OS2		0.27	0.52	0.20	B	5.00	0.14	8.82	1.24						1.24	100.00	4	1.90	6.2	21.8	0.00	Site area drains off undetained (connects to outfall from on-site pond)
TR		0.43	0.85	0.90	B	5.00	0.36	8.82	3.20													off-site regional trail along Industrial tributary
OS4	O1	5.35	0.54	0.25	B	11.61	2.90	6.62	19.21						19.21	0.73	24	19.33	409.1	6.2	1.11	direct to off-site curb inlet, to OS6
OS5		0.88	0.45	0.05	B	10.00	0.40	7.03	2.78													to swale to OS6
OS4 + OS5	O2									6.23	12.72	3.30	6.36	20.99								
OS6		6.44	0.45	0.05	B	13.74	2.89	6.15	17.79													to swale to off-site south pond
DP O2 + OS6	O3									12.67	18.19	3.29	5.37	17.66								total to off-site south pond
OS7	O4	2.79	0.83	0.85	B	10.00	2.31	7.03	16.21						16.21	0.50	18	7.43	187.0	4.2	0.74	to swale & landscpe drains, piped to off-site north pond
OS8		0.60	0.82	0.84	B	10.00	0.49	7.03	3.48													direct to off-site curb inlet, piped to off-site north pond
OS7 + OS8	O5									3.40	10.74	2.80	6.84	19.14	19.14	1.00	18	10.50	37.7	5.9	0.11	
OS9		0.09	0.90	1.00	B	10.00	0.08	7.03	0.55													
DP O5 + OS9	O6									3.48	10.85	2.88	6.81	19.59	19.59	1.00	24	22.62	85.3	7.2	0.20	total to south forebay of off-site north pond
OS10		52.20	0.46	0.07	B	24.64	24.00	4.57	109.61													to west forebay of north off-site pond
DP O6 + OS10	O7									55.68	24.64	26.87	4.57	122.76								total to off-site north pond

APPENDIX D – HYDRAULIC CALCULATIONS

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Aug 4 2025

trickle channel from west forebay

Rectangular

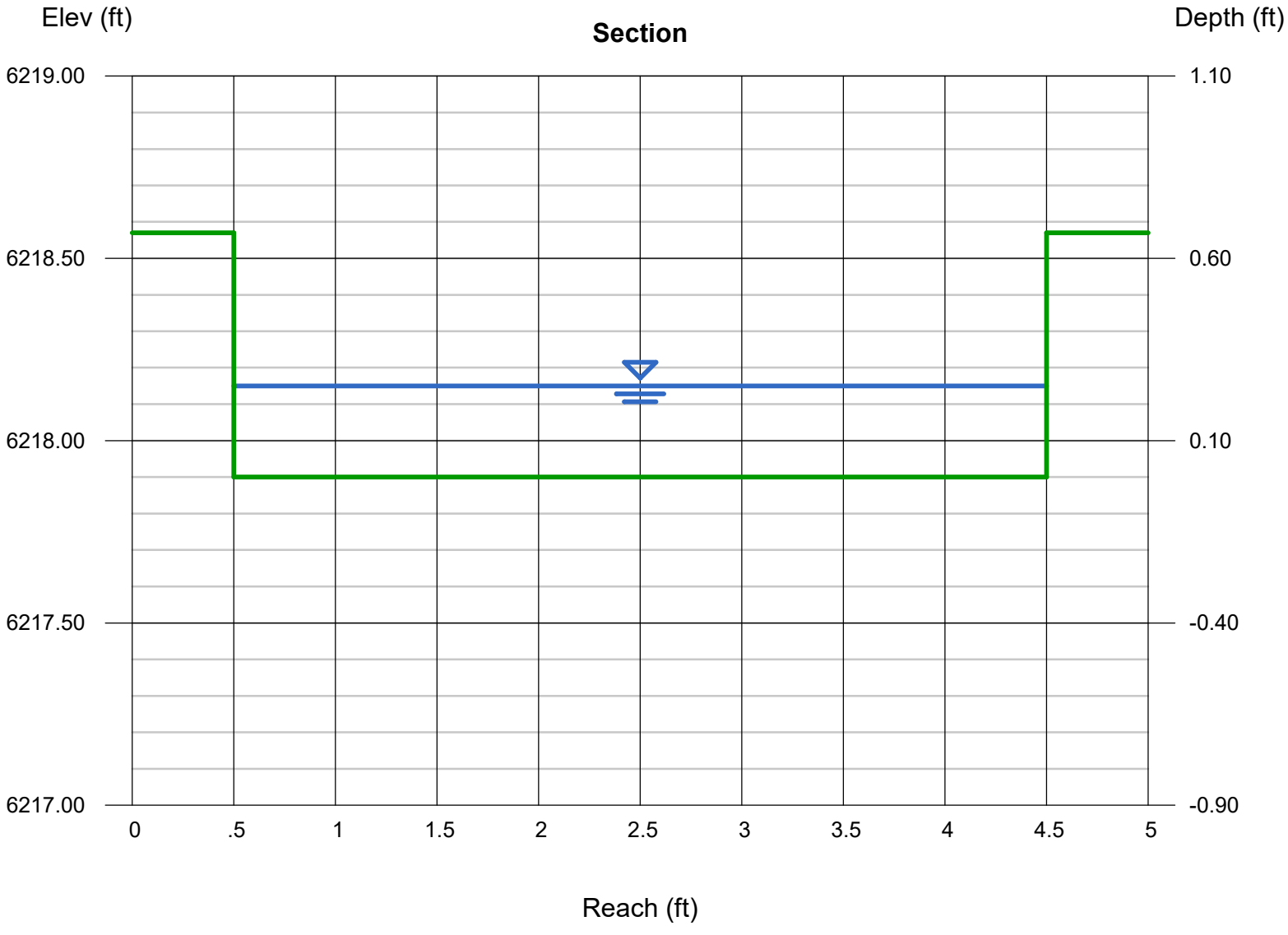
Bottom Width (ft)	= 4.00
Total Depth (ft)	= 0.67
Invert Elev (ft)	= 6217.90
Slope (%)	= 0.52
N-Value	= 0.016

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.34

Highlighted

Depth (ft)	= 0.25
Q (cfs)	= 2.340
Area (sqft)	= 1.00
Velocity (ft/s)	= 2.34
Wetted Perim (ft)	= 4.50
Crit Depth, Yc (ft)	= 0.22
Top Width (ft)	= 4.00
EGL (ft)	= 0.34



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Aug 4 2025

trickle channel from east forebay

Rectangular

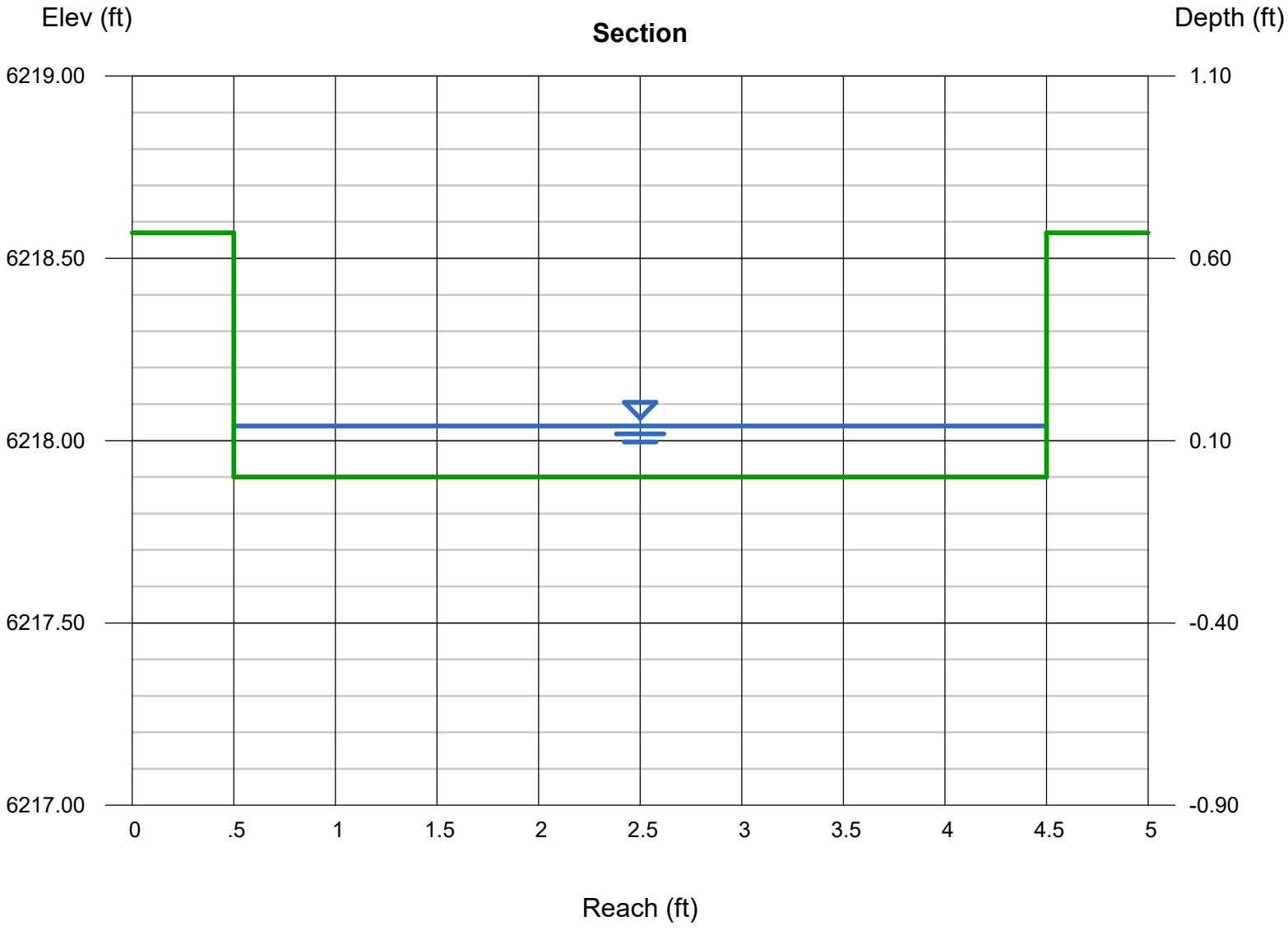
Bottom Width (ft)	= 4.00
Total Depth (ft)	= 0.67
Invert Elev (ft)	= 6217.90
Slope (%)	= 0.52
N-Value	= 0.016

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.96

Highlighted

Depth (ft)	= 0.14
Q (cfs)	= 0.960
Area (sqft)	= 0.56
Velocity (ft/s)	= 1.71
Wetted Perim (ft)	= 4.28
Crit Depth, Yc (ft)	= 0.13
Top Width (ft)	= 4.00
EGL (ft)	= 0.19



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Aug 4 2025

trickle channel combined

Rectangular

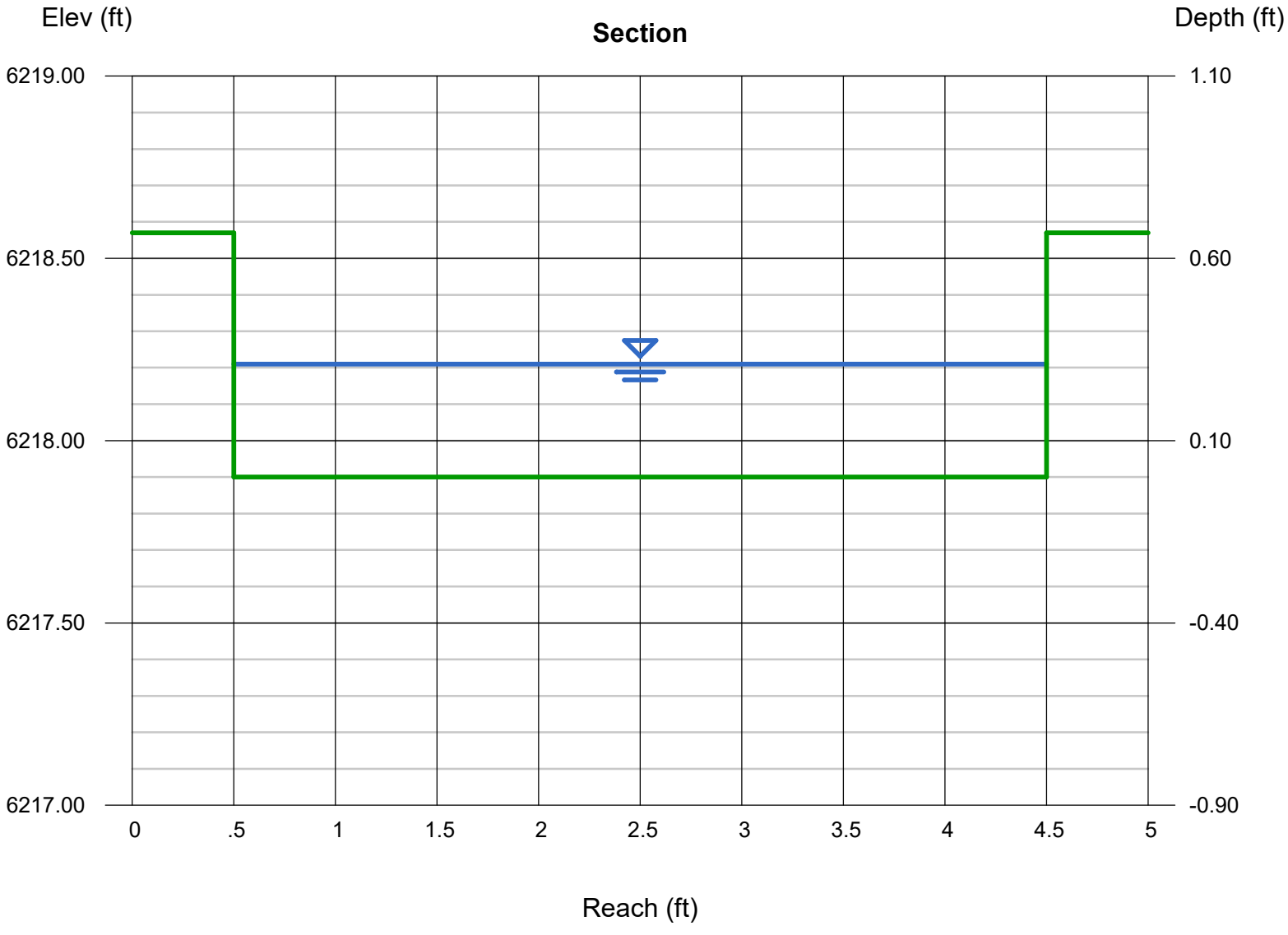
Bottom Width (ft)	= 4.00
Total Depth (ft)	= 0.67
Invert Elev (ft)	= 6217.90
Slope (%)	= 0.52
N-Value	= 0.016

Calculations

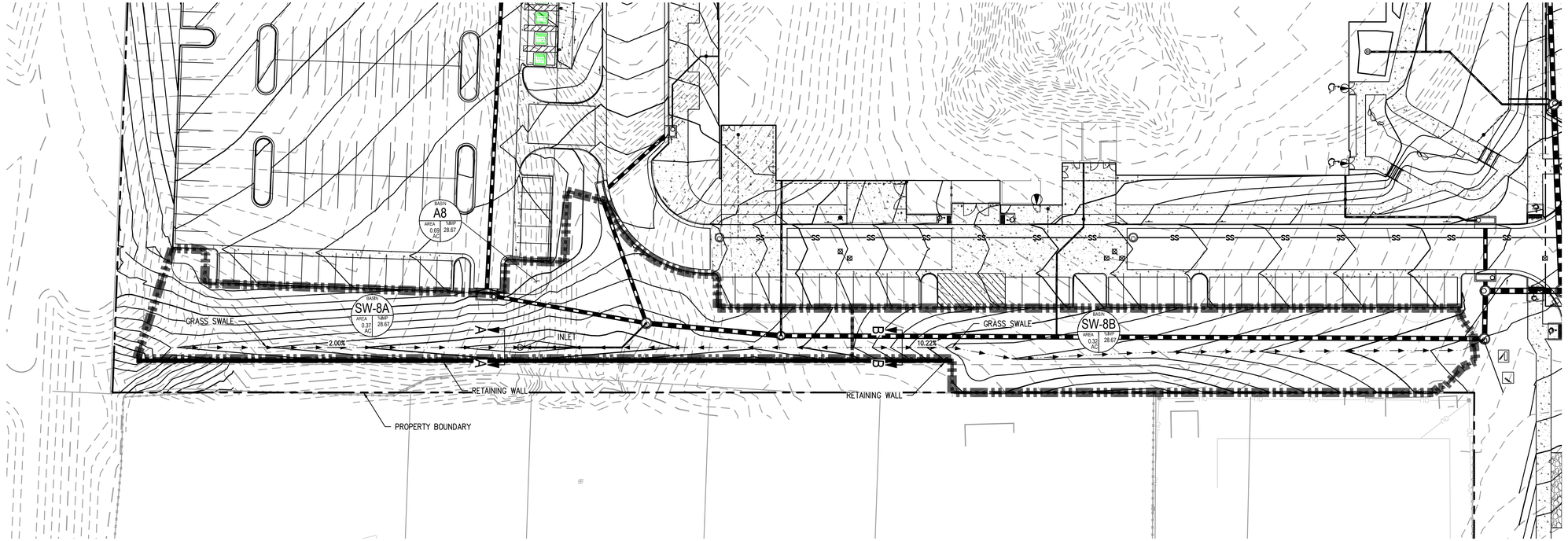
Compute by:	Known Q
Known Q (cfs)	= 3.30

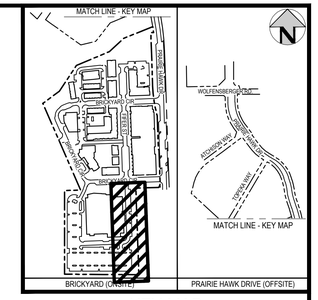
Highlighted

Depth (ft)	= 0.31
Q (cfs)	= 3.300
Area (sqft)	= 1.24
Velocity (ft/s)	= 2.66
Wetted Perim (ft)	= 4.62
Crit Depth, Yc (ft)	= 0.28
Top Width (ft)	= 4.00
EGL (ft)	= 0.42



NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.





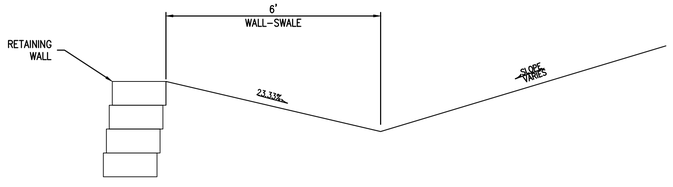
KEY MAP

LEGEND:

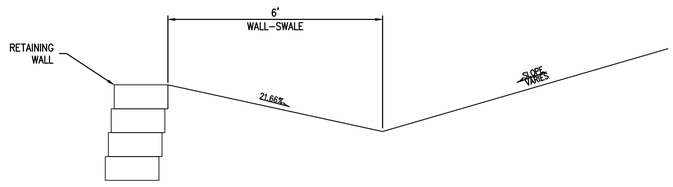
- EXISTING CONTOUR LINES — 5175 / 5171
- PROPOSED SUBBASIN BOUNDARY
- FLOW ARROW
- EXISTING STORM — ST
- PROPERTY BOUNDARY
- LMITS OF CONSTRUCTION — LOC
- DESIGN POINT — 1
- PROPOSED CONTOUR LINES — 5175 / 5171
- PROPOSED STORM

BASIN DESIGNATION — BASIN OS 1 — IMPERVIOUSNESS
BASIN SIZE IN ACRES — AREA 1.23 AC — IMP% 0.45

SUB-BASIN	SWALE BASIN	SUB-BASIN AREA (AC)	SWALE BASIN AREA (AC)	SUB-BASIN 100-YR RUNOFF (CFS)	SWALE BASIN 100-YR RUNOFF (CFS)
A8	SW-8A	0.69	0.37	2.63	1.43
A8	SW-8B	0.69	0.32	2.63	1.20



SECTION A–A
SCALE: NTS



SECTION B–B
SCALE: NTS

811 Know what's below. Call before you dig.

30 0 30 60
SCALE: 1" = 30'

DESIGNED BY: BS
CHECKED BY: JDO
DRAWN BY: BS

ISSUE DATE: 12-06-2024

DATE	REVISION COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

CONFLUENCE COMPANIES, LLC

THE BRICKYARD
PROPOSED GRASS SWALE (SUB-BASIN A8) EXHIBIT

PROJECT #: 200726
SHEET NUMBER
1
1 OF 1

FILEPATH: P:\2020\200726\ENGINEERING\DRAINAGE\RETAINING WALL SWALE PLAN.DWG LAYOUT: A8 SWALE
17 XREFs e-base, e-legal, e-ult, keymap, p-base, p-base-ph2, p-base-ph3, p-base-ph4, p-base-pravs, p-base-rec, p-legal, p-roadway, p-ult, p-ult-master-to others, p-ult-rec-to others, p-ult-to others, proposed drainage plan[U]
PLOTTED: WED 03/26/25 3:47:00P BY: BILGEE SUKHBAATAR

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Mar 26 2025

SW-8A (GRASS SWALE)

User-defined

Invert Elev (ft)	= 100.00
Slope (%)	= 2.00
N-Value	= 0.030

Calculations

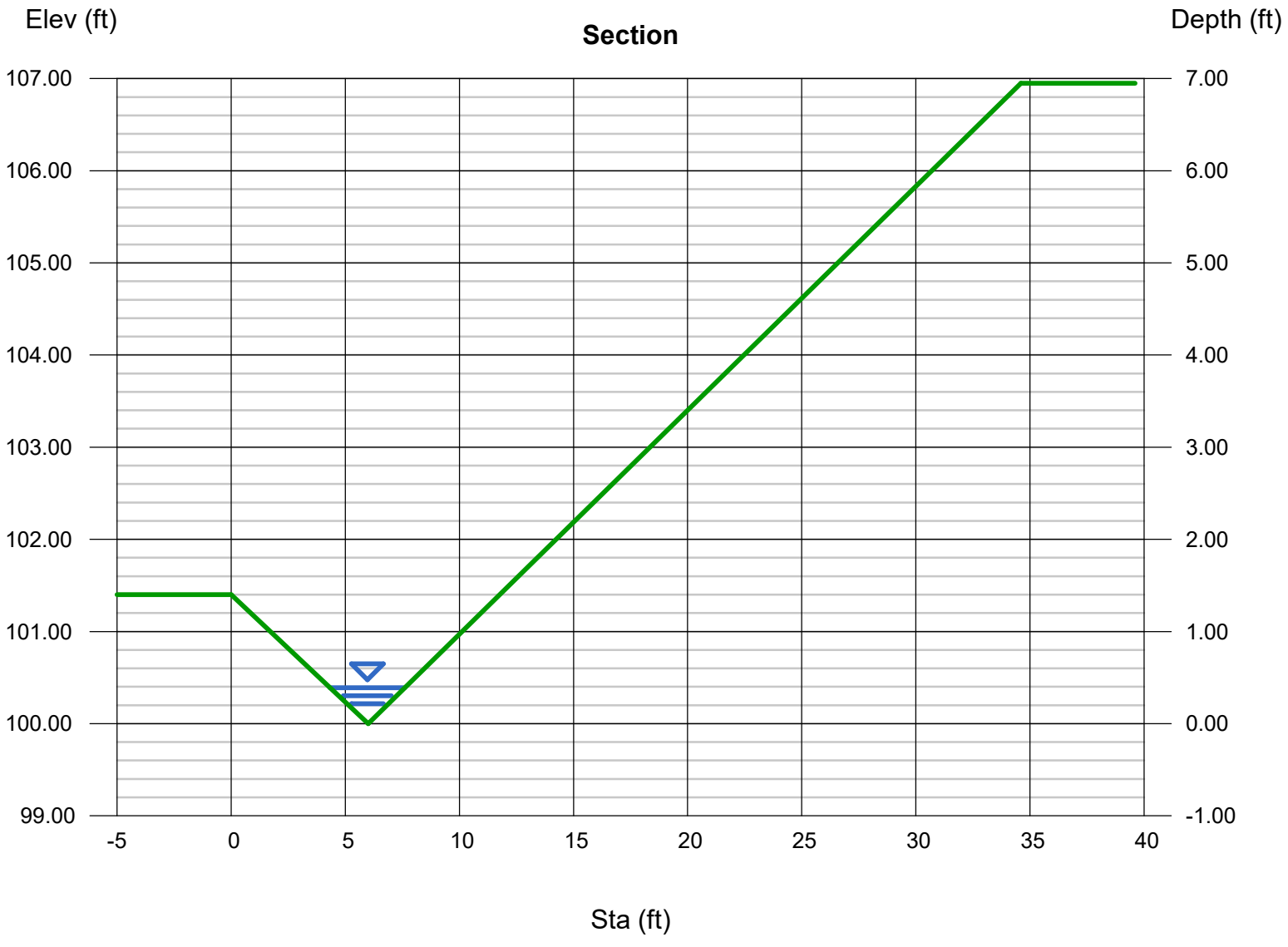
Compute by:	Known Q
Known Q (cfs)	= 1.43

(Sta, El, n)-(Sta, El, n)...

(0.00, 101.40)-(6.00, 100.00, 0.030)-(34.60, 106.95, 0.030)

Highlighted

Depth (ft)	= 0.39
Q (cfs)	= 1.430
Area (sqft)	= 0.64
Velocity (ft/s)	= 2.24
Wetted Perim (ft)	= 3.37
Crit Depth, Yc (ft)	= 0.38
Top Width (ft)	= 3.28
EGL (ft)	= 0.47



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Mar 26 2025

SW-8B (GRASS SWALE)

User-defined

Invert Elev (ft)	= 100.00
Slope (%)	= 10.22
N-Value	= 0.030

Calculations

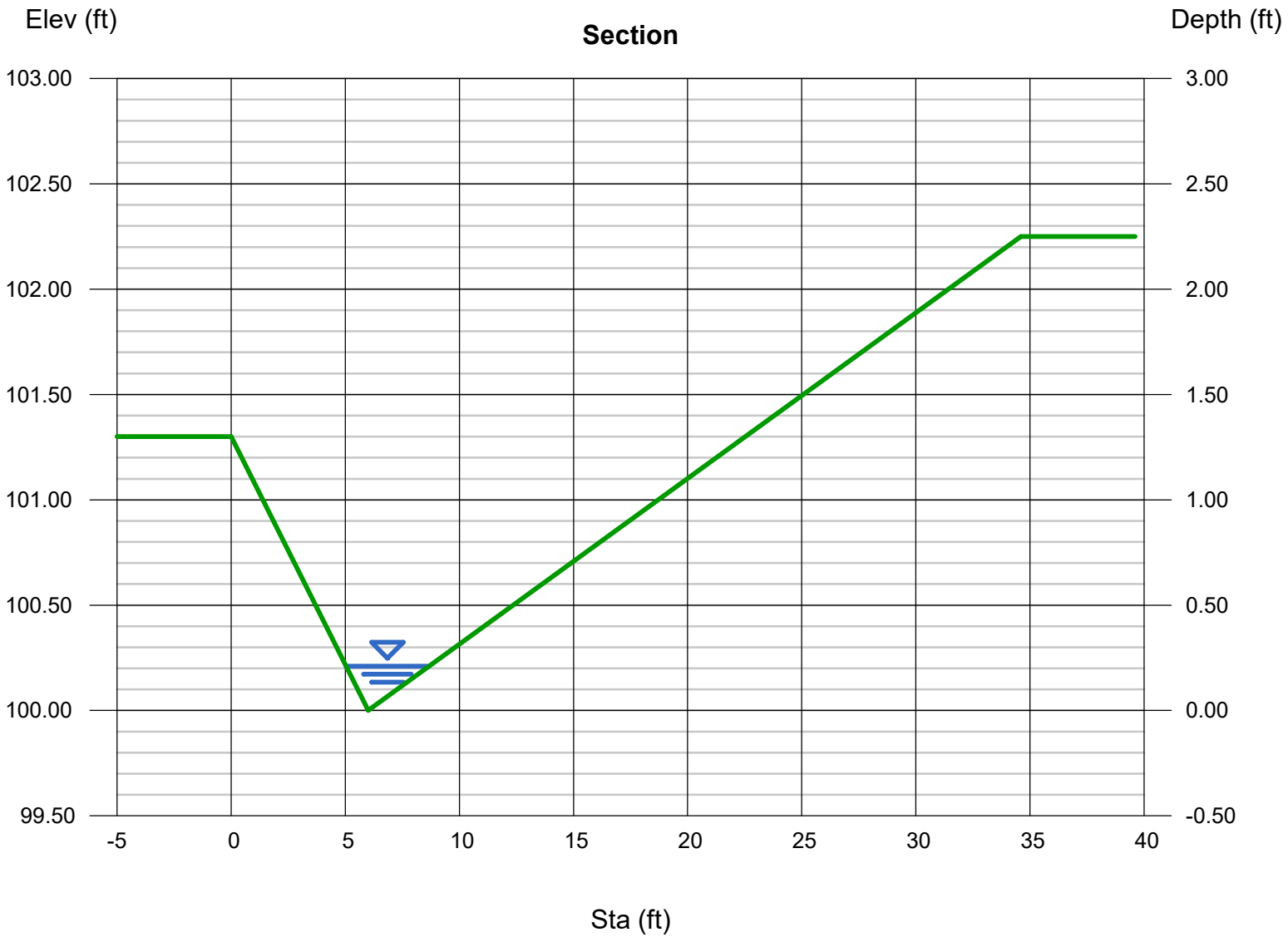
Compute by:	Known Q
Known Q (cfs)	= 1.20

(Sta, El, n)-(Sta, El, n)...

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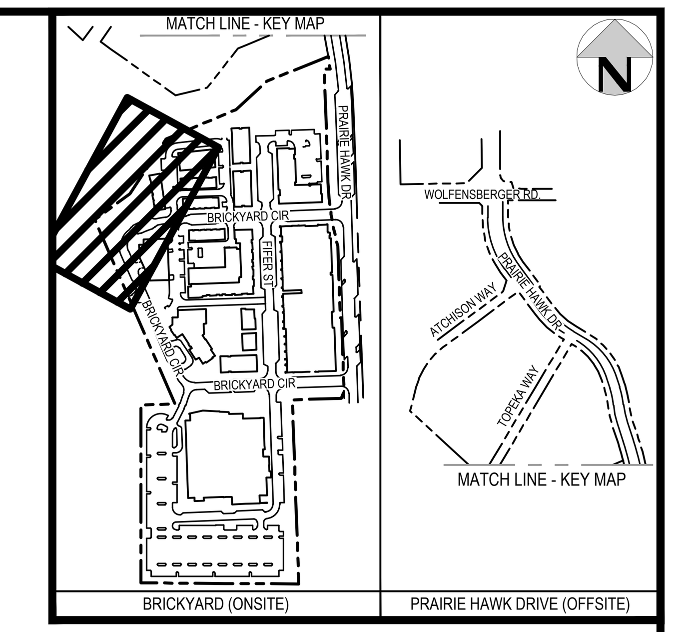
Highlighted

Depth (ft)	= 0.21
Q (cfs)	= 1.200
Area (sqft)	= 0.38
Velocity (ft/s)	= 3.14
Wetted Perim (ft)	= 3.67
Crit Depth, Yc (ft)	= 0.27
Top Width (ft)	= 3.64
EGL (ft)	= 0.36



NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.





KEY MAP

LEGEND:

EXISTING CONTOUR LINES — 5175 / 5171

PROPOSED SUBBASIN BOUNDARY

FLOW ARROW

EXISTING STORM — ST

PROPERTY BOUNDARY

LMITS OF CONSTRUCTION — LOC

DESIGN POINT — 1

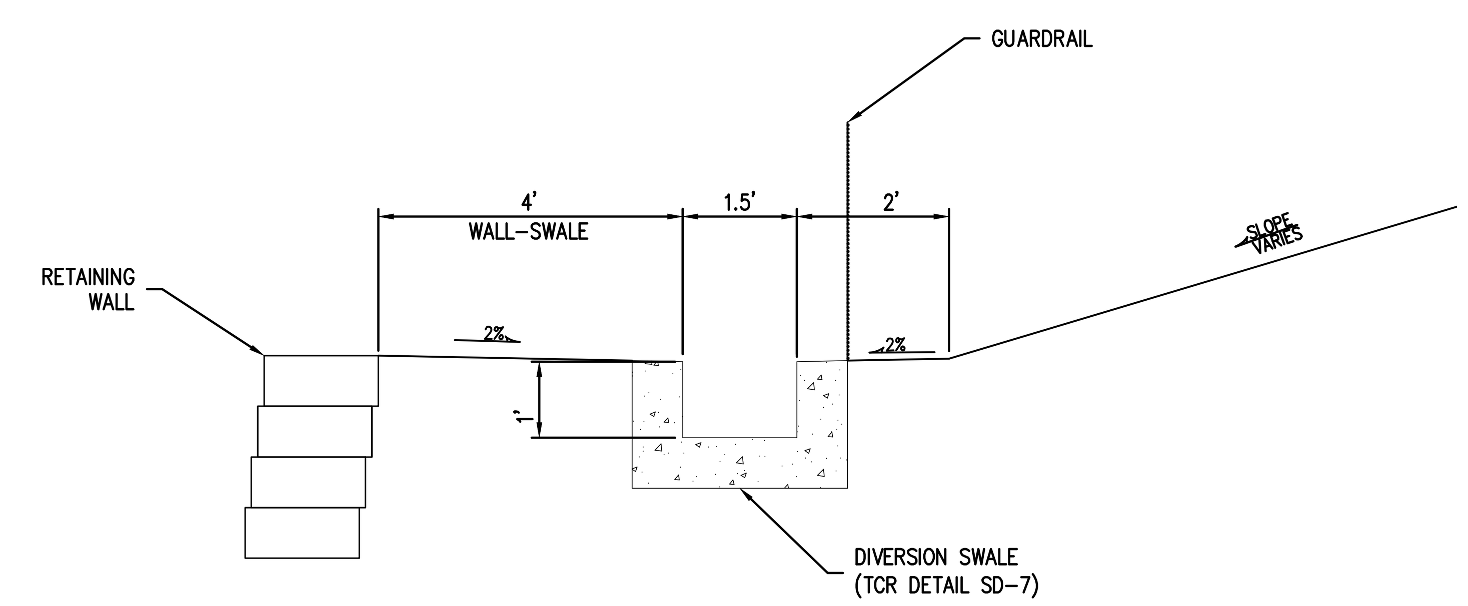
PROPOSED CONTOUR LINES — 5175 / 5171

PROPOSED STORM

BASIN DESIGNATION — BASIN OS 1 — IMPERVIOUSNESS

BASIN SIZE IN ACRES — AREA 1.23 AC — IMP% 0.45

SUB-BASIN	SUB-BASIN AREA (AC)	SUB-BASIN 100-YR RUNOFF (CFS)
A24	0.83	3.92



SECTION A–A

SCALE: NTS

FILEPATH: P:\2020\200726\ENGINEERING\DRAINAGE\RETAINING WALL SWALE PLAN.DWG LAYOUT: A24 SWALE
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PLOTTED: MON 08/04/25 11:52:32A BY: AMANDA CASTEEL

Know what's below. Call before you dig.

30 0 30 60
SCALE: 1" = 30'

DESIGNED BY: BS
CHECKED BY: JDO
DRAWN BY: BS

ISSUE DATE: 12-06-2024

DATE	REVISION COMMENTS

HARRIS KOCHER SMITH
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Denver, Colorado 80203
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HarrisKocherSmith.com

CONFLUENCE COMPANIES, LLC

THE BRICKYARD
PROPOSED DIVERSION SWALE (SUB-BASIN A24) EXHIBIT

PROJECT #: 200726

SHEET NUMBER

1

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Aug 4 2025

A24 (DIVERSION SWALE)

Rectangular

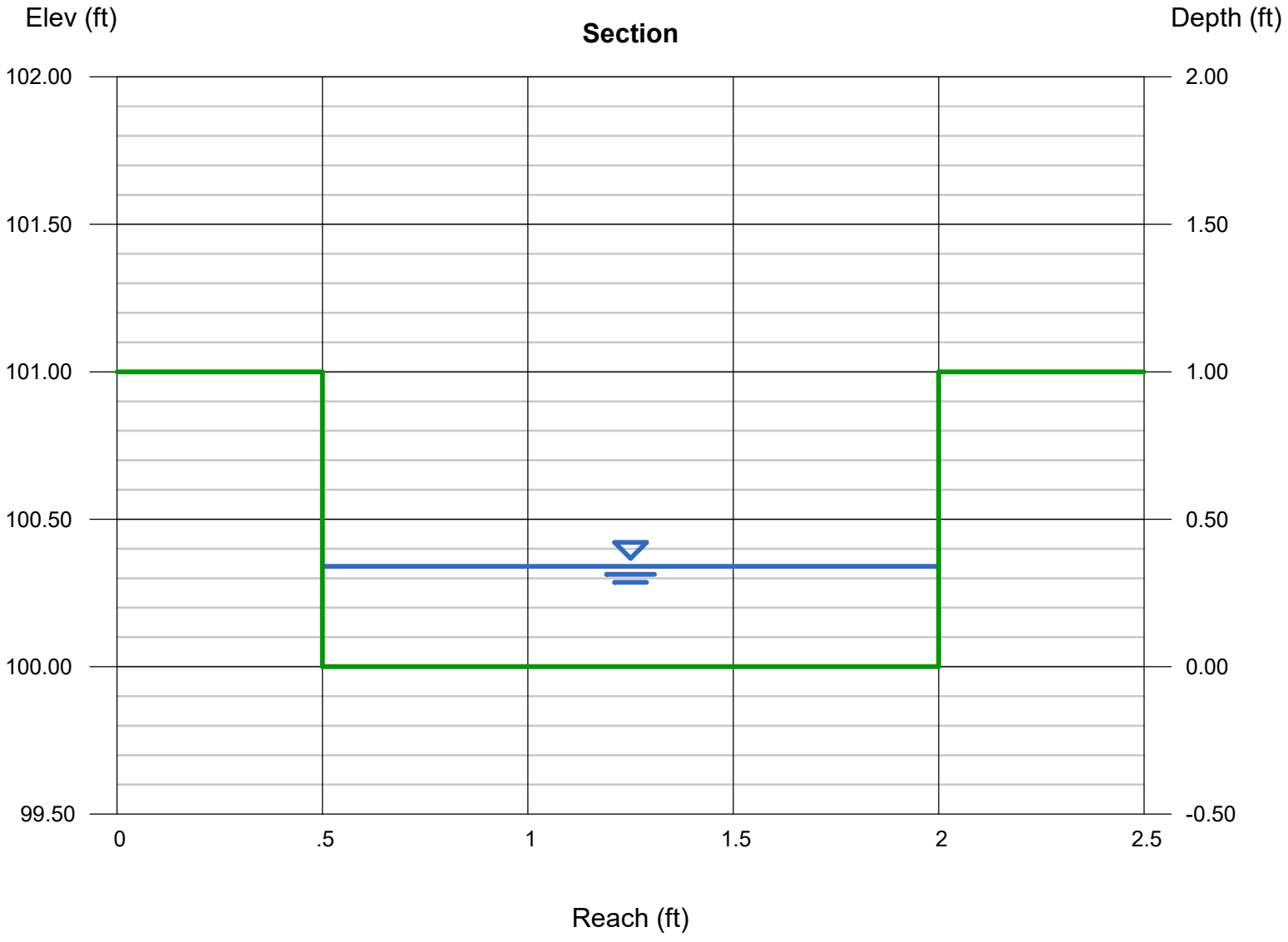
Bottom Width (ft)	= 1.50
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Invert Elev (ft)	= 100.00
Slope (%)	= 5.02
N-Value	= 0.016

Calculations

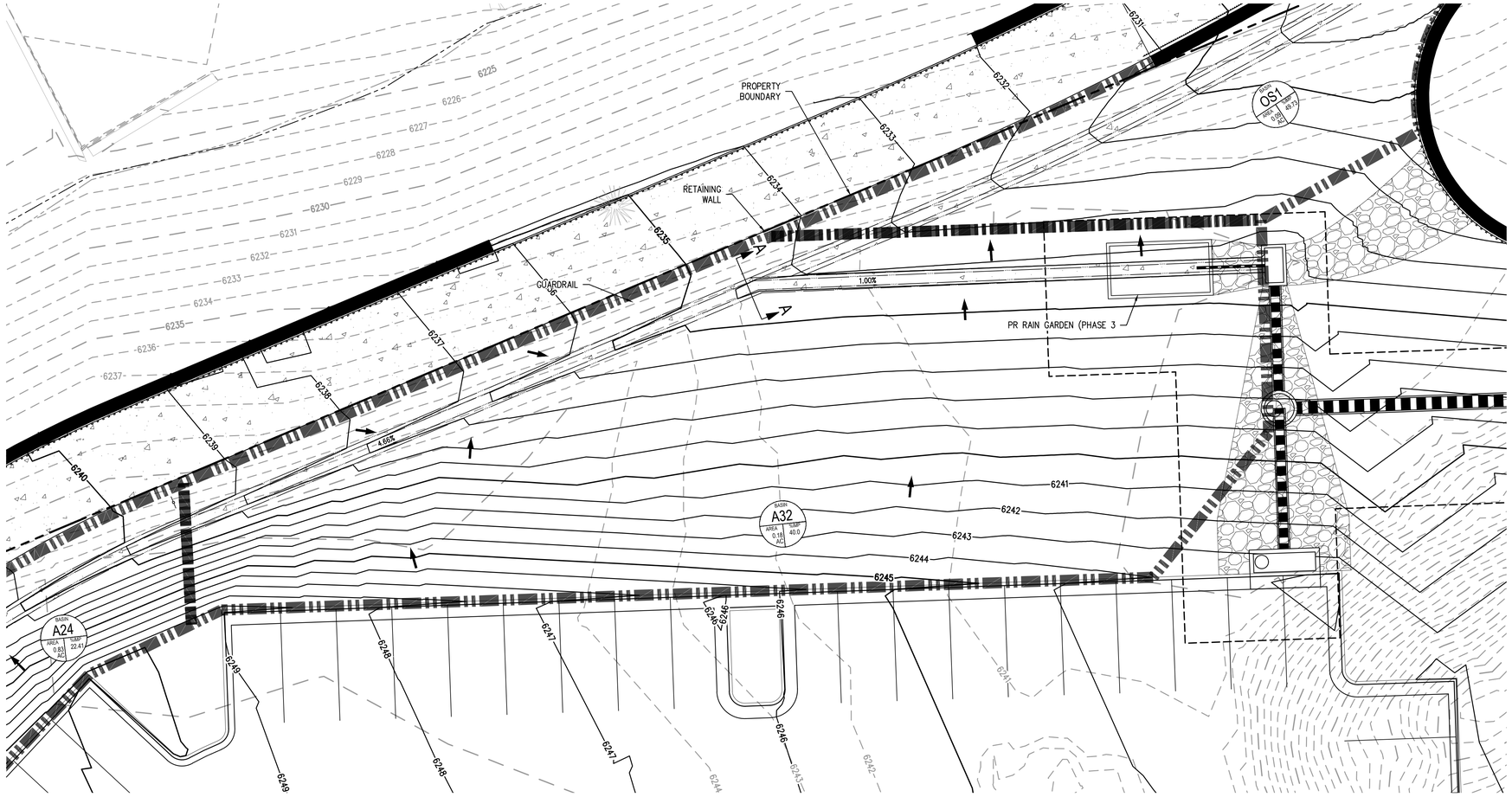
Compute by:	Known Q
Known Q (cfs)	= 3.92

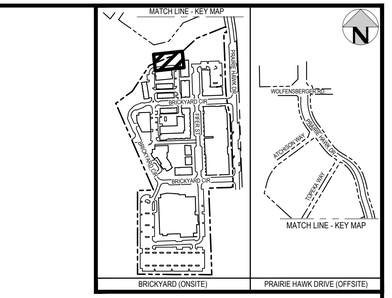
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Depth (ft)	= 0.34
Q (cfs)	= 3.920
Area (sqft)	= 0.51
Velocity (ft/s)	= 7.69
Wetted Perim (ft)	= 2.18
Crit Depth, Yc (ft)	= 0.60
Top Width (ft)	= 1.50
EGL (ft)	= 1.26



NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.





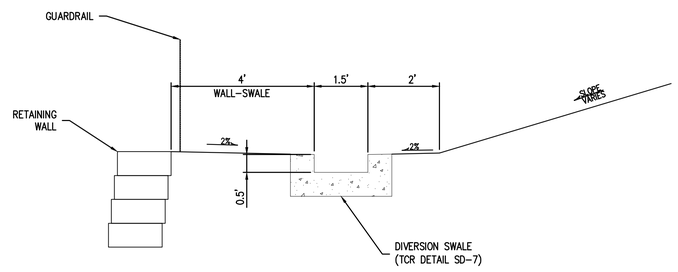
KEY MAP

LEGEND:

- EXISTING CONTOUR LINES — 5175 / 5171
- PROPOSED SUBBASIN BOUNDARY
- FLOW ARROW
- EXISTING STORM — ST — ST
- PROPERTY BOUNDARY
- LMITS OF CONSTRUCTION — LOC
- DESIGN POINT — 1
- PROPOSED CONTOUR LINES — 5175 / 5171
- PROPOSED STORM — S

BASIN DESIGNATION: BASIN OS 1 (AREA 1.23 AC, IMP% 0.45) — IMPERVIOUSNESS; BASIN SIZE IN ACRES

SUB-BASIN	SUB-BASIN AREA (AC)	SUB-BASIN 100-YR RUNOFF (CFS)
A32	0.18	1.00



SECTION A–A
SCALE: NTS

Know what's below. Call before you dig.

SCALE: 1" = 10'

DESIGNED BY: BS
CHECKED BY: JDO
DRAWN BY: BS

ISSUE DATE: 12-06-2024

DATE	REVISION COMMENTS

HARRIS KOCHER SMITH
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Denver, Colorado 80203
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HarrisKocherSmith.com

CONFLUENCE COMPANIES, LLC

THE BRICKYARD
PROPOSED DIVERSION SWALE (SUB-BASIN A32) EXHIBIT

PROJECT #: 200726
SHEET NUMBER
1
1 OF 1

FILEPATH: P:\2020\200726\ENGINEERING\DRAINAGE\RETAINING WALL SWALE PLAN.DWG | LAYOUT: A32 SWALE
17 XREFs: e-base, e-legal, e-util, keymap, p-base, p-base-ph2, p-base-ph3, p-base-pnuis, p-base-rec, p-legal, p-roadway, p-util, p-util-master-to others, p-util-rec-to others, p-util-to others, proposed drainage plan[U]
PLOTTED: FRI 08/15/25 11:21:12A BY: CLAIRE BENNETT

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Aug 4 2025

A32 (DIVERSION SWALE)

Rectangular

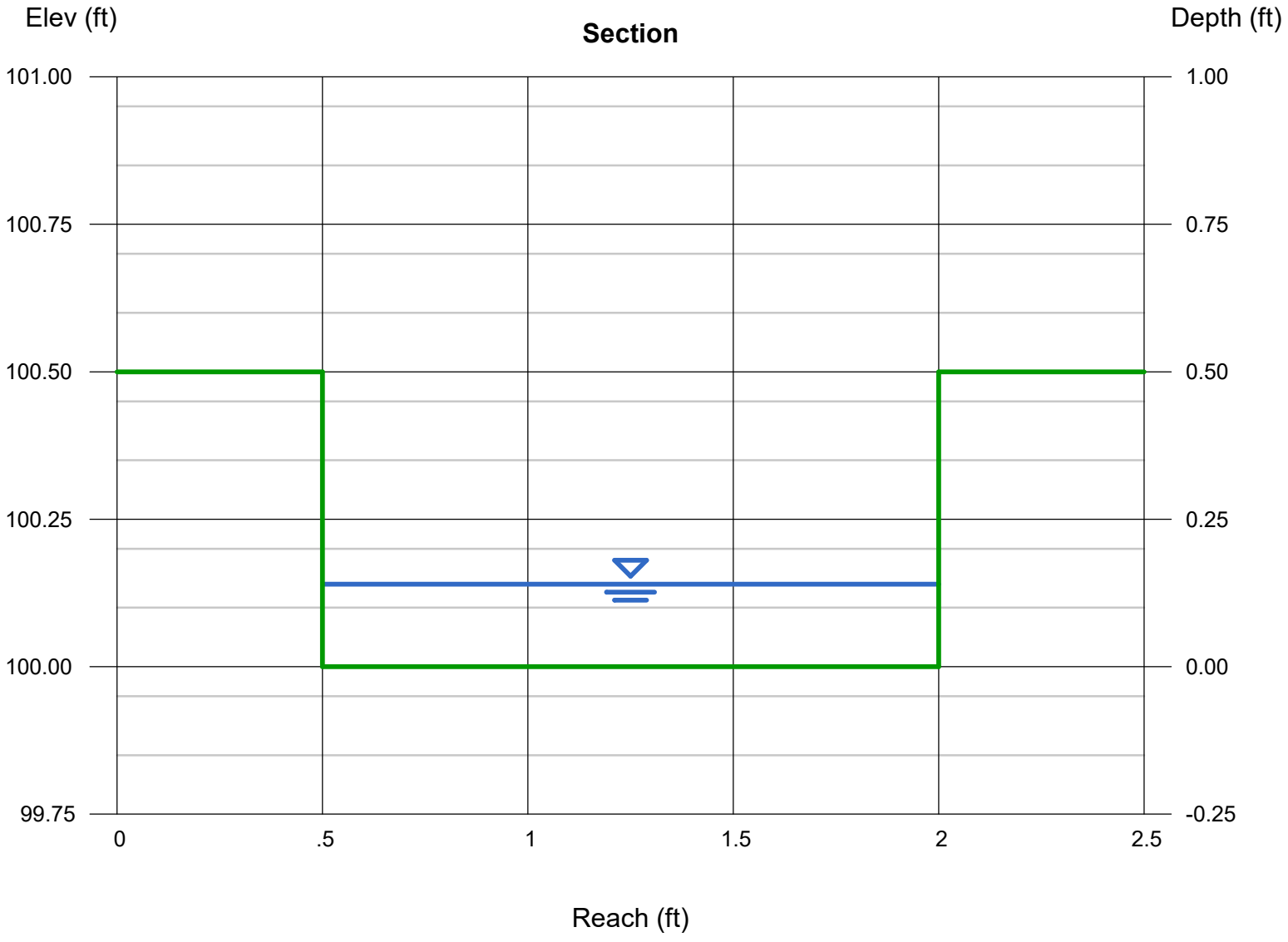
Bottom Width (ft)	= 1.50
Total Depth (ft)	= 0.50
Invert Elev (ft)	= 100.00
Slope (%)	= 5.18
N-Value	= 0.016

Calculations

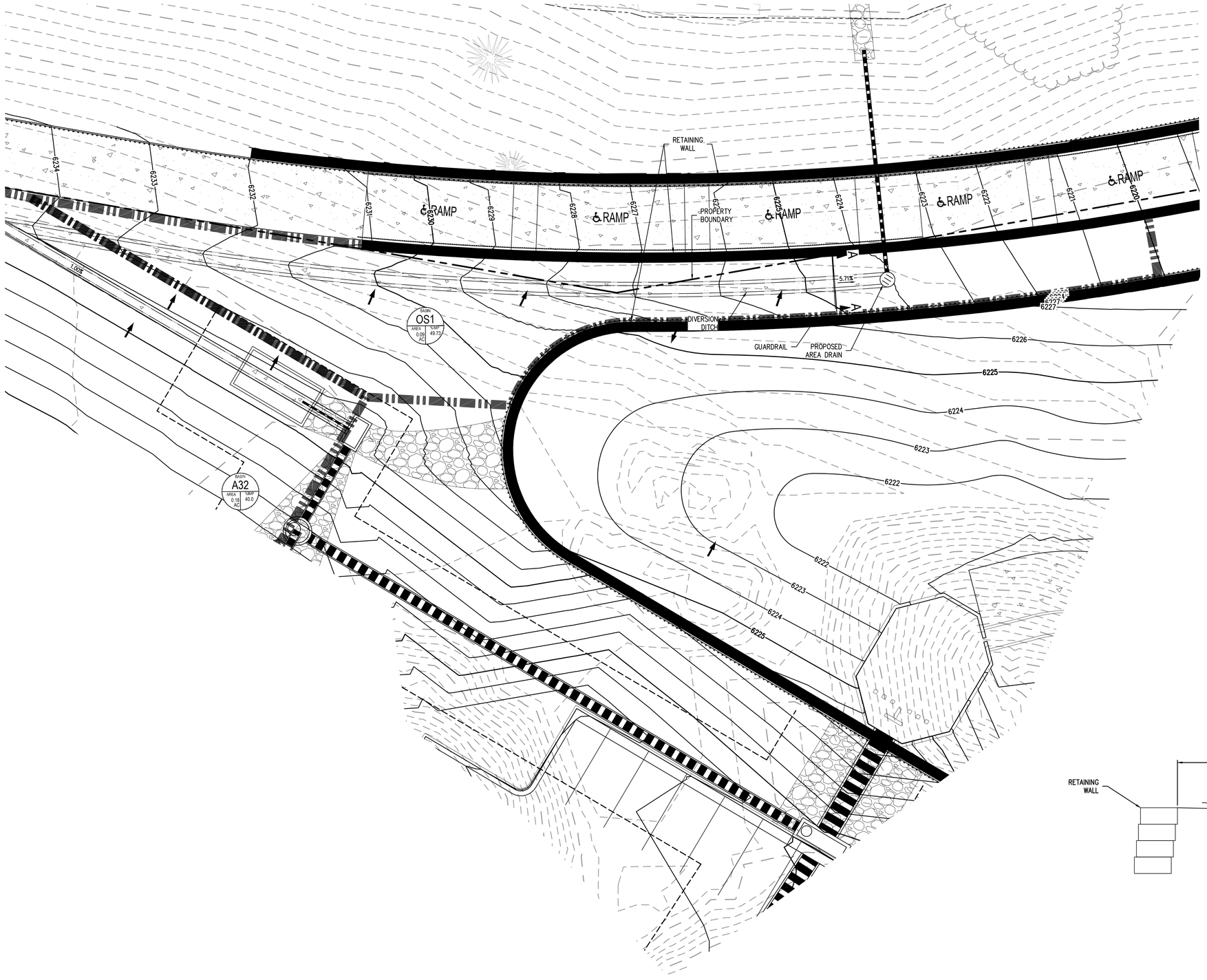
Compute by:	Known Q
Known Q (cfs)	= 1.00

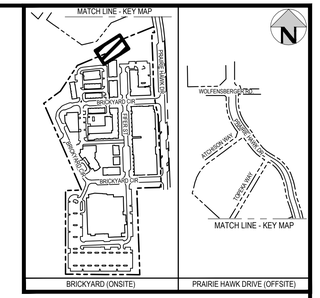
Highlighted

Depth (ft)	= 0.14
Q (cfs)	= 1.000
Area (sqft)	= 0.21
Velocity (ft/s)	= 4.76
Wetted Perim (ft)	= 1.78
Crit Depth, Yc (ft)	= 0.24
Top Width (ft)	= 1.50
EGL (ft)	= 0.49



NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.





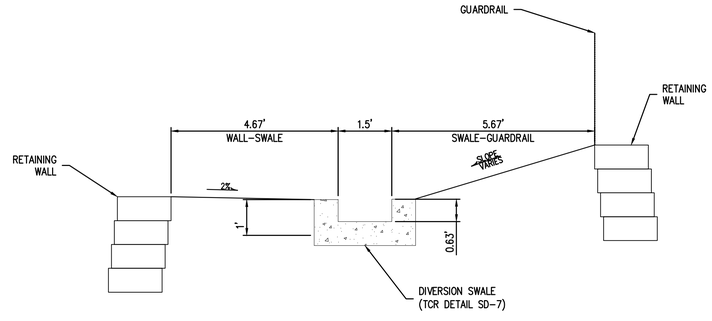
KEY MAP

LEGEND:

- EXISTING CONTOUR LINES — 5175 / 5171
- PROPOSED SUBBASIN BOUNDARY
- FLOW ARROW
- EXISTING STORM — ST
- PROPERTY BOUNDARY
- LIMITS OF CONSTRUCTION — LOC
- DESIGN POINT — 1
- PROPOSED CONTOUR LINES — 5175 / 5171
- PROPOSED STORM — S

BASIN DESIGNATION: BASIN OS 1 (AREA 1.23 AC, IMP% 0.45) — IMPERVIOUSNESS; BASIN SIZE IN ACRES

SUB-BASIN	SUB-BASIN AREA (AC)	SUB-BASIN 100-YR RUNOFF (CFS)
OS1	0.09	0.47



SECTION A–A
SCALE: NTS

Know what's below. Call before you dig.

SCALE: 1" = 10'

DESIGNED BY: BS
CHECKED BY: JDO
DRAWN BY: BS

ISSUE DATE: 12-06-2024

DATE	REVISION COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

CONFLUENCE COMPANIES, LLC

THE BRICKYARD
PROPOSED DIVERSION SWALE (SUB-BASIN OS1) EXHIBIT

PROJECT #: 200726
SHEET NUMBER
1
1 OF 1

FILEPATH: P:\2020\200726\ENGINEERING\DRAINAGE\RETAINING WALL SWALE PLAN.DWG, LAYOUT: OS1 SWALE
17 XREFs: e-base, e-legal, e-util, keymap, p-base, p-base-ph2, p-base-ph4, p-base-ph3, p-base-grass, p-base-rec, p-legal, p-roadway, p-util, p-utili-master-to others, p-utili-rec-to others, p-utili-to others, proposed drainage plan[U]
PLOTTED: FRI 08/15/25 11:16:23A BY: CLAIRE BENNETT

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Aug 4 2025

OS1 (DIVERSION SWALE)

Rectangular

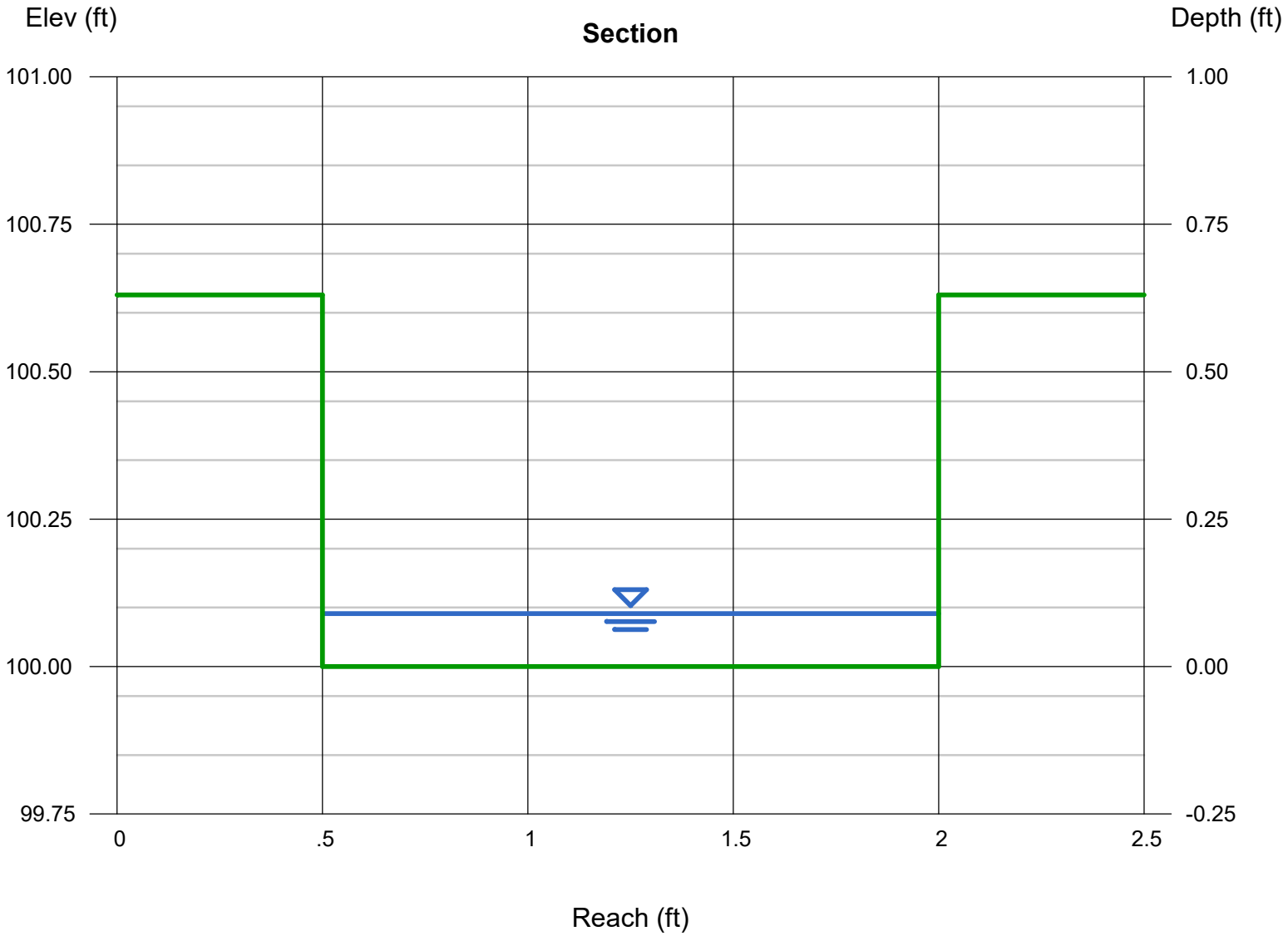
Bottom Width (ft)	= 1.50
Total Depth (ft)	= 0.63
Invert Elev (ft)	= 100.00
Slope (%)	= 5.73
N-Value	= 0.016

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.47

Highlighted

Depth (ft)	= 0.09
Q (cfs)	= 0.470
Area (sqft)	= 0.14
Velocity (ft/s)	= 3.48
Wetted Perim (ft)	= 1.68
Crit Depth, Yc (ft)	= 0.15
Top Width (ft)	= 1.50
EGL (ft)	= 0.28



INLET SUMMARY, 100-YEAR, Site

Sub-basin / Design Point	Inlet ID	Inlet Type & Size	On grade, Sump, Swale	Sump Depth (in)	Road Slope	Design Flow (CFS)	Bypass Flow Received (CFS)	Design Flow + Bypass (CFS)	Captured Flow (cfs)	Bypass Flow	Bypass to
sub-basin A4	E8-E7	Inlets Type R 5' & 10'	On grade	--	3.35%	8.76	0	8.76	8.34	0.42	sub-basin A7
sub-basin A3	E9	Inlet Type R 5'	On grade	--	1.60%	0.51	0	0.51	0.51	0	sub-basin A7
sub-basin A7	EC1	Inlet Type R 10'	On grade	--	3.66%	6.34	0.42	6.76	5.69	1.07	sub-basin A11
sub-basin A11	EA1	Inlet Type R 10'	On grade	--	2.52%	2.29	3.54	5.83	5.18	0.65	sub-basin B4
sub-basin A2	E10	Inlet Type R 5'	On grade	--	1.55%	1.24	0	1.24	1.23	0.01	sub-basin A6
sub-basin A6	EC2	Inlet Type R 5'	On grade	--	4.68%	1.10	0.01	1.11	1.11	0	sub-basin A10
sub-basin A10	EA2	Inlet Type R 10'	On grade	--	2.08%	3.06	0	3.06	3.06	0	sub-basin B4
sub-basin A5	E5	Inlet Type R 10'	Sump	4.56	--	3.79	0	3.79	3.79	0	sub-basin A8
sub-basin A8	--	landscape drains, grate-lid MH	Swale	--	2.00%	2.63	0	2.63	2.21	0.42	sub-basin B4
sub-basin A14	F5	Inlet #16 Valley Triple	On Grade	--	2.80%	3.79	0	3.79	2.48	1.31	sub-basin A15
sub-basin A15	FB1	Inlet Type R 10'	On grade	--	2.11%	4.68	1.31	5.99	5.26	0.73	sub-basin s A16 + A17
sub-basins A16 + A17	FA1	Inlet Type R 10'	On grade	--	2.41%	4.1	0.72	4.82	4.55	0.27	sub-basin A20
sub-basin A20	AAA1	Inlet #16 Valley Triple	On grade	--	3.92%	7.88	0.27	8.15	4.11	4.04	sub-basin B4
sub-basin A21	AAA2	Inlet Type R 10'	On grade	--	4.00%	4.45	0	4.45	4.32	0.13	sub-basin B3
sub-basin A21a	B7	Inlet Type R 5' Modified 54"W	On grade	--	1.05%	2.18	0	2.18	1.83	0.35	sub-basin B3
sub-basin A22 (part)	BC2	Inlet #16 Valley	On grade	--	4.80%	14.62	0	14.62	2.68	11.94	inlet BC1
sub-basin A22 (remainder)	BC1	Inlet Type R 5'	On grade	--	1.64%	0	11.95	11.95	4.14	7.81	sub-basin A23
sub-basin A23	B5	Inlet Type R 10' Modified 64"W	On grade	--	1.64%	6.08	7.83	13.91	8.25	5.66	sub-basin B12
sub-basin A24	JA1	Inlet Type C	Swale		2.50%	3.92	0	3.92	3.92	0	sub-basin A32
sub-basin A25	A6	Inlet Type R 10'	On grade	--	4.50%	3.13	0	3.13	3.13	0	sub-basin A28a
sub-basin A26 (part)	AD2	Inlet Type C	Swale		4.78%	6.25	0	6.25	1.81	4.44	inlet AD1
sub-basin A26 (remainder)	AD1	Inlet Type R 5'	On grade	--	1.10%	3.13	3.33	6.46	1.84	4.62	sub-basin A29
sub-basin A27	A5	Inlet Type R 10'	On grade	--	1.16%	2.29	0	2.29	2.29	0	sub-basin A29
sub-basin A28	AC1	Inlet #16 Valley Triple	On grade	--	3.83%	1.20	0	1.2	1.00	0.20	sub-basin A28a
sub-basin A28a	A1A	Inlet Type R 5'	On grade	--	2.00%	1.04	0.20	1.24	1.23	0.01	sub-basin B11
sub-basin A29	A3	Inlet #16 Valley Triple (Modified)	On grade	--	5.61%	1.19	3.3	4.49	4.49	0	sub-basin A29a
sub-basins A31 (part) + A29a	A1	Inlet Type R10'	On grade	--	6.00%	4.75	1.95	6.7	4.80	1.9	sub-basin B12
sub-basin A30	J3	Inlet Type R 10'	Sump	6.00	--	13.94	0	13.94	8.26	5.68	Type D inlet
overflow from A30	J2	Inlet Type D (parallel)	On grade	--	6.92%	0	5.68	5.68	4.80	0.88	A37 (on-site pond)
sub-basin A34	B2	Inlet Type R 10'	Sump	4.93	--	4.77	0	4.77	4.77	0	sub-basin A36
sub-basin A36	B1	Inlet Type R 10'	Sump	4.08	--	2.61	0	2.61	2.61	0	sub-basin A37
sub-basin B1	D9	Inlet Type R 10'	On grade	--	1.68%	3.86	0	3.86	3.82	0.04	sub-basin B6
Sub-basins OS12 (part), B2	D8	Inlet Type R 10'	On grade	--	1.68%	5.36	0	5.36	6.24	-0.88	sub-basin B7
sub-basin B4	DG1	Inlet Type R 10'	On grade	--	3.24%	2.62	5.11	7.73	4.62	3.11	sub-basin B7
sub-basin B3	DG2	Inlet Type R 10'	On grade	--	4.00%	2.31	0.50	2.81	4.62	-1.81	sub-basin B7
sub-basin B6	DF2	Inlet Type R 5'	Sump	3.60	--	1.31	0.04	1.35	1.35	0	sub-basin B15
sub-basin B7	DF1	Inlet Type R 10'	Sump	5.33	--	2.73	3.25	5.98	5.98	0	sub-basin B16
sub-basin B16	DE1	Inlet Type R 5'	Sump	1.16	--	2.54	0	2.54	0.05	2.49	sub-basin B9
sub-basins B15 + B8	DD2	Inlet Type R 10'	Sump	5.17	--	3.04	2.45	5.49	5.49	0	
sub-basin B9	DD1	Inlet Type R 10'	Sump	5.60	--	2.02	7.31	9.33	9.33	0	
sub-basin B11	DC2	Inlet Type R 5'	On grade	--	4.90%	1.80	0.01	1.81	1.68	0.13	sub-basin B14
sub-basin B12	DB1	Inlet #16 Valley Triple (Modified)	On grade	--	4.90%	2.27	6.64	8.91	6.36	2.55	sub-basin B9
sub-basin B13	DA2	Inlet Type R 10'	On grade	--	1.39%	2.52	0	2.52	2.52	0	sub-basin P1
sub-basin B14	DA1	Inlet Type R 15'	On grade	--	1.39%	3.99	0.18	4.17	4.17	0	sub-basin P2

MHFD-Inlet, Version 5.02 (August 2022)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	A4 to inl E8-E7	A3 to inl E9	A7 to inl EC1	A11 to inl EA1	A2 to inl E10	A6 to inl EC2
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	4.48	0.21	3.16	1.18	0.49	0.47
Major Q_{Known} (cfs)	8.76	0.51	6.34	2.29	1.24	1.10

Bypass (Carry-Over) Flow from Upstream Inlets must be organized from upstream (left) to downstream (right) in order for bypass flows to be linked.

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	User-Defined	User-Defined	No Bypass Flow Received	A2 to inl E10
Minor Bypass Flow Received, Q_b (cfs)	0.00	0.00	0.00	0.65	0.00	0.00
Major Bypass Flow Received, Q_b (cfs)	0.00	0.00	0.42	3.54	0.00	0.01

Watershed Characteristics

Subcatchment Area (acres)						
Percent Impervious						
NRCS Soil Type						

Watershed Profile

Overland Slope (ft/ft)						
Overland Length (ft)						
Channel Slope (ft/ft)						
Channel Length (ft)						

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)						
One-Hour Precipitation, P_1 (inches)						

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)						
One-Hour Precipitation, P_1 (inches)						

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**4.48**	**0.21**	**3.16**	**1.83**	**0.49**	**0.47**
Major Total Design Peak Flow, Q (cfs)	**8.76**	**0.51**	**6.76**	**5.83**	**1.24**	**1.11**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.00	0.00	0.00	0.00	0.00	0.00
Major Flow Bypassed Downstream, Q_b (cfs)	0.42	0.00	1.07	0.65	0.01	0.00

	next/downstream: sub-basin A7 (inlet EC1)	next/downstream: sub-basin A7 (inlet EC1)	bypass from inlets E9, E8-E7 (sub-basins A3 & A4); next/downstream: sub-basin A11 (inlet EA1)	bypass from inlets EC1, EA2 (sub-basins A7, A10); next/downstream: sub-basin B4 (inlet DG1)	next/downstream: sub-basin A6 (inlet EC2)	bypass from inlet E10 (sub-basin A2); next/downstream: sub-basin A10 (inlet EA2)

MHFD-Inlet, Version 5.02 (August 2022)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	A10 to inl EA2	A5 to inl E5	A8 to grate drn	A14 to inl F5	A15 to inl FB1	A16+A17 to inl FA1
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	AREA	STREET	STREET	STREET
Hydraulic Condition	On Grade	In Sump	Swale	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	User-Defined	Denver No. 16 Valley Grate	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	1.24	1.93	0.57	1.81	2.28	1.70
Major Q_{Known} (cfs)	3.06	3.79	2.63	3.79	4.68	4.10
	bypass from inlet EC2 (sub-basin A6); next/downstream: sub-basin B4 (inlet DG1)	Emergency overflow to sub-basin A8	Emergency overflow from sub-basin A5 (inlet E5); landscape drains, and grate-lid MH downstream; next/downstream: sub-basin B4	next/downstream: sub-basin A15 (inlet FB1)	bypass from inlet F5 (sub-basin A14); next/downstream: sub-basins A16, A17 (inlet FA1)	bypass from inlet FB1 (sub-basin A15); next/downstream: sub-basin A20 (inlet AAA1)

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	A6 to inl EC2	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	A14 to inl F5	A15 to inl FB1
Minor Bypass Flow Received, Q_b (cfs)	0.00	0.00	0.00	0.00	0.39	0.00
Major Bypass Flow Received, Q_b (cfs)	0.00	0.00	0.00	0.00	1.31	0.72

Watershed Characteristics

Subcatchment Area (acres)						
Percent Impervious						
NRCS Soil Type						

Watershed Profile

Overland Slope (ft/ft)						
Overland Length (ft)						
Channel Slope (ft/ft)						
Channel Length (ft)						

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)						
One-Hour Precipitation, P_1 (inches)						

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)						
One-Hour Precipitation, P_1 (inches)						

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**1.24**	**1.93**	**0.57**	**1.81**	**2.67**	**1.70**
Major Total Design Peak Flow, Q (cfs)	**3.06**	**3.79**	**2.63**	**3.79**	**5.99**	**4.82**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.00	N/A	0.00	0.39	0.00	0.00
Major Flow Bypassed Downstream, Q_b (cfs)	0.00	N/A	0.42	1.31	0.72	0.27

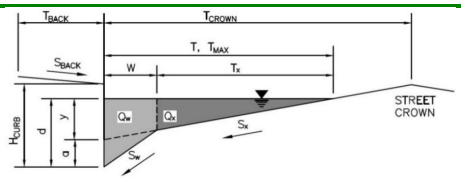
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **Brickyard Rec Center - 200726**

Inlet ID: **A4 to inl E8-E7**



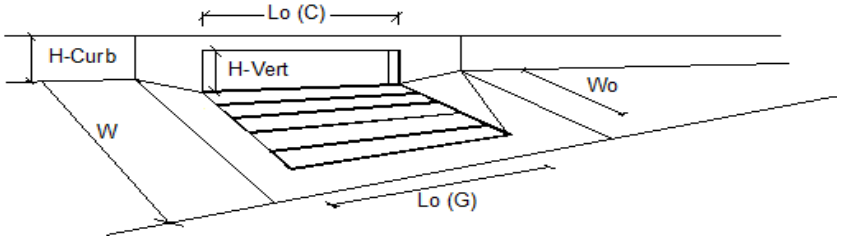
Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	26.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.008		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	24.5		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.018		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 =	0.0335		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	24.5	24.5	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Depth Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**18.2**	**44.6**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 4.48 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 8.76 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**4.48**	**8.34**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.00**	**0.42**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**100**	**95**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 4.5 cfs and Qmajor = 8.5 cfs)

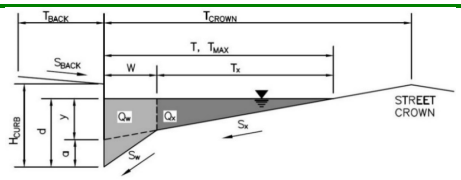
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **Brickyard Rec Center - 200726**

Inlet ID: **A3 to inl E9**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	12.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.076	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} =	13.1	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 =	0.0160	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.1	13.1	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.28	4.28	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

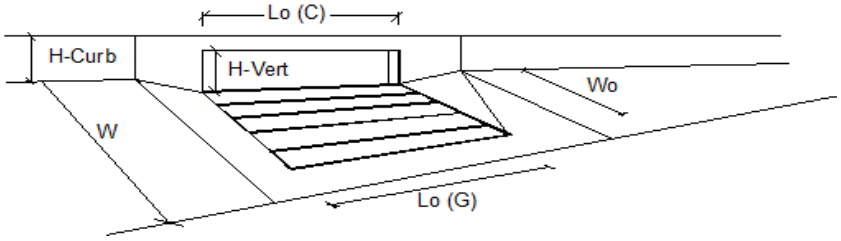
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**5.5**	**5.5**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.21 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 0.51 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
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, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.21**	**0.51**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.00**	**0.00**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**100**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 0.2 cfs and Qmajor = 0.5 cfs)

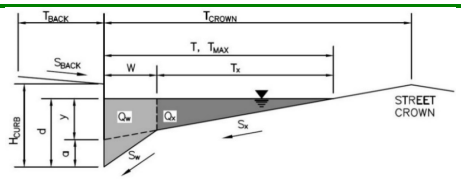
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **Brickyard Rec Center - 200726**

Inlet ID: **A7 to inl EC1**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	20.2	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.070	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} =	15.6	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 =	0.0366	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	15.6	15.6	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.64	4.64	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

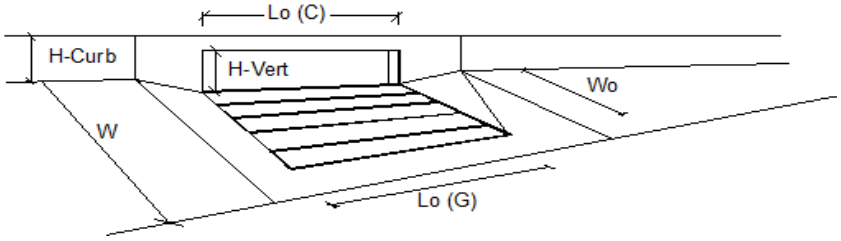
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**11.1**	**11.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 3.16 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 6.76 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.16**	**5.69**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.00**	**1.07**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**84**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 3.2 cfs and Qmajor = 5.9 cfs)

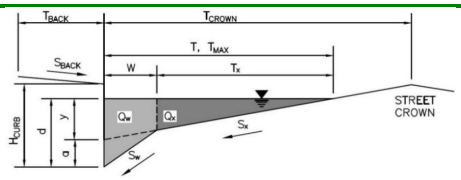
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **Brickyard Rec Center - 200726**

Inlet ID: **A11 to inl EA1**



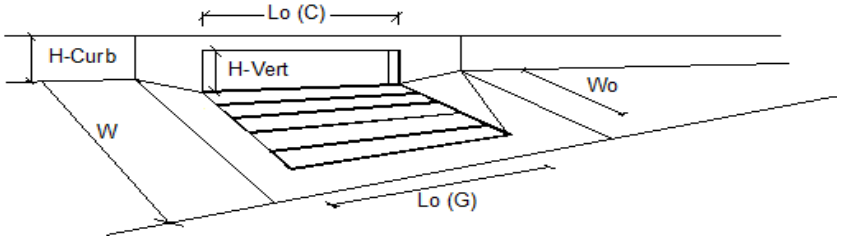
Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.5		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0		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 =	0.0252		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.64	4.64	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Spread Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**9.0**	**9.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.83 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 5.83 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**1.83**	**5.18**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.00**	**0.65**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**100**	**89**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 1.8 cfs and Qmajor = 5.4 cfs)

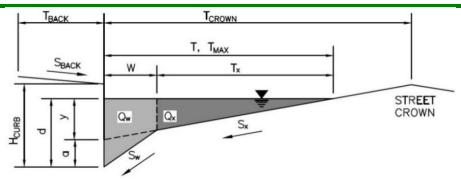
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **Brickyard Rec Center - 200726**

Inlet ID: **A2 to inl E10**



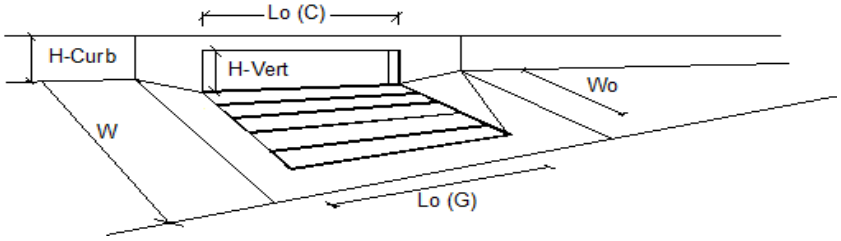
Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.5		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.017		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.94		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 =	0.0155		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	21.9	21.9	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.80	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**17.1**	**25.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.49 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 1.24 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
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, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**0.49**	**1.23**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.00**	**0.01**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**100**	**99**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 0.5 cfs and Qmajor = 1.2 cfs)

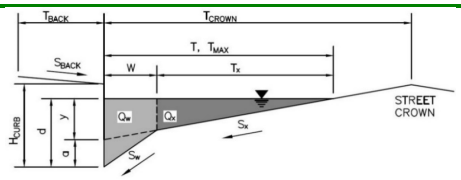
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **Brickyard Rec Center - 200726**

Inlet ID: **A6 to inl EC2**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.043	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} =	21.4	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 =	0.0468	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	21.4	21.4	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.80	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

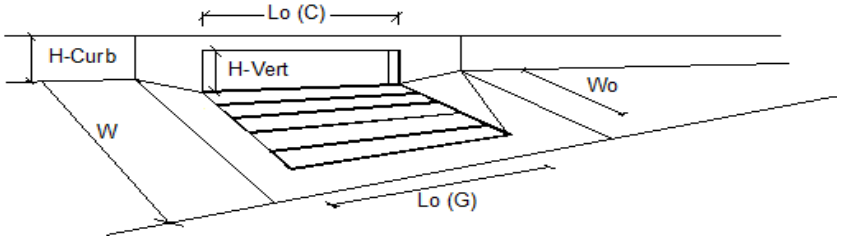
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**15.5**	**19.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.47 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 1.11 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



1

Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
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, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.47**	**1.11**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.00**	**0.00**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**100**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 0.5 cfs and Qmajor = 1.1 cfs)

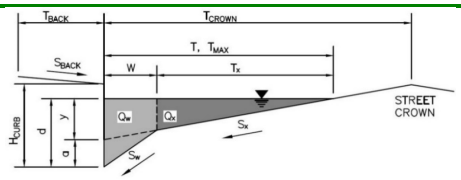
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **Brickyard Rec Center - 200726**

Inlet ID: **A10 to inl EA2**



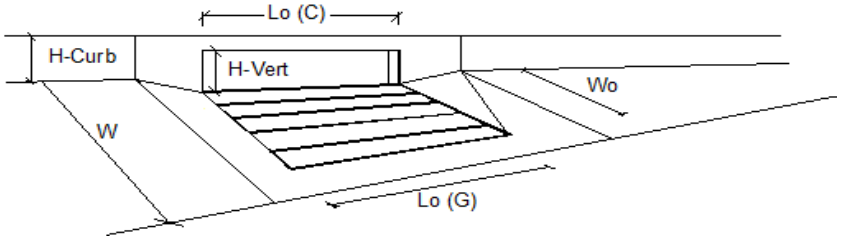
Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	19.5		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.039		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0		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 =	0.0208		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	2.11	2.11	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Depth Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**0.59**	**0.59**	**cfs**

WARNING: MINOR STORM max. allowable capacity is less than the design peak flow of 1.24 cfs on sheet 'Inlet Management'

WARNING: MAJOR STORM max. allowable capacity is less than the design peak flow of 3.06 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



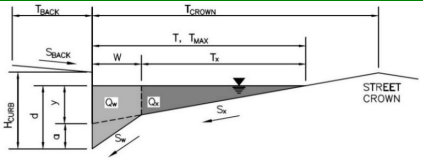
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MINOR & MAJOR STORM			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**1.24**	**3.06**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.00**	**0.00**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**100**	**100**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 1.2 cfs and Qmajor = 3.1 cfs)

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

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

Project: **Brickyard Rec Center - 200726**
Inlet ID: **A5 to inl E5**



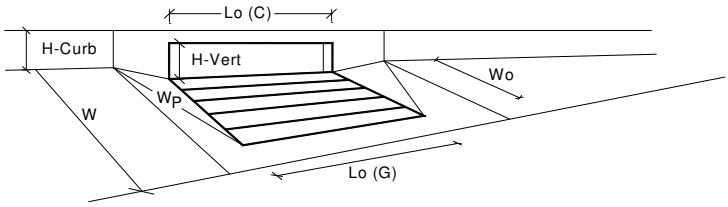
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	11.7	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.026	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	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	11.7	11.7	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening			
		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	3.75	4.56	inches

Grate Information		MINOR	MAJOR	☑ 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
Open Area 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_f (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	

Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	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_f (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	

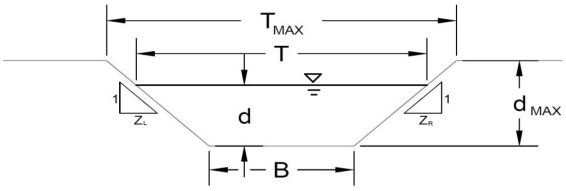
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.15	0.21	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.76	0.84	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**1.96**	**3.80**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	1.93	3.79	cfs

AREA INLET IN A SWALE

Brickyard Rec Center - 200726

A8 to grate drn



This worksheet uses the NRCS vegetal retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D, or E =		
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	0.035	
Channel Invert Slope	S_O =	0.0220	ft/ft
Bottom Width	B =	0.00	ft
Left Side Slope	Z1 =	4.00	ft/ft
Right Side Sloe	Z2 =	4.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- Non-Cohesive
- Cohesive
- Paved

		Minor Storm	Major Storm	
Maximum Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	**15.00**	**27.00**	**ft**
Maximum Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	**0.45**	**0.90**	**ft**

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**1.85**	**11.77**	**cfs**
MAJOR STORM Allowable Capacity is based on Depth Criterion	d_{allow} =	**0.45**	**0.90**	**ft**

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	**0.57**	**2.63**	**cfs**
Water Depth	**d** =	**0.29**	**0.51**	**ft**

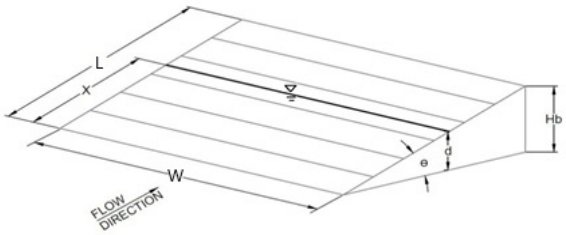
Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Inlet Design Information (Input)

Type of Inlet: User-Defined — Inlet Type = User-Defined

Angle of Inclined Grate (must be <= 30 degrees)	θ =	0.00	degrees
Width of Grate	W =	2.00	ft
Length of Grate	L =	2.00	ft
Open Area Ratio	A_{RATIO} =	0.30	
Height of Inclined Grate	H_B =	0.00	ft
Clogging Factor	C_f =	0.50	
Grate Discharge Coefficient	C_d =	N/A	
Orifice Coefficient	C_o =	0.64	
Weir Coefficient	C_w =	2.05	



		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.29	0.51	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**1.28**	**2.21**	**cfs**
Bypassed Flow	Q_b =	**0.00**	**0.42**	**cfs**
Capture Percentage = Qa/Qo	C% =	**100**	**84**	**%**

Warning 04: Froude No. exceeds USDCM Volume I recommendation.

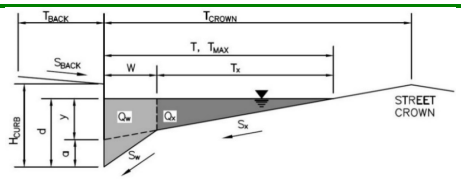
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **Brickyard Rec Center - 200726**

Inlet ID: **A14 to inl F5**



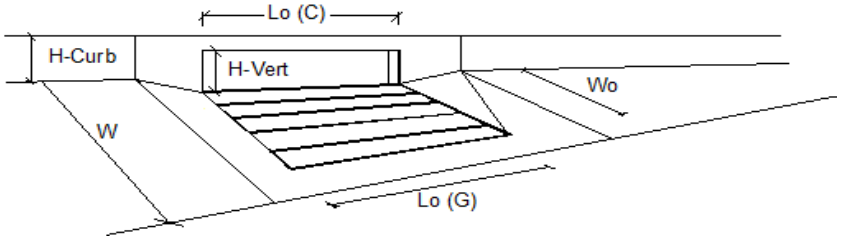
Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	16.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	39.0		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 =	0.0417		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.028		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	23.0	39.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	11.1	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Depth Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**29.0**	**152.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.81 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 3.79 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	Denver No. 16 Valley Grate	MINOR	MAJOR	
Type of Inlet	Type =	Denver No. 16 Valley Grate		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	2.0	2.0	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_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	N/A	N/A	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.42**	**2.48**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.39**	**1.31**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**78**	**66**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 1.6 cfs and Qmajor = 3 cfs)

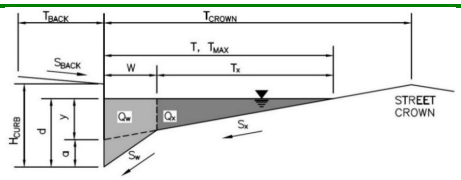
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **Brickyard Rec Center - 200726**

Inlet ID: **A15 to inl FB1**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	16.4	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.010	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} =	40.0	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 =	0.0211	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	23.0	40.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	8.5	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

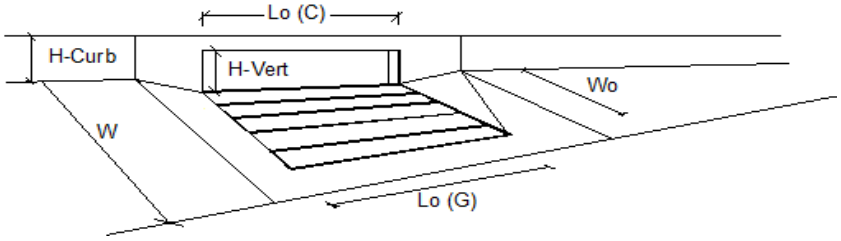
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**19.7**	**54.6**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 2.67 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 5.99 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.67**	**5.26**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.00**	**0.72**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**88**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 2.7 cfs and Qmajor = 5.4 cfs)

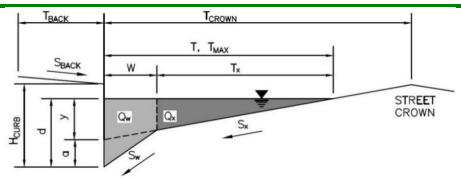
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **Brickyard Rec Center - 200726**

Inlet ID: **A16+A17 to inl FA1**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	10.9	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.0575	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} =	24.0	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 =	0.0241	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	12.0	24.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

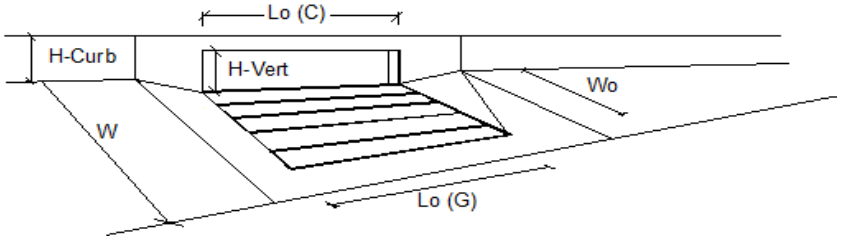
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**7.3**	**40.5**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.70 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 4.82 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening			
		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.70**	**4.55**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.00**	**0.27**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**94**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 1.7 cfs and Qmajor = 4.7 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	A20 to inl AAA1	A21 to inl AAA2	part A22 to inl BC1	A23 to inl B5	A25 to inl A6	A27 to inl A5	rem A26 to inl AD1
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade	On Grade	On Grade	On Grade	On Grade
Inlet Type	Denver No. 16 Valley Grate	CDOT Type R Curb Opening	Denver No. 16 Valley Grate	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	3.11	1.89	3.51	2.81	1.23	0.94	1.50
Major Q_{Known} (cfs)	7.88	4.45	7.31	6.08	3.13	2.29	3.13
	bypass from inlet FA1 (sub-basins A16, A17); next/downstream: sub-basin B4 (inlet DG1)	next/downstream: sub-basin B3 (inlet DG2)	approx half of flows computed for A22 (remainder assumed in roof drains); next/downstream: sub-basin A23 (inlet B5)	bypass from inlet BC1 (sub-basin A22); next/downstream: sub-basin B12 (inlet DB1)	next/downstream: sub-basin A28 (inlet AC1)	next/downstream: sub-basin A29 (inlet A2)	byppass from inlet AD2; next/downstream: sub-basin A29 (inlet A2)

Bypass (Carry-Over) Flow from Upstream Inlets must be organized from upstream (left) to downstream (right) in order for bypass flows to be linked.

Receive Bypass Flow from:	User-Defined	No Bypass Flow Received	No Bypass Flow Received	part A22 to inl BC1	No Bypass Flow Received	No Bypass Flow Received	User-Defined
Minor Bypass Flow Received, Q_b (cfs)	0.00	0.00	0.00	2.03	0.00	0.00	1.07
Major Bypass Flow Received, Q_b (cfs)	0.27	0.00	0.00	5.24	0.00	0.00	3.33

Watershed Characteristics

Subcatchment Area (acres)							
Percent Impervious							
NRCS Soil Type							

Watershed Profile

Overland Slope (ft/ft)							
Overland Length (ft)							
Channel Slope (ft/ft)							
Channel Length (ft)							

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)							
One-Hour Precipitation, P_1 (inches)							

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)							
One-Hour Precipitation, P_1 (inches)							

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**3.11**	**1.89**	**3.51**	**4.84**	**1.23**	**0.94**	**2.57**
Major Total Design Peak Flow, Q (cfs)	**8.15**	**4.45**	**7.31**	**11.32**	**3.13**	**2.29**	**6.46**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.99	0.00	2.03	0.00	0.00	0.00	0.55
Major Flow Bypassed Downstream, Q_b (cfs)	4.04	0.15	5.24	1.36	0.00	0.00	3.30

MHFD-Inlet, Version 5.02 (August 2022)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	A28 to inl AC1	A29 to inl A3	pt A31 + A29a inl A1	A30 to inl JA1	A24 + A32 to inl J3	A34 to inl B2	A36 to inl B1
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET	AREA	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade	In Sump	Swale	In Sump	In Sump
Inlet Type	Denver No. 16 Valley Grate	Denver No. 16 Valley Grate	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT TYPE D (Parallel)	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	0.56	0.55	2.24	6.87	0.99	2.23	1.29
Major Q_{Known} (cfs)	1.20	1.19	4.75	13.94	4.92	4.77	2.61
	bypass from inlet A5 (sub-basin A25); next/downstream: sub-basin A28a (inlet A1A)	bypass from inlets A4, AD1 (sub-basins A27, A26); next/downstream: sub-basin A29a (inlet A1)	bypass from inlet A3 (sub-basin A29); next/downstream: sub-basin B12 (inlet DB1)	next/downstream: sub-basin A37 (proposed on-site detention pond)	to rain garden to overflow inlet JA1; next/downstream: sub-basin A37 (on-site detention pond)	next/downstream: sub-basin A36 (inlet B1)	next/downstream: sub-basin A37 (on-site detention pond)

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	A25 to inl A6	User-Defined	A29 to inl A3	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.00	0.55	0.34	0.00	0.00	0.00	0.00
Major Bypass Flow Received, Q_b (cfs)	0.00	3.30	1.95	0.00	0.00	0.00	0.00

Watershed Characteristics

Subcatchment Area (acres)							
Percent Impervious							
NRCS Soil Type							

Watershed Profile

Overland Slope (ft/ft)							
Overland Length (ft)							
Channel Slope (ft/ft)							
Channel Length (ft)							

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)							
One-Hour Precipitation, P_1 (inches)							

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)							
One-Hour Precipitation, P_1 (inches)							

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**0.56**	**1.10**	**2.58**	**6.87**	**0.99**	**2.23**	**1.29**
Major Total Design Peak Flow, Q (cfs)	**1.20**	**4.49**	**6.70**	**13.94**	**4.92**	**4.77**	**2.61**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.05	0.34	0.00	N/A	0.00	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	0.20	1.95	1.00	N/A	0.00	N/A	N/A

MHFD-Inlet, Version 5.02 (August 2022)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	B1 to inl D9	pt OS12 + B2 to inl D8	B4 to inl DG1	B3 to inl DG2	B6 to inl DF2	B7 to inl DF1	B16 to inl DE1
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET	STREET	STREET	STREET
Hydraulic Condition	On Grade	On Grade	On Grade	On Grade	In Sump	In Sump	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	1.83	0.65	1.07	1.08	0.53	1.18	1.23
Major Q_{Known} (cfs)	3.86	5.36	2.62	2.31	1.31	2.73	2.54
	next/downstream: sub-basin B6 (inlet DF2)	part of sub-basin OS12 is approx 35%; next/downstream: sub-basin B7 (inlet DF1)	bypass from inlets EA2, EA1, AAA1, LS drains (sub-basins A8, A10, A11, A20); next/downstream: sub-basin B7 (inlet DF1)	bypass from inlets AAA2, B7 (sub-basins A21, A21a); next/downstream: sub-basin B7 (inlet DF1)	bypass from inlet D9, (sub-basin B1); next/downstream: sub-basin B15 (inlet DE2)	bypass from inlets D8, DG1, DG2 (sub-basins B2, B4, B3); next/downstream: sub-basin B16 (inlet DE1)	next/downstream: sub-basin B9 (inlet DD1)

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received	No Bypass Flow Received	User-Defined	User-Defined	B1 to inl D9	User-Defined	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.00	0.00	0.99	0.00	0.00	0.00	0.00
Major Bypass Flow Received, Q_b (cfs)	0.00	0.00	5.11	0.50	0.04	3.25	0.00

Watershed Characteristics

Subcatchment Area (acres)							
Percent Impervious							
NRCS Soil Type							

Watershed Profile

Overland Slope (ft/ft)							
Overland Length (ft)							
Channel Slope (ft/ft)							
Channel Length (ft)							

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)							
One-Hour Precipitation, P_1 (inches)							

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)							
One-Hour Precipitation, P_1 (inches)							

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**1.83**	**0.65**	**2.06**	**1.08**	**0.53**	**1.18**	**1.23**
Major Total Design Peak Flow, Q (cfs)	**3.86**	**5.36**	**7.73**	**2.81**	**1.35**	**5.98**	**2.54**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.00	0.00	0.00	0.00	N/A	N/A	N/A
Major Flow Bypassed Downstream, Q_b (cfs)	0.04	0.47	2.77	0.00	N/A	N/A	N/A

MHFD-Inlet, Version 5.02 (August 2022)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	B15 + B8 to inl DD2	B9 to inl DD1	B11 to inl DC2	B12 to inl DB1	B13 to inl DA2	B14 to inl DA1
Site Type (Urban or Rural)	URBAN	URBAN	URBAN	URBAN	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET	STREET	STREET	STREET	STREET
Hydraulic Condition	In Sump	In Sump	On Grade	On Grade	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening	CDOT Type R Curb Opening	Denver No. 16 Valley Grate	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	1.44	0.92	0.79	1.00	1.27	1.54
Major Q_{Known} (cfs)	3.04	2.02	1.80	2.27	2.52	3.99

	bypass from inlets DD1 (sub-basin B9); next/downstream: sub-basin B13 (inlet DA2)	bypass from inlets DB1, DE1 (sub-basins B12, B16); next/downstream: sub-basin B14 (inlet DA1)	bypass from inlet A1A (sub-basin A28a); next/downstream: sub-basin B14 (inlet DA1)	bypass from inlets B5, A1 (sub-basins A23, part of A31 + A29a); next/downstream: sub-basin B9 (inlet DD1)	next/downstream: sub-basin P1 (inlet H3)	bypass from inlet DC2 (sub-basin B11); next/downstream: sub-basin P2 (inlet H2)

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	User-Defined	User-Defined	User-Defined	User-Defined	No Bypass Flow Received	B11 to inl DC2
Minor Bypass Flow Received, Q_b (cfs)	0.00	1.44	0.00	0.00	0.00	0.00
Major Bypass Flow Received, Q_b (cfs)	-0.41	4.45	0.01	2.36	0.00	0.18

Watershed Characteristics

Subcatchment Area (acres)						
Percent Impervious						
NRCS Soil Type						

Watershed Profile

Overland Slope (ft/ft)						
Overland Length (ft)						
Channel Slope (ft/ft)						
Channel Length (ft)						

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)						
One-Hour Precipitation, P_1 (inches)						

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)						
One-Hour Precipitation, P_1 (inches)						

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**1.44**	**2.36**	**0.79**	**1.00**	**1.27**	**1.54**
Major Total Design Peak Flow, Q (cfs)	**2.63**	**6.47**	**1.81**	**4.63**	**2.52**	**4.17**
Minor Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	0.00	0.26	0.00	0.00
Major Flow Bypassed Downstream, Q_b (cfs)	N/A	N/A	0.18	1.95	0.00	0.00

MHFD-Inlet, Version 5.02 (August 2022)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	part A26 to inl AD2
Site Type (Urban or Rural)	URBAN
Inlet Application (Street or Area)	AREA
Hydraulic Condition	Swale
Inlet Type	CDOT Type C

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	3.00
Major Q_{Known} (cfs)	6.25

next/downstream: inlet AD1 (remainder of sub-basin A26)

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.00
Major Bypass Flow Received, Q_b (cfs)	0.00

Watershed Characteristics

Subcatchment Area (acres)	
Percent Impervious	
NRCS Soil Type	

Watershed Profile

Overland Slope (ft/ft)	
Overland Length (ft)	
Channel Slope (ft/ft)	
Channel Length (ft)	

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)	
One-Hour Precipitation, P_1 (inches)	

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)	
One-Hour Precipitation, P_1 (inches)	

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	**3.00**
Major Total Design Peak Flow, Q (cfs)	**6.25**
Minor Flow Bypassed Downstream, Q_b (cfs)	1.07
Major Flow Bypassed Downstream, Q_b (cfs)	3.33

MHFD-Inlet, Version 5.02 (August 2022)

INLET MANAGEMENT

Worksheet Protected

INLET NAME	A28a to inl A1A	A21a to inl B7
Site Type (Urban or Rural)	URBAN	URBAN
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	On Grade	On Grade
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening

USER-DEFINED INPUT

User-Defined Design Flows

Minor Q_{Known} (cfs)	0.46	1.05
Major Q_{Known} (cfs)	1.04	2.18

	bypass from inlet AC1 (sub-basin A28); next/downstream: inlet DC2 (sub-basin B11)	next/downstream: if bypass, inlet DG2 (sub-basin B3) to east forebay; storm sewer to west forebay

Bypass (Carry-Over) Flow from Upstream

Receive Bypass Flow from:	A28 to inl AC1	No Bypass Flow Received
Minor Bypass Flow Received, Q_b (cfs)	0.05	0.00
Major Bypass Flow Received, Q_b (cfs)	0.20	0.00

Watershed Characteristics

Subcatchment Area (acres)		
Percent Impervious		
NRCS Soil Type		

Watershed Profile

Overland Slope (ft/ft)		
Overland Length (ft)		
Channel Slope (ft/ft)		
Channel Length (ft)		

Minor Storm Rainfall Input

Design Storm Return Period, T_r (years)		
One-Hour Precipitation, P_1 (inches)		

Major Storm Rainfall Input

Design Storm Return Period, T_r (years)		
One-Hour Precipitation, P_1 (inches)		

CALCULATED OUTPUT

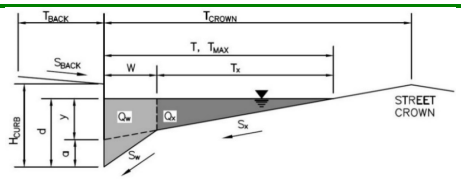
Minor Total Design Peak Flow, Q (cfs)	**0.51**	**1.05**
Major Total Design Peak Flow, Q (cfs)	**1.24**	**2.18**
Minor Flow Bypassed Downstream, Q_b (cfs)	0.00	0.00
Major Flow Bypassed Downstream, Q_b (cfs)	0.01	0.35

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **A20 to inl AAA1**

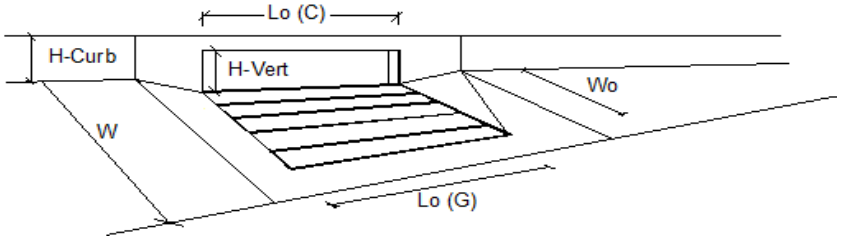


Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	15.5		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	15.0		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 =	0.0392		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	15.0	15.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.1	10.3	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Depth Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**7.1**	**15.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 3.11 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 8.15 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	Denver No. 16 Valley Grate		MINOR	MAJOR	
Type of Inlet		Type =	Denver No. 16 Valley Grate		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	2.0	2.0	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_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	N/A	N/A	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**2.12**	**4.11**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.99**	**4.04**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**68**	**50**	**%**

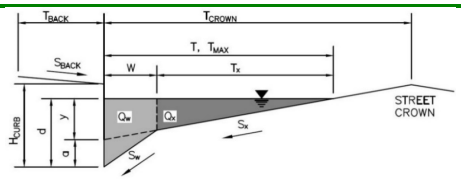
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 2.4 cfs and Qmajor = 5.1 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **A21 to inl AAA2**

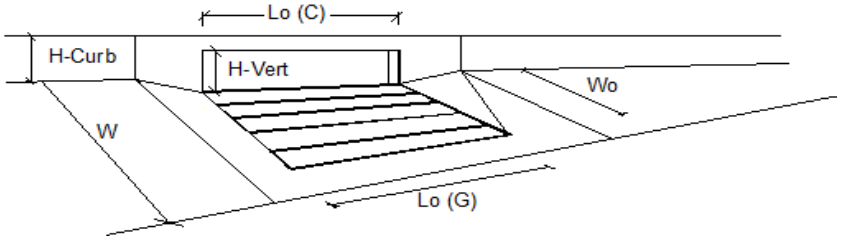


Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.9		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0		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 =	0.040		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.6	9.4	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Depth Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**10.7**	**11.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.89 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 4.45 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**1.89**	**4.30**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.00**	**0.15**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**100**	**97**	**%**

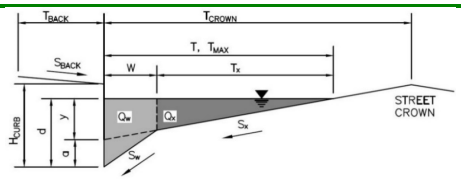
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 1.9 cfs and Qmajor = 4.4 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **part A22 to inl BC1**

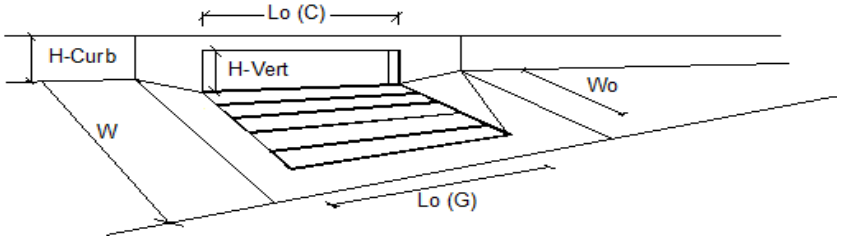


Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =			ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =			ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =			
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.015		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 =	0.048		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	12.9	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**8.1**	**25.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 3.51 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 7.31 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	Denver No. 16 Valley Grate	MINOR	MAJOR	
Type of Inlet	Type =	Denver No. 16 Valley Grate		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	2.0	2.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	N/A	N/A	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.48**	**2.07**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**2.03**	**5.24**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**42**	**28**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 1.7 cfs and Qmajor = 2.5 cfs)

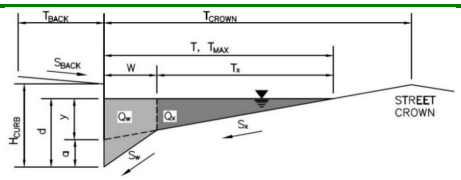
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**

Inlet ID: **A23 to inl B5**



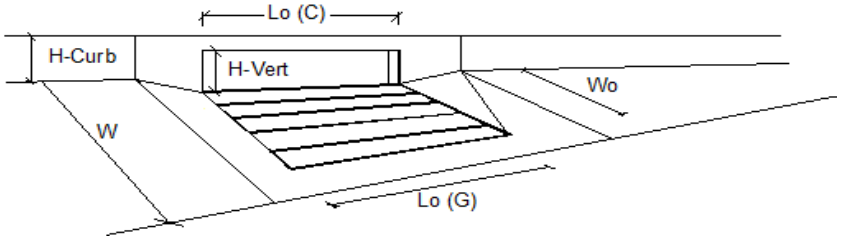
Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	23.5		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.0197		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	32.0		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 =	0.0164		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	32.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.00	7.60	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Spread Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**12.0**	**38.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 4.84 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 11.32 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**4.84**	**9.96**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.00**	**1.36**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**100**	**88**	**%**

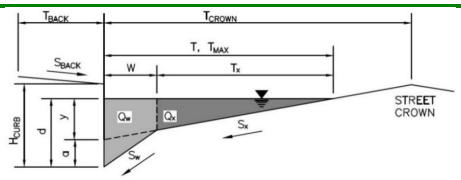
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 4.8 cfs and Qmajor = 10.2 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **A25 to inl A6**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	21.6	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.0176	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} =	12.9	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 =	0.045	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

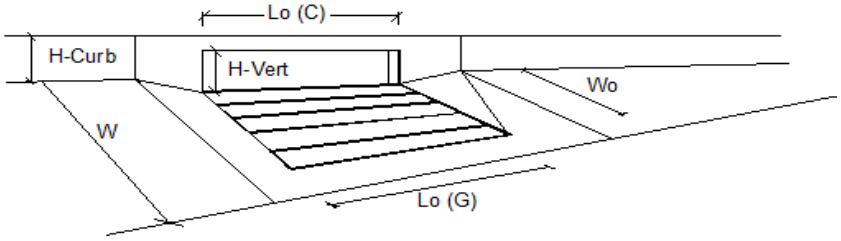
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	12.9	12.9	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.6	10.6	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**11.7**	**11.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.23 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 3.13 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.23**	**3.13**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.00**	**0.00**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**100**	**%**

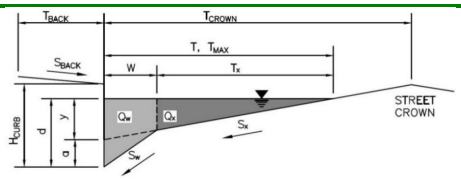
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 1.2 cfs and Qmajor = 3.1 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **A27 to inl A5**

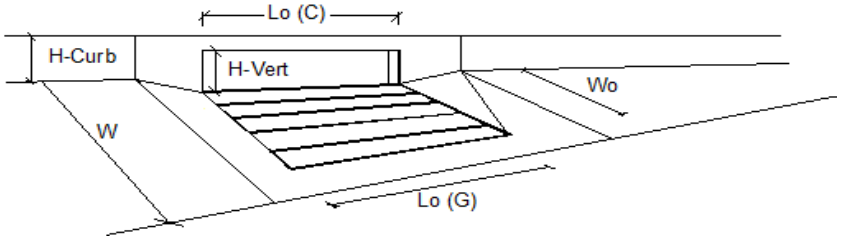


Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	21.3		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.018		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.2		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 =	0.0116		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.2	13.2	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.56	4.56	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**5.8**	**5.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.94 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 2.29 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening			
		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.94**	**2.29**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.00**	**0.00**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**100**	**%**

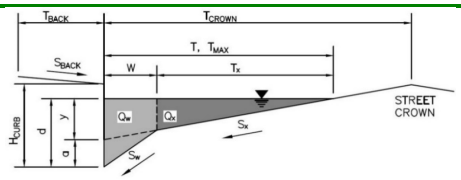
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 0.9 cfs and Qmajor = 2.3 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **rem A26 to inl AD1**

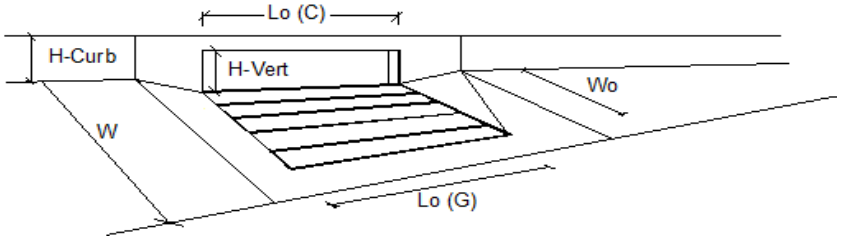


Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =			ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =			ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =			
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0		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 =	0.011		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Spread Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**6.0**	**14.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 2.57 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 6.46 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
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, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**2.01**	**3.16**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.55**	**3.30**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**78**	**49**	**%**

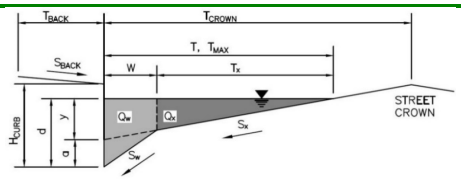
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 2.2 cfs and Qmajor = 3.5 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **A28 to inl AC1**

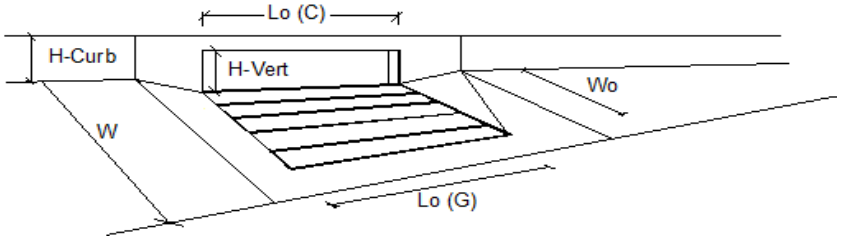


Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	21.5		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.0166		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0		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 =	0.0383		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	3.6	10.9	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Depth Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**4.5**	**11.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.56 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 1.20 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	Denver No. 16 Valley Grate			
		MINOR	MAJOR	
Type of Inlet	Type =	Denver No. 16 Valley Grate		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	2.0	2.0	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_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	N/A	N/A	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.51**	**1.00**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.05**	**0.20**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**90**	**83**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 0.5 cfs and Qmajor = 1.1 cfs)

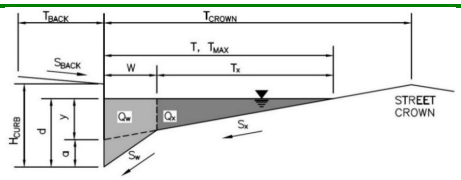
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**

Inlet ID: **A29 to inl A3**



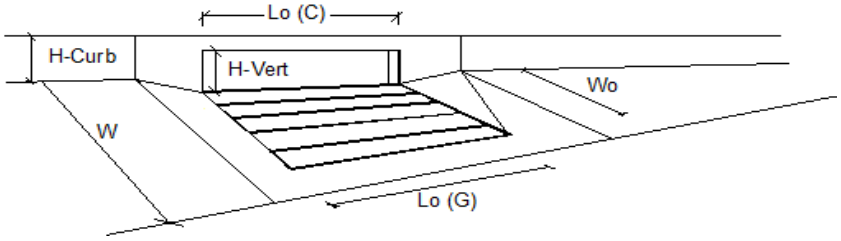
Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	21.5		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.0169		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0		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 =	0.0561		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	3.64	3.64	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Depth Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**5.7**	**5.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.10 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 4.49 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	Denver No. 16 Valley Grate		MINOR	MAJOR	
Type of Inlet		Type =	Denver No. 16 Valley Grate		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	2.0	2.0	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_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	N/A	N/A	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**0.76**	**2.53**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.34**	**1.95**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**69**	**56**	**%**

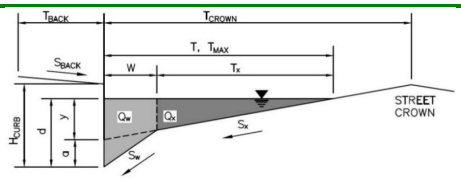
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 0.8 cfs and Qmajor = 3 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **pt A31 + A29a inl A1**

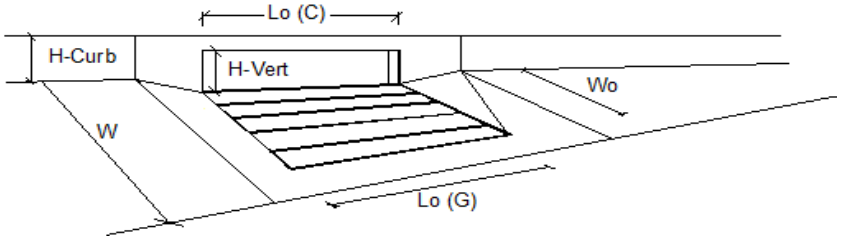


Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =			ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =			ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =			
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	24.0		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 =	0.060		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	24.0	24.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Depth Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**14.4**	**14.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 2.58 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 6.70 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



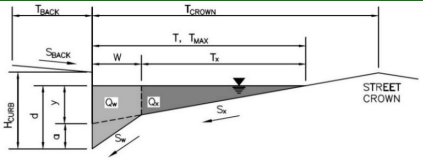
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**2.58**	**5.71**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.00**	**1.00**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**100**	**85**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 2.6 cfs and Qmajor = 5.9 cfs)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **A30 to inl JA1**



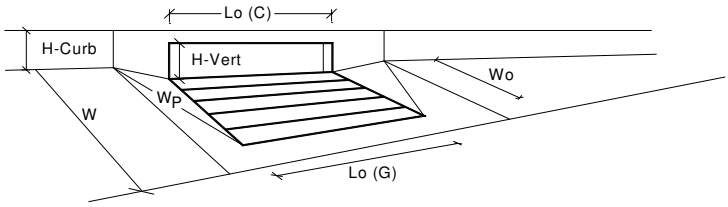
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	42.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.018	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	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	21.0	42.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening			
		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.61	6.00	inches

Grate Information		MINOR	MAJOR	☑ 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
Open Area 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_f (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	

Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	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_f (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	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.30	0.33	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.91	0.93	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	

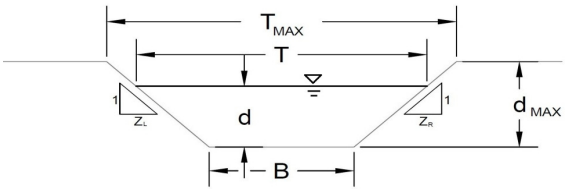
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**6.90**	**8.26**	**cfs**
WARNING: Inlet Capacity < Q Peak for Major Storm	$Q_{PEAK\ REQUIRED}$ =	6.87	13.94	cfs

MHFD-Inlet, Version 5.02 (August 2022)

AREA INLET IN A SWALE

ACME Brickyard - 200726

A24 + A32 to inl J3



This worksheet uses the NRCS vegetal retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D, or E =		
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	0.035	
Channel Invert Slope	S_O =	0.0250	ft/ft
Bottom Width	B =	0.00	ft
Left Side Slope	Z1 =	4.00	ft/ft
Right Side Sloe	Z2 =	4.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- Non-Cohesive
- Cohesive
- Paved

		Minor Storm	Major Storm	
Maximum Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	**4.00**	**8.00**	**ft**
Maximum Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	**0.35**	**0.65**	**ft**

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**1.01**	**5.27**	**cfs**
MAJOR STORM Allowable Capacity is based on Depth Criterion	d_{allow} =	**0.35**	**0.65**	**ft**

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	**0.99**	**4.92**	**cfs**
Water Depth	**d** =	**0.35**	**0.63**	**ft**

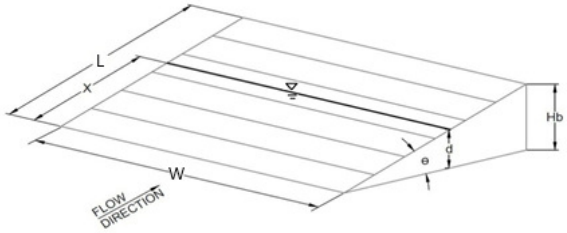
Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Inlet Design Information (Input)

Type of Inlet: CDOT TYPE D (Parallel) — Inlet Type = CDOT TYPE D (Parallel)

Angle of Inclined Grade (must be <= 30 degrees)	θ =	0.00 degrees
Width of Grade	W =	6.00 ft
Length of Grade	L =	3.00 ft
Open Area Ratio	A_{RATIO} =	0.70
Height of Inclined Grade	H_B =	0.00 ft
Clogging Factor	C_f =	0.38
Grate Discharge Coefficient	C_d =	0.76
Orifice Coefficient	C_o =	0.50
Weir Coefficient	C_w =	1.62



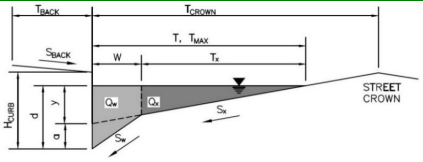
		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.35	0.63	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**5.27**	**13.00**	**cfs**
Bypassed Flow	Q_b =	**0.00**	**0.00**	**cfs**
Capture Percentage = Qa/Qo	**C%** =	**100**	**100**	**%**

Warning 04: Froude No. exceeds USDCM Volume I recommendation.

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **A34 to inl B2**



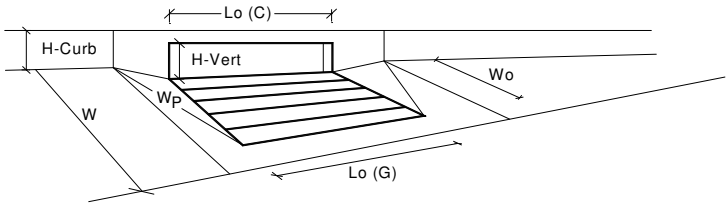
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	32.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.030	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	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	32.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	3.90	4.93	inches

Grate Information		MINOR	MAJOR	☑ 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
Open Area 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_f (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	

Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	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_f (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	

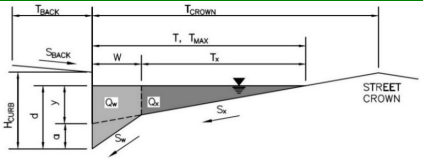
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.16	0.24	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.78	0.86	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**2.25**	**4.79**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	2.23	4.77	cfs

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **A36 to inl B1**



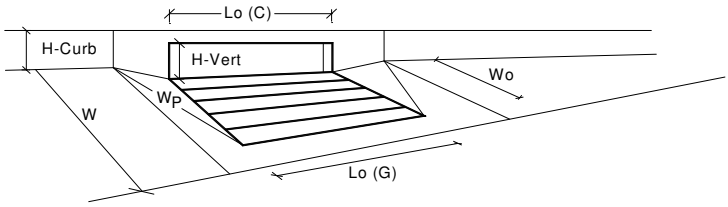
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	44.0	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	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	22.0	44.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening			
		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	3.38	4.08	inches
Grate Information		MINOR	MAJOR	☑ 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
Open Area 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_f (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	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	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_f (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	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.12	0.17	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.72	0.79	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**1.30**	**2.63**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	1.29	2.61	cfs

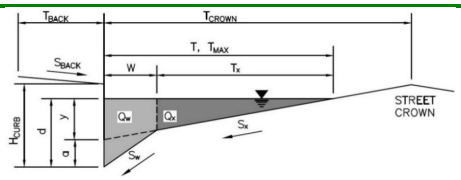
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**

Inlet ID: **B1 to inl D9**



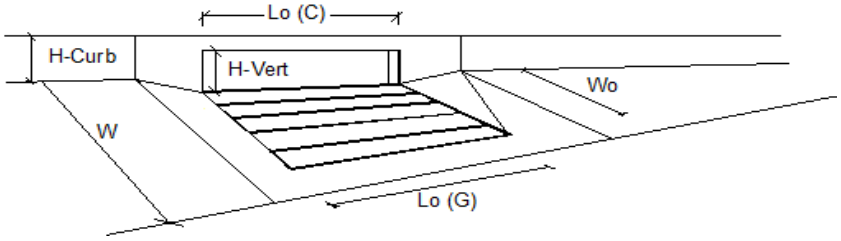
Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	18.5		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.013		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	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 =	0.0168		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.60	5.6	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**14.1**	**14.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.83 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 3.86 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**1.83**	**3.82**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.00**	**0.04**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**100**	**99**	**%**

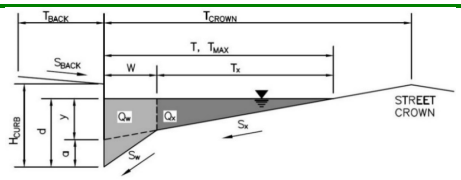
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 1.8 cfs and Qmajor = 3.9 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **pt OS12 + B2 to inl D8**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	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 =	0.0168	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

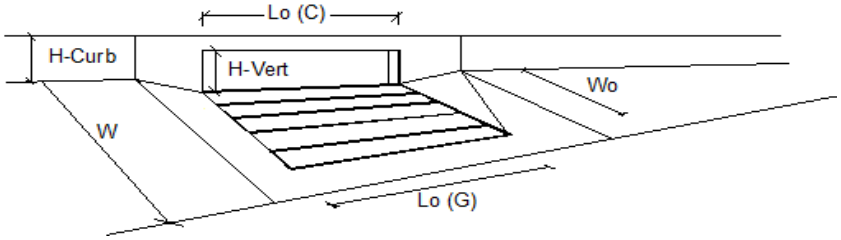
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.6	5.6	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**14.1**	**14.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.65 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 5.36 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input) — CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.65**	**4.89**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.00**	**0.47**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**91**	**%**

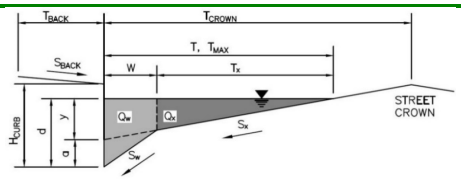
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 0.7 cfs and Qmajor = 5 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **B4 to inl DG1**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	13.8	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.018	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.002	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 =	0.0324	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

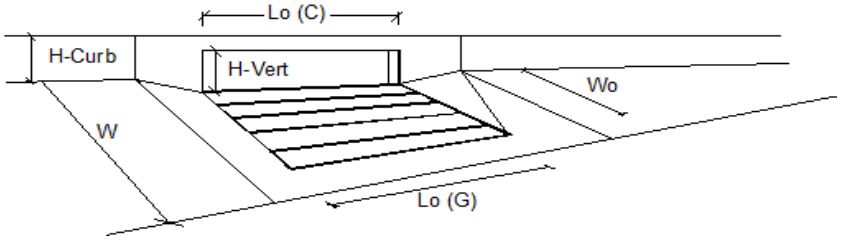
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	21.0	21.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	2.22	2.22	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**0.92**	**0.92**	**cfs**

WARNING: MINOR STORM max. allowable capacity is less than the design peak flow of 2.06 cfs on sheet 'Inlet Management'
WARNING: MAJOR STORM max. allowable capacity is less than the design peak flow of 7.73 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening			
		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	0.10	0.10	

Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MINOR & MAJOR STORM		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.06**	**4.95**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.00**	**2.77**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**64**	**%**

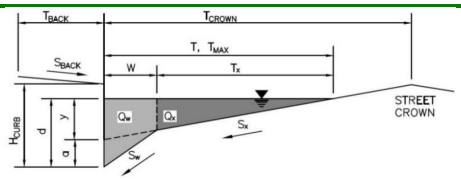
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 2.1 cfs and Qmajor = 5.2 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **B3 to inl DG2**

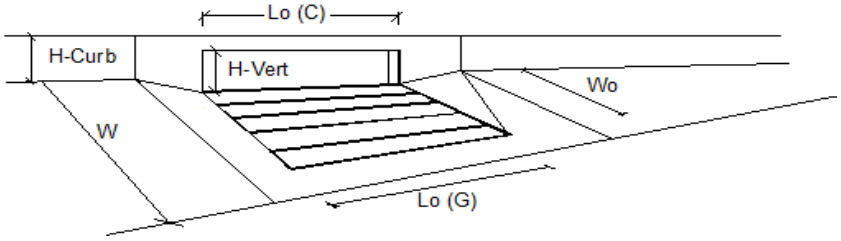


Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	13.8		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.019		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0		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 =	0.040		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	21.0	21.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.34	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Depth Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**16.2**	**16.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.08 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 2.81 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



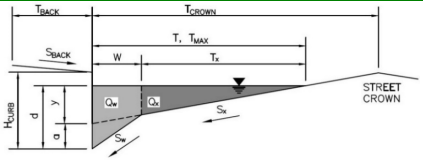
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**1.08**	**2.81**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.00**	**0.00**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**100**	**100**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 1.1 cfs and Qmajor = 2.8 cfs)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **B6 to inl DF2**



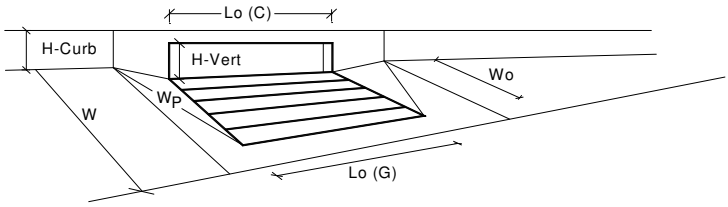
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	15.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.025	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	32.0	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	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	32.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.96	5.96	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	2.91	3.60	inches

Grate Information		MINOR	MAJOR	☑ 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
Open Area 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_f (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	

Curb Opening Information		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_f (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	

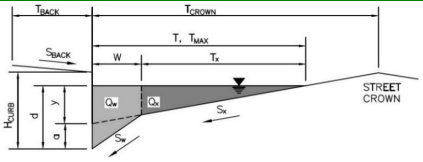
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.08	0.13	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.92	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**0.53**	**1.35**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	0.53	1.35	cfs

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

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

Project: ACME Brickyard - 200726
Inlet ID: B7 to inl DF1



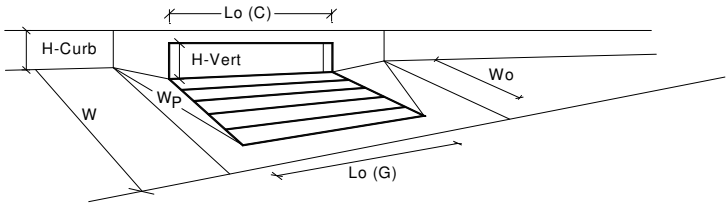
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	17.8	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.067	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	32.0	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	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	32.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.6	5.6	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)

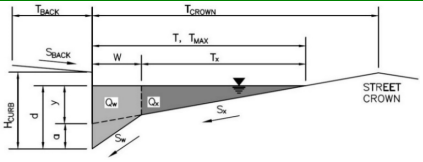


Design Information (Input)	CDOT Type R Curb Opening			
		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	3.31	5.33	inches
Grate Information		MINOR	MAJOR	☑ 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
Open Area 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_f (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	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	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_f (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	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.11	0.28	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.72	0.89	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**1.19**	**5.99**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	1.18	5.98	cfs

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **B16 to inl DE1**



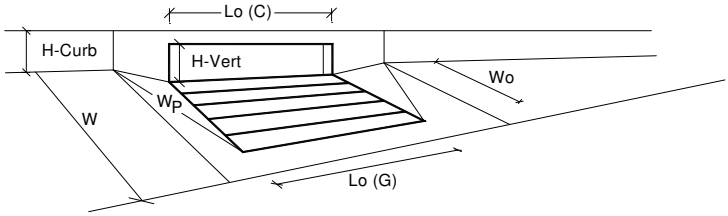
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	24.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.0217	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	32.0	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 =	0.0000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	32.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	3.0	3.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening	MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	1.16	1.16	inches

Grate Information		MINOR	MAJOR	☑ 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
Open Area 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_f (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	

Curb Opening Information		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_f (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	

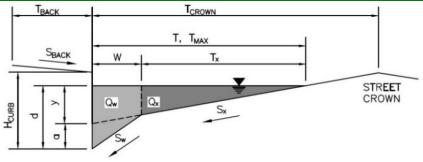
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.02	0.02	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.59	0.59	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**0.05**	**0.05**	**cfs**
WARNING: Inlet Capacity < Q Peak for Minor and Major Storms	$Q_{PEAK\ REQUIRED}$ =	1.23	2.54	cfs

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

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

Project: ACME Brickyard - 200726
Inlet ID: B15 + B8 to inl DD2



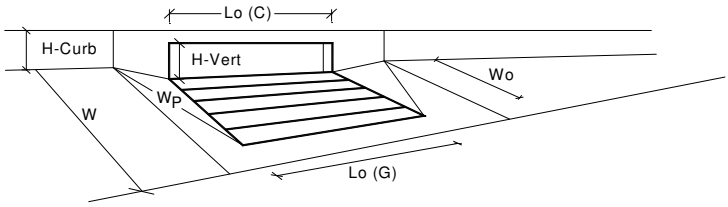
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	31.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.0174	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	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	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	11.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.6	5.6	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)

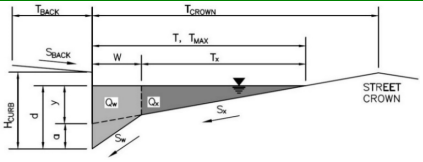


Design Information (Input)	CDOT Type R Curb Opening			
		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	3.47	4.26	inches
Grate Information		MINOR	MAJOR	☑ 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
Open Area 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_f (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	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	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_f (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	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.12	0.19	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.73	0.81	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**1.44**	**3.04**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	1.44	3.04	cfs

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

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

Project: ACME Brickyard - 200726
Inlet ID: B9 to inl DD1



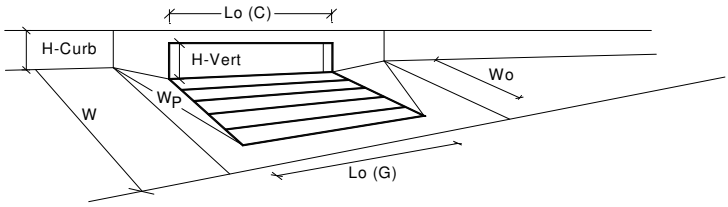
Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	33.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.0217	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	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	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	11.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	5.6	5.6	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is not applicable to Sump Condition				
MAJOR STORM Allowable Capacity is not applicable to Sump Condition	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening			
		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	3.97	5.48	inches

Grate Information		MINOR	MAJOR	☑ 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
Open Area 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_f (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	

Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	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_f (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	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.16	0.29	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.78	0.90	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	

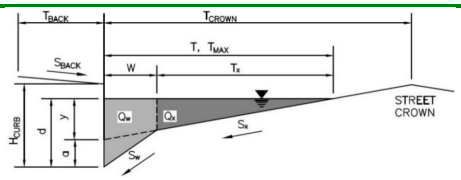
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**2.40**	**6.47**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	2.36	6.47	cfs

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **B11 to inl DC2**

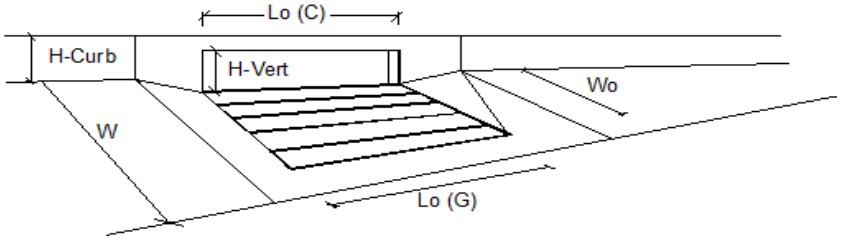


Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	16.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.0359		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0		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 =	0.049		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	15.0	21.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.56	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Depth Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**15.3**	**16.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.79 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 1.81 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
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, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**0.79**	**1.64**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.00**	**0.18**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**100**	**90**	**%**

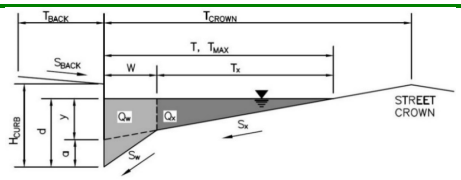
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 0.8 cfs and Qmajor = 1.7 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **B12 to inl DB1**

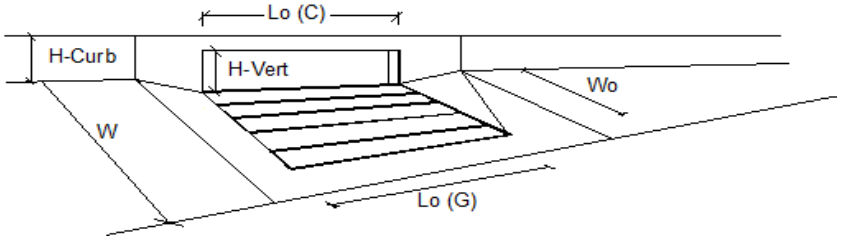


Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.0172		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.018		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	21.0		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 =	0.049		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	15.0	21.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.56	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Depth Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**15.3**	**16.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.00 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 4.63 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	Denver No. 16 Valley Grate	MINOR	MAJOR	
Type of Inlet	Type =	Denver No. 16 Valley Grate		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	2.0	2.0	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_o =	3.00	3.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	1.73	1.73	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f (G) =	0.50	0.50	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f (C) =	N/A	N/A	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.74**	**2.68**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.26**	**1.95**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**74**	**58**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 0.8 cfs and Qmajor = 3.1 cfs)

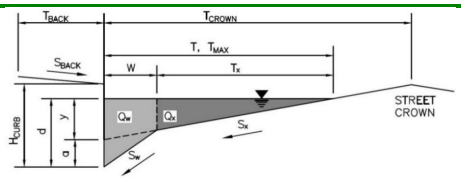
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**

Inlet ID: **B13 to inl DA2**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	6.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.015	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	32.0	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 =	0.0139	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	32.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	7.08	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

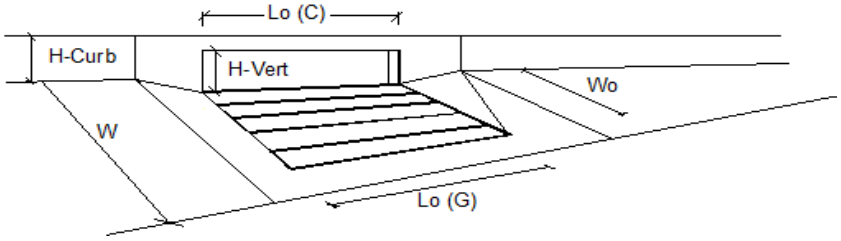
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**16.2**	**28.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.27 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 2.52 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.27**	**2.52**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.00**	**0.00**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**100**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 1.3 cfs and Qmajor = 2.5 cfs)

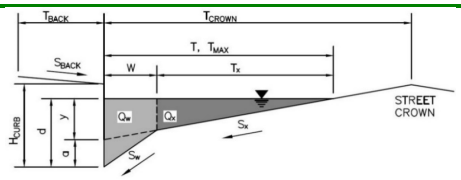
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: ACME Brickyard - 200726

Inlet ID: B14 to inl DA1



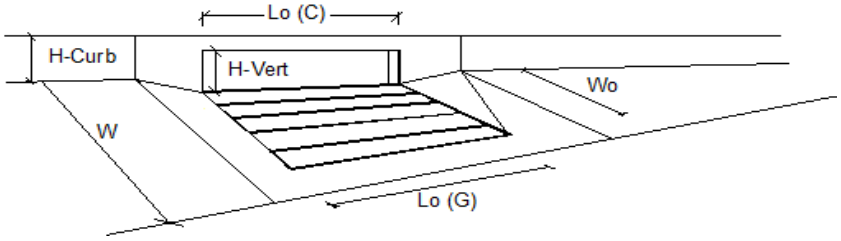
Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	39.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.0335		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	32.0		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 =	0.0139		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	32.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.2	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
MINOR STORM Allowable Capacity is based on Depth Criterion		Minor Storm	Major Storm	
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**16.2**	**67.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.54 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 4.17 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**1.54**	**4.17**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.00**	**0.00**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**100**	**100**	**%**

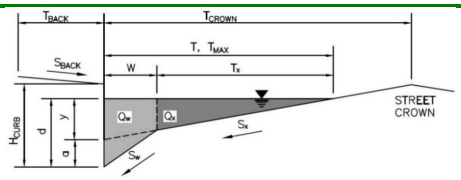
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 1.5 cfs and Qmajor = 4.2 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **rem A22 to inl BC1**

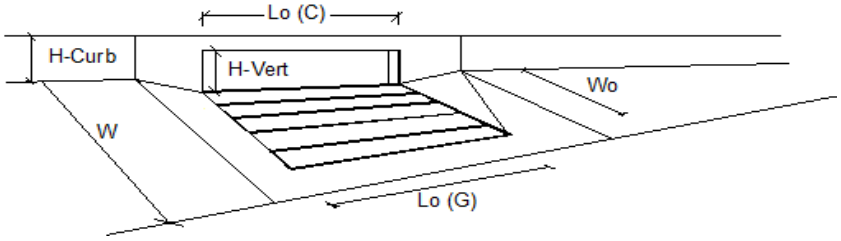


Gutter Geometry:				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	23.5		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	32.0		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 =	0.0164		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	32.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**12.0**	**75.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 4.98 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 11.95 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
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, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**2.83**	**4.12**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**2.15**	**7.83**	**cfs**
Capture Percentage = Q_a/Q_o		**C% =**	**57**	**34**	**%**

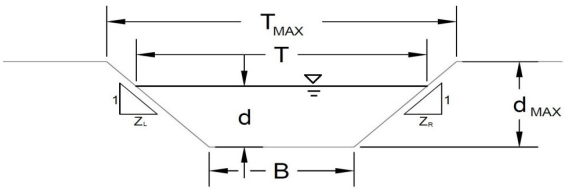
Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 3.1 cfs and Qmajor = 4.5 cfs)

MHFD-Inlet, Version 5.02 (August 2022)

AREA INLET IN A SWALE

ACME Brickyard - 200726

part A26 to inl AD2



This worksheet uses the NRCS vegetal retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D, or E =		
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	0.035	
Channel Invert Slope	S_O =	0.0478	ft/ft
Bottom Width	B =	0.00	ft
Left Side Slope	Z1 =	50.00	ft/ft
Right Side Sloe	Z2 =	6.74	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- Non-Cohesive
- Cohesive
- Paved

		Minor Storm	Major Storm	
Maximum Allowable Top Width of Channel for Minor & Major Storm	T_{MAX} =	**10.00**	**25.00**	**ft**
Maximum Allowable Water Depth in Channel for Minor & Major Storm	d_{MAX} =	**0.33**	**0.33**	**ft**

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Top Width Criterion	Q_{allow} =	**1.6**	**8.6**	**cfs**
MAJOR STORM Allowable Capacity is based on Depth Criterion	d_{allow} =	**0.18**	**0.33**	**ft**

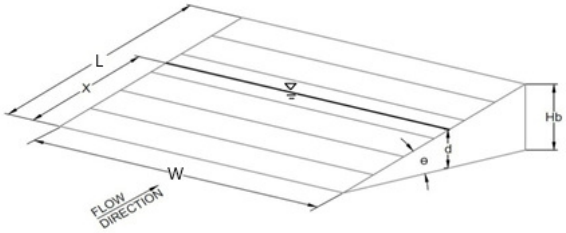
Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	Q_o =	**3.0**	**6.3**	**cfs**
Water Depth	d =	**0.22**	**0.29**	**ft**

WARNING: MINOR STORM max. allowable capacity is less than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Inlet Design Information (Input)

Type of Inlet: CDOT Type C — Inlet Type = CDOT Type C



Angle of Inclined Grate (must be <= 30 degrees)	θ =	0.00 degrees
Width of Grate	W =	3.00 ft
Length of Grate	L =	3.00 ft
Open Area Ratio	A_{RATIO} =	0.70
Height of Inclined Grate	H_B =	0.00 ft
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

		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	0.22	0.29	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**1.93**	**2.92**	**cfs**
Bypassed Flow	Q_b =	**1.07**	**3.33**	**cfs**
Capture Percentage = Qa/Qo	C% =	**64**	**47**	**%**

Warning 04: Froude No. exceeds USDCM Volume I recommendation.

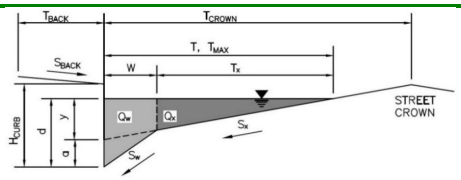
Warning 06: Top Width (T) exceeds max allowable top width (Tmax).

MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**
Inlet ID: **A28a to inl A1A**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	24.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.0183	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} =	13.0	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 =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

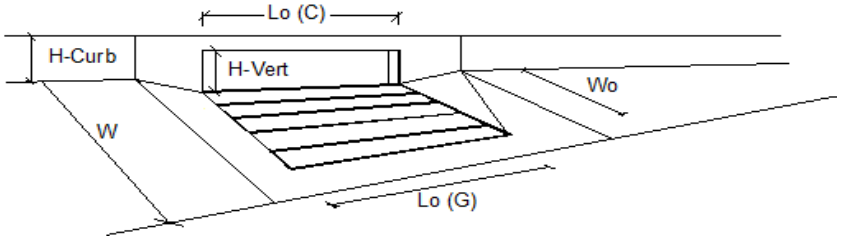
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	4.64	4.6	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**8.0**	**8.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 0.51 cfs on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design peak flow of 1.24 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
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, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.51**	**1.23**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.00**	**0.01**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**99**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 0.5 cfs and Qmajor = 1.2 cfs)

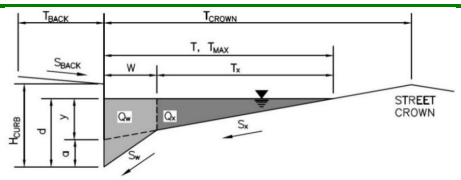
MHFD-Inlet, Version 5.02 (August 2022)

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

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

Project: **ACME Brickyard - 200726**

Inlet ID: **A21a to inl B7**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	31.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.0066	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} =	32.0	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 =	0.0105	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	32.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	8.47	inches
Allow Flow Depth at Street Crown (check box for yes, leave blank for no)		☐	☐	

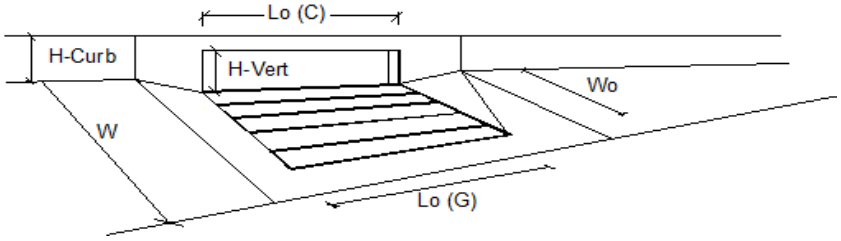
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**9.6**	**49.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design peak flow of 1.05 cfs on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design peak flow of 2.18 cfs on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

MHFD-Inlet, Version 5.02 (August 2022)

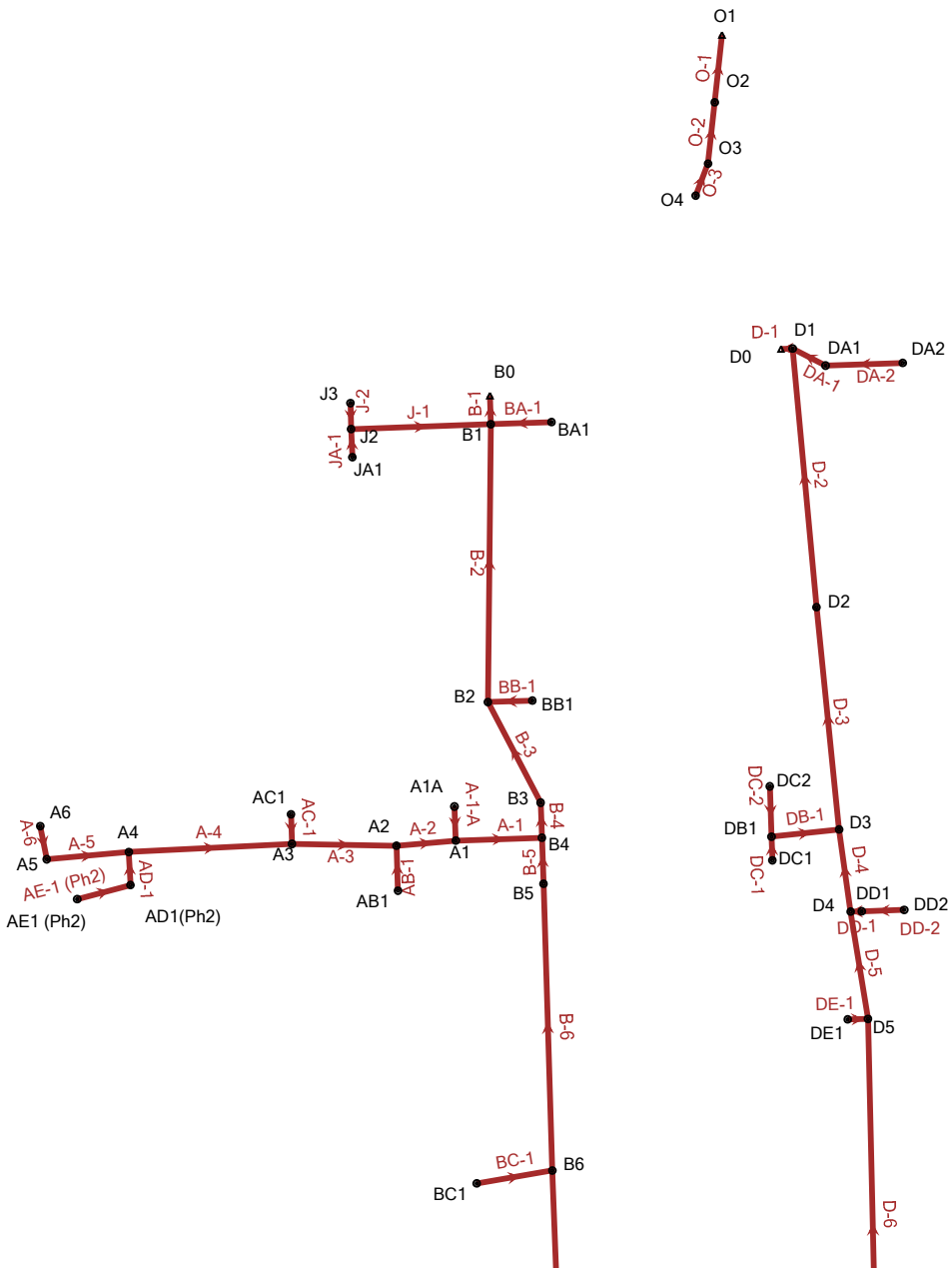


Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f (G) =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f (C) =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**1.05**	**1.83**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.00**	**0.35**	**cfs**
Capture Percentage = Q_a/Q_o	**C% =**	**100**	**84**	**%**

Note: Storm sewer should be sized for the sum of the unclogged interception capacities (Qminor = 1.1 cfs and Qmajor = 1.9 cfs)

The Brickyard
Network Schematic
Site, including CRSC



The Brickyard
Conduit FlexTable: Combined Pipe/Node Report
Active Scenario: 5-YR

Label	Start Node	Stop Node	Length (Unified) (ft)	Rise (Unified) (ft)	Notes	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Capacity (Full Flow) (cfs)	System Known Flow (cfs)	Velocity (ft/s)	Depth (Normal) (ft)	Froude Number (Normal)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)
A-1	A1	B4	71.00	2.00	24" RCP	6,235.63	6,233.12	0.0354	0.013	42.53	12.56	11.79	0.74	2.800	6,236.90	6,233.89	6,237.45	6,235.87	6,244.43	6,242.64
A-1-A	A1A	A1	27.33	1.50	18" RCP	6,240.20	6,238.63	0.0574	0.013	25.18	0.46	5.49	0.14	3.131	6,240.45	6,238.77	6,240.54	6,239.24	6,244.49	6,244.43
A-2	A2	A1	50.17	2.00	24" RCP	6,237.65	6,235.88	0.0353	0.013	42.49	11.78	11.57	0.72	2.801	6,238.88	6,237.12	6,239.40	6,237.64	6,245.20	6,244.43
A-3	A3	A2	87.27	1.50	18" RCP	6,240.70	6,238.65	0.0235	0.013	16.10	7.20	8.86	0.70	2.119	6,241.74	6,239.35	6,242.21	6,240.57	6,247.55	6,245.20
A-4	A4	A3	139.37	1.50	18" RCP	6,242.95	6,240.95	0.0144	0.013	12.58	6.29	7.12	0.75	1.637	6,243.92	6,242.08	6,244.34	6,242.38	6,254.32	6,247.55
A-5	A5	A4	68.09	1.50	18" RCP	6,244.67	6,243.20	0.0216	0.013	15.43	2.12	6.12	0.38	2.092	6,245.22	6,243.93	6,245.42	6,244.02	6,256.20	6,254.32
A-6	A6	A5	27.45	1.50	18" RCP	6,247.50	6,246.67	0.0302	0.013	18.26	1.23	5.89	0.26	2.425	6,247.92	6,246.93	6,248.06	6,247.47	6,256.18	6,256.20
AA-1	AA1	B8	99.55	2.50	30" RCP	6,240.35	6,237.68	0.0268	0.013	67.17	12.59	10.49	0.73	2.547	6,241.54	6,238.42	6,242.00	6,240.11	6,250.02	6,247.67
AA-2	AA2	AA1	272.67	2.00	24" RCP	6,251.18	6,240.85	0.0379	0.013	44.03	7.74	10.54	0.57	2.913	6,252.17	6,241.42	6,252.56	6,243.15	6,263.07	6,250.02
AAA-1	AAA1	AA1	10.09	1.50	18" RCP	6,242.80	6,242.60	0.0198	0.013	14.79	4.94	7.53	0.60	1.987	6,243.65	6,243.28	6,244.01	6,243.90	6,249.77	6,250.02
AAA-2	AAA2	AAA1	33.86	1.50	18" RCP	6,243.80	6,243.05	0.0222	0.013	15.63	1.89	5.98	0.35	2.113	6,244.32	6,243.65	6,244.51	6,243.78	6,250.04	6,249.77
AB-1	AB1	A2	23.50	1.50	18" RCP	6,239.36	6,238.65	0.0302	0.013	18.26	5.13	8.87	0.54	2.470	6,240.23	6,239.24	6,240.59	6,240.21	6,246.21	6,245.20
AC-1	AC1	A3	24.08	1.50	18" RCP	6,242.92	6,242.50	0.0174	0.013	13.87	0.56	3.84	0.21	1.800	6,243.20	6,242.71	6,243.29	6,242.93	6,247.55	6,247.55
AD-1	AD1(Ph2)	A4	26.84	1.50	18" RCP	6,245.40	6,244.95	0.0168	0.013	13.60	4.50	6.91	0.59	1.828	6,246.21	6,245.57	6,246.54	6,246.23	6,255.23	6,254.32
AE-1 (Ph2)	AE1 (Ph2)	AD1(Ph2)	45.95	1.00	18" RCP	6,252.40	6,251.20	0.0261	0.013	5.76	3.00	7.41	0.51	2.051	6,253.14	6,251.72	6,253.50	6,252.56	6,255.14	6,255.23
B-1	B1	B0	23.83	4.00	48" RCP	6,221.47	6,221.35	0.0050	0.013	101.93	53.67	8.22	2.06	1.133	6,224.34	6,224.34	6,224.82	6,224.78	6,240.33	6,235.53
B-2	B2	B1	243.12	3.50	42" RCP	6,224.66	6,222.47	0.0090	0.013	95.48	46.80	9.87	1.73	1.496	6,226.80	6,224.20	6,227.70	6,225.71	6,241.71	6,240.33
B-3	B3	B2	99.21	3.50	42" RCP	6,230.17	6,229.66	0.0051	0.013	72.13	43.94	7.86	1.97	1.093	6,232.24	6,231.63	6,233.09	6,232.59	6,242.71	6,241.71
B-4	B4	B3	28.67	3.50	42" RCP	6,230.70	6,230.42	0.0098	0.013	99.42	43.94	10.01	1.63	1.575	6,232.77	6,232.20	6,233.63	6,233.44	6,242.64	6,242.71
B-5	B5	B4	30.80	3.50	42" RCP	6,231.11	6,230.95	0.0052	0.013	72.51	34.21	7.43	1.69	1.141	6,232.92	6,232.82	6,233.64	6,233.49	6,243.76	6,242.64
B-6	B6	B5	246.64	3.50	42" RCP	6,232.62	6,231.36	0.0051	0.013	71.91	32.77	7.30	1.66	1.136	6,234.39	6,233.02	6,235.09	6,233.85	6,247.94	6,243.76
B-7	B7	B6	294.77	3.00	36" RCP	6,234.59	6,233.12	0.0050	0.013	47.10	28.50	6.98	1.68	1.050	6,236.32	6,234.80	6,237.03	6,235.56	6,248.56	6,247.94
B-8	B8	B7	68.67	3.00	36" RCP	6,235.18	6,234.84	0.0050	0.013	46.93	27.91	6.93	1.67	1.050	6,236.89	6,236.51	6,237.59	6,237.25	6,247.67	6,248.56
BA-1	BA1	B1	48.83	1.50	18" RCP	6,233.00	6,227.47	0.1133	0.013	35.35	3.13	12.34	0.30	4.738	6,233.67	6,227.77	6,233.93	6,230.14	6,240.89	6,240.33
BB-1	BB1	B2	34.34	1.50	18" PVC	6,227.00	6,226.66	0.0099	0.013	10.45	1.29	4.02	0.36	1.412	6,227.43	6,227.31	6,227.58	6,227.35	6,241.71	6,241.71
BC-1	BC1	B6	67.40	1.50	18" RCP	6,244.00	6,240.60	0.0504	0.013	23.59	7.02	11.65	0.56	3.186	6,245.03	6,241.17	6,245.49	6,243.22	6,249.51	6,247.94
D-1	D1	D0	8.00	4.00	48" RCP	6,219.69	6,219.64	0.0062	0.013	113.55	15.39	1.22	0.99	1.325	6,224.34	6,224.34	6,224.36	6,224.36	6,232.27	6,231.65
D-2	D2	D1	227.06	3.00	36" RCP	6,222.83	6,221.69	0.0050	0.013	47.26	14.03	5.83	1.12	1.128	6,224.35	6,224.35	6,224.59	6,224.42	6,230.35	6,232.27
D-3	D3	D2	197.82	3.00	36" RCP	6,224.57	6,223.58	0.0050	0.013	47.18	13.54	5.76	1.10	1.127	6,225.74	6,224.68	6,226.18	6,225.20	6,231.26	6,230.35
D-4	D4	D3	73.61	3.00	36" RCP	6,225.19	6,224.82	0.0050	0.013	47.29	10.17	5.33	0.94	1.136	6,226.20	6,225.76	6,226.57	6,226.21	6,230.88	6,231.26
D-5	D5	D4	96.23	3.00	36" RCP	6,225.92	6,225.44	0.0050	0.013	47.10	8.99	5.13	0.89	1.132	6,226.87	6,226.33	6,227.21	6,226.74	6,231.14	6,230.88
D-6	D6	D5	371.57	2.50	30" RCP	6,229.16	6,226.42	0.0074	0.013	35.22	8.54	5.91	0.84	1.333	6,230.13	6,227.26	6,230.50	6,227.80	6,234.74	6,231.14
D-7	D7	D6	76.05	2.50	30" RCP	6,229.79	6,229.41	0.0050	0.013	28.99	7.69	4.99	0.88	1.095	6,230.71	6,230.29	6,231.05	6,230.68	6,235.47	6,234.74
D-8	D8	D7	46.58	2.50	30" RCP	6,230.34	6,229.99	0.0075	0.013	35.55	4.48	4.95	0.60	1.342	6,231.04	6,230.71	6,231.29	6,230.94	6,235.92	6,235.47
D-9	D9	D8	34.53	2.00	24" RCP	6,231.14	6,230.84	0.0087	0.013	21.09	3.92	5.13	0.58	1.396	6,231.83	6,231.43	6,232.09	6,231.83	6,236.64	6,235.92
D-10	D10	D9	35.34	2.00	24" RCP	6,232.70	6,232.14	0.0158	0.013	28.48	1.83	5.09	0.34	1.839	6,233.17	6,232.48	6,233.33	6,232.89	6,237.06	6,236.64
DA-1	DA1	D1	29.26	1.50	18" RCP	6,222.44	6,222.19	0.0085	0.013	9.71	2.65	1.50	0.54	1.314	6,224.36	6,224.34	6,224.40	6,224.38	6,227.06	6,232.27
DA-2	DA2	DA1	65.33	1.50	18" RCP	6,223.07	6,222.69	0.0058	0.013	8.01	1.27	3.31	0.40	1.088	6,224.41	6,224.40	6,224.42	6,224.41	6,227.10	6,227.06
DB-1	DB1	D3	54.93	1.50	18" RCP	6,228.07	6,226.07	0.0364	0.013	20.04	6.83	10.26	0.60	2.690	6,229.08	6,226.69	6,229.53	6,228.22	6,233.00	6,231.26
DC-1	DC1	DB1	17.10	1.00	12" PVC	6,228.61	6,228.32	0.0170	0.013	4.64	5.09	6.48	(N/A)	1.143	6,229.86	6,229.51	6,230.51	6,230.16	6,231.32	6,233.00
DC-2	DC2	DB1	41.71	1.50	18" RCP	6,229.21	6,228.82	0.0094	0.013	10.16	0.79	3.42	0.28	1.357	6,229.54	6,229.39	6,229.66	6,229.41	6,233.60	6,233.00
DD-1	DD1	D4	7.75	1.50	18" RCP	6,226.07	6,226.03	0.0052	0.013	7.55	2.29	3.75	0.57	1.019	6,226.64	6,226.60	6,226.85	6,226.81	6,230.70	6,230.88
DD-2	DD2	DD1	35.33	1.50	18" RCP	6,226.50	6,226.32	0.0051	0.013	7.50	1.44	3.27	0.45	1.019	6,226.95	6,226.77	6,227.11	6,226.93	6,230.33	6,230.70
DE-1	DE1	D5	17.97	1.50	18" RCP	6,227.10	6,226.96	0.0078	0.013	9.27	1.23	3.64	0.37	1.256	6,227.51	6,227.33	6,227.66	6,227.54	6,231.23	6,231.14
DF-1	DF1	D6	12.48	1.50	18" RCP	6,230.60	6,230.43	0.0136	0.013	12.26	1.18	4.39	0.31	1.648	6,231.01	6,230.75	6,231.15	6,231.03	6,234.90	6,234.74
DF-2	DF2	D6	39.36	1.50	18" RCP	6,230.83	6,230.43	0.0102	0.013	10.59	0.53	3.12	0.23	1.388	6,231.10	6,230.66	6,231.19	6,230.81	6,235.09	6,234.74
DG-1	DG1	D7	40.75	2.00	24" RCP	6,231.74	6,231.00	0.0182	0.013	30.48	6.24	7.63	0.61	2.019	6,232.62	6,231.63	6,232.96	6,232.46	6,236.99	6,235.47
DG-2	DG3	DG1	20.12	1.50	18" PVC	6,232.97	6,232.81	0.0080	0.013	9.37	5.17	5.43	0.80	1.201	6,233.85	6,233.61	6,234.21	6,234.06	6,238.26	6,236.99
DH-1	DH1	D9	16.00	2.00	24" RCP	6,232.22	6,232.14	0.0050	0.013	16.00	0.65	2.49	0.28	1.011	6,232.50	6,232.42	6,232.59	6,232.51	6,236.42	6,236.64
DJ-1	DJ1	D8	39.40	1.50	18" RCP	6,234.01	6,232.20	0.0459	0.013	22.51	1.07	6.54	0.22	2.943	6,234.40	6,232.42	6,234.53	6,233.09	6,237.32	6,235.92
E-1	E1	B8	40.65	2.50	30" RCP	6,238.75	6,238.18	0.0140	0.013	48.57	16.75	8.98	1.01	1.817	6,240.13	6,239.26	6,240.69	6,240.32	6,249.18	6,247.67
E-2	E2	E1	25.55	2.00	24" RCP	6,239.80	6,239.25	0.0215	0.013	33.19	13.68	10.05	0.89	2.143	6,241.13	6,240.25	6,241.72	6,241.43	6,247.99	6,249.18

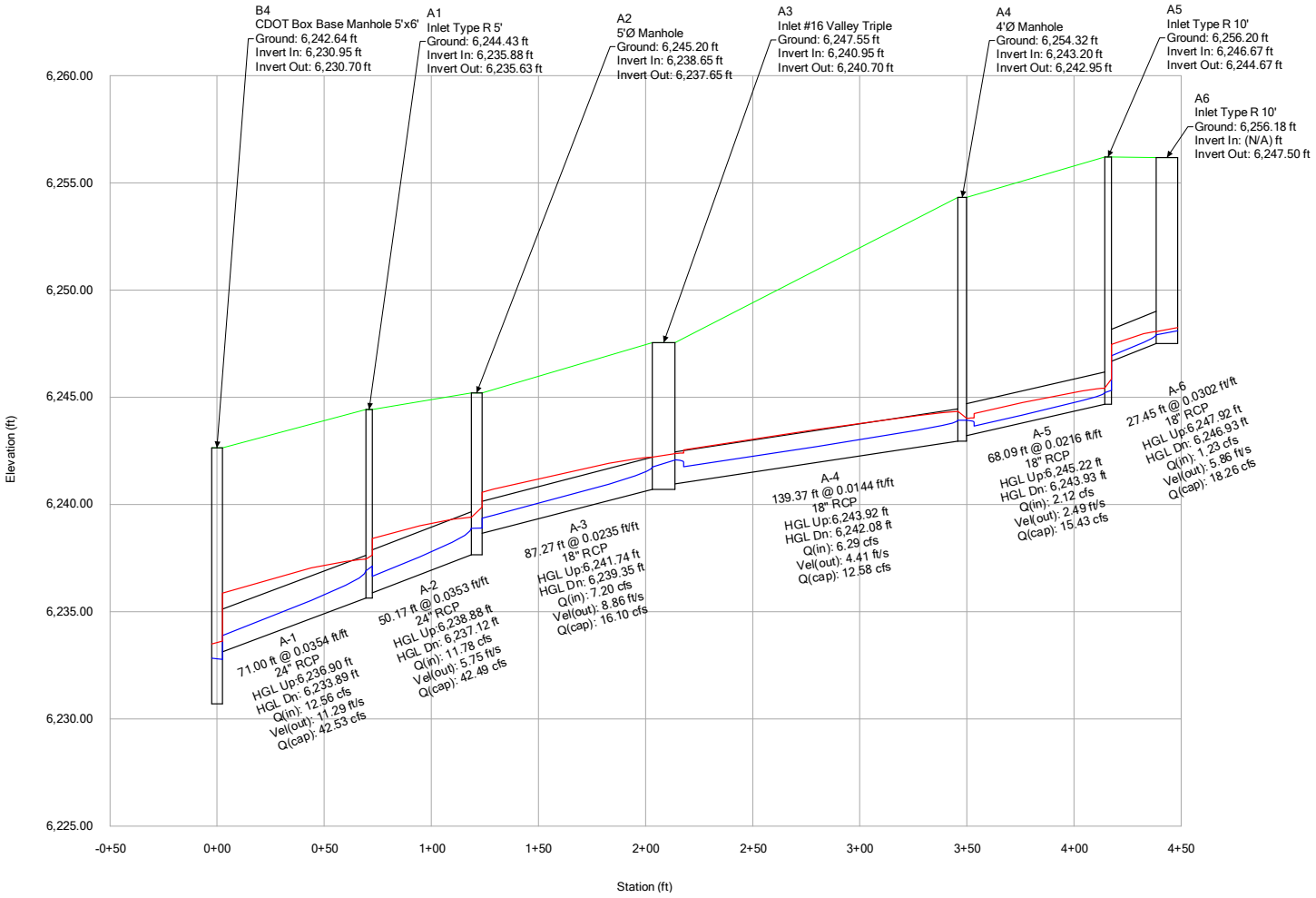
The Brickyard
Conduit FlexTable: Combined Pipe/Node Report
Active Scenario: 5-YR

Label	Start Node	Stop Node	Length (Unified) (ft)	Rise (Unified) (ft)	Notes	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Capacity (Full Flow) (cfs)	System Known Flow (cfs)	Velocity (ft/s)	Depth (Normal) (ft)	Froude Number (Normal)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)
E-3	E3	E2	375.02	2.00	24" RCP	6,248.64	6,240.05	0.0229	0.013	34.24	13.68	10.29	0.88	2.216	6,249.97	6,240.93	6,250.56	6,242.57	6,260.64	6,247.99
E-4	E4	E3	72.11	2.00	24" RCP	6,250.92	6,248.89	0.0282	0.013	37.95	11.54	10.60	0.76	2.496	6,252.14	6,249.67	6,252.65	6,251.30	6,260.55	6,260.64
E-5	E5	E4	81.40	1.50	18" RCP	6,255.46	6,253.42	0.0251	0.013	16.63	7.87	9.28	0.73	2.177	6,256.55	6,254.15	6,257.06	6,255.48	6,265.34	6,260.55
E-6	E6	E5	193.51	1.50	18" RCP	6,260.25	6,256.21	0.0209	0.013	15.18	6.26	8.17	0.67	2.011	6,261.22	6,256.88	6,261.64	6,257.92	6,269.40	6,265.34
E-7	E7	E6	12.83	1.50	18" RCP	6,261.28	6,261.00	0.0218	0.013	15.52	6.26	8.31	0.66	2.060	6,262.25	6,261.75	6,262.67	6,262.52	6,269.61	6,269.40
E-8	E8	E7	26.74	1.50	18" RCP	6,262.50	6,262.03	0.0176	0.013	13.93	4.48	7.02	0.59	1.874	6,263.31	6,262.64	6,263.64	6,263.32	6,270.34	6,269.61
E-9	E9	E8	39.36	1.50	18" RCP	6,263.51	6,263.25	0.0066	0.013	8.54	2.74	4.30	0.58	1.149	6,264.14	6,263.83	6,264.38	6,264.12	6,271.24	6,270.34
E-10	E10	E9	36.33	1.50	18" RCP	6,263.94	6,263.76	0.0050	0.013	7.39	2.56	3.80	0.61	0.992	6,264.55	6,264.51	6,264.77	6,264.64	6,271.08	6,271.24
EA-1	EA1	E1	5.69	1.50	18" RCP	6,242.94	6,242.76	0.0316	0.013	18.68	2.85	7.64	0.40	2.537	6,243.58	6,243.24	6,243.82	6,243.76	6,249.33	6,249.18
EA-2	EA2	EA1	27.33	1.50	18" RCP	6,243.44	6,243.17	0.0099	0.013	10.44	1.76	4.39	0.42	1.418	6,243.94	6,243.69	6,244.12	6,243.85	6,249.74	6,249.33
EC-1	EC1	E4	68.96	1.50	18" RCP	6,257.16	6,255.00	0.0313	0.013	18.59	4.18	8.49	0.48	2.525	6,257.94	6,255.48	6,258.25	6,256.60	6,263.77	6,260.55
EC-2	EC2	EC1	47.37	1.50	18" RCP	6,260.32	6,259.43	0.0188	0.013	14.40	1.42	5.19	0.32	1.936	6,260.77	6,259.75	6,260.93	6,260.17	6,264.58	6,263.77
F-1	F1	AA2	18.34	1.50	18" RCP	6,252.55	6,252.18	0.0202	0.013	14.92	7.74	8.52	0.77	1.930	6,253.63	6,253.02	6,254.13	6,253.91	6,263.49	6,263.07
F-2	F2	F1	137.96	1.50	18" RCP	6,258.06	6,252.80	0.0381	0.013	20.51	5.17	9.67	0.51	2.782	6,258.94	6,253.31	6,259.30	6,254.77	6,266.68	6,263.49
F-3	F3	F2	32.51	1.50	18" RCP	6,258.96	6,258.31	0.0200	0.013	14.85	5.17	7.65	0.61	1.991	6,259.84	6,258.95	6,260.20	6,259.76	6,267.30	6,266.68
F-4	F4	F3	182.63	1.50	18" RCP	6,263.50	6,259.21	0.0235	0.013	16.10	1.81	6.03	0.34	2.173	6,264.01	6,259.84	6,264.19	6,259.95	6,271.00	6,267.30
F-5	F5	F4	18.04	1.50	18" RCP	6,264.80	6,264.25	0.0305	0.013	18.34	1.81	6.61	0.32	2.467	6,265.31	6,264.58	6,265.49	6,265.17	6,270.58	6,271.00
FA-1	FA1	F1	18.75	1.50	18" RCP	6,253.75	6,253.30	0.0240	0.013	16.27	2.93	6.98	0.43	2.212	6,254.40	6,253.76	6,254.65	6,254.39	6,263.60	6,263.49
FB-1	FB1	F3	19.67	1.50	18" RCP	6,259.95	6,259.71	0.0122	0.013	11.60	3.48	5.74	0.56	1.566	6,260.66	6,260.29	6,260.94	6,260.76	6,267.32	6,267.30
G-1	G2	G1	61.28	4.00	48" RCP	6,186.94	6,186.63	0.0051	0.013	102.16	50.77	8.12	1.99	1.144	6,189.08	6,188.63	6,189.94	6,189.64	6,195.63	6,193.76
G-2	G3	G2	180.96	4.00	48" RCP	6,189.90	6,187.19	0.0150	0.013	175.77	49.02	11.98	1.44	2.048	6,192.00	6,188.65	6,192.84	6,190.82	6,201.42	6,195.63
G-3	G4	G3	185.39	4.00	48" RCP	6,193.00	6,190.15	0.0154	0.013	178.09	49.02	12.10	1.43	2.076	6,195.10	6,191.60	6,195.94	6,193.81	6,203.93	6,201.42
G-4	G5	G4	79.13	4.00	48" RCP	6,195.00	6,193.25	0.0221	0.013	213.60	44.52	13.43	1.24	2.501	6,197.00	6,194.59	6,197.78	6,196.85	6,205.97	6,203.93
G-5	G6	G5	46.80	1.50	18" RCP	6,200.50	6,198.50	0.0427	0.013	21.71	1.31	6.78	0.25	2.873	6,200.93	6,198.75	6,201.08	6,199.46	6,205.64	6,205.97
GA-1	GA2	GA1	19.33	1.50	18" RCP	6,186.73	6,186.63	0.0052	0.013	7.55	3.52	4.20	0.72	0.991	6,187.45	6,187.35	6,187.72	6,187.62	6,191.20	6,193.14
GA-2	GA3	GA2	57.36	1.50	18" RCP	6,187.27	6,186.98	0.0051	0.013	7.47	1.47	3.28	0.45	1.015	6,187.72	6,187.45	6,187.89	6,187.60	6,191.08	6,191.20
GC-1	GC1	G5	16.51	3.00	36" RCP	6,199.15	6,199.00	0.0091	0.013	63.57	43.45	9.68	1.82	1.379	6,201.30	6,200.96	6,202.30	6,202.19	6,205.53	6,205.97
GC-2	GC2	GC1	89.82	3.00	36" RCP	6,201.50	6,199.40	0.0234	0.013	101.98	30.98	12.65	1.13	2.431	6,203.30	6,201.41	6,204.06	6,202.00	6,207.37	6,205.53
H-1	H2	H1	43.12	3.00	36" RCP	6,200.13	6,199.91	0.0051	0.013	47.64	21.70	6.58	1.42	1.107	6,202.94	6,202.91	6,203.10	6,203.06	6,207.77	6,202.16
H-2	H3	H2	27.10	3.00	36" RCP	6,200.47	6,200.33	0.0052	0.013	47.94	21.70	6.61	1.42	1.114	6,202.96	6,202.94	6,203.14	6,203.12	6,216.23	6,207.77
H-3	H4	H3	156.16	3.00	36" RCP	6,203.77	6,202.98	0.0051	0.013	47.44	21.70	6.56	1.42	1.101	6,205.27	6,204.40	6,205.86	6,205.07	6,209.69	6,216.23
H-4	H5	H4	131.45	3.00	36" RCP	6,204.64	6,203.97	0.0051	0.013	47.62	21.70	6.58	1.42	1.106	6,206.14	6,205.39	6,206.73	6,206.06	6,214.32	6,209.69
H-5	H6	H5	164.39	3.00	36" RCP	6,205.68	6,204.84	0.0051	0.013	47.68	21.70	6.59	1.42	1.107	6,207.18	6,206.26	6,207.77	6,206.93	6,211.48	6,214.32
H-6	H7	H6	82.40	3.00	36" RCP	6,206.30	6,205.88	0.0051	0.013	47.62	21.70	6.58	1.42	1.106	6,207.80	6,207.30	6,208.39	6,207.97	6,212.01	6,211.48
H-7	H8	H7	86.68	3.00	36" RCP	6,206.95	6,206.50	0.0052	0.013	48.05	21.70	6.63	1.41	1.117	6,208.45	6,207.91	6,209.04	6,208.60	6,211.30	6,212.01
H-8	H9	H8	46.04	2.00	24" RCP	6,208.29	6,208.04	0.0054	0.013	16.67	6.10	4.90	0.84	1.086	6,209.16	6,208.88	6,209.50	6,209.25	6,213.77	6,211.30
H-9	H10	H9	40.93	1.50	18" RCP	6,209.60	6,209.38	0.0054	0.013	7.70	2.42	3.86	0.58	1.037	6,210.19	6,209.96	6,210.41	6,210.19	6,213.72	6,213.77
J-1	J2	B1	118.67	2.00	24" RCP	6,228.16	6,226.97	0.0100	0.013	22.65	7.82	6.55	0.81	1.480	6,229.15	6,227.78	6,229.54	6,228.45	6,238.30	6,240.33
J-2	J3	J2	20.32	1.50	18" RCP	6,229.37	6,229.16	0.0103	0.013	10.68	0.99	3.78	0.31	1.433	6,229.74	6,229.47	6,229.87	6,229.69	6,233.69	6,238.30
JA-1	JA1	J2	23.36	1.50	18" RCP	6,231.10	6,229.16	0.0830	0.013	30.27	6.87	13.85	0.49	4.109	6,232.11	6,229.71	6,232.57	6,231.81	6,243.13	6,238.30
O-1	O2	O1	60.66	2.50	30" RCP	6,196.81	6,196.50	0.0051	0.013	29.32	7.03	4.91	0.83	1.110	6,199.01	6,199.00	6,199.05	6,199.03	6,216.26	6,199.34
O-2	O3	O2	53.88	2.50	30" RCP	6,206.00	6,203.81	0.0406	0.013	82.69	7.03	10.27	0.49	3.087	6,206.88	6,204.31	6,207.20	6,205.85	6,227.74	6,216.26
O-3	O4	O3	30.49	2.50	30" RCP	6,214.92	6,213.50	0.0466	0.013	88.51	7.03	10.78	0.48	3.297	6,215.80	6,214.02	6,216.12	6,215.45	6,225.34	6,227.74

The Brickyard
FlexTable: Outfall Table
Active Scenario: 5-YR

Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Boundary Condition Type	Elevation (User Defined Tailwater) (ft)	Hydraulic Grade (ft)	Flow (Total Out) (cfs)	Notes
B0	6,235.53	6,220.35	User Defined Tailwater	6,224.34	6,224.34	53.67	Connect to West Forebay
D0	6,231.65	6,219.39	User Defined Tailwater	6,224.34	6,224.34	15.39	Connect to East Forebay
G1	6,193.76	6,186.63	Free Outfall		6,188.63	50.77	Connect to PR Headwall
GA1	6,193.14	6,186.63	Free Outfall		6,187.35	3.52	Connect to PR Wingwall
H1	6,202.16	6,199.91	Crown		6,202.91	21.70	24" FES
O1	6,199.34	6,196.50	Crown		6,199.00	7.03	30" FES

The Brickyard
Profile Report
Engineering Profile - Line A (200726 - StormCAD.stsw)
Active Scenario: 5-YR

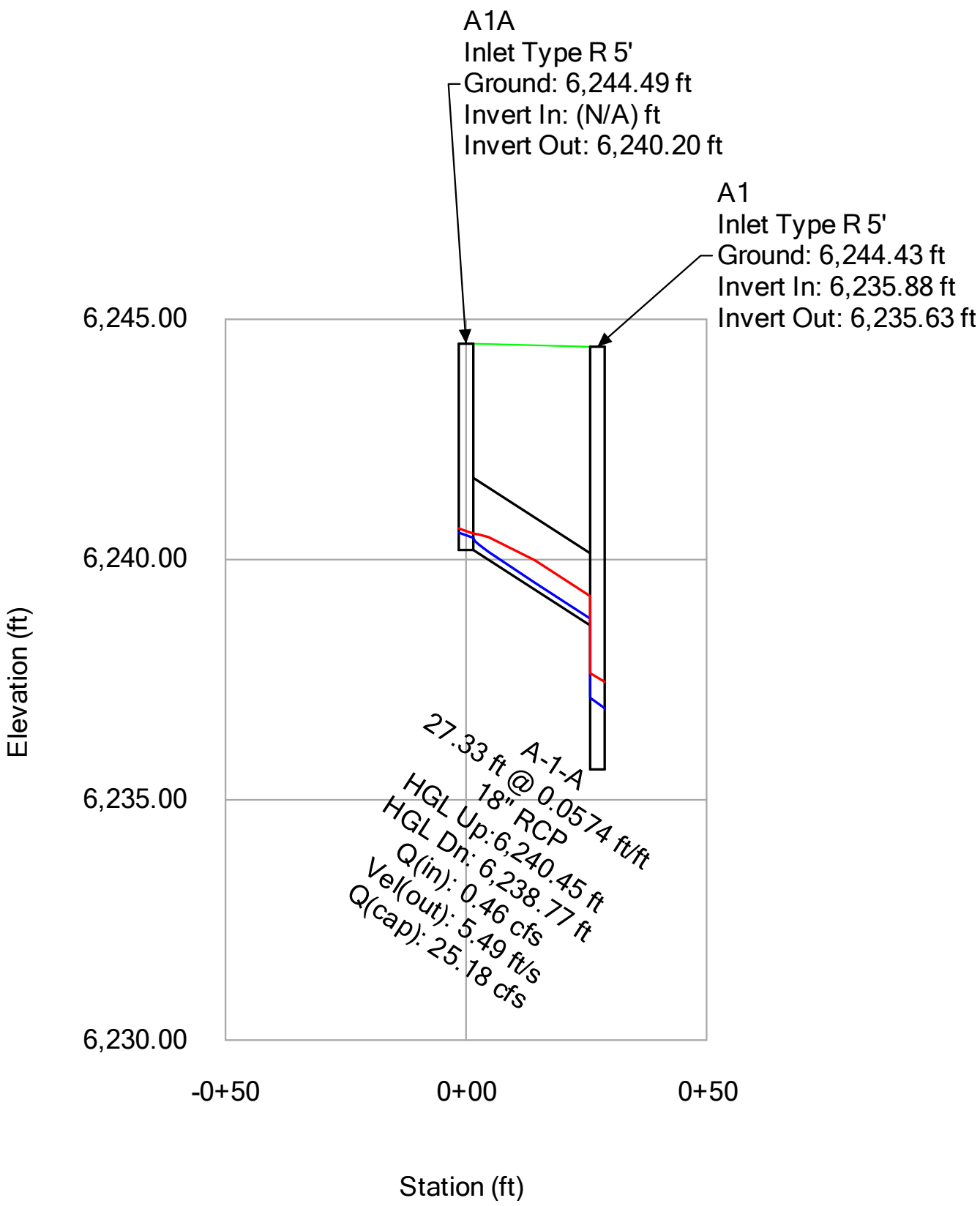


The Brickyard

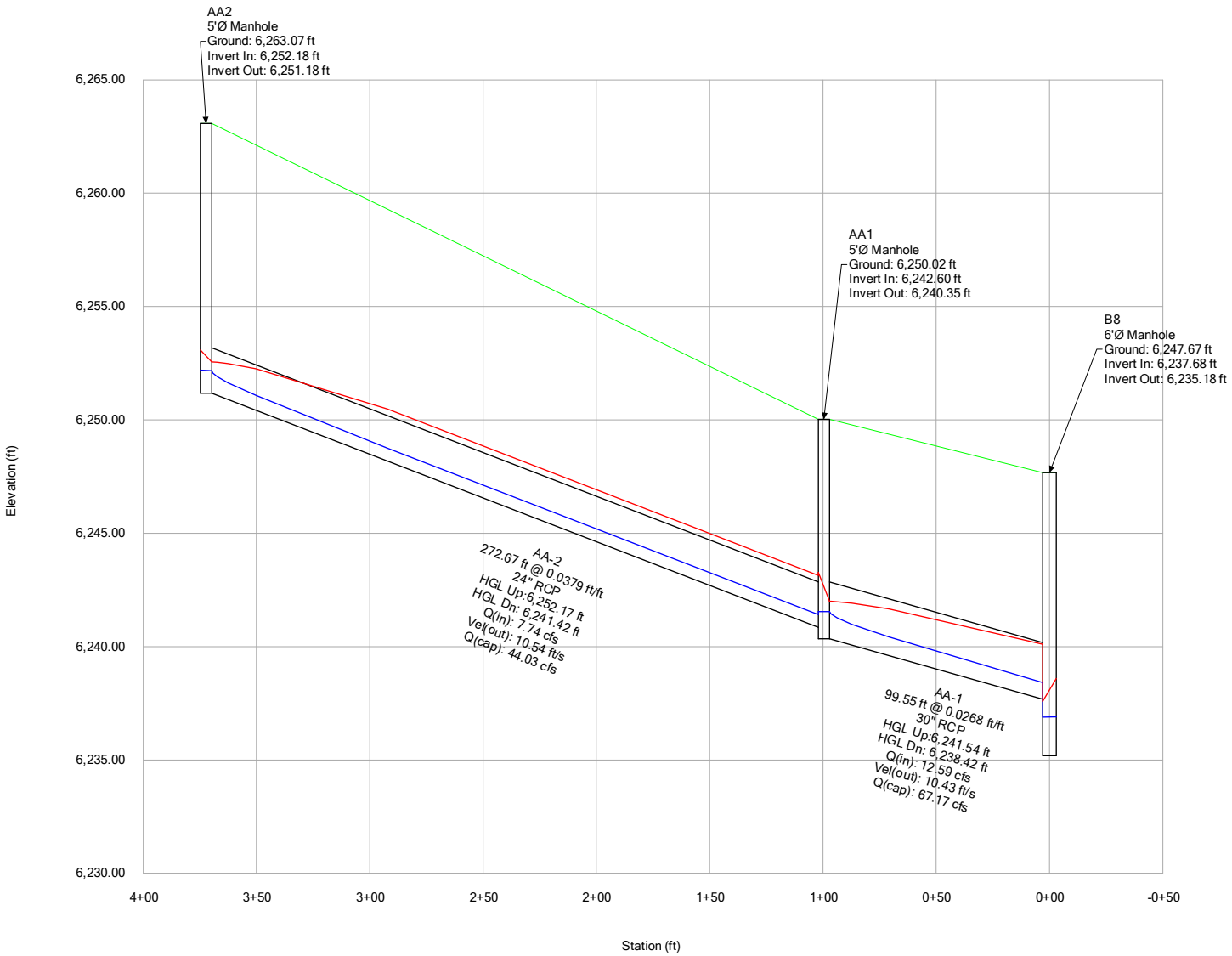
Profile Report

Engineering Profile - Line A1 (200726 - StormCAD.stsw)

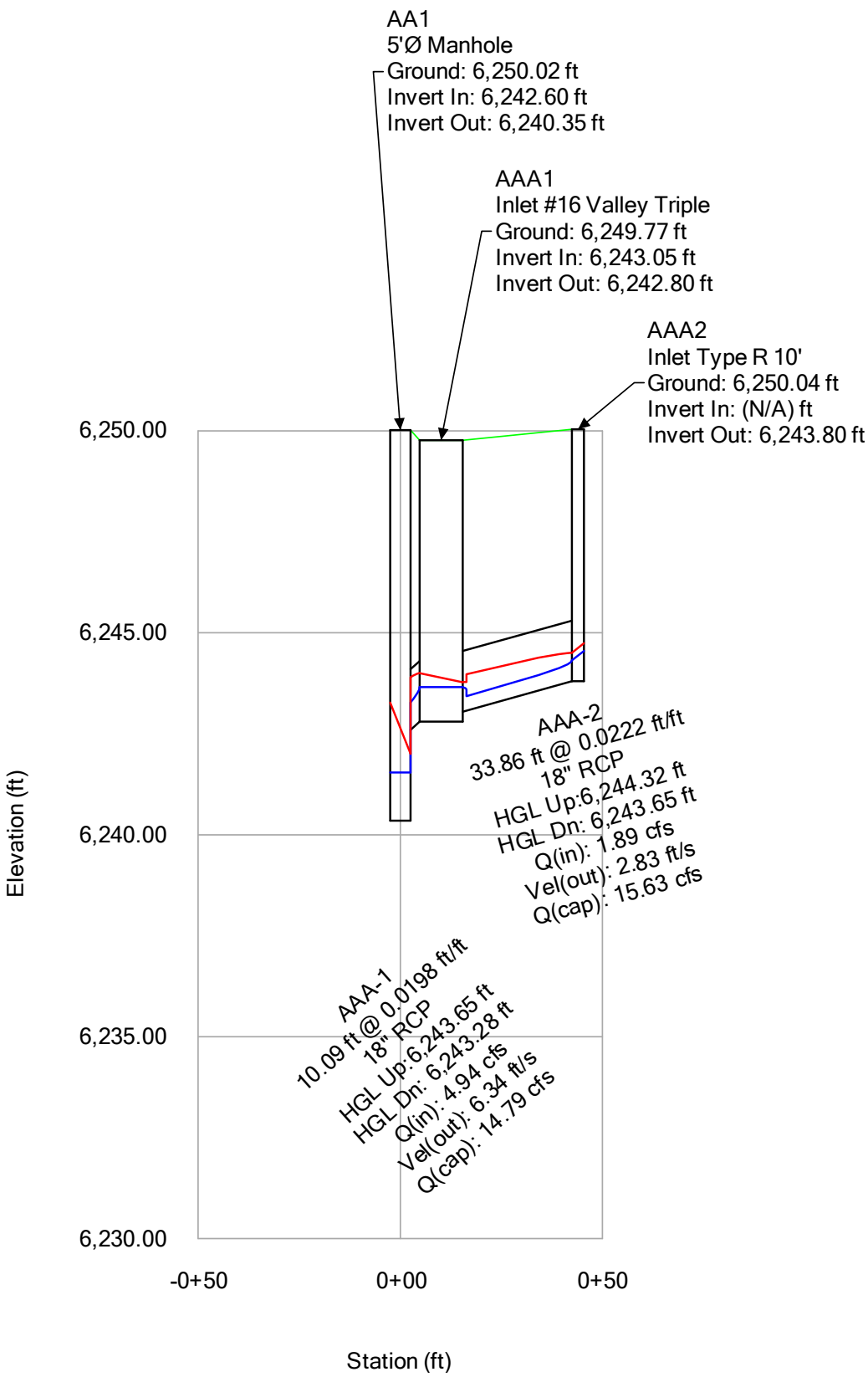
Active Scenario: 5-YR



The Brickyard
Profile Report
Engineering Profile - Line AA (200726 - StormCAD.stsw)
Active Scenario: 5-YR



The Brickyard
Profile Report
Engineering Profile - Line AAA (200726 - StormCAD.stsw)
Active Scenario: 5-YR

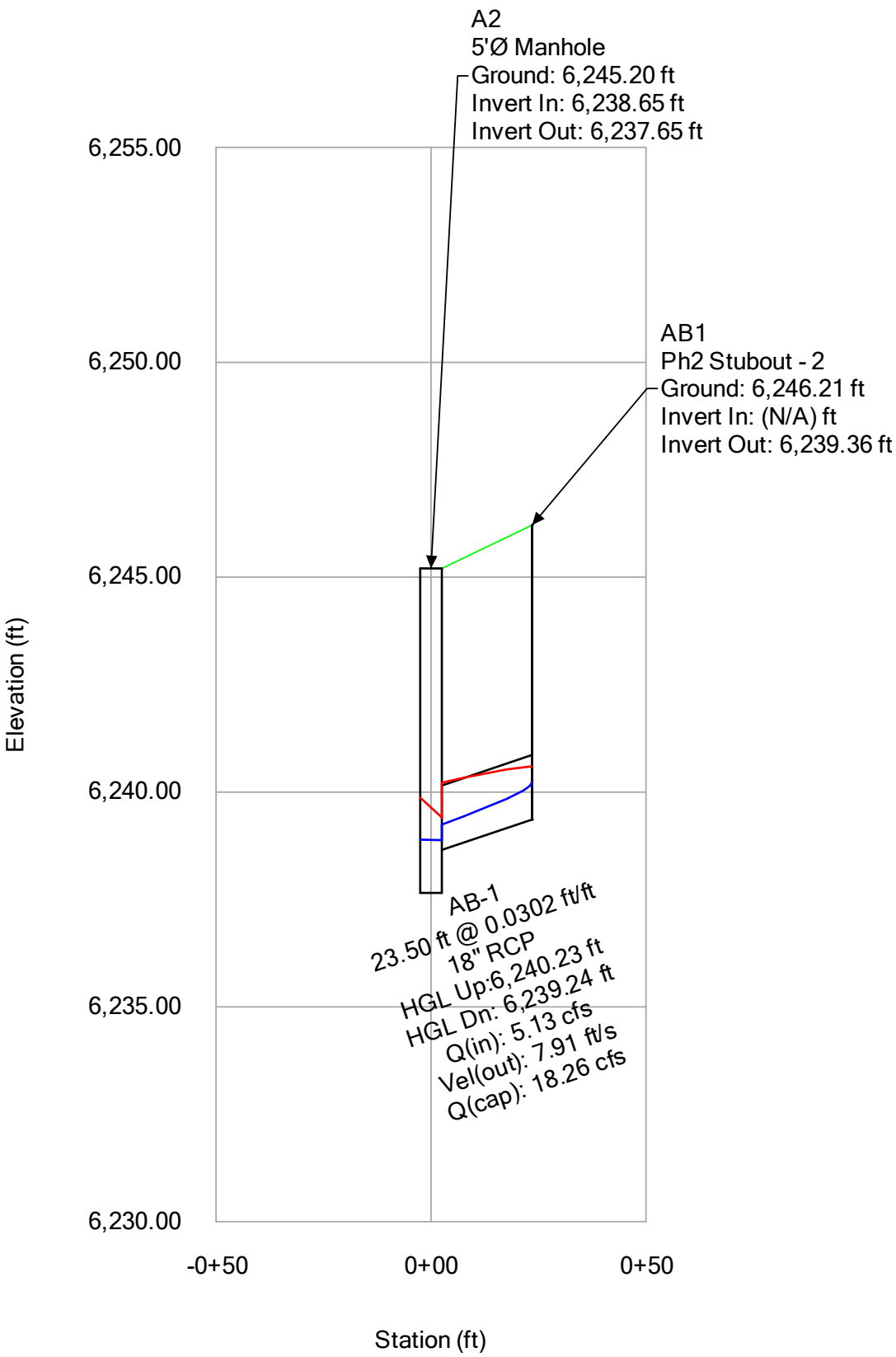


The Brickyard

Profile Report

Engineering Profile - Line AB (200726 - StormCAD.stsw)

Active Scenario: 5-YR

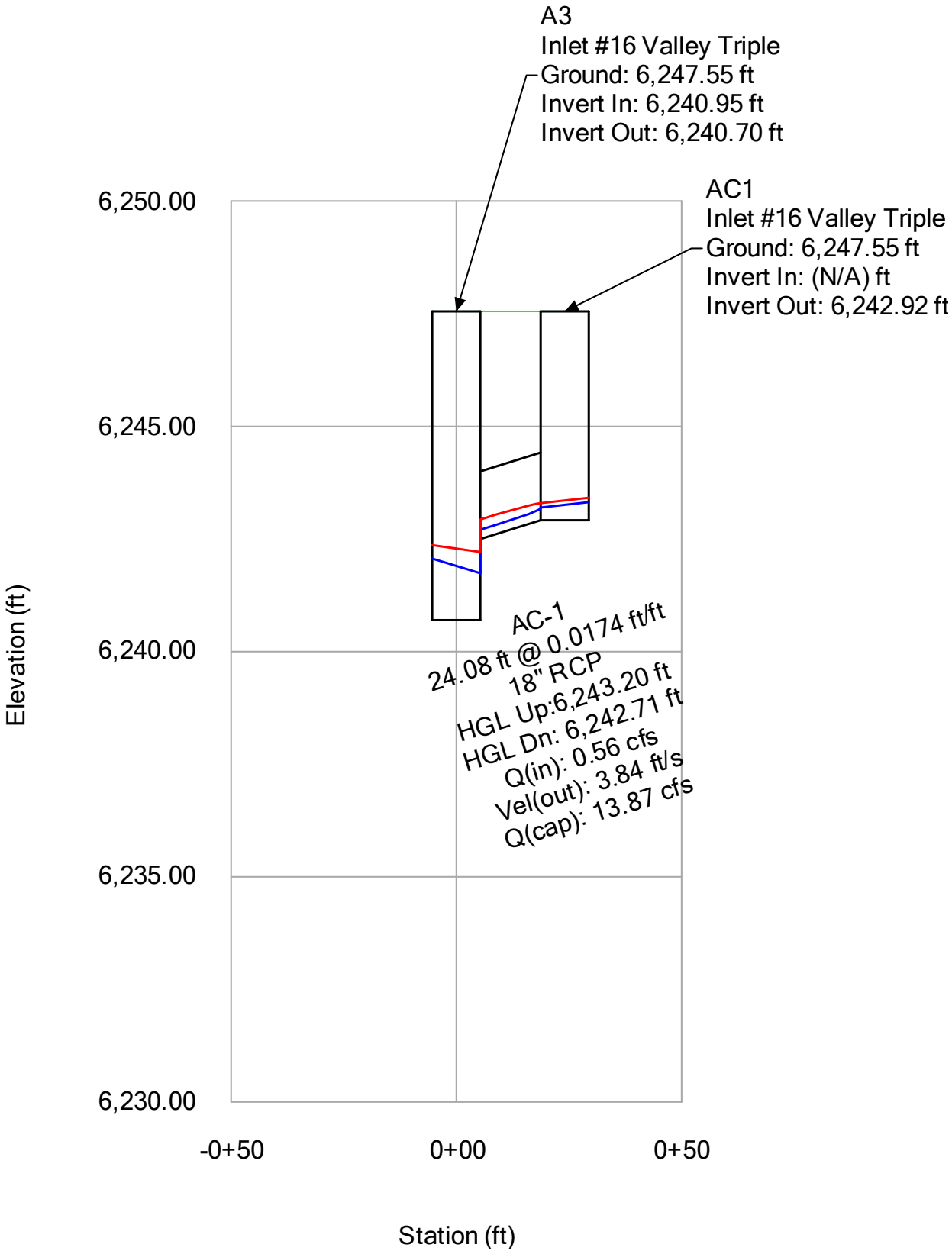


The Brickyard

Profile Report

Engineering Profile - Line AC (200726 - StormCAD.stsw)

Active Scenario: 5-YR

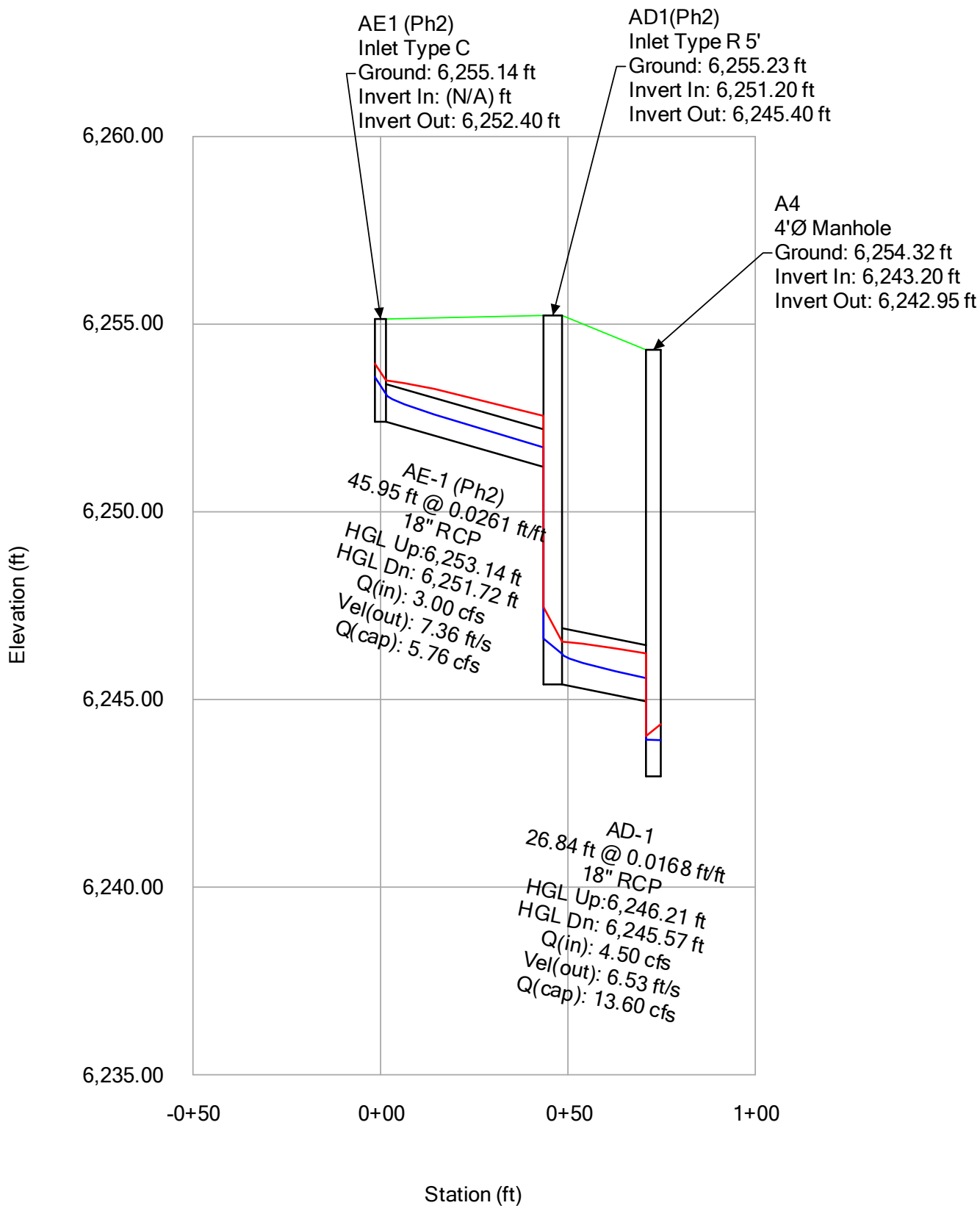


The Brickyard

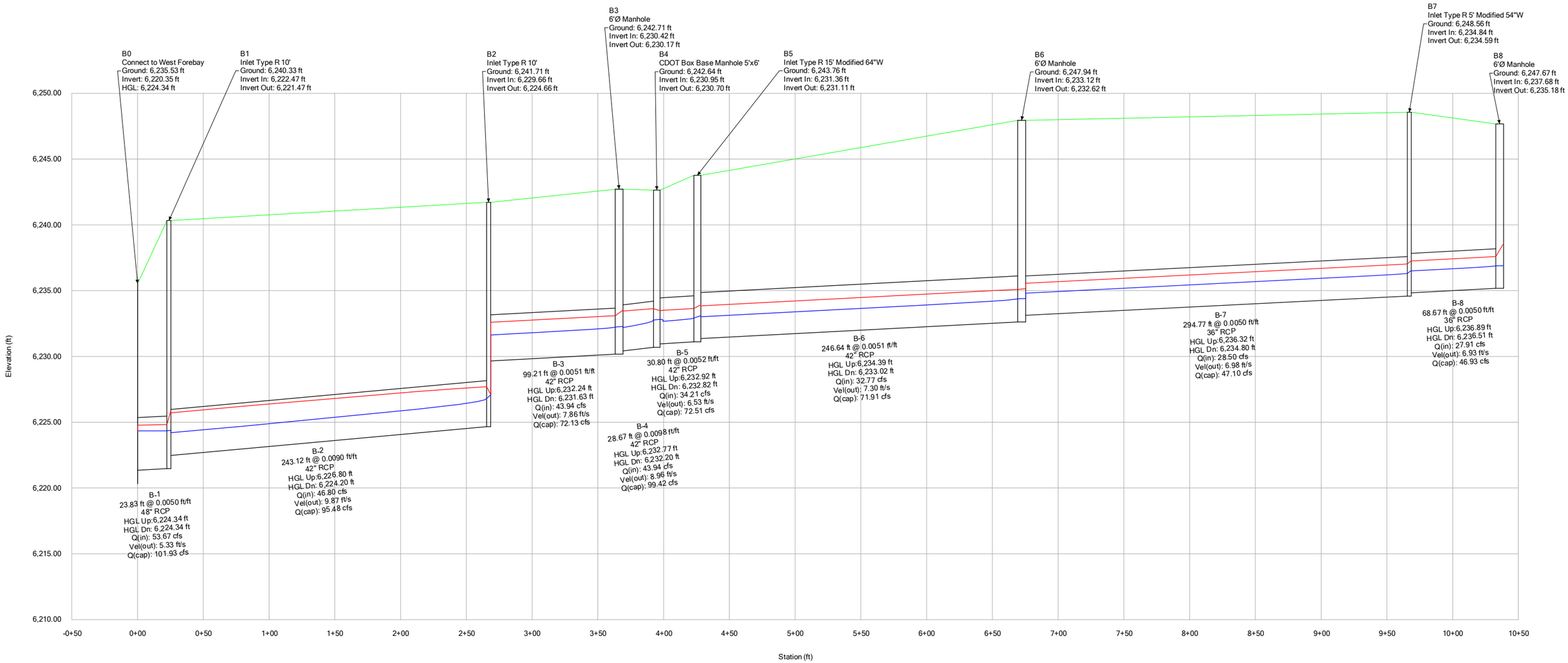
Profile Report

Engineering Profile - Lines AE (Phase 2) - AD (200726 - StormCAD.stsw)

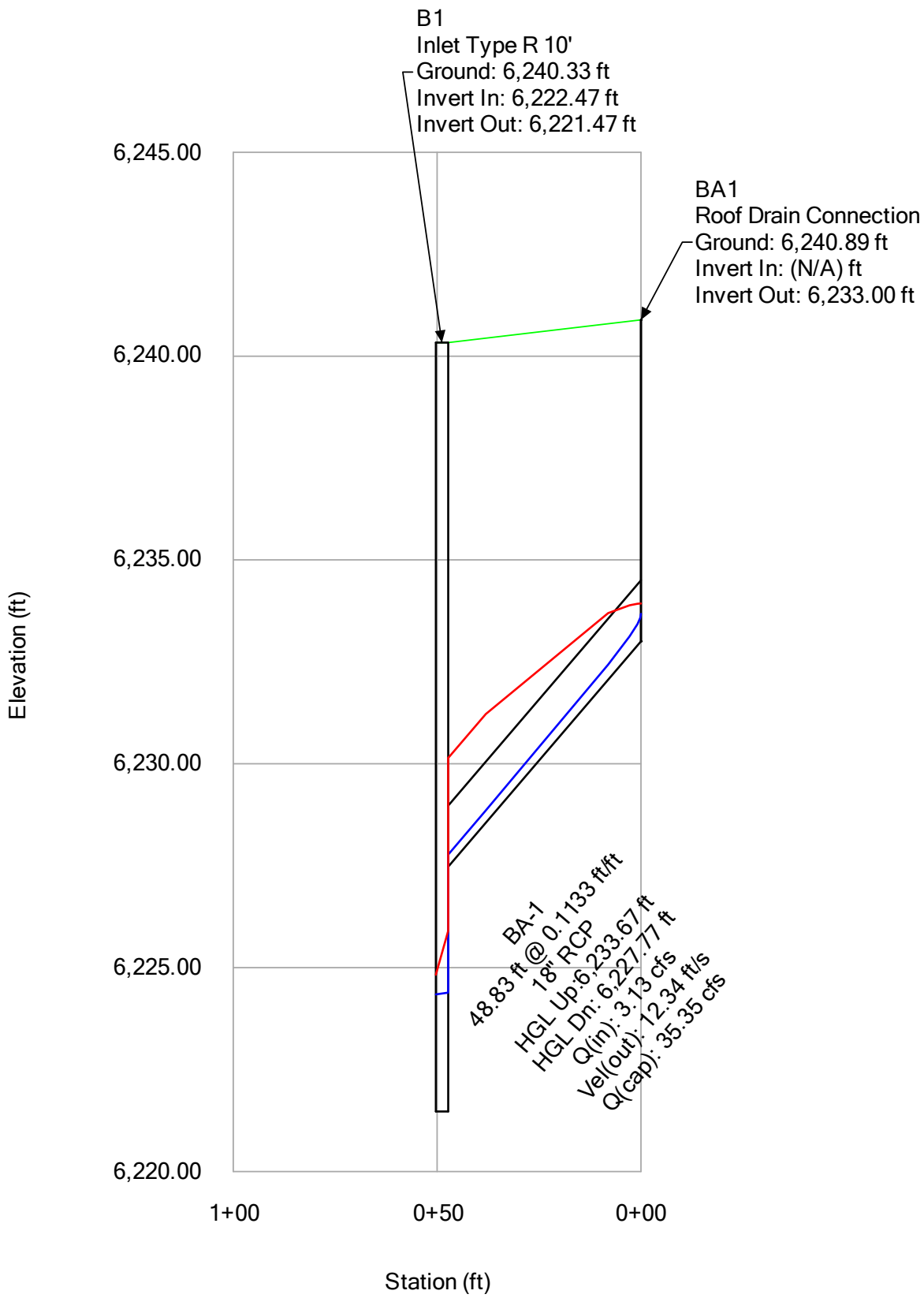
Active Scenario: 5-YR



The Brickyard
Profile Report
Engineering Profile - Line B (200726 - StormCAD.stsw)
Active Scenario: 5-YR



The Brickyard
Profile Report
Engineering Profile - Line BA (200726 - StormCAD.stsw)
Active Scenario: 5-YR

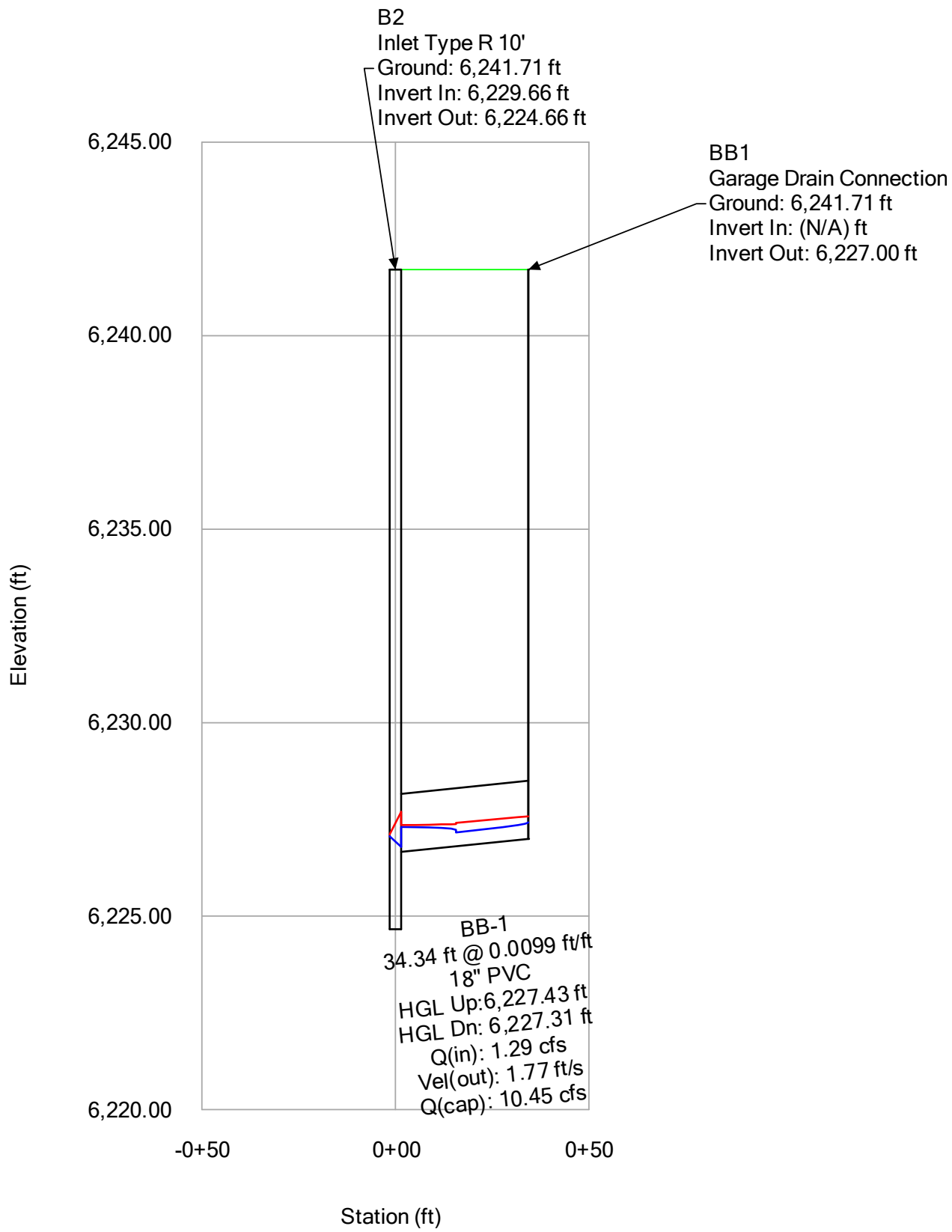


The Brickyard

Profile Report

Engineering Profile - Line BB (200726 - StormCAD.stsw)

Active Scenario: 5-YR

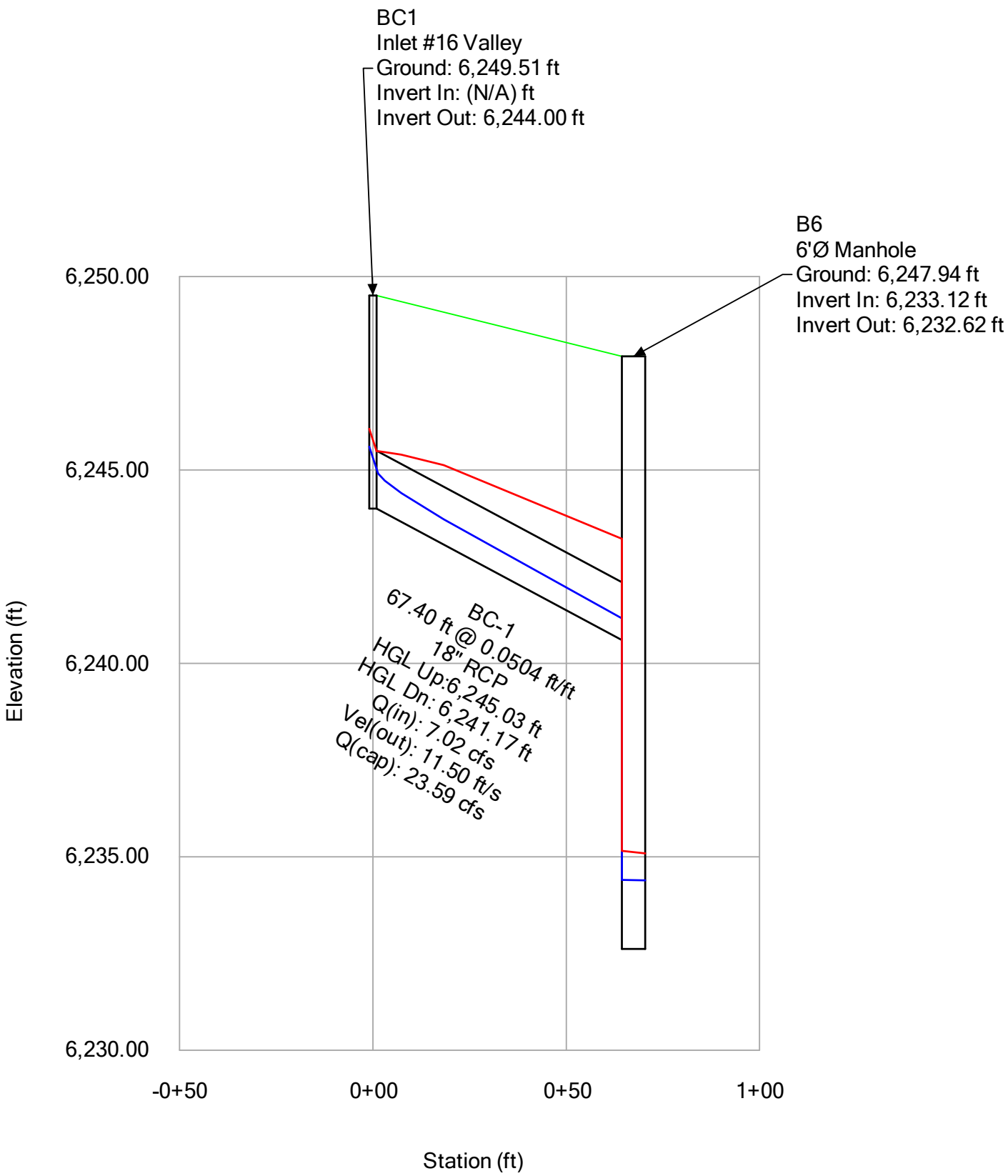


The Brickyard

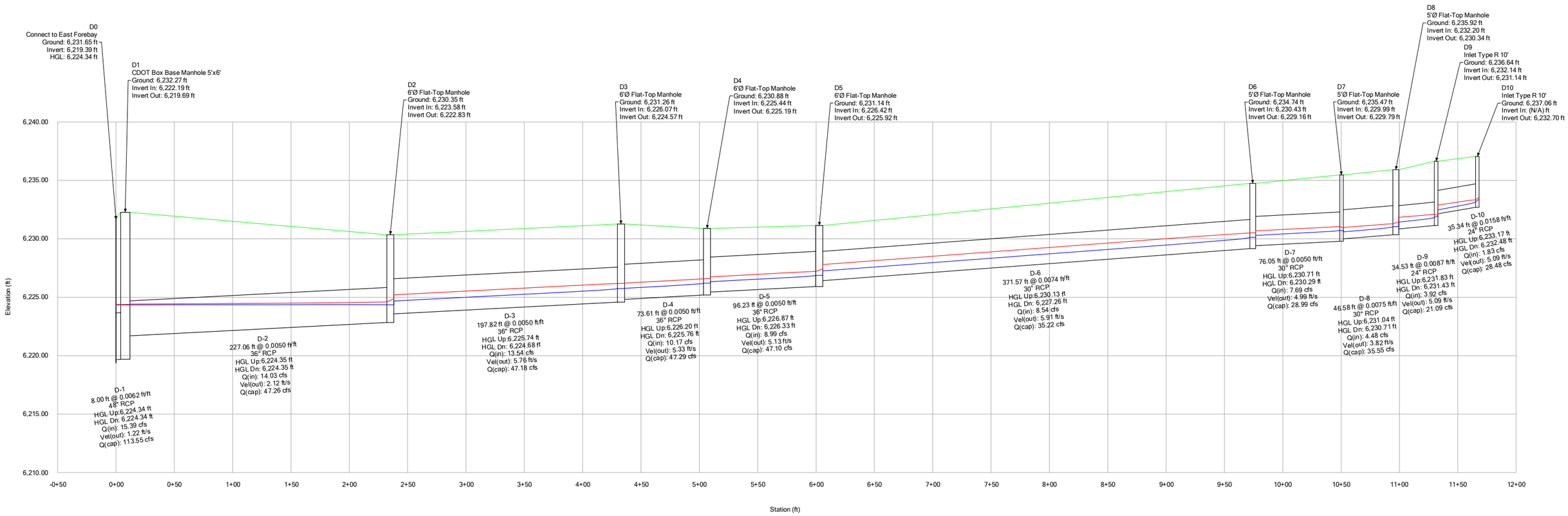
Profile Report

Engineering Profile - Line BC (200726 - StormCAD.stsw)

Active Scenario: 5-YR



The Brickyard
Profile Report
Engineering Profile - Line D (200726 - StormCAD.stsw)
Active Scenario: 5-YR

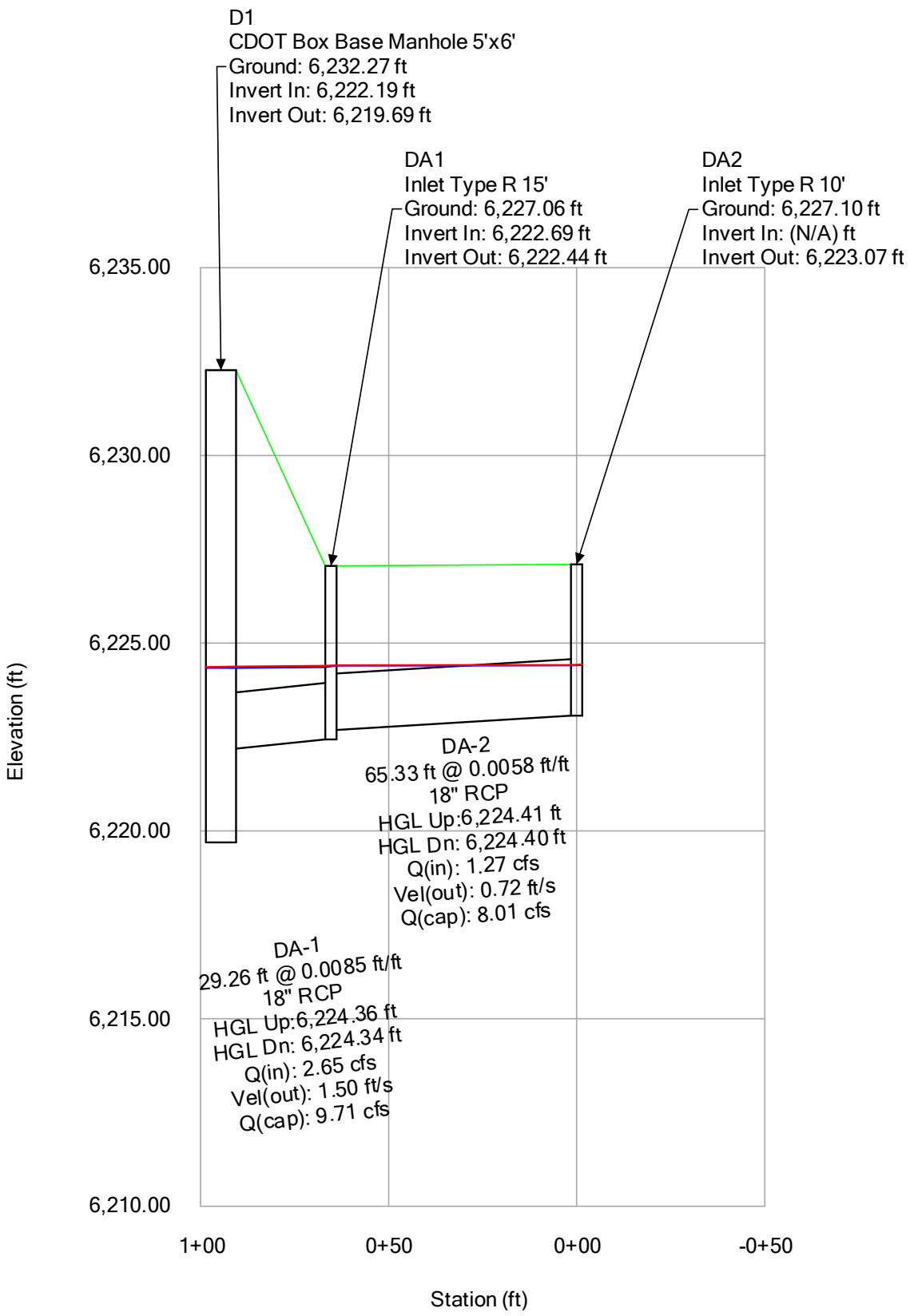


The Brickyard

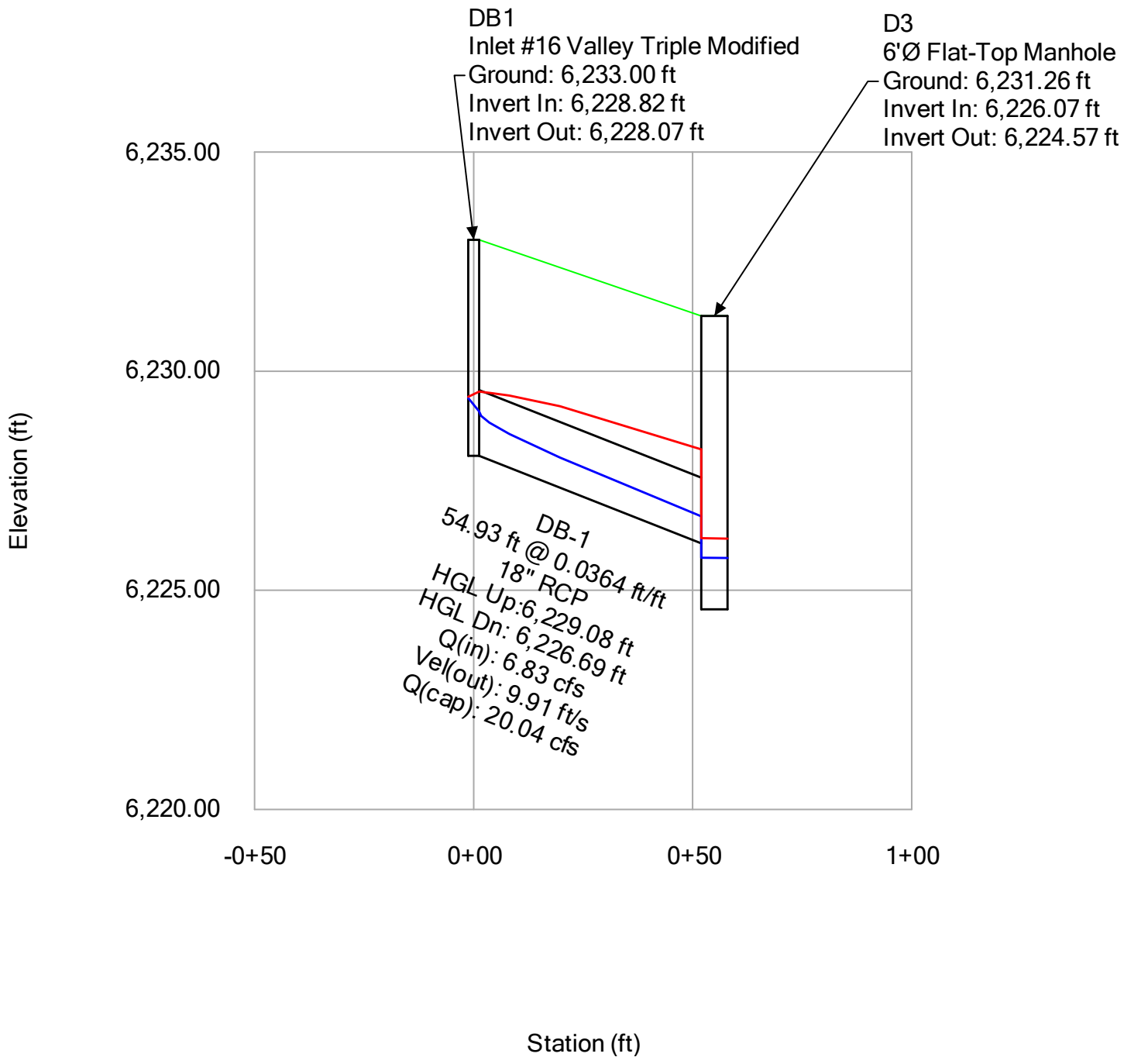
Profile Report

Engineering Profile - Line DA (200726 - StormCAD.stsw)

Active Scenario: 5-YR



The Brickyard
Profile Report
Engineering Profile - Line DB (200726 - StormCAD.stsw)
Active Scenario: 5-YR

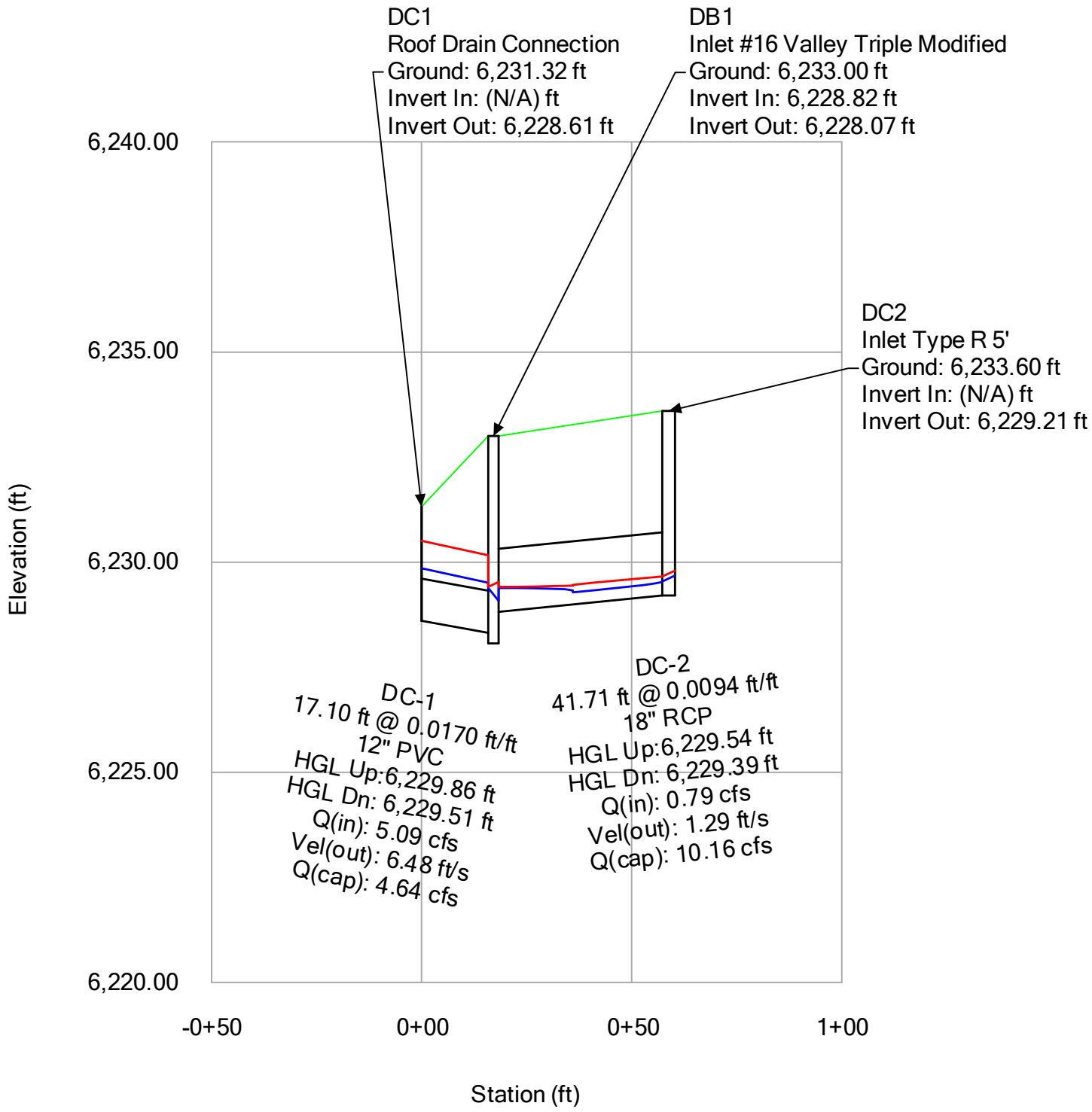


The Brickyard

Profile Report

Engineering Profile - Line DC (200726 - StormCAD.stsw)

Active Scenario: 5-YR

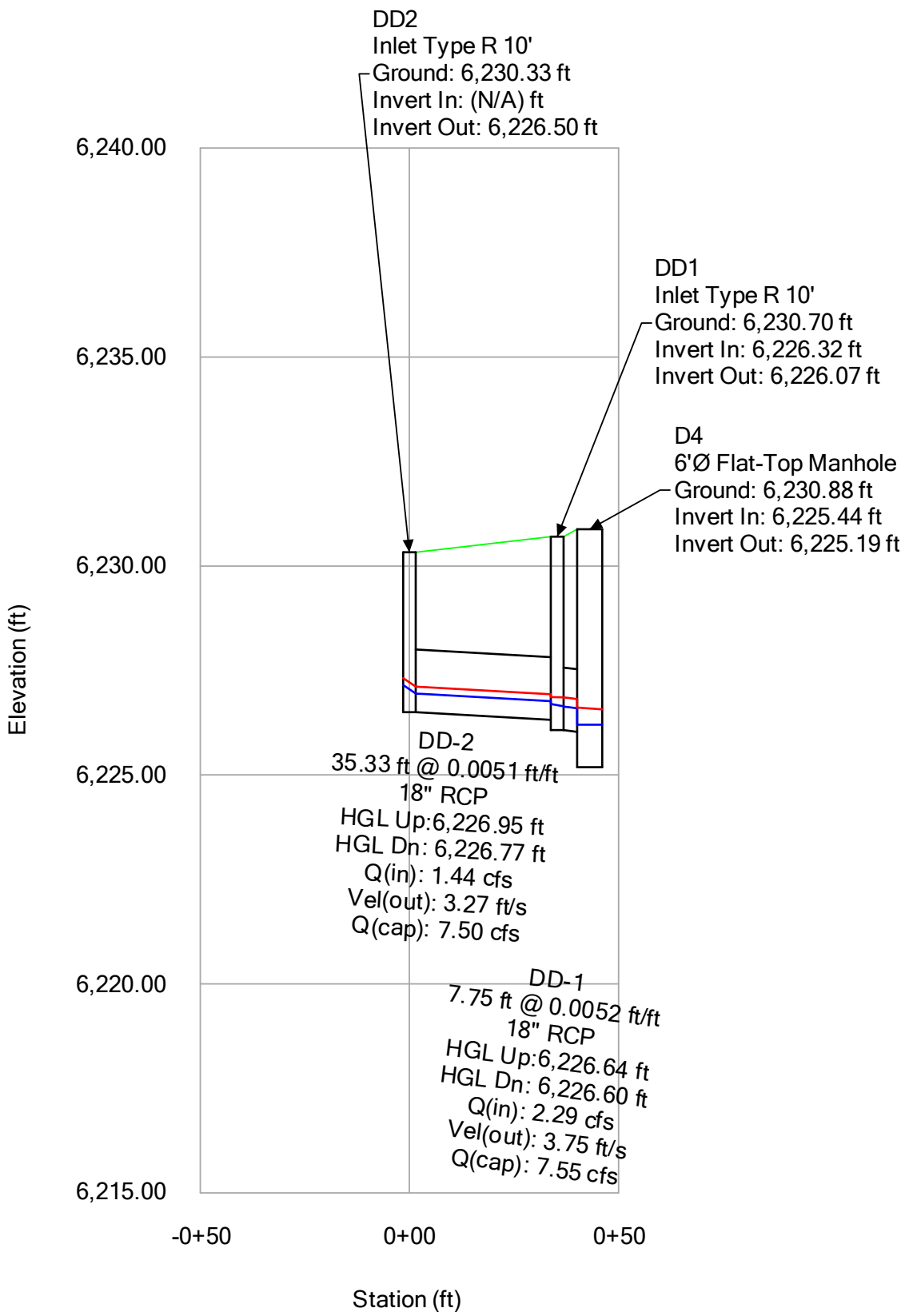


The Brickyard

Profile Report

Engineering Profile - Line DD (200726 - StormCAD.stsw)

Active Scenario: 5-YR

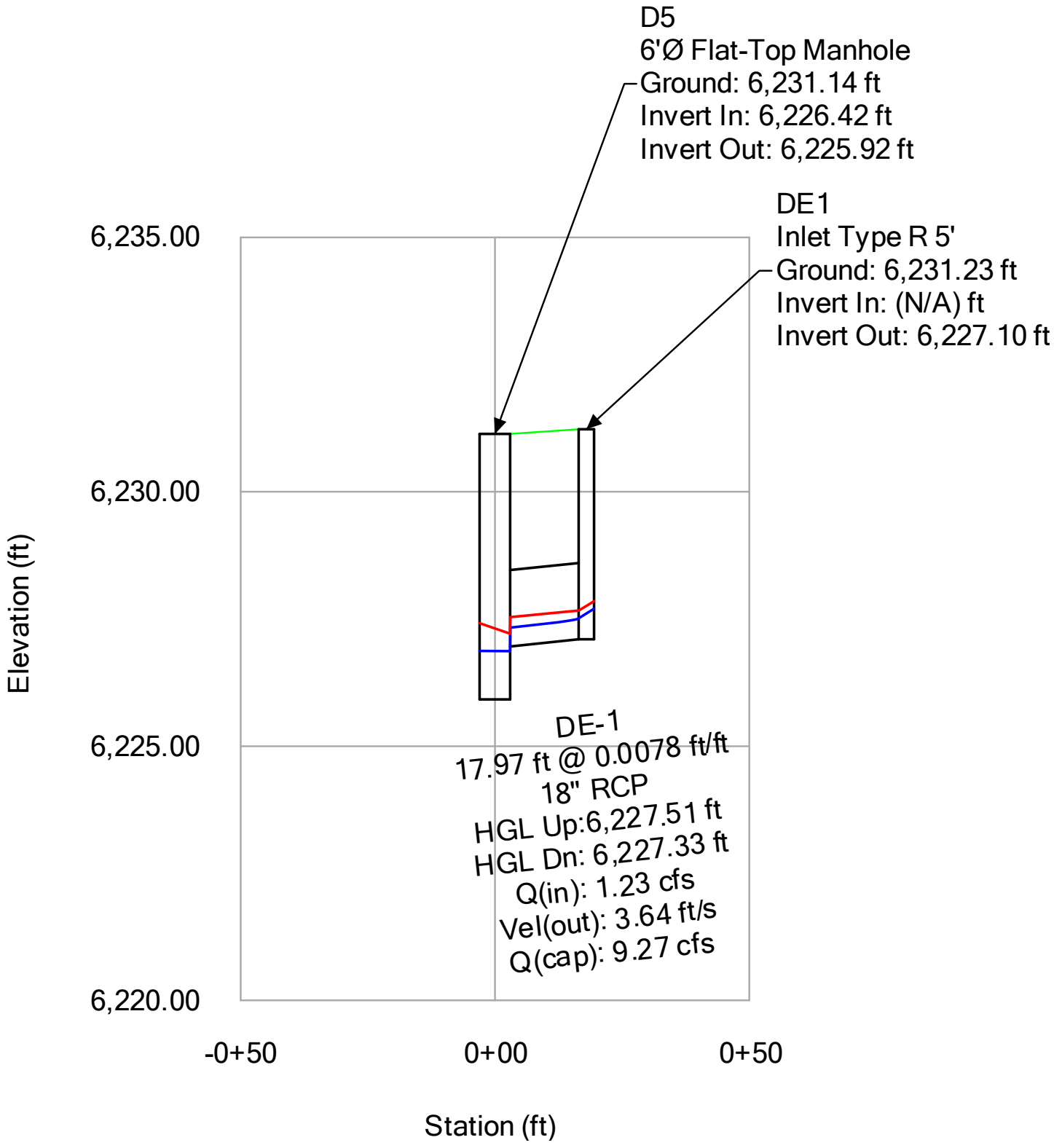


The Brickyard

Profile Report

Engineering Profile - Line DE (200726 - StormCAD.stsw)

Active Scenario: 5-YR

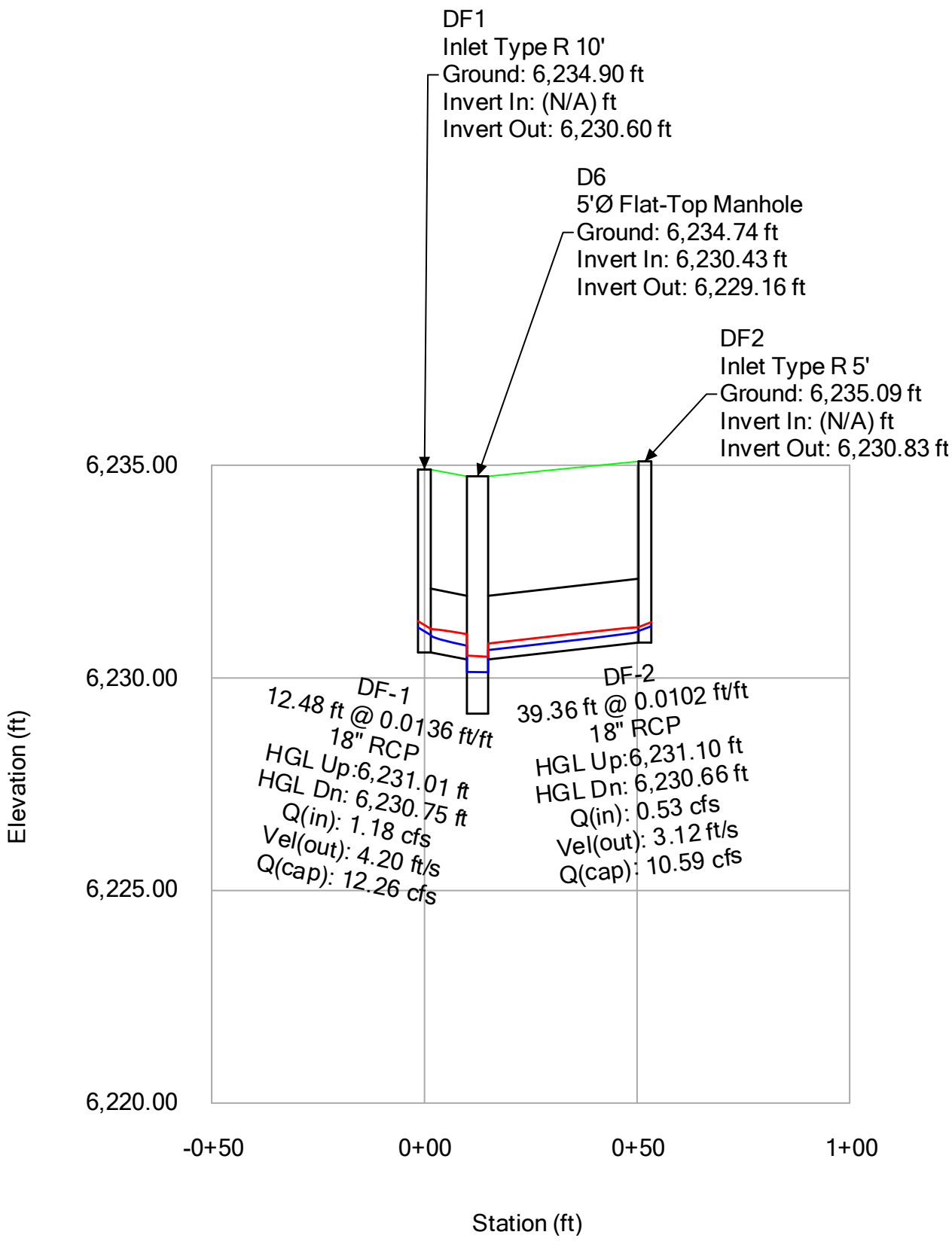


The Brickyard

Profile Report

Engineering Profile - Line DF (200726 - StormCAD.stsw)

Active Scenario: 5-YR

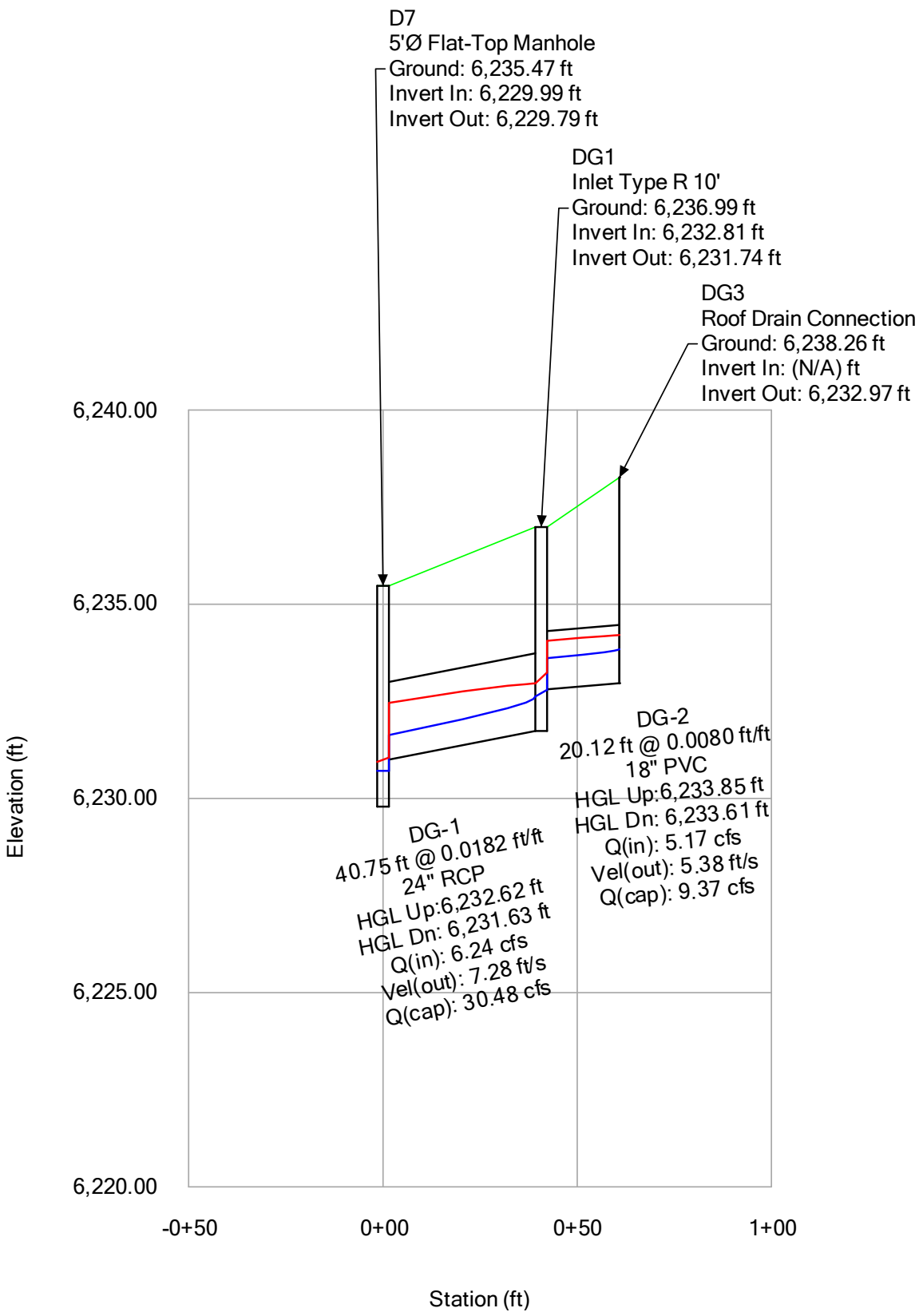


The Brickyard

Profile Report

Engineering Profile - Line DG (200726 - StormCAD.stsw)

Active Scenario: 5-YR

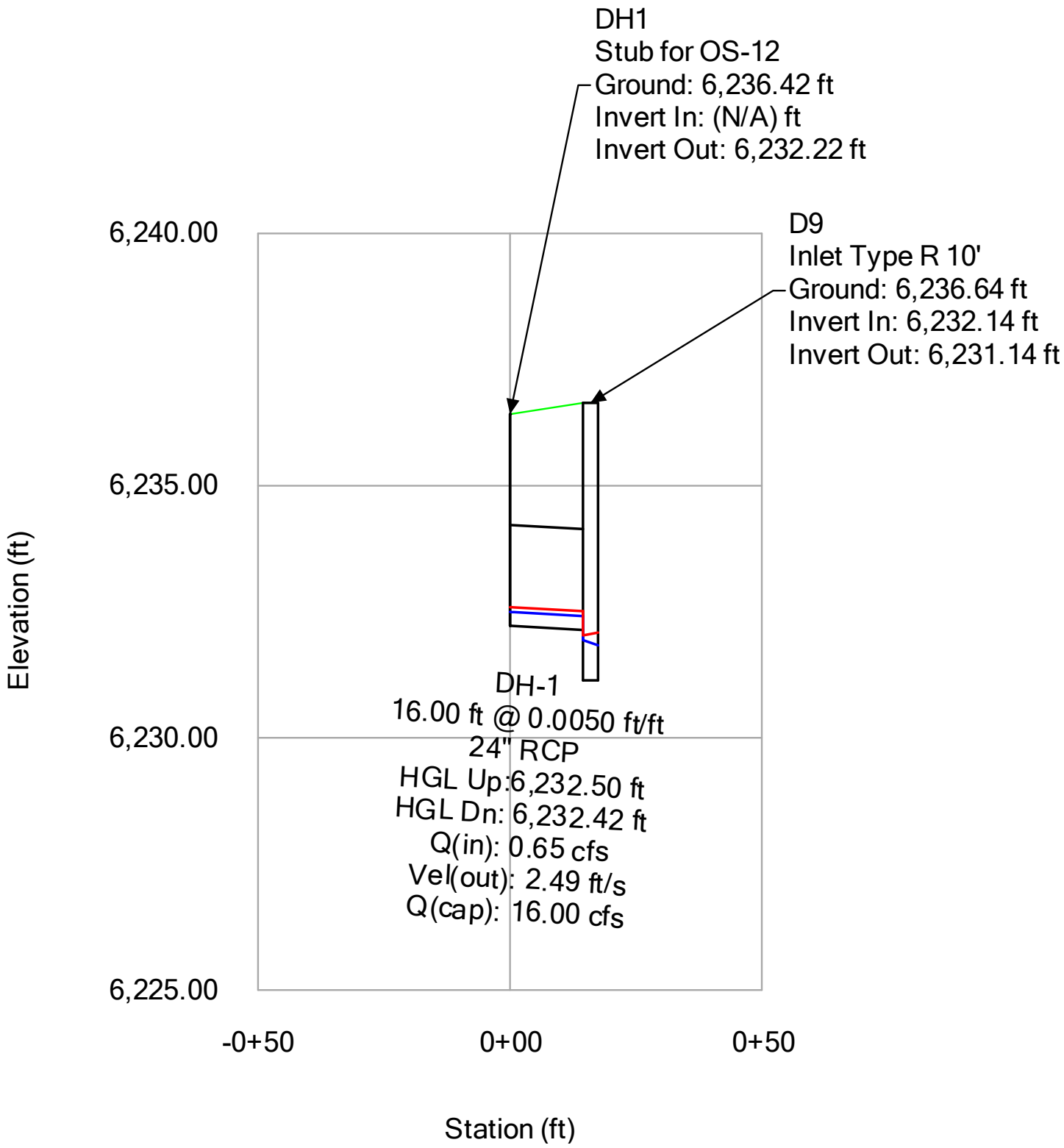


The Brickyard

Profile Report

Engineering Profile - Line DH (200726 - StormCAD.stsw)

Active Scenario: 5-YR

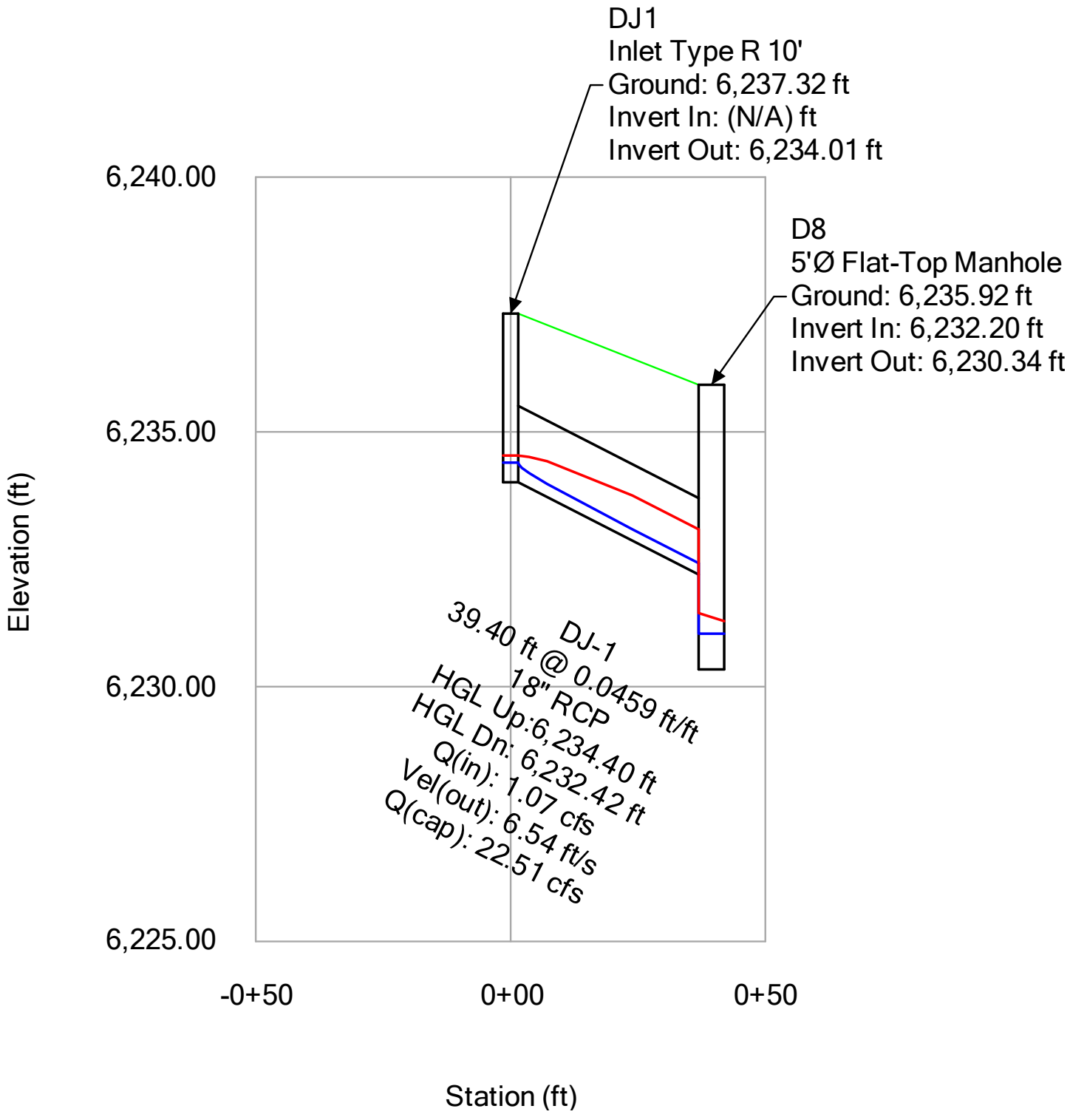


The Brickyard

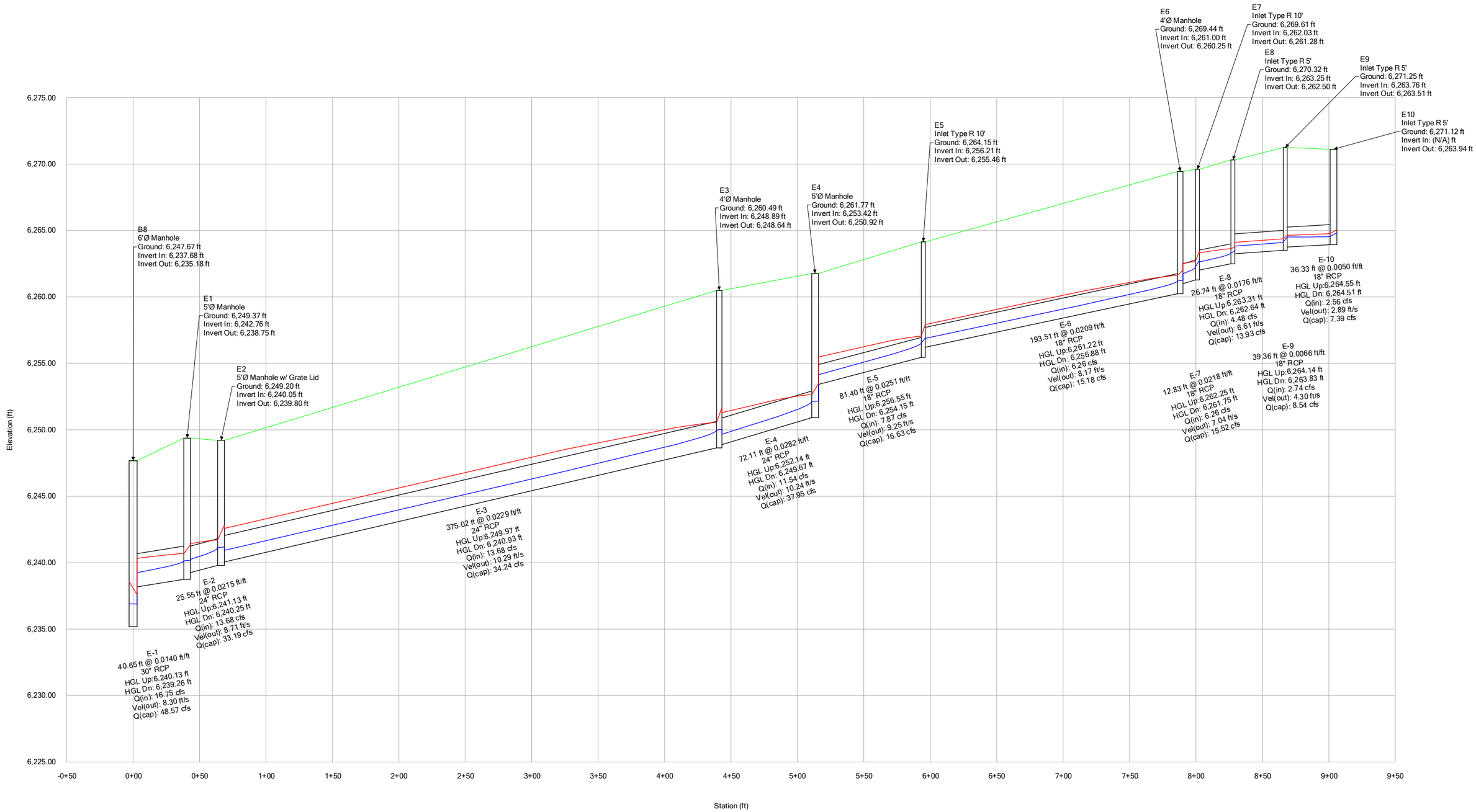
Profile Report

Engineering Profile - Line DJ (200726 - StormCAD.stsw)

Active Scenario: 5-YR



The Brickyard
Profile Report
Engineering Profile - Line E (CRSC) (200726 - StormCAD.stsw)
Active Scenario: 5-YR

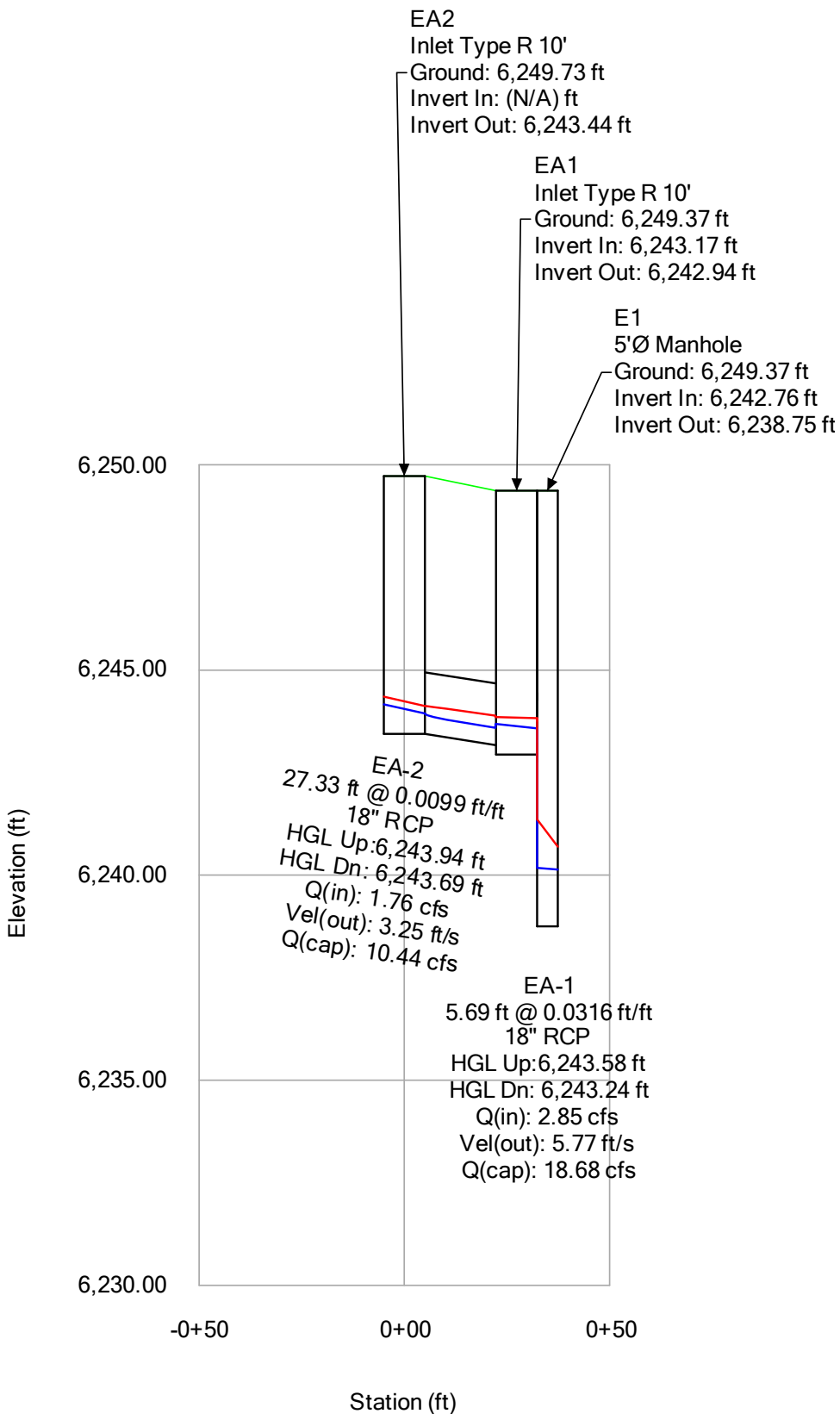


The Brickyard

Profile Report

Engineering Profile - Line EA (CRSC) (200726 - StormCAD.stsw)

Active Scenario: 5-YR

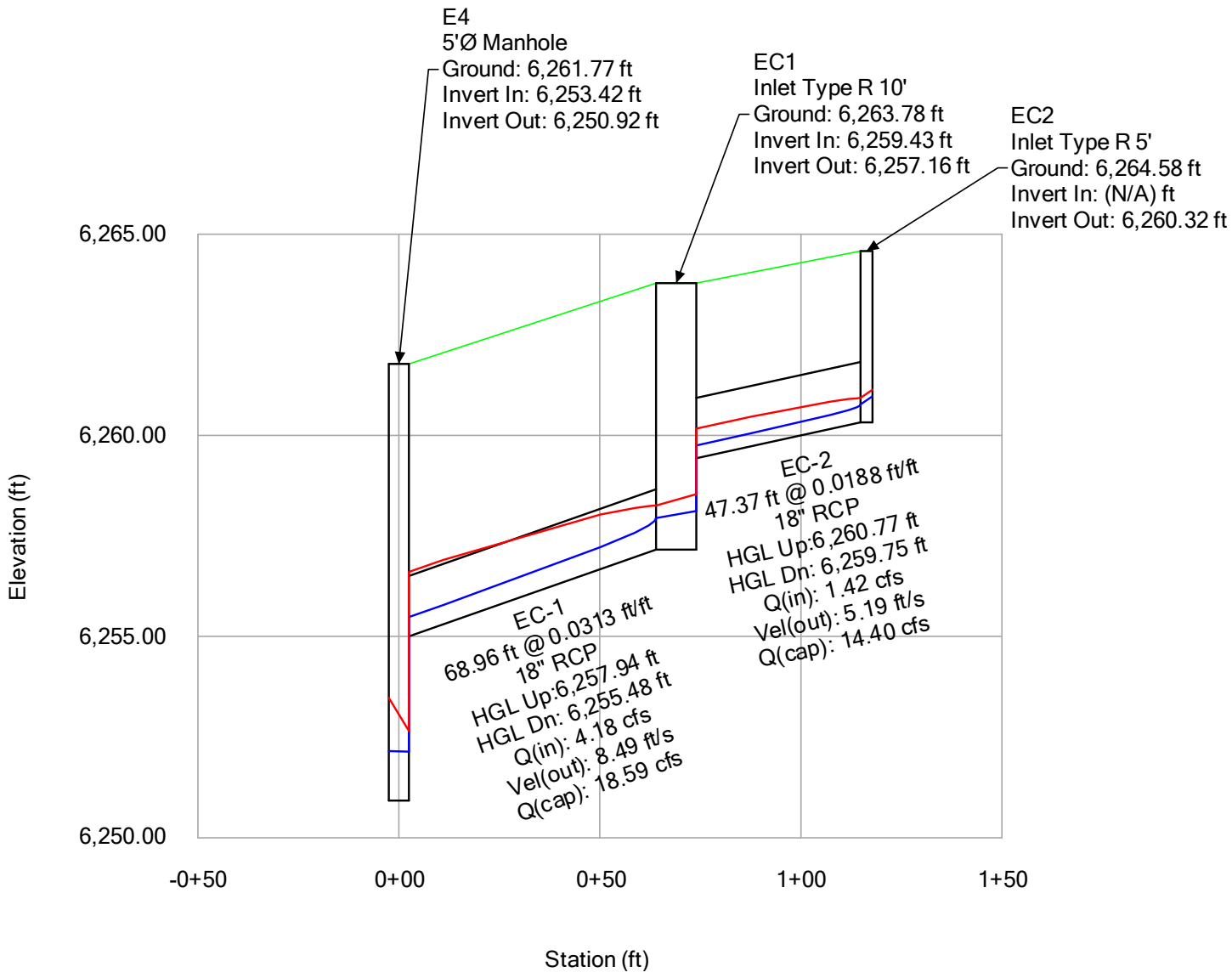


The Brickyard

Profile Report

Engineering Profile - Line EC (CRSC) (200726 - StormCAD.stsw)

Active Scenario: 5-YR

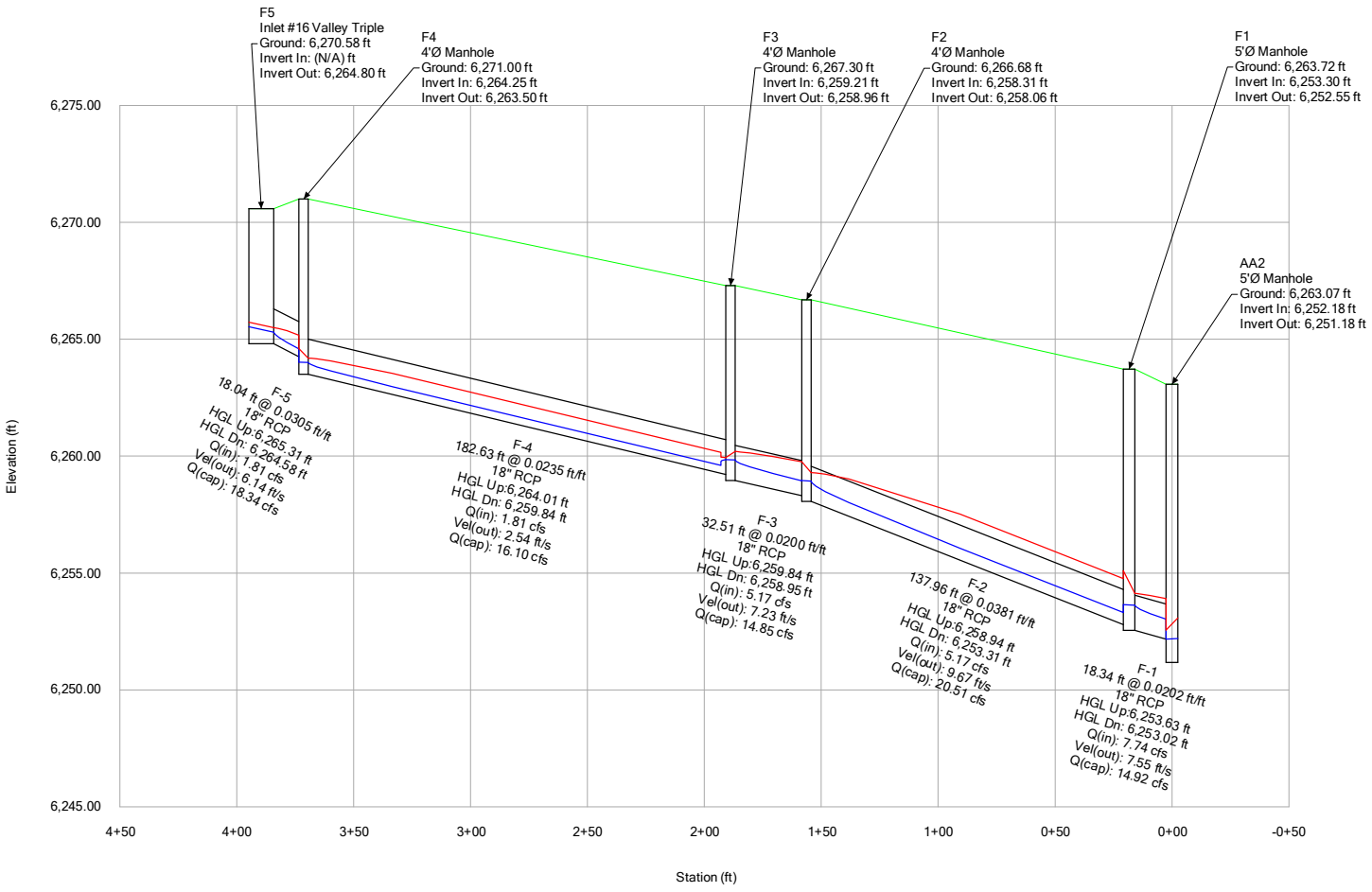


The Brickyard

Profile Report

Engineering Profile - Line F (CRSC) (200726 - StormCAD.stsw)

Active Scenario: 5-YR

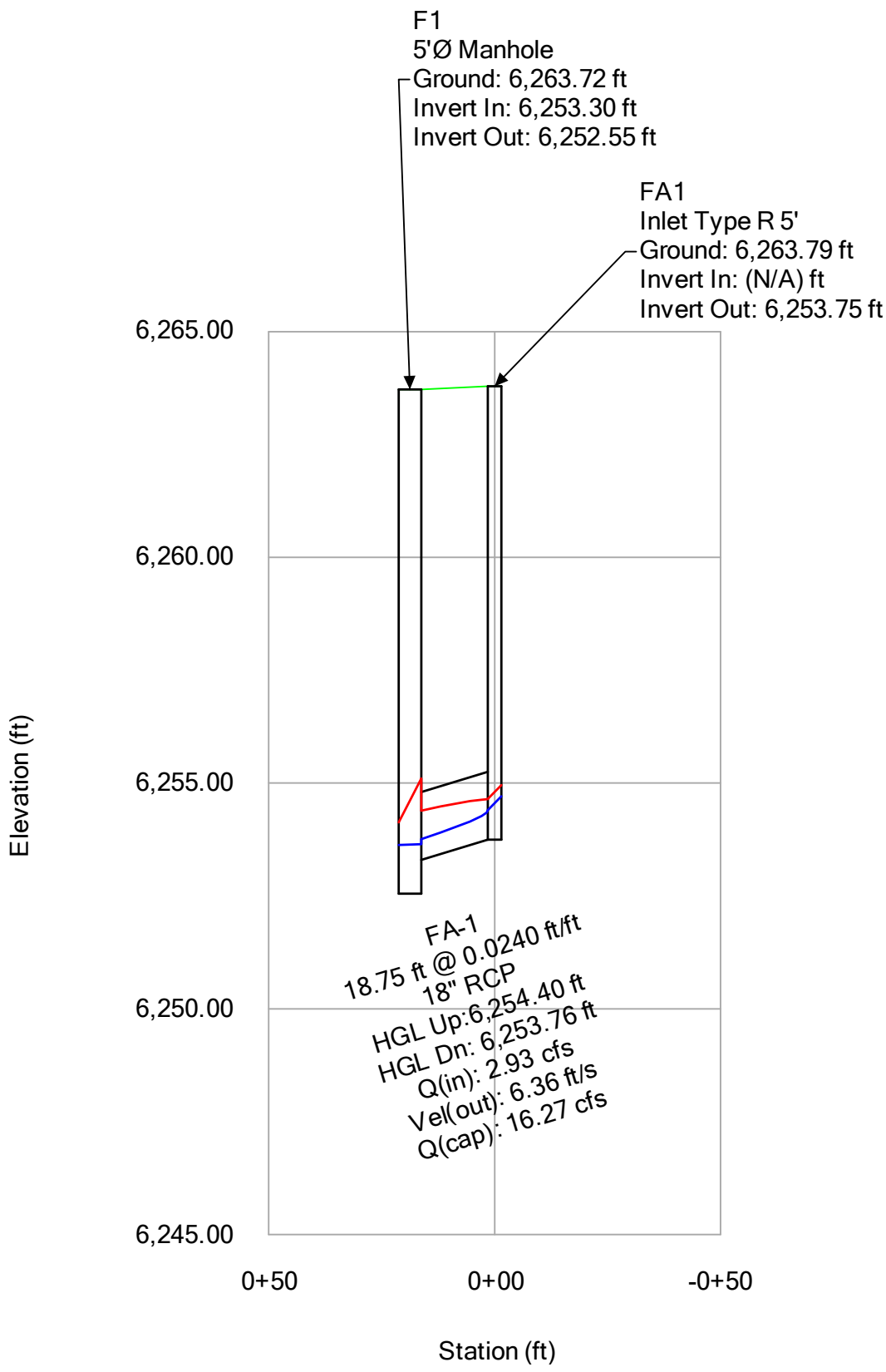


The Brickyard

Profile Report

Engineering Profile - Line FA (CRSC) (200726 - StormCAD.stsw)

Active Scenario: 5-YR

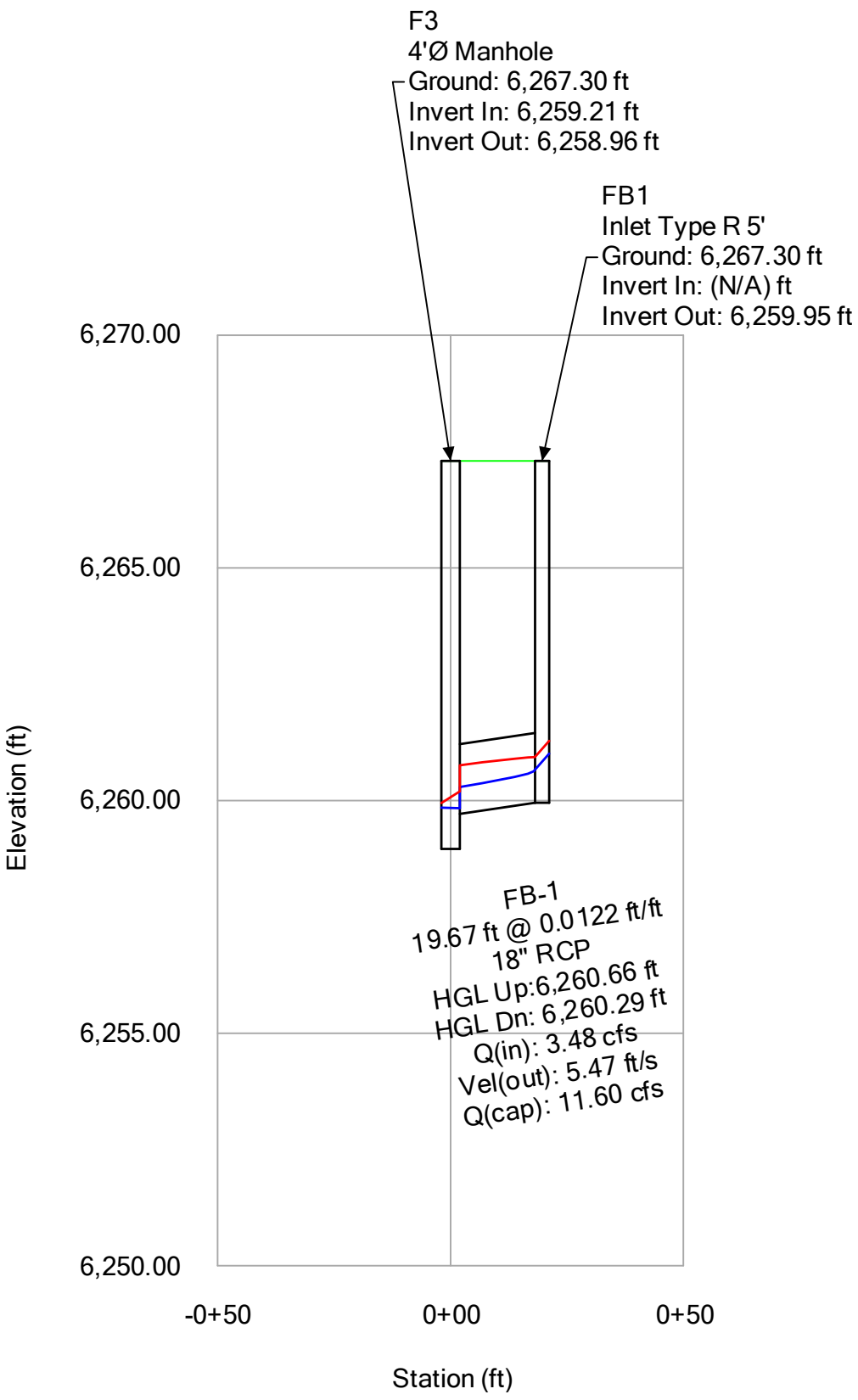


The Brickyard

Profile Report

Engineering Profile - Line FB (CRSC) (200726 - StormCAD.stsw)

Active Scenario: 5-YR

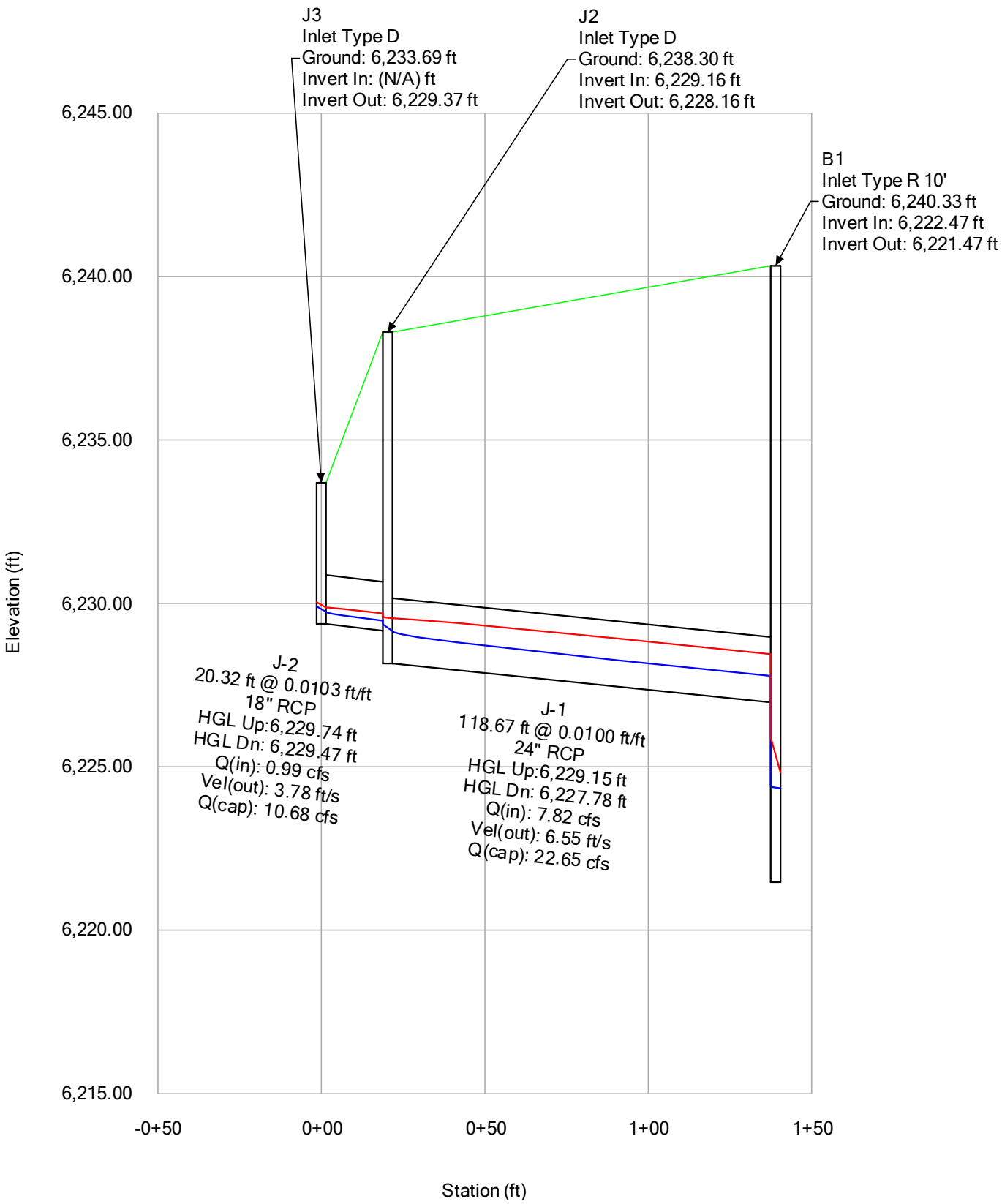


The Brickyard

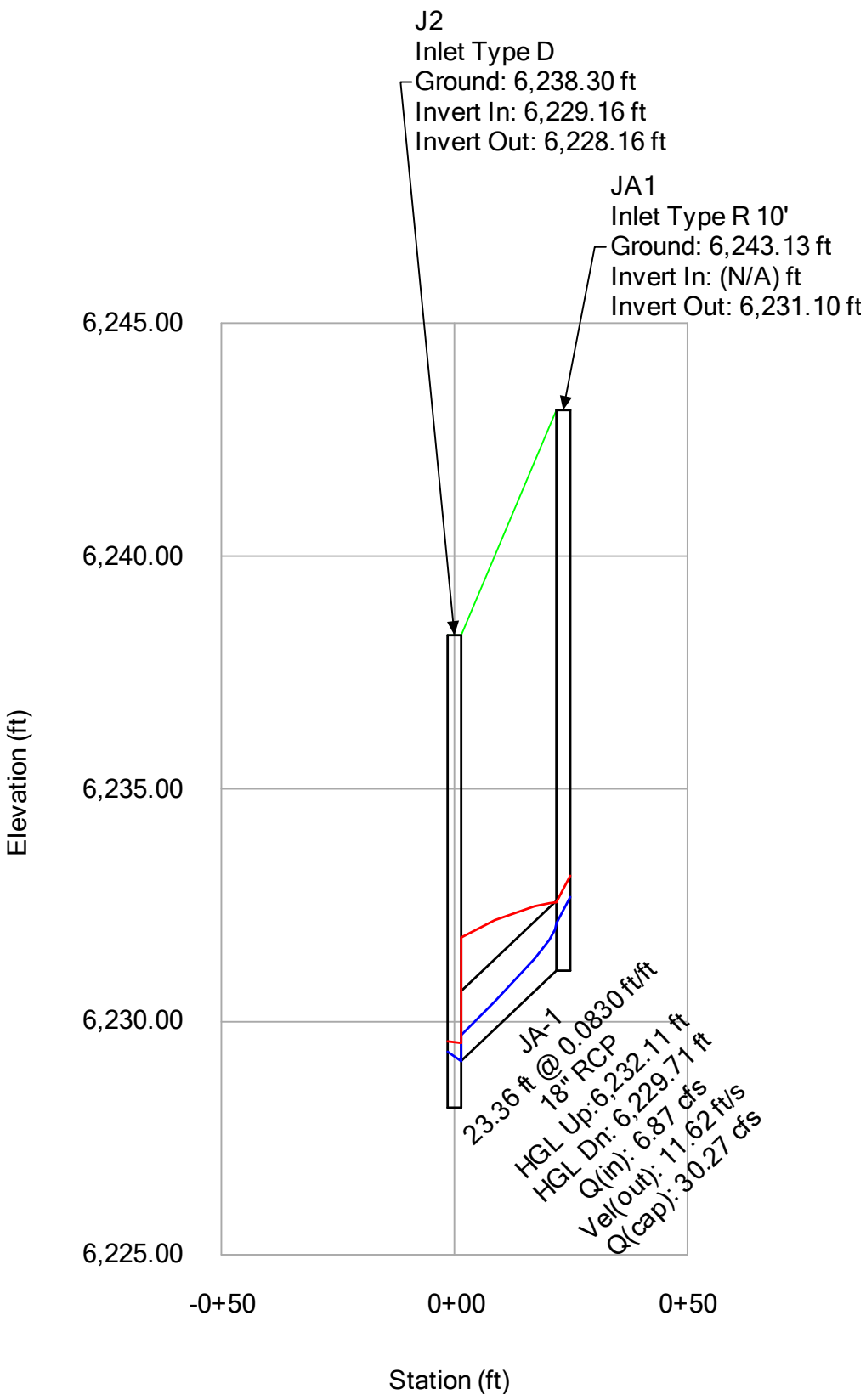
Profile Report

Engineering Profile - Line J (200726 - StormCAD.stsw)

Active Scenario: 5-YR



The Brickyard
Profile Report
Engineering Profile - Line JA (Phase 3) (200726 - StormCAD.stsw)
Active Scenario: 5-YR

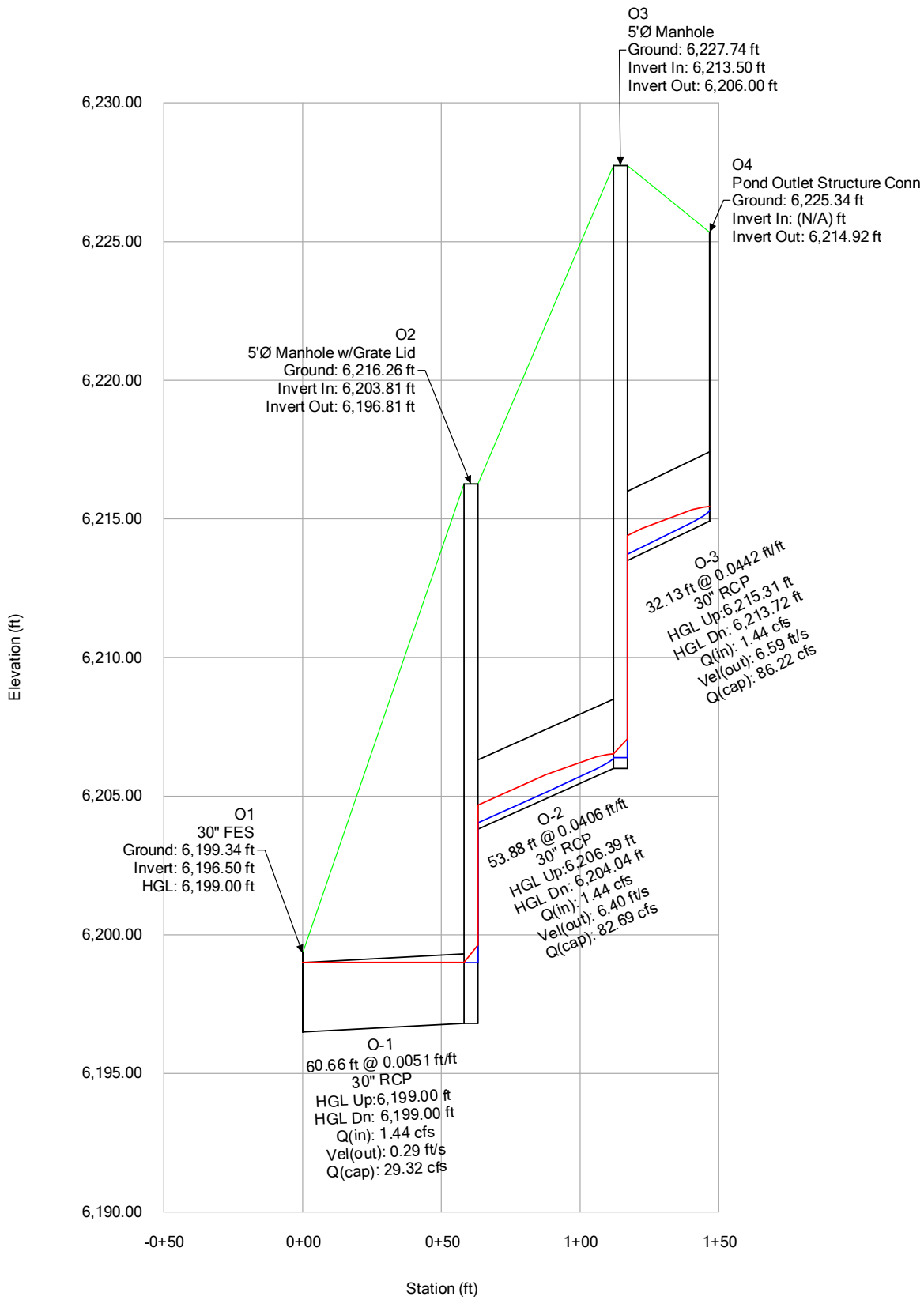


The Brickyard

Profile Report

Engineering Profile - Line O (Pond Outfall) (200726 - StormCAD.stsw)

Active Scenario: 5-YR



The Brickyard
Conduit FlexTable: Combined Pipe/Node Report
Active Scenario: 100-YR

Label	Start Node	Stop Node	Length (Unified) (ft)	Rise (Unified) (ft)	Notes	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Capacity (Full Flow) (cfs)	System Known Flow (cfs)	Velocity (ft/s)	Depth (Normal) (ft)	Froude Number (Normal)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)
A-1	A1	B4	71.00	2.00	24" RCP	6,235.63	6,233.12	0.0354	0.013	42.53	27.32	14.37	1.17	2.581	6,237.45	6,235.31	6,238.74	6,236.48	6,244.43	6,242.64
A-1-A	A1A	A1	27.33	1.50	18" RCP	6,240.20	6,238.63	0.0574	0.013	25.18	1.04	7.01	0.21	3.270	6,240.58	6,238.84	6,240.72	6,239.60	6,244.49	6,244.43
A-2	A2	A1	50.17	2.00	24" RCP	6,237.65	6,235.88	0.0353	0.013	42.49	25.54	14.14	1.12	2.615	6,239.43	6,238.04	6,240.59	6,239.07	6,245.20	6,244.43
A-3	A3	A2	87.27	1.50	18" RCP	6,240.70	6,238.65	0.0235	0.013	16.10	15.97	10.39	1.22	1.598	6,242.12	6,239.88	6,243.44	6,241.53	6,247.55	6,245.20
A-4	A4	A3	139.37	1.50	18" RCP	6,242.95	6,240.95	0.0144	0.013	12.58	14.00	7.92	(N/A)	1.140	6,245.68	6,243.20	6,246.65	6,244.18	6,254.32	6,247.55
A-5	A5	A4	68.09	1.50	18" RCP	6,244.67	6,243.20	0.0216	0.013	15.43	5.32	7.93	0.61	2.070	6,245.91	6,245.78	6,246.09	6,245.92	6,256.20	6,254.32
A-6	A6	A5	27.45	1.50	18" RCP	6,247.50	6,246.67	0.0302	0.013	18.26	3.13	7.73	0.42	2.484	6,248.17	6,247.11	6,248.43	6,247.93	6,256.18	6,256.20
AA-1	AA1	B8	99.55	2.50	30" RCP	6,240.35	6,237.68	0.0268	0.013	67.17	28.28	13.10	1.13	2.479	6,242.16	6,239.83	6,243.02	6,240.45	6,250.02	6,247.67
AA-2	AA2	AA1	272.67	2.00	24" RCP	6,251.18	6,240.85	0.0379	0.013	44.03	16.48	13.01	0.85	2.864	6,252.64	6,241.70	6,253.34	6,244.33	6,263.07	6,250.02
AAA-1	AAA1	AA1	10.09	1.50	18" RCP	6,242.80	6,242.60	0.0198	0.013	14.79	12.19	9.35	1.04	1.698	6,244.12	6,243.76	6,244.97	6,244.83	6,249.77	6,250.02
AAA-2	AAA2	AAA1	33.86	1.50	18" RCP	6,243.80	6,243.05	0.0222	0.013	15.63	4.45	7.62	0.55	2.114	6,244.61	6,244.12	6,244.93	6,244.29	6,250.04	6,249.77
AB-1	AB1	A2	23.50	1.50	18" RCP	6,239.36	6,238.65	0.0302	0.013	18.26	10.68	10.74	0.82	2.318	6,240.61	6,239.58	6,241.33	6,240.93	6,246.21	6,245.20
AC-1	AC1	A3	24.08	1.50	18" RCP	6,242.92	6,242.50	0.0174	0.013	13.87	1.20	4.81	0.30	1.858	6,243.33	6,243.22	6,243.48	6,243.25	6,247.55	6,247.55
AD-1	AD1(Ph2)	A4	26.84	1.50	18" RCP	6,245.40	6,244.95	0.0168	0.013	13.60	9.38	8.30	0.92	1.665	6,246.58	6,246.18	6,247.19	6,246.75	6,255.23	6,254.32
AE-1 (Ph2)	AE1 (Ph2)	AD1(Ph2)	45.95	1.00	18" RCP	6,252.40	6,251.20	0.0261	0.013	5.76	6.25	7.96	(N/A)	1.403	6,253.58	6,252.16	6,254.57	6,253.17	6,255.14	6,255.23
B-1	B1	B0	23.83	4.00	48" RCP	6,221.47	6,221.35	0.0050	0.013	101.93	117.83	9.38	(N/A)	0.827	6,226.16	6,226.00	6,227.53	6,227.37	6,240.33	6,235.53
B-2	B2	B1	243.12	3.50	42" RCP	6,224.66	6,222.47	0.0090	0.013	95.48	99.89	10.38	3.04	1.024	6,228.72	6,226.32	6,230.39	6,228.00	6,241.71	6,240.33
B-3	B3	B2	99.21	3.50	42" RCP	6,230.17	6,229.66	0.0051	0.013	72.13	95.77	9.95	(N/A)	0.938	6,233.81	6,232.68	6,235.35	6,234.51	6,242.71	6,241.71
B-4	B4	B3	28.67	3.50	42" RCP	6,230.70	6,230.42	0.0098	0.013	99.42	95.77	11.77	2.76	1.230	6,234.13	6,233.91	6,235.69	6,235.45	6,242.64	6,242.71
B-5	B5	B4	30.80	3.50	42" RCP	6,231.11	6,230.95	0.0052	0.013	72.51	74.49	8.58	2.96	0.815	6,234.41	6,234.27	6,235.39	6,235.24	6,243.76	6,242.64
B-6	B6	B5	246.64	3.50	42" RCP	6,232.62	6,231.36	0.0051	0.013	71.91	71.22	8.52	2.84	0.860	6,235.72	6,234.74	6,236.69	6,235.61	6,247.94	6,243.76
B-7	B7	B6	294.77	3.00	36" RCP	6,234.59	6,233.12	0.0050	0.013	47.10	62.20	8.80	(N/A)	0.896	6,238.44	6,235.73	6,239.64	6,237.14	6,248.56	6,247.94
B-8	B8	B7	68.67	3.00	36" RCP	6,235.18	6,234.84	0.0050	0.013	46.93	60.86	8.61	(N/A)	0.876	6,239.49	6,238.92	6,240.64	6,240.07	6,247.67	6,248.56
BA-1	BA1	B1	48.83	1.50	18" RCP	6,233.00	6,227.47	0.1133	0.013	35.35	6.30	15.11	0.43	4.802	6,233.97	6,227.91	6,234.39	6,231.26	6,240.89	6,240.33
BB-1	BB1	B2	34.34	1.50	18" PVC	6,227.00	6,226.66	0.0099	0.013	10.45	2.47	1.40	0.50	1.420	6,230.13	6,230.11	6,230.16	6,230.14	6,241.71	6,241.71
BC-1	BC1	B6	67.40	1.50	18" RCP	6,244.00	6,240.60	0.0504	0.013	23.59	14.62	14.06	0.85	2.962	6,245.40	6,241.49	6,246.53	6,244.26	6,249.51	6,247.94
D-1	D1	D0	8.00	4.00	48" RCP	6,219.69	6,219.64	0.0062	0.013	113.55	47.76	3.80	1.81	1.294	6,226.01	6,226.00	6,226.23	6,226.22	6,232.27	6,231.65
D-2	D2	D1	227.06	3.00	36" RCP	6,222.83	6,221.69	0.0050	0.013	47.26	44.53	6.30	2.32	0.879	6,227.10	6,226.09	6,227.72	6,226.71	6,230.35	6,232.27
D-3	D3	D2	197.82	3.00	36" RCP	6,224.57	6,223.58	0.0050	0.013	47.18	43.62	6.17	2.28	0.892	6,227.97	6,227.13	6,228.57	6,227.72	6,231.26	6,230.35
D-4	D4	D3	73.61	3.00	36" RCP	6,225.19	6,224.82	0.0050	0.013	47.29	36.36	5.14	1.97	0.988	6,228.21	6,227.99	6,228.62	6,228.40	6,230.88	6,231.26
D-5	D5	D4	96.23	3.00	36" RCP	6,225.92	6,225.44	0.0050	0.013	47.10	33.84	7.25	1.88	1.008	6,228.36	6,228.22	6,228.83	6,228.60	6,231.14	6,230.88
D-6	D6	D5	371.57	2.50	30" RCP	6,229.16	6,226.42	0.0074	0.013	35.22	32.92	8.15	1.92	1.040	6,231.11	6,228.34	6,232.11	6,229.37	6,234.74	6,231.14
D-7	D7	D6	76.05	2.50	30" RCP	6,229.79	6,229.41	0.0050	0.013	28.99	30.92	6.64	2.25	0.662	6,231.92	6,231.31	6,232.67	6,232.24	6,235.47	6,234.74
D-8	D8	D7	46.58	2.50	30" RCP	6,230.34	6,229.99	0.0075	0.013	35.55	24.20	7.79	1.51	1.218	6,232.02	6,231.92	6,232.76	6,232.47	6,235.92	6,235.47
D-9	D9	D8	34.53	2.00	24" RCP	6,231.14	6,230.84	0.0087	0.013	21.09	22.83	7.27	(N/A)	0.906	6,232.95	6,232.54	6,233.85	6,233.54	6,236.64	6,235.92
D-10	D10	D9	35.34	2.00	24" RCP	6,232.70	6,232.14	0.0158	0.013	28.48	3.86	6.33	0.50	1.880	6,233.59	6,233.65	6,233.72	6,233.69	6,237.06	6,236.64
DA-1	DA1	D1	29.26	1.50	18" RCP	6,222.44	6,222.19	0.0085	0.013	9.71	6.20	3.51	0.87	1.211	6,226.16	6,226.05	6,226.35	6,226.25	6,227.06	6,232.27
DA-2	DA2	DA1	65.33	1.50	18" RCP	6,223.07	6,222.69	0.0058	0.013	8.01	2.52	1.43	0.58	1.079	6,226.39	6,226.35	6,226.42	6,226.38	6,227.10	6,227.06
DB-1	DB1	D3	54.93	1.50	18" RCP	6,228.07	6,226.07	0.0364	0.013	20.04	14.63	12.38	0.95	2.414	6,229.47	6,228.07	6,230.60	6,229.14	6,233.00	6,231.26
DC-1	DC1	DB1	17.10	1.00	12" PVC	6,228.61	6,228.32	0.0170	0.013	4.64	10.65	13.56	(N/A)	2.391	6,232.18	6,230.65	6,235.03	6,233.51	6,231.32	6,233.00
DC-2	DC2	DB1	41.71	1.50	18" RCP	6,229.21	6,228.82	0.0094	0.013	10.16	1.80	4.33	0.43	1.379	6,230.40	6,230.40	6,230.42	6,230.41	6,233.60	6,233.00
DD-1	DD1	D4	7.75	1.50	18" RCP	6,226.07	6,226.03	0.0052	0.013	7.55	4.91	2.78	0.88	0.937	6,228.27	6,228.26	6,228.39	6,228.38	6,230.70	6,230.88
DD-2	DD2	DD1	35.33	1.50	18" RCP	6,226.50	6,226.32	0.0051	0.013	7.50	3.04	1.72	0.66	0.995	6,228.35	6,228.33	6,228.40	6,228.37	6,230.33	6,230.70
DE-1	DE1	D5	17.97	1.50	18" RCP	6,227.10	6,226.96	0.0078	0.013	9.27	2.54	4.47	0.54	1.255	6,228.41	6,228.40	6,228.45	6,228.44	6,231.23	6,231.14
DF-1	DF1	D6	12.48	1.50	18" RCP	6,230.60	6,230.43	0.0136	0.013	12.26	2.73	5.58	0.48	1.666	6,231.23	6,231.21	6,231.46	6,231.35	6,234.90	6,234.74
DF-2	DF2	D6	39.36	1.50	18" RCP	6,230.83	6,230.43	0.0102	0.013	10.59	1.31	4.07	0.36	1.431	6,231.26	6,231.21	6,231.41	6,231.24	6,235.09	6,234.74
DG-1	DG1	D7	40.75	2.00	24" RCP	6,231.74	6,231.00	0.0182	0.013	30.48	13.05	9.33	0.91	1.962	6,233.04	6,231.97	6,233.61	6,233.13	6,236.99	6,235.47
DG-2	DG3	DG1	20.12	1.50	18" PVC	6,232.97	6,232.81	0.0080	0.013	9.37	10.77	6.09	(N/A)	0.877	6,234.36	6,234.07	6,234.98	6,234.79	6,238.26	6,236.99
DH-1	DH1	D9	16.00	2.00	24" RCP	6,232.22	6,232.14	0.0050	0.013	16.00	5.36	4.59	0.80	1.047	6,233.60	6,233.59	6,233.68	6,233.67	6,236.42	6,236.64
DJ-1	DJ1	D8	39.40	1.50	18" RCP	6,234.01	6,232.20	0.0459	0.013	22.51	2.62	8.51	0.35	3.041	6,234.62	6,232.55	6,234.85	6,233.65	6,237.32	6,235.92
E-1	E1	B8	40.65	2.50	30" RCP	6,238.75	6,238.18	0.0140	0.013	48.57	35.80	10.82	1.60	1.626	6,240.78	6,239.88	6,241.87	6,241.45	6,249.18	6,247.67
E-2	E2	E1	25.55	2.00	24" RCP	6,239.80	6,239.25	0.0215	0.013	33.19	29.16	11.92	1.45	1.793	6,241.65	6,240.85	6,243.08	6,242.67	6,247.99	6,249.18

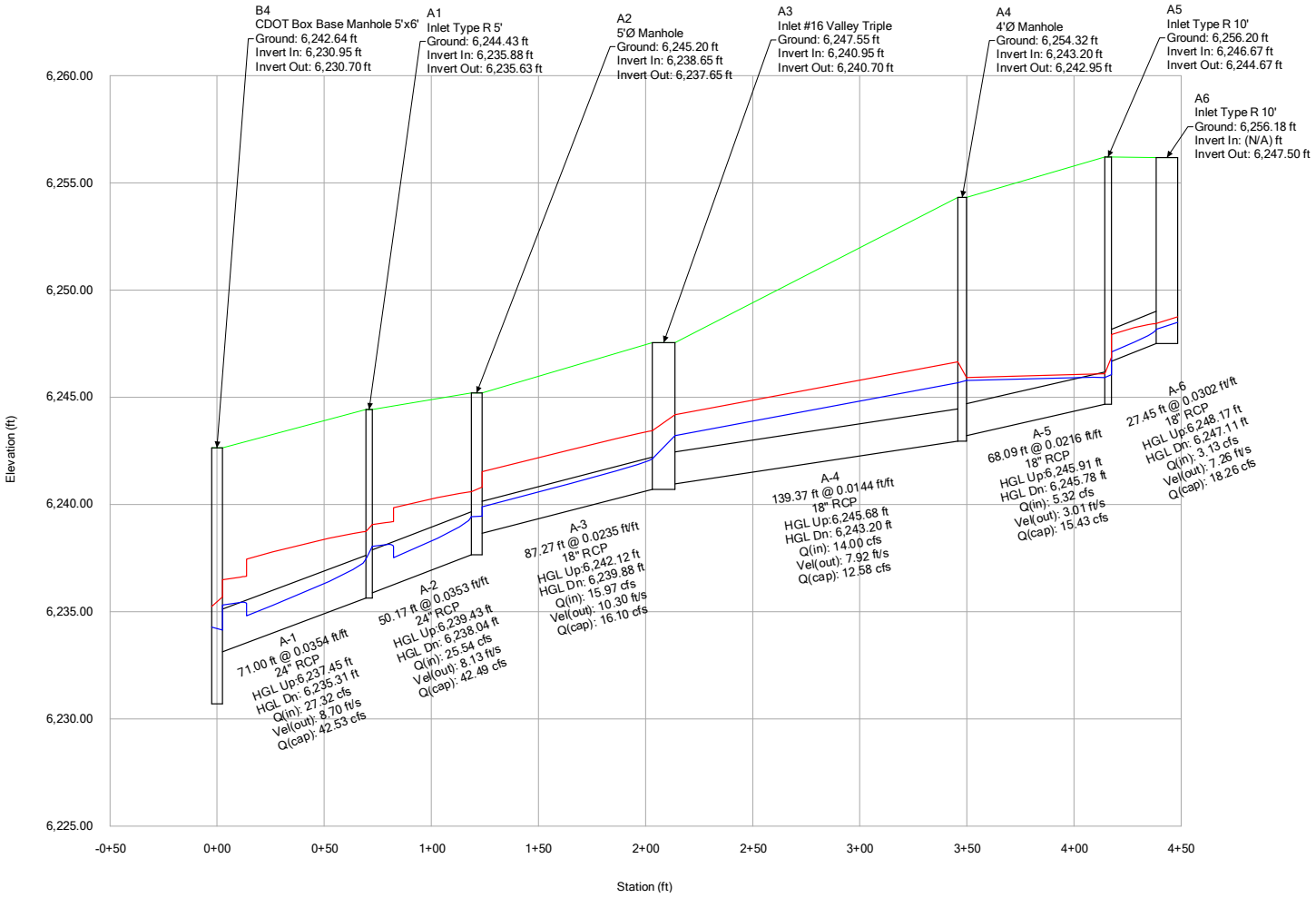
The Brickyard
Conduit FlexTable: Combined Pipe/Node Report
Active Scenario: 100-YR

Label	Start Node	Stop Node	Length (Unified) (ft)	Rise (Unified) (ft)	Notes	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Capacity (Full Flow) (cfs)	System Known Flow (cfs)	Velocity (ft/s)	Depth (Normal) (ft)	Froude Number (Normal)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)
E-3	E3	E2	375.02	2.00	24" RCP	6,248.64	6,240.05	0.0229	0.013	34.24	29.16	12.24	1.42	1.883	6,250.49	6,241.47	6,251.92	6,243.80	6,260.64	6,247.99
E-4	E4	E3	72.11	2.00	24" RCP	6,250.92	6,248.89	0.0282	0.013	37.95	23.47	12.72	1.14	2.322	6,252.64	6,250.69	6,253.68	6,251.65	6,260.55	6,260.64
E-5	E5	E4	81.40	1.50	18" RCP	6,255.46	6,253.42	0.0251	0.013	16.63	15.91	10.71	1.17	1.723	6,256.88	6,254.61	6,258.19	6,256.35	6,265.34	6,260.55
E-6	E6	E5	193.51	1.50	18" RCP	6,260.25	6,256.21	0.0209	0.013	15.18	12.74	9.62	1.05	1.727	6,261.59	6,257.98	6,262.50	6,258.78	6,269.40	6,265.34
E-7	E7	E6	12.83	1.50	18" RCP	6,261.28	6,261.00	0.0218	0.013	15.52	12.74	9.80	1.03	1.785	6,262.62	6,262.16	6,263.53	6,263.33	6,269.61	6,269.40
E-8	E8	E7	26.74	1.50	18" RCP	6,262.50	6,262.03	0.0176	0.013	13.93	8.76	8.33	0.86	1.743	6,263.92	6,263.76	6,264.32	6,264.14	6,270.34	6,269.61
E-9	E9	E8	39.36	1.50	18" RCP	6,263.51	6,263.25	0.0066	0.013	8.54	5.84	5.20	0.91	1.047	6,264.44	6,264.19	6,264.84	6,264.58	6,271.24	6,270.34
E-10	E10	E9	36.33	1.50	18" RCP	6,263.94	6,263.76	0.0050	0.013	7.39	5.41	4.57	0.95	0.890	6,265.27	6,265.21	6,265.44	6,265.35	6,271.08	6,271.24
EA-1	EA1	E1	5.69	1.50	18" RCP	6,242.94	6,242.76	0.0316	0.013	18.68	6.20	9.50	0.60	2.511	6,243.90	6,243.52	6,244.32	6,244.26	6,249.33	6,249.18
EA-2	EA2	EA1	27.33	1.50	18" RCP	6,243.44	6,243.17	0.0099	0.013	10.44	4.10	5.55	0.65	1.388	6,244.22	6,244.12	6,244.52	6,244.31	6,249.74	6,249.33
EC-1	EC1	E4	68.96	1.50	18" RCP	6,257.16	6,255.00	0.0313	0.013	18.59	8.57	10.31	0.72	2.440	6,258.29	6,255.73	6,258.85	6,257.31	6,263.77	6,260.55
EC-2	EC2	EC1	47.37	1.50	18" RCP	6,260.32	6,259.43	0.0188	0.013	14.40	3.03	6.45	0.47	1.957	6,260.98	6,259.90	6,261.23	6,260.54	6,264.58	6,263.77
F-1	F1	AA2	18.34	1.50	18" RCP	6,252.55	6,252.18	0.0202	0.013	14.92	16.48	9.33	(N/A)	1.342	6,254.09	6,253.61	6,255.44	6,255.01	6,263.49	6,263.07
F-2	F2	F1	137.96	1.50	18" RCP	6,258.06	6,252.80	0.0381	0.013	20.51	10.66	11.72	0.77	2.653	6,259.31	6,254.16	6,260.02	6,254.78	6,266.68	6,263.49
F-3	F3	F2	32.51	1.50	18" RCP	6,258.96	6,258.31	0.0200	0.013	14.85	10.66	9.14	0.94	1.799	6,260.21	6,259.30	6,260.92	6,260.45	6,267.30	6,266.68
F-4	F4	F3	182.63	1.50	18" RCP	6,263.50	6,259.21	0.0235	0.013	16.10	3.79	7.45	0.50	2.187	6,264.24	6,260.24	6,264.54	6,260.37	6,271.00	6,267.30
F-5	F5	F4	18.04	1.50	18" RCP	6,264.80	6,264.25	0.0305	0.013	18.34	3.79	8.18	0.46	2.493	6,265.54	6,264.76	6,265.84	6,265.56	6,270.58	6,271.00
FA-1	FA1	F1	18.75	1.50	18" RCP	6,253.75	6,253.30	0.0240	0.013	16.27	6.58	8.72	0.66	2.160	6,254.74	6,254.04	6,255.18	6,254.94	6,263.60	6,263.49
FB-1	FB1	F3	19.67	1.50	18" RCP	6,259.95	6,259.71	0.0122	0.013	11.60	7.10	6.89	0.85	1.461	6,260.98	6,260.59	6,261.45	6,261.26	6,267.32	6,267.30
G-1	G2	G1	61.28	4.00	48" RCP	6,186.94	6,186.63	0.0051	0.013	102.16	112.35	8.94	(N/A)	0.788	6,190.42	6,189.83	6,191.88	6,191.52	6,195.63	6,193.76
G-2	G3	G2	180.96	4.00	48" RCP	6,189.90	6,187.19	0.0150	0.013	175.77	108.85	14.73	2.28	1.901	6,193.06	6,190.47	6,194.68	6,191.98	6,201.42	6,195.63
G-3	G4	G3	185.39	4.00	48" RCP	6,193.00	6,190.15	0.0154	0.013	178.09	108.85	14.88	2.26	1.931	6,196.16	6,192.48	6,197.78	6,195.66	6,203.93	6,201.42
G-4	G5	G4	79.13	4.00	48" RCP	6,195.00	6,193.25	0.0221	0.013	213.60	99.85	16.71	1.92	2.410	6,198.03	6,196.30	6,199.52	6,197.77	6,205.97	6,203.93
G-5	G6	G5	46.80	1.50	18" RCP	6,200.50	6,198.50	0.0427	0.013	21.71	2.48	8.17	0.34	2.932	6,201.10	6,198.84	6,201.32	6,199.88	6,205.64	6,205.97
GA-1	GA2	GA1	19.33	1.50	18" RCP	6,186.73	6,186.63	0.0052	0.013	7.55	8.10	4.78	1.37	0.590	6,187.96	6,187.73	6,188.38	6,188.26	6,191.20	6,193.14
GA-2	GA3	GA2	57.36	1.50	18" RCP	6,187.27	6,186.98	0.0051	0.013	7.47	2.78	3.92	0.63	0.997	6,187.98	6,187.96	6,188.16	6,188.04	6,191.08	6,191.20
GC-1	GC1	G5	16.51	3.00	36" RCP	6,199.15	6,199.00	0.0091	0.013	63.57	97.79	13.83	(N/A)	1.408	6,202.31	6,201.89	6,205.29	6,204.94	6,205.53	6,205.97
GC-2	GC2	GC1	89.82	3.00	36" RCP	6,201.50	6,199.40	0.0234	0.013	101.98	69.74	15.53	1.82	2.212	6,204.15	6,202.75	6,205.88	6,204.26	6,207.37	6,205.53
H-1	H2	H1	43.12	3.00	36" RCP	6,200.13	6,199.91	0.0051	0.013	47.64	42.60	6.03	2.21	0.923	6,206.47	6,206.29	6,207.03	6,206.85	6,207.77	6,202.16
H-2	H3	H2	27.10	3.00	36" RCP	6,200.47	6,200.33	0.0052	0.013	47.94	42.60	6.03	2.20	0.933	6,206.58	6,206.47	6,207.14	6,207.03	6,216.23	6,207.77
H-3	H4	H3	156.16	3.00	36" RCP	6,203.77	6,202.98	0.0051	0.013	47.44	42.60	6.03	2.22	0.917	6,207.21	6,206.58	6,207.78	6,207.14	6,209.69	6,216.23
H-4	H5	H4	131.45	3.00	36" RCP	6,204.64	6,203.97	0.0051	0.013	47.62	42.60	6.03	2.21	0.922	6,207.75	6,207.21	6,208.31	6,207.78	6,214.32	6,209.69
H-5	H6	H5	164.39	3.00	36" RCP	6,205.68	6,204.84	0.0051	0.013	47.68	42.60	7.63	2.21	0.924	6,208.23	6,207.75	6,208.92	6,208.32	6,211.48	6,214.32
H-6	H7	H6	82.40	3.00	36" RCP	6,206.30	6,205.88	0.0051	0.013	47.62	42.60	7.62	2.21	0.922	6,208.54	6,208.23	6,209.42	6,209.03	6,212.01	6,211.48
H-7	H8	H7	86.68	3.00	36" RCP	6,206.95	6,206.50	0.0052	0.013	48.05	42.60	7.68	2.20	0.937	6,209.15	6,208.63	6,210.06	6,209.61	6,211.30	6,212.01
H-8	H9	H8	46.04	2.00	24" RCP	6,208.29	6,208.04	0.0054	0.013	16.67	12.86	5.85	1.32	0.959	6,209.61	6,209.33	6,210.14	6,209.89	6,213.77	6,211.30
H-9	H10	H9	40.93	1.50	18" RCP	6,209.60	6,209.38	0.0054	0.013	7.70	4.77	4.59	0.85	0.967	6,210.45	6,210.22	6,210.78	6,210.56	6,213.72	6,213.77
J-1	J2	B1	118.67	2.00	24" RCP	6,228.16	6,226.97	0.0100	0.013	22.65	18.78	8.06	1.39	1.264	6,229.72	6,228.36	6,230.51	6,229.37	6,238.30	6,240.33
J-2	J3	J2	20.32	1.50	18" RCP	6,229.37	6,229.16	0.0103	0.013	10.68	4.92	5.92	0.71	1.402	6,230.22	6,230.26	6,230.57	6,230.46	6,233.69	6,238.30
JA-1	JA1	J2	23.36	1.50	18" RCP	6,231.10	6,229.16	0.0830	0.013	30.27	13.94	16.78	0.71	3.973	6,232.48	6,230.02	6,233.52	6,232.78	6,243.13	6,238.30
O-1	O2	O1	60.66	2.50	30" RCP	6,196.81	6,196.50	0.0051	0.013	29.32	42.20	8.60	(N/A)	0.959	6,206.93	6,206.29	6,208.08	6,207.44	6,216.26	6,199.34
O-2	O3	O2	53.88	2.50	30" RCP	6,206.00	6,203.81	0.0406	0.013	82.69	42.20	16.93	1.27	2.988	6,208.17	6,207.15	6,209.52	6,208.30	6,227.74	6,216.26
O-3	O4	O3	30.49	2.50	30" RCP	6,214.92	6,213.50	0.0466	0.013	88.51	42.20	17.82	1.22	3.226	6,217.09	6,215.01	6,218.44	6,217.91	6,225.34	6,227.74

The Brickyard
FlexTable: Outfall Table
Active Scenario: 100-YR

Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Boundary Condition Type	Elevation (User Defined Tailwater) (ft)	Hydraulic Grade (ft)	Flow (Total Out) (cfs)	Notes
B0	6,235.53	6,220.35	User Defined Tailwater	6,226.00	6,226.00	117.83	Connect to West Forebay
D0	6,231.65	6,219.39	User Defined Tailwater	6,226.00	6,226.00	47.76	Connect to East Forebay
G1	6,193.76	6,186.63	Free Outfall		6,189.83	112.35	Connect to PR Headwall
GA1	6,193.14	6,186.63	Free Outfall		6,187.73	8.10	Connect to PR Wingwall
H1	6,202.16	6,199.91	User Defined Tailwater	6,206.29	6,206.29	42.60	24" FES
O1	6,199.34	6,196.50	User Defined Tailwater	6,206.29	6,206.29	42.20	30" FES

The Brickyard
Profile Report
Engineering Profile - Line A (200726 - StormCAD.stsw)
Active Scenario: 100-YR

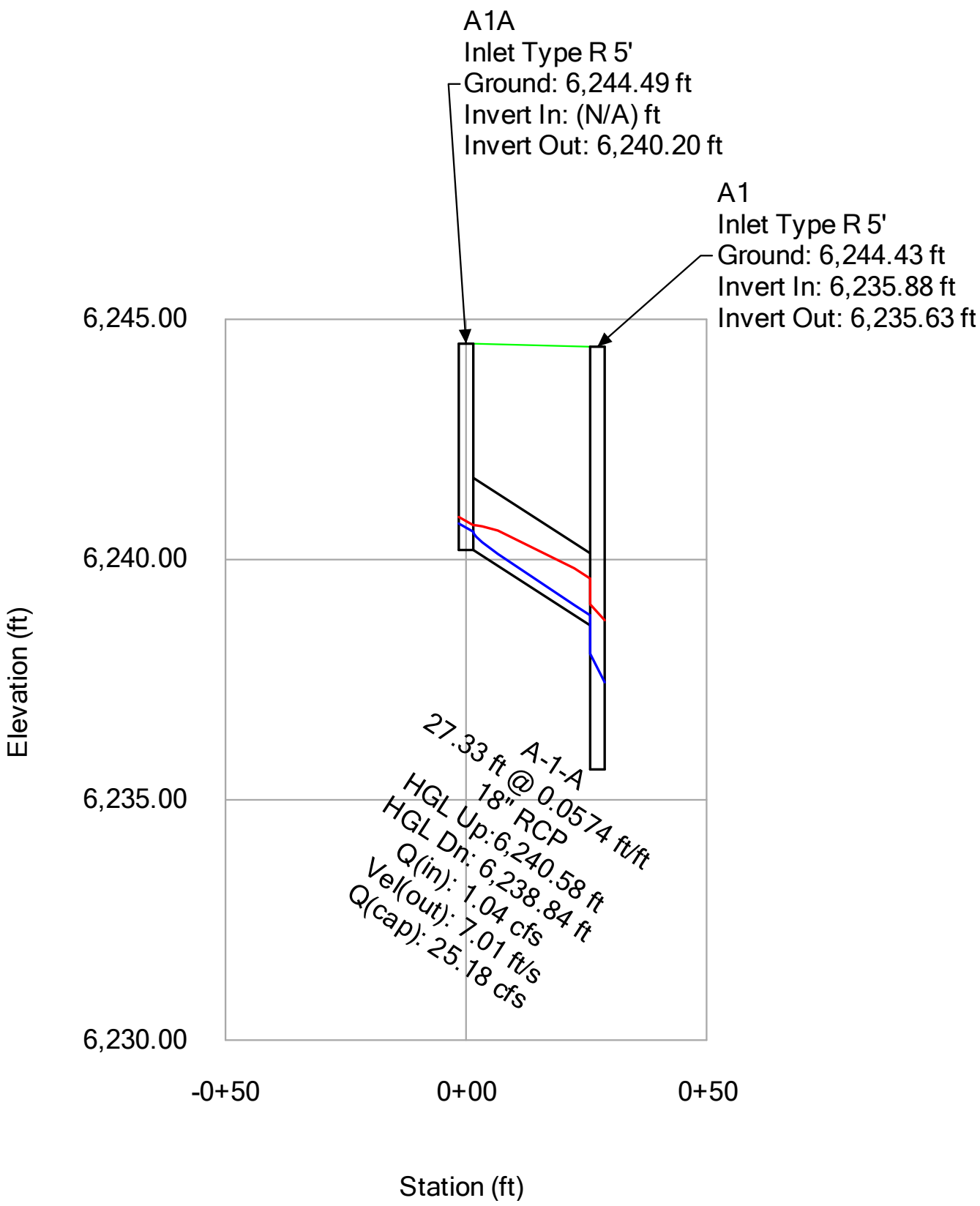


The Brickyard

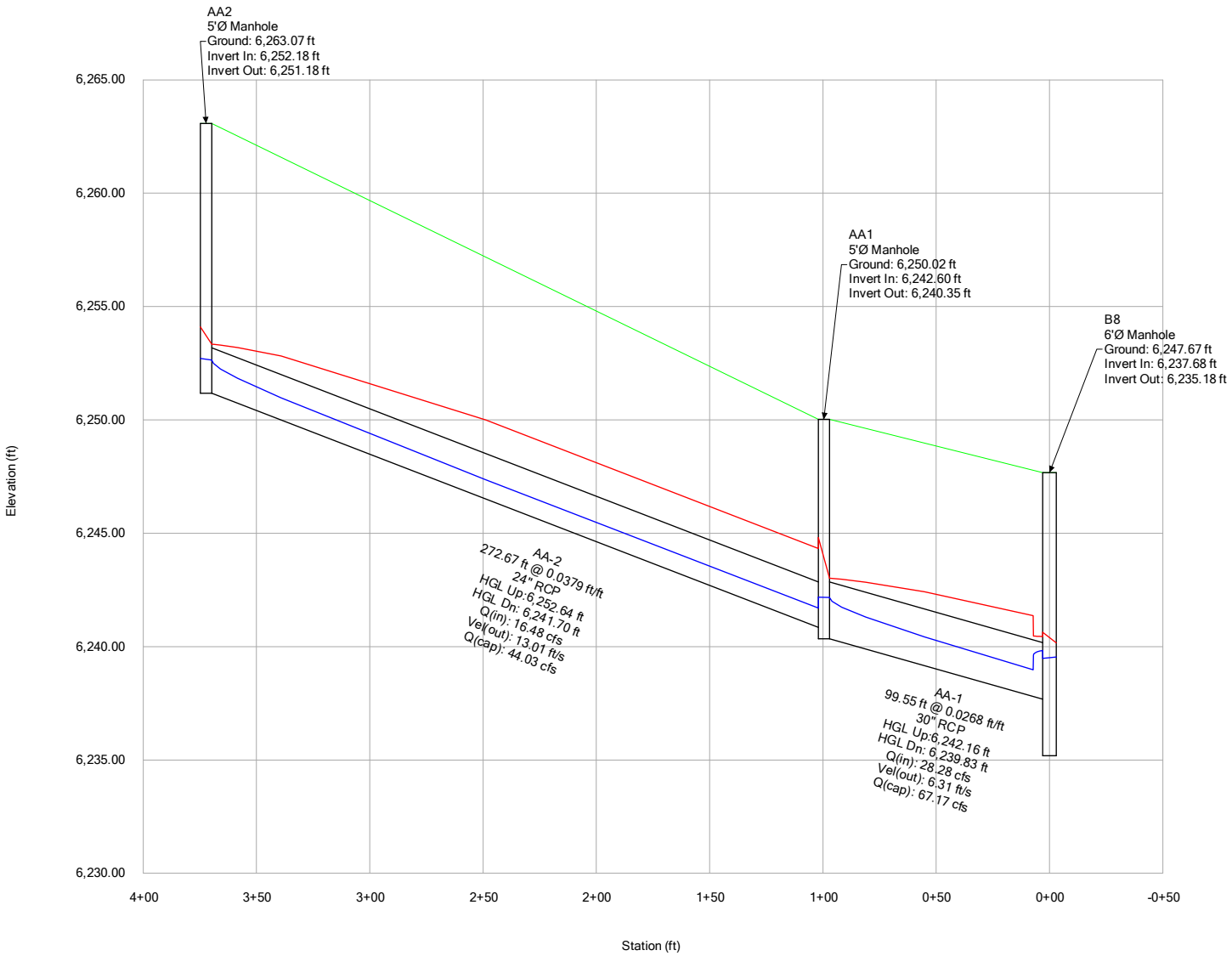
Profile Report

Engineering Profile - Line A1 (200726 - StormCAD.stsw)

Active Scenario: 100-YR



The Brickyard
Profile Report
Engineering Profile - Line AA (200726 - StormCAD.stsw)
Active Scenario: 100-YR

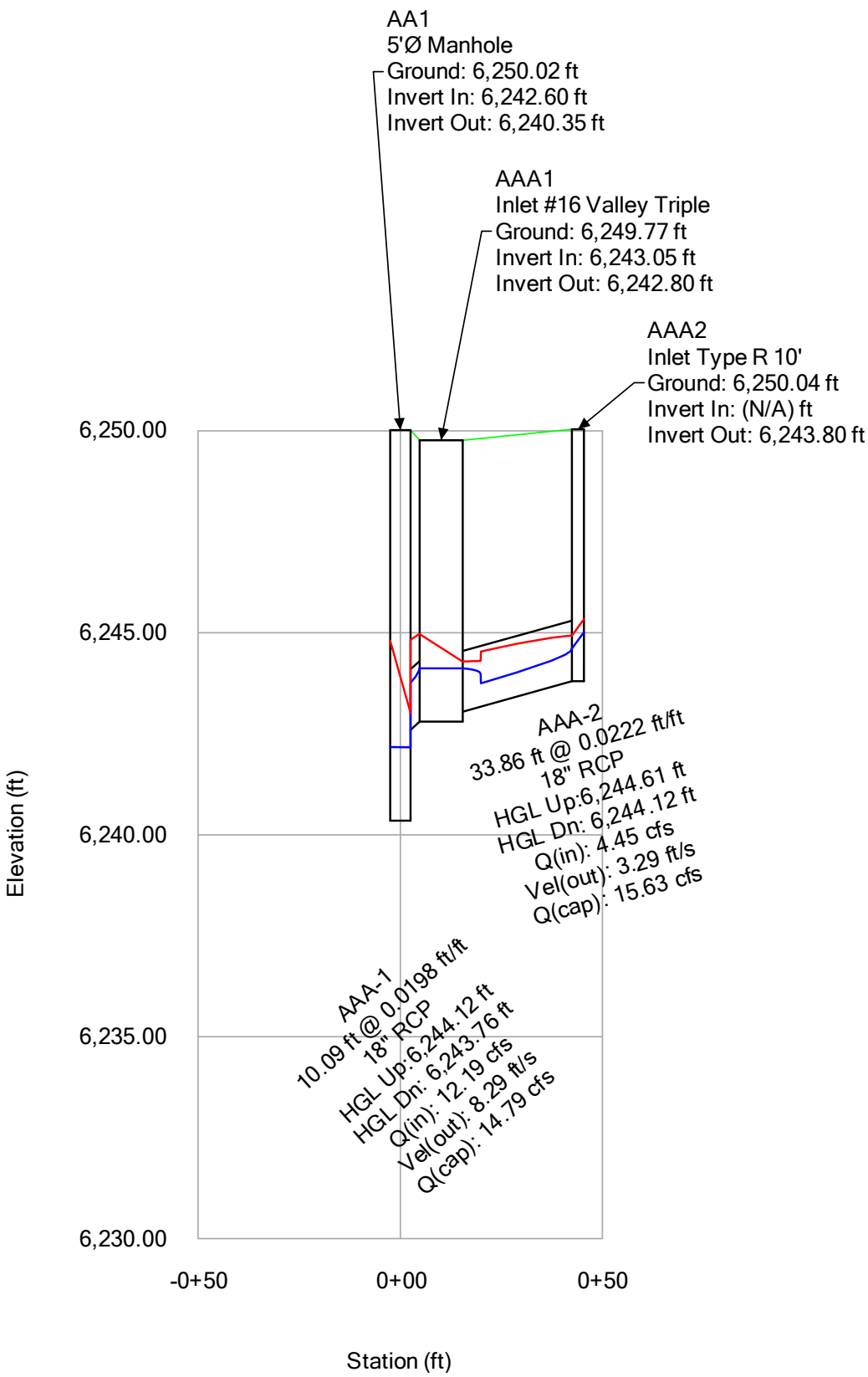


The Brickyard

Profile Report

Engineering Profile - Line AAA (200726 - StormCAD.stsw)

Active Scenario: 100-YR

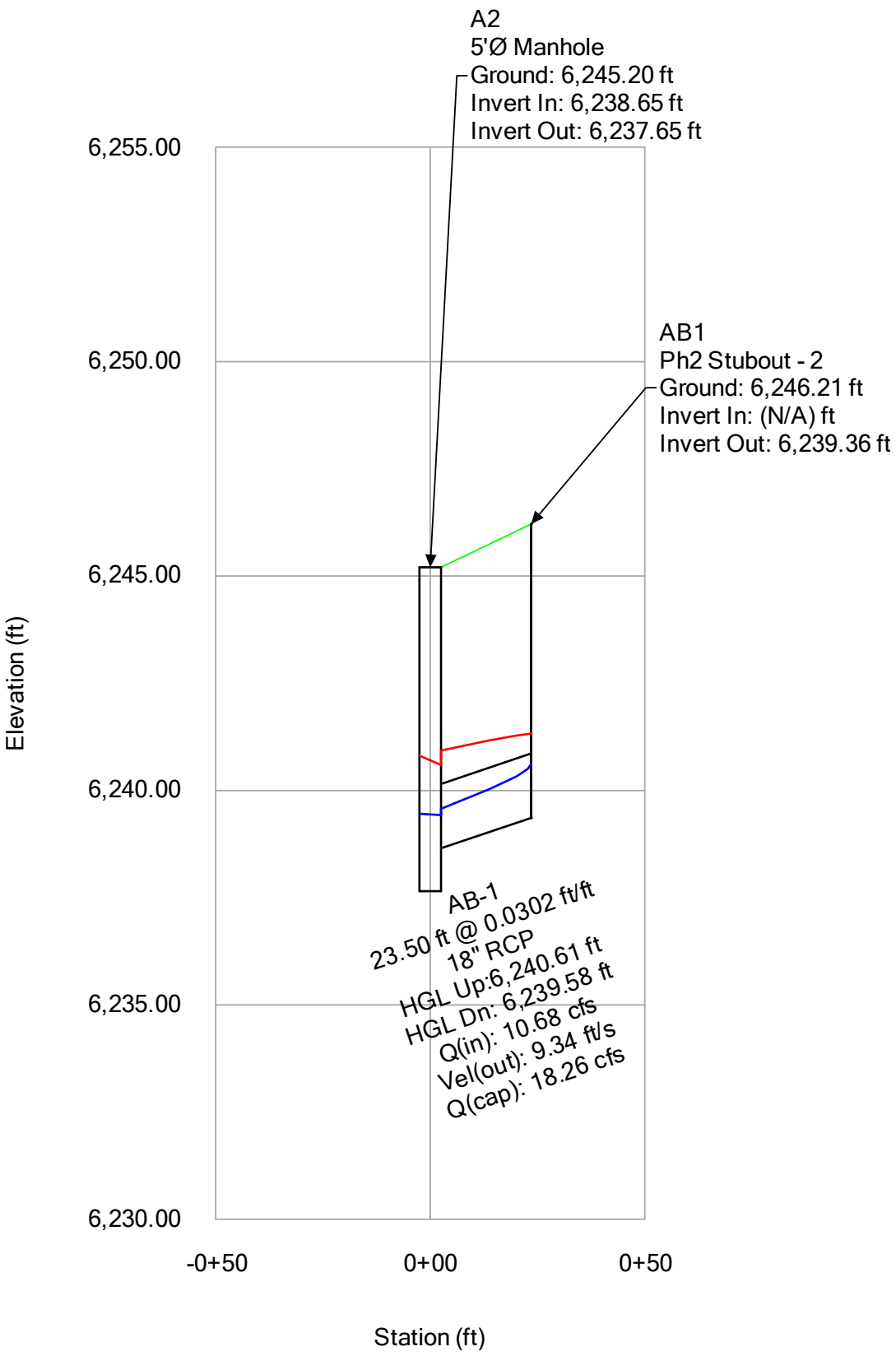


The Brickyard

Profile Report

Engineering Profile - Line AB (200726 - StormCAD.stsw)

Active Scenario: 100-YR

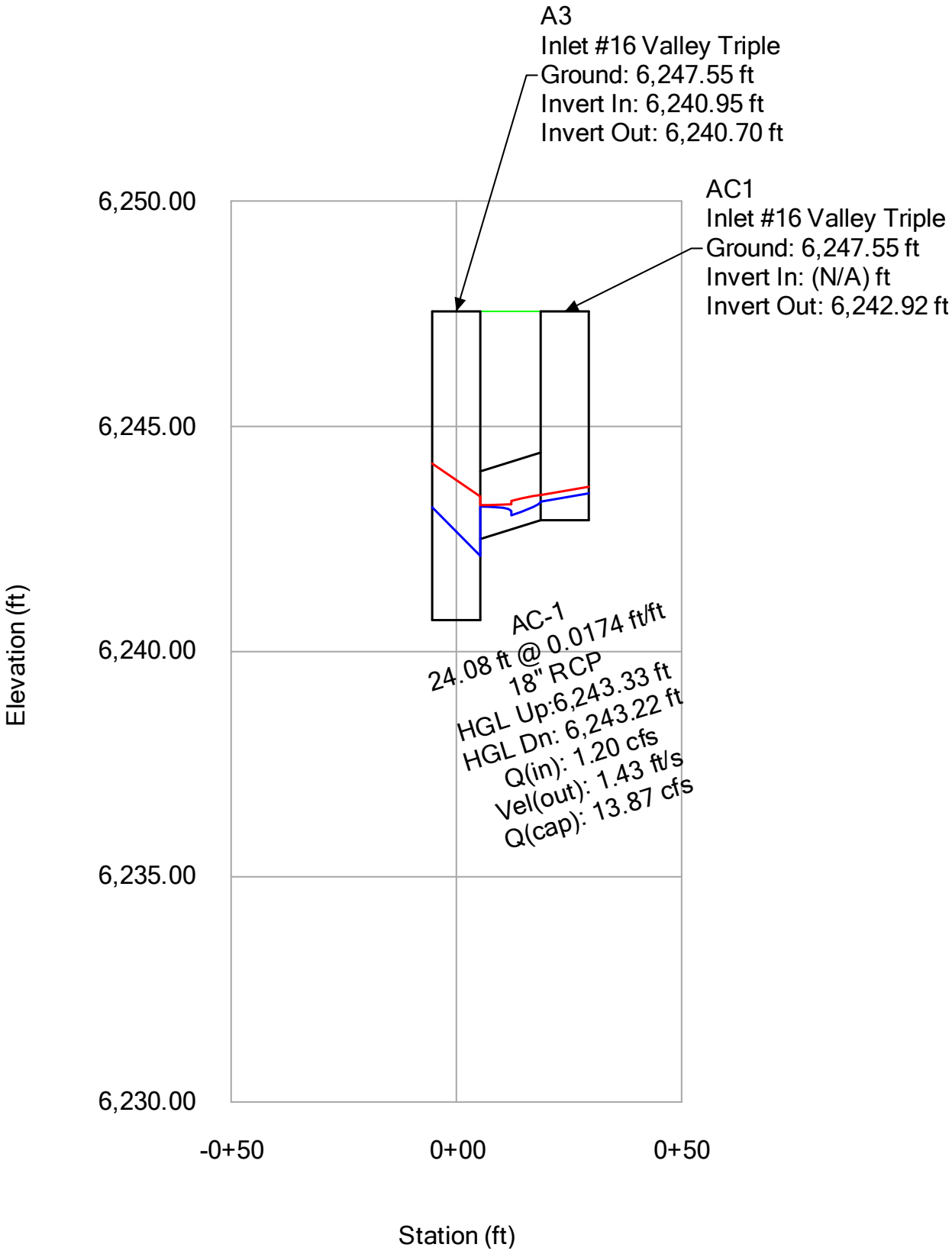


The Brickyard

Profile Report

Engineering Profile - Line AC (200726 - StormCAD.stsw)

Active Scenario: 100-YR

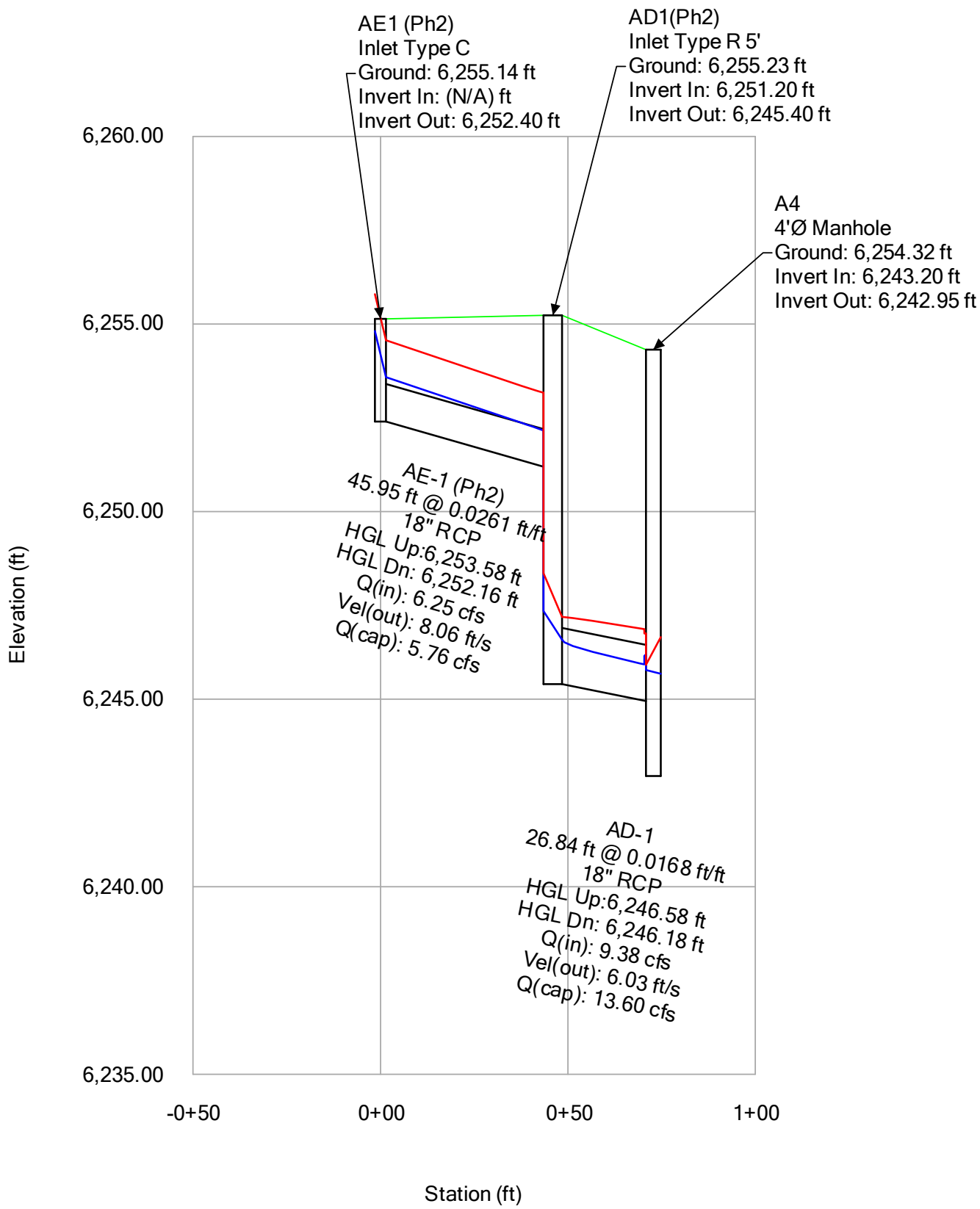


The Brickyard

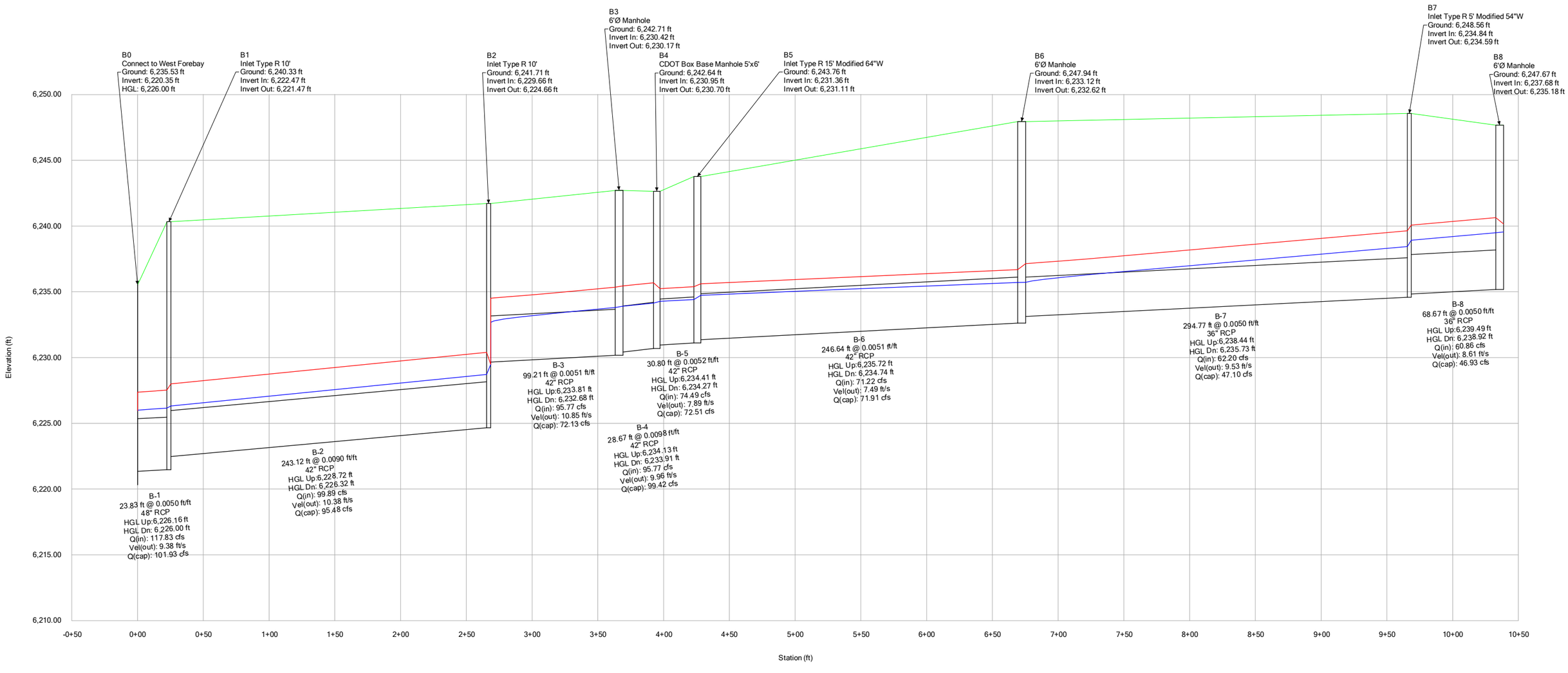
Profile Report

Engineering Profile - Lines AE (Phase 2) - AD (200726 - StormCAD.stsw)

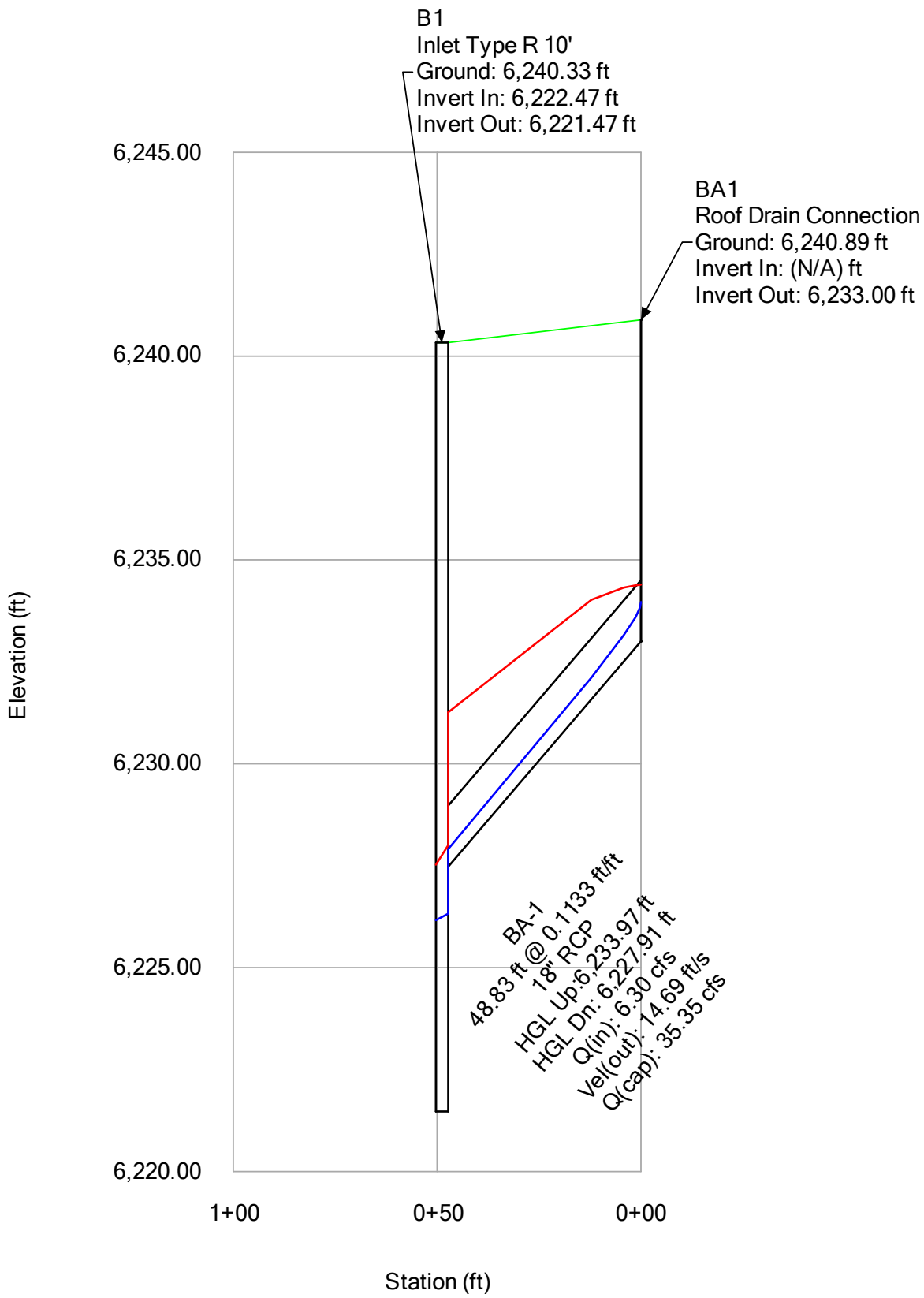
Active Scenario: 100-YR



The Brickyard
Profile Report
Engineering Profile - Line B (200726 - StormCAD.stsw)
Active Scenario: 100-YR



The Brickyard
Profile Report
Engineering Profile - Line BA (200726 - StormCAD.stsw)
Active Scenario: 100-YR

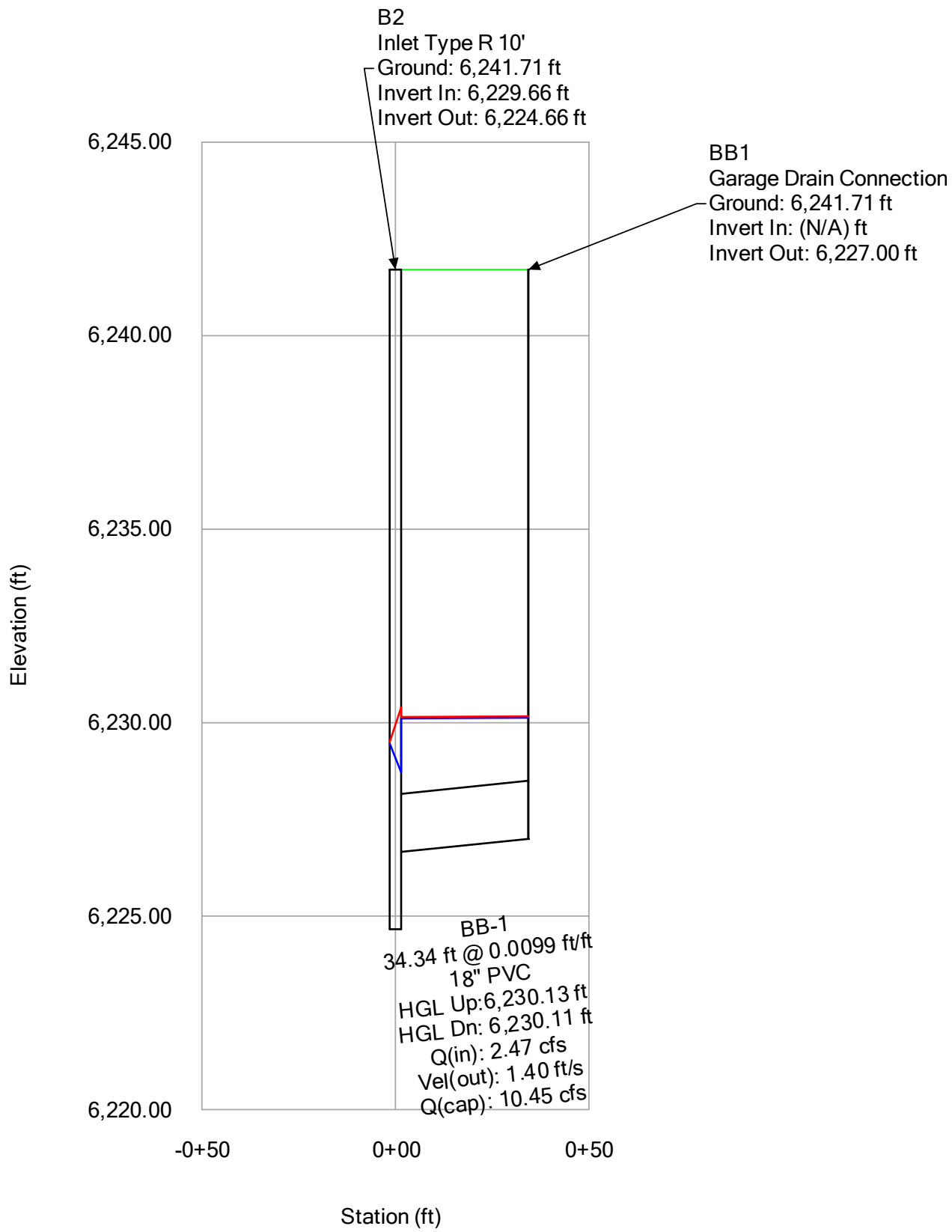


The Brickyard

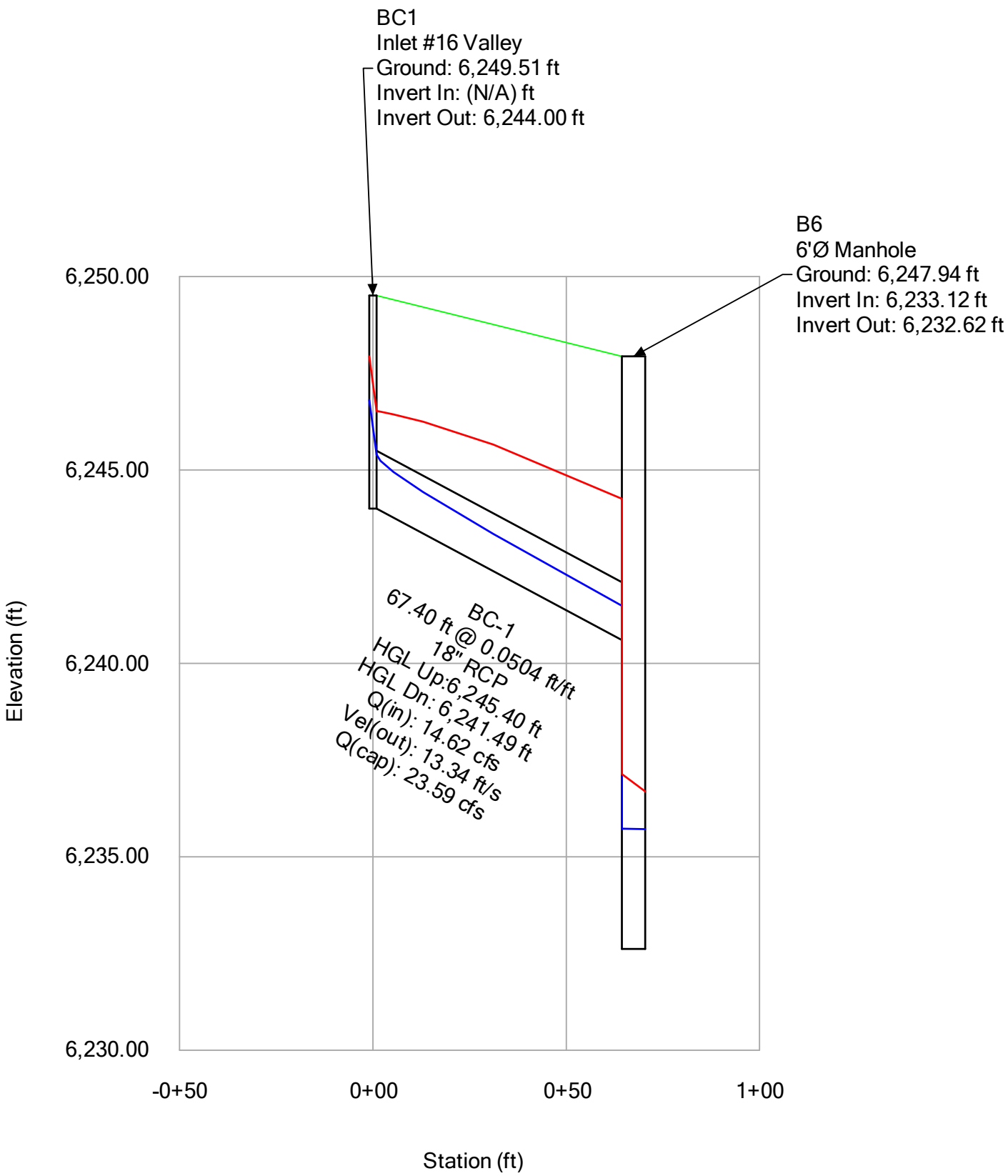
Profile Report

Engineering Profile - Line BB (200726 - StormCAD.stsw)

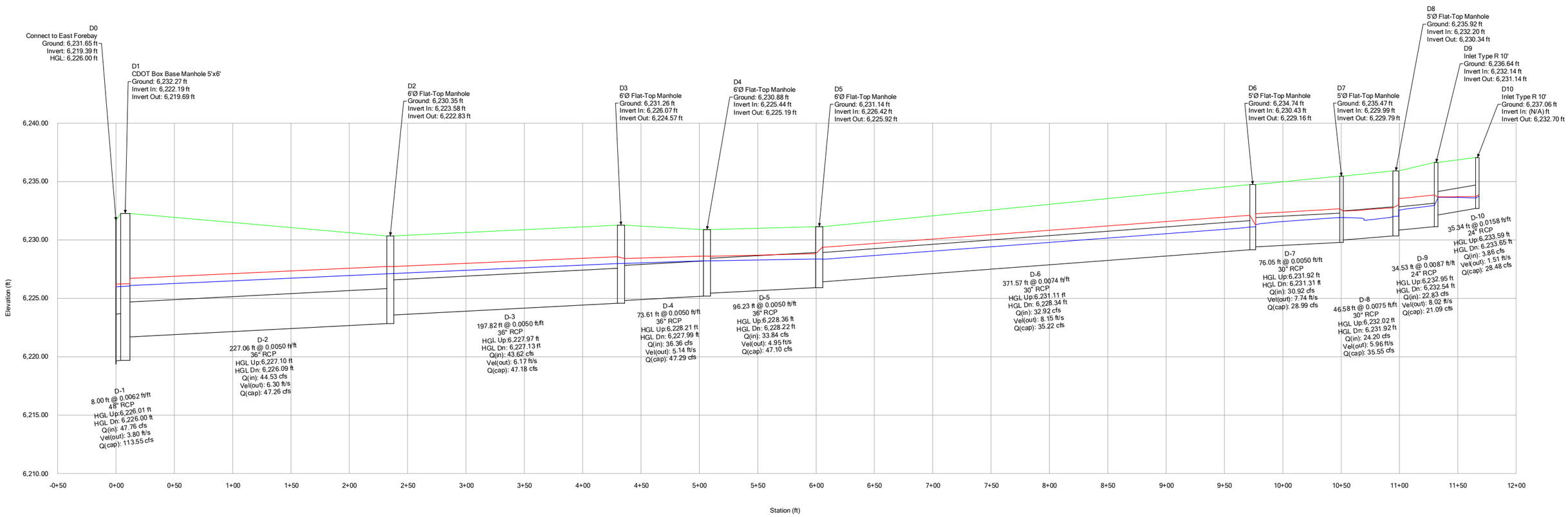
Active Scenario: 100-YR



The Brickyard
Profile Report
Engineering Profile - Line BC (200726 - StormCAD.stsw)
Active Scenario: 100-YR



The Brickyard
Profile Report
Engineering Profile - Line D (200726 - StormCAD.stsw)
Active Scenario: 100-YR

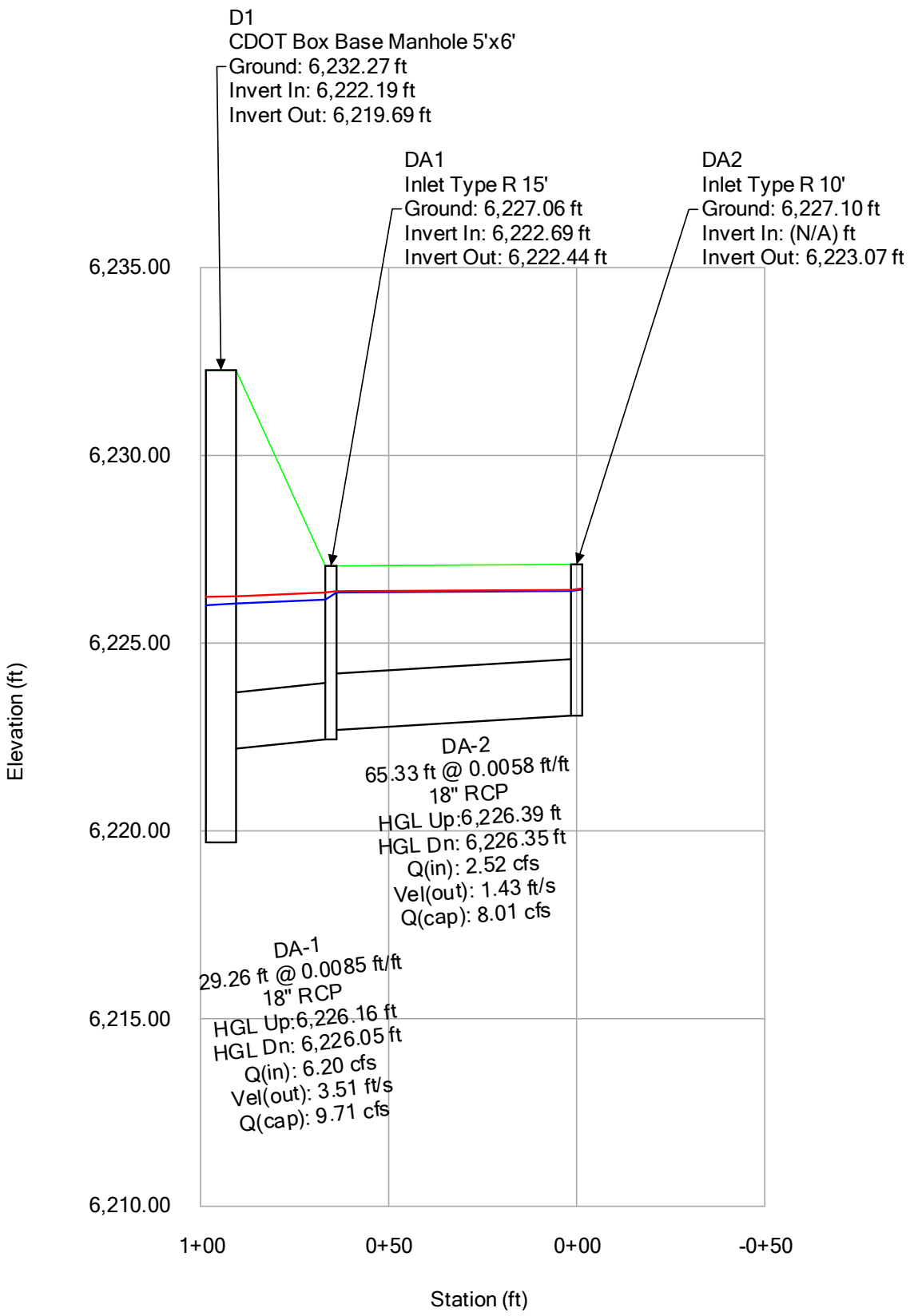


The Brickyard

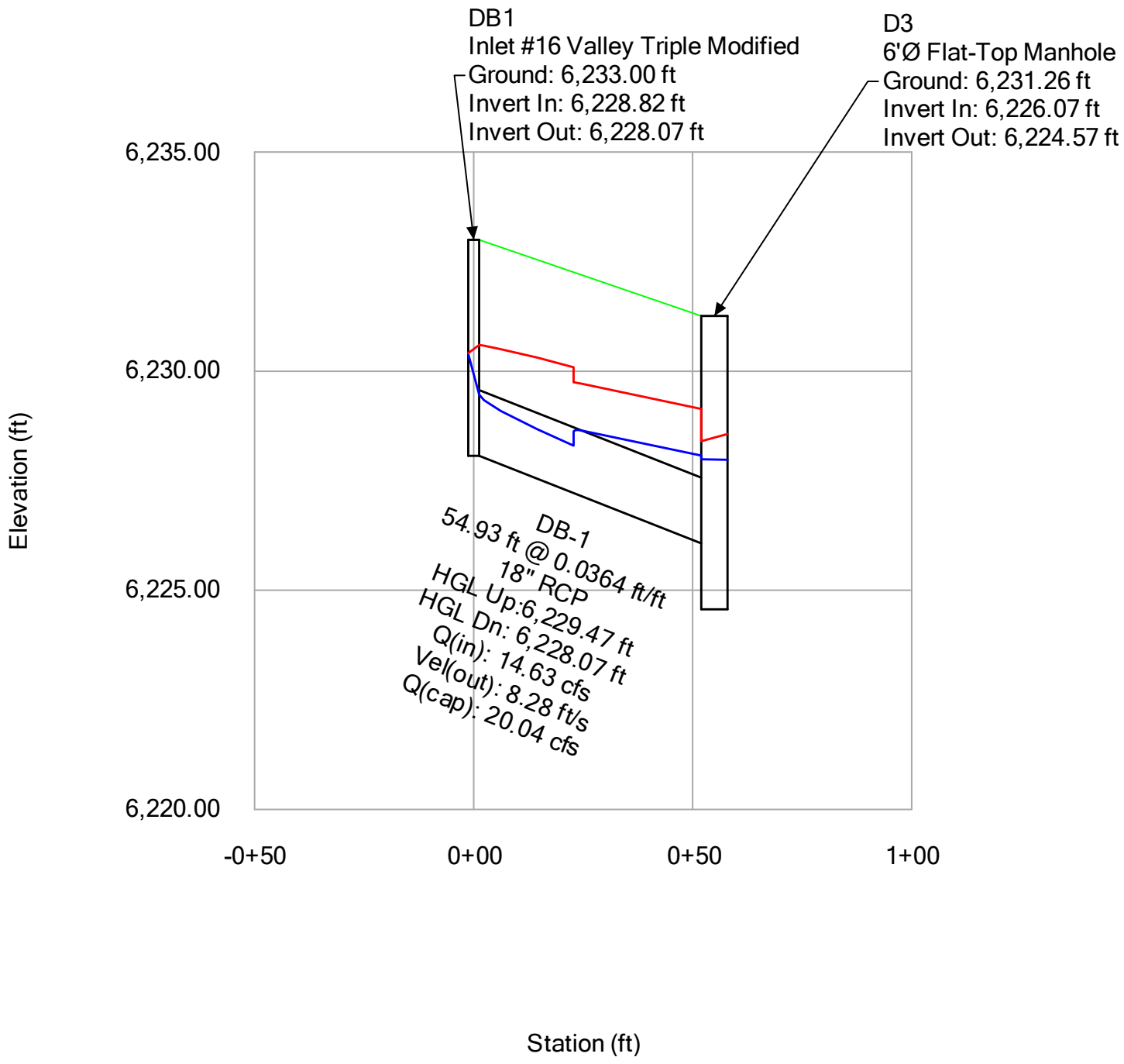
Profile Report

Engineering Profile - Line DA (200726 - StormCAD.stsw)

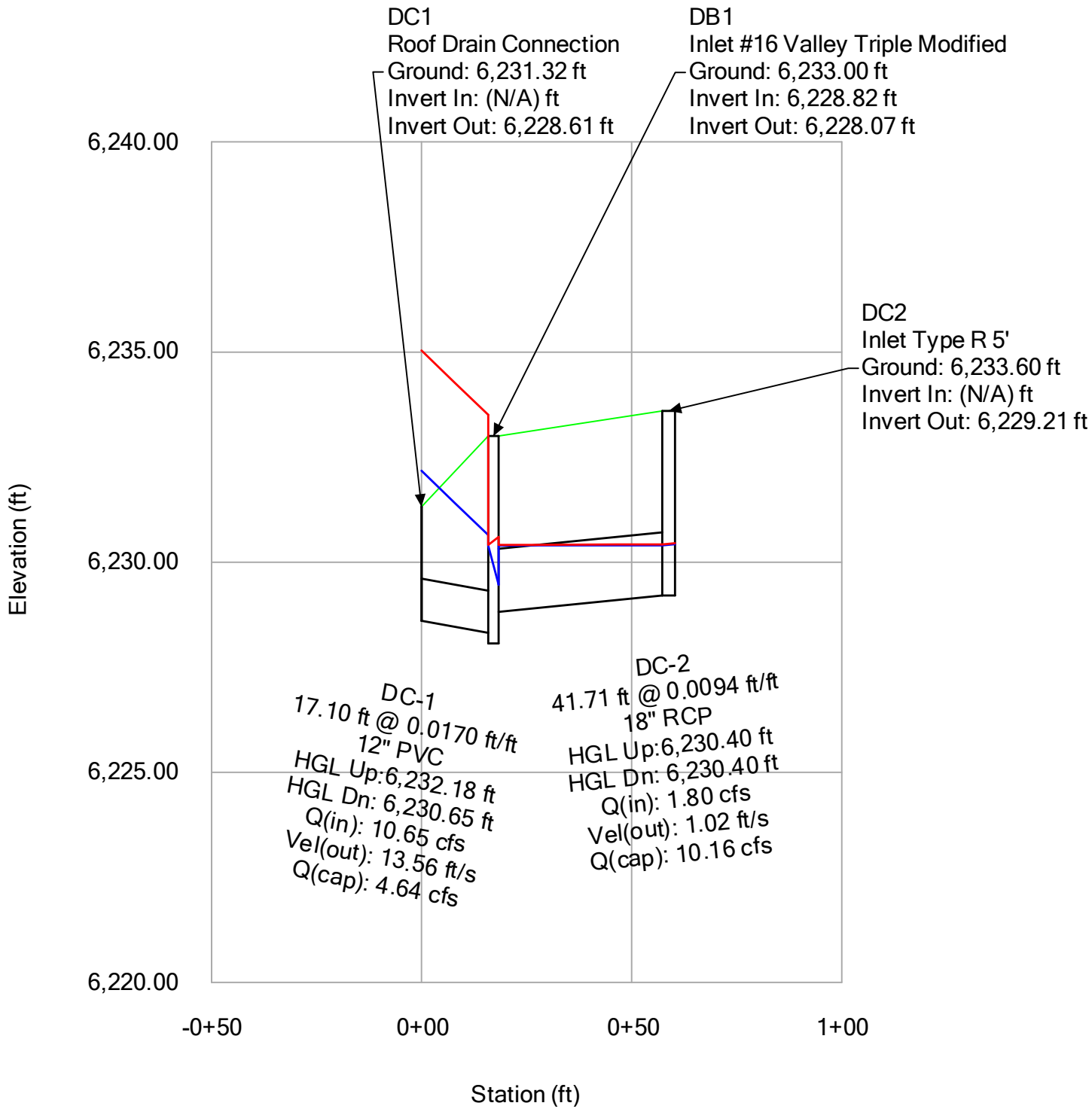
Active Scenario: 100-YR



The Brickyard
Profile Report
Engineering Profile - Line DB (200726 - StormCAD.stsw)
Active Scenario: 100-YR



The Brickyard
Profile Report
Engineering Profile - Line DC (200726 - StormCAD.stsw)
Active Scenario: 100-YR

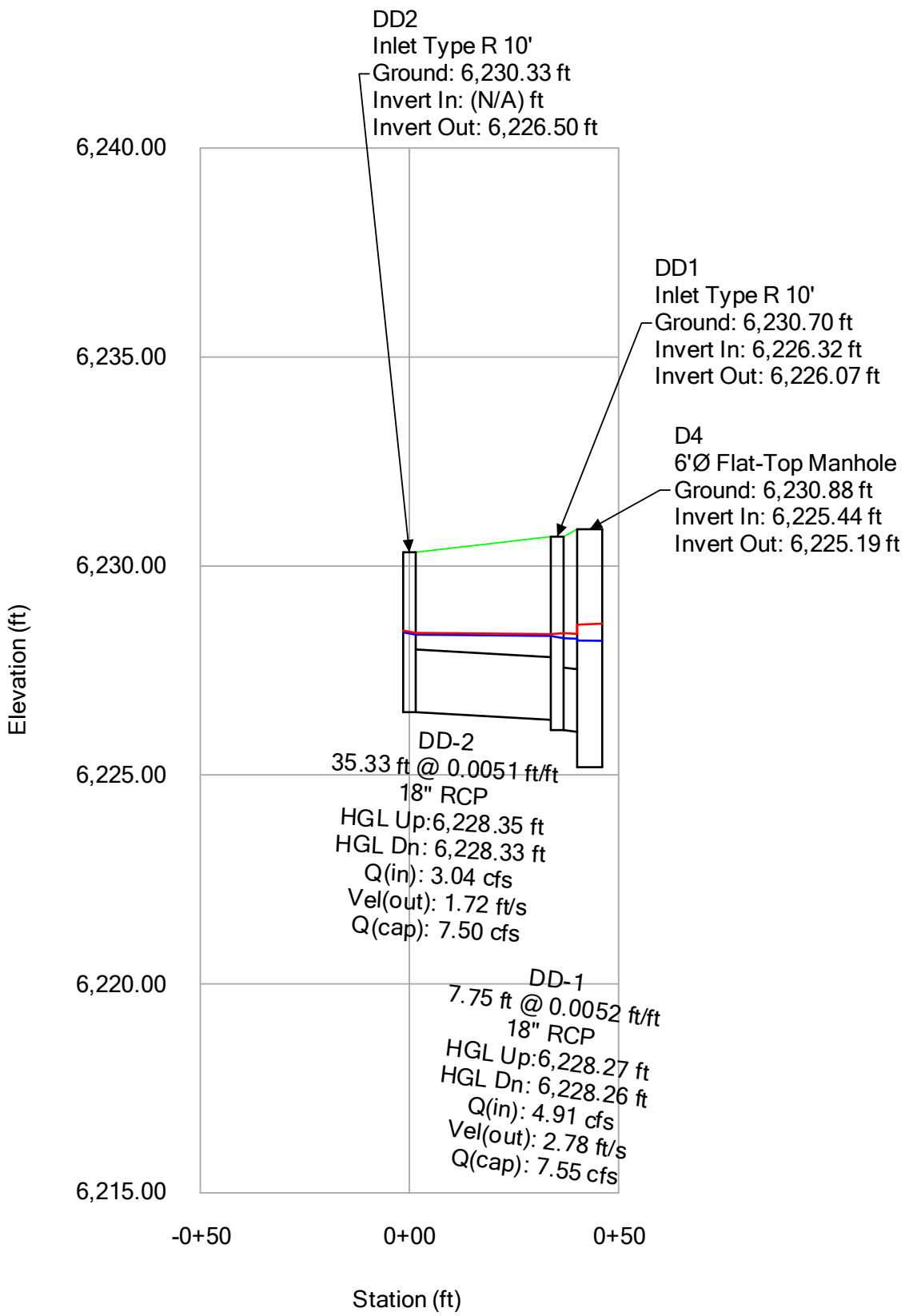


The Brickyard

Profile Report

Engineering Profile - Line DD (200726 - StormCAD.stsw)

Active Scenario: 100-YR

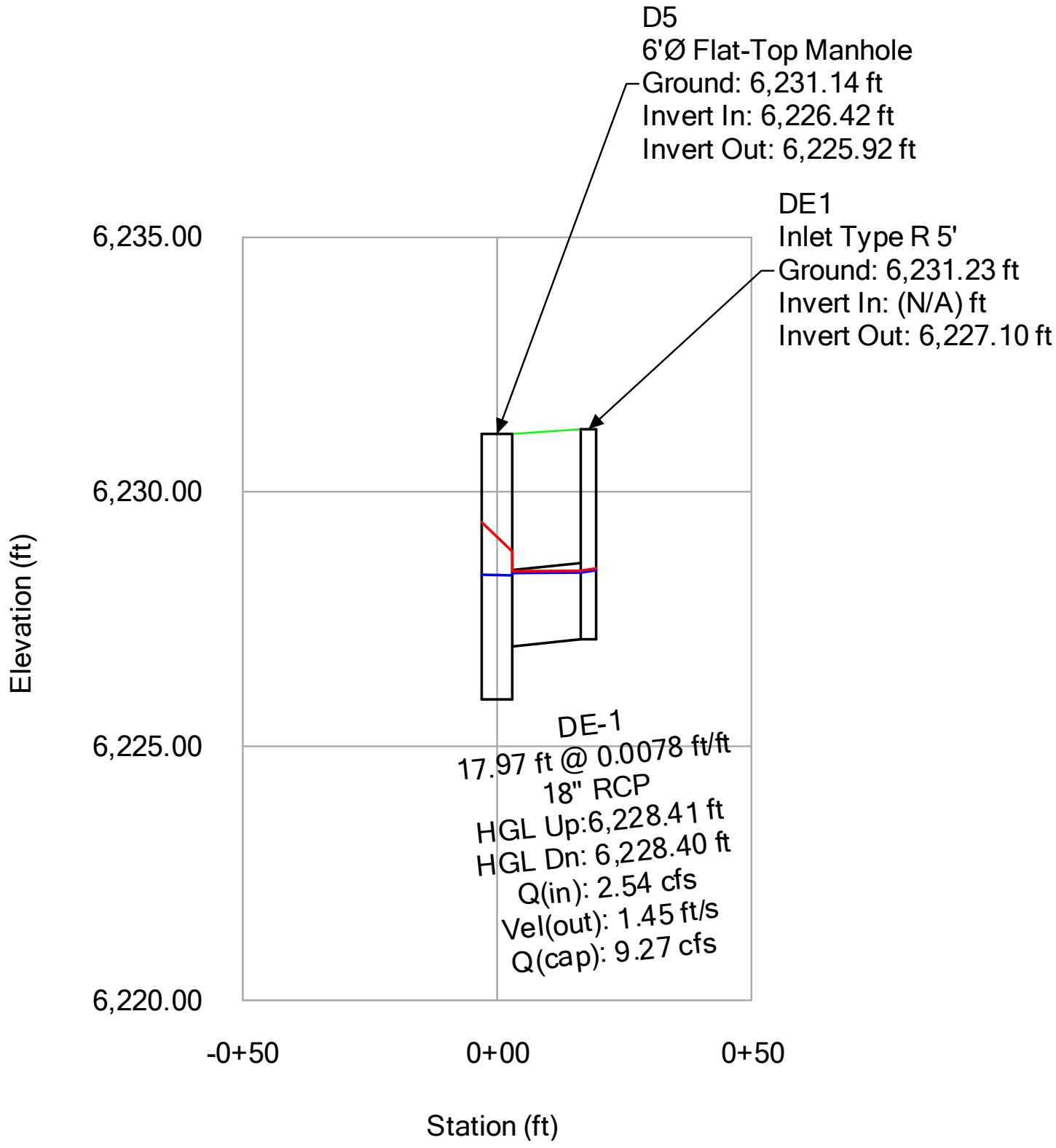


The Brickyard

Profile Report

Engineering Profile - Line DE (200726 - StormCAD.stsw)

Active Scenario: 100-YR

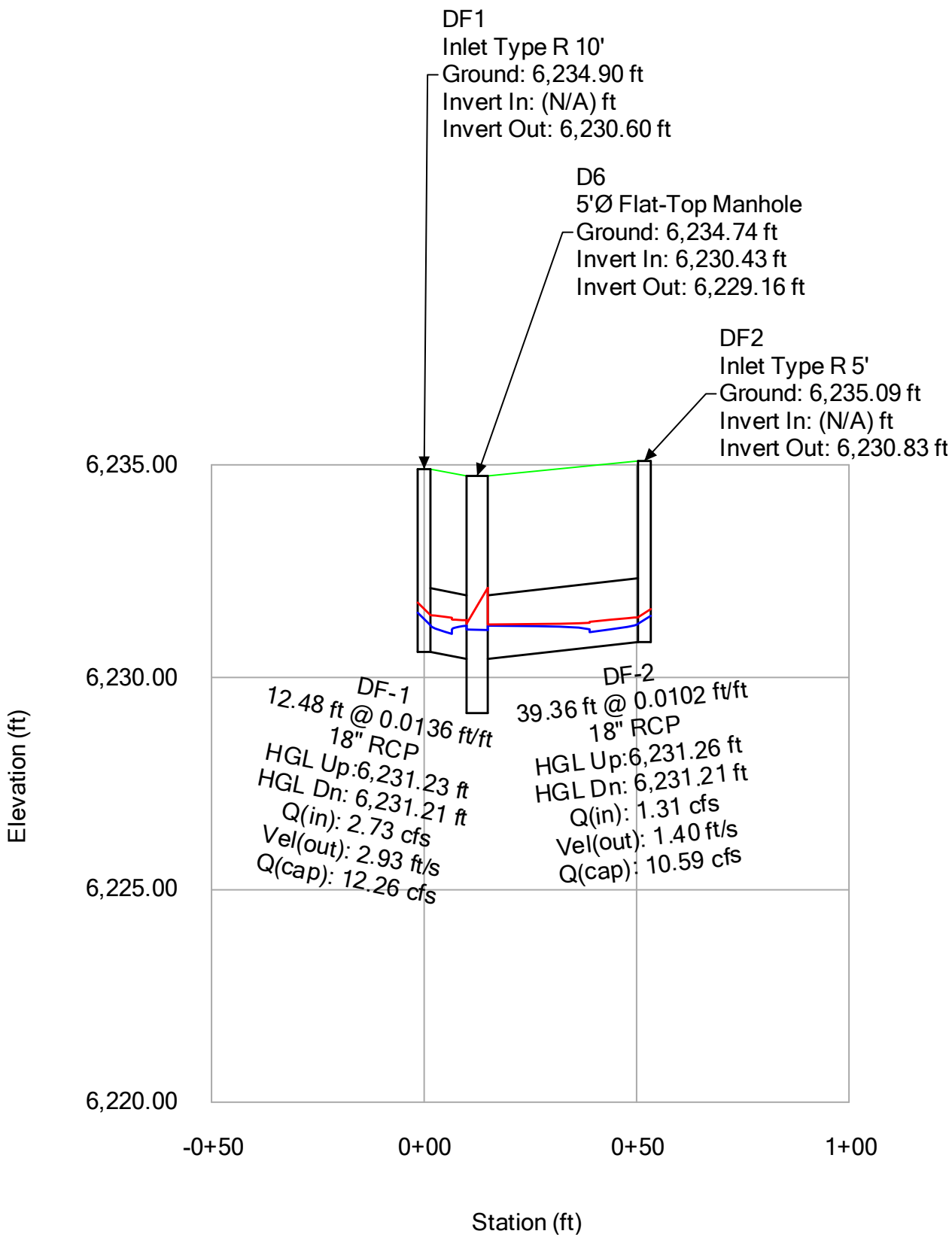


The Brickyard

Profile Report

Engineering Profile - Line DF (200726 - StormCAD.stsw)

Active Scenario: 100-YR

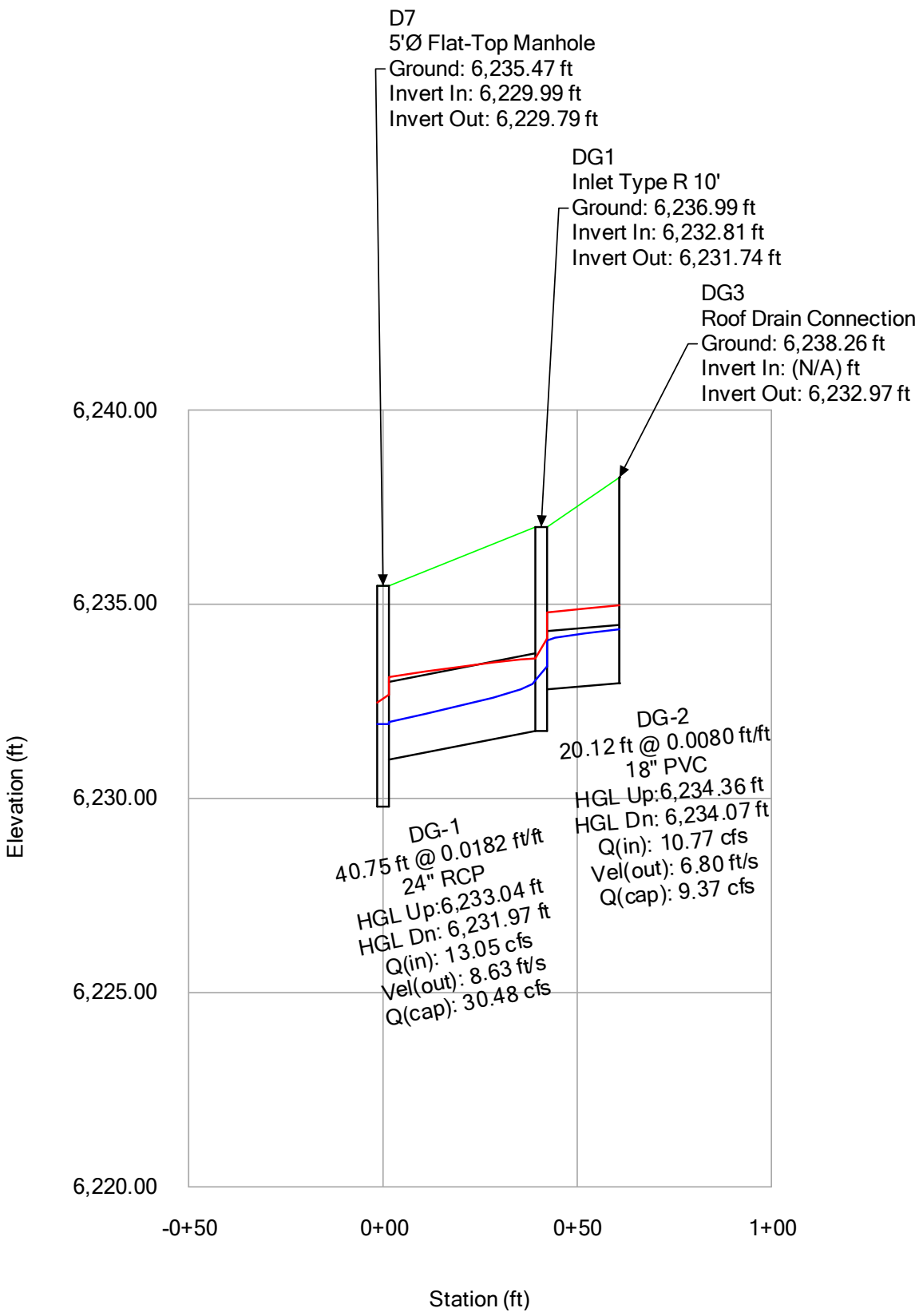


The Brickyard

Profile Report

Engineering Profile - Line DG (200726 - StormCAD.stsw)

Active Scenario: 100-YR

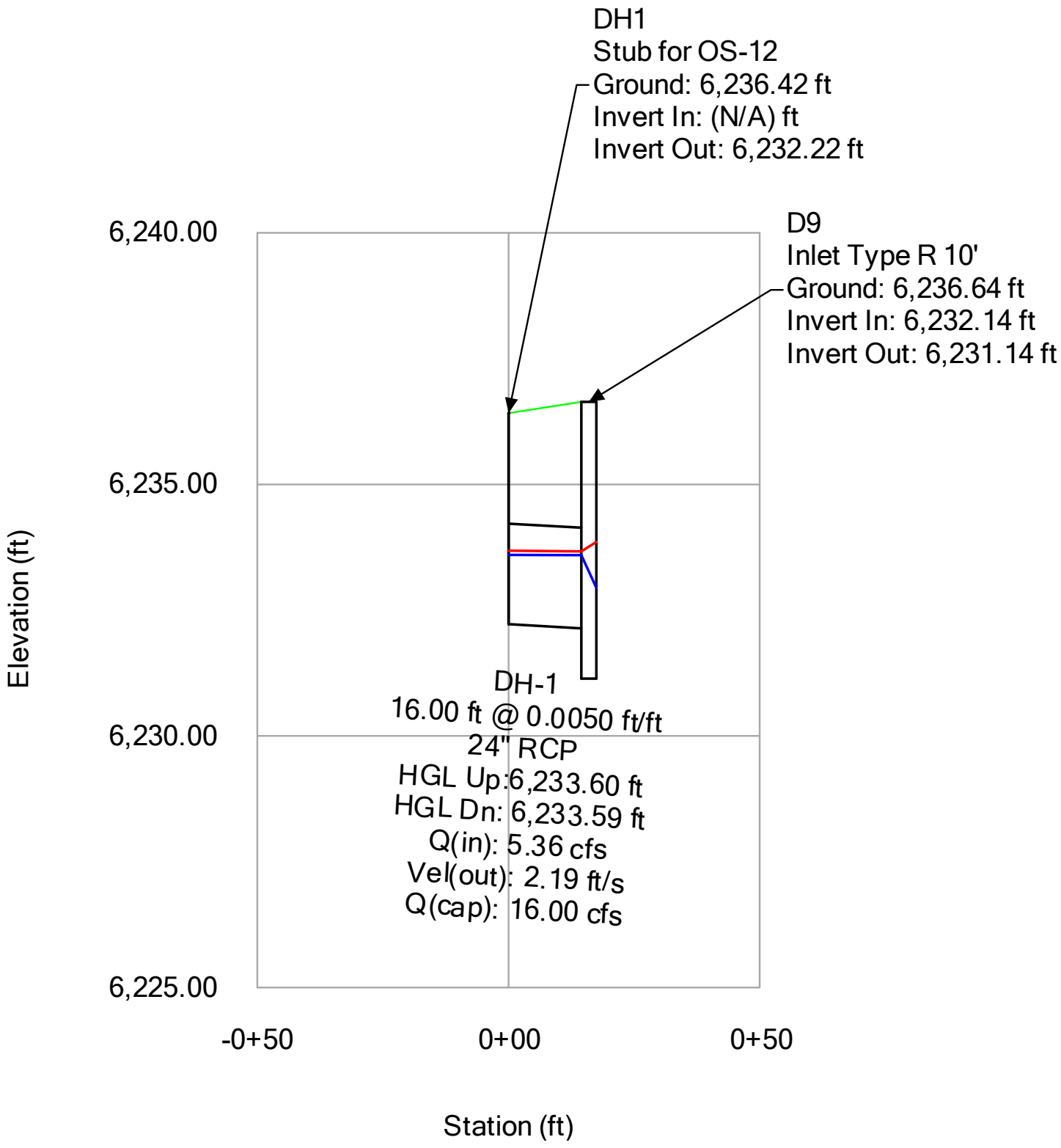


The Brickyard

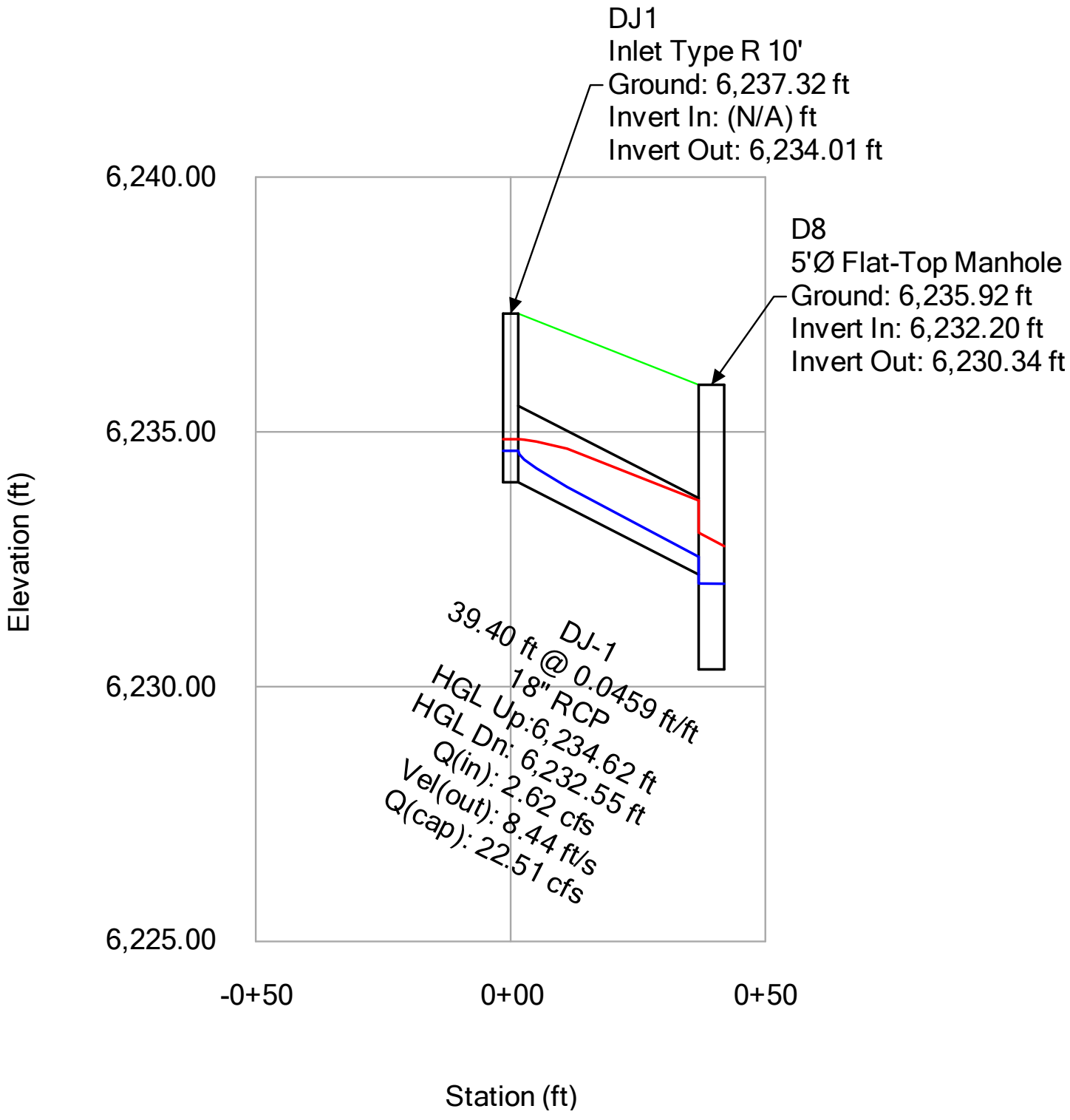
Profile Report

Engineering Profile - Line DH (200726 - StormCAD.stsw)

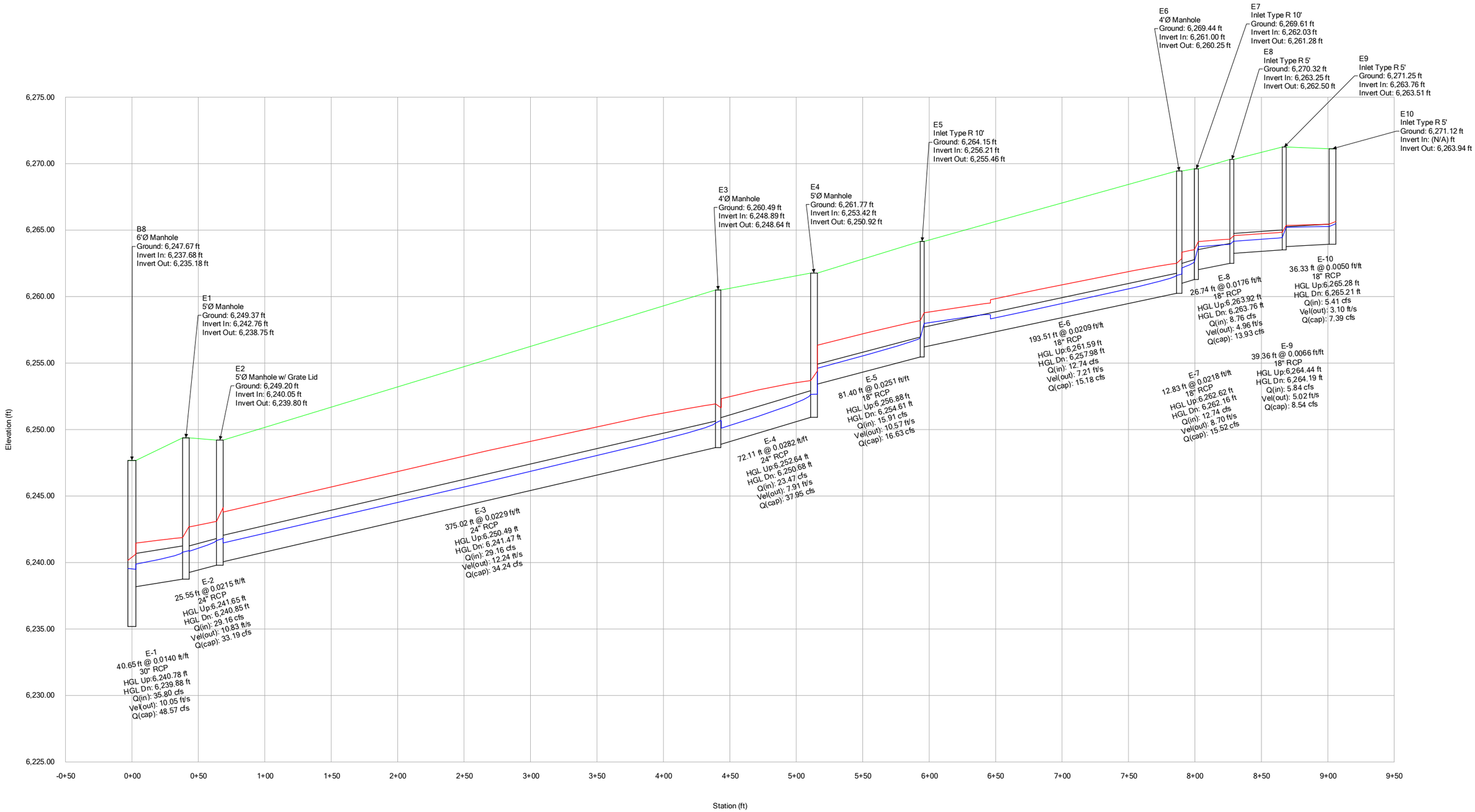
Active Scenario: 100-YR



The Brickyard
Profile Report
Engineering Profile - Line DJ (200726 - StormCAD.stsw)
Active Scenario: 100-YR



The Brickyard
Profile Report
Engineering Profile - Line E (CRSC) (200726 - StormCAD.stsw)
Active Scenario: 100-YR

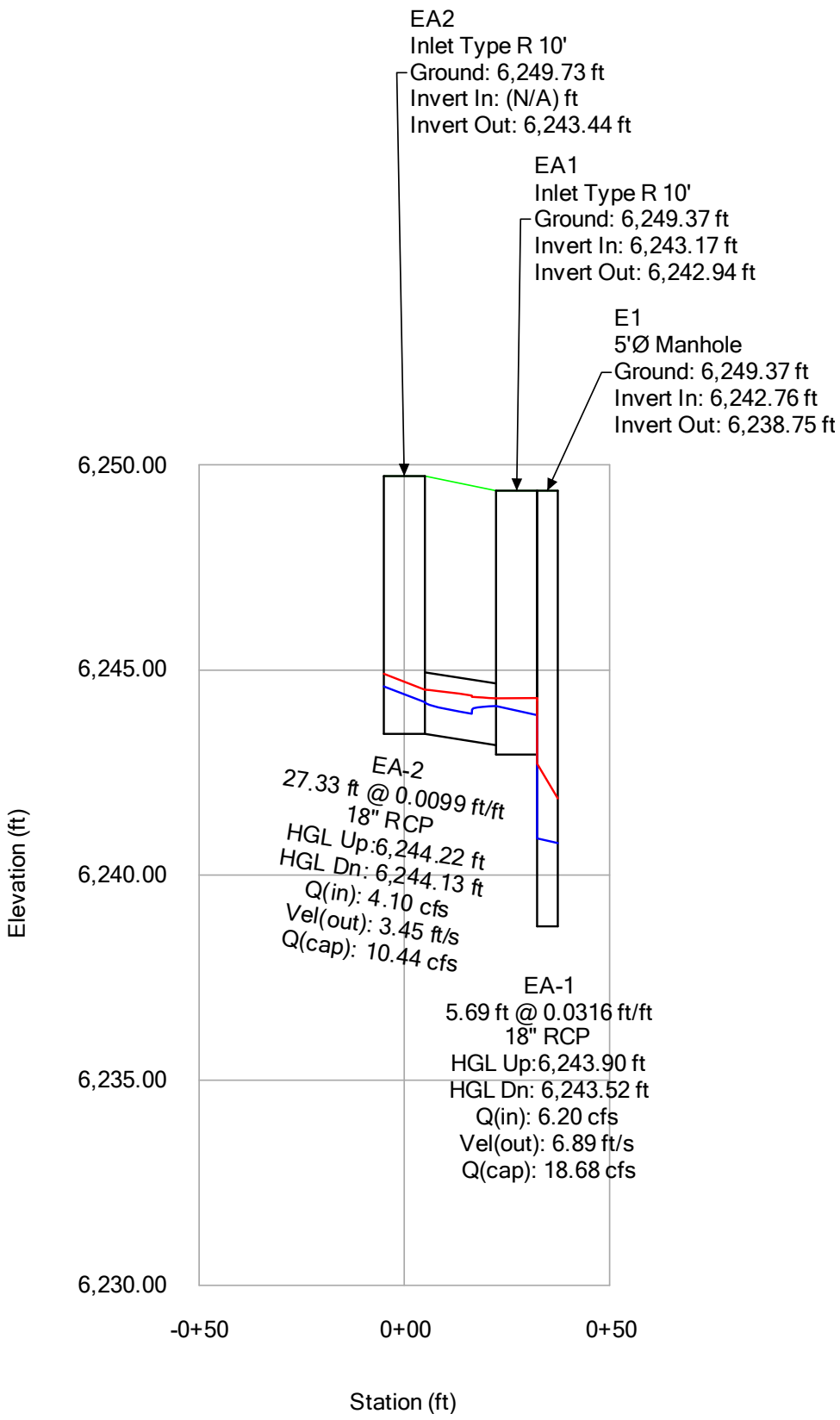


The Brickyard

Profile Report

Engineering Profile - Line EA (CRSC) (200726 - StormCAD.stsw)

Active Scenario: 100-YR

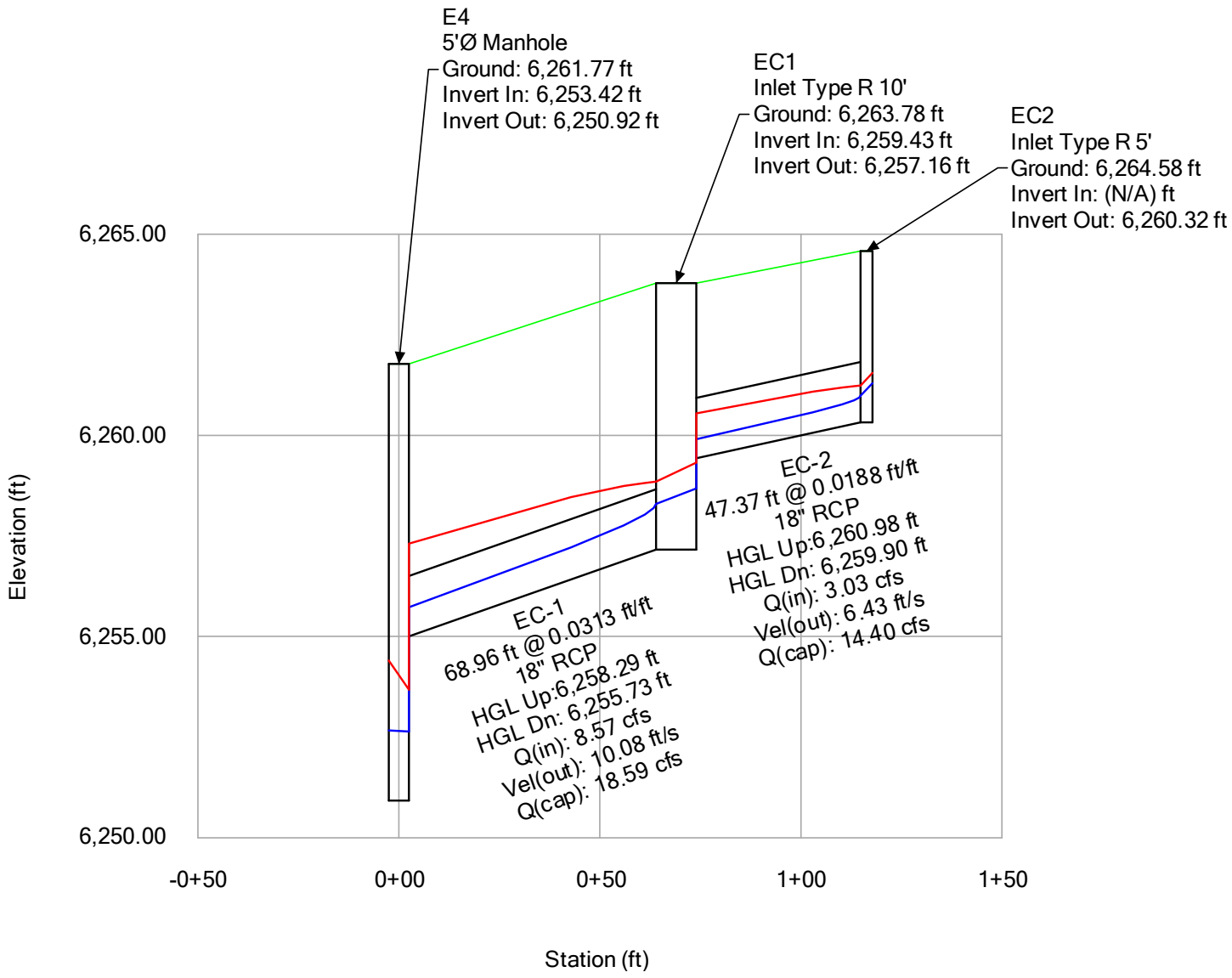


The Brickyard

Profile Report

Engineering Profile - Line EC (CRSC) (200726 - StormCAD.stsw)

Active Scenario: 100-YR

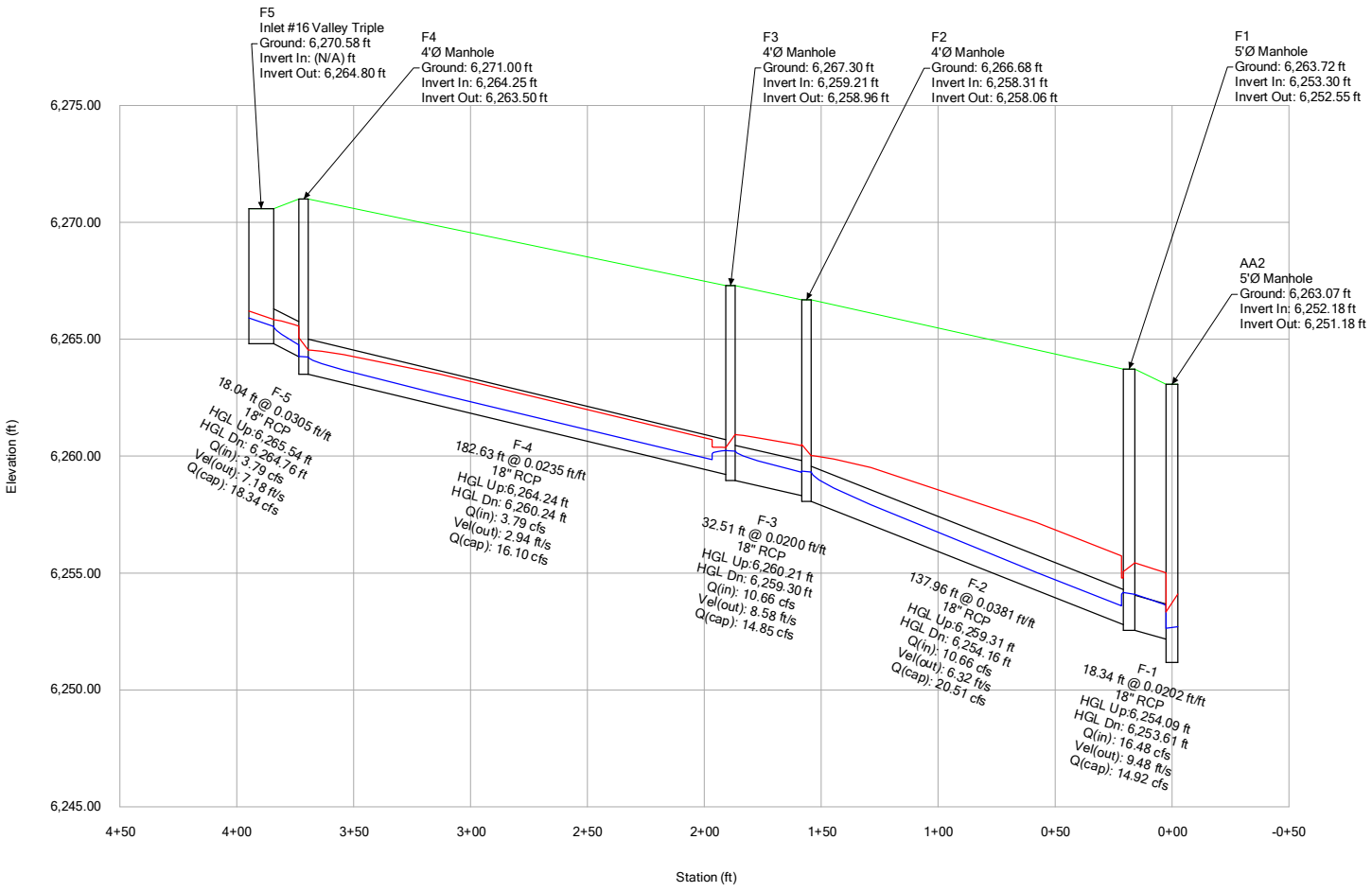


The Brickyard

Profile Report

Engineering Profile - Line F (CRSC) (200726 - StormCAD.stsw)

Active Scenario: 100-YR

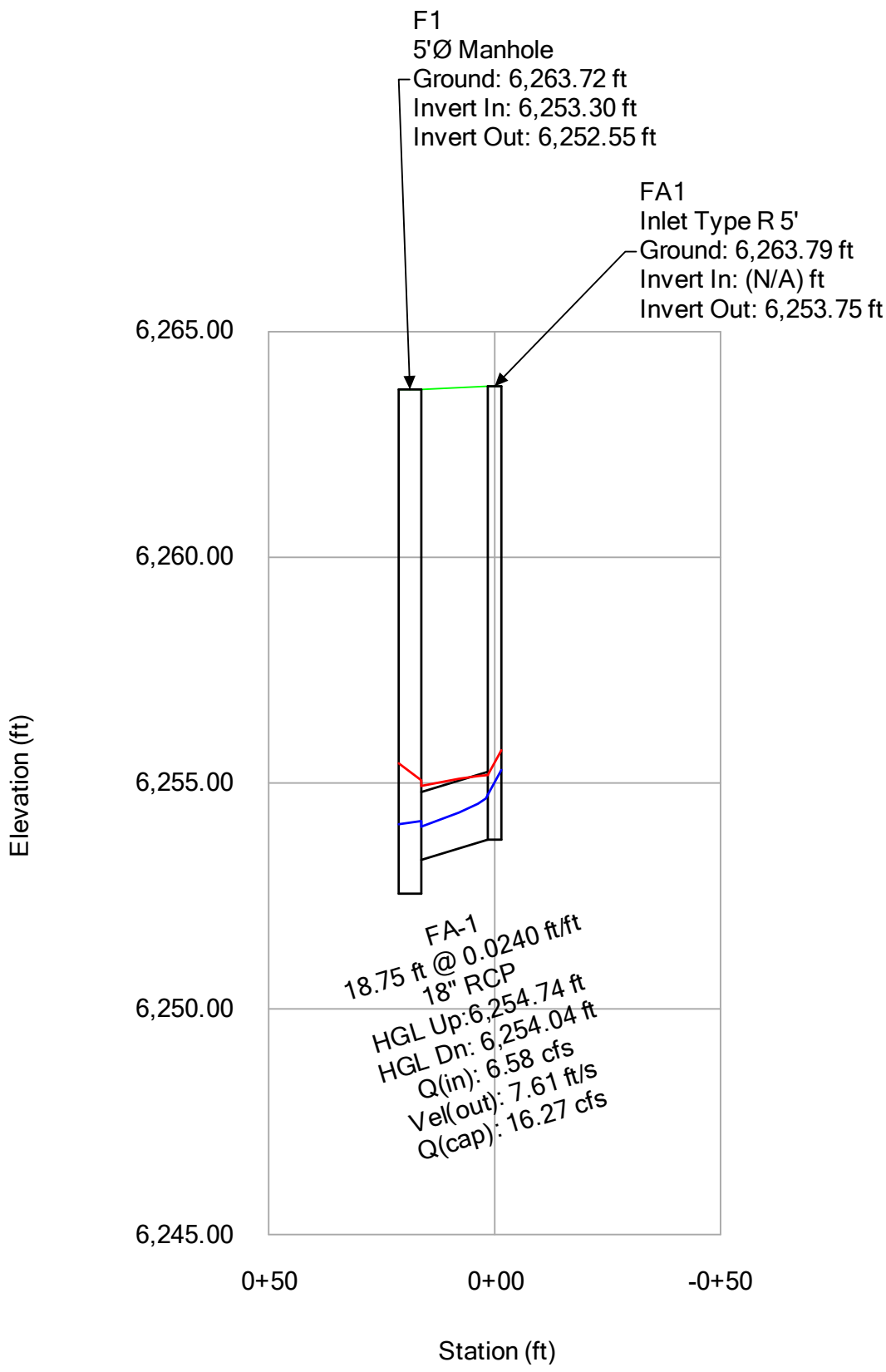


The Brickyard

Profile Report

Engineering Profile - Line FA (CRSC) (200726 - StormCAD.stsw)

Active Scenario: 100-YR

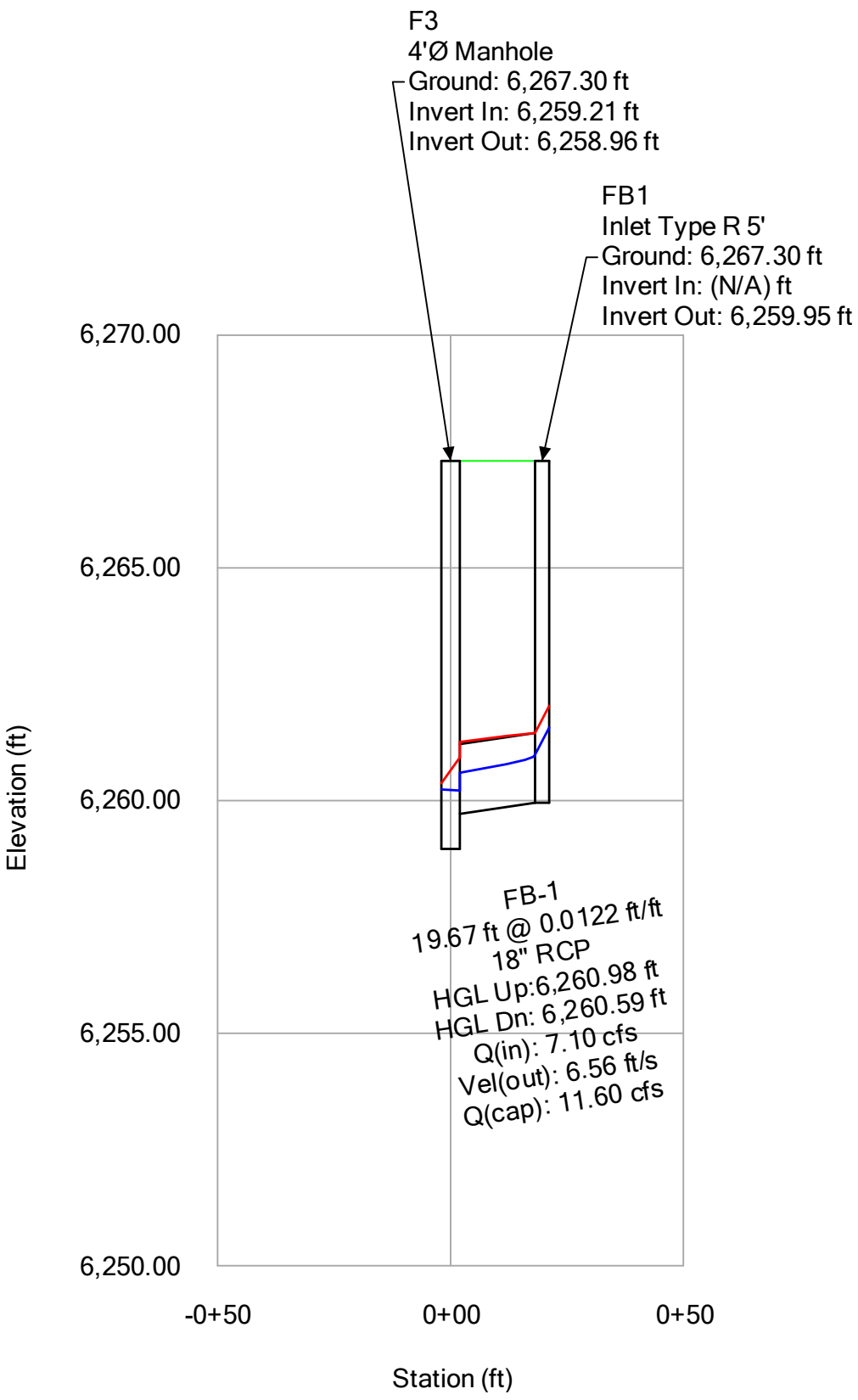


The Brickyard

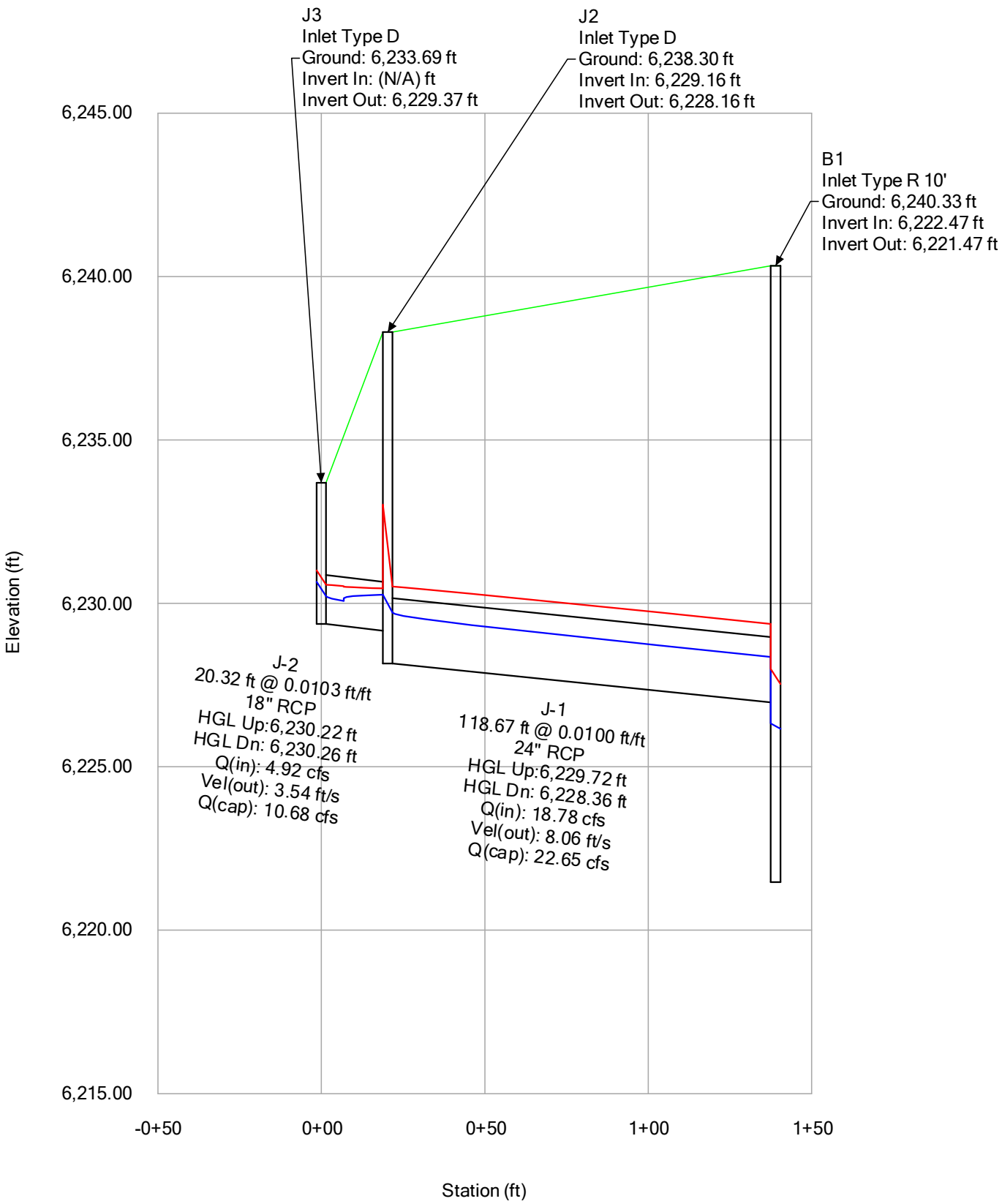
Profile Report

Engineering Profile - Line FB (CRSC) (200726 - StormCAD.stsw)

Active Scenario: 100-YR



The Brickyard
Profile Report
Engineering Profile - Line J (200726 - StormCAD.stsw)
Active Scenario: 100-YR

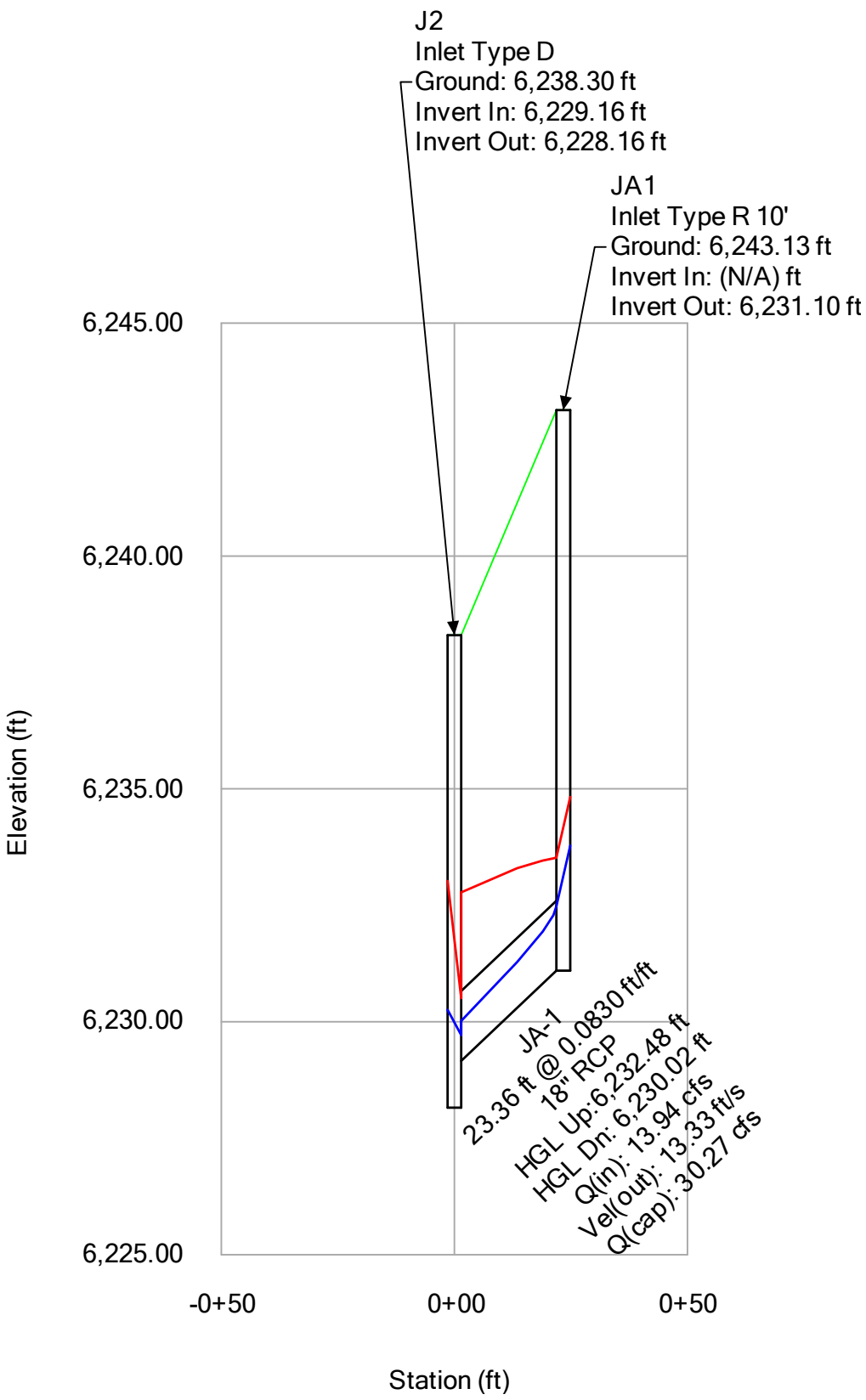


The Brickyard

Profile Report

Engineering Profile - Line JA (Phase 3) (200726 - StormCAD.stsw)

Active Scenario: 100-YR

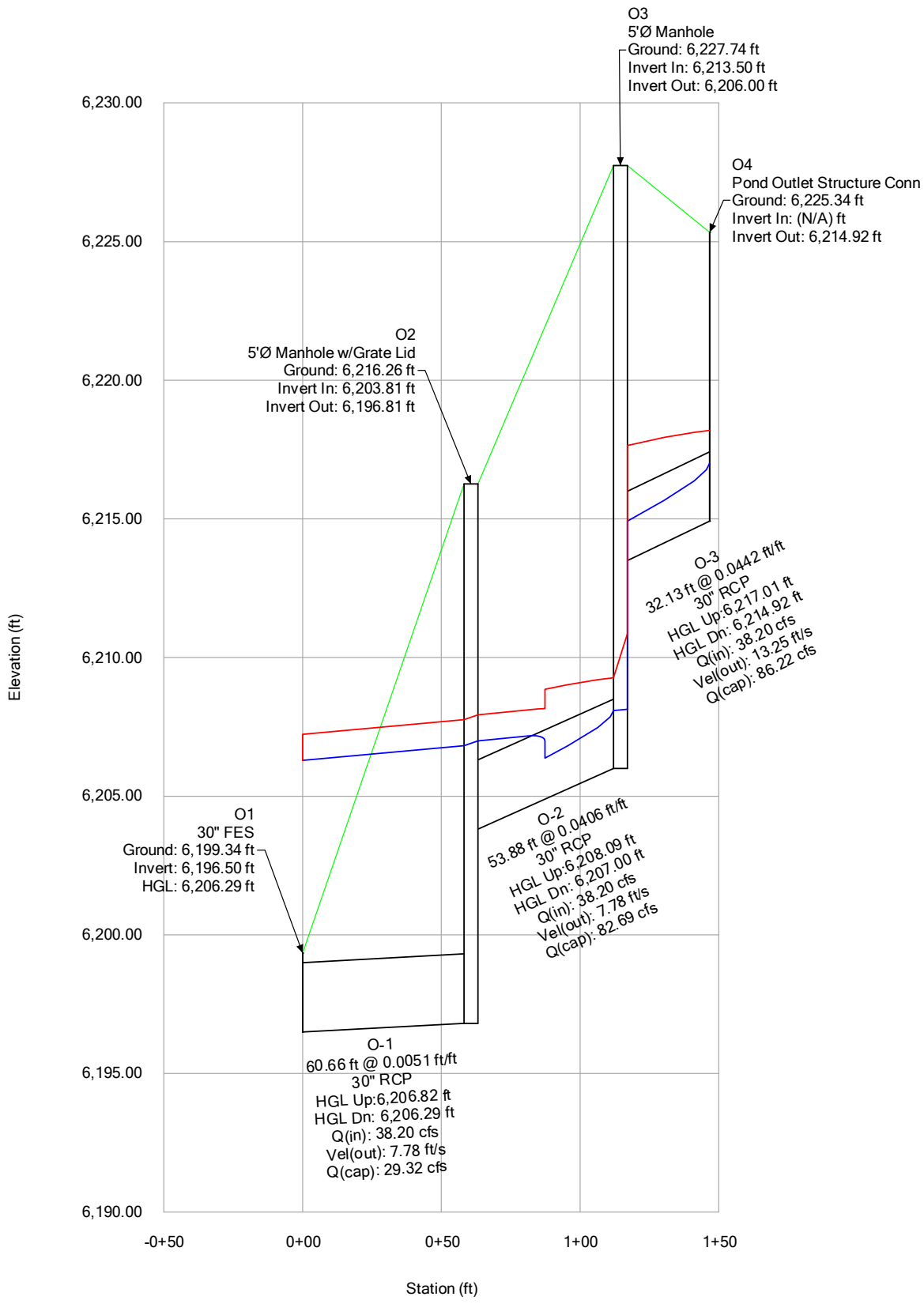


The Brickyard

Profile Report

Engineering Profile - Line O (Pond Outfall) (200726 - StormCAD.stsw)

Active Scenario: 100-YR



The Brickyard

Conduit FlexTable: Combined Pipe/Node Report 25% full

Active Scenario: 25% full

Label	Start Node	Stop Node	Length (Unified) (ft)	Rise (Unified) (ft)	Notes	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Capacity (Full Flow) (cfs)	System Known Flow (cfs)	Velocity (ft/s)	Depth (Normal) (ft)	Froude Number (Normal)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Part Full Design?	Design Percent Full (%)	Capacity (Design) (cfs)
A-1	A1	B4	71.00	2.00	24" RCP	6,235.63	6,233.12	0.0354	0.013	42.53	5.83	9.49	0.50	2.808	6,236.48	6,233.62	6,236.81	6,235.02	6,244.43	6,242.64	True	25.0	5.83
A-1-A	A1A	A1	27.33	1.50	18" RCP	6,240.20	6,238.63	0.0574	0.013	25.18	3.45	9.98	0.38	3.412	6,240.91	6,239.03	6,241.18	6,240.35	6,244.49	6,244.43	True	25.0	3.45
A-2	A2	A1	50.17	2.00	24" RCP	6,237.65	6,235.88	0.0353	0.013	42.49	5.82	9.48	0.50	2.806	6,238.50	6,236.39	6,238.83	6,237.70	6,245.20	6,244.43	True	25.0	5.82
A-3	A3	A2	87.27	1.50	18" RCP	6,240.70	6,238.65	0.0235	0.013	16.10	2.21	6.39	0.38	2.182	6,241.26	6,239.03	6,241.47	6,239.66	6,247.55	6,245.20	True	25.0	2.21
A-4	A4	A3	139.37	1.50	18" RCP	6,242.95	6,240.95	0.0144	0.013	12.58	1.72	4.99	0.37	1.705	6,243.44	6,241.32	6,243.62	6,241.71	6,254.32	6,247.55	True	25.0	1.72
A-5	A5	A4	68.09	1.50	18" RCP	6,244.67	6,243.20	0.0216	0.013	15.43	2.11	6.12	0.37	2.092	6,245.22	6,243.57	6,245.42	6,244.16	6,256.20	6,254.32	True	25.0	2.11
A-6	A6	A5	27.45	1.50	18" RCP	6,247.50	6,246.67	0.0302	0.013	18.26	2.50	7.24	0.37	2.476	6,248.10	6,247.06	6,248.32	6,247.80	6,256.18	6,256.20	True	25.0	2.50
AA-1	AA1	B8	99.55	2.50	30" RCP	6,240.35	6,237.68	0.0268	0.013	67.17	9.20	9.59	0.62	2.539	6,241.36	6,238.31	6,241.74	6,239.73	6,250.02	6,247.67	True	25.0	9.20
AA-2	AA2	AA1	272.67	2.00	24" RCP	6,251.18	6,240.85	0.0379	0.013	44.03	6.03	9.82	0.50	2.907	6,252.05	6,241.35	6,252.38	6,242.85	6,263.07	6,250.02	True	25.0	6.03
AAA-1	AAA1	AA1	10.09	1.50	18" RCP	6,242.80	6,242.60	0.0198	0.013	14.79	2.03	5.87	0.38	2.005	6,243.34	6,243.01	6,243.54	6,243.43	6,249.77	6,250.02	True	25.0	2.03
AAA-2	AAA2	AAA1	33.86	1.50	18" RCP	6,243.80	6,243.05	0.0222	0.013	15.63	2.14	6.20	0.37	2.119	6,244.35	6,243.43	6,244.56	6,244.01	6,250.04	6,249.77	True	25.0	2.14
AB-1	AB1	A2	23.50	1.50	18" RCP	6,239.36	6,238.65	0.0302	0.013	18.26	2.50	7.24	0.37	2.475	6,239.96	6,239.04	6,240.18	6,239.76	6,246.21	6,245.20	True	25.0	2.50
AC-1	AC1	A3	24.08	1.50	18" RCP	6,242.92	6,242.50	0.0174	0.013	13.87	1.90	5.50	0.37	1.880	6,243.44	6,242.88	6,243.63	6,243.33	6,247.55	6,247.55	True	25.0	1.90
AD-1	AD1(Ph2)	A4	26.84	1.50	18" RCP	6,245.40	6,244.95	0.0168	0.013	13.60	1.86	5.39	0.37	1.843	6,245.91	6,245.33	6,246.10	6,245.76	6,255.23	6,254.32	True	25.0	1.86
AE-1 (Ph2)	AE1 (Ph2)	AD1 (Ph2)	45.95	1.00	18" RCP	6,252.40	6,251.20	0.0261	0.013	5.76	0.79	5.14	0.25	2.150	6,252.77	6,251.45	6,252.91	6,251.86	6,255.14	6,255.23	True	25.0	0.79
B-1	B1	B0	23.83	4.00	48" RCP	6,221.47	6,221.35	0.0050	0.013	101.93	13.96	5.68	1.00	1.190	6,222.56	6,222.36	6,222.95	6,222.85	6,240.33	6,235.53	True	25.0	13.96
B-2	B2	B1	243.12	3.50	42" RCP	6,224.66	6,222.47	0.0090	0.013	95.48	13.08	6.95	0.88	1.556	6,225.76	6,223.35	6,226.16	6,224.10	6,241.71	6,240.33	True	25.0	13.08
B-3	B3	B2	99.21	3.50	42" RCP	6,230.17	6,229.66	0.0051	0.013	72.13	9.88	5.25	0.87	1.176	6,231.12	6,230.54	6,231.46	6,230.96	6,242.71	6,241.71	True	25.0	9.88
B-4	B4	B3	28.67	3.50	42" RCP	6,230.70	6,230.42	0.0098	0.013	99.42	13.62	7.24	0.88	1.620	6,231.82	6,231.34	6,232.23	6,232.04	6,242.64	6,242.71	True	25.0	13.62
B-5	B5	B4	30.80	3.50	42" RCP	6,231.11	6,230.95	0.0052	0.013	72.51	9.93	5.28	0.87	1.182	6,232.06	6,231.83	6,232.40	6,232.26	6,243.76	6,242.64	True	25.0	9.93
B-6	B6	B5	246.64	3.50	42" RCP	6,232.62	6,231.36	0.0051	0.013	71.91	9.85	5.24	0.88	1.172	6,233.57	6,232.23	6,233.91	6,232.66	6,247.94	6,243.76	True	25.0	9.85
B-7	B7	B6	294.77	3.00	36" RCP	6,234.59	6,233.12	0.0050	0.013	47.10	6.45	4.67	0.75	1.129	6,235.39	6,233.87	6,235.67	6,234.21	6,248.56	6,247.94	True	25.0	6.45
B-8	B8	B7	68.67	3.00	36" RCP	6,235.18	6,234.84	0.0050	0.013	46.93	6.43	4.65	0.75	1.124	6,235.98	6,235.59	6,236.26	6,235.93	6,247.67	6,248.56	True	25.0	6.43
BA-1	BA1	B1	48.83	1.50	18" RCP	6,233.00	6,227.47	0.1133	0.013	35.35	4.84	14.01	0.37	4.791	6,233.85	6,227.85	6,234.19	6,230.86	6,240.89	6,240.33	True	25.0	4.84
BB-1	BB1	B2	34.34	1.50	18" PVC	6,227.00	6,226.66	0.0099	0.013	10.45	1.43	4.14	0.37	1.417	6,227.45	6,227.03	6,227.61	6,227.30	6,241.71	6,241.71	True	25.0	1.43
BC-1	BC1	B6	67.40	1.50	18" RCP	6,244.00	6,240.60	0.0504	0.013	23.59	3.23	9.35	0.37	3.198	6,244.68	6,240.98	6,244.95	6,242.33	6,249.51	6,247.94	True	25.0	3.23
D-1	D1	D0	8.00	4.00	48" RCP	6,219.69	6,219.64	0.0062	0.013	113.55	15.55	6.33	1.00	1.325	6,220.85	6,220.71	6,221.26	6,221.23	6,232.27	6,231.65	True	25.0	15.55
D-2	D2	D1	227.06	3.00	36" RCP	6,222.83	6,221.69	0.0050	0.013	47.26	6.47	4.68	0.75	1.132	6,223.63	6,222.44	6,223.91	6,222.78	6,230.35	6,232.27	True	25.0	6.47
D-3	D3	D2	197.82	3.00	36" RCP	6,224.57	6,223.58	0.0050	0.013	47.18	6.46	4.68	0.75	1.131	6,225.37	6,224.33	6,225.65	6,224.67	6,231.26	6,230.35	True	25.0	6.46
D-4	D4	D3	73.61	3.00	36" RCP	6,225.19	6,224.82	0.0050	0.013	47.29	6.48	4.69	0.75	1.133	6,225.99	6,225.57	6,226.27	6,225.91	6,230.88	6,231.26	True	25.0	6.48
D-5	D5	D4	96.23	3.00	36" RCP	6,225.92	6,225.44	0.0050	0.013	47.10	6.45	4.67	0.75	1.129	6,226.72	6,226.19	6,227.00	6,226.53	6,231.14	6,230.88	True	25.0	6.45
D-6	D6	D5	371.57	2.50	30" RCP	6,229.16	6,226.42	0.0074	0.013	35.22	4.82	5.03	0.62	1.331	6,229.88	6,227.04	6,230.14	6,227.44	6,234.74	6,231.14	True	25.0	4.82
D-7	D7	D6	76.05	2.50	30" RCP	6,229.79	6,229.41	0.0050	0.013	28.99	3.97	4.14	0.62	1.096	6,230.44	6,230.03	6,230.68	6,230.30	6,235.47	6,234.74	True	25.0	3.97
D-8	D8	D7	46.58	2.50	30" RCP	6,230.34	6,229.99	0.0075	0.013	35.55	4.87	5.07	0.62	1.344	6,231.07	6,230.62	6,231.33	6,231.02	6,235.92	6,235.47	True	25.0	4.87
D-9	D9	D8	34.53	2.00	24" RCP	6,231.14	6,230.84	0.0087	0.013	21.09	2.89	4.70	0.50	1.392	6,231.73	6,231.34	6,231.95	6,231.68	6,236.64	6,235.92	True	25.0	2.89
D-10	D10	D9	35.34	2.00	24" RCP	6,232.70	6,232.14	0.0158	0.013	28.48	3.90	6.35	0.50	1.880	6,233.39	6,232.65	6,233.65	6,233.24	6,237.06	6,236.64	True	25.0	3.90
DA-1	DA1	D1	29.26	1.50	18" RCP	6,222.44	6,222.19	0.0085	0.013	9.71	1.33	3.85	0.38	1.316	6,222.87	6,222.56	6,223.03	6,222.80	6,227.06	6,232.27	True	25.0	1.33
DA-2	DA2	DA1	65.33	1.50	18" RCP	6,223.07	6,222.69	0.0058	0.013	8.01	1.10	3.18	0.38	1.086	6,223.46	6,223.07	6,223.60	6,223.22	6,227.10	6,227.06	True	25.0	1.10
DB-1	DB1	D3	54.93	1.50	18" RCP	6,228.07	6,226.07	0.0364	0.013	20.04	2.75	7.95	0.38	2.717	6,228.70	6,226.45	6,228.94	6,227.43	6,233.00	6,231.26	True	25.0	2.75
DC-1	DC1	DB1	17.10	1.00	12" PVC	6,228.61	6,228.32	0.0170	0.013	4.64	0.64	4.15	0.25	1.733	6,228.94	6,228.75	6,229.06	6,228.81	6,231.32	6,233.00	True	25.0	0.64
DC-2	DC2	DB1	41.71	1.50	18" RCP	6,229.21	6,228.82	0.0094	0.013	10.16	1.39	4.03	0.37	1.377	6,229.65	6,229.19	6,229.81	6,229.45	6,233.60	6,233.00	True	25.0	1.39
DD-1	DD1	D4	7.75	1.50	18" RCP	6,226.07	6,226.03	0.0052	0.013	7.55	1.03	2.99	0.37	1.023	6,226.45	6,226.40	6,226.58	6,226.54	6,230.70	6,230.88	True	25.0	1.03
DD-2	DD2	DD1	35.33	1.50	18" RCP	6,226.50	6,226.32	0.0051	0.013	7.50	1.03	2.98	0.38	1.016	6,226.88	6,226.70	6,227.01	6,226.83	6,230.33	6,230.70	True	25.0	1.03
DE-1	DE1	D5	17.97	1.50	18" RCP	6,227.10	6,226.96	0.0078	0.013	9.27	1.27	3.68	0.38	1.257	6,227.52	6,227.33	6,227.67	6,227.54	6,231.23	6,231.14	True	25.0	1.27
DF-1	DF1	D6	12.48	1.50	18" RCP	6,230.60	6,230.43	0.0136	0.013	12.26	1.68	4.86	0.38	1.662	6,231.09	6,230.82	6,231.26	6,231.15	6,234.90	6,234.74	True	25.0	1.68
DF-2	DF2	D6	39.36	1.50	18" RCP	6,230.83	6,230.43	0.0102	0.013	10.59	1.45	4.20	0.37	1.435	6,231.28	6,230.81	6,231.44	6,231.08	6,235.09	6,234.74	True	25.0	1.45
DG-1	DG1	D7	40.75	2.00	24" RCP	6,231.74	6,231.00	0.0182	0.013	30.48	4.18	6.80	0.50	2.013	6,232.46	6,231.51	6,232.72	6,232.19	6,236.99	6,235.47	True	25.0	4.18
DG-2	DG3	DG1	20.12	1.50	18" PVC	6,232.97	6,232.81	0.0080	0.013	9.37	1.28	3.71	0.37	1.270	6,233.39	6,233.18	6,233.54	6,233.40	6,238.26	6,236.99	True	25.0	1.28
DH-1	DH1	D9	16.00	2.00	24" RCP	6,232.22	6,232.14	0.0050	0.013	16.00	2.19	3.57	0.50	1.056	6,232.73	6,232.64	6,232.92	6,232.84	6,236.42	6,236.64	True	25.0	2.19
DJ-1	DJ1	D8	39.40	1.50	18" RCP	6,234.01	6,232.20	0.0459	0.013	22.51	3.08	8.92	0.37	3.051	6,234.68	6,232.58	6,234.93	6,233.77	6,237.32	6,235.92	True	25.0	3.08
E-1	E1	B8	40.65	2.50	30" RCP	6,238.75	6,238.18	0.0140	0.013	48.57	6.65	6.93	0.62	1.836	6,239.60	6,238.82	6,239.92	6,239.51	6,249.18	6,247.67	True	25.0	6.65

The Brickyard

Conduit FlexTable: Combined Pipe/Node Report 25% full

Active Scenario: 25% full

Label	Start Node	Stop Node	Length (Unified) (ft)	Rise (Unified) (ft)	Notes	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Capacity (Full Flow) (cfs)	System Known Flow (cfs)	Velocity (ft/s)	Depth (Normal) (ft)	Froude Number (Normal)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Elevation Ground (Start) (ft)	Elevation Ground (Stop) (ft)	Part Full Design?	Design Percent Full (%)	Capacity (Design) (cfs)
E-2	E2	E1	25.55	2.00	24" RCP	6,239.80	6,239.25	0.0215	0.013	33.19	4.55	7.40	0.50	2.191	6,240.55	6,239.78	6,240.83	6,240.50	6,247.99	6,249.18	True	25.0	4.55
E-3	E3	E2	375.02	2.00	24" RCP	6,248.64	6,240.05	0.0229	0.013	34.24	4.69	7.64	0.50	2.261	6,249.40	6,240.55	6,249.69	6,241.46	6,260.64	6,247.99	True	25.0	4.69
E-4	E4	E3	72.11	2.00	24" RCP	6,250.92	6,248.89	0.0282	0.013	37.95	5.20	8.47	0.50	2.506	6,251.72	6,249.39	6,252.02	6,250.50	6,260.55	6,260.64	True	25.0	5.20
E-5	E5	E4	81.40	1.50	18" RCP	6,255.46	6,253.42	0.0251	0.013	16.63	2.28	6.59	0.38	2.254	6,256.03	6,253.80	6,256.24	6,254.47	6,265.34	6,260.55	True	25.0	2.28
E-6	E6	E5	193.51	1.50	18" RCP	6,260.25	6,256.21	0.0209	0.013	15.18	2.08	6.02	0.38	2.057	6,260.79	6,256.58	6,261.00	6,257.15	6,269.40	6,265.34	True	25.0	2.08
E-7	E7	E6	12.83	1.50	18" RCP	6,261.28	6,261.00	0.0218	0.013	15.52	2.13	6.16	0.38	2.103	6,261.83	6,261.41	6,262.03	6,261.88	6,269.61	6,269.40	True	25.0	2.13
E-8	E8	E7	26.74	1.50	18" RCP	6,262.50	6,262.03	0.0176	0.013	13.93	1.91	5.52	0.38	1.888	6,263.02	6,262.41	6,263.21	6,262.86	6,270.34	6,269.61	True	25.0	1.91
E-9	E9	E8	39.36	1.50	18" RCP	6,263.51	6,263.25	0.0066	0.013	8.54	1.17	3.39	0.38	1.157	6,263.91	6,263.63	6,264.06	6,263.80	6,271.24	6,270.34	True	25.0	1.17
E-10	E10	E9	36.33	1.50	18" RCP	6,263.94	6,263.76	0.0050	0.013	7.39	1.01	2.93	0.37	1.002	6,264.31	6,264.13	6,264.45	6,264.27	6,271.08	6,271.24	True	25.0	1.01
EA-1	EA1	E1	5.69	1.50	18" RCP	6,242.94	6,242.76	0.0316	0.013	18.68	2.56	7.41	0.38	2.532	6,243.55	6,243.22	6,243.77	6,243.71	6,249.33	6,249.18	True	25.0	2.56
EA-2	EA2	EA1	27.33	1.50	18" RCP	6,243.44	6,243.17	0.0099	0.013	10.44	1.43	4.14	0.37	1.415	6,243.89	6,243.64	6,244.05	6,243.78	6,249.74	6,249.33	True	25.0	1.43
EC-1	EC1	E4	68.96	1.50	18" RCP	6,257.16	6,255.00	0.0313	0.013	18.59	2.55	7.37	0.38	2.520	6,257.77	6,255.38	6,257.99	6,256.22	6,263.77	6,260.55	True	25.0	2.55
EC-2	EC2	EC1	47.37	1.50	18" RCP	6,260.32	6,259.43	0.0188	0.013	14.40	1.97	5.71	0.37	1.951	6,260.85	6,259.80	6,261.04	6,260.31	6,264.58	6,263.77	True	25.0	1.97
F-1	F1	AA2	18.34	1.50	18" RCP	6,252.55	6,252.18	0.0202	0.013	14.92	2.04	5.91	0.37	2.022	6,253.09	6,252.57	6,253.29	6,253.05	6,263.49	6,263.07	True	25.0	2.04
F-2	F2	F1	137.96	1.50	18" RCP	6,258.06	6,252.80	0.0381	0.013	20.51	2.81	8.13	0.38	2.780	6,258.70	6,253.17	6,258.94	6,254.20	6,266.68	6,263.49	True	25.0	2.81
F-3	F3	F2	32.51	1.50	18" RCP	6,258.96	6,258.31	0.0200	0.013	14.85	2.03	5.89	0.37	2.013	6,259.50	6,258.69	6,259.70	6,259.21	6,267.30	6,266.68	True	25.0	2.03
F-4	F4	F3	182.63	1.50	18" RCP	6,263.50	6,259.21	0.0235	0.013	16.10	2.21	6.39	0.38	2.182	6,264.06	6,259.59	6,264.27	6,260.22	6,271.00	6,267.30	True	25.0	2.21
F-5	F5	F4	18.04	1.50	18" RCP	6,264.80	6,264.25	0.0305	0.013	18.34	2.51	7.27	0.37	2.486	6,265.40	6,264.65	6,265.62	6,265.33	6,270.58	6,271.00	True	25.0	2.51
FA-1	FA1	F1	18.75	1.50	18" RCP	6,253.75	6,253.30	0.0240	0.013	16.27	2.23	6.45	0.38	2.206	6,254.31	6,253.70	6,254.52	6,254.25	6,263.60	6,263.49	True	25.0	2.23
FB-1	FB1	F3	19.67	1.50	18" RCP	6,259.95	6,259.71	0.0122	0.013	11.60	1.59	4.60	0.38	1.573	6,260.42	6,260.09	6,260.60	6,260.41	6,267.32	6,267.30	True	25.0	1.59
G-1	G2	G1	61.28	4.00	48" RCP	6,186.94	6,186.63	0.0051	0.013	102.16	13.99	5.70	1.00	1.192	6,188.03	6,187.63	6,188.43	6,188.13	6,195.63	6,193.76	True	25.0	13.99
G-2	G3	G2	180.96	4.00	48" RCP	6,189.90	6,187.19	0.0150	0.013	175.77	24.08	9.80	1.00	2.052	6,191.35	6,188.19	6,191.88	6,189.68	6,201.42	6,195.63	True	25.0	24.08
G-3	G4	G3	185.39	4.00	48" RCP	6,193.00	6,190.15	0.0154	0.013	178.09	24.40	9.93	1.00	2.079	6,194.46	6,191.15	6,195.00	6,192.68	6,203.93	6,201.42	True	25.0	24.40
G-4	G5	G4	79.13	4.00	48" RCP	6,195.00	6,193.25	0.0221	0.013	213.60	29.26	11.91	1.00	2.493	6,196.60	6,194.31	6,197.20	6,196.19	6,205.97	6,203.93	True	25.0	29.26
G-5	G6	G5	46.80	1.50	18" RCP	6,200.50	6,198.50	0.0427	0.013	21.71	2.97	8.61	0.37	2.943	6,201.16	6,198.87	6,201.40	6,200.03	6,205.64	6,205.97	True	25.0	2.97
GA-1	GA2	GA1	19.33	1.50	18" RCP	6,186.73	6,186.63	0.0052	0.013	7.55	1.03	2.99	0.37	1.024	6,187.11	6,187.00	6,187.24	6,187.14	6,191.20	6,193.14	True	25.0	1.03
GA-2	GA3	GA2	57.36	1.50	18" RCP	6,187.27	6,186.98	0.0051	0.013	7.47	1.02	2.96	0.37	1.012	6,187.65	6,187.35	6,187.78	6,187.49	6,191.08	6,191.20	True	25.0	1.02
GC-1	GC1	G5	16.51	3.00	36" RCP	6,199.15	6,199.00	0.0091	0.013	63.57	8.71	6.30	0.75	1.523	6,200.08	6,199.80	6,200.42	6,200.32	6,205.53	6,205.97	True	25.0	8.71
GC-2	GC2	GC1	89.82	3.00	36" RCP	6,201.50	6,199.40	0.0234	0.013	101.98	13.97	10.11	0.75	2.444	6,202.69	6,200.16	6,203.13	6,201.69	6,207.37	6,205.53	True	25.0	13.97
H-1	H2	H1	43.12	3.00	36" RCP	6,200.13	6,199.91	0.0051	0.013	47.64	6.53	4.72	0.75	1.142	6,200.93	6,200.66	6,201.22	6,201.01	6,207.77	6,202.16	True	25.0	6.53
H-2	H3	H2	27.10	3.00	36" RCP	6,200.47	6,200.33	0.0052	0.013	47.94	6.57	4.75	0.75	1.149	6,201.28	6,201.08	6,201.56	6,201.43	6,216.23	6,207.77	True	25.0	6.57
H-3	H4	H3	156.16	3.00	36" RCP	6,203.77	6,202.98	0.0051	0.013	47.44	6.50	4.70	0.75	1.137	6,204.57	6,203.73	6,204.86	6,204.07	6,209.69	6,216.23	True	25.0	6.50
H-4	H5	H4	131.45	3.00	36" RCP	6,204.64	6,203.97	0.0051	0.013	47.62	6.52	4.72	0.75	1.141	6,205.44	6,204.72	6,205.73	6,205.07	6,214.32	6,209.69	True	25.0	6.52
H-5	H6	H5	164.39	3.00	36" RCP	6,205.68	6,204.84	0.0051	0.013	47.68	6.53	4.73	0.75	1.142	6,206.48	6,205.59	6,206.77	6,205.94	6,211.48	6,214.32	True	25.0	6.53
H-6	H7	H6	82.40	3.00	36" RCP	6,206.30	6,205.88	0.0051	0.013	47.62	6.52	4.72	0.75	1.141	6,207.10	6,206.63	6,207.39	6,206.98	6,212.01	6,211.48	True	25.0	6.52
H-7	H8	H7	86.68	3.00	36" RCP	6,206.95	6,206.50	0.0052	0.013	48.05	6.58	4.76	0.75	1.151	6,207.76	6,207.25	6,208.04	6,207.60	6,211.30	6,212.01	True	25.0	6.58
H-8	H9	H8	46.04	2.00	24" RCP	6,208.29	6,208.04	0.0054	0.013	16.67	2.28	3.72	0.50	1.101	6,208.81	6,208.54	6,209.00	6,208.75	6,213.77	6,211.30	True	25.0	2.28
H-9	H10	H9	40.93	1.50	18" RCP	6,209.60	6,209.38	0.0054	0.013	7.70	1.05	3.05	0.37	1.044	6,209.98	6,209.75	6,210.12	6,209.90	6,213.72	6,213.77	True	25.0	1.05
J-1	J2	B1	118.67	2.00	24" RCP	6,228.16	6,226.97	0.0100	0.013	22.65	3.10	5.05	0.50	1.496	6,228.77	6,227.47	6,229.00	6,227.87	6,238.30	6,240.33	True	25.0	3.10
J-2	J3	J2	20.32	1.50	18" RCP	6,229.37	6,229.16	0.0103	0.013	10.68	1.46	4.23	0.37	1.447	6,229.82	6,229.54	6,229.99	6,229.81	6,233.69	6,238.30	True	25.0	1.46
JA-1	JA1	J2	23.36	1.50	18" RCP	6,231.10	6,229.16	0.0830	0.013	30.27	4.15	12.00	0.38	4.103	6,231.88	6,229.57	6,232.19	6,231.33	6,243.13	6,238.30	True	25.0	4.15
O-1	O2	O1	60.66	2.50	30" RCP	6,196.81	6,196.50	0.0051	0.013	29.32	4.02	4.19	0.63	1.108	6,197.47	6,197.13	6,197.70	6,197.40	6,216.26	6,199.34	True	25.0	4.02
O-2	O3	O2	53.88	2.50	30" RCP	6,206.00	6,203.81	0.0406	0.013	82.69	11.33	11.80	0.63	3.125	6,207.13	6,204.47	6,207.56	6,206.35	6,227.74	6,216.26	True	25.0	11.33
O-3	O4	O3	30.49	2.50	30" RCP	6,214.92	6,213.50	0.0466	0.013	88.51	12.12	12.63	0.62	3.346	6,216.09	6,214.21	6,216.54	6,215.96	6,225.34	6,227.74	True	25.0	12.12

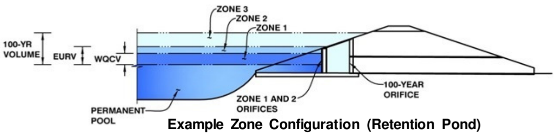
APPENDIX E – WATER QUALITY & DETENTION CALCULATIONS

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: **ACME Brickyard**

Basin ID: **Off-Site WQCV (sub-basins OS4-OS6 + 1/3 of OS12)**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	13.86	acres
Watershed Length =	1,250	ft
Watershed Length to Centroid =	625	ft
Watershed Slope =	0.030	ft/ft
Watershed Imperviousness =	13.46%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	95.4%	percent
Percentage Hydrologic Soil Groups C/D =	4.6%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.099	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.179	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.06 in.) =	0.126	acre-feet	1.06	inches
5-yr Runoff Volume (P1 = 1.43 in.) =	0.400	acre-feet	1.43	inches
10-yr Runoff Volume (P1 = 1.66 in.) =	0.593	acre-feet	1.66	inches
25-yr Runoff Volume (P1 = 1.74 in.) =	0.807	acre-feet	1.74	inches
50-yr Runoff Volume (P1 = 2.26 in.) =	1.368	acre-feet	2.26	inches
100-yr Runoff Volume (P1 = 2.6 in.) =	1.835	acre-feet	2.60	inches
500-yr Runoff Volume (P1 = 3.07 in.) =	2.375	acre-feet	3.07	inches
Approximate 2-yr Detention Volume =	0.106	acre-feet		
Approximate 5-yr Detention Volume =	0.177	acre-feet		
Approximate 10-yr Detention Volume =	0.317	acre-feet		
Approximate 25-yr Detention Volume =	0.384	acre-feet		
Approximate 50-yr Detention Volume =	0.466	acre-feet		
Approximate 100-yr Detention Volume =	0.609	acre-feet		

Define Zones and Basin Geometry

Select Zone 1 Storage Volume (Required) =		acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =		acre-feet
Initial Surcharge Volume (ISV) =		ft^3
Initial Surcharge Depth (ISD) =		ft
Total Available Detention Depth (H_{total}) =		ft
Depth of Trickle Channel (H_{TC}) =		ft
Slope of Trickle Channel (S_{TC}) =		ft/ft
Slopes of Main Basin Sides (S_{main}) =		H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =		

Initial Surcharge Area (A_{ISV}) =		ft^2
Surcharge Volume Length (L_{ISV}) =		ft
Surcharge Volume Width (W_{ISV}) =		ft
Depth of Basin Floor (H_{FLOOR}) =		ft
Length of Basin Floor (L_{FLOOR}) =		ft
Width of Basin Floor (W_{FLOOR}) =		ft
Area of Basin Floor (A_{FLOOR}) =		ft^2
Volume of Basin Floor (V_{FLOOR}) =		ft^3
Depth of Main Basin (H_{MAIN}) =		ft
Length of Main Basin (L_{MAIN}) =		ft
Width of Main Basin (W_{MAIN}) =		ft
Area of Main Basin (A_{MAIN}) =		ft^2
Volume of Main Basin (V_{MAIN}) =		ft^3
Calculated Total Basin Volume (V_{total}) =		acre-feet

Depth Increment = ft

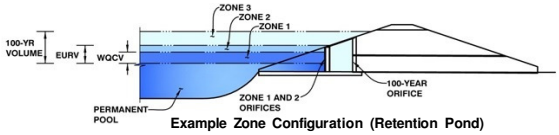
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool									

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: ACME Brickyard

Basin ID: on-site pond



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	33.73	acres
Watershed Length =	1,894	ft
Watershed Length to Centroid =	952	ft
Watershed Slope =	0.030	ft/ft
Watershed Imperviousness =	76.80%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	95.4%	percent
Percentage Hydrologic Soil Groups C/D =	4.6%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.870	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	2.851	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.06 in.) =	2.208	acre-feet	1.06	inches
5-yr Runoff Volume (P1 = 1.43 in.) =	3.209	acre-feet	1.43	inches
10-yr Runoff Volume (P1 = 1.66 in.) =	3.847	acre-feet	1.66	inches
25-yr Runoff Volume (P1 = 1.74 in.) =	4.153	acre-feet	1.74	inches
50-yr Runoff Volume (P1 = 2.26 in.) =	5.663	acre-feet	2.26	inches
100-yr Runoff Volume (P1 = 2.6 in.) =	6.713	acre-feet	2.60	inches
500-yr Runoff Volume (P1 = 3.07 in.) =	8.106	acre-feet	3.07	inches
Approximate 2-yr Detention Volume =	2.015	acre-feet		
Approximate 5-yr Detention Volume =	2.857	acre-feet		
Approximate 10-yr Detention Volume =	3.533	acre-feet		
Approximate 25-yr Detention Volume =	3.473	acre-feet		
Approximate 50-yr Detention Volume =	4.164	acre-feet		
Approximate 100-yr Detention Volume =	4.531	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (User Defined) =	0.969	acre-feet
Zone 2 Volume (EURV - Zone 1) =	1.882	acre-feet
Zone 3 (100yr + 1 / 2 WQCV - Zones 1 & 2) =	2.115	acre-feet
Total Detention Basin Volume =	4.966	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

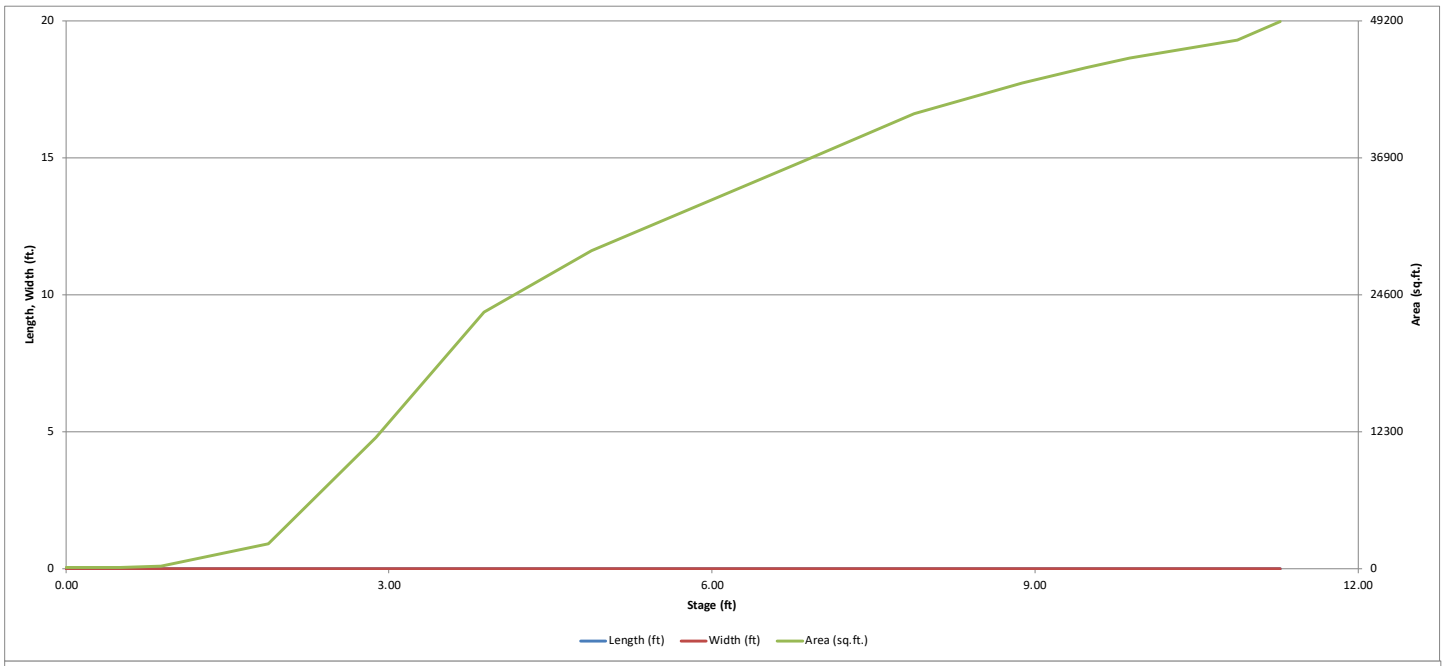
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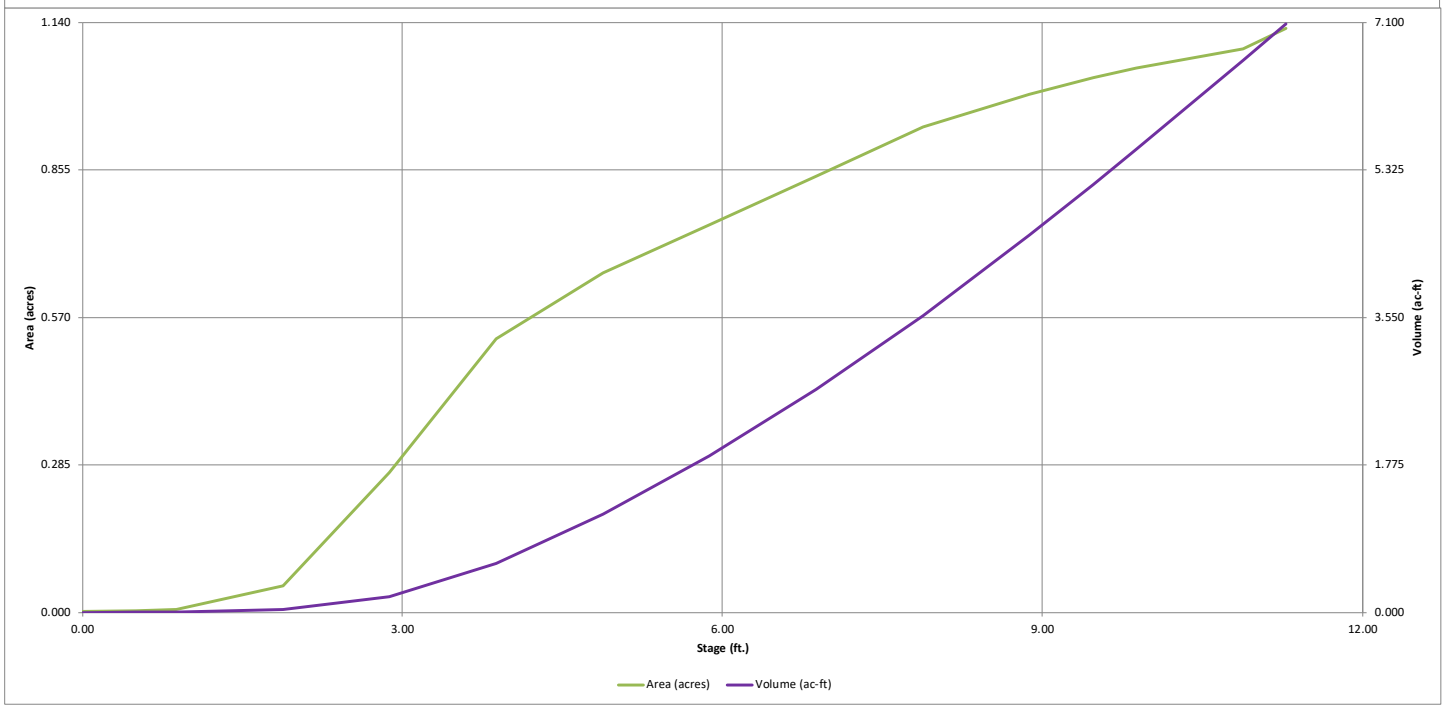
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	119	0.003		
6217.62	--	0.50	--	--	--	125	0.003	61	0.001
6217.99	--	0.87	--	--	--	232	0.005	127	0.0029
6218	--	0.88	--	--	--	236	0.005	129	0.0030
6219	--	1.88	--	--	--	2,232	0.051	1,363	0.031
6220	--	2.88	--	--	--	11,769	0.270	8,364	0.192
6221	--	3.88	--	--	--	23,013	0.528	25,755	0.591
6222	--	4.88	--	--	--	28,571	0.656	51,547	1.183
6223	--	5.88	--	--	--	32,620	0.749	82,142	1.886
6224	--	6.88	--	--	--	36,701	0.843	116,803	2.681
6225	--	7.88	--	--	--	40,835	0.937	155,571	3.571
6226	--	8.88	--	--	--	43,607	1.001	197,792	4.541
6226.6	--	9.48	--	--	--	45,004	1.033	224,375	5.151
6227	--	9.88	--	--	--	45,832	1.052	242,542	5.568
6228	--	10.88	--	--	--	47,428	1.089	289,172	6.638
6228.4	--	11.28	--	--	--	49,142	1.128	308,486	7.082

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



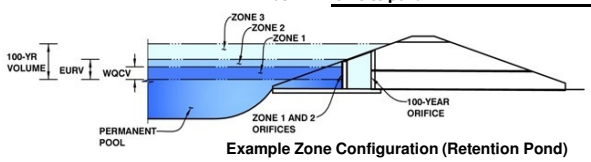


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: ACME Brickyard

Basin ID: on-site pond



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (User)	4.55	0.969	Orifice Plate
Zone 2 (EURV)	7.08	1.882	Orifice Plate
3 (100+1/2WQCV)	9.30	2.115	Weir&Pipe (Restrict)
Total (all zones)		4.966	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	7.18	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	sq. inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	4.50						
Orifice Area (sq. inches)	4.00	16.00						

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	7.18	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	8.59	N/A	feet
Overflow Weir Front Edge Length =	6.00	N/A	feet	Overflow Weir Slope Length =	6.16	N/A	feet
Overflow Weir Grate Slope =	4.25	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	10.99	N/A	
Horiz. Length of Weir Sides =	6.00	N/A	feet	Overflow Grate Open Area w/o Debris =	29.25	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	N/A		Overflow Grate Open Area w/ Debris =	14.63	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.20	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	2.66	N/A	ft^2
Outlet Pipe Diameter =	30.00	N/A	inches	Outlet Orifice Centroid =	0.76	N/A	feet
Restrictor Plate Height Above Pipe Invert =	16.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.64	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	9.48	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.76	feet	6227.36
Spillway Crest Length =	55.00	feet	Stage at Top of Freeboard =	11.28	feet	6228.40
Spillway End Slopes =	12.92	H:V	Basin Area at Top of Freeboard =	1.13	acres	
Freeboard above Max Water Surface =	1.04	feet	Basin Volume at Top of Freeboard =	7.07	acre-ft	

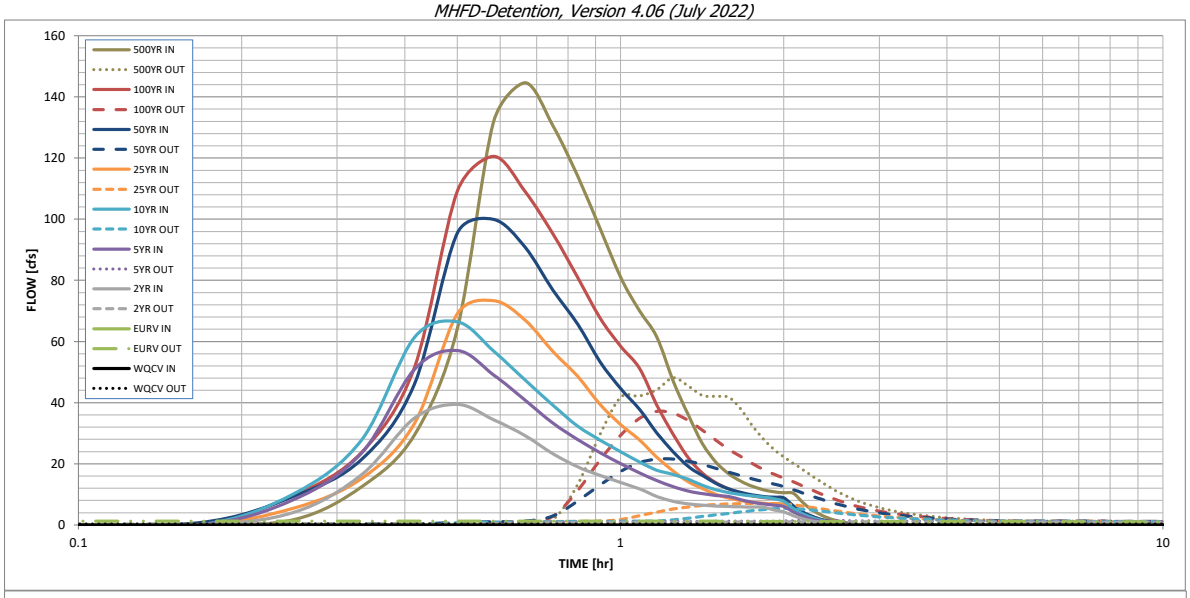
Calculated Parameters for Spillway

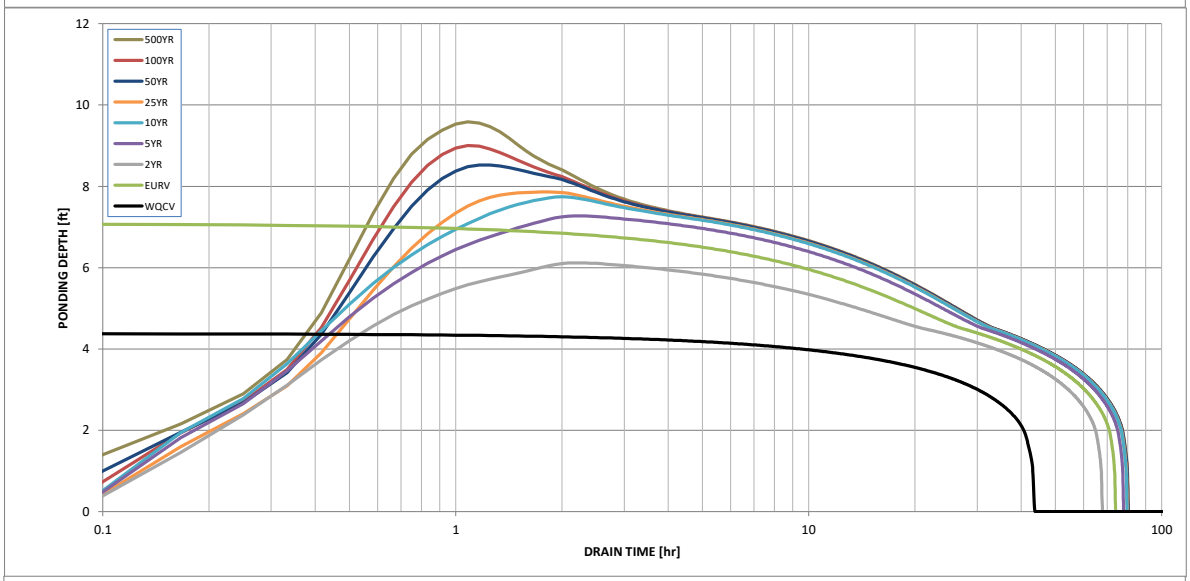
Routed Hydrograph Results *The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).*

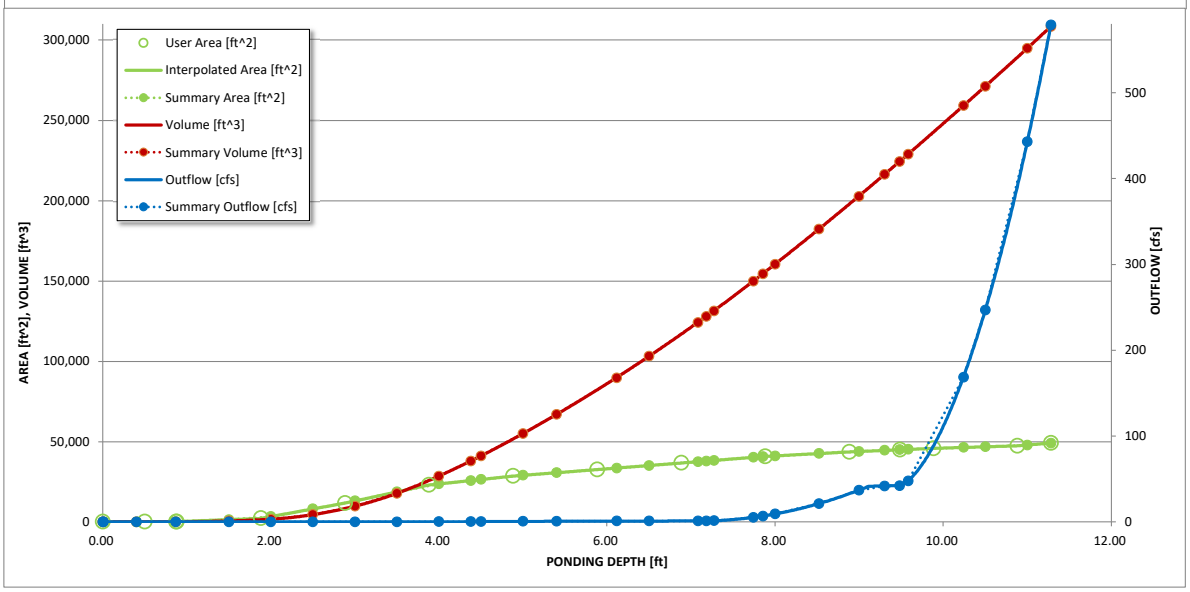
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.06	1.43	1.66	1.74	2.26	2.60	3.07
CUHP Runoff Volume (acre-ft) =	0.870	2.851	2.208	3.209	3.847	4.153	5.663	6.713	8.106
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	2.208	3.209	3.847	4.153	5.663	6.713	8.106
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.5	8.5	13.0	20.3	34.7	46.2	59.3
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.02	0.25	0.39	0.60	1.03	1.37	1.76
Peak Inflow Q (cfs) =	N/A	N/A	39.4	57.1	66.4	73.3	99.9	120.6	144.7
Peak Outflow Q (cfs) =	0.28	1.21	1.01	**1.47**	5.41	7.0	21.6	**37.1**	48.1
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.17	0.41	0.34	0.62	0.80	0.8
Structure Controlling Flow =	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.0	0.1	0.2	0.7	1.2	1.4
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	42	68	63	71.70	72	72	70	68	66
Time to Drain 99% of Inflow Volume (hours) =	**43**	72	66	76	77	77	76	76	75
Maximum Ponding Depth (ft) =	4.38	7.08	6.12	7.27	7.74	7.85	8.52	9.00	9.58
Area at Maximum Ponding Depth (acres) =	0.59	0.86	0.77	0.88	0.92	0.93	0.98	1.01	1.04
Maximum Volume Stored (acre-ft) =	0.871	2.852	2.060	3.017	3.441	3.543	4.184	4.651	5.254
Water Surface Elevation (WSE) =	**6221.50**	**6224.20**	6223.24	**6224.39**	6224.86	6224.97	6225.64	**6226.12**	6226.70

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







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

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename: _____

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.32	1.80
	0:15:00	0.00	0.00	4.12	8.31	10.27	5.54	9.41	9.67	12.53
	0:20:00	0.00	0.00	16.48	23.63	27.95	15.24	21.49	23.85	29.41
	0:25:00	0.00	0.00	34.93	50.88	61.32	33.13	46.04	51.46	64.13
	0:30:00	0.00	0.00	39.39	57.07	66.42	69.04	95.41	109.12	131.73
	0:35:00	0.00	0.00	34.40	49.11	56.88	73.33	99.94	120.57	144.68
	0:40:00	0.00	0.00	29.21	40.81	47.36	67.02	90.81	109.04	130.69
	0:45:00	0.00	0.00	23.31	33.36	39.23	56.77	76.88	95.31	114.15
	0:50:00	0.00	0.00	19.01	27.96	32.34	48.60	65.71	80.99	96.99
	0:55:00	0.00	0.00	16.17	23.63	27.75	39.41	53.39	67.67	81.09
	1:00:00	0.00	0.00	13.88	20.10	23.98	32.88	44.64	58.49	70.13
	1:05:00	0.00	0.00	11.82	17.02	20.61	27.81	37.85	51.27	61.49
	1:10:00	0.00	0.00	9.32	14.53	17.91	22.14	30.08	39.26	47.19
	1:15:00	0.00	0.00	7.73	12.50	16.52	17.65	23.96	29.75	35.93
	1:20:00	0.00	0.00	6.91	11.07	14.90	14.07	19.12	21.92	26.53
	1:25:00	0.00	0.00	6.45	10.21	12.92	11.89	16.15	16.92	20.50
	1:30:00	0.00	0.00	6.19	9.65	11.53	10.04	13.54	13.80	16.74
	1:35:00	0.00	0.00	6.04	9.27	10.58	8.78	11.76	11.78	14.29
	1:40:00	0.00	0.00	5.92	8.23	9.91	7.98	10.62	10.42	12.65
	1:45:00	0.00	0.00	5.84	7.44	9.45	7.44	9.85	9.51	11.54
	1:50:00	0.00	0.00	5.79	6.88	9.13	7.08	9.33	8.93	10.83
	1:55:00	0.00	0.00	4.95	6.49	8.61	6.87	9.03	8.68	10.52
	2:00:00	0.00	0.00	4.30	6.01	7.71	6.74	8.84	8.57	10.39
	2:05:00	0.00	0.00	3.02	4.23	5.40	4.76	6.23	6.07	7.36
	2:10:00	0.00	0.00	2.05	2.86	3.68	3.24	4.24	4.16	5.04
	2:15:00	0.00	0.00	1.37	1.91	2.48	2.20	2.88	2.83	3.42
	2:20:00	0.00	0.00	0.89	1.22	1.62	1.44	1.88	1.85	2.24
	2:25:00	0.00	0.00	0.55	0.78	1.03	0.93	1.21	1.19	1.44
	2:30:00	0.00	0.00	0.31	0.48	0.62	0.58	0.76	0.74	0.90
	2:35:00	0.00	0.00	0.15	0.26	0.32	0.31	0.41	0.40	0.48
	2:40:00	0.00	0.00	0.06	0.10	0.12	0.13	0.16	0.16	0.19
	2:45:00	0.00	0.00	0.01	0.02	0.02	0.02	0.03	0.03	0.03
	2:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.
The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft²]	Area [acres]	Volume [ft³]	Volume [ac-ft]	Total Outflow [cfs]
micropool WSE, centr lowest orif (6217.12)	0.00	119	0.003	0	0.000	0.00
(just above micropool WSE)	0.01	119	0.003	1	0.000	0.01
	0.40	124	0.003	49	0.001	0.08
ISV WSE (6217.99)	0.87	232	0.005	127	0.003	0.12
	1.50	1,474	0.034	659	0.015	0.16
	2.00	3,376	0.078	1,700	0.039	0.19
	2.50	8,145	0.187	4,580	0.105	0.21
	3.00	13,118	0.301	9,857	0.226	0.23
	3.50	18,740	0.430	17,822	0.409	0.25
	4.00	23,680	0.544	28,556	0.656	0.27
WQCV WSE (Routed)	4.38	25,792	0.592	37,956	0.871	0.28
centr top orif (6221.62)	4.50	26,459	0.607	41,091	0.943	0.28
	5.00	29,057	0.667	55,004	1.263	0.68
	5.40	30,676	0.704	66,951	1.537	0.82
2-Yr WSE (Routed)	6.12	33,559	0.770	89,753	2.060	1.01
	6.50	35,150	0.807	103,151	2.368	1.10
EURV WSE (Routed)	7.08	37,528	0.862	124,226	2.852	1.22
front edge weir height (6224.25)	7.18	37,941	0.871	127,999	2.938	1.23
5-Yr WSE (Routed)	7.27	38,313	0.880	131,431	3.017	1.46
10-Yr WSE (Routed)	7.74	40,256	0.924	149,894	3.441	5.39
25-Yr WSE (Routed)	7.85	40,711	0.935	154,348	3.543	6.91
	8.00	41,168	0.945	160,491	3.684	9.37
50-Yr WSE (Routed)	8.52	42,609	0.978	182,273	4.184	21.51
100-Yr WSE (Routed)	9.00	43,863	1.007	202,603	4.651	36.87
100-Yr + 1/2 WQCV WSE (pre-routed)	9.30	44,585	1.024	216,312	4.966	42.01
emergency overflow spillway crest (6226.6)	9.48	45,004	1.033	224,375	5.151	42.36
500-Yr WSE (Routed)	9.58	45,211	1.038	228,886	5.254	47.87
emergency overflow WSE	10.24	46,407	1.065	259,145	5.949	168.74
	10.50	46,822	1.075	271,265	6.227	246.85
	11.00	47,942	1.101	294,894	6.770	442.74
top of spillway (6228.40, >1' freeboard)	11.28	49,142	1.128	308,486	7.082	578.97

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

Design Procedure Form: Extended Detention Basin (EDB)

UD-BMP (Version 3.07, March 2018)

Designer: VCB
Company: HKS
Date: July 9, 2025
Project: ACME Brickyard - 200726, West Forebay
Location: Castle Rock, CO

1. Basin Storage Volume

A) Effective Imperviousness of Tributary Area, I_a — I_a = 78.92 %

B) Tributary Area's Imperviousness Ratio (i = I_a / 100) — i = 0.789

C) Contributing Watershed Area — Area = 23.91 ac

D) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm — d_6 = ____ in

E) Design Concept (Select EURV when also designing for flood control)

Choose One
- (●) Water Quality Capture Volume (WQCV)
- ( ) Excess Urban Runoff Volume (EURV)

F) Design Volume (WQCV) Based on 40-hour Drain Time
(V_{DESIGN} = (1.0 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i) / 12 * Area) — V_{DESIGN} = 0.641 ac-ft

G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume
($V_{WQCV\ OTHER}$ = (d_6*(V_{DESIGN}/0.43)) — $V_{DESIGN\ OTHER}$ = ____ ac-ft

H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired) — $V_{DESIGN\ USER}$ = ____ ac-ft

I) NRCS Hydrologic Soil Groups of Tributary Watershed
- i) Percentage of Watershed consisting of Type A Soils — HSG_A = ____ %
- ii) Percentage of Watershed consisting of Type B Soils — HSG_B = ____ %
- iii) Percentage of Watershed consisting of Type C/D Soils — $HSG_{C/D}$ = ____ %

J) Excess Urban Runoff Volume (EURV) Design Volume
For HSG A: $EURV_A = 1.68 * i^{1.28}$
For HSG B: $EURV_B = 1.36 * i^{1.08}$
For HSG C/D: $EURV_{C/D} = 1.20 * i^{1.08}$
— $EURV_{DESIGN}$ = ____ ac-ft

K) User Input of Excess Urban Runoff Volume (EURV) Design Volume (Only if a different EURV Design Volume is desired) — $EURV_{DESIGN\ USER}$ = ____ ac-ft

2. Basin Shape: Length to Width Ratio
(A basin length to width ratio of at least 2:1 will improve TSS reduction.)

L : W = 1.5 : 1 **INCREASE FLOW PATH FOR 2:1 RATIO**

3. Basin Side Slopes

A) Basin Maximum Side Slopes (Horizontal distance per unit vertical, 4:1 or flatter preferred) — Z = 4.00 ft / ft

4. Inlet

A) Describe means of providing energy dissipation at concentrated inflow locations:

5. Forebay

A) Minimum Forebay Volume (V_{FMIN} = 3% of the WQCV) — V_{FMIN} = 0.0190 ac-ft

B) Actual Forebay Volume — V_F = 0.0192 ac-ft

C) Forebay Depth (D_F = 18 inch maximum) — D_F = 18.0 in

D) Forebay Discharge

i) Undetained 100-year Peak Discharge — Q_{100} = 117.1 cfs

ii) Forebay Discharge Design Flow (Q_F = 0.02 * Q_{100}) — Q_F = 2.34 cfs

E) Forebay Discharge Design

Choose One
- ( ) Berm With Pipe
- (●) Wall with Rect. Notch
- ( ) Wall with V-Notch Weir

Flow too small for berm w/ pipe

F) Discharge Pipe Size (minimum 8-inches) — Calculated D_P = ____ in

G) Rectangular Notch Width — Calculated W_N = 8.20 in

Design Procedure Form: Extended Detention Basin (EDB)

UD-BMP (Version 3.07, March 2018)

Designer: VCB
Company: HKS
Date: July 9, 2025
Project: ACME Brickyard - 200726, East Forebay
Location: Castle Rock, CO

1. Basin Storage Volume

A) Effective Imperviousness of Tributary Area, I_a — I_a = 29.16 %

B) Tributary Area's Imperviousness Ratio (i = I_a / 100) — i = 0.292

C) Contributing Watershed Area — Area = 34.83 ac

D) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm — d_6 = ____ in

E) Design Concept (Select EURV when also designing for flood control)

Choose One
- (●) Water Quality Capture Volume (WQCV)
- ( ) Excess Urban Runoff Volume (EURV)

F) Design Volume (WQCV) Based on 40-hour Drain Time
(V_{DESIGN} = (1.0 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i) / 12 * Area) — V_{DESIGN} = 0.432 ac-ft

G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume
($V_{WQCV\ OTHER}$ = (d_6*(V_{DESIGN}/0.43)) — $V_{DESIGN\ OTHER}$ = ____ ac-ft

H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired) — $V_{DESIGN\ USER}$ = ____ ac-ft

I) NRCS Hydrologic Soil Groups of Tributary Watershed
- i) Percentage of Watershed consisting of Type A Soils — HSG_A = ____ %
- ii) Percentage of Watershed consisting of Type B Soils — HSG_B = ____ %
- iii) Percentage of Watershed consisting of Type C/D Soils — $HSG_{C/D}$ = ____ %

J) Excess Urban Runoff Volume (EURV) Design Volume
For HSG A: $EURV_A = 1.68 * i^{1.28}$
For HSG B: $EURV_B = 1.36 * i^{1.08}$
For HSG C/D: $EURV_{C/D} = 1.20 * i^{1.08}$
— $EURV_{DESIGN}$ = ____ ac-ft

K) User Input of Excess Urban Runoff Volume (EURV) Design Volume (Only if a different EURV Design Volume is desired) — $EURV_{DESIGN\ USER}$ = ____ ac-ft

2. Basin Shape: Length to Width Ratio
(A basin length to width ratio of at least 2:1 will improve TSS reduction.)

L : W = 1.5 : 1 **INCREASE FLOW PATH FOR 2:1 RATIO**

3. Basin Side Slopes

A) Basin Maximum Side Slopes (Horizontal distance per unit vertical, 4:1 or flatter preferred) — Z = 4.00 ft / ft

4. Inlet

A) Describe means of providing energy dissipation at concentrated inflow locations:

5. Forebay

A) Minimum Forebay Volume (V_{FMIN} = 3% of the WQCV) — V_{FMIN} = 0.0130 ac-ft

B) Actual Forebay Volume — V_F = 0.0131 ac-ft

C) Forebay Depth (D_F = 18 inch maximum) — D_F = 19.00 in **DF > DF MAXIMUM**

D) Forebay Discharge

i) Undetained 100-year Peak Discharge — Q_{100} = 47.83 cfs

ii) Forebay Discharge Design Flow (Q_F = 0.02 * Q_{100}) — Q_F = 0.96 cfs

E) Forebay Discharge Design

Choose One
- ( ) Berm With Pipe
- (●) Wall with Rect. Notch
- ( ) Wall with V-Notch Weir

Flow too small for berm w/ pipe

F) Discharge Pipe Size (minimum 8-inches) — Calculated D_P = ____ in

G) Rectangular Notch Width — Calculated W_N = 5.53 in

Design Procedure Form: Extended Detention Basin (EDB)

UD-BMP (Version 3.07, March 2018)

Designer: VCB
Company: HKS
Date: July 9, 2025
Project: ACME Brickyard - 200726, overall pond
Location: Castle Rock, CO

1. Basin Storage Volume

A) Effective Imperviousness of Tributary Area, I_a — I_a = 76.80 %

B) Tributary Area's Imperviousness Ratio (i = I_a / 100) — i = 0.768

C) Contributing Watershed Area — Area = 33.73 ac

D) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm — d_6 = ____ in

E) Design Concept (Select EURV when also designing for flood control)

Choose One
- (•) Water Quality Capture Volume (WQCV)
- ( ) Excess Urban Runoff Volume (EURV)

F) Design Volume (WQCV) Based on 40-hour Drain Time
(V_{DESIGN} = (1.0 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i) / 12 * Area) — V_{DESIGN} = 0.870 ac-ft

G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume
($V_{WQCV\ OTHER}$ = (d_6*(V_{DESIGN}/0.43)) — $V_{DESIGN\ OTHER}$ = ____ ac-ft

H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired) — $V_{DESIGN\ USER}$ = ____ ac-ft

I) NRCS Hydrologic Soil Groups of Tributary Watershed
- i) Percentage of Watershed consisting of Type A Soils — HSG_A = ____ %
- ii) Percentage of Watershed consisting of Type B Soils — HSG_B = ____ %
- iii) Percentage of Watershed consisting of Type C/D Soils — $HSG_{C/D}$ = ____ %

J) Excess Urban Runoff Volume (EURV) Design Volume
For HSG A: $EURV_A$ = 1.68 * $i^{1.28}$
For HSG B: $EURV_B$ = 1.36 * $i^{1.08}$
For HSG C/D: $EURV_{C/D}$ = 1.20 * $i^{1.08}$
— $EURV_{DESIGN}$ = ____ ac-ft

K) User Input of Excess Urban Runoff Volume (EURV) Design Volume (Only if a different EURV Design Volume is desired) — $EURV_{DESIGN\ USER}$ = ____ ac-ft

2. Basin Shape: Length to Width Ratio
(A basin length to width ratio of at least 2:1 will improve TSS reduction.)
L : W = 1.5 : 1 **INCREASE FLOW PATH FOR 2:1 RATIO**

3. Basin Side Slopes

A) Basin Maximum Side Slopes (Horizontal distance per unit vertical, 4:1 or flatter preferred) — Z = 4.00 ft / ft

4. Inlet

A) Describe means of providing energy dissipation at concentrated inflow locations:

5. Forebay

A) Minimum Forebay Volume (V_{FMIN} = 3% of the WQCV) — V_{FMIN} = 0.026 ac-ft

B) Actual Forebay Volume — V_F = ____ ac-ft

C) Forebay Depth (D_F = 30 inch maximum) — D_F = ____ in

D) Forebay Discharge

i) Undetained 100-year Peak Discharge — Q_{100} = ____ cfs

ii) Forebay Discharge Design Flow (Q_F = 0.02 * Q_{100}) — Q_F = ____ cfs

E) Forebay Discharge Design

Choose One
- ( ) Berm With Pipe
- ( ) Wall with Rect. Notch
- ( ) Wall with V-Notch Weir

F) Discharge Pipe Size (minimum 8-inches) — Calculated D_P = ____ in

G) Rectangular Notch Width — Calculated W_N = ____ in

Design Procedure Form: Extended Detention Basin (EDB)

Designer: VCB
Company: HKS
Date: July 9, 2025
Project: ACME Brickyard - 200726, overall pond
Location: Castle Rock, CO

6. Trickle Channel

A) Type of Trickle Channel — Choose One: (●) Concrete ( ) Soft Bottom

FOR A CONCRETE TRICKLE CHANNEL, SLOPE SHOULD BE BETWEEN 0.004 AND 0.010 FT/FT.

F) Slope of Trickle Channel — S = 0.0160 ft / ft

7. Micropool and Outlet Structure

A) Depth of Micropool (2.5-feet minimum) — D_M = 2.5 ft

B) Surface Area of Micropool (10 ft^2 minimum) — A_M = 119 sq ft

C) Outlet Type — Choose One: (●) Orifice Plate ( ) Other (Describe):

D) Smallest Dimension of Orifice Opening Based on Hydrograph Routing (Use UD-Detention) — $D_{orifice}$ = 2.00 inches

E) Total Outlet Area — A_{ot} = 9.42 square inches

8. Initial Surcharge Volume

A) Depth of Initial Surcharge Volume (Minimum recommended depth is 4 inches) — D_{IS} = 10.08 in

B) Minimum Initial Surcharge Volume (Minimum volume of 0.3% of the WQCV) — V_{IS} = 113.6 cu ft

C) Initial Surcharge Provided Above Micropool — V_s = 100.0 cu ft

9. Trash Rack

A) Water Quality Screen Open Area: $A_t = A_{ot} * 38.5*(e^{-0.095D})$ — A_t = 300 square inches

B) Type of Screen (If specifying an alternative to the materials recommended in the USDCM, indicate "other" and enter the ratio of the total open are to the total screen are for the material specified.) — *Aluminum Amico-Klemp SR Series with Cross Rods 2" O.C.*

Other (Y/N): N

C) Ratio of Total Open Area to Total Area (only for type 'Other') — User Ratio =

D) Total Water Quality Screen Area (based on screen type) — A_{total} = 423 sq. in.

E) Depth of Design Volume (EURV or WQCV) (Based on design concept chosen under 1E) — H= 4.39 feet

F) Height of Water Quality Screen (H_{TR}) — H_{TR}= 80.68 inches

G) Width of Water Quality Screen Opening ($W_{opening}$) (Minimum of 12 inches is recommended) — $W_{opening}$ = 12.0 inches

VALUE LESS THAN RECOMMENDED MIN. WIDTH. WIDTH HAS BEEN SET TO 12 INCHES.

Design Procedure Form: Extended Detention Basin (EDB)

Designer: VCB
Company: HKS
Date: July 9, 2025
Project: ACME Brickyard - 200726, overall pond
Location: Castle Rock, CO

10. Overflow Embankment

A) Describe embankment protection for 100-year and greater overtopping: concrete apron on downstream side of spillway

B) Slope of Overflow Embankment
(Horizontal distance per unit vertical, 4:1 or flatter preferred)

Ze = 4.00 ft / ft

11. Vegetation

Choose One
- ○ Irrigated
- ◉ Not Irrigated

12. Access

A) Describe Sediment Removal Procedures

Notes:

Design Procedure Form: Rain Garden (RG)

UD-BMP (Version 3.07, March 2018)

Designer: VCB
Company: HKS
Date: March 26, 2025
Project: The Brickyard - rain garden for dog park
Location:

1. Basin Storage Volume

A) Effective Imperviousness of Tributary Area, I_a (100% if all paved and roofed areas upstream of rain garden): I_a = 40.0 %

B) Tributary Area's Imperviousness Ratio ($i = I_a/100$): i = 0.400

C) Water Quality Capture Volume (WQCV) for a 12-hour Drain Time ($WQCV = 0.8 * (0.91* i^3 - 1.19 * i^2 + 0.78 * i)$): WQCV = 0.14 watershed inches

D) Contributing Watershed Area (including rain garden area): Area = 8,964 sq ft

E) Water Quality Capture Volume (WQCV) Design Volume, Vol = (WQCV / 12) * Area: V_{WQCV} = 107 cu ft

F) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm: d_6 = in

G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume: $V_{WQCV\ OTHER}$ = cu ft

H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired): $V_{WQCV\ USER}$ = cu ft

2. Basin Geometry

A) WQCV Depth (12-inch maximum): D_{WQCV} = 12 in

B) Rain Garden Side Slopes (Z = 4 min., horiz. dist per unit vertical) (Use "0" if rain garden has vertical walls): Z = 4.00 ft / ft

C) Mimimum Flat Surface Area: A_{Min} = 72 sq ft

D) Actual Flat Surface Area: A_{Actual} = 72 sq ft

E) Area at Design Depth (Top Surface Area): A_{Top} = 326 sq ft

F) Rain Garden Total Volume ($V_T = ((A_{Top} + A_{Actual}) / 2) * Depth$): V_T = 199 cu ft

3. Growing Media

Choose One
- (●) 18" Rain Garden Growing Media
- ( ) Other (Explain):

4. Underdrain System

A) Are underdrains provided?

Choose One
- ( ) YES
- (●) NO

B) Underdrain system orifice diameter for 12 hour drain time

i) Distance From Lowest Elevation of the Storage Volume to the Center of the Orifice: y = N/A ft

ii) Volume to Drain in 12 Hours: Vol_{12} = N/A cu ft

iii) Orifice Diameter, 3/8" Minimum: D_O = N/A in

Summary of Water Quality Conformance to MS4 Permit

The purpose of this worksheet is to document conformance with the Town of Castle Rock's MS4 permit with regard to permanent water quality on land disturbance projects.

Project Name The Brickyard

Project Owner Confluence Companies

Project Location Castle Rock

ToCR Project Number SDP24-0022, CD24-0030

Total Site Area 31.31 **acres**

Total Size of Common Plan of Development 69.3 **acres**

Check all that apply:

- ☒ **Project within Plum Creek Basin**
- ☐ **Project within Cherry Creek Basin**

Estimated construction completion date Fall 2025

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1. The water quality control measure(s) for applicable development sites shall meet one of the following base design standards as per the SDDTCM Section 14.4. Please select all design standards that were applied to meet conformance with the MS4 on this site.

   - ☑ WQCV standard
   - ☐ Pollutant removal standard
   - ☐ Runoff reduction standard
   - ☐ Applicable site draining to regional WQVC control measure (accepts drainage prior to discharging to WOTS)
   - ☐ Applicable site draining to regional WQVC control facility (with receiving pervious area control measure upstream of WOTS)
   - ☐ Constrained redevelopment sites standard
     - Imperviousness of existing site _____/_____(Imp. Ac/Site Ac) =____%
     - Variance required TCV No. _____
   - ☐ Existing control measure with WQCV per previous criteria standards
     - Reference Construction Permit No. _____
   - ☐ Cherry Creek Basin only, choose one: ☐ Tier 1 ☐ Tier 2 ☐ Tier 3
   - ☐ No control measures provided (See Permanent WQ Worksheet for applicability)

Summary of Water Quality Conformance to MS4 Permit

2. Was an exclusion to water quality applied as per SDDTCM Section 13.1.5? ☒Yes ☐No

   i. If yes, please select all that apply, provide total excluded impervious area(s) and submit variance, as applicable: TCV No. _____

- ☐ Pavement management site
  Excluded impervious area: _____ acres
- ☒ Excluded roadway redevelopment
  Excluded impervious area: 0.22 acres
- ☐ Excluded existing roadway areas
  Excluded impervious area: _____ acres
- ☐ Above ground and below ground utilities
- ☐ Large lot single family home
- ☐ Non-residential and non-commercial infiltration
  Excluded impervious area: _____ acres
- ☐ Land disturbance for land to remain undeveloped
  Excluded impervious area: _____ acres
- ☐ Stream Stabilization Sites
  Excluded impervious area: _____ acres
- ☒ Trails
  Excluded impervious area: 0.43 Ac (18,594 SF) acres
- ☐ Oil and Gas Exploration

Area for Prairie Hawk Drive north of the Site:

126,335 SF (2.90 Ac) proposed impervious area

116,743.02 SF (2.68 Ac) existing impervious area

3. For Development and Redevelopment sites, following any exclusions claimed above, was any portion of the site excluded up to 20% of the site and not to exceed one acre? ☒Yes ☐No

   If yes, complete the following:

   Excluded area: 0.75 acres

   Total Site area: 31.18 acres, 2.4 % site excluded

4. For Constrained sites, was any portion of the site excluded up to 50% of the site and not to exceed 50% of the impervious area? ☐Yes ☐No N/A

   If yes, complete the following:

   Excluded area: _____ acres

   Excluded impervious area: _____ acres

   Total Site area: _____ acres, _____ % site excluded

   Total Impervious area: _____ acres, _____ % impervious excluded

Permanent Water Quality Determination Worksheet (Taken from 2019 SDDTCM Sections 13.1.4 and 13.1.5)

Project: The Brickyard **Project #:** 22-0002 **Applicant:** Confluence Companies

Section	Question	Response	Instructions
1	**Non-applicable Sites**		
1.1	Will the project result in a temporary disturbance of greater than one acre?	○ No ◉ Yes	Proceed to section 1.2. Proceed to section 2.
1.2	Is the project part of a larger common plan of development or sale where multiple separate and distinct construction activities may be taking place at different times on different schedules, but remain related and are within 1/4 mile of each other? (A common plan of development will generally be documented on a site development plan, master plan, or equivalent, for the property/project)	○ No ○ Yes	Proceed to section 1.3. Proceed to section 2.
1.3	Is the project within the Cherry Creek Watershed?	○ Yes ○ No	Permanent water quality control measures may be required. Refer to Water Qualtiy Control Regulation 72.7 for details and allowable exclusions. Permanent water quality control measures are not required.

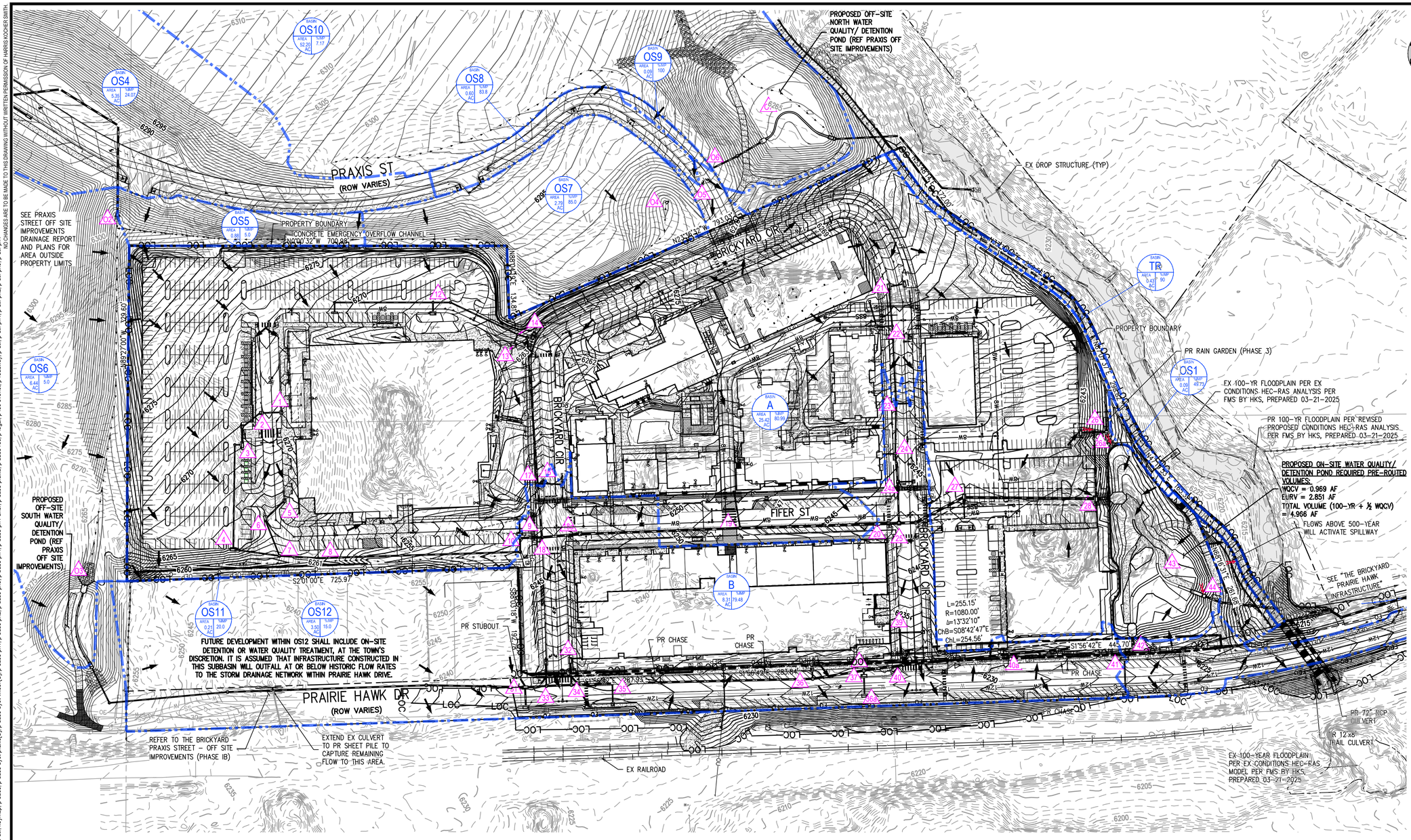
Section	Question	Response	Instructions
2	**Applicable Site Types and Exclusions by Variance**		
2.1	Does the project have more than 35% impervious area on the existing site?	◉ No ○ Yes	Project is an applicable Development Site. Proceed to section 3. Proceed to 2.2.
2.2	Does the project have greater than 75% impervious area on the existing site?	○ No ○ Yes	Project is an applicable Redevelopment Site. Proceed to section 3. Project is an applicable Constrainted Redevelopment Site. Proceed to 2.3.
2.3	Will 100% of the runoff from the existing and proposed site be captured and treated using one or more of the allowable design standards for permanent water quality?	○ Yes ○ No	No further action required. Proceed to 2.4.
2.4	Do any other water quality exclusions apply to the site?	○ No ○ Yes	Portions of the project are excluded. Proceed with design in accordance with Constrained Redevelopment standards and apply for **variance** for Constrained Redevelopment Sites. Proceed to section 3. Following approval of other exclusions, design remaining site in accordance with Constrained Redevelopment standards and apply for **variance** for Constrained Redevelopment Sites.

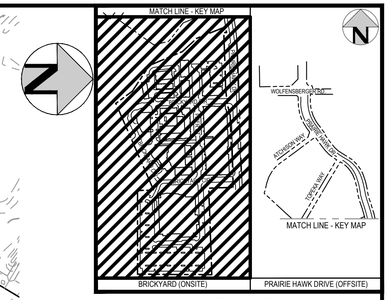
Section	Question	Response	Instructions
3	**Applicable Sites with Other Exclusions by Variance**		
3.1	**Category 1: Roadways, bridges and trails only**		
3.1.1	Is the project a bike or pedestrian trail?	◉ Yes ○ No	Proceed to next line. Proceed to 3.1.2.
	Is the trail for a roadway?	○ Yes ◉ No	Proceed to 3.1.2. Project is excluded. Submit **variance** for Trails Excluded from Permanent Water Quality Requirements.
3.1.2	Is the project primarily used for parking or access to parking?	○ Yes ○ No	This exclusion does not apply. Permanent water quality is required. Proceed to 3.1.3.
3.1.3	Does the project add impervious area?	○ No ○ Yes	Project is excluded. Submit **variance** for Pavement Management Sites Excluded from Permanent Water Quality Requirements. Proceed to 3.1.4.
3.1.4	Does the project add more than 8.25 feet of paved width at any location to the existing roadway?	○ No ○ Yes	Project is excluded. Submit **variance** for Roadway Redevelopment Sites Excluded from Permanent Water Quality Requirements. Proceed to next line.
	Does the project add more than one acre of paved area per mile to an existing roadway?	○ No ○ Yes	Project is excluded. Submit **variance** for Roadway Redevelopment Sites Excluded from Permanent Water Quality Requirements. Proceed to next line.
	Does the project increase the width by two times or more, on average, of the original roadway area?	○ No ○ Yes	Existing areas of site are excluded only. Submit **variance** for Existing Roadway Surfaces Only Excluded from Permanent Water Quality Requirements. This exclusion does not apply. Permanent water quality is required.
3.2	**Category 2: Non-residential and non-commercial projects only**		
3.2.1	Is the project associated with oil and gas exploration, production, processing, or treatment operations or transmission facilities, including activities necessary to prepare a site for drilling and the movement and placement of drilling equipment?	○ Yes ◉ No	Project is excluded. Submit **variance** for Oil and Gas Exploration Sites Excluded from Permanent Water Quality Requirements. Proceed to 3.2.2.
3.2.2	Is the project for stream stabilization?	○ Yes ◉ No	Project is excluded. Submit **variance** for Stream Stabilization Sites Excluded from Permanent Water Quality Requirements. Proceed to 3.2.3.
3.2.3	Is the project for installation or maintenance of aboveground or underground utilities or infrastructure that does not permanently alter the terrain, ground cover, or drainage patterns from those present prior to the construction activity including activities to install, replace or maintain utilities under roadways or other paved areas that return the surface to the same condition?	○ Yes ◉ No	Project is excluded. Submit **variance** for Aboveground and Underground Utilities Excluded from Permanent Water Quality Requirements. Proceed to 3.2.4.
3.2.4	Is the project on undeveloped land (land with no human-made structures such as buildings or pavement) that will remain undeveloped after the project?	○ Yes ◉ No	Project is excluded. Submit **variance** for Sites with Land Disturbances to Undeveloped Land that will Remain Undeveloped Excluded from Permanent Water Quality Requirements. Proceed to 3.2.5.
3.2.5	Will the post-project condition result in surface water discharge during the 80th percentile storm runoff event?	○ No ◉ Yes	Project is excluded. Submit **study** along with **variance** for Non-residential and Non-commercial Infiltration Conditions Excluded from Permanent Water Quality Requirements. This exclusion does not apply. Permanent water quality is required.

Section	Question	Response	Instructions
3.3	**Category 3: Residential, Agricultural and Commercial projects**		
3.3.1	Is the project a single-family residential lot, or agricultural zoned lands, greater than or equal to 2.5 acres in size per dwelling unit?	○ Yes ● No	Proceed to next line. Proceed to 3.3.2.
	Is the project site greater than 10% impervious?	○ No ● Yes	Project is excluded. Submit **variance** for Large Lot Single Family Sites Excluded from Permanent Water Quality Requirements. Proceed to next line.
	Is the project site greater than 20% impervious?	● Yes ○ No	This exclusion does not apply. Permanent water quality is required. Proceed to next line.
	Will the post-project condition result in surface water discharge during the 80th percentile storm runoff event?	○ No ○ Yes	Project is excluded. Submit **study** along with **variance** for Large Lot Single Family Sites Excluded from Permanent Water Quality Requirements. This exclusion does not apply. Permanent water quality is required.
3.3.2	Will 100% of the runoff from the residential or commercial site be captured?	○ Yes ● No	This exclusion does not apply. Permanent water quality is required. Proceed to next line.
	Is all or a portion of the site undeveloped or will it remain undeveloped after construction?	○ Yes ● No	This portion of the project is excluded. Submit **variance** for Sites with Land Disturbance to Undeveloped Land that will Remain Undeveloped Excluded from Permanent Water Quality Requirements. Proceed to next line. Proceed to next line.
	Is the remaining untreated impervious area greater than 20% of the site?	○ Yes ● No	This exclusion does not apply. Permanent water quality is required. Proceed to next line.
	Is the remaining untreated impervious area greater than one acre?	○ Yes ● No	This exclusion does not apply. Permanent water quality is required. Proceed to next line.
	Is it practicable to capture runoff from portions of the site that will not drain to a control measure?	● No ○ Yes	Document justification demonstrating that it is not practicable to capture runoff from this portion of the site in the **drainage report**. No further action is needed. This exclusion does not apply. Permanent water quality is required.

APPENDIX F – DRAINAGE MAPS

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.





KEY MAP

LEGEND:

EXISTING CONTOUR LINES 5175 / 5171

PROPOSED SUBBASIN BOUNDARY

FLOW ARROW

EXISTING STORM ST ST

PROPERTY BOUNDARY

LMITS OF CONSTRUCTION LOC

DESIGN POINT 1

PROPOSED CONTOUR LINES 5175 / 5171

PROPOSED CONTOUR LINES, SEPARATE PROJECT 5175 / 5171

PROPOSED STORM

EMERGENCY OVERFLOW DIRECTION

BASIN DESIGNATION — BASIN OS 1 (AREA 1.23 AC, IMP% 0.45) — IMPERVIOUSNESS

BASIN SIZE IN ACRES

ROUTED HYDROGRAPH RESULTS:

On-site Pond	WQCV	EURV	100-yr	100-yr + 1/2 WQCV
Release Rate (cfs)	0.28	1.21	37.1	42.01
Volume (ac-ft)	0.871	2.852	4.651	4.966
Max. Depth (ft)	4.38	7.08	9.00	9.30

VERTICAL DATUM

NGS POINT G 23, BEING A STANDARD BENCHMARK DISK IN TOP OF CONCRETE POST, ELEVATION = 6231.61 NAVD88

HORIZONTAL CONTROL

BEARINGS ARE BASED ON THE WEST LINE OF THE NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 8 SOUTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN. AS MONUMENTED AT THE NORTHWEST CORNER BY A REBAR W/ 2.5" ALUM. CAP PLS 6935 AND AT THE WEST QUARTER CORNER BY A 1" STEEL RODE W/ 2" CAP PIPE PLS 6935 AS BEARING NORTH 00°25'11" WEST, AS SHOWN ON THE PLAT OF CITADEL STATION FILING NO. 6.

PROFESSIONAL ENGINEER CERTIFICATION

I HEREBY AFFIRM THAT THESE FINAL CONSTRUCTION PLANS WERE PREPARED UNDER MY DIRECT SUPERVISION, IN ACCORDANCE WITH ALL APPLICABLE TOWN OF CASTLE ROCK AND STATE OF COLORADO STANDARDS AND STATUTES, RESPECTIVELY; AND THAT I AM FULLY RESPONSIBLE FOR ALL DESIGN AND REVISIONS RELATIVE TO SAID PLANS.

COLORADO LICENSED — MARK A. WEST — 38561 — PROFESSIONAL ENGINEER

MARK A. WEST, P.E. #38561 DATE

TOWN OF CASTLE ROCK APPROVAL

PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

Approved By:

Development Services Date

ROUTED-CUMULATIVE RUNOFF SUMMARY TABLE

DESIGN POINT (DP)	CONTRIBUTING SUB-BASINS	CONTRIBUTING AREA (AC)	Q5 (CFS)	Q100 (CFS)
O1	OS4	5.35	3.67	19.21
O2	OS4 + OS5	6.23	3.61	20.99
O3	DP O2 + OS6	12.67	0.71	17.66
O4	OS7	2.79	7.78	16.21
O5	OS7 + OS8	3.40	9.15	19.14
O6	DP O5 + OS9	3.48	9.39	19.59
O7	DP O6 + OS10	55.68	12.73	122.76
1	A1 + A2	0.93	2.56	5.41
2	DP 1 + A3	1.01	2.74	5.84
3	DP 2 + A4	2.15	6.26	12.74
4	DP 3 + A5	2.71	7.87	15.91
5	A6 + 1/2 A9	0.48	1.42	3.03
6	DP 5 + A7	1.33	4.18	8.57
7	DP 4 + DP 6	4.04	11.54	23.47
8	DP 7 + A8 + A9	5.32	13.68	29.16
9	A10 + 1/3 A19 + A11	1.02	2.85	6.20
10	DP 8 + 2/3 A19 + DP 9	6.67	16.75	35.80
12	A14 + A15 + 1/2 A18	1.54	5.17	10.66
13	A16 + A17 + 1/2 A18	1.09	2.93	6.58
14	DP 12 + D P13	2.63	7.74	16.48
16	A20 + A21	1.99	4.94	12.19
17	DP 14 + 1/2 A19 + DP 16	4.87	12.59	28.28
18	DP 10 + D P17	11.54	27.91	60.86
18a	DP 18 + A21a	11.86	28.50	62.20
19	DP 18a + A22	13.87	32.77	71.22
20	DP 19 + A23	14.79	34.21	74.49
21	A25 + A27	0.89	2.12	5.32
22	A26 + DP 21	2.18	6.29	14.00
23	DP 22 + A28 + A29	2.52	7.20	15.97
24	DP 23 + A31	3.98	11.78	25.54
24a	DP 24 + A28a + A29a	4.28	12.56	27.32
25	DP 20 + DP 24a	19.07	43.94	95.77
26	A24 + A32	1.02	0.99	4.92
26a	A30 + DP 26	2.89	7.82	18.78
27	DP 25 + 1/2 A33 + A34	20.06	45.90	99.89
28	DP 26a + DP 27 + A35 + A36	24.14	53.67	117.83
31	off-site south pond out + B1 + 35% OS12 + B2	2.50	3.92	22.83
32	B3 + B5	1.80	6.24	13.05
33	DP31 + B4	2.91	4.48	24.20
34	DP32 + DP 33	4.72	7.69	30.92
35	DP 34 + B6 + B7	5.32	8.54	32.92
36	DP 35 + B16	5.67	8.99	33.84
36a	B15 + B8	0.45	1.44	3.04
37	DP 36a + B9	0.74	2.29	4.91
38	DP 36 + DP 37	6.41	10.17	36.36
39	B10 + B11 + B12	2.07	6.83	14.63
40	DP 38 + DP 39	8.47	13.54	43.62
40a	1/2 A33 + DP 40	8.79	14.03	44.53
41	B13 + B14	1.06	2.65	6.20
42	DP 40a + DP 41	9.85	15.39	47.76
43	DP 28 + DP 42 + A37	35.50	54.23	134.45
44	ON-SITE POND OUTFALL	--	7.03	42.20

NOTES:

1. BASIN DELINEATION IS NOT BASED ON ROUGH OVERLOT GRADING, RATHER ON ASSUMED GRADING FOR FINAL DESIGN.
2. FLOW VALUES ARE BASED ON TIME OF CONCENTRATION PER ROUGH OVERLOT GRADING. TABLE VALUES SHOULD BE USED AS APPROXIMATE.
3. REFER TO PRAXIS STREET OFF-SITE IMPROVEMENTS FOR ADDITIONAL OFF-SITE INFORMATION.

Know what's below. Call before you dig.

90 0 90 180

SCALE: 1" = 90'

DESIGNED BY: GRS, VCB
CHECKED BY: MAW
DRAWN BY: GRS, VCB

ISSUE DATE: 08-07-2024

DATE	REVISION COMMENTS
10-22-2024	PRICING SET
12-06-2024	PER TOWN COMMENTS
03-25-2025	PER TOWN COMMENTS
05-22-2025	UTILITY SUBMITTAL - PER TOWN COMMENTS
06-23-2025	UTILITY SUBMITTAL - PER TOWN COMMENTS
07-09-2025	SDP SUBMITTAL
08-15-2025	SDP SUBMITTAL

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

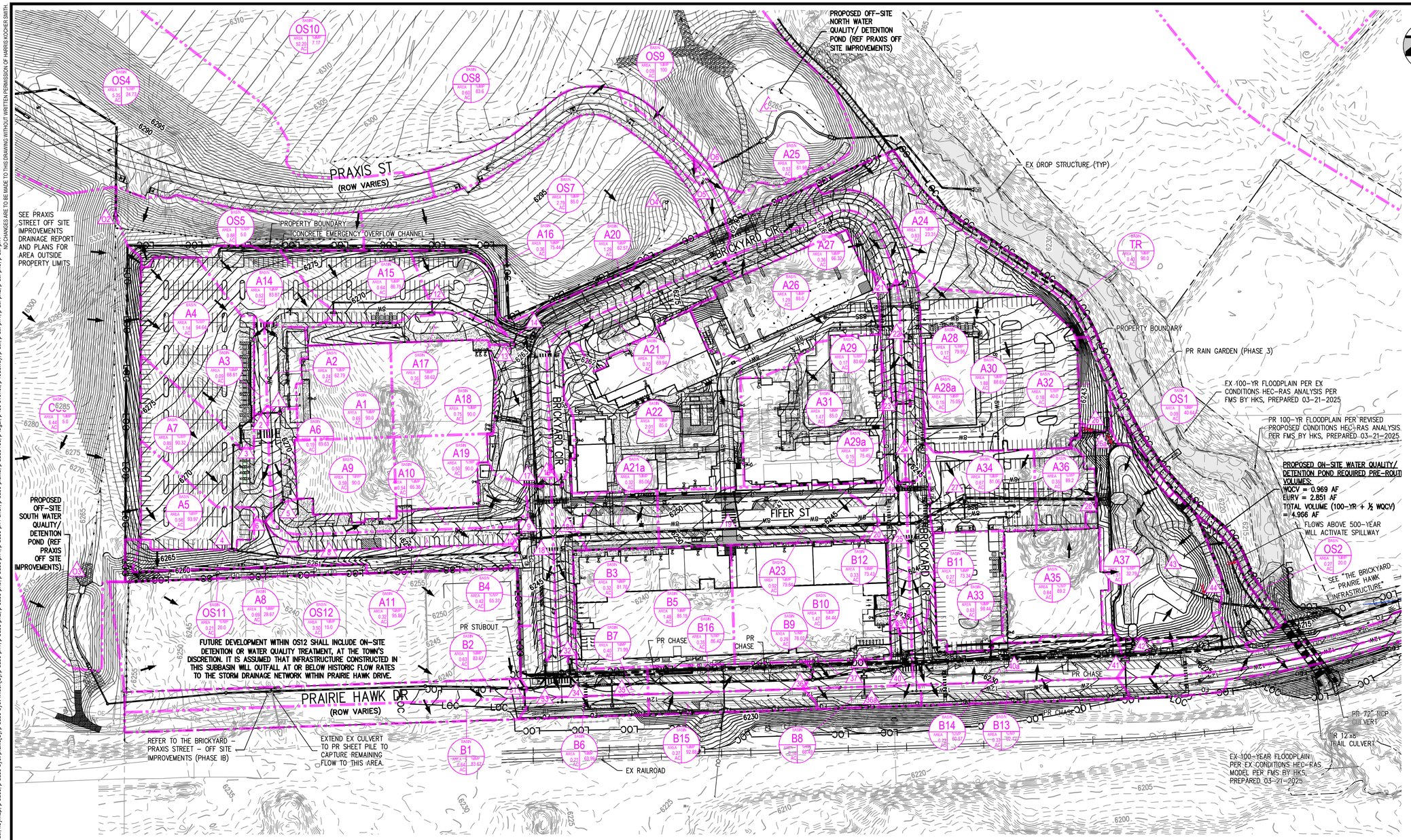
CONFLUENCE COMPANIES, LLC

THE BRICKYARD
PROPOSED MAJOR BASIN DRAINAGE PLAN

PROJECT #: 200726
SHEET NUMBER 1
1 OF 4

FILEPATH: P:\2020\200726\ENGINEERING\DRAINAGE\PROPOSED DRAINAGE PLAN.DWG LAYOUT: MAJOR BASIN PLAN (DR)
26 XREFs: aerial(U), cd-stamp(U), cd-stamp(U), cd-cr pa approval block, cd-cr pa confirmation block m_west, e-base, e-legal, e-util, keymap, p-base, p-base-byot-praxis(U), p-base-byot-wilson(U), p-base-ph1, p-base-ph2, p-base-ph3, p-base-ph4, p-base-ph3, p-base-ph4, p-base-ph4-undr, p-base-praxis, p-base-rec, p-legal, p-loc-overlot, p-roadway, p-util, p-util-ph1, p-util-ph2, p-util-ph3, p-util-ph4
PLOTTED: FRI 08/15/25 10:43:29A BY: CLAIRE BENNETT

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.



KEY MAP

LEGEND:

- EXISTING CONTOUR LINES (5175 / 5171)
- PROPOSED SUBBASIN BOUNDARY
- FLOW ARROW
- EXISTING STORM (ST)
- PROPERTY BOUNDARY
- LMITS OF CONSTRUCTION (LOC)
- DESIGN POINT (1)
- PROPOSED CONTOUR LINES (5175 / 5171)
- PROPOSED CONTOUR LINES, SEPARATE PROJECT (5175 / 5171)
- PROPOSED STORM
- EMERGENCY OVERFLOW DIRECTION

BASIN DESIGNATION — BASIN OS 1 — IMPERVIOUSNESS
BASIN SIZE IN ACRES — AREA 1.230 — IMP% 45 AC

ROUTED HYDROGRAPH RESULTS:

On-site Pond	WQCV	EURV	100-yr	100-yr + 1/2 WQCV
Release Rate (cfs)	0.28	1.21	37.1	42.01
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COLORADO LICENSED — MARK A. WEST — 38561 — PROFESSIONAL ENGINEER

MARK A. WEST, P.E. #38561 DATE

TOWN OF CASTLE ROCK APPROVAL

PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

Approved By:

Development Services Date

SUB-BASIN DIRECT RUNOFF SUMMARY TABLE

SUB-BASIN	AREA (AC)	Q5 (CFS)	Q100 (CFS)
A1	0.69	2.39	4.82
A2	0.24	0.49	1.24
A3	0.09	0.21	0.51
A4	1.14	4.48	8.76
A5	0.56	1.93	3.79
A6	0.19	0.47	1.10
A7	0.85	3.16	6.34
A8	0.69	0.57	2.63
A9	0.59	1.96	3.94
A10	0.54	1.24	3.06
A11	0.32	1.18	2.29
A14	0.52	1.81	3.79
A15	0.64	2.28	4.68
A16	0.36	1.11	2.49

SUB-BASIN	AREA (AC)	Q5 (CFS)	Q100 (CFS)
A17	0.35	0.72	1.91
A18	0.75	2.67	5.37
A19	0.50	1.61	3.24
A20	1.29	3.11	7.88
A21	0.70	1.89	4.45
A21a	0.32	1.06	2.29
A22	2.01	7.02	14.62
A23	0.92	2.81	6.08
A24	0.83	0.71	3.92
A25	0.53	1.23	3.13
A26	1.29	4.50	9.38
A27	0.36	0.94	2.29
A28	0.17	0.56	1.20
A28a	0.15	0.46	1.04

SUB-BASIN	AREA (AC)	Q5 (CFS)	Q100 (CFS)
A29	0.17	0.55	1.19
A29a	0.15	0.45	1.01
A30	1.88	6.87	13.94
A31	1.47	5.13	10.68
A32	0.18	0.28	1.00
A33	0.63	2.58	4.93
A34	0.67	2.23	4.77
A35	0.84	3.13	6.30
A36	0.35	1.29	2.61
A37	1.51	1.27	5.24
B1	0.64	1.83	3.86
B2	0.63	1.80	3.78
B3	0.32	1.08	2.31
B4	0.42	1.07	2.62

SUB-BASIN	AREA (AC)	Q5 (CFS)	Q100 (CFS)
B5	1.48	5.17	10.77
B6	0.21	0.53	1.31
B7	0.40	1.18	2.73
B8	0.18	0.48	1.15
B9	0.29	0.92	2.02
B10	1.47	5.09	10.65
B11	0.27	0.79	1.80
B12	0.33	1.00	2.27
B13	0.33	1.27	2.52
B14	0.73	1.54	3.99
B15	0.27	1.03	2.03
B16	0.35	1.23	2.54
OS1	0.09	0.13	0.47
OS2	0.27	0.20	1.24

SUB-BASIN	AREA (AC)	Q5 (CFS)	Q100 (CFS)
TR	0.43	1.59	3.20
OS4	5.35	3.67	19.21
OS5	0.88	0.11	2.78
OS6	6.44	0.72	17.79
OS7	2.79	7.78	16.21
OS8	0.60	1.65	3.48
OS9	0.09	0.29	0.55
OS10	52.20	6.41	109.61
OS11	0.21	0.15	0.92
OS12	3.50	1.85	15.31

NOTES:

1. BASIN DELINEATIONS FOR PUBLIC AND PRIVATE ROADS ARE BASED ON THE FINAL DESIGN OF THE SITE. ENGINEERING JUDGEMENT WAS USED FOR PHASE I, PHASE II, PHASE III, AND PHASE IIII BY ASSUMING 90% IMPERVIOUSNESS AND BASIN BOUNDARIES FOR ASSUMED GRADING FOR FINAL DESIGN OF THE ENTIRE SITE.
2. REFER TO PRAXIS STREET OFF-SITE IMPROVEMENTS FOR ADDITIONAL OFF-SITE INFORMATION.

Know what's below. Call before you dig.

90 0 90 180
SCALE: 1" = 90'

DESIGNED BY: GRS, VCB
CHECKED BY: MAW
DRAWN BY: GRS, VCB

ISSUE DATE: 08-07-2024

DATE	REVISION COMMENTS
10-22-2024	PRICING SET
12-06-2024	PER TOWN COMMENTS
03-25-2025	PER TOWN COMMENTS
05-22-2025	UTILITY SUBMITTAL - PER TOWN COMMENTS
06-23-2025	UTILITY SUBMITTAL - PER TOWN COMMENTS
07-09-2025	SDP SUBMITTAL
08-15-2025	SDP SUBMITTAL

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

CONFLUENCE COMPANIES, LLC

THE BRICKYARD
PROPOSED MINOR SUBBASIN DRAINAGE PLAN

PROJECT #: 200726
SHEET NUMBER
3
3 OF 4

FILEPATH: P:\2020\200726\ENGINEERING\DRAINAGE\PROPOSED DRAINAGE PLAN.DWG LAYOUT: MINOR BASIN PLAN (DR)
26 XREFs: aerial=[], cd_datmg=[], cd1 - r approval block, cd - r pe certification block rh_west, e-base, e-legal, e-ult_keymap, p-base, p-base-byd-praxis=[], p-base-byot-wilson=[], p-base-ph1, p-base-ph2, p-base-ph3, p-base-ph4, p-base-ph4_undr, r p-base-praxis, p-base-rec, p-legal, p-loc-overlot, p-roadway, p-ult, p-ult-ph1, p-ult-ph2, p-ult-ph3, p-ult-ph4
PLOTTED: FRI 08/15/25 10:48:22A BY: CLAIRE BENNETT

APPENDIX G – EXCERPTS OF STUDIES BY OTHERS AND CHECKLIST

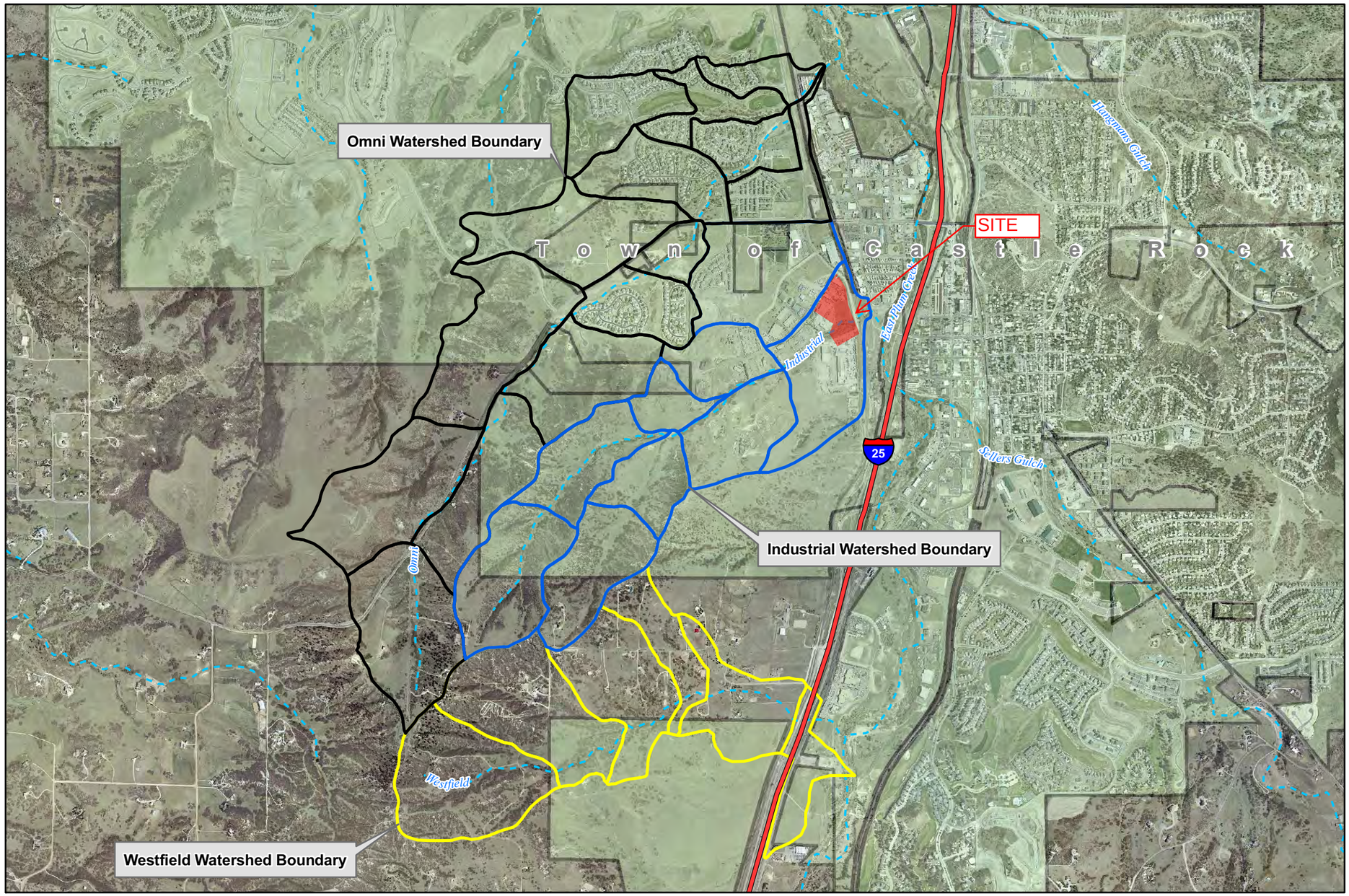
OMNI, INDUSTRIAL AND WESTFIELD WATERSHEDS
FLOOD HAZARD AREA DELINEATION
APRIL 2013

PREPARED FOR:

TOWN OF CASTLE ROCK COLORADO

PREPARED BY:

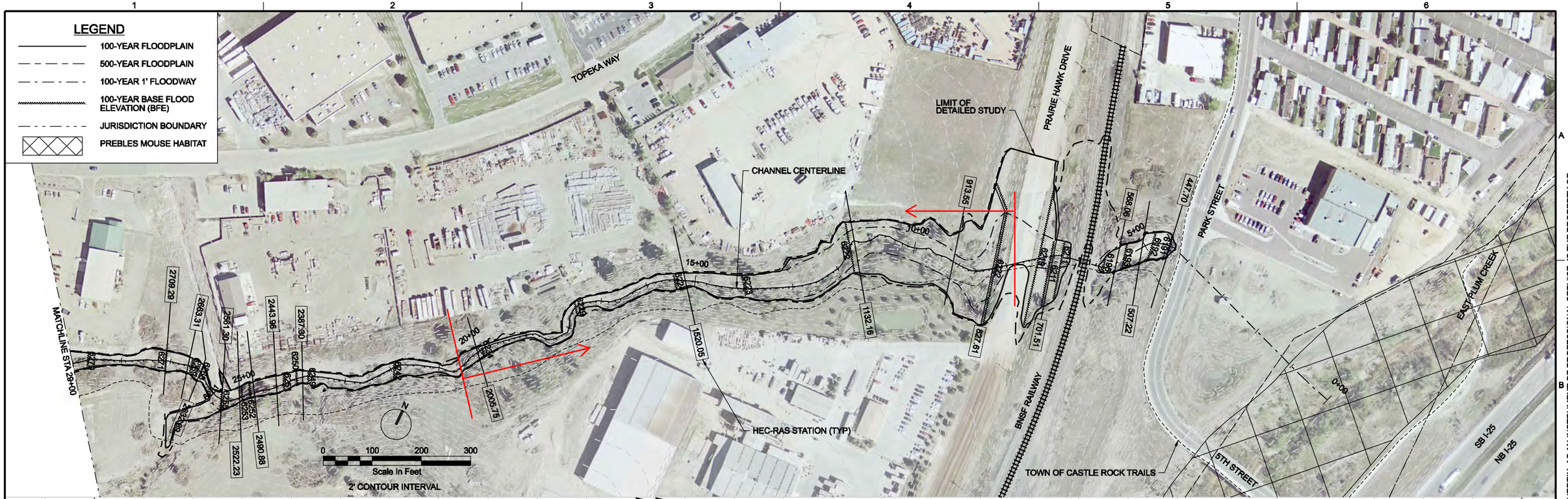
CH2MHILL

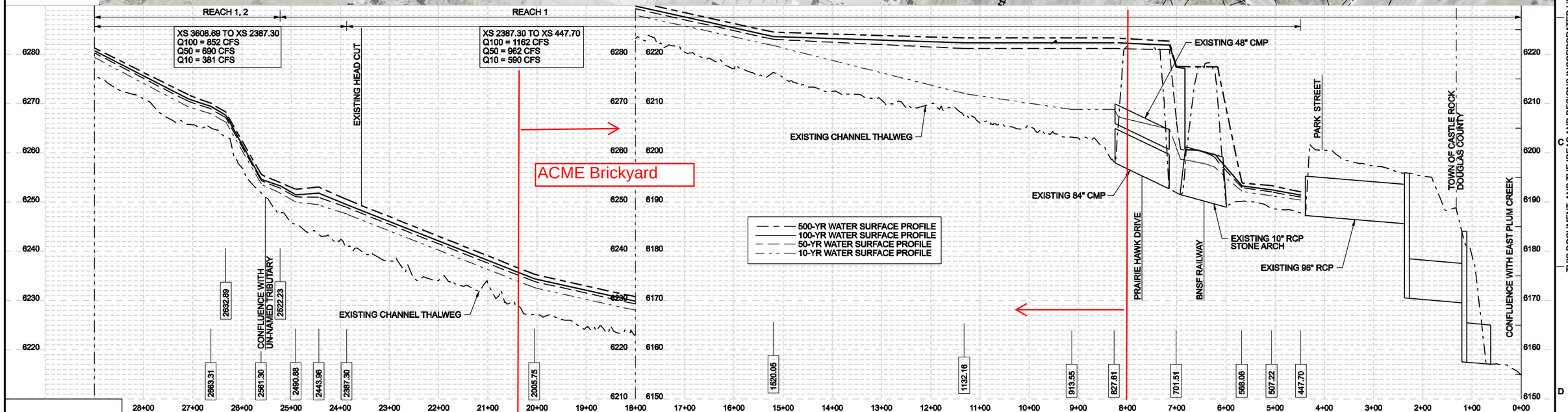












NOTE:
TOPOGRAPHY FROM TOWN OF CASTLE ROCK (2006), NAVD 88 VERTICAL DATUM,
NAD 83 STATE PLANE COLORADO CONTROL HORIZONTAL DATUM
AERIAL MAPPING FROM TOWN OF CASTLE ROCK (2006)

PRELIMINARY

NOT FOR CONSTRUCTION

DSGN	A COOK						VERIFY SCALE
DR	C SCHNEE						BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"
CHK	A TURNER	NO	DATE	DESCRIPTION	APVR	N	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY
APVD	M GLIDDEN	NO.	DATE	REVISION	BY	APVD	

CH2MHILL

TOWN OF CASTLE ROCK COLORADO

INDUSTRIAL
PLAN AND PROFILE
STA 29+00 TO STA 0+00

SHEET	11
DWG	PP-4
DATE	DECEMBER 2011
PROJ	381198

FILENAME: Industrial_PP04.dgn PLOT DATE: 2/6/2012 PLOT TIME: 11:33:27 AM

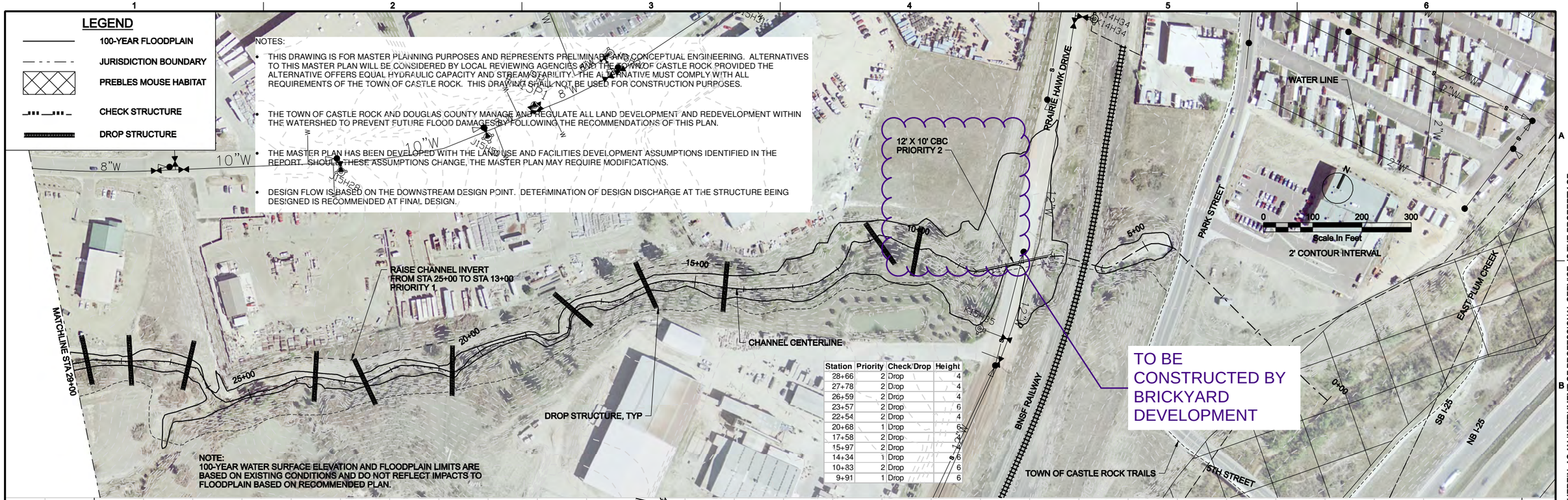
REUSE OF DOCUMENTS: THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF CH2M HILL AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF CH2MHILL. © CH2M HILL

LEGEND

- 100-YEAR FLOODPLAIN
- JURISDICTION BOUNDARY
- PREBLES MOUSE HABITAT
- CHECK STRUCTURE
- DROP STRUCTURE

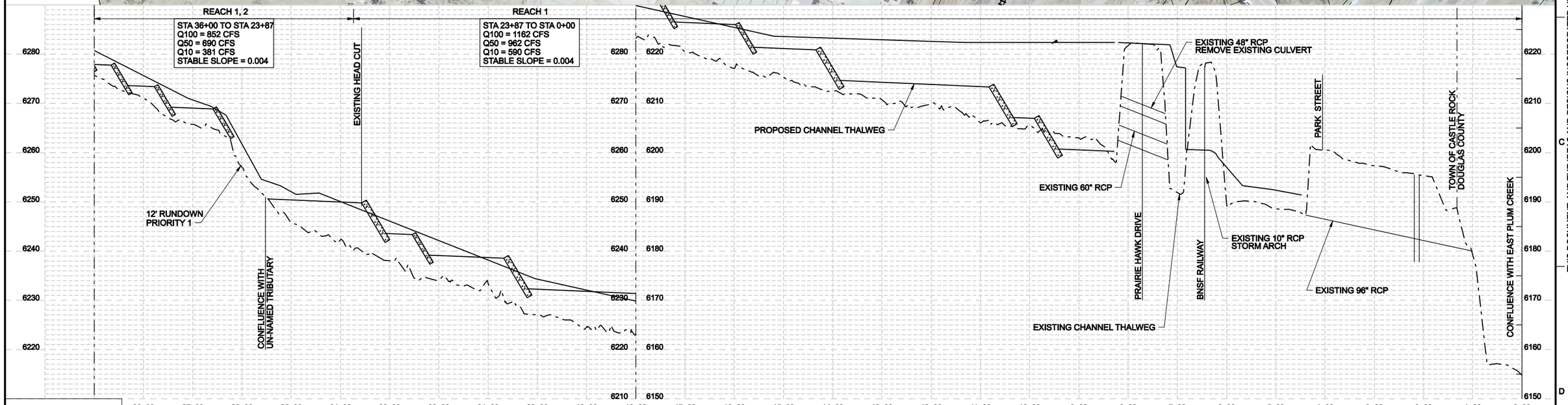
NOTES:

- THIS DRAWING IS FOR MASTER PLANNING PURPOSES AND REPRESENTS PRELIMINARY AND CONCEPTUAL ENGINEERING. ALTERNATIVES TO THIS MASTER PLAN WILL BE CONSIDERED BY LOCAL REVIEWING AGENCIES AND THE TOWN OF CASTLE ROCK PROVIDED THE ALTERNATIVE OFFERS EQUAL HYDRAULIC CAPACITY AND STREAM STABILITY. THE ALTERNATIVE MUST COMPLY WITH ALL REQUIREMENTS OF THE TOWN OF CASTLE ROCK. THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSES.
- THE TOWN OF CASTLE ROCK AND DOUGLAS COUNTY MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE WATERSHED TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.
- THE MASTER PLAN HAS BEEN DEVELOPED WITH THE LAND USE AND FACILITIES DEVELOPMENT ASSUMPTIONS IDENTIFIED IN THE REPORT. SHOULD THESE ASSUMPTIONS CHANGE, THE MASTER PLAN MAY REQUIRE MODIFICATIONS.
- DESIGN FLOW IS BASED ON THE DOWNSTREAM DESIGN POINT. DETERMINATION OF DESIGN DISCHARGE AT THE STRUCTURE BEING DESIGNED IS RECOMMENDED AT FINAL DESIGN.



Station	Priority	Check/Drop	Height
28+66	2	Drop	4
27+78	2	Drop	4
26+59	2	Drop	4
23+57	2	Drop	6
22+54	2	Drop	4
20+68	1	Drop	6
17+58	2	Drop	4
15+97	2	Drop	4
14+34	1	Drop	6
10+83	2	Drop	6
9+91	1	Drop	6

NOTE:
100-YEAR WATER SURFACE ELEVATION AND FLOODPLAIN LIMITS ARE BASED ON EXISTING CONDITIONS AND DO NOT REFLECT IMPACTS TO FLOODPLAIN BASED ON RECOMMENDED PLAN.



NOTE:
TOPOGRAPHY FROM TOWN OF CASTLE ROCK (2006), NAVD 88 VERTICAL DATUM,
NAD 83 STATE PLANE COLORADO CONTROL HORIZONTAL DATUM
AERIAL MAPPING FROM TOWN OF CASTLE ROCK (2006)

PRELIMINARY

NOT FOR CONSTRUCTION

DSGN	A COOK						VERIFY SCALE
DR	C SCHNEE						BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"
CHK	A TURNER	NO	DATE	DESCRIPTION	APVR	N	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
APVD	M GLIDDEN	NO.	DATE	REVISION	BY	APVD	

CH2MHILL

TOWN OF CASTLE ROCK COLORADO

INDUSTRIAL
PLAN AND PROFILE
STA 29+00 TO STA 0+00

SHEET	11
DWG	PP-4
DATE	JULY 2010
PROJ	381198

FILENAME: MP_Industrial_PP04.dgr PLOT DATE: 11/8/2010 PLOT TIME: 3:27:01 PM

REUSE OF DOCUMENTS: THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF CH2M HILL AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF CH2MHILL ©CH2M HILL

Commentary Sheet 11

Industrial Tributary - Reach 1, 2

Station 29+00 to Station 0+00

Existing Conditions: Upstream of Station 25+22, the channel is a deeply incised v-ditch with short native grasses and scrub oaks on both the channel bottoms and banks. At Station 25+22, which is the confluence of the Industrial Tributary with a small un-named tributary coming from Topeka Way, is a large (approximately 20 foot) head cut. A culvert outfall within this reach has been undercut by approximately 15 feet. Downstream of the head cut the channel is incised between 2 and 10 feet with little channel bottom vegetation and near vertical banks. Overbank vegetation includes a mixture of native grasses, scrub oak, and cottonwood trees. The channel bottom throughout this reach is approximately 10 feet wide. The culvert through Prairie Hawk Drive is undersized for 100-year future flows. The outfall to the Industrial Tributary is a 96-inch RCP owned by CDOT with two drops that is undersized for 100-year future flows.

Preliminary Design Cost Estimate

Item	Priority	Unit	Quantity	Unit cost	Total Cost	Assumed Cost Breakdown: Castle Rock Utilities	Douglas County	Other
6' Drop Structure at Station 20+68	1	Each	1	$75,000	$75,000	x		
6' Drop Structure at Station 14+34	1	Each	1	$75,000	$75,000	x		
6' Drop Structure at Station 9+91	1	Each	1	$75,000	$75,000	x		
Raise Channel Invert from Station 25+00 to Station 13+00	1	CY	2890	$8	$23,120	x		
Bank Stabilization from Station 25+00 to Station 13+00	1	CY	500	$100	$50,000	x		
4' Drop Structure at Station 28+66	2	Each	1	$75,000	$75,000			x
4' Drop Structure at Station 27+78	2	Each	1	$75,000	$75,000			x
4' Drop Structure at Station 26+59	2	Each	1	$75,000	$75,000			x
6' Drop Structure at Station 23+57	2	Each	1	$75,000	$75,000	x		
4' Drop Structure at Station 22+54	2	Each	1	$75,000	$75,000	x		
4' Drop Structure at Station 17+58	2	Each	1	$75,000	$75,000	x		
4' Drop Structure at Station 15+97	2	Each	1	$75,000	$75,000	x		
6' Drop Structure at Station 10+83	2	Each	1	$75,000	$75,000	x		
12' Grouted Boulder Rundown at Station 26+24	2	Each	1	$150,000	$150,000			x
Replace existing culvert at Prairie Hawk Drive with 12' x 10' CBC	2	LF	105	$1,500	$157,500			x

Proposed Priority 1 Improvements: Priority 1 improvements for this sheet are 3 drop structures to stabilize the channel grade and raising the channel invert from Station 25+00 to Station 13+00. Each drop structure is recommended to be 6 feet. From Station 25+00 to Station 13+00, the channel is deeply incised and the drop structures combined with raising the channel invert will stabilize the channel.

Drainageway Costs (Priority 1)	$298,120	$298,120	$0	$0
Contingency and Unscoped Items (30% of Drainageway Costs)	$89,400	$89,436	$0	$0
Construction Access (5% of Drainageway Costs)	$14,900	$14,906	$0	$0
Subtotal (Priority 1)	**$402,400**	**$402,462**	**$0**	**$0**
Mobilization and Permitting Requirements (15% of Subtotal)	$60,400	$60,369	$0	$0
Construction Total (Priority 1)	**$462,800**	**$462,831**	**$0**	**$0**
Administration and Engineering (20% of Construction Total)	$92,600	$92,566	$0	$0
Total (Priority 1)	**$555,400**	**$555,398**	**$0**	**$0**

Proposed Priority 2 Improvements: Priority 2 improvements for this sheet are 8 drop structures designed to stabilize the channel grade. The drop structures vary from 4 feet high to 6 feet high. Other Priority 2 improvements are the construction of a 12 foot grouted boulder rundown at the location of the large head cut and replacing the existing culvert through Prairie Hawk Drive with a 12' x 10' CBC with trail crossing. The existing culverts through Prairie Hawk Drive are undersized for 100-year future flows.

Drainageway Costs (Priority 2)	$907,500	$375,000	$0	$307,500
Contingency and Unscoped Items (30% of Drainageway Costs)	$272,300	$112,500	$0	$92,250
Construction Access (5% of Drainageway Costs)	$45,400	$18,750	$0	$15,375
Subtotal (Priority 2)	**$1,225,200**	**$506,250**	**$0**	**$415,125**
Mobilization and Permitting Requirements (15% of Subtotal)	$183,800	$75,938	$0	$62,269
Construction Total (Priority 2)	**$1,409,000**	**$582,188**	**$0**	**$477,394**
Administration and Engineering (20% of Construction Total)	$281,800	$116,438	$0	$95,479
Total (Priority 2)	**$1,690,800**	**$698,625**	**$0**	**$572,873**

Proposed Priority 3 Improvements: There are no Priority 3 improvements on this sheet.

Drainageway Costs (Priority 3)	$0	$0	$0	$0
Contingency and Unscoped Items (30% of Drainageway Costs)	$0	$0	$0	$0
Construction Access (5% of Drainageway Costs)	$0	$0	$0	$0
Subtotal (Priority 3)	**$0**	**$0**	**$0**	**$0**
Mobilization and Permitting Requirements (15% of Subtotal)	$0	$0	$0	$0
Construction Total (Priority 3)	**$0**	**$0**	**$0**	**$0**
Administration and Engineering (20% of Construction Total)	$0	$0	$0	$0
Total (Priority 3)	**$0**	**$0**	**$0**	**$0**
Total Cost of Improvements	***$2,246,200***	***$1,254,023***	***$0***	***$572,873***

PUBLIC IMPROVEMENT CONSTRUCTION PLANS

FOR

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT



VICINITY MAP
1" = 1500'

NORTHEAST QUARTER OF SECTION 10 AND NORTHWEST QUARTER OF SECTION 11, TOWNSHIP 8 SOUTH, RANGE 67 WEST OF THE 6TH P.M. DOUGLAS COUNTY, COLORADO

PREPARED FOR:

TOWN OF CASTLE ROCK
175 KELLOGG COURT
CASTLE ROCK, COLORADO 80109

INDEMNIFICATION AND ADHERENCE TO STANDARDS

THESE PLANS HAVE BEEN REVIEWED BY THE TOWN OF CASTLE ROCK FOR CONCEPT ONLY. THE REVIEW DOES NOT IMPLY RESPONSIBILITY BY THE REVIEWING DEPARTMENT, THE TOWN ENGINEER, OR THE TOWN OF CASTLE ROCK FOR ACCURACY AND CORRECTNESS OF THE CALCULATIONS. FURTHERMORE, THE REVIEW DOES NOT IMPLY THAT QUANTITIES OF ITEMS ON THE PLANS ARE THE FINAL QUANTITIES REQUIRED. THE REVIEW SHALL NOT BE CONSTRUED FOR ANY REASON AS ACCEPTANCE OF FINANCIAL RESPONSIBILITY BY THE TOWN FOR ADDITIONAL QUANTITIES OF ITEMS SHOWN THAT MAY BE REQUIRED DURING THE CONSTRUCTION PHASE.

ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TOWN OF CASTLE ROCK MUNICIPAL CODE, TECHNICAL MANUALS AND/OR OTHER TOWN-APPROVED APPLICABLE STANDARDS.

FOR CONSTRUCTION
October 29, 2019
DATE PRINTED
OLSSON

CALL UTILITY NOTIFICATION CENTER OF COLORADO
811
CALL 3-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.



Certification Block

RECORD DRAWINGS
Town of Castle Rock Construction Permit No. CIP20-0001

BASED UPON REVIEW OF AND RELIANCE ON THE FIELD SURVEY DATA AND OTHER PERTINENET DATA PROVIED BY: OLSSON, INC.

I HEREBY STATE THAT TO THE BEST OF MY KNOWLEDGE, FACILITIES SHOWN ON THESE DRAWINGS WERE CONSTRUCTED IN SUBSTANTIAL CONFORMANCE WITH THE APPROVED CONSTRUCTION DRAWINGS. THIS STATEMENT IS BASED ONLY ON REVIEW OF FIELD SURVEY DATA AND A FINAL SITE INVESTIGATION. I ALSO UNDERSTAND THAT THE TOWN OF CASTLE ROCK HAS NOT VERIFIED THE ACCURACY OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED INTO THESE RECORD DRAWINGS.



DEBRA L. OHLINGER, PE, 37936, PROJECT MANAGER 12/17/2020
(Civil Engineer Signature & Seal) Date

PROFESSIONAL ENGINEER CERTIFICATION

olsson

1525 Raleigh St
Suite 400
Denver, CO 80204
TEL 303.237.2072
FAX 303.237.2659

I HEREBY AFFIRM THAT THESE FINAL PUBLIC IMPROVEMENT CONSTRUCTION PLANS WERE PREPARED UNDER MY DIRECT SUPERVISION, IN ACCORDANCE WITH ALL APPLICABLE TOWN OF CASTLE ROCK AND STATE OF COLORADO STANDARDS AND STATUTES, RESPECTIVELY; AND THAT I AM FULLY RESPONSIBLE FOR ALL DESIGN AND REVISIONS RELATIVE TO SAID PLANS.



DEBRA L. OHLINGER, PE, 37936, PROJECT MANAGER DATE

INDEX OF DRAWINGS

SHEET NAME	SHEET NUMBER	SHEET DESCRIPTION
G1	1	COVER SHEET
G2	2	GENERAL NOTES AND LEGEND
SC1	3	SURVEY CONTROL PLAN

INDUSTRIAL TRIBUTARY IMPROVEMENTS

PPC1	4	KEY MAP
PPC2-PPC3	5-6	PLAN AND PROFILE, SPLIT FLOW LINE AND CURVE TABLES
PPR1-PPR3	7-9	ACCESS ROAD PLAN AND PROFILE
PPR4	10	ACCESS ROAD LINE AND CURVE TABLES
DDT1-DDT6	11-16	DROP STRUCTURE DETAILS
DDT7	17	TYPICAL DROP DETAILS
DDT8	18	SHEET PILE DETAILS

TOWN OF CASTLE ROCK APPROVAL BLOCK

TOWN OF CASTLE ROCK APPROVAL PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

APPROVED BY: TOWN OF CASTLE ROCK COLORADO — DEVELOPMENT SERVICES APPROVED
By tkucewesky
on 01/03/2020
Approved CIP20-0001 Plans.pdf
Record Document on File

DEVELOPMENT SERVICES DATE

olsson
1525 Raleigh Street
Suite 400
Denver, CO 80204
TEL 303.237.2072
www.olsson.com

OLSSON ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS (HORIZONTAL OR VERTICAL). THE EXISTING UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION. IT IS HOWEVER THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES.

REV. NO.	DATE	REVISIONS DESCRIPTION
1	2019.10.29	ADDENDUM 2 - REVISED ACCESS

REVISIONS

COVER SHEET

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

CASTLE ROCK, COLORADO

2019

drawn by:	CAU
checked by:	DPK
approved by:	DLO
CA/QC by:	DPK
project no.:	018-1719
drawing no.:	-
date:	2019.10.10

G1
SHEET 1 OF 18

DWG: F:\2018\1501-2000\018-1719\40-Design\AutoCAD\Final Plans\Sheets\WTRS\DWG\181719_G1.dwg
DATE: Oct 29, 2019 1:15pm
XREFS: 181719_TBLK_11x17
USER: cuhrich

GENERAL NOTES

1. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION OF PUBLIC IMPROVEMENTS SHALL MEET OR EXCEED THE STANDARDS AND SPECIFICATIONS SET FORTH IN THE TOWN OF CASTLE ROCK (TCR) MUNICIPAL CODE, TCR TECHNICAL MANUALS, AND APPLICABLE STATE AND FEDERAL REGULATIONS. WHERE THERE IS CONFLICT BETWEEN THESE PLANS AND THE TECHNICAL MANUAL OR ANY APPLICABLE STANDARDS, THE MORE STRINGENT STANDARD SHALL APPLY. ALL WORK SHALL BE INSPECTED AND APPROVED BY THE TCR CONSTRUCTION INSPECTOR.
2. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED UPON AS BEING EXACT OR COMPLETE.
3. THE CONTRACTOR MUST CALL THE LOCAL UTILITY LOCATION CENTER AT LEAST 48 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATIONS OF THE UTILITIES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY PERTINENT LOCATIONS AND ELEVATIONS, ESPECIALLY AT CONNECTION POINTS AND AT POTENTIAL UTILITY CONFLICTS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES THAT CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS.
4. THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH THE TOWN AND ALL UTILITY COMPANIES INVOLVED WITH REGARD TO RELOCATIONS OR ADJUSTMENTS OF EXISTING UTILITIES DURING CONSTRUCTION AND TO ASSURE THAT THE WORK IS ACCOMPLISHED IN A TIMELY FASHION AND WITH A MINIMUM DISRUPTION OF SERVICE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL PARTIES AFFECTED BY ANY DISRUPTION OF ANY UTILITY SERVICE.
5. CONTRACTOR SHALL PROVIDE A MINIMUM SEVENTY-TWO (72) HOURS NOTICE TO THE ON-SITE TCR CONSTRUCTION INSPECTOR, (720) 733-2200, PRIOR TO MAKING ANY CONNECTIONS/TIE-INS TO EXISTING WATER, SANITARY SEWER, AND/OR STORM SEWER SYSTEMS PROVIDED THAT THE UTILITY TIE-IN DOES NOT DISRUPT SERVICE TO EXISTING CR WATER CUSTOMERS. IF THE TIE-IN WILL DISRUPT UTILITY SERVICE, THEN CONTRACTOR SHALL PROVIDE A MINIMUM OF THREE (3) WEEKS NOTICE TO THE TCR CONSTRUCTION INSPECTOR TO ALLOW TIME FOR CR WATER TO PROVIDE WRITTEN NOTIFICATION TO EXISTING CUSTOMERS AFFECTED BY THE TIE-IN. ALL TOWN UTILITY TIE-INS MUST BE APPROVED BY CR WATER PRIOR TO COMMENCING WORK.
6. THE CONTRACTOR SHALL HAVE ONE (1) SIGNED COPY OF THE APPROVED PLANS, ONE (1) COPY OF THE APPROPRIATE CRITERIA AND SPECIFICATIONS, AND A COPY OF ANY PERMITS AND EXTENSION AGREEMENTS NEEDED FOR THE JOB ONSITE AT ALL TIMES.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASPECTS OF SAFETY INCLUDING, BUT NOT LIMITED TO, EXCAVATION, TRENCHING, SHORING, TRAFFIC CONTROL, AND SECURITY.
8. IF DURING THE CONSTRUCTION PROCESS CONDITIONS ARE ENCOUNTERED WHICH COULD INDICATE A SITUATION THAT IS NOT IDENTIFIED IN THE PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL CONTACT THE TCR CONSTRUCTION INSPECTOR IMMEDIATELY.
9. ALL REFERENCES TO ANY PUBLISHED STANDARDS SHALL REFER TO THE LATEST REVISION OF SAID STANDARD UNLESS SPECIFICALLY STATED OTHERWISE.
10. THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN IN ACCORDANCE WITH MUTCD TO THE APPROPRIATE RIGHT-OF-WAY AUTHORITY (TOWN, COUNTY OR STATE) FOR APPROVAL PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN OR AFFECTING THE RIGHT-OF-WAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ANY AND ALL TRAFFIC CONTROL DEVICES AS MAY BE REQUIRED BY THE CONSTRUCTION ACTIVITIES.
11. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL LABOR AND MATERIALS NECESSARY FOR THE COMPLETION OF THE INTENDED IMPROVEMENTS SHOWN ON THESE DRAWINGS OR AS DESIGNATED TO BE PROVIDED, INSTALLED, OR CONSTRUCTED UNLESS SPECIFICALLY NOTED OTHERWISE.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING ROADWAYS FREE AND CLEAR OF ALL CONSTRUCTION DEBRIS AND DIRT TRACKED FROM THE SITE.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RECORDING AS-BUILT INFORMATION ON A SET OF RECORD DRAWINGS KEPT ON THE CONSTRUCTION SITE AND AVAILABLE TO THE TCR CONSTRUCTION INSPECTOR AT ALL TIMES.
14. DIMENSIONS FOR LAYOUT AND CONSTRUCTION ARE NOT TO BE SCALED FROM ANY DRAWING. IF PERTINENT DIMENSIONS ARE NOT SHOWN, CONTACT THE CONSULTANT ENGINEER FOR CLARIFICATION AND ANNOTATE THE DIMENSION ON THE AS-BUILT RECORD DRAWINGS.
15. THE CONTRACTOR SHALL COMPLY WITH ALL TERMS AND CONDITIONS OF THE COLORADO PERMIT FOR STORM WATER DISCHARGE, THE STORM WATER MANAGEMENT PLAN, AND THE EROSION CONTROL PLAN.
16. ALL STRUCTURAL EROSION CONTROL MEASURES SHALL BE INSTALLED AT THE LIMITS OF CONSTRUCTION PRIOR TO ANY OTHER EARTH-DISTURBING ACTIVITY. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED IN GOOD REPAIR BY THE CONTRACTOR UNTIL SUCH TIME AS THE ENTIRE DISTURBED AREA IS STABILIZED WITH HARD SURFACE OR LANDSCAPING.
17. THE CONTRACTOR SHALL SEQUENCE INSTALLATION OF UTILITIES IN SUCH A MANNER AS TO MINIMIZE POTENTIAL UTILITY CONFLICTS. IN GENERAL, STORM SEWER AND SANITARY SEWER SHOULD BE CONSTRUCTED PRIOR TO INSTALLATION OF THE WATER LINES AND DRY UTILITIES.
18. THERE SHALL BE NO SITE CONSTRUCTION ACTIVITIES ON SATURDAYS UNLESS SPECIFICALLY APPROVED BY THE TCR CONSTRUCTION INSPECTOR AND NO SITE CONSTRUCTION ACTIVITIES ON SUNDAYS OR HOLIDAYS UNLESS THERE IS PRIOR WRITTEN APPROVAL BY THE PUBLIC WORKS DIRECTOR.
19. NO SOLID OBJECT (EXCLUDING FIRE HYDRANTS AND TRAFFIC CONTROL DEVICES AND TRAFFIC SIGNS) EXCEEDING THIRTY (30) INCHES IN HEIGHT ABOVE THE FLOWLINE ELEVATION OF THE ADJACENT STREET, INCLUDING BUT NOT LIMITED TO BUILDINGS, UTILITY CABINETS, WALLS, FENCES, LANDSCAPE PLANTINGS, CROPS, CUT SLOPES, AND BERMS, SHALL BE PLACED WITHIN SIGHT DISTANCE LINES AND SIGHT DISTANCE EASEMENTS.
20. PROJECT BENCHMARK: THE PUBLISHED VALUES CDOT TYPE 2 ALUMINUM CAP, POINT I-25 CM-MP 181.61, EL=6212.09' PER DEPARTMENT OF TRANSPORTATION STATE OF COLORADO RIGHT OF WAY PROJECT NUMBER IM 0252-351 (PHASE 4). (NAVD88). SITE BENCHMARK: A CHISELED "X" ON THE BACK OF CURB ADJACENT TO A GRATED INLET ON THE SOUTHERLY CURB OF TOPEKA BOULEVARD AT THE INTERSECTION OF ATCHISON WAY, EL=6276.19' (NAVD88).
21. BEARINGS ARE BASED ON THE SOUTH LINE OF THE NORTHEAST QUARTER OF SECTION 10, TOWNSHIP 8 SOUTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN FROM THE FOUND 2" PIPE WITH ALUMINUM CAP STAMPED "PLS 6935" BEING THE EAST QUARTER OF SECTION 10 ON THE EAST END TO THE FOUND 3¼" ALUMINUM CAP STAMPED "AZTEC PLS 36567" BEING THE CENTER QUARTER CORNER OF SECTION 10 ON THE WEST END, BEING NORTH 89°27'23" WEST.

LEGEND

EXISTING	FEATURE	PROPOSED
5515	MAJOR CONTOUR	5515
	MINOR CONTOUR	5513
	SHRUBS	
	DECIDUOUS TREE	
	CONIFEROUS TREE	
	CHANNEL BOTTOM FILL	
	RIPRAP	
	CONCRETE	
100	CONTROL POINT	
	BASELINE	1+00
	PROPERTY LINE	
	EASEMENT	
	ELEVATION POINT	
	FLARED END SECTION	
S	SANITARY SEWER MH	
	STORM SEWER	
	WOOD FENCE	
	GROUTED BOULDERS	
	SHEET PILE	
	100 YEAR FLOODPLAIN	
	LIMITS OF CONSTRUCTION	
	TEMP CONS. EASEMENT	

LIST OF ABBREVIATIONS

WSE	WATER SURFACE ELEVATION
INV	INVERT
EX	EXISTING
RCP	REINFORCED CONCRETE PIPE
ELEV	ELEVATION
TYP	TYPICAL
STA	STATION
CH	CHANNEL
LF	LINEAR FEET
PVC	POLYVINYL CHLORIDE
CMP	CORRUGATED METAL PIPE
RCBC	REINFORCED CONCRETE BOX CULVERT
HDPE	HIGH DENSITY POLYETHYLENE

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SUMMARY OF EARTHWORK QUANTITIES

CHANNEL IMPROVEMENTS EXCAVATION	609 CY
CHANNEL IMPROVEMENTS FILL	<3,833> CY
NET	<3,225> CY FILL

EARTHWORK QUANTITY NOTES

1. TEMPORARY CONSTRUCTION ACCESS ROAD EXCAVATIONS ARE NOT INCLUDED AND WILL NOT BE MEASURED AND PAID FOR SEPARATELY.
2. TOPSOIL PLACEMENT IS NOT FACTORED INTO EXCAVATION/FILL QUANTITIES.
3. DISPLACEMENT OF MATERIAL FOR RIPRAP AND BOULDERS IS NOT FACTORED INTO EXCAVATION/FILL QUANTITIES.

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TOWN OF CASTLE ROCK APPROVAL BLOCK

TOWN OF CASTLE ROCK APPROVAL PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

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By tkucewesky on 01/03/2020
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GENERAL NOTES

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

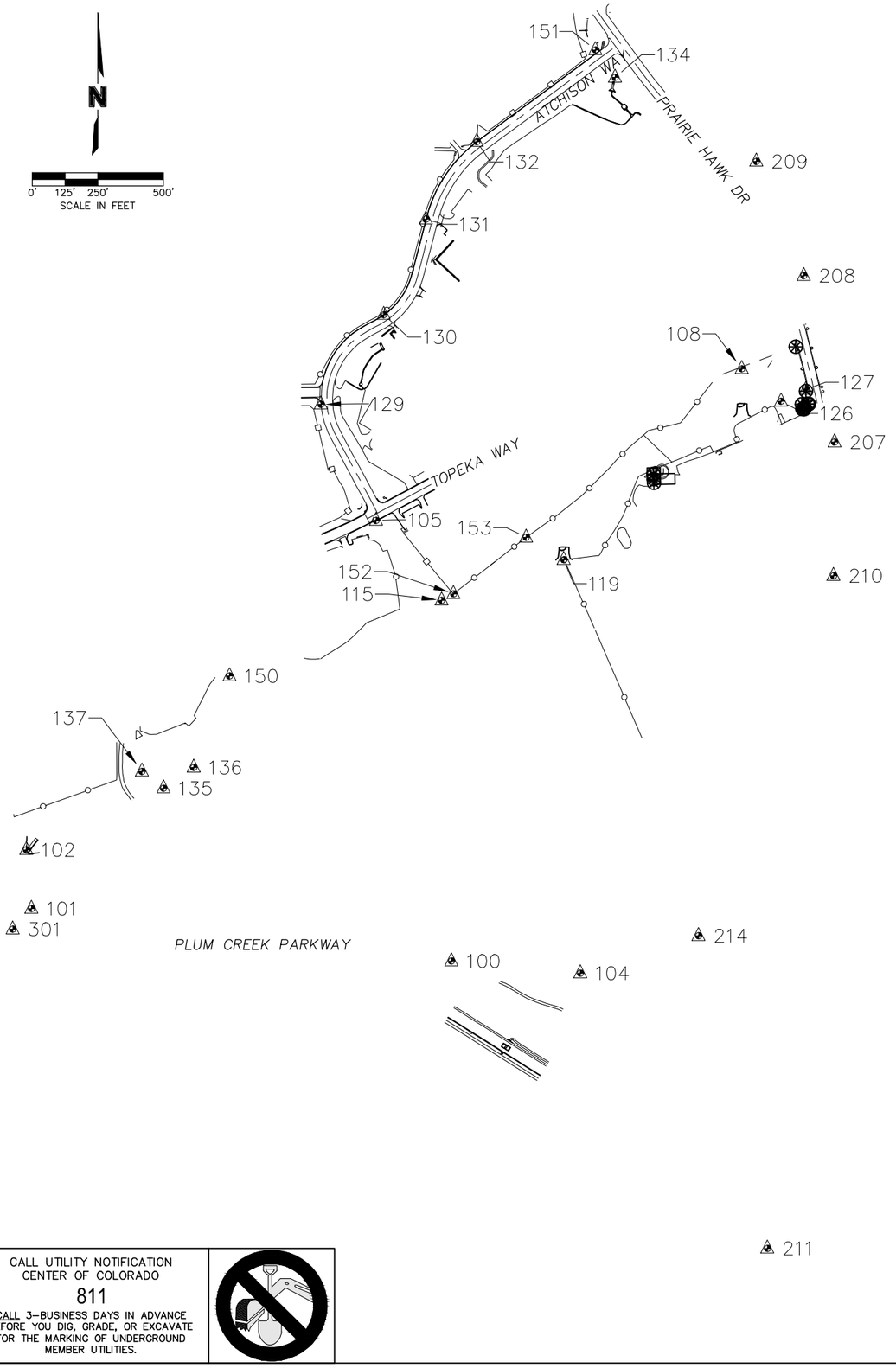
CASTLE ROCK, COLORADO

2019

drawn by:	CAU
checked by:	DPK
approved by:	DLO
QA/QC by:	DPK
project no.:	018-1719
drawing no.:	-
date:	2019.10.10

G2
SHEET 2 OF 18

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CONTROL POINT TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
100	1560458.85	3178850.63	6341.44	NO.6 REBAR
101	1560659.25	3177248.26	6361.47	CHISELED "X"
102	1560883.15	3177228.99	6361.21	CHISELED "X" CULVERT
104	1560412.61	3179342.26	6316.99	NO.5 REBAR
105	1562139.61	3178563.26	6276.19	CHISELED "X"
108	1562718.33	3179958.10	6226.52	NO.5 REBAR
115	1561835.18	3178813.23	6267.04	NO.5 REBAR
119	1561990.17	3179279.25	6259.05	YELLOW CAP LS16112
126	1562594.40	3180107.82	6227.27	NO.5 REBAR
127	1562639.38	3180203.20	6221.78	NO.5 REBAR
129	1562583.08	3178352.74	6276.54	CHISELED "X"
130	1562924.85	3178592.38	6258.53	CHISELED "X"
131	1563289.45	3178753.59	6242.30	CHISELED "X"
132	1563585.12	3178947.16	6229.56	CHISELED "X"
134	1563830.19	3179475.17	6216.80	NO.3 REBAR
135	1561118.23	3177752.25	6336.83	NO.3 REBAR
136	1561197.65	3177867.30	6332.06	NO.3 REBAR
137	1561182.42	3177669.78	6331.04	RED CAP ILLEGIBLE
150	1561546.26	3178003.85	6307.77	YELLOW CAP LS16845
151	1563935.08	3179399.95	6210.00	CDOT MP181.74
152	1561860.17	3178858.55	6275.74	YELLOW CAP LS18475
153	1562075.49	3179135.58	6262.50	YELLOW CAP LS18475
200	1558168.02	3179907.51	6248.04	CDOT NO.3603 LS24941
201	1558028.58	3179904.65	6250.82	CDOT NO.827 LS17488
202	1557935.53	3179892.00	6253.17	CDOT NO.3600 LS24941
203	1557788.51	3179858.32	6258.03	CDOT NO.824 LS17488
204	1558025.03	3179906.48	6250.45	CDOT NO.3602 LS24941
205	1557935.21	3179777.11	6276.18	NO.5 REBAR
206	1560567.20	3180852.26	6224.70	CDOT MP181.05
207	1562438.53	3180311.99	6226.96	CDOT MP181.41
208	1563073.82	3180194.63	6216.03	CDOT MP181.53 GIS3.010019
209	1563509.85	3180013.94	6212.09	CDOT MP181.61
210	1561929.15	3180308.27	6228.59	CDOT MP181.31
211	1559362.60	3180055.75	6224.42	CDOT NO.3605 LS24941
214	1560555.44	3179793.39	6280.80	2"PIPE ALUM CAP LS6935
301	1560580.26	3177176.91	6358.64	ALUM CAP AZTEC LS36567

NOTE: POINTS 200–206 ARE OUTSIDE THE LIMITS OF THIS SHEET.

NOTES

1. THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION. THE SURVEYOR MAKES NO GUARANTEES THAT THE UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN–SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED, ALTHOUGH THE SURVEYOR DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES. THIS INCLUDES PRIVATE AND PUBLIC UTILITIES.

2. HORIZONTAL CONTROL IS BASED ON COLORADO NORTH ZONE NAD83. PROJECT COORDINATES ARE A MODIFIED STATE PLANE SYSTEM. TO REDUCE PROJECT COORDINATES TO STATE PLANE, MULTIPLY BY A COMBINED SCALE FACTOR OF 0.99966234.

3. THE VERTICAL DATUM USED FOR DESIGN AND CONSTRUCTION OF FACILITIES SHOWN IN THE PLANS SHALL CONFORM TO NAVD88 VERTICAL DATUM CRITERIA.

4. DATE OF COMPLETED SURVEY: 08–15–13

5. BEARINGS ARE BASED ON THE SOUTH LINE OF THE NORTHEAST QUARTER OF SECTION 10, TOWNSHIP 8 SOUTH, RANGE 67 WEST OF THE 6TH PRINCIPAL MERIDIAN FROM THE FOUND 2" PIPE WITH ALUMINUM CAP STAMPED "PLS 6935" BEING THE EAST QUARTER OF SECTION 10 ON THE EAST END TO THE FOUND 3¼" ALUMINUM CAP STAMPED "AZTEC PLS 36567" BEING THE CENTER QUARTER CORNER OF SECTION 10 ON THE WEST END, BEING NORTH 89°27'23" WEST.

6. CONTROL POINTS 200–206 ARE OUTSIDE THE LIMITS OF SURVEY CONTROL PLAN.

PROJECT BENCHMARKS

1. PROJECT BENCHMARK: THE PUBLISHED VALUES CDOT TYPE 2 ALUMINUM CAP, POINT I–25 CM–MP 181.61, EL=6212.09' PER DEPARTMENT OF TRANSPORTATION STATE OF COLORADO RIGHT OF WAY PROJECT NUMBER IM 0252–351 (PHASE 4). (NAVD88) [POINT #209]

2. SITE BENCHMARK: A CHISELED "X" ON THE BACK OF CURB ADJACENT TO A GRATED INLET ON THE SOUTHERLY CURB OF TOPEKA BOULEVARD AT THE INTERSECTION OF ATCHISON WAY, EL=6276.19' (NAVD88) [POINT #105]

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SURVEY CONTROL PLAN

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

CASTLE ROCK, COLORADO

2019

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checked by:	DPK
approved by:	DLO
QA/QC by:	DPK
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date:	2019.10.10

SC1
SHEET 3 OF 18

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KEYMAP

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

CASTLE ROCK, COLORADO

2019

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10/10/2019
PROFESSIONAL ENGINEER

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TOWN OF CASTLE ROCK APPROVAL BLOCK

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on 01/03/2020
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date:	2019.10.10

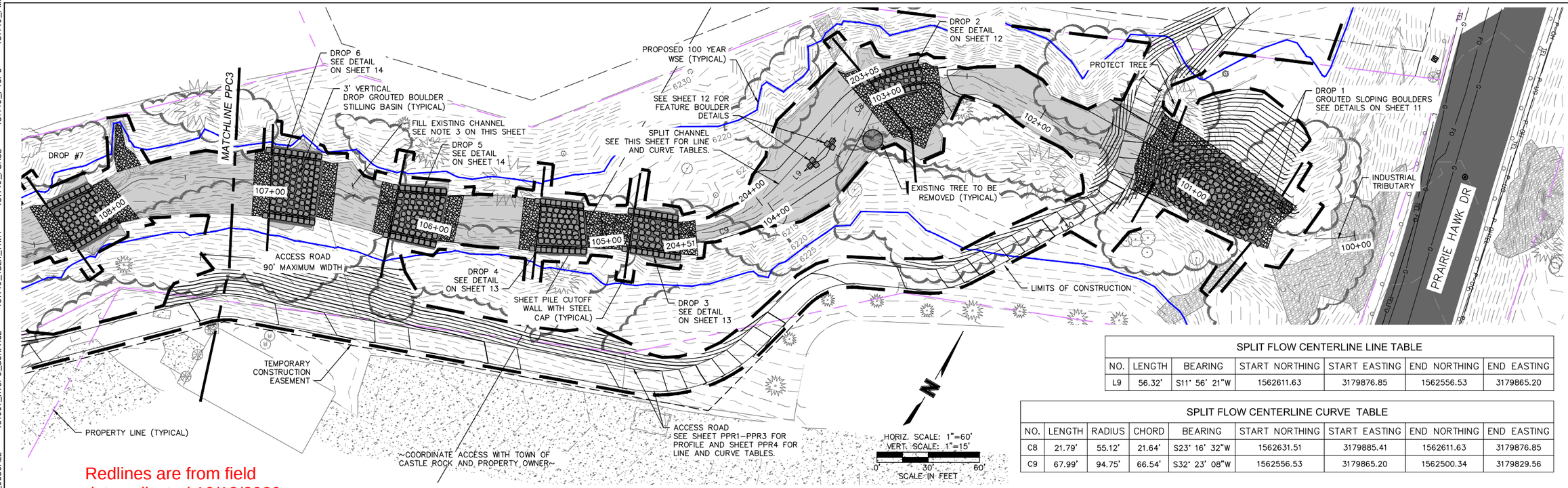
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SHEET 4 OF 18

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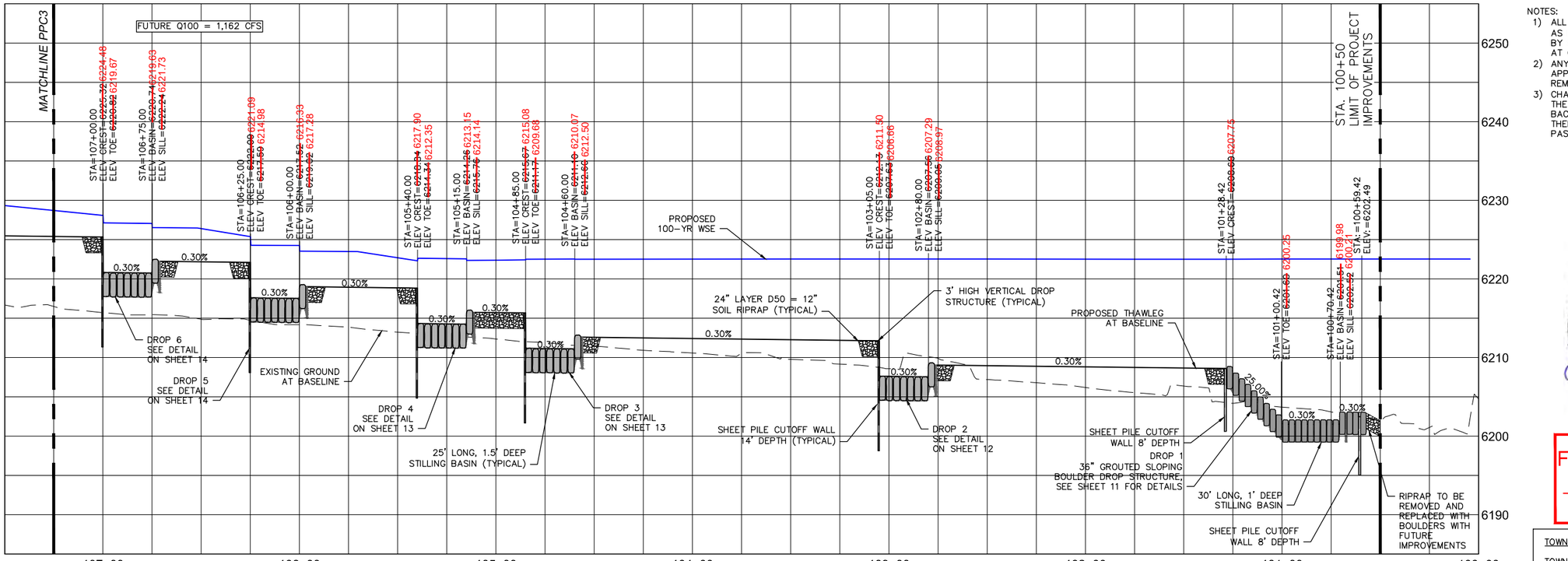
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Redlines are from field
data collected 10/13/2020

SPLIT FLOW CENTERLINE LINE TABLE						
NO.	LENGTH	BEARING	START NORTHING	START EASTING	END NORTHING	END EASTING
L9	56.32'	S11° 56' 21"W	1562611.63	3179876.85	1562556.53	3179865.20

SPLIT FLOW CENTERLINE CURVE TABLE								
NO.	LENGTH	RADIUS	CHORD	BEARING	START NORTHING	START EASTING	END NORTHING	END EASTING
C8	21.79'	55.12'	21.64'	S23° 16' 32"W	1562631.51	3179885.41	1562611.63	3179876.85
C9	67.99'	94.75'	66.54'	S32° 23' 08"W	1562556.53	3179865.20	1562500.34	3179829.56



NOTES:
1) ALL TREES TO BE PROTECTED (EXCEPT AS NOTED). EXISTING TREES DAMAGED BY CONTRACTOR SHALL BE REPLACED AT CONTRACTOR COST.
2) ANY TREE TO BE REMOVED SHALL BE APPROVED BY THE TOWN PRIOR TO REMOVAL.
3) CHANNEL FILL MATERIAL SHALL MEET THE REQUIREMENTS OF CDOT CLASS 2 BACKFILL WITH THE ADDITION THAT THERE SHALL BE A MINIMUM OF 50% PASSING THE NO. 200 SIEVE.

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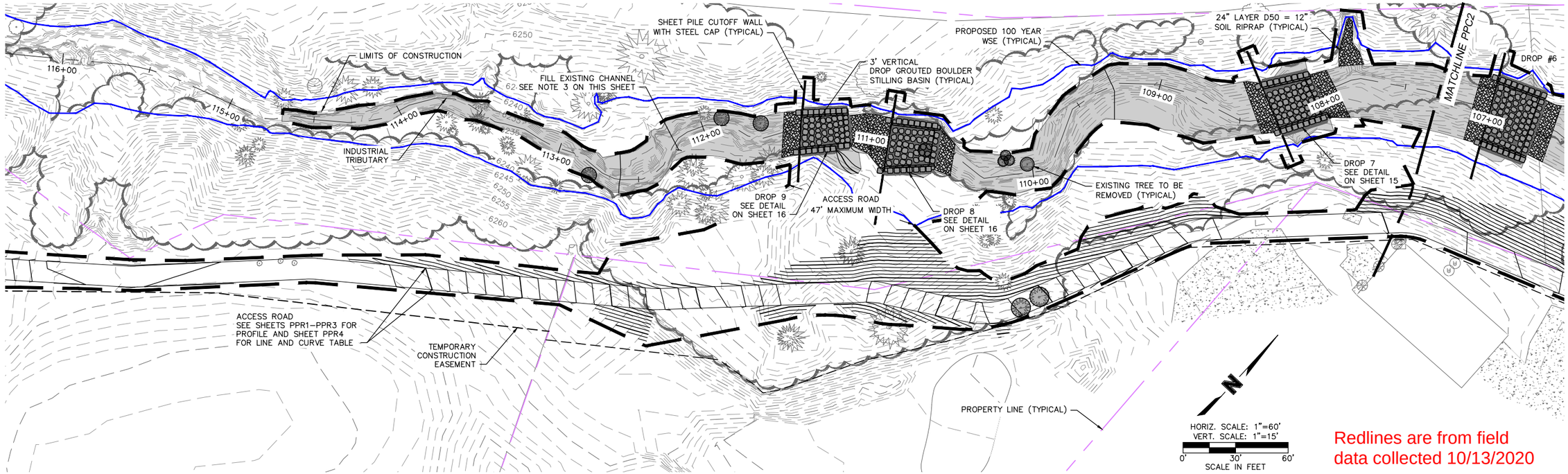
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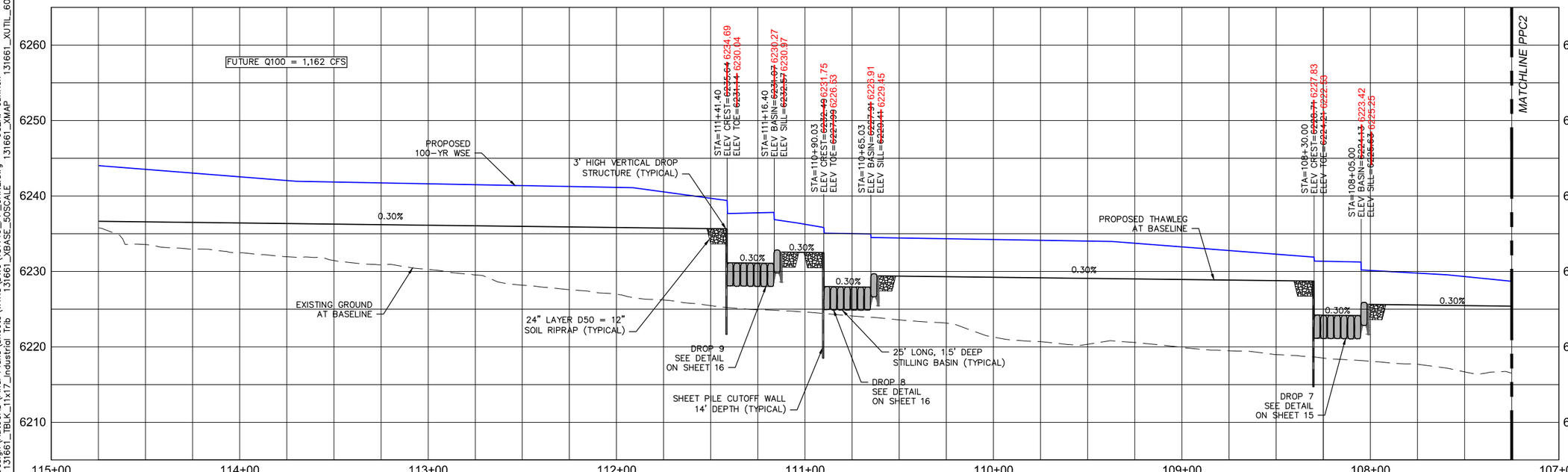
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1) ALL TREES TO BE PROTECTED (EXCEPT AS NOTED). EXISTING TREES DAMAGED BY CONTRACTOR SHALL BE REPLACED AT CONTRACTOR COST.
2) ANY TREE TO BE REMOVED SHALL BE APPROVED BY THE TOWN PRIOR TO REMOVAL.
3) CHANNEL FILL MATERIAL SHALL MEET THE REQUIREMENTS OF CDOT CLASS 2 BACKFILL WITH THE ADDITION THAT THERE SHALL BE A MINIMUM OF 50% PASSING THE NO. 200 SIEVE.

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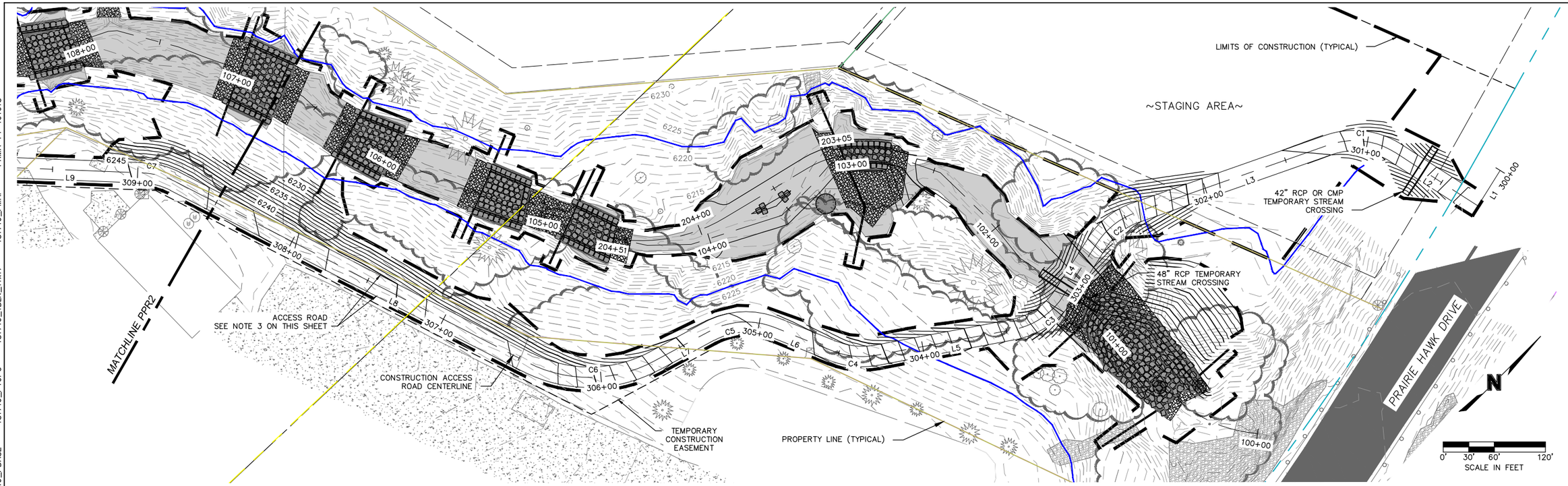
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STA. 107+25 TO 114+75

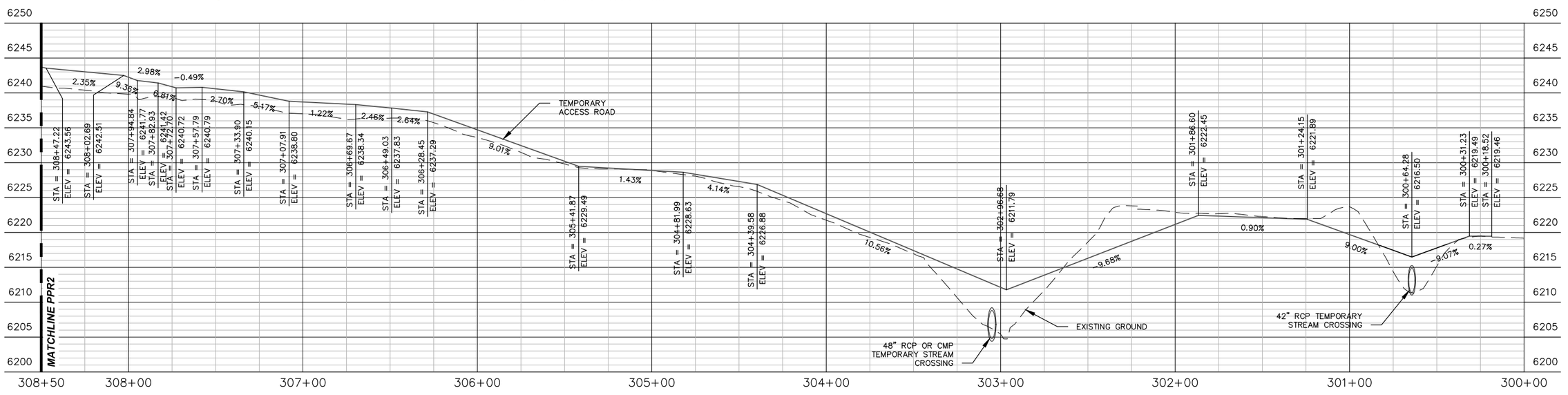
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SHEET 6 OF 18





NOTES:
1) ALL TREES TO BE PROTECTED (EXCEPT AS NOTED). EXISTING TREES DAMAGED BY CONTRACTOR SHALL BE REPLACED AT CONTRACTOR COST.
2) ANY TREE TO BE REMOVED SHALL BE APPROVED BY THE TOWN PRIOR TO REMOVAL.
3) CONSTRUCTION ACCESS ROAD SHALL BE A MINIMUM OF 12' WIDE WITH MAXIMUM CROSS SLOPE OF 4% AND MAXIMUM LONGITUDINAL SLOPE OF 10%. THE STABILIZATION OF THE ACCESS ROAD WILL BE AT THE DISCRETION OF THE CONTRACTOR AND WILL NOT BE PAID FOR SEPARATELY.

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DEBRA L. OLLINGER
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PROFESSIONAL ENGINEER

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CONSTRUCTION ACCESS ROAD
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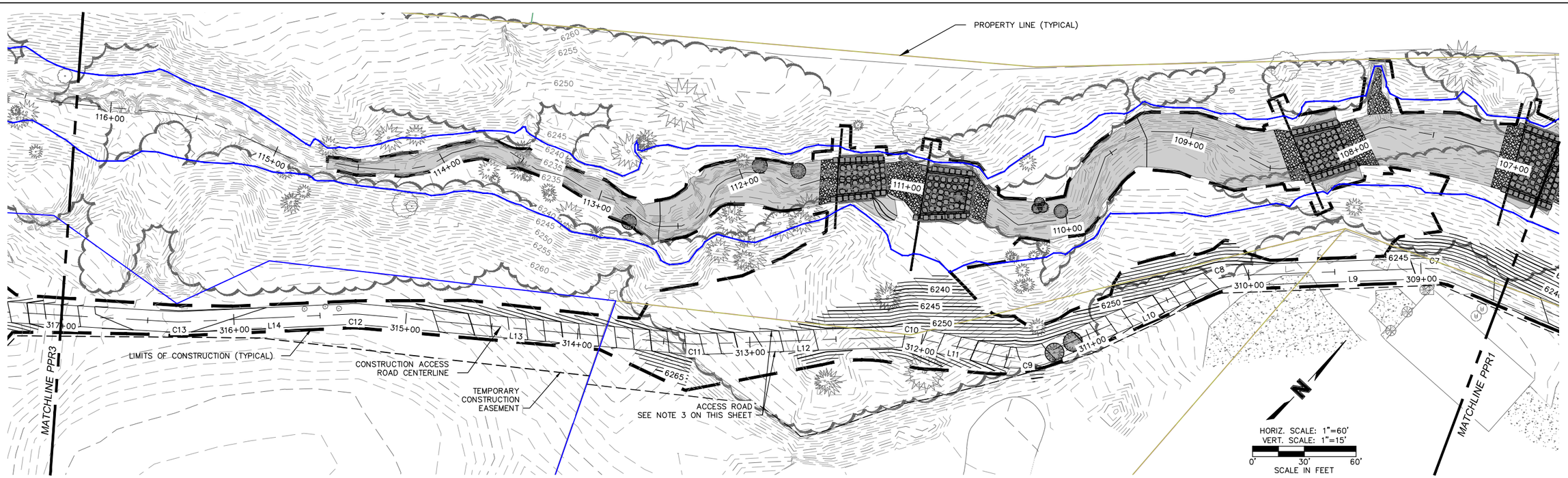
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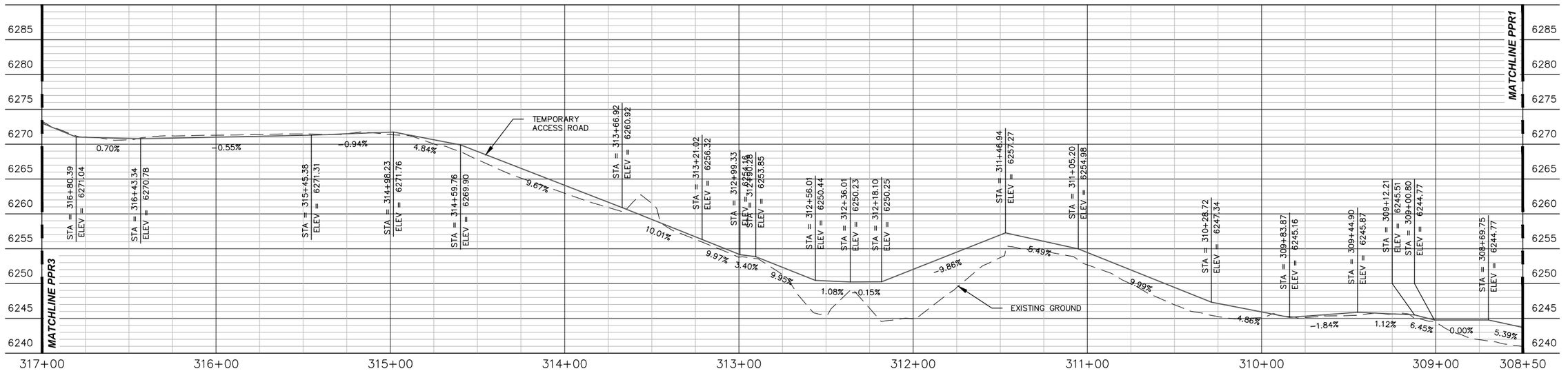
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checked by:	DPK
approved by:	DLO
QA/QC by:	DPK
project no.:	018-1719
drawing no.:	-
date:	2019.10.10

PPR1
SHEET 7 OF 18

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181719_TBLK_11x17 181719_PMAP PRMA-F1-191018





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REVISIONS

REV. NO.	DATE	REVISIONS DESCRIPTION
1	2019.10.29	ADDENDUM 2 - REVISED ACCESS

COLORADO LICENSED
CEBRAL O. DILLINGER
37936
10/10/2019
PROFESSIONAL ENGINEER

NOTES:
1) ALL TREES TO BE PROTECTED (EXCEPT AS NOTED). EXISTING TREES DAMAGED BY CONTRACTOR SHALL BE REPLACED AT CONTRACTOR COST.
2) ANY TREE TO BE REMOVED SHALL BE APPROVED BY THE TOWN PRIOR TO REMOVAL.
3) CONSTRUCTION ACCESS ROAD SHALL BE A MINIMUM OF 12' WIDE WITH MAXIMUM CROSS SLOPE OF 4% AND MAXIMUM LONGITUDINAL SLOPE OF 10%. THE STABILIZATION OF THE ACCESS ROAD WILL BE AT THE DISCRETION OF THE CONTRACTOR AND WILL NOT BE PAID FOR SEPARATELY.

FOR CONSTRUCTION
October 29, 2019
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TOWN OF CASTLE ROCK APPROVAL BLOCK

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By tkucewesky
on 01/03/2020
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CONSTRUCTION ACCESS ROAD
PLAN AND PROFILE STA. 308+50 TO 317+00

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
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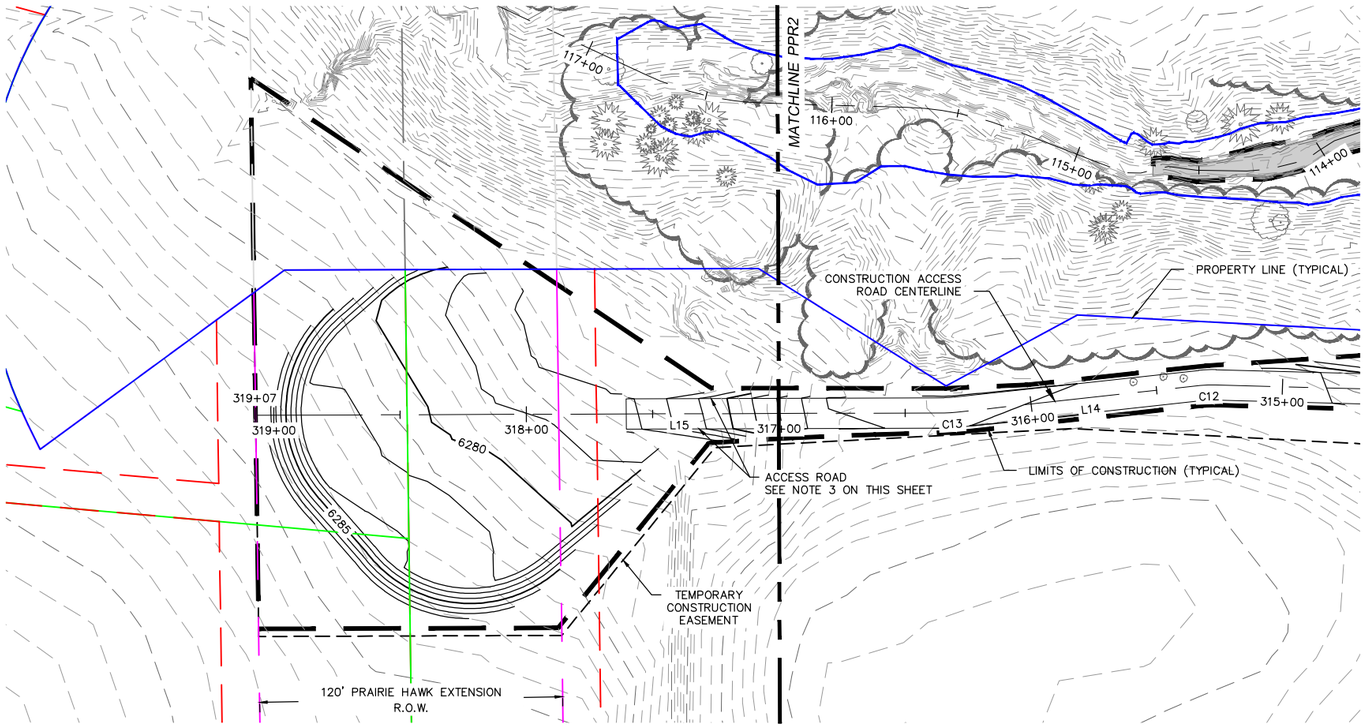
CASTLE ROCK, COLORADO

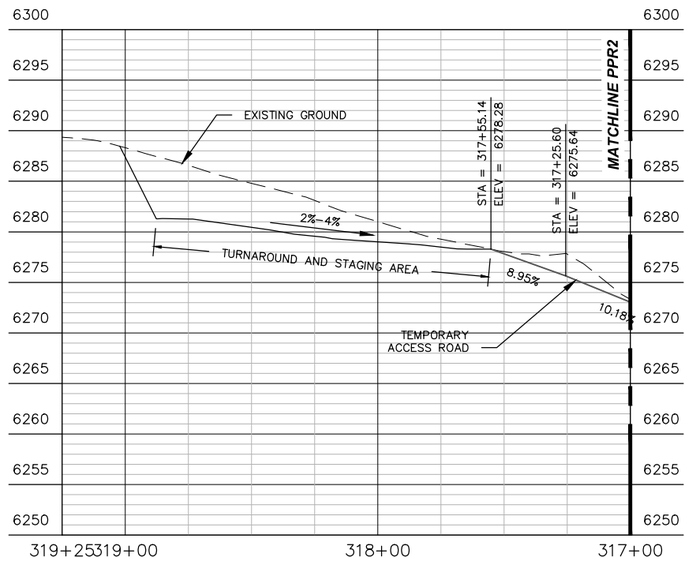
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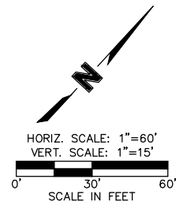
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approved by:	DLO
QA/QC by:	DPK
project no.:	018-1719
drawing no.:	-
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PPR2
SHEET 8 OF 18

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181719_LIDAR







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10/10/2019
PROFESSIONAL ENGINEER

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TOWN OF CASTLE ROCK APPROVAL BLOCK

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CONSTRUCTION ACCESS ROAD PLAN AND PROFILE STA. 317+00 TO 325+43

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

CASTLE ROCK, COLORADO 2019

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checked by:	DPK
approved by:	DLO
QA/QC by:	DPK
project no.:	018-1719
drawing no.:	-
date:	2019.10.10

PPR3
SHEET 9 OF 18

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ACCESS ROAD CENTERLINE LINE TABLE

NO.	LENGTH	BEARING	START NORTHING	START EASTING	END NORTHING	END EASTING
L1	24.52'	S15° 09' 13"E	1562908.81	3180154.68	1562885.15	3180161.09
L2	57.57'	S75° 41' 32"W	1562885.15	3180161.09	1562870.92	3180105.31
L3	120.09'	S23° 33' 33"W	1562845.30	3180075.18	1562735.22	3180027.18
L4	36.20'	S14° 33' 51"E	1562705.91	3180024.88	1562670.88	3180033.98
L5	81.95'	S32° 20' 09"W	1562635.49	3180028.45	1562566.25	3179984.61
L6	37.05'	S64° 48' 49"W	1562549.60	3179965.74	1562533.83	3179932.21
L7	36.91'	S14° 30' 36"W	1562504.38	3179907.80	1562468.65	3179898.55
L8	232.75'	S70° 03' 17"W	1562413.49	3179848.39	1562334.10	3179629.60
L9	109.88'	S45° 08' 49"W	1562323.70	3179613.21	1562246.20	3179535.31
L10	100.83'	S23° 36' 42"W	1562232.32	3179525.82	1562139.93	3179485.43
L11	49.46'	S59° 13' 47"W	1562119.29	3179467.22	1562093.99	3179424.73
L12	116.83'	S45° 11' 48"W	1562087.25	3179416.04	1562004.93	3179333.14
L13	191.06'	S52° 21' 44"W	1562001.22	3179328.91	1561884.55	3179177.61
L14	97.12'	S44° 33' 31"W	1561880.49	3179173.03	1561811.28	3179104.88
L15	272.70'	S50° 36' 04"W	1561808.08	3179101.38	1561634.99	3178890.65

ACCESS ROAD CENTERLINE CURVE TABLE

NO.	LENGTH	RADIUS	CHORD	BEARING
C1	40.95'	45.00'	39.55'	S49° 37' 33"W
C2	29.94'	45.00'	29.39'	S4° 29' 51"W
C3	36.84'	45.00'	35.82'	S8° 53' 09"W
C4	25.51'	45.00'	25.17'	S48° 34' 29"W
C5	39.51'	45.00'	38.25'	S39° 39' 43"W
C6	77.55'	80.00'	74.55'	S42° 16' 56"W
C7	19.56'	45.00'	19.41'	S57° 36' 03"W
C8	16.91'	45.00'	16.81'	S34° 22' 46"W
C9	27.97'	45.00'	27.53'	S41° 25' 15"W
C10	11.02'	45.00'	10.99'	S52° 12' 47"W
C11	5.63'	45.00'	5.62'	S48° 46' 46"W
C12	6.13'	45.00'	6.12'	S48° 27' 38"W
C13	4.75'	45.00'	4.74'	S47° 34' 48"W

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37936
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PROFESSIONAL ENGINEER

FOR CONSTRUCTION
October 29, 2019
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TOWN OF CASTLE ROCK APPROVAL BLOCK

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APPROVED BY: Town of Castle Rock Colorado — DEVELOPMENT SERVICES APPROVED
By tkuczewesky on 01/03/2020
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DEVELOPMENT SERVICES DATE

ACCESS ROAD LINE AND CURVE TABLES

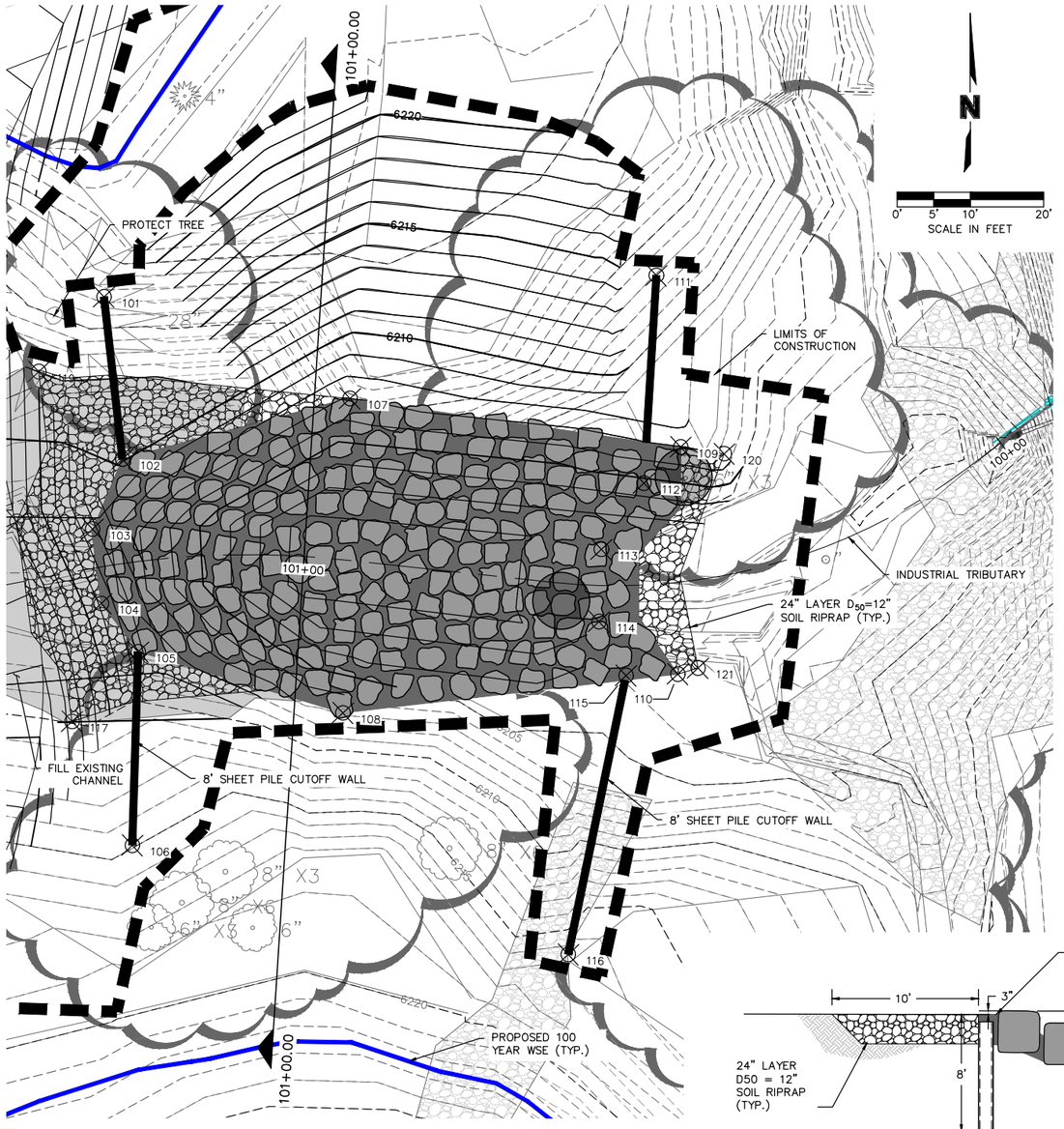
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FOR CONSTRUCTION

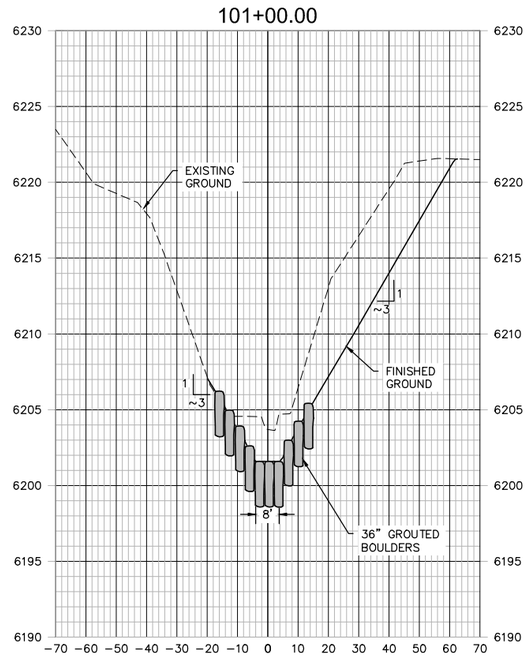
CASTLE ROCK, COLORADO

2019

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approved by:	DLO
QA/QC by:	DPK
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drawing no.:	-
date:	2019.10.10

PPR4

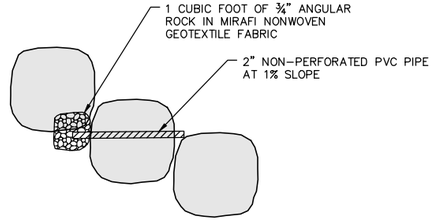




POINT TABLE - DROP 101+28.42				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
101	1562714.93	3180047.87	6217.40	SHEET PILE
102	1562692.87	3180051.14	6209.59	SHEET PILE
103	1562683.18	3180047.40	6208.10	SHEET PILE
104	1562673.08	3180048.94	6208.10	SHEET PILE
105	1562666.65	3180054.19	6208.38	SHEET PILE
106	1562640.23	3180054.29	6214.90	SHEET PILE
107	1562702.21	3180081.93	6207.00	EDGE OF BOULDERS
108	1562659.27	3180082.42	6207.00	EDGE OF BOULDERS
109	1562697.11	3180127.27	6207.00	EDGE OF BOULDERS
110	1562666.12	3180127.94	6204.00	EDGE OF BOULDERS
111	1562720.42	3180123.17	6212.91	SHEET PILE
112	1562692.03	3180122.41	6204.23	SHEET PILE
113	1562682.79	3180116.93	6201.99	SHEET PILE
114	1562672.92	3180116.93	6201.99	SHEET PILE
115	1562665.68	3180120.88	6203.50	SHEET PILE
116	1562627.37	3180114.30	6216.32	SHEET PILE
117	1562656.85	3180045.48	6209.99	EDGE OF RIPRAP
118	1562683.85	3180037.04	6208.98	EDGE OF RIPRAP
119	1562704.40	3180039.32	6211.00	EDGE OF RIPRAP
120	1562696.40	3180133.24	6206.62	EDGE OF RIPRAP
121	1562667.06	3180130.67	6203.11	EDGE OF RIPRAP

NOTES:

1. MIX SOIL RIPRAP 65% RIPRAP TO 35% SOIL BY VOLUME.
2. SOIL RIPRAP SHALL CONSIST OF A UNIFORM MIXTURE OF SOIL AND RIPRAP WITHOUT VOIDS.
3. SHEET PILE SHALL GENERALLY FOLLOW THE GROUND SURFACE LESS 6 INCHES UP TO THE ELEVATION SHOWN. SHEET PILE ELEVATIONS CORRESPOND TO THE TOP OF SHEET PILE OUTSIDE THE LIMITS OF GROUTED BOULDERS. WITHIN THE LIMITS OF GROUTED BOULDERS, SHEET PILE SHALL BE COVERED WITH 6 INCHES OF GROUT. ELEVATIONS IN TABLE REFLECT DEPRESSING SHEET PILE 6 INCHES LOWER THAN GROUND SURFACE.
4. BOULDER ELEVATIONS CORRESPOND TO THE TOP OF BOULDER.
5. ALL RIPRAP OUTSIDE THE CHANNEL BOTTOM SHALL BE COVERED BY 6 INCHES OF TOPSOIL.
6. BOULDERS ARE NOT NECESSARILY DRAWN TO SCALE AND MAY VARY FROM THE QUANTITY SHOWN ON THE PLAN. THE GOAL IS TO DEPICT THE OVERALL LENGTHS OF BOULDER RUNS.
7. ALL BOULDERS SHALL CONFORM TO MILE HIGH FLOOD DISTRICT / URBAN DRAINAGE AND FLOOD CONTROL SPECIFICATIONS.
8. BOULDER PLACEMENT SHALL BE VERIFIED BY OWNER REPRESENTATIVE PRIOR TO POURING GROUT.
9. SOIL RIPRAP SHALL CONFORM TO SHAPE OF CHANNEL WITHIN LIMITS INDICATED BY POINTS AND POINT TABLE.

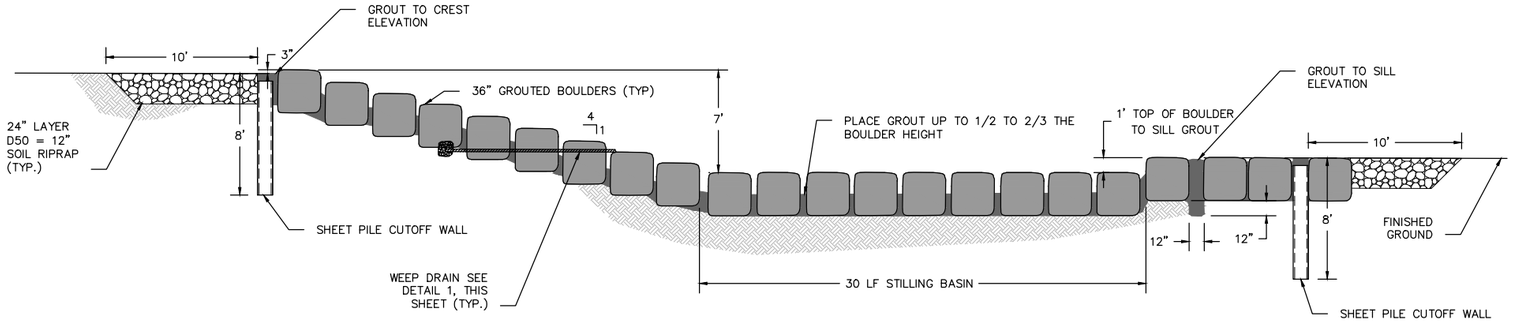


1 WEEP DRAIN DETAIL

Scale:NTS

NOTES:

1. WEEP DRAINS SHALL BE INSTALLED EVERY 6 FEET ALONG FACE OF DROP STRUCTURE.
2. GROUT NOT SHOWN FOR CLARITY.



A GROUTED BOULDER DROP STRUCTURE PROFILE

0' 2.5' 5' 10'

TOWN OF CASTLE ROCK APPROVAL BLOCK

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By tkucewesky on 01/03/2020
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GROUTED BOULDER DETAILS
DROP 1 - STA. 101+28.42

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

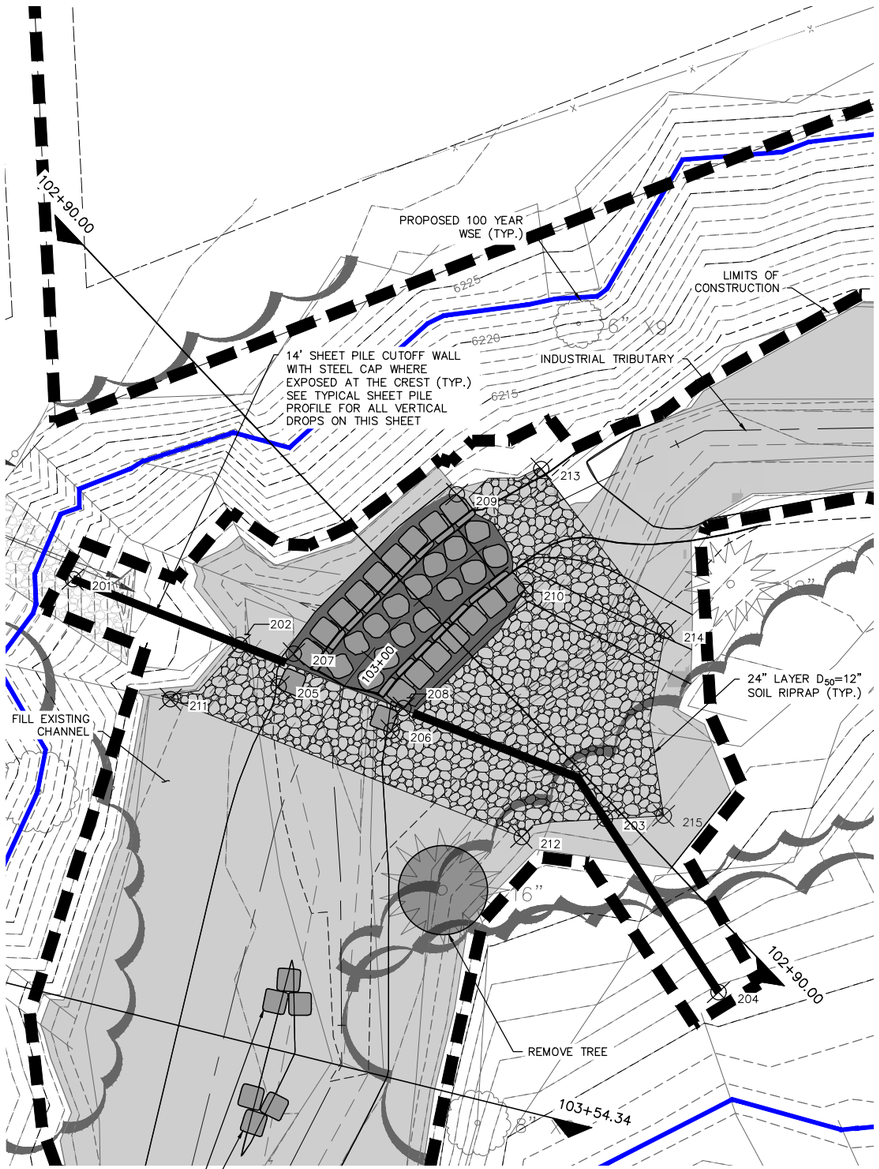
CASTLE ROCK, COLORADO

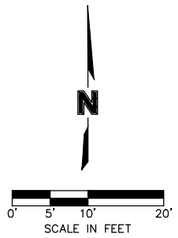
2019

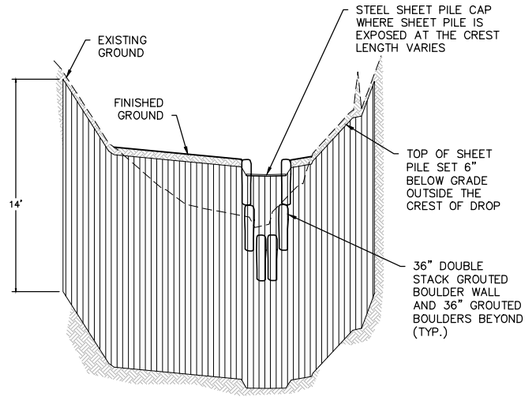
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approved by:	DLO
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project no.:	018-1719
drawing no.:	-
date:	2019.10.10

DDT1
SHEET 11 OF 18

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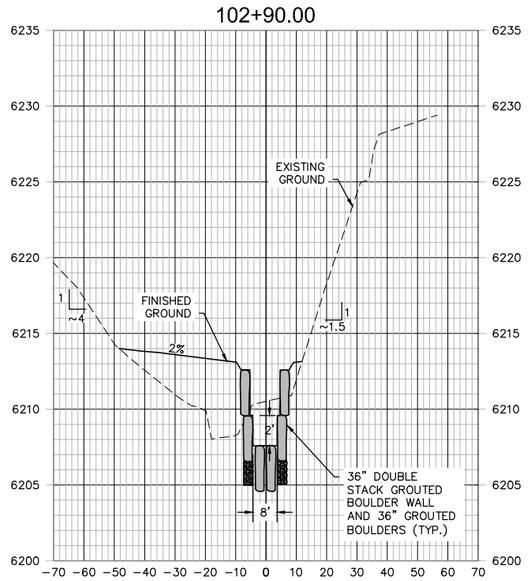


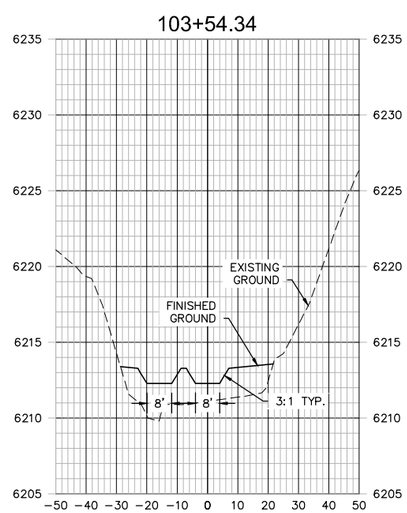




1 DDT2 TYPICAL VERTICAL DROP SHEET PILE SECTION

1"=50' HORIZONTAL, 1"=10' VERTICAL





THREE FEATURE BOULDERS ARE TO BE PLACED AT THE UPSTREAM AND DOWNSTREAM NOSE OF THE SPLIT FLOW ISLAND WITH THE TOP OF BOULDER APPROXIMATELY 12 INCHES ABOVE THE CHANNEL BOTTOM. FIELD VERIFY LOCATION AND ELEVATION WITH OWNER OR OWNERS REPRESENTATIVE PRIOR TO FINAL PLACEMENT.

NOTES:

1. MIX SOIL RIPRAP 65% RIPRAP TO 35% SOIL BY VOLUME.
2. SOIL RIPRAP SHALL CONSIST OF A UNIFORM MIXTURE OF SOIL AND RIPRAP WITHOUT VOIDS.
3. SHEET PILE SHALL GENERALLY FOLLOW THE GROUND SURFACE LESS 6 INCHES UP TO THE ELEVATION SHOWN. SHEET PILE ELEVATIONS CORRESPOND TO THE TOP OF THE SHEET PILE OUTSIDE THE LIMITS OF GROUTED BOULDERS. WITHIN THE LIMITS OF GROUTED BOULDERS AT THE CREST, SHEET PILE SHALL HAVE A STEEL CAP. ELEVATIONS IN TABLE REFLECT DEPRESSING SHEET PILE 6 INCHES LOWER THAN GROUND SURFACE OUTSIDE THE CREST OF THE DROP.
4. BOULDER ELEVATIONS CORRESPOND TO THE TOP OF BOULDER.
5. ALL RIPRAP OUTSIDE THE CHANNEL BOTTOM SHALL BE COVERED BY 6 INCHES OF TOPSOIL.
6. BOULDERS ARE NOT NECESSARILY DRAWN TO SCALE AND MAY VARY FROM THE QUANTITY SHOWN ON THE PLAN. THE GOAL IS TO DEPICT THE OVERALL LENGTHS OF BOULDER RUNS.
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9. SOIL RIPRAP SHALL CONFORM TO SHAPE OF CHANNEL WITHIN LIMITS INDICATED BY POINTS AND POINT TABLE.

POINT TABLE - DROP 103+05.00

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
201	1562644.61	3179849.24	6219.62	END OF SHEET PILE
202	1562636.69	3179871.52	6211.63	SHEET PILE AT CREST
203	1562615.41	3179920.47	6211.63	SHEET PILE AT CREST
204	1562593.05	3179936.25	6219.22	END OF SHEET PILE
205	1562631.37	3179876.83	6213.63	FEATURE BOULDER UPSTREAM OF SHEET PILE
206	1562626.05	3179891.92	6213.63	FEATURE BOULDER UPSTREAM OF SHEET PILE
207	1562635.77	3179878.70	6212.63	EDGE OF BOULDER WALL
208	1562629.08	3179893.41	6212.63	EDGE OF BOULDER WALL
209	1562657.51	3179899.50	6212.56	EDGE OF BOULDER WALL
210	1562645.29	3179908.90	6212.56	EDGE OF BOULDER WALL
211	1562629.22	3179862.65	6213.50	RIPRAP LIMIT
212	1562612.61	3179909.59	6213.50	RIPRAP LIMIT
213	1562661.24	3179910.52	6210.48	RIPRAP LIMIT
214	1562640.47	3179927.56	6211.85	RIPRAP LIMIT
215	1562616.09	3179928.22	6213.90	RIPRAP LIMIT

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CALL 3-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.



COLORADO LICENSED DEBRA L OLLINGER 37936 10/10/2019 PROFESSIONAL ENGINEER

FOR CONSTRUCTION
October 29, 2019
DATE PRINTED
OLSSON

TOWN OF CASTLE ROCK APPROVAL BLOCK

TOWN OF CASTLE ROCK APPROVAL PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL.

APPROVED BY: Town of Castle Rock Colorado — DEVELOPMENT SERVICES APPROVED
By tkucewesky on 01/03/2020
Approved CIP20-0001 Plans.pdf
Record Document on File

DEVELOPMENT SERVICES DATE

olsson
1525 Raleigh Street
Suite 400
Denver, CO 80204
TEL 303.237.2072
www.olsson.com

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REV. NO.	DATE	REVISIONS DESCRIPTION
1	2019.10.29	ADDENDUM 2 - REVISED ACCESS

REVISIONS

VERTICAL DROP DETAIL
DROP 2 - STA. 103+05

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

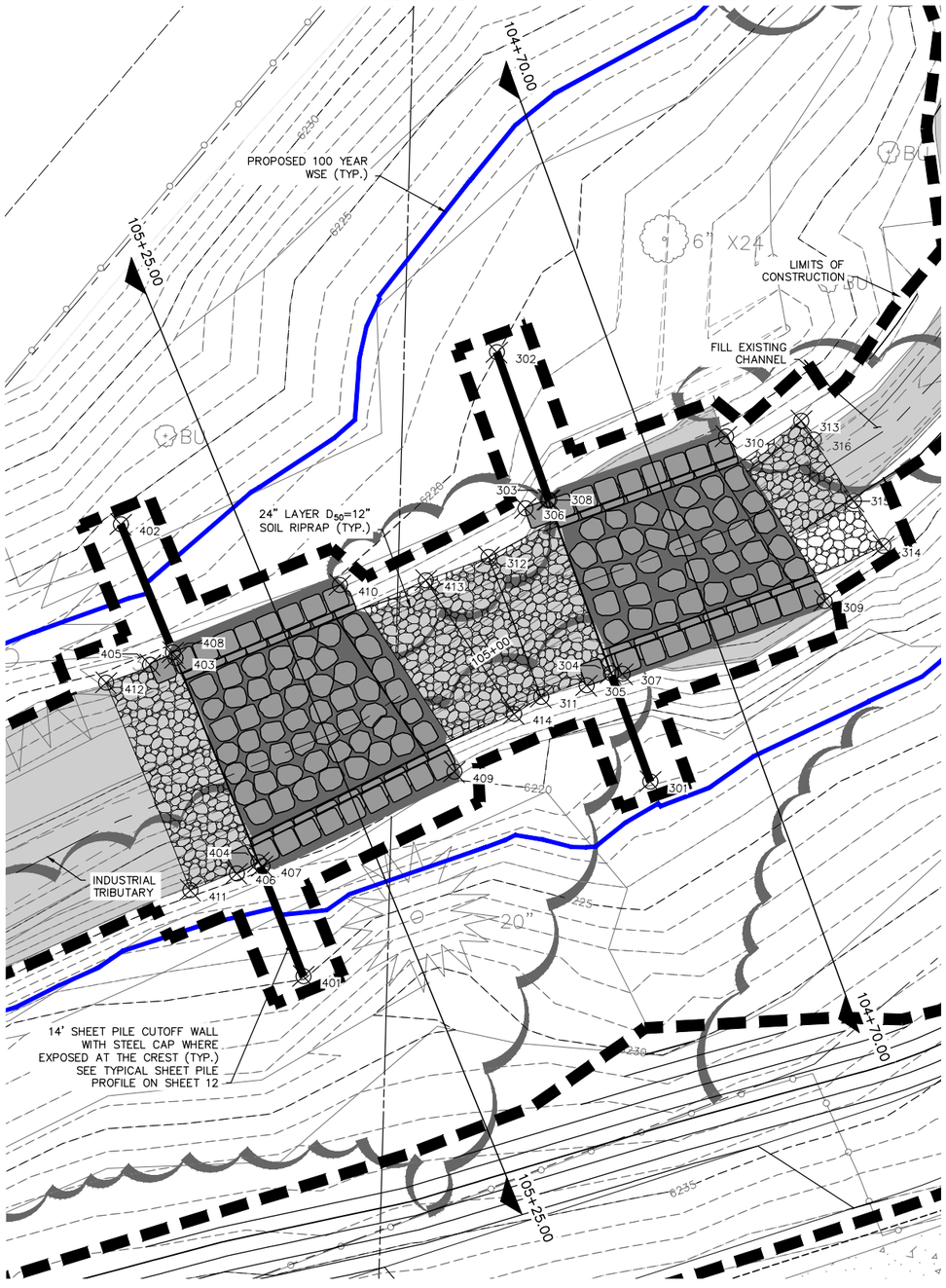
CASTLE ROCK, COLORADO

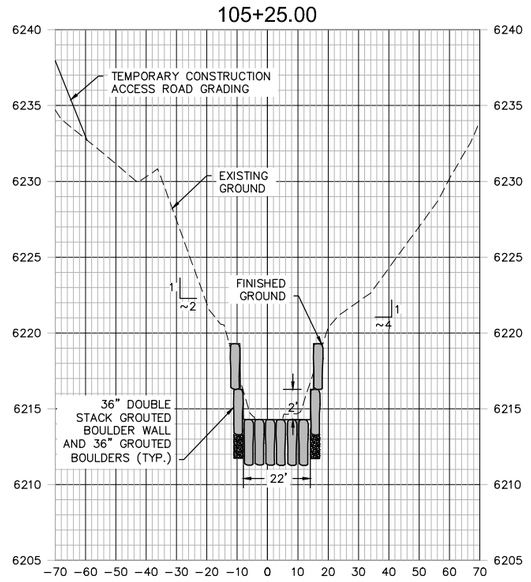
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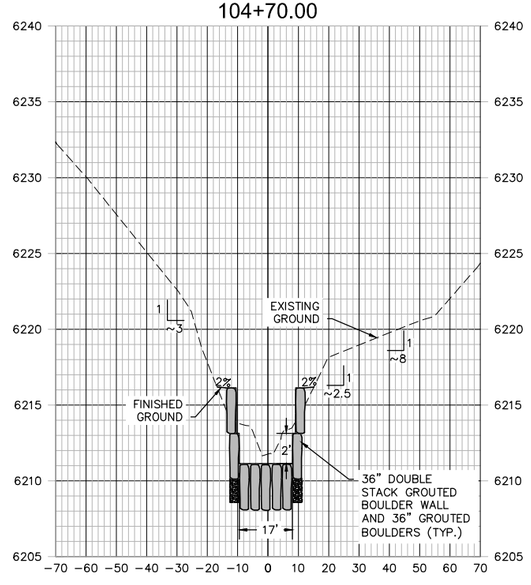
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checked by:	DPK
approved by:	DLO
QA/QC by:	DPK
project no.:	018-1719
drawing no.:	-
date:	2019.10.10

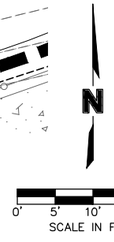
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SHEET 12 OF 18

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131661_XTOPO_SURFACE 181719_PBASE 181719_PTOPO 181719_TBLK_11x17 181719_PMAP









0' 5' 10' 20'
SCALE IN FEET

POINT TABLE - DROP 105+40.00				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
401	1562434.46	3179768.69	6224.89	SHEET PILE
402	1562494.85	3179741.85	6224.47	SHEET PILE
403	1562476.98	3179749.86	6218.34	SHEET PILE AT CREST
404	1562449.73	3179762.08	6218.34	SHEET PILE AT CREST
405	1562475.95	3179746.46	6220.34	FEATURE BOULDER UPSTREAM OF SHEET PILE
406	1562448.10	3179759.20	6220.34	FEATURE BOULDER UPSTREAM OF SHEET PILE
407	1562449.20	3179762.61	6219.34	EDGE OF BOULDER WALL
408	1562477.74	3179749.52	6219.34	EDGE OF BOULDER WALL
409	1562462.88	3179788.21	6219.26	EDGE OF BOULDER WALL
410	1562487.63	3179771.82	6219.26	EDGE OF BOULDER WALL
411	1562445.60	3179752.97	6218.87	RIPRAP LIMIT
412	1562473.32	3179740.61	6218.87	RIPRAP LIMIT
413	1562488.68	3179783.46	6216.55	RIPRAP LIMIT
414	1562471.00	3179796.03	6216.40	RIPRAP LIMIT

POINT TABLE - DROP 104+85.00				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
301	1562462.45	3179814.80	6221.92	SHEET PILE
302	1562519.90	3179792.03	6220.02	SHEET PILE
303	1562500.13	3179799.61	6215.17	SHEET PILE AT CREST
304	1562476.95	3179808.95	6215.17	SHEET PILE AT CREST
305	1562475.20	3179805.71	6217.17	FEATURE BOULDER UPSTREAM OF SHEET PILE
306	1562498.88	3179796.59	6217.17	FEATURE BOULDER UPSTREAM OF SHEET PILE
307	1562476.91	3179810.52	6216.17	EDGE OF BOULDER WALL
308	1562500.15	3179799.79	6216.17	EDGE OF BOULDER WALL
309	1562487.71	3179837.57	6216.09	EDGE OF BOULDER WALL
310	1562509.56	3179823.46	6216.09	EDGE OF BOULDER WALL
311	1562473.40	3179799.60	6215.71	RIPRAP LIMIT
312	1562492.13	3179791.85	6215.71	RIPRAP LIMIT
313	1562512.04	3179833.59	6212.96	RIPRAP LIMIT
314	1562495.43	3179845.27	6213.73	RIPRAP LIMIT
315	1562501.41	3179841.08	6213.13	RIPRAP LIMIT
316	1562509.53	3179835.35	6212.55	RIPRAP LIMIT

NOTES:

1. MIX SOIL RIPRAP 65% RIPRAP TO 35% SOIL BY VOLUME.
2. SOIL RIPRAP SHALL CONSIST OF A UNIFORM MIXTURE OF SOIL AND RIPRAP WITHOUT VOIDS.
3. SHEET PILE SHALL GENERALLY FOLLOW THE GROUND SURFACE LESS 6 INCHES UP TO THE ELEVATION SHOWN. SHEET PILE ELEVATIONS CORRESPOND TO THE TOP OF THE SHEET PILE OUTSIDE THE LIMITS OF GROUTED BOULDERS. WITHIN THE LIMITS OF GROUTED BOULDERS AT THE CREST, SHEET PILE SHALL HAVE A STEEL CAP. ELEVATIONS IN TABLE REFLECT DEPRESSING SHEET PILE 6 INCHES LOWER THAN GROUND SURFACE OUTSIDE THE CREST OF THE DROP.
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7. ALL BOULDERS SHALL CONFORM TO MILE HIGH FLOOD DISTRICT / URBAN DRAINAGE AND FLOOD CONTROL SPECIFICATIONS.
8. BOULDER PLACEMENT SHALL BE VERIFIED BY OWNER REPRESENTATIVE PRIOR TO POURING GROUT.
9. SOIL RIPRAP SHALL CONFORM TO SHAPE OF CHANNEL WITHIN LIMITS INDICATED BY POINTS AND POINT TABLE.



FOR CONSTRUCTION
October 29, 2019
DATE PRINTED
OLSSON

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APPROVED BY: DEVELOPMENT SERVICES APPROVED
By tkucewesky on 01/03/2020
Approved CIP20-0001 Plans.pdf
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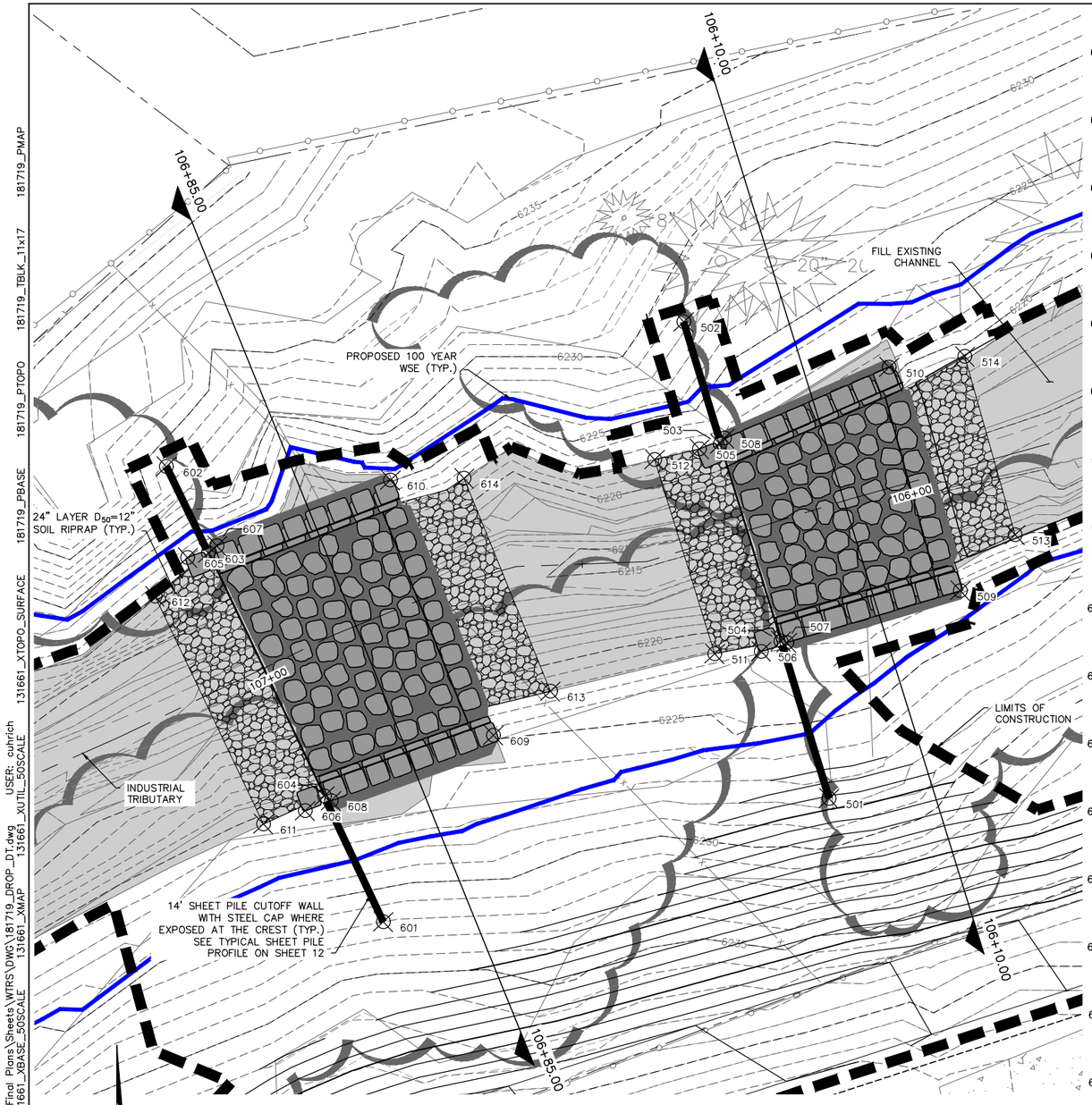
REVISIONS		
REV. NO.	DATE	REVISIONS DESCRIPTION
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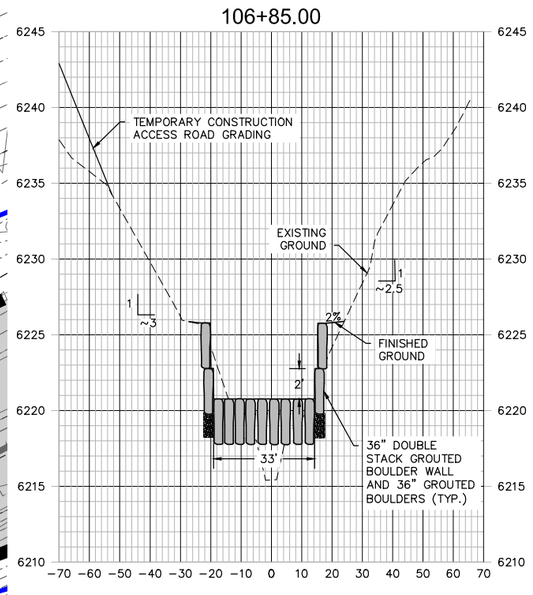
VERTICAL DROP DETAIL
DROPS 3 / 4 - STA. 105+40 / STA. 104+85
INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION
CASTLE ROCK, COLORADO
2019

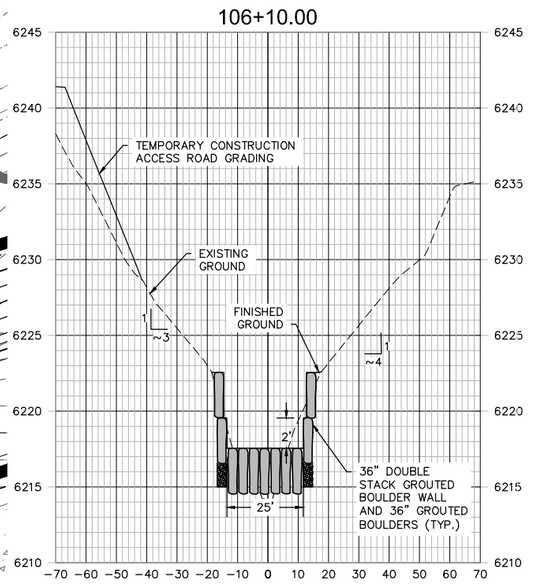
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checked by: DPK
approved by: DLO
QA/QC by: DPK
project no.: 018-1719
drawing no.: -
date: 2019.10.10

DDT3
SHEET 13 OF 18

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POINT TABLE - DROP 107+00.00				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
601	1562370.04	3179626.71	6232.00	SHEET PILE
602	1562436.11	3179592.42	6233.86	SHEET PILE
603	1562423.55	3179599.04	6224.82	SHEET PILE AT CREST
604	1562388.31	3179617.39	6224.82	SHEET PILE AT CREST
605	1562422.78	3179596.01	6226.82	FEATURE BOULDER UPSTREAM OF SHEET PILE
606	1562386.03	3179614.63	6226.82	FEATURE BOULDER UPSTREAM OF SHEET PILE
607	1562424.68	3179600.29	6225.82	EDGE OF BOULDER WALL
608	1562387.63	3179618.40	6225.82	EDGE OF BOULDER WALL
609	1562398.13	3179642.01	6225.74	EDGE OF BOULDER WALL
610	1562435.24	3179625.52	6225.74	EDGE OF BOULDER WALL
611	1562383.86	3179608.55	6225.35	RIPRAP LIMIT
612	1562416.92	3179591.39	6225.35	RIPRAP LIMIT
613	1562404.91	3179650.19	6222.21	RIPRAP LIMIT
614	1562435.88	3179636.38	6222.21	RIPRAP LIMIT

POINT TABLE - DROP 106+25.00				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
501	1562390.49	3179691.83	6227.60	SHEET PILE
502	1562460.07	3179668.00	6228.33	SHEET PILE
503	1562442.19	3179673.98	6221.59	SHEET PILE AT CREST
504	1562413.45	3179683.95	6221.59	SHEET PILE AT CREST
505	1562441.38	3179670.94	6223.59	FEATURE BOULDER UPSTREAM OF SHEET PILE
506	1562411.84	3179681.07	6223.59	FEATURE BOULDER UPSTREAM OF SHEET PILE
507	1562413.25	3179684.80	6222.59	EDGE OF BOULDER WALL
508	1562443.13	3179674.59	6222.59	EDGE OF BOULDER WALL
509	1562421.81	3179710.13	6222.51	EDGE OF BOULDER WALL
510	1562454.40	3179698.52	6222.51	EDGE OF BOULDER WALL
511	1562411.25	3179674.23	6222.12	RIPRAP LIMIT
512	1562439.59	3179664.40	6222.12	RIPRAP LIMIT
513	1562430.33	3179717.95	6218.98	RIPRAP LIMIT
514	1562456.39	3179709.62	6218.98	RIPRAP LIMIT

NOTES:

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REVISIONS

REV. NO.	DATE	REVISIONS DESCRIPTION
1	2019.10.29	ADDENDUM 2 - REVISED ACCESS



FOR CONSTRUCTION
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OLSSON

TOWN OF CASTLE ROCK APPROVAL BLOCK

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APPROVED BY: DEVELOPMENT SERVICES
APPROVED
By tkuconewsky on 01/03/2020
Approved CIP20-0001 Plans.pdf
Record Document on File

DEVELOPMENT SERVICES DATE

VERTICAL DROP DETAIL
DROPS 5 / 6 - STA. 107+00.00 / STA. 106+25.00

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

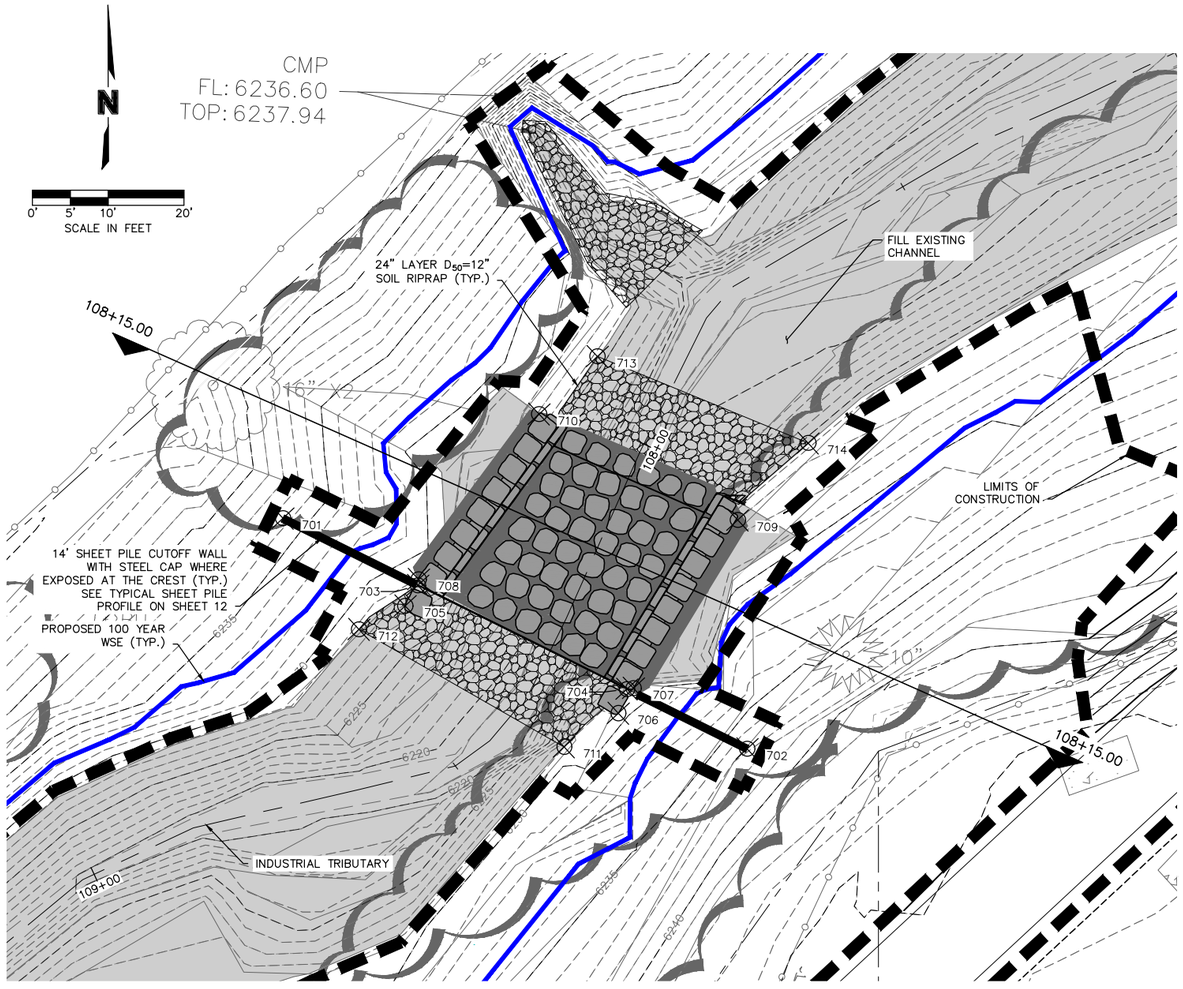
CASTLE ROCK, COLORADO

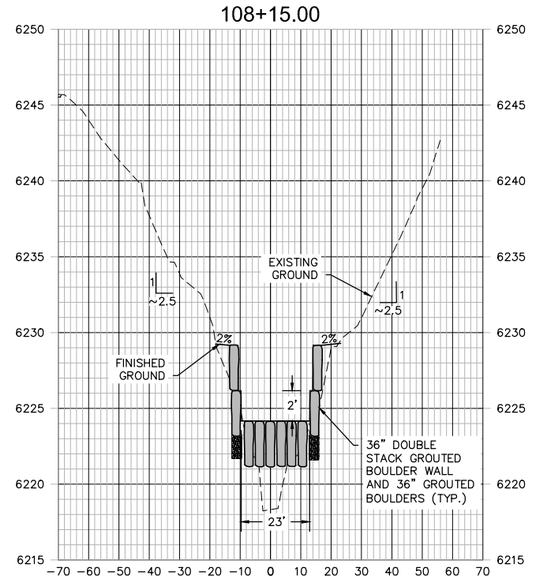
2019

drawn by:	CAU
checked by:	DPK
approved by:	DLO
QA/QC by:	DPK
project no.:	018-1719
drawing no.:	-
date:	2019.10.10

DDT4
SHEET 14 OF 18

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POINT TABLE - DROP 108+30.00				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
701	1562336.82	3179483.40	6236.43	SHEET PILE
702	1562308.49	3179545.69	6236.82	SHEET PILE
703	1562328.58	3179501.51	6228.21	SHEET PILE AT CREST
704	1562315.83	3179529.54	6228.21	SHEET PILE AT CREST
705	1562325.81	3179499.92	6230.21	FEATURE BOULDER UPSTREAM OF SHEET PILE
706	1562312.62	3179528.53	6230.21	FEATURE BOULDER UPSTREAM OF SHEET PILE
707	1562315.97	3179530.41	6229.21	EDGE OF BOULDER WALL
708	1562329.36	3179501.57	6229.21	EDGE OF BOULDER WALL
709	1562338.63	3179543.40	6229.12	EDGE OF BOULDER WALL
710	1562351.71	3179516.71	6229.12	EDGE OF BOULDER WALL
711	1562307.93	3179521.53	6228.75	RIPRAP LIMIT
712	1562322.50	3179493.93	6228.75	RIPRAP LIMIT
713	1562359.58	3179524.16	6225.62	RIPRAP LIMIT
714	1562349.10	3179552.35	6225.62	RIPRAP LIMIT

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REVISIONS

VERTICAL DROP DETAIL
DROP 7 - STA. 108+30.00

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

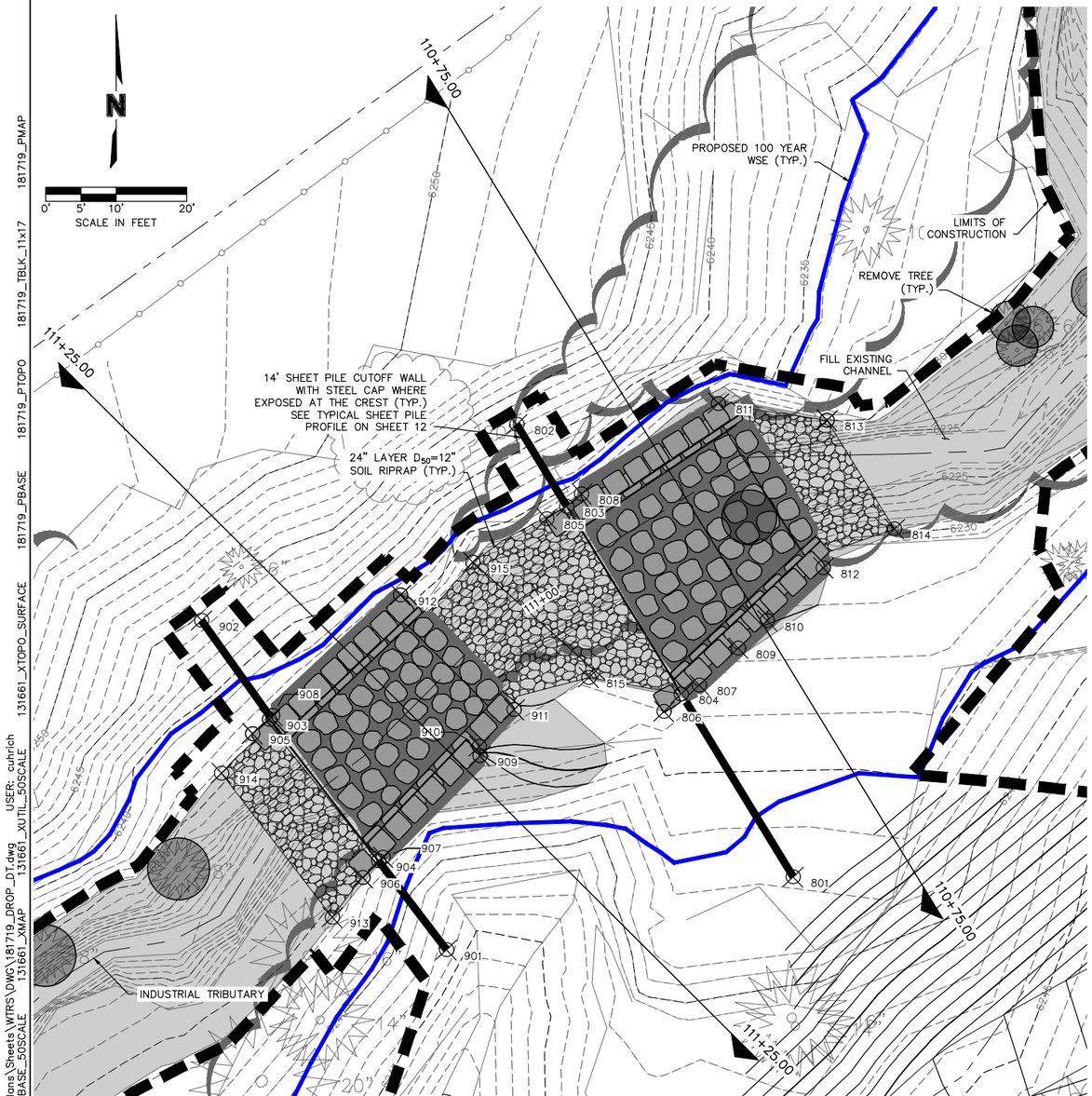
CASTLE ROCK, COLORADO

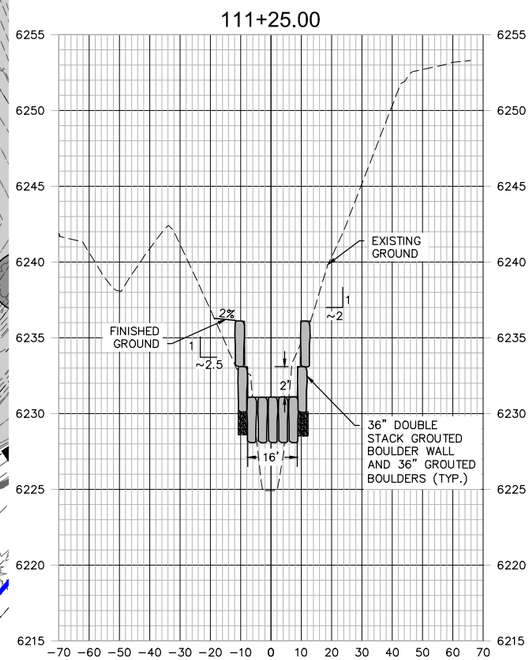
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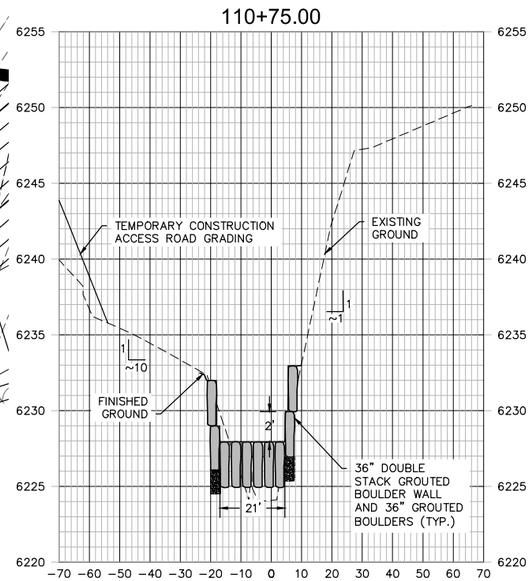
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checked by:	DPK
approved by:	DLO
QA/QC by:	DPK
project no.:	018-1719
drawing no.:	-
date:	2019.10.10

DDT5
SHEET 15 OF 18

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POINT TABLE - DROP 111+41.40				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
901	1562107.72	3179345.85	6243.51	SHEET PILE
902	1562153.16	3179309.54	6244.58	SHEET PILE
903	1562139.47	3179319.67	6235.14	SHEET PILE AT CREST
904	1562119.98	3179335.79	6235.14	SHEET PILE AT CREST
905	1562137.36	3179317.31	6237.14	FEATURE BOULDER UPSTREAM OF SHEET PILE
906	1562117.53	3179333.64	6237.14	FEATURE BOULDER UPSTREAM OF SHEET PILE
907	1562120.49	3179336.43	6236.14	EDGE OF BOULDER WALL
908	1562140.05	3179320.07	6236.14	EDGE OF BOULDER WALL
909	1562135.35	3179349.64	6236.14	EDGE OF BOULDER WALL
910	1562136.67	3179349.49	6233.14	EDGE OF SINGLE STACK BOULDER WALL
911	1562142.06	3179354.25	6233.12	EDGE OF SINGLE STACK BOULDER WALL
912	1562157.73	3179337.63	6236.06	EDGE OF BOULDER WALL
913	1562111.77	3179329.51	6235.68	RIPRAP LIMIT
914	1562131.62	3179313.11	6235.68	RIPRAP LIMIT
915	1562162.70	3179347.70	6232.53	RIPRAP LIMIT

POINT TABLE - DROP 110+90.00				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
801	1562119.72	3179394.63	6236.82	SHEET PILE
802	1562182.49	3179353.26	6242.33	SHEET PILE
803	1562171.09	3179360.74	6231.99	SHEET PILE AT CREST
804	1562145.08	3179377.87	6231.99	SHEET PILE AT CREST
805	1562169.23	3179357.95	6233.99	FEATURE BOULDER UPSTREAM OF SHEET PILE
806	1562142.52	3179375.54	6233.99	FEATURE BOULDER UPSTREAM OF SHEET PILE
807	1562146.43	3179380.39	6232.99	EDGE OF SE BOULDER WALL
808	1562172.93	3179362.79	6232.99	EDGE OF BOULDER WALL
809	1562151.82	3179385.75	6232.49	EDGE OF SE BOULDER WALL
810	1562155.87	3179389.71	6231.99	EDGE OF SE BOULDER WALL
811	1562186.40	3179381.74	6232.92	EDGE OF BOULDER WALL
812	1562163.64	3179397.38	6231.49	EDGE OF SE BOULDER WALL
813	1562184.55	3179397.21	6229.38	RIPRAP LIMIT
814	1562169.49	3179407.30	6229.38	RIPRAP LIMIT
815	1562146.97	3179364.70	6232.53	RIPRAP LIMIT

NOTES:

1. MIX SOIL RIPRAP 65% RIPRAP TO 35% SOIL BY VOLUME.
2. SOIL RIPRAP SHALL CONSIST OF A UNIFORM MIXTURE OF SOIL AND RIPRAP WITHOUT VOIDS.
3. SHEET PILE SHALL GENERALLY FOLLOW THE GROUND SURFACE LESS 6 INCHES UP TO THE ELEVATION SHOWN. SHEET PILE ELEVATIONS CORRESPOND TO THE TOP OF THE SHEET PILE OUTSIDE THE LIMITS OF GROUTED BOULDERS. WITHIN THE LIMITS OF GROUTED BOULDERS AT THE CREST, SHEET PILE SHALL HAVE A STEEL CAP. ELEVATIONS IN TABLE REFLECT DEPRESSING SHEET PILE 6 INCHES LOWER THAN GROUND SURFACE OUTSIDE THE CREST OF THE DROP.
4. BOULDER ELEVATIONS CORRESPOND TO THE TOP OF BOULDER.
5. ALL RIPRAP OUTSIDE THE CHANNEL BOTTOM SHALL BE COVERED BY 6 INCHES OF TOPSOIL.
6. BOULDERS ARE NOT NECESSARILY DRAWN TO SCALE AND MAY VARY FROM THE QUANTITY SHOWN ON THE PLAN. THE GOAL IS TO DEPICT THE OVERALL LENGTHS OF BOULDER RUNS.
7. ALL BOULDERS SHALL CONFORM TO MILE HIGH FLOOD DISTRICT / URBAN DRAINAGE AND FLOOD CONTROL SPECIFICATIONS.
8. BOULDER PLACEMENT SHALL BE VERIFIED BY OWNER REPRESENTATIVE PRIOR TO POURING GROUT.
9. SOIL RIPRAP SHALL CONFORM TO SHAPE OF CHANNEL WITHIN LIMITS INDICATED BY POINTS AND POINT TABLE.

CALL UTILITY NOTIFICATION CENTER OF COLORADO

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CALL 3-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.



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REV. NO.	DATE	REVISIONS DESCRIPTION
1	2019.10.29	ADDENDUM 2 - REVISED ACCESS

REVISIONS



FOR CONSTRUCTION

October 29, 2019
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TOWN OF CASTLE ROCK APPROVAL BLOCK

TOWN OF CASTLE ROCK APPROVAL PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

APPROVED BY: DEVELOPMENT SERVICES APPROVED
By tkucewesky on 01/03/2020
Approved CIP20-0001 Plans.pdf
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DEVELOPMENT SERVICES DATE

VERTICAL DROP DETAIL
DROPS 8 / 9 - STA. 111+41.40 / STA. 110+90.00

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

CASTLE ROCK, COLORADO

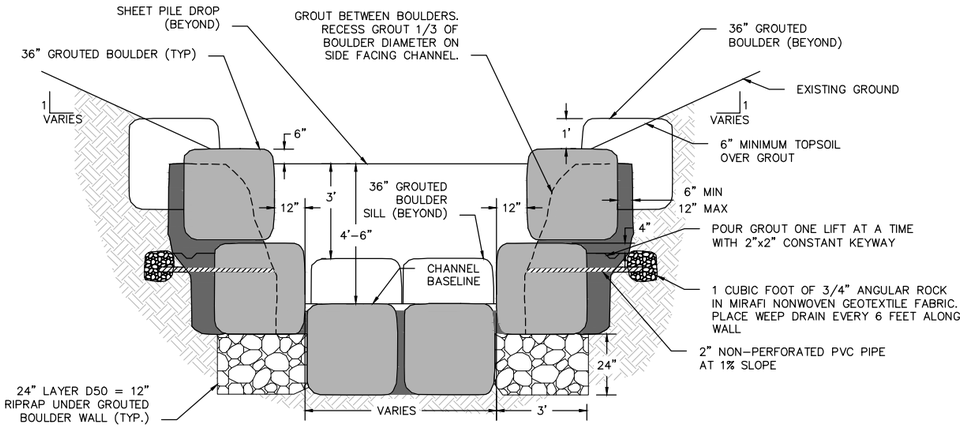
2019

drawn by:	CAU
checked by:	DPK
approved by:	DLO
QA/QC by:	DPK
project no.:	018-1719
drawing no.:	-
date:	2019.10.10

DDT6

SHEET 16 OF 18

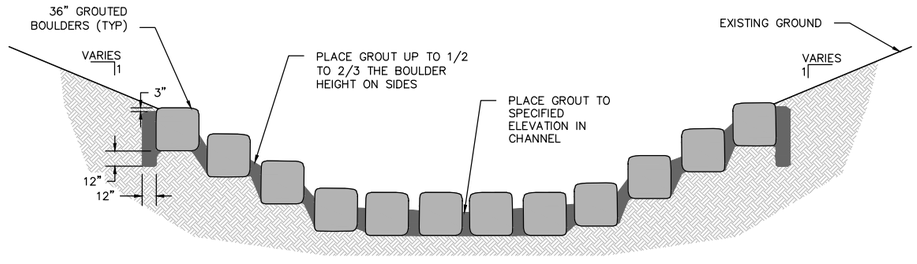
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*NOTE:
WALL ELEVATIONS VARY IN VERTICAL DROPS. ELEVATIONS FOR THE WALLS ARE SHOWN IN THE POINT TABLES ON SHEETS 12–16.

1 DDT7 TYPICAL GROUTED DOUBLE STACK 36" BOULDER WALL ON VERTICAL DROP STRUCTURES

0' 1.25' 2.5' 5'



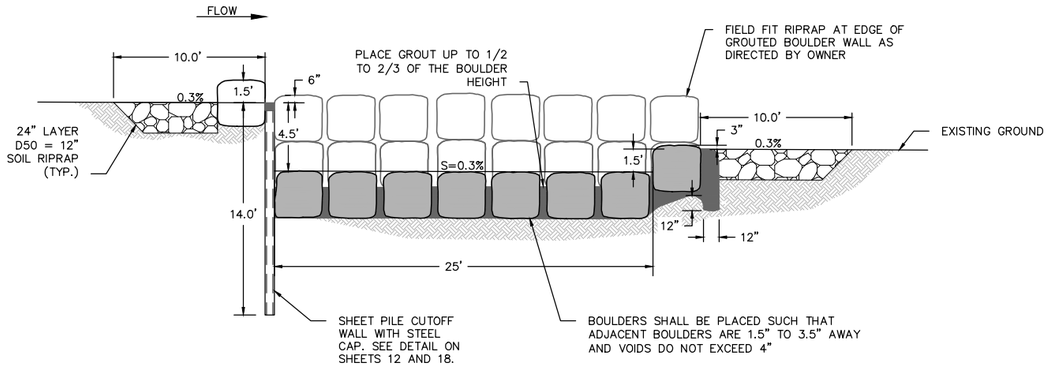
*NOTE:
GROUT IS 3" BELOW THE TOP OF BOULDER AT THE CREST AND SILL OF THE DROP SERIES.

3 DDT7 TYPICAL GROUTED BOULDER DROP STRUCTURE SECTION

0' 2.5' 5' 10'

NOTES:

1. MIX SOIL RIPRAP 65% RIPRAP TO 35% SOIL BY VOLUME.
2. SOIL RIPRAP SHALL CONSIST OF A UNIFORM MIXTURE OF SOIL AND RIPRAP WITHOUT VOIDS.



*NOTE:
WALL ELEVATIONS VARY IN VERTICAL DROPS. ELEVATIONS FOR THE WALLS ARE SHOWN IN THE POINT TABLES ON SHEETS 12–16.

3 DDT7 TYPICAL VERTICAL DROP GROUTED BOULDER BASIN

0' 2.5' 5' 10'

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REVISIONS

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DEBRA L. OLLINGER
37936
10/10/2019
PROFESSIONAL ENGINEER

FOR CONSTRUCTION
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TOWN OF CASTLE ROCK APPROVAL BLOCK

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TYPICAL DROP DETAILS

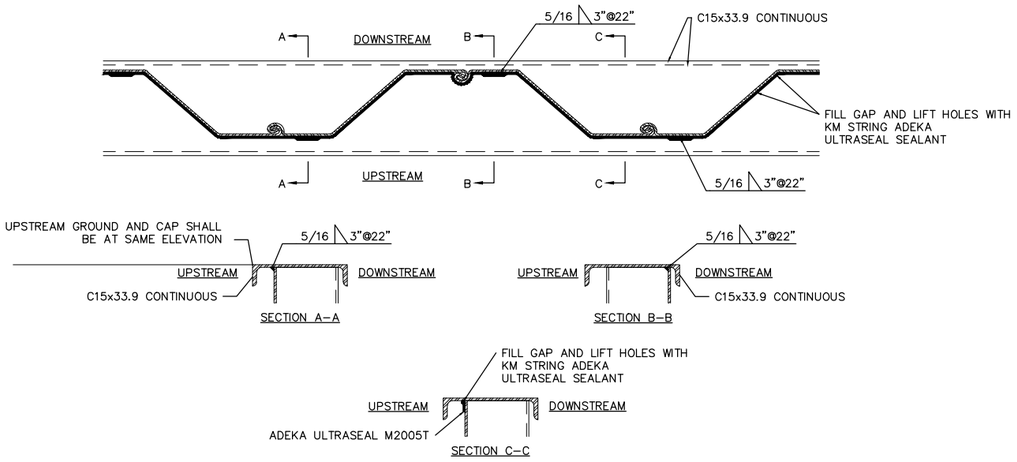
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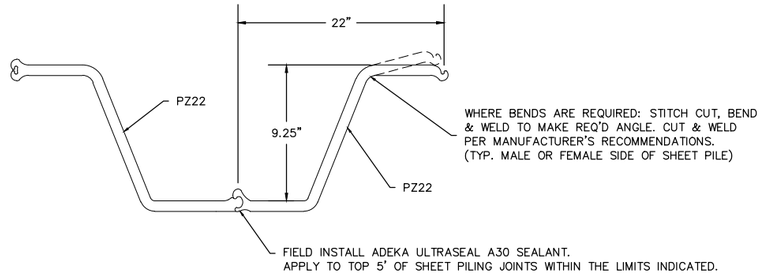
CASTLE ROCK, COLORADO 2019

drawn by:	CAU
checked by:	DPK
approved by:	DLO
QA/QC by:	DPK
project no.:	018-1719
drawing no.:	-
date:	2019.10.10

DDT7
SHEET 17 OF 18

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DATE: Oct 29, 2019 1:23pm XREFS: 131661_TBLK_11x17_Industrial Trib 181719_TBLK_11x17





1 DDT8 TYPICAL SHEET PILE CAP

0' 0.5' 1' 2'

2 DDT8 TYPICAL PZ22 SHEET PILE

0' 0.75' 1.5' 3'

NOTE: WITHIN LIMITS OF BOULDERS, CAP SHALL BE GROUT.

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10/10/2019
PROFESSIONAL ENGINEER

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By tkucewesky on 01/03/2020
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DEVELOPMENT SERVICES DATE

SHEET PILE DETAILS

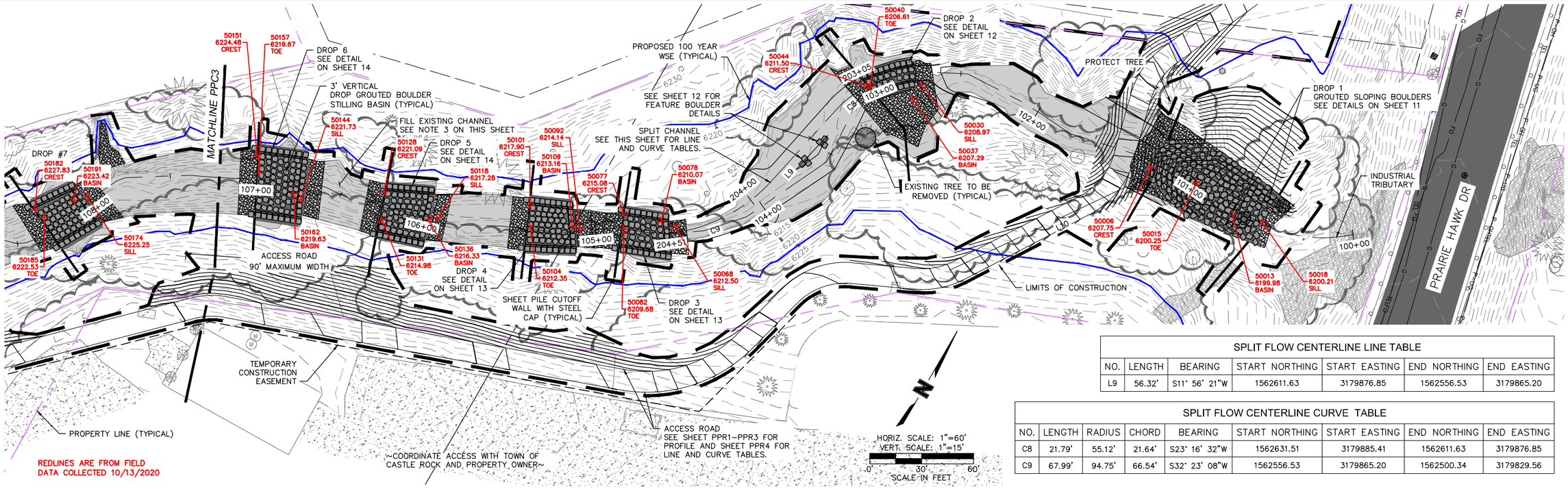
INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

CASTLE ROCK, COLORADO 2019

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approved by:	DLO
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date:	2019.10.10

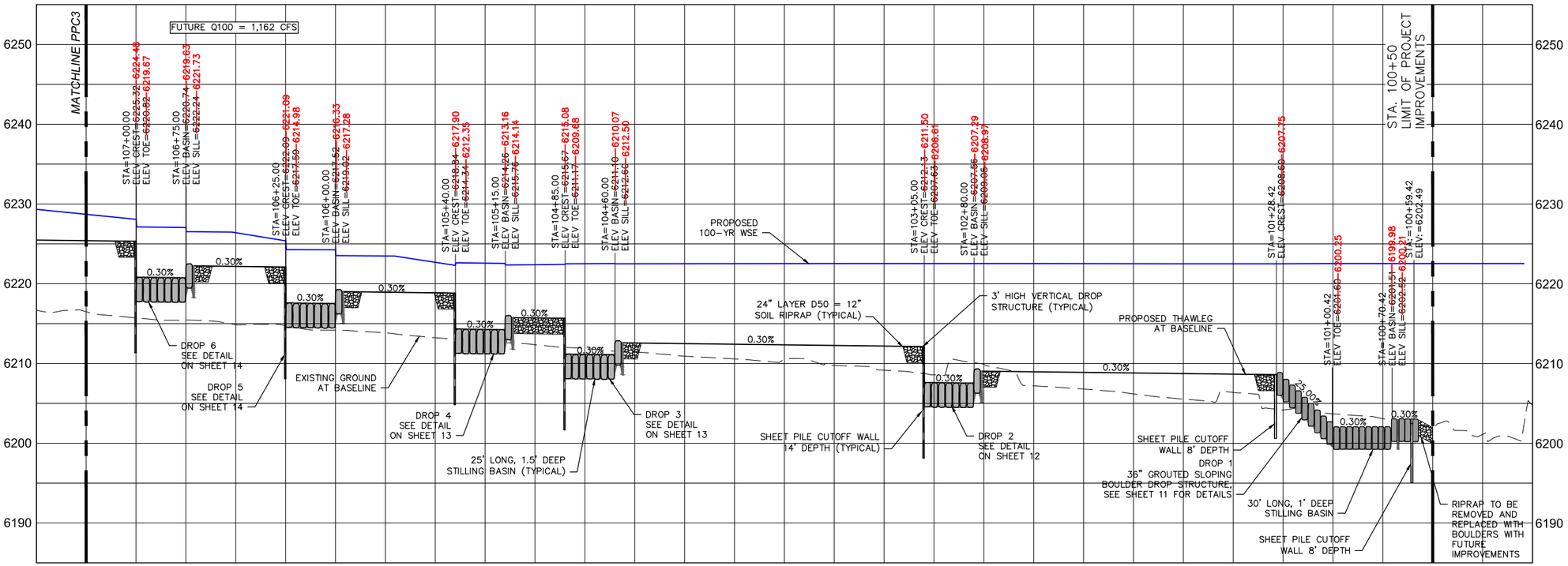
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SHEET 18 OF 18

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DATE: Oct 29, 2019 1:23pm XREFS: 131661_TBLK_11x17_Industrial Trib 181719_TBLK_11x17



SPLIT FLOW CENTERLINE LINE TABLE						
NO.	LENGTH	BEARING	START NORTHING	START EASTING	END NORTHING	END EASTING
L9	56.32'	S11° 56' 21"W	1562611.63	3179876.85	1562556.53	3179865.20

SPLIT FLOW CENTERLINE CURVE TABLE								
NO.	LENGTH	RADIUS	CHORD	BEARING	START NORTHING	START EASTING	END NORTHING	END EASTING
C8	21.79'	55.12'	21.64'	S23° 16' 32"W	1562631.51	3179885.41	1562611.63	3179876.85
C9	67.99'	94.75'	66.54'	S32° 23' 08"W	1562556.53	3179865.20	1562500.34	3179829.56



NOTES:
1) ALL TREES TO BE PROTECTED (EXCEPT AS NOTED). EXISTING TREES DAMAGED BY CONTRACTOR SHALL BE REPLACED AT CONTRACTOR COST.
2) ANY TREE TO BE REMOVED SHALL BE APPROVED BY THE TOWN PRIOR TO REMOVAL.
3) CHANNEL FILL MATERIAL SHALL MEET THE REQUIREMENTS OF CDOT CLASS 2 BACKFILL WITH THE ADDITION THAT THERE SHALL BE A MINIMUM OF 50% PASSING THE NO. 200 SIEVE.

COLORADO LICENSED
CEBRAL OLLINGER
37936
10/10/2019
PROFESSIONAL ENGINEER

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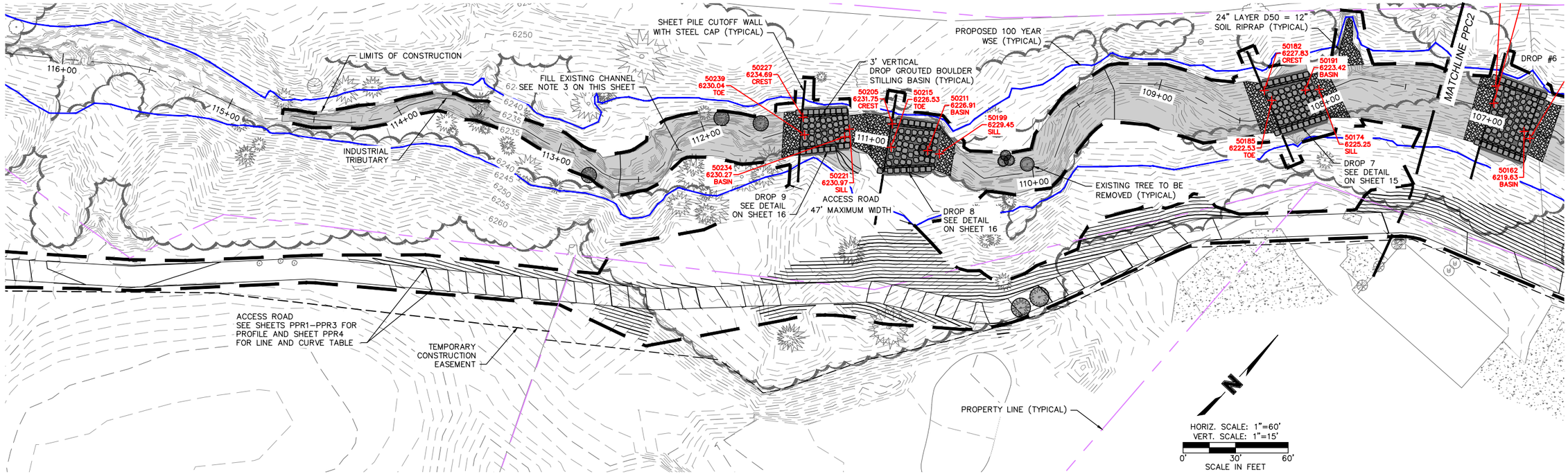
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1	2019.10.29	ADDENDUM 2 - REVISED ACCESS

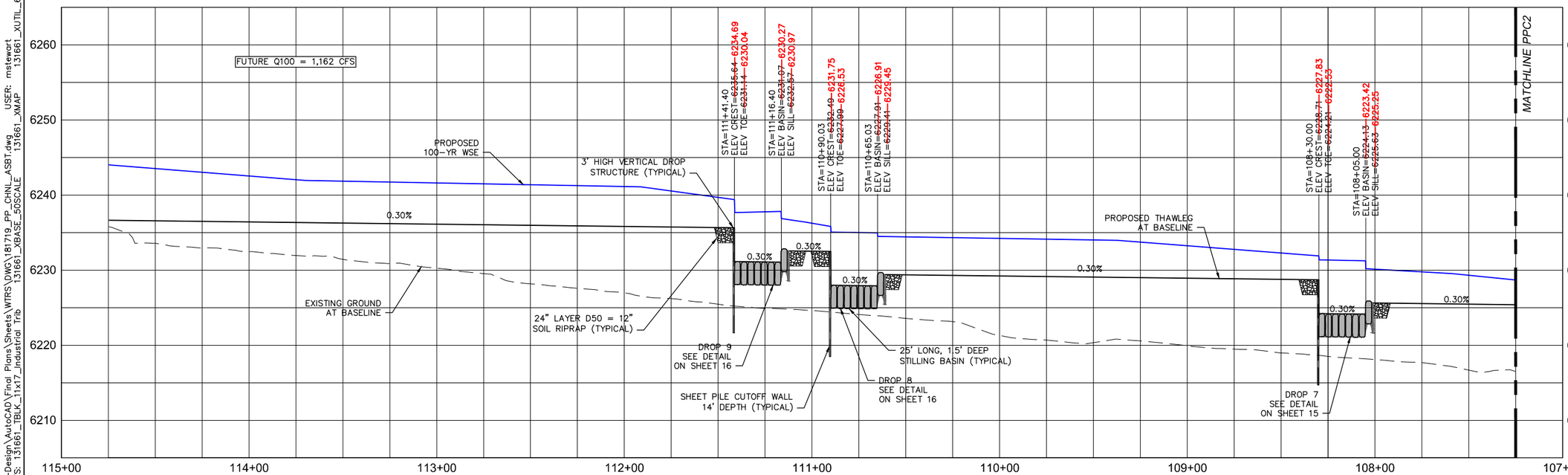
PLAN AND PROFILE
STA. 85+00 TO 107+25
INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION
CASTLE ROCK, COLORADO
2019

drawn by:	CAU
checked by:	DPK
approved by:	DLO
QA/QC by:	DPK
project no.:	018-1719
drawing no.:	-
date:	2019.10.10

PPC2
SHEET 5 OF 18

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REDLINES ARE FROM FIELD DATA COLLECTED 10/13/2020

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COLORADO LICENSED DEBRA L. OLLINGER 37936 PROFESSIONAL ENGINEER 10/10/2020

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REV. NO.	DATE	REVISIONS DESCRIPTION
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PLAN AND PROFILE
STA. 107+25 TO 114+75

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

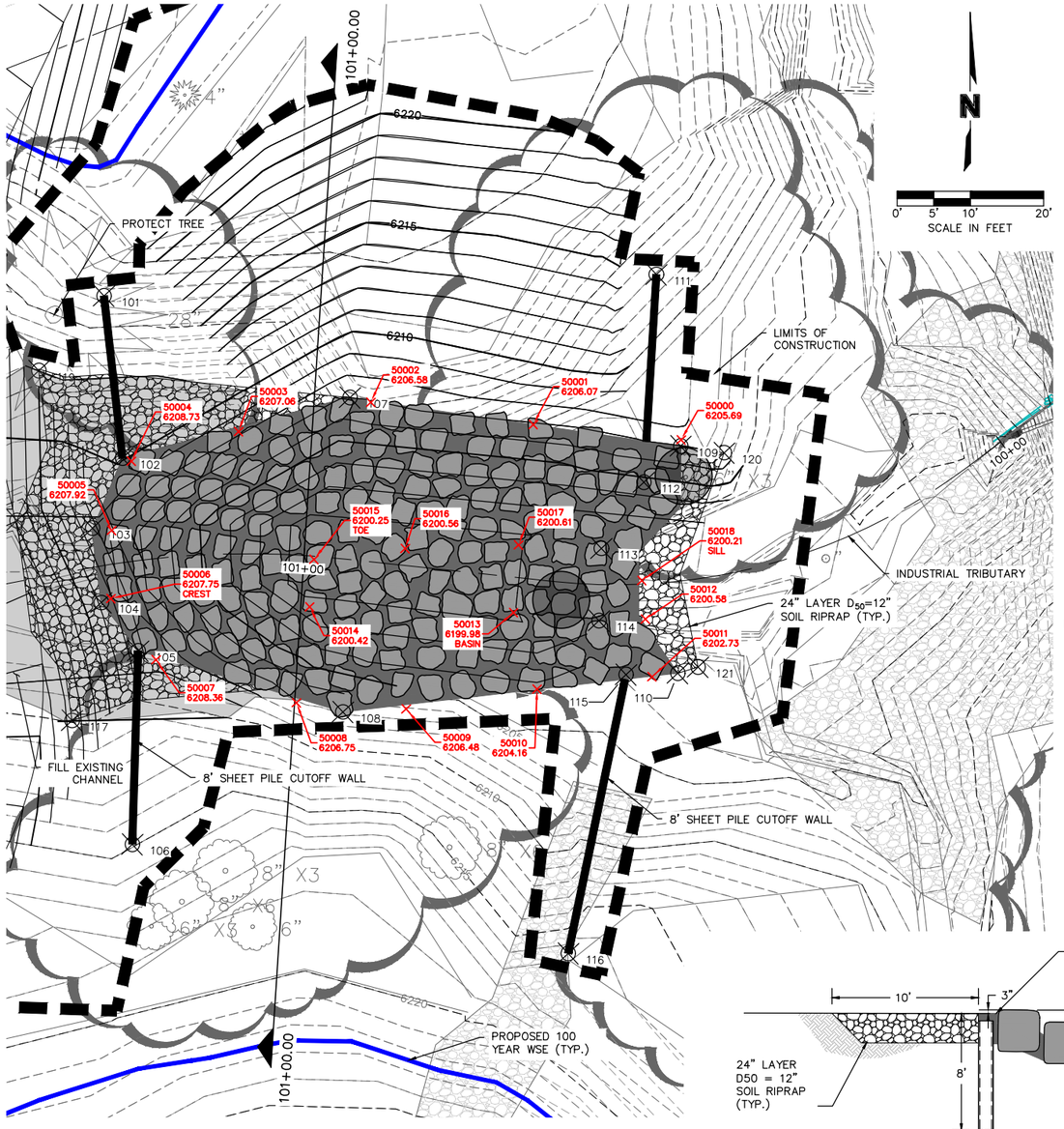
CASTLE ROCK, COLORADO

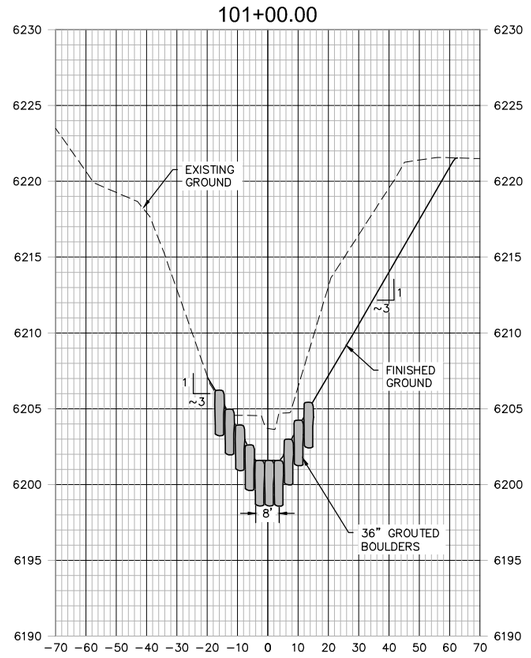
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PPC3
SHEET 6 OF 18

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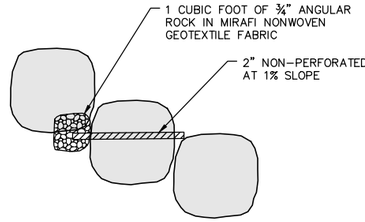




POINT TABLE - DROP 101+28.42				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
101	1562714.93	3180047.87	6217.40	SHEET PILE
102	1562692.87	3180051.14	6209.59	SHEET PILE
103	1562683.18	3180047.40	6208.10	SHEET PILE
104	1562673.08	3180048.94	6208.10	SHEET PILE
105	1562666.65	3180054.19	6208.38	SHEET PILE
106	1562640.23	3180054.29	6214.90	SHEET PILE
107	1562702.21	3180081.93	6207.00	EDGE OF BOULDERS
108	1562659.27	3180082.42	6207.00	EDGE OF BOULDERS
109	1562697.11	3180127.27	6207.00	EDGE OF BOULDERS
110	1562666.12	3180127.94	6204.00	EDGE OF BOULDERS
111	1562720.42	3180123.17	6212.91	SHEET PILE
112	1562692.03	3180122.41	6204.23	SHEET PILE
113	1562682.79	3180116.93	6201.99	SHEET PILE
114	1562672.92	3180116.93	6201.99	SHEET PILE
115	1562665.68	3180120.88	6203.50	SHEET PILE
116	1562627.37	3180114.30	6216.32	SHEET PILE
117	1562656.85	3180045.48	6209.99	EDGE OF RIPRAP
118	1562683.85	3180037.04	6208.98	EDGE OF RIPRAP
119	1562704.40	3180039.32	6211.00	EDGE OF RIPRAP
120	1562696.40	3180133.24	6206.62	EDGE OF RIPRAP
121	1562667.06	3180130.67	6203.11	EDGE OF RIPRAP

NOTES:

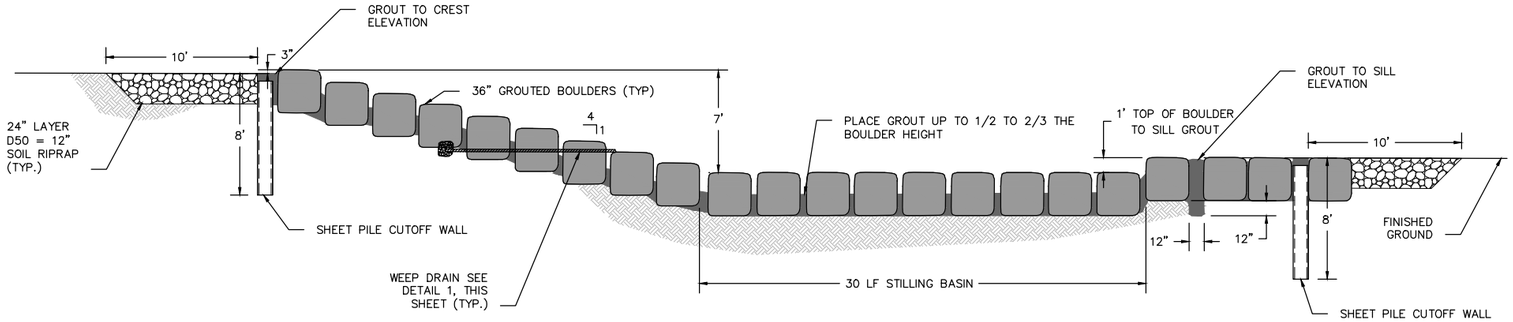
1. MIX SOIL RIPRAP 65% RIPRAP TO 35% SOIL BY VOLUME.
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3. SHEET PILE SHALL GENERALLY FOLLOW THE GROUND SURFACE LESS 6 INCHES UP TO THE ELEVATION SHOWN. SHEET PILE ELEVATIONS CORRESPOND TO THE TOP OF SHEET PILE OUTSIDE THE LIMITS OF GROUTED BOULDERS. WITHIN THE LIMITS OF GROUTED BOULDERS, SHEET PILE SHALL BE COVERED WITH 6 INCHES OF GROUT. ELEVATIONS IN TABLE REFLECT DEPRESSING SHEET PILE 6 INCHES LOWER THAN GROUND SURFACE.
4. BOULDER ELEVATIONS CORRESPOND TO THE TOP OF BOULDER.
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6. BOULDERS ARE NOT NECESSARILY DRAWN TO SCALE AND MAY VARY FROM THE QUANTITY SHOWN ON THE PLAN. THE GOAL IS TO DEPICT THE OVERALL LENGTHS OF BOULDER RUNS.
7. ALL BOULDERS SHALL CONFORM TO MILE HIGH FLOOD DISTRICT / URBAN DRAINAGE AND FLOOD CONTROL SPECIFICATIONS.
8. BOULDER PLACEMENT SHALL BE VERIFIED BY OWNER REPRESENTATIVE PRIOR TO POURING GROUT.
9. SOIL RIPRAP SHALL CONFORM TO SHAPE OF CHANNEL WITHIN LIMITS INDICATED BY POINTS AND POINT TABLE.



1 WEEP DRAIN DETAIL
Scale:NTS

NOTES:

1. WEEP DRAINS SHALL BE INSTALLED EVERY 6 FEET ALONG FACE OF DROP STRUCTURE.
2. GROUT NOT SHOWN FOR CLARITY.



A GROUTED BOULDER DROP STRUCTURE PROFILE
0' 2.5' 5' 10'

REDLINES ARE FROM FIELD DATA COLLECTED 10/13/2020

TOWN OF CASTLE ROCK APPROVAL BLOCK

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REV. NO.	DATE	REVISIONS DESCRIPTION
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REVISIONS

GROUTED BOULDER DETAILS
DROP 1 - STA. 101+28.42

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

CASTLE ROCK, COLORADO

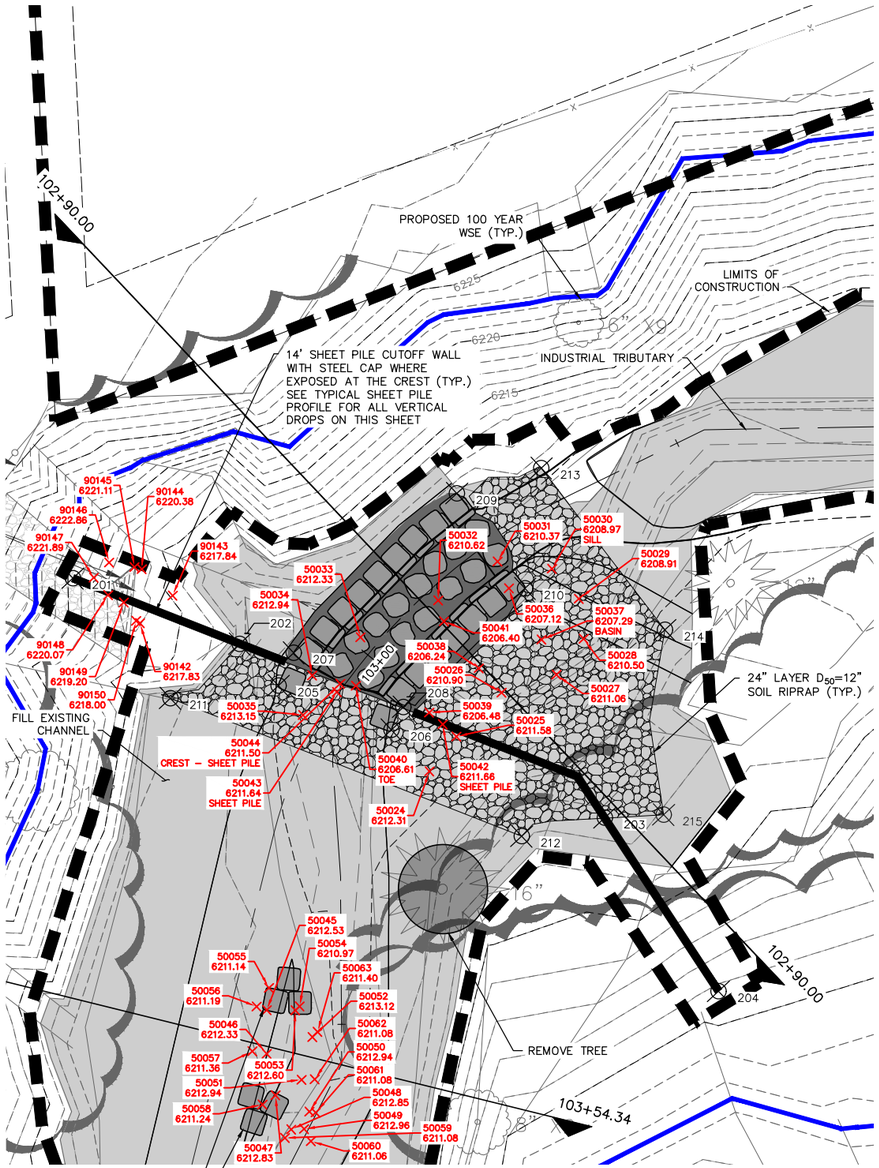
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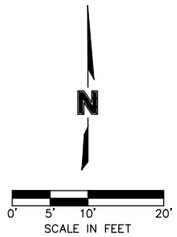
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approved by:	DLO
QA/QC by:	DPK
project no.:	018-1719
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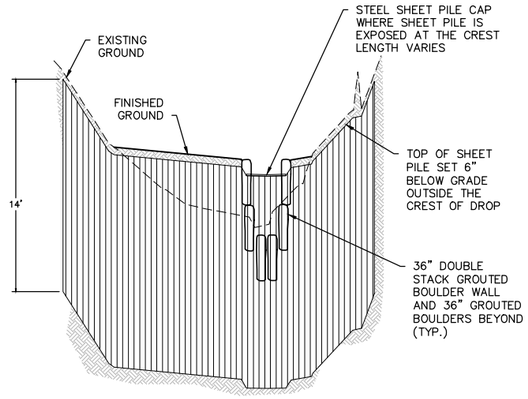
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DDT1
SHEET 11 OF 18

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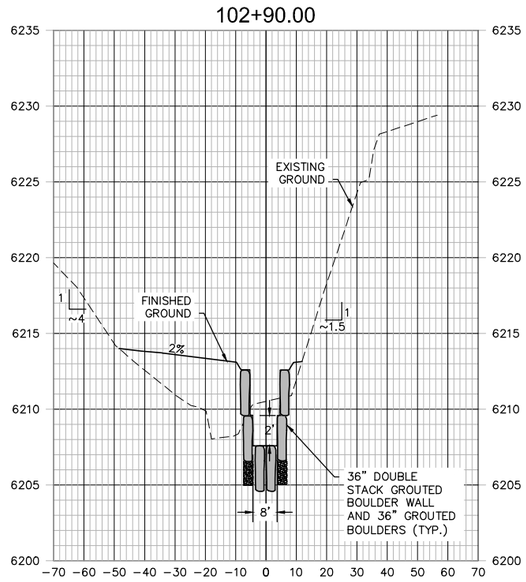


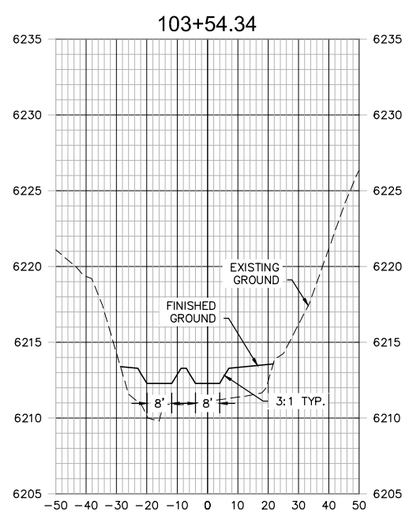




1 DDT2 TYPICAL VERTICAL DROP SHEET PILE SECTION

1"=50' HORIZONTAL, 1"=10' VERTICAL





POINT TABLE - DROP 103+05.00				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
201	1562644.61	3179849.24	6219.62	END OF SHEET PILE
202	1562636.69	3179871.52	6211.63	SHEET PILE AT CREST
203	1562615.41	3179920.47	6211.63	SHEET PILE AT CREST
204	1562593.05	3179936.25	6219.22	END OF SHEET PILE
205	1562631.37	3179876.83	6213.63	FEATURE BOULDER UPSTREAM OF SHEET PILE
206	1562626.05	3179891.92	6213.63	FEATURE BOULDER UPSTREAM OF SHEET PILE
207	1562635.77	3179878.70	6212.63	EDGE OF BOULDER WALL
208	1562629.08	3179893.41	6212.63	EDGE OF BOULDER WALL
209	1562657.51	3179899.50	6212.56	EDGE OF BOULDER WALL
210	1562645.29	3179908.90	6212.56	EDGE OF BOULDER WALL
211	1562629.22	3179862.65	6213.50	RIPRAP LIMIT
212	1562612.61	3179909.59	6213.50	RIPRAP LIMIT
213	1562661.24	3179910.52	6210.48	RIPRAP LIMIT
214	1562640.47	3179927.56	6211.85	RIPRAP LIMIT
215	1562616.09	3179928.22	6213.90	RIPRAP LIMIT

NOTES:

1. MIX SOIL RIPRAP 65% RIPRAP TO 35% SOIL BY VOLUME.
2. SOIL RIPRAP SHALL CONSIST OF A UNIFORM MIXTURE OF SOIL AND RIPRAP WITHOUT VOIDS.
3. SHEET PILE SHALL GENERALLY FOLLOW THE GROUND SURFACE LESS 6 INCHES UP TO THE ELEVATION SHOWN. SHEET PILE ELEVATIONS CORRESPOND TO THE TOP OF THE SHEET PILE OUTSIDE THE LIMITS OF GROUTED BOULDERS. WITHIN THE LIMITS OF GROUTED BOULDERS AT THE CREST, SHEET PILE SHALL HAVE A STEEL CAP. ELEVATIONS IN TABLE REFLECT DEPRESSING SHEET PILE 6 INCHES LOWER THAN GROUND SURFACE OUTSIDE THE CREST OF THE DROP.
4. BOULDER ELEVATIONS CORRESPOND TO THE TOP OF BOULDER.
5. ALL RIPRAP OUTSIDE THE CHANNEL BOTTOM SHALL BE COVERED BY 6 INCHES OF TOPSOIL.
6. BOULDERS ARE NOT NECESSARILY DRAWN TO SCALE AND MAY VARY FROM THE QUANTITY SHOWN ON THE PLAN. THE GOAL IS TO DEPICT THE OVERALL LENGTHS OF BOULDER RUNS.
7. ALL BOULDERS SHALL CONFORM TO MILE HIGH FLOOD DISTRICT / URBAN DRAINAGE AND FLOOD CONTROL SPECIFICATIONS.
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REDLINES ARE FROM FIELD DATA COLLECTED 10/13/2020

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REV. NO.	DATE	REVISIONS DESCRIPTION
1	2019.10.29	ADDENDUM 2 – REVISED ACCESS

REVISIONS

COLORADO LICENSED
DEBRA L. OLLINGER
37936
10/10/2019
PROFESSIONAL ENGINEER

RECORD DRAWINGS
December 22, 2020
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TOWN OF CASTLE ROCK APPROVAL BLOCK

TOWN OF CASTLE ROCK APPROVAL PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

APPROVED BY:

DEVELOPMENT SERVICES DATE

VERTICAL DROP DETAIL
DROP 2 - STA. 103+05

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

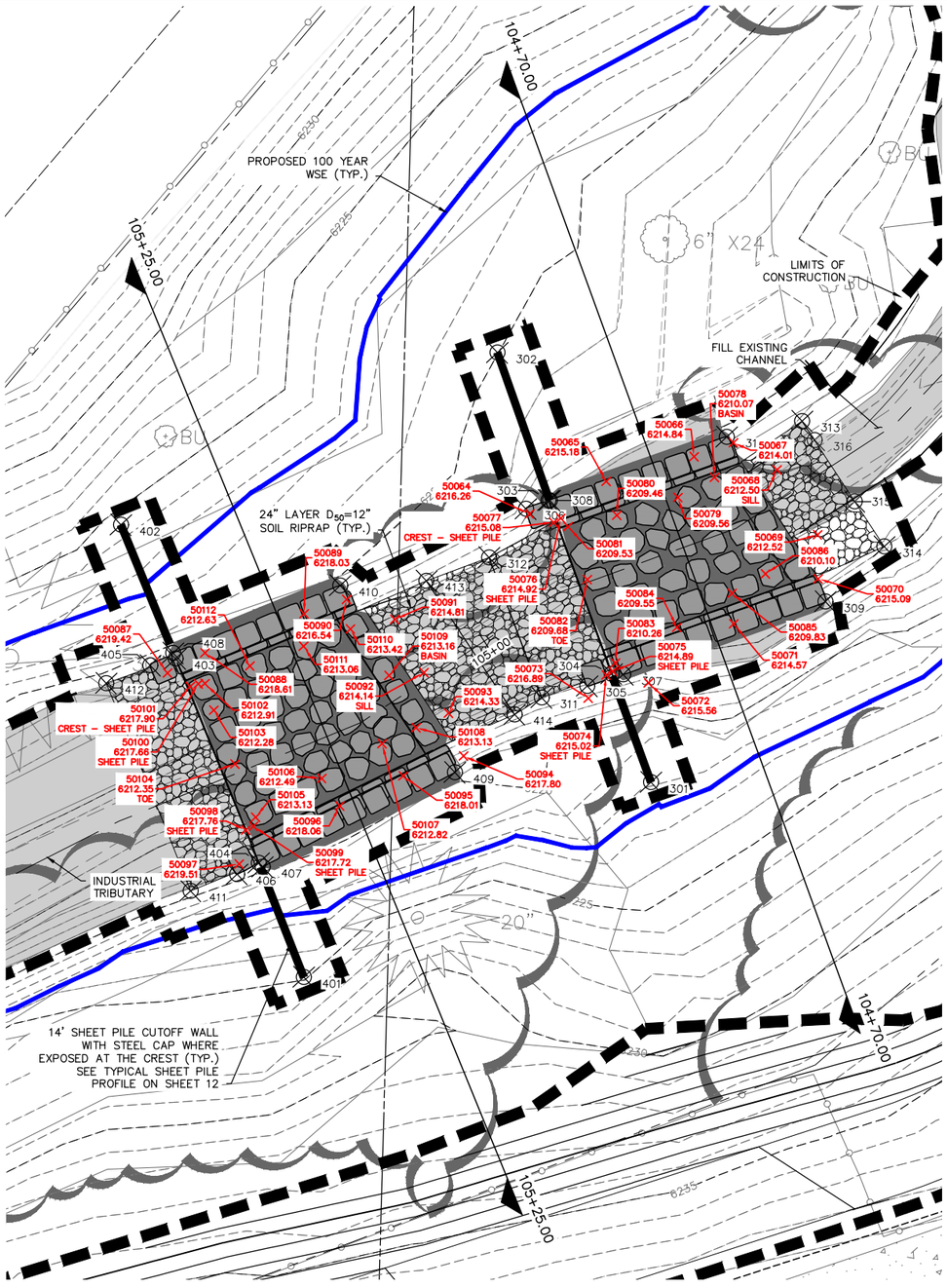
CASTLE ROCK, COLORADO

2019

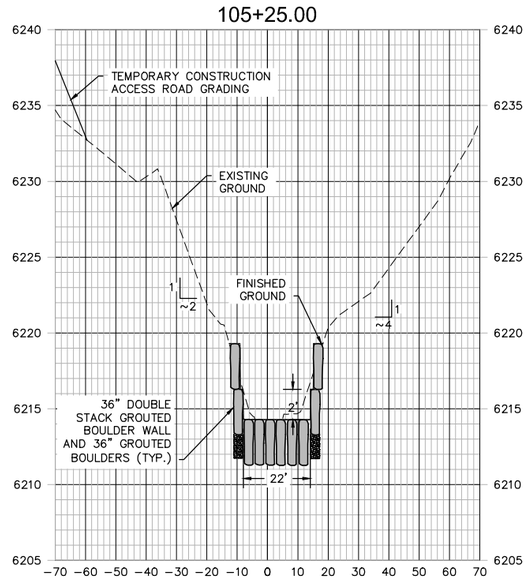
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approved by:	DLO
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project no.:	018-1719
drawing no.:	-
date:	2019.10.10

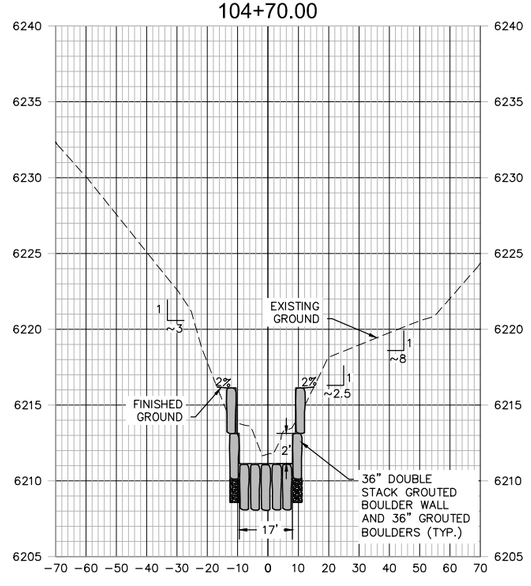
DDT2
SHEET 12 OF 18

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REDLINES ARE FROM FIELD
DATA COLLECTED 10/13/2020





POINT TABLE - DROP 105+40.00				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
401	1562434.46	3179768.69	6224.89	SHEET PILE
402	1562494.85	3179741.85	6224.47	SHEET PILE
403	1562476.98	3179749.86	6218.34	SHEET PILE AT CREST
404	1562449.73	3179762.08	6218.34	SHEET PILE AT CREST
405	1562475.95	3179746.46	6220.34	FEATURE BOULDER UPSTREAM OF SHEET PILE
406	1562448.10	3179759.20	6220.34	FEATURE BOULDER UPSTREAM OF SHEET PILE
407	1562449.20	3179762.61	6219.34	EDGE OF BOULDER WALL
408	1562477.74	3179749.52	6219.34	EDGE OF BOULDER WALL
409	1562462.88	3179788.21	6219.26	EDGE OF BOULDER WALL
410	1562487.63	3179771.82	6219.26	EDGE OF BOULDER WALL
411	1562445.60	3179752.97	6218.87	RIPRAP LIMIT
412	1562473.32	3179740.61	6218.87	RIPRAP LIMIT
413	1562488.68	3179783.46	6216.55	RIPRAP LIMIT
414	1562471.00	3179796.03	6216.40	RIPRAP LIMIT

POINT TABLE - DROP 104+85.00				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
301	1562462.45	3179814.80	6221.92	SHEET PILE
302	1562519.90	3179792.03	6220.02	SHEET PILE
303	1562500.13	3179799.61	6215.17	SHEET PILE AT CREST
304	1562476.95	3179808.95	6215.17	SHEET PILE AT CREST
305	1562475.20	3179805.71	6217.17	FEATURE BOULDER UPSTREAM OF SHEET PILE
306	1562498.88	3179796.59	6217.17	FEATURE BOULDER UPSTREAM OF SHEET PILE
307	1562476.91	3179810.52	6216.17	EDGE OF BOULDER WALL
308	1562500.15	3179799.79	6216.17	EDGE OF BOULDER WALL
309	1562487.71	3179837.57	6216.09	EDGE OF BOULDER WALL
310	1562509.56	3179823.46	6216.09	EDGE OF BOULDER WALL
311	1562473.40	3179799.60	6215.71	RIPRAP LIMIT
312	1562492.13	3179791.85	6215.71	RIPRAP LIMIT
313	1562512.04	3179833.59	6212.96	RIPRAP LIMIT
314	1562495.43	3179845.27	6213.73	RIPRAP LIMIT
315	1562501.41	3179841.08	6213.13	RIPRAP LIMIT
316	1562509.53	3179835.35	6212.55	RIPRAP LIMIT

NOTES:

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COLORADO LICENSED
DEBRA L OHLINGER
37936
10/10/2020
PROFESSIONAL ENGINEER

RECORD DRAWINGS
December 22, 2020
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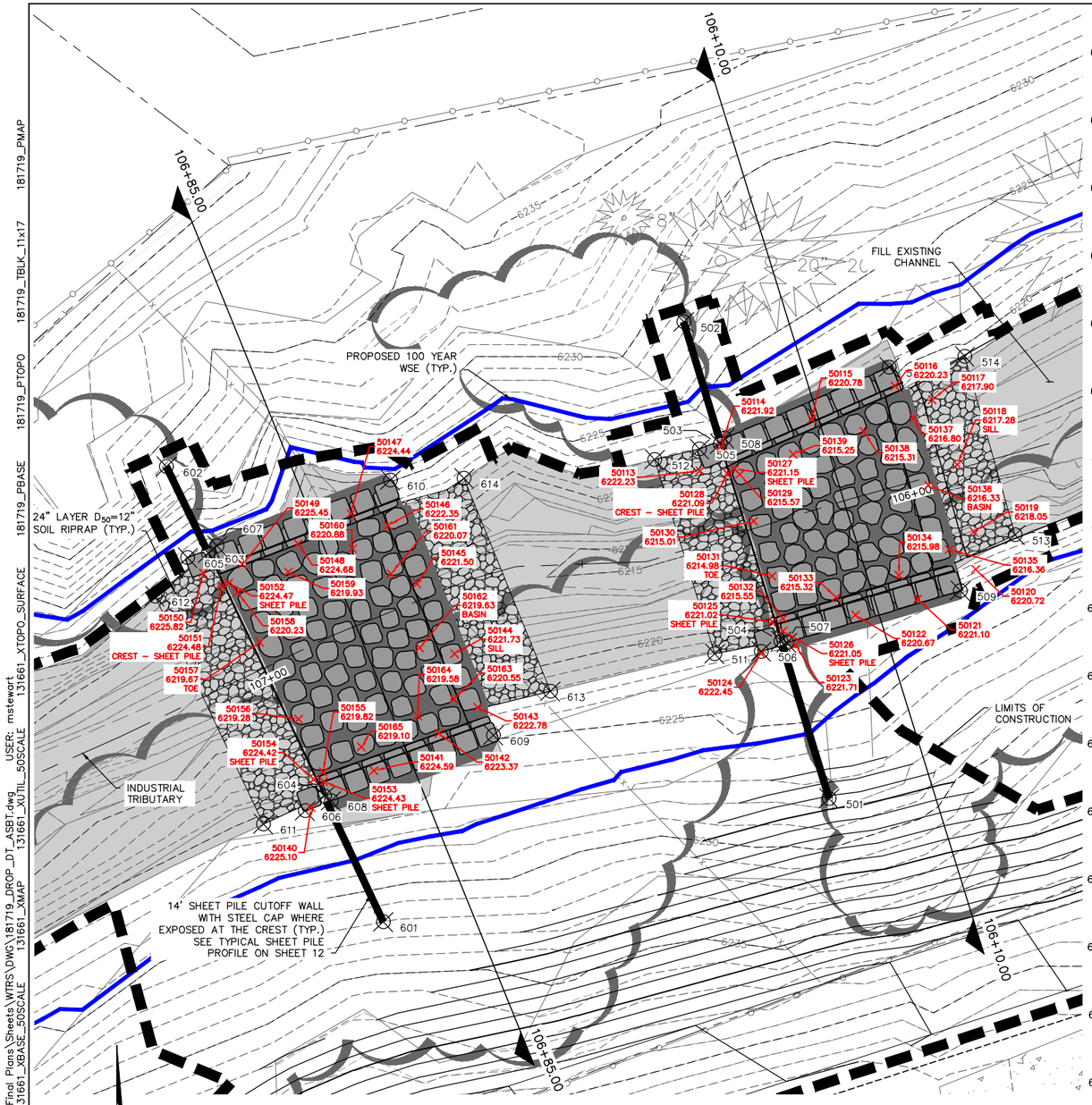
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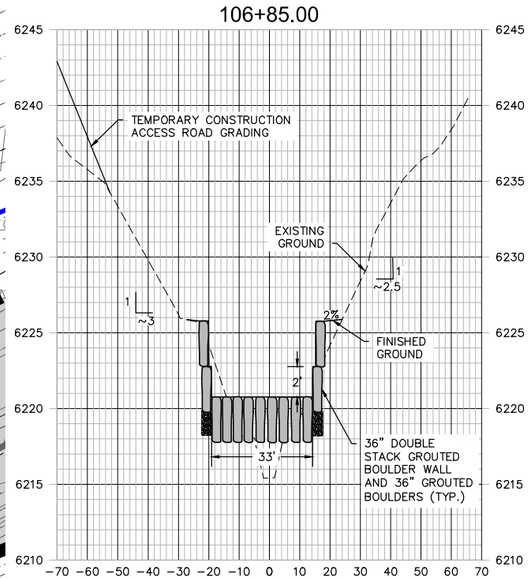
VERTICAL DROP DETAIL
DROPS 3 / 4 - STA. 105+40 / STA. 104+85
INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION
CASTLE ROCK, COLORADO
2019

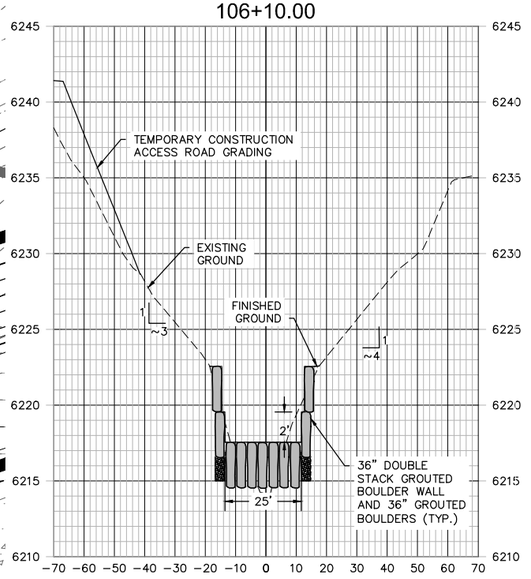
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drawing no.: -
date: 2019.10.10

DDT3
SHEET 13 OF 18

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POINT TABLE - DROP 107+00.00

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
601	1562370.04	3179626.71	6232.00	SHEET PILE
602	1562436.11	3179592.42	6233.86	SHEET PILE
603	1562423.55	3179599.04	6224.82	SHEET PILE AT CREST
604	1562388.31	3179617.39	6224.82	SHEET PILE AT CREST
605	1562422.78	3179596.01	6226.82	FEATURE BOULDER UPSTREAM OF SHEET PILE
606	1562386.03	3179614.63	6226.82	FEATURE BOULDER UPSTREAM OF SHEET PILE
607	1562424.68	3179600.29	6225.82	EDGE OF BOULDER WALL
608	1562387.63	3179618.40	6225.82	EDGE OF BOULDER WALL
609	1562398.13	3179642.01	6225.74	EDGE OF BOULDER WALL
610	1562435.24	3179625.52	6225.74	EDGE OF BOULDER WALL
611	1562383.86	3179608.55	6225.35	RIPRAP LIMIT
612	1562416.92	3179591.39	6225.35	RIPRAP LIMIT
613	1562404.91	3179650.19	6222.21	RIPRAP LIMIT
614	1562435.88	3179636.38	6222.21	RIPRAP LIMIT

POINT TABLE - DROP 106+25.00

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
501	1562390.49	3179691.83	6227.60	SHEET PILE
502	1562460.07	3179668.00	6228.33	SHEET PILE
503	1562442.19	3179673.98	6221.59	SHEET PILE AT CREST
504	1562413.45	3179683.95	6221.59	SHEET PILE AT CREST
505	1562441.38	3179670.94	6223.59	FEATURE BOULDER UPSTREAM OF SHEET PILE
506	1562411.84	3179681.07	6223.59	FEATURE BOULDER UPSTREAM OF SHEET PILE
507	1562413.25	3179684.80	6222.59	EDGE OF BOULDER WALL
508	1562443.13	3179674.59	6222.59	EDGE OF BOULDER WALL
509	1562421.81	3179710.13	6222.51	EDGE OF BOULDER WALL
510	1562454.40	3179698.52	6222.51	EDGE OF BOULDER WALL
511	1562411.25	3179674.23	6222.12	RIPRAP LIMIT
512	1562439.59	3179664.40	6222.12	RIPRAP LIMIT
513	1562430.33	3179717.95	6218.98	RIPRAP LIMIT
514	1562456.39	3179709.62	6218.98	RIPRAP LIMIT

NOTES:

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December 22, 2020
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REVISIONS

REV. NO.	DATE	REVISIONS DESCRIPTION
1	2019.10.29	ADDENDUM 2 - REVISED ACCESS

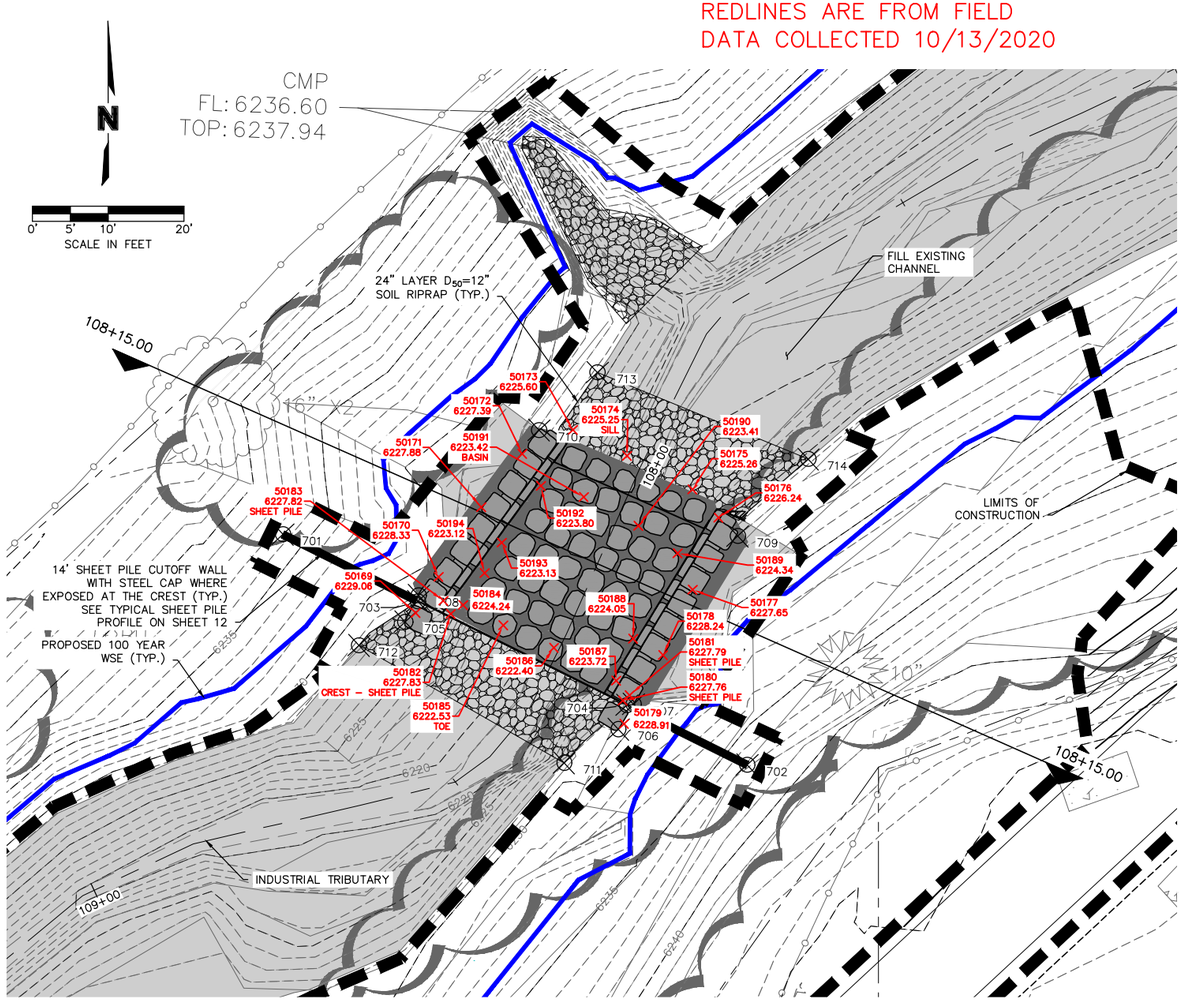
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DROPS 5 / 6 - STA. 107+00.00 / STA. 106+25.00
INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION
CASTLE ROCK, COLORADO
2019

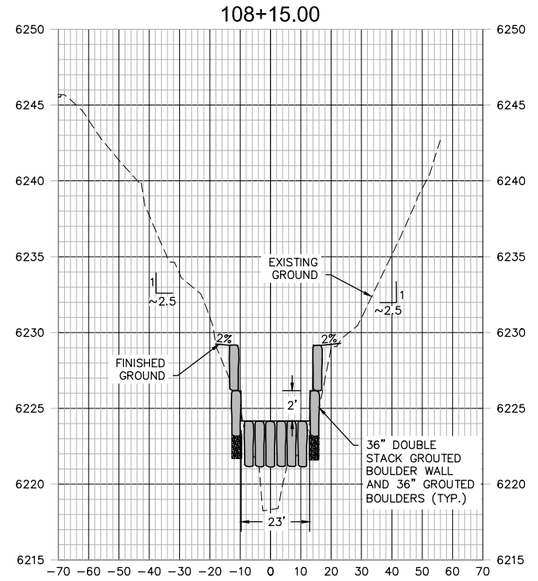
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checked by:	DPK
approved by:	DLO
QA/QC by:	DPK
project no.:	018-1719
drawing no.:	-
date:	2019.10.10

DDT4
SHEET 14 OF 18

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REDLINES ARE FROM FIELD
DATA COLLECTED 10/13/2020





POINT TABLE - DROP 108+30.00

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
701	1562336.82	3179483.40	6236.43	SHEET PILE
702	1562308.49	3179545.69	6236.82	SHEET PILE
703	1562328.58	3179501.51	6228.21	SHEET PILE AT CREST
704	1562315.83	3179529.54	6228.21	SHEET PILE AT CREST
705	1562325.81	3179499.92	6230.21	FEATURE BOULDER UPSTREAM OF SHEET PILE
706	1562312.62	3179528.53	6230.21	FEATURE BOULDER UPSTREAM OF SHEET PILE
707	1562315.97	3179530.41	6229.21	EDGE OF BOULDER WALL
708	1562329.36	3179501.57	6229.21	EDGE OF BOULDER WALL
709	1562338.63	3179543.40	6229.12	EDGE OF BOULDER WALL
710	1562351.71	3179516.71	6229.12	EDGE OF BOULDER WALL
711	1562307.93	3179521.53	6228.75	RIPRAP LIMIT
712	1562322.50	3179493.93	6228.75	RIPRAP LIMIT
713	1562359.58	3179524.16	6225.62	RIPRAP LIMIT
714	1562349.10	3179552.35	6225.62	RIPRAP LIMIT

NOTES:

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6. BOULDERS ARE NOT NECESSARILY DRAWN TO SCALE AND MAY VARY FROM THE QUANTITY SHOWN ON THE PLAN. THE GOAL IS TO DEPICT THE OVERALL LENGTHS OF BOULDER RUNS.
7. ALL BOULDERS SHALL CONFORM TO MILE HIGH FLOOD DISTRICT / URBAN DRAINAGE AND FLOOD CONTROL SPECIFICATIONS.
8. BOULDER PLACEMENT SHALL BE VERIFIED BY OWNER REPRESENTATIVE PRIOR TO POURING GROUT.
9. SOIL RIPRAP SHALL CONFORM TO SHAPE OF CHANNEL WITHIN LIMITS INDICATED BY POINTS AND POINT TABLE.

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CALL 3-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.



COLORADO LICENSED
CAUBRAL OLLINGER
37936
10/10/2020
PROFESSIONAL ENGINEER

RECORD DRAWINGS
December 22, 2020
DATE PRINTED
OLSSON

TOWN OF CASTLE ROCK APPROVAL BLOCK

TOWN OF CASTLE ROCK APPROVAL PLANS ARE HEREBY APPROVED FOR ONE YEAR FROM DATE OF DEVELOPMENT SERVICES APPROVAL

APPROVED BY:

DEVELOPMENT SERVICES DATE

olsson
1525 Raleigh Street
Suite 400
Denver, CO 80204
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REV. NO.	DATE	REVISIONS DESCRIPTION
1	2019.10.29	ADDENDUM 2 - REVISED ACCESS

REVISIONS

VERTICAL DROP DETAIL
DROP 7 - STA. 108+30.00

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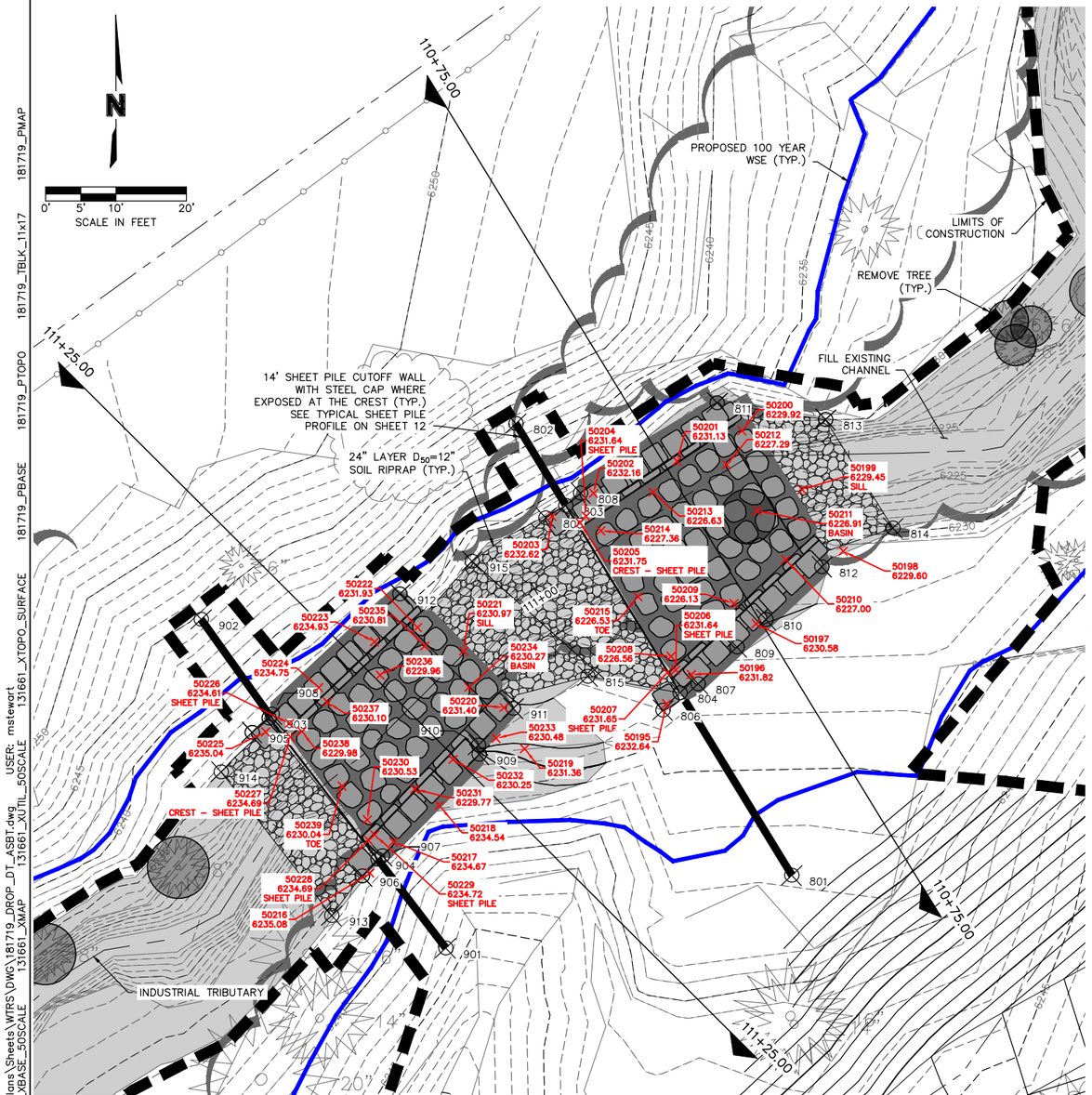
CASTLE ROCK, COLORADO

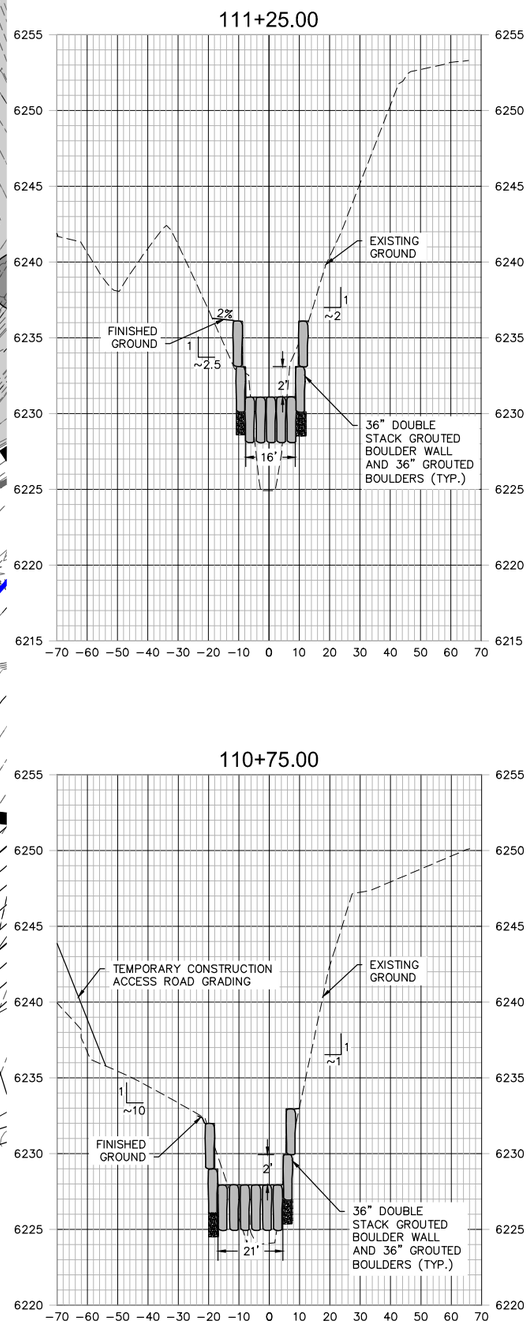
2019

drawn by: CAU
checked by: DPK
approved by: DLO
QA/QC by: DPK
project no.: 018-1719
drawing no.: -
date: 2019.10.10

DDT5
SHEET 15 OF 18

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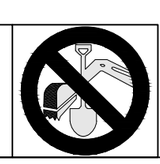


REDLINES ARE FROM FIELD DATA COLLECTED 10/13/2020

NOTES:

1. MIX SOIL RIPRAP 65% RIPRAP TO 35% SOIL BY VOLUME.
2. SOIL RIPRAP SHALL CONSIST OF A UNIFORM MIXTURE OF SOIL AND RIPRAP WITHOUT VOIDS.
3. SHEET PILE SHALL GENERALLY FOLLOW THE GROUND SURFACE LESS 6 INCHES UP TO THE ELEVATION SHOWN. SHEET PILE ELEVATIONS CORRESPOND TO THE TOP OF THE SHEET PILE OUTSIDE THE LIMITS OF GROUTED BOULDERS. WITHIN THE LIMITS OF GROUTED BOULDERS AT THE CREST, SHEET PILE SHALL HAVE A STEEL CAP. ELEVATIONS IN TABLE REFLECT DEPRESSING SHEET PILE 6 INCHES LOWER THAN GROUND SURFACE OUTSIDE THE CREST OF THE DROP.
4. BOULDER ELEVATIONS CORRESPOND TO THE TOP OF BOULDER.
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POINT TABLE - DROP 111+41.40

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
901	1562107.72	3179345.85	6243.51	SHEET PILE
902	1562153.16	3179309.54	6244.58	SHEET PILE
903	1562139.47	3179319.67	6235.14	SHEET PILE AT CREST
904	1562119.98	3179335.79	6235.14	SHEET PILE AT CREST
905	1562137.36	3179317.31	6237.14	FEATURE BOULDER UPSTREAM OF SHEET PILE
906	1562117.53	3179333.64	6237.14	FEATURE BOULDER UPSTREAM OF SHEET PILE
907	1562120.49	3179336.43	6236.14	EDGE OF BOULDER WALL
908	1562140.05	3179320.07	6236.14	EDGE OF BOULDER WALL
909	1562135.35	3179349.64	6236.14	EDGE OF BOULDER WALL
910	1562136.67	3179349.49	6233.14	EDGE OF SINGLE STACK BOULDER WALL
911	1562142.06	3179354.25	6233.12	EDGE OF SINGLE STACK BOULDER WALL
912	1562157.73	3179337.63	6236.06	EDGE OF BOULDER WALL
913	1562111.77	3179329.51	6235.68	RIPRAP LIMIT
914	1562131.62	3179313.11	6235.68	RIPRAP LIMIT
915	1562162.70	3179347.70	6232.53	RIPRAP LIMIT

POINT TABLE - DROP 110+90.00

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
801	1562119.72	3179394.63	6236.82	SHEET PILE
802	1562182.49	3179353.26	6242.33	SHEET PILE
803	1562171.09	3179360.74	6231.99	SHEET PILE AT CREST
804	1562145.08	3179377.87	6231.99	SHEET PILE AT CREST
805	1562169.23	3179357.95	6233.99	FEATURE BOULDER UPSTREAM OF SHEET PILE
806	1562142.52	3179375.54	6233.99	FEATURE BOULDER UPSTREAM OF SHEET PILE
807	1562146.43	3179380.39	6232.99	EDGE OF SE BOULDER WALL
808	1562172.93	3179362.79	6232.99	EDGE OF BOULDER WALL
809	1562151.82	3179385.75	6232.49	EDGE OF SE BOULDER WALL
810	1562155.87	3179389.71	6231.99	EDGE OF SE BOULDER WALL
811	1562186.40	3179381.74	6232.92	EDGE OF BOULDER WALL
812	1562163.64	3179397.38	6231.49	EDGE OF SE BOULDER WALL
813	1562184.55	3179397.21	6229.38	RIPRAP LIMIT
814	1562169.49	3179407.30	6229.38	RIPRAP LIMIT
815	1562146.97	3179364.70	6232.53	RIPRAP LIMIT

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DEBRA L. OLLINGER
37936
10/10/2019
PROFESSIONAL ENGINEER

RECORD DRAWINGS
December 22, 2020
DATE PRINTED
OLSSON

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APPROVED BY:

DEVELOPMENT SERVICES DATE

VERTICAL DROP DETAIL
DROPS 8 / 9 - STA. 111+41.40 / STA. 110+90.00

INDUSTRIAL TRIBUTARY STABILIZATION PROJECT
FOR CONSTRUCTION

CASTLE ROCK, COLORADO

2019

drawn by:	CAU
checked by:	DPK
approved by:	DLO
QA/QC by:	DPK
project no.:	018-1719
drawing no.:	-
date:	2019.10.10

DDT6
SHEET 16 OF 18

DWG: F:\2018\1501-2000\018-1719\40-Design\AutoCAD\Final Plans\Sheets\WTRS\DWG\181719_DROP_DT_ASBT.dwg USER: mstewart
DATE: Dec 22, 2020 11:09am XREFS: EX-UTIL 131661_XBASE_50SCALE 131661_XMAP 131661_XUTIL_50SCALE 181719_TBLK_11x17 181719_PTOPO 181719_PBASE 181719_PMAP

PHASE I DRAINAGE REPORT
FOR
MILLERS LANDING
Castle Rock, Colorado
PROJECT NO. PDP16-0003

PREPARED FOR:

Norris Design
1101 Bannock Street
Denver, CO 80204
Phone: 303-892-1166
Contact: Mitch Black

Developer:

Citadel Development, LLC (developer and future owner)
135 South LaSalle Street, Suite 3025
Chicago, IL 60603
Phone: 847-323-5277
Contact: Scott Springer

PREPARED BY:

CORE Consultants, Inc.
1950 W. Littleton Boulevard, Suite 109
Littleton, CO 80120
Phone: 303-703-4444
Contact: Rob Hansen
CORE Project Number: 16-033

August 15, 2016
REV September 8, 2016

APPROVAL BLOCKS

I. ENGINEER'S STATEMENT:

I affirm that this report and plan for the Phase I Drainage design of Millers Landing was prepared by me (or under my direct supervision) in accordance with the provisions of the Town of Castle Rock Drainage Design and Technical Criteria for the owners thereof. I understand that the Town of Castle Rock does not and will not assume liability for drainage facilities designed by others.



Robert D. Hansen, PE, CFM
Colorado Professional Engineer
License #50417

II. TOWN OF CASTLE ROCK APPROVALS:

UTILITIES DEPARTMENT _____ DATE _____

DEVELOPMENT SERVICES _____ DATE _____

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1. GENERAL LOCATION AND DESCRIPTION

1.1. Site Location

The Millers Landing project is located north of Plum Creek Parkway approximately 1,300ft west of Interstate 25 (I-25) in Castle Rock, Colorado. The site is primarily within the Northeast Quarter (NE ¼) of Section 10 with a small portion in the Southeast Quarter (SE ¼) of Section 10 in Township 8 South, Range 67 West of the 6th P.M. in Douglas County, Colorado. The project is bounded to the north by an existing drainageway known as the Industrial Channel. The Phillip S. Miller Park is located southwest of the project site. Existing industrial development is located to the north and northeast. Undeveloped land is located to the south of Plum Creek Parkway known as the Castle Meadow Planned Development. An 18ac undeveloped parcel is located southeast of the project site and is also part of the Castle Meadows Planned Development, known as the Castle Meadows Northeast Corner Parcel. Refer to the Vicinity Map located in Appendix A.

1.2. Description of Property and Land Use

The Millers Landing project includes approximately 48.2 acres of undeveloped land. Portions of the site were previously disturbed but have generally been revegetated. The site generally drains to the north and northeast toward the Industrial Channel. A local storm sewer system collects runoff from Plum Creek Parkway and outlets to the project site via a 36" RCP. A portion of the Industrial Channel is identified as a Zone AE flood zone on FEMA FIRM Panels 08035C0282G and 08035C0301G dated March 16, 2016, refer to Appendix B.

The soils vary throughout the site and include Newlin gravelly sandy loam (NeE), Fondis clay loam (FoD) and Pits, clay (CP). The Newlin gravelly sandy loam is a part of the Type B hydrologic soil group, Fondis clay loam is part of the Type C hydrologic soil group and the Pits, clay soil type is assumed to be part of the Type D hydrologic soil group. A soils map has been provided in Appendix B.

The property is currently zone as I-2, General Industrial. The property is to be rezoned to IO, Interchange Overlay District, to support a Mixed Use Development. The specific future uses and site configuration have not been determined at this time. It is likely the development will include: retail stores, food and beverage establishments, entertainment establishments, office space and a hotel.

The project will complete the east half of Plum Creek Parkway along the project frontage and complete the roadway improvements north to Auburn Drive. Additionally it is assumed the project will extend Atchison Way from Topeka Way to Plum Creek Parkway.

2. DRAINAGE BASIN AND SUB-BASINS

2.1. Major Drainage Basins

The Millers Landing site is located in a portion of the Industrial Watershed which outfalls to East Plum Creek. The Industrial Watershed was studied as part of the Omni, Industrial and Westfield Watershed Master Plan report by CH2MHill in January 2011, referred to as the Master Plan hereafter. The Master Plan provided a comprehensive drainage plan and flood plain analysis for the Omni, Industrial and Westfield Watersheds, including providing recommendations for channel improvements. The Master Plan is referenced throughout this report, reference material can be found in Appendix D. The provided reference information has been reviewed and accepted for use in this report. In conjunction with the Master Plan a Flood Hazard Area Delineation study was also completed in April 2013 that mapped the AE floodzone for the Industrial Channel.

2.2. Minor Drainage Basins

The project is impacted by offsite storm flows from a portion of Plum Creek Parkway. The Phase III Drainage Repot for Coachline Road and Plum Creek Boulevard at I-15, by Felsburg Holt & Ullevig revised March 18, 2009 was reviewed and used to quantify offsite flows impacting the project site. This study will be referred to as the Plum Creek Study hereafter. Additionally at the time of the Plum Creek Study the roadway west of I-25 was called Coachline Road; today it's known as Plum Creek Parkway. The Plum Creek Study is referenced throughout this report, reference material can be found in Appendix D. The provided reference information has been reviewed and accepted for use in this report. The Plum Creek Study master planned the improvements for the full build out of Plum Creek Parkway and identified sub-basin groups using letter designations; the Millers Landing project is adjacent to the A, B and C sub-basin groups. The A basins include portions of Plum Creek Parkway north of the Industrial Channel to Auburn Drive. The B basins include Plum Creek Parkway from the Industrial Channel south to the 36" RCP that discharges to the Millers Landing site. Additionally a 10.4ac offsite basin, OS2, contributes runoff to the B basins storm sewer system and ultimately the project site. The C basins include Plum Creek Parkway from the 36" RCP south to I-25. The referenced sub-basins are shown on the Drainage Plan in Appendix E.

The project site will follow the historic drainage patterns with some minor rerouting due to the proposed roadways and development. Runoff will generally drain north towards the Industrial Channel. An onsite storm sewer system will collect and convey runoff to a proposed detention pond located at the northeast corner of the project site.

3. EXISTING STORMWATER CONVEYANCE OR STORAGE FACILITIES

3.1. Existing Stormwater Conveyance Facilities

An existing 18ftx10ft box culvert conveys flow in the Industrial Channel under Plum Creek Parkway at the west edge of the project site. The Master Plan indicates the existing 100-year flow just upstream of Plum Creek Parkway is 400cfs, refer to referenced design point J7. The Industrial Channel continues northeast along the northern edge of the project site. At the downstream end of the project site the Master Plan indicates an existing 100-year flow rate of 610cfs in the Industrial Channel, refer to referenced design point J6. Significant erosion is present along the Industrial Channel; stabilization will likely be required.

The Master Plan identifies a number of channel improvements to the Industrial Channel. The Millers Landing project site is located from approximately station 20+00 to 46+00 of the Industrial Channel as identified on the Master Plan and Profile drawings, refer to Appendix D. The Master Plan indicates approximately 14 check structures, a 12ft sloping grouted boulder run down, and 750LF of channelization are required along the project frontage. Refer to reference material in Appendix D. The Millers Landing development will likely be required to complete channel improvements along the Industrial Channel. Future drainage studies will determine whether to follow the Master Plan recommendations or some other alternative.

A small storm drain system collects flow from the A basins and discharges on the south (upstream) side of Plum Creek Parkway and the Industrial Channel to a water quality basin. The Millers Landing project will be responsible for completing the east half of Plum Creek Parkway to Auburn Drive. Existing storm sewer stubs will need to be extended to future inlets to collect runoff at referenced design points A2, A4 and A6. The existing storm sewer system that collects runoff from the B basins will need to be extended as well to collect flows at design points B2 and B4 to support the buildout of Plum Creek Parkway. The outlet for the B basin storm sewer discharges to the project site; this runoff will need be routed through the project site, most likely in a storm sewer system, to Pond A, the detention pond at the northeast corner of the project. Within the C sub-basins existing storm drain stubs have also been provided to serve the future roadway expansion. Storm drain inlets will be required to collect runoff from basins C2, C4 and C6. This C sub-basin storm sewer system discharges to a water quality pond, Pond 2, adjacent to I-25.

An existing earthen channel conveys runoff from an existing culvert crossing Topeka Way at Atchison Way to the Industrial Channel; the channel will need to modified with the extension of Atchison Way from Topeka Way to Plum Creek Parkway. Additionally there appears to be significant erosion in the existing channel.

3.2. Existing Stormwater Storage Facilities

Within the project site there are no existing stormwater storage or water quality treatment facilities. There are two existing water quality basins used to treat runoff from Plum Creek Parkway. Pond 1 water quality basin is located on the south side of Plum Creek Parkway and the Industrial Channel crossing and treats flow from the A basins. This water quality basin will need to be modified to account for additional impervious area for the expansion of the Plum Creek Parkway. Pond 2 is located at the southwest corner of the I-25 and Plum Creek Parkway. According to the Plum Creek study Pond 2 provides water quality and detains the minor storm for runoff from the C basins. Refer to the Plum Creek study reference material for the location of Pond 2.

4. PROPOSED STORMWATER CONVEYANCE OR STORAGE FACILITIES

4.1. Proposed Stormwater Conveyance Facilities

A large culvert crossing will be required to convey flow in the Industrial Channel under the Atchison Way roadway extension. The Master Plan identifies the future 100-year flow at this crossing is 850cfs, refer to referenced design point J6. Additionally a multi-use trail is planned to follow the Industrial Channel, therefore the culvert should be designed for pedestrian access to provide grade separation between Atchison Way and the multi-use trail.

As previously discussed the existing storm sewer systems in Plum Creek Parkway will need to be modified in conjunction with the roadway expansion. The B basin storm drain system will be extended through the project site to a detention basin, Pond A.

Onsite runoff will be routed through the site via surface flow and onsite storm sewer systems. Runoff will generally be conveyed northeast to the proposed detention pond. The size and location of this storm drain system will be designed during the detailed design phase of the project.

4.2. Proposed Stormwater Storage Facilities

The proposed detention pond, Pond A, at the northeast corner of the project will be designed as a full-spectrum detention pond (WQCV, EURV, 100-year), and will release at the required flow rates. The area treated includes the B basins, offsite basin OS2 and the project site, basin 1. The detention pond volume has been calculated using the Urban Drainage spreadsheet for detention ponds. The location and configuration of Pond A is conceptual and subject to change. Refer to Appendix C for calculations. Pond A will release runoff at historic rates into the Industrial Channel.

5. WATER QUALITY ENCHANCEMENT BEST MANAGEMENT PRACTICES

5.1. Non-Structural Best Management Practices

The project will utilize non-structural best management practices as defined in the future grading, erosion, & sediment control plans for the site during construction. They will include but are not limited to silt fence, inlet protection, diversion ditches, check dams, and sediment basins. Post construction best management practices may include swales and permanent seeding.

5.2. Structural Best Management Practices

Water quality measures will be included in the design of the proposed detention pond for the site. The pond will be designed as an extended detention basin which will incorporate structures which will release flows for the excess urban runoff volume (EURV), and the 100-year storm event. Stream stabilization improvements within Industrial Channel will also be incorporated as previously discussed.

6. FLOODPLAIN MODIFICATIONS

6.1. Major Drainageway – Undesignated Floodplain

The Industrial Channel is the only major drainageway impacted by the project and for the purpose of this report will be addressed in Section 6.2.

6.2. Major Drainageway – Designated Floodplain

A portion of the Industrial Channel is located in a 100-yr floodplain, the remaining portion of the channel is mapped as a 500-yr floodplain. The Industrial Channel was mostly recently studied by the Omni, Industrial and Westfield Watersheds Flood Hazard Area Delineation report by CH2MHill in April 2013 in conjunction with the referenced Master Plan.

As previously discussed in section 3.1 the Master Plan indicates multiple improvements to the channel for stabilization, additionally a roadway crossing is proposed at Atchison Way. Due to the proposed modifications within the floodzone a Floodplain Development Permit and subsequently a Conditional Letter of Map Revision (CLOMR) will be required prior to construction of the modifications to the Industrial Channel. After the Industrial Channel improvements are constructed a Letter of Map Revision (LOMR) will need to be processed through FEMA. The Floodplain Development Permit will need to permitted through the Town of Castle Rock.

7. POTENTIAL PERMITTING REQUIREMENTS

According to the Master Plan, the United States Fish and Wildlife Service (USFWS) have not identified any areas of the Industrial tributary as "riverine wetlands" or as "emergent wetlands. Therefore a Section 404 permit is not anticipated, however small pockets of ephemeral wetlands were found along the stream and a detailed inventory should be completed prior to the construction of any improvements.

As previously mentioned in Section 6.2 a Floodplain Development Permit, CLOMR and LOMR will be required for the project. A Colorado Discharge System Permit (CDPS) will also be required for the project.

Aracdis completed a Wildlife and Habitat Survey in June 2016 and determined that threatened, endangered, proposed and candidate species were not likely to occur on the project site; this includes the Preble's Meadows Jumping Mouse. Excerpts from the report can be found in Appendix D.

8. REFERENCES

Drainage Criteria Manual, Volumes 1, 2, & 3, Urban Drainage and Flood Control District, Volumes 1 & 2 – Originally Published September 1969, Updated January 2016; Volume 3 Originally Published September 1992, Updated November 2010.

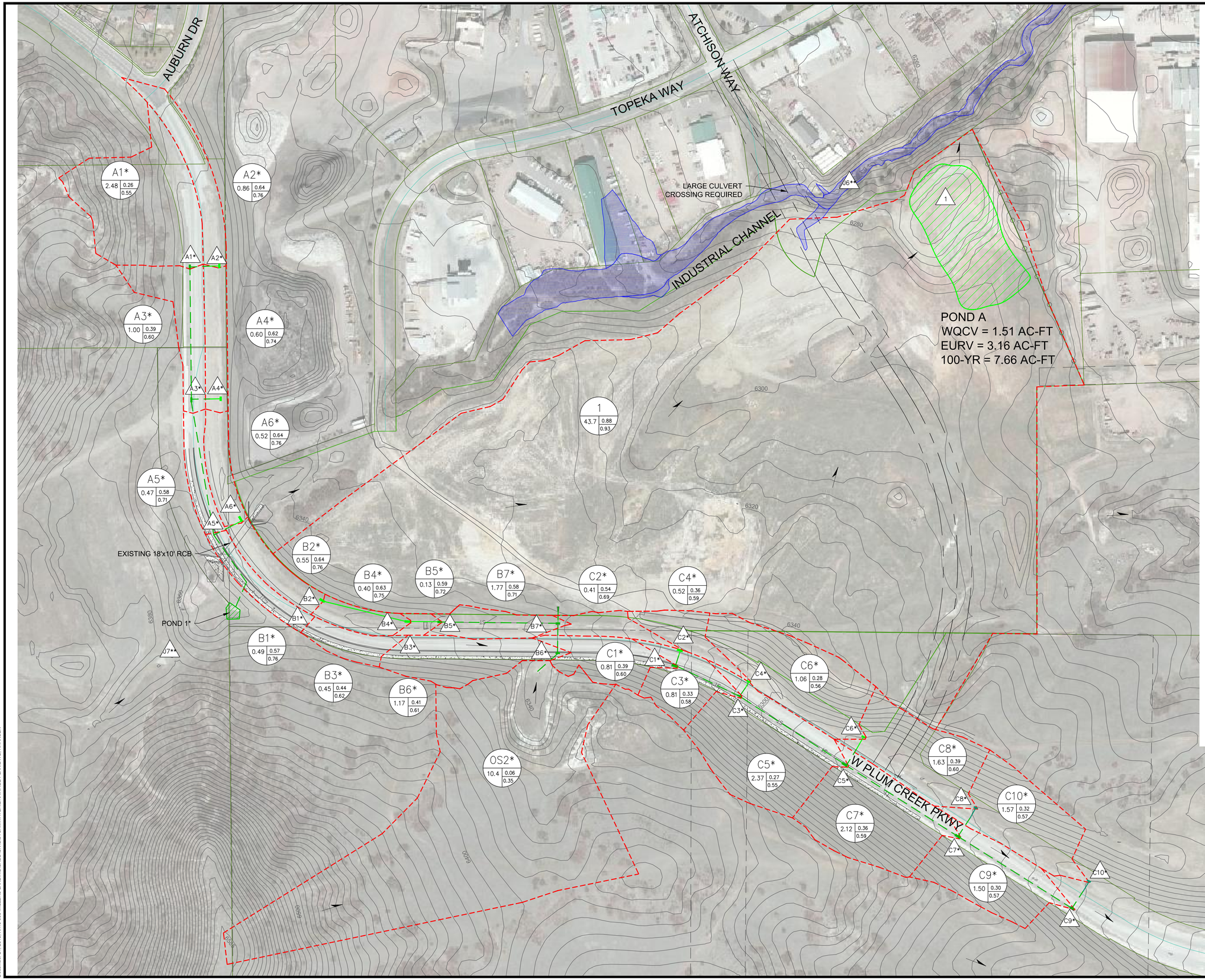
Omni, Industrial and Westfield Watersheds Flood Hazard Area Delineation, CH2MHill, April 2013

Omni, Industrial and Westfield Watershed Master Plan, CH2MHill, January 2011

Phase III Drainage Repot for Coachline Road and Plum Creek Boulevard at I-15, Felsburg Holt & Ullevig, revised March 18, 2009

Town of Castle Rock Storm Drainage Design and Technical Criteria Manual, September 2007, Revised October 2012.

Wildlife and Habitat Survey Citadel Station, Castle Rock, CO 80109, Arcadis, Inc, June 2016.



120 60 0 120 240

SCALE: 1" = 120'

LEGEND

- XX — BASIN DESIGNATION
- BASIN AREA: XX.X — 5 YEAR COEFFICIENTS: XXX; 100 YEAR COEFFICIENTS: XXX
- BASIN BOUNDARY
- DIRECTIONAL FLOW ARROW
- DESIGN POINT
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- FUTURE STORM SEWER
- 100YR FLOOD ZONE
- XXXX — 5FT CONTOUR

DESIGN POINT	BASIN	5-YR Q (CFS)	100-YR Q (CFS)
A1*	A1*	2.9	11.5
A2*	A2*	2.3	4.9
A3*	A3*	1.4	4.0
A4*	A4*	1.5	3.3
A5*	A5*	1.1	2.5
A6*	A6*	1.4	3.1
B1*	B1*	1.1	2.5
B2*	B2*	1.5	3.2
B3*	B3*	0.8	2.1
B4*	B4*	1.1	2.5
B5*	B5*	0.4	0.8
B6*	B6*	1.7	4.6
B7*	B7*	1.5	3.5
OS2*	OS2*	2.1	22.6
--	1	126.5	242.8
1	N/A POND 1 INFLOW	136.7	284.6
C1*	C1*	1.3	3.6
C2*	C2*	0.9	2.1
C3*	C3*	1.1	3.8
C4*	C4*	0.7	2.2
C5*	C5*	2.5	9.8
C6*	C6*	1.9	7.0
C7*	C7*	3.1	9.5
C8*	C8*	2.8	7.9
C9*	C9*	1.8	6.5
C10*	C10*	2.1	7.0
J6**	--	310	850
J7**	--	130	490

* INDICATES FLOW REFERENCED FROM PLUM CREEK STUDY

** INDICATES FLOW REFERENCED FROM INDUSTURIAL TRIBUTARY MASTER PLAN

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Littleton, CO 80120

CORE CONSULTANTS

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CORE ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS (HORIZONTAL AND VERTICAL). THE EXISTING UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE AND ARE FROM THE BEST AVAILABLE INFORMATION. IT IS, HOWEVER, THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE LOCATION AND ELEVATION OF ALL UTILITIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES.

Know what's below. Call before you dig. 811

REVISIONS

#	DESCRIPTION	DATE	BY

MILLERS LANDING
DRAINAGE PLAN
CASTLE ROCK, COLORADO

INITIAL PLAN
RELEASE: 8/15/16
DESIGNED BY: RDH
DRAWN BY: RDH
CHECKED BY: BC

JOB NO. 16-033

SHEET 1 OF 1

December 21, 2015, X:\16-033 MILLERS LANDING\CADD\CIVIL\STORMWATER\DRAINAGE PLAN.DWG, RHANSEN

MEMO

☐	Overnight
☐	Regular Mail
☐	Hand Delivery
☒	Other: E-mail

TO:	Town of Castle Rock Attn: Barbara Horton 175 Kellogg Court Castle Rock, CO 80109
FROM:	Madison Stewart, EI and Deb Ohlinger, PE, CFM
RE:	Industrial Tributary As-Built Conditions Hydraulic Analysis
DATE:	December 16, 2020
PROJECT #:	A18-1719
PHASE:	400
TASK:	400100

This memorandum documents a summary of the findings from the hydraulic analysis of Industrial Tributary Improvements as-built conditions in Castle Rock, Colorado. As part of this project, Olsson was retained by The Town of Castle Rock to conduct a topographic survey of the post-project conditions of the Industrial Tributary improvements and to perform a hydraulic analysis.

In December 2015, Olsson prepared a Phase III Drainage Report for the Prairie Hawk Extension Drainage and Industrial Tributary Channel Improvement Project. The report included hydraulic analysis of the existing and proposed conditions using a HEC-RAS model, version 4.1.0. This model served as the basis for comparison for the post-project conditions analysis, which was also run in version 4.1.0.

Olsson prepared final construction documents for the Industrial Tributary Stabilization Project in October 2019. An as-built topographic survey was completed in November 2020 and was combined with the December 2014 topographic survey that was used for design.

As anticipated, the water surface elevations mostly increased along the project reach due to raising the channel bottom. A summary of findings and HEC-RAS output tables for the 100-year storm event are attached. A figure depicting the pre-project, proposed, and post-project floodplains is also attached.

1525 Raleigh Street / Suite 400 / Denver, CO 80204
O 303.237.2072 / **olsson.com**

BFE Comparison Table

Project Name :	**Industrial Tributary Improvements**
Flooding Source:	**Industrial Tributary**
Company:	**Olsson**
Completed By:	**Madison Stewart**

SOURCE DATA					COMPARISONS		
HYDRAULIC CROSS-SECTION INFO.		BASE FLOOD ELEVATIONS (NAVD88)					
Cross-Section ID	Proposed River Station	Pre-Project	Proposed	Post-Project	Proposed vs Pre-Project	Post-Project vs Proposed	Post-Project vs Pre-Project
		BFE	BFE	BFE	BFE	BFE	BFE
61	12163.65	6284.45	6284.45	6284.45	0.00	0.00	0.00
60	11934.12	6273.93	6271.74	6273.93	-2.19	2.19	0.00
59	11908.54	6270.42	6265.34	6270.42	-5.08	5.08	0.00
58	11878.54	6269.76	6264.68	6269.76	-5.08	5.08	0.00
57	11854.54	6268.64	6262.69	6268.64	-5.95	5.95	0.00
56	11659.99	6250.84	6259.46	6250.84	8.62	-8.62	0.00
55	11635.99	6250.23	6253.45	6250.21	3.22	-3.24	-0.02
54	11605.99	6248.08	6252.79	6248.07	4.71	-4.72	-0.01
53	11581.99	6247.11	6248.29	6247.09	1.18	-1.20	-0.02
52	11551.99	6246.31	6247.2	6246.32	0.89	-0.88	0.01
51	11524.60	6244.73	6245.1	6245.03	0.37	-0.07	0.30
50	11489.70	--	6244.58	6244.36	--	-0.22	--
49	11489.60	6244.28	6244.29	6244.28	0.01	-0.01	0.00
48	11369.99	6240.7	6241.94	6240.71	1.24	-1.23	0.01
47	11191.23	6236.71	6241.08	6239.18	4.37	-1.90	2.47
46	11141.39	6234.9	6239.38	6238.46	4.48	-0.92	3.56
45	11141.19	--	6237.66	6237.42	--	-0.24	--
44	11116.49	--	6237.82	6236.21	--	-1.61	--
43	11116.39	6233.83	6236.86	6236.21	3.03	-0.65	2.38
42	11103.47	6233.31	6236.4	6235.26	3.09	-1.14	1.95
41	11090.03	6231.83	6235.8	6234.97	3.97	-0.83	3.14
40	11089.83	--	6235.06	6234.84	--	-0.22	--
39	11065.13	--	6234.97	6234.93	--	-0.04	--
38	11065.03	6231.52	6234.5	6234.8	2.98	0.30	3.28
37	10937.21	6229.99	6233.96	6233.11	3.97	-0.85	3.12
36	10830.00	6225.84	6231.89	6230.25	6.05	-1.64	4.41
35	10829.80	--	6231.38	6229.88	--	-1.50	--
34	10805.10	--	6231.23	6229.89	--	-1.34	--
33	10805.00	6225.3	6230.19	6229.88	4.89	-0.31	4.58
32	10759.06	6223.2	6229.54	6228.73	6.34	-0.81	5.53

SOURCE DATA					COMPARISONS		
HYDRAULIC CROSS-SECTION INFO.		BASE FLOOD ELEVATIONS (NAVD88)					
Cross-Section ID	Proposed River Station	Pre-Project	Proposed	Post-Project	Proposed vs Pre-Project	Post-Project vs Proposed	Post-Project vs Pre-Project
		BFE	BFE	BFE	BFE	BFE	BFE
31	10700.00	6222.57	6228.06	6226.75	5.49	-1.31	4.18
30	10699.80	--	6227.12	6226.73	--	-0.39	--
29	10675.10	--	6227.04	6226.59	--	-0.45	--
28	10675.00	6222.71	6226.52	6226.58	3.81	0.06	3.87
27	10651.94	6222.8	6226.48	6225.51	3.68	-0.97	2.71
26	10625.00	6221.99	6225.37	6223.19	3.38	-2.18	1.20
25	10624.80	--	6224.28	6223.08	--	-1.20	--
24	10600.10	--	6224.25	6223.27	--	-0.98	--
23	10600.00	6222.26	6223.51	6223.27	1.25	-0.24	1.01
22	10570.60	6222.4	6223.48	6222.07	1.08	-1.41	-0.33
21	10540.00	6222.37	6222.3	6222.44	-0.07	0.14	0.07
20	10539.80	--	6222.62	6222.29	--	-0.33	--
19	10515.10	--	6222.55	6222.43	--	-0.12	--
18	10515.00	6222.33	6222.34	6222.43	0.01	0.09	0.10
17	10499.76	6222.35	6222.37	6222.46	0.02	0.09	0.11
16	10485.00	6222.4	6222.42	6222.5	0.02	0.08	0.10
15	10484.79	--	6222.49	6222.51	--	0.02	--
14	10460.10	--	6222.52	6222.5	--	-0.02	--
13	10460.00	6222.47	6222.5	6222.5	0.03	0.00	0.03
12	10349.99	6222.52	6222.52	6222.53	0.00	0.01	0.01
11	10305.03	6222.53	6222.53	6222.53	0.00	0.00	0.00
10	10304.71	--	6222.54	6222.53	--	-0.01	--
9	10280.11	--	6222.52	6222.51	--	-0.01	--
8	10280.01	6222.52	6222.52	6222.51	0.00	-0.01	-0.01
7	10250.00	6222.51	6222.51	6222.5	0.00	-0.01	-0.01
6	10177.07	6222.5	6222.49	6222.5	-0.01	0.01	0.00
5	10128.42	6222.51	6222.51	6222.51	0.00	0.00	0.00
4	10100.48	--	6222.51	6222.51	--	0.00	--
3	10070.52	--	6222.52	6222.52	--	0.00	--
2	10070.42	6222.52	6222.52	6222.52	0.00	0.00	0.00
1	10004.35	6222.52	6222.52	6222.52	0.00	0.00	0.00

HEC-RAS Plan: PRE Ex DS River: Industrial Trib Reach: 1 Profile: 100-YR Future

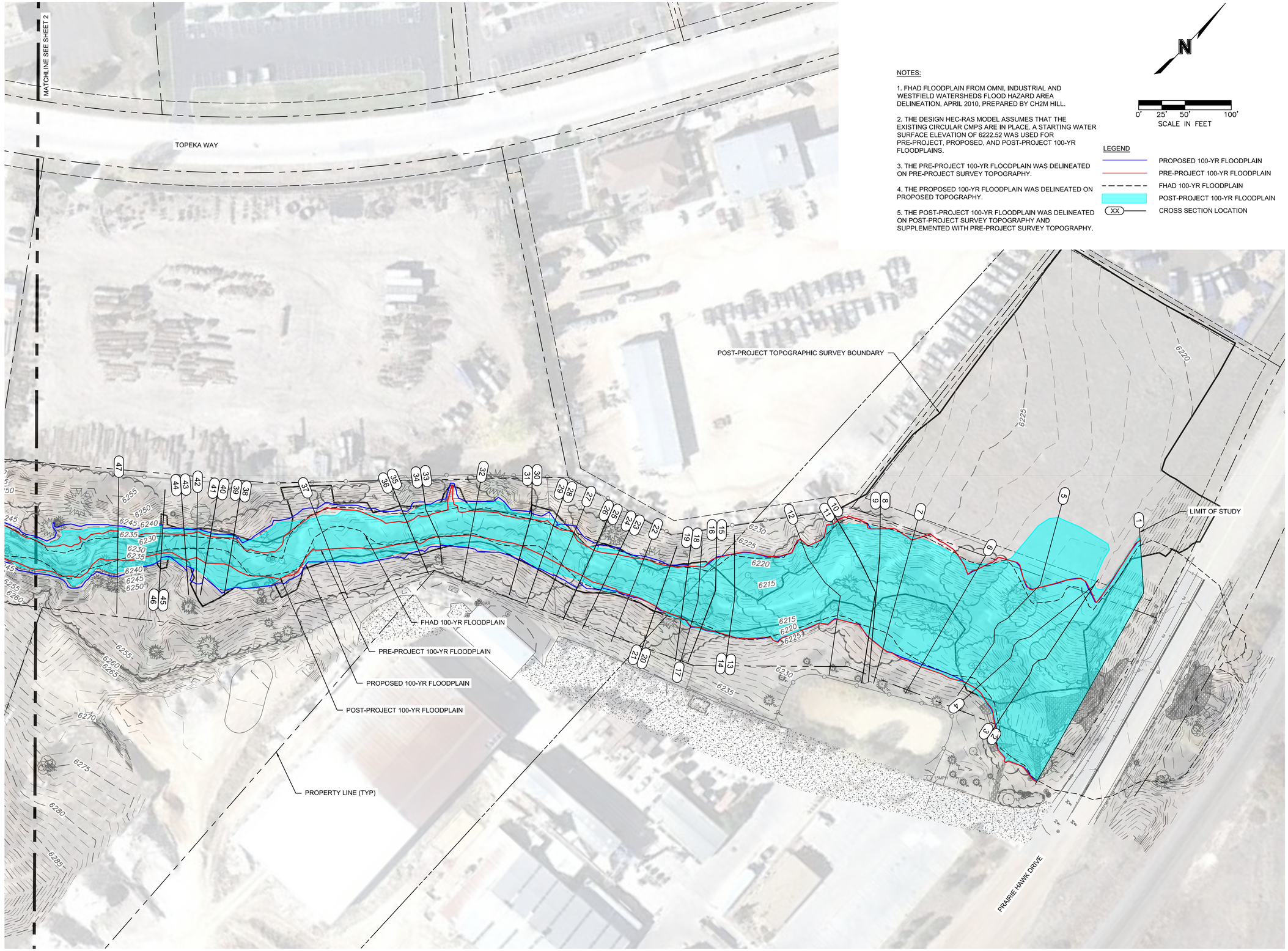
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	61	100-YR Future	852.00	6280.82	6284.45	6284.45	6285.67	0.013985	8.88	95.92	39.68	1.01
1	60	100-YR Future	852.00	6267.71	6273.93	6273.93	6275.60	0.014225	10.39	82.01	24.65	1.00
1	59	100-YR Future	852.00	6266.92	6270.42	6270.42	6271.66	0.013740	8.94	95.31	38.49	1.00
1	58	100-YR Future	852.00	6265.05	6269.76	6269.76	6271.13	0.014477	9.38	90.80	33.93	1.01
1	57	100-YR Future	852.00	6265.15	6268.64	6268.64	6270.00	0.013675	9.34	91.24	33.80	1.00
1	56	100-YR Future	1162.00	6243.73	6250.84	6250.84	6252.77	0.014026	11.13	104.45	27.21	1.00
1	55	100-YR Future	1162.00	6241.67	6250.23	6250.23	6252.32	0.016821	11.60	100.19	24.36	1.01
1	54	100-YR Future	1162.00	6239.25	6248.08		6249.37	0.007482	9.15	127.06	24.31	0.70
1	53	100-YR Future	1162.00	6238.29	6247.11	6246.76	6249.06	0.013162	11.19	103.84	22.38	0.92
1	52	100-YR Future	1162.00	6237.86	6246.31	6246.31	6248.58	0.016963	12.11	95.99	21.32	1.01
1	51	100-YR Future	1162.00	6236.91	6244.73	6244.73	6247.14	0.016399	12.45	93.35	19.87	1.01
1	49	100-YR Future	1162.00	6235.95	6244.28	6244.28	6246.32	0.016181	11.44	101.56	25.27	1.01
1	48	100-YR Future	1162.00	6231.82	6240.70	6240.70	6242.44	0.016484	10.59	109.76	32.10	1.01
1	47	100-YR Future	1162.00	6226.47	6236.71	6236.71	6238.51	0.018057	10.76	107.97	30.46	1.01
1	46	100-YR Future	1162.00	6225.16	6234.90	6234.90	6237.16	0.018832	12.07	96.27	21.36	1.00
1	43	100-YR Future	1162.00	6224.74	6233.83	6233.83	6235.75	0.017049	11.13	104.38	28.11	1.01
1	42	100-YR Future	1162.00	6224.54	6233.31	6233.31	6235.33	0.015888	11.39	102.13	27.25	1.01
1	41	100-YR Future	1162.00	6224.31	6231.83	6231.83	6233.67	0.014850	10.87	106.88	29.21	1.00
1	38	100-YR Future	1162.00	6223.77	6231.52		6232.71	0.006138	8.82	135.90	29.49	0.67
1	37	100-YR Future	1162.00	6220.79	6229.99	6229.99	6231.51	0.015109	9.93	118.11	40.12	1.00
1	36	100-YR Future	1162.00	6218.51	6225.84	6225.59	6227.79	0.013343	11.21	103.65	23.23	0.94
1	33	100-YR Future	1162.00	6218.08	6225.30	6225.30	6227.41	0.014684	11.66	99.92	24.82	1.00
1	32	100-YR Future	1162.00	6216.79	6223.20	6223.20	6225.18	0.014028	11.30	102.81	26.37	1.01
1	31	100-YR Future	1162.00	6215.69	6222.57	6222.24	6224.11	0.010904	9.96	116.66	30.68	0.90
1	28	100-YR Future	1162.00	6215.27	6222.71		6223.73	0.006210	8.09	143.70	33.97	0.69
1	27	100-YR Future	1162.00	6214.90	6222.80		6223.54	0.004015	6.90	168.41	36.59	0.57
1	26	100-YR Future	1162.00	6214.53	6221.99		6223.33	0.008817	9.27	125.31	30.15	0.80
1	23	100-YR Future	1162.00	6214.07	6222.26		6222.99	0.004040	6.86	169.36	36.56	0.56
1	22	100-YR Future	1162.00	6213.54	6222.40		6222.82	0.001797	5.19	224.21	41.67	0.39
1	21	100-YR Future	1162.00	6212.98	6222.37		6222.76	0.001681	5.01	233.61	46.11	0.38
1	18	100-YR Future	1162.00	6212.50	6222.33		6222.72	0.001325	5.10	252.43	56.66	0.34
1	17	100-YR Future	1162.00	6212.25	6222.35		6222.69	0.001139	4.84	278.96	65.36	0.32
1	16	100-YR Future	1162.00	6211.91	6222.40		6222.65	0.000767	4.13	332.97	78.45	0.27
1	13	100-YR Future	1162.00	6211.40	6222.47		6222.60	0.000360	3.07	454.51	89.26	0.19
1	12	100-YR Future	1162.00	6209.64	6222.52		6222.56	0.000072	1.68	767.30	101.56	0.09
1	11	100-YR Future	1162.00	6208.63	6222.53		6222.55	0.000035	1.12	1088.35	136.66	0.06
1	8	100-YR Future	1162.00	6207.87	6222.52		6222.55	0.000044	1.41	951.87	120.89	0.07
1	7	100-YR Future	1162.00	6207.11	6222.51		6222.54	0.000060	1.43	886.53	121.74	0.08
1	6	100-YR Future	1162.00	6205.51	6222.50		6222.54	0.000073	1.69	821.73	121.73	0.09
1	5	100-YR Future	1162.00	6204.23	6222.51		6222.53	0.000024	1.02	1176.68	131.82	0.05
1	2	100-YR Future	1162.00	6202.75	6222.52		6222.53	0.000013	0.90	1528.15	181.11	0.04
1	1	100-YR Future	1162.00	6200.35	6222.52	6206.22	6222.52	0.000004	0.59	3288.09	291.22	0.02

HEC-RAS Plan: PROTOPO Ex DS River: Industrial Trib Reach: 1 Profile: 100-YR Future

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	61	100-YR Future	852.00	6280.82	6284.45	6284.45	6285.68	0.028550	8.90	95.69	39.45	1.01
1	60	100-YR Future	852.00	6267.88	6271.74	6271.74	6272.98	0.028561	8.93	95.42	39.26	1.01
1	59	100-YR Future	852.00	6261.38	6265.34	6265.34	6266.67	0.026965	9.26	92.33	36.38	0.99
1	58	100-YR Future	852.00	6261.39	6264.68	6264.68	6265.73	0.022517	8.65	113.75	57.84	0.92
1	57	100-YR Future	852.00	6255.35	6262.69	6259.21	6262.89	0.002041	3.55	239.88	50.02	0.29
1	56.5		Culvert									
1	56	100-YR Future	1162.00	6254.81	6259.46	6259.46	6261.08	0.025960	10.22	113.70	47.00	1.01
1	55	100-YR Future	1162.00	6248.81	6253.45	6253.35	6254.89	0.024637	9.64	120.59	39.68	0.97
1	54	100-YR Future	1162.00	6248.71	6252.79	6252.79	6254.13	0.023886	9.41	130.64	52.81	0.96
1	53	100-YR Future	1162.00	6242.70	6248.29	6247.28	6249.16	0.008903	7.73	169.15	49.71	0.63
1	52	100-YR Future	1162.00	6242.46	6247.20	6247.20	6248.70	0.020829	10.40	129.60	45.02	0.91
1	51	100-YR Future	1162.00	6235.78	6245.10		6245.55	0.003452	5.32	218.96	35.38	0.32
1	50	100-YR Future	1162.00	6235.68	6244.58		6245.34	0.007411	7.00	166.10	20.79	0.44
1	49	100-YR Future	1162.00	6236.69	6244.29		6245.32	0.010655	8.11	143.21	20.75	0.54
1	48	100-YR Future	1162.00	6236.32	6241.94	6241.77	6243.46	0.023244	10.82	124.35	36.40	0.91
1	47	100-YR Future	1162.00	6235.78	6241.08		6241.51	0.004776	5.29	221.37	54.67	0.45
1	46	100-YR Future	1162.00	6235.64	6239.38	6239.38	6240.93	0.027088	9.97	116.50	38.06	1.00
1	45	100-YR Future	1162.00	6231.14	6237.66		6238.83	0.012609	8.85	140.69	31.65	0.61
1	44	100-YR Future	1162.00	6231.07	6237.82	6235.90	6238.42	0.007506	6.19	187.60	59.88	0.52
1	43	100-YR Future	1162.00	6232.57	6236.86	6236.86	6238.33	0.028607	9.74	119.29	39.68	0.99
1	42	100-YR Future	1162.00	6232.53	6236.40	6236.12	6237.35	0.021277	7.83	148.43	59.16	0.87
1	41	100-YR Future	1162.00	6232.49	6235.80	6235.80	6237.00	0.028468	8.79	132.16	55.15	1.00
1	40	100-YR Future	1162.00	6227.99	6235.06		6235.63	0.004964	6.16	205.39	47.21	0.41
1	39	100-YR Future	1162.00	6227.91	6234.97		6235.49	0.005113	6.25	229.65	61.59	0.42
1	38	100-YR Future	1162.00	6229.41	6234.50		6235.45	0.012565	8.49	170.28	59.67	0.67
1	37	100-YR Future	1162.00	6229.03	6233.96		6234.33	0.004811	4.92	236.26	62.06	0.44
1	36	100-YR Future	1162.00	6228.71	6231.89	6231.89	6233.21	0.027613	9.21	126.18	48.33	1.00
1	35	100-YR Future	1162.00	6224.21	6231.38		6231.92	0.004730	6.05	210.96	45.95	0.40
1	34	100-YR Future	1162.00	6224.13	6231.23		6231.79	0.005381	6.31	212.89	52.07	0.42
1	33	100-YR Future	1162.00	6225.63	6230.19	6230.19	6231.70	0.021643	10.13	128.92	47.27	0.84
1	32	100-YR Future	1162.00	6225.49	6229.54	6228.62	6230.28	0.010639	6.94	169.26	50.61	0.65
1	31	100-YR Future	1162.00	6225.32	6228.06	6228.06	6229.27	0.028156	8.84	131.44	54.29	1.00
1	30	100-YR Future	1162.00	6220.82	6227.12		6227.53	0.003766	5.22	234.01	50.47	0.37
1	29	100-YR Future	1162.00	6220.74	6227.04		6227.44	0.003630	5.14	241.01	56.12	0.36
1	28	100-YR Future	1162.00	6222.24	6226.52		6227.39	0.011768	7.54	162.21	54.00	0.65
1	27	100-YR Future	1162.00	6222.16	6226.48		6227.07	0.009192	6.16	188.77	57.50	0.60
1	26	100-YR Future	1162.00	6222.09	6225.37	6225.37	6226.60	0.028272	8.91	130.36	53.54	1.01
1	25	100-YR Future	1162.00	6217.59	6224.28		6224.97	0.006532	6.76	185.06	43.74	0.47
1	24	100-YR Future	1162.00	6217.52	6224.25		6224.78	0.004744	5.92	213.81	49.99	0.41
1	23	100-YR Future	1162.00	6219.02	6223.51	6222.94	6224.71	0.016208	8.90	139.20	44.29	0.74
1	22	100-YR Future	1162.00	6218.92	6223.48		6224.20	0.009874	6.82	170.37	45.92	0.62
1	21	100-YR Future	1162.00	6218.84	6222.30	6222.30	6223.66	0.027831	9.36	124.11	46.01	1.00
1	20	100-YR Future	1162.00	6214.34	6222.62		6223.03	0.002990	5.29	245.97	48.58	0.33
1	19	100-YR Future	1162.00	6214.26	6222.55		6222.95	0.003078	5.31	257.42	57.73	0.33
1	18	100-YR Future	1162.00	6215.76	6222.34		6222.93	0.005411	6.49	212.80	56.23	0.45
1	17	100-YR Future	1162.00	6215.71	6222.37		6222.82	0.003746	5.62	241.34	65.52	0.41
1	16	100-YR Future	1162.00	6215.67	6222.42		6222.73	0.002418	4.68	293.94	79.31	0.33
1	15	100-YR Future	1162.00	6211.17	6222.49		6222.70	0.001283	4.06	382.14	80.18	0.21
1	14	100-YR Future	1162.00	6211.10	6222.52		6222.65	0.000870	3.39	466.83	89.16	0.18
1	13	100-YR Future	1162.00	6212.60	6222.50		6222.65	0.001055	3.67	438.12	89.06	0.21
1	12	100-YR Future	1162.00	6212.27	6222.52		6222.58	0.000224	1.90	679.05	101.61	0.11
1	11	100-YR Future	1162.00	6212.13	6222.53		6222.56	0.000132	1.51	932.12	137.03	0.09
1	10	100-YR Future	1162.00	6207.63	6222.54		6222.56	0.000174	1.55	980.63	137.52	0.07
1	9	100-YR Future	1162.00	6207.56	6222.52		6222.55	0.000249	1.83	835.11	120.14	0.08
1	8	100-YR Future	1162.00	6209.05	6222.52		6222.55	0.000255	1.92	822.81	120.18	0.09
1	7	100-YR Future	1162.00	6208.96	6222.51		6222.55	0.000142	1.59	867.83	121.72	0.09
1	6	100-YR Future	1162.00	6208.75	6222.49		6222.54	0.000087	1.79	777.30	118.77	0.10
1	5	100-YR Future	1162.00	6208.60	6222.51		6222.53	0.000032	1.12	1072.59	131.76	0.06
1	4	100-YR Future	1162.00	6201.60	6222.51		6222.53	0.000013	0.94	1525.18	165.70	0.04
1	3	100-YR Future	1162.00	6201.51	6222.52		6222.53	0.000009	0.83	1750.30	180.83	0.04
1	2	100-YR Future	1162.00	6202.52	6222.52		6222.52	0.000009	0.72	1735.45	180.85	0.03
1	1	100-YR Future	1162.00	6200.35	6222.52	6206.19	6222.52	0.000004	0.48	3294.56	291.46	0.02

HEC-RAS Plan: POST River: Industrial Trib Reach: 1 Profile: 100-YR Future

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	61	100-YR Future	852.00	6280.82	6284.45	6284.45	6285.67	0.013985	8.88	95.92	39.68	1.01
1	60	100-YR Future	852.00	6267.71	6273.93	6273.93	6275.60	0.014225	10.39	82.01	24.65	1.00
1	59	100-YR Future	852.00	6266.92	6270.42	6270.42	6271.66	0.013740	8.94	95.31	38.49	1.00
1	58	100-YR Future	852.00	6265.05	6269.76	6269.76	6271.13	0.014477	9.38	90.80	33.93	1.01
1	57	100-YR Future	852.00	6265.15	6268.64	6268.64	6270.00	0.013675	9.34	91.24	33.80	1.00
1	56	100-YR Future	1162.00	6243.73	6250.84	6250.84	6252.77	0.014031	11.13	104.43	27.20	1.00
1	55	100-YR Future	1162.00	6241.67	6250.21	6250.21	6252.32	0.016996	11.64	99.82	24.33	1.01
1	54	100-YR Future	1162.00	6239.25	6248.07		6249.37	0.007500	9.15	126.94	24.29	0.71
1	53	100-YR Future	1162.00	6238.29	6247.09	6246.77	6249.05	0.013326	11.24	103.37	22.34	0.92
1	52	100-YR Future	1162.00	6237.86	6246.32	6246.32	6248.58	0.016856	12.07	96.25	21.37	1.00
1	51	100-YR Future	1162.00	6236.91	6245.03	6244.74	6247.15	0.014312	11.69	99.36	21.08	0.95
1	50	100-YR Future	1162.00	6235.95	6244.36	6244.36	6246.38	0.033014	11.40	101.89	25.53	1.01
1	49	100-YR Future	1162.00	6235.95	6244.28	6244.28	6246.32	0.016195	11.45	101.52	25.26	1.01
1	48	100-YR Future	1162.00	6231.82	6240.71	6240.71	6242.44	0.016425	10.57	109.90	32.12	1.01
1	47	100-YR Future	1162.00	6226.47	6239.18		6239.67	0.003362	5.63	206.33	47.29	0.48
1	46	100-YR Future	1162.00	6231.47	6238.46		6239.35	0.011324	7.56	153.61	38.33	0.67
1	45	100-YR Future	1162.00	6231.35	6237.42	6237.42	6239.25	0.020252	11.35	116.77	34.08	0.92
1	44	100-YR Future	1162.00	6230.28	6236.21	6234.87	6236.97	0.009186	6.99	166.20	40.57	0.61
1	43	100-YR Future	1162.00	6230.29	6236.21	6234.88	6236.97	0.009217	6.99	166.23	40.71	0.61
1	42	100-YR Future	1162.00	6231.06	6235.26	6235.26	6236.71	0.027344	9.68	120.00	41.61	1.00
1	41	100-YR Future	1162.00	6227.18	6234.97		6235.49	0.006204	5.79	200.79	45.94	0.49
1	40	100-YR Future	1162.00	6227.11	6234.84		6235.48	0.004906	6.60	198.01	45.19	0.45
1	39	100-YR Future	1162.00	6227.68	6234.93		6235.30	0.003227	4.91	245.54	58.64	0.38
1	38	100-YR Future	1162.00	6227.72	6234.80		6235.29	0.003564	6.07	237.14	57.50	0.42
1	37	100-YR Future	1162.00	6229.48	6233.11	6233.11	6234.40	0.027550	9.13	127.30	49.65	1.00
1	36	100-YR Future	1162.00	6223.47	6230.25		6231.14	0.012045	7.56	153.61	40.27	0.68
1	35	100-YR Future	1162.00	6223.38	6229.88		6231.11	0.011433	9.13	140.95	37.87	0.69
1	34	100-YR Future	1162.00	6224.07	6229.89		6230.76	0.007893	7.71	168.25	44.66	0.59
1	33	100-YR Future	1162.00	6224.09	6229.88		6230.76	0.008049	7.77	167.15	44.58	0.60
1	32	100-YR Future	1162.00	6224.60	6228.73	6228.73	6230.09	0.027567	9.35	124.24	46.44	1.01
1	31	100-YR Future	1162.00	6219.85	6226.75		6227.27	0.006068	5.79	200.65	46.02	0.49
1	30	100-YR Future	1162.00	6219.81	6226.73		6227.27	0.004851	5.96	203.47	45.84	0.45
1	29	100-YR Future	1162.00	6220.77	6226.59		6227.15	0.004872	6.19	210.25	54.42	0.47
1	28	100-YR Future	1162.00	6220.81	6226.58		6227.15	0.005019	6.25	208.32	54.29	0.48
1	27	100-YR Future	1162.00	6221.37	6225.51	6225.51	6226.84	0.026407	9.26	125.54	46.04	0.99
1	26	100-YR Future	1162.00	6215.65	6223.19		6224.05	0.011473	7.45	156.06	38.55	0.65
1	25	100-YR Future	1162.00	6215.56	6223.08		6224.04	0.008630	7.96	156.41	37.88	0.58
1	24	100-YR Future	1162.00	6215.94	6223.27		6223.77	0.003591	5.73	217.08	45.91	0.40
1	23	100-YR Future	1162.00	6215.95	6223.27		6223.77	0.003610	5.75	216.69	45.92	0.40
1	22	100-YR Future	1162.00	6217.77	6222.07	6221.93	6223.46	0.023834	9.47	122.73	39.71	0.95
1	21	100-YR Future	1162.00	6214.08	6222.44		6222.89	0.004894	5.41	214.77	45.86	0.44
1	20	100-YR Future	1162.00	6213.92	6222.29		6222.88	0.003954	6.47	212.57	45.02	0.41
1	19	100-YR Future	1162.00	6213.06	6222.43		6222.73	0.001662	4.63	300.41	57.97	0.28
1	18	100-YR Future	1162.00	6213.06	6222.43		6222.73	0.001657	4.63	300.83	58.08	0.28
1	17	100-YR Future	1162.00	6214.39	6222.46		6222.69	0.001443	3.95	328.92	67.99	0.27
1	16	100-YR Future	1162.00	6210.14	6222.50		6222.64	0.000718	3.20	444.03	81.23	0.18
1	15	100-YR Future	1162.00	6210.07	6222.51		6222.64	0.000695	3.16	449.28	81.38	0.18
1	14	100-YR Future	1162.00	6210.38	6222.50		6222.62	0.000576	3.22	495.79	89.48	0.17
1	13	100-YR Future	1162.00	6210.41	6222.50		6222.62	0.000578	3.23	495.36	89.52	0.17
1	12	100-YR Future	1162.00	6210.55	6222.53		6222.57	0.000165	1.67	749.02	101.63	0.09
1	11	100-YR Future	1162.00	6206.59	6222.53		6222.56	0.000098	1.27	978.22	132.71	0.07
1	10	100-YR Future	1162.00	6206.52	6222.53		6222.56	0.000146	1.71	978.60	132.81	0.08
1	9	100-YR Future	1162.00	6207.07	6222.51		6222.55	0.000169	2.05	864.69	120.48	0.10
1	8	100-YR Future	1162.00	6207.08	6222.51		6222.55	0.000169	2.05	864.88	120.51	0.10
1	7	100-YR Future	1162.00	6208.92	6222.50		6222.55	0.000182	1.96	786.19	124.16	0.10
1	6	100-YR Future	1162.00	6207.84	6222.50		6222.54	0.000063	1.53	882.23	128.62	0.08
1	5	100-YR Future	1162.00	6207.84	6222.51		6222.53	0.000029	1.08	1156.68	213.43	0.06
1	4	100-YR Future	1162.00	6200.42	6222.51		6222.53	0.000012	1.01	1542.72	177.57	0.04
1	3	100-YR Future	1162.00	6199.99	6222.52		6222.53	0.000009	0.87	1763.23	188.58	0.04
1	2	100-YR Future	1162.00	6199.99	6222.52		6222.52	0.000009	0.71	1764.28	188.47	0.03
1	1	100-YR Future	1162.00	6197.22	6222.52	6205.61	6222.52	0.000004	0.47	3318.46	295.26	0.02



NOTES:

1. FHAD FLOODPLAIN FROM OMNI, INDUSTRIAL AND WESTFIELD WATERSHEDS FLOOD HAZARD AREA DELINEATION, APRIL 2010, PREPARED BY CH2M HILL.

2. THE DESIGN HEC-RAS MODEL ASSUMES THAT THE EXISTING CIRCULAR CMPS ARE IN PLACE. A STARTING WATER SURFACE ELEVATION OF 6222.52 WAS USED FOR PRE-PROJECT, PROPOSED, AND POST-PROJECT 100-YR FLOODPLAINS.

3. THE PRE-PROJECT 100-YR FLOODPLAIN WAS DELINEATED ON PRE-PROJECT SURVEY TOPOGRAPHY.

4. THE PROPOSED 100-YR FLOODPLAIN WAS DELINEATED ON PROPOSED TOPOGRAPHY.

5. THE POST-PROJECT 100-YR FLOODPLAIN WAS DELINEATED ON POST-PROJECT SURVEY TOPOGRAPHY AND SUPPLEMENTED WITH PRE-PROJECT SURVEY TOPOGRAPHY.

N

0' 25' 50' 100'
SCALE IN FEET

LEGEND

- PROPOSED 100-YR FLOODPLAIN
- PRE-PROJECT 100-YR FLOODPLAIN
- FHAD 100-YR FLOODPLAIN
- POST-PROJECT 100-YR FLOODPLAIN
- XX — CROSS SECTION LOCATION

olsson
1525 Raleigh Street
Suite 400
Denver, CO 80204
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www.olsson.com

NOTE
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REV. NO.	DATE	REVISIONS DESCRIPTION
		REVISIONS

POST-PROJECT FLOODPLAIN FIGURE

INDUSTRIAL TRIBUTARY STABILIZATION
POST-PROJECT HYDRAULIC ANALYSIS

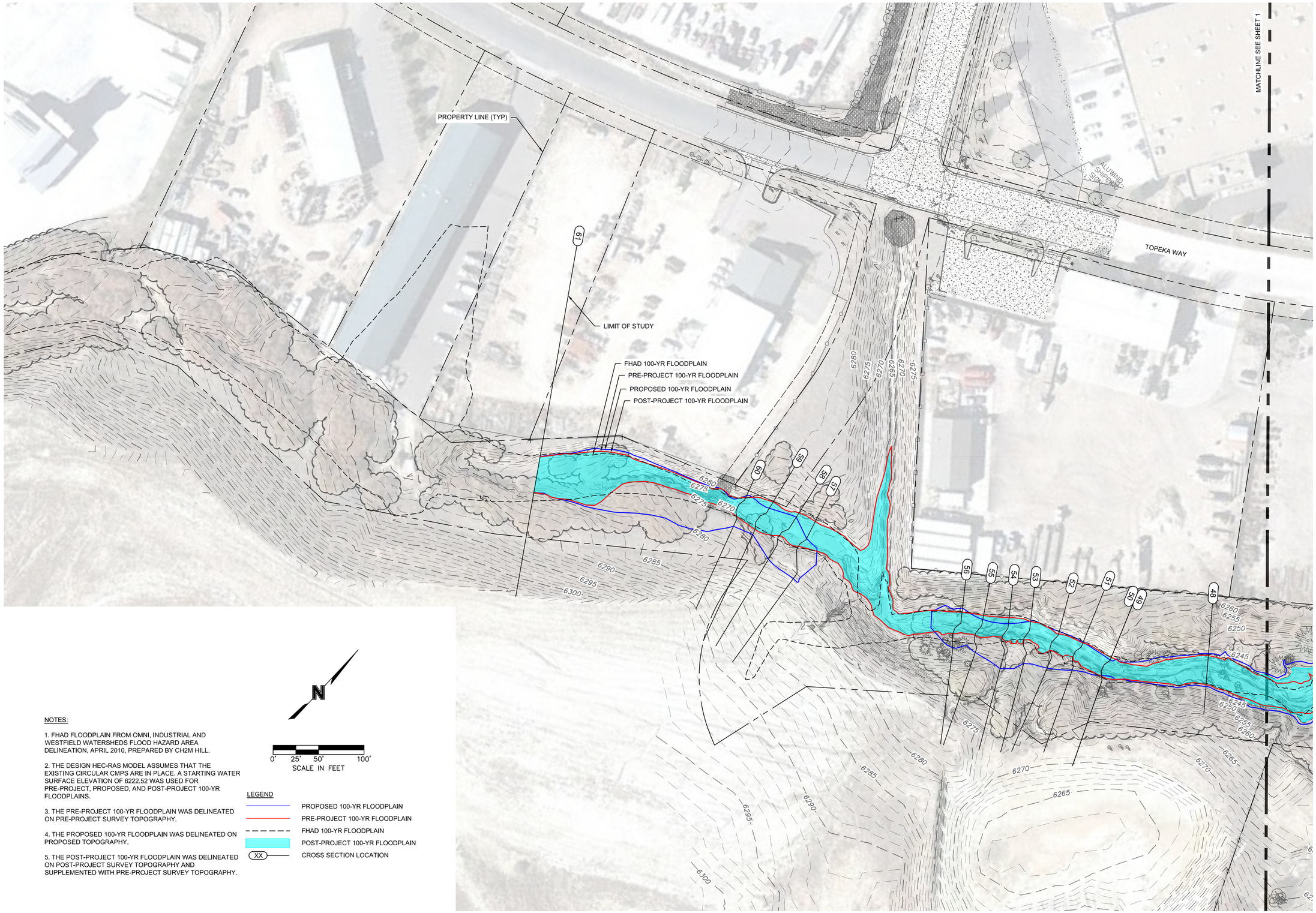
CASTLE ROCK, COLORADO

2020

drawn by:	MS
checked by:	DO
approved by:	DO
QA/QC by:	DO
project no.:	A18-1719
drawing no.:	
date:	12.15.2020

SHEET
1 of 2

DWG: F:\2018\1501-2000\018-1719\40-Design\AutoCAD\Final Plans\Sheets\WTRS\DWG\181719_POSTFLDP.dwg USER: mstewart
DATE: Dec 16, 2020 8:39am XREFS: 13166I_XBASE_50SCALE 13166I_XMAP 13166I_AERIAL 13166I_XUTIL_60SCALE



NOTES:

1. FHAD FLOODPLAIN FROM OMNI, INDUSTRIAL AND WESTFIELD WATERSHEDS FLOOD HAZARD AREA DELINEATION, APRIL 2010, PREPARED BY CH2M HILL.

2. THE DESIGN HEC-RAS MODEL ASSUMES THAT THE EXISTING CIRCULAR CMPS ARE IN PLACE. A STARTING WATER SURFACE ELEVATION OF 6222.52 WAS USED FOR PRE-PROJECT, PROPOSED, AND POST-PROJECT 100-YR FLOODPLAINS.

3. THE PRE-PROJECT 100-YR FLOODPLAIN WAS DELINEATED ON PRE-PROJECT SURVEY TOPOGRAPHY.

4. THE PROPOSED 100-YR FLOODPLAIN WAS DELINEATED ON PROPOSED TOPOGRAPHY.

5. THE POST-PROJECT 100-YR FLOODPLAIN WAS DELINEATED ON POST-PROJECT SURVEY TOPOGRAPHY AND SUPPLEMENTED WITH PRE-PROJECT SURVEY TOPOGRAPHY.

LEGEND

- PROPOSED 100-YR FLOODPLAIN
- PRE-PROJECT 100-YR FLOODPLAIN
- FHAD 100-YR FLOODPLAIN
- POST-PROJECT 100-YR FLOODPLAIN
- XX — CROSS SECTION LOCATION

DWG: F:\2018\1501-2000\018-1719\40-Design\AutoCAD\Final Plans\Sheets\WTRS\DWG\181719_POSTFLDP.dwg USER: mstewart
DATE: Dec 16, 2020 8:36am XREFS: 13166I_XBASE_50SCALE 13166I_XMAP 13166I_AERIAL 13166I_XUTIL_60SCALE

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REV. NO.	DATE	REVISIONS DESCRIPTION
		REVISIONS

POST-PROJECT FLOODPLAIN FIGURE

INDUSTRIAL TRIBUTARY STABILIZATION
POST-PROJECT HYDRAULIC ANALYSIS

CASTLE ROCK, COLORADO

2020

drawn by:	MS
checked by:	DO
approved by:	DO
QA/QC by:	DO
project no.:	A18-1719
drawing no.:	
date:	12.15.2020

SHEET
2 of 2

Castle Rock Water
175 Kellogg Court, Castle Rock CO 80109
720-733-6000

Phase II Drainage Report Checklist

The Phase II Drainage Report must be in conformance with the latest Town of Castle Rock Storm Drainage Design and Technical Criteria Manual available on the Town's website.

The Phase II Drainage Report must be signed and sealed by a Professional Engineer licensed in the State of Colorado. The purpose of the Phase II Drainage Report is to identify and refine conceptual stormwater management solutions to the challenges that may be present or occur on-site and off-site.

The preparer should contact and work with the Town Stormwater Engineering Staff regarding any design, master planning and existing system questions (720-733-6000). The following outline sets forth the **required minimum** content to be provided in the Phase II Drainage Report that shall be submitted with the Planned Development Plan or Straight Zoning documents. A copy of this checklist must be submitted with the Phase II Drainage Report.

Please see Chapter 4 of the Town of Castle Rock Storm Drainage Design and Technical Criteria Manual for additional details and information. Please check off the following items to assure your report is complete. Appropriate notations shall be provided with the checklist. For example, if a specific item is not addressed or not applicable, an explanation needs to be provided.

Included	N/A	
		I. COVER SHEET
✓		A. Name of Project, including legal name of development
✓		B. Address
✓		C. Owner
✓		D. Developer
✓		E. Engineer
✓		F. Submittal date and revision dates as applicable
		II. GENERAL LOCATION AND DESCRIPTION
✓		A. Site Location
✓		B. Description of Property and Land Use
		III. DRAINAGE BASIN AND SUB-BASINS
✓		A. Major Drainage Basins
✓		B. Minor Drainage Basins
		IV. DRAINAGE DESIGN CRITERIA
✓		A. Regulations
✓		B. Drainage Studies, Master Plans, Site Constraints
✓		C. Hydrology
✓		D. Hydraulics
✓		E. Water Quality Enhancement

Phase II Drainage Report Checklist

Included	N/A	
		V. STORMWATER MANAGEMENT FACILITY DESIGN
✓		A. Stormwater Conveyance Facilities
✓		B. Stormwater Storage Facilities
✓		C. Water Quality Enhancement Best Management Practices
✓		D. Floodplain Modification
✓		E. Additional Permitting Requirements
	✓	F. General
		VI. CONCLUSIONS
✓		A. Compliance with Standards
✓		B. Variances
✓		C. Drainage Concept
✓		**VII. REFERENCES**
		VIII. APPENDICES
✓		A. Hydrologic Computations
✓		B. Hydraulic Computations (If known at this time—not required)
✓		C. Water Quality Enhancement Best Management Practices
✓		D. Referenced Information
✓		**OVERALL DRAINAGE PLAN (IN POCKET)**
✓		**DETAILED DRAINAGE PLANS (IN POCKET)**

Notes/Comments:

Operations and Maintenance sections
are included in the report.